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1994 Environmental Monitoring Drinking Water and Nonradiological Effluent Programs Annual Report

**B. D. Andersen
T. A. Brock
T. R. Meachum**

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Published October 1995

**Idaho National Engineering Laboratory
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ABSTRACT

EG&G Idaho, Inc., initiated monitoring programs for drinking water in 1988 and for nonradiological parameters and pollutants in liquid effluents in 1985. These programs were initiated for the facilities operated by EG&G Idaho for the U. S. Department of Energy at the Idaho National Engineering Laboratory. On October 1, 1994, Lockheed Idaho Technologies Company (LITCO) replaced EG&G Idaho as the prime contractor at the INEL and assumed responsibility for these programs. Section 1 discusses the general site characteristics, the analytical laboratories, and sampling methodology general to both programs. Section 2, the Drinking Water Program, tracks the bacteriological, chemical, and radiological parameters required by State and Federal regulations. This section describes the drinking water monitoring activities conducted at 17 LITCO-operated production wells and 11 distribution systems. It also contains all of the drinking water parameters detected and the regulatory limits exceeded during calendar year 1994. In addition, groundwater quality is discussed as it relates to contaminants identified at the wellhead for LITCO production wells. Section 3 discusses the nonradiological liquid effluent monitoring results for 27 liquid effluent streams. These streams are presented with emphasis on calendar year 1994 activities. All parameter measurements and concentrations were below the Resource Conservation and Recovery Act toxic characteristics limits.

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SUMMARY

The 1994 *Environmental Monitoring Drinking Water and Nonradiological Effluent Programs Annual Report* describes the activities of the Drinking Water Program and the Nonradiological Liquid Effluent Monitoring Program for 1994. These activities were performed by Environmental Monitoring at the Idaho National Engineering Laboratory (INEL). Lockheed Idaho Technologies Company (LITCO) replaced EG&G Idaho as the prime contractor at the INEL on October 1, 1994, and assumed responsibility for the Drinking Water Program and the Nonradiological Liquid Effluent Monitoring Program.

The goal of the Compliance Monitoring Program is to comply with Environmental Protection Agency regulations, State of Idaho regulations, and applicable DOE orders.

Drinking Water Program

The Drinking Water Program monitors all drinking water at LITCO-operated facilities located at the INEL. During 1994, personnel conducted sampling at 17 production wells and 11 distribution systems. Drinking water was monitored and analyzed for bacteriological, radiological, and chemical constituents. This annual report lists all drinking water parameters that were detected and the regulatory limits that were exceeded during calendar year 1994.

All samples were analyzed using approved drinking water methods listed in the Code of Federal Regulations (40 CFR parts 141-143).¹ Analysis was conducted by laboratories which are certified in the State of Idaho for drinking water analysis or which have reciprocity with the State of Idaho. Each laboratory used to perform analysis was also audited and reviewed by LITCO personnel to ensure it would meet the requirements of the Drinking Water Program.

Under the Safe Drinking Water Act,² maximum contaminant levels (MCL) have been established for drinking water standards at health-based levels. All analytical results produced by the LITCO program are compared against these MCLs to ensure adherence to the regulations. The only parameters that were exceeded in 1994 were trichloroethylene (TCE) at the Water Reactor Research Test Facility (WRRTF) and Technical Support Facility (TSF) and coliform bacteria [no *Escherichia coli* (*E. coli*)] at Main Gate, Containment Test Facility, Test Reactor Area, Radioactive Waste Management Complex, and TSF distribution systems.

The WRRTF water system is an inactive system and is not used for human consumption. Personnel at this area are supplied with bottled water. The only use of the WRRTF well is for monitoring groundwater quality.

In 1994, water samples collected at the wellhead of the Test Area North (TAN)/TSF #1 well exceeded the MCL established for TCE. Since 1988 when TCE was initially found to exceed the MCL, a sparger system (air stripping process) was installed to volatilize the TCE from the TAN/TSF water system prior to the water's point of entry into the distribution system. This process has reduced the TCE concentration to levels below the MCL.

Analytical results from samples collected directly from the TAN/TSF #1 well are used for groundwater quality assessment only, not for drinking water compliance purposes. Compliance samples are collected from the distribution system. MCLs for TCE have not been exceeded in the distribution system since 1988 when the sparger system was installed.

Coliform bacteria exceedances generally have been isolated incidents. Some detections were related to water line deterioration and stagnant water, and resampling of these areas normally indicated compliance with the MCL. If resamples indicated presence of coliform bacteria, the system was tagged out of service and disinfected. After disinfecting a tagged-out system, samples were then collected for three consecutive days, and these samples had to test negative for total coliform bacteria and *E. coli* before the water system could be placed back into service for human consumption.

Effluent Monitoring

The Nonradiological Effluent Monitoring Program monitors radiological and nonradiological effluent discharges at selected facilities located at the INEL. For the purpose of this report, only the nonradiological data will be reported. Both radiological and nonradiological effluent data will be reported in the 1995 Annual report. During 1994, sampling was conducted at 27 effluent discharge points. Some parameters were changed from 1993 to accommodate new regulations and to reflect changing processes at the INEL. Sampling design is reviewed on an ongoing basis to ensure proper characterization and representation of the various processes and streams. Twenty-four hour composite samplers are currently being used at all possible locations. Grab sampling is still employed at certain areas because of either inaccessibility to the effluent stream or the nature of the discharge.

All analyses performed on effluent samples were analyzed using methods described in 40 CFR 136.³ Depending upon the sample matrix, equivalent EPA-approved methods in EPA-SW-846⁴ were sometimes used. All analyses for 1994 were conducted by Roy F. Weston laboratories in Lionville, Pennsylvania.

As in previous years, the concentrations of all monitored LITCO site liquid effluent parameters were within Resource Conservation and Recovery Act limits for hazardous waste. The concentrations of liquid parameters monitored at the Idaho Falls facilities were within the criteria of the City of Idaho Falls Industrial Wastewater Acceptance agreements,⁵ with the exception of silver analysis at the Willow Creek Building.

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CONTENTS

ABSTRACT	iii
SUMMARY	v
ACKNOWLEDGMENTS	vii
ACRONYMS	xv
1. INTRODUCTION	1
1.1 Site Description	1
1.2 SRPA Hydrochemistry	3
1.2.1 Test Area North	3
1.2.2 Aquifer South of Test Reactor Area and the Idaho Chemical Processing Plant	4
1.2.3 Radioactive Waste Management Complex	4
1.3 Analytical Laboratories	4
1.4 General Analytical and Sampling Design and Methodology Information	5
1.4.1 Sample Collection Procedures and Methods	5
1.4.2 Sample Containers and Sample Preservation	5
1.4.3 Sample Integrity and Handling	5
2. DRINKING WATER PROGRAM	7
2.1 Drinking Water Program Analytical and Sampling Design and Methodology	10
2.1.1 Standard Operating Procedures	10
2.1.2 Training	10
2.1.3 Analytical Methods	10
2.1.4 Quality Control	11
2.1.5 Data Validation	11
2.2 Drinking Water Program Quality Assurance	11
2.2.1 Conclusion	14
2.3 Drinking Water Program Data Summary and Assessment	14
2.3.1 Locations and Summary of Results	14
2.3.2 Trichloroethylene	15
2.3.3 Tritium	15
2.3.4 Central Facilities Area	29
2.3.5 Main Gate	29
2.3.6 Power Burst Facility	32

2.3.7	Experimental Breeder Reactor No. I	32
2.3.8	Gun Range	32
2.3.9	Fire Station #2 (Inactive)	35
2.3.10	Test Reactor Area	35
2.3.11	Test Area North	37
2.3.12	Radioactive Waste Management Complex	42
3.	NONRADIOLOGICAL LIQUID EFFLUENT MONITORING PROGRAM	45
3.1	Nonradiological Liquid Effluent Monitoring Program Analytical and Sampling Design and Methodology	45
3.2	Nonradiological Liquid Effluent Monitoring Program Quality Assurance	50
3.2.1	Conclusion	50
3.3	Nonradiological Liquid Effluent Monitoring Program Data Summary and Assessment ...	50
3.3.1	Effluent Stream Descriptions and Data	50
3.3.2	Locations and Summary of Results	51
3.3.3	Central Facilities Area	52
3.3.4	Test Reactor Area	53
3.3.5	Test Area North	54
3.3.6	Idaho Falls	55
4.	REFERENCES	59
Appendix A		A-1
Appendix B		B-1
Appendix C		C-1

FIGURES

1.	Location map of selected facilities at the Idaho National Engineering Laboratory	2
2.	Sparger system installed in the water storage tank at TAN/TSF distribution system, TAN-610	28
3.	CFA sampling locations	30
4.	Monthly tritium concentrations in CFA drinking water during 1994	31
5.	Main Gate well sampling location	31
6.	PBF sampling locations	33
7.	EBR-I sampling locations	34
8.	Gun Range sampling location	35

9.	TRA sampling locations	36
10.	TSF water system sampling locations	38
11.	CTF water system sampling locations	39
12.	WRRTF water system sampling locations	40
13.	Monthly TCE concentration in TSF drinking water systems during 1994	41
14.	RWMC sampling locations	43
15.	Monthly carbon tetrachloride concentrations in the RWMC drinking water systems	44
16.	Idaho Falls sampling locations	56
C-1.	Basic concept of an $\bar{x}$ chart	C-3

TABLES

1.	Pertinent regulatory codes and orders for the Drinking Water Program	7
2.	List of 1994 drinking water parameters and analytical methods used for analyses	8
3.	Holding times for drinking water samples	13
4.	Parameters for LITCO production wells and distribution systems exceeding the EPA and State of Idaho MCLs or action level for 1994	16
5.	Detected radiological parameters results of the 1994 sampling	17
6.	Detected nonradiological parameter results of the 1994 sampling	20
7.	Copper and lead data for the 1994 sampling	24
8.	Pertinent regulatory codes and orders for the nonradiological liquid effluent monitoring program	46
9.	Analyte parameters and methods for the Nonradiological Liquid Effluent Monitoring Program	47
10.	Nonradiological liquid effluent reporting limits	49
11.	Holding times for effluent stream samples	51
B-1.	1994 effluent monitoring data for CFA-603	B-6
B-2.	Summary statistics for CFA-603	B-7
B-3.	1994 effluent monitoring data for CFA-608	B-12

B-4. 1994 volatile organics data for CFA-608A	B-13
B-5. Summary statistics for CFA-608	B-14
B-6. 1994 effluent monitoring data for CFA-612	B-20
B-7. 1994 volatile organics data for CFA-612	B-22
B-8. Summary statistics for CFA-612	B-23
B-9. 1994 effluent monitoring data for CFA-625	B-30
B-10. 1994 volatile organics data for CFA-625A	B-32
B-11. Summary statistics for CFA-625	B-33
B-12. 1994 effluent monitoring data for CFA-657	B-42
B-13. 1994 volatile organics data for CFA-657A	B-44
B-14. Summary statistics for CFA-657	B-45
B-15. 1994 effluent monitoring data for CFA-665	B-56
B-16. 1994 volatile organics data for CFA-665A	B-57
B-17. Summary statistics for CFA-665	B-58
B-18. 1994 effluent monitoring data for CFA-688	B-68
B-19. Summary statistics for CFA-688	B-69
B-20. 1994 effluent monitoring data for CFA-690	B-74
B-21. 1994 volatile organics data for CFA-690A	B-76
B-22. Summary statistics for CFA-690	B-77
B-23. 1994 effluent monitoring data for CFA-691	B-84
B-24. 1994 volatile organics data for CFA-691A	B-86
B-25. Summary statistics for CFA-691	B-87
B-26. 1994 effluent monitoring data for CFA-766	B-96
B-27. 1994 volatile organics data for CFA-766A	B-98
B-28. Summary statistics for CFA-766	B-99

B-29. 1994 effluent monitoring data for TRA-604	B-110
B-30. 1994 volatile organics data for TRA-604A	B-112
B-31. 1994 effluent monitoring data for TRA-624	B-114
B-32. 1994 volatile organics data for TRA-634A	B-116
B-33. Summary statistics for TRA-624	B-117
B-34. 1994 effluent monitoring data for TRA-624	B-128
B-35. 1994 volatile organics data for TRA-624B	B-130
B-36. Summary statistics for TRA-624	B-131
B-37. 1994 effluent monitoring data for TRA-631	B-142
B-38. Summary statistics for TRA-631	B-144
B-39. 1994 effluent monitoring data for TRA-636	B-156
B-40. 1994 volatile organics data for TRA-636A	B-158
B-41. Summary statistics for TRA-636	B-159
B-42. 1994 effluent monitoring data for TRA-764	B-166
B-43. 1994 volatile organics data for TRA-764A	B-168
B-44. Summary statistics for TRA-764	B-169
B-45. 1994 effluent monitoring data for TAN-607	B-180
B-46. Summary statistics for TAN-607	B-182
B-47. 1994 effluent monitoring data for TAN-623	B-188
B-48. 1994 volatile organics data for TAN-623A	B-190
B-49. Summary statistics for TAN-623	B-191
B-50. 1994 effluent monitoring data for TAN-623	B-200
B-51. 1994 volatile organics data for TAN-623B	B-202
B-52. Summary statistics for TAN-623	B-203
B-53. 1994 effluent monitoring data for TAN-655	B-212

B-54. 1994 volatile organics data for TAN-655A	B-214
B-55. Summary statistics for TAN-655	B-215
B-56. 1994 effluent monitoring data for LOFT-1B	B-226
B-57. 1994 volatile organics data for LOFT-1BB	B-228
B-58. 1994 effluent monitoring data for LOFT-1B	B-230
B-59. 1994 volatile organics data for LOFT-1BC	B-232
B-60. 1994 effluent monitoring data for WRRTF1	B-234
B-61. 1994 volatile organics data for WRRTF1A	B-236
B-62. Summary statistics for WRRTF1	B-237
B-63. 1994 effluent monitoring data for WRRTF2	B-246
B-64. 1994 volatile organics data for WRRTF2A	B-248
B-65. Summary statistics for WRRTF2	B-249
B-66. 1994 effluent monitoring data for IFF-603	B-254
B-67. 1994 volatile organics data for IFF-603A	B-256
B-68. Summary statistics for IFF-603	B-257
B-69. 1994 effluent monitoring data for IFF-603	B-262
B-70. 1994 volatile organics data for IFF-603B	B-263
B-71. Summary statistics for IFF-603	B-264
B-72. 1994 effluent monitoring data for IFF-616	B-268
B-73. 1994 volatile organics data for IFF-616B	B-270
B-74. Summary statistics for IFF-616	B-271

ACRONYMS

AA	atomic absorption
AES	atomic emission spectrometry
ALR	Accu-Lab Research
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CFR	Code of Federal Regulations
CTF	Containment Test Facility
CY	calendar year
DOE	Department of Energy
DOE-ID	Department of Energy Idaho Operations Office
DWP	Drinking Water Program
EBR-I	Experimental Breeder Reactor No. I
EPA	Environmental Protection Agency
ESRP	Eastern Snake River Plain
FY	fiscal year
GFAAS	graphite furnace atomic absorption spectrometry
IC	ion chromatography
ICP	inductively coupled plasma
ICPP	Idaho Chemical Processing Plant
IDAPA	Idaho Administrative Procedures Act
IF	Idaho Falls
IHL	Industrial Hygiene Laboratory
INEL	Idaho National Engineering Laboratory
IRC	INEL Research Center
LITCO	Lockheed Idaho Technologies Company
LOFT	Loss-of-Fluid Test Facility
MCL	maximum contaminant level
PBF	Power Burst Facility
PCE	tetrachloroethylene
QA	quality assurance
QC	quality control
RCRA	Resource Conservation and Recovery Act
RESL	Radiological and Environmental Sciences Laboratory
RWMC	Radioactive Waste Management Complex

SMC	Specific Manufacturing Capabilities
SMCL	secondary maximum contaminant level
SRPA	Snake River Plain Aquifer
STP	sewage treatment plant
TAN	Test Area North
TCA	1,1,1-trichloroethane
TCE	trichloroethylene
TDS	total dissolved solids
TIC	tentatively identified compound
TOC	total organic carbon
TRA	Test Reactor Area
TSF	Technical Support Facility
TSS	total suspended solids
USGS	United States Geological Survey
VOC	volatile organic compound
WCB	Willow Creek Building
WMF	Waste Management Facilities
WRRTF	Water Reactor Research Test Facility

1994 Environmental Monitoring Drinking Water and Nonradiological Effluent Programs Annual Report

1. INTRODUCTION

The Idaho National Engineering Laboratory (INEL) was established as a nuclear energy research and development testing station in the late 1940s and was designated a National Environmental Research Park in 1975 (see Figure 1). All land within the INEL is a protected outdoor laboratory where the effects of energy development on the environment and the complex ecological relationships of this cool desert ecosystem can be studied. The INEL serves as a research area for scientists from several universities and State and Federal agencies.

1.1 Site Description

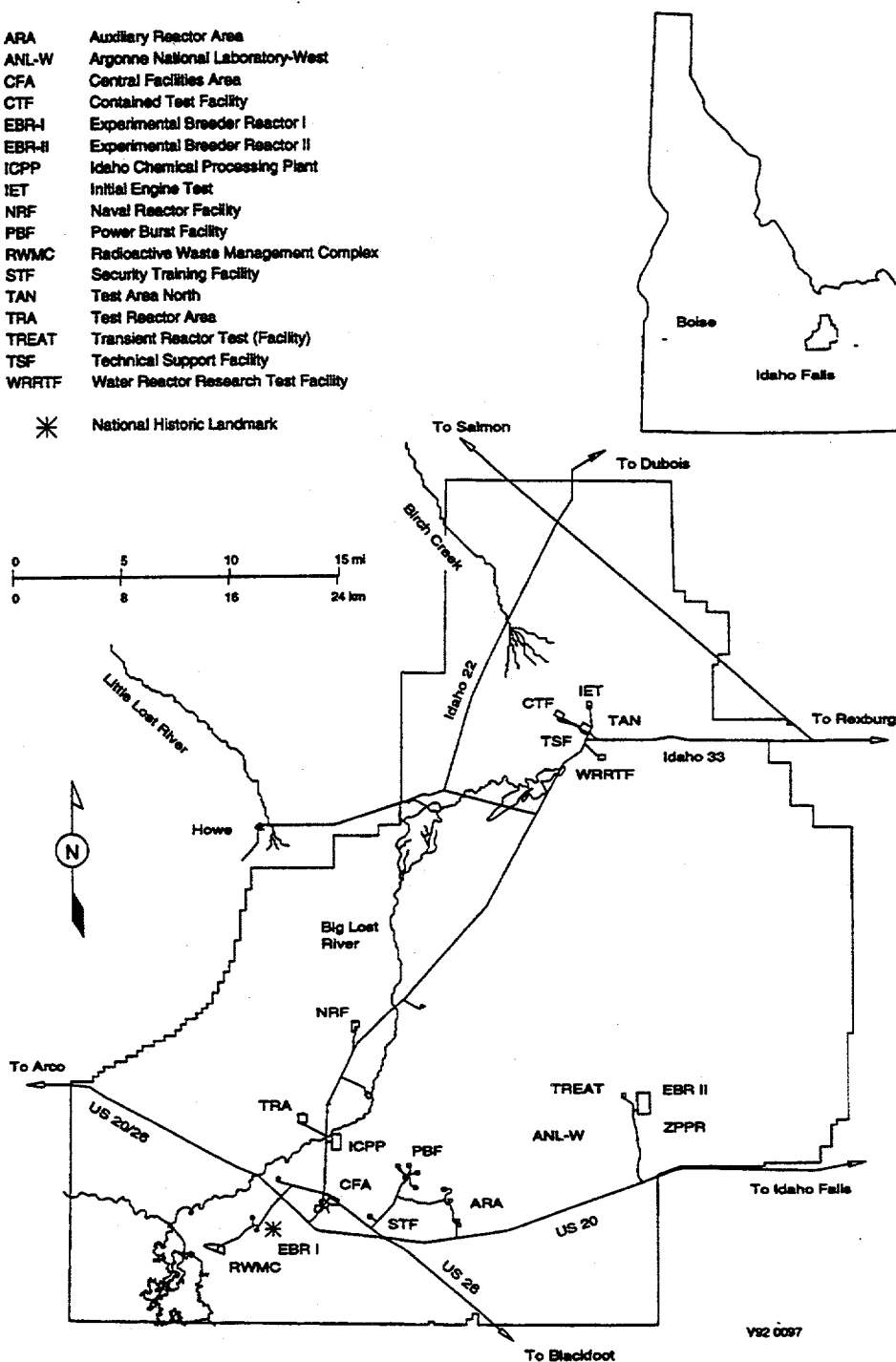
The 2300-km² (approximately 890 mi²) INEL is located on the Eastern Snake River Plain (ESRP) in southeastern Idaho. All air masses entering the ESRP must first cross a mountain barrier, which precipitates a large percentage of the moisture contained in the air masses. The average precipitation is 22 cm (8.66 in.) with maximum levels occurring in winter and late spring, and the region also has semiarid characteristics. The local northeast-southwest orientation of the ESRP and the bordering mountain ranges tends to channel the prevailing west winds so that a southwest wind predominates over the INEL; the second-most frequent winds come from the northeast. The relatively dry air and infrequent low clouds permit intense solar heating of the surface during the day and rapid cooling at night. These factors combine to give a large diurnal range of temperatures near the ground. Because of the moderating influence of the Pacific Ocean, most of the air masses flowing over this area are usually warmer during winter and cooler in the summer than air masses flowing at a similar latitude in the more continental climate east of the Continental Divide. The Centennial and Bitterroot Mountain ranges keep most of the shallow, but intensely cold, winter air masses from entering the ESRP when they move southward from Canada. Occasionally, however, the cold air can spill over the mountains. When this happens, the cold air is then held in the ESRP by the surrounding mountains, and the INEL experiences low temperatures for periods lasting a week or longer. The annual average temperature is 5.56°C (42°F), with recorded extremes of -43.89 and 39.44°C (-47 and 103°F).⁶

Subsurface geology at the INEL consists of successive layers of basalt and sedimentary strata, overlaid at the surface by wind- and water-deposited sediments. The primary groundwater source of the region is the Snake River Plain Aquifer (SRPA). Most of the INEL is located in the Mud Lake-Lost River Basin (Pioneer Basin) which is an informally named, closed drainage basin. Surface water within the Pioneer Basin includes that from the Big Lost River, the Little Lost River, and Birch Creek, all of which drain mountain watersheds located to the north and northwest of the INEL. Local rainfall and snowmelt contribute to surface water, mainly during the spring months. In very high-flow years, Birch Creek flows into the Birch Creek Playa on the north end of the INEL. The portion that is not lost to evapotranspiration infiltrates into the subsurface. The Little Lost River flows onsite during high-flow years, and some of it infiltrates into the subsurface. Both aquifer and surface waters are used for irrigation of crops outside the INEL. The SRPA is used as a process water and drinking water source both on and off the INEL.

ARA	Auxiliary Reactor Area
ANL-W	Argonne National Laboratory-West
CFA	Central Facilities Area
CTF	Contained Test Facility
EBR-I	Experimental Breeder Reactor I
EBR-II	Experimental Breeder Reactor II
ICPP	Idaho Chemical Processing Plant
IET	Initial Engine Test
NRF	Naval Reactor Facility
PBF	Power Burst Facility
RWMC	Radioactive Waste Management Complex
STF	Security Training Facility
TAN	Test Area North
TRA	Test Reactor Area
TREAT	Transient Reactor Test (Facility)
TSF	Technical Support Facility
WRRTF	Water Reactor Research Test Facility

✱ National Historic Landmark

0 5 10 15 mi
0 8 16 24 km



V92 0097

Figure 1. Location map of selected facilities at the Idaho National Engineering Laboratory.

The SRPA, approximately 320 km (199 mi) long and 32 to 97 km (20 to 60 mi) wide, comprises an area of about 25,000 km² (9650 mi²), and is the ESRP source of groundwater. The aquifer may contain as much as 2.5×10^{12} m³ (2×10^9 acre-ft) of water. Discharges of approximately 8×10^9 m³ (6.5×10^6 acre-ft) occur annually through springs in the Hagerman area, upstream from American Falls Reservoir, and through irrigation systems. Discharges from the springs make a significant contribution to the flow of the Snake River downstream from Twin Falls, Idaho. Aquifer recharge occurs mostly from infiltration of ground irrigation water (6.3×10^9 m³, 5.1×10^6 acre-ft) and valley underflow from the recharge area to the north and northeast of the ESRP (1.9×10^9 m³, 1.5×10^6 acre-ft).⁷ Other contributions are from river seepage (1.6×10^9 m³, 1.3×10^6 acre-ft) and infiltration of precipitation (1.0×10^9 m³, 0.6×10^6 acre-ft).

The depth to the SRPA varies from 61 m (200 ft) in the northeast corner of the INEL to 270 m (886 ft) in the southeast corner. The thickness of the aquifer is considered to be approximately 76 m (250 ft).⁸ Groundwater in the aquifer flows generally to the southwest, although locally the direction of flow is influenced by recharge from rivers, surface water spreading areas, and heterogeneities in the aquifer. Tracer studies at the INEL indicate that natural flow rates range from 1.5 to 6.1 m/d (5 to 20 ft/d). Aquifer transmissivities range from 3.7×10^5 to 2.2×10^8 L/d/m (3×10^4 to 1.8×10^7 gal/d/ft); storage coefficients range from 0.01 to 0.06.⁹

1.2 SRPA Hydrochemistry

Because groundwater is used as the drinking water source, information on the quality of groundwater is used to guide the Drinking Water Program (DWP). This program actively monitors and characterizes groundwater quality at the INEL. The United States Geological Survey (USGS) initially evaluated the suitability of the site as the National Reactor Testing Station for the Atomic Energy Commission in the early 1950s. Since then, the USGS has maintained a program office at the site to provide independent monitoring and characterization of the groundwater. The USGS has published many reports documenting the water quality in the SRPA and quantifying the impact of waste disposal practices. Primarily through the efforts of the USGS, three areas of groundwater contamination have been identified at the INEL. These are located at Test Area North (TAN), in the central and southern portion of the INEL south of the Test Reactor Area (TRA); the Idaho Chemical Processing Plant (ICPP), and the Radioactive Waste Management Complex (RWMC).

1.2.1 Test Area North

An injection well at the Technical Support Facility (TSF) is believed to be the principle source of groundwater contamination at the TAN facilities. Volatile organic compounds (VOCs) were first detected at TAN during routine sampling of the TAN water supply wells by the DWP. The USGS followed up on that detection with a more comprehensive sampling program at TAN. High levels (up to 35 mg/L) of VOCs were detected in groundwater monitoring wells.¹⁰ A number of investigations into the extent of groundwater contamination have been conducted under consent orders signed under Resource Conservation and Recovery Act (RCRA) or Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) authority among Department of Energy Idaho Operations Office (DOE-ID), the State of Idaho, and the Environmental Protection Agency (EPA) Region 10. Groundwater contamination at TAN is currently being investigated as Operable Unit 1-07 of the INEL CERCLA Federal Facility Agreement and Consent Order.¹¹ A remedial investigation has been conducted at the site to develop information necessary to assess the risk posed by the groundwater contamination and to select a remedial action, if necessary.¹² The vertical and horizontal extent of the groundwater contamination has been well defined.

1.2.2 Aquifer South of Test Reactor Area and the Idaho Chemical Processing Plant

Since 1952, liquid waste has been injected into the aquifer and discharged to infiltration ponds at land surface. Both disposal practices resulted in water and contaminants recharging the SRPA. Two facilities at the INEL (TRA and ICPP) have discharged several millions of gallons of water per year into the aquifer. The USGS has monitored these waste disposal practices with an extensive network of monitoring wells.^{13,14} This area of contamination originates from the TRA and the ICPP and contains a number of contaminant plumes. The size of the individual plumes depends on waste disposal practices, retardation of the plume by sorption on the aquifer matrix, and radioactive decay. Therefore, each plume is somewhat different in size and distribution.

1.2.3 Radioactive Waste Management Complex

Various solid and liquid radioactive and chemical wastes, including TRU wastes, have been disposed of at the RWMC. The RWMC contains pits, trenches, and vaults where radioactive and organic wastes were disposed below grade, as well as a large pad upon which waste was placed above grade and covered. During a site-wide characterization program, carbon tetrachloride and other VOCs were detected in groundwater at the RWMC.¹⁰ Review of waste disposal records indicates an estimated 88,400 gal (334,600 L) of organic chemical wastes were disposed at the RWMC prior to 1970, including carbon tetrachloride, trichloroethylene (TCE), tetrachloroethylene (PCE), toluene, benzene, trichloroethane (TCA), and lubricating oil. No distinct plume has developed yet in the groundwater at the RWMC, but there are high vapor-phase concentrations (up to 2,700 ppmv) of VOCs in the vadose zone above the water table.¹⁰

1.3 Analytical Laboratories

The State of Idaho requires that drinking water analysis be conducted by a State of Idaho-certified laboratory or a laboratory that has been granted reciprocity by the State [Idaho Administrative Procedures Act (IDAPA) 16.01.08.100,10.].¹⁵ The following laboratories were used for drinking water analyses.

Drinking water samples were submitted for gross alpha, gross beta, and tritium analyses to the Department of Energy (DOE) Radiological and Environmental Sciences Laboratory (RESL). In addition to samples analyzed for gross alpha, gross beta, and tritium, Accu-Lab Research (ALR) in Golden, Colorado, analyzed samples collected for tritium at the Central Facilities Area (CFA) wells and distribution system on a quarterly schedule. All ALR sample analysis results have been comparable to RESL's sample analysis results. Samples analyzed for VOCs were submitted to Alpha Analytical Laboratory in Sparks, Nevada. Lead, copper, and other inorganic and organic parameters were analyzed by the Environmental Health Laboratory in South Bend, Indiana. Lockheed Idaho Technologies Company (LITCO) Industrial Hygiene Laboratory (IHL) located at CFA-612 analyzed samples for total coliform and *E. coli* bacteria. Also, the State of Idaho Laboratory, located at District 7 Health Department in Idaho Falls, analyzed samples for total coliform and *E. coli* bacteria.

All analyses of nonradiological liquid effluent parameters were conducted by Roy F. Weston laboratories in Lionville, Pennsylvania.

1.4 General Analytical and Sampling Design and Methodology Information

The generation of high quality data begins with the plans (documentation) and then the collection of the sample. Samples must be collected in such a way that no pollutant distribution bias exists, no foreign material is introduced into the sample, and no material of interest escapes from the sample prior to analysis. There are three steps in obtaining representative samples. Step one, samples are collected in accordance with a proven sampling protocol. Step two, a cleanliness control protocol must exist, and procedures are required for preserving certain samples once representative samples have been acquired. Step three, a protocol must be followed for handling the samples and maintaining sample integrity.

1.4.1 Sample Collection Procedures and Methods

Written and approved standard operating procedures delineate the sampling protocol used.¹⁶ The approved EPA analytical methods used to analyze the chemical and radiological parameters are listed in Section 2 and Section 3 of this report.

1.4.2 Sample Containers and Sample Preservation

The recommended bottle types, protocols, and sample preservation requirements (American Chemical Society reagent grade or better) follow recommendations by the EPA to ensure that errors in sampling do not result from contamination.¹⁷

1.4.3 Sample Integrity and Handling

Both programs follow chain of custody procedures to ensure that errors will not result from fraud and sabotage. Chain of custody procedures provide legal evidence that tampering of the sample has not occurred. Sample handling and analysis must strictly follow chain of custody procedures and documentation to guarantee sample integrity and to ensure that the analytical data will be useful for other environmental investigations. Chain of custody procedures provide this assurance by producing permanent record of sample custody, preparation, and analysis. The sample custody protocols used by the sampling programs follow those recommended by EPA in SW-846, *Test Methods for Evaluation of Solid Waste*,⁴ and EMSP 8.3, "Labeling Samples and Maintaining Chain of Custody."¹⁸

Samples are packaged according to the specific program standard operating procedure.¹⁶ Samples are shipped by overnight carrier, if necessary, and are stored by the subcontract laboratory to ensure sample integrity.



2. DRINKING WATER PROGRAM

In 1988, in response to a DOE-ID request, EG&G Idaho, Inc., established an INEL DWP. This program was established for monitoring production wells and distribution systems on a routine schedule at facilities operated by EG&G Idaho. The DWP was structured to ensure that EG&G Idaho met or exceeded the minimum regulatory requirements for monitoring drinking water systems. On October 1, 1994, LITCO replaced EG&G Idaho as the prime contractor at the INEL and assumed the responsibilities of the DWP. Under the Idaho Regulations for Public Drinking Water Systems (IDAPA 16.01.08.003,32.), LITCO drinking water systems are classified as "nontransient or transient, noncommunity water systems."¹⁵ Regulations for such systems are less stringent than those required for "community water systems." DOE's policy provides a level of protection to water consumers equivalent to that provided by the public community drinking water standards (DOE Order 5400.5).¹⁹ Following DOE Order 5400.5,¹⁹ LITCO has adopted the more stringent regulations of a community water system classification for monitoring and construction, with the exception of the transient noncommunity sources [Main Gate, Experimental Breeder Reactor No. I (EBR-I), Gun Range, Fire Station #2 (inactive), and Water Reactor Research Test Facility (WRRTF) (inactive)]. Regulations governing the DWP are listed in Table 1. Consolidation of the site-wide DWP began in 1994 when LITCO was awarded the subcontract, and was officially implemented in January 1995.

Currently, the DWP monitors 17 wells and 11 distribution systems on a routine basis at the INEL. Drinking water samples are collected from all water systems either monthly, quarterly, or annually, and are analyzed for the following: (a) radioisotopes, (b) VOCs, coliform bacteria, and (d) organic and inorganic parameters. The DWP uses the EPA-approved analytical methods for drinking water analyses in compliance with IDAPA 16.01.08.100,10.¹⁵ These EPA methods have specific detection limits and holding times that are listed in the Code of Federal Regulations (CFR) 40 Part 141 - 143¹ and *Standard Methods for the Examination of Water and Wastewater*.²⁰ Table 2 lists the primary drinking water parameters of interest and the specific EPA methods that were used for the analyses.

Table 1. Pertinent regulatory codes and orders for the Drinking Water Program.

Source	Title
40 CFR 141 through 143 ¹	"Protection of the Environment"
IDAPA 16.01.08.000 through 16.01.08.999 ¹⁵	"Idaho Regulations for Public Drinking Water Systems"
DOE Order 5400.5 Part D ¹⁹	"Radiation Protection of the Public and the Environment"
Architectural Engineering Standards 0266 ²¹	"DOE-ID Architectural Engineering Standards—Water Distribution Systems"

Table 2. List of 1994 drinking water parameters and analytical methods used for analyses.

Parameters	Method of Analysis
Primary drinking water standards	
Antimony	200.8
Arsenic	206.2
Barium	208.1
Beryllium	200.8
Cadmium	213.2
Chromium	218.2
Coliform bacteria	MMO-mug test™ (Colilert)
Copper	200.8
Cyanide	335.3
Fluoride	340.3
Lead	200.8
Mercury	245.2
Nickel	200.8
Nitrite	353.2
Nitrate/Nitrite	353.2
Selenium	270.2
Sulfate	300.0
Thallium	200.8
Radiological	
Gross Alpha (including radium-226, excluding radon and uranium)	302/900.0
Gross Beta	302/900.0
Tritium	306/906.0
Strontium 89/90	303/905
Regulated VOCs	
Benzene	524.2
CIS-1,2-Dichloroethylene	524.2
Vinyl Chloride	524.2
1,2-Dichloropropane	524.2
Carbon Tetrachloride	524.2
Ethylbenzene	542.2
1,2-Dichloroethane	524.2
(Mono) Chlorobenzene	542.2
Trans-1,2-Dichloroethylene	542.2
1,1,1-Trichloroethane (TCA)	524.2
0-Dichlorobenzene	524.2
para-Dichlorobenzene	524.2
Styrene	524.2
Trichloroethylene (TCE)	524.2
Tetrachloroethylene (PCE)	524.2
1,1-Dichloroethylene	524.2
Toluene	524.2
Xylenes (total)	524.2

Table 2. (continued).

Parameters	Method of Analysis
Unregulated VOCs	
1,1-Dichloroethylene	524.2
1,1,2,2-Tetrachloroethane	524.2
Bromobenzene	524.2
1,2,4-Trimethylbenzene	524.2
1,2,3-Trichlorobenzene	524.2
n-Butylbenzene	524.2
Dibromomethane	524.2
1,1-Dichloropropene	524.2
1,1,1,2-Tetrachloroethane	524.2
Chloroethane	524.2
1,1,2-Trichloroethane	524.2
2,2-Dichloropropane	524.2
o-Chlorotoluene	524.2
p-Chlorotoluene	524.2
1,3-Dichloropropene	524.2
1,2,4-Trichlorobenzene	524.2
m-Dichlorobenzene	524.2
Dichloromethane	524.2
n-Propylbenzene	524.2
Napthalene	524.2
1,3-Dichloropropane	524.2
Chloromethane	524.2
Bromomethane	524.2
Hexachlorobutadiene	524.2
1,3,5-Trimethylbenzene	524.2
p-Isopropyltoluene	524.2
Isopropylbenzene	524.2
Tert-butylbenzene	524.2
Sec-butylbenzene	524.2
Fluorotrichloromethane	524.2
Dichlorodifluoromethane	524.2
Bromochloromethane	524.2
1,2,3-Trichloropropane	524.2
Total Trihalomethanes	
Chloroform	501.1/524.2
Bromoform	501.1/524.2
Bromodichloromethane	501.1/524.2
Chlorodibromomethane	501.1/524.2
Secondary drinking water standards	
Chloride	Potentiometric
Color	Platinum cobalt
Odor	Consistent series
Surfactants	Methylene blue
Total dissolved solids (TDS)	Total residue

Table 2. (continued).

Parameters	Method of Analysis
	Unregulated
Alkalinity	310.1/310.2
Hardness	130.1/130.2
pH	150.1

2.1 Drinking Water Program Analytical and Sampling Design and Methodology

The DWP follows established procedures for sample collection and analytical methodology which include: (a) following standard operating procedures, which are based on EPA sampling protocols, (b) attending site-specific training, (c) using approved EPA analytical methods, (d) submitting quality control (QC) samples, and (e) conducting data validation. Descriptions of LITCO facilities water distribution systems and production wells are in Appendix A.

2.1.1 Standard Operating Procedures

Standard operating procedures were followed to ensure consistent collection of representative samples. The following is a description of the sampling techniques used and the QC measures taken in accordance with DWP standard operating procedures.¹⁶

Field measurements such as pH, conductivity, and temperature are taken using a portable water quality instrument. The water quality instrument is standardized as recommended by the manufacturer each day prior to use. This instrument is used to ensure that the water has stabilized before samples are collected. Readings are taken at the wellhead after the calculated purge time is met until the readings are consistently within ± 0.05 units for the pH and ± 10 $\mu\text{mhos}/\text{cm}^2$ for conductivity. Three well-bore volumes are purged from the well prior to sample collection. This helps to ensure that the sample collected is representative of water quality in the aquifer. Distribution systems are purged a minimum of two minutes or until readings are consistently within ± 0.05 units for the pH and ± 10 $\mu\text{mhos}/\text{cm}^2$ for conductivity.

2.1.2 Training

Site-specific training is required for collection of representative samples. Personnel are trained according to sampling procedures and field QC practices on a task-specific basis.¹⁶

2.1.3 Analytical Methods

Sampling for water quality parameters is performed either monthly, quarterly, or annually, depending on the parameter of interest and regulatory requirements. During 1994, water systems in service at LITCO were sampled at least annually for VOCs, unless the system was down for repairs or for other maintenance. In addition, total trihalomethanes were monitored quarterly at CFA and the Gun Range due to chlorination of these systems. Lead and copper were monitored in June 1994 at all LITCO water systems according to 40 CFR Part 141.80 to 141.91.¹ In addition, bacteriological sampling was conducted on a monthly schedule to ensure the water was safe for human consumption. Contract laboratories perform the analyses according

to specified EPA methods, protocols, and procedures (see 40 CFR Part 141-143)¹ and *Standard Methods for the Examination of Water and Wastewater*.²⁰ Data collected in 1994 have been reported to the State of Idaho. The State of Idaho requires that drinking water analysis be conducted by a State of Idaho-certified laboratory or a laboratory that has been granted reciprocity by the State (IDAPA 16.01.08.100,10).¹⁵

2.1.4 Quality Control

The samples are collected directly from the wellhead for groundwater quality information and at various points throughout the distribution systems for compliance purposes. Sampling from the distribution system ensures that the quality of the drinking water meets or exceeds health standards set forth by the regulatory agencies. QC samples (duplicates, trip blanks, and spikes) are collected and sent as blind samples to ensure that bias does not enter into the analyses at the laboratory. The laboratory also runs QC samples as required by the analytical methods. QC samples provide a check on the field sampling techniques, sample shipment, and laboratory handling and analyses.

2.1.5 Data Validation

All data used for compliance purposes is validated in accordance with the *Drinking Water Program Plan*¹⁶ objectives. Personnel assigned to perform data validation are knowledgeable of sampling techniques and analytical methods practiced.

2.2 Drinking Water Program Quality Assurance

The objectives of the Quality Assurance (QA) Program for the DWP at LITCO-operated facilities at the INEL are to identify deficiencies in the sampling and measurement processes so that corrective action can be taken and to ensure that the analytical results of the DWP are valid.

Specific management and program controls used to ensure that the objectives of the QA Program are met include:

- Organizational structure and responsibilities of managerial and program personnel
- Documented procedures that describe the materials and equipment used, specific precautions, prerequisites, and step-by-step sampling procedures for monitoring activities
- Document-control processes for the preparation, revision, and approval of procedures
- Maintenance of records pertaining to monitoring activities, such as planning documents, data sheets, sample results, and calibration records
- Proper calibration and preventive maintenance of the sampling equipment
- Analyses of QC samples (known standards, blank samples, split samples, and replicates) to assess accuracy and precision of monitoring results
- Planned and periodic self-assessments.

The DWP determines whether the analytical results for the control samples are acceptable. The activity in the QC sample and type of analysis are taken into consideration. Each set of known values and laboratory results receives individual consideration. QC samples representative of the DWP water samples are submitted for each analysis type.

The DWP follows the guidance provided in ANSI/ASQC E-4.²² This ensures that the program provides adequate QC practices to verify the representativeness of the sampling methods and the integrity of the samples themselves. Other supporting documentation includes calibration requirements for field instruments and criteria for ensuring that field personnel are properly trained.

Part of the QA Program deals with analytical concerns and is designed to ensure that data of a known quality are produced by the analyses. QC practices are used to identify and resolve any problems caused by possible matrix effects, contamination, or instrument malfunction. The QA Program addresses and resolves such issues as intended data use, training and qualifications of personnel, organization and responsibilities, corrective action in case of an out-of-control operation, calibration and standardization of analytical instrumentation, sampling and analytical methodology, source and submission of QC samples, sample and data tracking chain of custody, and audit and evaluation programs. The standard operating procedures that document operation of the QA Program are appended to the *Quality Program Plan*.²³

For all chemical measurements (excluding radiochemical procedures), the uncertainty in an analytical result for a single sample is created by a combination of the following portions of the analytical process:

- Sample heterogeneity
- Analysis equipment calibration
- Analysis equipment noise
- Laboratory contamination
- Sample contamination
- Analyte extraction efficiency
- Chemical interferences.

Laboratory analysis procedures are designed to minimize the uncertainties as much as is practical. The uncertainties are largely a result of limitations in the analytical methods and are acceptable by approved EPA methods, including EPA Contract Laboratory Program methods.

The observation of sample holding times for each parameter of interest is crucial to the production of data of known quality. The holding time is the maximum amount of time that a sample may be stored between time of collection and analysis and still permit meaningful analytical results. Holding times for drinking water samples, as presented in Table 3, meet EPA regulatory guidelines.

Determining the uncertainty of each sample is not usually practical, so the normal approach is to conduct QC measurements on 10 to 20% of the samples and assume that the observed uncertainty applies to all samples. This is a valid assumption as long as monitoring of the QC results indicates that results are consistently within established control limits. The control limits then indicate the maximum uncertainty of each component of the measurements.

Table 3. Holding times for drinking water samples.

Parameter	Maximum holding time
<u>Bacterial tests:</u>	
Coliform, fecal and total	6 hours
General bacteria	6 hours
<u>Inorganic Tests:</u>	
Chloride	28 days
Color	48 hours
Cyanide	14 days
Fluoride	28 days
Hardness	6 months
pH	Analyze in the field
<u>Metals:</u>	
Chromium VI	24 hours
Mercury	28 days
Metals, except chromium VI and mercury ^a	6 months
<u>Other Analytes:</u>	
Nitrate	48 hours
Phenols	28 days
Specific conductance	28 days
Sulfate	28 days
Sulfide, total	7 days
Corrosivity	14 days
Odor	48 hours
Alkyl benzene sulfonate (ABS)	7 days
Temperature	Analyze in the field
Turbidity	48 hours
<u>Organic Tests:</u>	
PCBs	40 days after extraction
Volatile organic compounds (VOCs)	14 days
<u>Herbicide^b/pesticide^c tests</u>	
Herbicides	40 days after extraction
Pesticides	40 days after extraction
<u>Radiological Tests:</u>	
Alpha, beta	6 months
Tritium	6 months

a. Metals: arsenic, barium, cadmium, lead, selenium, silver, sodium, copper, zinc, iron, manganese.

b. Herbicides: 2, 4-D and 2, 4, 5-TP silvex.

c. Pesticides: Endrin, Lindane, Methoxychlor, Toxaphene.

Data undergoes a validation for conformance to three main program integrity areas: sample integrity, method validity, and adherence to program data quality objectives. Logbook entries are compared with the chain of custody forms and laboratory deliverables, verifying that requested analyses were performed and proper preservation techniques were employed. Next the analytical method is validated by reviewing such QC indicators as holding time, calibrations, associated blanks, and associated laboratory control standards. Finally the data is compared against program data quality objectives which have been set to provide a level of confidence in the data that is generated.

Analytical uncertainty does not include uncertainties introduced by field sampling variability and by natural spatial and temporal variability of the medium sampled in the field. A true statistical evaluation of these uncertainties can be made only by collecting and analyzing multiple samples in both space and time from each sampling site. Sampling bias or contamination of samples can also greatly increase the uncertainty associated with the analytical result for a sample. These uncertainties can and often do exceed the analytical uncertainty. The sampling and natural field variability components of uncertainty are established, or at least estimated, and added to analytical uncertainty before any analytical results are assumed to represent concentrations at the site of collection.

2.2.1 Conclusion

The data in this report have met the QA objectives and fall within the ranges of acceptability for the *Drinking Water Program Plan*.¹⁶ Laboratories used during 1994 successfully passed a QA and technical audit before samples were sent to them. Because the State of Idaho audited both RESL and District 7 Health Department for laboratory certification for drinking water analyses, LITCO did not audit these two laboratories.

2.3 Drinking Water Program Data Summary and Assessment

2.3.1 Locations and Summary of Results

This section describes each of the 11 distribution systems and 17 INEL LITCO-operated drinking water wells sampled during 1994. The analytical results for each system are also discussed. These wells and distribution systems are located at: CFA, Main Gate, Power Burst Facility (PBF), EBR-I, Gun Range, Fire Station #2 (inactive), TRA, TAN, WRRTF (inactive), and RWMC (see Figure 1). See Appendix A for a detailed description of each production well and distribution sampling location. In addition, Sections 2.3.2 and 2.3.3 describe two contamination plumes that extent beyond facility boundaries. Section 2.3.2 describes the TCE plume at TAN, and Section 2.3.3 describes the tritium plume that extends into the CFA area from its sources at TRA and ICPP.

Samples analyzed for VOCs are collected quarterly, semiannually, or annually from all active water systems with the exception of TSF, where TCE has been detected. The TSF water system is on a monthly sampling schedule. During the quarterly VOC sampling, 11 drinking water distribution systems were sampled. Sampling occurs at the following water systems: EBR-I, Fire Station #2, Main Gate, Containment Test Facility (CTF), Gun Range, RWMC, PBF, TRA, TSF, WRRTF, and CFA. Sampling for other organic and inorganic parameters are performed monthly, quarterly, semiannually, or annually, depending on the parameter of interest and the regulatory requirement.

Table 4 lists analytical results of water samples collected during 1994 that were detected at concentrations exceeding the maximum contaminant level (MCL) established for each parameter. Radiological analytical results for gross alpha, gross beta, and tritium concentrations at each facility are listed in Table 5. Table 6 presents the detected results for the majority of the nonradiological parameters, and Table 7 presents the copper and lead results.

2.3.2 Trichloroethylene

In 1987, TCE was detected at both TAN/TSF #1 and #2 wells, which supply water to the employees at TSF. In 1988, a sparger system was installed in the water storage tank to reduce the TCE concentrations, providing drinking water safe for consumption (Figure 2). Concentrations of TCE have decreased in the distribution system since the introduction of the sparger system. The average concentration for TCE has remained consistently below the MCL of 0.005 mg/L at the point of entry to the distribution system. Sampling has also been conducted at drinking fountains downstream from the sparger to verify the effectiveness of the system at the point of consumption. To date, the system has proven to be very effective. Monitoring will continue monthly to verify the efficiency and effectiveness of the sparger system and to ensure that the water remains safe for human consumption.

Remedial action (pump and treat) is being conducted at the injection wells at TSF that should improve the groundwater quality and reduce the concentration of TCE.

Concentrations of TCE in samples from the WRRTF distribution system are also above the MCL. However, only bottled water is consumed by personnel at this facility, so the elevated concentrations of TCE are not a health concern to WRRTF employees. Sampling at WRRTF is conducted for trend and groundwater data information. Data are not used for compliance purposes because personnel do not drink the water from this inactive water system.

2.3.3 Tritium

Routine monitoring for tritium in water from the SRPA began in 1961.²⁴ The concentration of tritium in groundwater has varied because of changes in disposal rates, disposal techniques, recharge conditions, and radioactive decay. Water samples are collected monthly from all active wells at the INEL with CFA #1 and #2 wells having the highest concentrations of tritium. Even though the CFA wells have the highest concentration of tritium, the levels are below the established MCL.

The ICPP and the TRA generated most of the tritium found in the SRPA. Wastewater containing tritium at ICPP was routinely injected into the SRPA through a disposal well from 1953 to 1984. Beginning in 1984, the wastewater was routinely disposed to an infiltration pond. The disposal well was used as an emergency backup to the disposal ponds in 1984 to 1986. This well was abandoned in 1989. The discharge of tritium and other radionuclides to the ICPP percolation ponds was eliminated with the addition of the process equipment waste evaporator. At the TRA, a deep disposal well was used from 1964 to March 1982 to inject wastewater from cooling-tower operations at TRA into the SRPA. Wastewater containing tritium has been disposed into one of three interconnected infiltration ponds since operations began in 1952. The wastewater containing low levels of tritium and other radionuclides is now discharged to a double-lined evaporation pond which replaced the infiltration pond in 1993. At both facilities, water that was disposed into the ponds infiltrates about 137 m of unsaturated and saturated rock to the SRPA.

Table 4. Parameters for LITCO production wells and distribution systems exceeding the EPA and State of Idaho MCLs or action level for 1994.^a

Parameter	Location	Results (mg/L)	Action level
Coliform Bacteria	Main Gate distribution system	P ^b September	NA ^c
	TSF distribution system	P ^b (July, Aug., Sept., Oct., Nov., Dec.)	NA
	TRA distribution system	P (July)	NA
	CTF distribution system	P (June)	NA
Trichloroethylene	WRRTF, distribution system	0.011 ^d	NA
	TSF #1 Well, TAN-612	0.011 ^e	NA
	TSF #2 Well, TAN-613	0.006 ^f	NA
	TSF, distribution system TAN-610	0.006 ^g	NA
Lead	CFA-606	0.031 ^h	0.015
	CFA-643	0.024 ^h	0.015
	CFA-674	0.022 ^h	0.015
	PBF-612	0.021 ^h	0.015
	PBF-612	0.041 ^h	0.015
	TSF-653	0.021 ^h	0.015

a. Coliform Bacteria and Trichloroethylene have MCLs. Lead has an action level.

b. P = Present.

c. NA = not applicable.

d. One time detection in September.

e. Result is based on an average of 4 quarterly samples.

f. One time detection in October.

g. One time detection in August. Exceedance due to failure of the sparger system.

h. One time detection in June.

Table 5. Detected radiological parameters results of the 1994 sampling.

Location	Parameter	#	Results (pCi/L) ^a	Lab	MCL(pCi/L)
CFA #1 Well	Tritium	2	16,000	ALR ^b	20,000
	Gross Alpha	8	0.69		15
	Gross Beta	8	3.83		50°
	Tritium	8	15,625		20,000
CFA #2 Well	Tritium	4	13,750	ALR	20,000
	Gross Alpha	11	0.9		15
	Gross Beta	11	2.96		50°
	Tritium	11	14,018		20,000
CFA distribution system	Gross Alpha	6	3.5	ALR	15
	Gross Beta	6	7.67	ALR	50°
	Strontium-89/90	2	1.2	ALR	--
	Tritium	3	13,670	ALR	20,000
	Gross Alpha	12	0.78		15
	Gross Beta	12	1.91		50°
	Tritium	12	14,258		20,000
EBR-I	Gross Alpha	8	0.85		15
	Gross Beta	8	2.54		50°
	Tritium	8	BDL ^d		20,000
EBR-I distribution system	Gross Alpha	6	2	ALR	15
	Gross Beta	6	4.5	ALR	50°
	Strontium-89/90	2	0.05	ALR	--
	Tritium	2	BDL	ALR	20,000
Fire Station #2 Well	Gross Alpha	11	0.84		15
	Gross Beta	11	2.51		50°
	Tritium	11	BDL		20,000
Fire Station distribution system	Gross Alpha	2	4	ALR	15
	Gross Beta	2	7	ALR	50°
	Strontium-89/90	1	0.6	ALR	--
	Tritium	1	50	ALR	20,000
Gun Range distribution system	Gross Alpha	6	2.17	ALR	15
	Gross Beta	6	4.83	ALR	50°
	Strontium-89/90	2	BDL	ALR	--
	Tritium	2	3,800	ALR	20,000
Gun Range Well	Gross Alpha	12	0.88		15
	Gross Beta	12	2.53		50°
	Tritium	12	3,866		20,000
Lost River Rest Area	Gross Alpha	12	1.44		15
	Gross Beta	12	2.35		50°
	Tritium	12	97		20,000
Main Gate distribution system	Gross Alpha	6	1.5	ALR	15
	Gross Beta	6	2.67	ALR	50°
	Strontium-89/90	2	0.1	ALR	--
	Tritium	2	60	ALR	20,000
Main Gate Well	Gross Alpha	12	1.18		15
	Gross Beta	12	2.73		50°
	Tritium	12	BDL		20,000

Table 5. (continued).

Location	Parameter	#	Results (pCi/L) ^a	Lab	MCL(pCi/L)
PBF #1 Well	Gross Alpha	11	1.07		15
	Gross Beta	11	2.78		50 ^c
	Tritium	11	BDL		20,000
PBF #2 Well	Gross Alpha	11	0.93		15
	Gross Beta	11	2.79		50 ^c
	Tritium	11	BDL		20,000
PBF distribution system	Gross Alpha	6	1.67	ALR	15
	Gross Beta	6	4.17	ALR	50 ^c
	Strontium-89/90	2	< 0	ALR	--
	Tritium	2	10	ALR	20,000
RWMC distribution system	Gross Alpha	6	2.17	ALR	15
	Gross Beta	6	4.67	ALR	50 ^c
	Strontium-89/90	2	0.15	ALR	--
	Tritium	2	1,650	ALR	20,000
RWMC Well	Gross Alpha	12	0.94		15
	Gross Beta	12	2.94		50 ^c
	Tritium	12	1,516		20,000
TAN/CTF #1 Well	Gross Alpha	12	0.93		15
	Gross Beta	12	2.89		50 ^c
	Tritium	12	830		20,000
TAN/CTF #2 Well	Gross Alpha	12	0.77		15
	Gross Beta	12	2.92		50
	Tritium	12	BDL		20,000
TAN/CTF distribution system	Gross Alpha	6	3	ALR	15
	Gross Beta	6	4.17	ALR	50 ^c
	Strontium-89/90	2	0	ALR	--
	Tritium	2	30	ALR	20,000
TAN/TSF #1 Well	Gross Alpha	10	1.5		15
	Gross Beta	10	2.63		50 ^c
	Tritium	10	69		20,000
TAN/TSF #2 Well	Gross Alpha	10	0.95		15
	Gross Beta	10	2.64		50 ^c
	Tritium	10	BDL		20,000
TAN/TSF distribution system	Gross Alpha	5	2.4	ALR	15
	Gross Beta	5	7	ALR	50 ^c
	Strontium-89/90	2	< 0	ALR	--
	Tritium	1	170	ALR	20,000
TRA #1 Well	Gross Alpha	11	0.78		15
	Gross Beta	11	3.06		50 ^c
	Tritium	11	BDL		20,000
TRA #4 Well	Gross Alpha	12	1.29		15
	Gross Beta	12	2.39		50 ^c
	Tritium	12	BDL		20,000
TRA Building 667	Gross Alpha	11	1.03		15
	Gross Beta	11	3.09		50 ^c
	Tritium	11	BDL		20,000

Table 5. (continued).

Location	Parameter	#	Results (pCi/L) ^a	Lab	MCL(pCi/L)
TRA distribution system	Gross Alpha	7	2.14	ALR	15
	Gross Beta	7	2.71	ALR	50 ^c
	Strontium-89/90	2	0.15	ALR	--
TRA distribution system (cont.)	Tritium	2	BDL	ALR	20,000
	Gross Alpha	1	1.7		15
	Gross Beta	1	4		50 ^c
	Tritium	1	10		20,000
WRRTF Well	Gross Alpha	11	0.84		15
	Gross Beta	11	2.3		50 ^c
	Tritium	11	4.6		20,000
WRRTF distribution system	Gross Alpha	4	2.25	ALR	15
	Gross Beta	4	3.75	ALR	50 ^c
	Strontium-89/90	1	BDL	ALR	--
	Tritium	1	220	ALR	20,000

a. Results is the average of all samples collected.

b. ALR indicates that Accu-Lab Research of Golden Colorado performed the sample analysis. All other analyses were performed at the INEL RESL laboratory.

c. Gross beta MCL is 50 pCi/L; however, it has an action level of 4 mrem/yr.

d. BDL = below detection limit.

Table 6. Detected nonradiological parameter results of the 1994 sampling.

Location	Parameter	Results (mg/L)	MCL/SMCL(mg/L)
CFA distribution system, CFA-665	Ethylbenzene	0.0191	0.7
	Trichloroethylene	0.001	0.005
	Xylenes (total)	0.0204	10
CFA distribution system, CFA-688	Trichloroethylene	0.0011	0.005
	Xylenes (total)	0.0011	10
CFA distribution system, CFA-698	Ethylbenzene	0.0307	0.7
	Toluene	0.0006	1
	Trichloroethylene	0.0009	0.005
	Xylenes (total)	0.0281	10
CFA #1 Well	Trichloroethylene	0.0006	0.005
CFA #2 Well	Trichloroethylene	0.0012 ^a	0.005
CFA distribution system, CFA-641	Nitrate/Nitrite as N	3.3	10
	Arsenic	0.0015	0.05
	Cadmium	0.00014	0.005
	Chromium	0.012	0.1
	Lead	0.0005	0.015
	Nickel	0.0063	0.1
	Selenium	0.0014	0.05
	Sulfate	30	250
	Chloride	36	250
	TDS ^b	440	500
	Alkalinity	130	--
	Hardness (as CaCO ₃)	190	--
	pH	7.6	6.5 - 8.5
	Trichloroethylene	0.0008 ^a	0.005
	Ethylbenzene	0.0141	0.7
	Trichloroethylene	0.0008	0.005
	Xylenes (total)	0.0041	10
Drinking Fountain, CFA-690	TTHM	0.0031	0.10
EBR-I distribution system, EBR-601	Nitrate/Nitrite as N	0.3667	10
	Arsenic	0.0028	0.05
	Cadmium	0.00012	0.005
	Chromium	0.0069	0.1
	Lead	0.0004	0.015
	Nickel	0.0023	0.1
	Fluoride	0.2	4
	Sulfate	14	250
	Chloride	5.7	250
	TDS	200	500
	Alkalinity	110	--
	Hardness (as CaCO ₃)	67	--
	pH	7.8	6.5 - 8.5
Gun Range distribution system, B21-608	TTHM	0.0012	0.10
	Nitrate/Nitrite as N	1.05	10
	Arsenic	0.0017	0.05
	Cadmium	0.00015	0.005
	Chromium	0.021	0.1
	Lead	0.0022	0.015
	Nickel	0.0067	0.1
	Selenium	0.0011	0.05

Table 6. (continued).

Location	Parameter	Results (mg/L)	MCL/SMCL(mg/L)
Gun Range distribution system (cont.)	Sulfate	35	250
	Chloride	13	250
	TDS	300	500
	Alkalinity	180	--
	Hardness (as CaCO ₃)	160	--
	pH	7.7	6.5 - 8.5
Main Gate distribution system, B27-603	1,1,1-Trichloroethane	0.0012 ^a	0.200
	Nitrate/Nitrite as N	0.75	10
	Arsenic	0.0026	0.05
	Cadmium	0.00011	0.005
	Chromium	0.0097	0.1
	Lead	0.0007	0.015
	Nickel	0.0034	0.1
	Selenium	0.0016	0.05
	Fluoride	0.2	4
	Sulfate	20	250
	Chloride	17	250
	TDS	220	500
	Alkalinity	130	--
	Hardness (as CaCO ₃)	110	--
	pH	7.7	6.5 - 8.5
	p-Dichlorobenzene	0.0007	0.075
Main Gate Well, B27-605	1,1,1-Trichloroethane	0.0011 ^a	0.200
PBF distribution system, PBF-602	Nitrate/Nitrite as N	0.85	10
	Arsenic	0.0025	0.05
	Cadmium	0.00010	0.005
	Chromium	0.0075	0.1
	Lead	0.0003	0.015
	Nickel	0.0038	0.1
	Selenium	0.0011	0.05
	Fluoride	0.2	4
	Sulfate	20	250
	Chloride	18	250
	TDS	240	500
	Alkalinity	140	--
	Hardness (as CaCO ₃)	120	--
	pH	7.8	6.5 - 8.5
RWMC #1 Well, WMF-603	Carbon tetrachloride	0.0027 ^a	0.005
	Trichloroethylene	0.0013 ^a	0.005
RWMC distribution system, WMF-604	Carbon tetrachloride	0.0018 ^a	0.005
	Nitrate/Nitrite as N	0.7	10
	Arsenic	0.0022	0.05
	Cadmium	0.00014	0.005
	Chromium	0.014	0.1
	Lead	0.0007	0.015
	Nickel	0.0043	0.1
	Fluoride	0.2	4
	Sulfate	23	250
	Chloride	13	250
	TDS	250	500
	Alkalinity	150	--

Table 6. (continued).

Location	Parameter	Results (mg/L)	MCL/SMCL(mg/L)
RWMC distribution system, WMF-604 (cont.)	Hardness (as CaCO ₃)	120	--
	pH	7.6	6.5 - 8.5
	Trichloroethylene	0.001 ^a	0.005
TAN/CTF distribution system, TAN-614	Nitrate/Nitrite as N	0.75	10
	Arsenic	0.0028	0.05
	Barium	0.072	1
	Cadmium	0.00020	0.005
	Chromium	0.0059	0.1
	Nickel	0.0063	0.1
	Fluoride	0.2	4
	Sulfate	29	250
	Chloride	17	250
	TDS	250	500
	Alkalinity	160	--
	Hardness (as CaCO ₃)	150	--
	pH	7.8	6.5 - 8.5
TAN/TSF #1 Well, TAN-612	Tetrachloroethylene	0.0029 ^a	0.005
	Trichloroethylene	0.01 ^a	0.005
TAN/TSF #2 Well, TAN-613	Tetrachloroethylene	0.001 ^a	0.005
	Trichloroethylene	0.0033 ^a	0.005
TAN/TSF distribution system, TAN-610	Nitrate/Nitrite as N	1.15	10
	Arsenic	0.0031	0.05
	Barium	0.074	1
	Cadmium	0.00009	0.005
	Chromium	0.0045	0.1
	Lead	0.0006	0.015
	Nickel	0.0051	0.1
	Selenium	0.0018	0.05
	Fluoride	0.2	4
	Sulfate	28	250
	Chloride	14	250
	TDS	240	500
	Alkalinity	160	--
	Hardness (as CaCO ₃)	140	--
	pH	8.0	6.5 - 8.5
	Tetrachloroethylene	0.0008 ^a	0.005
	Trichloroethylene	0.003 ^a	0.005
TRA distribution system, TRA-608	Nitrate/Nitrite as N	1	10
	Arsenic	0.0020	0.05
	Cadmium	0.00012	0.005
	Chromium	0.0036	0.1
	Lead	0.0012	0.015
	Nickel	0.011	0.1
	Sulfate	19	250
	Chloride	10	250
	TDS	230	500
	Alkalinity	190	--
	Hardness (as CaCO ₃)	140	--
	pH	7.7	6.5 - 8.5

Table 6. (continued).

Location	Parameter	Results (mg/L)	MCL/SMCL(mg/L)
WRRTF distribution system, TAN-645	Nitrate/Nitrite as N	0.8	10
	Antimony	0.0003	0.006
	Arsenic	0.0024	0.05
	Barium	0.053	1
	Cadmium	0.00058	0.005
	Chromium	0.0034	0.1
	Lead	0.0043	0.015
	Nickel	0.0045	.1
	Selenium	0.0018	0.05
	Fluoride	0.2	4
	Sulfate	28	250
	Chloride	12	250
	TDS	240	500
	Alkalinity	160	--
	Hardness (as CaCO ₃)	120	--
	pH	8.0	6.5 - 8.5
	Tetrachloroethylene	0.0042 ^a	0.005
	Trichloroethylene	0.0115 ^a	0.005
WRRTF Well, TAN-644	Tetrachloroethylene	0.0011 ^a	0.005
	Trichloroethylene	0.0039 ^a	0.005

a. Based on an average concentration rather than a one time concentration.

b. TDS - total dissolved solids.

Table 7. Copper and lead data for the 1994 sampling.

Location	Parameter	Results (mg/L)	MCL (mg/L)
CFA-602	Lead	0.0014	0.015
	Copper	0.0032	1.3
	Lead	0.0065	0.015
	Copper	0.0098	1.3
CFA-606	Lead	0.031 ^a	0.015
	Copper	0.037	1.3
	Lead	0.0043	0.015
	Copper	0.0099	1.3
	Lead	0.004	0.015
	Copper	0.015	1.3
CFA-607	Lead	0.0021	0.015
	Copper	0.0083	1.3
	Lead	0.01	0.015
	Copper	0.007	1.3
CFA-615	Lead	0.0023	0.015
	Copper	0.2	1.3
	Lead	--	0.015
	Copper	0.13	1.3
	Lead	0.0009	0.015
	Copper	0.2	1.3
CFA-643	Lead	0.024 ^a	0.015
	Copper	0.076	1.3
	Lead	0.011	0.015
	Copper	0.025	1.3
CFA-652	Lead	0.0077	0.015
	Copper	0.091	1.3
	Lead	0.012	0.015
	Copper	0.045	1.3
CFA-663	Lead	0.0029	0.015
	Copper	0.22	1.3
	Lead	0.0079	0.015
	Copper	0.24	1.3
CFA-674	Lead	0.022 ^a	0.015
	Copper	0.025	1.3
	Lead	0.0082	0.015
	Copper	0.0037	1.3
CFA-681	Lead	0.008	0.015
	Copper	0.34	1.3
EBR-I	Lead	0.0024	0.015
	Copper	0.0072	1.3
	Lead	0.0041	0.015
	Copper	0.072	1.3
	Lead	0.0071	0.015
	Copper	0.021	1.3
Gun Range	Lead	0.0006	0.015
	Copper	0.15	1.3

Table 7. (continued).

Location	Parameter	Results (mg/L)	MCL (mg/L)
Gun Range (cont.)	Lead	0.0019	0.015
	Copper	0.33	1.3
	Lead	0.0038	0.015
	Copper	0.28	1.3
Main Gate	Lead	0.0015	0.015
	Copper	0.037	1.3
	Lead	0.0015	0.015
	Copper	0.095	1.3
	Lead	0.0047	0.015
	Copper	0.059	1.3
	Lead	0.0039	0.015
	Copper	0.065	1.3
	Lead	0.0026	0.015
	Copper	0.089	1.3
	Lead	0.0053	0.015
	Copper	0.042	1.3
PBF-612	Lead	0.002	0.015
	Copper	0.025	1.3
	Lead	0.021 ^a	0.015
	Copper	0.021	1.3
	Lead	0.041 ^a	0.015
	Copper	0.019	1.3
PBF-613	Lead	0.012	0.015
	Copper	0.0062	1.3
	Lead	0.0095	0.015
	Copper	0.0058	1.3
PBF-632	Lead	0.0008	0.015
	Copper	0.0035	1.3
	Lead	0.001	0.015
	Copper	0.0032	1.3
	Lead	--	0.015
	Copper	0.0024	1.3
	Lead	0.0024	0.015
	Copper	0.0041	1.3
RWMC-601	Lead	0.001	0.015
	Copper	0.024	1.3
	Lead	0.0005	0.015
	Copper	0.0031	1.3
RWMC-610	Lead	0.0053	0.015
	Copper	0.37	1.3
	Lead	--	0.015
	Copper	0.052	1.3
	Lead	0.0042	0.015
	Copper	0.087	1.3
RWMC-613	Lead	0.0022	0.015
	Copper	0.1	1.3
	Lead	0.015	0.015

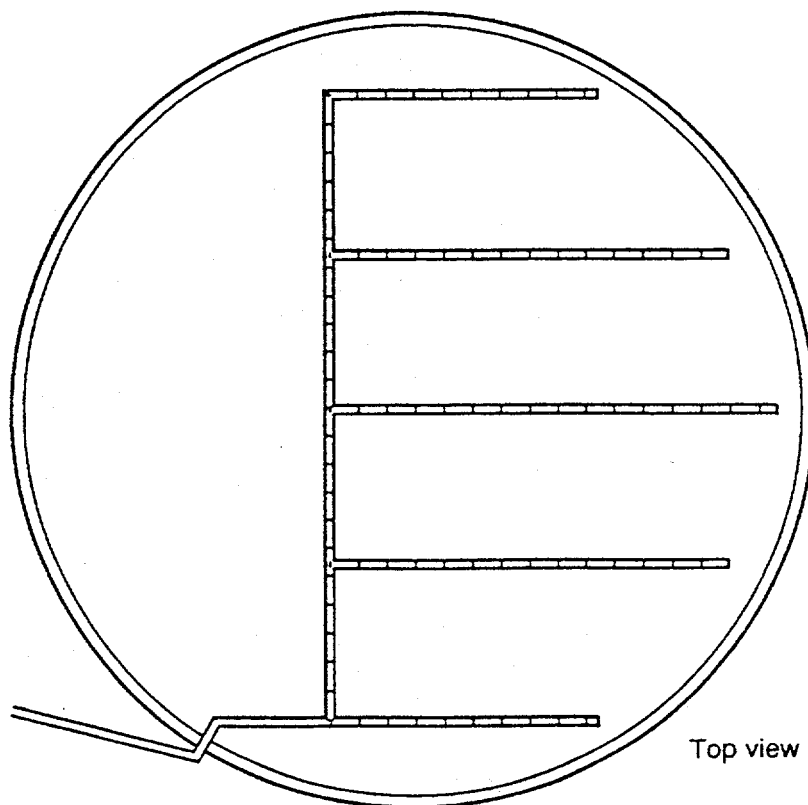
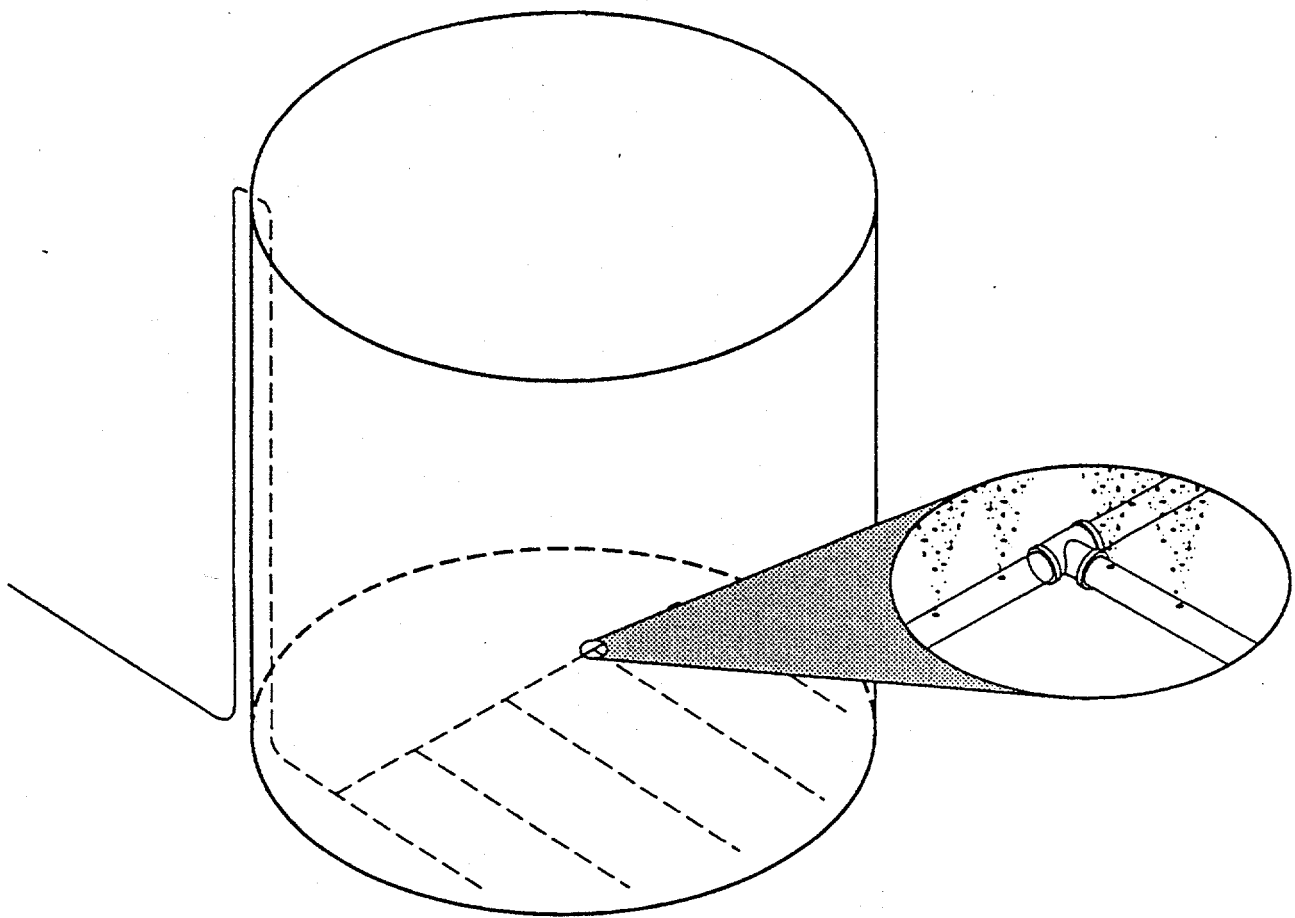
Table 7. (continued).

Location	Parameter	Results (mg/L)	MCL (mg/L)
	Copper	0.092	1.3
	Lead	0.0014	0.015
	Copper	0.1	1.3
TAN-610	Lead	0.013	0.015
	Copper	0.017	1.3
TAN-615	Lead	0.001	0.015
	Copper	0.0038	1.3
	Lead	0.0063	0.015
	Copper	0.022	1.3
TAN-653	Lead	0.021 ^a	0.015
	Copper	0.15	1.3
	Lead	0.0096	0.015
	Copper	0.095	1.3
	Lead	0.0019	0.015
	Copper	0.04	1.3
	Copper	0.15	1.3
TAN-678	Lead	0.0032	0.015
	Lead	0.0081	0.015
	Copper	0.071	1.3
	Lead	0.0012	0.015
	Copper	0.099	1.3
	Lead	0.0011	0.015
	Copper	0.073	1.3
	Lead	0.0018	0.015
	Copper	0.058	1.3
	Lead	0.0022	0.015
	Copper	0.067	1.3
TAN-687	Lead	0.0069	0.015
	Copper	0.069	1.3
	Lead	0.0029	0.015
	Copper	0.018	1.3
TRA-608	Lead	--	0.015
	Copper	0.27	1.3
	Lead	0.0013	0.015
	Copper	0.078	1.3
	Lead	0.0075	0.015
	Copper	0.18	1.3
TRA-609	Lead	0.011	0.015
	Copper	0.2	1.3
	Lead	0.0059	0.015
	Copper	0.13	1.3
TRA-614	Lead	0.0069	0.015
	Copper	0.072	1.3
	Lead	0.001	0.015
	Copper	0.035	1.3
	Lead	0.0045	0.015
	Copper	0.057	1.3

Table 7. (continued).

Location	Parameter	Results (mg/L)	MCL (mg/L)
TRA-647	Lead	0.0019	0.015
	Copper	0.006	1.3
	Lead	0.001	0.015
	Copper	0.077	1.3
	Lead	0.009	0.015
	Copper	0.044	1.3
	Lead	0.0033	0.015
	Copper	0.012	1.3
TRA-679	Lead	0.0011	0.015
	Copper	0.069	1.3
	Lead	0.0005	0.015
	Copper	0.089	1.3
	Lead	0.001	0.015
	Copper	0.15	1.3
TRA-680	Lead	0.0025	0.015
	Copper	0.2	1.3
	Lead	0.0016	0.015
	Copper	0.27	1.3
	Lead	0.0011	0.015
	Copper	0.22	1.3
	Lead	0.001	0.015
	Copper	0.19	1.3

a. Action level exceeded.



Top view

B93 0077

Figure 2. Sparger system installed in the water storage tank at TAN/TSF distribution system, TAN-610.

2.3.4 Central Facilities Area

Water samples were collected from CFA #1 well, located in CFA-651; CFA #2 well, located in CFA-642; and from CFA-641, which is the point of entry to the distribution system and the compliance point for sampling (Figure 3). In October 1994, the compliance point was changed because a new pump house (CFA-1603) was built as part of the CFA water system upgrade, and CFA-641 was demolished.

At the point of entry to the distribution system, mean concentration of tritium, as determined by RESL, was 14,258 pCi/L. Results for samples sent to ALR indicated that the mean concentration of tritium at the point of entry to the distribution system for 1994 was 13,670 pCi/L. Since December 1991, the tritium concentration has been below the MCL of 20,000 pCi/L. Figure 4 illustrates the variation of tritium concentrations overtime. During September through December, there is an increase in the tritium level due to construction activity on the CFA #2 well. TCE was detected in both wells and the distribution system at concentrations below the MCL. Disposal of wastewater from 1952 until 1984 at ICPP and from 1952 until 1982 at TRA contributed to tritium concentrations in the aquifer. The increased concentration of tritium in CFA #1 well is related to the increase of water usage and the possibility of plume migration.

The results of all detected parameters for the CFA water systems are listed in Table 5 for the radiological and Table 6 for the nonradiological. Table 7 lists the results of lead and copper sampling at CFA collected during June of 1994. No parameters were detected at levels exceeding the Federal or State regulated MCLs at the CFA wells or the distribution system with the exception of lead. Lead was detected at CFA-606, -643, and -674 at concentrations of 0.031 mg/L, 0.024 mg/L, and 0.022 mg/L, respectively (Table 4). These levels would indicate that the piping in the buildings have higher levels of lead than other areas. An action level is set for lead at 0.015 mg/L. This level is exceeded if lead concentrations are greater than 0.015 mg/L of lead in more than 10% of tap water samples collected (the 90th percentile). The 90th percentile contaminant level for CFA is at 0.0081 mg/L.

2.3.5 Main Gate

Water samples were collected from the Main Gate well and distribution system, located in B27-605 (Figure 5).

A sample that was collected as a best management practice during the month of September was positive for coliform bacteria at a sample point. All test results before and since have been negative for coliform bacteria (Table 4). No other Federal or State MCLs were exceeded at the Main Gate well or distribution system in 1994. The results of the 1994 Main Gate well and distribution system drinking water analyses are listed in Table 5 for the radiological and Table 6 for the nonradiological parameters. The Main Gate is a transient, noncommunity water system and is not required to be sampled for lead and copper in accordance with 40 CFR 141.80-141.91.¹ As a best management practice, samples were collected and analyzed for lead and copper. Table 7 lists the results, and all samples collected were below the action levels of 0.015 mg/L for lead and 1.3 mg/L for copper at the 90th percentile.

Figure 3. CFA sampling locations.

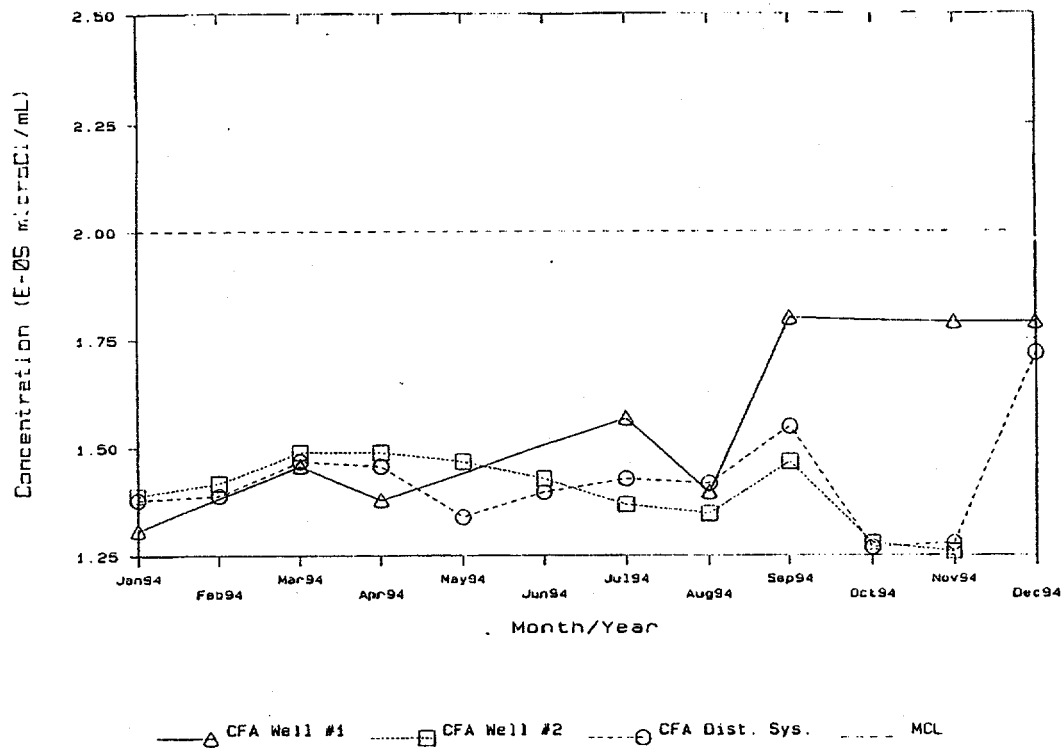


Figure 4. Monthly tritium concentrations in CFA drinking water during 1994.

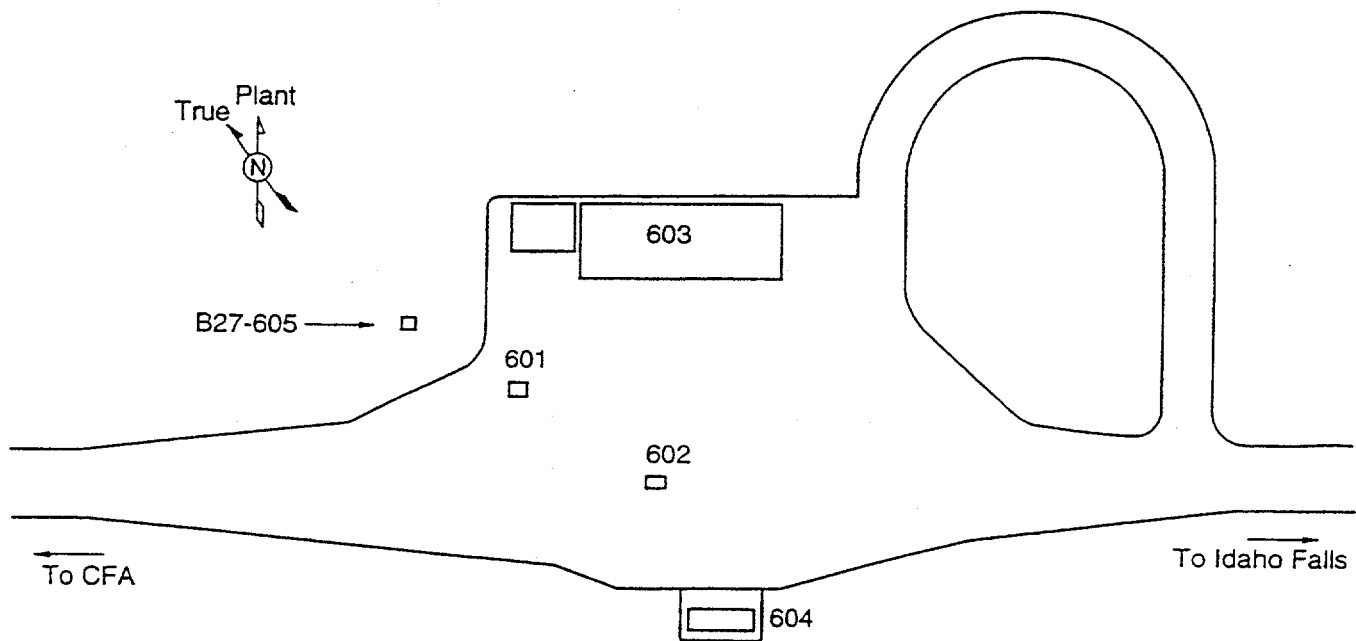


Figure 5. Main Gate well sampling location.

V92 0024

2.3.6 Power Burst Facility

Water samples were collected from the PBF #1 well, located at PBF-602; PBF #2 well, located in Building-614; and PBF distribution system, located in PBF-602 (Figure 6). PBF #1 and PBF #2 wells supply drinking water to all personnel at the PBF area. Approximately 120 people use the PBF water system.

No parameters were detected at concentrations exceeding the Federal and State MCLs at the PBF #1 well and PBF #2 well. The 1994 data are consistent with previous data. The concentrations of detected parameters of the 1994 drinking water analyses for the PBF wells are listed in Table 5 for radiological and Table 6 for nonradiological parameters. Lead was detected at PBF-612 above the action level of 0.015 mg/L, but below the 90th percentile for samples collected for regulatory purposes. An action level is set for lead at 0.015 mg/L. This level is exceeded if lead concentrations are greater than 0.015 mg/L in more than 10% of tap water samples collected (the 90th percentile). The 90th percentile contaminant level for PBF is 0.0095 mg/L. Table 7 lists the results of lead and copper sampling at PBF during June of 1994. No other parameters analyzed exceeded the MCLs established by EPA in 40 CFR Parts 141-143.¹ The concentration of lead detected in the PBF water system is listed in Table 4.

2.3.7 Experimental Breeder Reactor No. I

Water samples were collected from the EBR-I well, located at EBR-711; and the EBR-I distribution system, located at EBR-601 (see Figure 7).

Samples collected from EBR-I distribution system were collected from the wellhead and distribution system. There were no MCLs exceeded at the wellhead or distribution system. Concentrations of detected parameters for 1994 drinking water analyses of the EBR-I well are listed in Table 5 for the radiological and Table 6 for the nonradiological parameters. EBR-I is a transient, noncommunity water system and is not required to be sampled for lead and copper in accordance with 40 CFR Part 141.80-141.91.¹ As a best management practice, samples were collected and analyzed for lead and copper. Table 7 lists the results of lead and copper sampling and all samples collected were below the action levels of 0.015 mg/L for lead and 1.3 mg/L for copper at the 90th percentile.

2.3.8 Gun Range

Water samples were collected from the Gun Range well and distribution system, located at B21-607 (Figure 8). One well and one building are found at the Gun Range facility. The well was completed and put into service January 1990.

A chlorination system was installed in 1994 to correct general bacteria problems encountered during 1991 and 1992. No MCLs were exceeded either at the wellhead or in the distribution system for 1994 drinking water analyses. Parameters detected for the Gun Range well for 1994 are listed in Table 5 for the radiological and Table 6 for the nonradiological parameters. The Gun Range is a transient, noncommunity water system and does not require lead and copper sampling in accordance with 40 CFR Part 141.80-141.91.¹ As a best management practice, samples were collected and analyzed for lead and copper. Table 7 lists the results, and all samples collected were below the action levels of 0.015 mg/L for lead and 1.3 mg/L for copper at the 90th percentile.

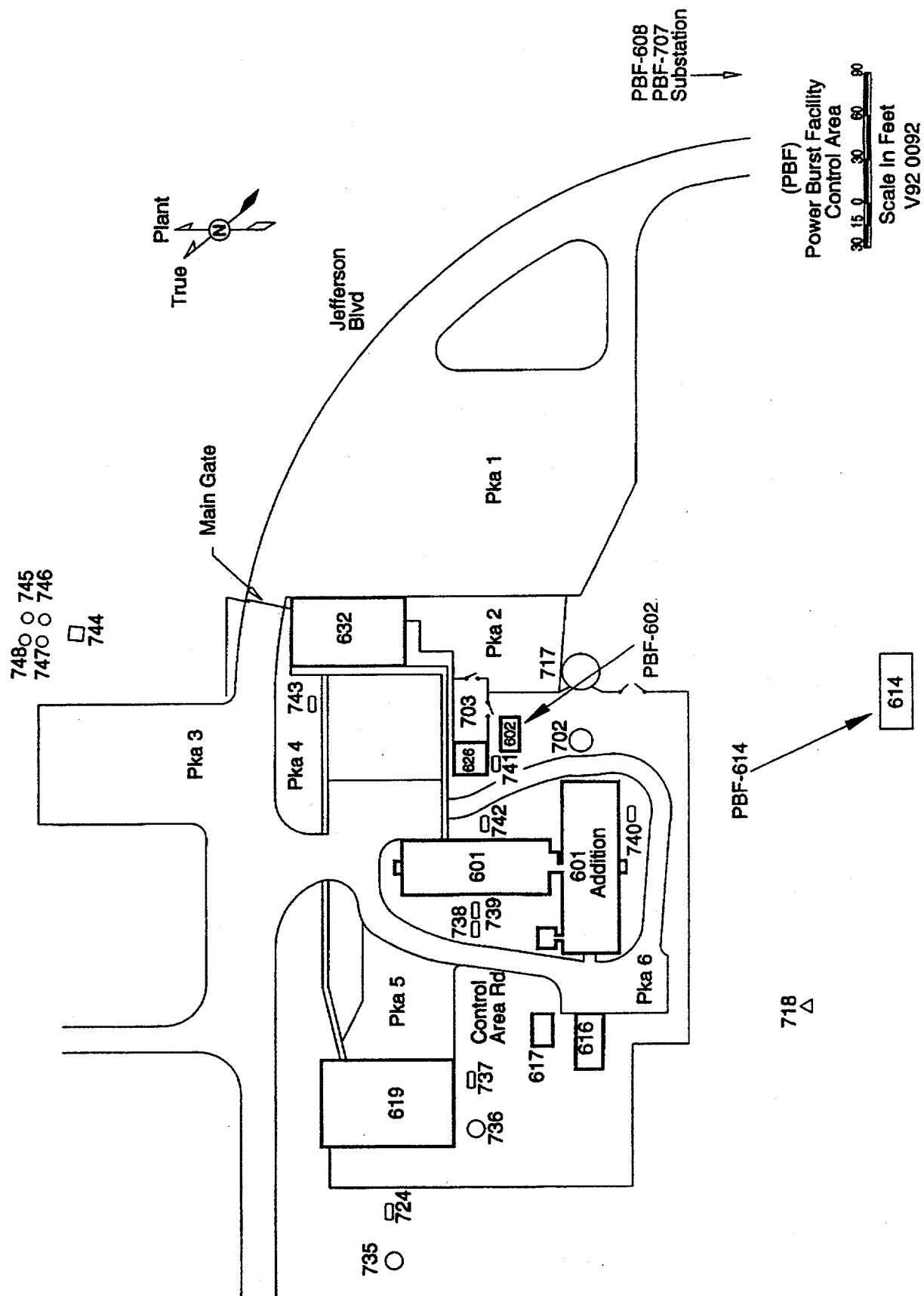


Figure 6. PBF sampling locations.

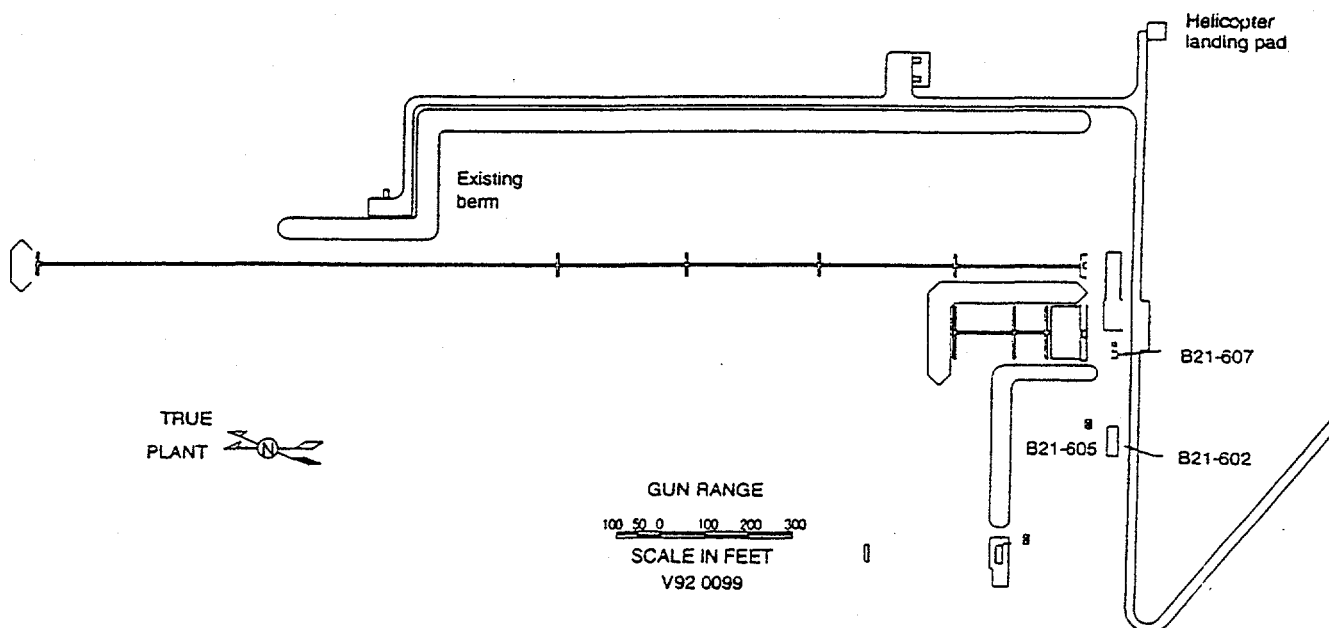


Figure 8. Gun Range sampling location.

2.3.9 Fire Station #2 (Inactive)

Water samples were collected from the Fire Station #2 well, located in B16-602, approximately two miles north of ICPP on Lincoln Boulevard, and the Fire Station #2 distribution system, located in B16-601. A site-specific map of the fire station is not available. The well was put into service in December 1957. This water system is inactive and does not supply drinking water to personnel. It is used for groundwater monitoring information purposes. All contaminants were below the MCLs and are listed in Table 5 for the radiological and Table 6 for the nonradiological parameters. Fire Station #2 is a transient, noncommunity water system and is not required to be sampled for lead and copper in accordance with 40 CFR Part 141.80-141.91.¹ As a best management practice, samples were collected and analyzed for lead and copper. Table 7 lists the results, and all samples collected were below the action levels of 0.015 mg/L for lead and 1.3 mg/L for copper at the 90th percentile.

2.3.10 Test Reactor Area

Water samples were collected from the TRA #1 well, located at TRA-601; TRA #3 well, located at TRA-650; TRA #4 well, located at TRA-672; and the TRA distribution system, located at TRA-608 (Figure 9). The three wells were put into service in 1950, 1957, and 1963, respectively. TRA-608 is the point of entry to the distribution system where compliance samples are collected and where the water from the three wells is distributed throughout the TRA water system.

Parameters detected at the TRA wells are listed in Table 5 for the radiological and Table 6 for the nonradiological. No MCLs were exceeded for samples collected from the TRA water system. One sample was positive for coliform bacteria in the month of July (Table 4). An investigation revealed that the drinking fountain was rarely used, and the bacteria detection was related to stagnant water in the fountain. Preventive measures (i.e., eliminating rarely used drinking fountains) by TRA have corrected this situation. Resampling since has shown no bacteria detection.

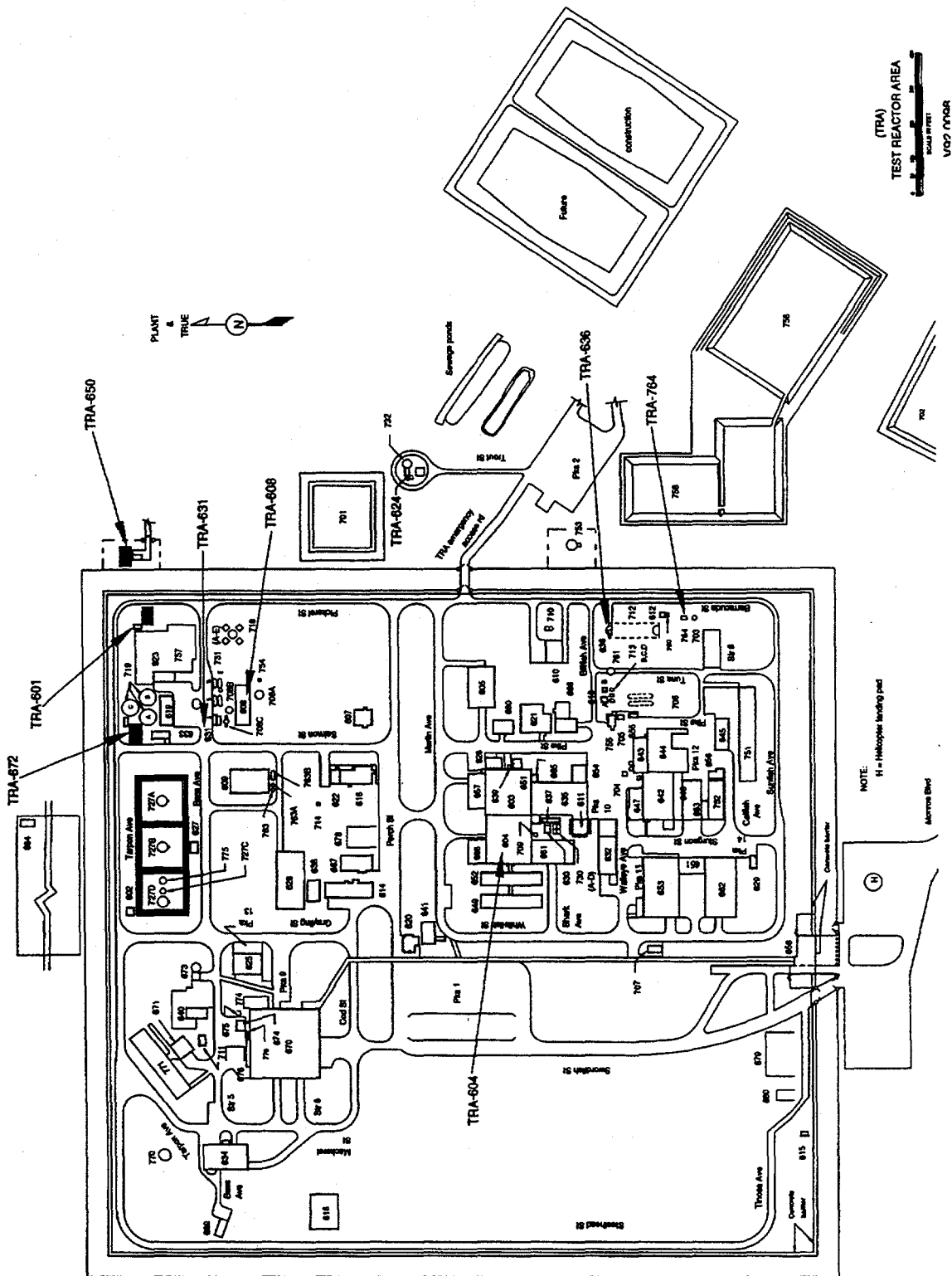


Figure 9. TRA sampling locations.

Lead and copper concentrations did not exceed the established MCLs. Table 7 lists the results of lead and copper sampling at the TRA distribution system during June of 1994.

2.3.11 Test Area North

Water samples were collected from 5 wells and 3 distribution systems:

- TSF Water System (see Figure 10)
 - TSF #1 Well, located in TAN-612
 - TSF #2 Well, located in TAN-613
 - TSF distribution system, located in TAN-610
- CTF Water System (see Figure 11)
 - CTF #1 Well, located in TAN-632
 - CTF #2 Well, located in proximity of TAN-639
 - CTF distribution system, located in TAN-614
- WRRTF Water System (see Figure 12)
 - WRRTF Well, located in TAN-644
 - WRRTF distribution system, located in TAN-655.

2.3.11.1 TSF Water System. Concentrations of TCE averaged 0.011 mg/L in TSF #1 Well, which exceeds the MCL of 0.005 mg/L (Table 4). Even though the MCL was exceeded at the wellhead, the compliance point is the point of entry to the distribution system (TSF-610) after treatment. Figure 13 illustrates the concentrations of TCE in both TSF wells and the distribution system during 1994. The differences between the two wells are attributed to different usage rates of the wells, proximity to the contamination source, and groundwater mobility. The TSF-05 injection well is the most likely source of TCE contamination.

A sample collected from TSF #2 well in October and a sample collected from the TSF distribution system in August exceeded the EPA drinking water standard of 0.005 mg/L for TCE (Table 4). The exceedance in the distribution system was due to a failure with the sparger system. A sparger system is an air stripping process to volatilize the TCE, thus reducing the concentrations below the MCL. Resampling occurred after the system was repaired, and subsequent analytical results were less than 0.005 mg/L. Annual concentrations of TCE averaged 0.0033 mg/L for TSF #2 well and 0.003 mg/L for the TSF distribution system. For systems that are conducting monitoring at a frequency greater than annually, compliance is determined by comparison of the MCL with a running annual average of four consecutive samples collected at each sampling point. If the annual average of any sampling point is greater than the MCL, then the system is considered out of compliance.

Water samples for coliform bacteria were collected monthly. Coliform bacteria was detected in the TSF water system for the months of July through December (Table 4). Bottled water was supplied to personnel working at TSF during those months. Investigations aimed at determining the actual source of coliform bacteria were unsuccessful, but the presence of the bacteria is believed to result from a combination of old deteriorating pipes, stagnant water buildup, and a biofilm problem, which can cause a positive coli-

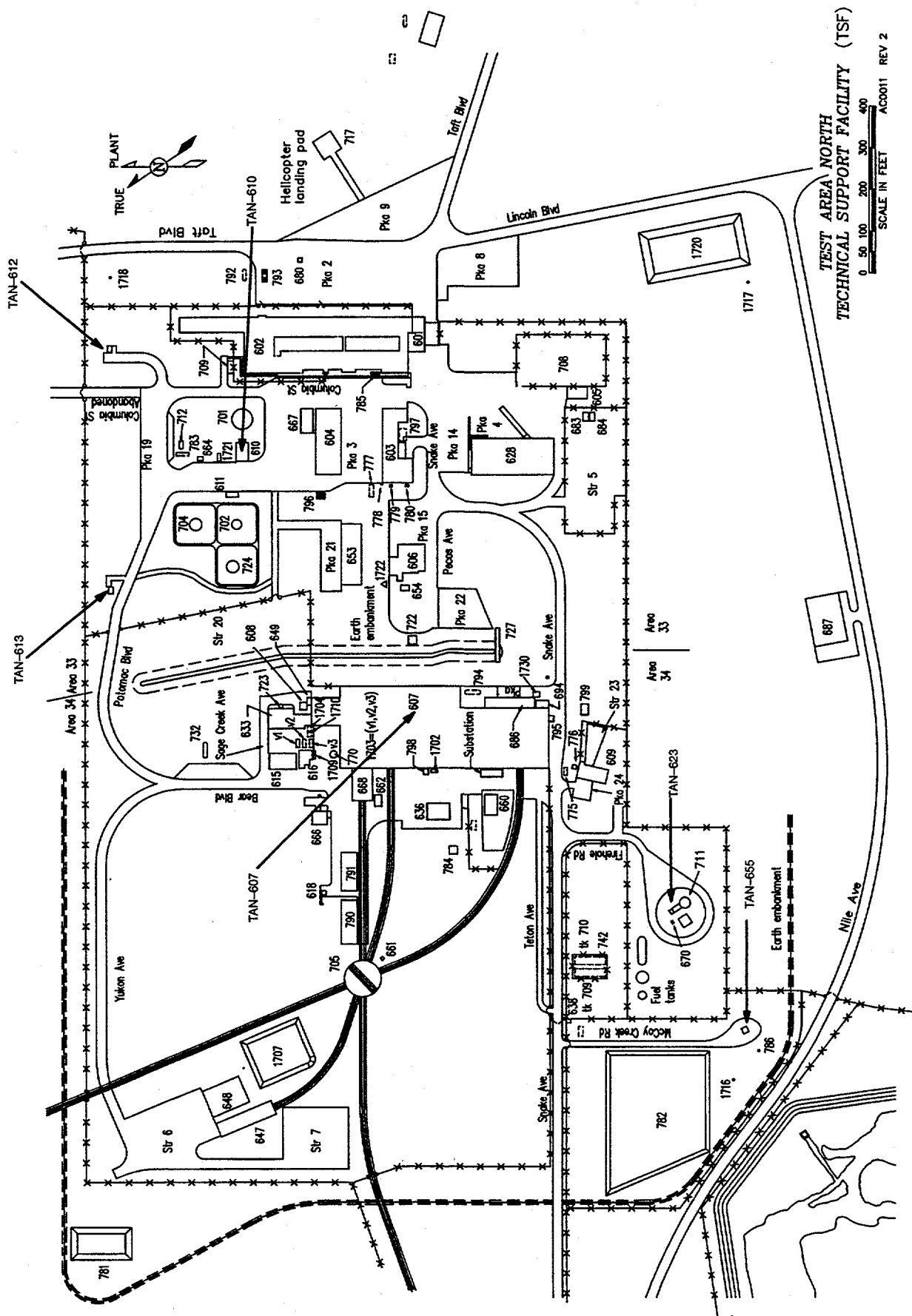


Figure 10. TSF water system sampling locations.

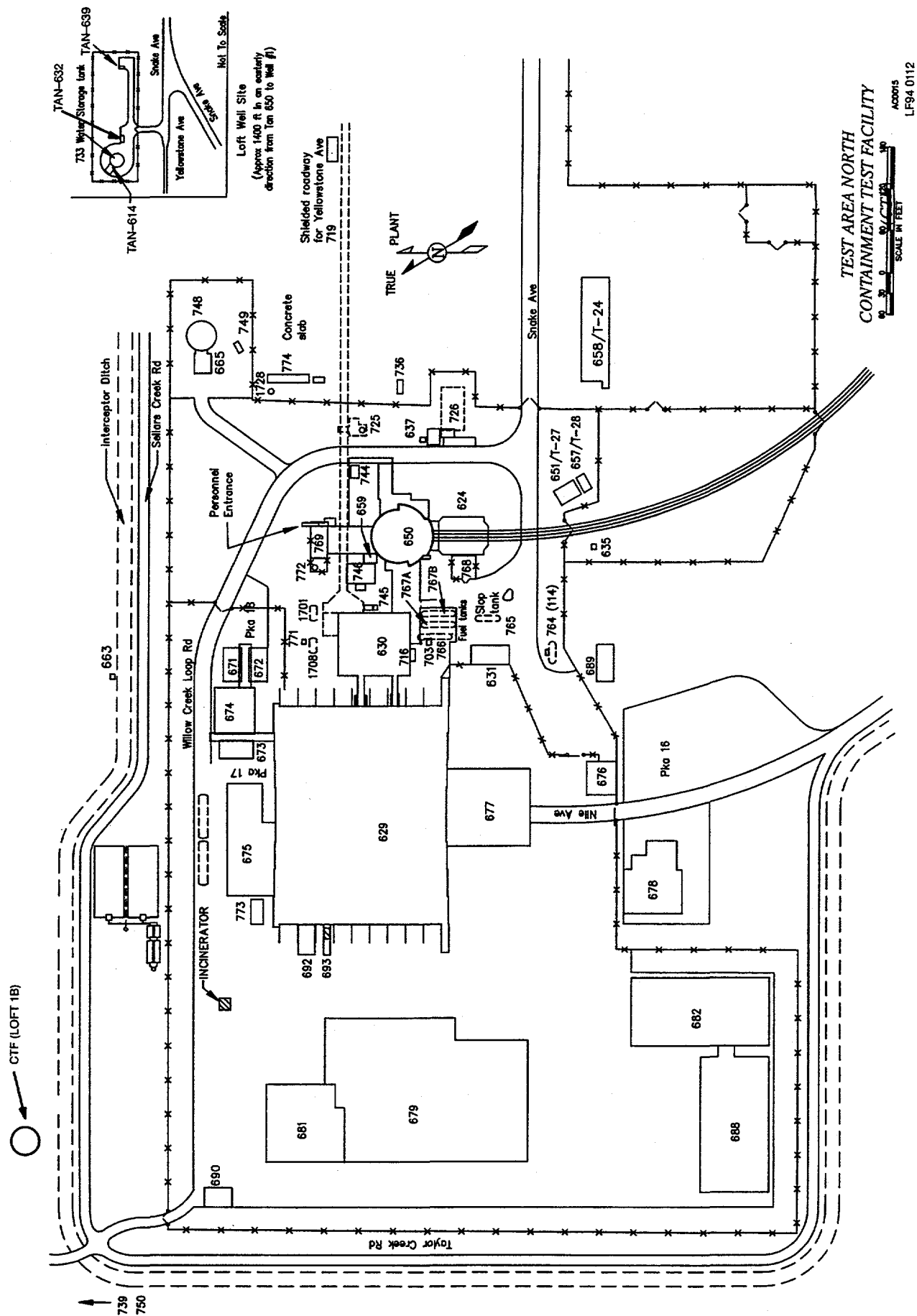


Figure 11. CTF water system sampling locations.

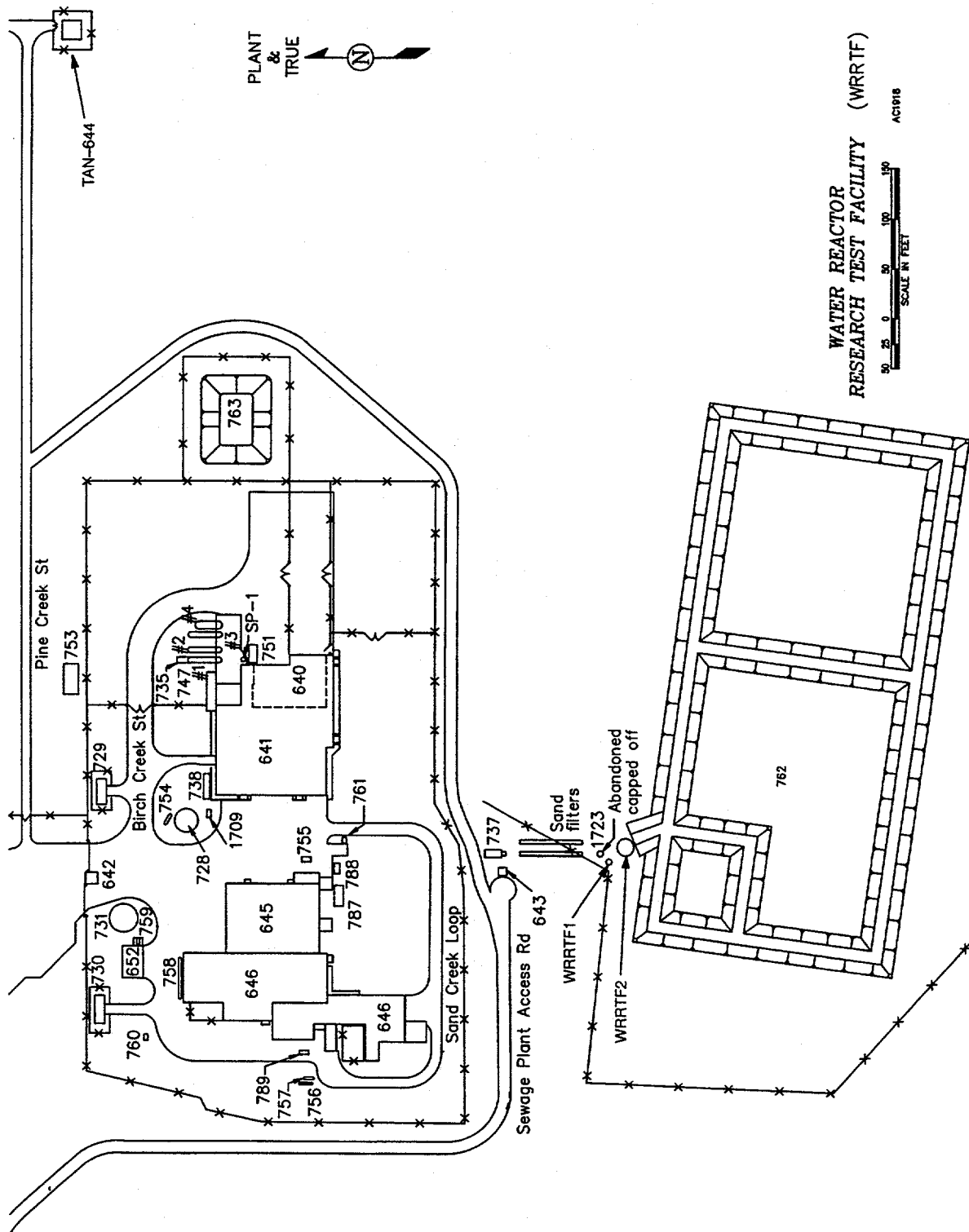


Figure 12. WRRTF water system sampling locations.

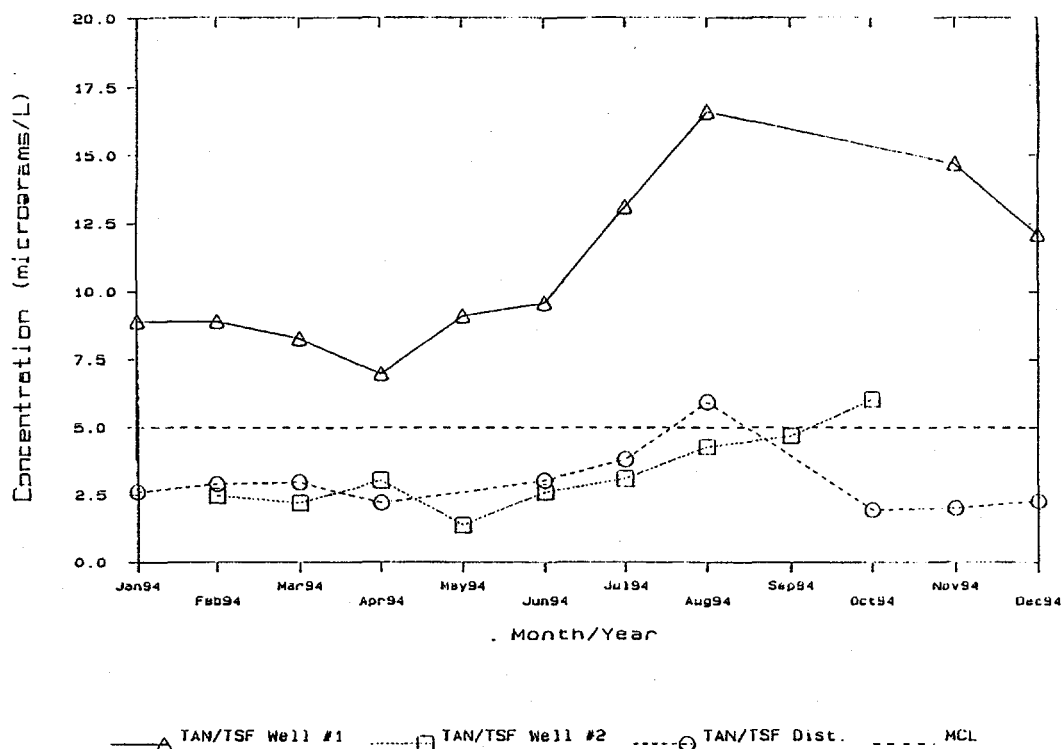


Figure 13. Monthly TCE concentration in TSF drinking water systems during 1994.

form detection. No other MCL drinking water standards were exceeded. In August 1995, a permanent chlorination system was installed.

Table 5 lists the radiological parameters and Table 6 lists the nonradiological parameters detected during 1994. Lead and copper concentrations did not exceed the established MCLs. Table 7 lists the results, and all samples collected were below the action levels of 0.015 mg/L for lead and 1.3 mg/L for copper at the 90th percentile.

2.3.11.2 CTF Water System. CTF #1 well located at TAN-632 and CTF #2 well located at TAN-639 supply all the drinking water to the CTF area. The CTF #1 and #2 wells were put into service in 1957 and 1958, respectively. TAN-614 is the compliance monitoring point. The CTF water system serves approximately 300 people. One sample was positive for coliform bacteria in the month of June (Table 4). An investigation revealed that the drinking fountain from which the sample was drawn was rarely used, and the bacteria detection was related to stagnant water in the fountain. Preventive measures (e.g., eliminating rarely used drinking fountains) by CTF personnel have corrected this situation. Resampling results have tested negative for bacteria.

No MCLs were exceeded during 1994. Detected parameters for drinking water in the CTF wells are listed in Table 5 for the radiological and Table 6 for the nonradiological parameters. Table 7 lists the results of lead and copper sampling, and all samples collected were below the action levels of 0.015 mg/L for lead and 1.3 mg/L for copper at the 90th percentile.

2.3.11.3 WRRTF Water System (Inactive). The well at WRRTF has been placed on inactive status by the State of Idaho, LITCO, and DOE-ID. All drinking fountains have been taken out of service. TCE was detected in the WRRTF distribution system at a concentration exceeding the MCL (Table 4). The concentration of TCE has remained consistent each month since it was first detected in 1988. Personnel

assigned to WRRTF use bottled water, which is sampled monthly for bacteriological analyses. PCE was detected, but was well below the MCL in the distribution system. No MCL other than that for TCE was exceeded.

The well at WRRTF was sampled for analysis of radiological constituents for trend analysis, which has stayed consistent over the years. Concentrations of radiological parameters, TCE, and PCE are listed in Table 5 for the radiological and Table 6 for the nonradiological parameters. WRRTF is an inactive transient, noncommunity water system and is not required to be sampled for lead and copper in accordance with 40 CFR Part 141.80-141.91;¹ therefore, no lead and copper samples were collected during 1994. Since this well is only used for trending, it was determined that no best management practice samples would be collected.

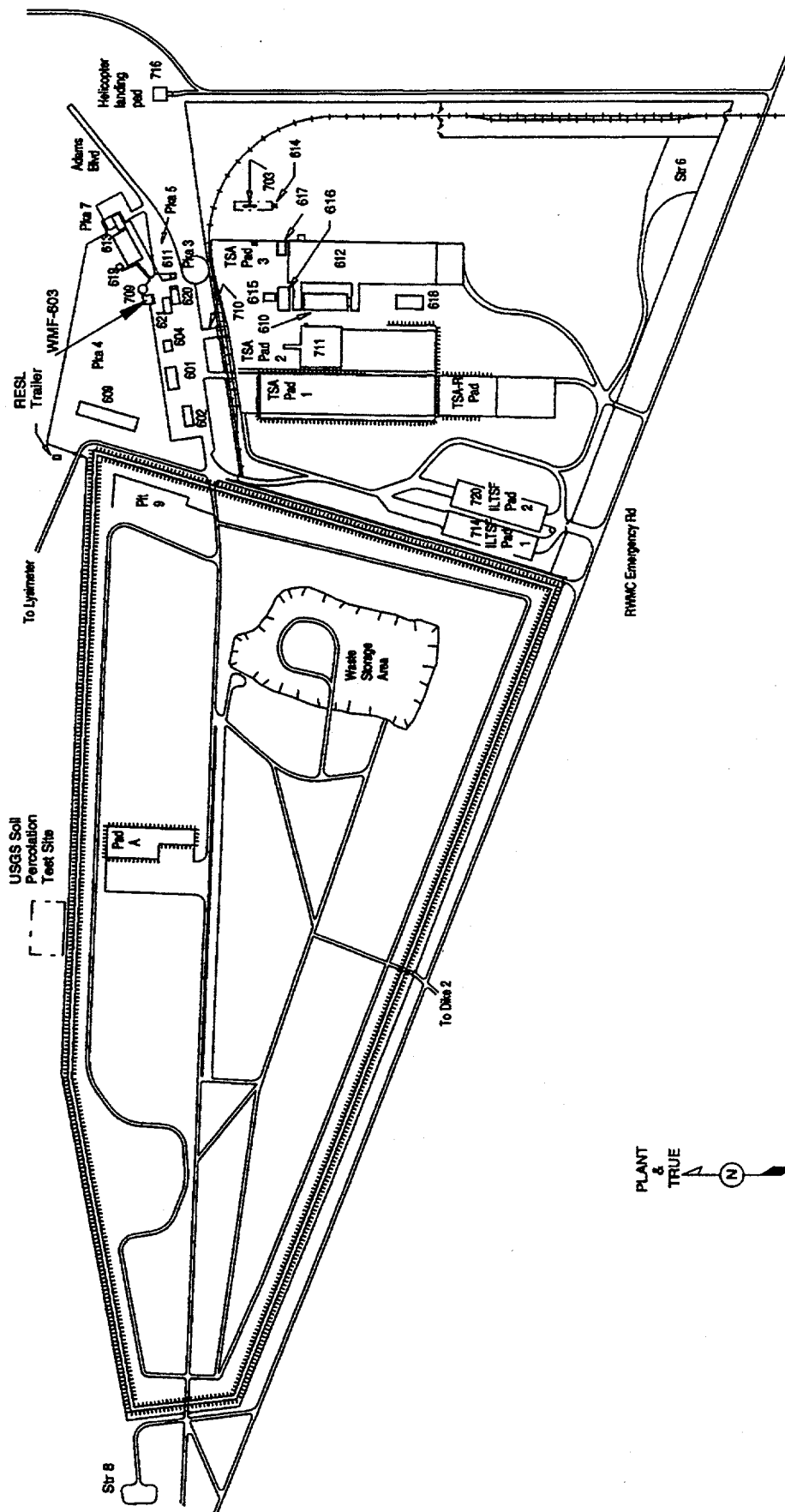
2.3.12 Radioactive Waste Management Complex

The RWMC well, located in building Waste Management Facilities (WMF)-603, supplies all the drinking water to the RWMC. The well was put into service in 1974. Water samples were collected from the RWMC well and from the starting point of the distribution system, which is also located at WMF-603 (Figure 14).

Since 1989, concentrations of carbon tetrachloride have remained in a limited range with a mean value near 0.0027 mg/L for the RWMC well and 0.0018 mg/L for the RWMC distribution system, which is less than the MCL of 0.005 mg/L. Figure 15 illustrates the carbon tetrachloride results for 1994. The production well is being monitored for trends and VOC regulatory limits. Sampling is being performed semiannually at the well because detected concentrations are stable and are less than the MCL. Sampling is being performed quarterly from the distribution system. The results of detected parameters for the well and distribution system are listed in Table 5 for the radiological and Table 6 for the nonradiological parameters. Lead and copper concentrations did not exceed the established MCLs. Table 7 lists the results of the lead and copper sampling at the RWMC distribution system during June of 1994.

USGS Well # 87 □
WMF-805

USGS Soil
Percolation
Test Site



PLANT
& TRUE
N

(RWMC)
RADIOACTIVE WASTE
MANAGEMENT COMPLEX
200 100 0 200 400 600
SCALE IN FEET
V82 0095

Figure 14. RWMC sampling locations.

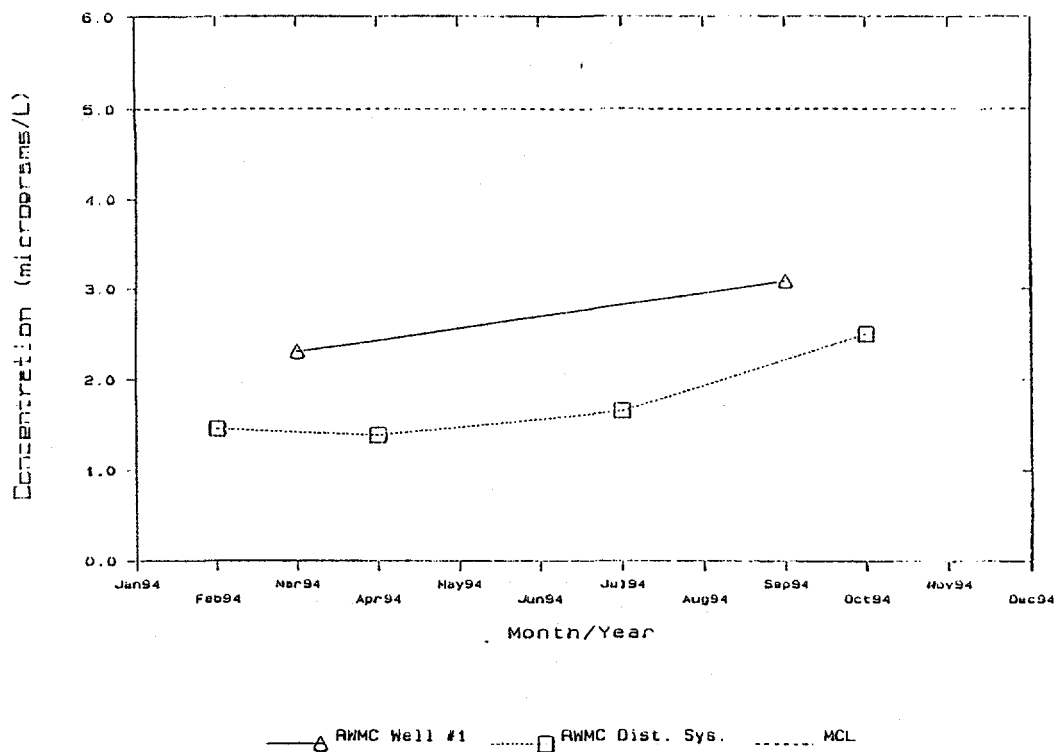


Figure 15. Monthly carbon tetrachloride concentrations in the RWMC drinking water systems.

3. NONRADIOLOGICAL LIQUID EFFLUENT MONITORING PROGRAM

EG&G Idaho instituted the Nonradiological Liquid Effluent Monitoring Program in fiscal year 1986. LITCO assumed the responsibilities of this program on October 1, 1994. This program provides environmental monitoring for nonradioactive parameters and pollutants in liquid waste effluents generated within selected facilities at the INEL. This effort involves sampling, analysis, and data interpretation carried out under a rigorous QA Program.

Before the implementation of this program, no cohesive sampling and analysis effort existed. This effort was directed towards nonradioactive species in the liquid effluents generated by various INEL operations. In 1984, an agreement between DOE and the EPA mandated the establishment of nonradiological environmental monitoring at DOE facilities to ensure compliance with applicable Federal, State, and local regulations and to ensure the protection of human health and the environment. The level of monitoring effort at each DOE facility is determined on a case-by-case basis. The monitoring level shall be consistent with regulatory requirements and the degree of environmental assurance required by activities at each facility.

Issued DOE and DOE-ID orders required that a comprehensive effluent monitoring plan be developed and implemented at the INEL (see Table 8). LITCO's safety organization developed a set of preliminary facility monitoring plans which identified effluent sampling locations and parameters that delineated minimum criteria for program operation.

Effluent monitoring entails the collection and analysis of samples and other measurements for the purpose of establishing the type and concentration of pollutants in liquid discharges from facilities. Because of the technical expertise and analytical equipment necessary to operate an EPA-auditable program, LITCO's safety organization decided to implement the nonradiological liquid effluent monitoring portion of the preliminary facility monitoring plans and to have this monitoring conducted on a site-wide basis by a single organization. This led to the formation of the Nonradiological Liquid Effluent Monitoring Program administered by Environmental Monitoring. The objective of the program involves monitoring, evaluating, and reporting onsite discharges of liquid effluents in the vicinity of DOE sites, and assessing the levels of pollutants and their impact on the public and the environment. Table 9 lists the parameters analyzed in 1994.

3.1 Nonradiological Liquid Effluent Monitoring Program Analytical and Sampling Design and Methodology

Parameters of interest for each liquid effluent stream were specified in the preliminary facility monitoring plans and were used as a basis to begin characterization of the effluent streams for the initial sampling effort in fiscal year 1986. Descriptions of all monitored effluent streams are given in Section 3.3.2. Parameters monitored in 1993 were reviewed in 1994 to accommodate new regulations, orders, and codes, and to reflect the changing processes at the INEL.

Standard methods (i.e., SW-846⁴ and *Standard Methods for the Examination of Water and Wastewater*²⁰) are used to analyze samples when such methods are required by regulatory programs. Analyses not required by regulations are conducted as determined by site-specific conditions. All methods used in the analysis of the effluent samples are EPA methods or approved equivalents (see Table 9). Selection of the specific method used for a particular parameter is dependent upon the sample matrix and laboratory capability. Because matrix effects can influence the precision, accuracy, and achievable detection

Table 8. Pertinent regulatory codes and orders for the nonradiological liquid effluent monitoring program.

Source	Title
City Order Chapter 1, Section 8, and Industrial Wastewater Acceptance Forms for INEL Research Center ⁵	"City of Idaho Falls Sewer Ordinance"
DOE Order 5480.1 ²⁵	"Environmental, Safety, and Health Protection Program"
DOE Order 5484.1 Chapter III ²⁶	"Environmental Protection, Safety, and Protection Information Reporting Requirements"
40 CFR 260 ²⁷	"Hazardous Waste Management System: General"
Executive Order 12088 ²⁸	"Federal Compliance with Pollution Control Standards"
IDAPA 16.01.02.200 ²⁹	"General Surface Water Quality Criteria"
IDAPA 16.01.02.600 ³⁰	"Land Application of Wastewaters or Recharge Waters"
IDAPA 16.01.17.000 ³¹	"Wastewater Land Application Permits"
DOE Order 5400.1 Chapter IV ³²	"General Environmental Protection Program"

Table 9. Analyte parameters and methods for the Nonradiological Liquid Effluent Monitoring Program.^a

Parameter	Preparation Method		Analysis Method ^b	
	ICP-AES ^c	GFAAS ^d	ICP-A-ES ^c	Aa ^e
Metals				
Arsenic	200.7	206.2, 206.3, 206.4, 206.5, 200.7	200.7	206.2
Barium	200.7	208.1, 208.2, 200.7	200.7	—
Cadmium	200.7	213.1, 213.2, 200.7	200.7	—
Chromium	200.7	218.2	200.7	218.2
Lead	200.7	200.7, 239.1, 239.2, 200.9	200.7	239.2
Nickel	200.7	200.8, 200.9, 249.1, 249.2	200.7	239.2
Selenium	200.7	270.2	200.7	270.2
Silver	200.7	200.7, 272.1 or 272.2	200.7	—
Mercury	—	245.1 ^b or 245.2	—	245.1 ^b
Thallium	200.7	279.2, 200.9, 200.8	200.7	279.2
Zinc	200.7	289.1, 189.2 or 200.7	200.7	—
Other Inorganics	—	—	—	200.7
Anions	Not applicable			
Fluoride		240.1, 340.2 or 340.3		
Chloride		325.8		
Nitrate		300.0, 353.1, 353.2, 353.3		
Phosphate		365.2		
Nitrite		300.0, 353.2, 353.3, 354.1		
Total organic carbon (TOC)	Not applicable	415.1		
Total dissolved solids (TDS)	Not applicable	160.1		
Total suspended solids (TSS)	Not applicable	160.2		
Hexavalent chromium		3111A		
pH	Not applicable	150.1		
Conductivity	Not applicable	120.1		
Cyanide (total)	335.2	335.2, 335.1, 335.3		
VOC	Not applicable	EPA-SW-846 Method 8240		
Chlorine, total residual	sm4500.CIG	—		
Ammonia as nitrogen	350.3	—		
Sulfate	375.4	—		
Sulfide	376.2	—		
Biochemical Oxygen Demand (5)	405.1	—		
Chemical Oxygen Demand	410.1; 410.4	—		
Oil and Grease, total	418.1	—		
Phenolics	420.2	—		
Methylene Blue Active Substances	425.1	—		
Total Nitrogen Kjeldahl	351.4	—		
Nitrate-Nitrite	354.1	—		
Ortho-phosphate	365.2	—		
Total phosphorous	356.2	—		

a. Unless otherwise stated, all methods are from EPA-600 4-79-020,²⁴ Method for Chemical Analysis of Water and Wastes. Methods 200.7 and 300.0 are additions to this methods manual. Depending upon the sample matrix, equivalent EPA-approved methods in EPA-SW-846²⁵ and Contract Laboratory Program Statement of Work No. 785 were used.

b. Cold vapor atomic absorption spectrometry.

c. ICP-AES - inductively coupled plasma - atomic emission spectrometry.

d. GFAAS - graphite furnace atomic absorption spectrometry.

e. AA - Atomic absorption.

limits of the analysis, it is vital that these effects be minimized by selection of the proper analytical methodology (see Table 10).

Liquid effluent streams identified in the preliminary facility monitoring plans issued by the LITCO safety organization were used as a basis for determining which effluents were included in the initial monitoring effort of fiscal year 1986. The initial monitoring plan contained the rationale and design criteria for the monitoring program, extent and frequency of monitoring and measurements, procedures for laboratory analyses, QA requirements, and program implementation. The data set on which these monitoring plans were based was extremely limited at that time, and continuing modifications have been made as the database has expanded. Effluent streams that were sampled during 1994 are listed and summarized in Section 3.3.2.

The sample collection program reflects specific facility needs. The sampling schedule for each effluent stream is designed to provide the maximum amount of data from the limited number of sampling excursions possible during the fiscal year. Beginning in October 1985, the initial sampling design required individual effluent streams to be grab-sampled once each quarter for three consecutive days. This design resulted in a total of 12 sampling excursions per effluent per year. Sampling was conducted at midweek (Tuesday, Wednesday, Thursday) during periods when the facilities were in a normal-operation mode. This approach was intended to allow evaluation of short-term and long-term variations in normal effluent-stream composition. For those effluents where composite samplers were operational, composite and grab samples were obtained to allow for more effective evaluation and selection of sampling methodologies.

The theoretical statistical implications of the original sampling schedule were reviewed, and the schedule design changed, beginning with the third quarter of fiscal year 1986 (April 1986). The statisticians involved in the design process believed that a better estimate of the day-to-day variation of the effluent streams could be obtained by considering it a random effect from a normal distribution; thus, sampling days for each effluent stream were selected at random. This stratified random approach to sampling is still the sampling theory being used.³³

In response to a Tiger Team concern, Environmental Monitoring evaluated the liquid effluent discharge processes. As a result, 13 new monitoring locations were added in April 1992.

The design of the sampling strategy provides accurate measurements of the concentration of pollutants in the effluent discharges. Sampling frequency and type are determined by considering the purpose for obtaining the data. Locations are chosen at the point where the data most closely represents the released element, when practical. Effluents discharging under a permit are monitored where the applicable standards apply.

Table 10. Nonradiological liquid effluent reporting limits.

Parameter	Instrument detection limit ^a
Metals	
Iron	100.0 µg/L
Silver	10.0 µg/L (ICP) ^b
Arsenic	10.0 µg/L (ICP); 1 µg/L (furnace AA) ^c
Barium	200.0 µg/L (ICP)
Calcium	5,000.0 µg/L
Cadmium	5.0 µg/L (ICP)
Chromium	10.0 µg/L (ICP)
Copper	25.0 µg/L (ICP)
Mercury	0.2 µg/L (furnace AA)
Nickel	40.0 µg/L (ICP)
Lead	3.0 µg/L
Selenium	5.0 µg/L
Thallium	10.0 µg/L (furnace AA)
Zinc	20.0 µg/L (ICP)
Chromium (hexavalent)	20.0 µg/L
Beryllium	5.0 µg/L
Anions	
Chloride	5,000.0 µg/L (IC) ^d
Fluoride	100.0 µg/L (IC)
Nitrate	100.0 µg/L (IC)
Phosphate	20.0 µg/L (IC)
Sulfate	100.0 µg/L (IC)
Total organic carbons	5,000.0 µg/L
Total dissolved solids	10,000.0 µg/L
Total suspended solids	5,000.0 µg/L
Cyanide	10.0 µg/L
Total Oil and Grease	5,000.0 µg/L
Nitrate-Nitrite	100.0 µg/L
Ammonia	100.0 µg/L
Biochemical Oxygen Demand (5)	1,000.0 µg/L
	5,000.0 µg/L
Total Nitrogen Kjeldahl	100.0 µg/L
Methylene Blue Active Substances	100.0 µg/L
Phenol	5.0 µg/L
Chlorine	100.0 µg/L
Potassium	5,000.0 µg/L
Magnesium	5,000.0 µg/L
Manganese	5,000.0 µg/L
Sodium	5,000.0 µg/L
Antimony	60.0 µg/L
Sulfide	100.0 µg/L

a. Instrument detection limit is the minimum analyte concentration level that can be discriminated from background. For most instrumentation, the quantitation limit is somewhat higher.

b. ICP - inductively coupled plasma

c. AA - Atomic absorption

d. IC - ion chromatography

3.2 Nonradiological Liquid Effluent Monitoring Program Quality Assurance

A QA Program addressing analytical concerns is designed to ensure that data of a known quality are produced by the analyses. The Nonradiological Liquid Effluent Monitoring Quality Assurance Program follows the guidance provided in ANSI/ASQC E-4.²² DOE Order 5400.1³² requires a QA program following DOE Order 5700.6C.³⁴ The QA Program has been designed around the format of ANSI/ASQC E-4²² that includes the ten elements of DOE Order 5700.6C.³⁴ QC practices are used to identify and resolve any problems caused by possible matrix effects, contamination, or instrument malfunction. The QA Program for the Nonradiological Liquid Effluent Monitoring Program is commensurate with its nature and complexity in accordance with DOE Order 5400.1.³² Issues such as minimum criteria for accuracy, precision, completeness, minimum training/qualifications of personnel, organization and responsibilities, corrective action (in case of an out-of-control operation), calibration and standardization of analytical instrumentation, sampling and analytical methodology, sample and data-tracking, chain of custody, and audit and evaluation programs are addressed and documented in the *Compliance Monitoring Handbook*.¹⁶

The observation of sample holding times for each analyte parameter of interest is crucial to the production of data of known quality. The holding time is the maximum amount of time that a sample may be stored between time of collection and analysis and still permit meaningful analytical results. Holding times for effluent stream samples meet EPA regulatory guidelines (Table 11).

3.2.1 Conclusion

The data in this report have met the QA objectives and fall within the ranges of acceptability of the effluent program. The laboratory used during 1994 successfully passed a QA and technical audit before samples were submitted.

3.3 Nonradiological Liquid Effluent Monitoring Program Data Summary and Assessment

3.3.1 Effluent Stream Descriptions and Data

Water is used at INEL facilities in a variety of processes and operations. The final liquid effluents released to the environment are composed of discharges from diverse sources. In many cases, the impact of water usage by a given facility process on influent water quality is minimal, creating relatively clean wastewater effluents that are roughly comparable in quality to the influent source. In other cases, however, wastewater effluents contain pollutants characteristic of particular processes. In order for effluent composition to be effectively interpreted, the characteristics of typical contributing sources must be assessed. Because of the great diversity of effluents from INEL facilities, the nature of the contributing sources for each effluent must be considered in stream-specific interpretation of data.

Two major classes of liquid effluents from LITCO facilities exist: those generated by numerous contributing sources within a facility, and those generated by a single source (i.e., a unique process or operation). For effluents generated by numerous contributing sources within a facility (i.e., nonspecific sources), operations have relatively little effect on water quality. Annual mean concentrations of individual pollutants usually lie in a relatively narrow range, well below regulated levels. General trends can often be attributed to a unique contributing source or operating history.

Table 11. Holding times for effluent stream samples.

Parameter	Holding time
Mercury	28 days
Anions: chloride, sulfate, fluoride	28 days
Anions: nitrate, ortho-phosphate	48 hours
Cyanide	14 days
Total Organic Carbons	28 days
Total Dissolved Solids/Total Suspended Particles	7 days
Volatile Organic Compounds	14 days
Total Oil and Grease	28 days
Nitrate-Nitrite	28 days
Ammonia as Nitrogen	28 days
Biochemical Oxygen Demand	5 days
Chemical Oxygen Demand	28 days
Total Nitrogen Kjeldahl	28 days
Methylene Blue Active Substances	48 hours
Phenolics	28 days
Nitrate	48 hours
Hexavalent Chromium	24 hours
pH	Field measurement
Conductivity	Field measurement
Dissolved Oxygen	Field measurement

For a single-source effluent, a change associated with its source has a more direct impact on the observed character of the effluent than does a comparable change in a stream generated by nonspecific sources. A single-source effluent may be homogeneous or highly variable, depending on the nature of its source. Thus, interpretation of data from a single-source effluent requires consideration of contributing sources. Unless the contributing sources are of similar nature, stream-to-stream comparisons with other single-source effluents are generally not useful.

3.3.2 Locations and Summary of Results

This section describes each of the effluent discharges that were monitored during 1994. Analytical results for each of the four sites, TRA, CFA, TAN, and Idaho Falls (IF), are summarized.

During 1994, 27 effluent discharge points were monitored. Appendix B lists the analytical results of samples collected during 1994 on a site-by-site basis. All analytes that were detectable above the practical quantitation levels are delineated with numerical values. All analytes that were below the practical quantitation levels are delineated with an ND.

Statistical level confidence limits are calculated for each parameter throughout the year. These limits are based on the variance estimate of the analyte concentrations around the combined mean for calendar year 1986 through calendar year 1993. A Level 1 control limit is set at the upper 95% confidence limit on individual measurements. Thus, a measurement exceeding the Level 1 control limit has a 5% chance of being attributed to random fluctuations in concentration levels based on the 1986 through 1993 results. A Level 2 control limit is set at the upper 99% confidence limit on individual measurements; and thus, has only a 1% chance of being exceeded because of random fluctuations in actual concentrations. Values that exceed

Level 2 control limits generally indicate a deviation from the normal stream characteristics for the analyte in question. Measurement results are compared to these limits monthly and any excursions are addressed as part of a monthly report to site and facility representatives. Actions are taken based upon these reviews. Note that an excursion beyond the Level 2 limit does not imply that regulatory standards have been exceeded, but does indicate a deviation from normal operating conditions. Control charts are generated quarterly and are used to help identify potential problems at a correctable stage.

3.3.3 Central Facilities Area

The primary effluent discharge to the environment monitored at CFA is the effluent from the Sewage Treatment Plant (STP). The CFA STP receives wastewater from sanitary sewer drains throughout CFA. This effluent was monitored at the influent to the STP (CFA-691), at the effluent from the clarifier (CFA-766), and at the final effluent from the sump to the drain field (CFA-657). In addition, eight locations upstream of the STP were monitored during 1994 for a total of 11 CFA effluent monitoring locations (see Figure 3):

- Access port access south of CFA-603, Medical Services
- Access port access upstream of junction with sanitary sewer system to CFA-608, SRT oil and water separator
- Access port in parking lot east of CFA-612, IHL
- Access port access in parking lot on north side of CFA-625, Environmental Chemistry Laboratory
- CFA-657, final effluent from sump to drain field
- Access port access in parking lot on east side of CFA-665, Big Shop oil and water separator
- Access port access to sanitary sewer of CFA-688, Printshop
- Access port access southeast of building CFA-690, Radiological and Environmental Sciences Laboratory
- Access to STP influent at CFA-691, influent to STP
- Clarifier at CFA-766, effluent from clarifier to sump.

The sanitary sewer drains throughout CFA have major potential for affecting the chemical characteristics of the overall CFA effluent. A number of unique discharge sources exist, including chemical laboratories, the craft shops, the cafeteria, the warehouse, photographic services, vehicles services, and the dispensary. Data collected from FY 1987 through CY 1994 support the characterization of this stream as homogenous, but with a larger standard day-to-day variance than other effluents on site.

No discharges were detected above the characteristic hazardous waste limits of the RCRA during routine monitoring activities at any of the CFA locations. The detection results from the CFA effluents sampled are summarized in Appendix B. Due to the cessation of activities in the CFA-617 laundry facilities, no discharges were monitored for calendar year 1994 for this facility.

3.3.4 Test Reactor Area

The primary effluent discharges to the environment monitored at TRA include (1) effluent to the Cold Waste Pond (TRA-764), (2) effluent to the Chemical Waste Pond (TRA-631), (3) effluent from the STP (TRA-624B), and (4) effluent to the Warm Waste Evaporation Pond (TRA-636). Other discharges monitored upstream from the primary effluent discharges are included in the following list. These six effluent monitoring locations were sampled during 1994 (see Figure 9):

- Access port access east of TRA-604, Radiochemistry Laboratory and Printshop
- Access to influent west of TRA-624A, influent to STP
- Access to effluent south of TRA-624B, effluent from STP
- Sample tap at TRA-631, effluent to leach pond
- Compositor at TRA-636, effluent to retention basin
- TRA-764, effluent to cold waste pond.

3.3.4.1 Effluent to the Cold Waste Pond (TRA-764). Effluent to the Cold Waste Pond (TRA-764) is generated by the cold waste drains within TRA. The cold drains are located throughout TRA, including laboratories and craft shops. The Radiochemistry Laboratory and Printshop (TRA-604) is monitored upstream of the Cold Waste Pond. Maintenance cleaning waste, floor, and yard drains are examples of intermittent TRA discharges that might alter water quality parameters during normal operation. The largest volume of wastewater received by the Cold Waste Pond is secondary cooling water from the ATR reactor when it is in operation. The cold waste effluents collect at the cold well sump and sampling station, and are pumped out to the Cold Waste Pond, which is located outside the TRA fence. Data collected from FY 1987 through CY 1994 indicate that the cold waste effluent is fairly homogenous, and meets drinking water standards for most parameters monitored.

3.3.4.2 Effluent to the Chemical Waste Pond (TRA-631). The TRA effluent to the Chemical Waste Pond is generated by water treatment processes at the TRA demineralizer facility. The ion-exchange process uses electrically charged resin beads to attract and adsorb oppositely charged ions from the water until the resin's exchange sites are filled with ions from the water. When the exchange capacity of the resin is saturated, the resin bed is regenerated by rinsing the resin with an appropriate chemical solution. Cation-exchange regeneration, which uses sulfuric acid as a regenerant, is carried out approximately every other day. Anion-exchange regeneration uses a sodium-hydroxide regenerant, and is performed approximately every third day. The waste streams are neutralized before being discharged to the Chemical Waste Pond. Ion-exchange regeneration waste streams typically contain mineral salts removed from the water, excess regenerant chemicals, and rinse waters from the regeneration process. Specific waste stream constituents anticipated in regeneration wastewater include calcium, sodium, and magnesium salts, iron, copper, zinc, aluminum, manganese, potassium, chlorides, sulfates, and sodium-hydroxide.

Water quality parameters determined from fiscal year (FY) 1987 to calendar year (CY) 1994 are consistent with the large quantities of dissolved salts in demineralizer effluents. The high annual mean

conductivity (22,936 μ S) and high annual dissolved solids (22,398 mg/L) result from the elevated levels of dissolved salts and free ions introduced during the regeneration process. The high historical mean for sodium (5,301,986 μ g/L) and sulfate (18296 mg/L) concentrations result from the sodium-hydroxide and sulfuric acid used in the regeneration process. The field pH measurement range for CY 1994 was 9.9 to 10.1.

3.3.4.3 Effluent from the Sewage Treatment Plant (TRA-624B). The TRA influent to the STP (TRA-624A) receives discharged wastewater from sanitary sewer drains throughout TRA. Effluent treated via a trickling filter system is discharged to the percolation ponds and monitored at location TRA-624B. Data collected from FY 1987 to CY 1994 are comparable to data obtained for other STP effluents onsite.

3.3.4.4 Effluent to the Warm Waste Evaporation Pond (TRA-636). The TRA effluent to the Warm Waste Evaporation Pond is generated by low-level radioactive waste drains at TRA. These drains are located throughout TRA in laboratories and craft shops, and within the reactor facilities. The effluent streams collect at the retention basin inlet (TRA-636) and are routed to the Warm Waste Evaporation Pond located outside the TRA fence.

No discharges were detected above the characteristic hazardous waste limits of RCRA during routine monitoring activities at any of the TRA monitoring locations. These results are summarized in Appendix B.

3.3.5 Test Area North

The primary discharges to the environment monitored at TAN include the final effluent to the TAN/TSF Disposal Pond (TAN-655) and the effluent to the WRRTF Sewage Lagoon and Process Pond (WRRTF-1 and WRRTF-2). Discharges from the Loss of Fluid Test Facility (LOFT) were rerouted to the new sewage lagoons at Specific Manufacturing Capability (SMC) during 1994, and the sampling point was changed to the new LiFT station. Other discharges monitored upstream from the primary discharges are included in the following list. These seven effluent monitoring locations were sampled during 1994 (see Figures 10, 11, and 12):

- Access port access to TAN-607, process wastewater
- Access to influent on the east side of TAN-623A, influent to STP
- Access to effluent on north side of TAN-623B, effluent from STP
- Final sump at TAN-655, effluent from sump to pond
- Sump behind CTF, outside of fenced area (LOFT-1B)
- LiFT station sump behind CTF (LOFT-1B).
- Sewage lagoon at WRRTF-1, effluent to sewage lagoon
- Pond pump pit at WRRTF-2, effluent to process pond.

3.3.5.1 Effluent to the TAN/TSF Disposal Pond (TAN-655). The TAN/TSF Disposal Pond receives wastewater discharges from a variety of contributing sources. The STP effluent (monitored at TAN-623 A&B) and process wastewater (monitored from the line at TAN-607) combine in the TAN-655

sump before being discharged to the pond. The TAN/TSF STP receives discharged wastewater from sanitary sewer drains throughout the TSF area. Sample data collected from FY 1987 to CY 1994 are comparable to data obtained for other STP effluents onsite. Process water contributed to the pond includes boiler blowdown, such as that generated in the Service Building, which is expected to contribute inorganic salts concentrated from feedwater (calcium and magnesium salts, chlorides, and sulfates), corrosion products (metal oxides), and any chemical additives. Wastewater from the demineralizer system is expected to contribute mineral salts from makeup water, and excess regenerant chemicals (sodium-hydroxide and sulfuric acid). Data from FY 1987 to CY 1994 are generally consistent with these anticipated discharges.

3.3.5.2 Effluent to the WRRTF Sewage Lagoon and Process Pond (WRRTF-1 and WRRTF-2). The WRRTF Sewage Lagoon receives effluent from sanitary drains from the WRRTF facility which passes through a sand filter before being discharged to the pond. Due to limited personnel at WRRTF, this discharge is low volume and intermittent. Data collected from FY 1992 to CY 1994 are comparable to data obtained from other STP effluents on site.

The WRRTF Process Pond receives low-volume, intermittent discharges of secondary cooling water, boiler blowdown, and rarely receives demineralizer regenerant solutions. Data from FY 1987 to CY 1994 are generally consistent with these anticipated discharges.

No discharges were detected above the characteristic hazardous waste limits of RCRA during routine monitoring activities at any of the TAN locations. These results are summarized in Appendix B.

3.3.6 Idaho Falls

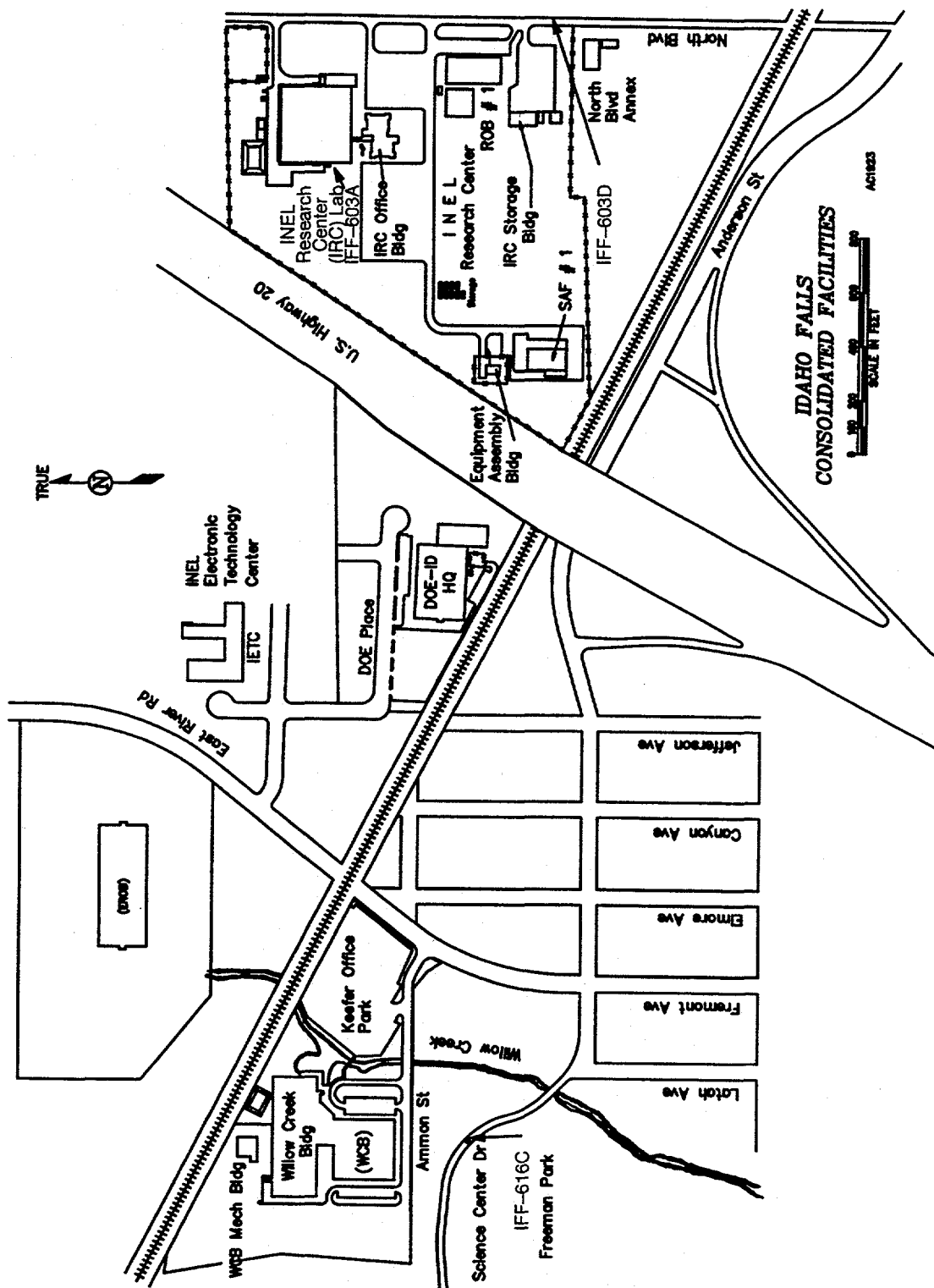
Three effluent monitoring locations in Idaho Falls were sampled during 1994, two on a monthly basis, and one on a semiannual basis (see Figure 16):

- Access port access to laboratory and mechanical room effluent on west side of IF-603, INEL Research Center (IRC) (monthly)
- Access port access to total building effluent on North Boulevard across from the main drive IRC (semiannually)
- Effluent from IF-616, Willow Creek Building (WCB) (monthly).

If results are summarized in Appendix B. No discharges were detected above the City of Idaho Falls limits with the exception of those discussed in the following sections.

3.3.6.1 INEL Research Center Effluent. IRC effluent is generated by drain discharges from all laboratories and discharge from the mechanical room. Toluene was detected at 11 µg/L in a sample collected from the IRC during routine monitoring activities. A resample occurred within 24 hours of receiving the analysis results. Resampling results indicated no toluene detected.

3.3.6.2 Willow Creek Building Effluent. WCB effluent is generated by the wastewater from WCB. Contributing sources are the discharge from printshop sinks and drains, and the x-ray photoprocessor in Medical. In most respects, the overall WCB wastewater effluent is quite characteristic of the known contributing sources.



LF95 0078

Figure 16. Idaho Falls sampling locations.

One discharge sample exceeded City of Idaho Falls Code limits during routine monitoring activities at WCB. A sample result of 0.501 mg/L for silver was reported during routine monitoring of the facility. Resampling within 24 hours of reception of the report showed the facility to be in compliance. A review of the WCB discharges is being conducted along with additional monitoring. Results of this review will be discussed in the 1995 annual report.



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Appendix A

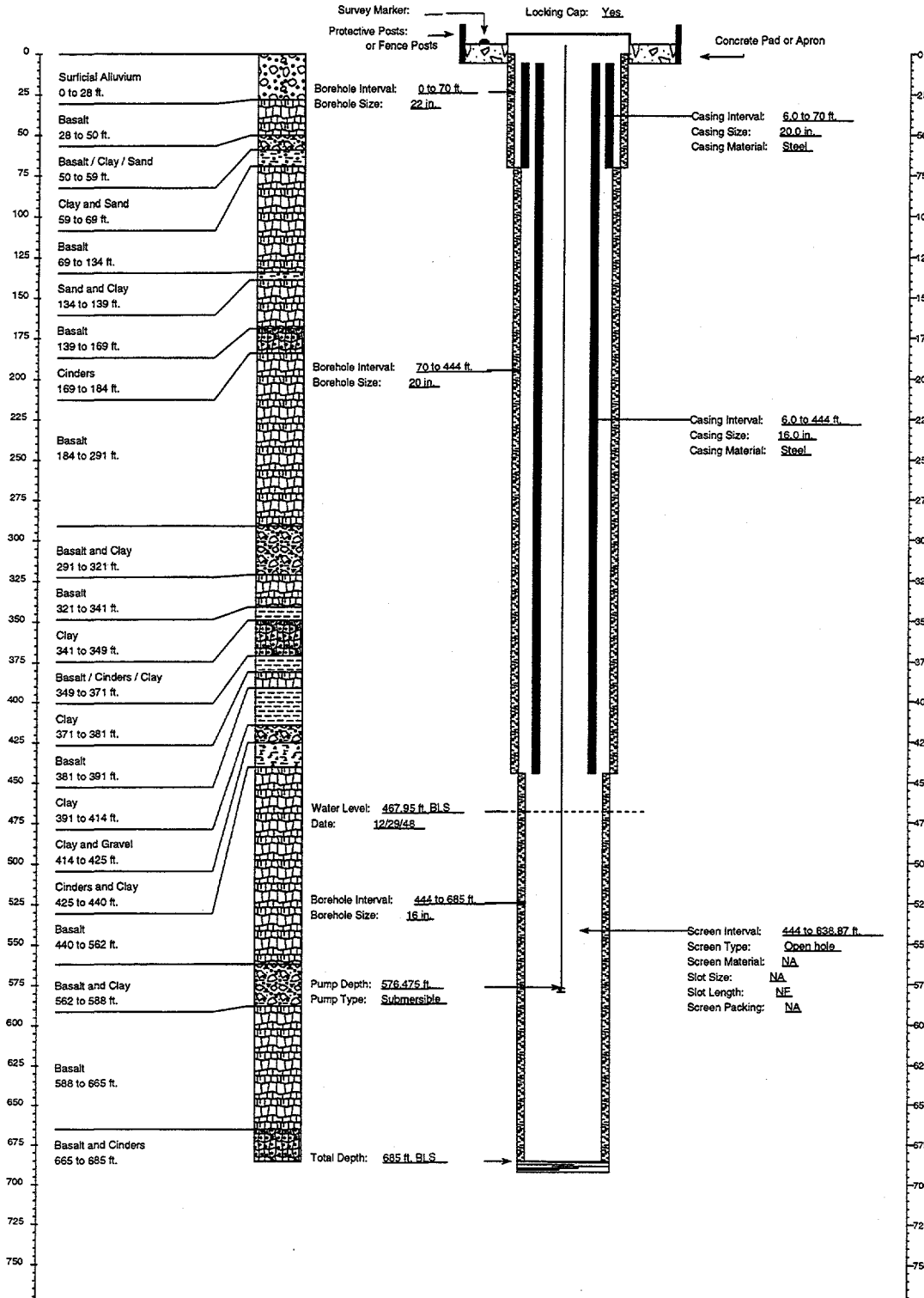
LITCO Facilities Water Distribution Systems and Production Well Descriptions

CFA #1 Production Well

USGS Site ID#: 433204112562001
 State of Idaho PWS#: 6120008
 Location: CFA-651
 Depth of Hole: 685'
 Depth of Well: 639'
 Depth to Water: 468'

Date of Completion: July 1942
 Size and Depth of Casing: 16", 6 to 440'
 Casing Material: Steel
 Pump Information: Submersible,
 GPM-650, Horsepower - 150
 Media: Aqueous

Special Equipment: None
 Access Required: None
 Support Required: Operator (mechanic)
 Point of Contact: Facilities and
 Management Craft Operation
 Minimum Purge Time: 8 minutes



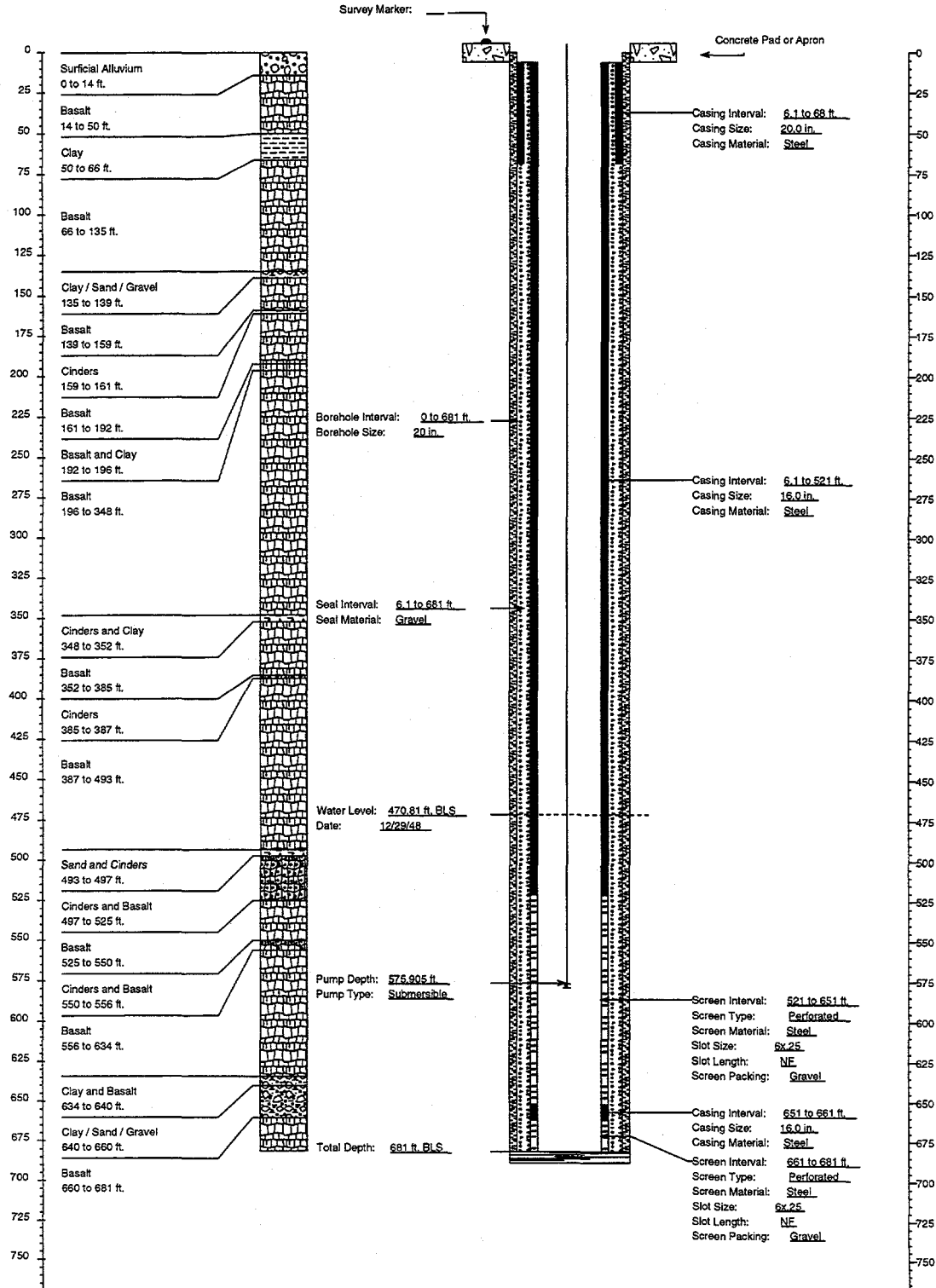
S5956905-1

CFA #2 Production Well

USGS Site ID#: 4331441 12563501
 State of Idaho PWS#: 6120008
 Location: CFA-642
 Depth of Hole: 681'
 Depth of Well: 681'
 Depth to Water: 471'

Date of Completion: May 1944
 Size and Depth of Casing: 20", 6 to 68'; 16", 6 to 681'
 Casing Material: Steel
 Pump Information: Submersible,
 GPM-600, Horsepower - 125
 Media: Aqueous

Special Equipment: None
 Access Required: None
 Support Required: Operator (mechanic)
 Point of Contact: Facilities and
 Management Craft Operation
 Minimum Purge Time: 11 minutes



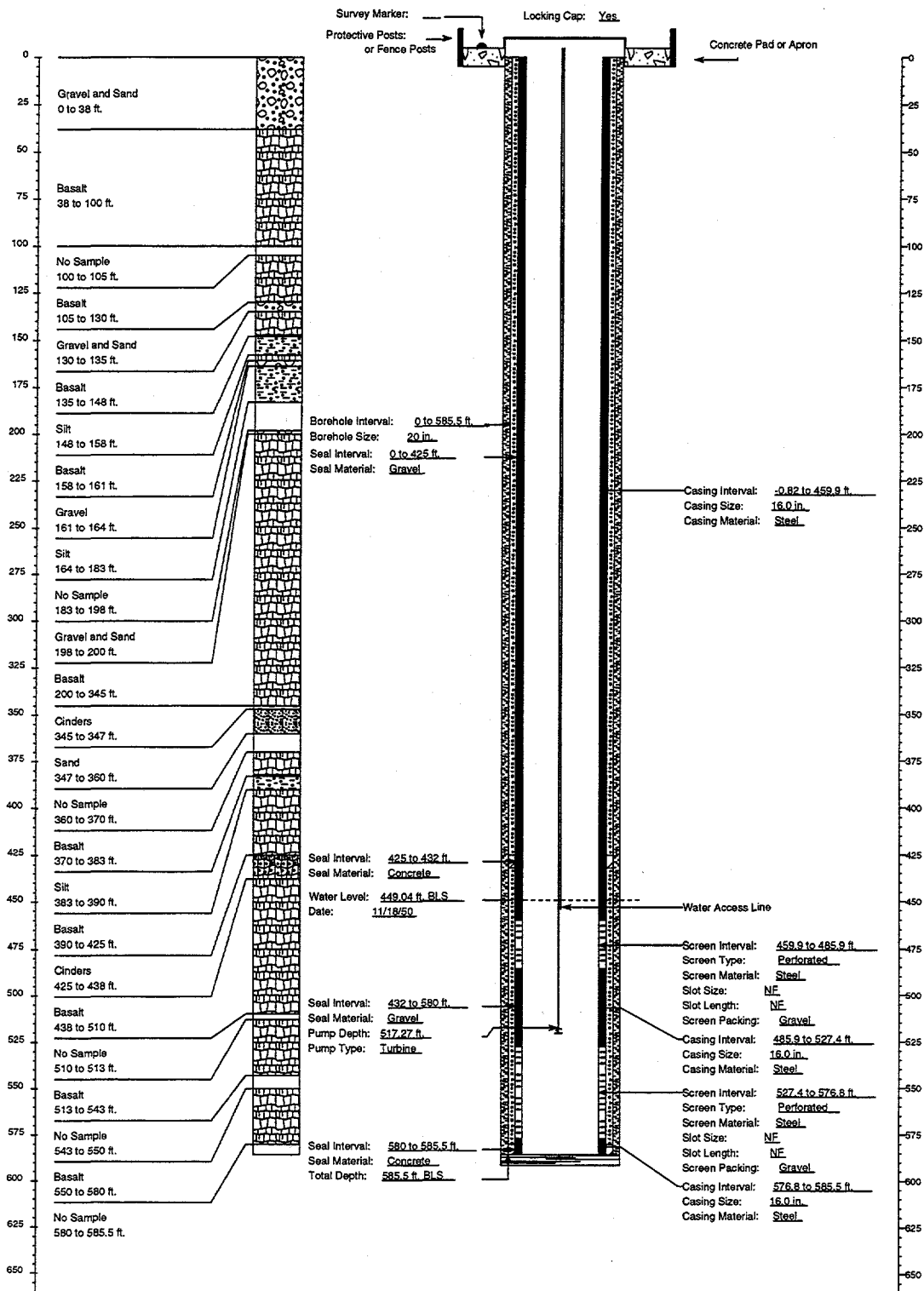
SS956905-2

CPP #1 Production Well

CPP Designation: Raw Water Well, Pump-UTI-670
 USGS Site ID#: 433433112560201
 State of Idaho PWS#: 6120012
 Location: CPP-611
 Depth of Hole: 585.5'
 Depth of Water: 136.46'

Date of Completion: 1950
 Size and Depth of Casing: 16", 0 to 585.5'
 Casing Material: Steel
 Pump Information: Vertical shaft,
 GPM-3000, Horsepower - 600
 Media: Aqueous

Special Equipment: None
 Access Required: Access to CPP
 Support Required: Operator
 Point of Contact: Utility Operator
 Minimum Purge Time: Unknown



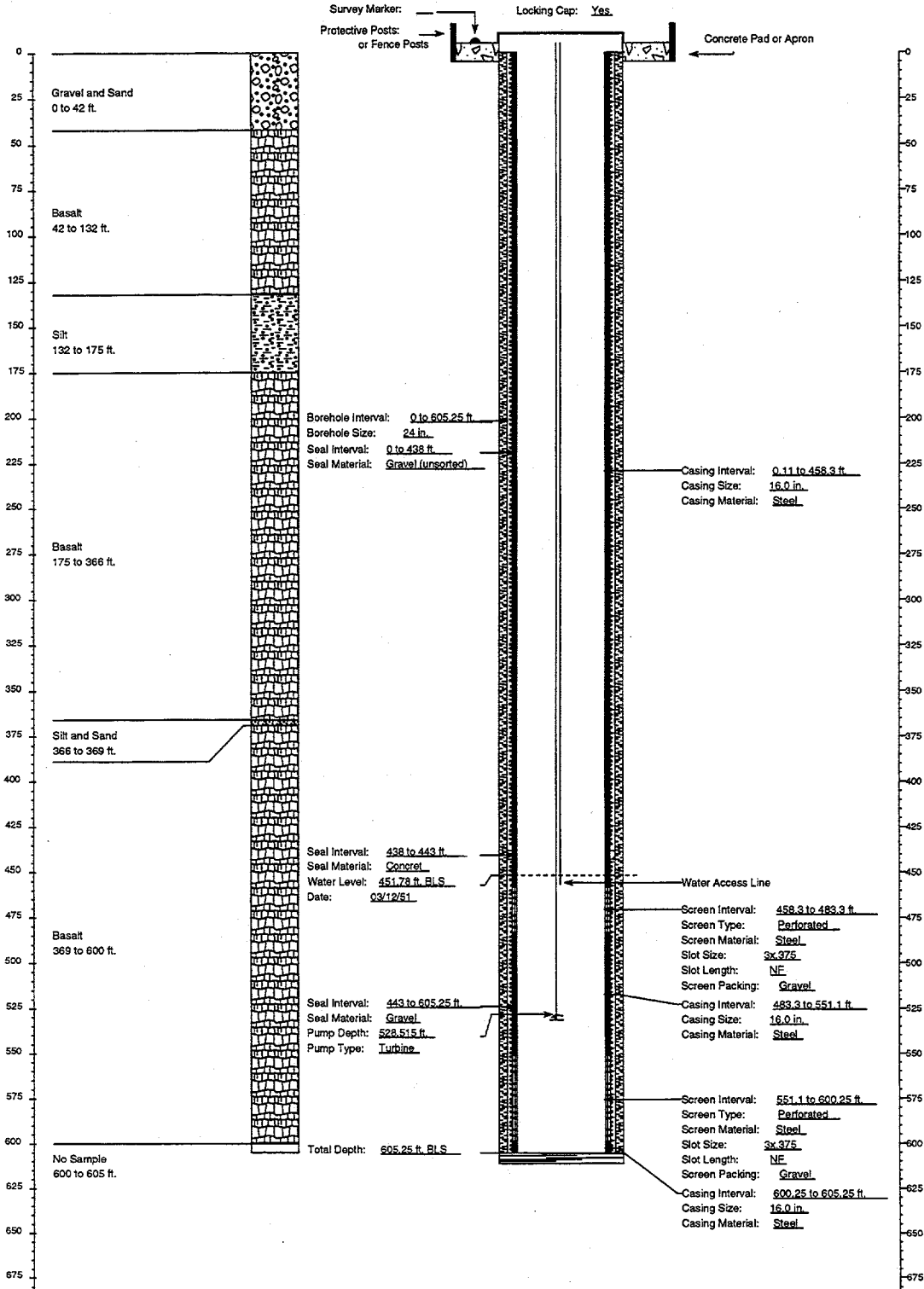
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CPP #2 Production Well

CPP Designation: Raw Water Well, Pump-UTI-671
 USGS Site ID#: 433432112560801
 State of Idaho PWS#: 6120012
 Location: CPP-612
 Depth of Hole: 605.25'
 Depth of Water: 153.47'

Date of Completion: 1951
 Size and Depth of Casing: 16", 0 to 605.25'
 Casing Material: Steel
 Pump Information: Vertical shaft,
 GPM-3000, Horsepower - 600
 Media: Aqueous

Special Equipment: None
 Access Required: Access to CPP
 Support Required: Operator
 Point of Contact: Utility Operator
 Minimum Purge Time: Unknown



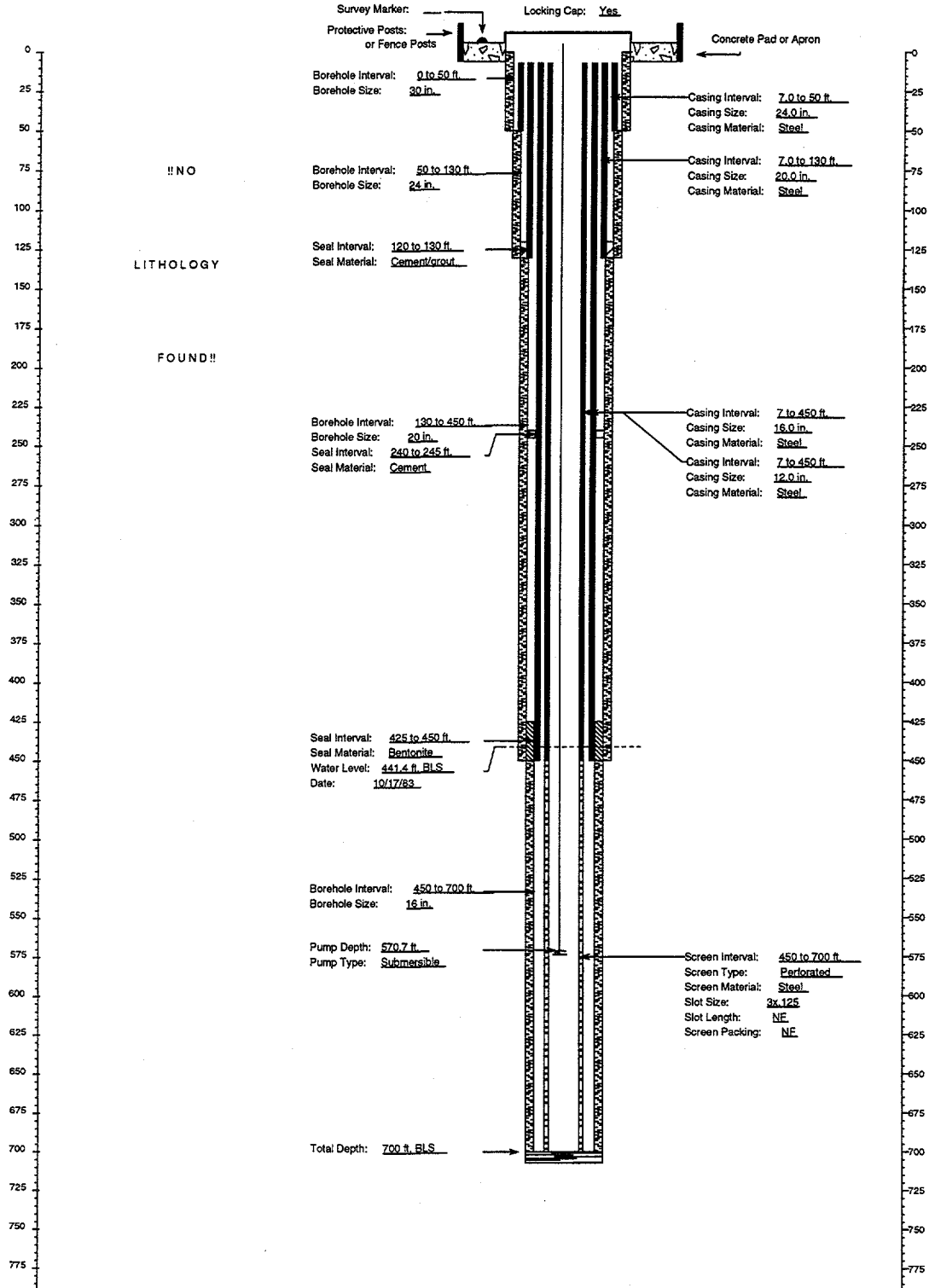
S5956905-4

CPP #4 Production Well

CPP Designation: Raw Water Well, Pump-UTI-660
 USGS Site ID#: 433440112554401
 State of Idaho PWS#: 6120012
 Location: Approximately 700 yards northeast of
 CPP-614 outside of the ICPP perimeter fence
 Depth of Hole: 605.25'
 Depth of Water: 153.47'

Date of Completion: 1983
 Size and Depth of Casing: 24", 0 to 50'; 20", 0 to 130';
 16", 0 to 450'; 12", 0 to 450'
 Casing Material: Steel
 Pump Information: Submersible,
 GPM-400, Horsepower - 100
 Media: Aqueous

Special Equipment: None
 Access Required: Access to CPP
 Support Required: Operator
 Point of Contact: Utility Operator
 Minimum Purge Time: Unknown



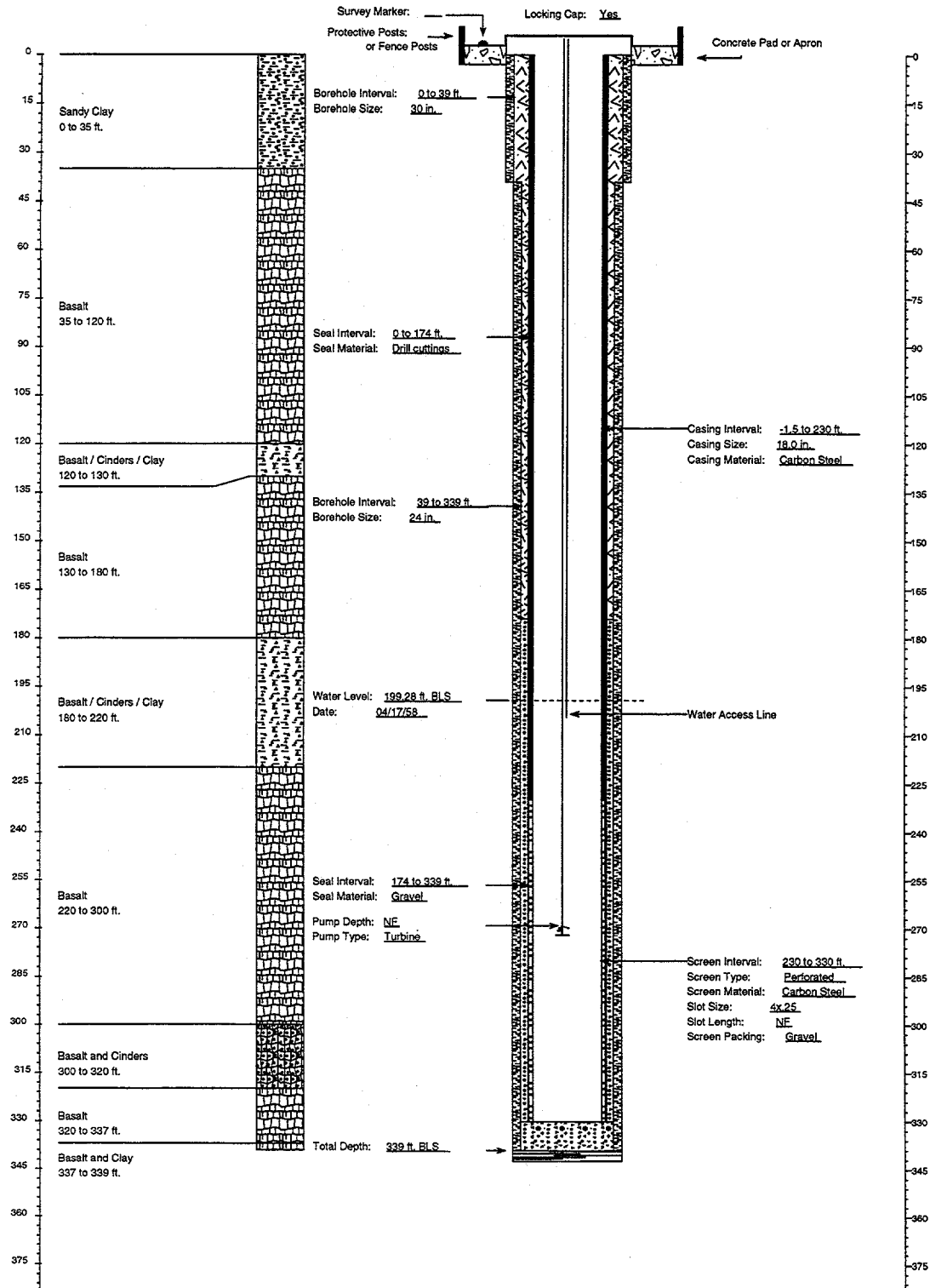
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CTF #1 Production Well

USGS Site ID#: 435120112432101
 State of Idaho PWS#: 6120013
 Location: TAIN-632
 Depth of Hole: 339'
 Depth of Well: 330'
 Depth to Water: 199'

Date of Completion: November 1, 1957
 Size and Depth of Casing: 18", 0 to 330'
 Casing Material: Steel
 Pump Information: Line shaft,
 GPM-1000, Horsepower - 100
 Media: Aqueous

Special Equipment: None
 Access Required: None
 Support Required: Operator
 Point of Contact: Utility Operators
 Minimum Purge Time: 5 minutes



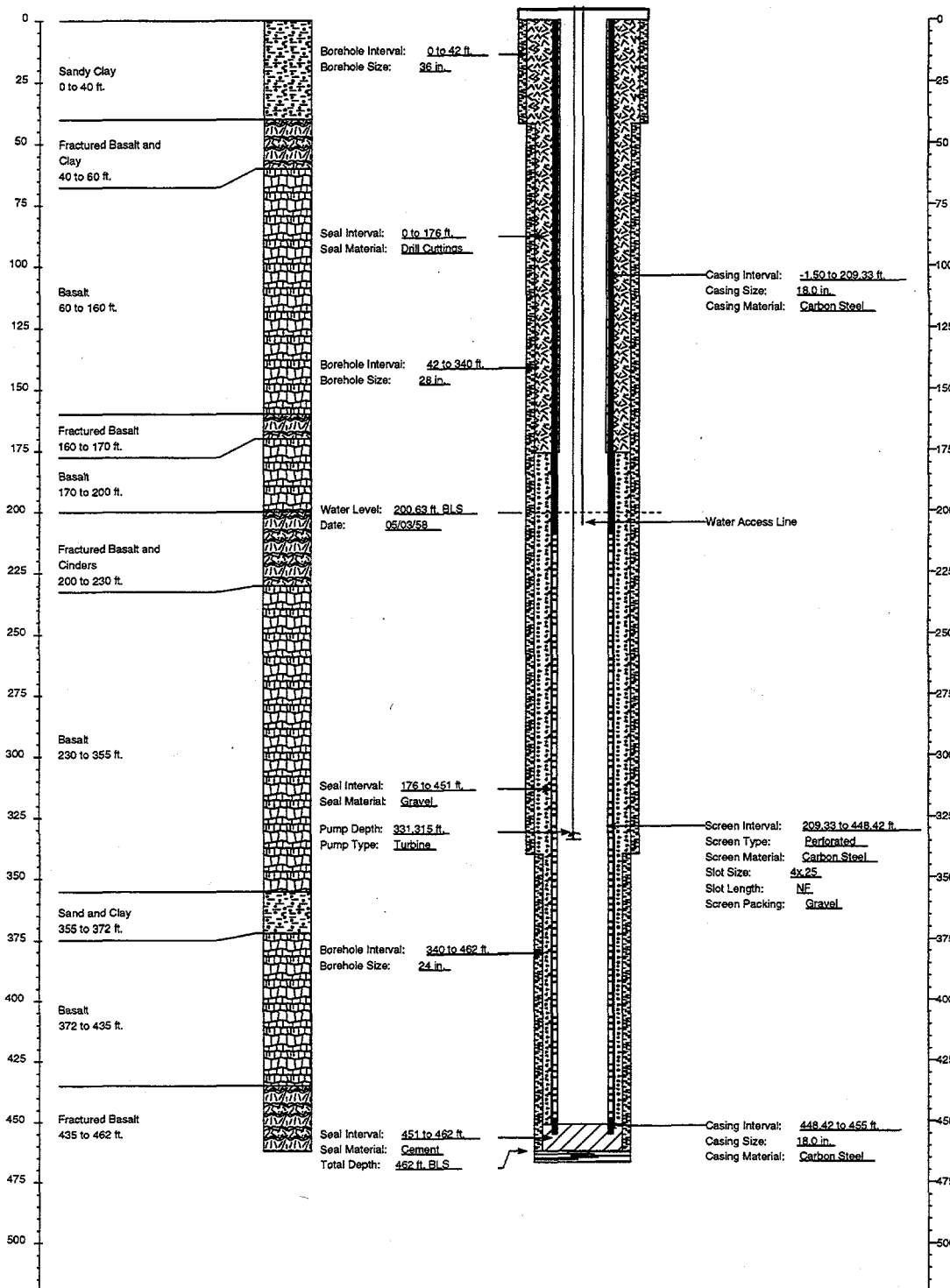
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CTF #2 Production Well

USGS Site ID#: 435119112431801
 State of Idaho PWS#: 6120013
 Location: TAN-639
 Depth of Hole: 462'
 Depth of Well: 455'
 Depth to Water: 200'

Date of Completion: April 1, 1958
 Size and Depth of Casing: 18", 0 to 455'
 Casing Material: Steel
 Pump Information: Line shaft,
 GPM-1000, Horsepower - 100
 Media: Aqueous

Special Equipment: None
 Access Required: None
 Support Required: Operator
 Point of Contact: Utility operators
 Minimum Purge Time: 10 minutes



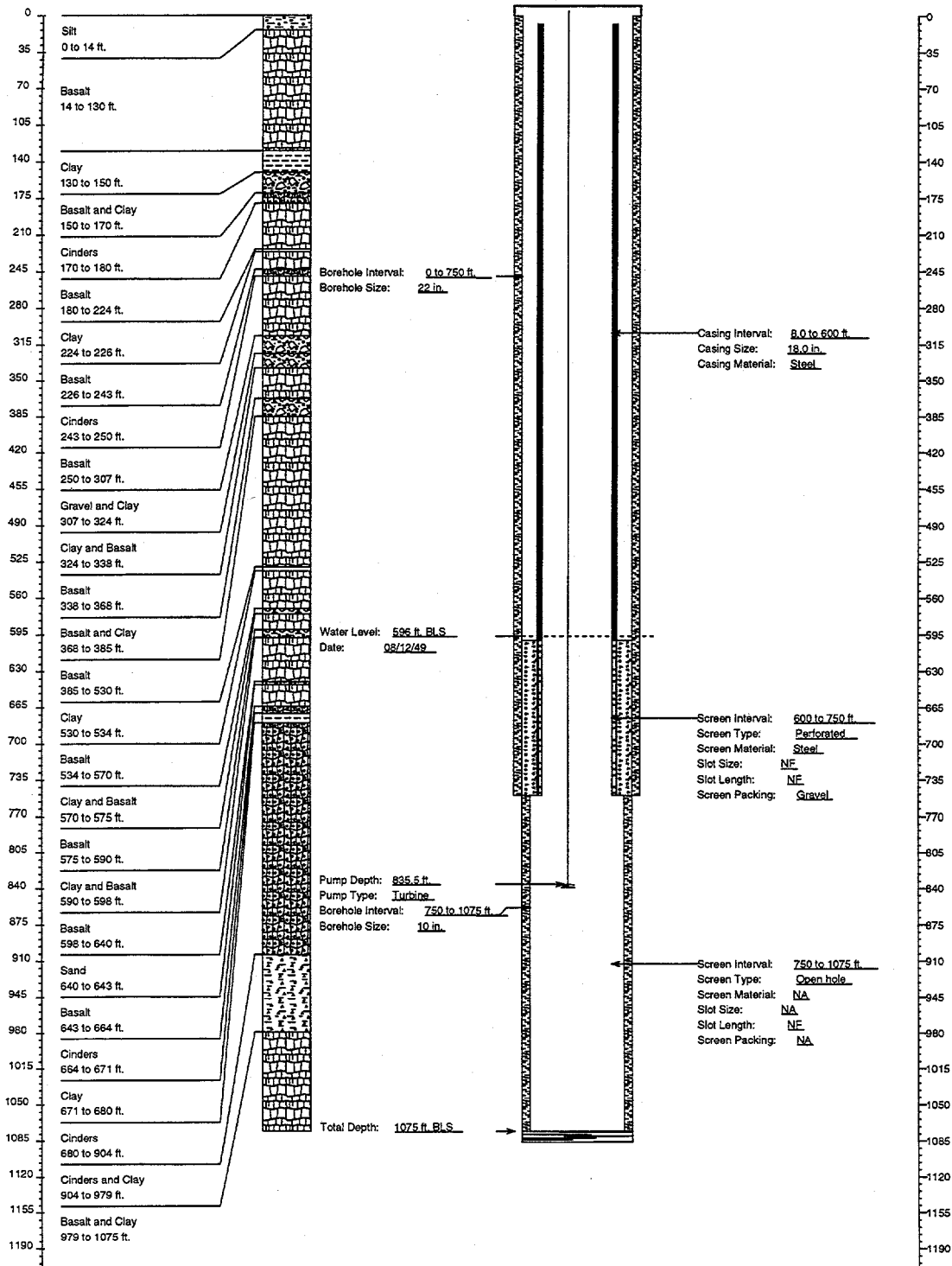
S5956905-7

EBR #1 Production Well

USGS Site ID: 43305113002601
 State of Idaho PWS#: 6120009
 Location: EBR-1, EBR-711
 Depth of Hole: 1075'
 Depth of Well: 1075'
 Depth to Water: 596'

Date of Completion: May 1949
 Size and Depth of Casing: 18", 6 to 750'
 Casing Material: Steel
 Pump Information: Submersible,
 GPM-800, Horsepower - 200
 Media: Aqueous

Special Equipment: None
 Access Required: Confined space permit
 (required for work, not for routine sampling)
 Support Required: Operator (mechanic)
 Point of Contact: (CFA) Facilities and
 Management Craft Operation
 Minimum Purge Time: 24 minutes



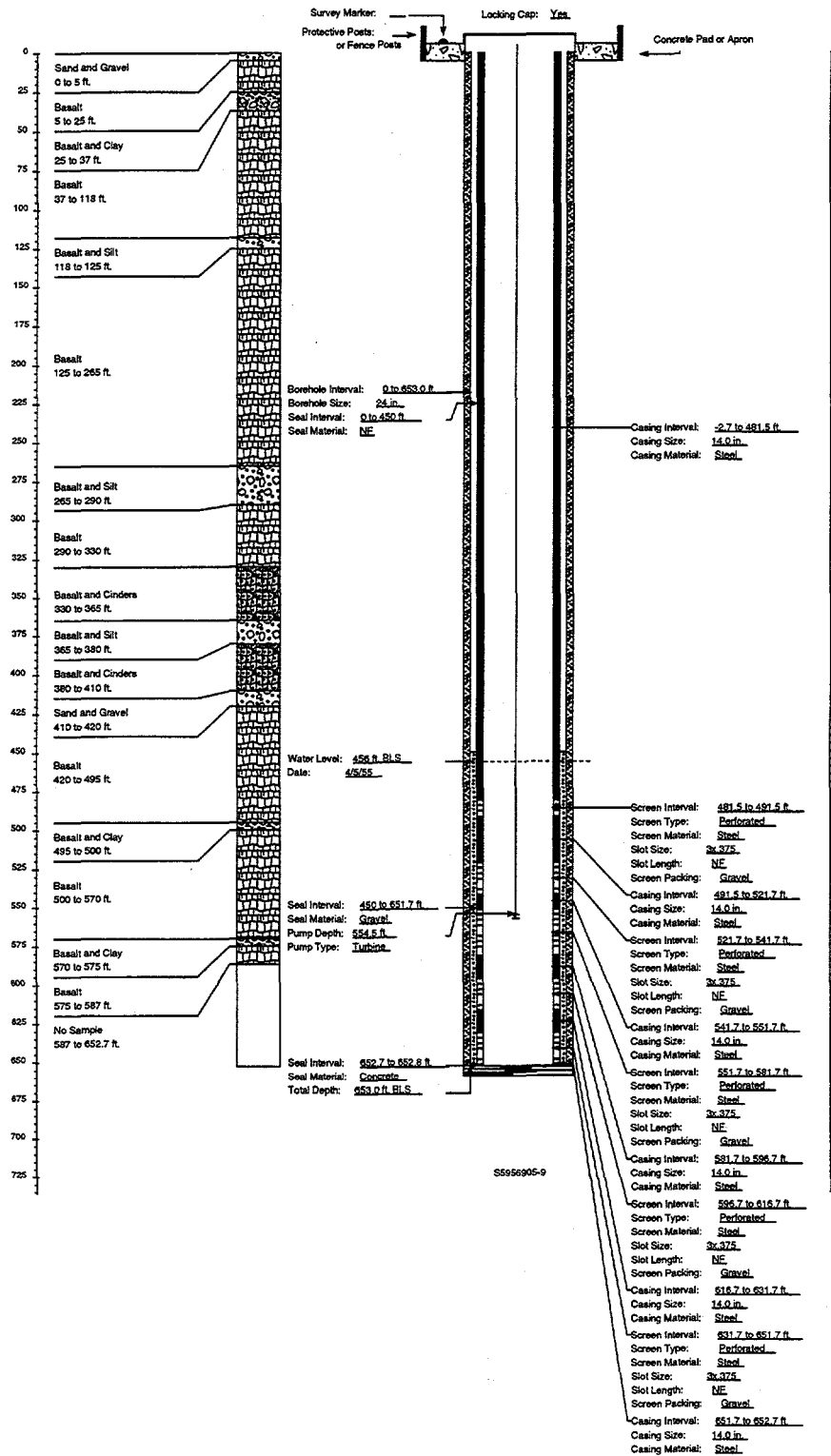
SS956905-8

USGS Site ID#: 433252112520301
 State of Idaho PWS#: 6120019
 Location: PBF-002
 Depth of Hole: 653'
 Depth of Well: 653'
 Depth to Water: 456'

PBF #1 Production Well

Date of Completion: February 4, 1955
 Size and Depth of Casing: 14", 0 to 653'
 Casing Material: Steel
 Pump Information: Submersible,
 GPM-400, Horsepower - 80
 Media: Aqueous

Special Equipment: None
 Access Required: None
 Support Required: Operator
 Point of Contact: (CFA) Facilities and
 Management Craft Operation
 Minimum Purge Time: 12 minutes

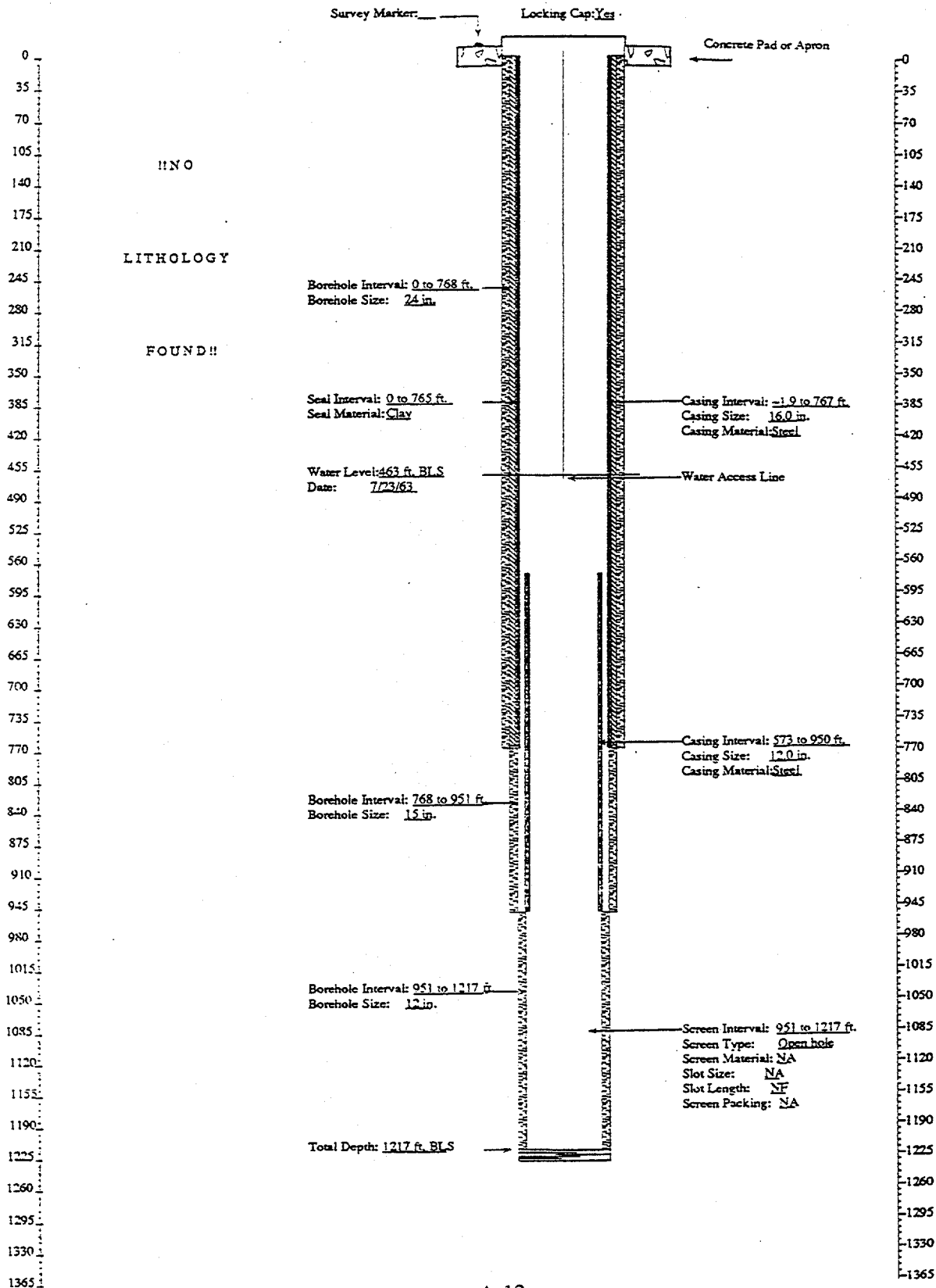


USGS Site ID#: 433247112515201
 State of Idaho PWS#: 6120019
 Location: PBF-614
 Depth of Hole: 1217
 Depth of Well: 1217
 Depth to Water: 463

PBF #2 Production Well

Date of Completion: April 14, 1960
 Size and Depth of Casing: 12", 573' to 950';
 16", 0 to 767'
 Casing Material: Steel
 Pump Information: Line shaft,
 GPM-800, Horsepower - 200
 Media: Aqueous

Special Equipment: None
 Access Required: None
 Support Required: Operator
 Point of Contact: Facilities and
 Management Craft Operations
 Minimum Purge Time: 22 minutes

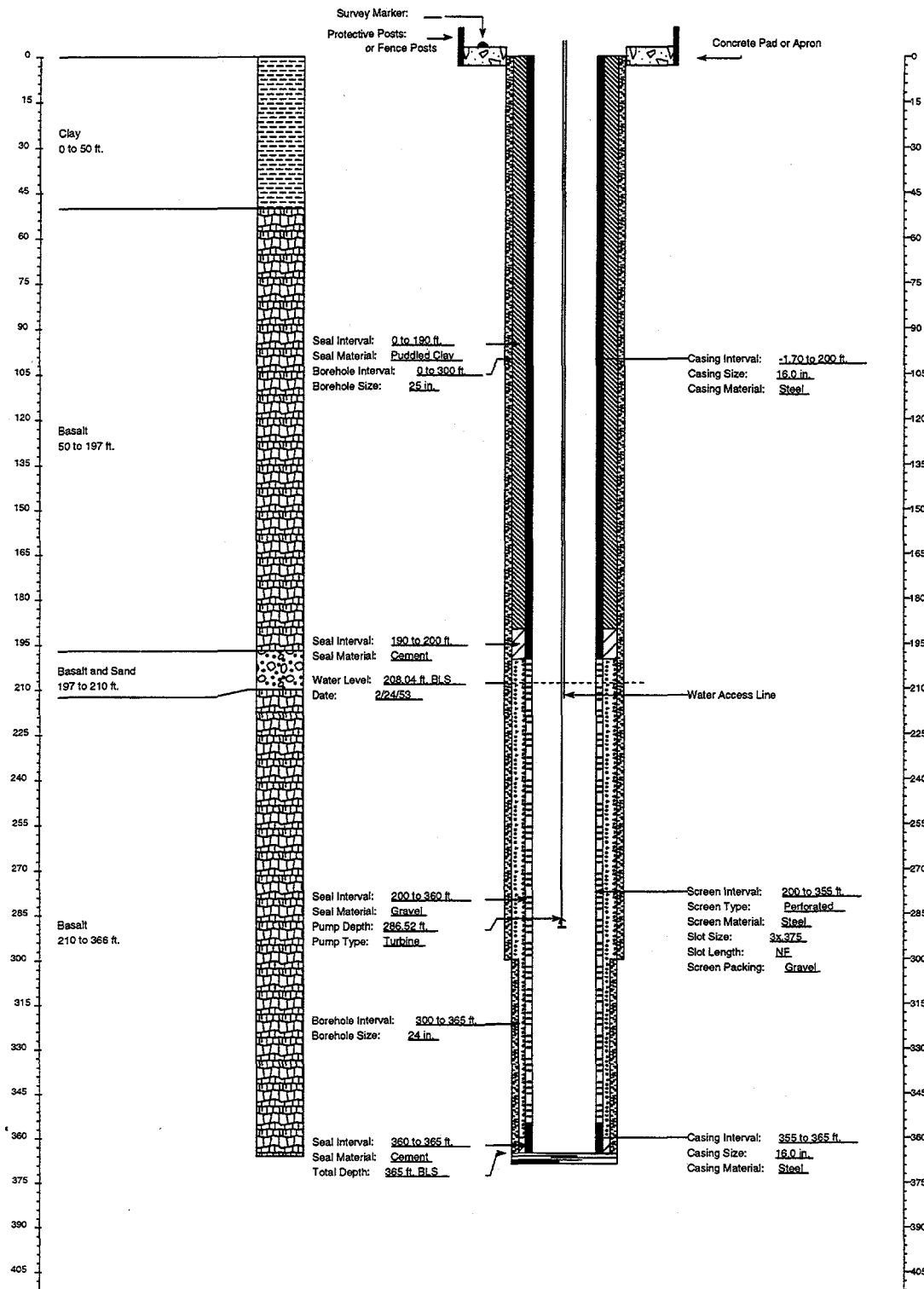


USGS Site ID#: 435056112420001
 State of Idaho PWS#: 6120021
 Location: TAN-612
 Depth of Hole: 365'
 Depth of Well: 360'
 Depth to Water: 208'

TSF #1 Production Well

Date of Completion: January 26, 1953
 Size and Depth of Casing: 18", 0 to 365'
 Casing Material: Steel
 Pump Information: Line shaft,
 GPM-1000, Horsepower - 80
 Media: Aqueous

Special Equipment: None
 Access Required: None
 Support Required: Operator
 Point of Contact: (TAN) Utility Operators
 Minimum Purge Time: 5 minutes



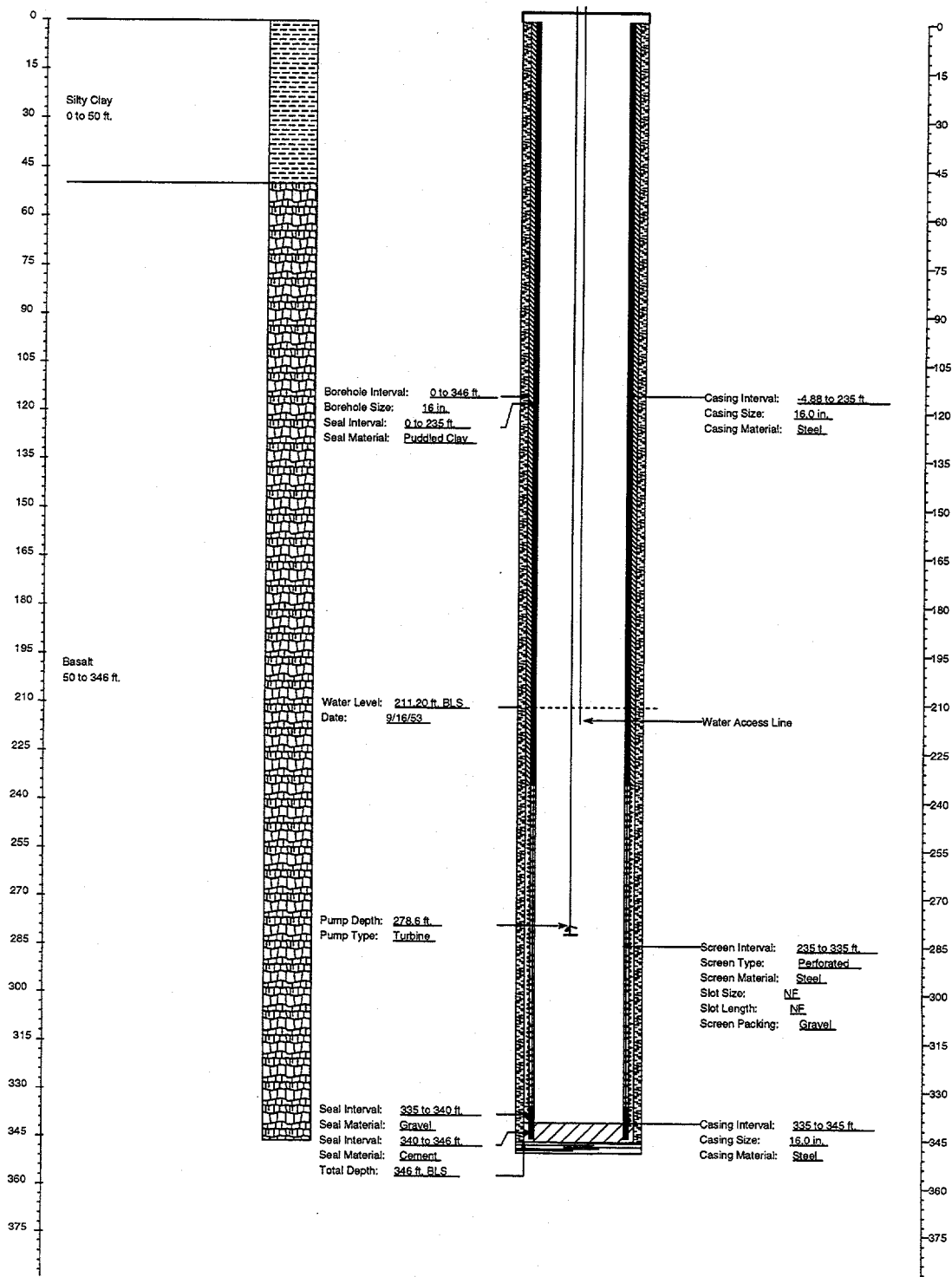
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USGS Site ID#: 435100112420701
 State of Idaho PWS#: 6120021
 Location: TAN-613
 Depth of Hole: 346'
 Depth of Well: 340'
 Depth to Water: 211'

TSF #2 Production Well

Date of Completion: August 29, 1953
 Size and Depth of Casing: 16", 0 to 345'
 Casing Material: Steel
 Pump Information: Line shaft,
 GPM-1000, Horsepower - 80
 Media: Aqueous

Special Equipment: None
 Access Required: None
 Support Required: Operator
 Point of Contact: (TAN) Utility Operators
 Minimum Purge Time: 4 minutes



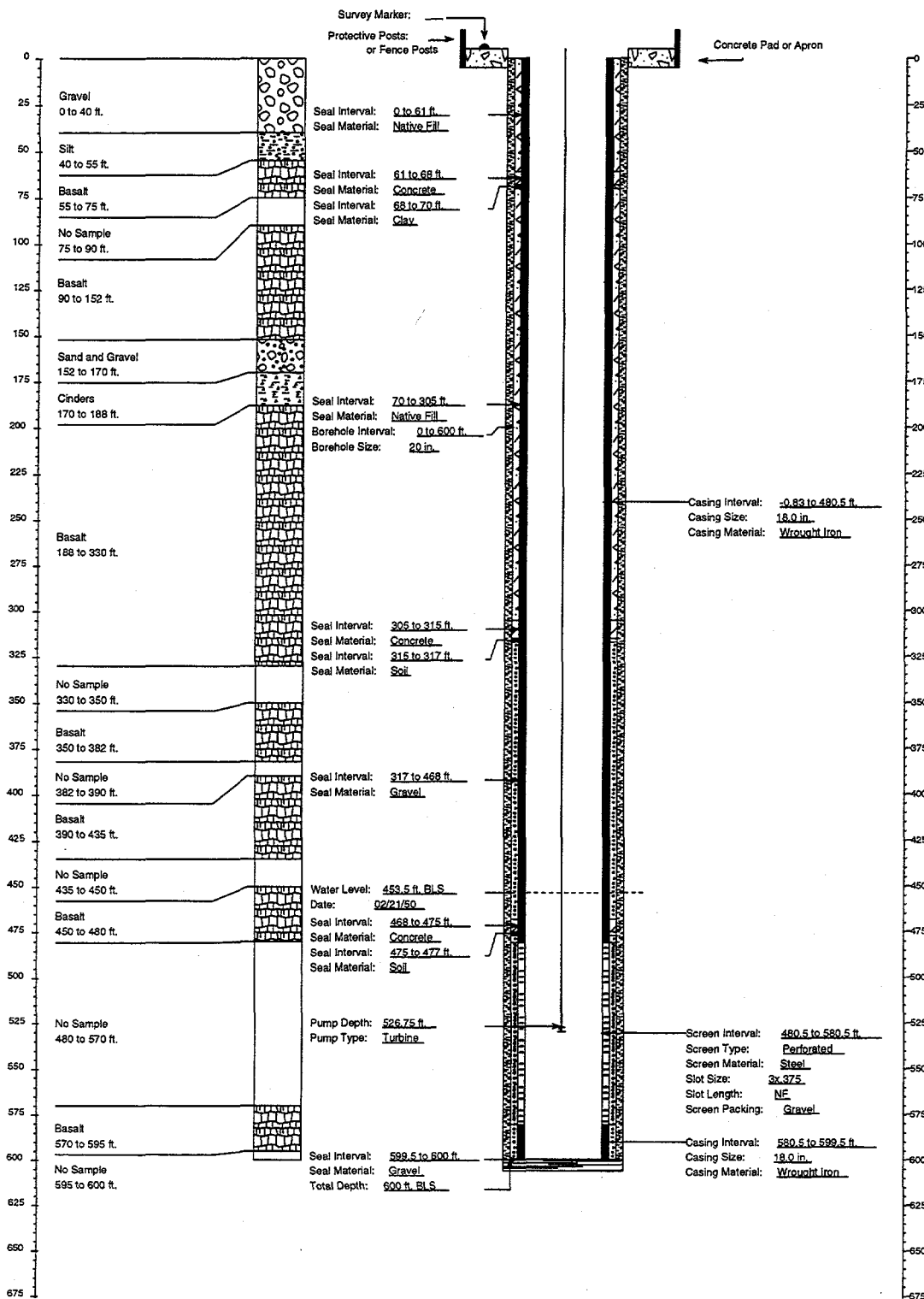
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TRA #1 Production Well

USGS Site ID#: 433521112573801
 State of Idaho PWS#: 6120020
 Location: TRA-601
 Depth of Hole: 600'
 Depth of Well: 600'
 Depth to Water: 453'

Date of Completion: February 1, 1950
 Size and Depth of Casing: 18", 0 to 600'
 Casing Material: Wrought iron
 Pump Information: Line shaft,
 GPM-3200, Horsepower - 700
 Media: Aqueous

Special Equipment: Hearing protection
 Access Required: None
 Support Required: Operator
 Point of Contact: Utility Operators
 Minimum Purge Time: 2 minutes



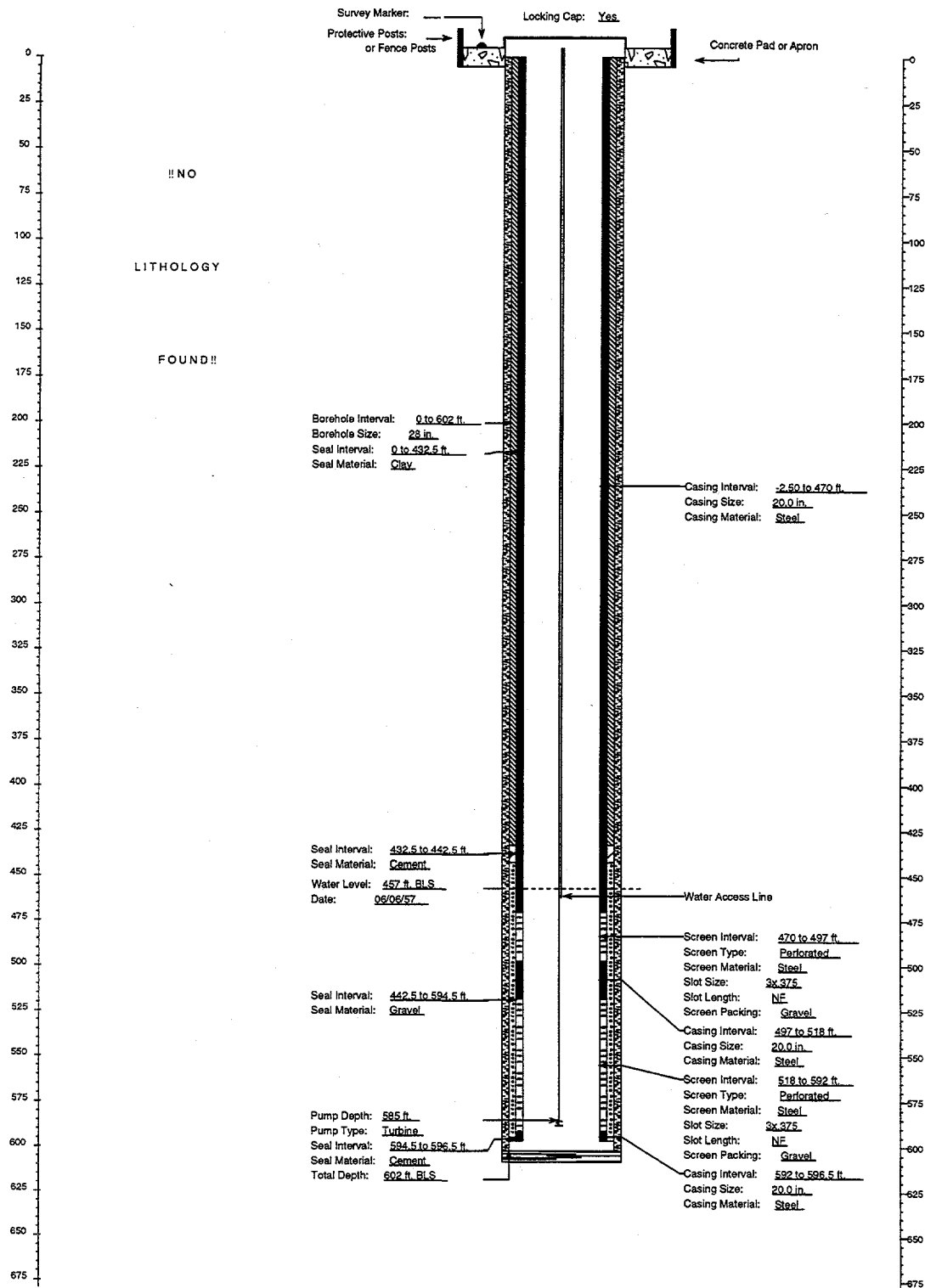
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USGS Site ID#: 433522112573501
 State of Idaho PWS#: 6120020
 Location: TRA-650
 Depth of Hole: 602'
 Depth of Well: 602'
 Depth to Water: 456'

TRA #3 Production Well

Date of Completion: March 17, 1957
 Size and Depth of Casing: 20", 0 to 597'
 Casing Material: Steel
 Pump Information: Line shaft,
 GPM-3800, Horsepower - 700
 Media: Aqueous

Special Equipment: Hearing protection
 Access Required: None
 Support Required: Operator
 Point of Contact: Utility Operators
 Minimum Purge Time: 2 minutes



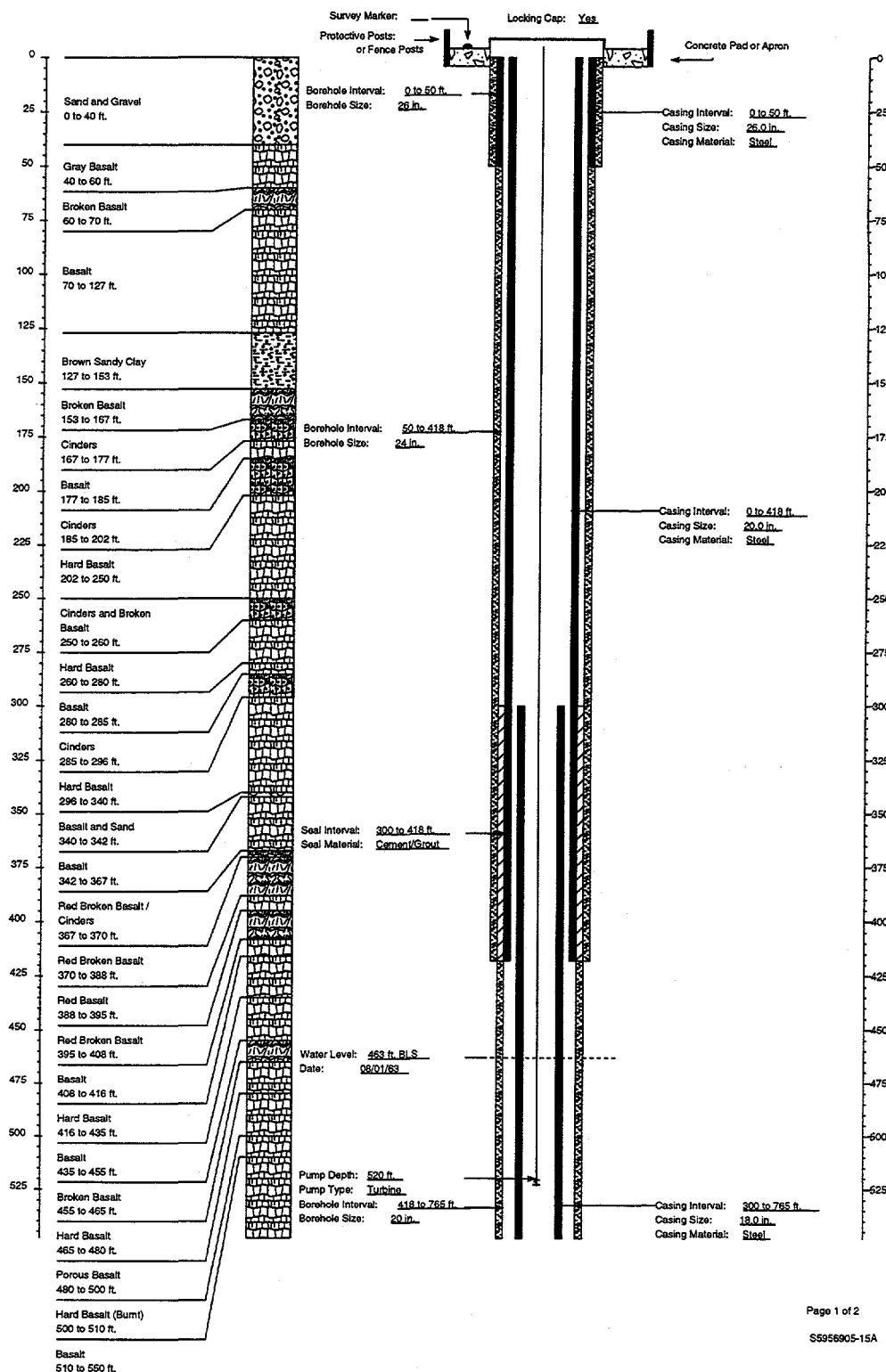
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TRA #4 Production Well

USGS Site ID#: 433521112574201
 State of Idaho PWS#: 6120020
 Location: TRA-672
 Depth of Hole: 975'
 Depth of Well: 965'
 Depth to Water: 463'

Date of Completion: July 25, 1963
 Size and Depth of Casing: 16", 705 to 970';
 18", 300 to 765'; 20", 0 to 418'; 26", 0 to 50'
 Casing Material: Steel
 Pump Information: Line shaft,
 GPM-2000, Horsepower - 350

Media: Aqueous
 Special Equipment: Hearing protection
 Access Required: None
 Support Required: Operator
 Point of Contact: Utility Operators
 Minimum Purge Time: 9 minutes

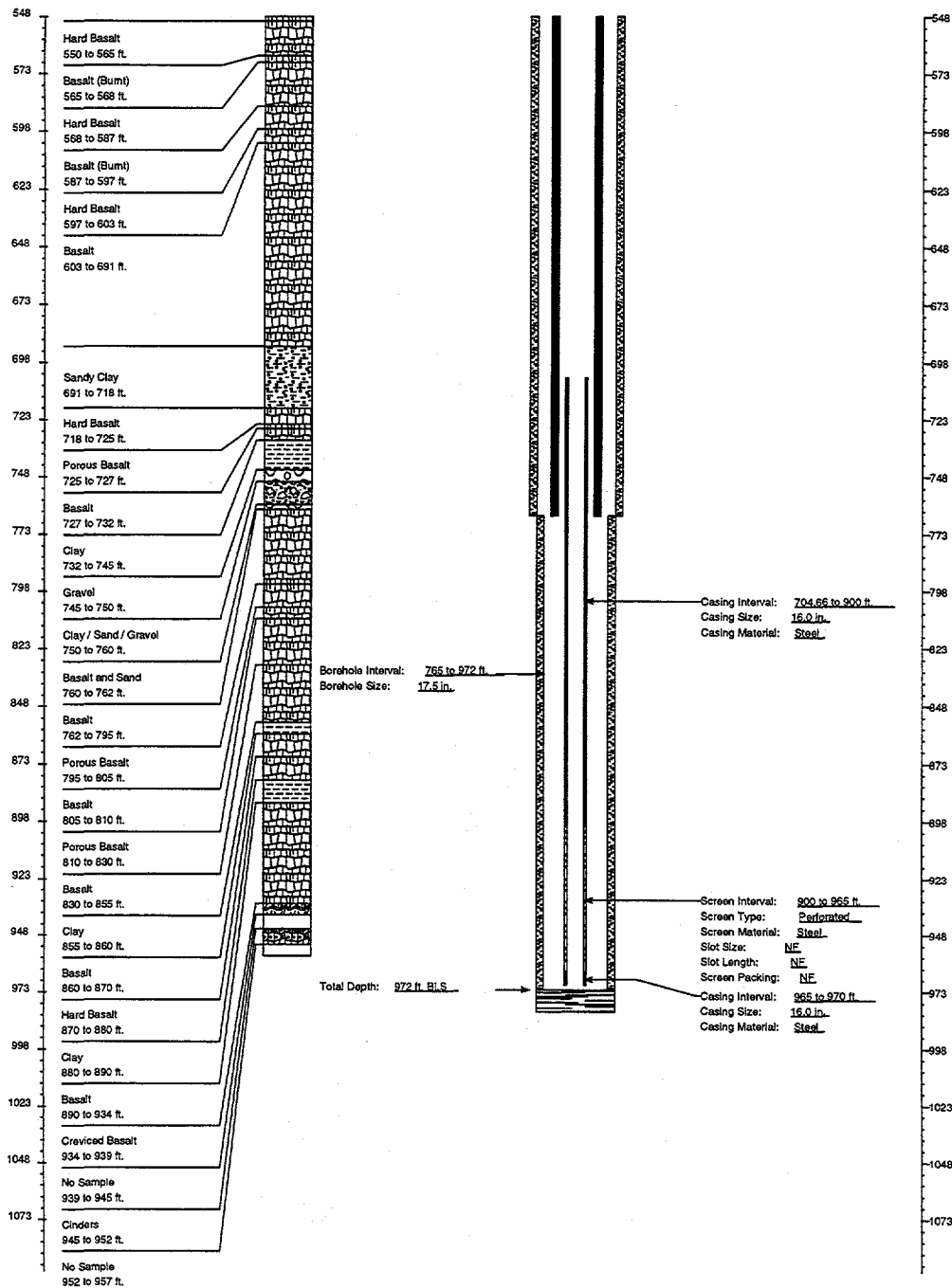


USGS Site ID: 43352112574201
 State of Idaho PWS#: 6120020
 Location: TRA-672
 Depth of Hole: 975'
 Depth of Well: 965'
 Depth to Water: 463'

TRA #4 Production Well

Date of Completion: July 25, 1963
 Size and Depth of Casing: 16", 705 to 970';
 18", 300 to 765'; 20", 0 to 418'; 26", 0 to 50'
 Casing Material: Steel
 Pump Information: Line shaft,
 GPM-2000, Horsepower - 350

Media: Aqueous
 Special Equipment: Heating protection
 Access Required: None
 Support Required: Operator
 Point of Contact: Utility Operators
 Minimum Purge Time: 9 minutes

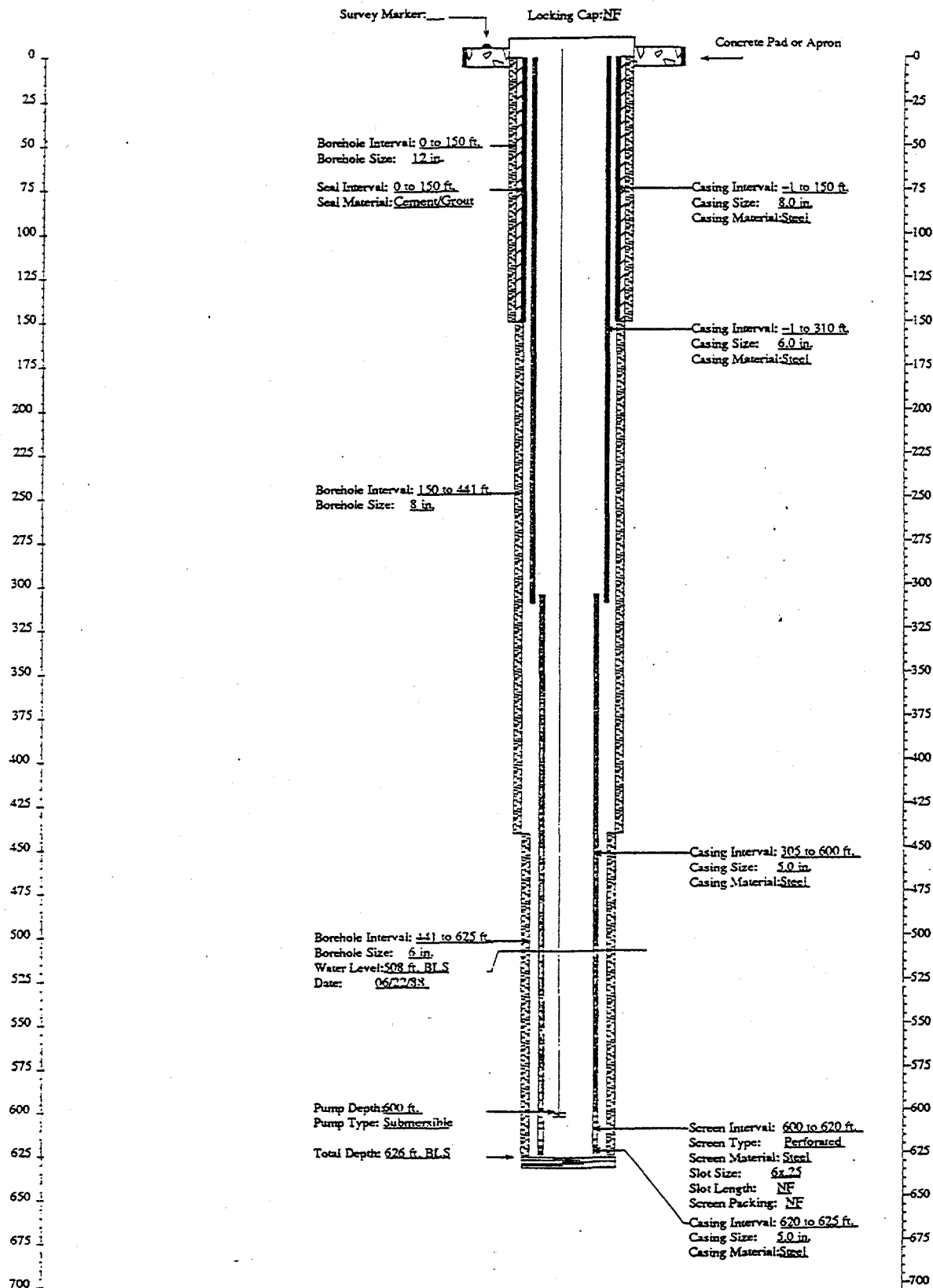


USGS Site ID#: Gun Range
 State of Idaho PWS#: 6120025
 Location: B21-807
 Depth of Hole: 626'
 Depth of Well: 620'
 Depth to Water: 508'

Gun Range Production Well

Date of Completion: January 1990
 Size and Depth of Casing: 5", 305 to 625';
 6", 0 to 310'; 8", 0 to 150'
 Casing Material: Steel
 Pump Information: Submersible,
 GPM-20, Horsepower - 200
 Media: Aqueous

Special Equipment: None
 Access Required: Notify Range Officer
 Support Required: Operator (mechanic)
 Point of Contact: Facilities and
 Management Craft Operation
 Minimum Purge Time: 18 minutes

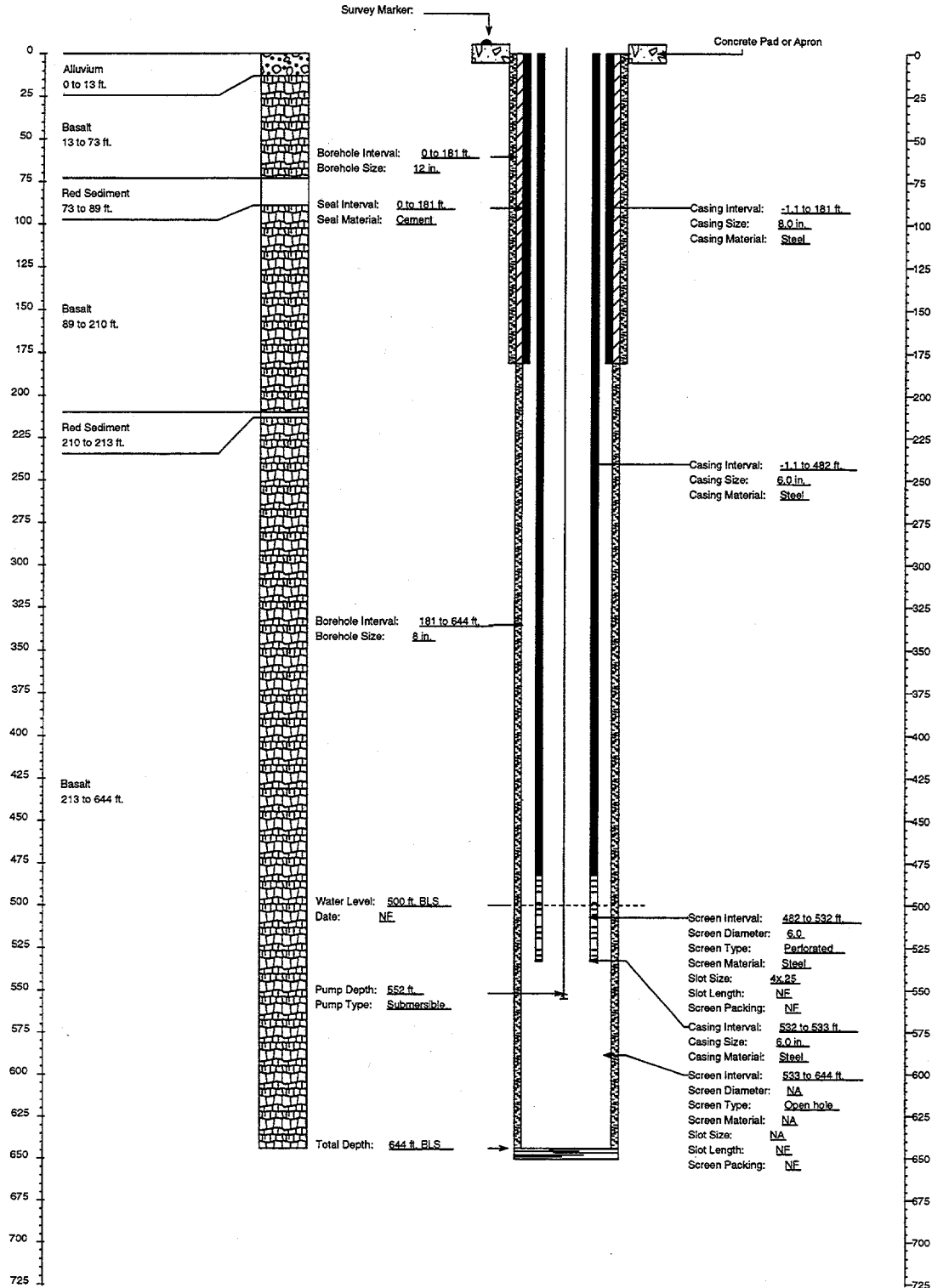


Main Gate Production Well

USGS Site ID#: 433042112535101
 State of Idaho PWS#: 6120015
 Location: B27-605
 Depth of Hole: 644'
 Depth of Well: 644'
 Depth to Water: 489'

Date of Completion: January 5, 1985
 Size and Depth of Casing: 6", 0 to 533';
 8", 0 to 181'
 Casing Material: Steel
 Pump Information: Submersible,
 GPM-20, Horsepower - 5
 Media: Aqueous

Special Equipment: None
 Access Required: None
 Support Required: Operator (mechanic)
 Point of Contact: Facilities and
 Management Craft Operation
 Minimum Purge Time: 34 minutes

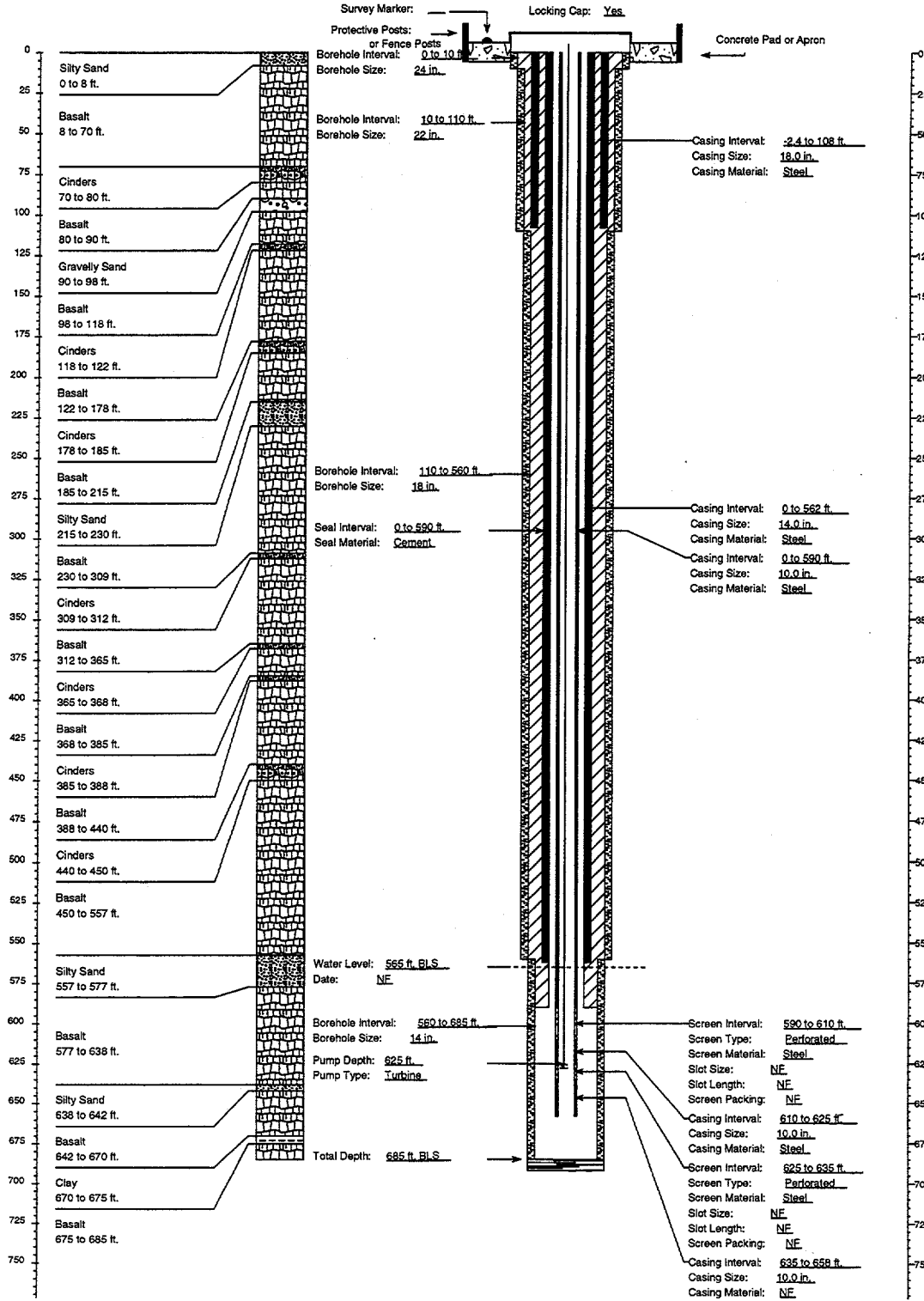


RWMC Production Well

USGS Site ID#: 433002113021701
 State of Idaho PWS#: 6120018
 Location: Waste Management Facility, WMF-603
 Depth of Hole: 685'
 Depth of Well: 685'
 Depth to Water: 568'

Date of Completion: November 1974
 Size and Depth of Casing: 10", 0 to 658';
 14", 0 to 562'; 18", 0 to 108'
 Casing Material: Steel
 Pump Information: Line shaft,
 GPM-240, Horsepower - 75
 Media: Aqueous

Special Equipment: None
 Access Required: None
 Support Required: Operator (mechanic)
 Point of Contact: Facilities and
 Management Craft Operation
 Minimum Purge Time: 6 minutes



S5956905-18

Appendix B

Nonradiological Liquid Effluent Monitoring Program Summary Data Results by Stream

Appendix B

Nonradiological Liquid Effluent Monitoring Program Summary Data Results by Stream

This appendix lists the analytical results of samples collected during 1994 on a site-by-site basis. All analytes that were detected above the practical quantitation levels are delineated with numerical values. All analytes that were below the practical quantitation levels are delineated with an ND. Several other items are also found within or as a footnote to the tables in this appendix. The following list is the key to those items.

—	Sample not analyzed for this parameter
B	Analyte is found in associated blank as well as in the sample.
E	Used for VOCs. Identified compounds whose concentration exceeds the calibration system of the GC/MS.
J	Analyte positively identified, but value may not be consistent with amount present in sample.
Level 1	Control limit set at 95% confidence limit on the individual measurements
Level 2	Control limit set at 95% confidence limit on the individual measurements
Mean	Average or expected value of a variable
N	Analyte tentatively identified, but value may not be consistent with amount present in sample.
N	Total possible number of field replicates
NA	Not applicable or results not available
ND	Value below the practical quantitation limit
NR	Analysis not requested
STD	Standard deviation which is the square root of the variance
TIC	Tentatively identified compound
X	The "X" flag is used in combination with other flags to properly identify the results.

**Effluent Monitoring Data for
CFA-603 (Medical Services)**

Table B-1. 1994 effluent monitoring data for CFA-603.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/06/94	01/06/94	04/27/94	07/06/94	10/19/94			
Biological Oxygen Demand (5-day) (mg/L)	6.0	7.0	7.0	14.0	10.0			
Conductivity (μ S)	525	503	536	588	590			
pH	7.0	7.5	7.8	7.8	6.8			
TSS (mg/L)	13.0	12.0	38.0	20.0	7.0			
Silver (μ g/L)	ND	ND	ND	ND	20.5			
Arsenic (μ g/L)	ND	ND	ND	ND	ND			
Barium (μ g/L)	ND	ND	ND	ND	ND			
Cadmium (μ g/L)	ND	ND	ND	ND	ND			
Chromium (μ g/L)	10.2	10.6	12.3	ND	10.4			
Mercury (μ g/L)	ND	ND	ND	ND	ND			
Lead (μ g/L)	ND	ND	9.6	ND	4.7			
Selenium (μ g/L)	ND	ND	ND	ND	ND			

ND - below practical quantitation level

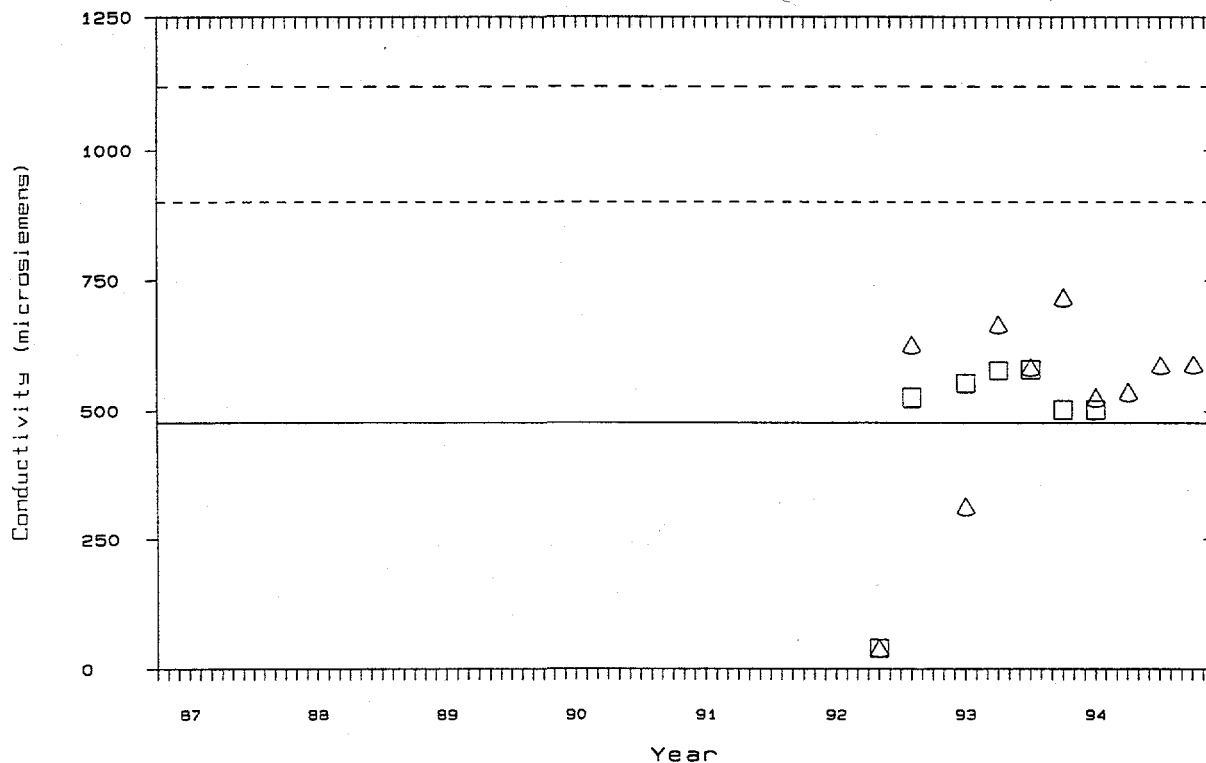
Table B-2. Summary statistics for CFA-603.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Biological Oxygen Demand (5-day) (mg/L)	7.1	4.8	12	16.1	20.8	NA
Conductivity (μ S)	478	227	12	903	1121	NA
pH	7.5	0.36	12	6.3	8.6	2.5-12
TSS (mg/L)	16.6	9.0	9	34.2	44.0	NA
Chromium (μ g/L)	11.3	1.3	9	13.7	15.1	5000

Guideline - RCRA Characteristic Guideline
 NA - Not Applicable

CFA603A Conductivity

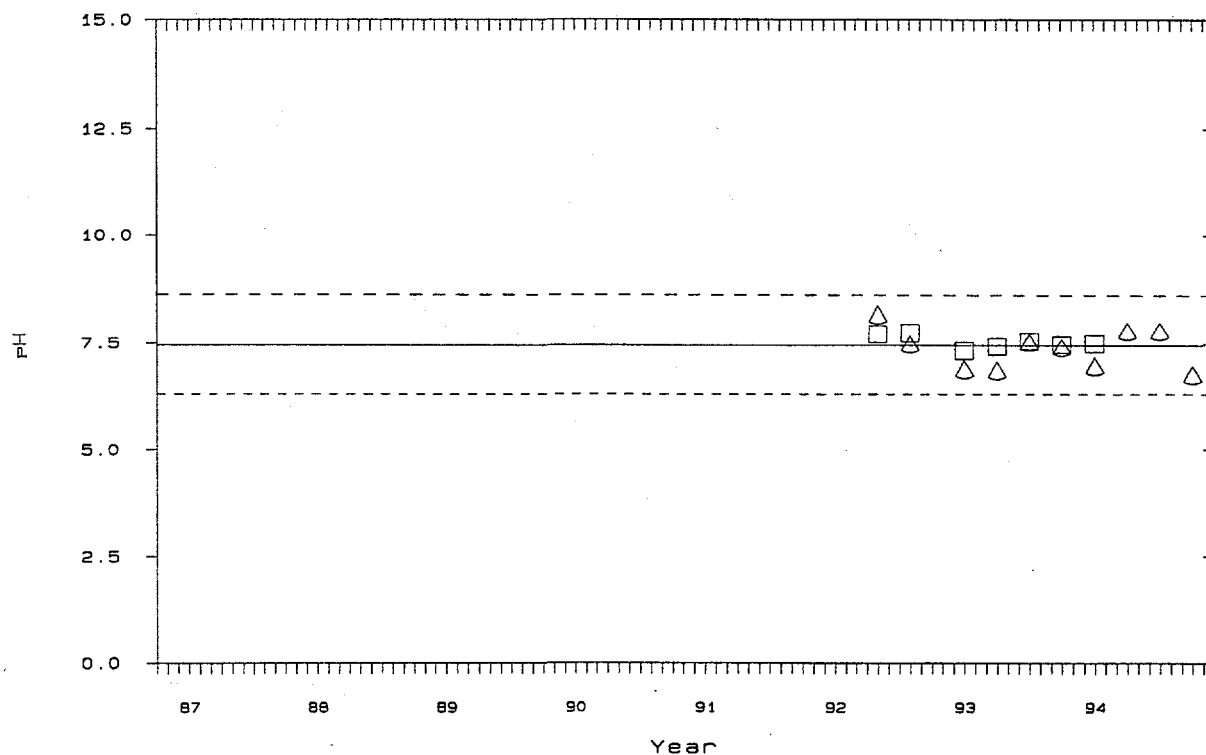
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

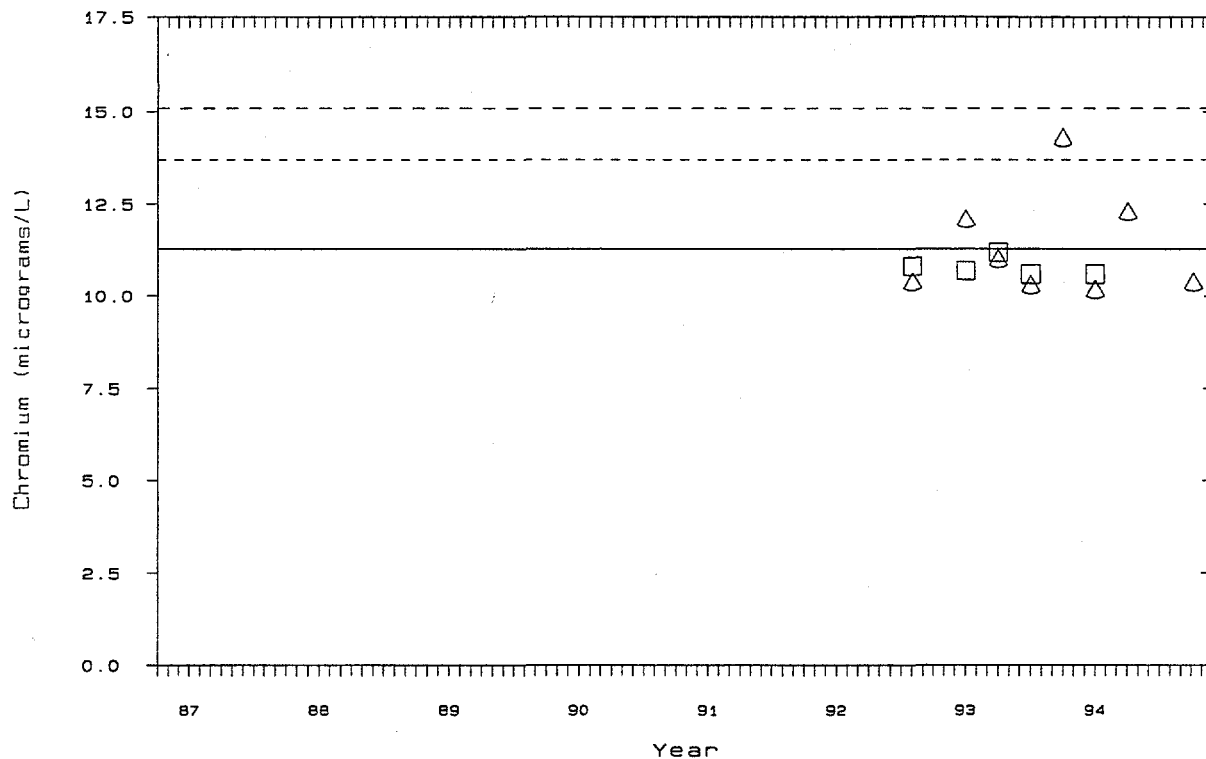
CFA603A pH

RCRA Characteristic Guideline = 2.5-12



CFA603A Chromium Concentrations

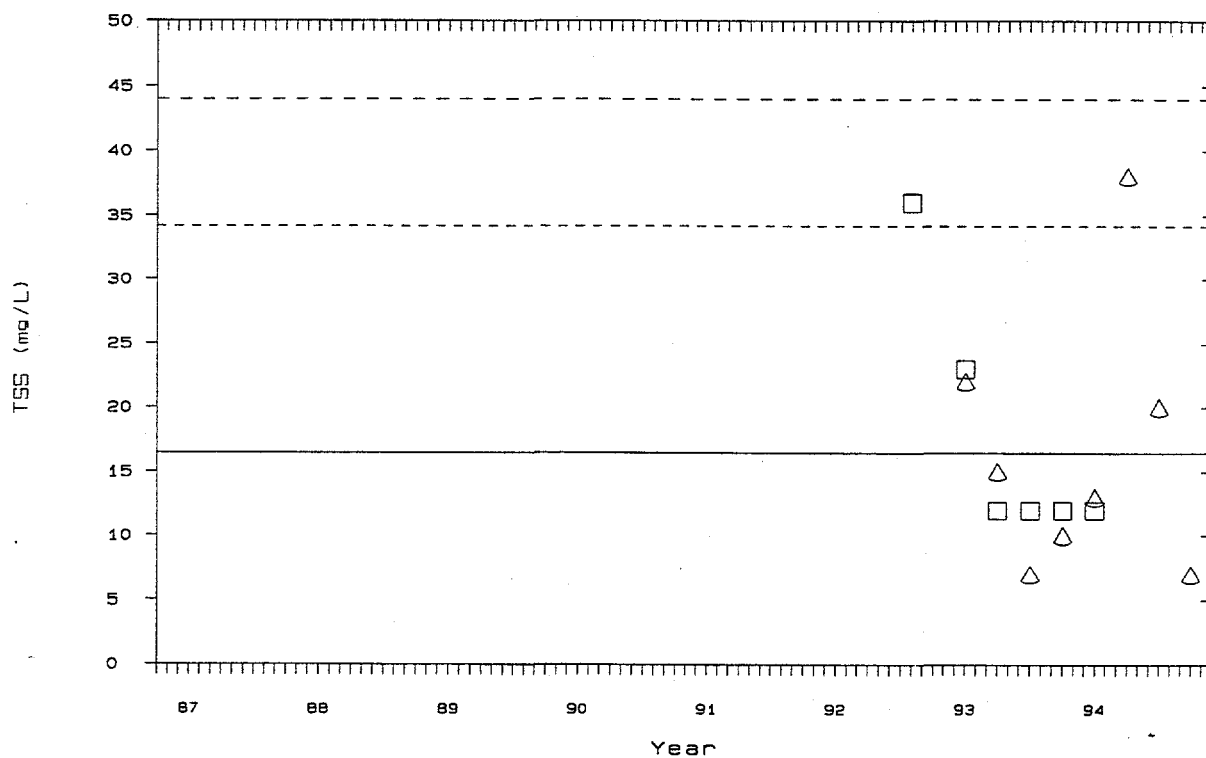
RCRA Characteristic Guideline = 5000 micrograms/L



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

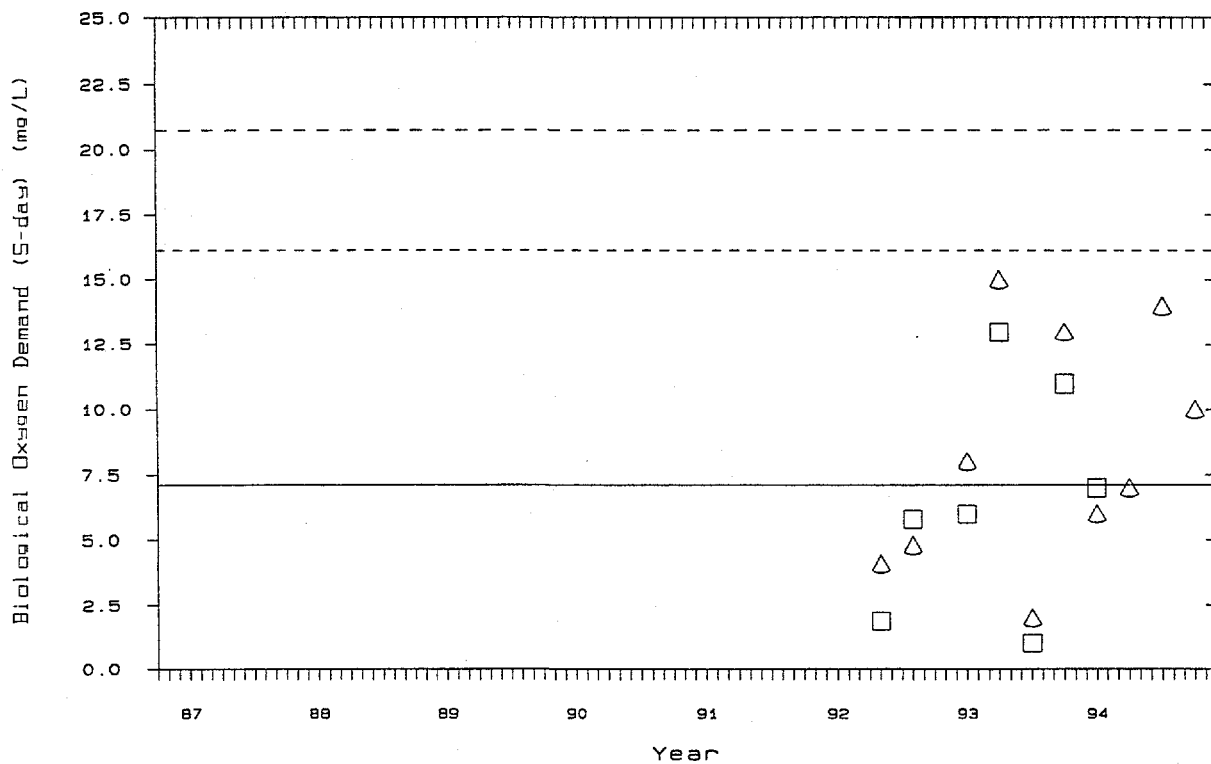
CFA603A TSS Concentrations

RCRA Guideline Not Applicable



CFA603A Biological Oxygen Demand (5-day) Concentrations

RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

**Effluent Monitoring Data for
CFA-608 (SRT Oil/Water Separator)**

Table B-3. 1994 effluent monitoring data for CFA-608.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/06/94	01/06/94	04/27/94	07/06/94			
Biological Oxygen Demand (5-day) (mg/L)	72.0	110	310	6.0			
Conductivity (μ S)	9700	9600	1880	400			
pH	8.8	8.9	8.8	8.4			
Chemical Oxygen Demand (mg/L)	547	598	904	349			
Chromium VI (μ g/L)	ND	ND	ND	ND			
Nitrogen, as Ammonia (mg/L)	0.34	0.33	0.17	0.36			
Phenols (μ g/L)	36.4	37.9	60.3	105			
Sulfide, Total (mg/L)	ND	ND	ND	0.62			
TOC (mg/L)	127	121	204	103			
Total Oil & Grease (mg/L)	226	175	84.8	109			
TSS (mg/L)	46.0	47.0	147	13.0			
Silver (μ g/L)	ND	ND	ND	ND			
Arsenic (μ g/L)	ND	ND	ND	ND			
Barium (μ g/L)	ND	ND	ND	ND			
Cadmium (μ g/L)	33.3	36.0	16.3	20.4			
Chromium (μ g/L)	10.2	ND	13.8	22.6			
Mercury (μ g/L)	ND	ND	ND	ND			
Lead (μ g/L)	5.8	ND	12.7	7.2			
Selenium (μ g/L)	ND	ND	ND	ND			

ND - below practical quantitation level

Table B-4. 1994 volatile organics data for CFA-608A.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
Acetone (TIC)	July	50.00	µg/L	X	6.03
Aromatic (TIC)	January	400.00	µg/L	J	32.00
C4 Alkenylbenzene (TIC)	April	500.00	µg/L	J	35.50
C4 Alkylbenzene (TIC)	January	40.00	µg/L	J	29.57
C4 Alkylbenzene (TIC)	April	40.00	µg/L	J	33.50
Ethylbenzene	January	1.00	µg/L	J	
Methylene Chloride	January	4.00	µg/L	JB	
Methylene Chloride	April	65.00	µg/L	B	
Methylene Chloride	July	10.00	µg/L	B	
Toluene	January	2.00	µg/L	J	
Trichlorofluoromethane	July	1.00	µg/L	J	
Trimethyl Silanol (TIC)	January	6.00	µg/L	J	8.90
Unknown (TIC)	January	6.00	µg/L	J	10.60
Unknown (TIC)	January	20.00	µg/L	J	20.67
Unknown (TIC)	April	40.00	µg/L	J	28.77
Unknown (TIC)	July	8.00	µg/L	J	32.20
Unknown (TIC)	July	5.00	µg/L	J	33.73
Unknown (TIC)	July	70.00	µg/L	J	35.80
Xylene (total)	January	6.00	µg/L		
Xylene (total)	July	2.00	µg/L	J	

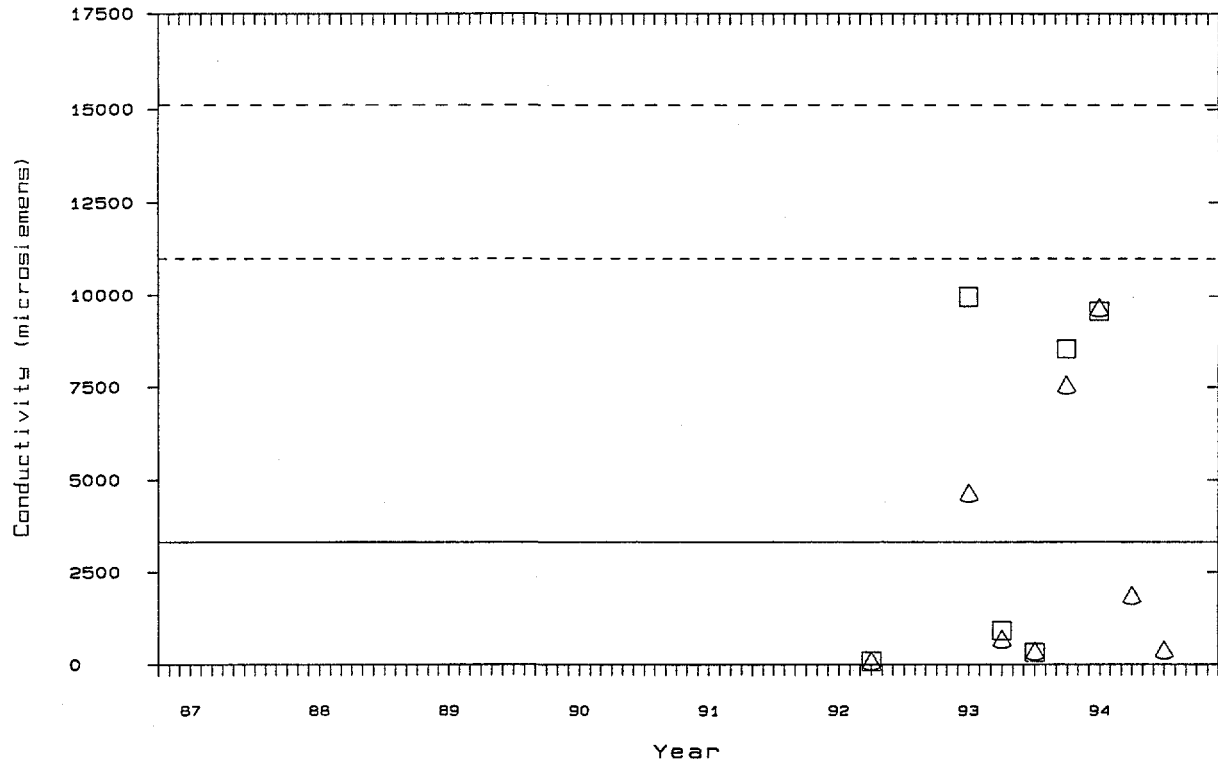
Table B-5. Summary statistics for CFA-608.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Biological Oxygen Demand (5-day) (mg/L)	148	143	10	423	571	NA
Conductivity (μ S)	3330	3987	10	10995	15127	NA
pH	8.5	0.96	10	5.3	11.8	2.5-12
Chemical Oxygen Demand (mg/L)	797	724	10	2189	2940	NA
Nitrogen, as Ammonia (mg/L)	1.0	0.77	10	2.5	3.3	NA
Phenols (μ g/L)	68.6	80.3	10	223	306	NA
Total Oil & Grease (mg/L)	70.4	95.5	9	257	362	NA
TSS (mg/L)	688	1615	9	3853	5618	NA

Guideline - RCRA Characteristic Guideline
 NA - Not Applicable

CFA608A Conductivity

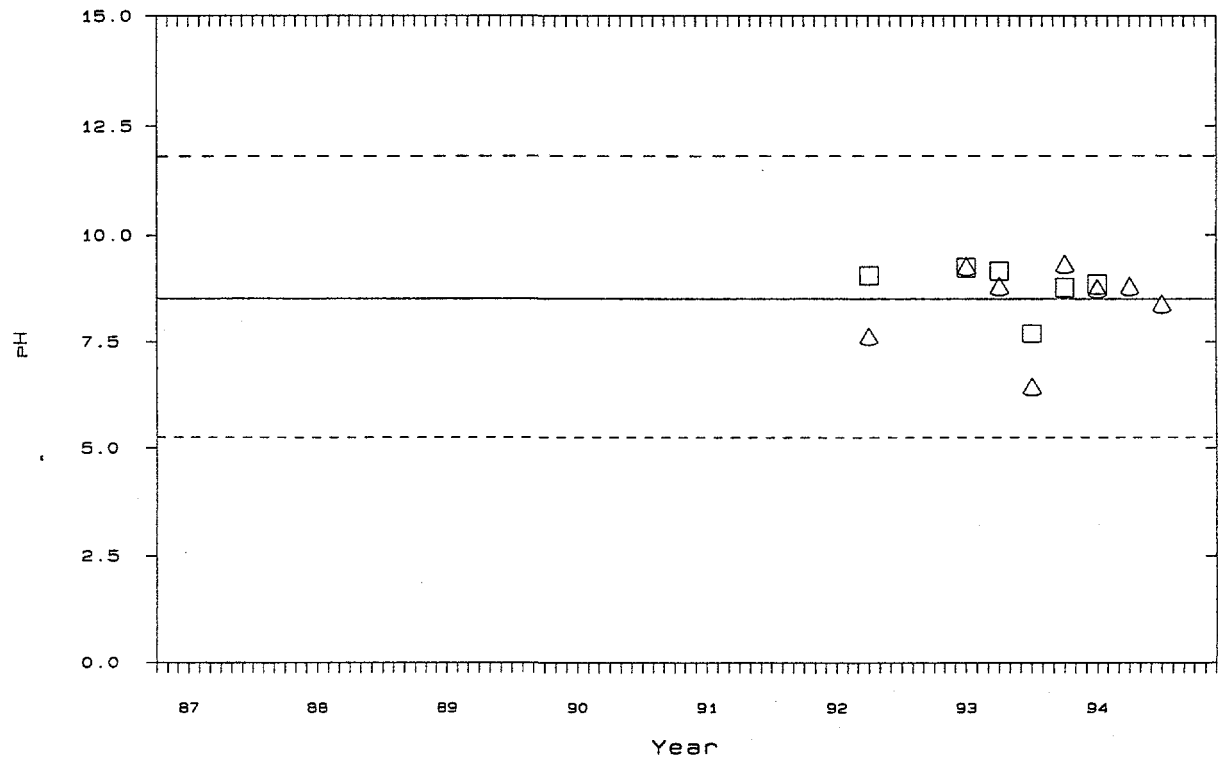
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

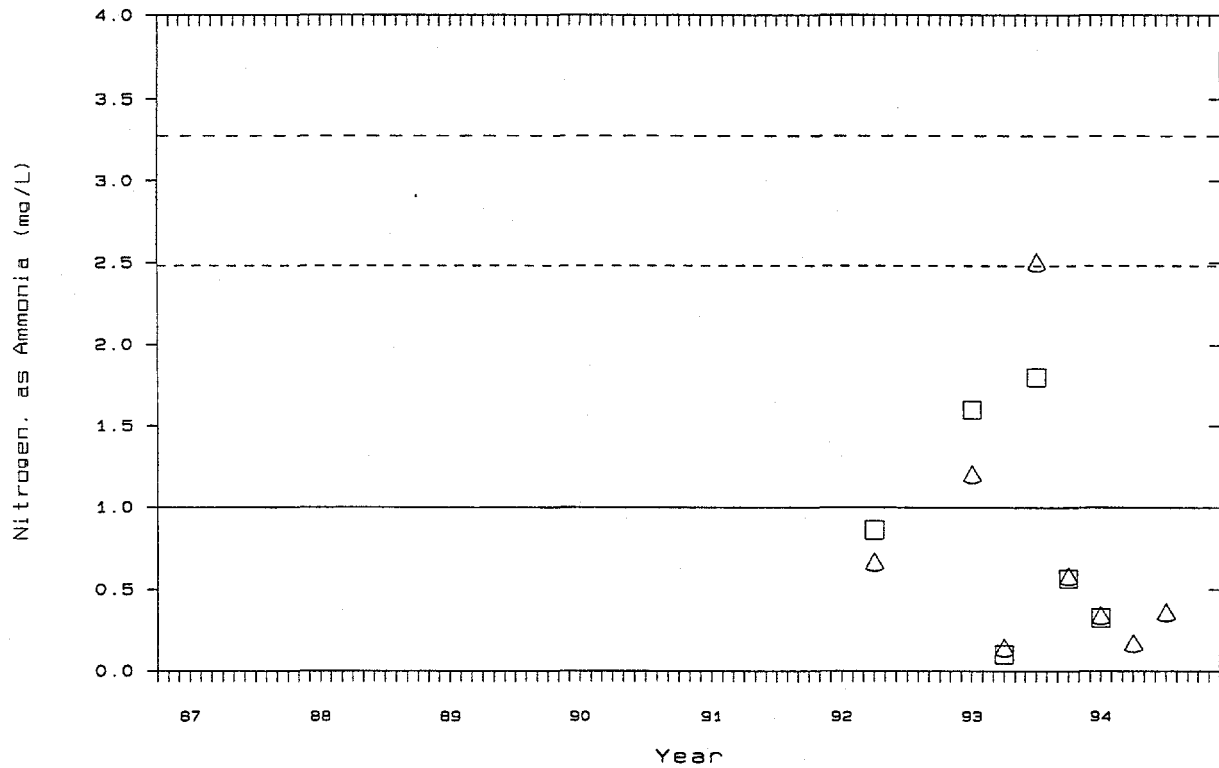
CFA608A pH

RCRA Characteristic Guideline = 2.5-12



CFA608A Nitrogen, as Ammonia Concentrations

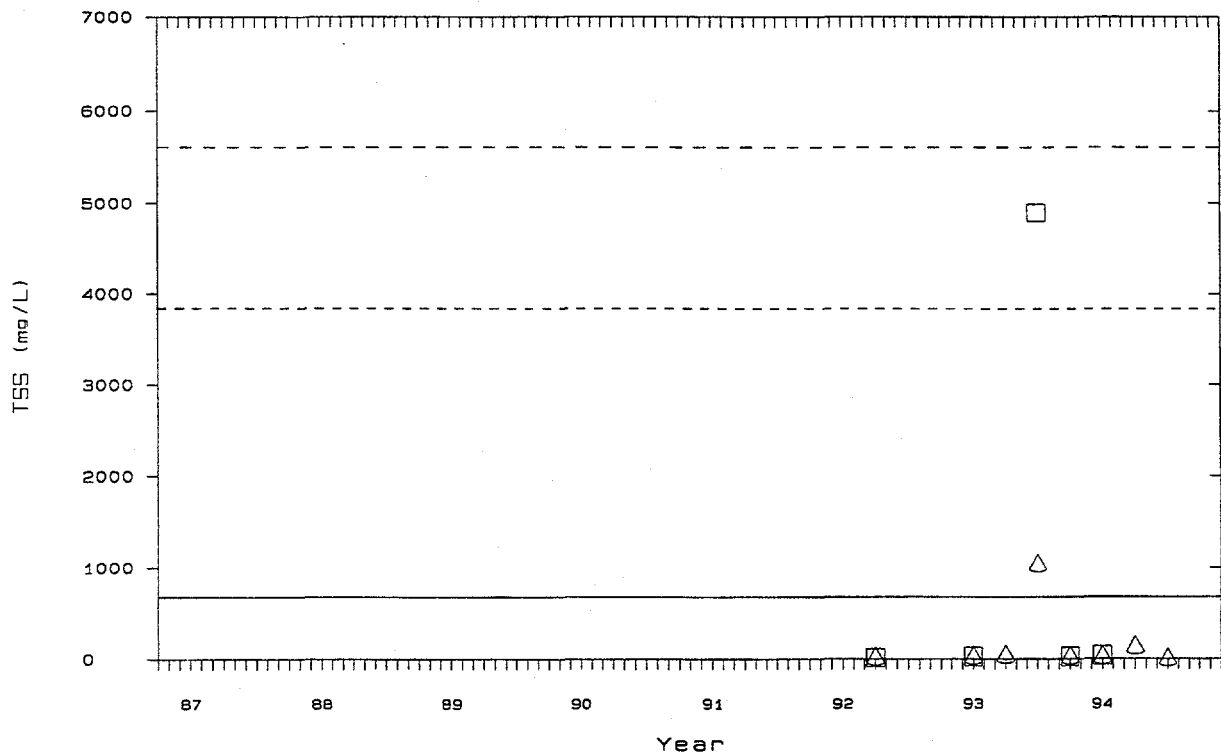
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

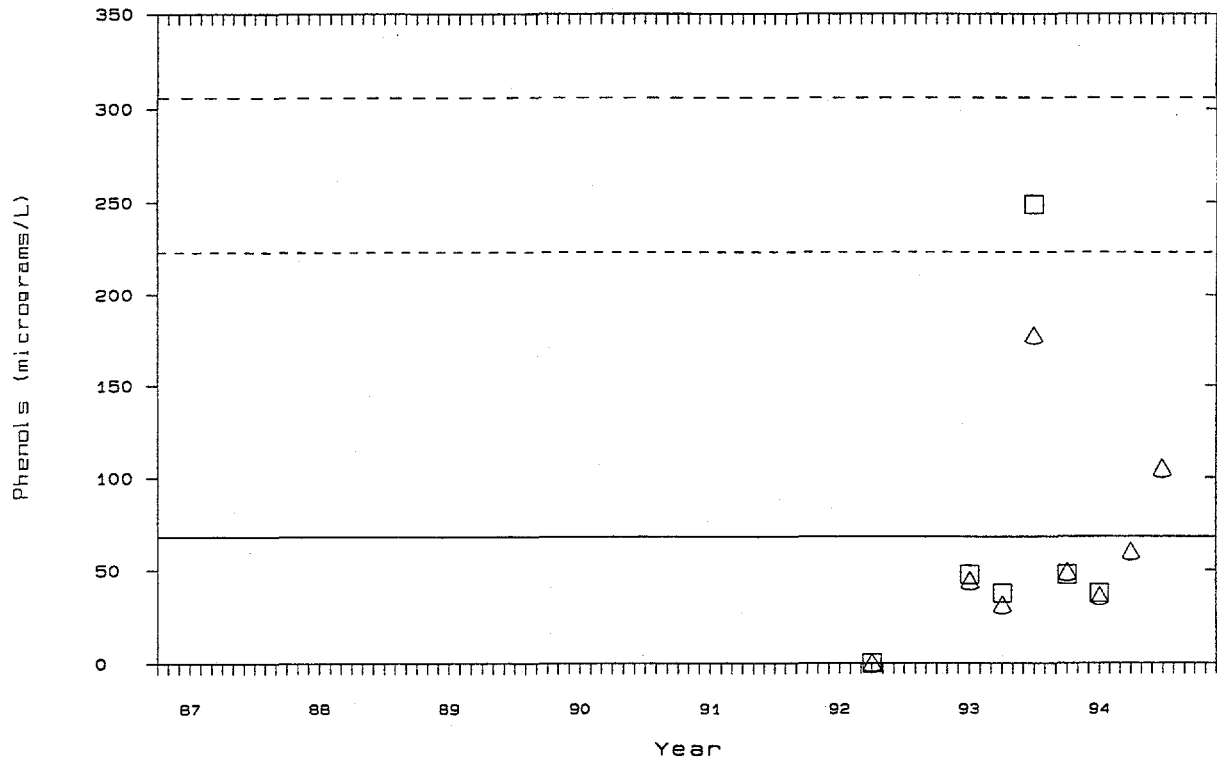
CFA608A TSS Concentrations

RCRA Guideline Not Applicable



CFA608A Phenols Concentrations

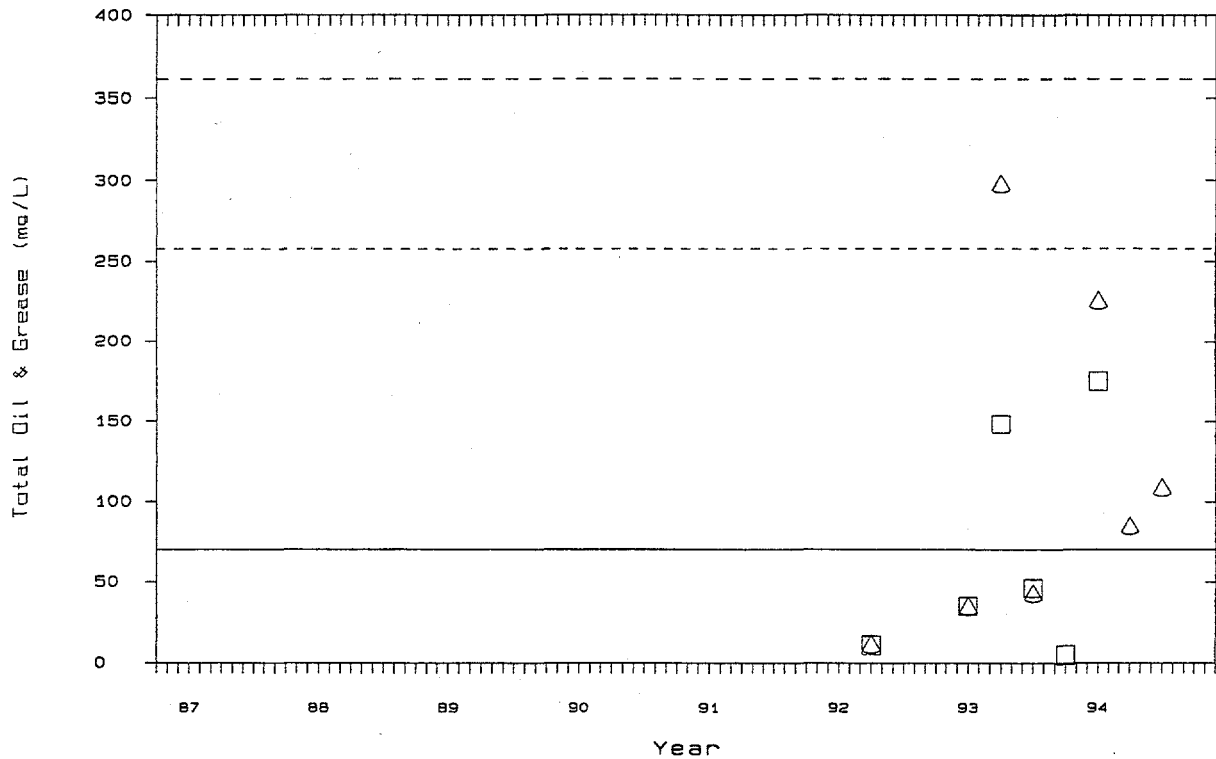
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

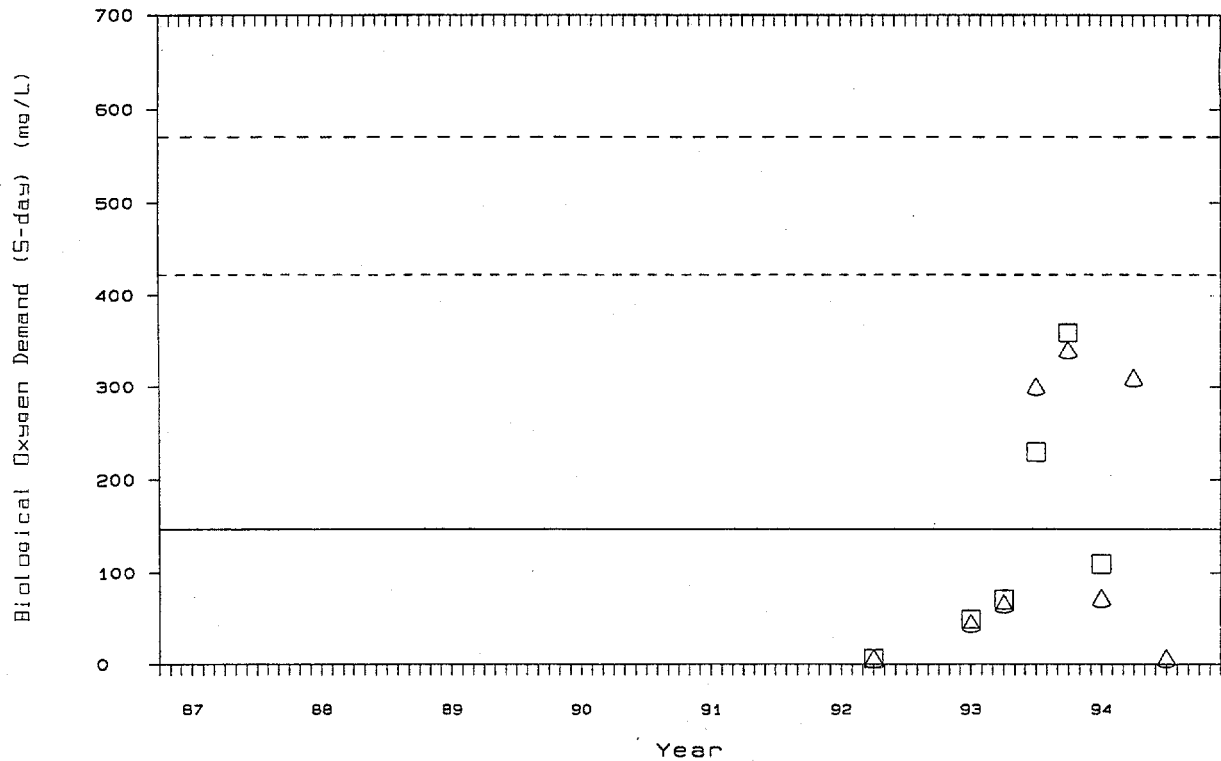
CFA608A Total Oil & Grease Concentrations

RCRA Guideline Not Applicable



CFA608A Biological Oxygen Demand (5-day) Concentrations

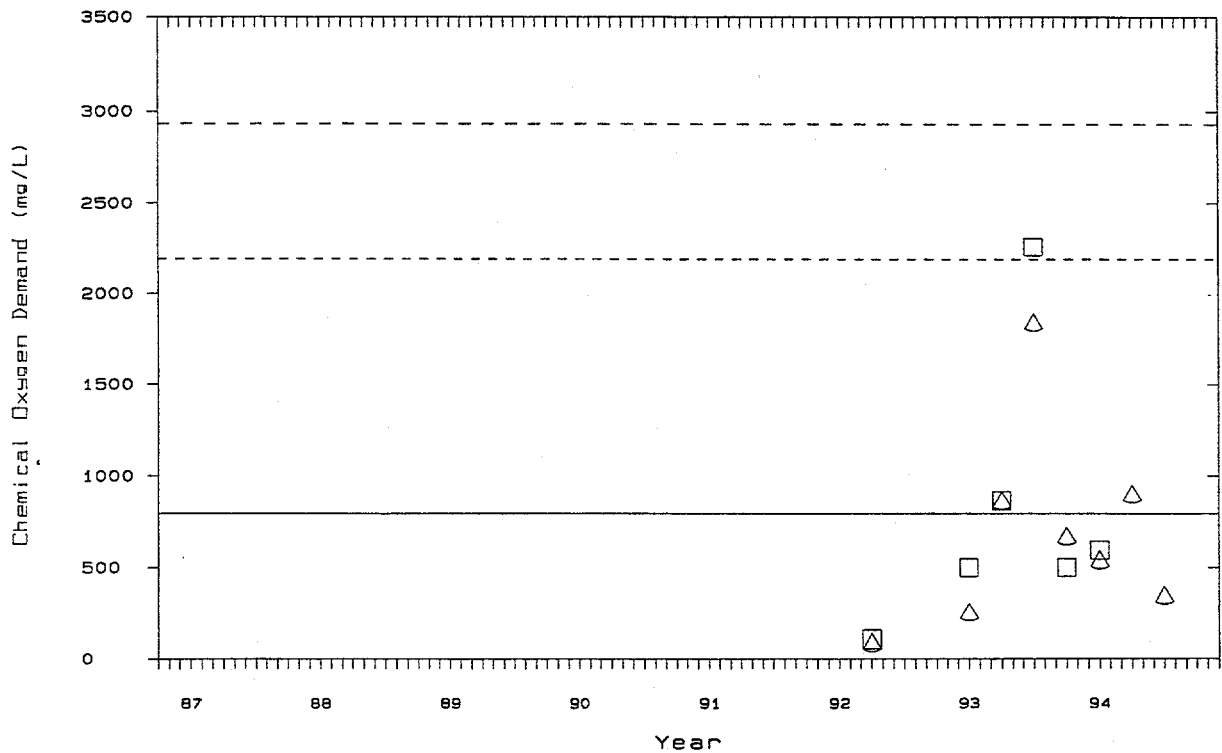
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

CFA608A Chemical Oxygen Demand Concentrations

RCRA Guideline Not Applicable



**Effluent Monitoring Data for
CFA-612 (Industrial Hygiene Laboratory)**

Table B-6. 1994 effluent monitoring data for CFA-612.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	03/30/94	06/08/94	09/14/94	12/14/94			
Biological Oxygen Demand (5-day) (mg/L)	27.0	7.0	15.0	19.0			
Conductivity (μ S)	512	1152	1367	557			
pH	7.5	9.0	7.4	8.3			
Chemical Oxygen Demand (mg/L)	55.7	28.6	40.2	72.0			
Chromium VI (μ g/L)	ND	ND	24.0	ND			
Fluoride (mg/L)	0.18	0.18	0.18	0.21			
Sulfide, Total (mg/L)	ND	ND	ND	ND			
TOC (mg/L)	19.5	6.3	26.0	48.3			
TSS (mg/L)	14.0	23.0	10.0	18.0			
Silver (μ g/L)	17.6	ND	ND	ND			
Arsenic (μ g/L)	ND	ND	ND	ND			
Barium (μ g/L)	ND	ND	ND	ND			
Beryllium (μ g/L)	ND	ND	ND	ND			
Cadmium (μ g/L)	ND	ND	ND	ND			
Cobalt (μ g/L)	ND	ND	ND	ND			
Chromium (μ g/L)	ND	19.9	18.1	22.4			
Copper (μ g/L)	ND	ND	ND	ND			
Iron (μ g/L)	252	134	299	358			
Mercury (μ g/L)	ND	ND	ND	ND			
Nickel (μ g/L)	ND	ND	ND	ND			

ND - below practical quantitation level

Table B-6. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	03/30/94	06/08/94	09/14/94	12/14/94					
Lead ($\mu\text{g/L}$)	ND	ND	33.9	ND					
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND					
Selenium ($\mu\text{g/L}$)	ND	ND	ND	ND					
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND					
Zinc ($\mu\text{g/L}$)	29.8	147	54.5	48.2					

ND - below practical quantitation level

Table B-7. 1994 volatile organics data for CFA-612.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
1,2-Dichlorobenzene	September	1.00	µg/L	J	
1,4-Dichlorobenzene	March	6.00	µg/L		
1,4-Dichlorobenzene	June	3.00	µg/L	J	
1,4-Dichlorobenzene	September	2.00	µg/L	J	
1,4-Dichlorobenzene	December	6.00	µg/L		
Chloroform	September	1.00	µg/L	J	
Chloroform	December	2.00	µg/L	J	
Methylene Chloride	June	6.00	µg/L	B	
Methylene Chloride	December	1.00	µg/L	JB	

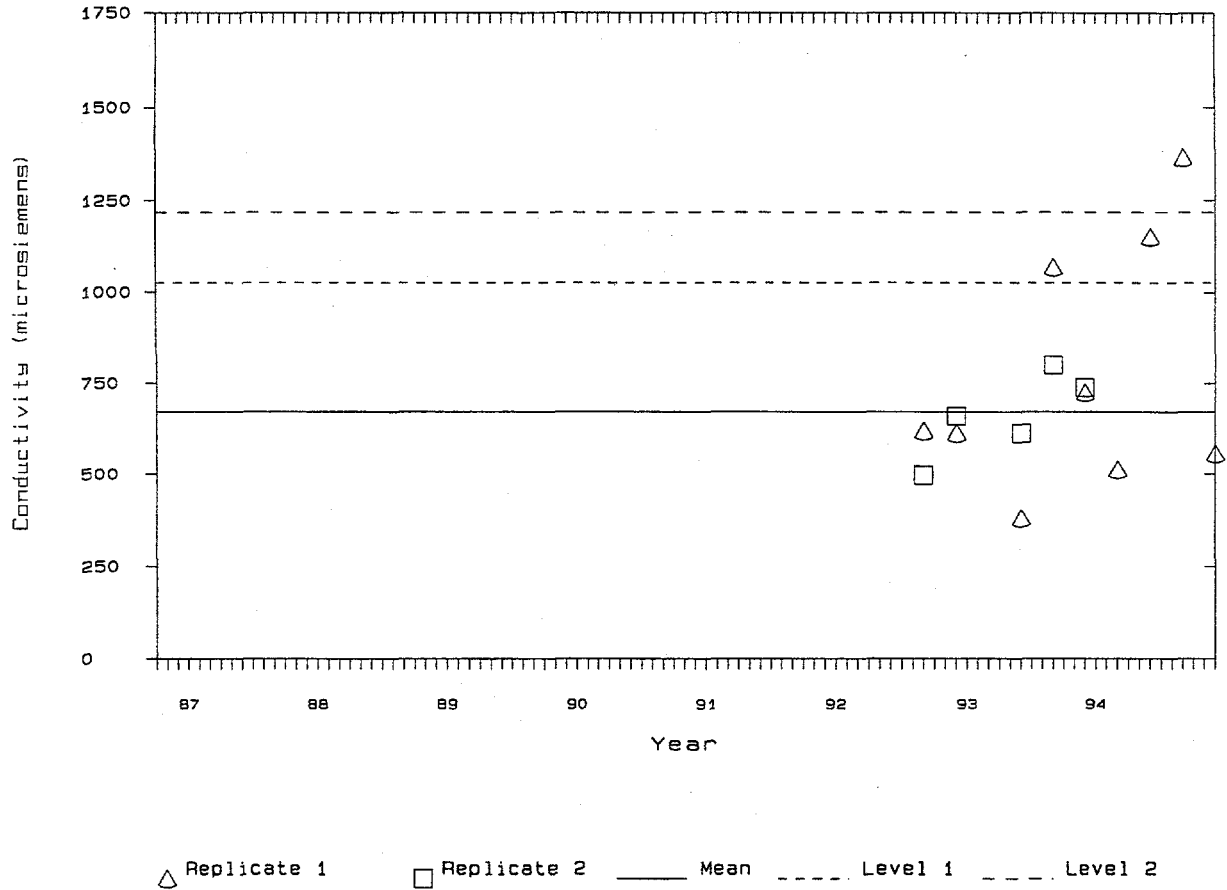
Table B-8. Summary statistics for CFA-612.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Biological Oxygen Demand (5-day) (mg/L)	92.3	116	10	315	435	NA
Conductivity (μ S)	672	185	10	1027	1218	NA
pH	7.4	0.74	10	4.9	9.9	2.5-12
Chemical Oxygen Demand (mg/L)	137	152	10	429	587	NA
TOC (mg/L)	31.4	35.1	10	98.9	135	NA
TSS (mg/L)	149	151	9	445	611	NA
Iron (μ g/L)	339	287	10	891	1189	NA
Zinc (μ g/L)	129	87.3	10	297	387	NA

Guideline - RCRA Characteristic Guideline
 NA - Not Applicable

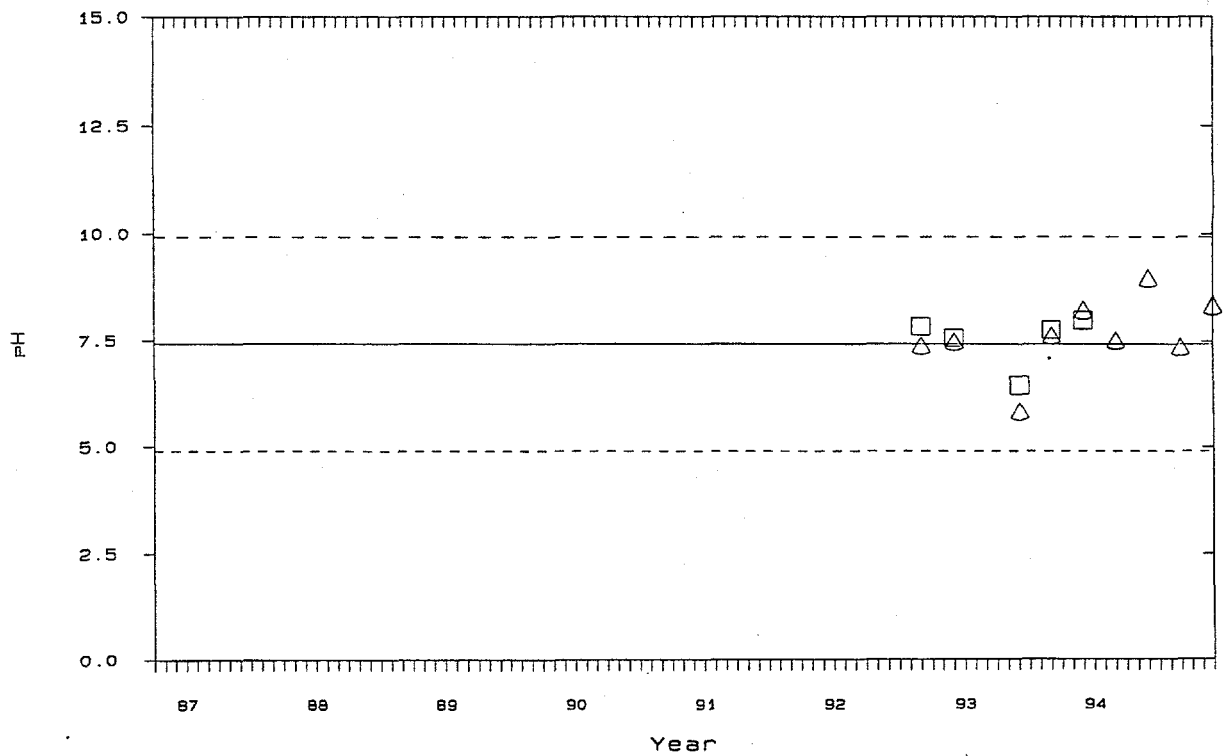
CFA612A Conductivity

RCRA Guideline Not Applicable



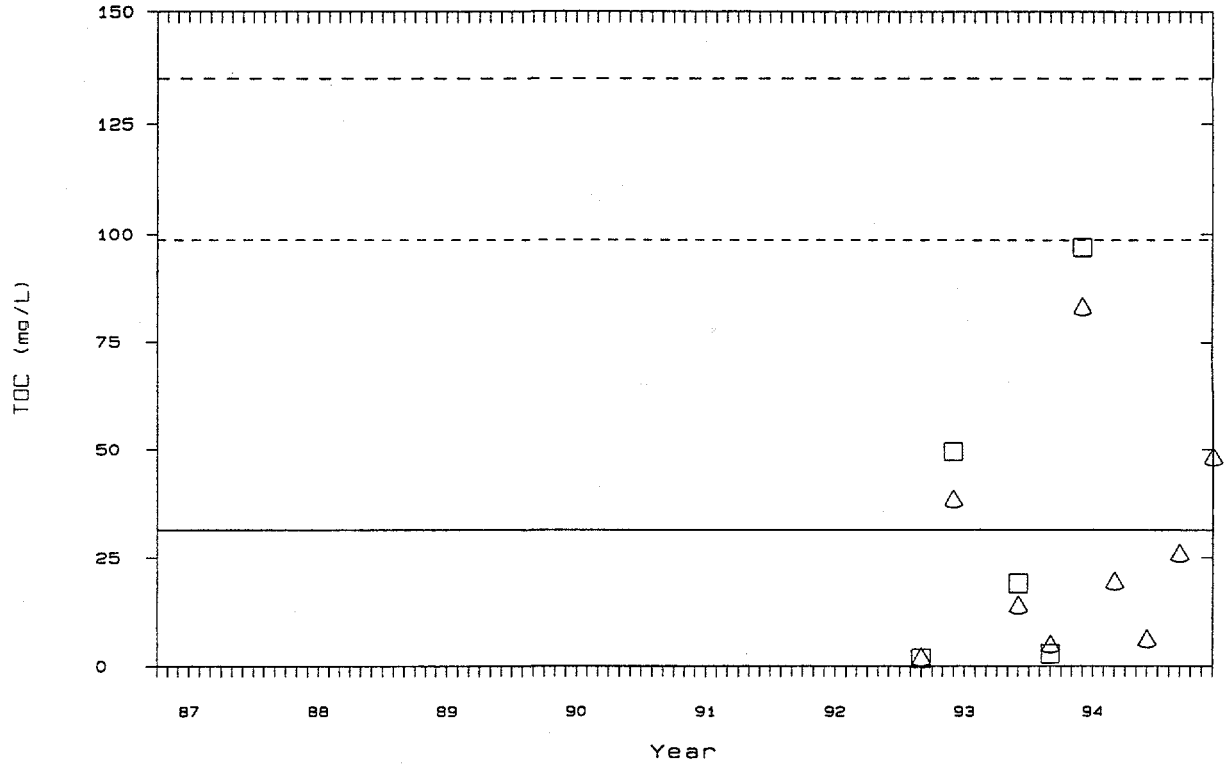
CFA612A pH

RCRA Characteristic Guideline = 2.5-12



CFA612A TOC Concentrations

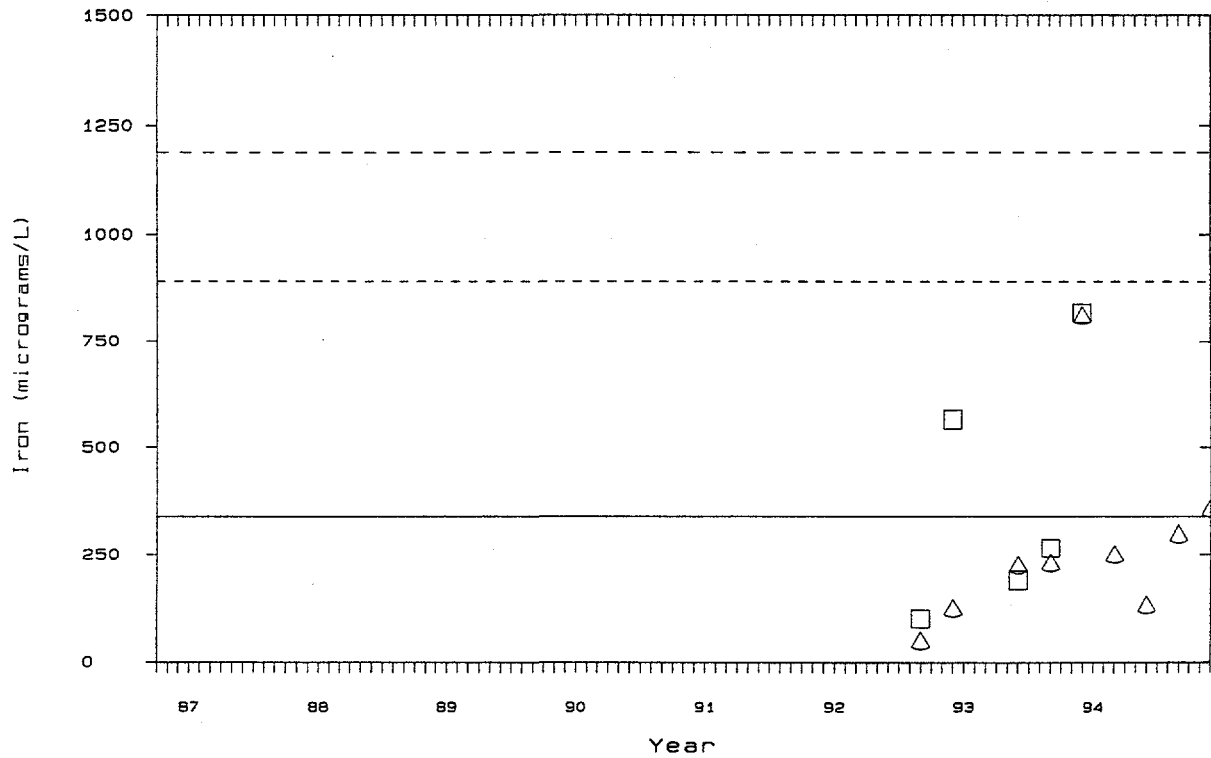
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 . . . Level 2

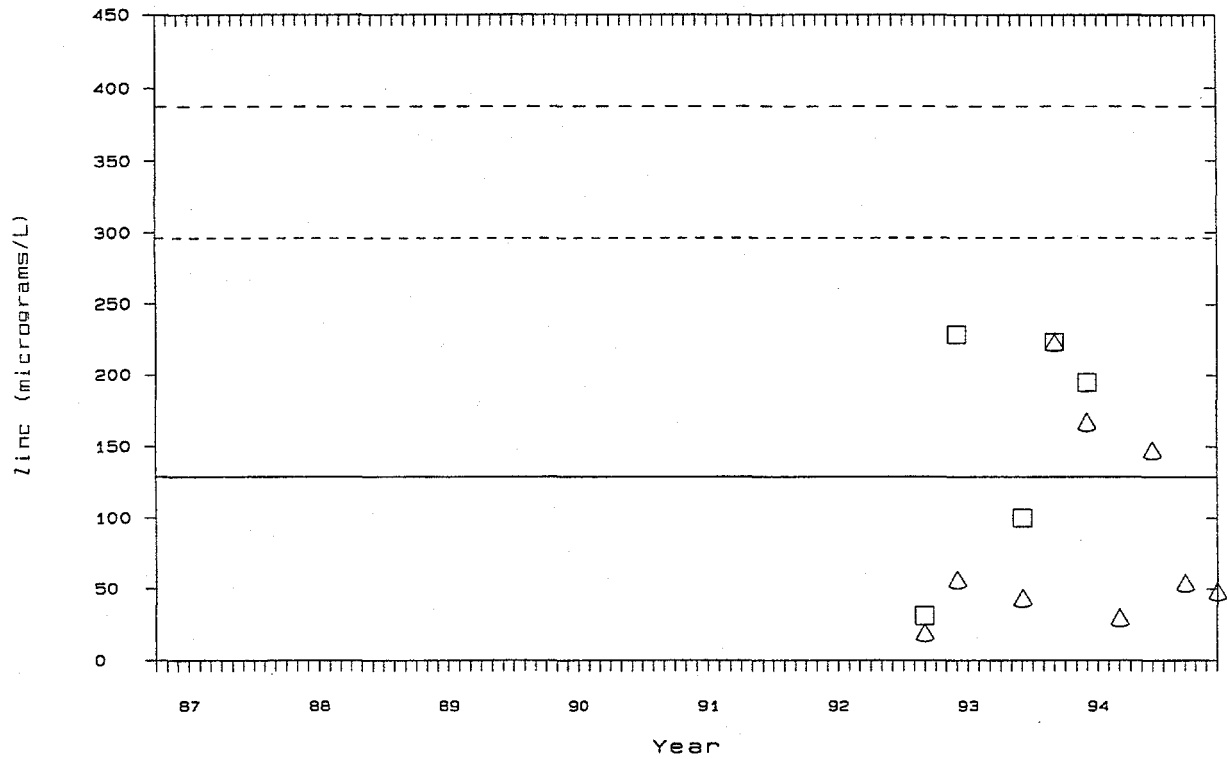
CFA612A Iron Concentrations

RCRA Guideline Not Applicable



CFA612A Zinc Concentrations

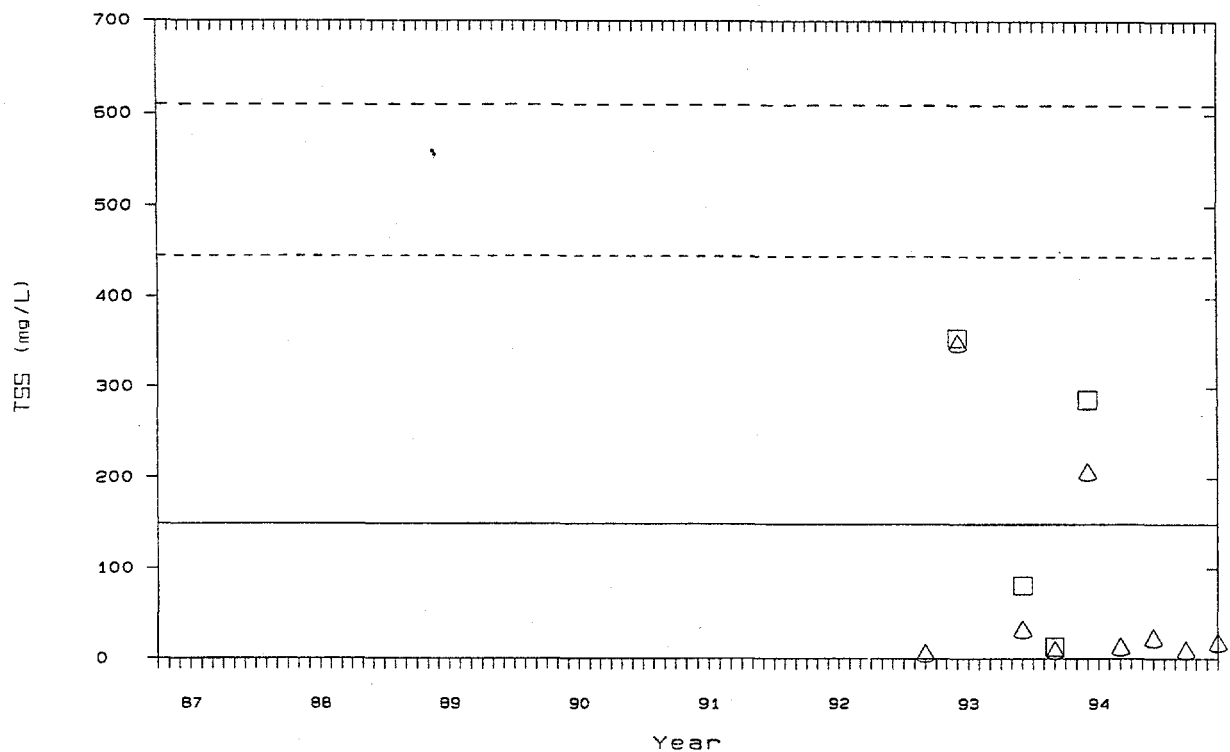
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

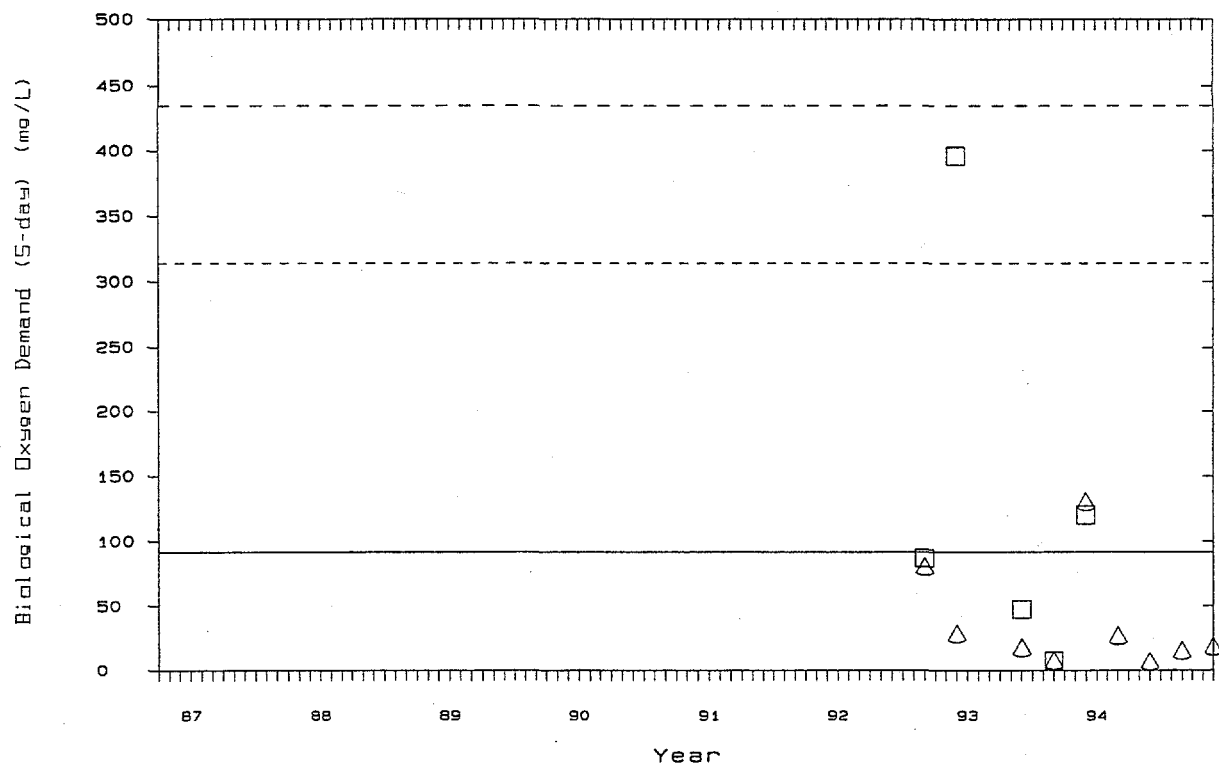
CFA612A TSS Concentrations

RCRA Guideline Not Applicable



CFA612A Biological Oxygen Demand (5-day) Concentrations

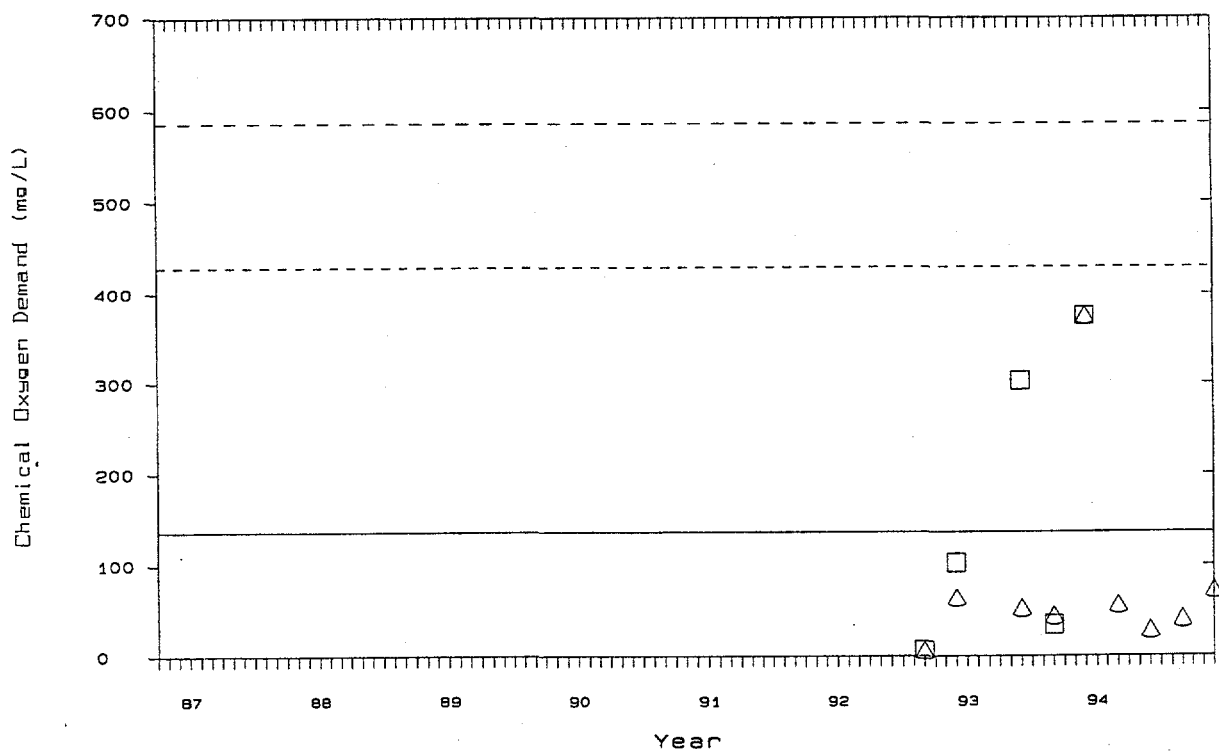
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

CFA612A Chemical Oxygen Demand Concentrations

RCRA Guideline Not Applicable



**Effluent Monitoring Data for
CFA-625 (Environmental Chemistry Laboratory)**

Table B-9. 1994 effluent monitoring data for CFA-625.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	03/30/94	12/14/94						
Biological Oxygen Demand (5-day) (mg/L)	ND	11.0						
Conductivity (μ S)	505	467						
pH	7.3	7.3						
Chemical Oxygen Demand (mg/L)	7.7	50.0						
Chromium VI (μ g/L)	ND	ND						
Fluoride (mg/L)	0.18	0.22						
Sulfide, Total (mg/L)	ND	ND						
TOC (mg/L)	1.8	23.2						
TSS (mg/L)	ND	12.0						
Silver (μ g/L)	ND	ND						
Arsenic (μ g/L)	ND	ND						
Barium (μ g/L)	ND	ND						
Beryllium (μ g/L)	ND	ND						
Calcium (μ g/L)	55900	72500						
Cadmium (μ g/L)	ND	ND						
Cobalt (μ g/L)	ND	ND						
Chromium (μ g/L)	ND	17.9						
Copper (μ g/L)	ND	85.5						
Iron (μ g/L)	163	NR						
Mercury (μ g/L)	ND	ND						

ND - below practical quantitation level
NR - analysis not requested

Table B-9. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	03/30/94	12/14/94							
Potassium ($\mu\text{g/L}$)	ND	8070							
Magnesium ($\mu\text{g/L}$)	19100	20500							
Manganese ($\mu\text{g/L}$)	ND	ND							
Sodium ($\mu\text{g/L}$)	17200	32900							
Nickel ($\mu\text{g/L}$)	ND	ND							
Lead ($\mu\text{g/L}$)	ND	ND							
Antimony ($\mu\text{g/L}$)	ND	ND							
Selenium ($\mu\text{g/L}$)	ND	ND							
Thallium ($\mu\text{g/L}$)	ND	ND							
Zinc ($\mu\text{g/L}$)	ND	50.0							

ND - below practical quantitation level

Table B-10. 1994 volatile organics data for CFA-625A.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
Bromoform	March	6.00	µg/L		
Dibromochloromethane	March	1.00	µg/L	J	
Methylene Chloride	December	2.00	µg/L	JB	

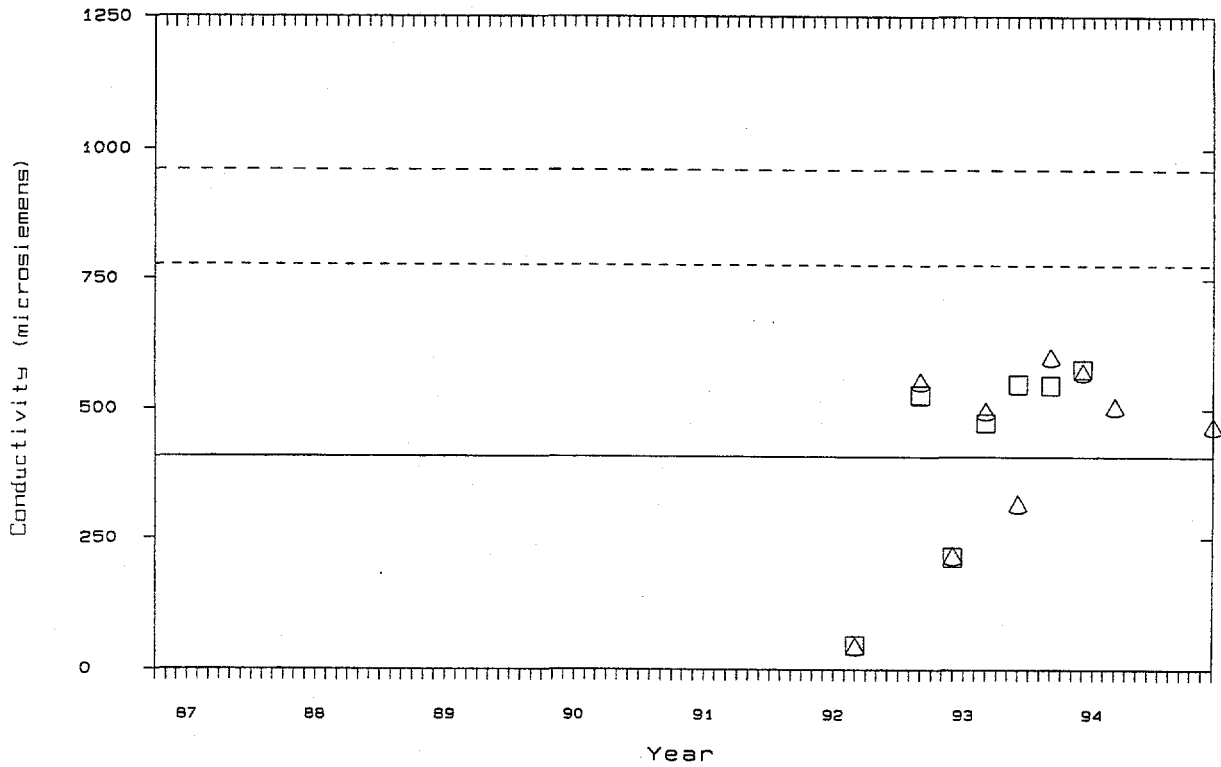
Table B-11. Summary statistics for CFA-625.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Biological Oxygen Demand (5-day) (mg/L)	5.3	4.0	10	13.0	17.2	NA
Conductivity (μ S)	410	201	14	778	961	NA
pH	7.2	0.74	14	4.8	9.5	2.5-12
Fluoride (mg/L)	0.19	0.03	14	0.24	0.27	NA
TOC (mg/L)	3.8	4.7	16	12.4	16.5	NA
Calcium (μ g/L)	61586	2666	14	66473	68899	NA
Chromium (μ g/L)	13.3	2.7	12	18.3	20.9	5000
Copper (μ g/L)	39.9	27.4	11	91.9	119	NA
Magnesium (μ g/L)	21107	966	14	22878	23757	NA
Sodium (μ g/L)	29450	33696	14	91218	121890	NA
Zinc (μ g/L)	50.4	59.0	11	162	221	NA

Guideline - RCRA Characteristic Guideline
 NA - Not Applicable

CFA625A Conductivity

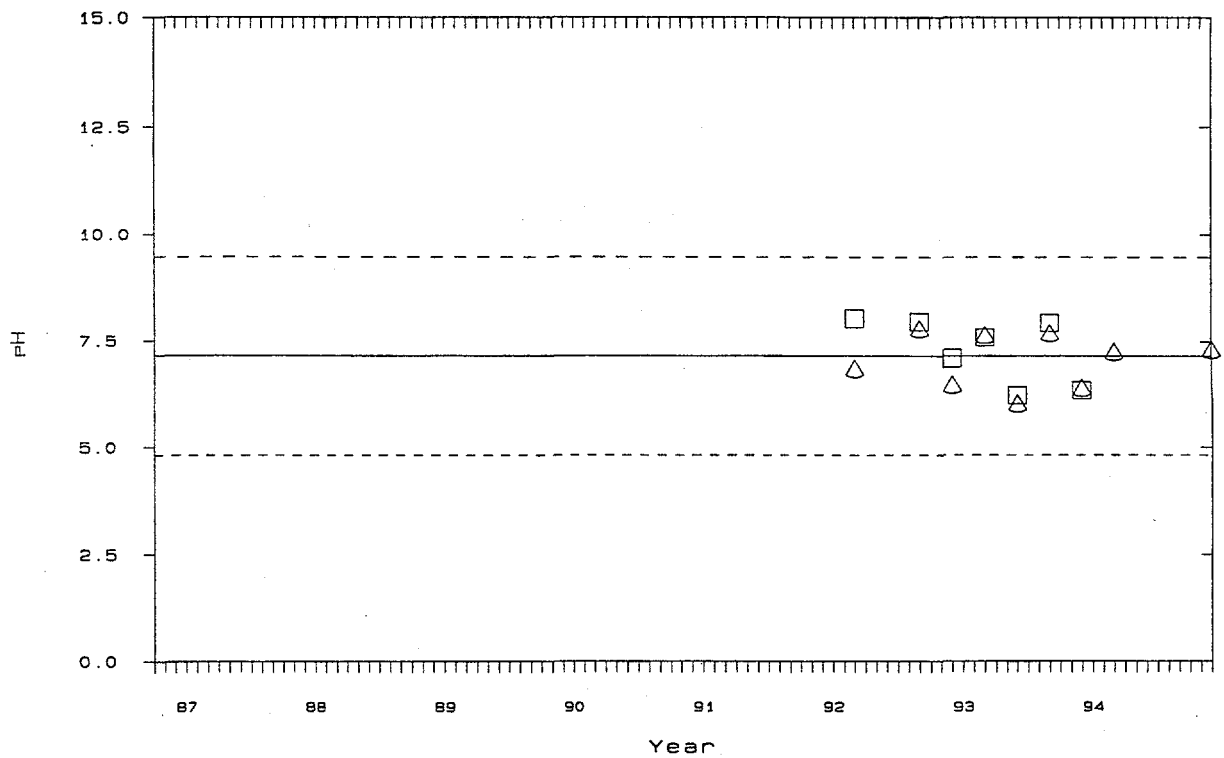
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

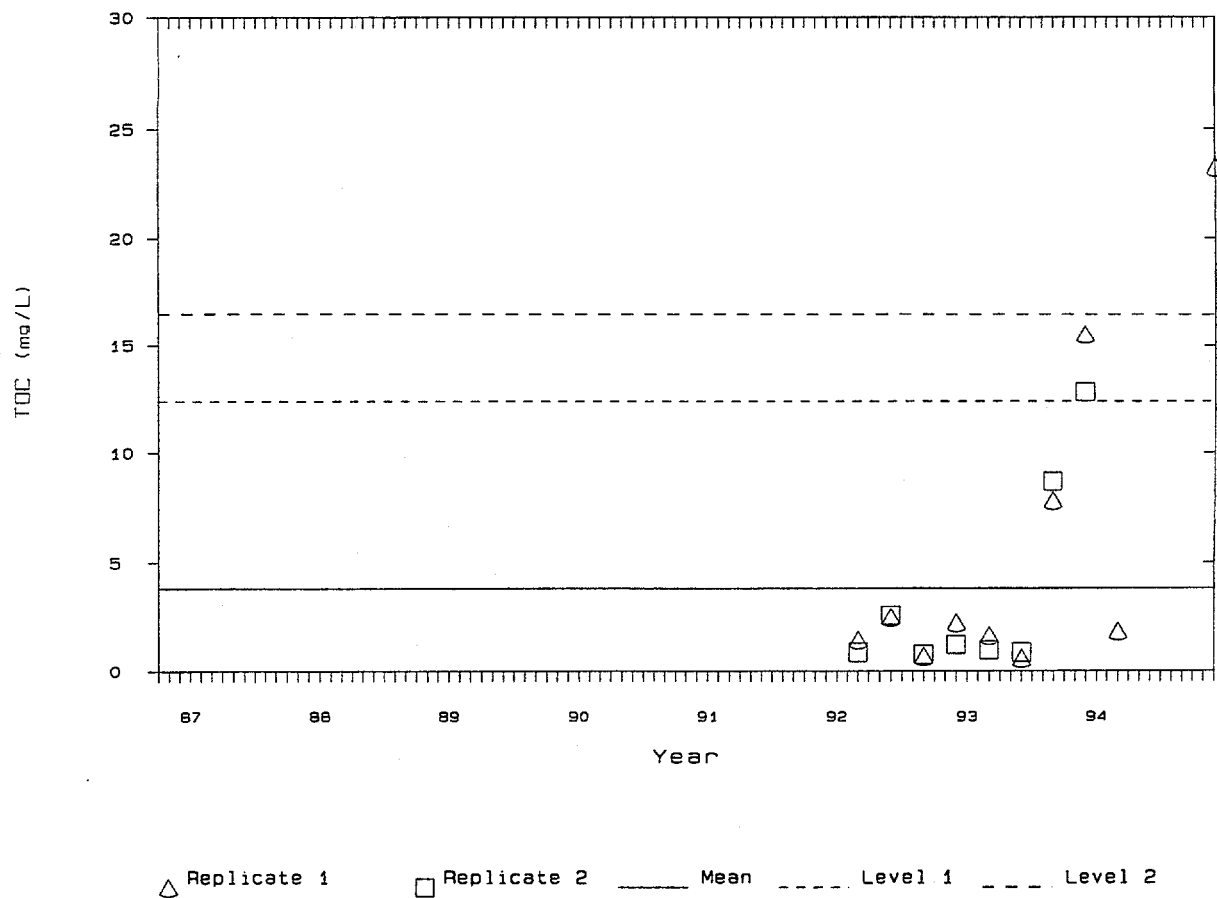
CFA625A pH

RCRA Characteristic Guideline = 2.5-12



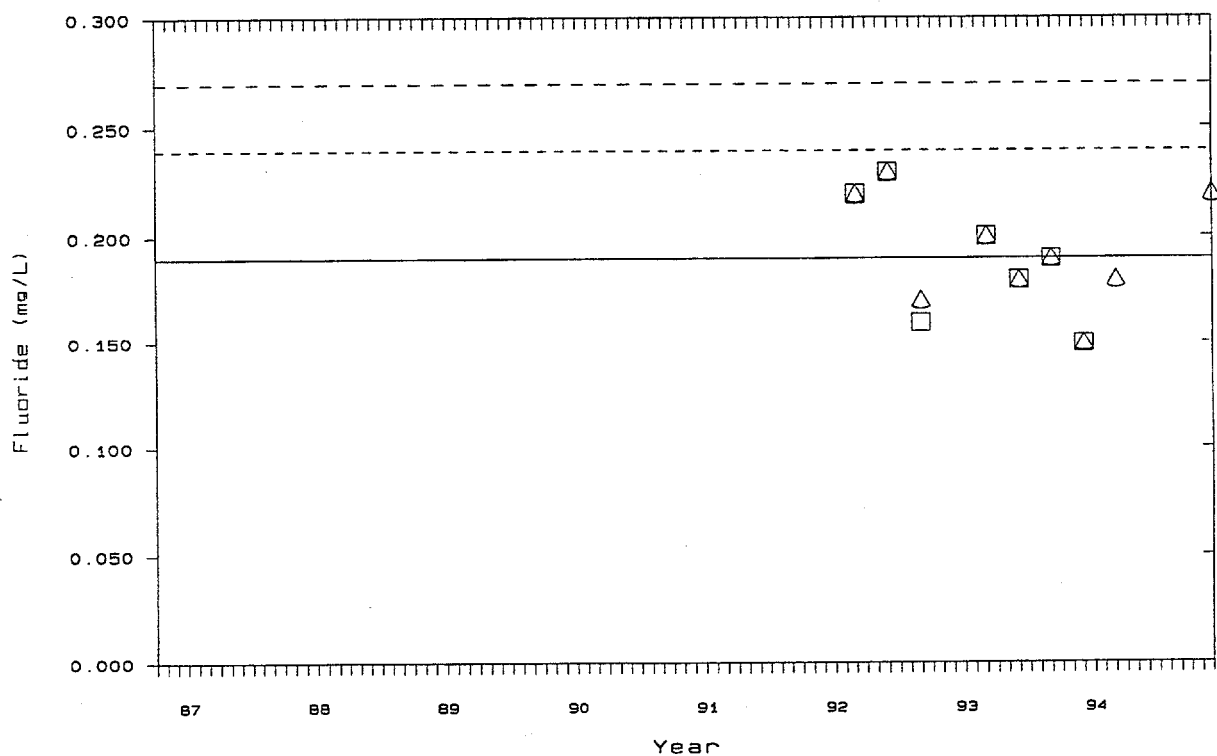
CFA625A TOC Concentrations

RCRA Guideline Not Applicable



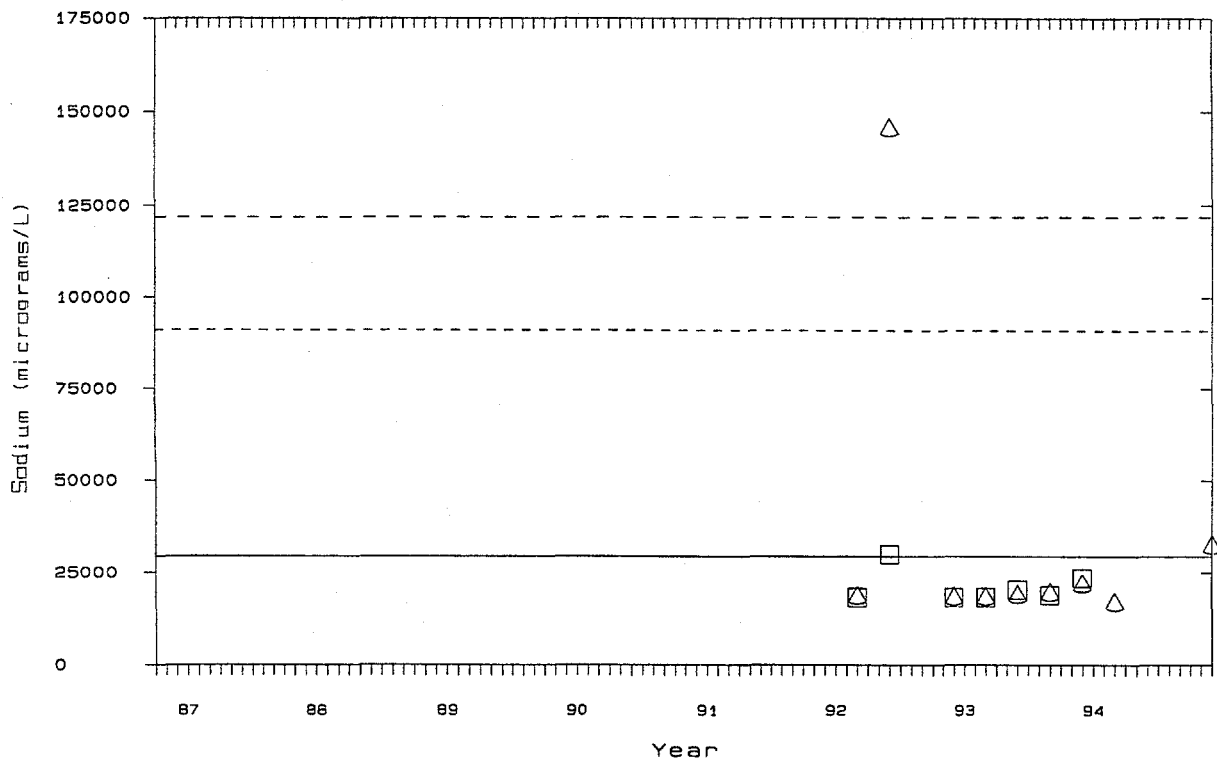
CFA625A Fluoride Concentrations

RCRA Guideline Not Applicable



CFA625A Sodium Concentrations

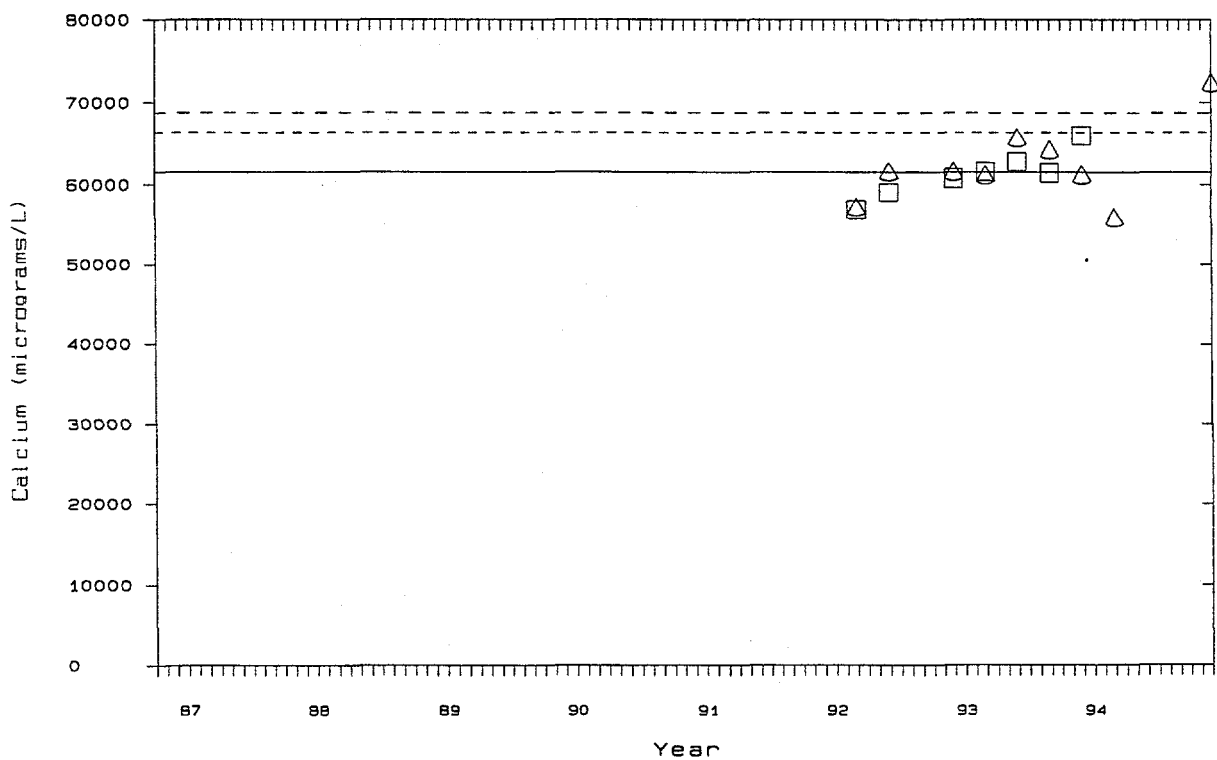
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

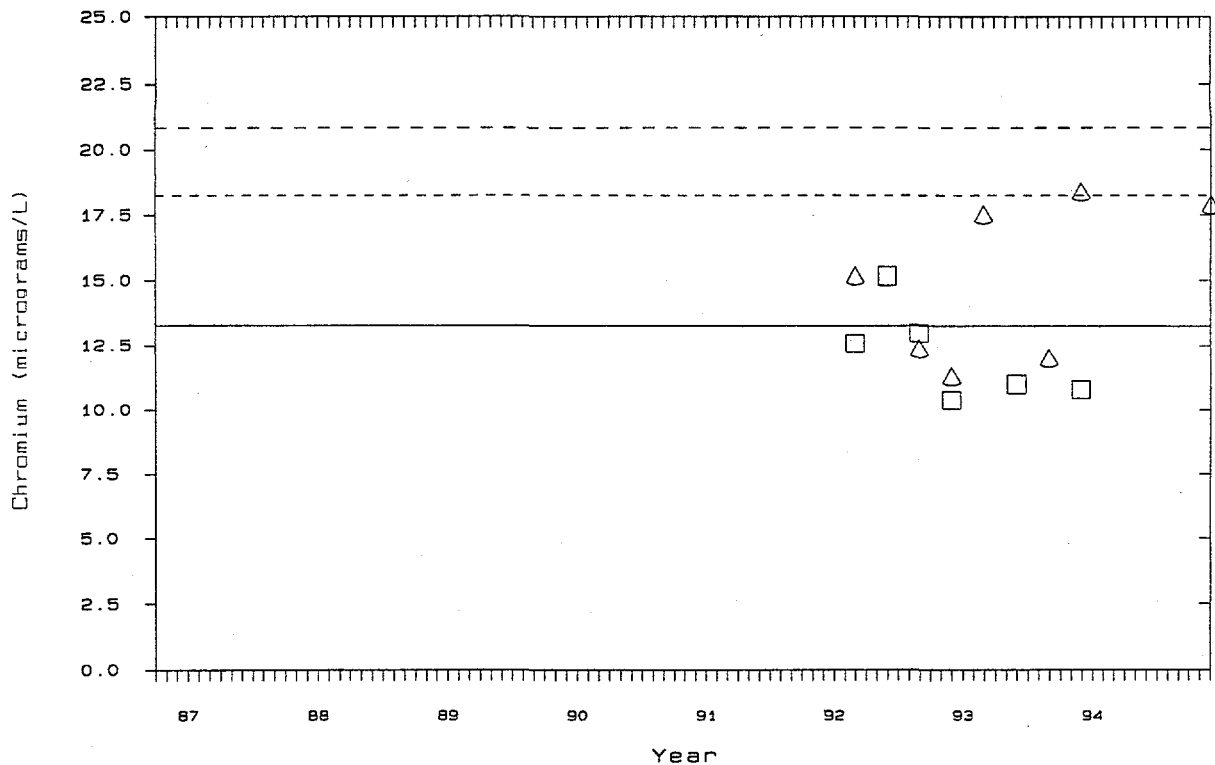
CFA625A Calcium Concentrations

RCRA Guideline Not Applicable



CFA625A Chromium Concentrations

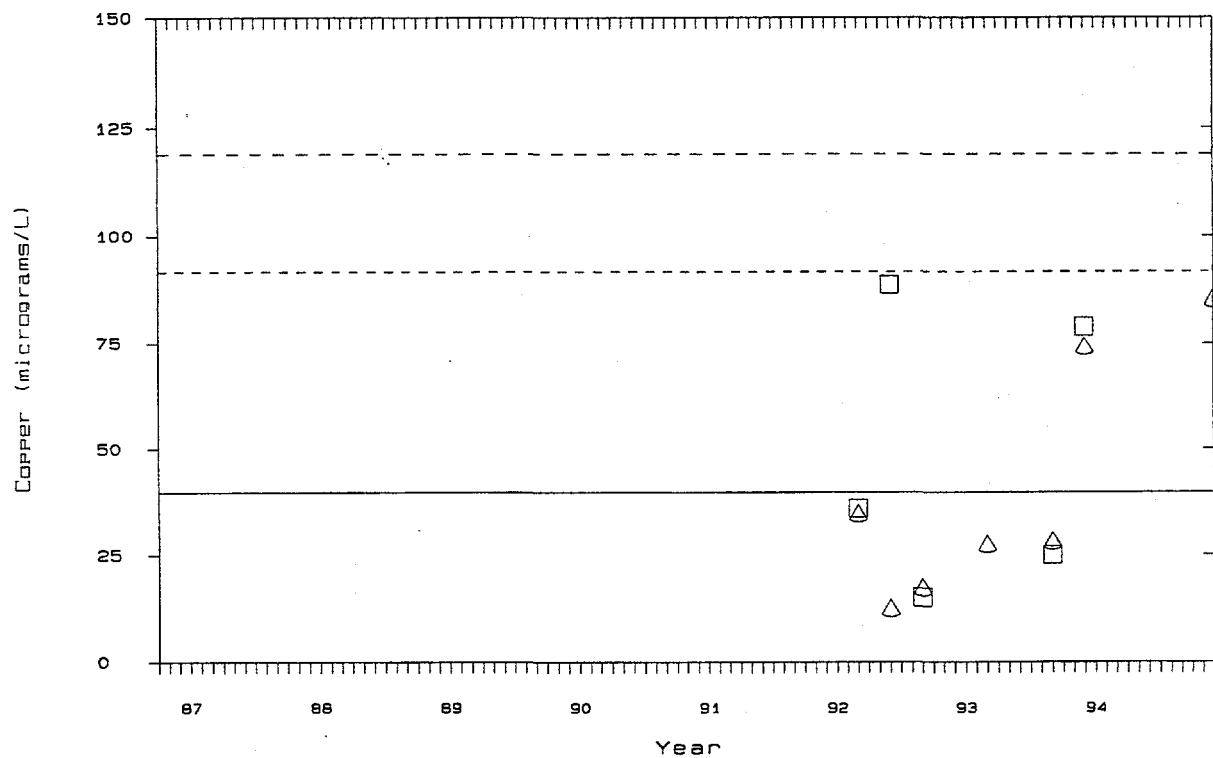
RCRA Characteristic Guideline = 5000 micrograms/L



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

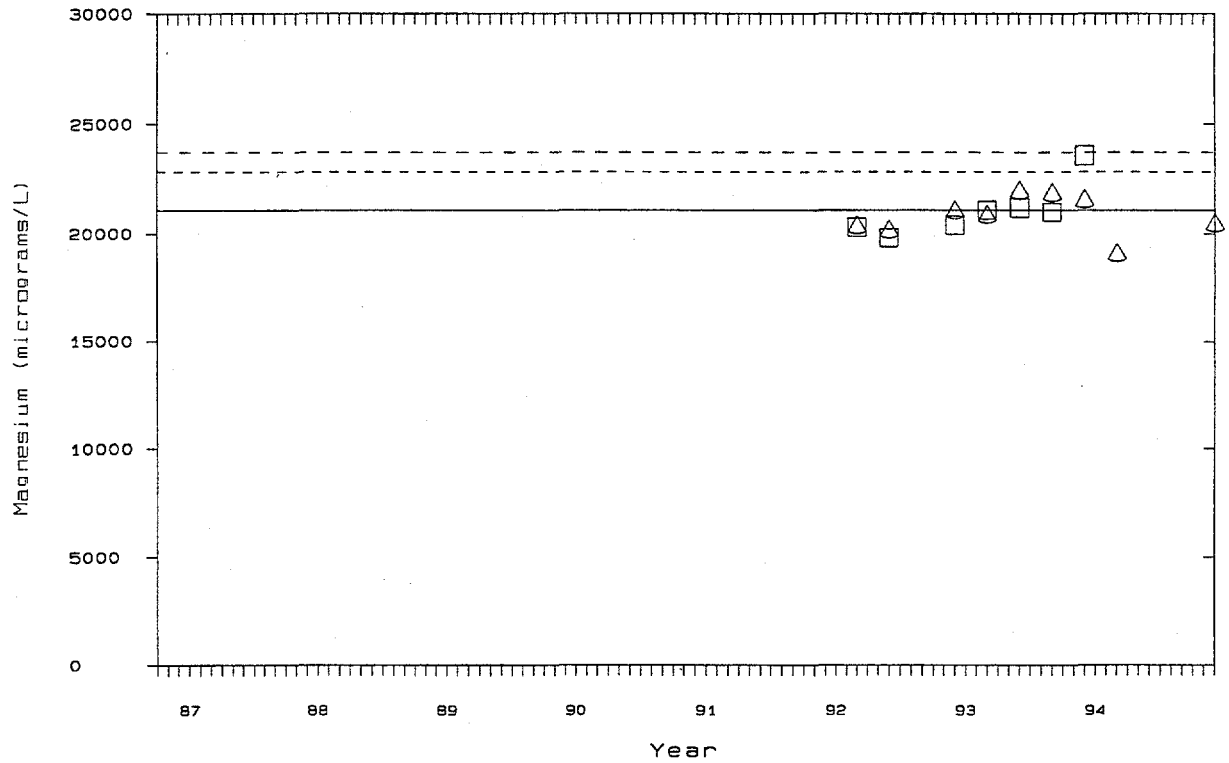
CFA625A Copper Concentrations

RCRA Guideline Not Applicable



CFA625A Magnesium Concentrations

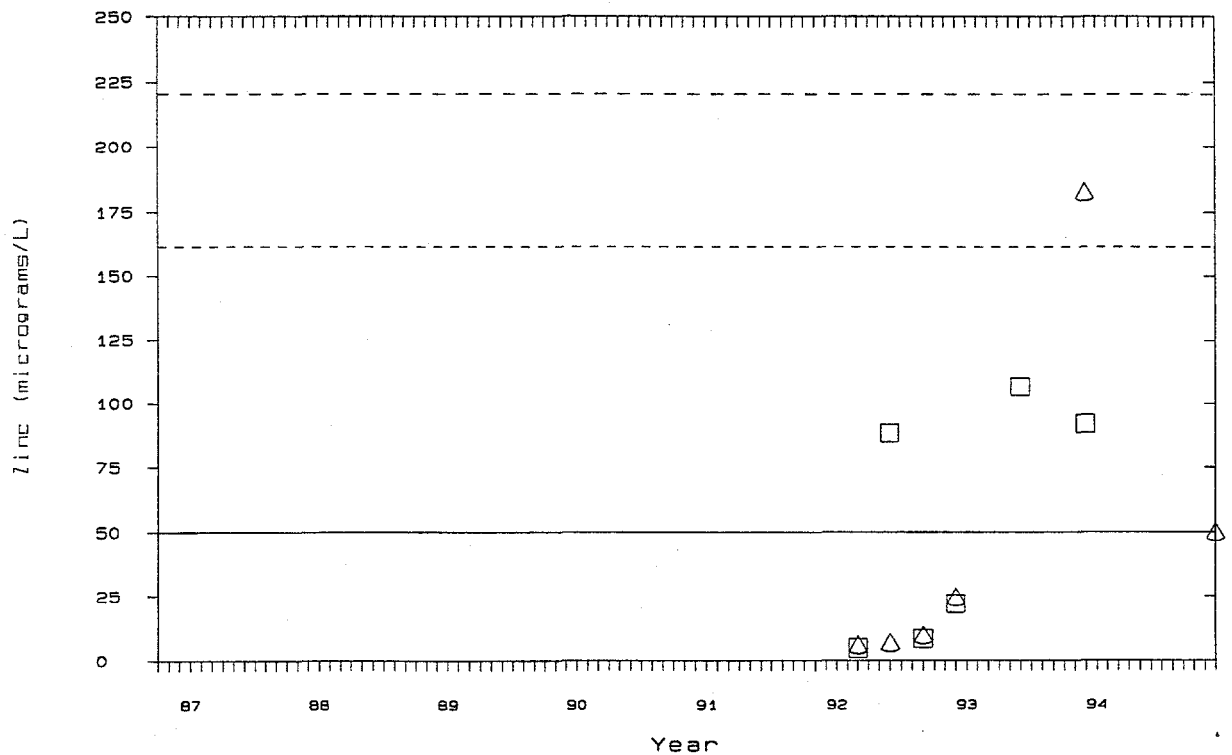
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

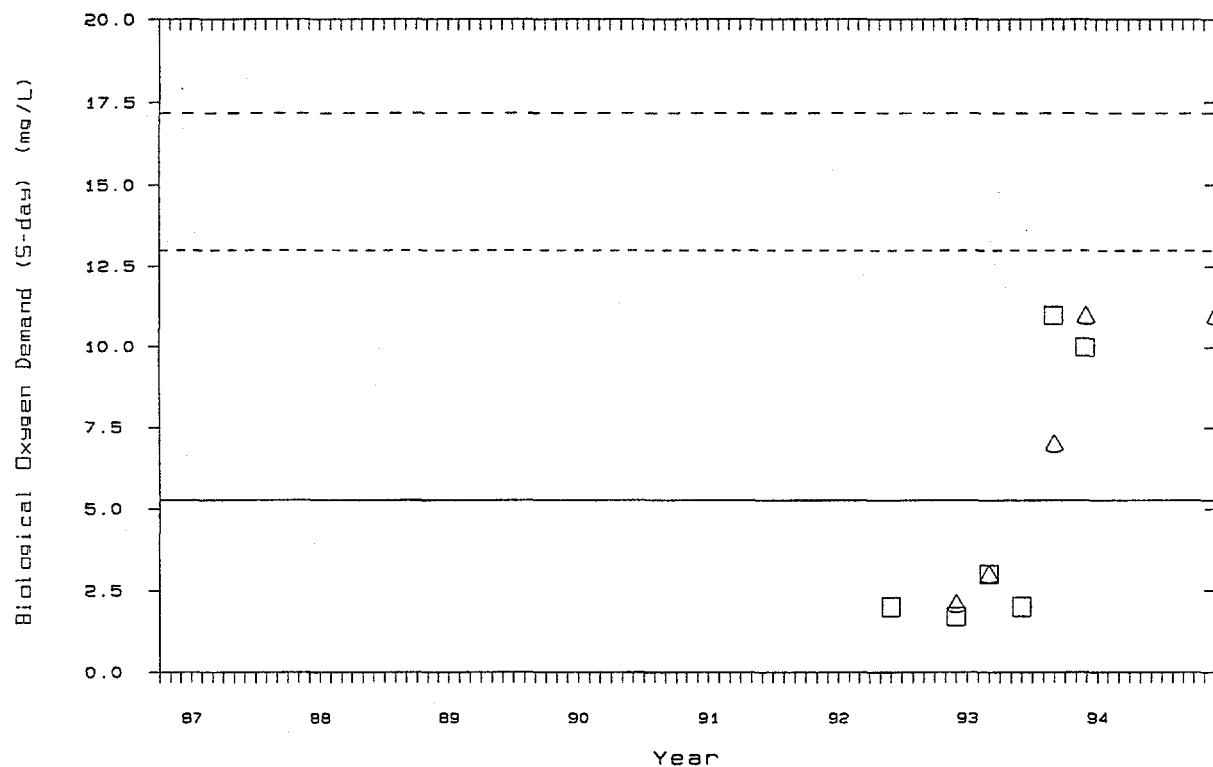
CFA625A Zinc Concentrations

RCRA Guideline Not Applicable



CFA625A Biological Oxygen Demand (5-day) Concentrations

RCRA Guideline Not Applicable



**Effluent Monitoring Data for
CFA-657 (Effluent from Sump to Drain Field)**

Table B-12. 1994 effluent monitoring data for CFA-657.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	02/16/94	05/31/94	08/02/94	11/08/94				
Biological Oxygen Demand (5-day) (mg/L)	NR	8.0	NR	8.0				
Conductivity (μ S)	776	889	711	878				
pH	7.7	8.3	7.7	7.1				
Chloride (mg/L)	NR	144	132	285				
Chemical Oxygen Demand (mg/L)	111	24.8	7.0	32.0				
Fluoride (mg/L)	NR	NR	0.18	0.19				
Nitrogen, Nitrate-Nitrite (mg-N/L)	2.9	4.8	4.4	5.2				
Total Phosphorus (mg/L)	NR	1.1	0.60	1.1				
Sulfate (mg/L)	NR	42.6	38.8	44.1				
TDS (mg/L)	NR	530	500	730				
Nitrogen, Total Kjeldahl (mg/L)	3.4	1.4	1.2	1.9				
TSS (mg/L)	NR	9.0	ND	ND				
Silver (μ g/L)	ND	ND	ND	ND				
Arsenic (μ g/L)	ND	ND	ND	ND				
Barium (μ g/L)	ND	ND	ND	ND				
Beryllium (μ g/L)	ND	ND	ND	ND				
Calcium (μ g/L)	64200	65500	64700	60100				
Cadmium (μ g/L)	ND	ND	ND	ND				
Cobalt (μ g/L)	ND	ND	ND	ND				
Chromium (μ g/L)	ND	ND	ND	10.5				

ND - below practical quantitation level

NR - analysis not requested

Table B-12. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	02/16/94	05/31/94	08/02/94	11/08/94				
Copper ($\mu\text{g/L}$)	ND	ND	ND	ND				
Iron ($\mu\text{g/L}$)	227	181	162	278				
Mercury ($\mu\text{g/L}$)	ND	ND	ND	ND				
Potassium ($\mu\text{g/L}$)	6390	5860	5840	5810				
Magnesium ($\mu\text{g/L}$)	21700	22400	21800	20300				
Manganese ($\mu\text{g/L}$)	ND	ND	ND	ND				
Sodium ($\mu\text{g/L}$)	72300	55200	43700	109000				
Nickel ($\mu\text{g/L}$)	ND	ND	ND	ND				
Lead ($\mu\text{g/L}$)	ND	4.0	ND	ND				
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND				
Selenium ($\mu\text{g/L}$)	ND	5.8	ND	ND				
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND				
Zinc ($\mu\text{g/L}$)	56.8	38.6	54.5	69.5				

ND - below practical quantitation level

Table B-13. 1994 volatile organics data for CFA-657A.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
Methylene Chloride	May	4.00	µg/L	JB	
Methylene Chloride	August	7.00	µg/L	B	
Methylene Chloride	November	2.00	µg/L	J	
Siloxane (TIC)	May	10.00	µg/L	JB	25.13

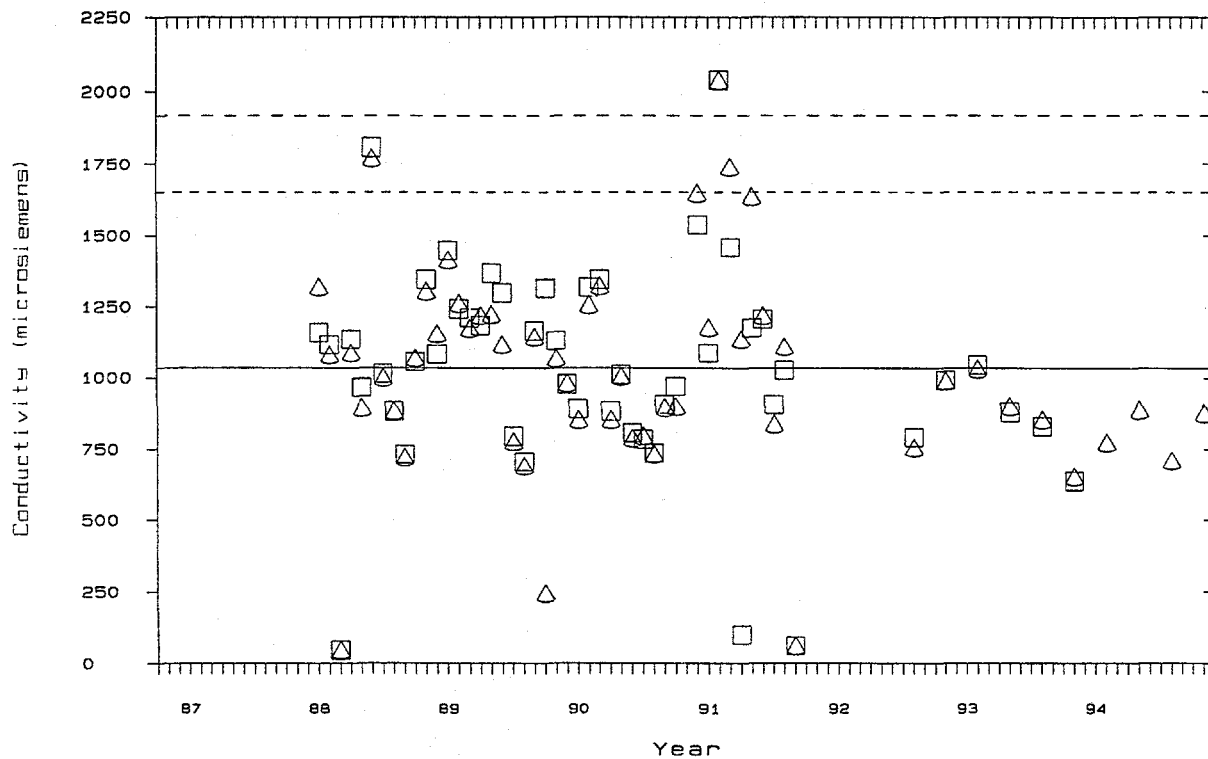
Table B-14. Summary statistics for CFA-657.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Conductivity (μ S)	1036	371	100	1655	1917	NA
pH	7.5	0.51	100	6.2	8.9	2.5-12
Chloride (mg/L)	224	76.2	88	351	405	NA
Fluoride (mg/L)	0.84	1.9	25	4.1	5.6	NA
Nitrogen, Nitrate-Nitrite (mg-N/L)	1.8	1.8	10	5.2	7.0	NA
Nitrate (mg/L)	14.8	7.5	71	27.4	32.9	NA
Nitrogen, as Nitrate (mg-N/L)	3.0	0.88	13	4.6	5.5	NA
Phosphate (mg/L)	7.3	7.4	70	19.7	25.0	NA
Total Phosphorus (mg/L)	2.5	0.84	12	4.1	4.9	NA
Sulfate (mg/L)	52.7	20.9	89	87.7	103	NA
Nitrogen, Total Kjeldahl (mg/L)	2.3	1.6	10	5.3	6.9	NA
TOC (mg/L)	25.0	32.6	66	79.8	103	NA
Arsenic (μ g/L)	29.3	78.9	21	169	233	5000
Barium (μ g/L)	69.5	28.2	53	117	138	100,000
Calcium (μ g/L)	63467	2124	12	67436	69474	NA
Cadmium (μ g/L)	6.5	2.0	9	10.4	12.6	1000
Chromium (μ g/L)	12.3	5.5	54	21.7	25.7	5000
Copper (μ g/L)	23.1	13.9	63	46.4	56.4	NA
Iron (μ g/L)	248	118	12	468	581	NA
Mercury (μ g/L)	0.22	0.14	29	0.46	0.57	200
Potassium (μ g/L)	6353	816	9	7954	8846	NA
Magnesium (μ g/L)	21542	960	12	23335	24256	NA
Sodium (μ g/L)	85717	31324	12	144269	174335	NA
Nickel (μ g/L)	17.0	9.4	15	34.1	42.6	NA
Lead (μ g/L)	13.6	26.7	53	58.7	78.2	5000
Selenium (μ g/L)	126	167	13	435	590	1000
Zinc (μ g/L)	77.2	41.4	99	146	176	NA

Guideline - RCRA Characteristic Guideline
NA - Not Applicable

CFA657A Conductivity

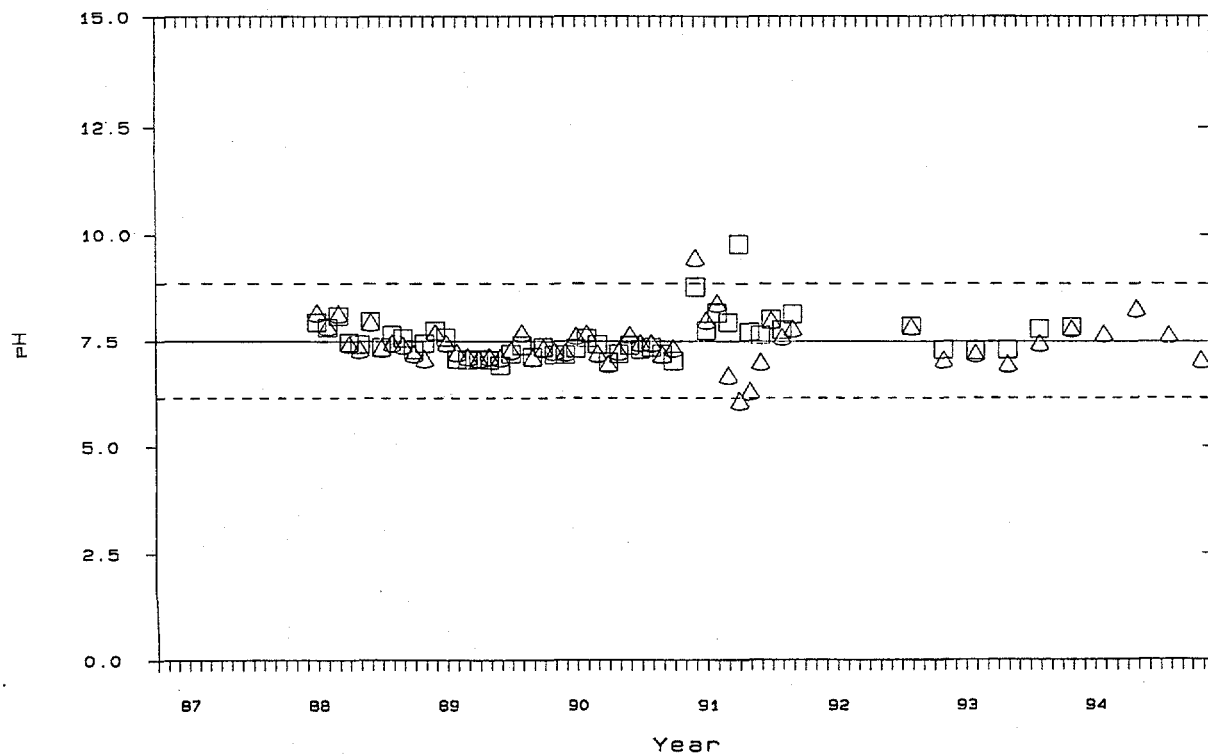
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

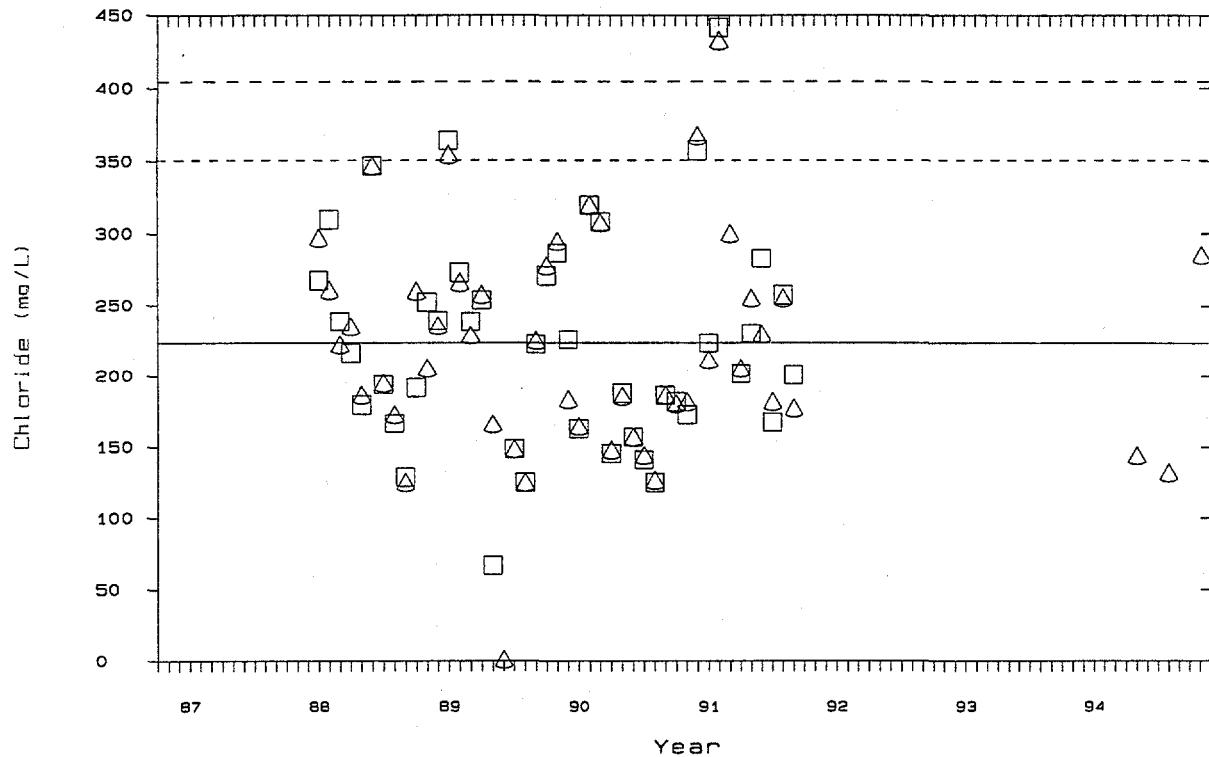
CFA657A pH

RCRA Characteristic Guideline = 2.5-12



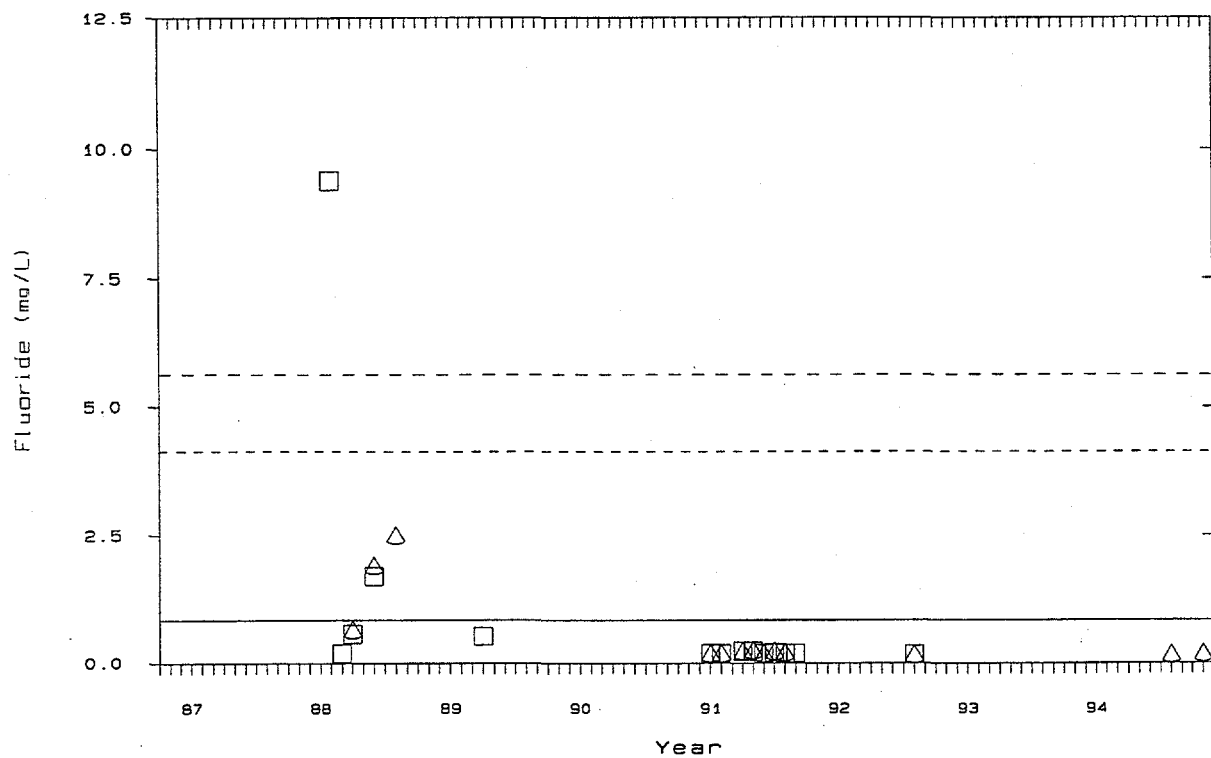
CFA657A Chloride Concentrations

RCRA Guideline Not Applicable



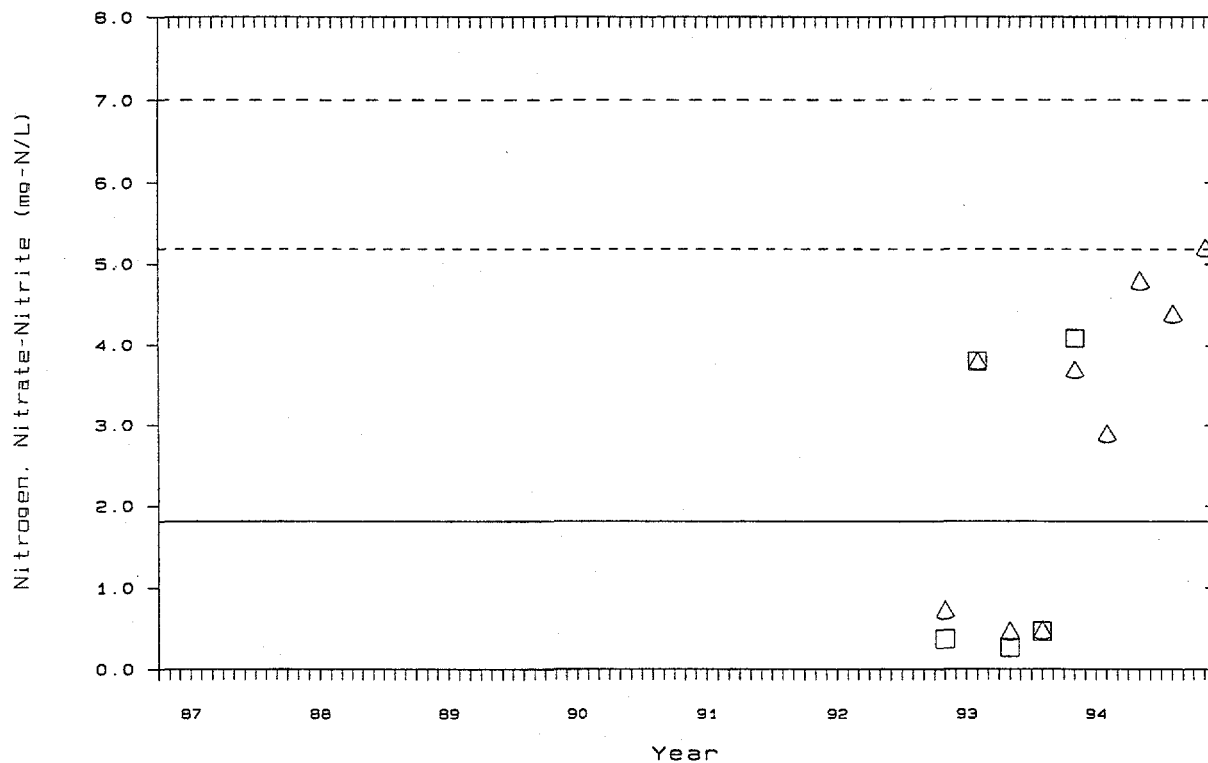
CFA657A Fluoride Concentrations

RCRA Guideline Not Applicable



CFA657A Nitrogen, Nitrate-Nitrite Concentrations

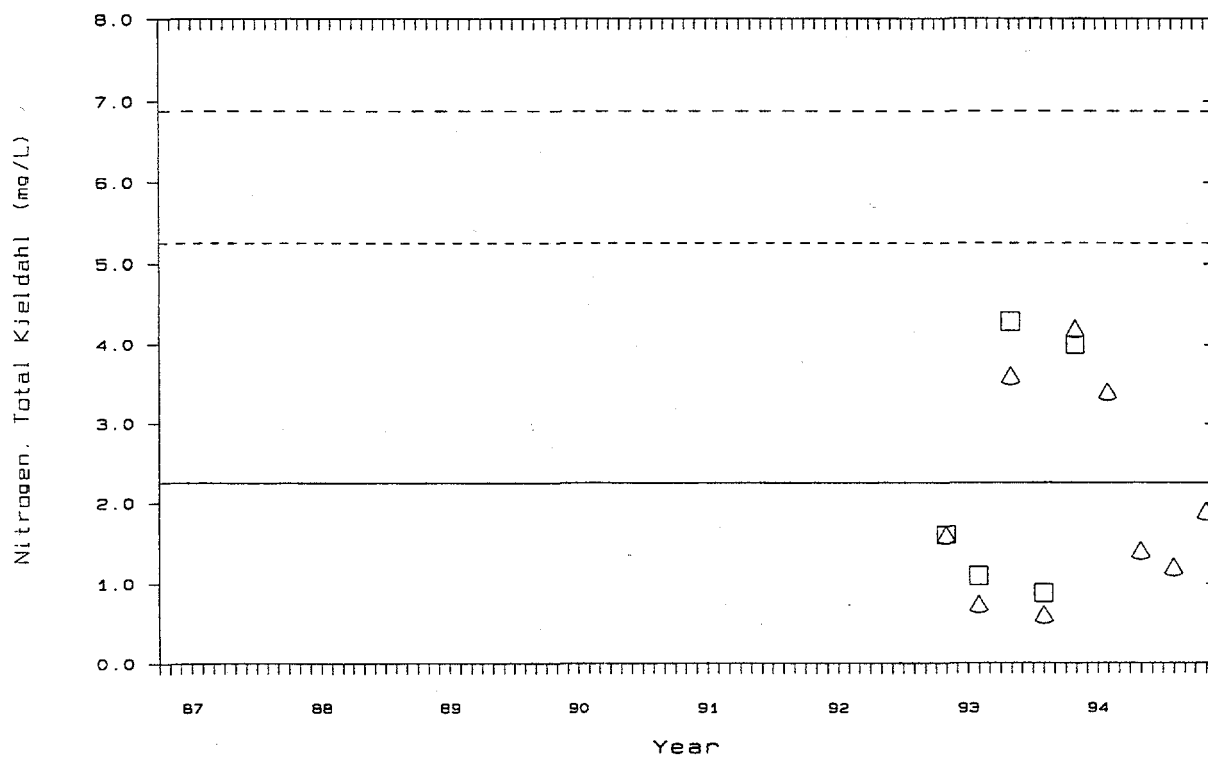
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

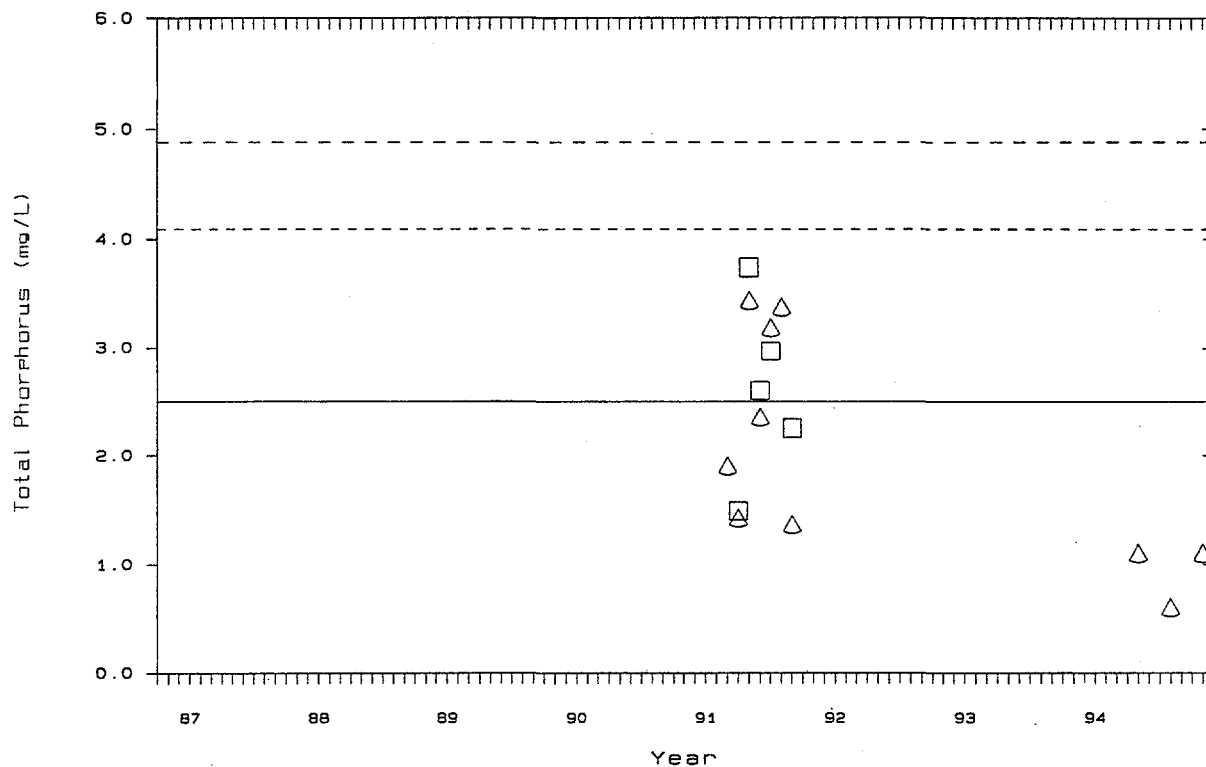
CFA657A Nitrogen, Total Kjeldahl Concentrations

RCRA Guideline Not Applicable



CFA657A Total Phosphorus Concentrations

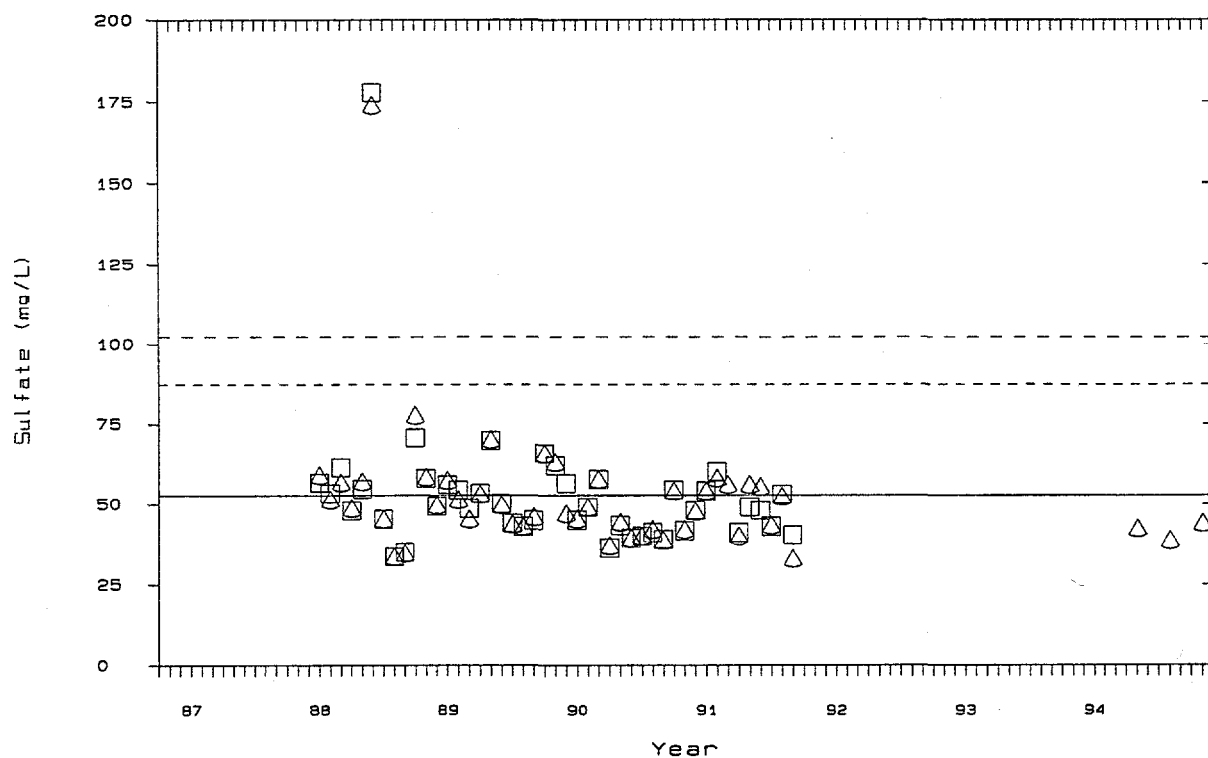
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

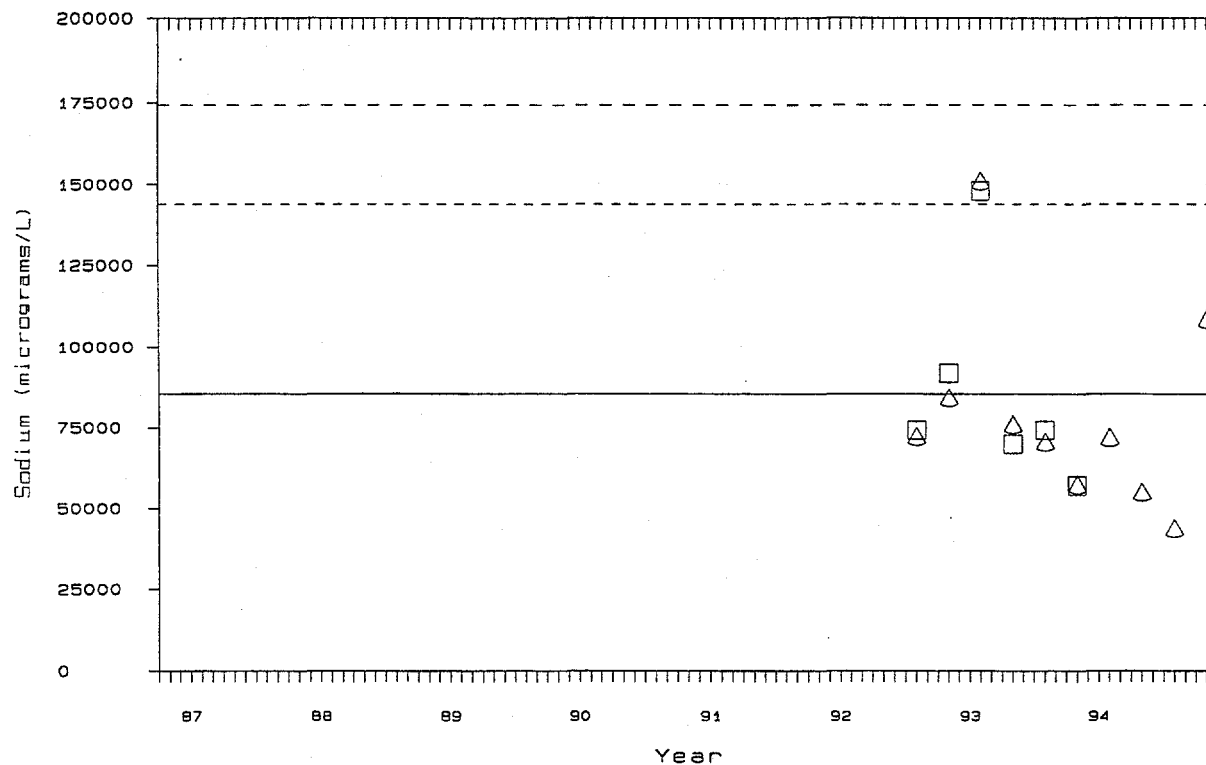
CFA657A Sulfate Concentrations

RCRA Guideline Not Applicable



CFA657A Sodium Concentrations

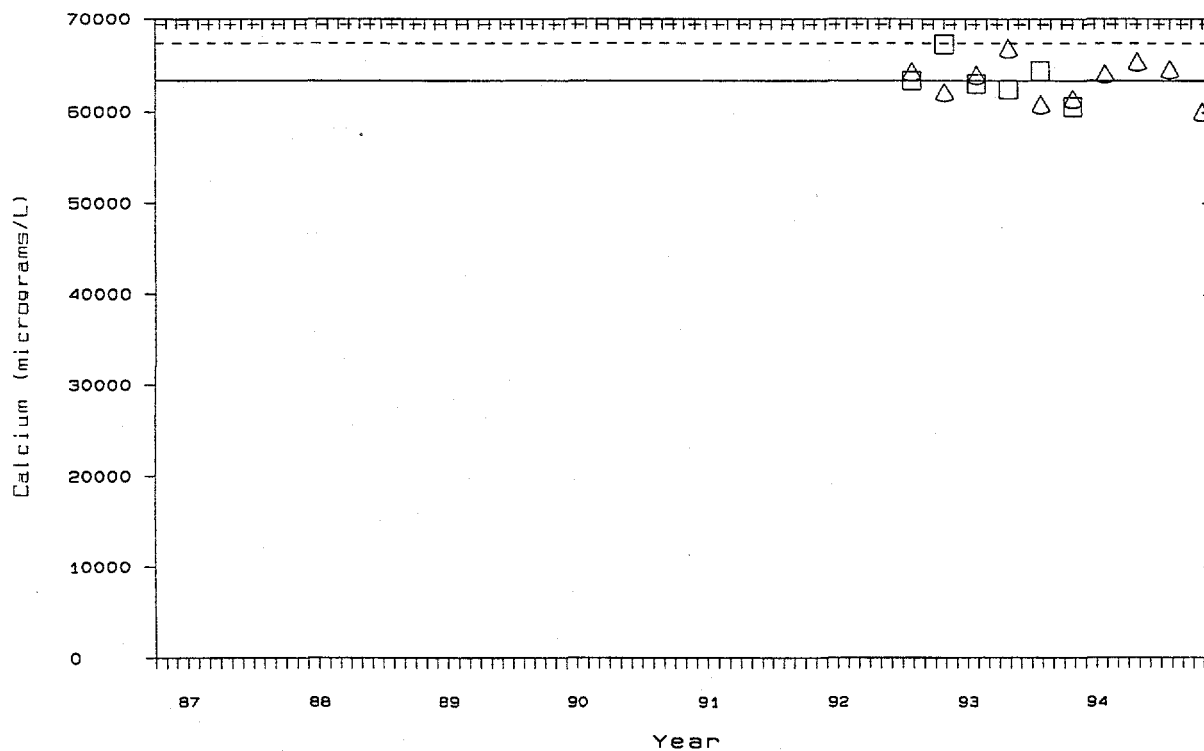
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

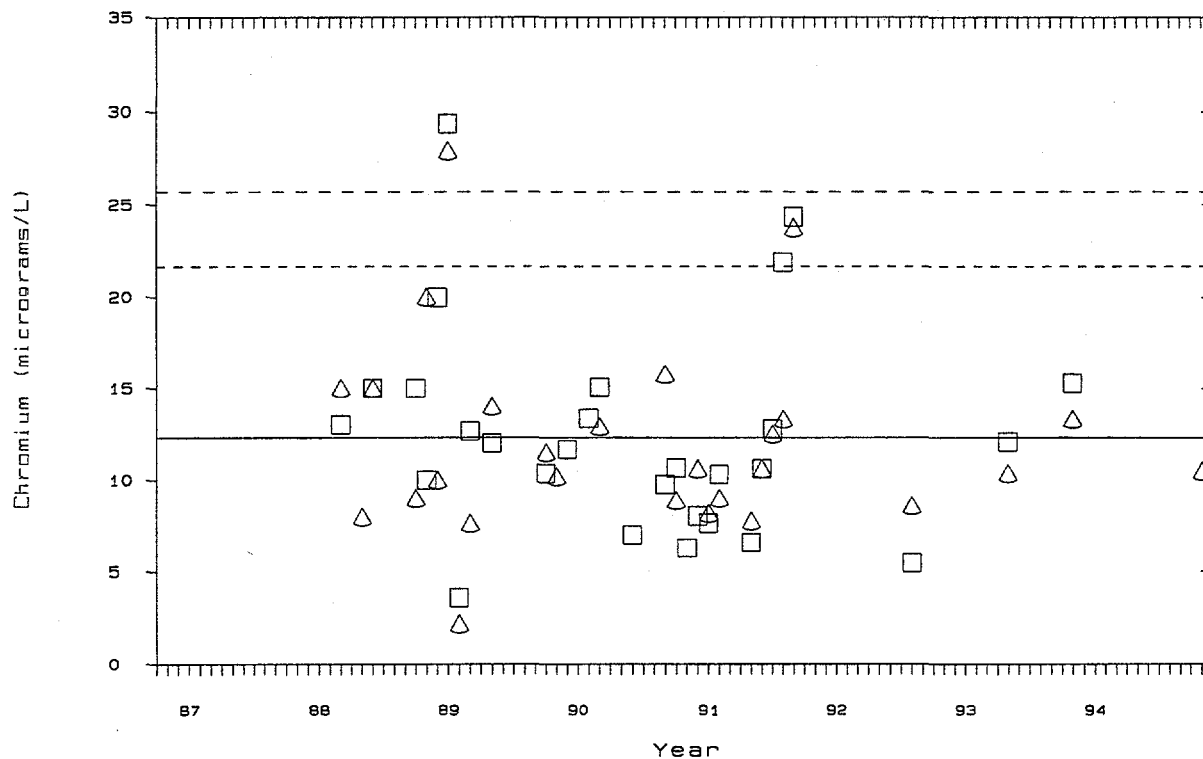
CFA657A Calcium Concentrations

RCRA Guideline Not Applicable



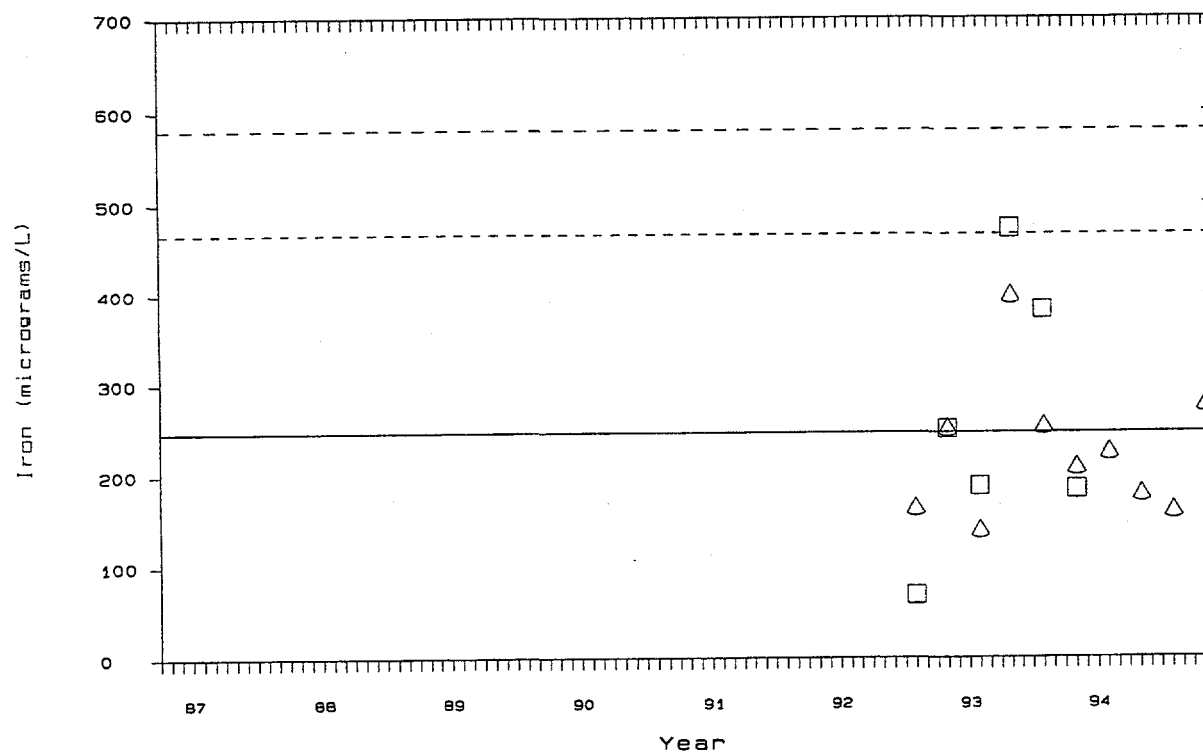
CFA657A Chromium Concentrations

RCRA Characteristic Guideline = 5000 micrograms/L



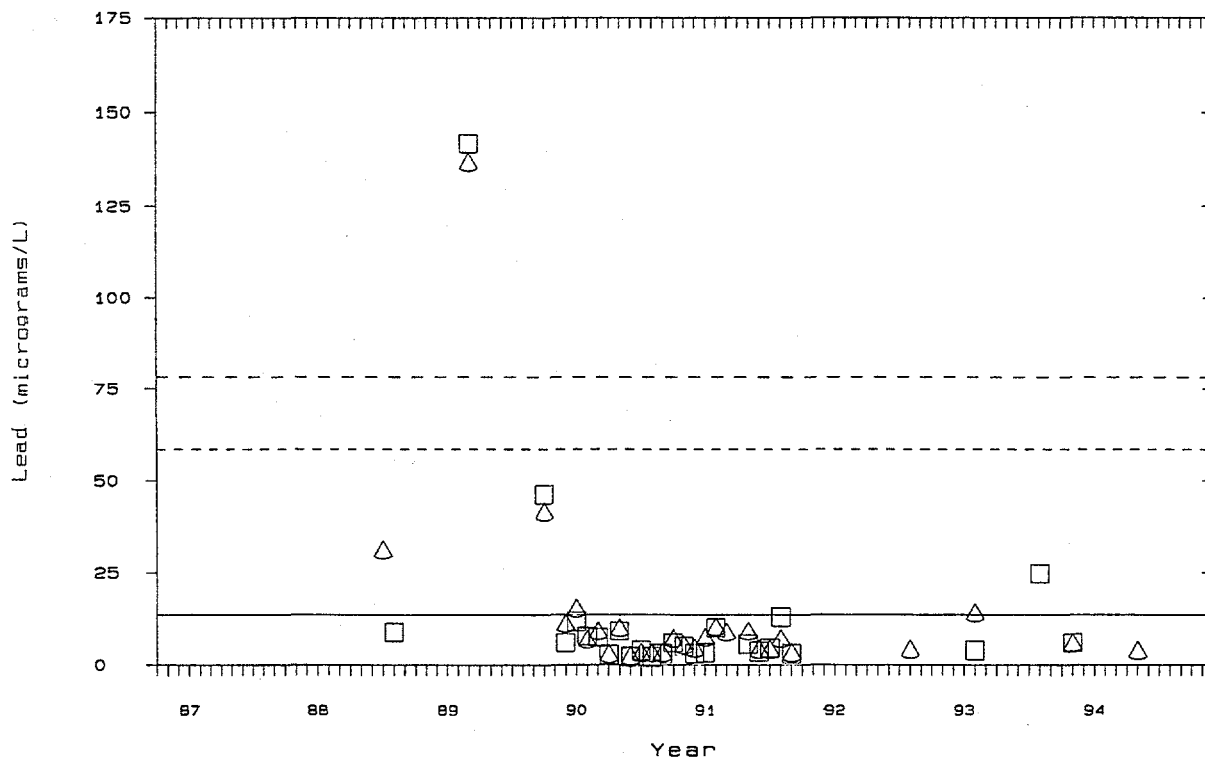
CFA657A Iron Concentrations

RCRA Guideline Not Applicable



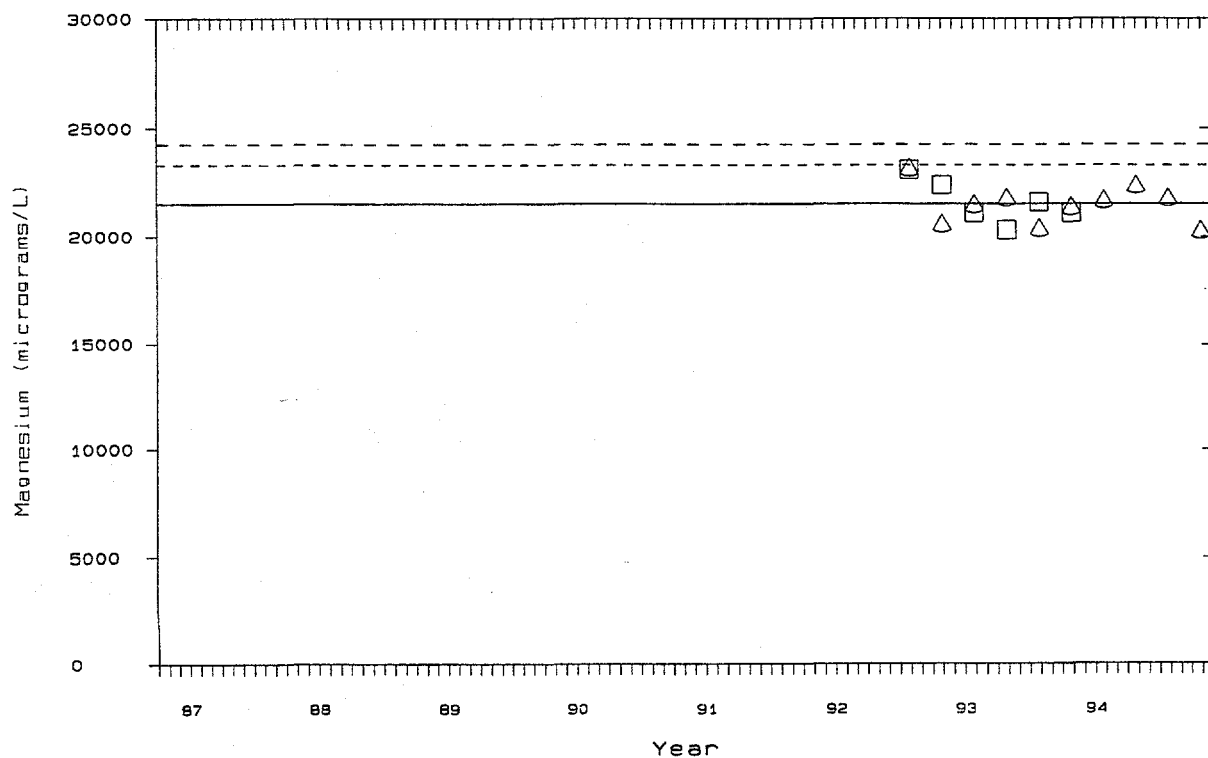
CFA657A Lead Concentrations

RCRA Characteristic Guideline = 5000 micrograms/L



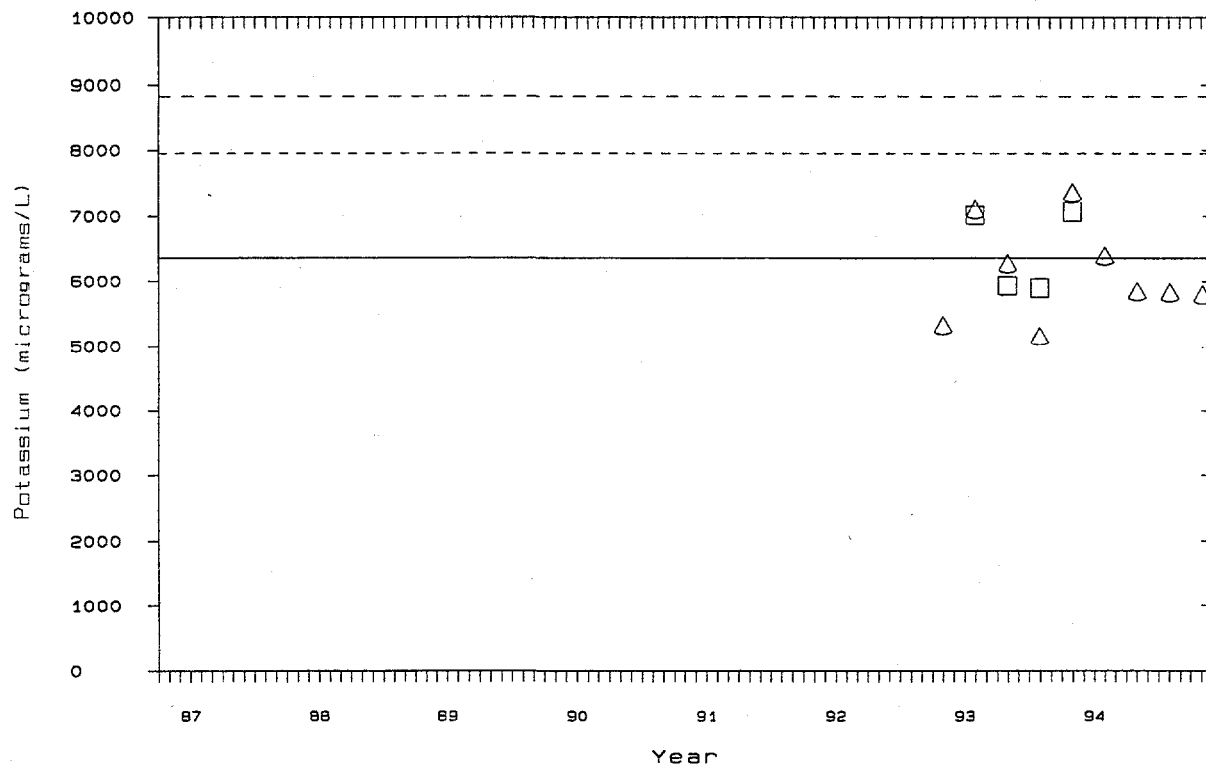
CFA657A Magnesium Concentrations

RCRA Guideline Not Applicable



CFA657A Potassium Concentrations

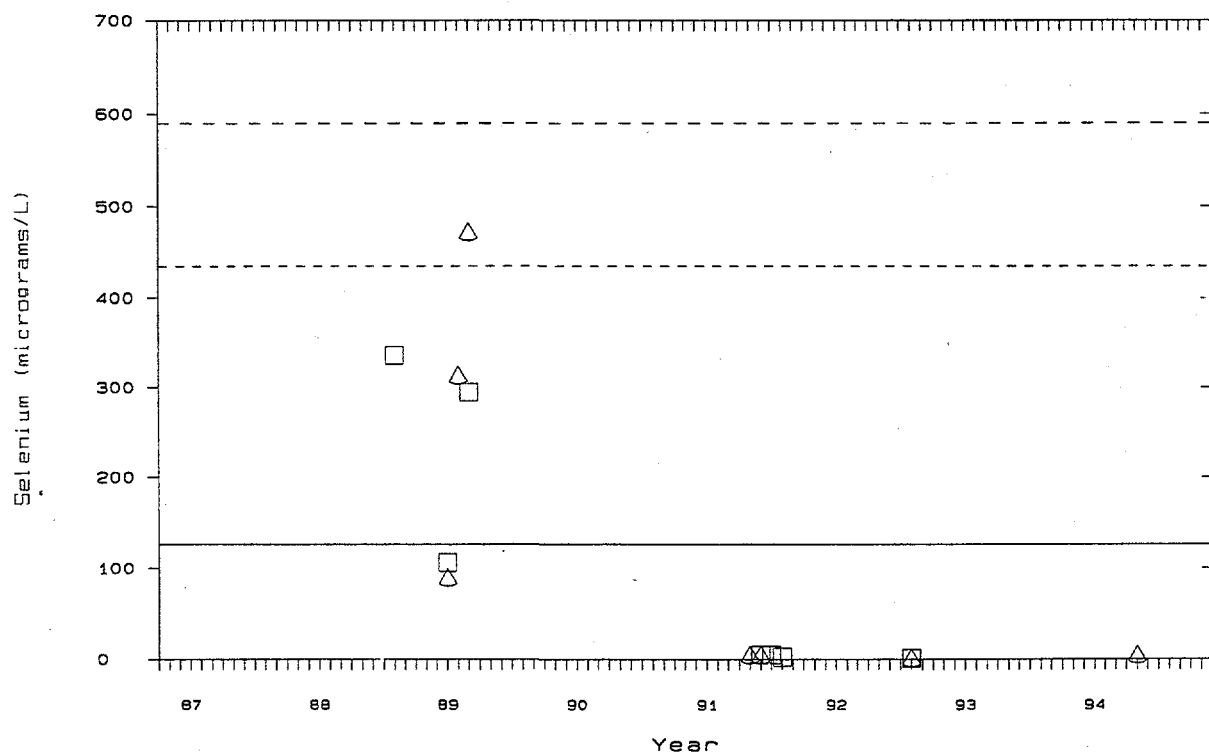
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

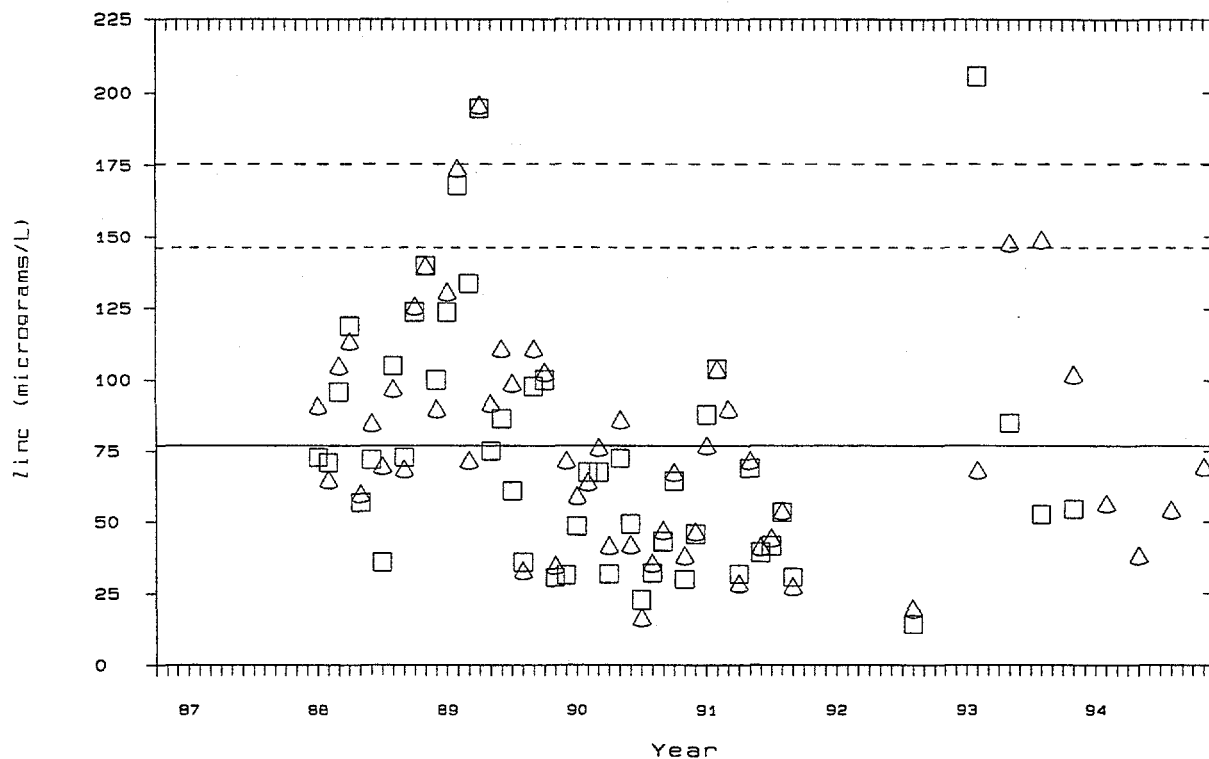
CFA657A Selenium Concentrations

RCRA Characteristic Guideline = 1000 micrograms/L



CFA657A Zinc Concentrations

RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

**Effluent Monitoring Data for
CFA-665 (Big Shop Oil/Water Separator)**

Table B-15. 1994 effluent monitoring data for CFA-665.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/06/94	01/06/94	04/27/94	07/06/94			
Biological Oxygen Demand (5-day) (mg/L)	48.0	42.0	500	64.0			
Conductivity (μ S)	722	643	1706	1920			
pH	9.4	9.4	8.3	7.6			
Chemical Oxygen Demand (mg/L)	444	444	1400	170			
Chromium VI (μ g/L)	ND	ND	ND	ND			
Nitrogen, as Ammonia (mg/L)	0.14	0.13	0.13	0.35			
Phenols (μ g/L)	33.5	37.6	40.9	63.7			
Sulfide, Total (mg/L)	ND	ND	ND	ND			
TOC (mg/L)	62.2	64.8	219	51.1			
Total Oil & Grease (mg/L)	115	147	185	49.8			
TSS (mg/L)	262	203	52.0	24.0			
Silver (μ g/L)	ND	ND	ND	ND			
Arsenic (μ g/L)	ND	ND	ND	ND			
Barium (μ g/L)	370	361	234	ND			
Cadmium (μ g/L)	21.7	22.5	19.0	6.8			
Chromium (μ g/L)	54.0	52.2	22.2	19.8			
Mercury (μ g/L)	ND	ND	ND	ND			
Lead (μ g/L)	88.0	34.5	114	50.5			
Selenium (μ g/L)	ND	ND	ND	6.6			

ND - below practical quantitation level

Table B-16. 1994 volatile organics data for CFA-665A.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
1,1,1-Trichloroethane	January	19.00	µg/L		
1,1,1-Trichloroethane	April	6.00	µg/L		
1,1-Dichloroethane	April	3.00	µg/L	JB	
4-methyl-2-pentanone (TIC)	January	20.00	µg/L	X	7.82
Acetone (TIC)	April	500.00	µg/L	JX	2.97
Acetone (TIC)	July	100.00	µg/L	X	6.07
Alkane (TIC)	July	6.00	µg/L	J	30.70
Alkane (TIC)	July	30.00	µg/L	J	33.63
Methylene Chloride	January	8.00	µg/L	B	
Methylene Chloride	April	5.00	µg/L		
Methylene Chloride	July	4.00	µg/L	JB	
Propylfuran (TIC)	April	8.00	µg/L	JN	10.60
Toluene	January	13.00	µg/L		
Toluene	April	7.00	µg/L		
Toluene	July	15.00	µg/L		
Unknown (TIC)	July	5.00	µg/L	J	35.63
Unknown (TIC)	July	7.00	µg/L	J	36.57

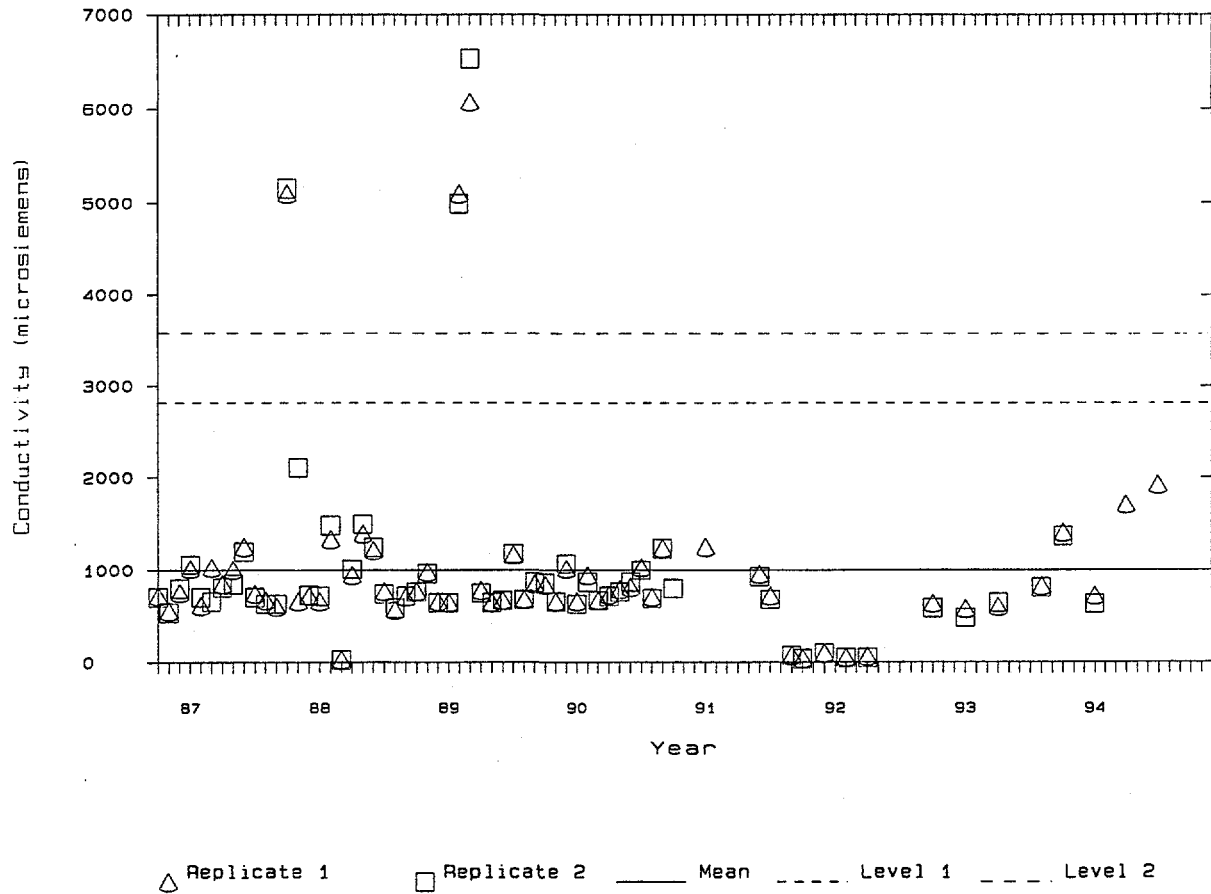
Table B-17. Summary statistics for CFA-665.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Biological Oxygen Demand (5-day) (mg/L)	197	191	12	554	738	NA
Conductivity (μ S)	1001	1088	122	2812	3577	NA
pH	7.8	0.76	124	5.8	9.8	2.5-12
Chloride (mg/L)	172	255	108	596	776	NA
Chemical Oxygen Demand (mg/L)	549	488	14	1444	1888	NA
Fluoride (mg/L)	0.91	1.1	52	2.7	3.5	NA
Nitrate (mg/L)	9.4	5.5	71	18.6	22.5	NA
Phenols (μ g/L)	87.8	75.4	16	224	290	NA
Phosphate (mg/L)	3.4	5.9	60	13.3	17.6	NA
Total Phosphorus (mg/L)	13.4	16.0	12	43.3	58.7	NA
Sulfate (mg/L)	46.8	10.6	105	64.5	72.0	NA
TDS (mg/L)	705	664	100	1813	2283	NA
TOC (mg/L)	83.5	85.7	121	226	286	NA
Total Oil & Grease (mg/L)	79.4	127	12	317	438	NA
TSS (mg/L)	120	153	14	401	540	NA
Silver (μ g/L)	10.4	5.6	17	20.5	25.3	5000
Arsenic (μ g/L)	29.9	81.4	31	170	233	5000
Barium (μ g/L)	206	157	116	468	578	100,000
Cadmium (μ g/L)	16.4	12.2	113	36.7	45.3	1000
Chromium (μ g/L)	79.9	128	147	293	383	5000
Copper (μ g/L)	120	138	137	349	446	NA
Mercury (μ g/L)	0.49	0.41	38	1.2	1.5	200
Nickel (μ g/L)	79.9	81.1	73	216	274	NA
Lead (μ g/L)	119	104	89	294	368	5000
Selenium (μ g/L)	125	126	16	352	462	1000
Thallium (μ g/L)	99.7	82.7	11	256	338	NA
Zinc (μ g/L)	893	712	149	2075	2573	NA

Guideline - RCRA Characteristic Guideline
NA - Not Applicable

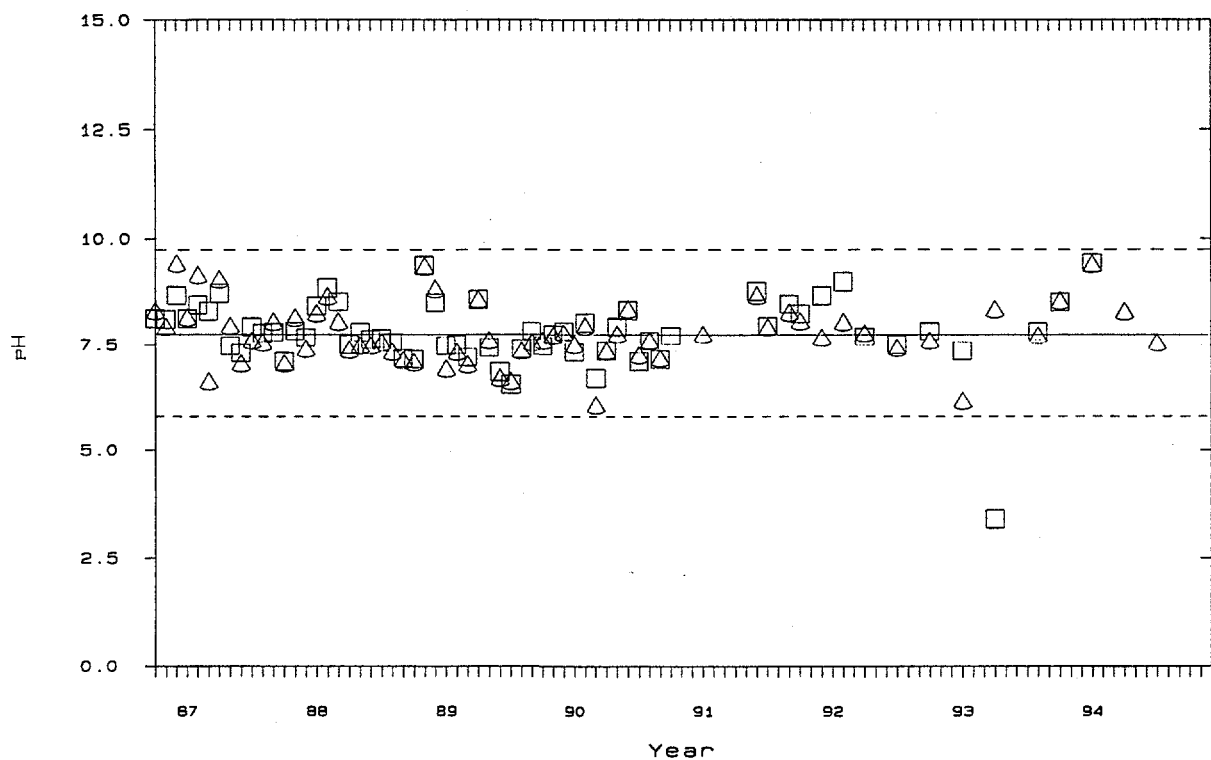
CFA665A Conductivity

RCRA Guideline Not Applicable



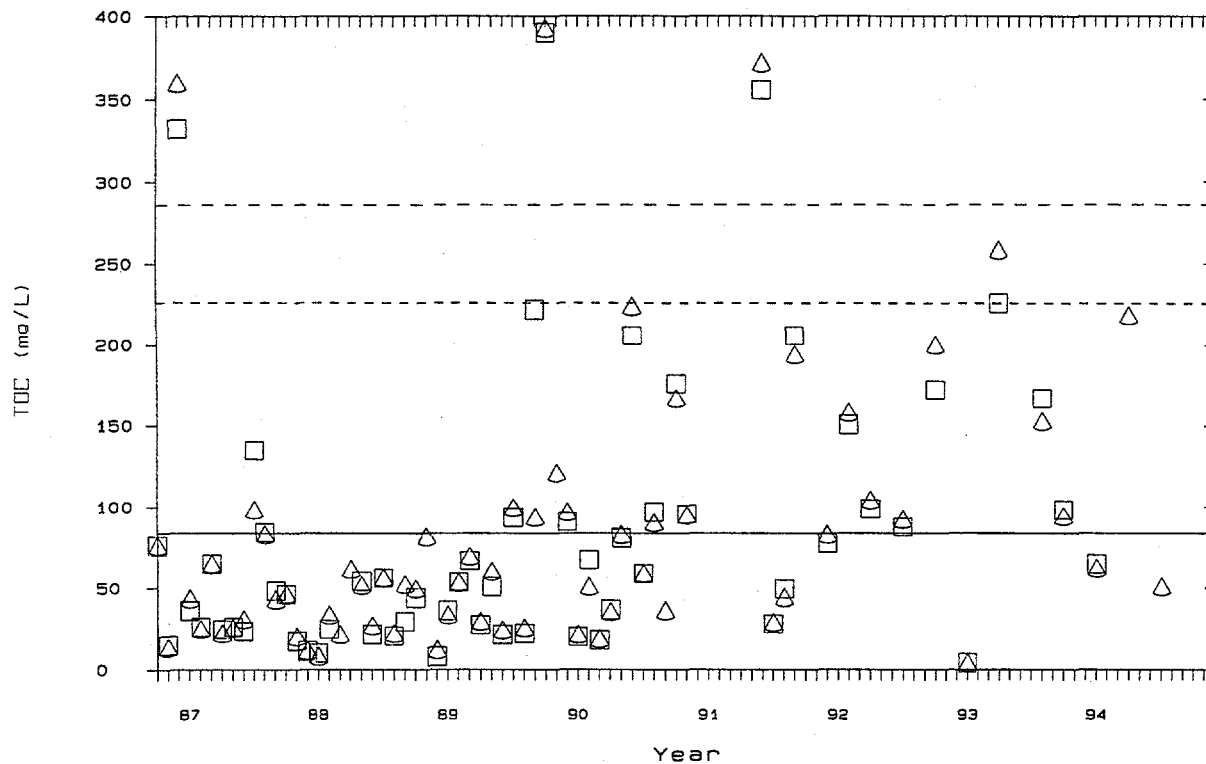
CFA665A pH

RCRA Characteristic Guideline = 2.5-12



CFA665A TOC Concentrations

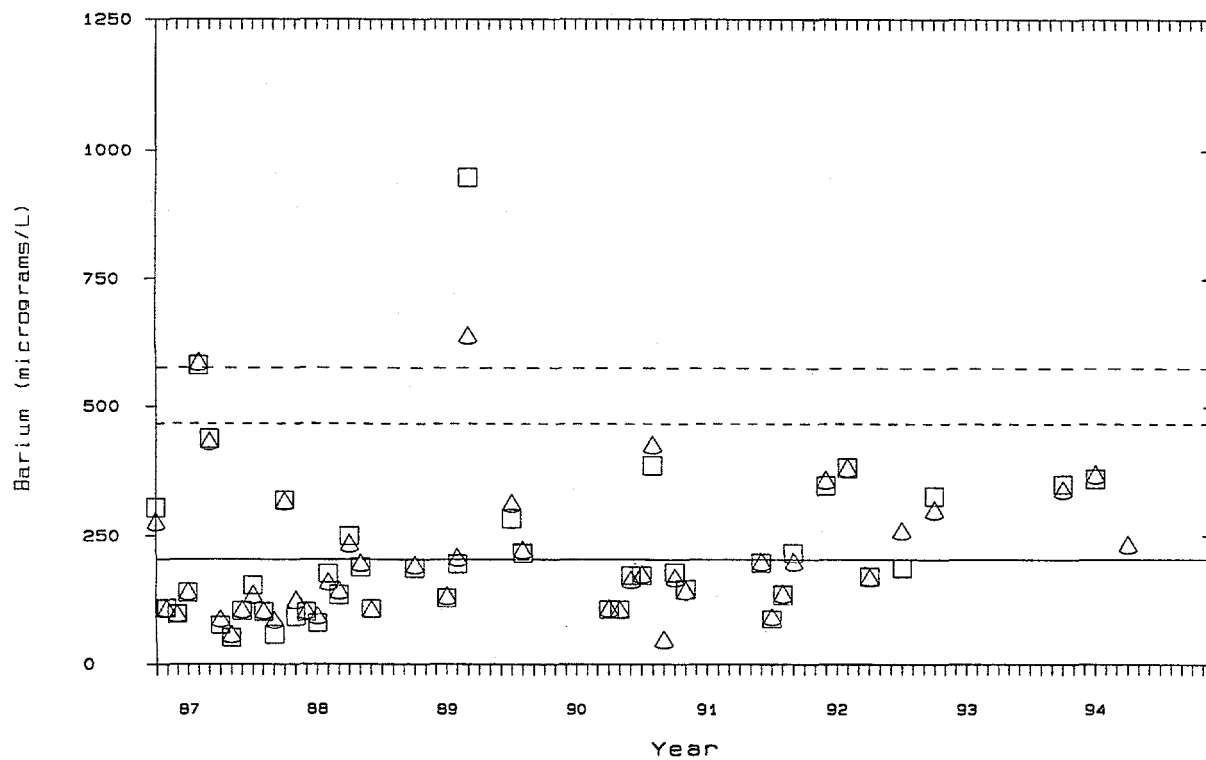
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

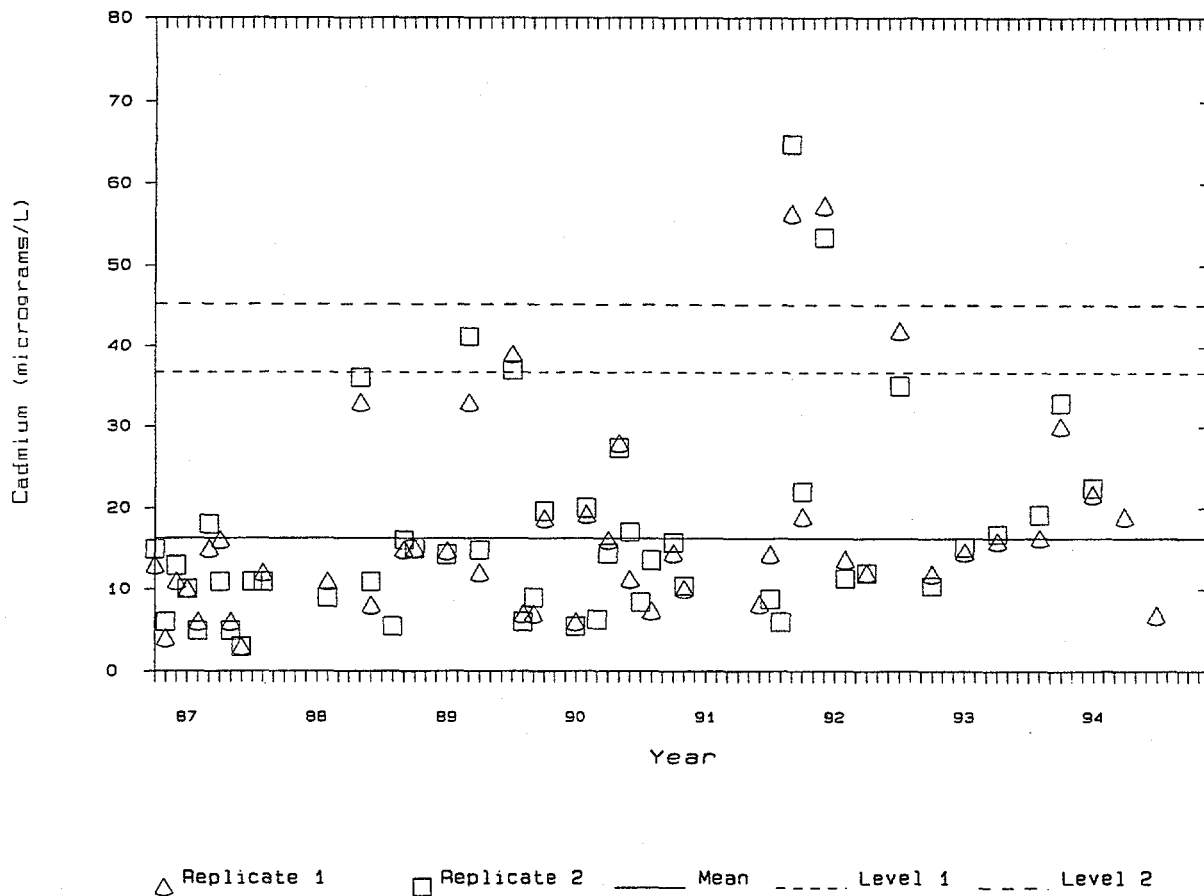
CFA665A Barium Concentrations

RCRA Characteristic Guideline = 100,000 micrograms/L



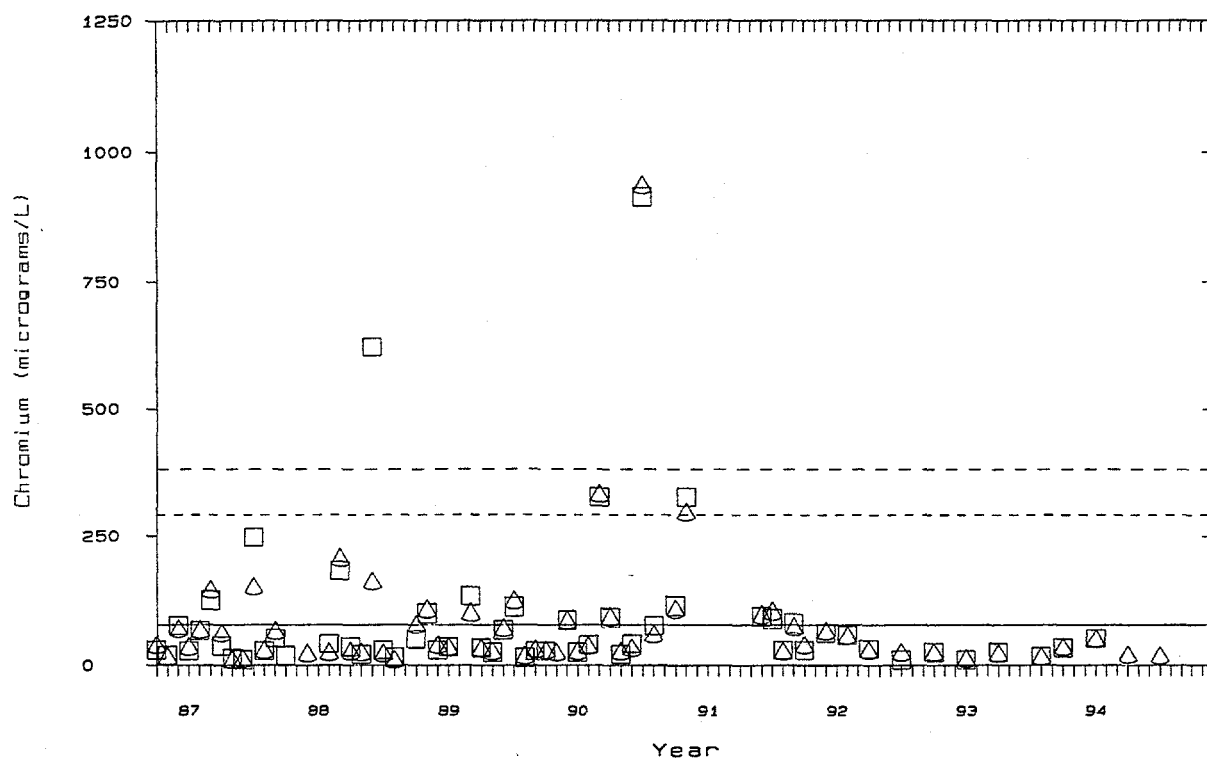
CFA665A Cadmium Concentrations

RCRA Characteristic Guideline = 1000 micrograms/L



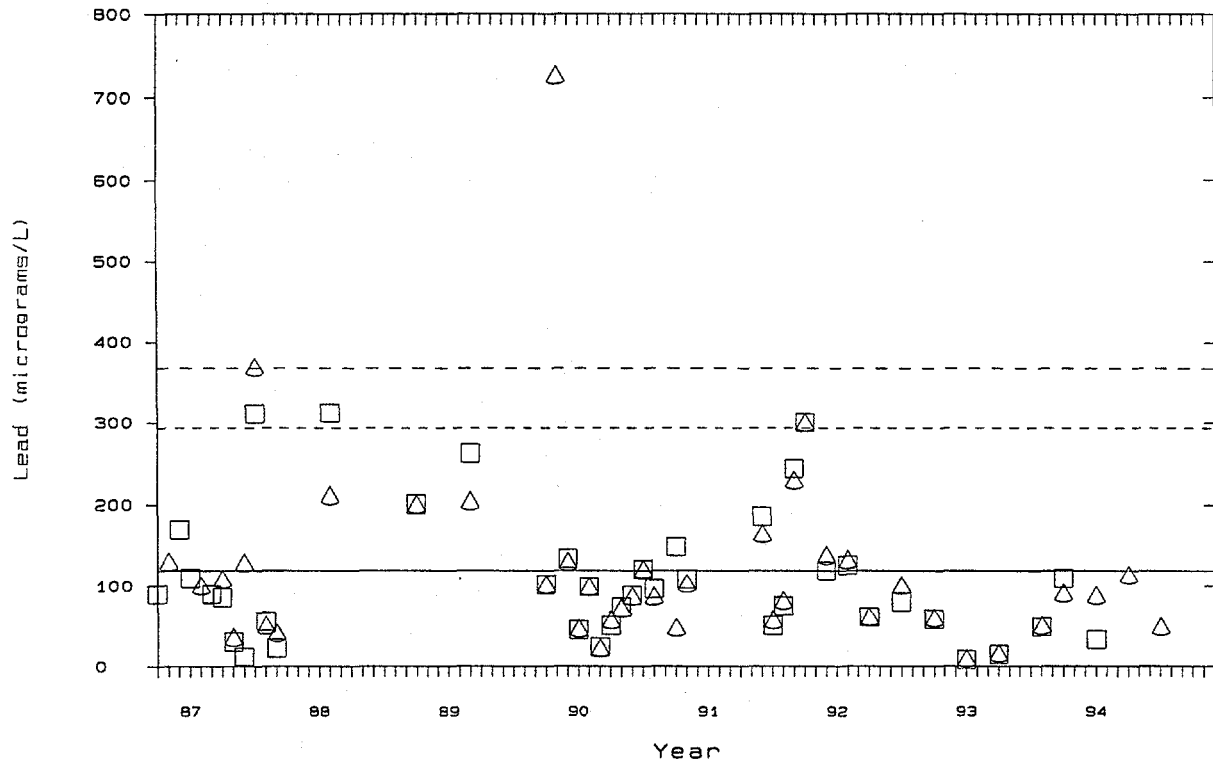
CFA665A Chromium Concentrations

RCRA Characteristic Guideline = 5000 micrograms/L



CFA665A Lead Concentrations

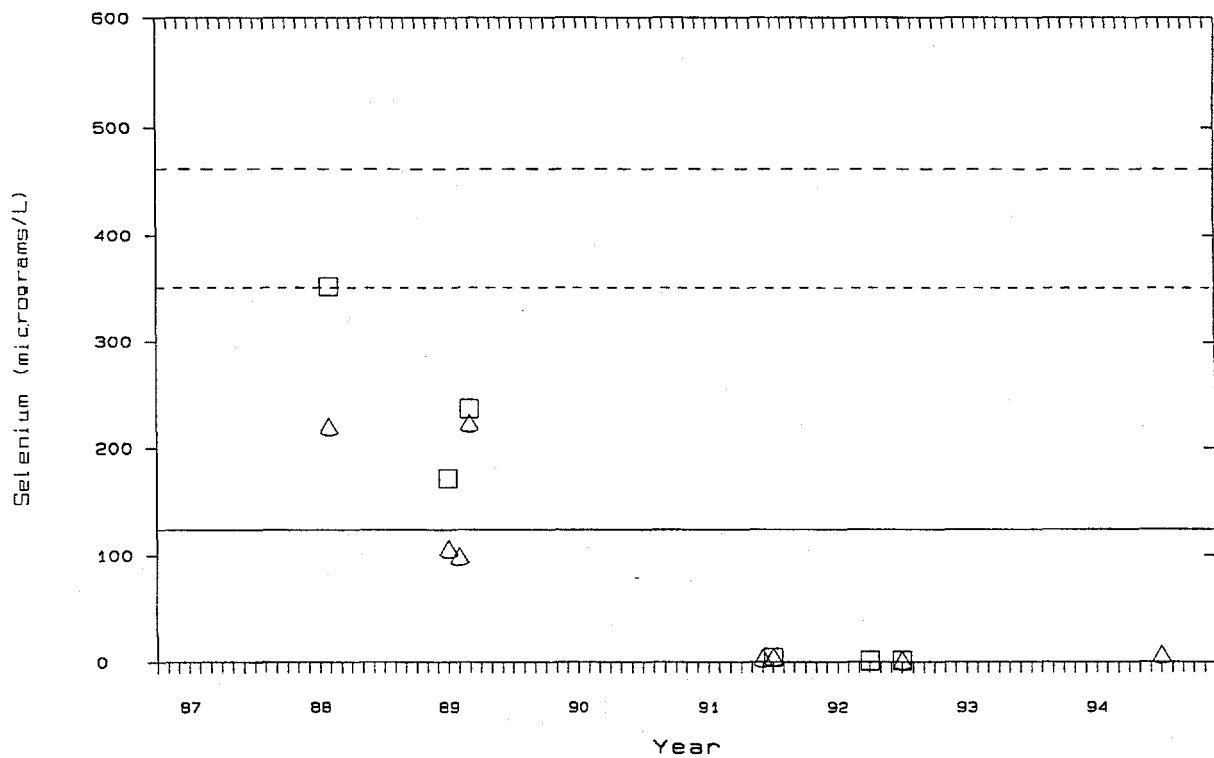
RCRA Characteristic Guideline = 5000 micrograms/L



△ Replicate 1 □ Replicate 2 _____ Mean _____ Level 1 _____ Level 2

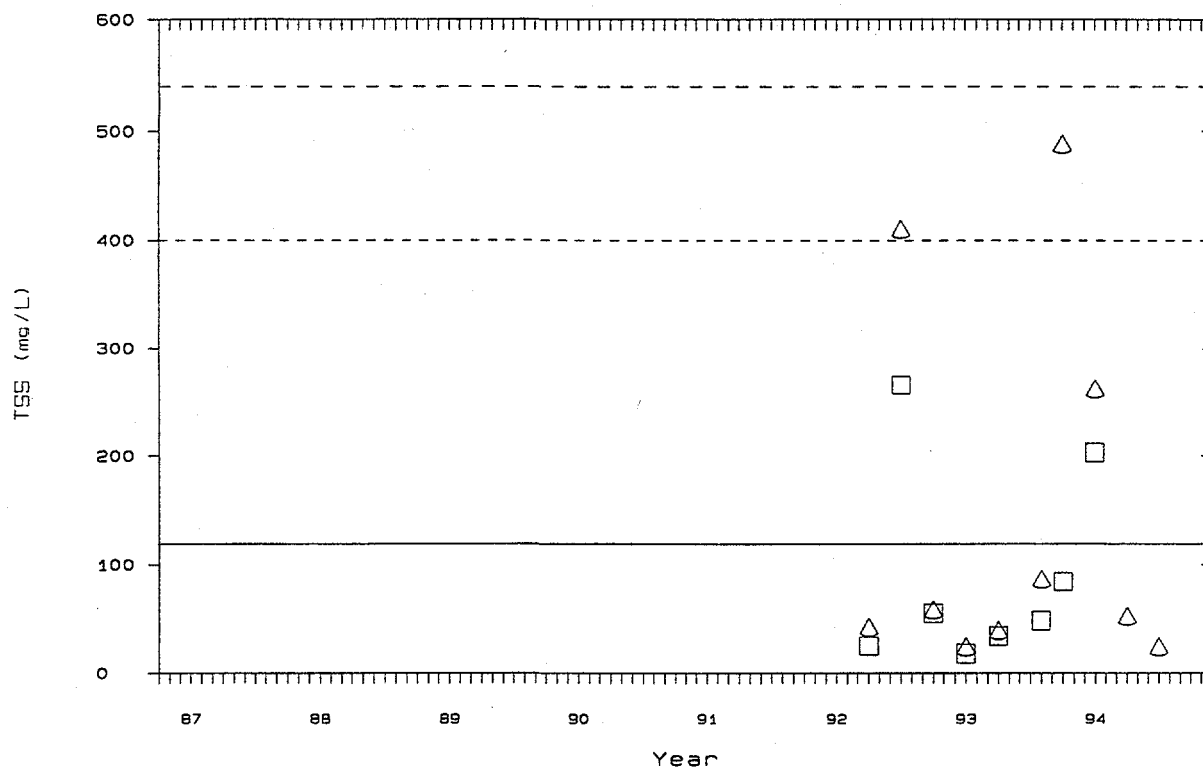
CFA665A Selenium Concentrations

RCRA Characteristic Guideline = 1000 micrograms/L



CFA665A TSS Concentrations

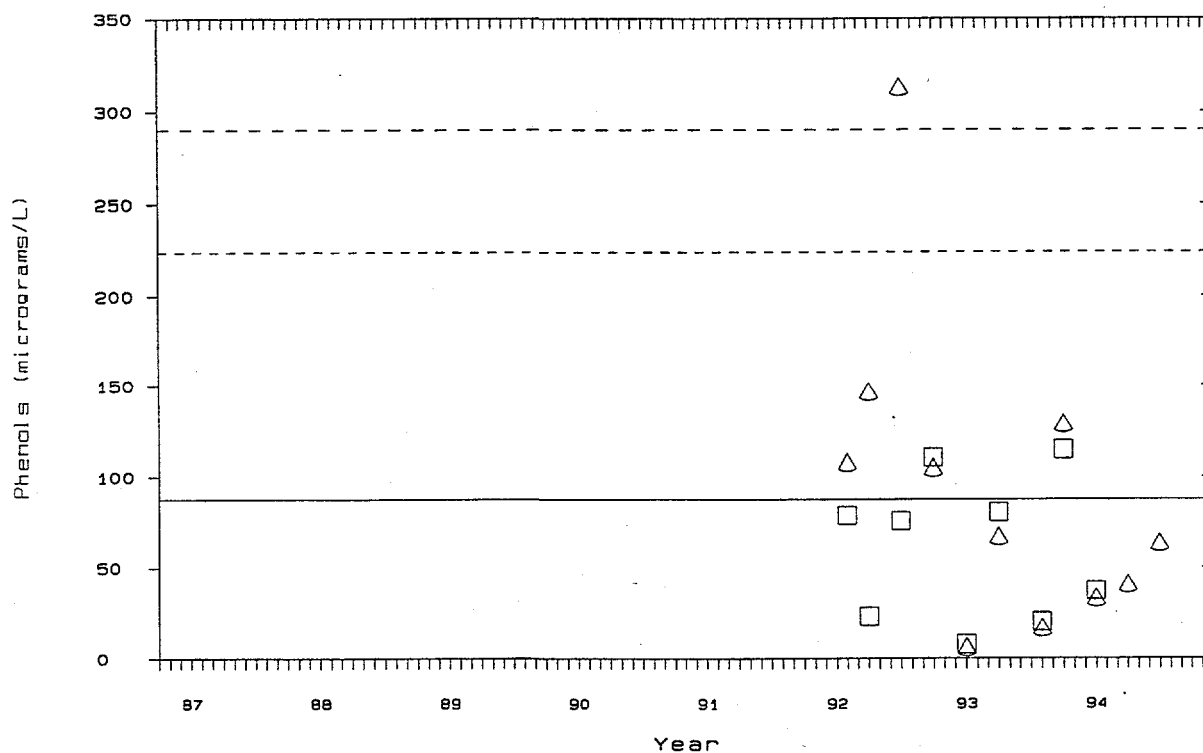
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

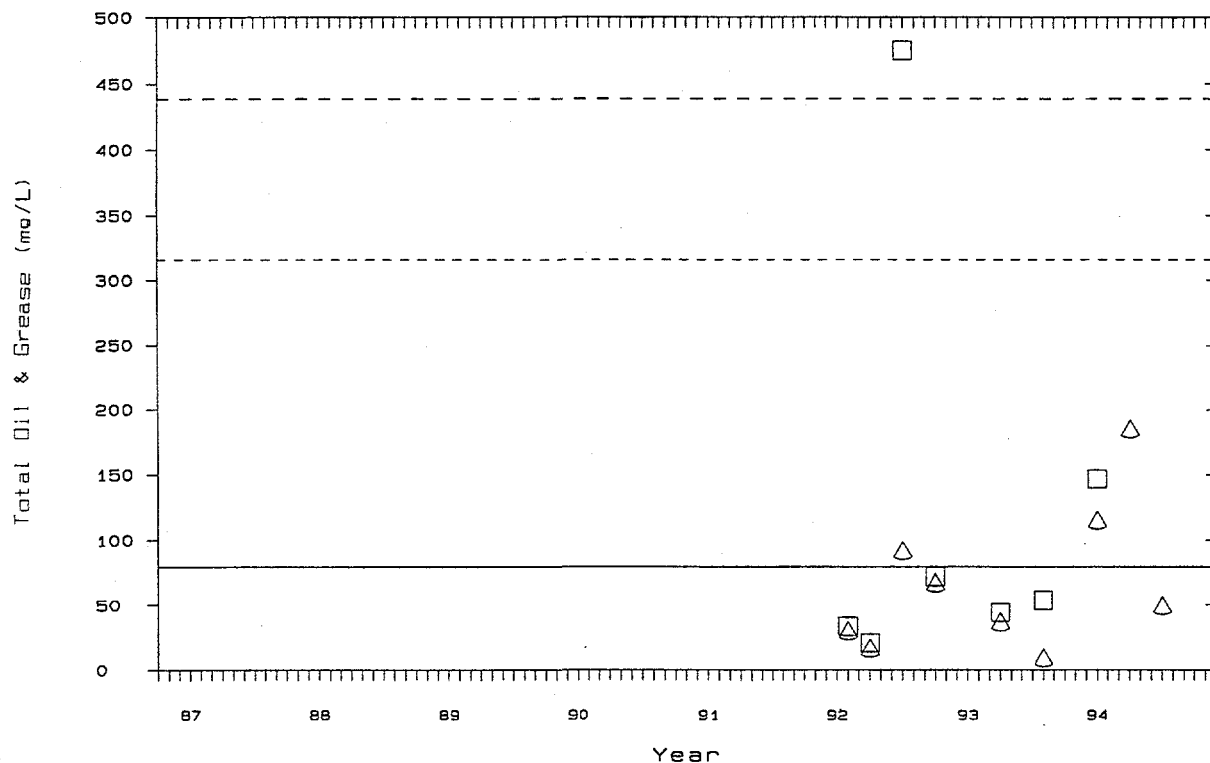
CFA665A Phenols Concentrations

RCRA Guideline Not Applicable



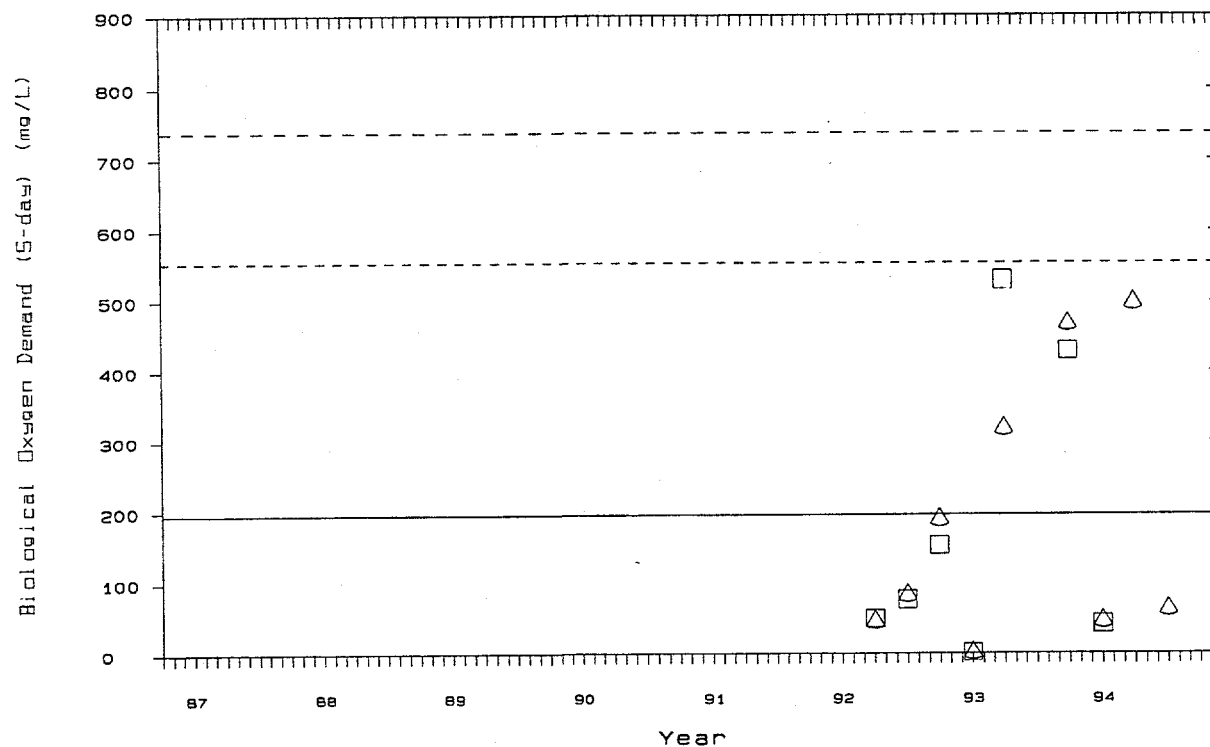
CFA665A Total Oil & Grease Concentrations

RCRA Guideline Not Applicable



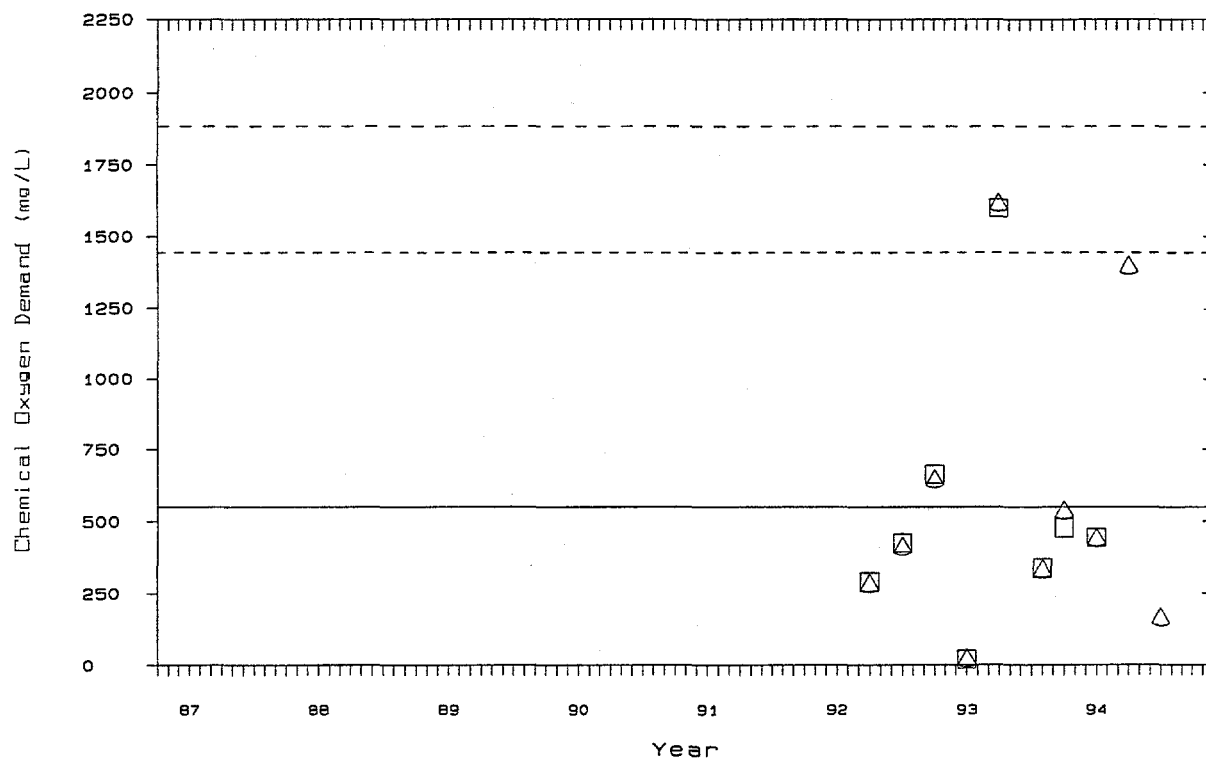
CFA665A Biological Oxygen Demand (5-day) Concentrations

RCRA Guideline Not Applicable



CFA665A Chemical Oxygen Demand Concentrations

RCRA Guideline Not Applicable



**Effluent Monitoring Data for
CFA-688 (Printshop)**

Table B-18. 1994 effluent monitoring data for CFA-688.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	03/30/94	06/08/94	12/14/94					
Conductivity (μ S)	1564	739	476					
pH	7.2	8.1	8.5					
Cyanide (μ g/L)	ND	ND	ND					
TSS (mg/L)	5.0	40.0	ND					
Silver (μ g/L)	ND	ND	ND					
Arsenic (μ g/L)	ND	ND	ND					
Barium (μ g/L)	206	ND	ND					
Cadmium (μ g/L)	ND	ND	ND					
Chromium (μ g/L)	ND	33.0	23.3					
Copper (μ g/L)	ND	32.3	ND					
Mercury (μ g/L)	ND	ND	ND					
Nickel (μ g/L)	ND	ND	ND					
Lead (μ g/L)	ND	6.2	ND					
Selenium (μ g/L)	ND	ND	ND					
Zinc (μ g/L)	38.9	121	21.1					

ND - below practical quantitation level

Table B-19. Summary statistics for CFA-688.

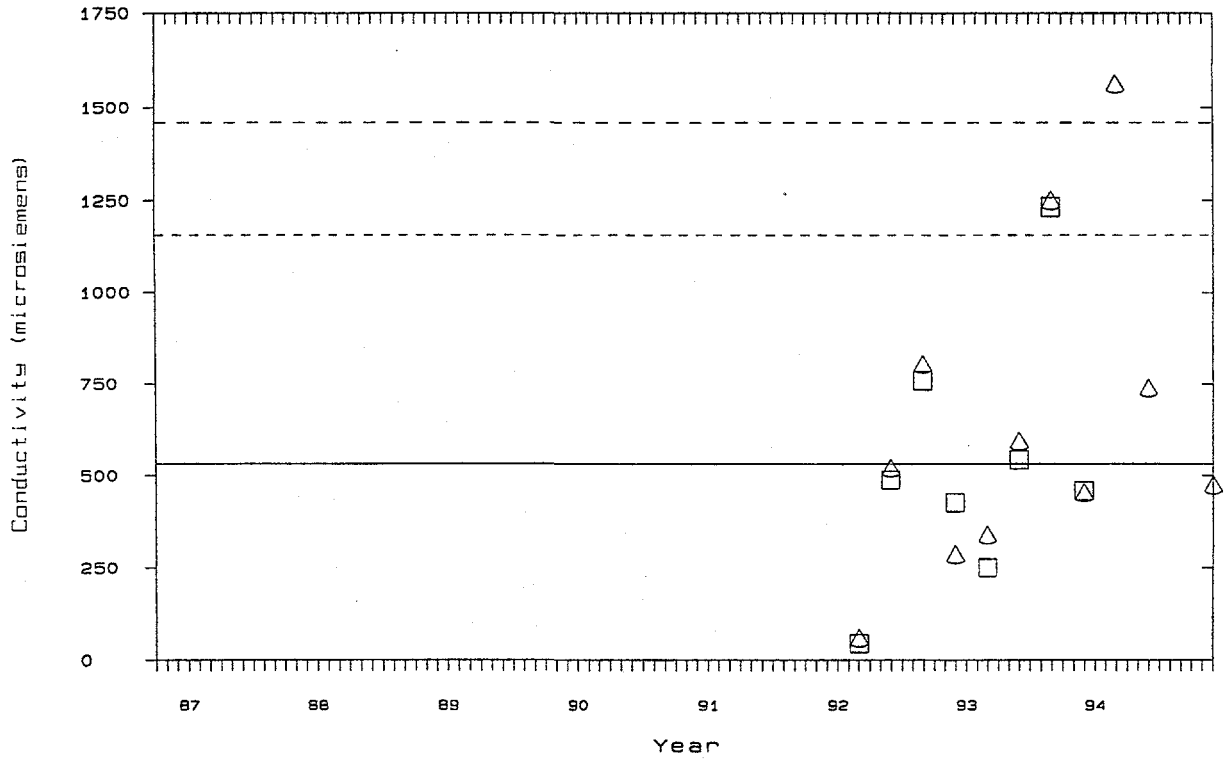
Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Conductivity (μ S)	533	346	16	1158	1461	NA
pH	7.5	0.71	16	5.3	9.6	2.5-12
Chromium (μ g/L)	13.1	4.2	14	20.8	24.7	5000
Zinc (μ g/L)	35.3	12.4	14	58.1	69.4	NA

Guideline - RCRA Characteristic Guideline

NA - Not Applicable

CFA688A Conductivity

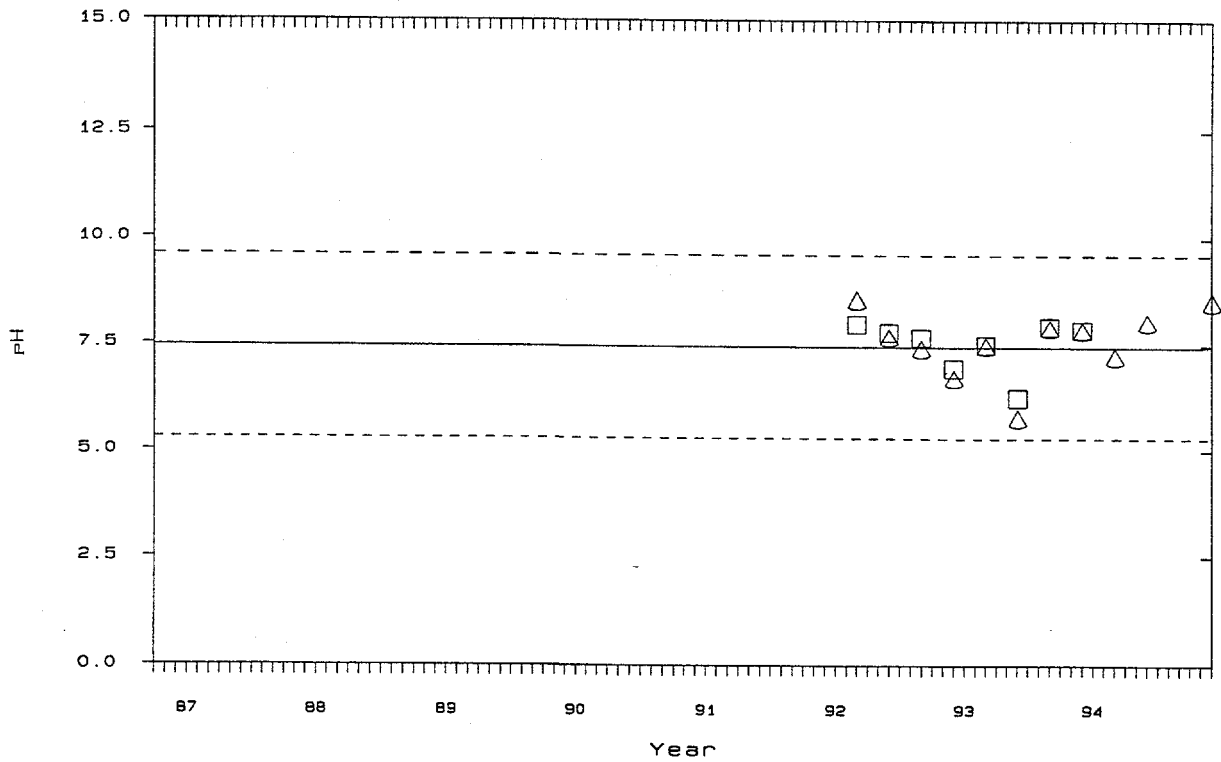
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

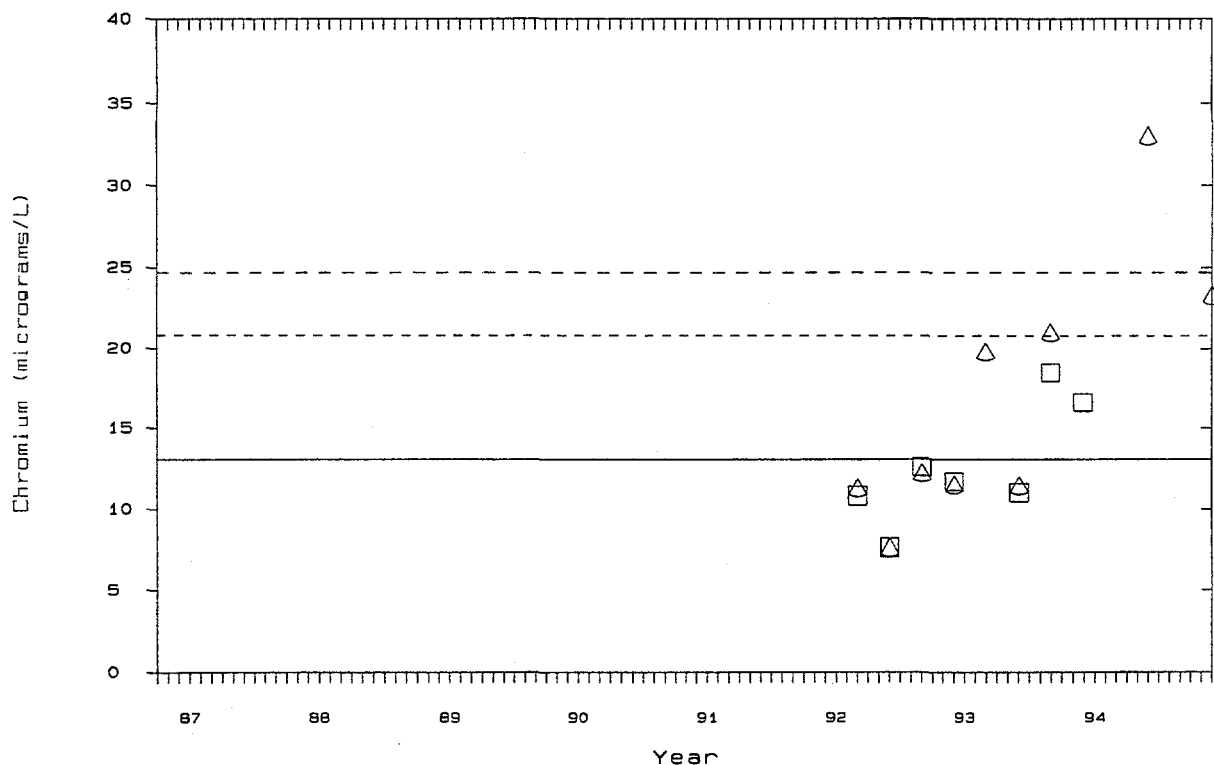
CFA688A pH

RCRA Characteristic Guideline = 2.5-12



CFA688A Chromium Concentrations

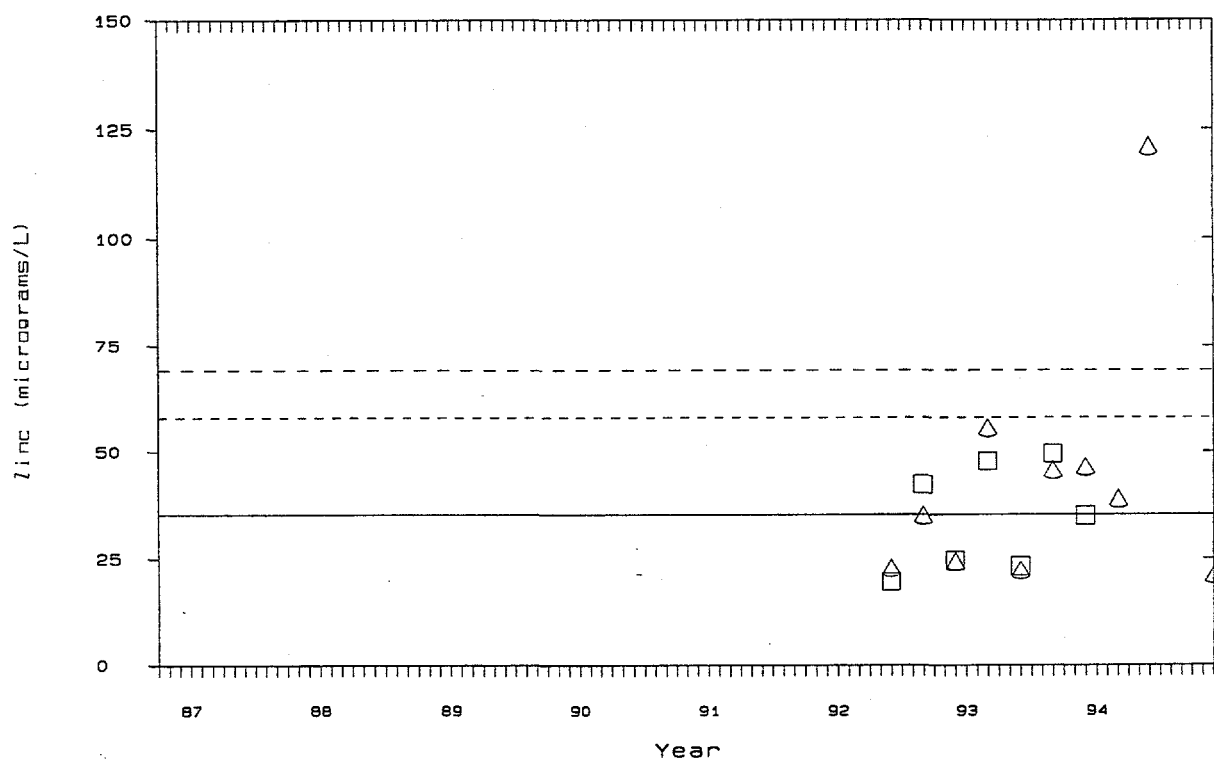
RCRA Characteristic Guideline = 5000 micrograms/L



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

CFA688A Zinc Concentrations

RCRA Guideline Not Applicable



**Effluent Monitoring Data for
CFA-690 (Radiological and Environmental
Sciences Laboratory)**

Table B-20. 1994 effluent monitoring data for CFA-690.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	03/30/94	06/08/94	09/14/94	12/14/94				
Biological Oxygen Demand (5-day) (mg/L)	3.0	220	5.0	9.0				
Conductivity (μ S)	579	845	510	519				
pH	7.8	7.9	7.1	8.3				
Chemical Oxygen Demand (mg/L)	43.7	233	ND	22.0				
Chromium VI (μ g/L)	ND	ND	ND	ND				
Fluoride (mg/L)	0.24	0.18	0.21	0.21				
Sulfide, Total (mg/L)	ND	ND	ND	ND				
TOC (mg/L)	7.2	49.0	2.3	3.4				
TSS (mg/L)	14.0	98.0	ND	12.0				
Silver (μ g/L)	ND	ND	ND	ND				
Arsenic (μ g/L)	ND	ND	ND	ND				
Barium (μ g/L)	ND	ND	ND	ND				
Beryllium (μ g/L)	ND	ND	ND	ND				
Calcium (μ g/L)	NR	NR	NR	61000				
Cadmium (μ g/L)	ND	ND	ND	ND				
Cobalt (μ g/L)	ND	ND	ND	ND				
Chromium (μ g/L)	11.0	25.0	19.5	15.3				
Copper (μ g/L)	ND	ND	ND	ND				
Iron (μ g/L)	185	192	ND	NR				
Mercury (μ g/L)	ND	ND	ND	ND				

ND - below practical quantitation level

NR - analysis not requested

Table B-20. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	03/30/94	06/08/94	09/14/94	12/14/94					
Potassium ($\mu\text{g/L}$)	NR	NR	NR	ND					
Magnesium ($\mu\text{g/L}$)	NR	NR	NR	18000					
Manganese ($\mu\text{g/L}$)	NR	NR	NR	ND					
Sodium ($\mu\text{g/L}$)	NR	NR	NR	18600					
Nickel ($\mu\text{g/L}$)	ND	ND	ND	ND					
Lead ($\mu\text{g/L}$)	ND	ND	ND	ND					
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND					
Selenium ($\mu\text{g/L}$)	ND	ND	ND	ND					
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND					
Zinc ($\mu\text{g/L}$)	ND	86.2	33.7	ND					

ND - below practical quantitation level

NR - analysis not requested

Table B-21. 1994 volatile organics data for CFA-690A.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
1,2-Dichlorobenzene	September	1.00	µg/L	J	
1,4-Dichlorobenzene	March	3.00	µg/L	J	
1,4-Dichlorobenzene	June	3.00	µg/L	J	
1,4-Dichlorobenzene	September	2.00	µg/L	J	
Chlorodifluoromethane (TIC)	September	300.00	µg/L	JN	1.83
Chloroform	September	1.00	µg/L	J	
Methylene Chloride	June	5.00	µg/L	B	
Methylene Chloride	September	3.00	µg/L	JB	
Methylene Chloride	December	4.00	µg/L	JB	
Unknown (TIC)	June	10.00	µg/L	J	3.93

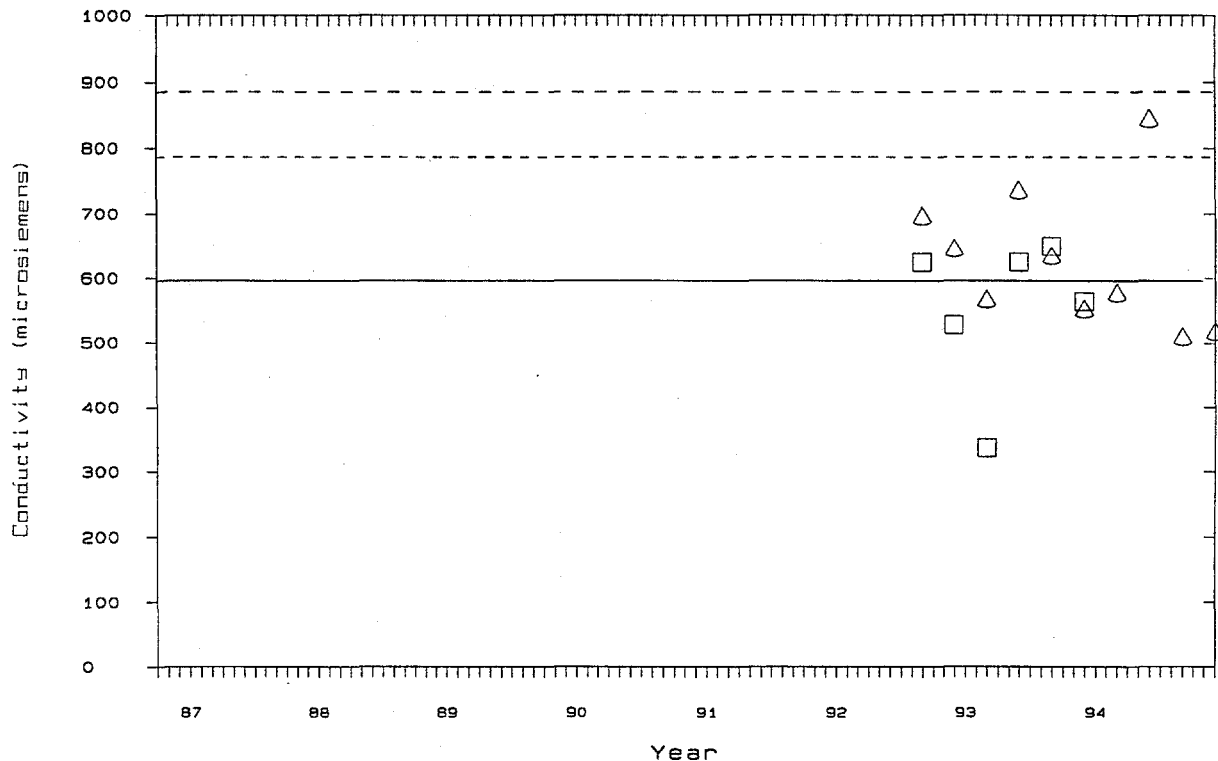
Table B-22. Summary statistics for CFA-690.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Biological Oxygen Demand (5-day) (mg/L)	133	297	12	687	972	NA
Conductivity (μ S)	598	102	12	788	886	NA
pH	7.3	0.56	12	5.5	9.1	2.5-12
Chemical Oxygen Demand (mg/L)	37.6	18.3	10	72.7	91.7	NA
Fluoride (mg/L)	0.20	0.02	10	0.23	0.24	NA
TOC (mg/L)	14.1	13.3	12	38.9	51.6	NA
TSS (mg/L)	18.6	15.5	11	47.9	63.3	NA
Chromium (μ g/L)	13.2	2.9	9	18.9	22.1	5000
Zinc (μ g/L)	51.1	26.5	11	101	128	NA

Guideline - RCRA Characteristic Guideline
 NA - Not Applicable

CFA690A Conductivity

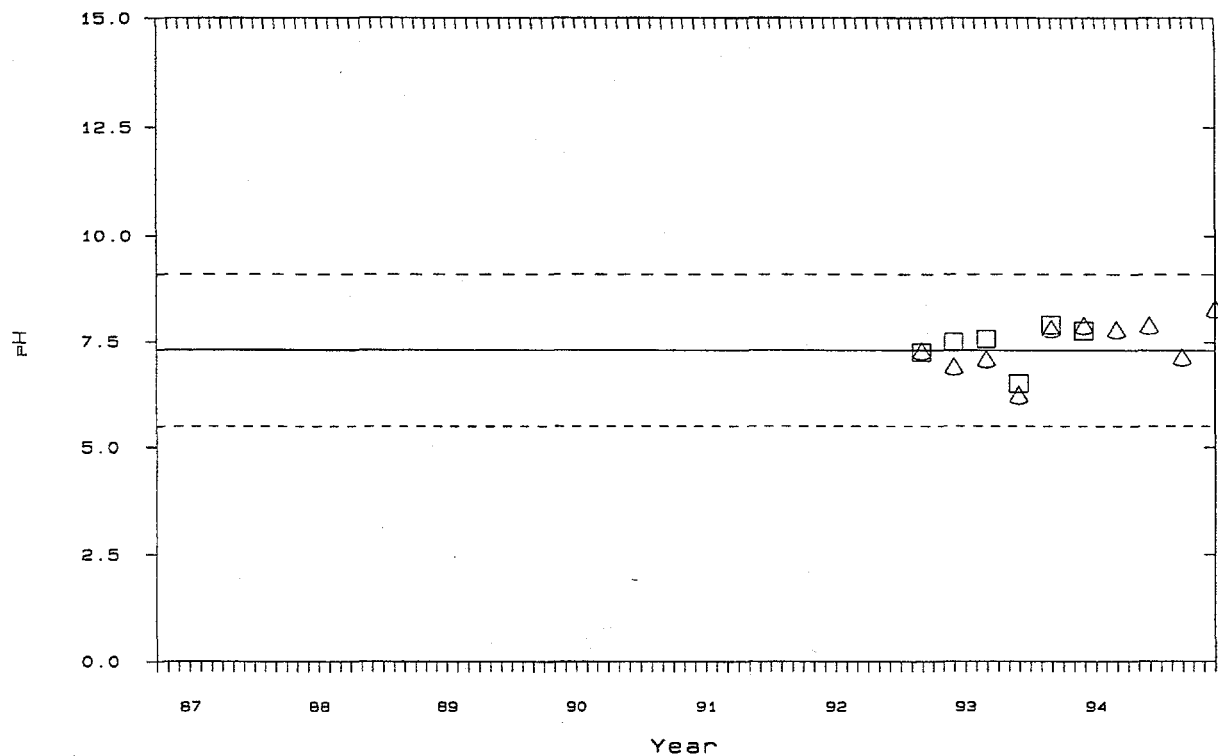
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

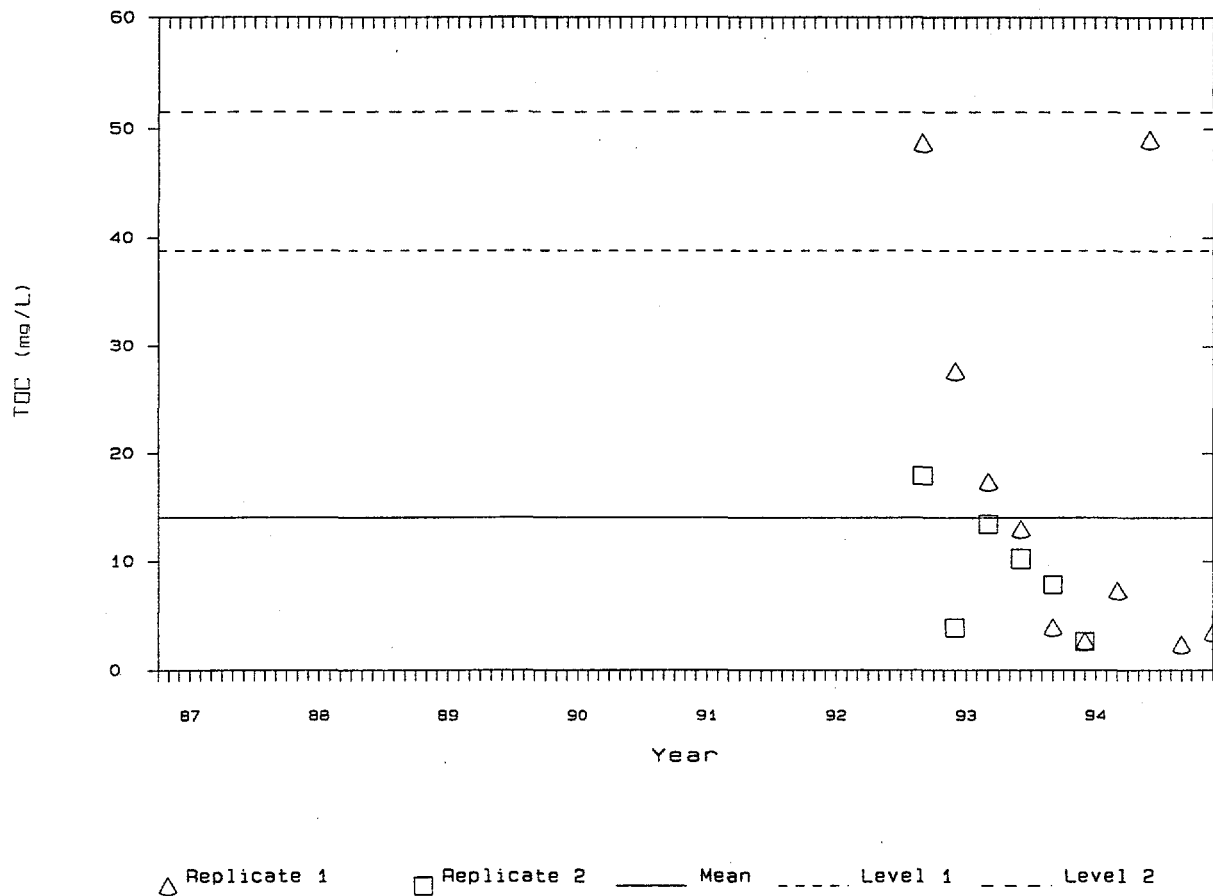
CFA690A pH

RCRA Characteristic Guideline = 2.5-12



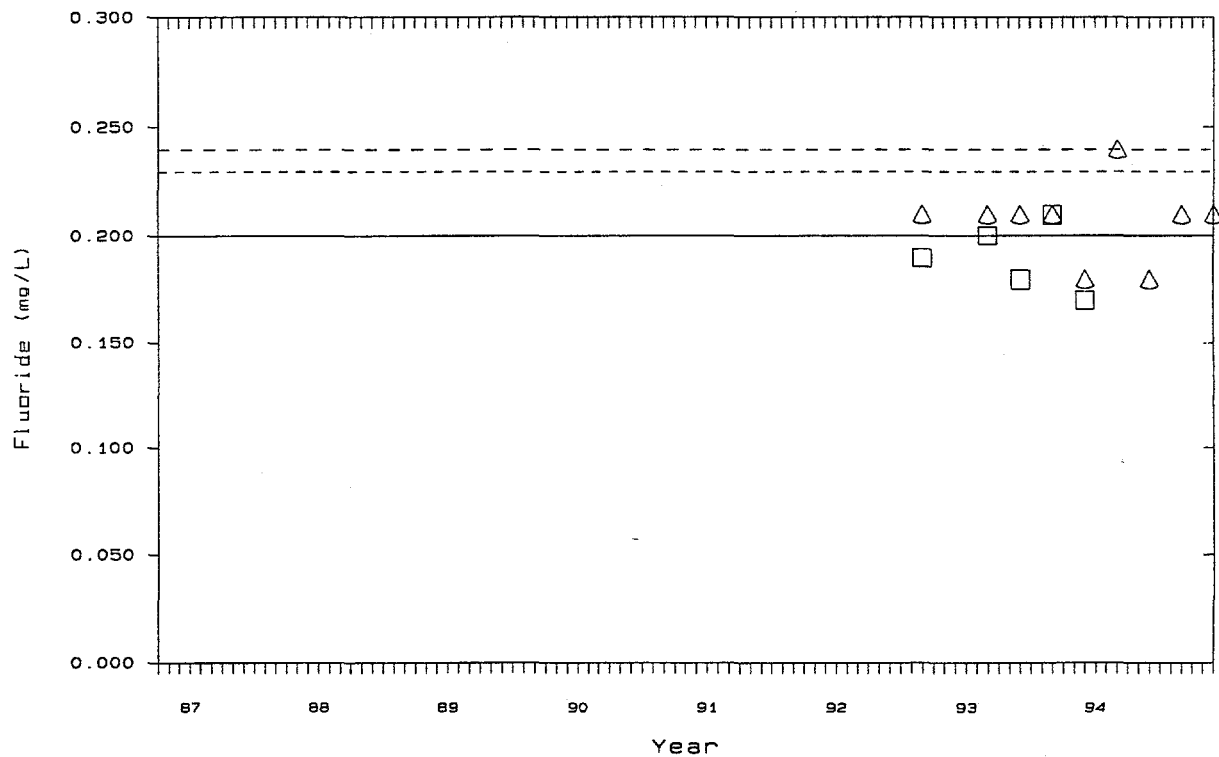
CFA690A TOC Concentrations

RCRA Guideline Not Applicable



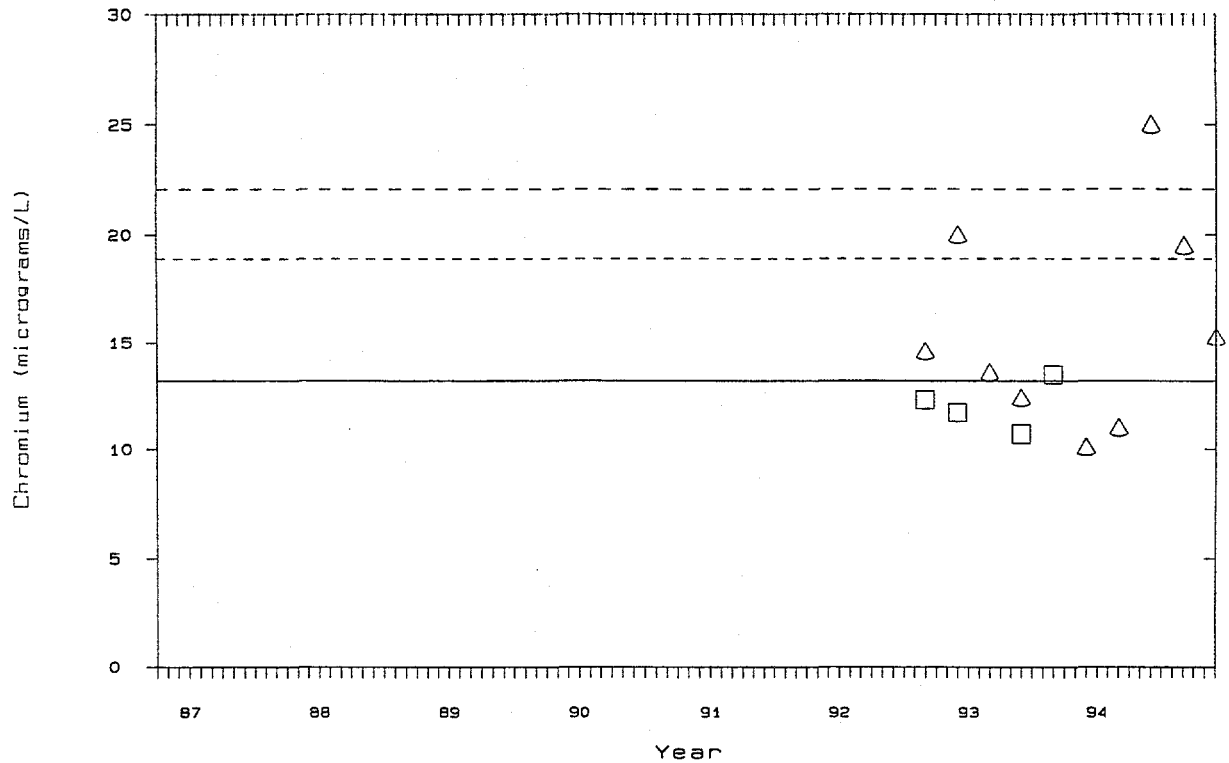
CFA690A Fluoride Concentrations

RCRA Guideline Not Applicable



CFA690A Chromium Concentrations

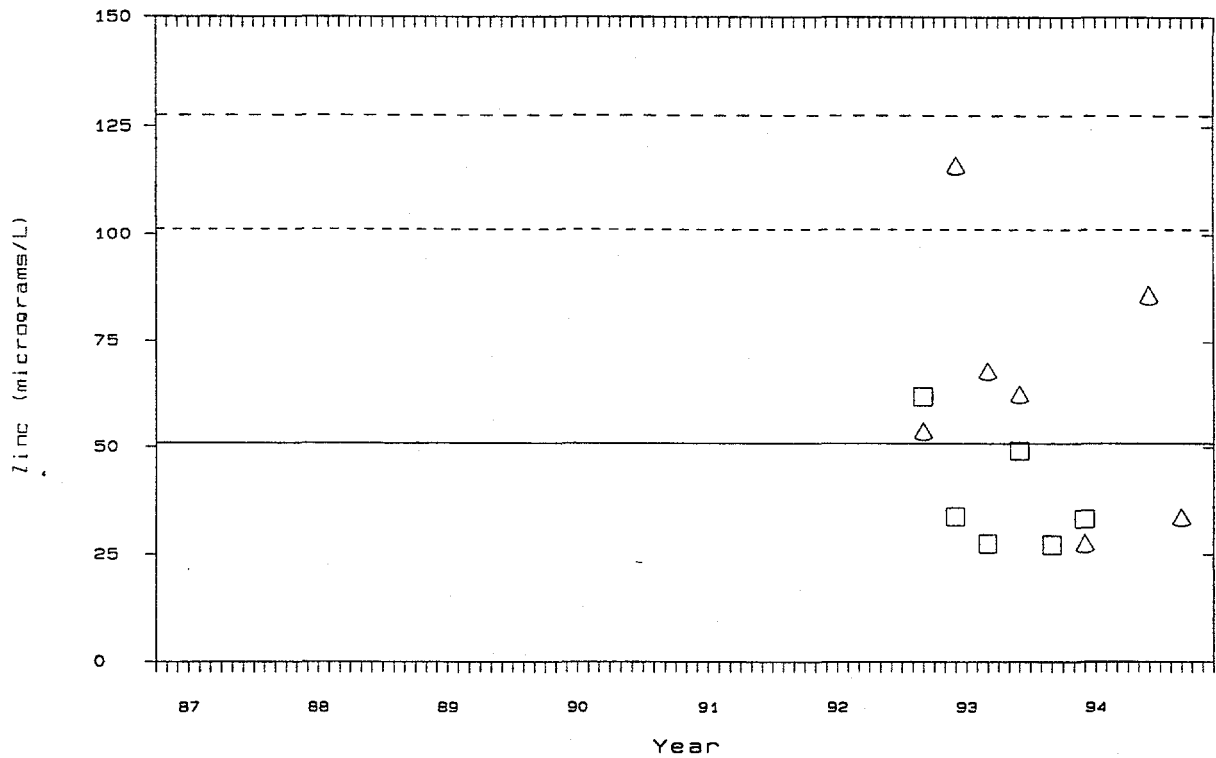
RCRA Characteristic Guideline = 5000 micrograms/L



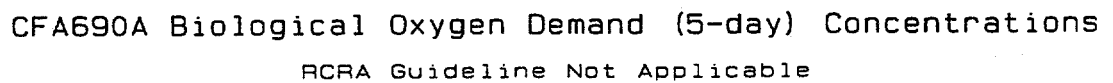
△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

CFA690A Zinc Concentrations

RCRA Guideline Not Applicable

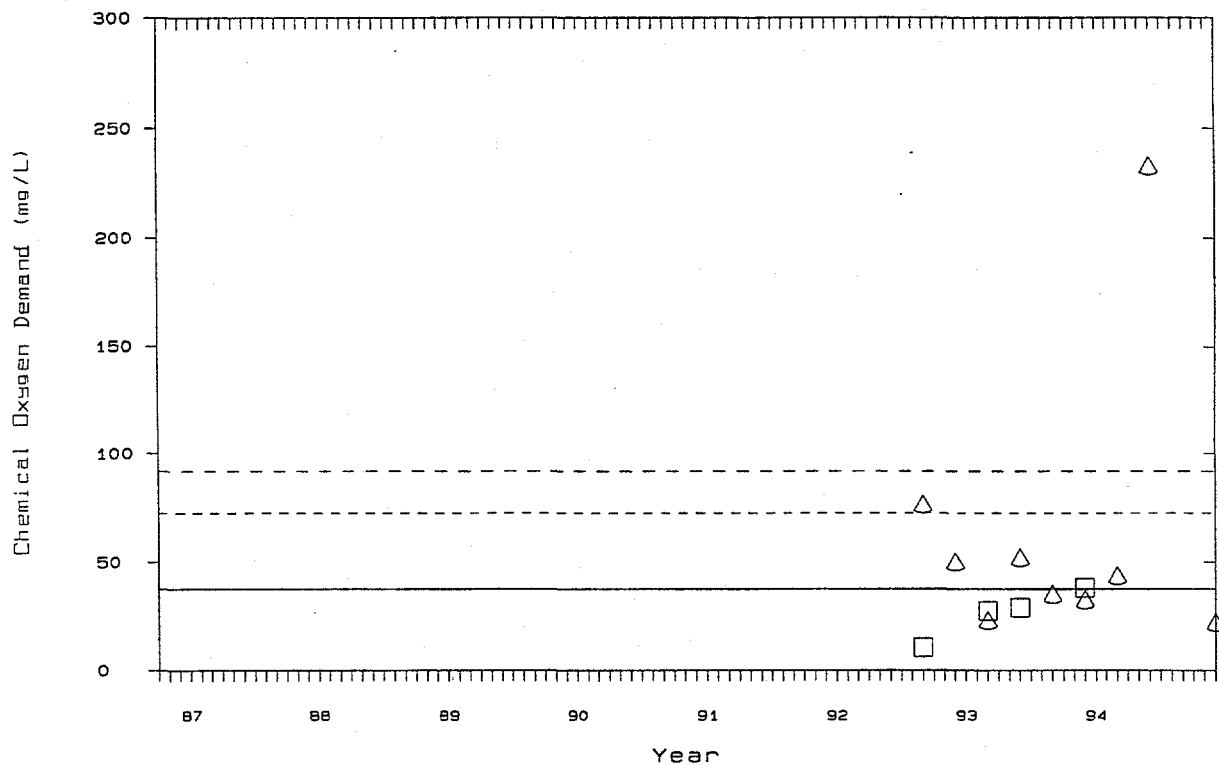


RCRA Guideline Not Applicable



CFA690A Chemical Oxygen Demand Concentrations

RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

**Effluent Monitoring Data for
CFA-691 (Influent to Sewage Treatment Plant)**

Table B-23. 1994 effluent monitoring data for CFA-691.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	02/16/94	05/31/94	08/02/94	11/08/94				
Biological Oxygen Demand (5-day) (mg/L)	NR	23.0	9.0	17.0				
Conductivity (μ S)	746	1167	707	755				
pH	6.8	7.7	7.3	7.4				
Chloride (mg/L)	151	178	122	160				
Chemical Oxygen Demand (mg/L)	80.3	102	39.0	64.0				
Fluoride (mg/L)	0.32	0.19	0.19	0.20				
Surfactants (mg/L)	ND	ND	ND	0.29				
Nitrogen, Nitrate-Nitrite (mg-N/L)	0.30	0.84	0.97	1.1				
Total Phosphorus (mg/L)	NR	1.1	2.5	2.4				
Sulfate (mg/L)	39.9	44.3	43.1	45.4				
Sulfide, Total (mg/L)	ND	ND	ND	ND				
TDS (mg/L)	424	542	440	480				
Nitrogen, Total Kjeldahl (mg/L)	14.9	20.0	8.4	22.0				
TOC (mg/L)	20.3	24.0	22.8	37.3				
Total Oil & Grease (mg/L)	9.9	9.9	329	8.3				
TSS (mg/L)	578	42.0	12.0	9.0				
Silver (μ g/L)	ND	ND	ND	ND				
Arsenic (μ g/L)	ND	ND	ND	ND				
Barium (μ g/L)	ND	ND	ND	ND				
Beryllium (μ g/L)	ND	ND	ND	ND				

ND - below practical quantitation level

NR - analysis not requested

Table B-23. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	02/16/94	05/31/94	08/02/94	11/08/94					
Calcium ($\mu\text{g/L}$)	65200	59300	63400	57000					
Cadmium ($\mu\text{g/L}$)	ND	ND	ND	ND					
Cobalt ($\mu\text{g/L}$)	ND	ND	ND	ND					
Chromium ($\mu\text{g/L}$)	11.9	12.9	12.4	23.3					
Copper ($\mu\text{g/L}$)	36.0	30.1	ND	27.6					
Iron ($\mu\text{g/L}$)	628	497	255	339					
Mercury ($\mu\text{g/L}$)	ND	0.21	ND	ND					
Potassium ($\mu\text{g/L}$)	7510	8220	6560	10300					
Magnesium ($\mu\text{g/L}$)	21100	20300	21300	19400					
Manganese ($\mu\text{g/L}$)	ND	18.9	ND	20.7					
Sodium ($\mu\text{g/L}$)	58400	69200	37600	54900					
Nickel ($\mu\text{g/L}$)	ND	ND	ND	ND					
Lead ($\mu\text{g/L}$)	ND	5.3	ND	ND					
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND					
Selenium ($\mu\text{g/L}$)	ND	ND	ND	ND					
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND					
Zinc ($\mu\text{g/L}$)	119	82.7	89.8	123					

ND - below practical quantitation level

Table B-24. 1994 volatile organics data for CFA-691A.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
1,1,1-Trichloroethane	February	2.00	µg/L	J	
1,1,1-Trichloroethane	November	1.00	µg/L	J	
1,4-Dichlorobenzene	February	10.00	µg/L		
1,4-Dichlorobenzene	May	15.00	µg/L		
1,4-Dichlorobenzene	August	7.00	µg/L		
1,4-Dichlorobenzene	November	9.00	µg/L		
Bromoform	February	1.00	µg/L	J	
Methylene Chloride	February	3.00	µg/L	JB	
Methylene Chloride	May	6.00	µg/L	B	
Methylene Chloride	August	3.00	µg/L	JB	
Siloxane (TIC)	May	5.00	µg/L	JB	25.03
Trichlorofluoromethane	August	2.00	µg/L	J	

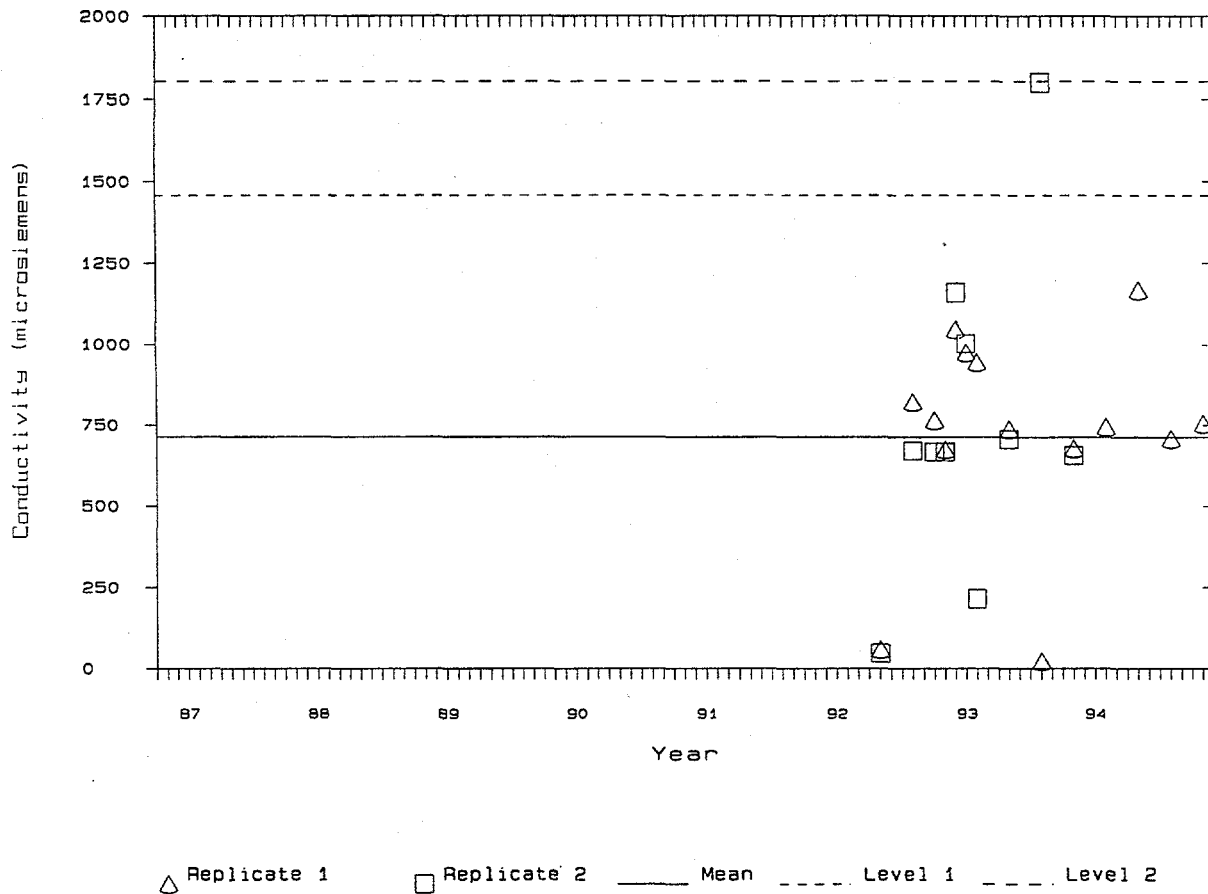
Table B-25. Summary statistics for CFA-691.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Biological Oxygen Demand (5-day) (mg/L)	23.4	20.0	20	58.8	75.4	NA
Conductivity (μ S)	716	419	20	1458	1805	NA
pH	7.3	0.31	20	6.4	8.3	2.5-12
Chemical Oxygen Demand (mg/L)	109	70.5	14	238	302	NA
Nitrogen, Nitrate-Nitrite (mg-N/L)	0.96	0.47	16	1.8	2.2	NA
Nitrogen, Total Kjeldahl (mg/L)	13.3	4.5	18	21.4	25.2	NA
TOC (mg/L)	27.9	37.1	14	95.9	130	NA
TSS (mg/L)	41.2	25.4	19	86.3	108	NA
Calcium (μ g/L)	61783	4741	12	70645	75195	NA
Iron (μ g/L)	319	149	12	598	741	NA
Magnesium (μ g/L)	20958	1595	12	23939	25469	NA
Sodium (μ g/L)	75242	39730	12	149507	187642	NA
Zinc (μ g/L)	66.9	26.1	12	116	141	NA

Guideline - RCRA Characteristic Guideline
 NA - Not Applicable

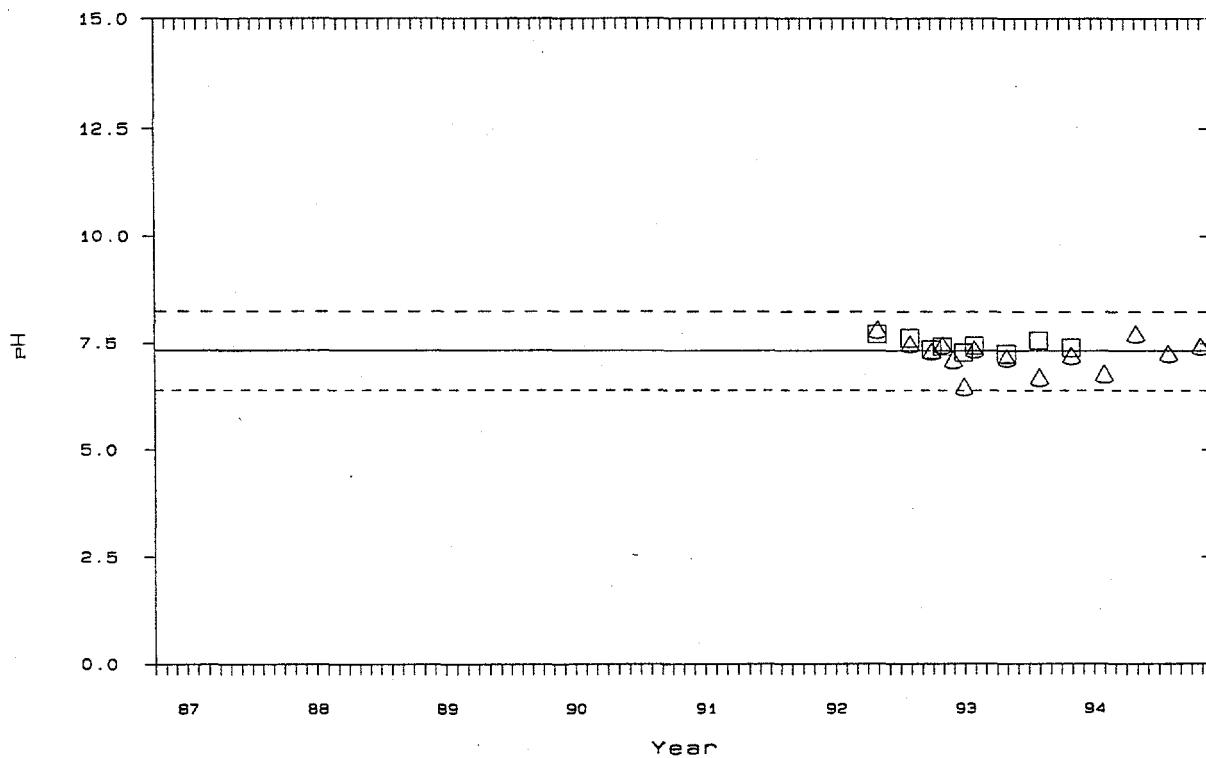
CFA691A Conductivity

RCRA Guideline Not Applicable



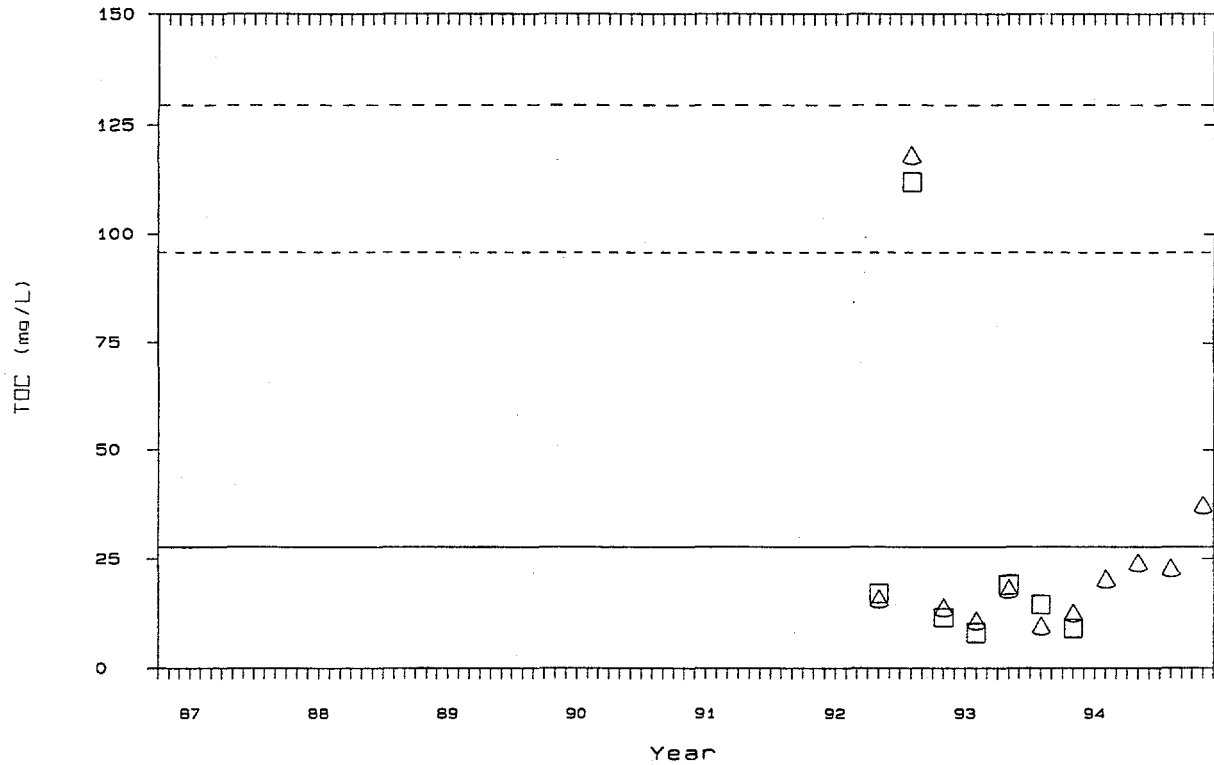
CFA691A pH

RCRA Characteristic Guideline = 2.5-12



CFA691A TOC Concentrations

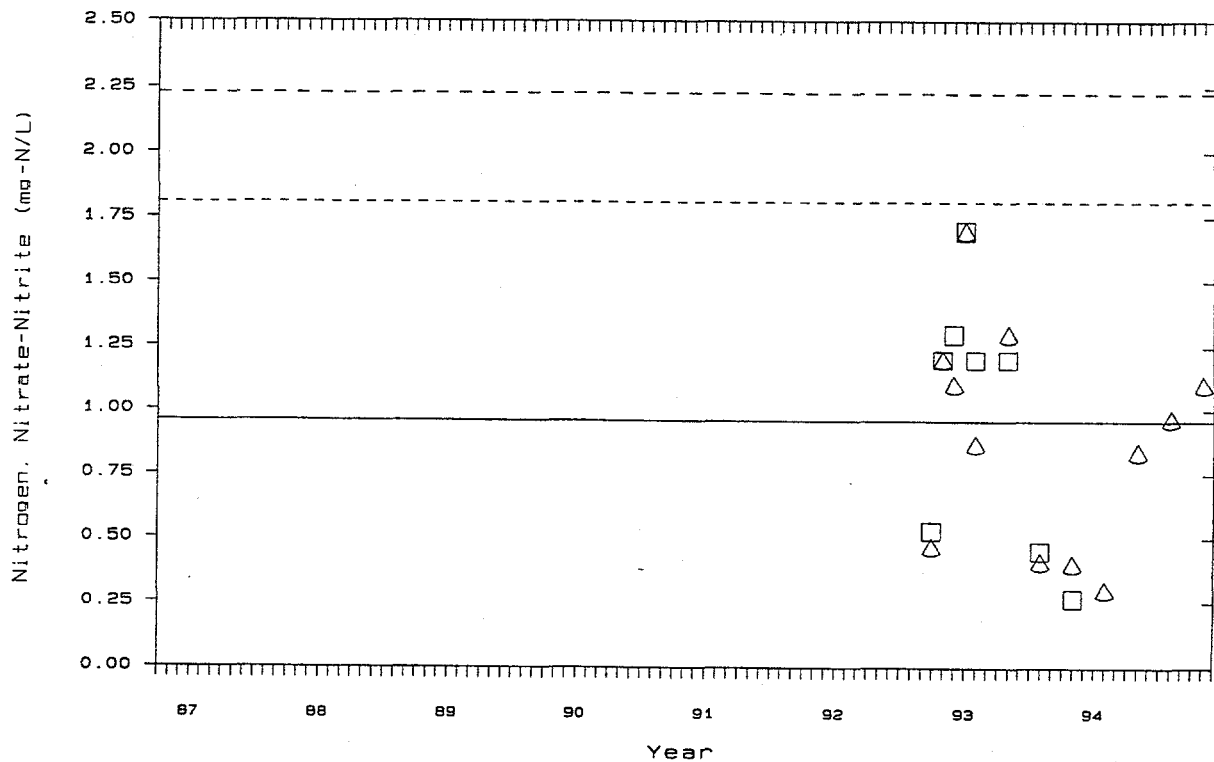
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

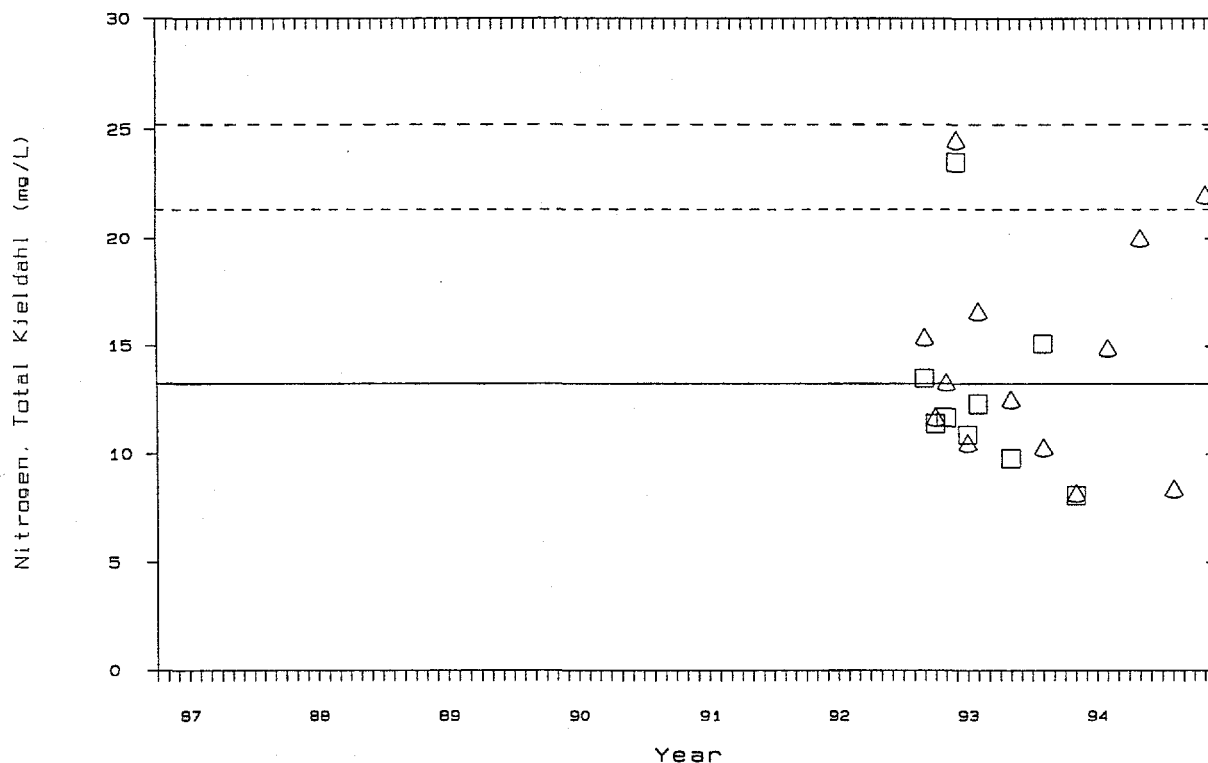
CFA691A Nitrogen, Nitrate-Nitrite Concentrations

RCRA Guideline Not Applicable



CFA691A Nitrogen, Total Kjeldahl Concentrations

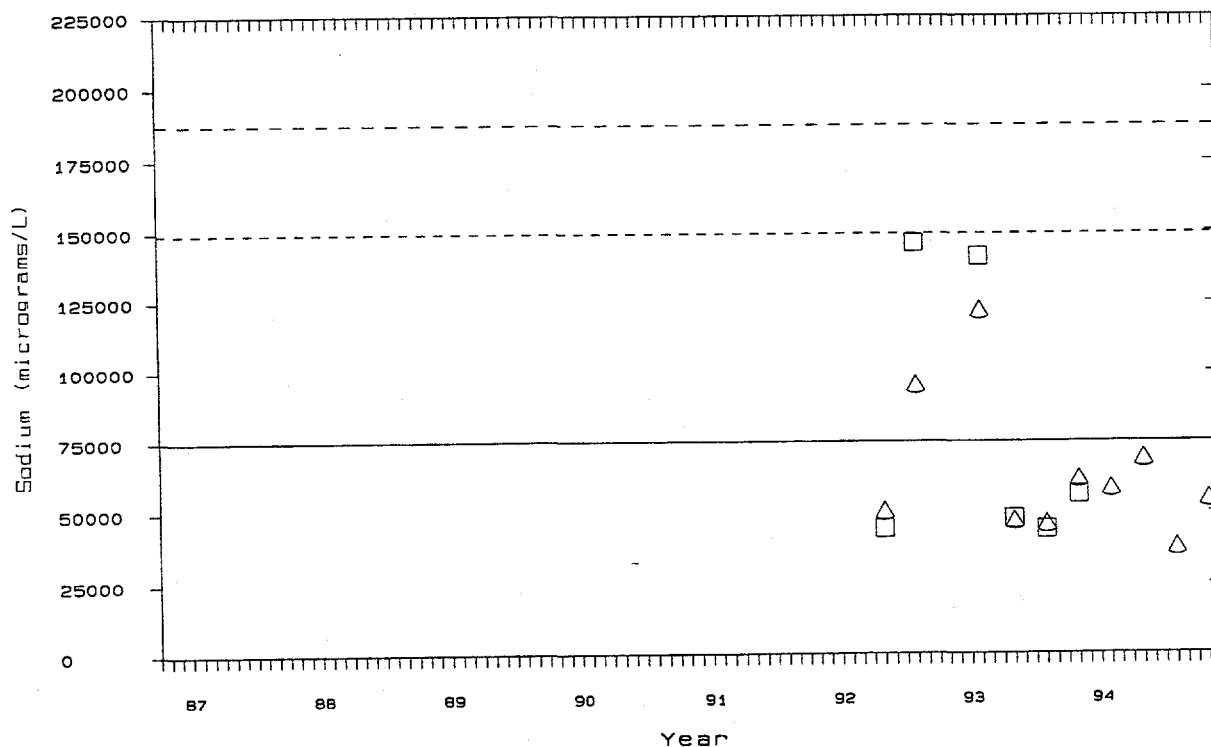
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

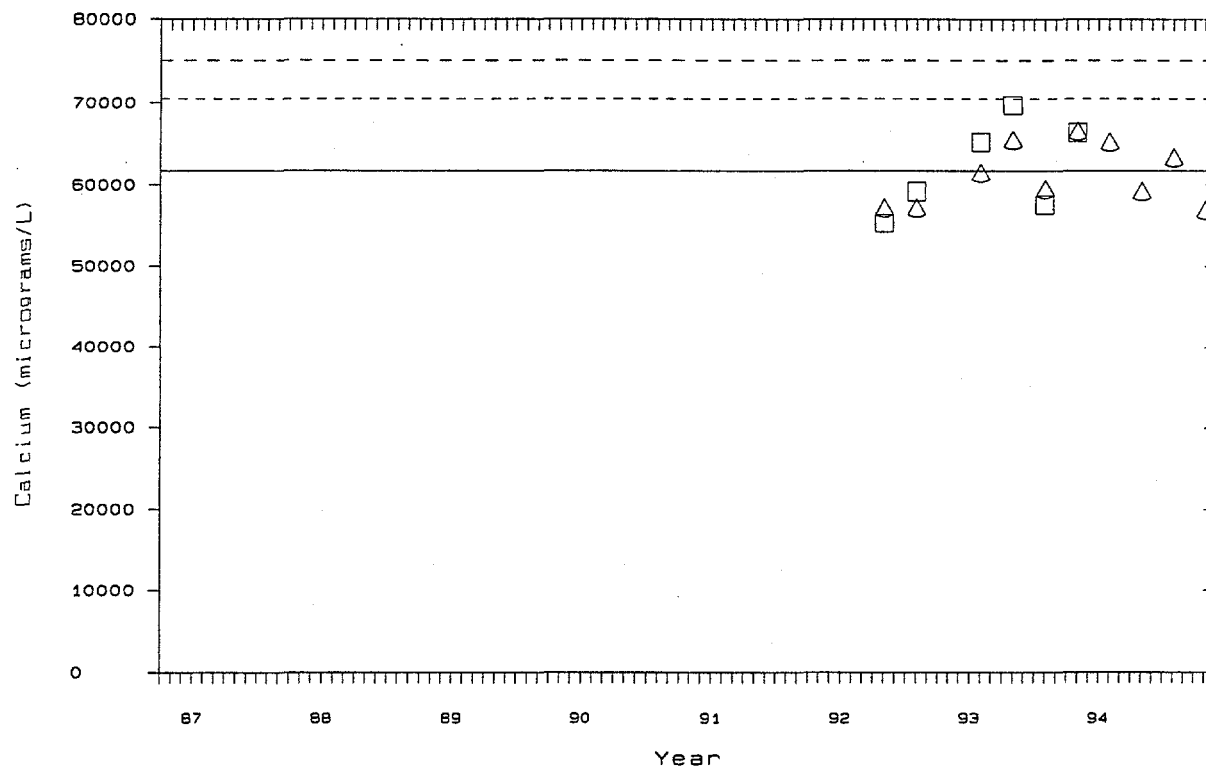
CFA691A Sodium Concentrations

RCRA Guideline Not Applicable



CFA691A Calcium Concentrations

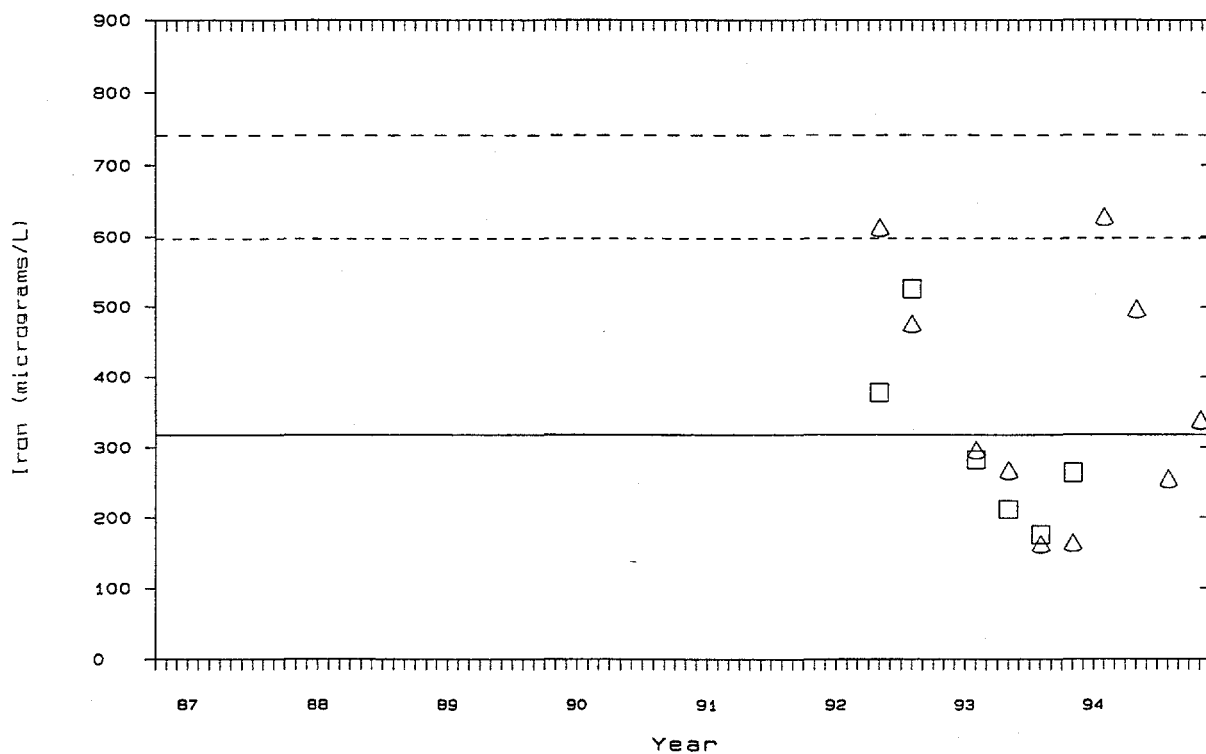
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

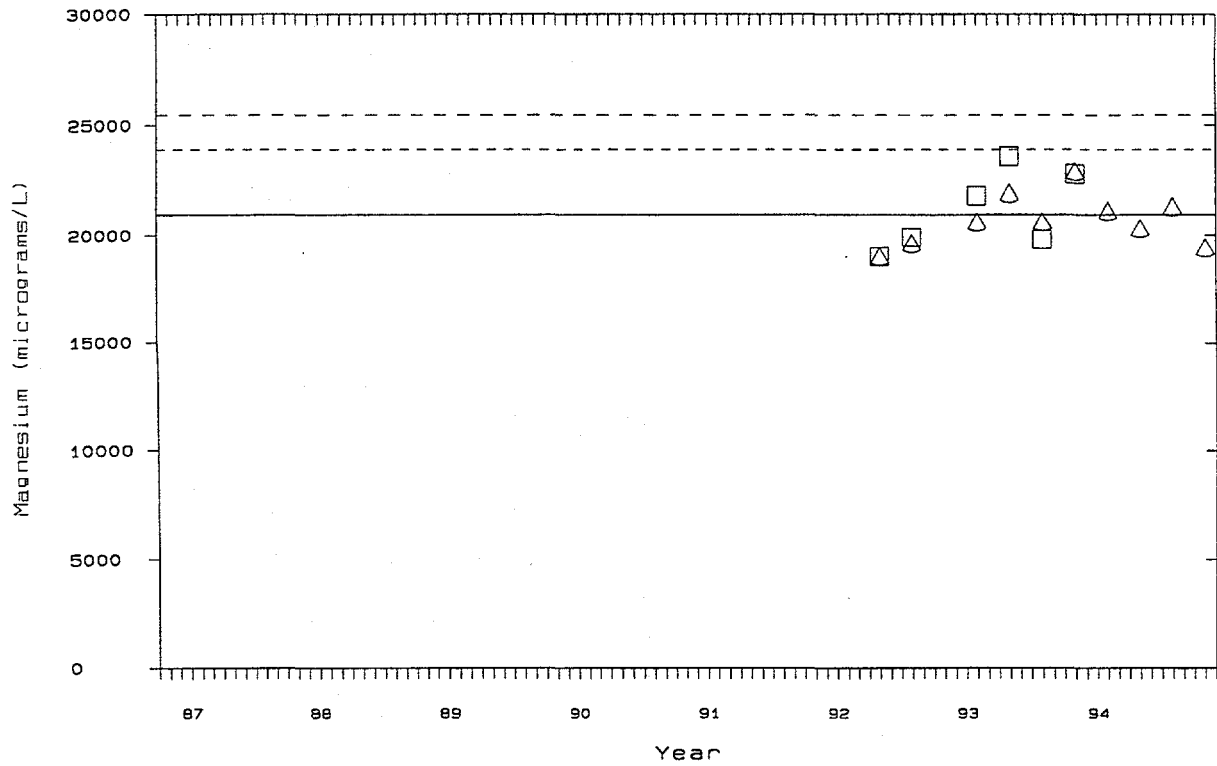
CFA691A Iron Concentrations

RCRA Guideline Not Applicable



CFA691A Magnesium Concentrations

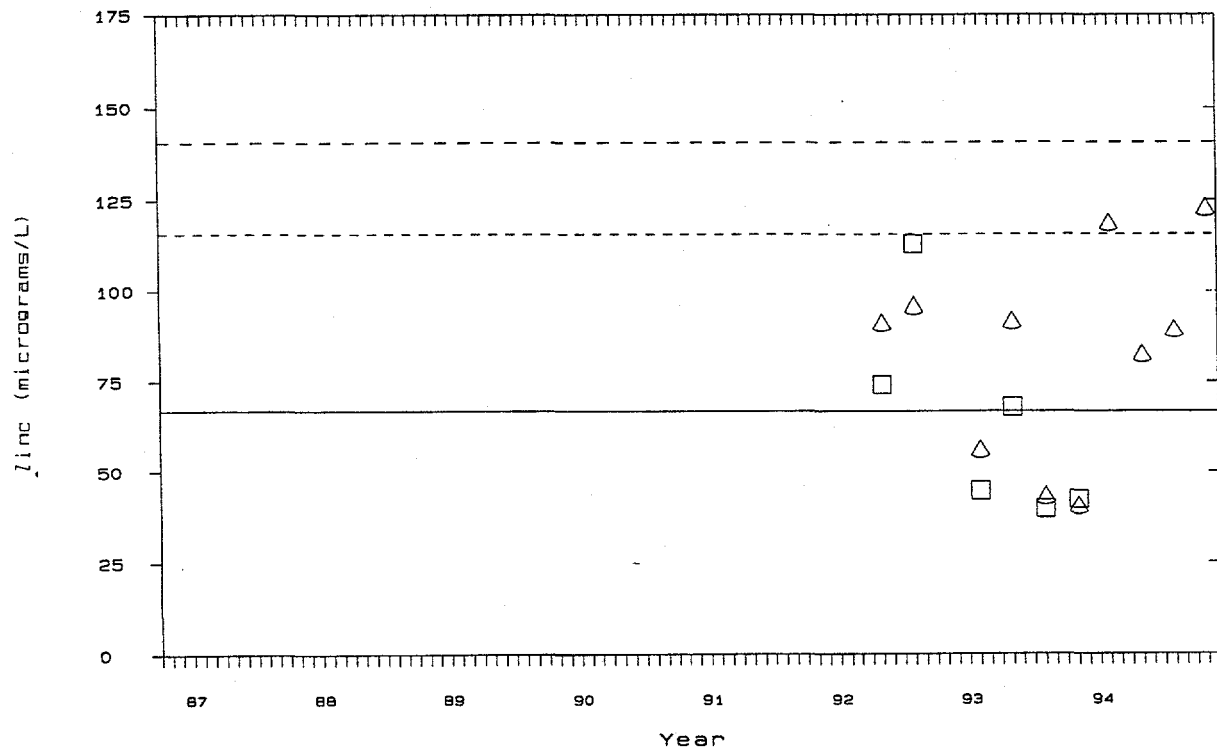
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

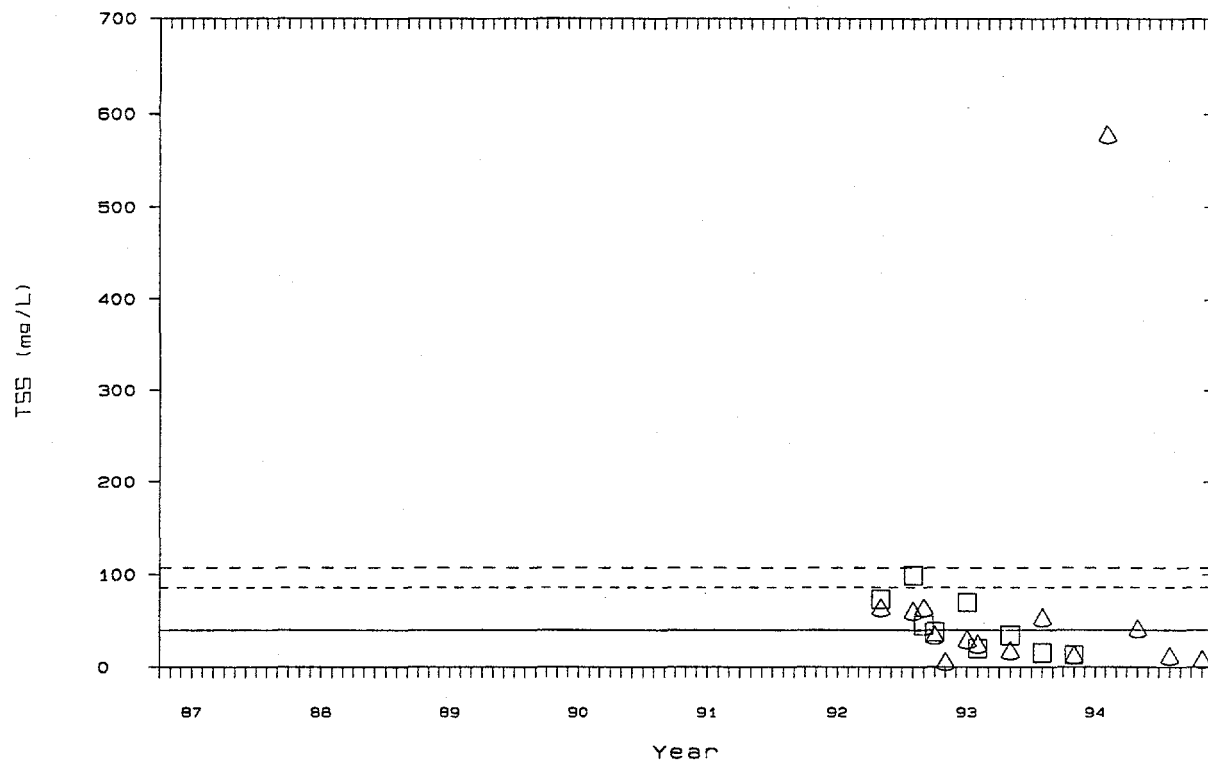
CFA691A Zinc Concentrations

RCRA Guideline Not Applicable



CFA691A TSS Concentrations

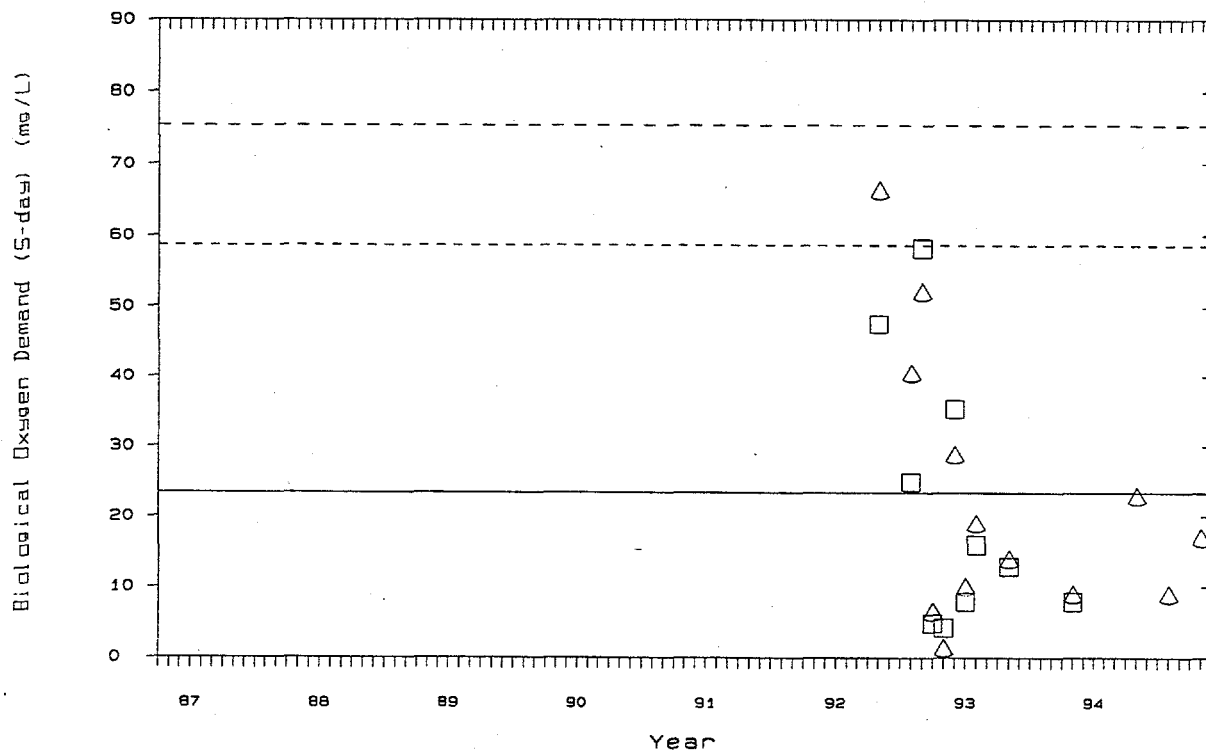
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

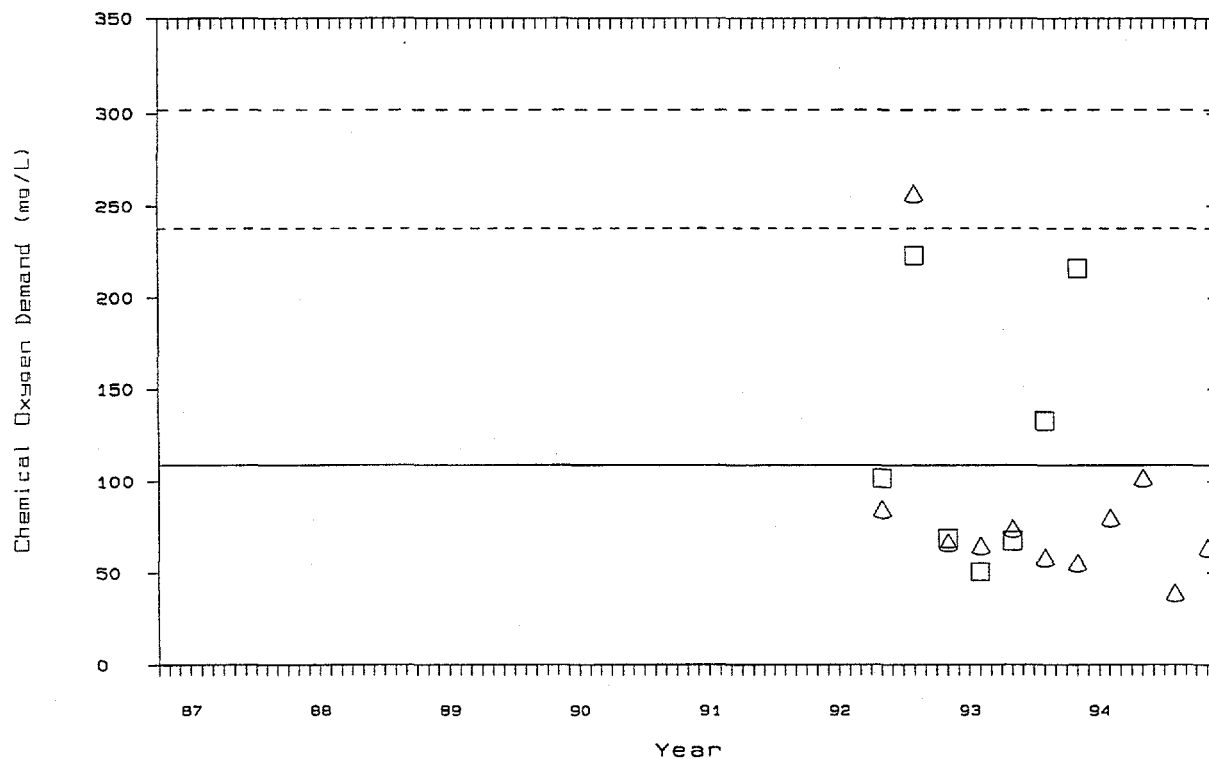
CFA691A Biological Oxygen Demand (5-day) Concentrations

RCRA Guideline Not Applicable



CFA691A Chemical Oxygen Demand Concentrations

RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 . . . Level 2

**Effluent Monitoring Data for
CFA-766 (Effluent from Sewage
Treatment Plant to Final Clarifier)**

Table B-26. 1994 effluent monitoring data for CFA-766.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	02/16/94	05/31/94	08/02/94	11/08/94				
Biological Oxygen Demand (5-day) (mg/L)	NR	9.0	2.0	20.0				
Conductivity (μ S)	632	995	672	836				
pH	6.6	7.7	7.7	7.4				
Chloride (mg/L)	169	147	132	264				
Chemical Oxygen Demand (mg/L)	76.9	24.8	13.0	22.0				
Fluoride (mg/L)	0.24	0.19	0.18	0.20				
Surfactants (mg/L)	ND	ND	ND	0.31				
Nitrogen, Nitrate-Nitrite (mg-N/L)	2.7	4.6	4.1	4.9				
Total Phosphorus (mg/L)	NR	0.95	0.54	0.94				
Sulfate (mg/L)	40.0	44.4	39.9	43.8				
Sulfide, Total (mg/L)	ND	ND	ND	ND				
TDS (mg/L)	533	521	500	700				
Nitrogen, Total Kjeldahl (mg/L)	3.6	1.2	1.3	1.9				
TOC (mg/L)	3.2	3.3	2.5	4.1				
Total Oil & Grease (mg/L)	ND	6.6	341	ND				
TSS (mg/L)	5.0	ND	8.0	14.0				
Silver (μ g/L)	ND	ND	ND	ND				
Arsenic (μ g/L)	ND	ND	ND	ND				
Barium (μ g/L)	ND	ND	ND	ND				
Beryllium (μ g/L)	ND	ND	ND	ND				

ND - below practical quantitation level

NR - analysis not requested

Table B-26. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	02/16/94	05/31/94	08/02/94	11/08/94				
Calcium ($\mu\text{g/L}$)	65700	58600	64300	62400				
Cadmium ($\mu\text{g/L}$)	ND	ND	ND	ND				
Cobalt ($\mu\text{g/L}$)	ND	ND	ND	ND				
Chromium ($\mu\text{g/L}$)	ND	ND	ND	ND				
Copper ($\mu\text{g/L}$)	ND	ND	ND	ND				
Iron ($\mu\text{g/L}$)	202	152	159	281				
Mercury ($\mu\text{g/L}$)	ND	ND	ND	ND				
Potassium ($\mu\text{g/L}$)	6950	5230	5600	6100				
Magnesium ($\mu\text{g/L}$)	22200	20100	21700	21000				
Manganese ($\mu\text{g/L}$)	ND	ND	ND	23.0				
Sodium ($\mu\text{g/L}$)	71800	49100	43600	100000				
Nickel ($\mu\text{g/L}$)	ND	ND	ND	ND				
Lead ($\mu\text{g/L}$)	ND	ND	ND	ND				
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND				
Selenium ($\mu\text{g/L}$)	ND	5.0	ND	ND				
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND				
Zinc ($\mu\text{g/L}$)	104	57.2	55.5	125				

ND - below practical quantitation level

Table B-27. 1994 volatile organics data for CFA-766A.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
Methylene Chloride	February	2.00	µg/L	JB	
Methylene Chloride	May	2.00	µg/L	JB	
Methylene Chloride	August	4.00	µg/L	JB	
Siloxane (TIC)	May	5.00	µg/L	JB	25.10

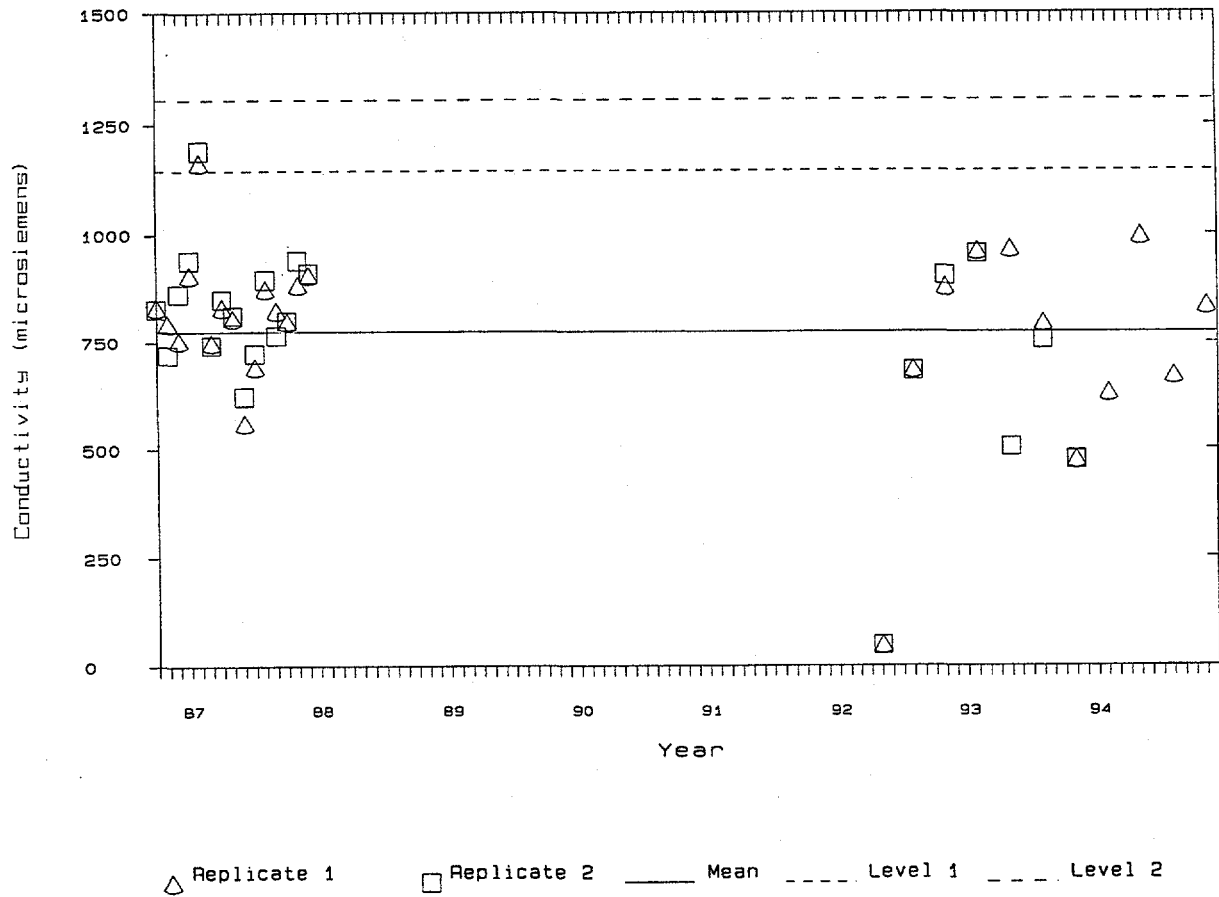
Table B-28. Summary statistics for CFA-766.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Conductivity (μ S)	776	217	44	1145	1307	NA
pH	7.7	0.35	44	6.7	8.6	2.5-12
Chloride (mg/L)	170	45.8	36	249	283	NA
Fluoride (mg/L)	0.30	0.27	30	0.77	0.97	NA
Nitrogen, Nitrate-Nitrite (mg-N/L)	4.5	1.5	10	7.4	8.9	NA
Nitrate (mg/L)	25.7	10.0	30	43.0	50.8	NA
Phosphate (mg/L)	4.2	6.5	30	15.4	20.5	NA
Sulfate (mg/L)	38.9	4.9	30	47.4	51.2	NA
Nitrogen, Total Kjeldahl (mg/L)	2.3	1.0	10	4.3	5.4	NA
TOC (mg/L)	5.0	1.1	13	7.1	8.1	NA
Barium (μ g/L)	68.3	7.6	34	81.3	87.1	100,000
Calcium (μ g/L)	63450	4794	14	72238	76602	NA
Chromium (μ g/L)	11.1	3.6	23	17.3	20.2	5000
Copper (μ g/L)	12.9	4.5	18	21.0	24.8	NA
Iron (μ g/L)	200	97.1	14	378	466	NA
Mercury (μ g/L)	0.43	0.15	15	0.71	0.84	200
Potassium (μ g/L)	6109	1254	9	8567	9938	NA
Magnesium (μ g/L)	21486	1451	14	24145	25465	NA
Sodium (μ g/L)	80579	36782	14	148003	181483	NA
Lead (μ g/L)	21.7	30.5	20	75.8	101	5000
Zinc (μ g/L)	52.9	19.4	44	86.0	100	NA

Guideline - RCRA Characteristic Guideline
 NA - Not Applicable

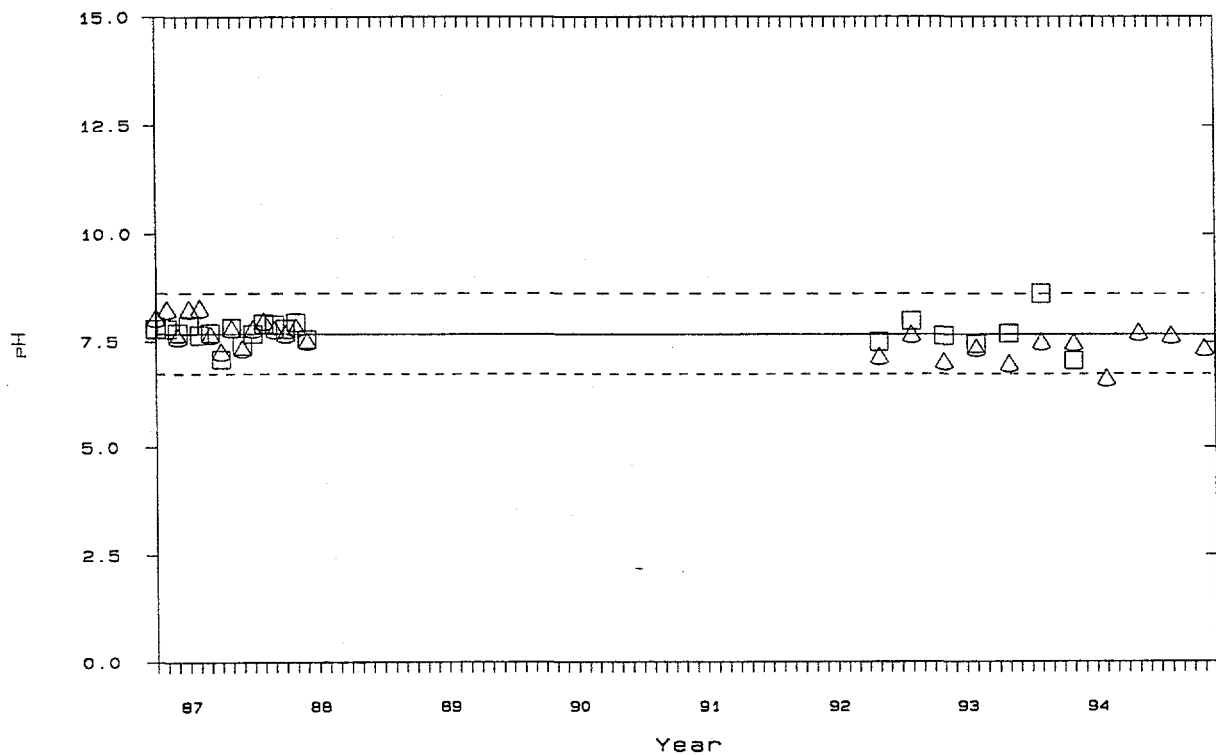
CFA766A Conductivity

RCRA Guideline Not Applicable



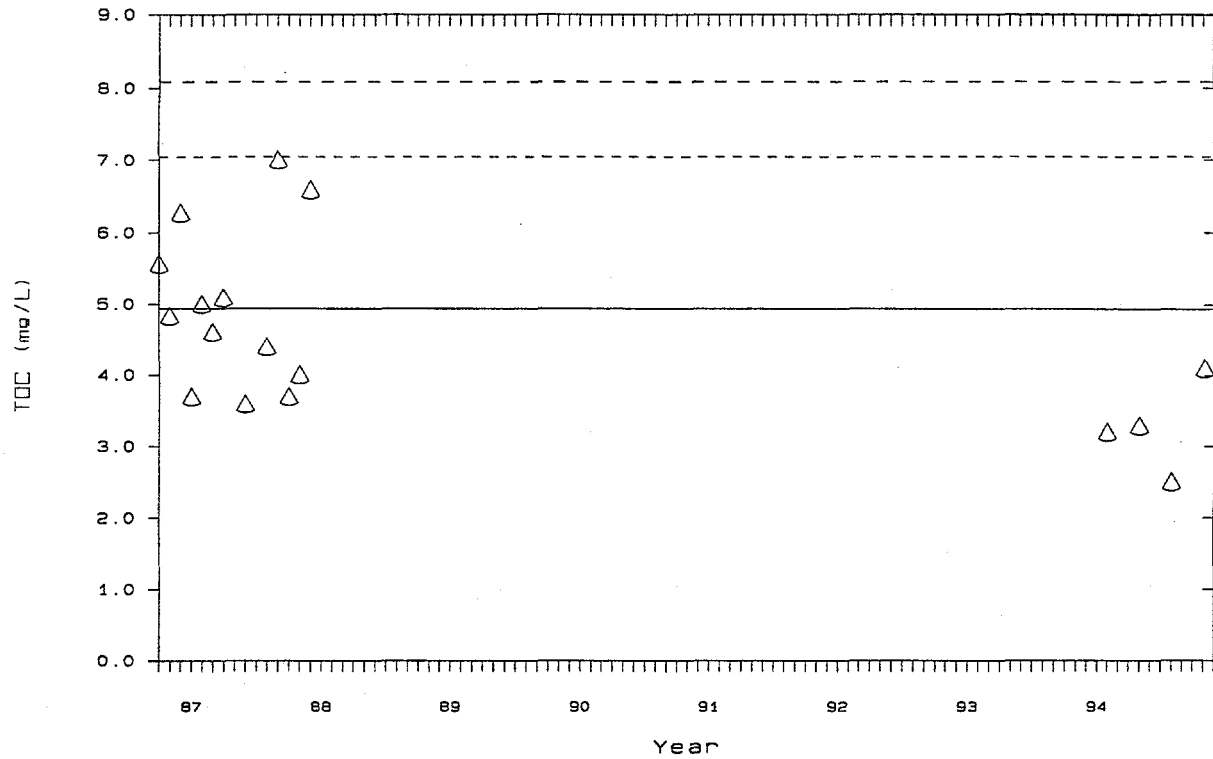
CFA766A pH

RCRA Characteristic Guideline = 2.5-12



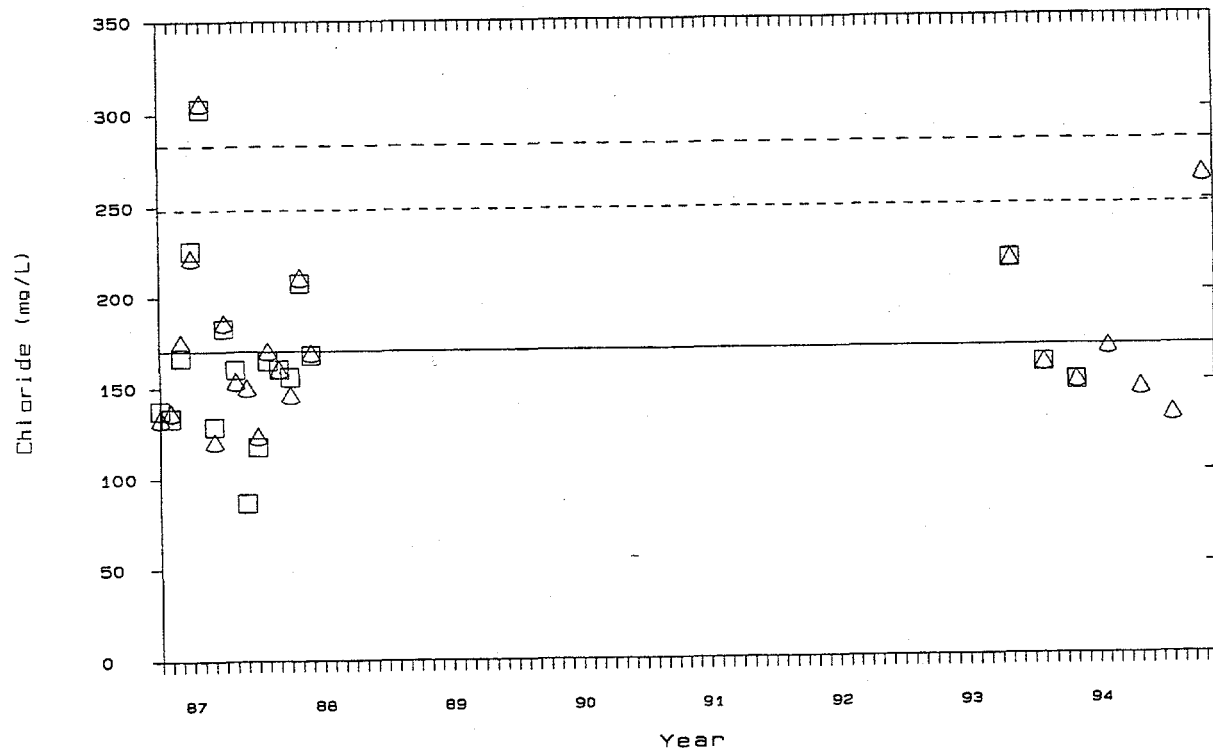
CFA766A TOC Concentrations

RCRA Guideline Not Applicable

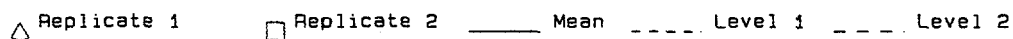


CFA766A Chloride Concentrations

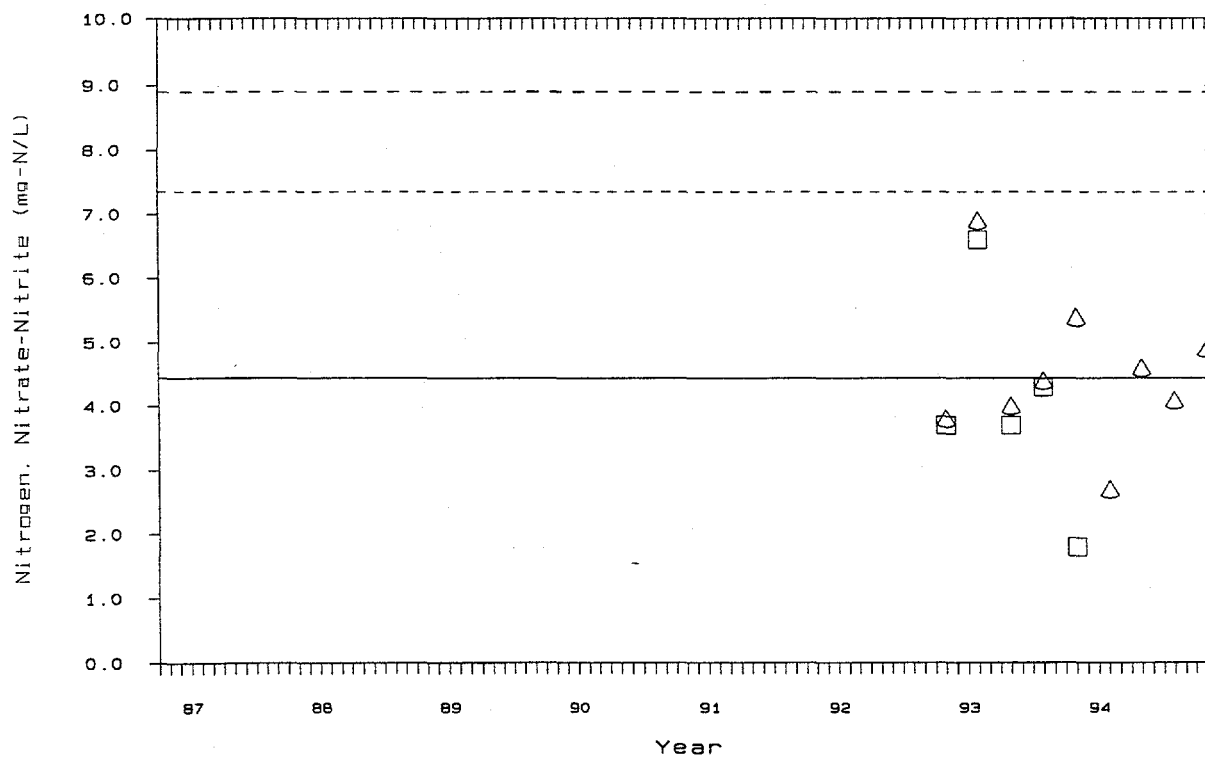
RCRA Guideline Not Applicable



RCRA Guideline Not Applicable

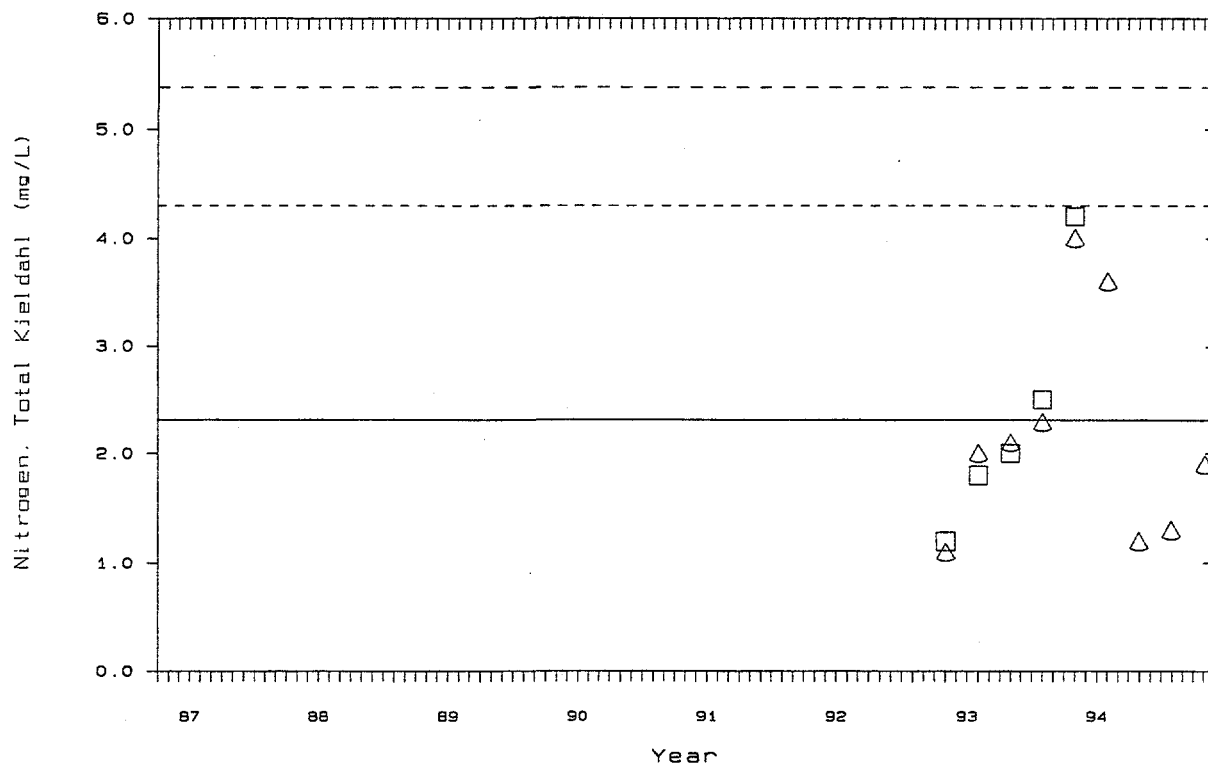


RCRA Guideline Not Applicable



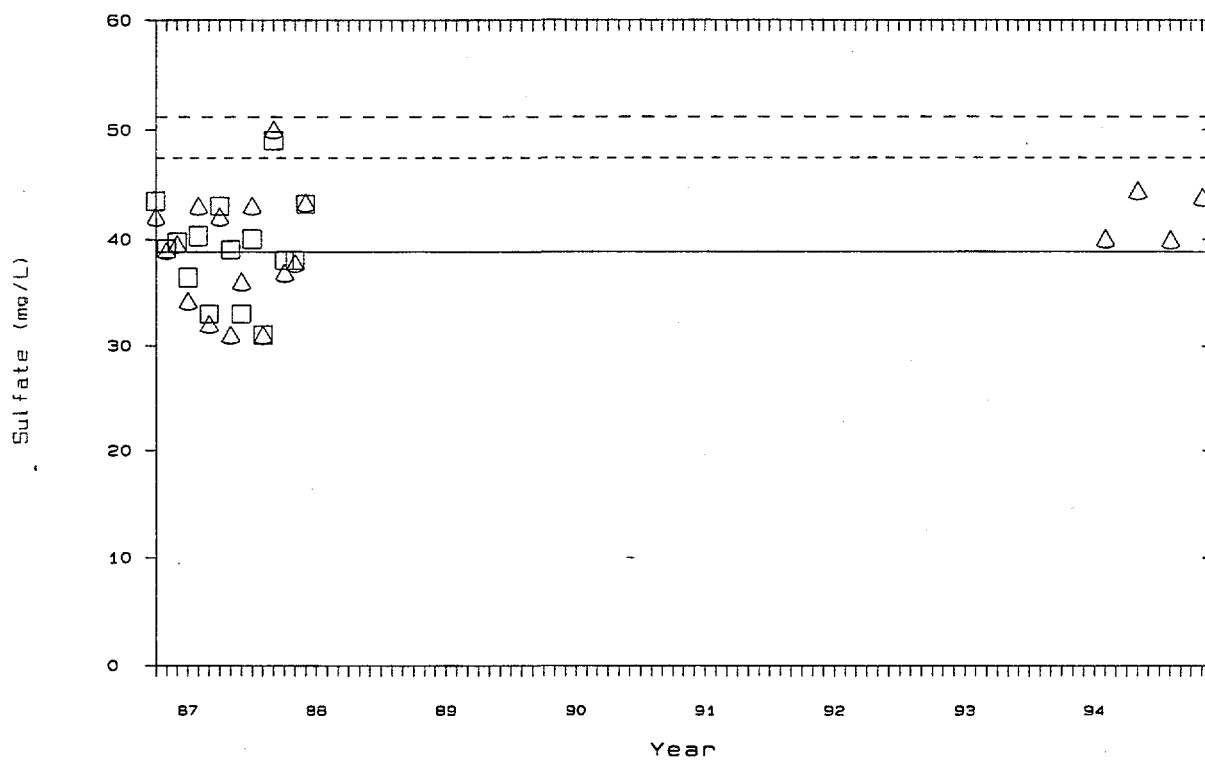
CFA766A Nitrogen, Total Kjeldahl Concentrations

RCRA Guideline Not Applicable



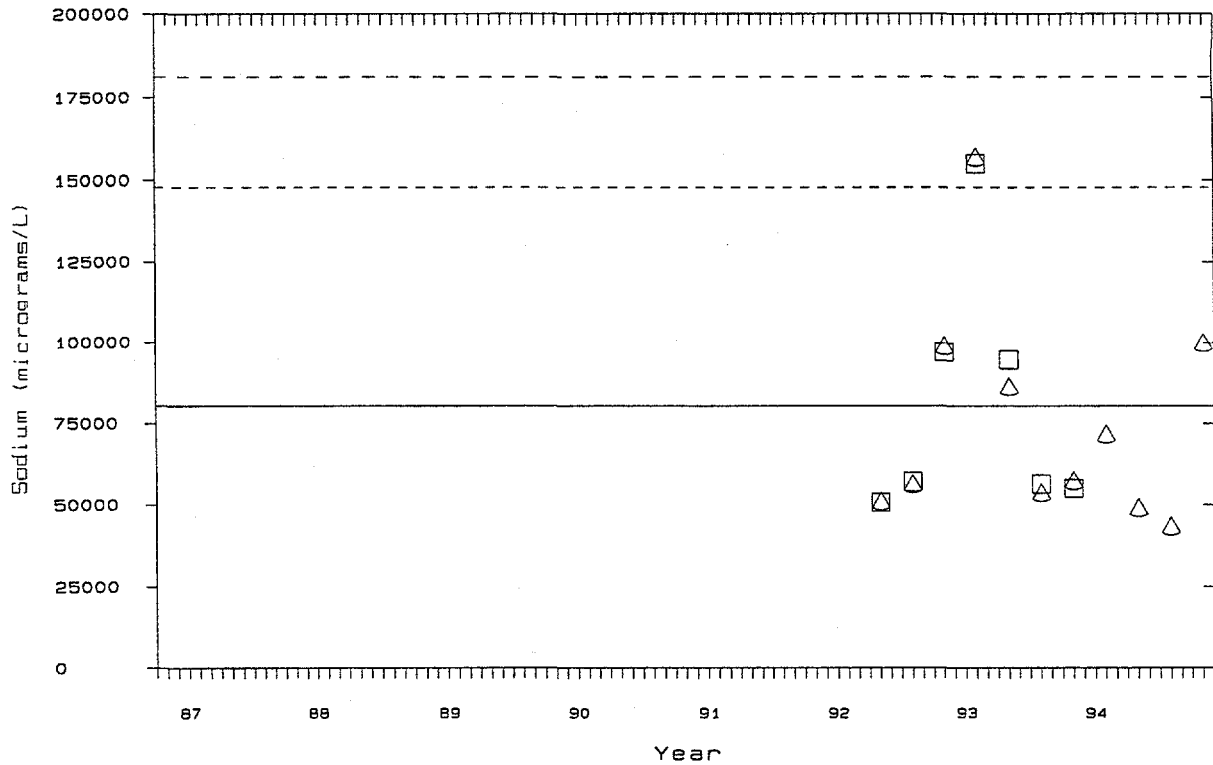
CFA766A Sulfate Concentrations

RCRA Guideline Not Applicable



CFA766A Sodium Concentrations

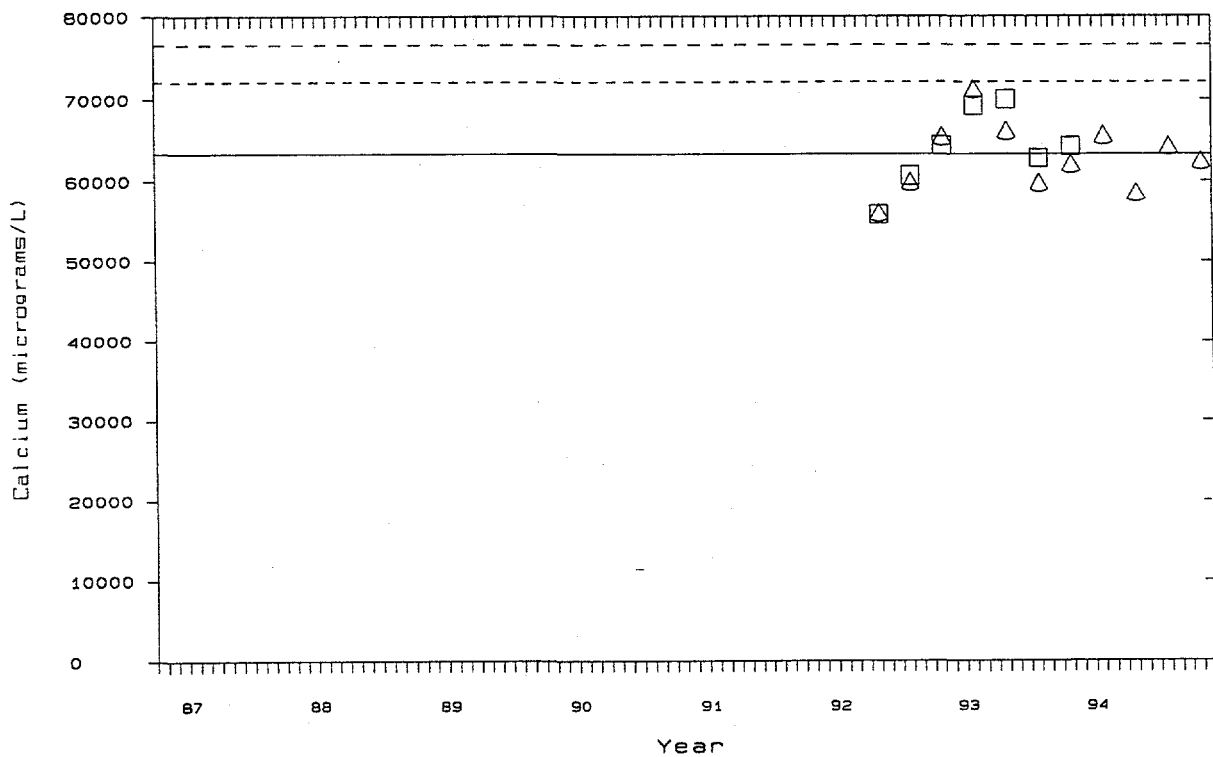
RCRA Guideline Not Applicable



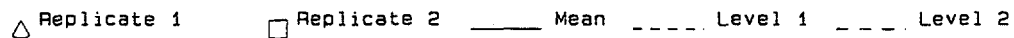
△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

CFA766A Calcium Concentrations

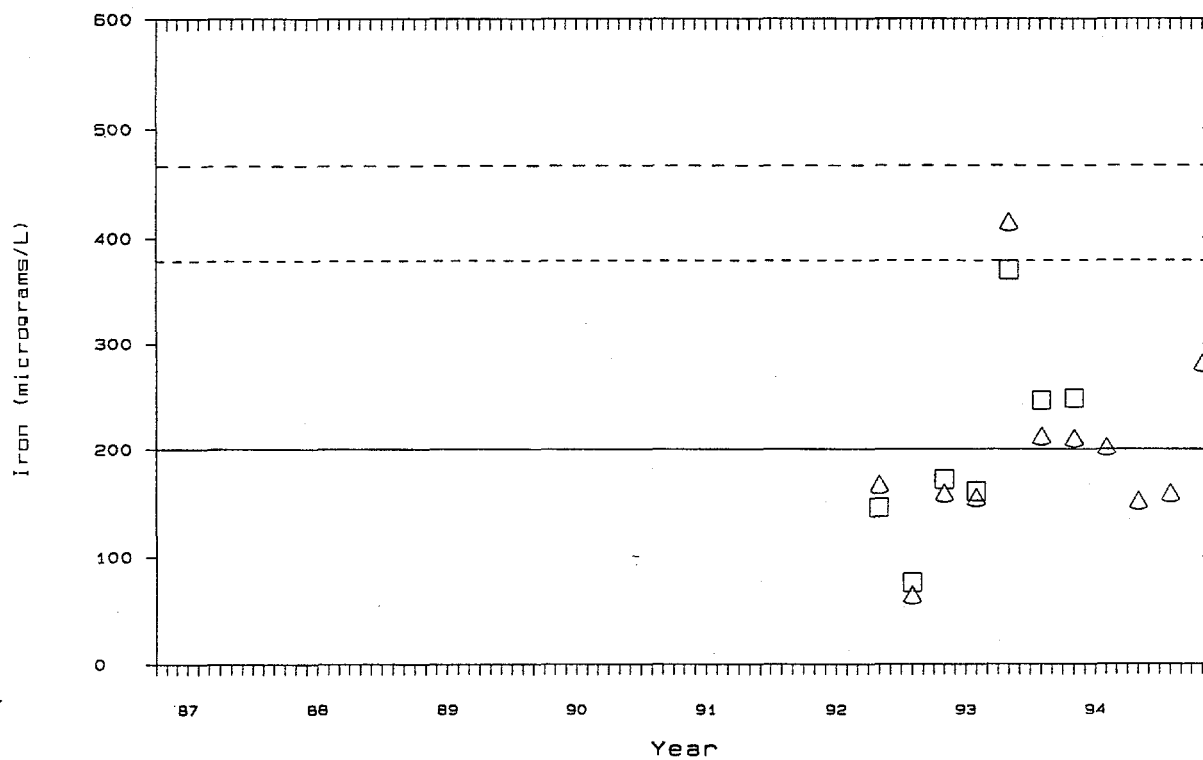
RCRA Guideline Not Applicable



RCRA Characteristic Guideline = 5000 micrograms/L

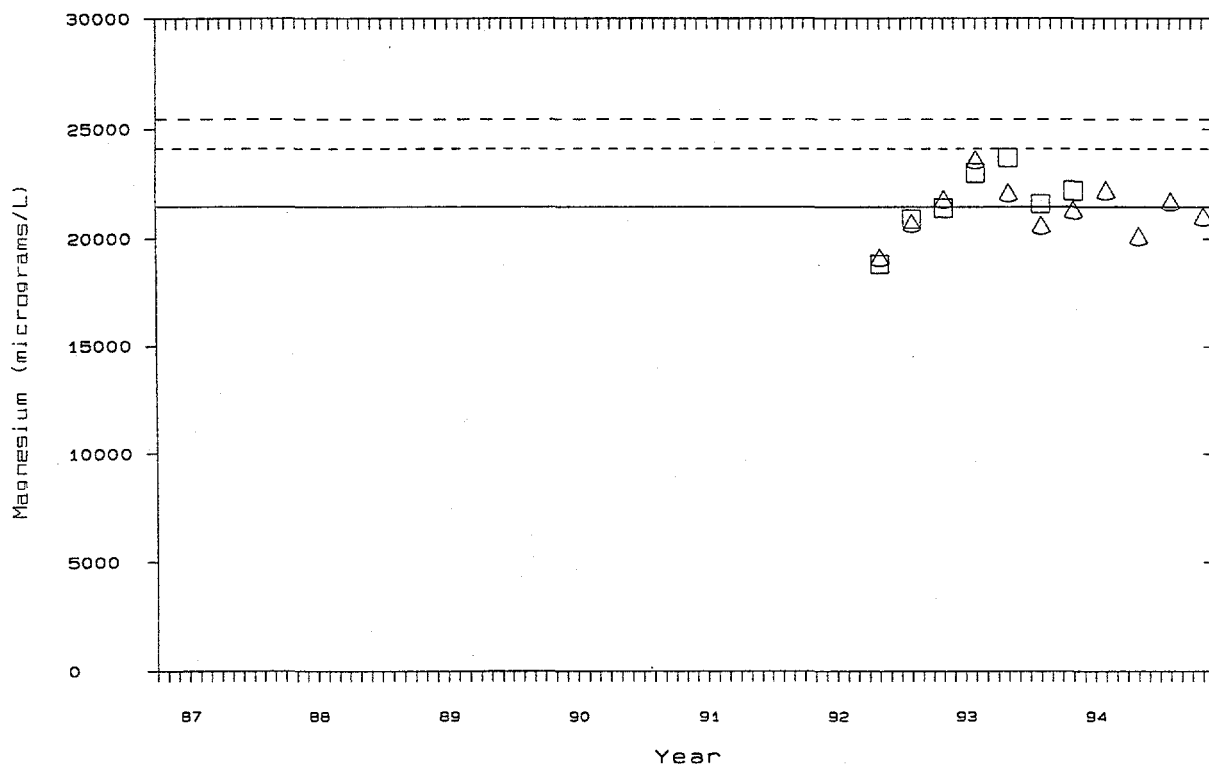


RCRA Guideline Not Applicable



CFA766A Magnesium Concentrations

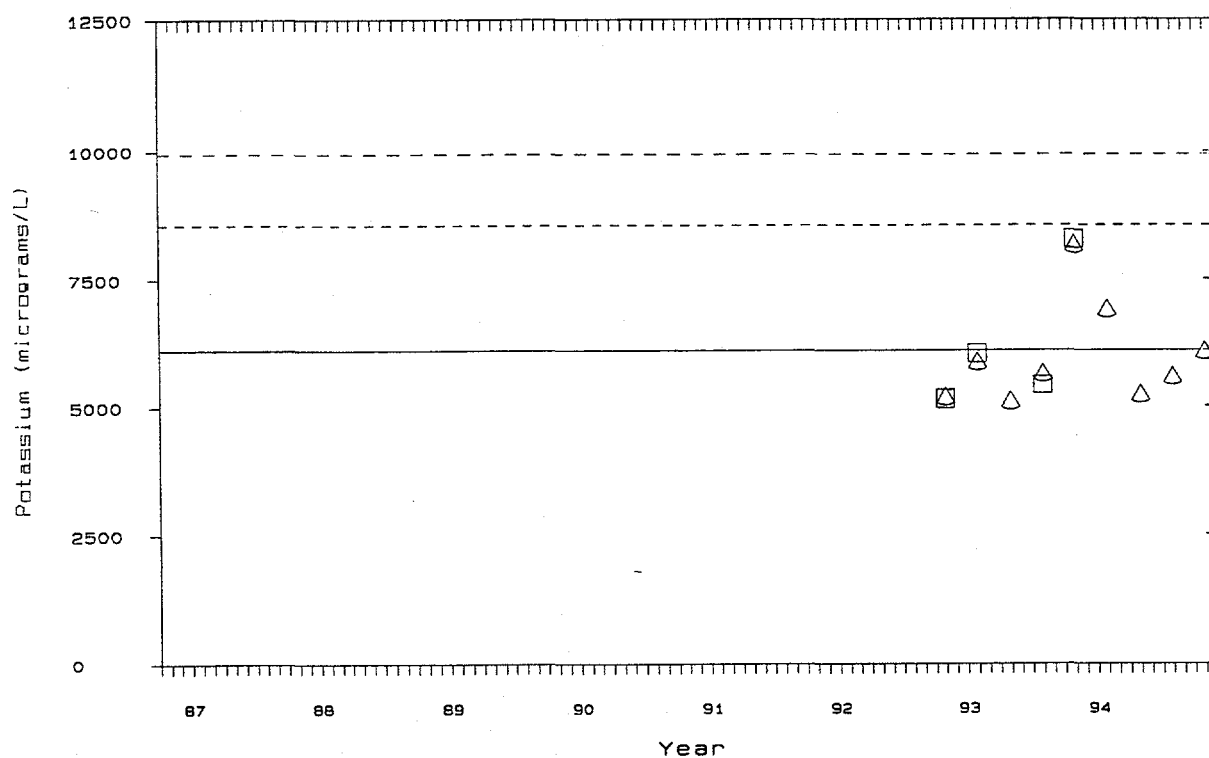
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

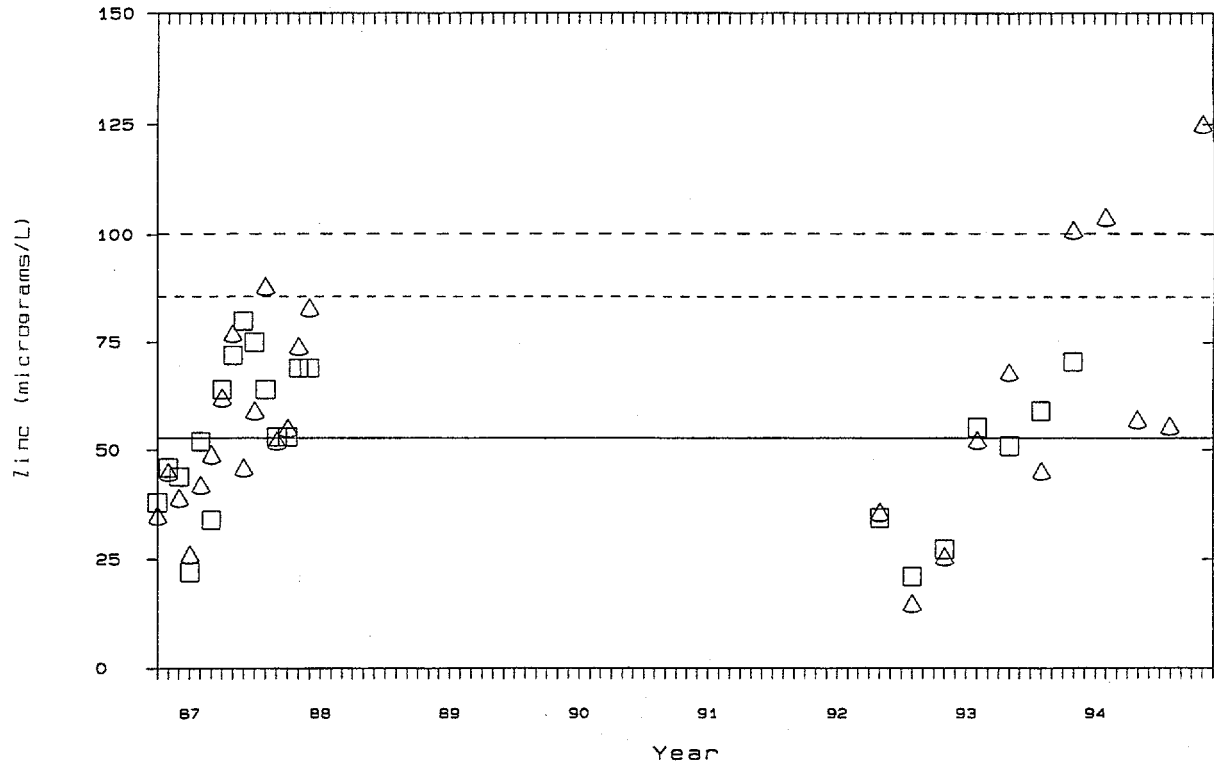
CFA766A Potassium Concentrations

RCRA Guideline Not Applicable



CFA766A Zinc Concentrations

RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

**Effluent Monitoring Data for
TRA-604 (Radiochemistry Laboratory and Printshop)**

Table B-29. 1994 effluent monitoring data for TRA-604.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	02/24/94	05/19/94	08/10/94	11/03/94				
Biological Oxygen Demand (5-day) (mg/L)	ND	2.0	1.0	98.0				
Conductivity (μ S)	280	401	196	252				
pH	7.7	8.3	7.7	6.8				
Cyanide (μ g/L)	ND	ND	ND	ND				
Chemical Oxygen Demand (mg/L)	27.3	16.8	ND	ND				
Chromium VI (μ g/L)	ND	ND	ND	ND				
Fluoride (mg/L)	0.15	0.14	0.15	0.14				
Sulfide, Total (mg/L)	ND	ND	ND	ND				
TDS (mg/L)	NR	231	270	210				
TOC (mg/L)	1.4	1.3	0.60	2.3				
TSS (mg/L)	22.0	6.0	7.0	ND				
Silver (μ g/L)	ND	ND	ND	ND				
Arsenic (μ g/L)	ND	ND	ND	ND				
Barium (μ g/L)	ND	ND	ND	ND				
Beryllium (μ g/L)	ND	ND	ND	ND				
Calcium (μ g/L)	NR	NR	NR	48400				
Cadmium (μ g/L)	ND	8.0	ND	ND				
Cobalt (μ g/L)	ND	ND	ND	ND				
Chromium (μ g/L)	ND	ND	ND	ND				
Copper (μ g/L)	28.7	ND	ND	ND				

ND - below practical quantitation level

NR - analysis not requested

Table B-29. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	02/24/94	05/19/94	08/10/94	11/03/94				
Iron ($\mu\text{g/L}$)	993	115	109	102				
Mercury ($\mu\text{g/L}$)	0.77	ND	ND	ND				
Potassium ($\mu\text{g/L}$)	NR	NR	NR	ND				
Magnesium ($\mu\text{g/L}$)	NR	NR	NR	18200				
Manganese ($\mu\text{g/L}$)	NR	NR	NR	ND				
Sodium ($\mu\text{g/L}$)	NR	NR	NR	8160				
Nickel ($\mu\text{g/L}$)	ND	ND	ND	ND				
Lead ($\mu\text{g/L}$)	15.2	ND	5.4	ND				
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND				
Selenium ($\mu\text{g/L}$)	ND	ND	ND	ND				
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND				
Zinc ($\mu\text{g/L}$)	102	25.9	ND	25.9				

ND - below practical quantitation level

NR - analysis not requested

Table B-30. 1994 volatile organics data for TRA-604A.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
Methylene Chloride	May	2.00	µg/L	JB	
Methylene Chloride	August	1.00	µg/L	JB	
Methylene Chloride	November	1.00	µg/L	J	

**Effluent Monitoring Data for
TRA-624 (Influent to Sewage Treatment Plant)**

Table B-31. 1994 effluent monitoring data for TRA-624.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/25/94	01/25/94	04/21/94	07/28/94	10/27/94			
Biological Oxygen Demand (5-day) (mg/L)	22.0	52.0	20.0	38.0	16.0			
Conductivity (μ S)	522	493	685	510	436			
pH	7.2	8.0	8.2	7.9	6.4			
Chloride (mg/L)	25.0	23.1	31.1	30.6	16.5			
Chemical Oxygen Demand (mg/L)	225	238	76.3	52.8	130			
Fluoride (mg/L)	0.15	0.15	0.12	0.16	0.15			
Surfactants (mg/L)	NR	NR	ND	ND	ND			
Nitrogen, Nitrate-Nitrite (mg-N/L)	1.0	0.97	0.02	0.33	0.04			
Total Phosphorus (mg/L)	1.2	1.8	1.2	0.95	2.6			
Sulfate (mg/L)	NR	NR	30.7	26.6	20.7			
TDS (mg/L)	302	290	299	368	310			
Nitrogen, Total Kjeldahl (mg/L)	12.7	14.4	18.5	21.7	25.2			
TOC (mg/L)	19.9	45.1	14.4	28.8	20.7			
Total Oil & Grease (mg/L)	19.0	21.3	7.6	424	20.3			
TSS (mg/L)	64.0	78.0	34.0	36.0	260			
Silver (μ g/L)	ND	ND	ND	ND	ND			
Arsenic (μ g/L)	ND	ND	ND	ND	ND			
Barium (μ g/L)	ND	ND	ND	ND	ND			
Beryllium (μ g/L)	ND	ND	ND	ND	ND			
Calcium (μ g/L)	45700	47100	49000	50800	44700			

ND - below practical quantitation level

NR - analysis not requested

Table B-31. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/25/94	01/25/94	04/21/94	07/28/94	10/27/94				
Cadmium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Cobalt ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Chromium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Copper ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Iron ($\mu\text{g/L}$)	428	478	211	213	354				
Mercury ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Potassium ($\mu\text{g/L}$)	5690	5490	7620	7540	6720				
Magnesium ($\mu\text{g/L}$)	17200	17700	18300	19300	16900				
Manganese ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Sodium ($\mu\text{g/L}$)	15900	16400	19400	22000	18200				
Nickel ($\mu\text{g/L}$)	ND	72.7	ND	ND	ND				
Lead ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Selenium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Zinc ($\mu\text{g/L}$)	132	136	196	77.0	144				

ND - below practical quantitation level

Table B-32. 1994 volatile organics data for TRA-624A.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
1,4-Dichlorobenzene	April	7.00	µg/L		
1,4-Dichlorobenzene	July	13.00	µg/L		
1,4-Dichlorobenzene	October	15.00	µg/L		
Chloroform	October	2.00	µg/L	J	
Dimethyl Disulfide (TIC)	July	6.00	µg/L	N	11.83
Methylene Chloride	April	2.00	µg/L	J	

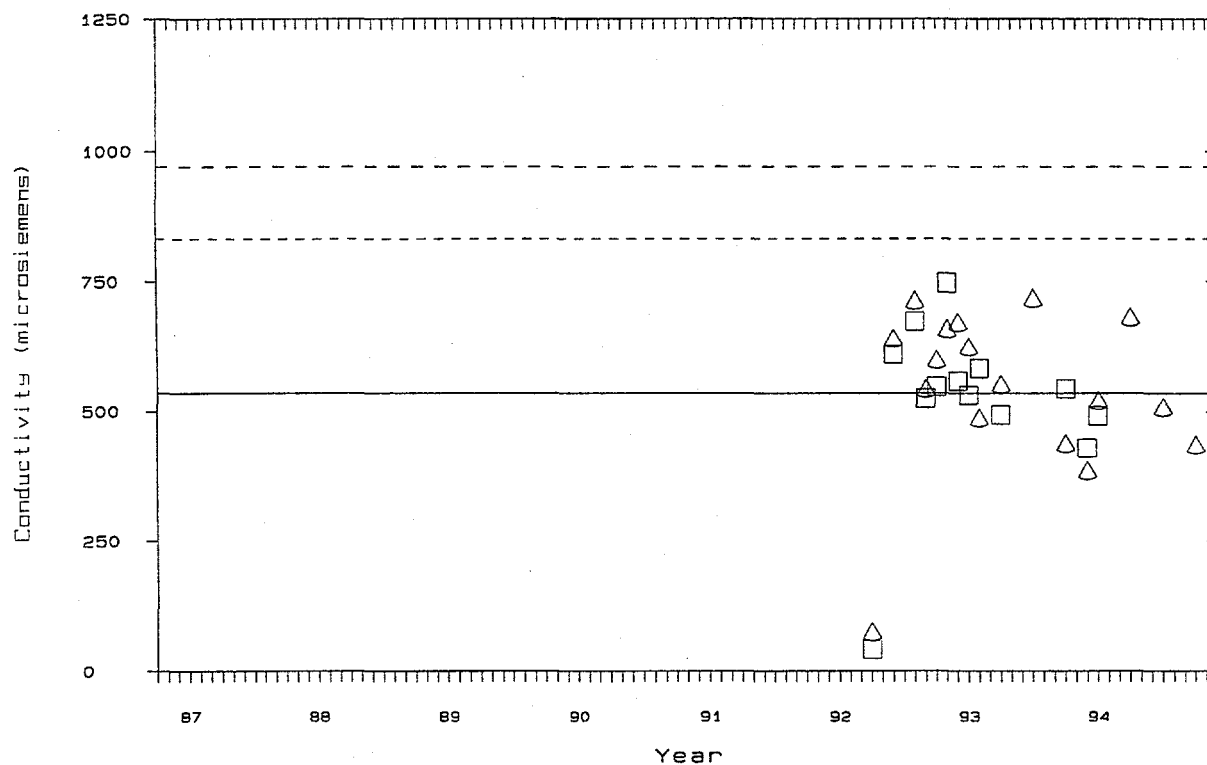
Table B-33. Summary statistics for TRA-624.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Biological Oxygen Demand (5-day) (mg/L)	149	122	25	362	459	NA
Conductivity (μ S)	537	171	25	835	971	NA
pH	8.0	0.54	25	6.5	9.5	2.5-12
Chemical Oxygen Demand (mg/L)	230	124	20	450	553	NA
Nitrogen, Nitrate-Nitrite (mg-N/L)	0.61	0.27	16	1.1	1.3	NA
Nitrogen, Total Kjeldahl (mg/L)	48.0	20.2	20	83.8	101	NA
TOC (mg/L)	54.6	25.5	20	99.7	121	NA
Total Oil & Grease (mg/L)	18.5	9.3	18	35.1	43.0	NA
TSS (mg/L)	145	92.5	21	308	384	NA
Calcium (μ g/L)	49370	3673	20	55877	58927	NA
Copper (μ g/L)	33.8	13.9	9	61.1	76.3	NA
Iron (μ g/L)	391	355	18	1026	1328	NA
Potassium (μ g/L)	12376	3921	11	19800	23696	NA
Magnesium (μ g/L)	17980	987	20	19728	20547	NA
Manganese (μ g/L)	24.9	11.4	11	46.5	57.8	NA
Sodium (μ g/L)	27025	4731	20	35407	39335	NA
Lead (μ g/L)	9.7	8.3	11	25.4	33.7	5000
Zinc (μ g/L)	155	102	20	335	419	NA

Guideline - RCRA Characteristic Guideline
 NA - Not Applicable

TRA624A Conductivity

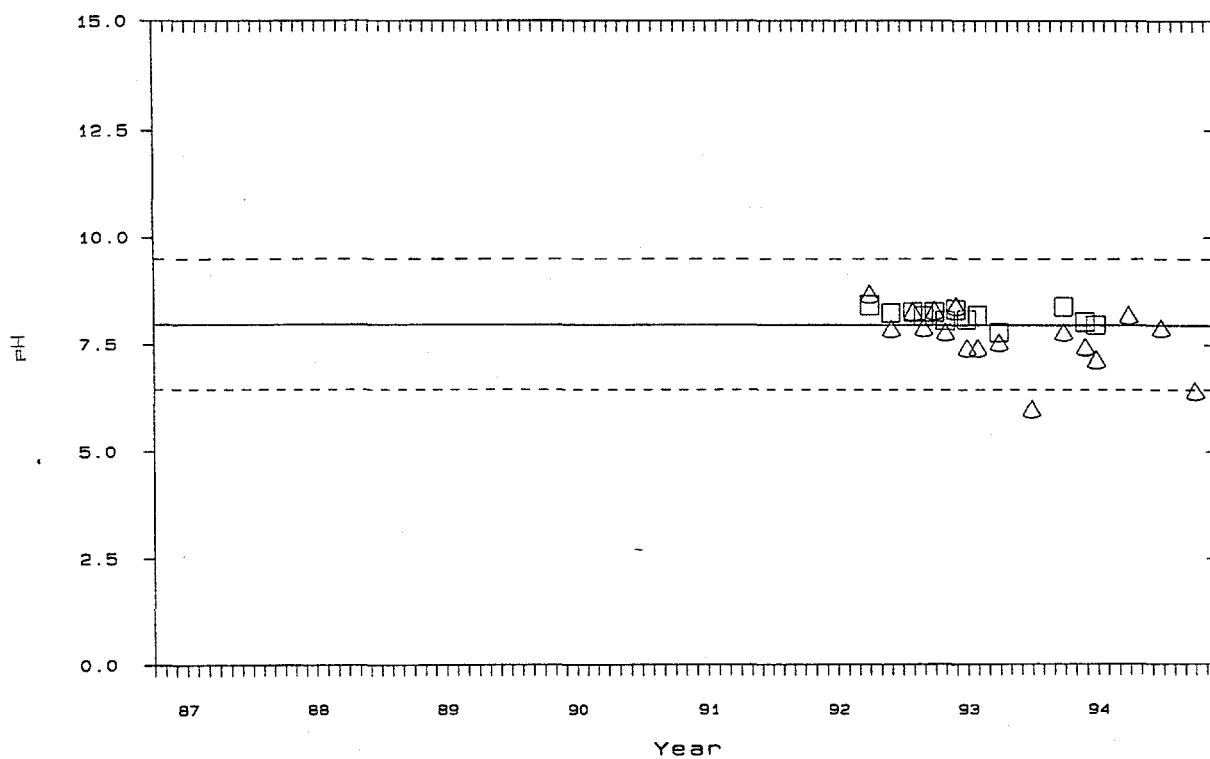
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

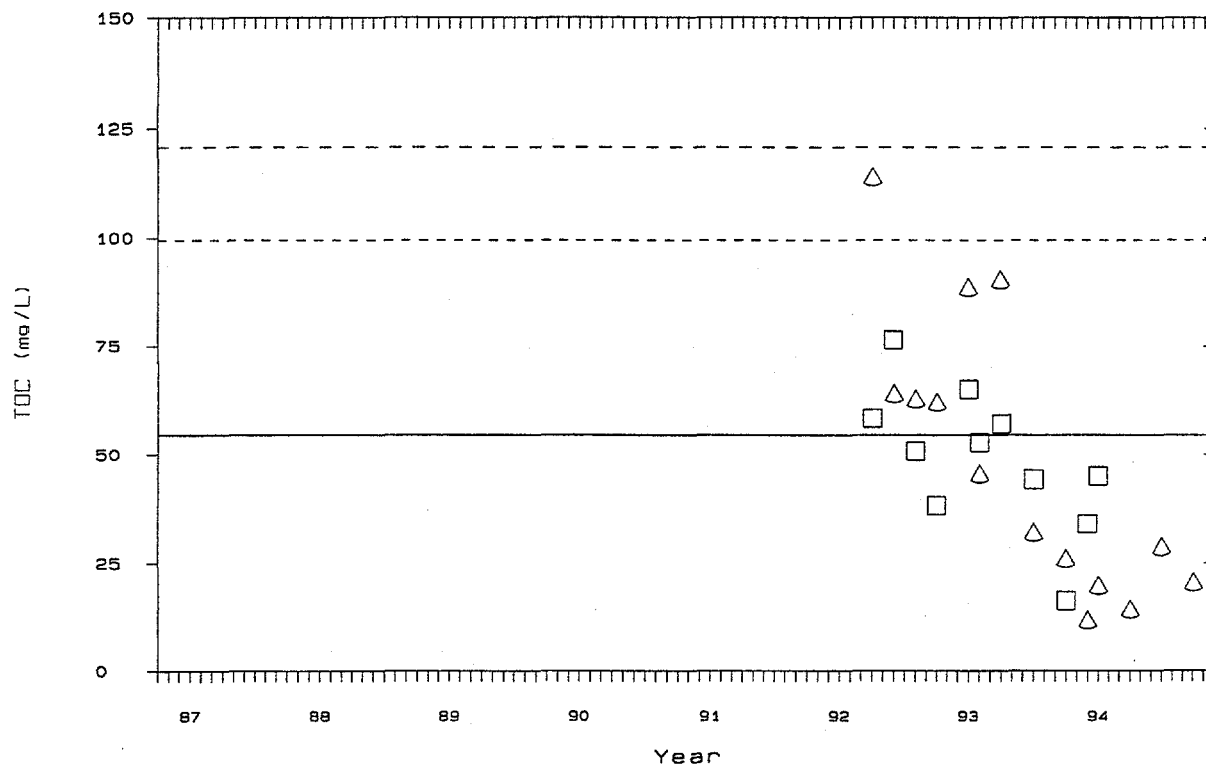
TRA624A pH

RCRA Characteristic Guideline = 2.5-12



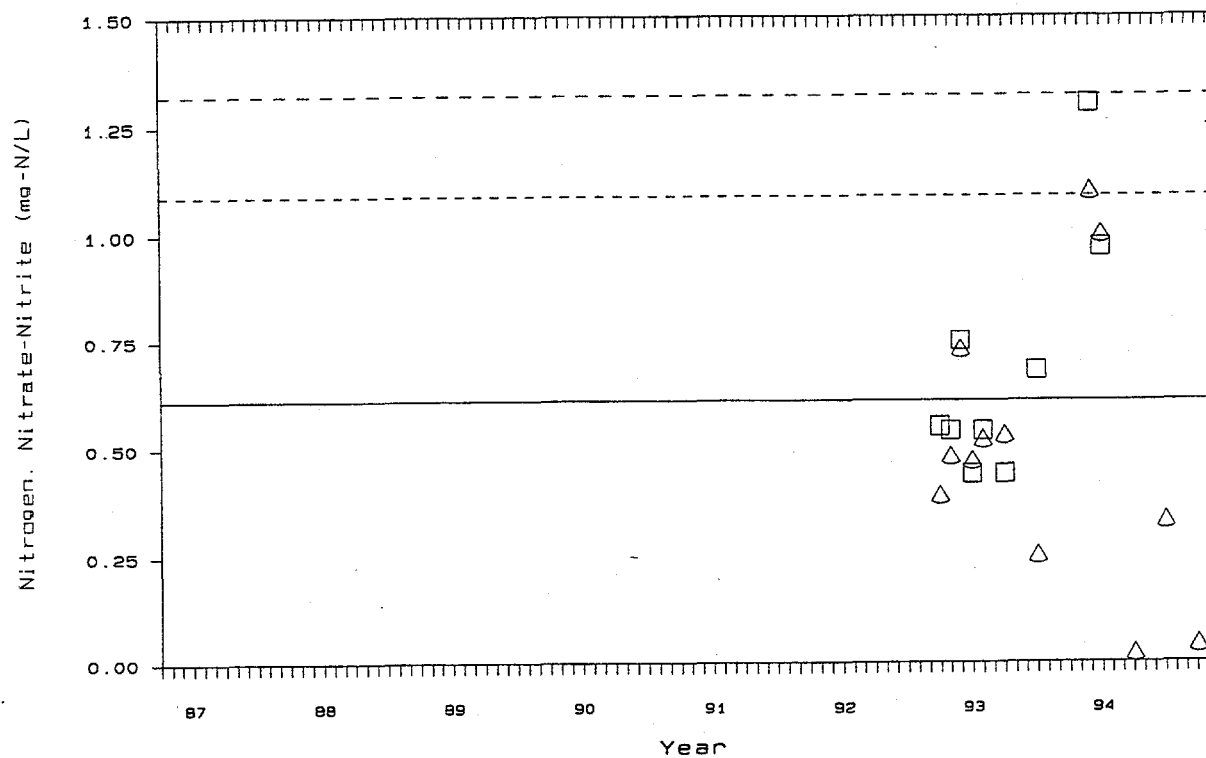
TRA624A TOC Concentrations

RCRA Guideline Not Applicable



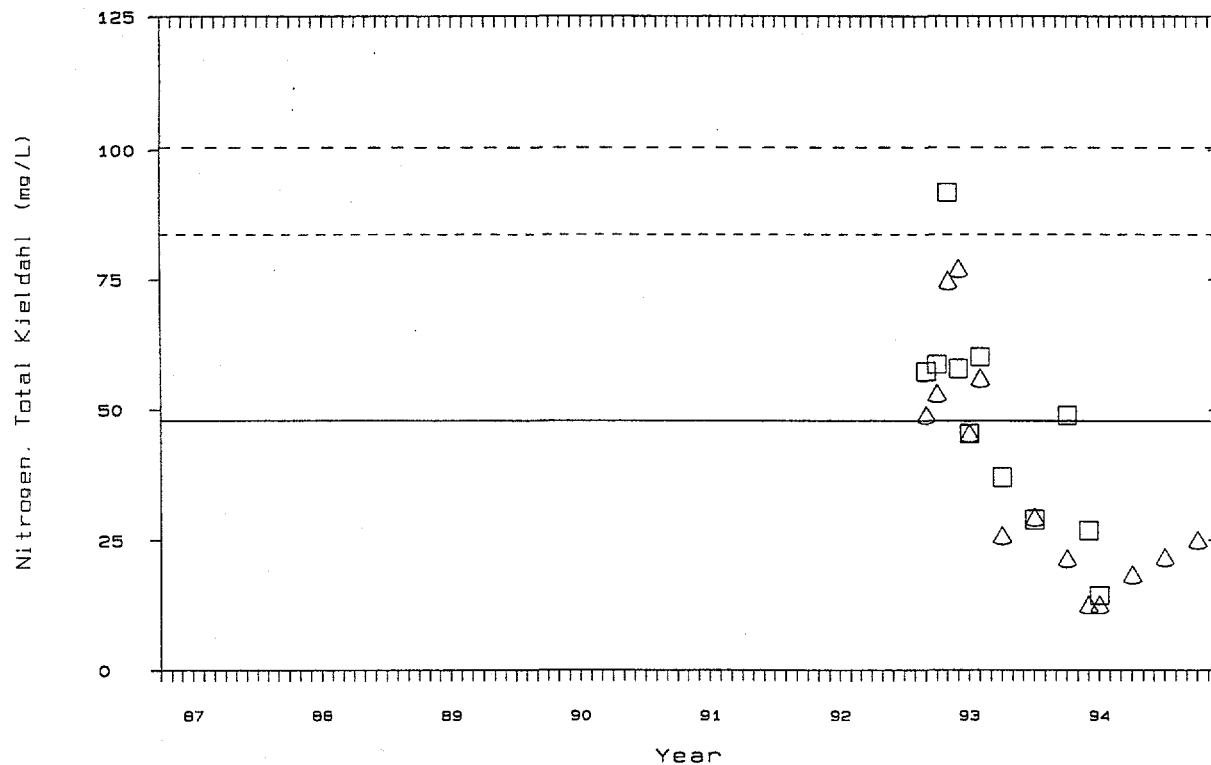
TRA624A Nitrogen, Nitrate-Nitrite Concentrations

RCRA Guideline Not Applicable



TRA624A Nitrogen, Total Kjeldahl Concentrations

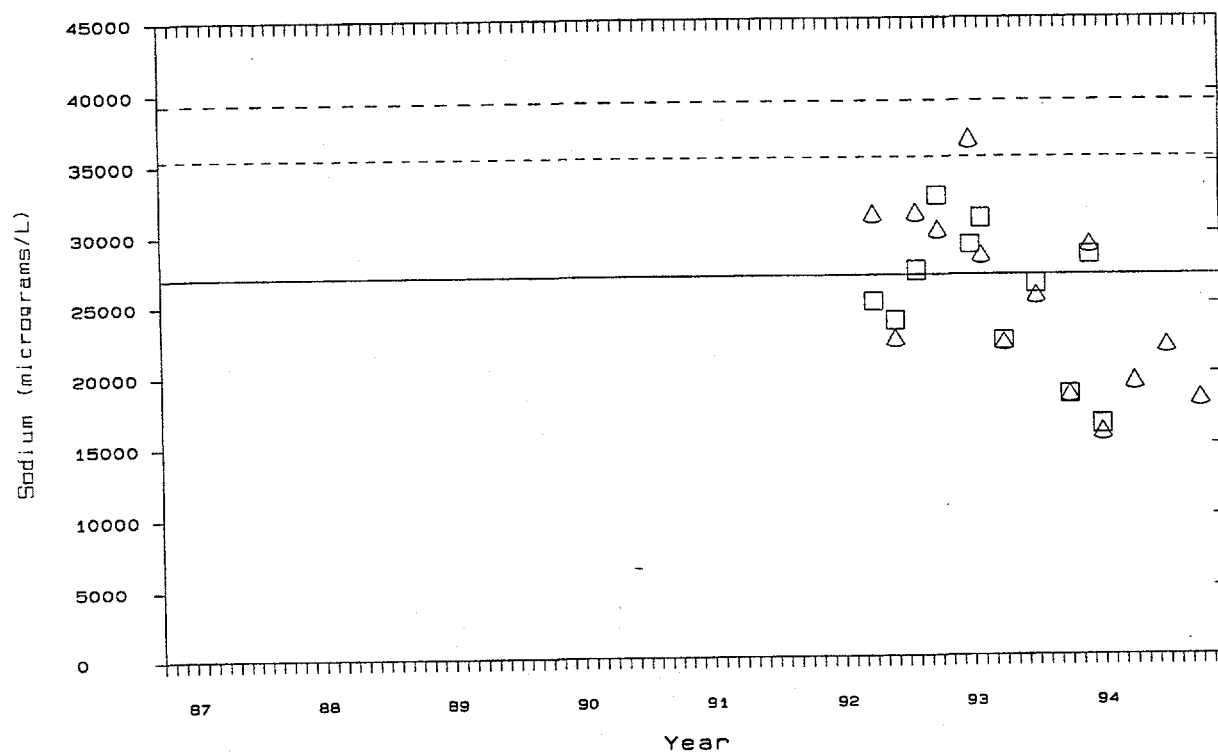
RCRA Guideline Not Applicable



Δ Replicate 1 $\square$ Replicate 2 — Mean - - - Level 1 - - - Level 2

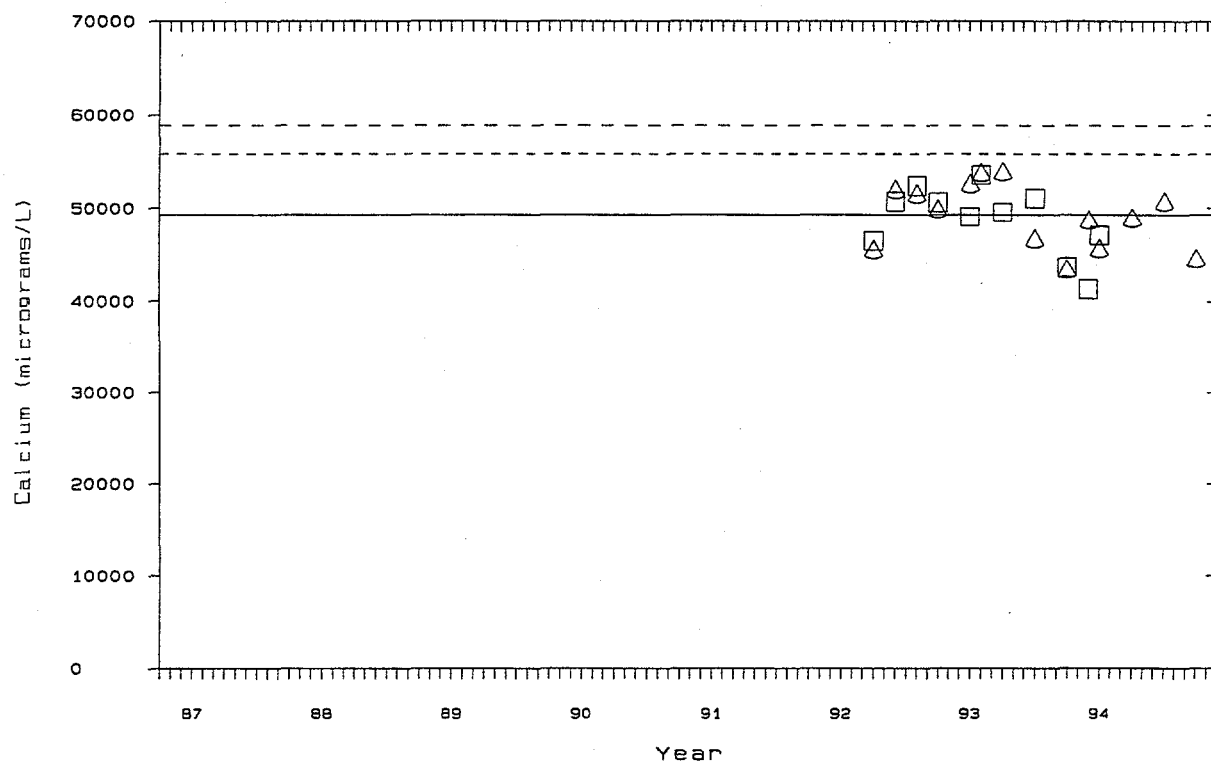
TRA624A Sodium Concentrations

RCRA Guideline Not Applicable



TRA624A Calcium Concentrations

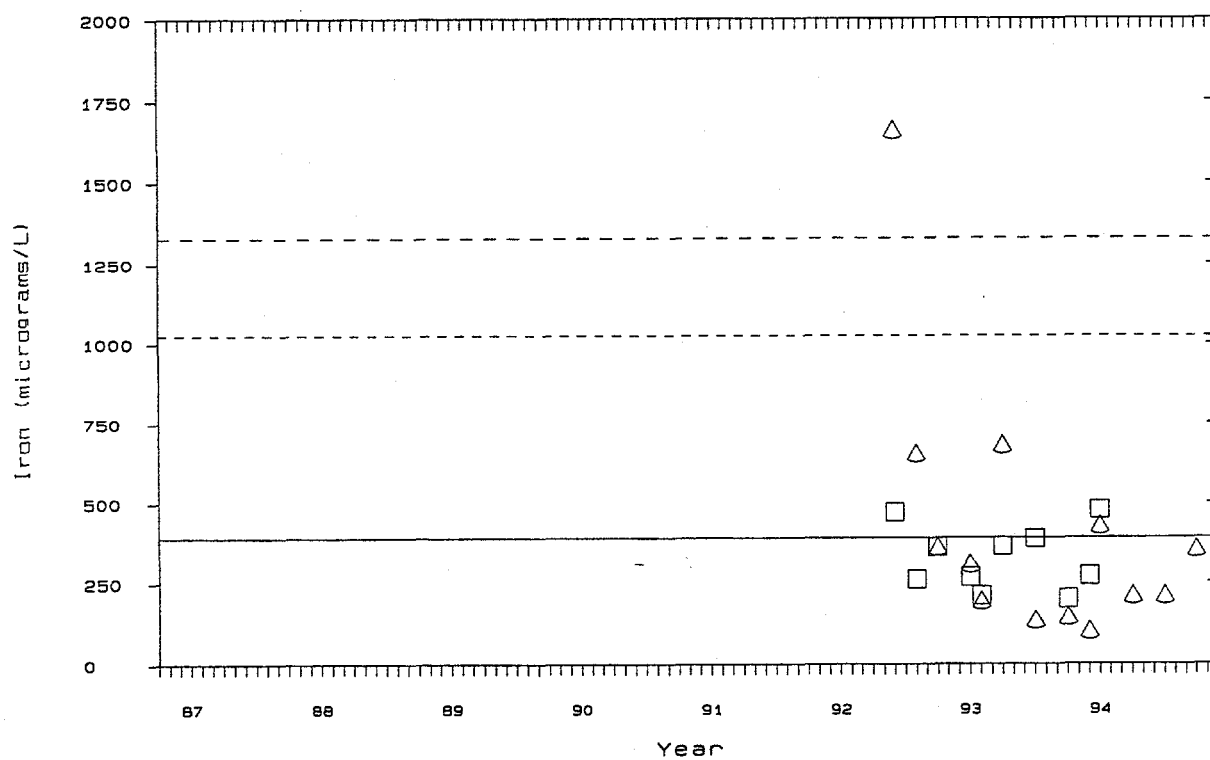
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

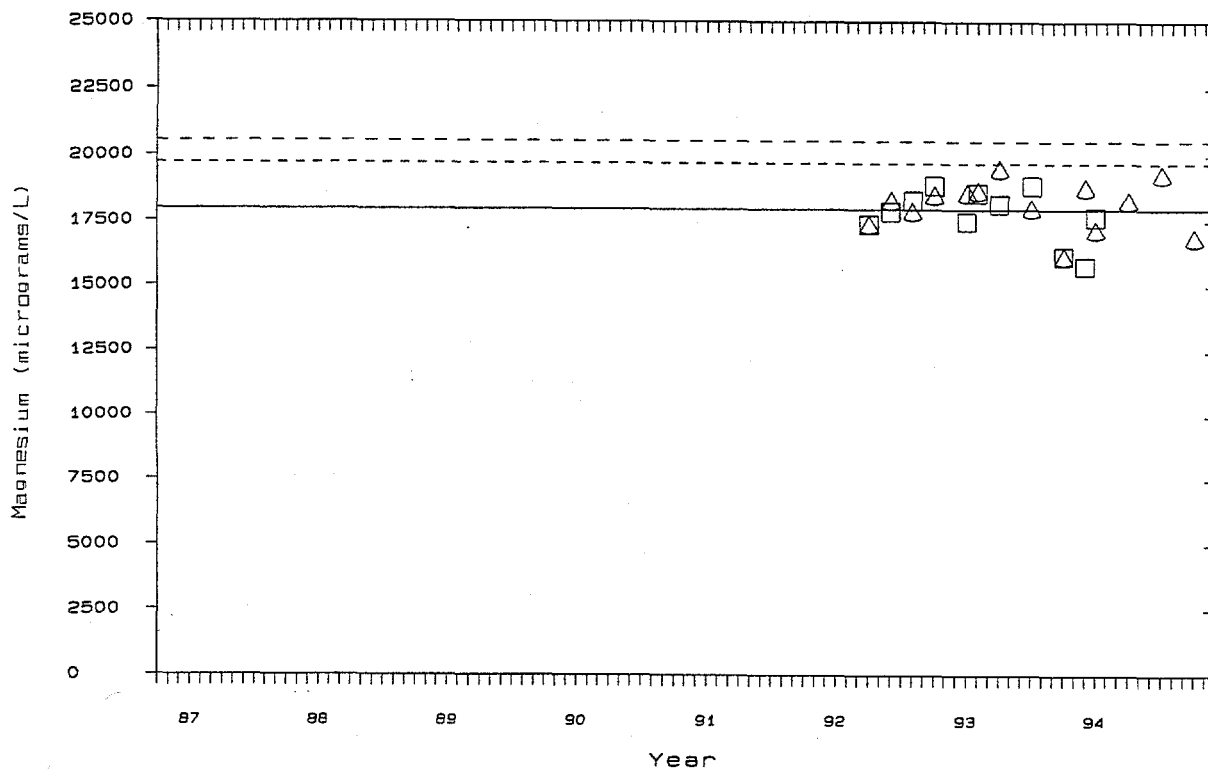
TRA624A Iron Concentrations

RCRA Guideline Not Applicable



TRA624A Magnesium Concentrations

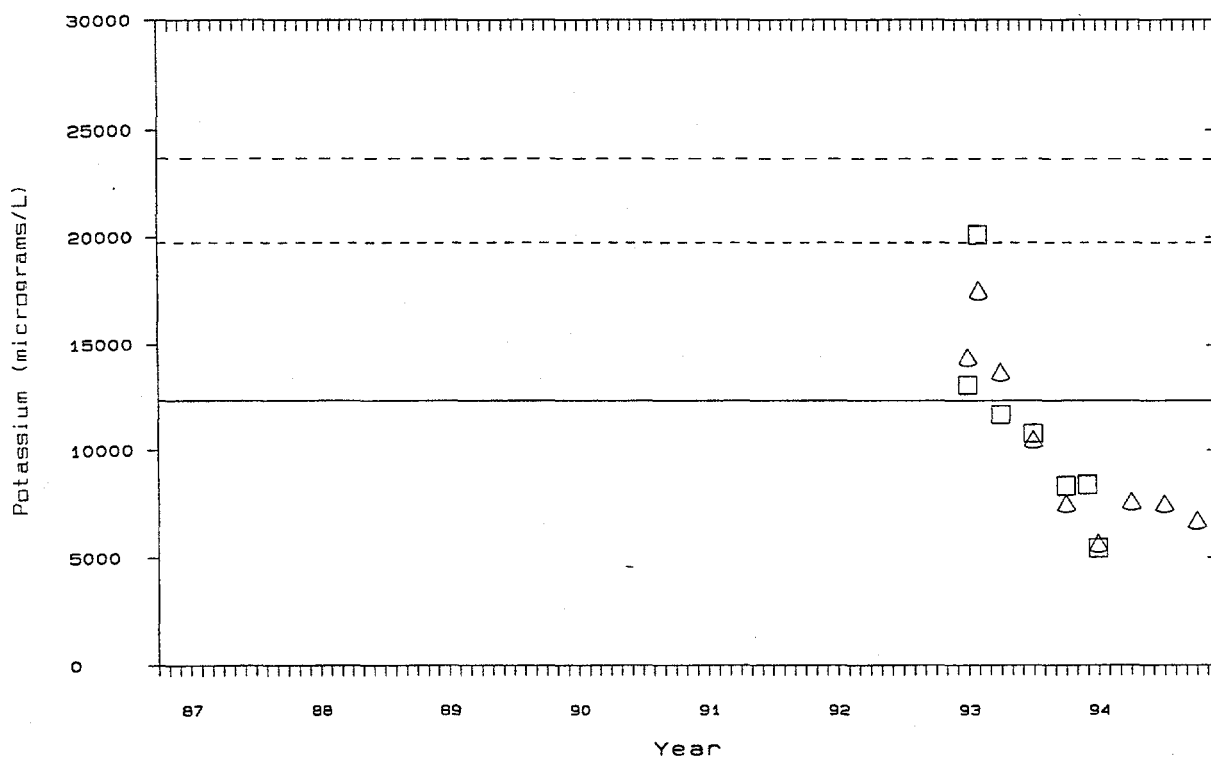
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

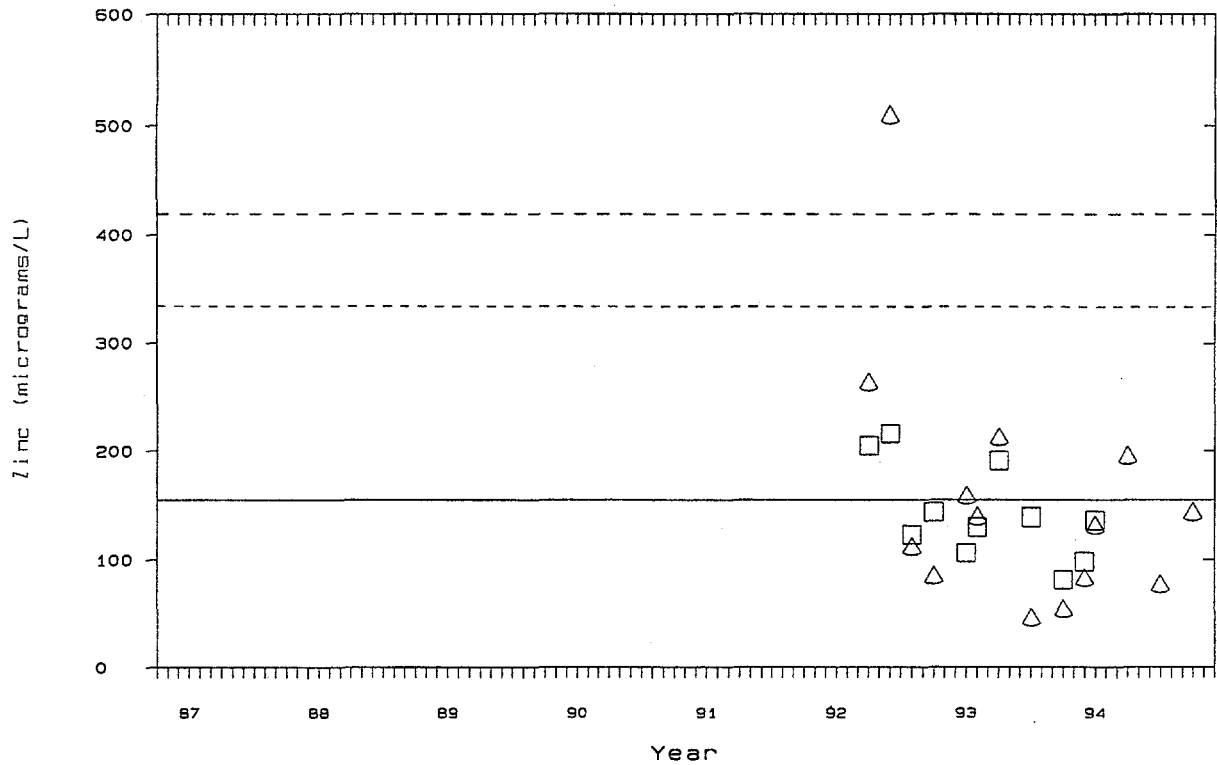
TRA624A Potassium Concentrations

RCRA Guideline Not Applicable



TRA624A Zinc Concentrations

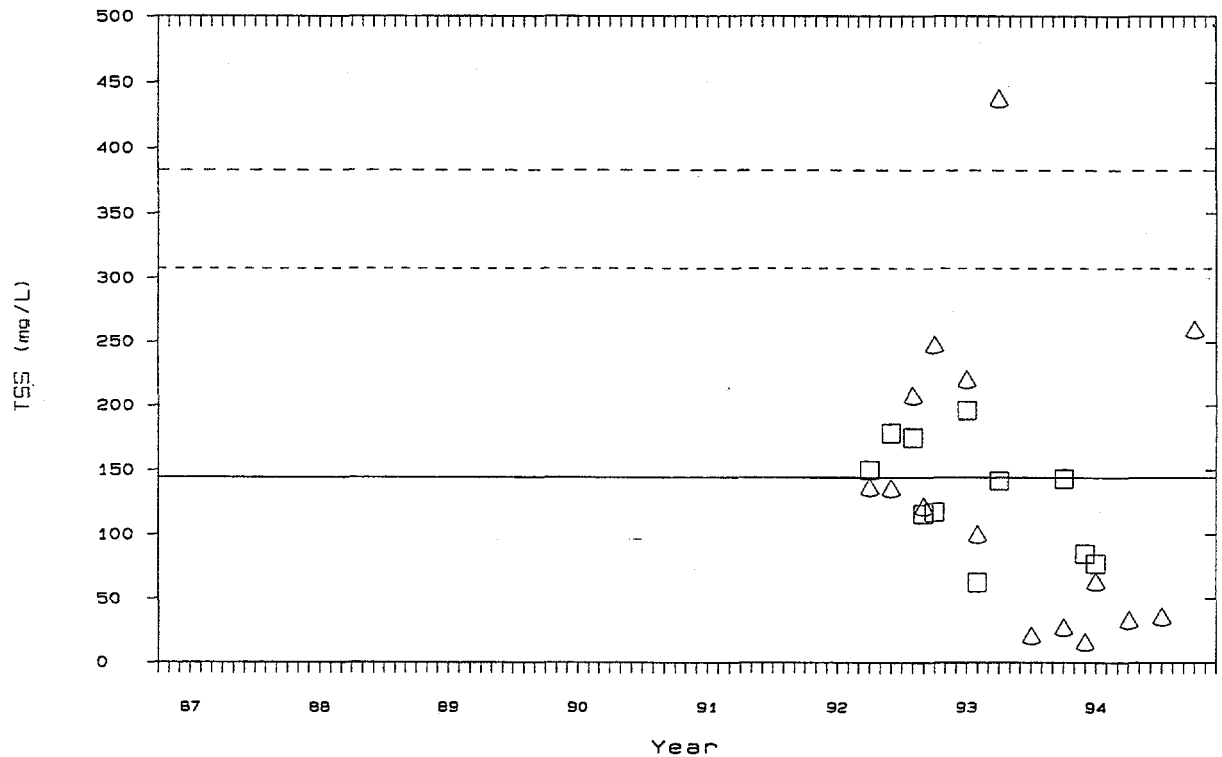
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

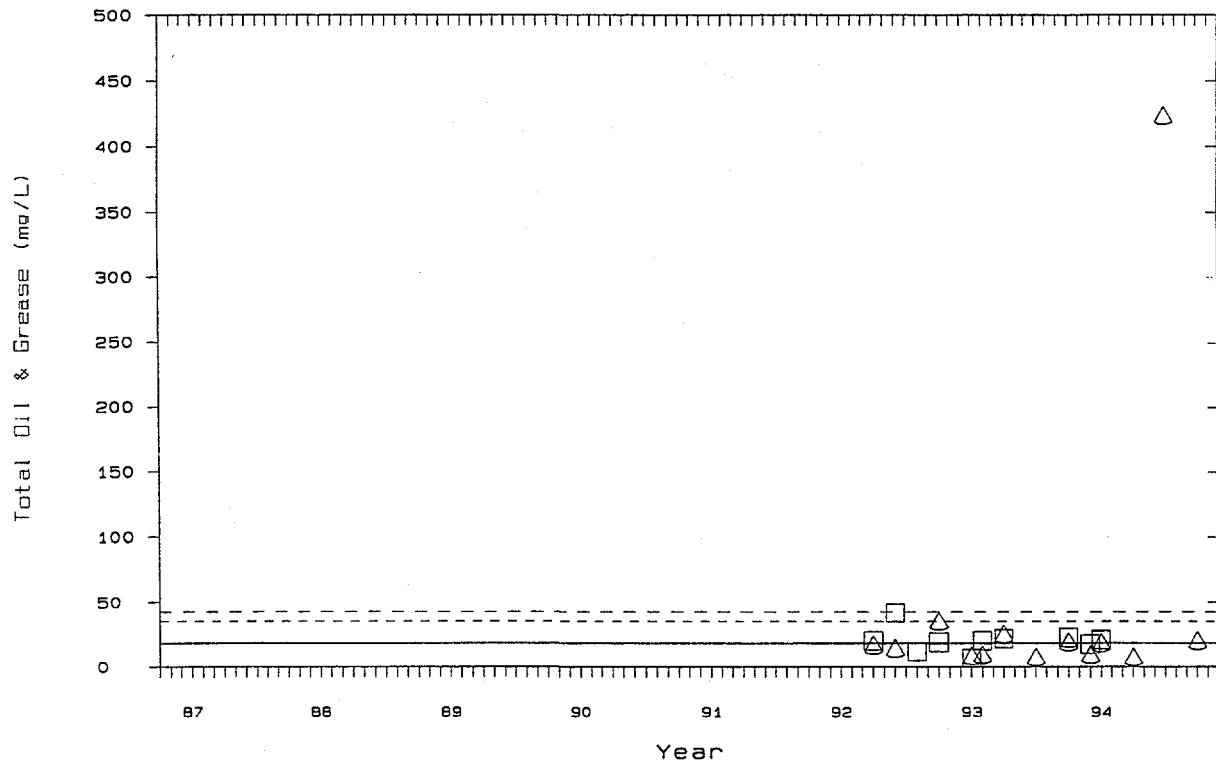
TRA624A TSS Concentrations

RCRA Guideline Not Applicable



TRA624A Total Oil & Grease Concentrations

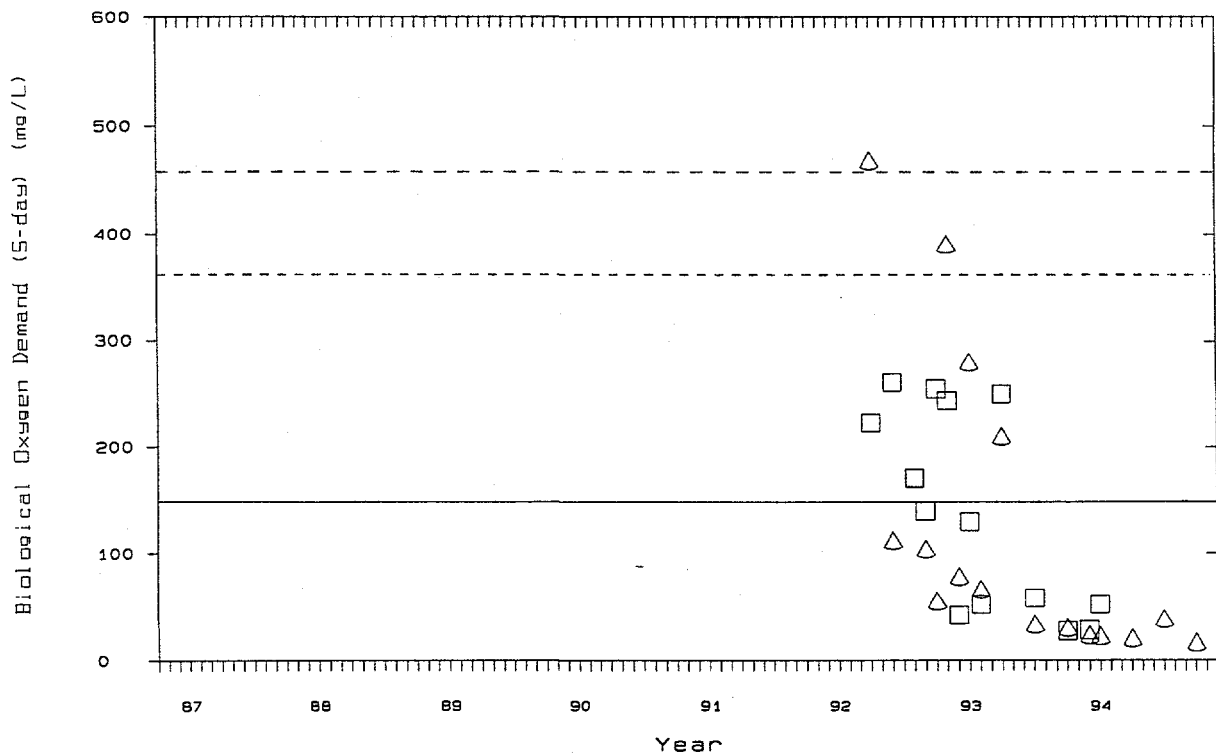
RCRA Guideline Not Applicable



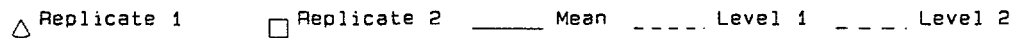
△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

TRA624A Biological Oxygen Demand (5-day) Concentrations

RCRA Guideline Not Applicable



RCRA Guideline Not Applicable



**Effluent Monitoring Data for
TRA-624 (Effluent from Sewage Treatment Plant)**

Table B-34. 1994 effluent monitoring data for TRA-624.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/25/94	01/25/94	04/21/94	07/28/94	10/27/94			
Biological Oxygen Demand (5-day) (mg/L)	NR	NR	5.0	15.0	7.0			
Conductivity (μ S)	365	444	468	470	474			
pH	7.4	7.4	7.1	7.6	7.6			
Chloride (mg/L)	26.4	26.6	32.1	29.0	14.5			
Chemical Oxygen Demand (mg/L)	NR	NR	62.0	28.2	25.0			
Fluoride (mg/L)	NR	NR	0.12	0.16	0.15			
Surfactants (mg/L)	NR	NR	ND	ND	0.11			
Nitrogen, Nitrate-Nitrite (mg-N/L)	3.5	3.3	4.7	6.3	3.8			
Nitrogen, as Nitrate (mg-N/L)	3.0	3.1	NR	NR	NR			
Total Phosphorus (mg/L)	1.6	1.3	1.6	0.87	1.9			
Sulfate (mg/L)	NR	NR	37.6	26.7	18.0			
TDS (mg/L)	320	303	309	365	290			
Nitrogen, Total Kjeldahl (mg/L)	8.7	6.9	9.9	9.4	9.6			
TOC (mg/L)	NR	NR	6.8	9.0	5.6			
Total Oil & Grease (mg/L)	NR	NR	ND	196	ND			
TSS (mg/L)	8.0	17.0	10.0	7.0	16.0			
Silver (μ g/L)	ND	ND	ND	ND	ND			
Arsenic (μ g/L)	ND	ND	ND	ND	ND			
Barium (μ g/L)	ND	ND	ND	ND	ND			
Beryllium (μ g/L)	ND	ND	ND	ND	ND			

ND - below practical quantitation level

NR - analysis not requested

Table B-34. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/25/94	01/25/94	04/21/94	07/28/94	10/27/94				
Calcium ($\mu\text{g/L}$)	45300	46400	48700	54700	44900				
Cadmium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Cobalt ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Chromium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Copper ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Iron ($\mu\text{g/L}$)	151	115	155	182	137				
Mercury ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Potassium ($\mu\text{g/L}$)	5580	6020	6800	7330	6280				
Magnesium ($\mu\text{g/L}$)	17200	17600	18400	20800	17200				
Manganese ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Sodium ($\mu\text{g/L}$)	17100	17700	21800	20800	18400				
Nickel ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Lead ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Selenium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Zinc ($\mu\text{g/L}$)	51.4	57.0	68.0	61.9	45.7				

ND - below practical quantitation level

Table B-35. 1994 volatile organics data for TRA-624B.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
1,4-Dichlorobenzene	April	1.00	µg/L	J	
1,4-Dichlorobenzene	October	3.00	µg/L	J	
Methylene Chloride	April	2.00	µg/L	J	
Methylene Chloride	July	1.00	µg/L	J	

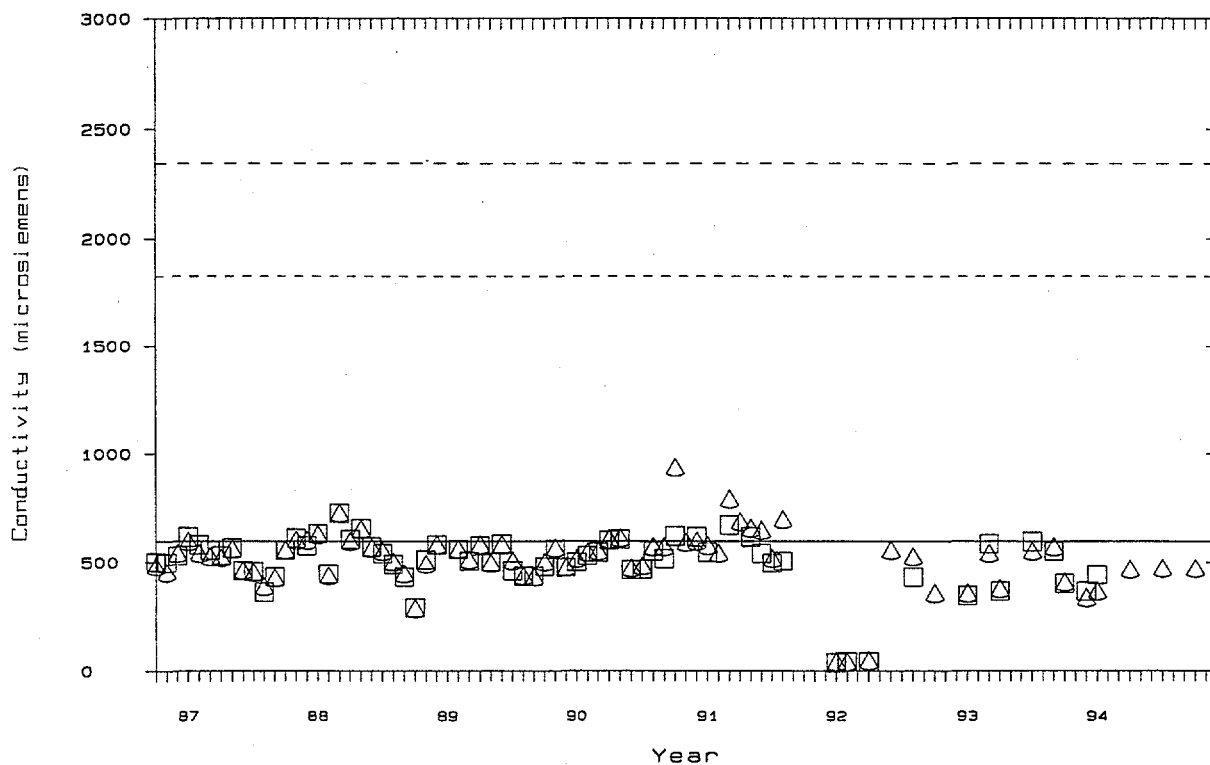
Table B-36. Summary statistics for TRA-624.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Conductivity (μS)	598	741	139	1829	2348	NA
pH	7.4	0.46	139	6.2	8.6	2.5-12
Chloride (mg/L)	33.9	13.7	128	56.7	66.3	NA
Fluoride (mg/L)	0.20	0.19	45	0.51	0.65	NA
Nitrogen, Nitrate-Nitrite (mg-N/L)	5.5	2.6	16	10.1	12.4	NA
Nitrate (mg/L)	30.3	9.6	100	46.3	53.1	NA
Nitrogen, as Nitrate (mg-N/L)	6.6	2.9	28	11.6	13.8	NA
Phosphate (mg/L)	5.7	3.9	99	12.2	15.0	NA
Total Phosphorus (mg/L)	2.6	0.84	12	4.2	5.0	NA
Sulfate (mg/L)	23.3	6.3	118	33.7	38.1	NA
Nitrogen, Total Kjeldahl (mg/L)	16.0	18.3	16	49.0	65.0	NA
TOC (mg/L)	16.3	23.3	81	55.4	72.0	NA
TSS (mg/L)	40.4	45.5	9	130	179	NA
Arsenic ($\mu\text{g/L}$)	33.6	64.5	24	146	198	5000
Barium ($\mu\text{g/L}$)	65.1	42.2	87	136	166	100,000
Calcium ($\mu\text{g/L}$)	48788	1982	26	52239	53808	NA
Cadmium ($\mu\text{g/L}$)	15.2	24.0	10	61.4	86.3	1000
Chromium ($\mu\text{g/L}$)	25.9	69.8	38	145	198	5000
Copper ($\mu\text{g/L}$)	20.8	18.5	68	51.8	65.2	NA
Iron ($\mu\text{g/L}$)	179	64.0	19	293	347	NA
Mercury ($\mu\text{g/L}$)	0.55	0.66	39	1.7	2.2	200
Potassium ($\mu\text{g/L}$)	8670	4460	13	16918	21077	NA
Magnesium ($\mu\text{g/L}$)	17888	596	26	18926	19398	NA
Manganese ($\mu\text{g/L}$)	19.5	13.7	16	44.2	56.2	NA
Sodium ($\mu\text{g/L}$)	23723	4786	26	32055	35844	NA
Nickel ($\mu\text{g/L}$)	50.7	73.5	10	192	268	NA
Lead ($\mu\text{g/L}$)	12.7	24.9	52	54.8	73.1	5000
Selenium ($\mu\text{g/L}$)	51.7	102	9	251	362	1000
Zinc ($\mu\text{g/L}$)	83.1	50.5	138	167	202	NA

Guideline - RCRA Characteristic Guideline
NA - Not Applicable

TRA624B Conductivity

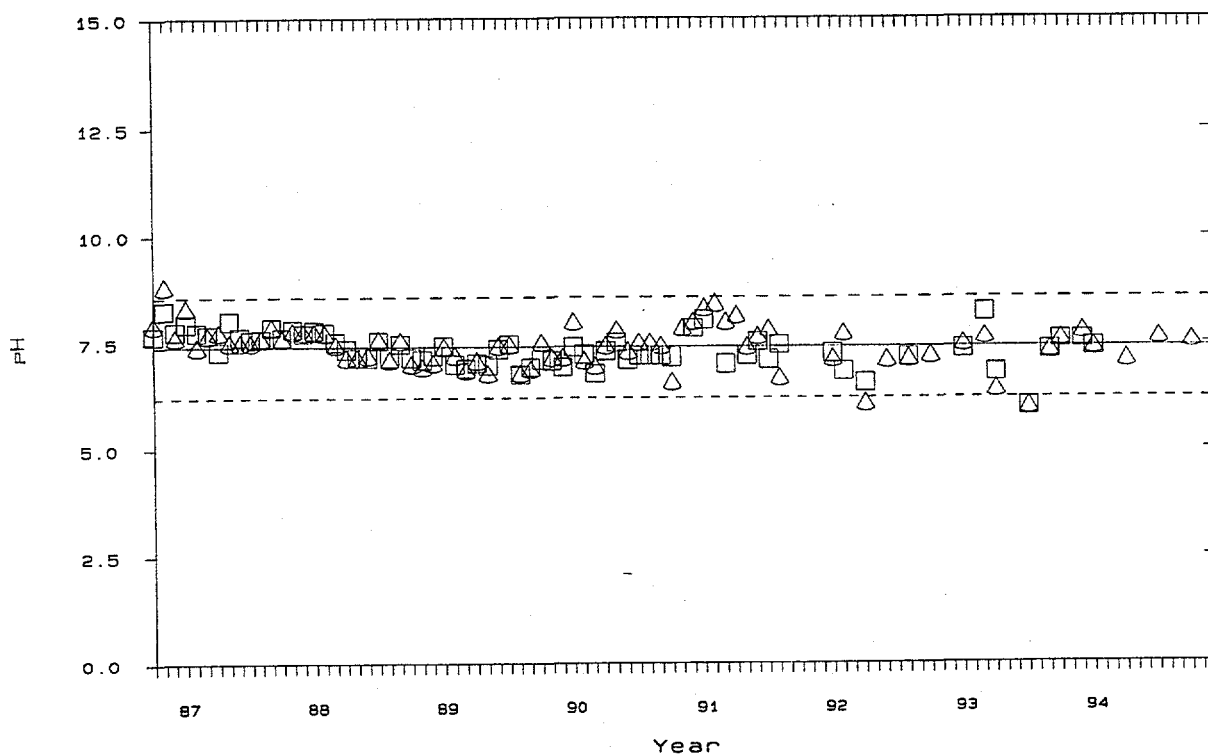
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

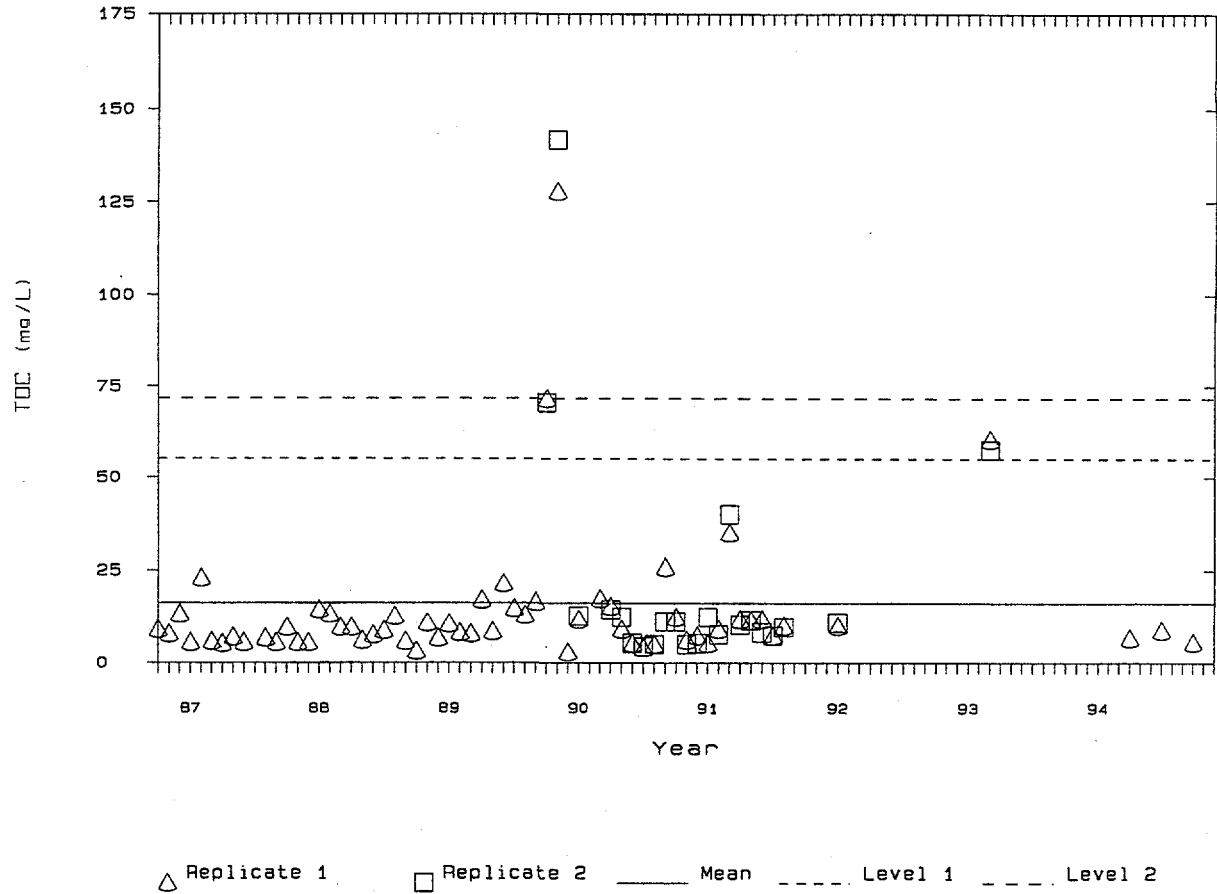
TRA624B pH

RCRA Characteristic Guideline = 2.5-12



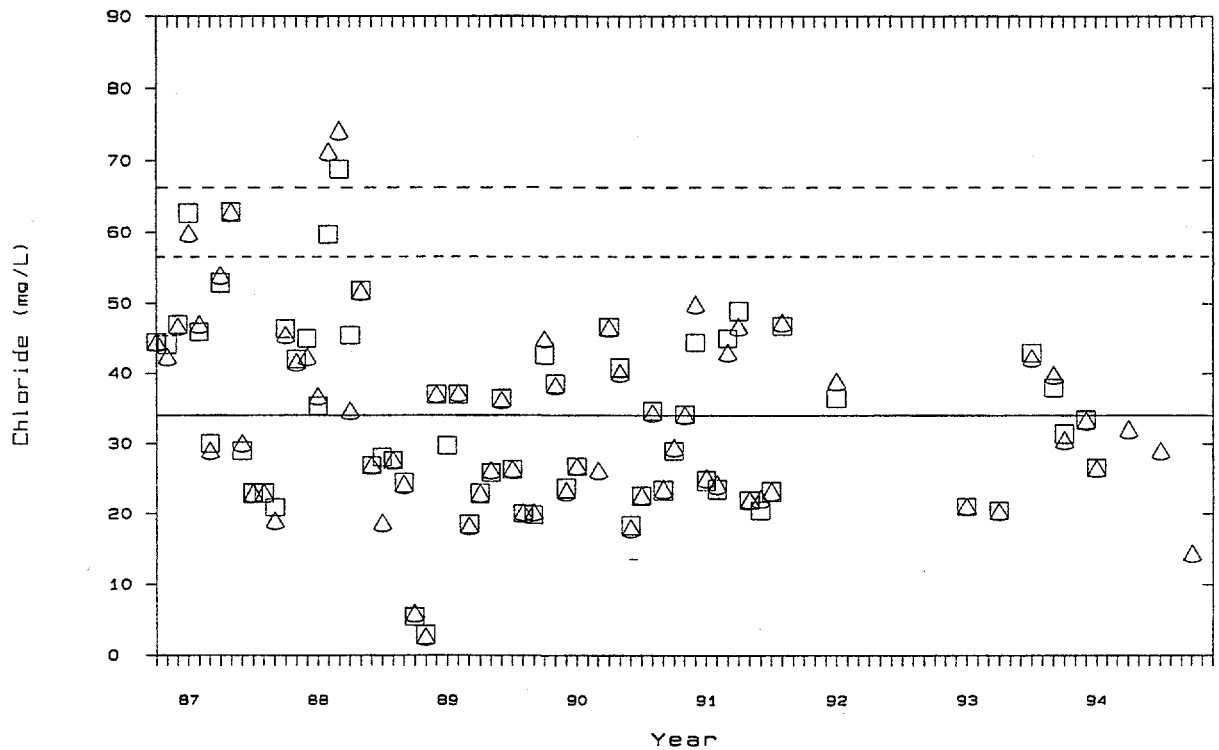
TRA624B TOC Concentrations

RCRA Guideline Not Applicable



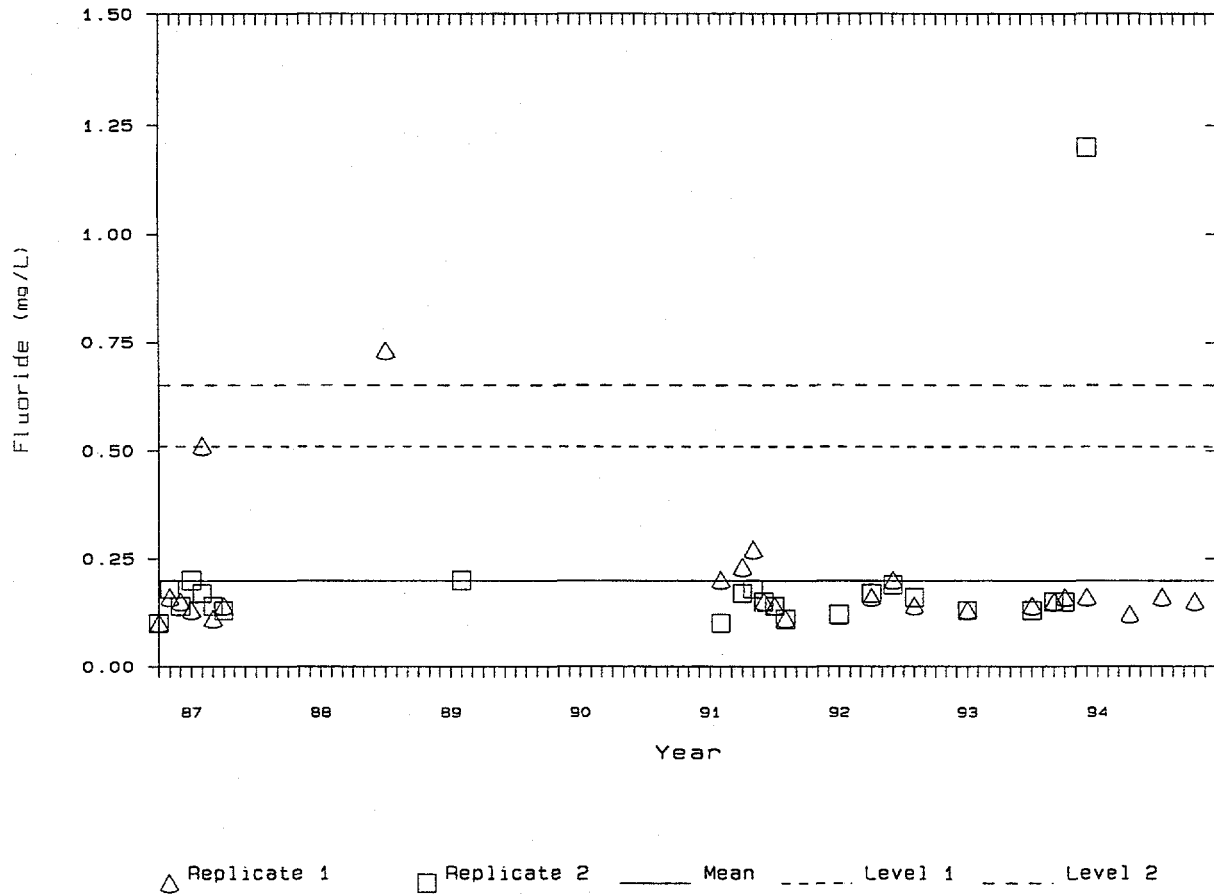
TRA624B Chloride Concentrations

RCRA Guideline Not Applicable



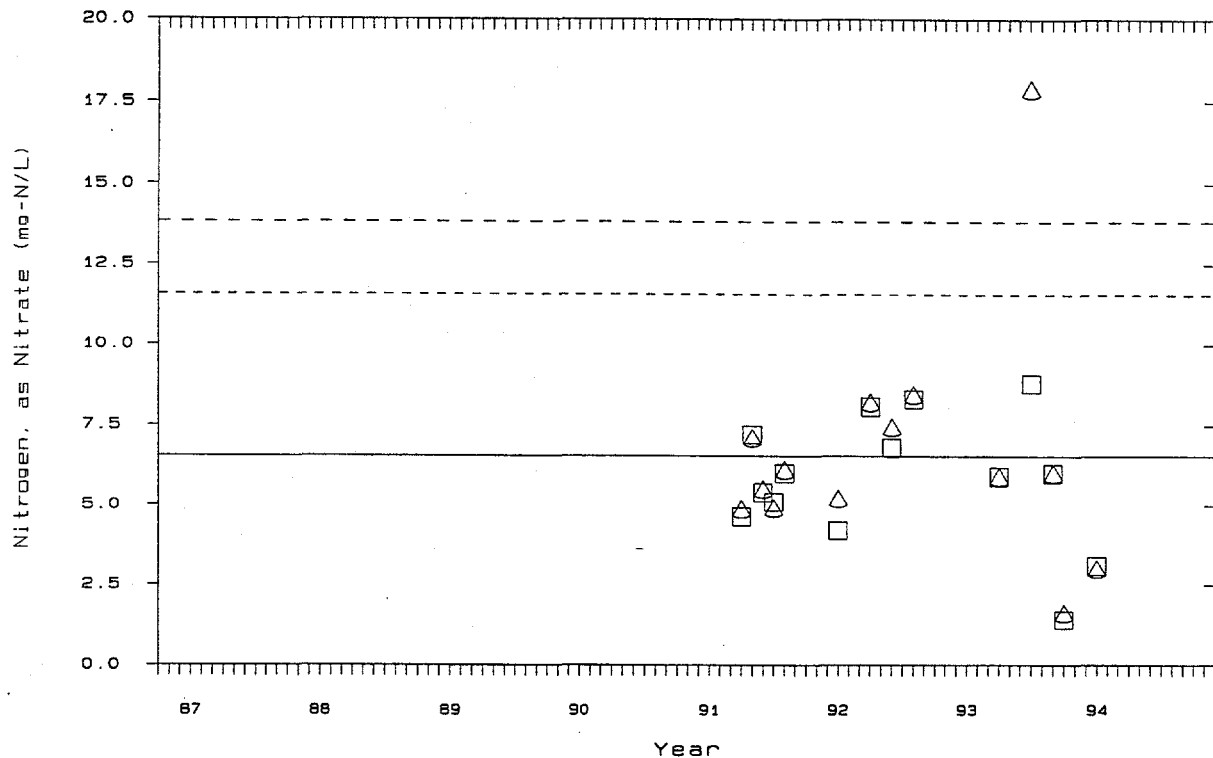
TRA624B Fluoride Concentrations

RCRA Guideline Not Applicable



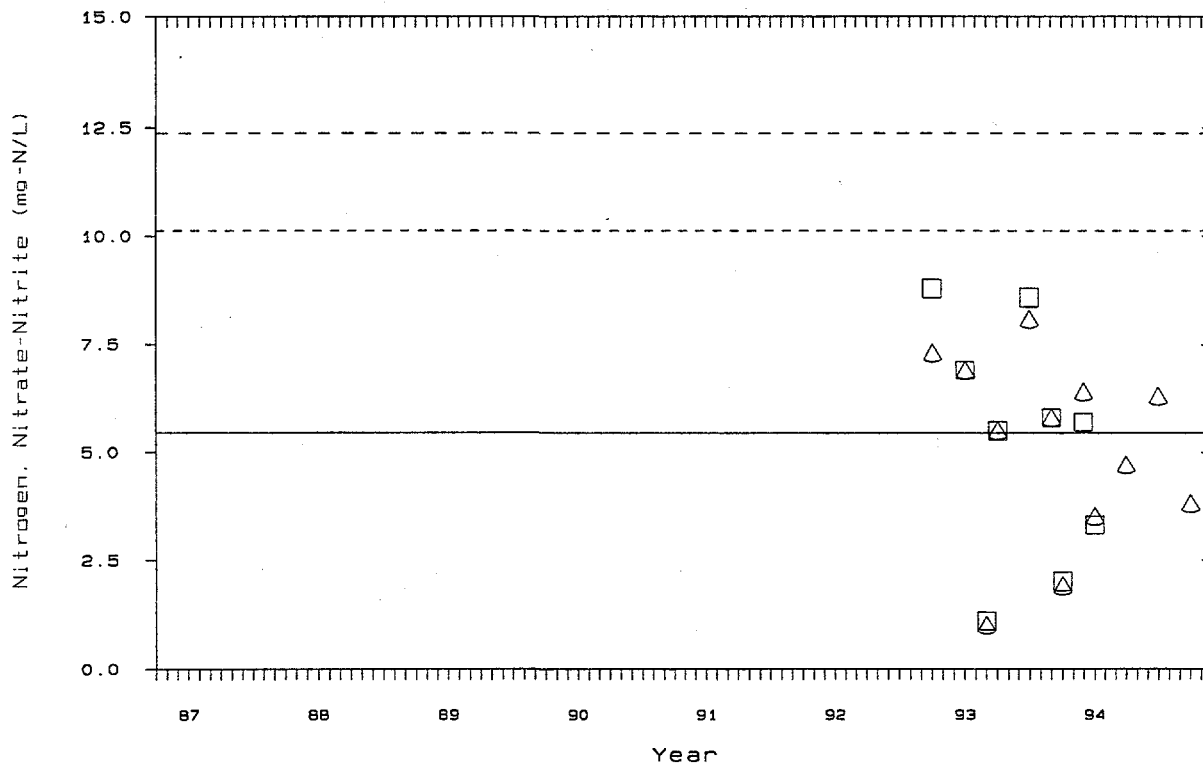
TRA624B Nitrogen, as Nitrate Concentrations

RCRA Guideline Not Applicable



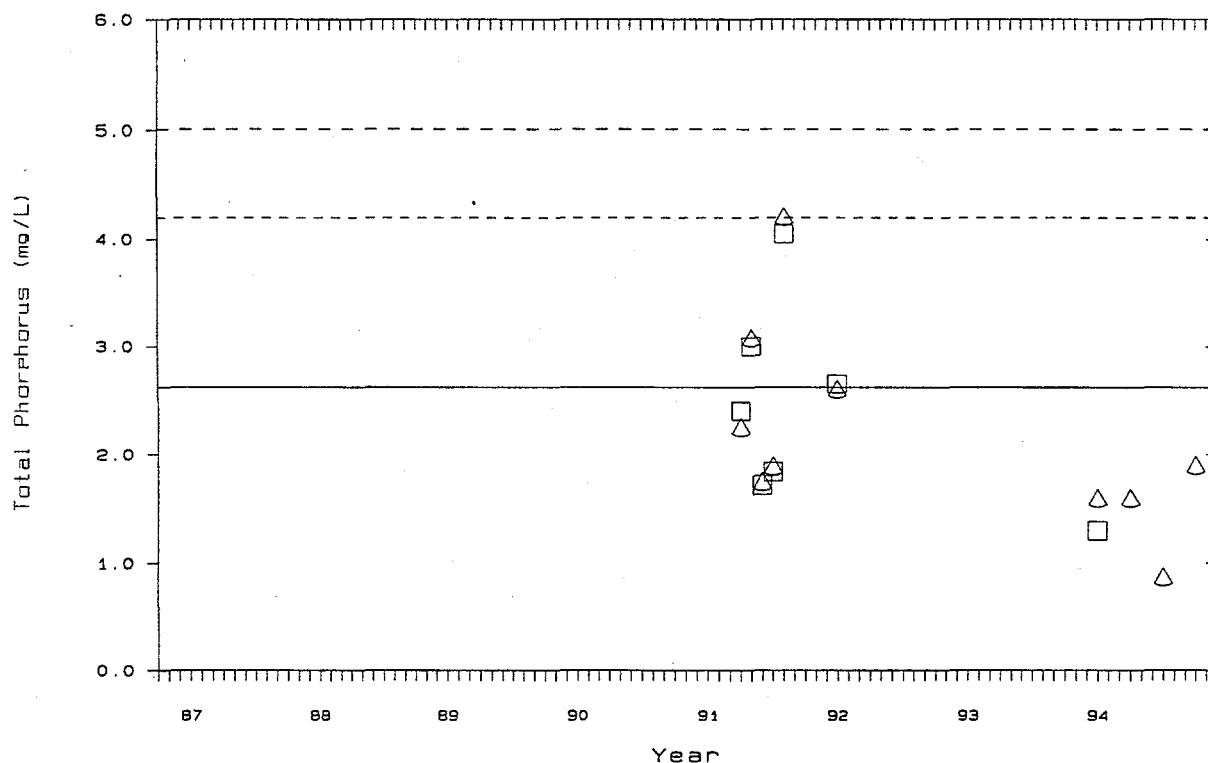
TRA624B Nitrogen, Nitrate-Nitrite Concentrations

RCRA Guideline Not Applicable



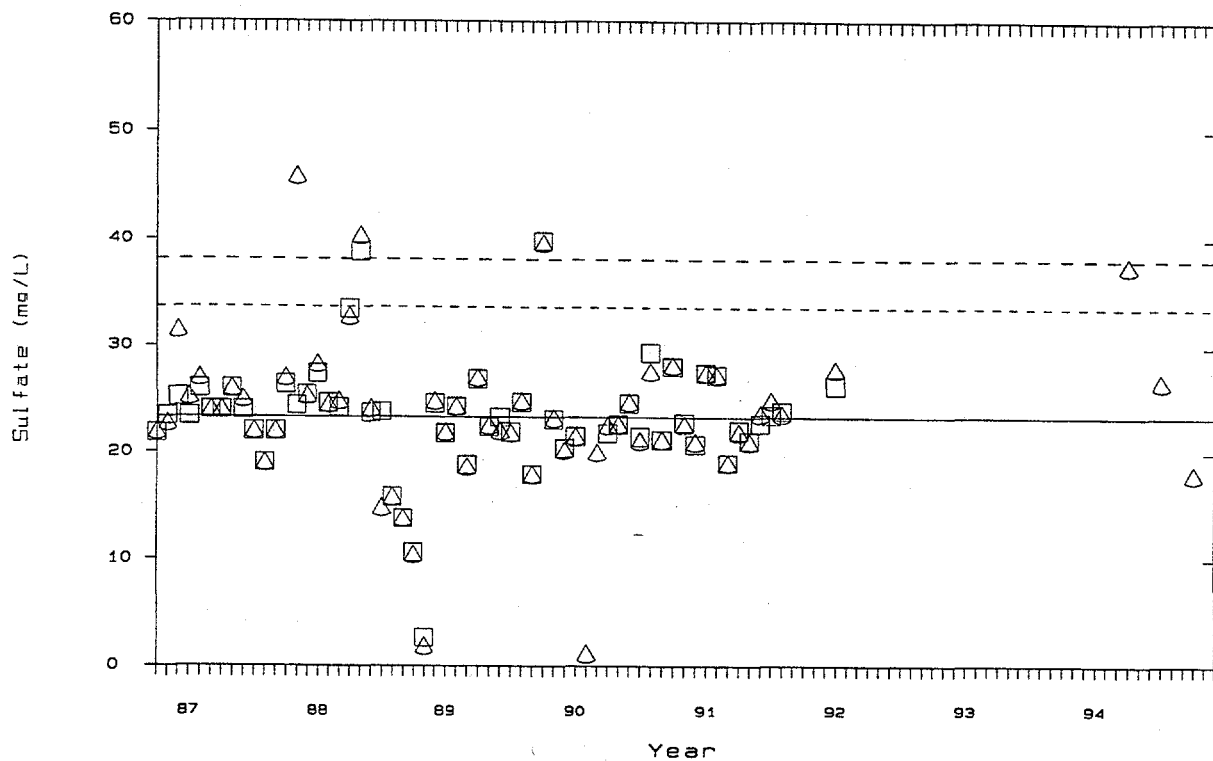
TRA624B Total Phosphorus Concentrations

RCRA Guideline Not Applicable



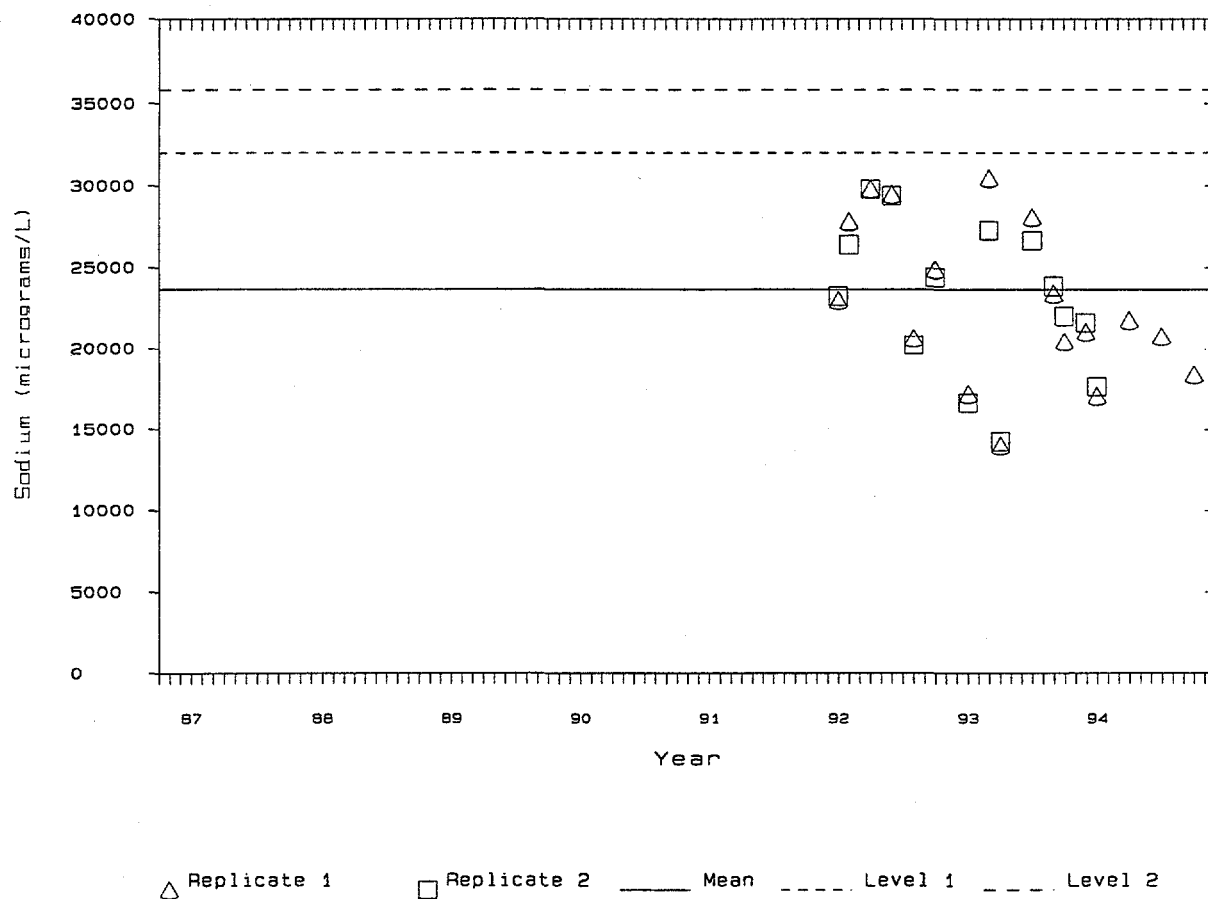
TRA624B Sulfate Concentrations

RCRA Guideline Not Applicable



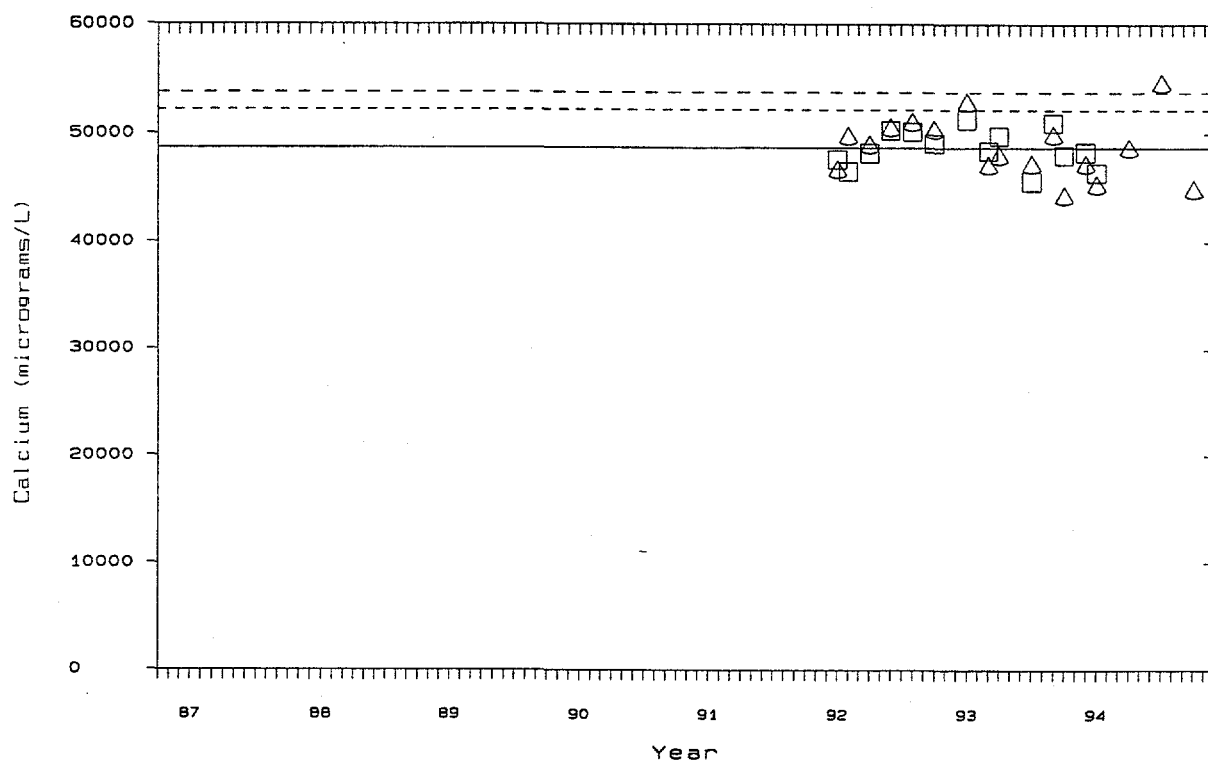
TRA624B Sodium Concentrations

RCRA Guideline Not Applicable



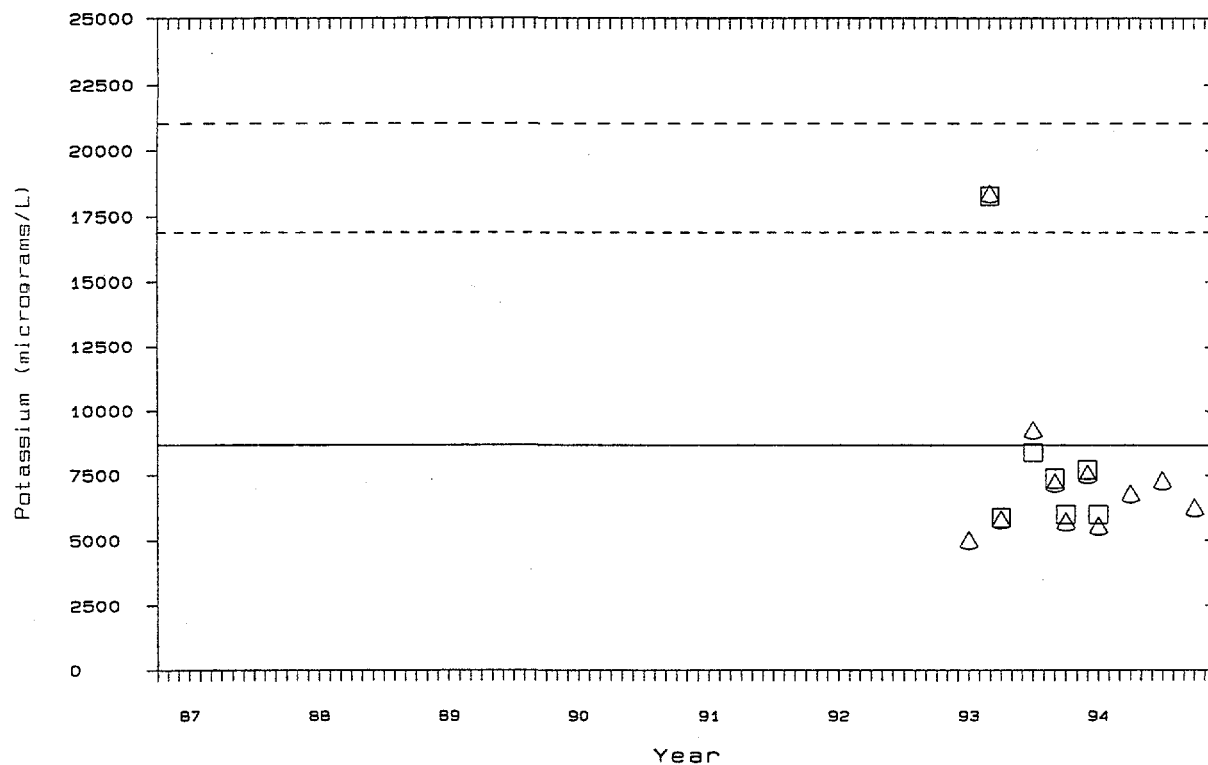
TRA624B Calcium Concentrations

RCRA Guideline Not Applicable



TRA624B Potassium Concentrations

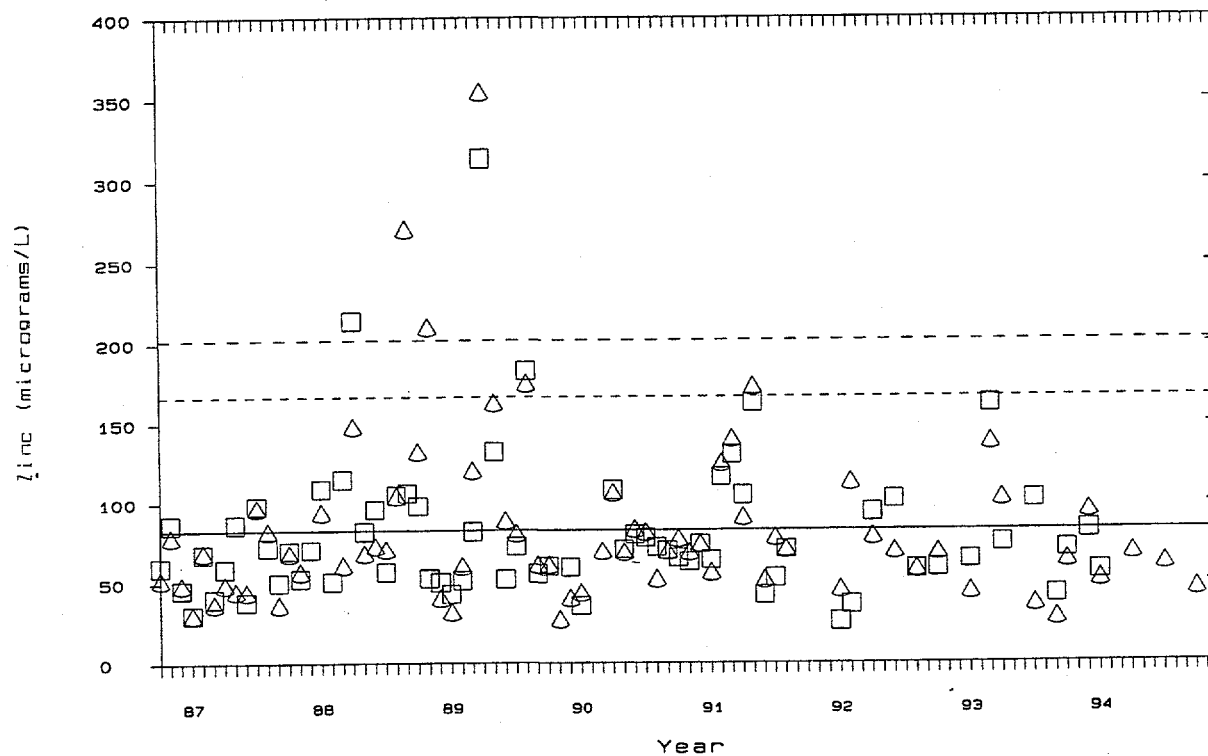
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

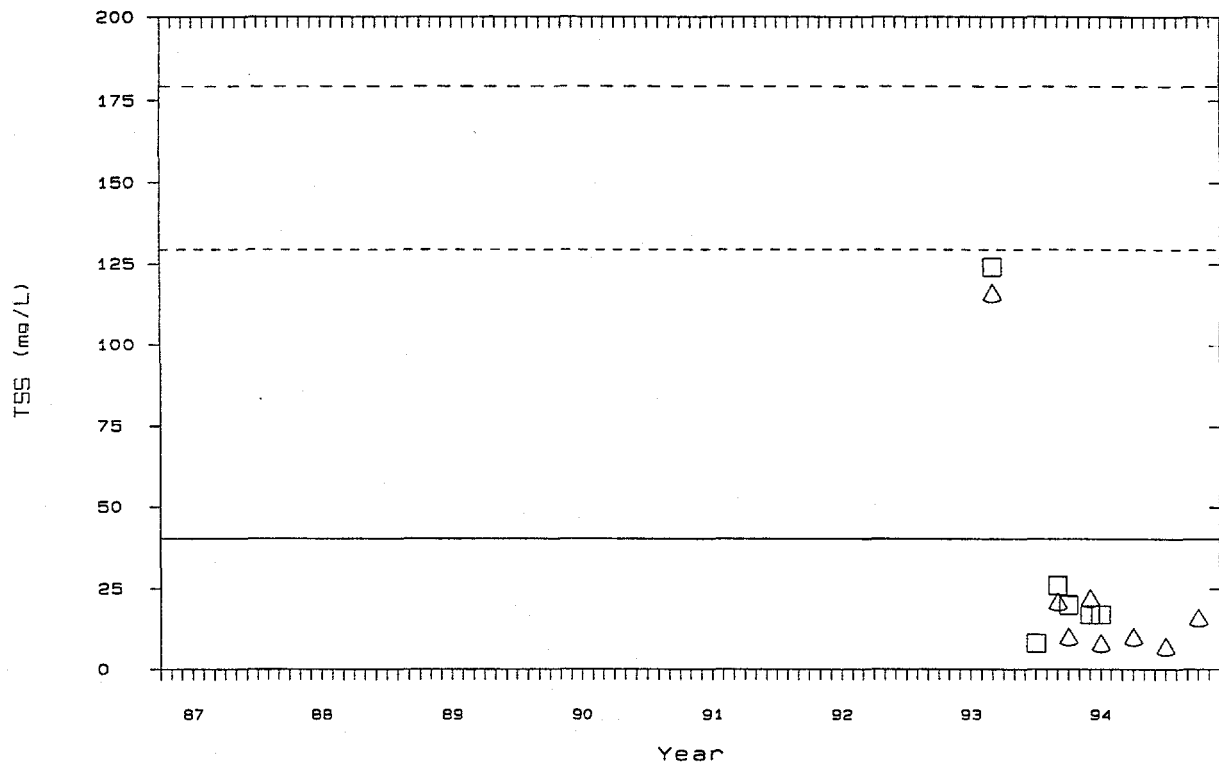
TRA624B Zinc Concentrations

RCRA Guideline Not Applicable



TRA624B TSS Concentrations

RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

**Effluent Monitoring Data for
TRA-631 (Effluent to Chemical Waste Pond)**

Table B-37. 1994 effluent monitoring data for TRA-631.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/25/94	01/25/94	01/25/94	03/17/94	06/17/94	09/28/94			
Conductivity (μ S)	13130	12780	11000	11000	NA	16670			
pH	9.9	9.9	10.1	10.1	NA	10.0			
Chloride (mg/L)	226	238	8.2	8.2	250	4.7			
Chemical Oxygen Demand (mg/L)	181	27.6	7.7	7.7	ND	ND			
Fluoride (mg/L)	3.2	3.2	0.17	0.17	2.6	ND			
Nitrogen, Nitrate-Nitrite (mg-N/L)	16.0	19.5	0.04	0.04	21.8	1.5			
Total Phosphorus (mg/L)	0.50	0.42	ND	ND	0.26	0.07			
Sulfate (mg/L)	9350	9510	8480	8480	10700	11200			
TDS (mg/L)	23900	11900	13300	13300	17100	9400			
Nitrogen, Total Kjeldahl (mg/L)	ND	ND	ND	ND	ND	ND			
TSS (mg/L)	2150	2000	235	235	652	440			
Silver (μ g/L)	ND	ND	ND	ND	ND	ND			
Arsenic (μ g/L)	ND	ND	ND	ND	ND	ND			
Barium (μ g/L)	309	219	ND	ND	360	ND			
Beryllium (μ g/L)	ND	ND	ND	ND	ND	ND			
Calcium (μ g/L)	550000	542000	471000	471000	415000	462000			
Cadmium (μ g/L)	ND	ND	ND	ND	ND	ND			
Cobalt (μ g/L)	ND	ND	ND	ND	ND	ND			
Chromium (μ g/L)	49.5	53.4	48.6	48.6	51.2	38.0			
Copper (μ g/L)	73.2	66.0	104	104	105	92.5			

ND - below practical quantitation level

NA - result not available

NR - analysis not requested

Table B-37. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/25/94	01/25/94	03/17/94	06/17/94	09/28/94				
Iron ($\mu\text{g/L}$)	1180	1180	1730	1320	1810				
Mercury ($\mu\text{g/L}$)	0.42	0.39	0.31	0.59	0.25				
Potassium ($\mu\text{g/L}$)	18100	17500	16500	15900	25500				
Magnesium ($\mu\text{g/L}$)	202000	212000	191000	169000	180000				
Manganese ($\mu\text{g/L}$)	15.9	15.2	19.5	29.1	29.4				
Sodium ($\mu\text{g/L}$)	3870000	3890000	3360000	454000	517000				
Nickel ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Lead ($\mu\text{g/L}$)	83.0	77.0	6.7	25.0	ND				
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND	71.6				
Selenium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Zinc ($\mu\text{g/L}$)	31.6	30.0	22.8	28.9	25.0				

ND - below practical quantitation level

NR - analysis not requested

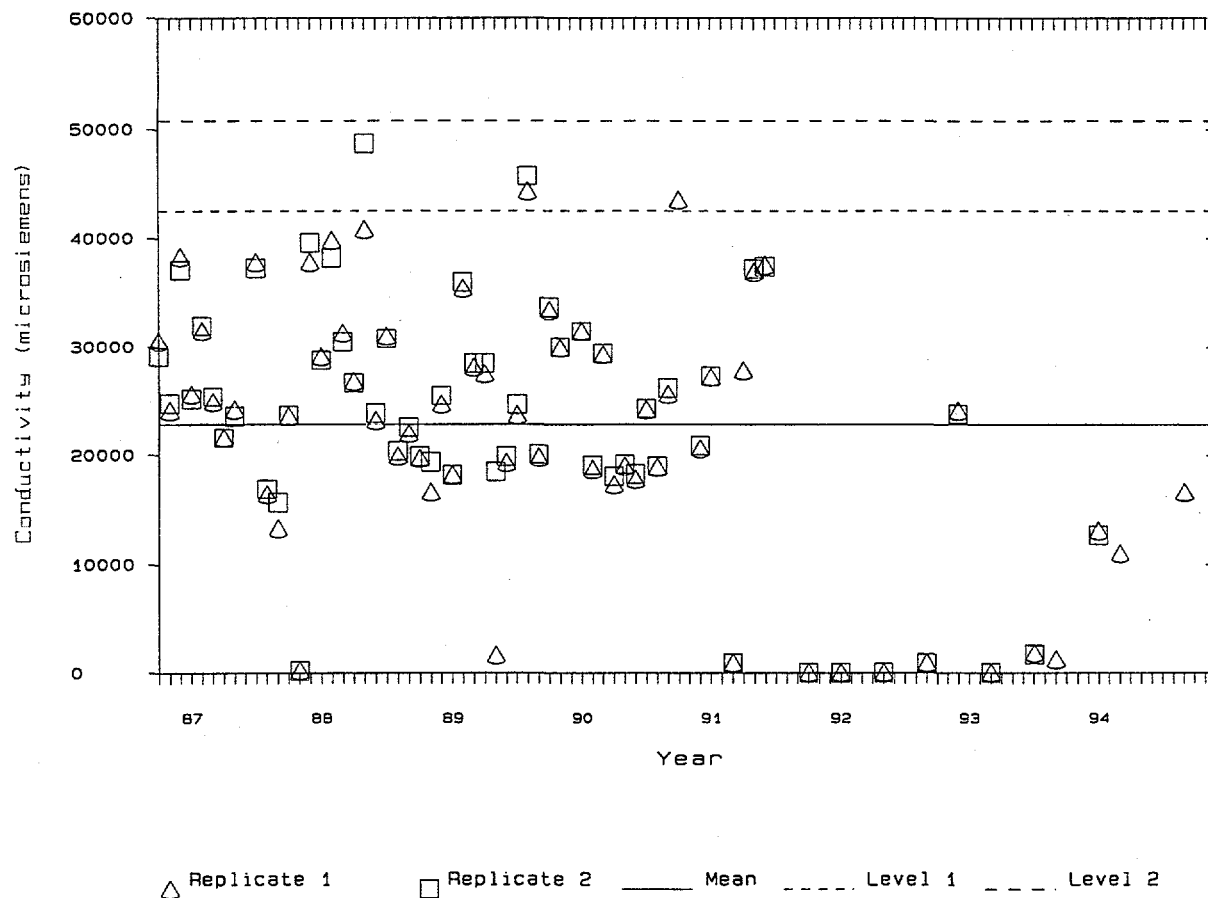
Table B-38. Summary statistics for TRA-631.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Conductivity (μ S)	22936	11792	119	42567	50862	NA
pH	8.2	3.0	121	2.0	12.5	2.5-12
Chloride (mg/L)	221	162	88	492	608	NA
Fluoride (mg/L)	7.5	20.9	38	43.2	58.9	NA
Nitrate (mg/L)	105	78.0	53	237	294	NA
Nitrogen, as Nitrate (mg-N/L)	15.3	17.4	18	46.4	61.2	NA
Total Phosphorus (mg/L)	0.21	0.15	14	0.49	0.63	NA
Sulfate (mg/L)	18296	11045	120	36681	44448	NA
TDS (mg/L)	22398	10359	108	39665	46975	NA
TOC (mg/L)	12.1	22.9	70	50.6	67.0	NA
Silver (μ g/L)	38.8	55.6	9	148	208	5000
Arsenic (μ g/L)	73.0	72.3	36	197	252	5000
Barium (μ g/L)	244	159	99	511	623	100,000
Calcium (μ g/L)	425400	147242	15	693243	824508	NA
Cadmium (μ g/L)	8.4	6.3	15	19.8	25.4	1000
Chromium (μ g/L)	72.5	49.2	113	155	189	5000
Copper (μ g/L)	69.2	82.4	79	207	266	NA
Mercury (μ g/L)	2.4	1.8	115	5.5	6.8	200
Magnesium (μ g/L)	273973	123482	15	498596	608679	NA
Manganese (μ g/L)	18.1	13.2	10	43.5	57.2	NA
Sodium (μ g/L)	5301986	4493560	14	13539086	17629305	NA
Nickel (μ g/L)	42.2	28.8	50	90.9	112	NA
Lead (μ g/L)	42.3	34.4	23	103	130	5000
Selenium (μ g/L)	375	454	9	1265	1761	1000
Thallium (μ g/L)	89.0	156	11	385	540	NA
Zinc (μ g/L)	46.9	71.8	79	167	218	NA

Guideline - RCRA Characteristic Guideline
 NA - Not Applicable

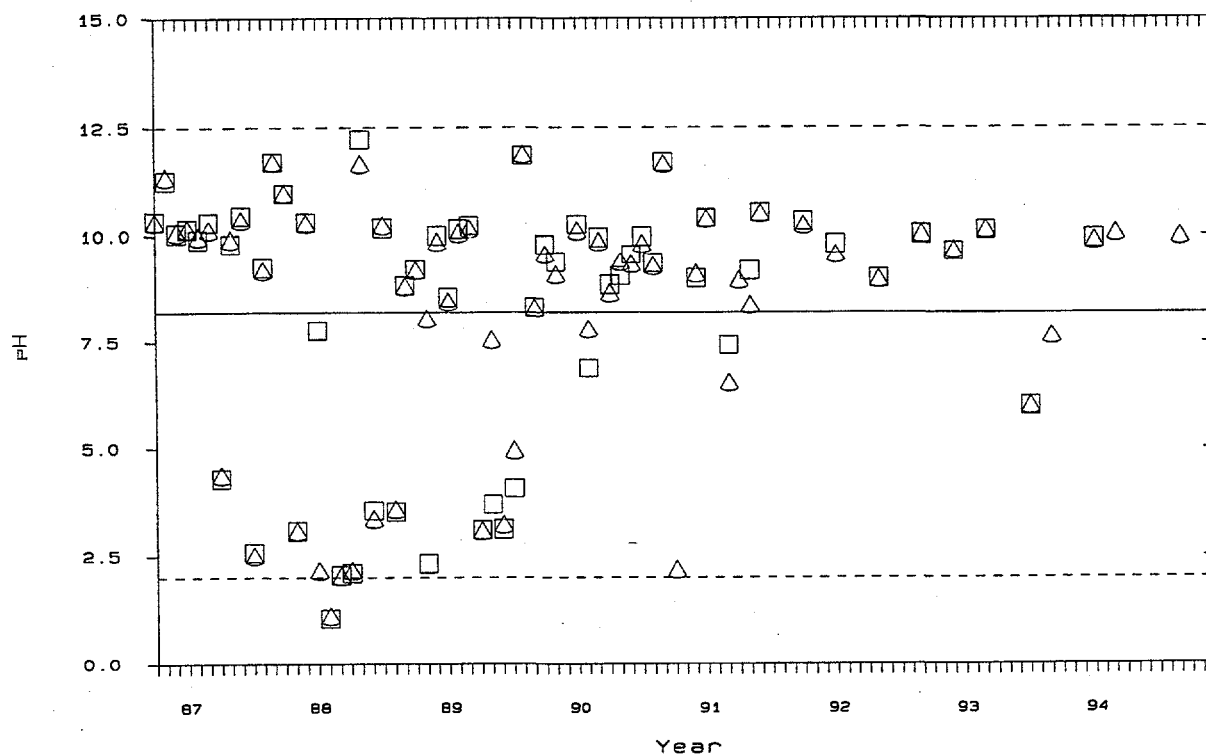
TRA631A Conductivity

RCRA Guideline Not Applicable



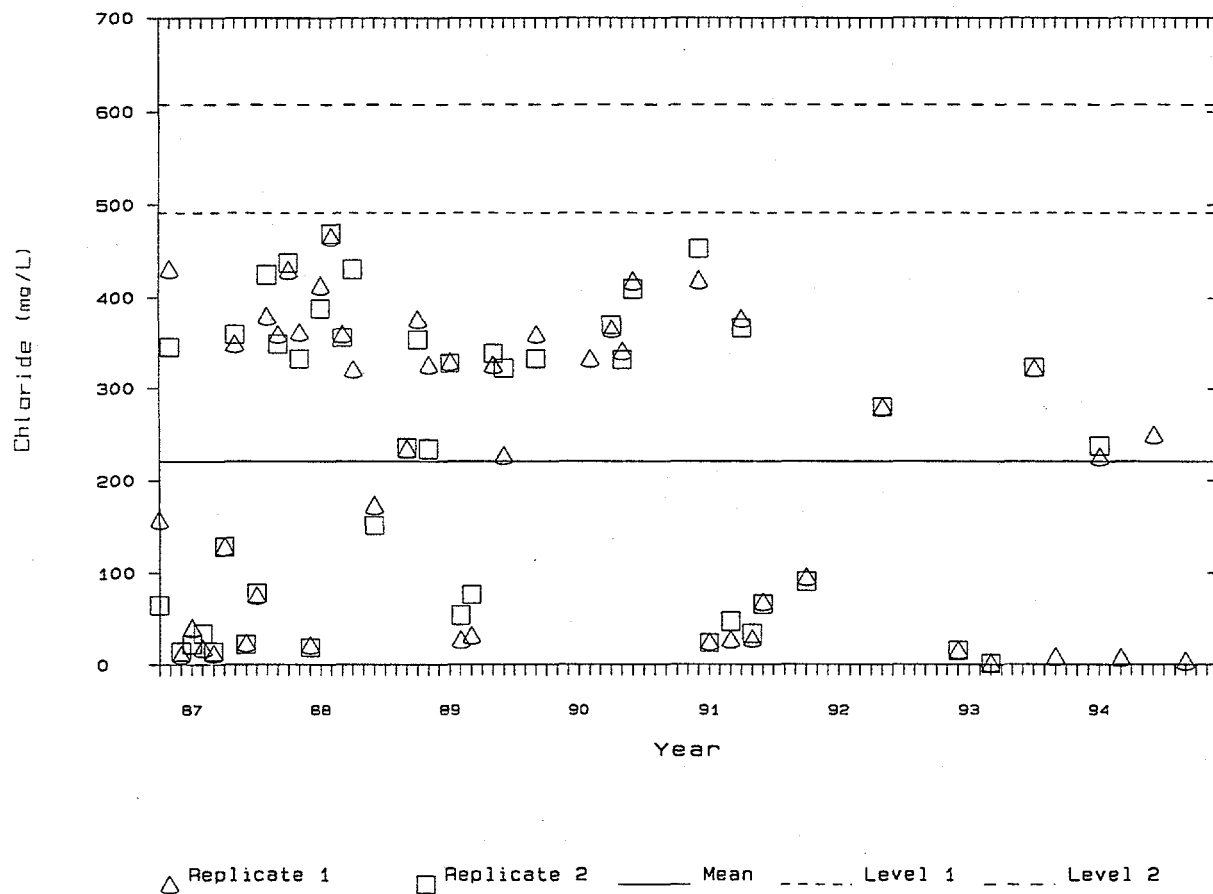
TRA631A pH

RCRA Characteristic Guideline = 2.5-12



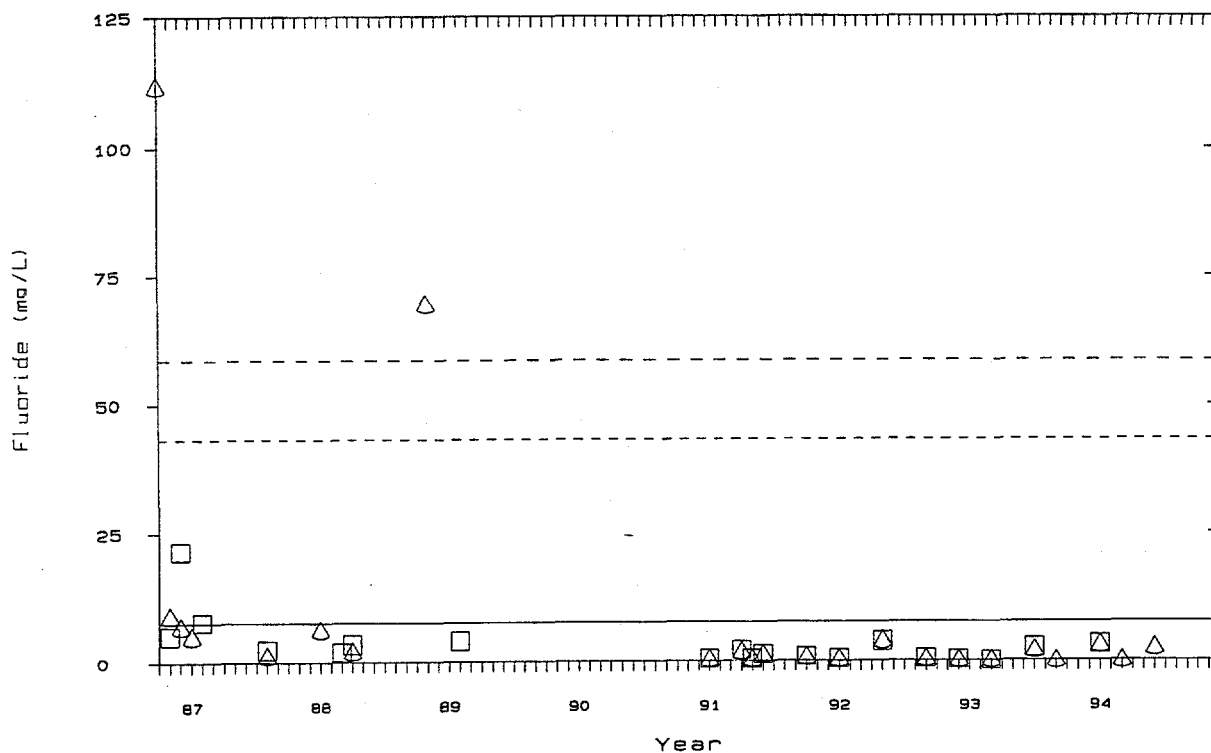
TRA631A Chloride Concentrations

RCRA Guideline Not Applicable



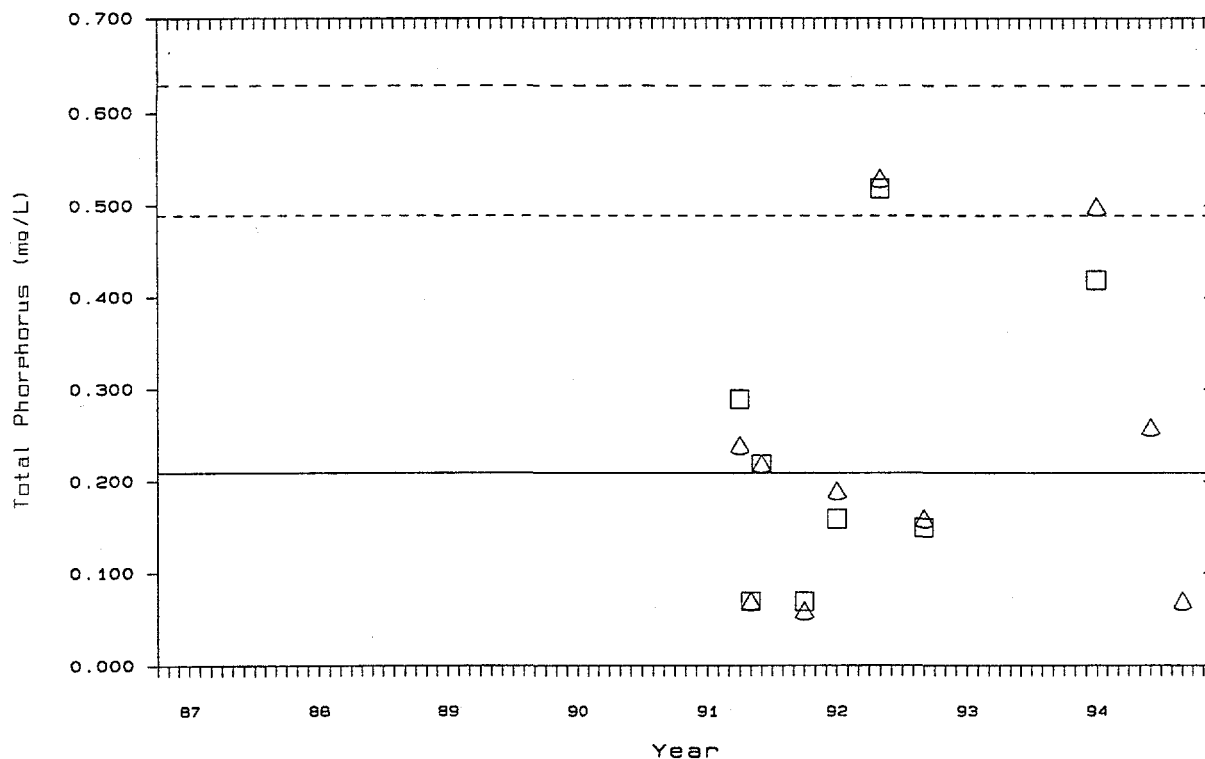
TRA631A Fluoride Concentrations

RCRA Guideline Not Applicable



TRA631A Total Phosphorus Concentrations

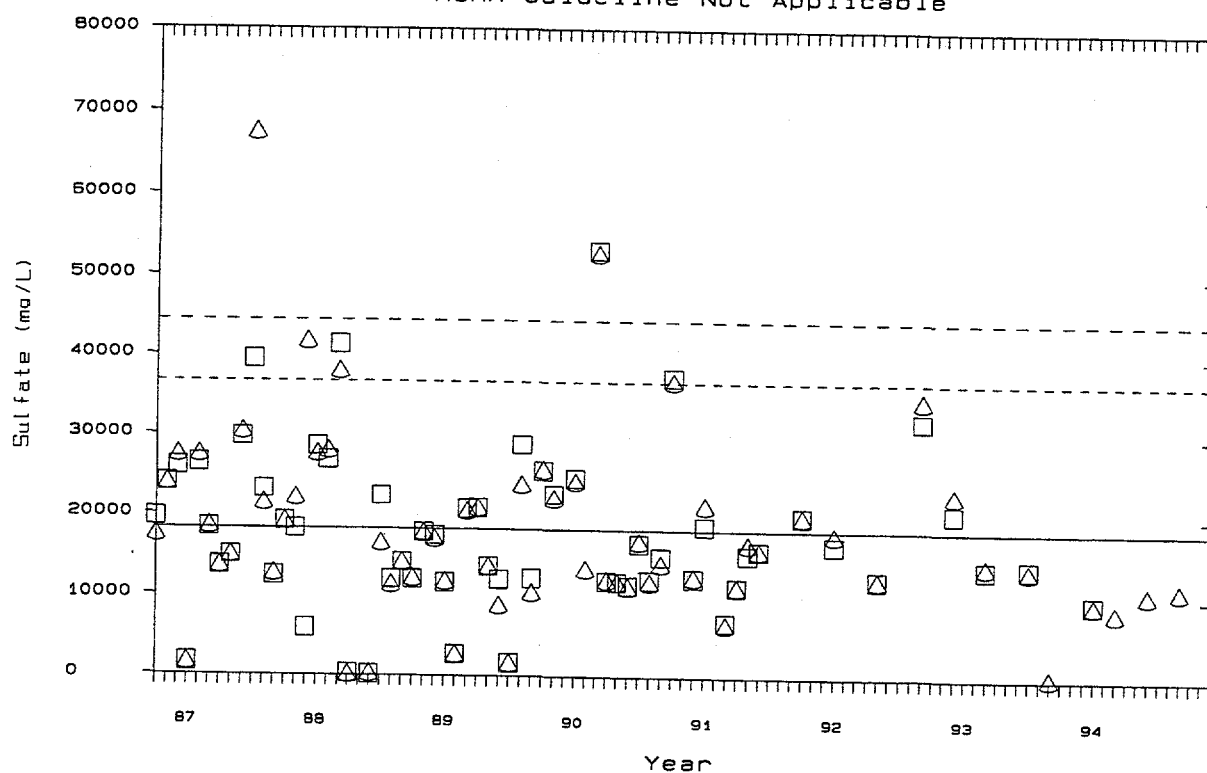
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

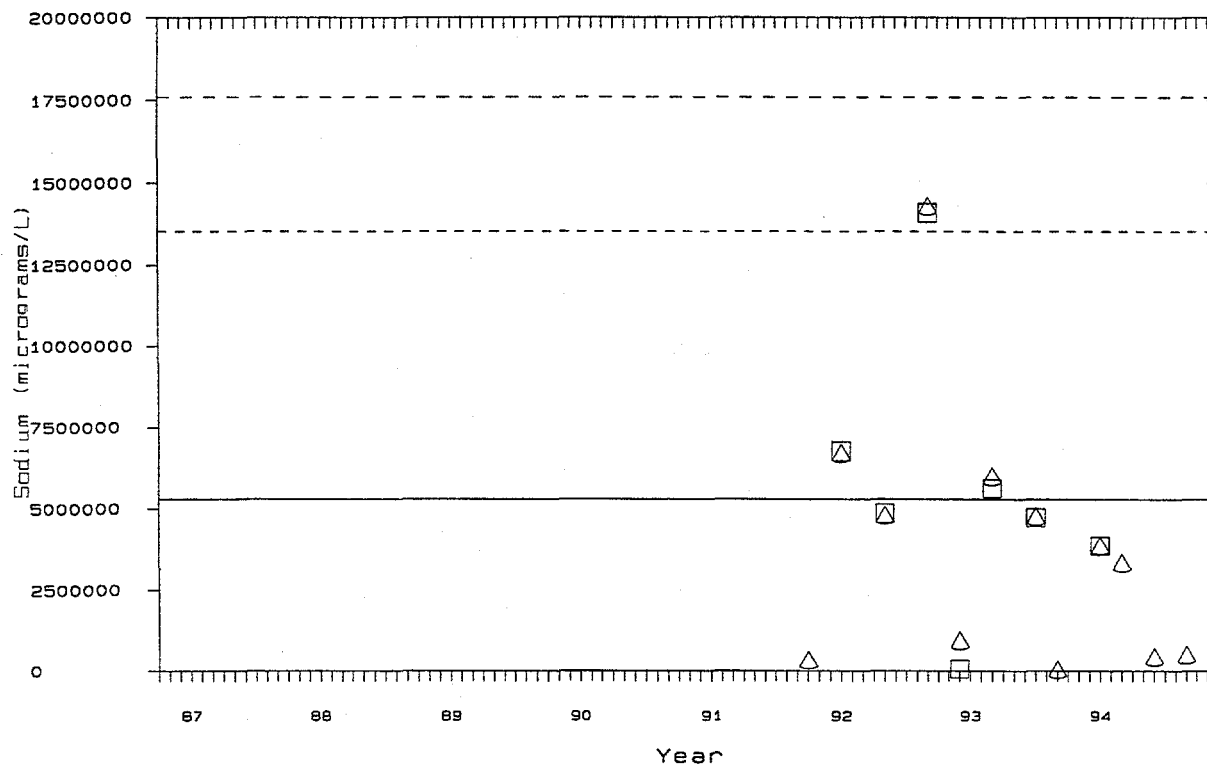
TRA631A Sulfate Concentrations

RCRA Guideline Not Applicable



TRA631A Sodium Concentrations

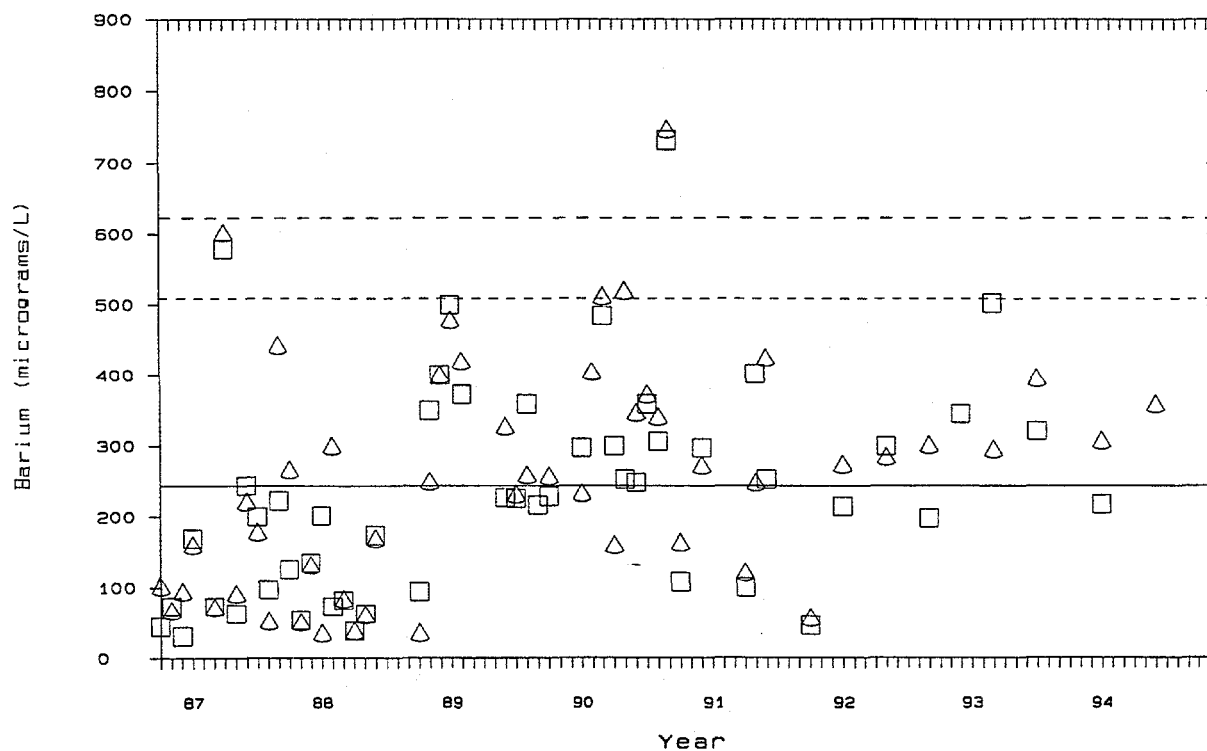
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

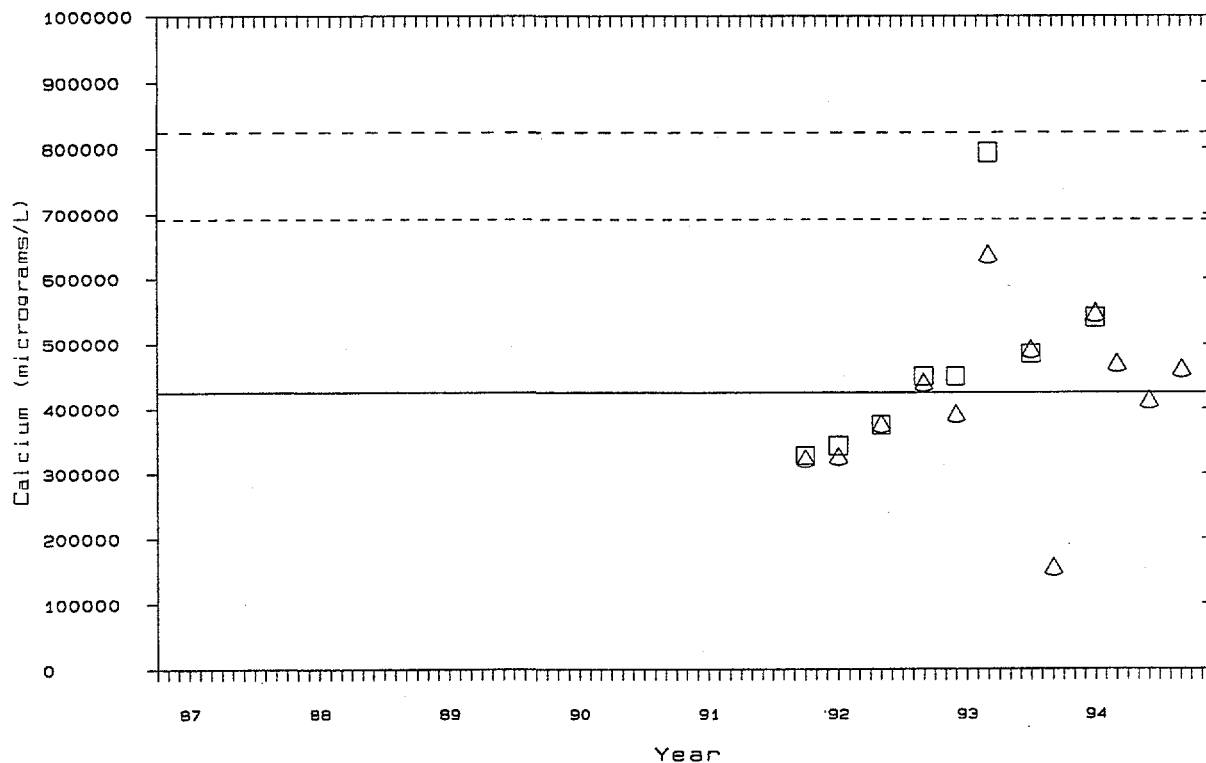
TRA631A Barium Concentrations

RCRA Characteristic Guideline = 100,000 micrograms/L



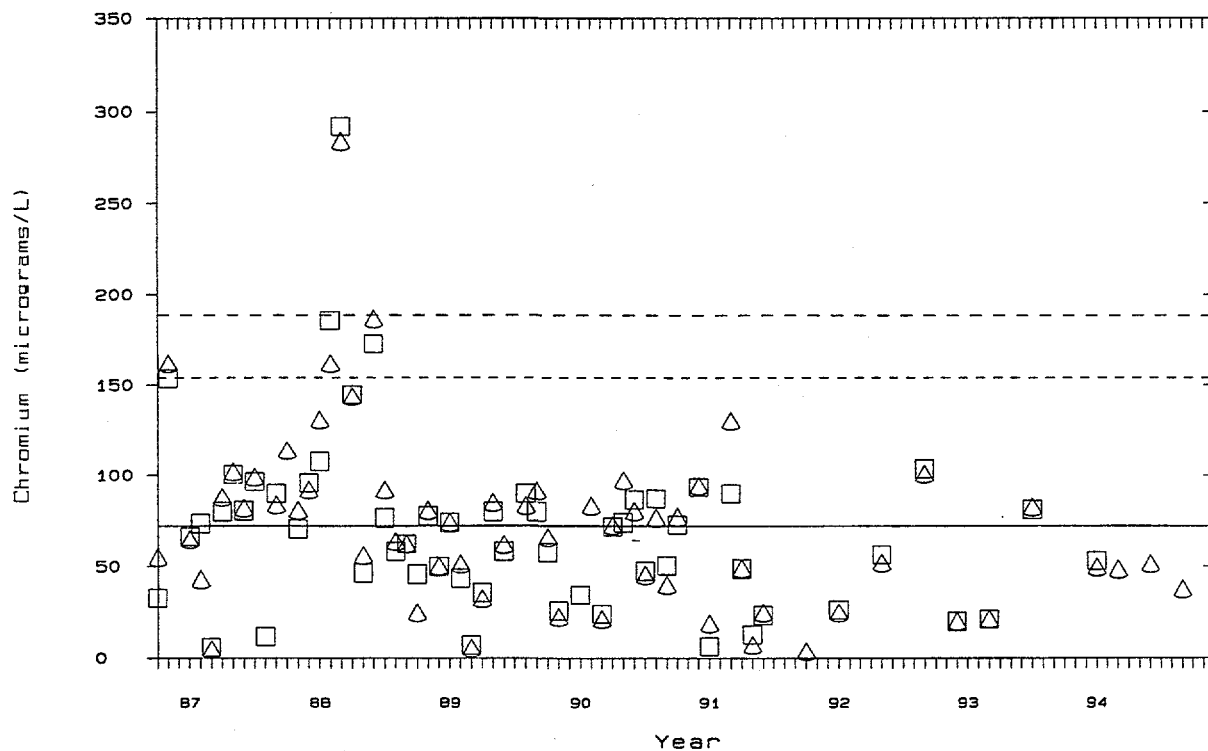
TRA631A Calcium Concentrations

RCRA Guideline Not Applicable



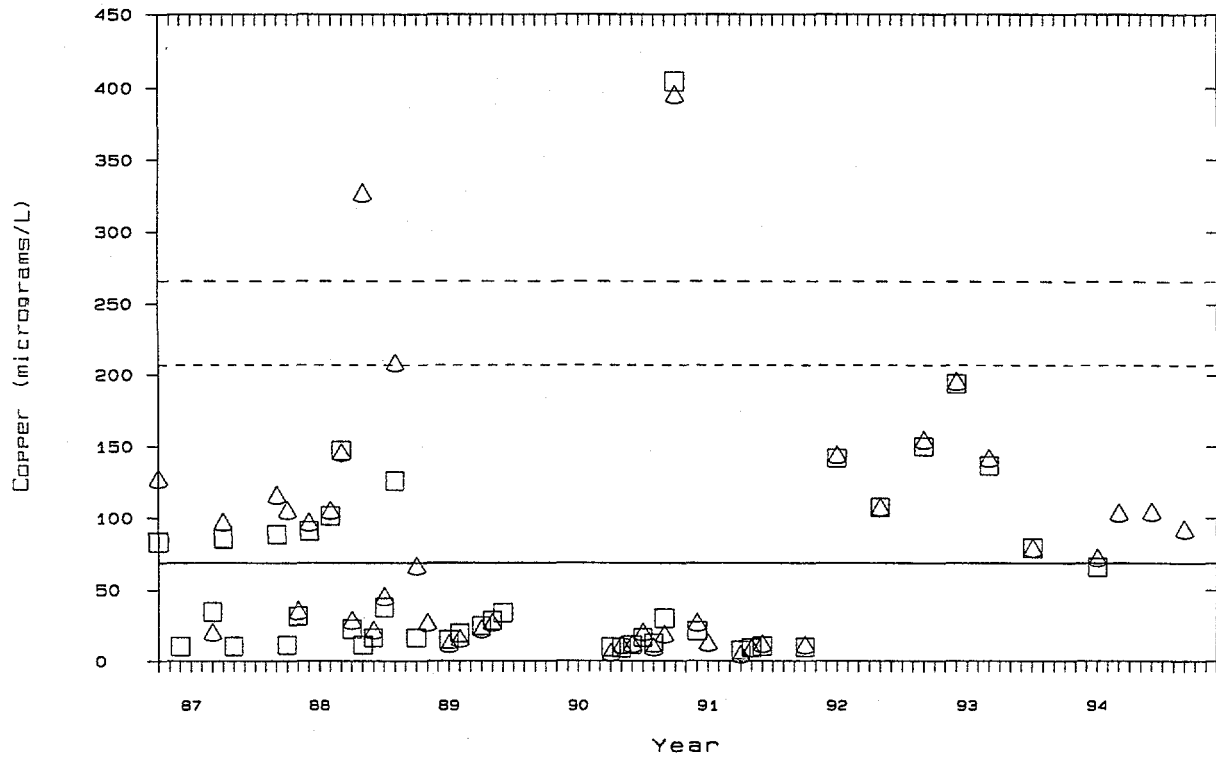
TRA631A Chromium Concentrations

RCRA Characteristic Guideline = 5000 micrograms/L



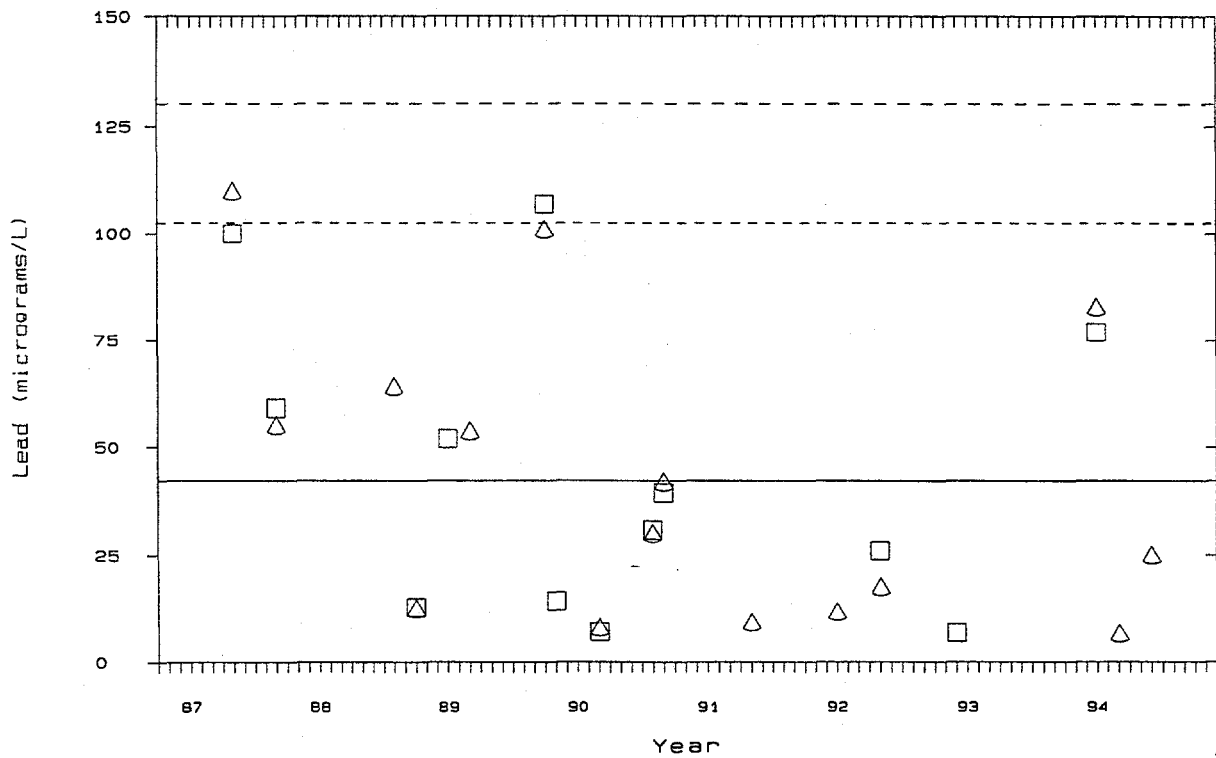
TRA631A Copper Concentrations

RCRA Guideline Not Applicable



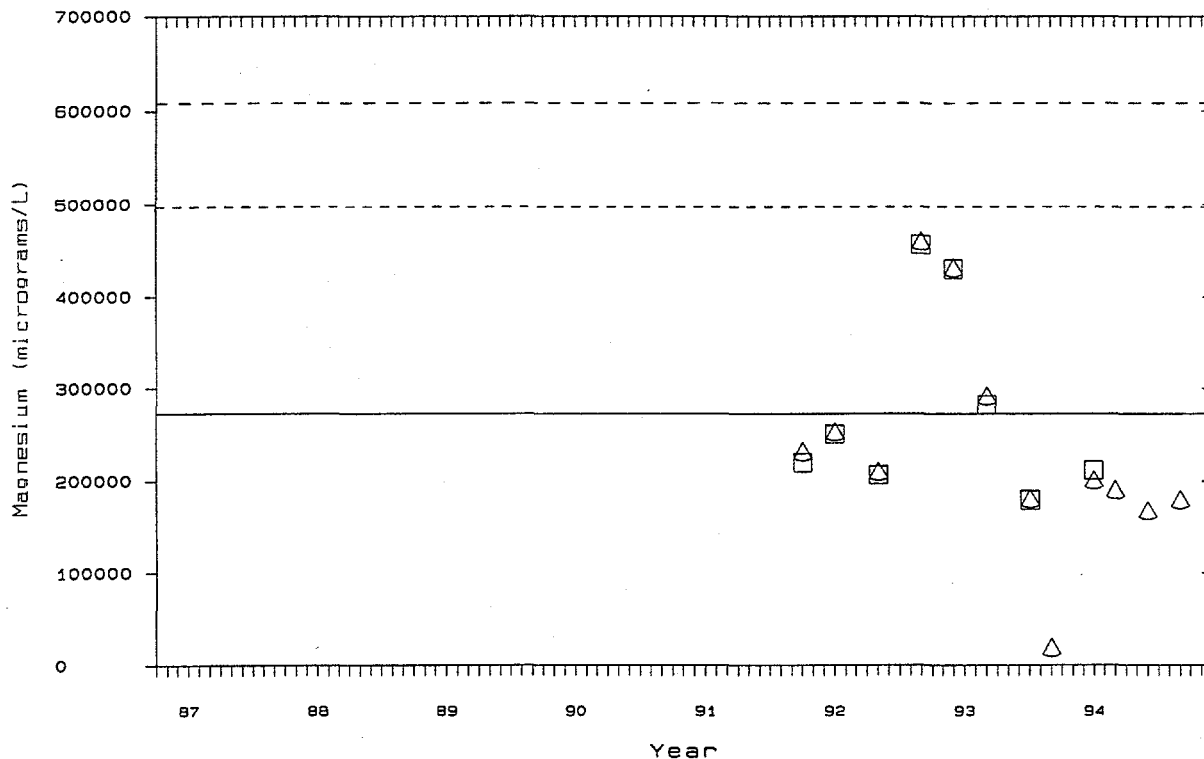
TRA631A Lead Concentrations

RCRA Characteristic Guideline = 5000 micrograms/L



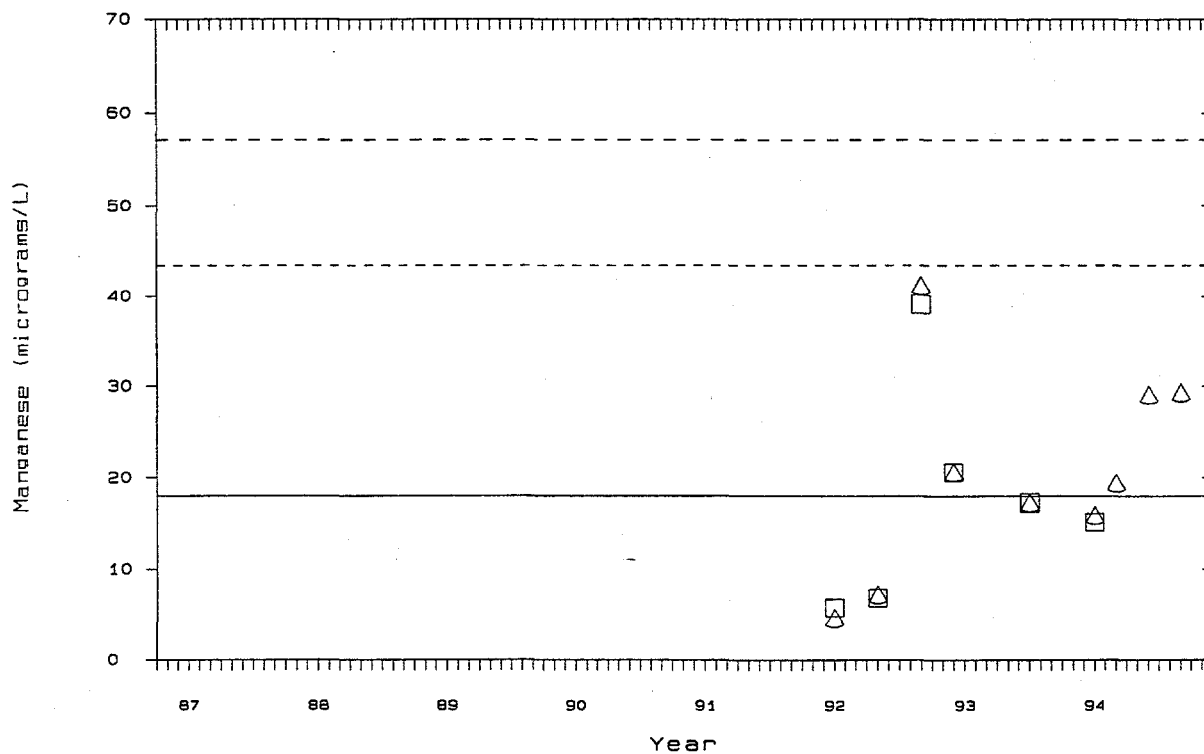
TRA631A Magnesium Concentrations

RCRA Guideline Not Applicable



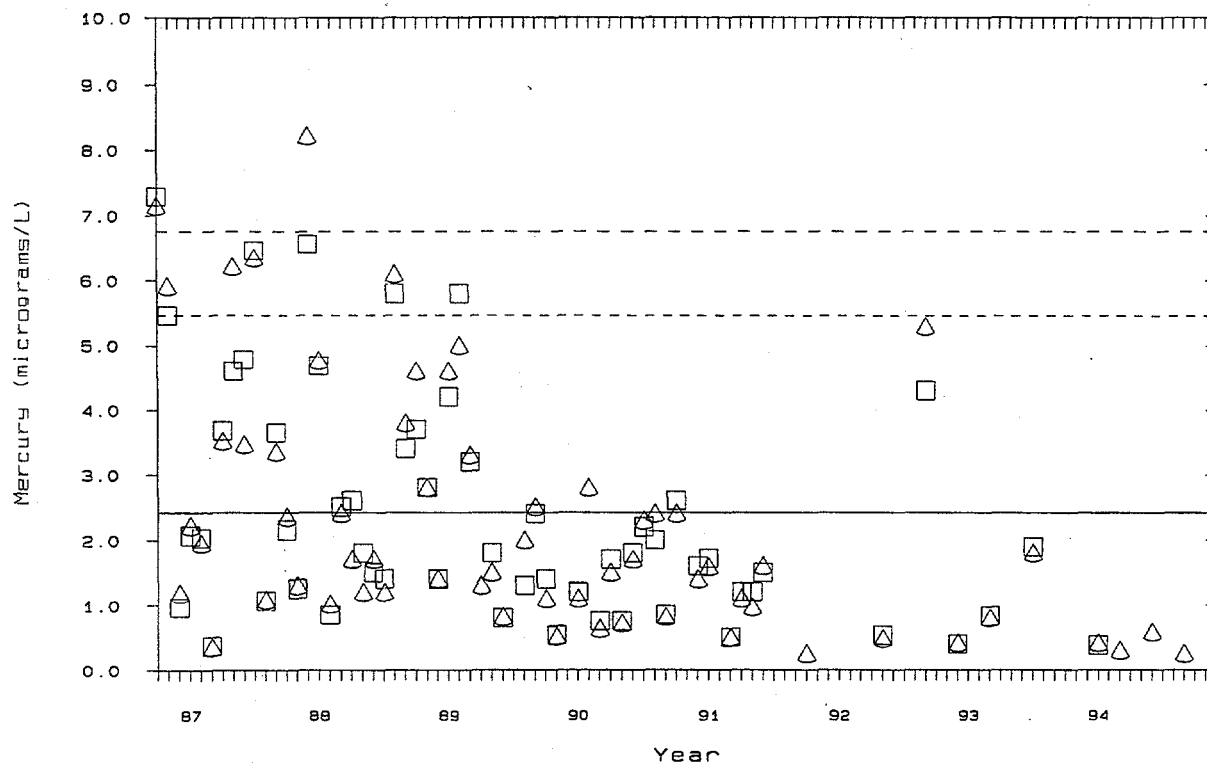
TRA631A Manganese Concentrations

RCRA Guideline Not Applicable



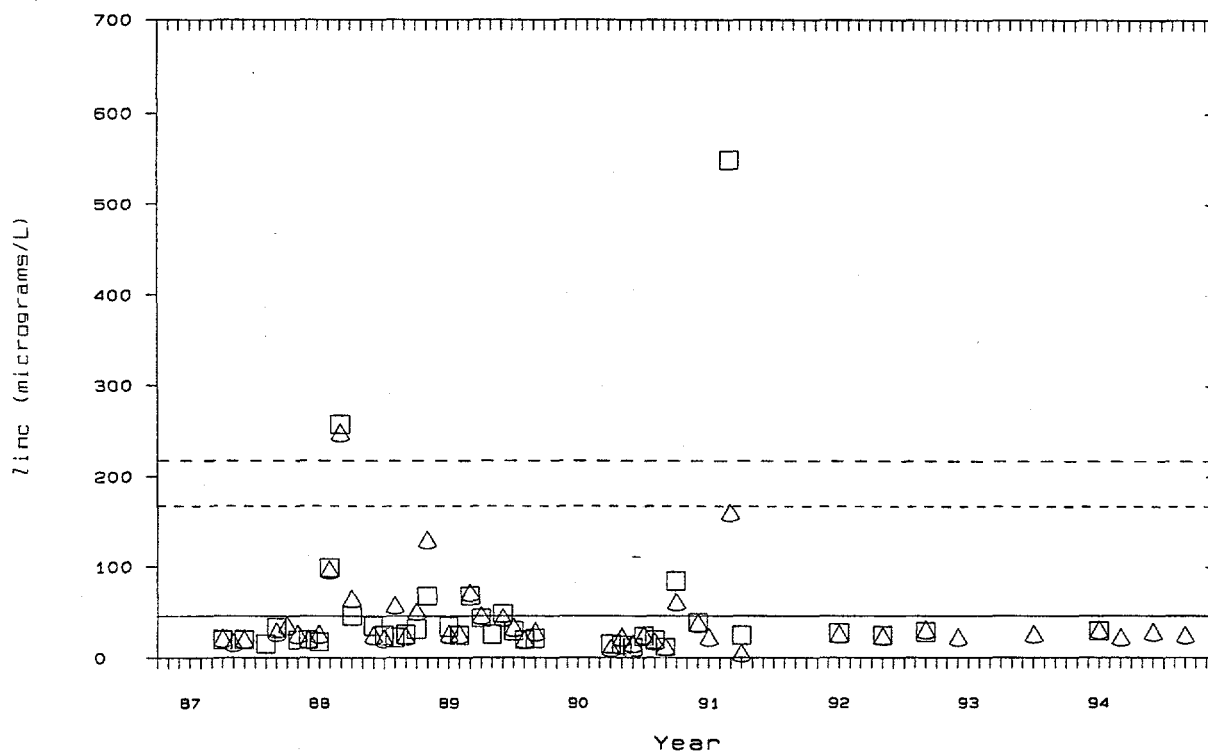
TRA631A Mercury Concentrations

RCRA Characteristic Guideline = 200 micrograms/L



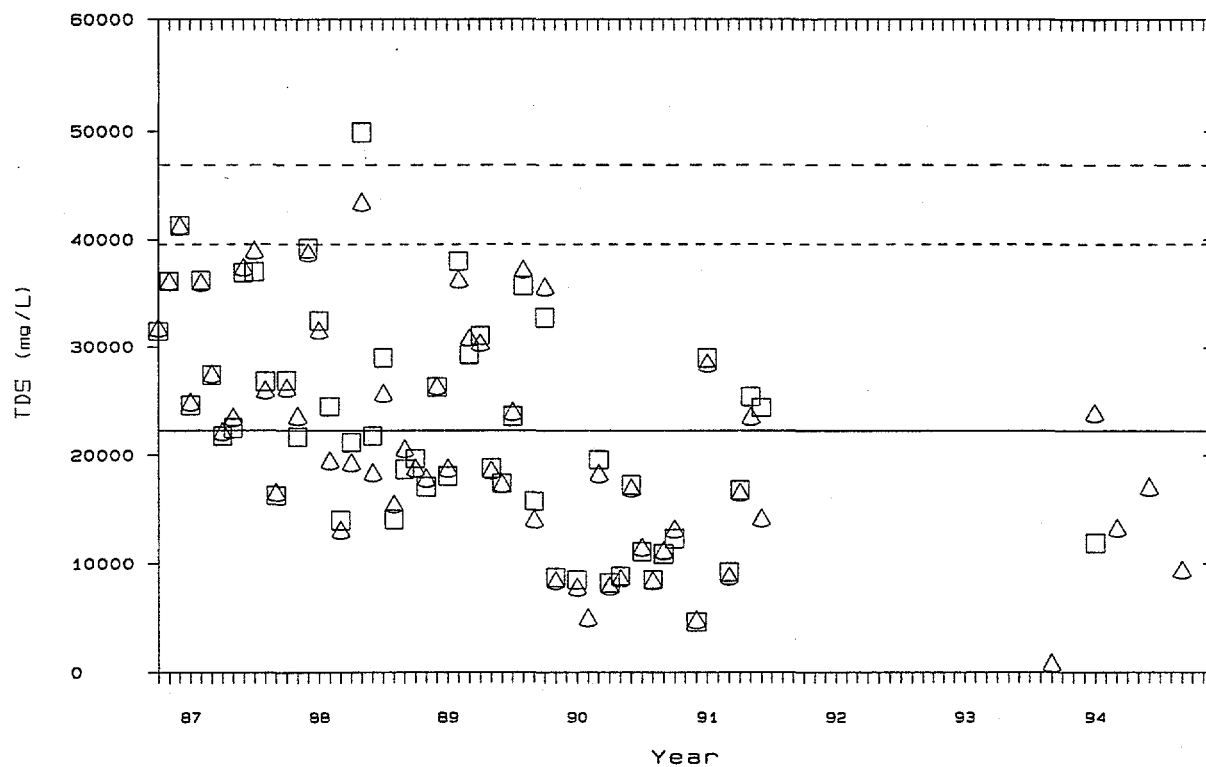
TRA631A Zinc Concentrations

RCRA Guideline Not Applicable



TRA631A TDS Concentrations

RCRA Guideline Not Applicable



**Effluent Monitoring Data for
TRA-636 (Effluent to Retention Basin)**

Table B-39. 1994 effluent monitoring data for TRA-636.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	03/17/94	06/22/94	06/29/94	09/29/94			
Biological Oxygen Demand (5-day) (mg/L)	NR	NR	4.0	2.0			
Conductivity (μ S)	124	47.0	NA	NA			
pH	6.6	7.9	NA	5.8			
Chloride (mg/L)	NR	NR	NR	ND			
Chemical Oxygen Demand (mg/L)	14.6	NR	16.4	ND			
Chromium VI (μ g/L)	ND	NR	ND	NR			
Fluoride (mg/L)	ND	NR	ND	ND			
Surfactants (mg/L)	ND	NR	ND	ND			
Nitrogen, Nitrate-Nitrite (mg-N/L)	0.96	NR	0.15	ND			
Sulfide, Total (mg/L)	ND	NR	ND	ND			
Nitrogen, Total Kjeldahl (mg/L)	0.20	NR	0.78	ND			
Silver (μ g/L)	ND	NR	ND	ND			
Arsenic (μ g/L)	ND	NR	ND	ND			
Barium (μ g/L)	ND	NR	ND	ND			
Beryllium (μ g/L)	ND	NR	ND	ND			
Calcium (μ g/L)	ND	NR	1450	ND			
Cadmium (μ g/L)	ND	NR	10.7	ND			
Cobalt (μ g/L)	ND	NR	ND	ND			
Chromium (μ g/L)	14.3	NR	ND	ND			
Copper (μ g/L)	ND	NR	ND	ND			
Iron (μ g/L)	106	NR	219	ND			

ND - below practical quantitation level
 NA - result not available
 NR - analysis not requested

Table B-39. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	03/17/94	06/22/94	06/29/94	09/29/94					
Mercury ($\mu\text{g/L}$)	ND	NR	ND	ND					
Potassium ($\mu\text{g/L}$)	ND	NR	ND	ND					
Magnesium ($\mu\text{g/L}$)	ND	NR	403	ND					
Manganese ($\mu\text{g/L}$)	ND	NR	11.7	ND					
Sodium ($\mu\text{g/L}$)	ND	NR	1260	ND					
Nickel ($\mu\text{g/L}$)	ND	NR	50.8	ND					
Lead ($\mu\text{g/L}$)	ND	NR	30.8	ND					
Antimony ($\mu\text{g/L}$)	ND	NR	ND	ND					
Selenium ($\mu\text{g/L}$)	ND	NR	ND	ND					
Thallium ($\mu\text{g/L}$)	ND	NR	ND	ND					
Zinc ($\mu\text{g/L}$)	ND	NR	110	39.2					

ND - below practical quantitation level

NR - analysis not requested

Table B-40. 1994 volatile organics data for TRA-636A.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
Methylene Chloride	March	1.00	µg/L	JB	
Methylene Chloride	September	3.00	µg/L	JB	
Toluene	September	3.00	µg/L	J	

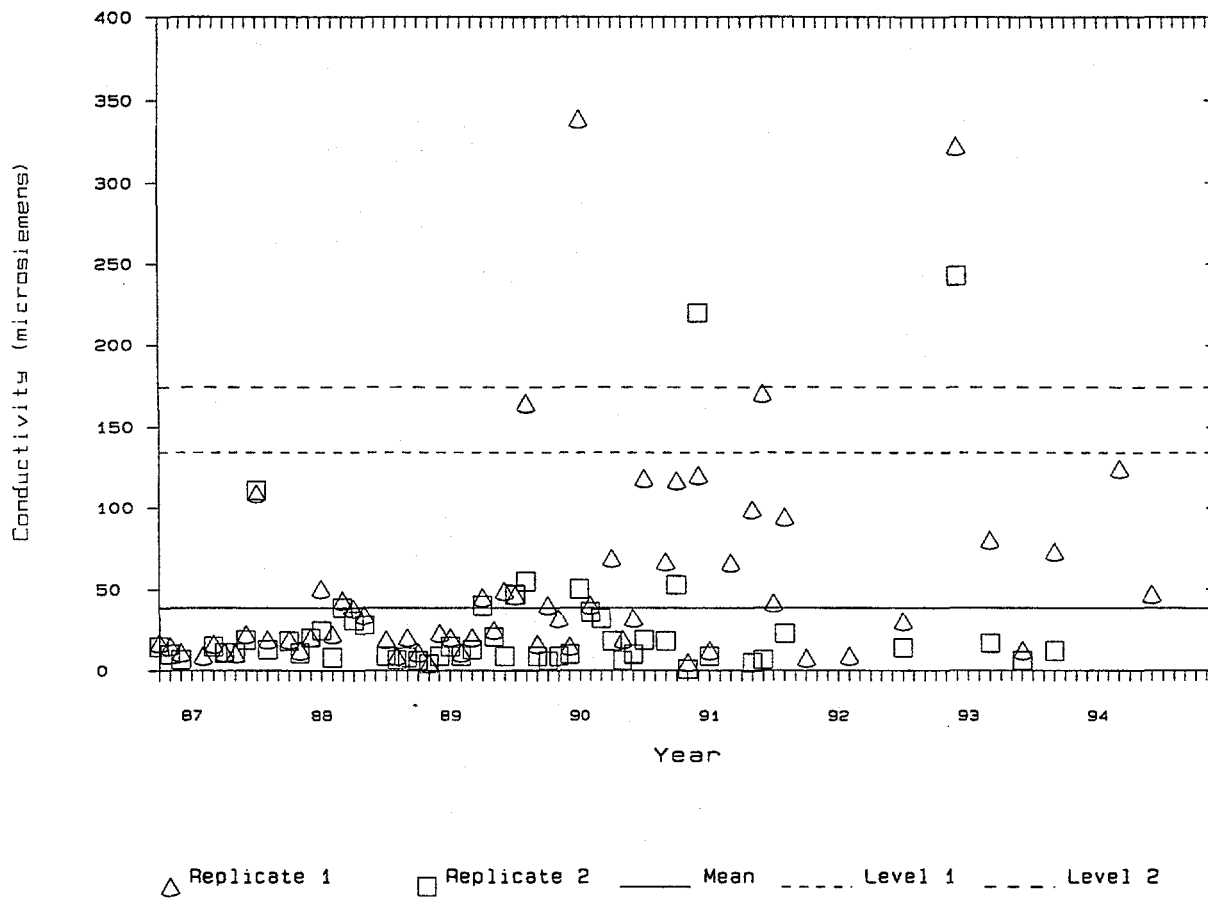
Table B-41. Summary statistics for TRA-636.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Conductivity (μ S)	38.8	57.2	115	134	174	NA
pH	7.0	1.2	128	3.8	10.3	2.5-12
Chloride (mg/L)	3.1	6.6	31	14.6	19.7	NA
Nitrate (mg/L)	3.9	8.2	34	18.1	24.4	NA
Sulfate (mg/L)	3.8	7.6	42	16.7	22.4	NA
TOC (mg/L)	4.3	6.8	25	16.2	21.7	NA
Calcium (μ g/L)	62.1	33.0	14	123	153	NA
Cadmium (μ g/L)	8.0	3.7	11	15.0	18.6	1000
Chromium (μ g/L)	11.3	8.0	23	25.3	31.8	5000
Copper (μ g/L)	12.2	7.7	21	25.7	32.0	NA
Mercury (μ g/L)	0.57	0.63	23	1.7	2.2	200
Sodium (μ g/L)	259	306	14	820	1098	NA
Nickel (μ g/L)	48.2	37.0	16	115	147	NA
Lead (μ g/L)	11.0	9.5	33	27.2	34.5	5000
Zinc (μ g/L)	24.5	19.5	68	57.2	71.2	NA

Guideline - RCRA Characteristic Guideline
 NA - Not Applicable

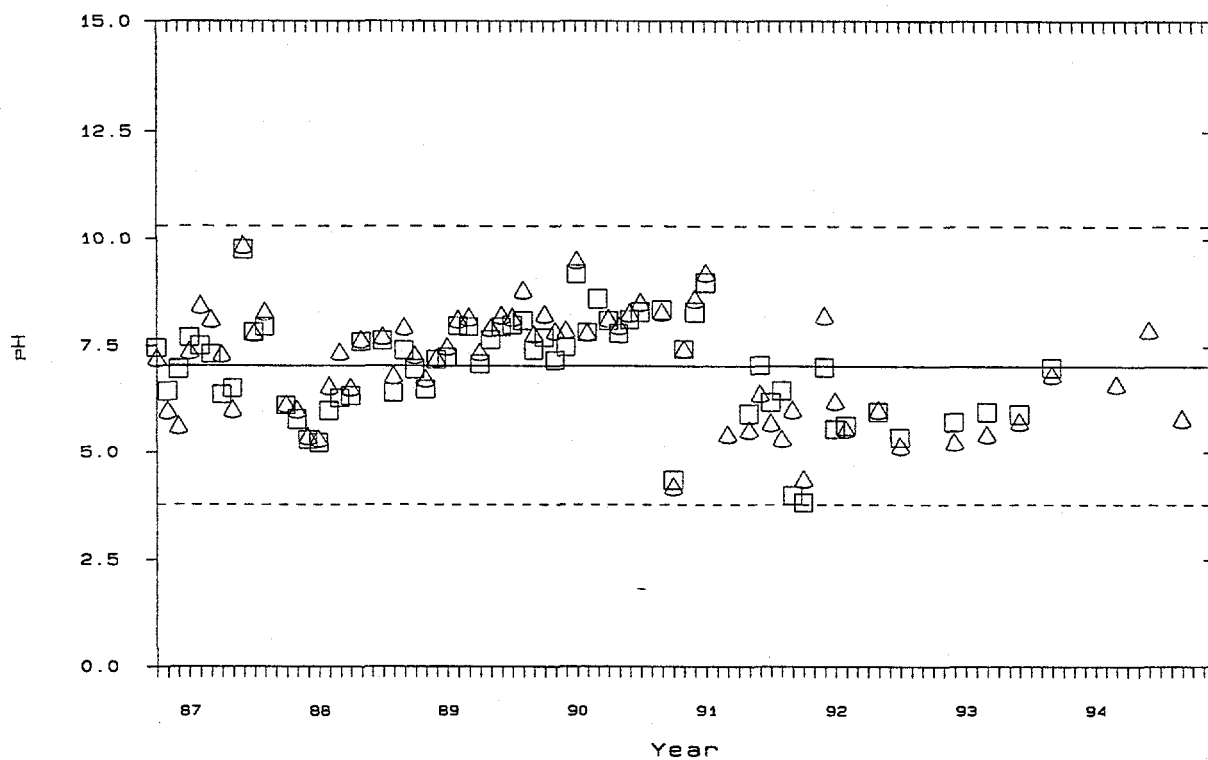
TRA636A Conductivity

RCRA Guideline Not Applicable



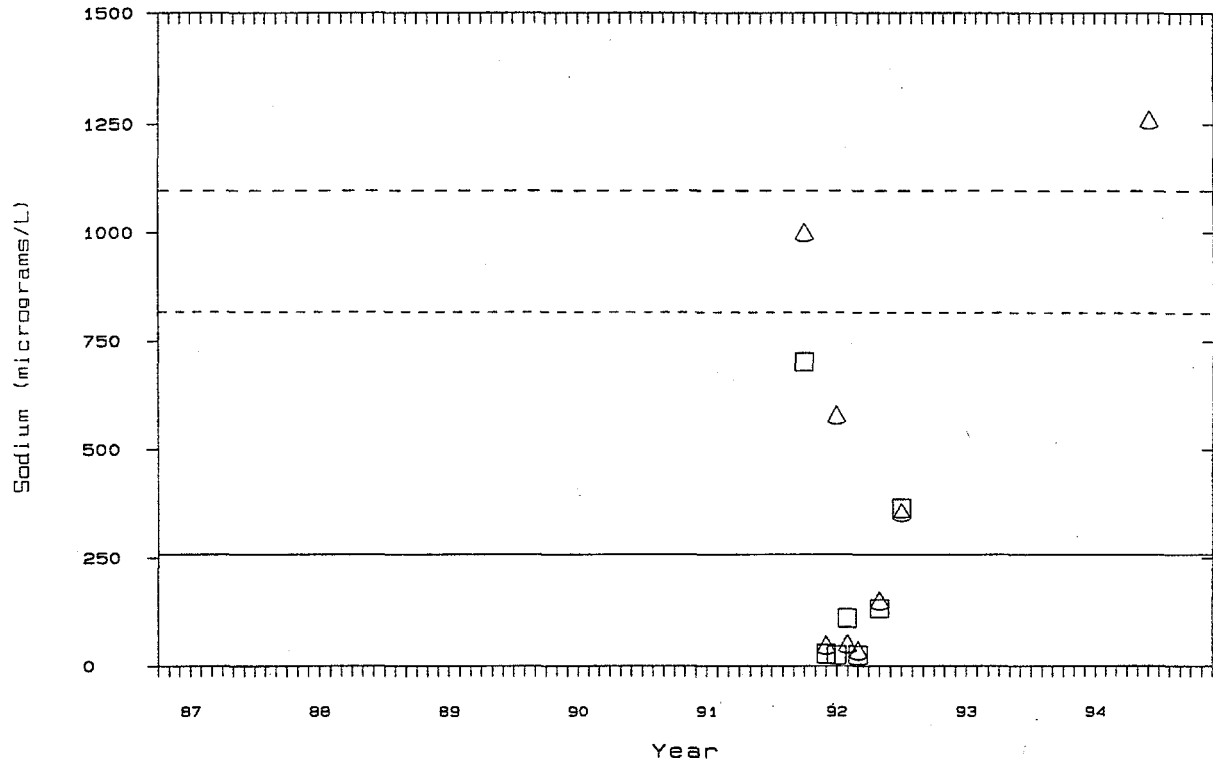
TRA636A pH

RCRA Characteristic Guideline = 2.5-12



TRA636A Sodium Concentrations

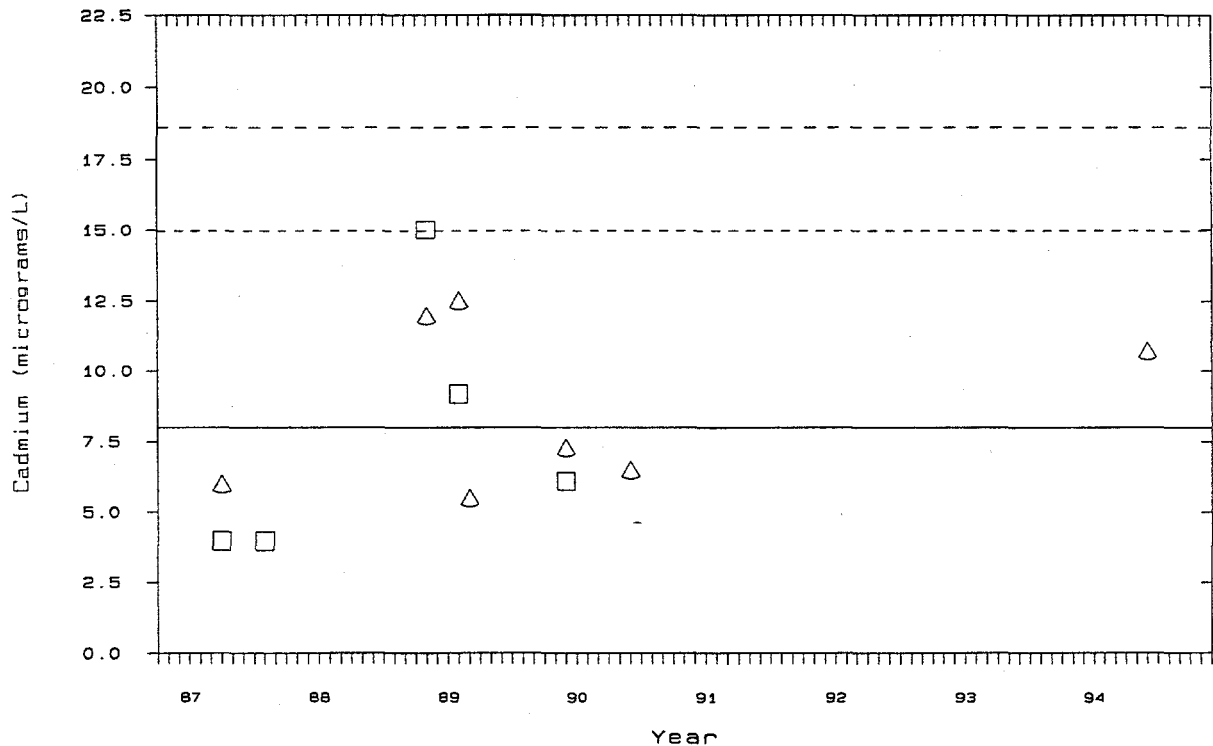
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

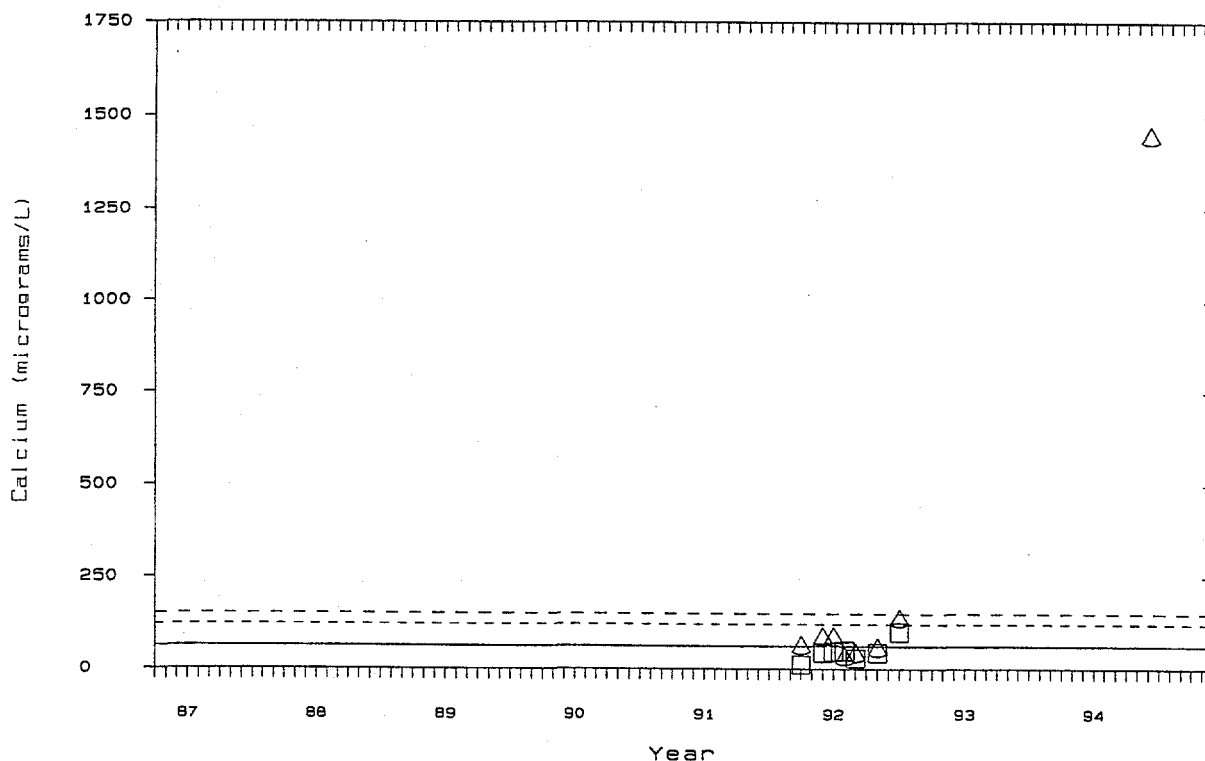
TRA636A Cadmium Concentrations

RCRA Characteristic Guideline = 1000 micrograms/L



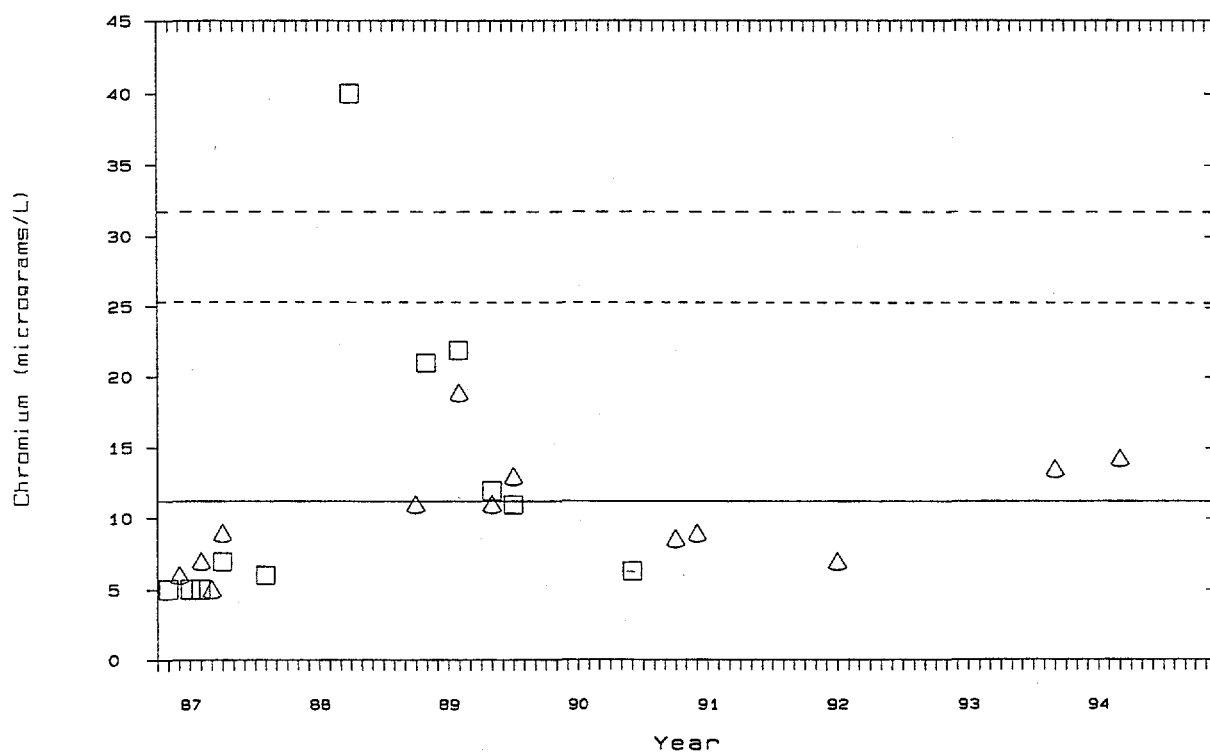
TRA636A Calcium Concentrations

RCRA Guideline Not Applicable



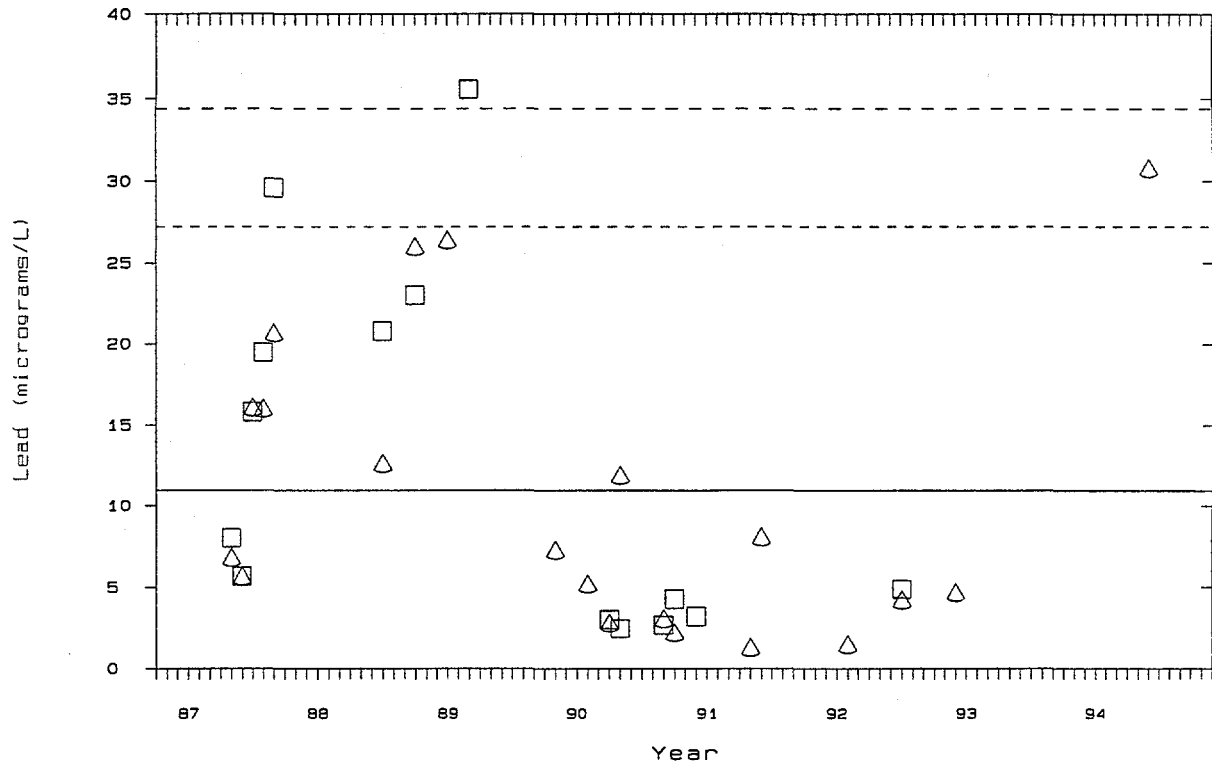
TRA636A Chromium Concentrations

RCRA Characteristic Guideline = 5000 micrograms/L



TRA636A Lead Concentrations

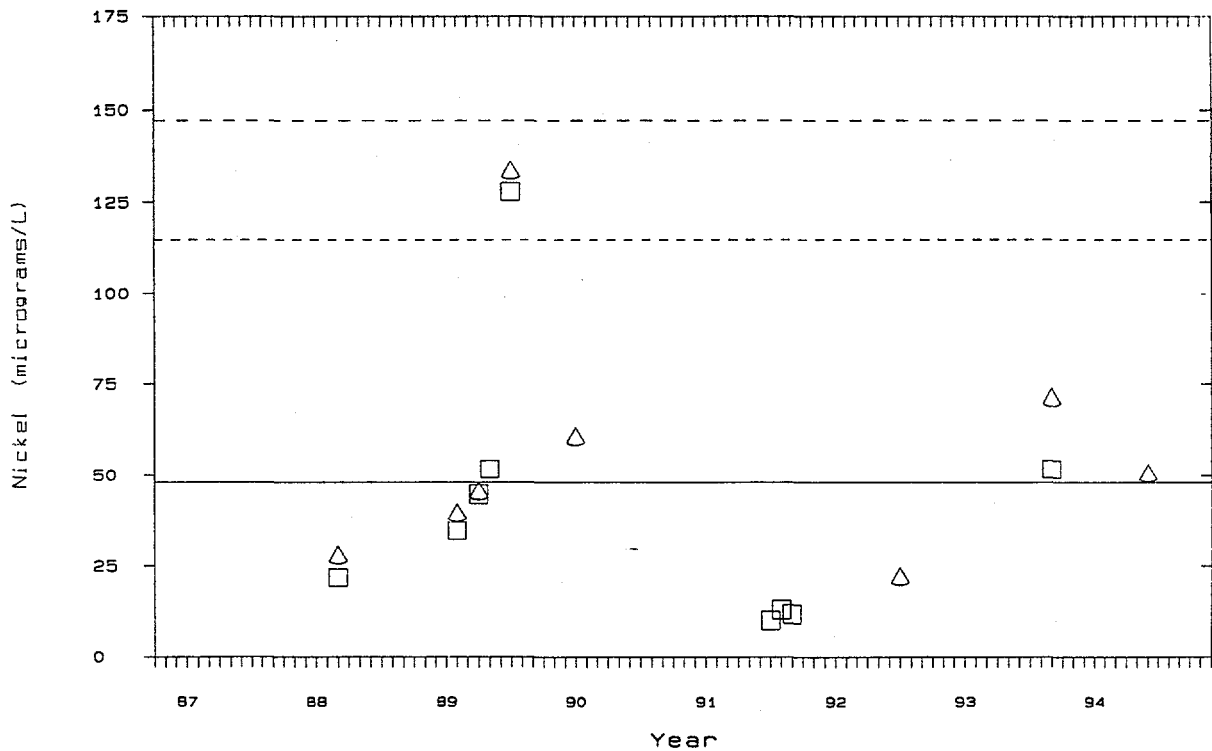
RCRA Characteristic Guideline = 5000 micrograms/L



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

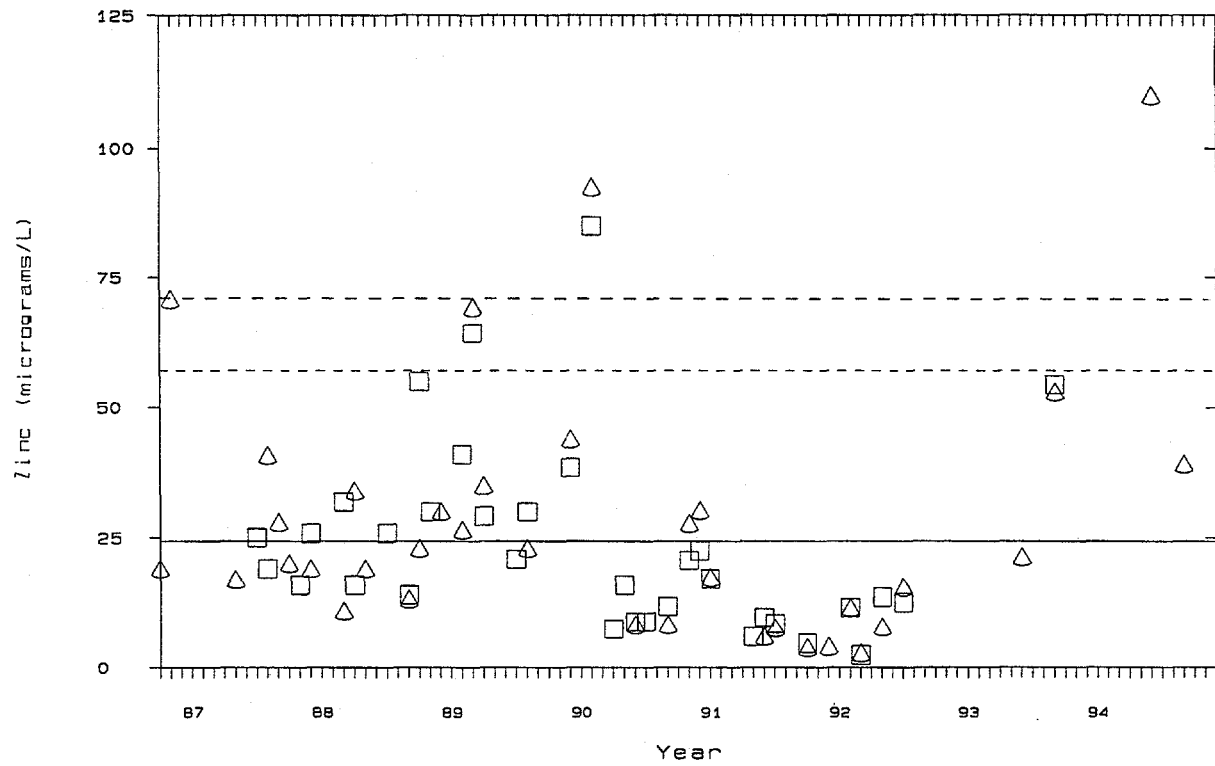
TRA636A Nickel Concentrations

RCRA Guideline Not Applicable



TRA636A Zinc Concentrations

RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

**Effluent Monitoring Data for
TRA-764 (Effluent to Cold Waste Pond)**

Table B-42. 1994 effluent monitoring data for TRA-764.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	02/24/94	05/19/94	08/10/94	11/03/94				
Biological Oxygen Demand (5-day) (mg/L)	NR	3.0	1.0	99.0				
Conductivity (μ S)	1046	573	377	978				
pH	7.5	8.2	7.4	7.5				
Chloride (mg/L)	29.4	11.2	10.9	28.7				
Chemical Oxygen Demand (mg/L)	59.8	ND	8.4	ND				
Fluoride (mg/L)	0.40	0.14	0.15	0.42				
Surfactants (mg/L)	ND	ND	ND	ND				
Nitrogen, Nitrate-Nitrite (mg-N/L)	2.1	0.98	0.89	2.4				
Total Phosphorus (mg/L)	1.3	0.05	0.29	1.7				
TDS (mg/L)	804	250	270	710				
Nitrogen, Total Kjeldahl (mg/L)	0.27	ND	ND	ND				
TOC (mg/L)	2.3	ND	0.70	16.0				
TSS (mg/L)	ND	8.0	7.0	ND				
Silver (μ g/L)	ND	ND	ND	ND				
Arsenic (μ g/L)	16.9	ND	ND	14.5				
Barium (μ g/L)	ND	ND	ND	ND				
Beryllium (μ g/L)	ND	ND	ND	ND				
Calcium (μ g/L)	142000	45300	53200	126000				
Cadmium (μ g/L)	ND	ND	ND	ND				
Cobalt (μ g/L)	ND	ND	ND	ND				
Chromium (μ g/L)	32.4	ND	ND	ND				

ND - below practical quantitation level

NR - analysis not requested

Table B-42. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	02/24/94	05/19/94	08/10/94	11/03/94					
Copper ($\mu\text{g/L}$)	33.9	ND	ND	ND					
Iron ($\mu\text{g/L}$)	1400	ND	ND	153					
Mercury ($\mu\text{g/L}$)	1.2	ND	ND	ND					
Potassium ($\mu\text{g/L}$)	11500	ND	ND	8990					
Magnesium ($\mu\text{g/L}$)	53900	17100	20300	47700					
Manganese ($\mu\text{g/L}$)	26.1	ND	ND	ND					
Sodium ($\mu\text{g/L}$)	23900	7370	9080	20800					
Nickel ($\mu\text{g/L}$)	ND	ND	ND	ND					
Lead ($\mu\text{g/L}$)	3.9	ND	ND	ND					
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND					
Selenium ($\mu\text{g/L}$)	ND	ND	ND	ND					
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND					
Zinc ($\mu\text{g/L}$)	33.9	ND	ND	ND					

ND - below practical quantitation level

Table B-43. 1994 volatile organics data for TRA-764A.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
Methylene Chloride	February	1.00	µg/L	JB	
Methylene Chloride	May	3.00	µg/L	JB	
Methylene Chloride	August	3.00	µg/L	JB	
Trichlorofluoromethane	August	1.00	µg/L	J	

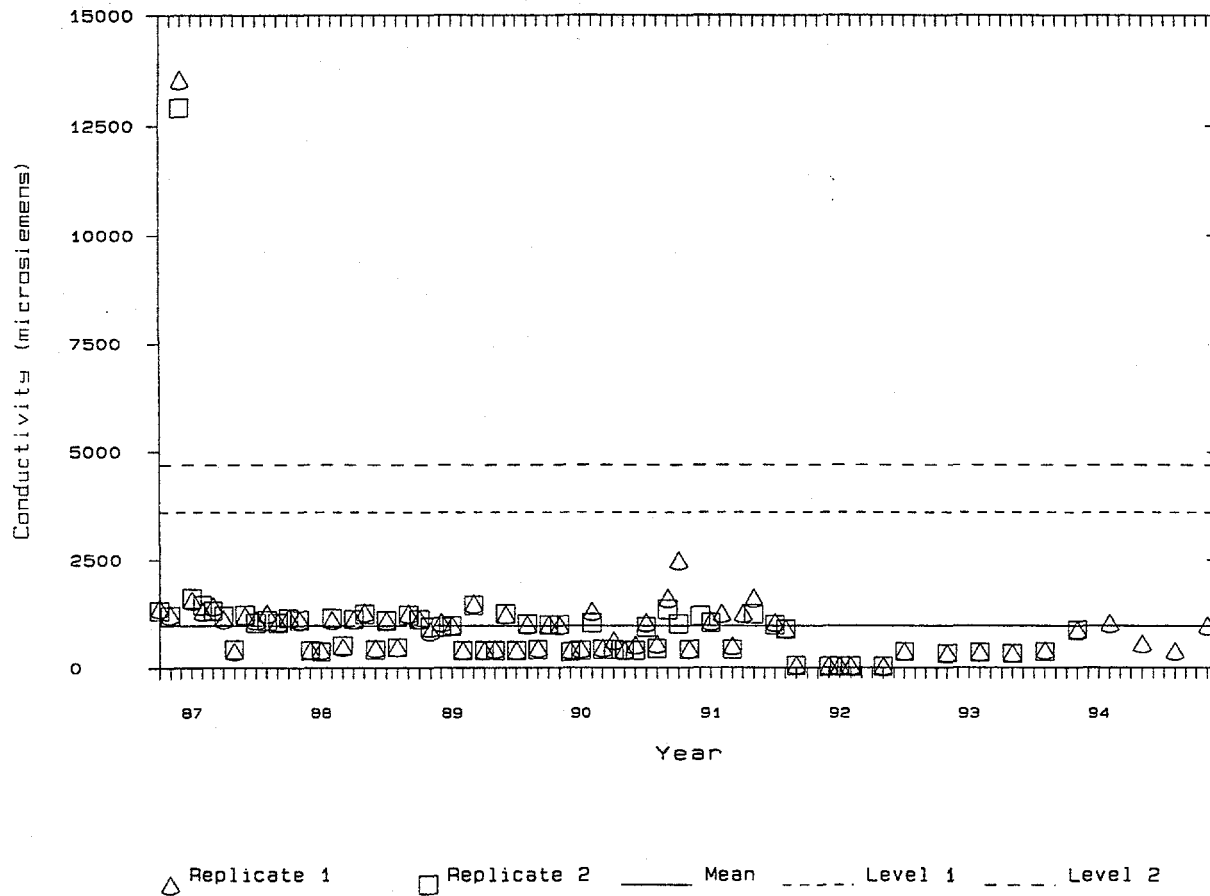
Table B-44. Summary statistics for TRA-764.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Conductivity (μ S)	999	1574	135	3616	4719	NA
pH	7.7	0.56	135	6.2	9.1	2.5-12
Chloride (mg/L)	23.7	10.6	119	41.3	48.7	NA
Fluoride (mg/L)	0.31	0.23	56	0.69	0.85	NA
Nitrogen, Nitrate-Nitrite (mg-N/L)	2.5	3.2	10	8.7	12.0	NA
Nitrate (mg/L)	9.9	5.0	90	18.4	21.9	NA
Nitrogen, as Nitrate (mg-N/L)	1.7	0.96	20	3.4	4.2	NA
Phosphate (mg/L)	11.0	26.8	74	55.9	75.1	NA
Total Phosphorus (mg/L)	1.2	1.0	14	3.0	3.9	NA
Sulfate (mg/L)	294	236	118	687	852	NA
TOC (mg/L)	5.4	13.3	65	27.7	37.3	NA
Silver (μ g/L)	11.6	3.2	14	17.5	20.4	5000
Arsenic (μ g/L)	32.5	73.4	34	159	215	5000
Barium (μ g/L)	91.6	47.5	87	171	205	100,000
Calcium (μ g/L)	54459	26607	22	101271	122951	NA
Cadmium (μ g/L)	7.2	4.9	16	16.0	20.3	1000
Chromium (μ g/L)	18.7	20.3	52	53.0	67.9	5000
Copper (μ g/L)	37.4	80.4	53	173	232	NA
Mercury (μ g/L)	0.43	0.57	32	1.4	1.9	200
Magnesium (μ g/L)	20027	9584	22	36890	44700	NA
Sodium (μ g/L)	11402	7558	22	24700	30858	NA
Nickel (μ g/L)	29.6	26.5	11	79.7	106	NA
Lead (μ g/L)	20.9	33.3	36	77.8	103	5000
Selenium (μ g/L)	68.3	116	19	274	371	1000
Zinc (μ g/L)	45.2	58.7	60	144	187	NA

Guideline - RCRA Characteristic Guideline
 NA - Not Applicable

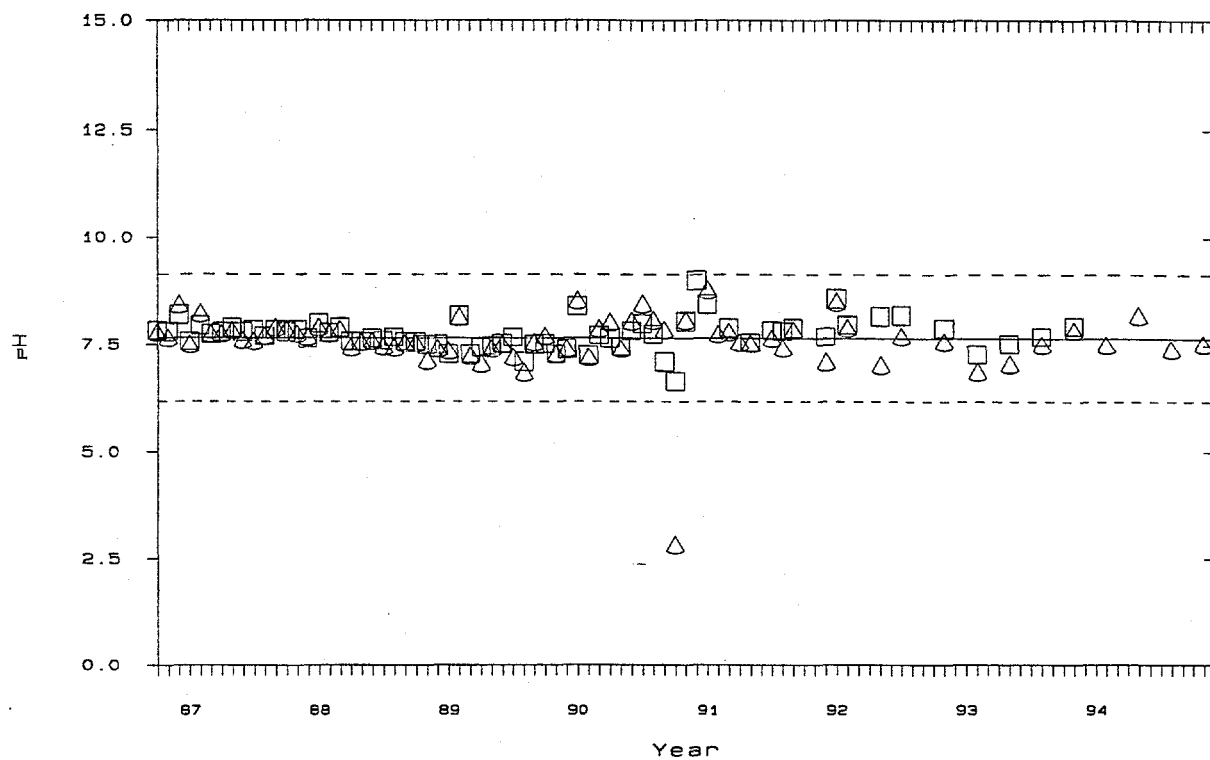
TRA764A Conductivity

RCRA Guideline Not Applicable



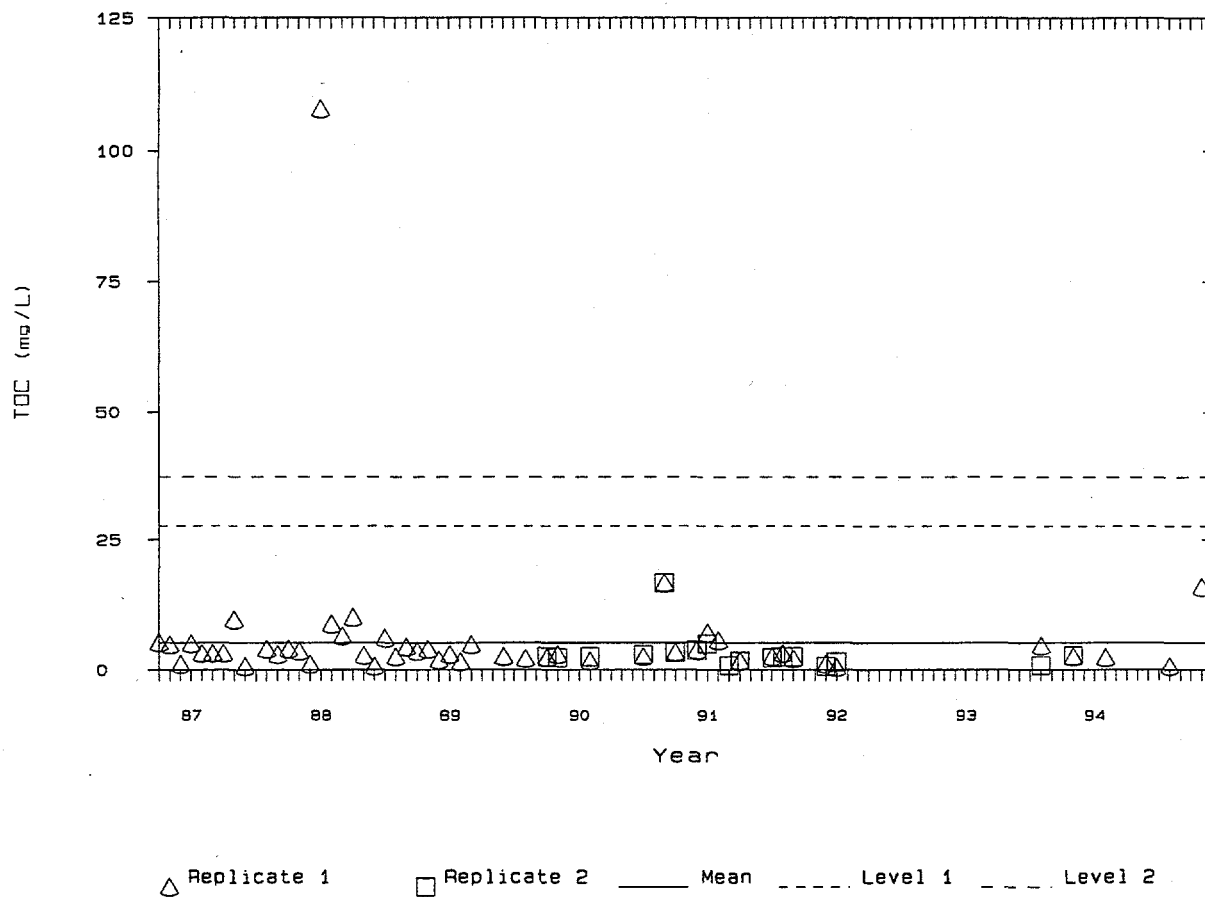
TRA764A pH

RCRA Characteristic Guideline = 2.5-12



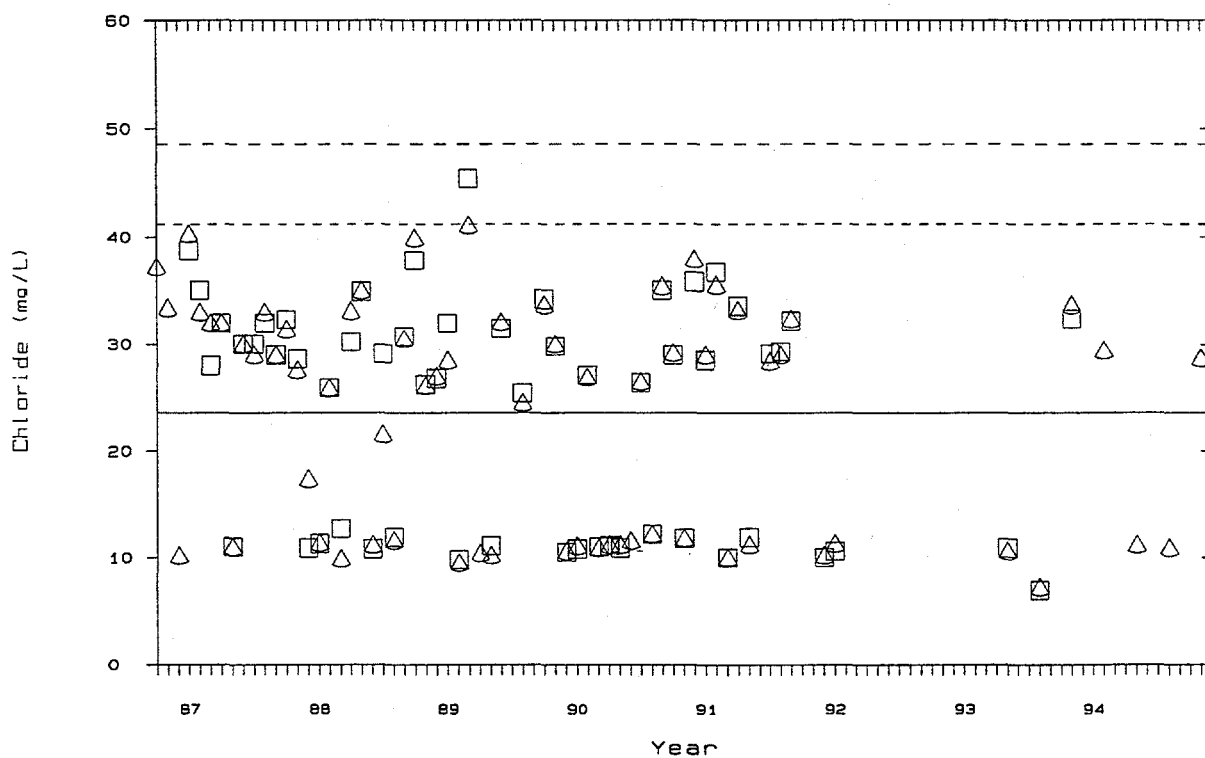
TRA764A TOC Concentrations

RCRA Guideline Not Applicable

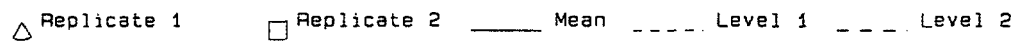


TRA764A Chloride Concentrations

RCRA Guideline Not Applicable



RCRA Guideline Not Applicable

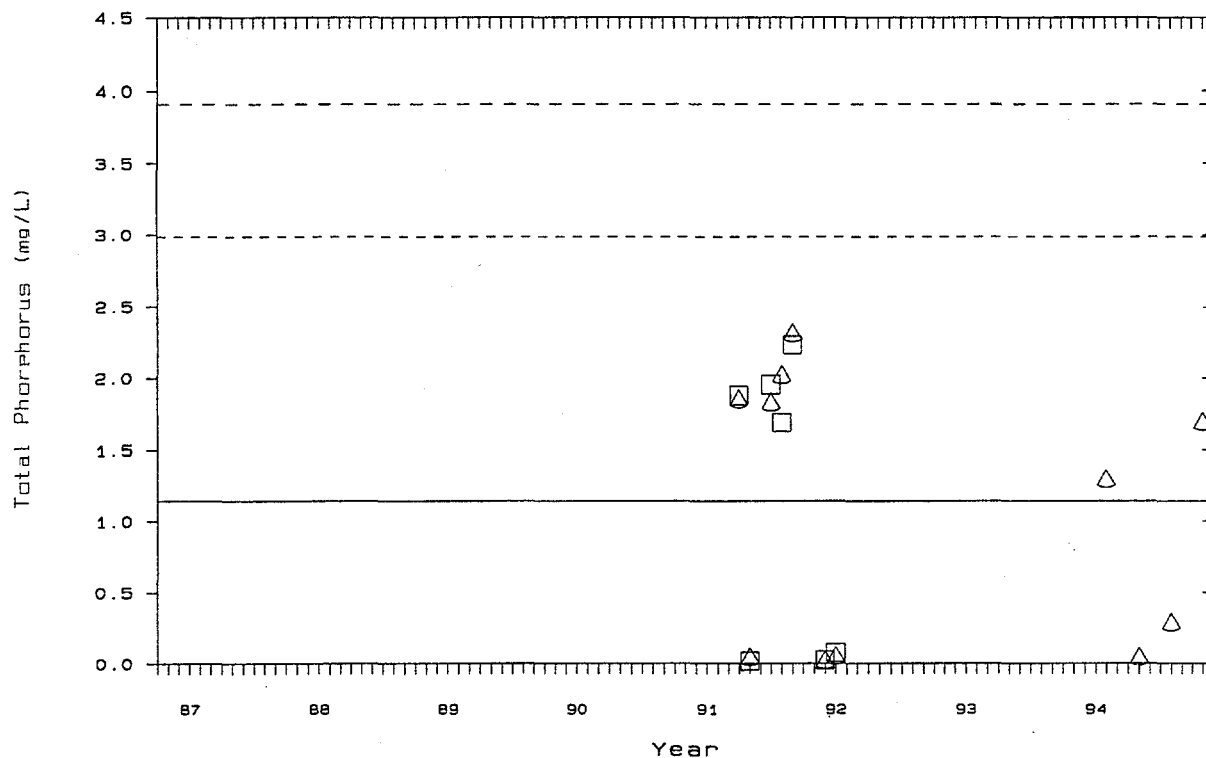


RCRA Guideline Not Applicable



TRA764A Total Phosphorus Concentrations

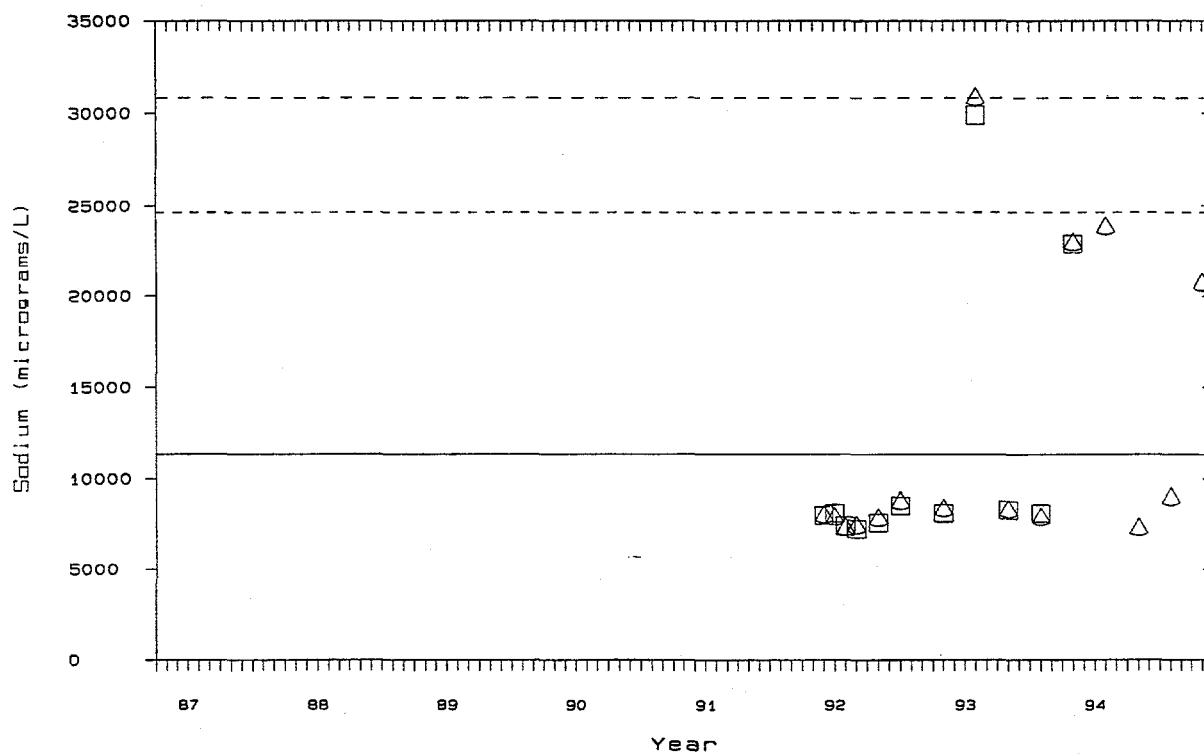
RCRA Guideline Not Applicable



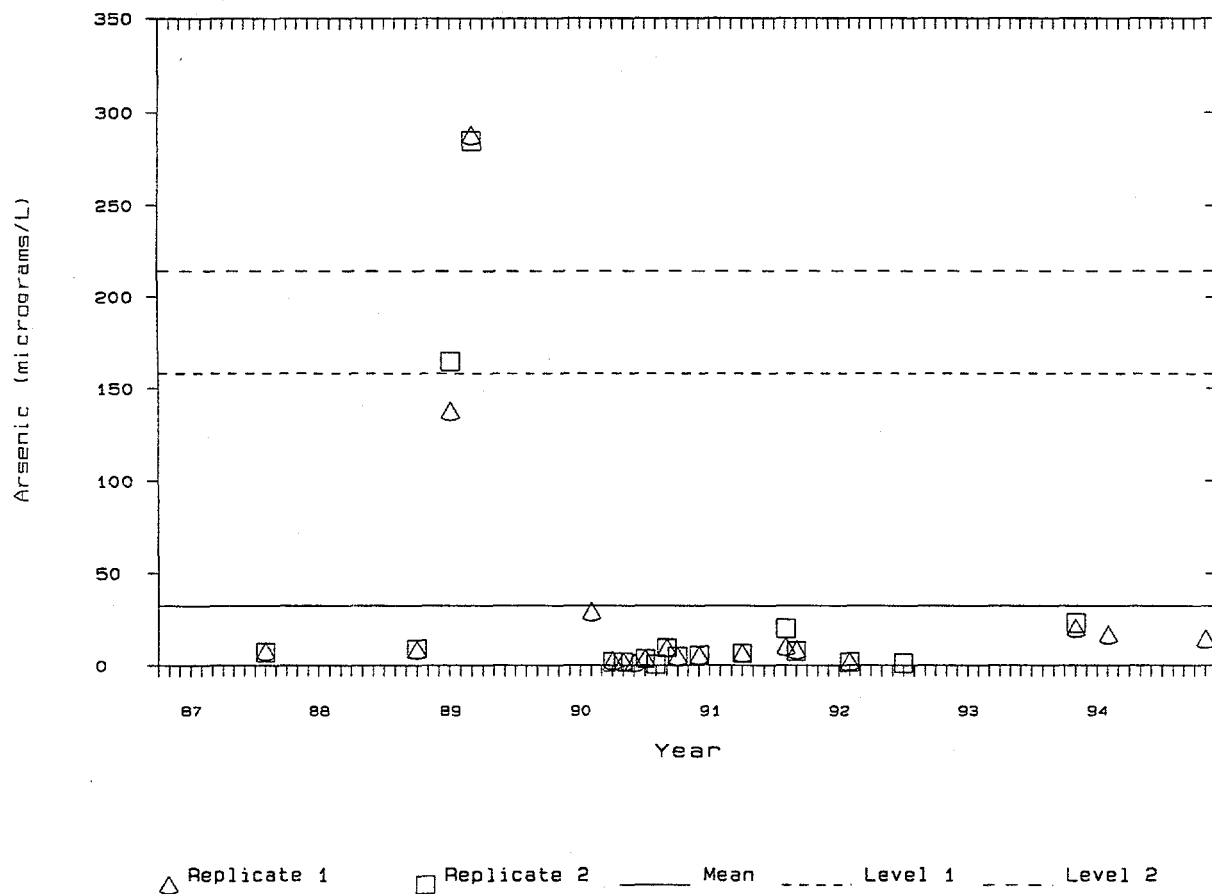
△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

TRA764A Sodium Concentrations

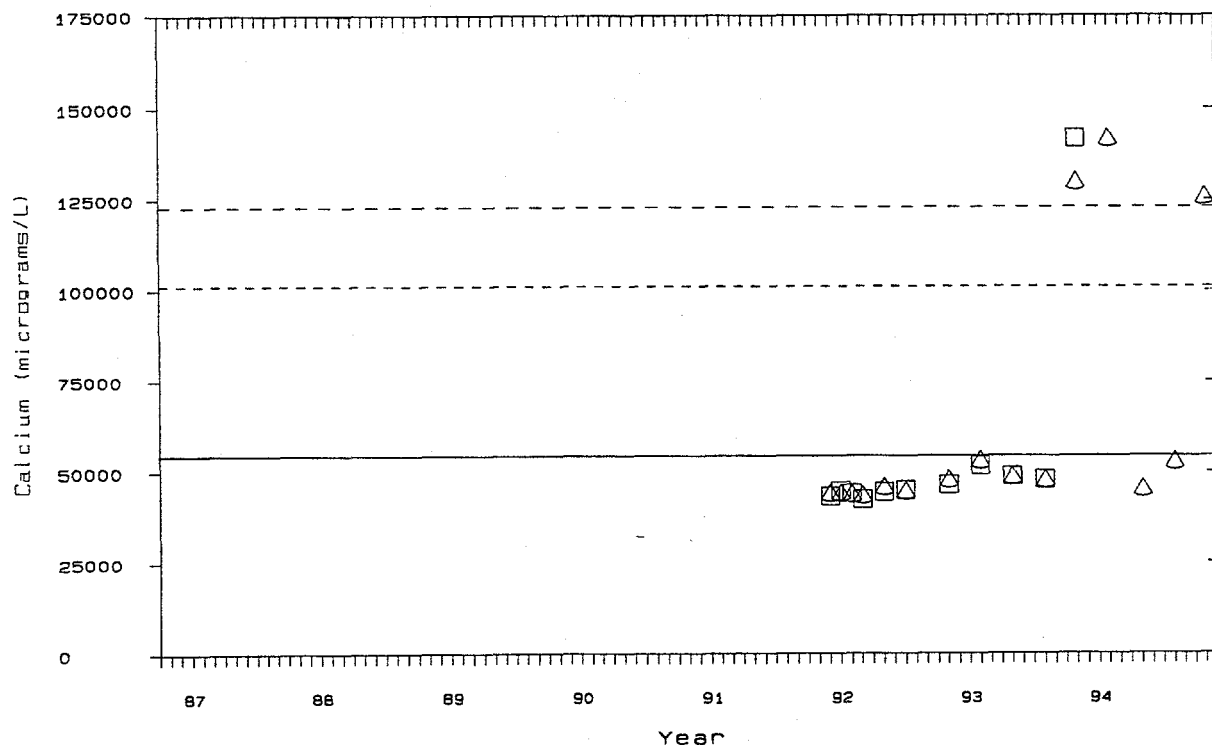
RCRA Guideline Not Applicable



RCRA Characteristic Guideline = 5000 micrograms/L

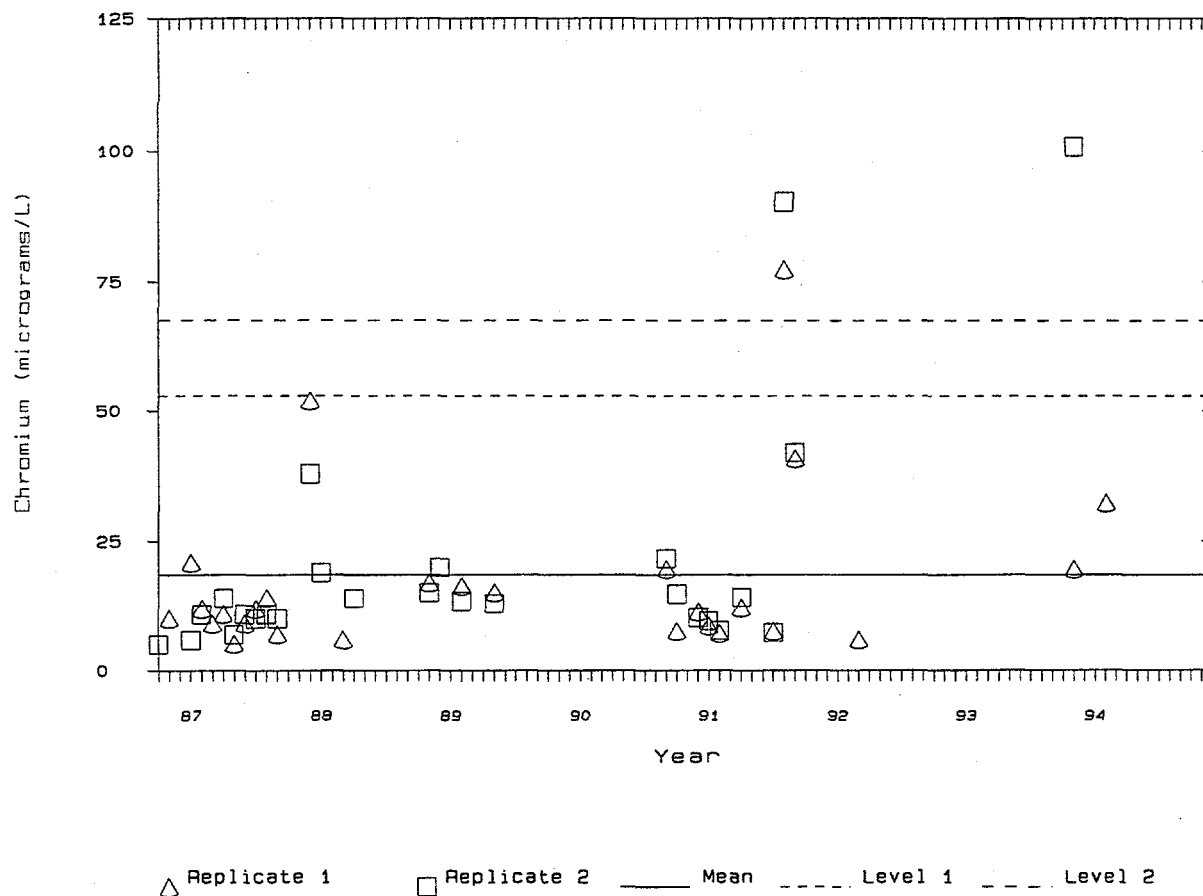


RCRA Guideline Not Applicable



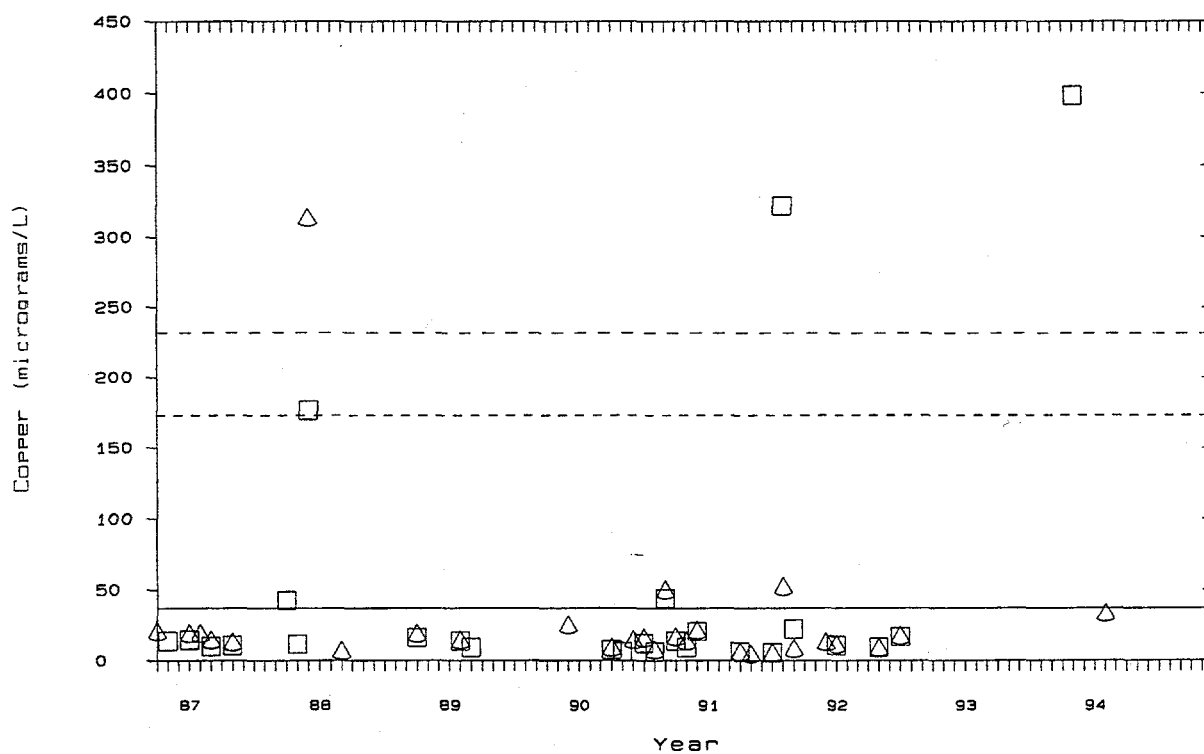
TRA764A Chromium Concentrations

RCRA Characteristic Guideline = 5000 micrograms/L



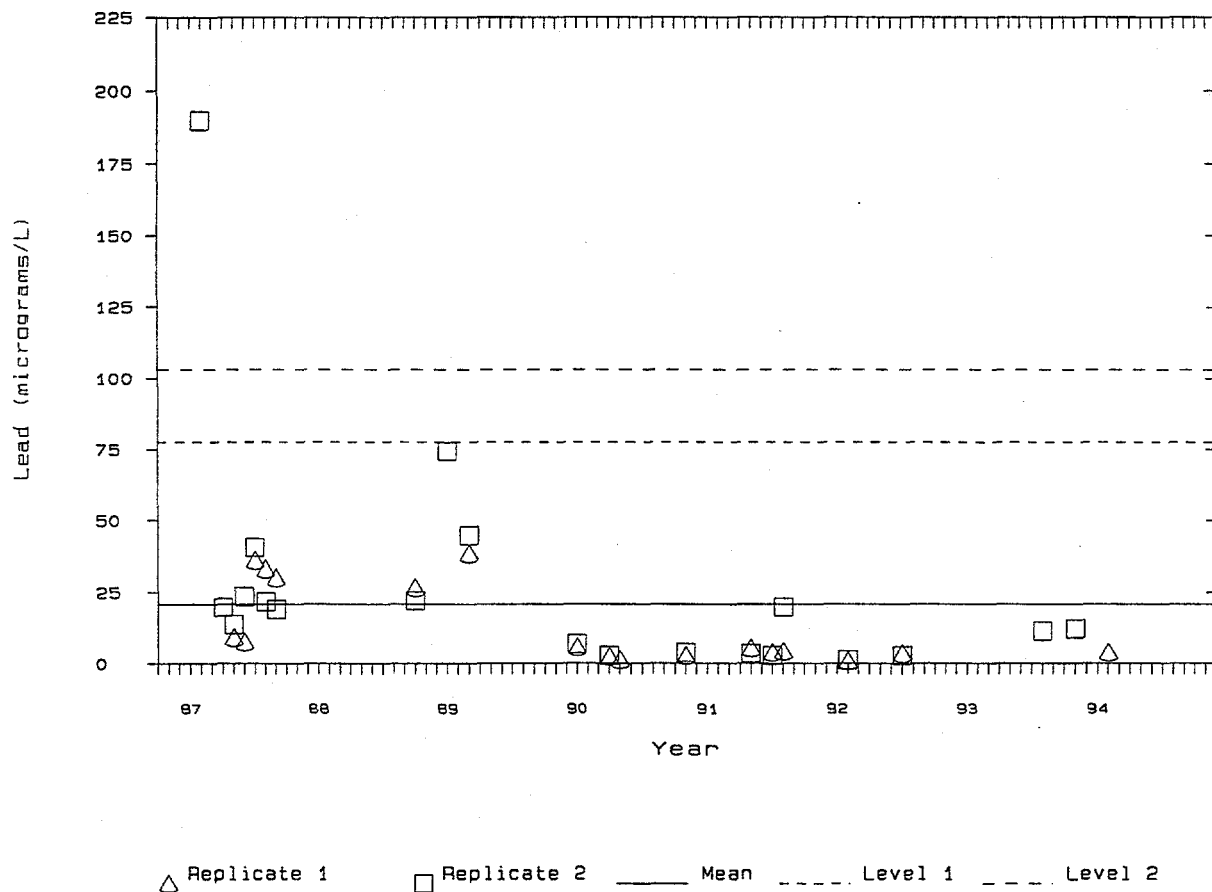
TRA764A Copper Concentrations

RCRA Guideline Not Applicable



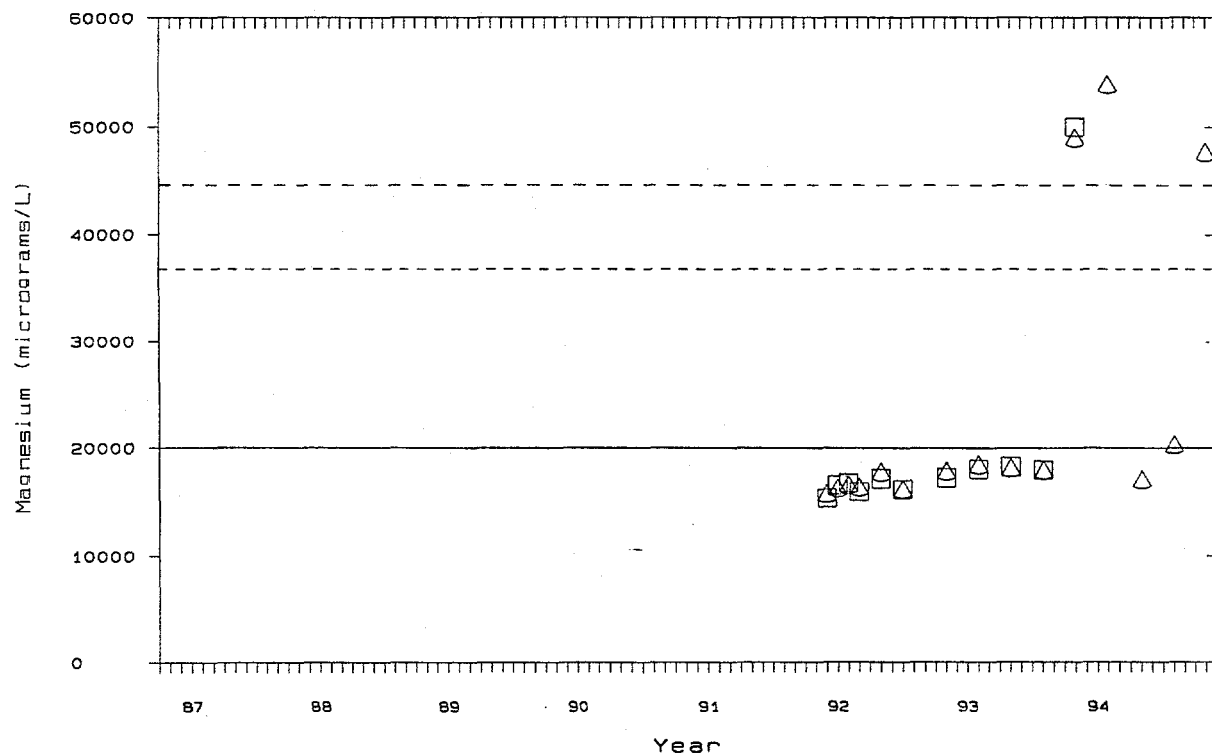
TRA764A Lead Concentrations

RCRA Characteristic Guideline = 5000 micrograms/L



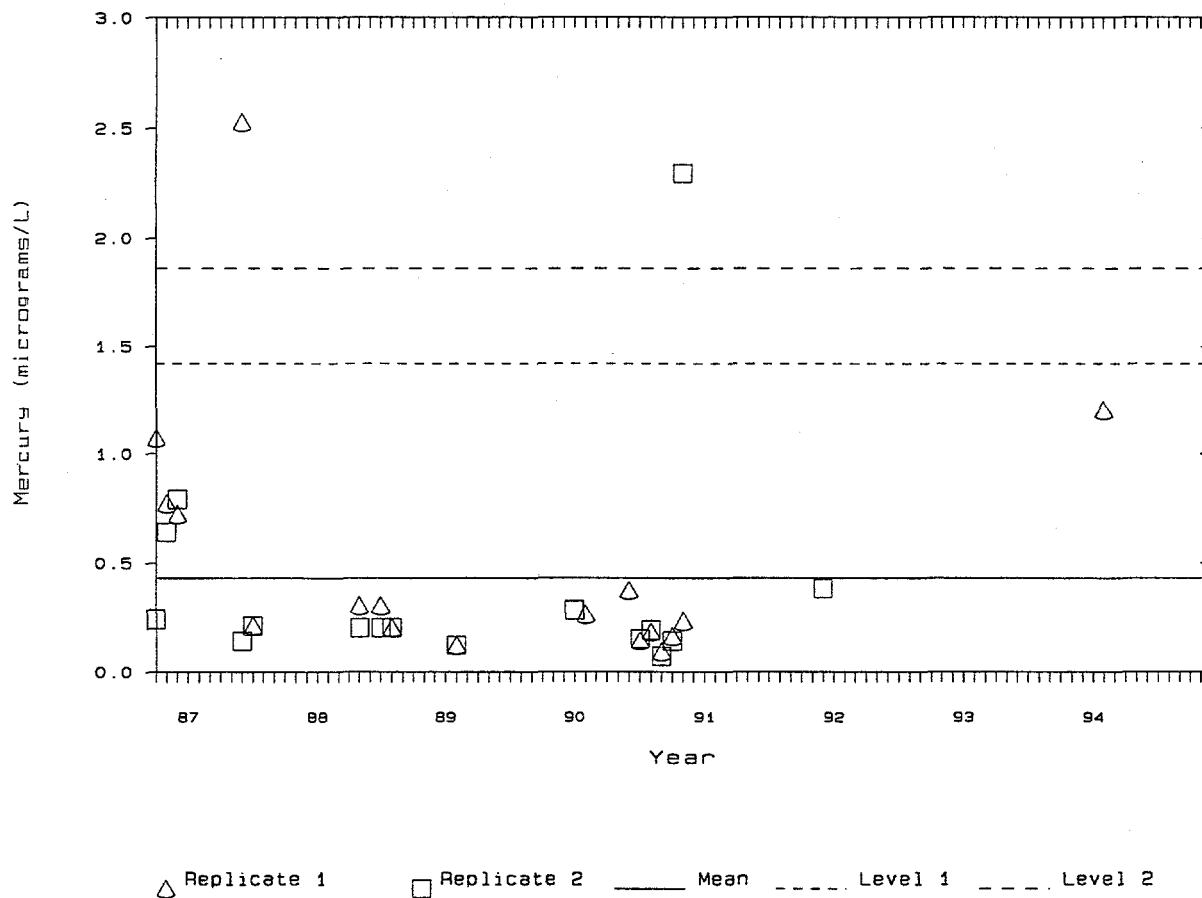
TRA764A Magnesium Concentrations

RCRA Guideline Not Applicable



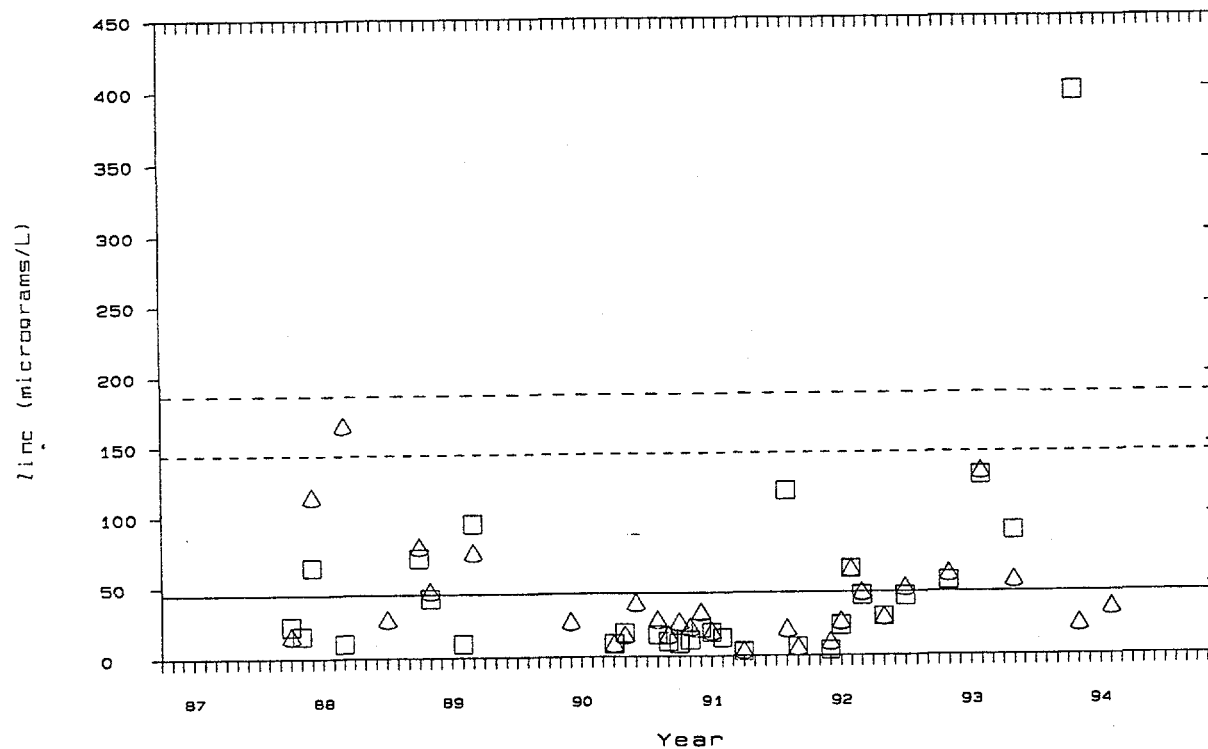
TRA764A Mercury Concentrations

RCRA Characteristic Guideline = 200 micrograms/L



TRA764A Zinc Concentrations

RCRA Guideline Not Applicable



**Effluent Monitoring Data for
TAN-607 (Process Waste Water)**

Table B-45. 1994 effluent monitoring data for TAN-607.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/20/94	01/20/94	01/20/94	05/17/94	08/16/94	11/30/94		
Conductivity (μ S)	504	523	1681	442	311			
pH	10.3	10.2	8.1	7.4	8.4			
Chloride (mg/L)	34.8	32.1	1070	26.6	20.5			
Chemical Oxygen Demand (mg/L)	47.5	43.2	66.5	ND	400			
Fluoride (mg/L)	0.35	0.36	0.19	0.25	0.22			
Nitrogen, Nitrate-Nitrite (mg-N/L)	1.5	1.4	NR	NR	NR			
Ortho Phosphate (mg/L)	ND	ND	NR	NR	NR			
Total Phosphorus (mg/L)	NR	NR	0.26	0.10	ND			
Sulfate (mg/L)	62.2	62.0	40.5	44.1	35.7			
TOC (mg/L)	4.3	4.4	0.84	0.80	0.70			
Total Oil & Grease (mg/L)	ND	ND	7.9	ND	ND			
Silver (μ g/L)	ND	ND	ND	ND	ND			
Arsenic (μ g/L)	ND	ND	ND	ND	ND			
Barium (μ g/L)	ND	ND	ND	ND	ND			
Beryllium (μ g/L)	ND	ND	ND	ND	ND			
Calcium (μ g/L)	12700	15300	72700	58500	55000			
Cadmium (μ g/L)	ND	ND	ND	ND	ND			
Cobalt (μ g/L)	ND	ND	ND	ND	ND			
Chromium (μ g/L)	ND	ND	ND	ND	ND			
Copper (μ g/L)	35.6	36.0	31.0	ND	ND			

ND - below practical quantitation level

NR - analysis not requested

Table B-45. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/20/94	01/20/94	05/17/94	08/16/94	11/30/94				
Iron ($\mu\text{g/L}$)	174	235	2020	ND	168				
Mercury ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Potassium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Magnesium ($\mu\text{g/L}$)	8290	8500	19000	20700	17200				
Manganese ($\mu\text{g/L}$)	ND	ND	34.1	ND	ND				
Sodium ($\mu\text{g/L}$)	117000	119000	580000	10800	12900				
Nickel ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Lead ($\mu\text{g/L}$)	ND	ND	6.1	ND	ND				
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Selenium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Zinc ($\mu\text{g/L}$)	ND	21.4	293	ND	34.1				

ND - below practical quantitation level

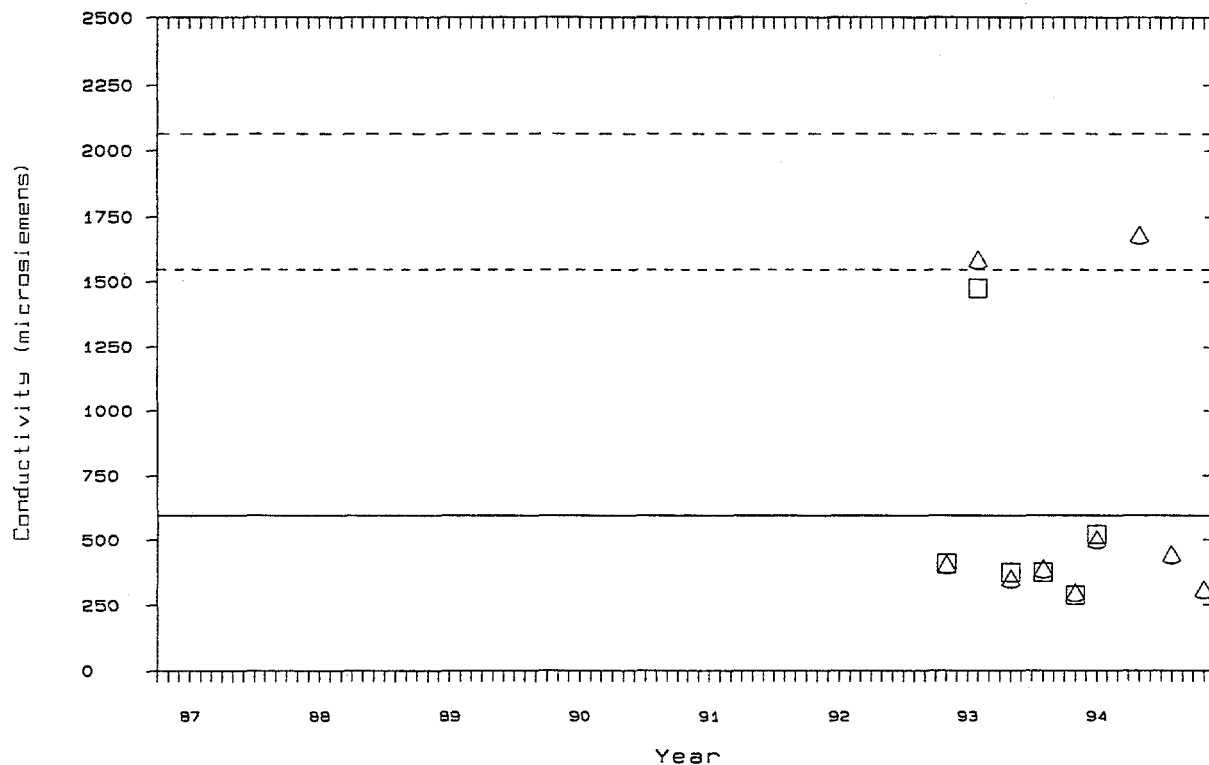
Table B-46. Summary statistics for TAN-607.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Conductivity (μ S)	597	496	10	1549	2063	NA
pH	8.7	1.1	10	4.8	12.5	2.5-12
Calcium (μ g/L)	80510	92087	10	257556	353010	NA
Magnesium (μ g/L)	16749	9625	10	35254	45231	NA
Sodium (μ g/L)	54243	85053	10	217765	305928	NA
Zinc (μ g/L)	265	578	10	1377	1976	NA

Guideline - RCRA Characteristic Guideline
 NA - Not Applicable

TAN607A Conductivity

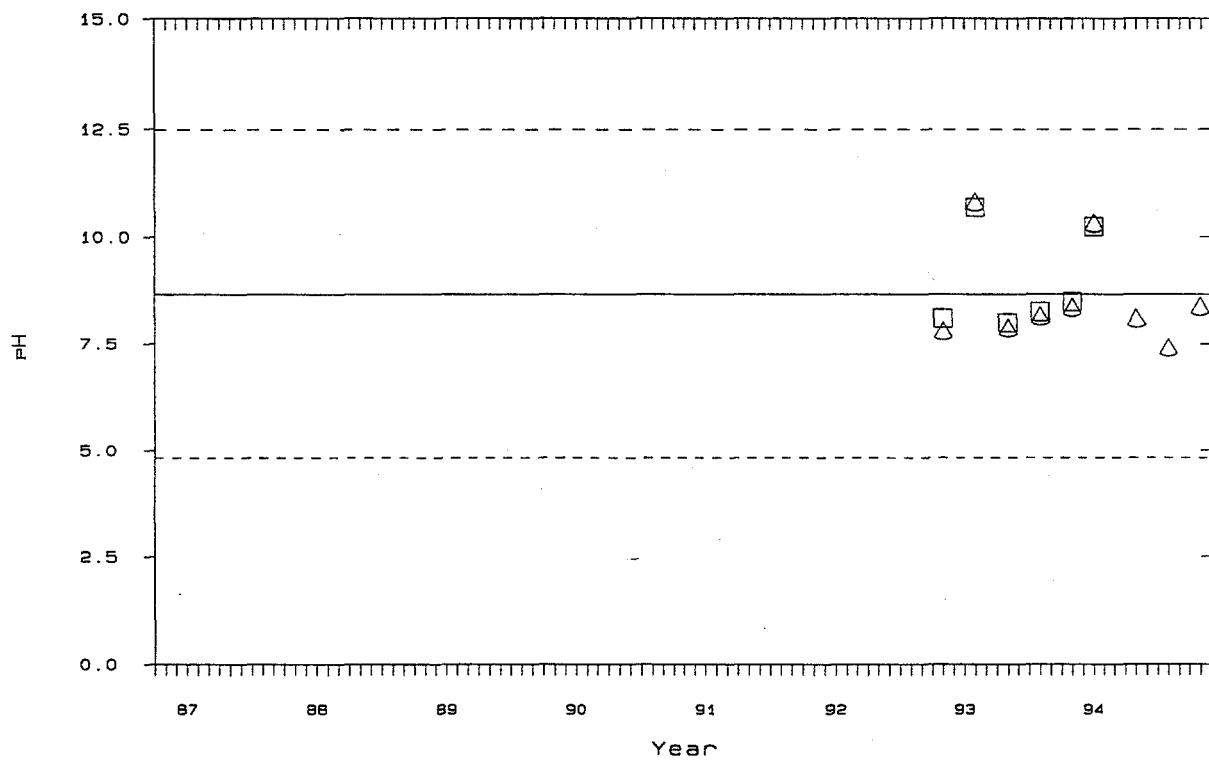
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

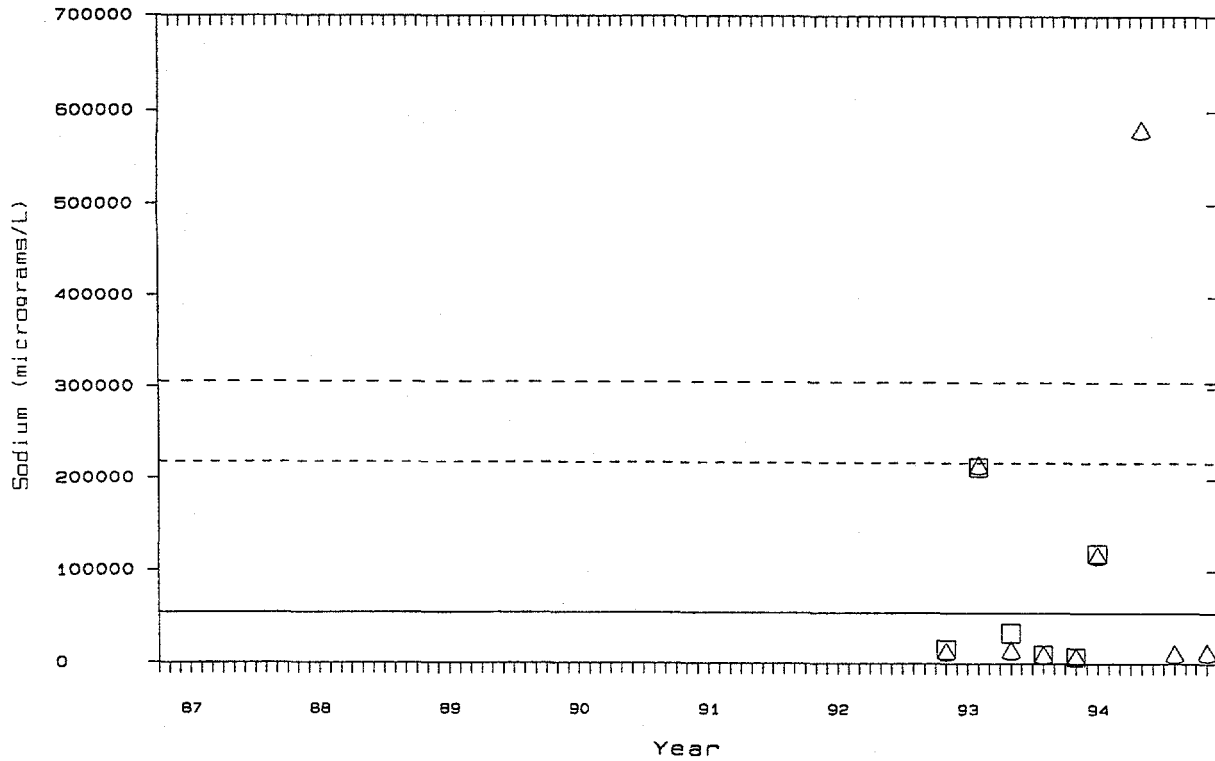
TAN607A pH

RCRA Characteristic Guideline = 2.5-12



TAN607A Sodium Concentrations

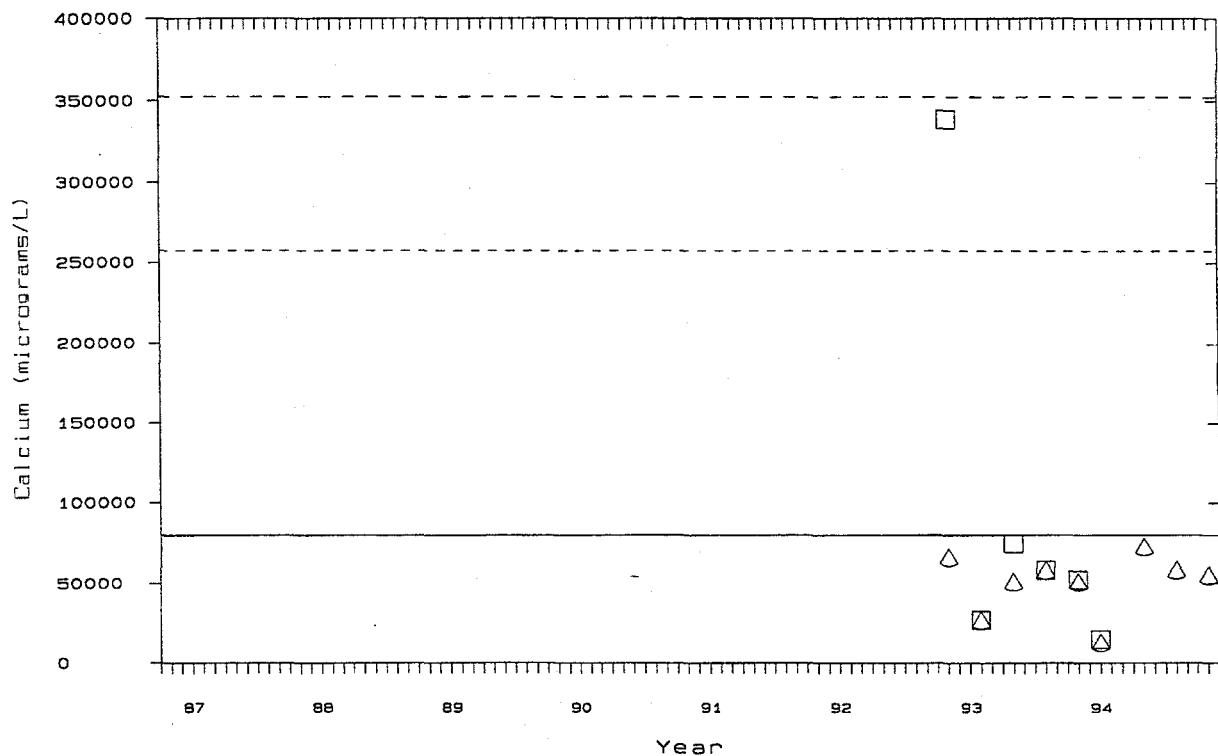
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

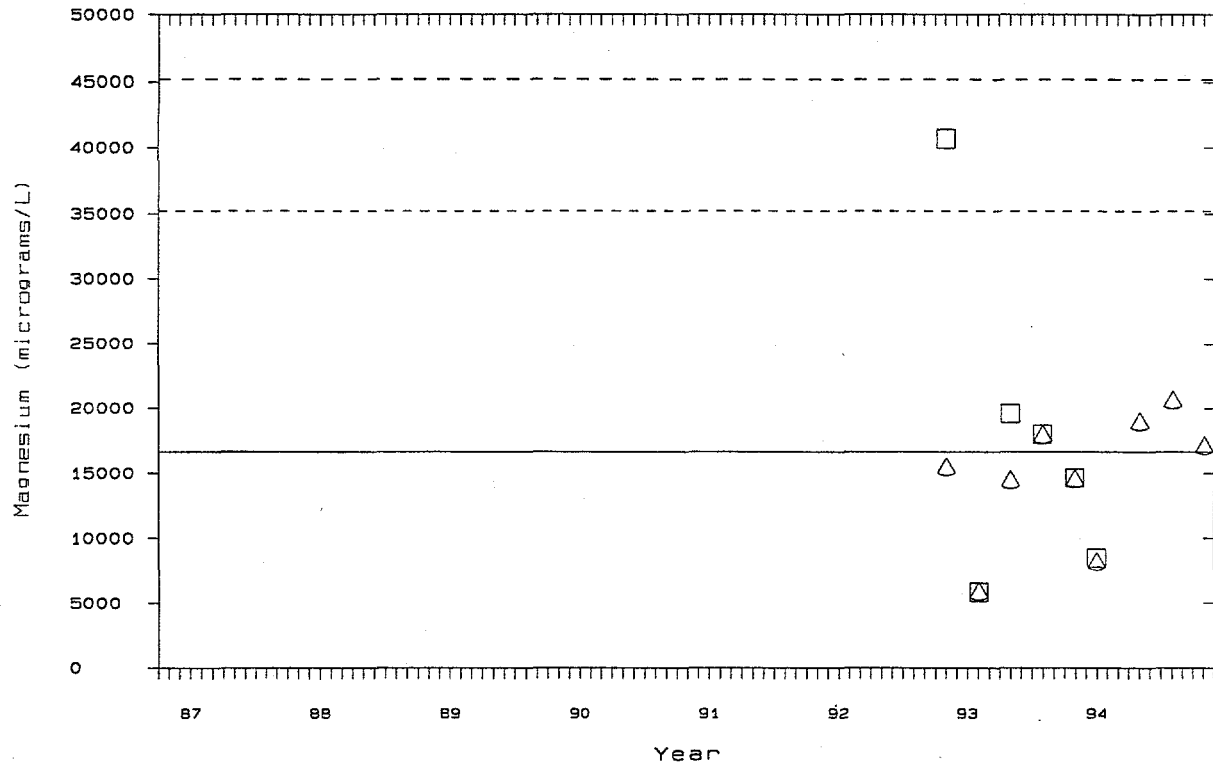
TAN607A Calcium Concentrations

RCRA Guideline Not Applicable



TAN607A Magnesium Concentrations

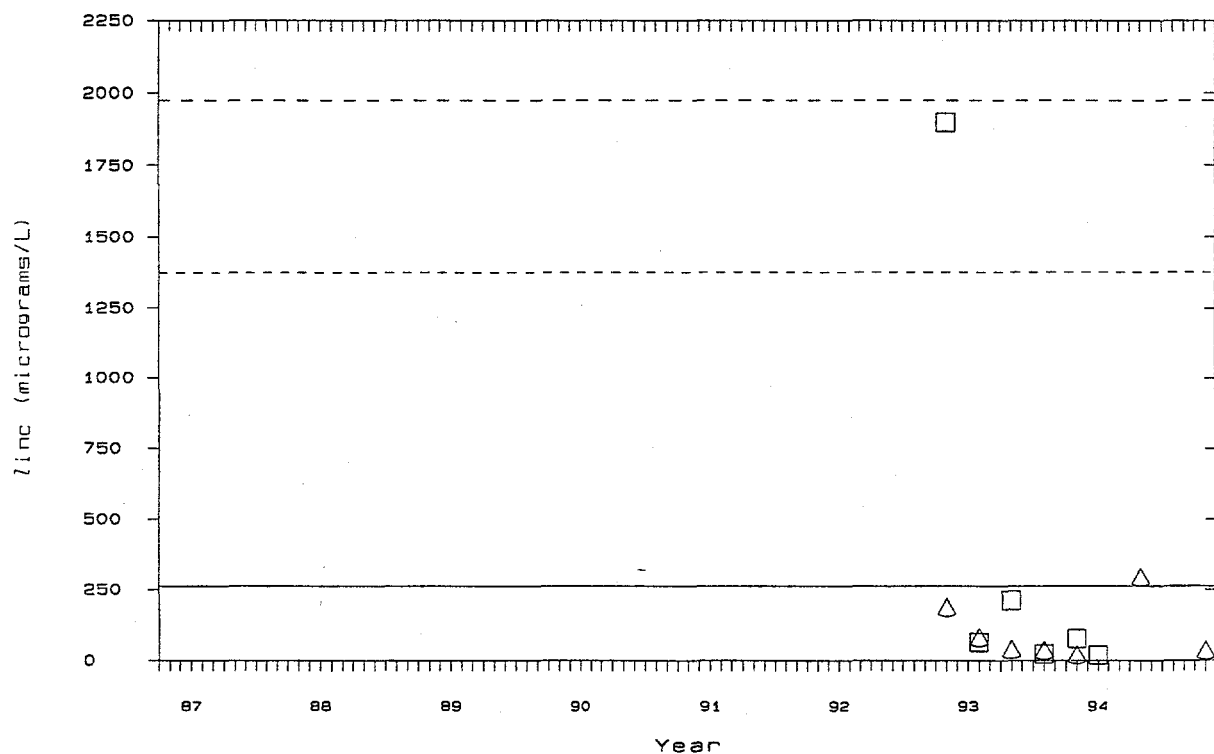
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

TAN607A Zinc Concentrations

RCRA Guideline Not Applicable



**Effluent Monitoring Data for
TAN-623 (Influent to Sewage Treatment Plant)**

Table B-47. 1994 effluent monitoring data for TAN-623.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/20/94	01/20/94	04/13/94	07/12/94	10/06/94			
Biological Oxygen Demand (5-day) (mg/L)	21.0	26.0	15.0	42.0	23.0			
Conductivity (μ S)	428	358	392	460	364			
pH	7.7	7.4	7.8	8.1	7.2			
Chloride (mg/L)	81.6	72.1	32.6	4.2	26.6			
Chemical Oxygen Demand (mg/L)	31.1	194	71.5	58.2	190			
Fluoride (mg/L)	0.22	0.20	0.20	0.23	0.23			
Surfactants (mg/L)	ND	ND	ND	ND	ND			
Nitrogen, Nitrate-Nitrite (mg-N/L)	0.87	1.0	1.8	0.82	0.87			
Ortho Phosphate (mg/L)	6.2	6.0	NR	NR	NR			
Total Phosphorus (mg/L)	NR	NR	1.2	0.71	1.8			
Sulfate (mg/L)	NR	NR	32.8	29.2	28.0			
TDS (mg/L)	346	282	319	351	300			
Nitrogen, Total Kjeldahl (mg/L)	13.8	14.6	10.6	37.0	12.6			
TOC (mg/L)	14.4	10.2	8.2	23.0	17.0			
Total Oil & Grease (mg/L)	8.2	8.8	ND	43.2	262			
TSS (mg/L)	25.0	48.0	52.0	65.0	190			
Silver (μ g/L)	ND	ND	ND	ND	ND			
Arsenic (μ g/L)	ND	ND	ND	ND	ND			
Barium (μ g/L)	ND	ND	ND	ND	ND			
Beryllium (μ g/L)	ND	ND	ND	ND	ND			

ND - below practical quantitation level

NR - analysis not requested

Table B-47. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/20/94	01/20/94	04/13/94	07/12/94	10/06/94				
Calcium ($\mu\text{g/L}$)	58700	56700	60300	50900	46500				
Cadmium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Cobalt ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Chromium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Copper ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Iron ($\mu\text{g/L}$)	ND	104	269	297	138				
Mercury ($\mu\text{g/L}$)	ND	ND	ND	ND	0.25				
Potassium ($\mu\text{g/L}$)	6230	7150	5730	13000	6030				
Magnesium ($\mu\text{g/L}$)	17200	16500	16200	14900	13100				
Manganese ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Sodium ($\mu\text{g/L}$)	34400	29500	17500	19700	11700				
Nickel ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Lead ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Selenium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Zinc ($\mu\text{g/L}$)	52.8	56.6	185	97.6	67.8				

ND - below practical quantitation level

Table B-48. 1994 volatile organics data for TAN-623A.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
1,4-Dichlorobenzene	April	9.00	µg/L		
1,4-Dichlorobenzene	July	15.00	µg/L		
1,4-Dichlorobenzene	October	6.00	µg/L		
Acetone (TIC)	April	80.00	µg/L	X	2.93
Methylene Chloride	April	1.00	µg/L	J	
Methylene Chloride	July	9.00	µg/L	B	
Trichloroethene	July	1.00	µg/L	J	

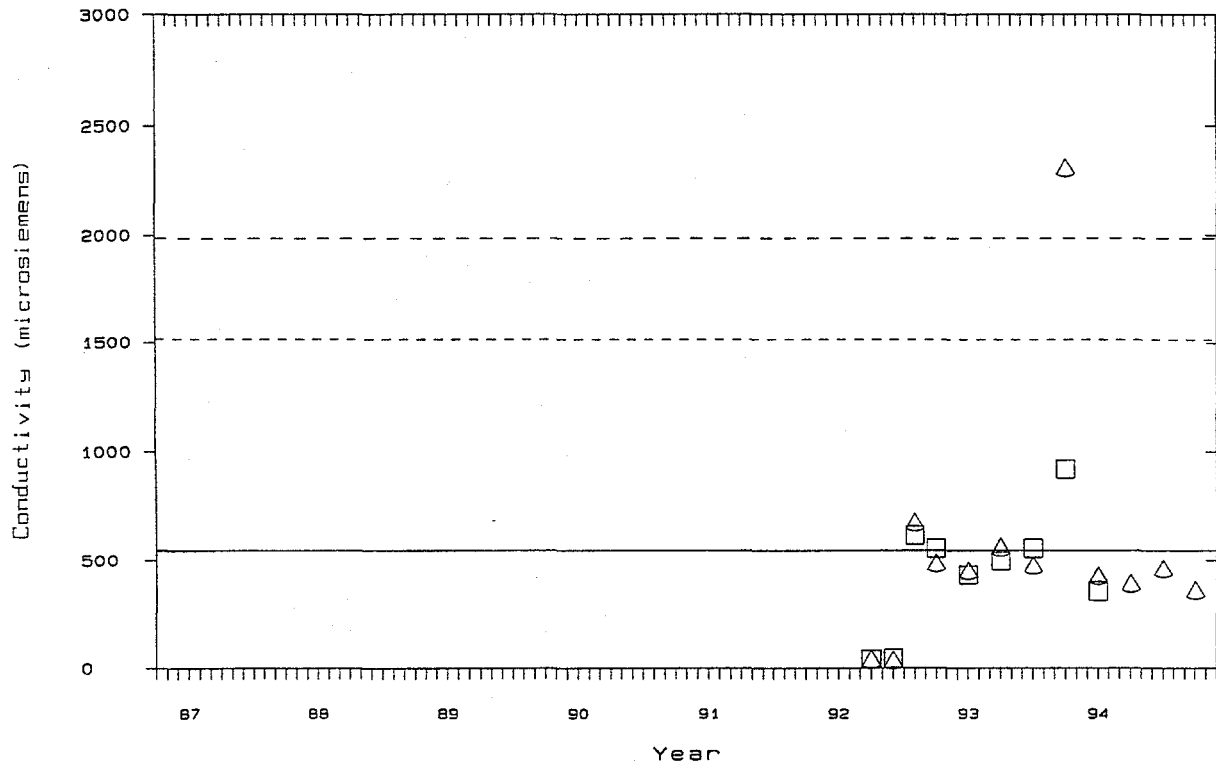
Table B-49. Summary statistics for TAN-623.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Biological Oxygen Demand (5-day) (mg/L)	77.1	73.1	15	210	275	NA
Conductivity (μ S)	545	538	16	1516	1987	NA
pH	8.3	0.49	16	6.8	9.8	2.5-12
Chemical Oxygen Demand (mg/L)	357	263	16	832	1063	NA
Nitrogen, Nitrate-Nitrite (mg-N/L)	1.4	1.1	10	3.5	4.7	NA
Nitrogen, Total Kjeldahl (mg/L)	22.0	14.8	12	49.7	63.9	NA
TOC (mg/L)	54.5	29.2	16	107	133	NA
Total Oil & Grease (mg/L)	47.0	72.4	15	179	243	NA
TSS (mg/L)	122	106	21	310	398	NA
Calcium (μ g/L)	57513	9848	16	75308	83930	NA
Iron (μ g/L)	397	233	14	824	1036	NA
Magnesium (μ g/L)	16325	2841	16	21458	23946	NA
Manganese (μ g/L)	20.3	7.5	10	34.6	42.3	NA
Sodium (μ g/L)	72713	124418	16	297537	406474	NA
Lead (μ g/L)	10.1	15.0	11	38.4	53.2	5000
Zinc (μ g/L)	196	107	16	390	484	NA

Guideline - RCRA Characteristic Guideline
 NA - Not Applicable

TAN623A Conductivity

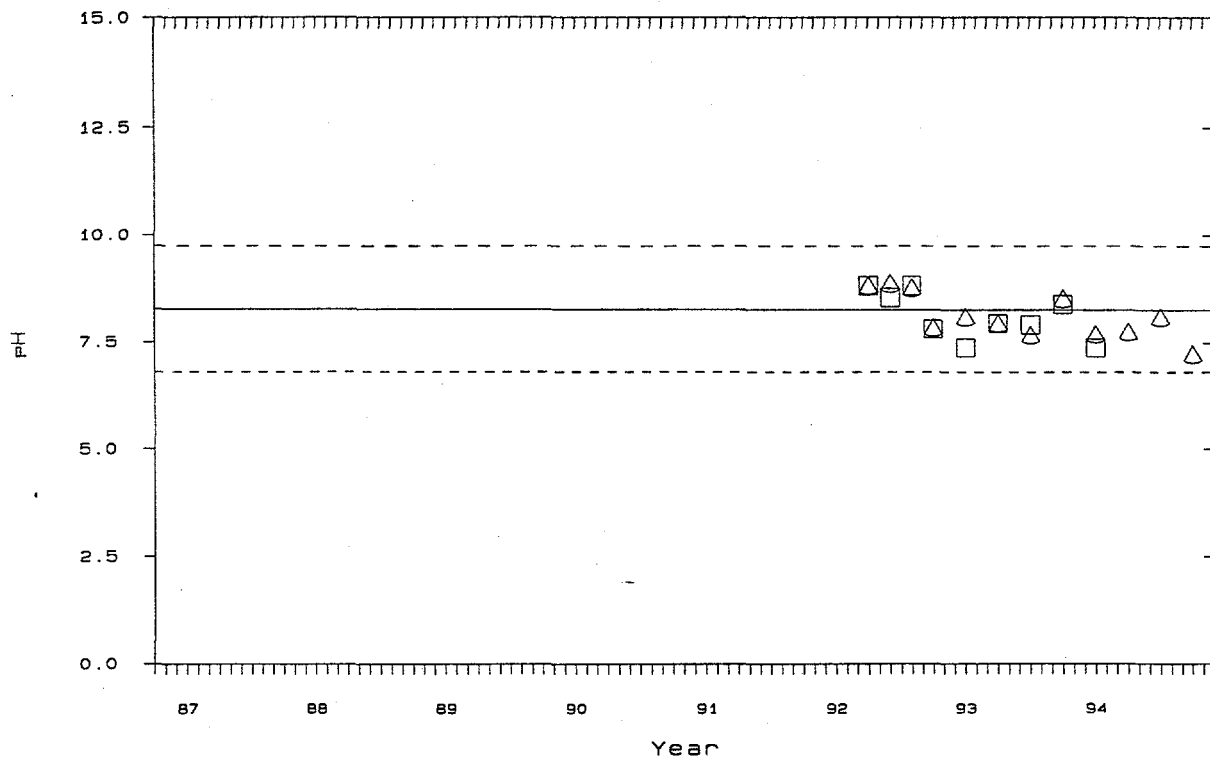
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

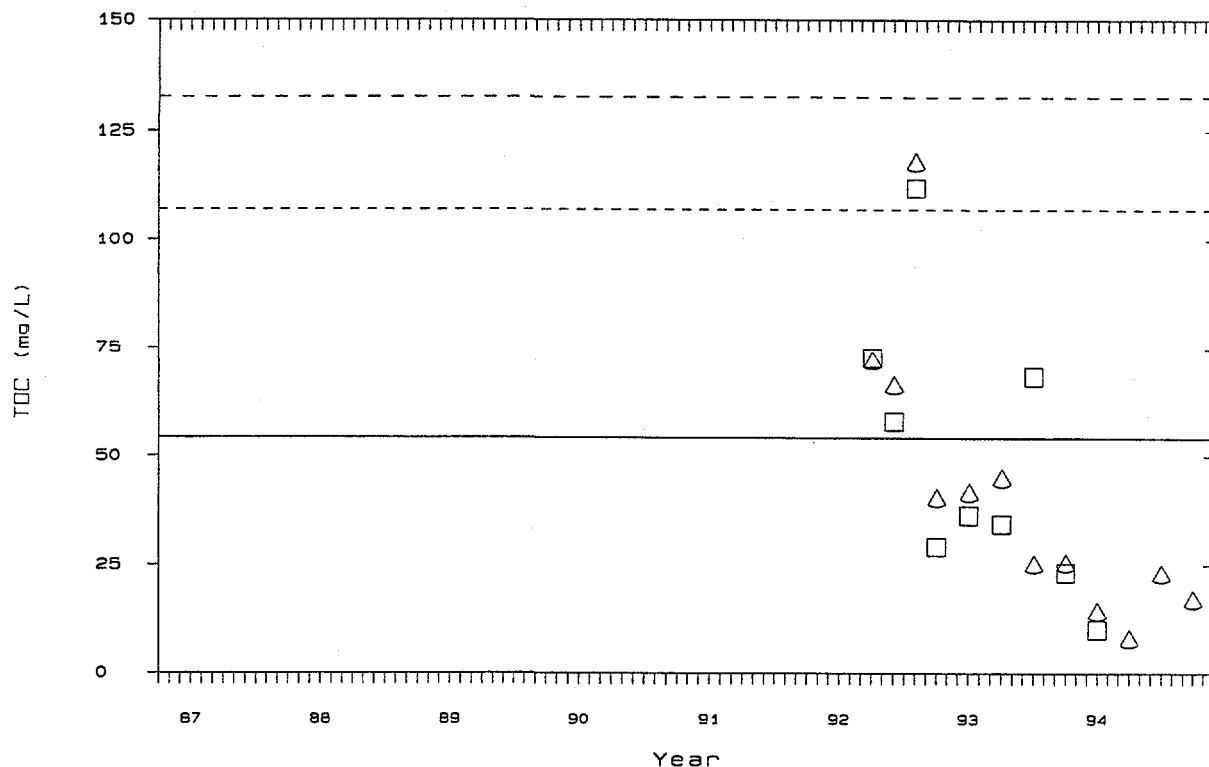
TAN623A pH

RCRA Characteristic Guideline = 2.5-12



TAN623A TOC Concentrations

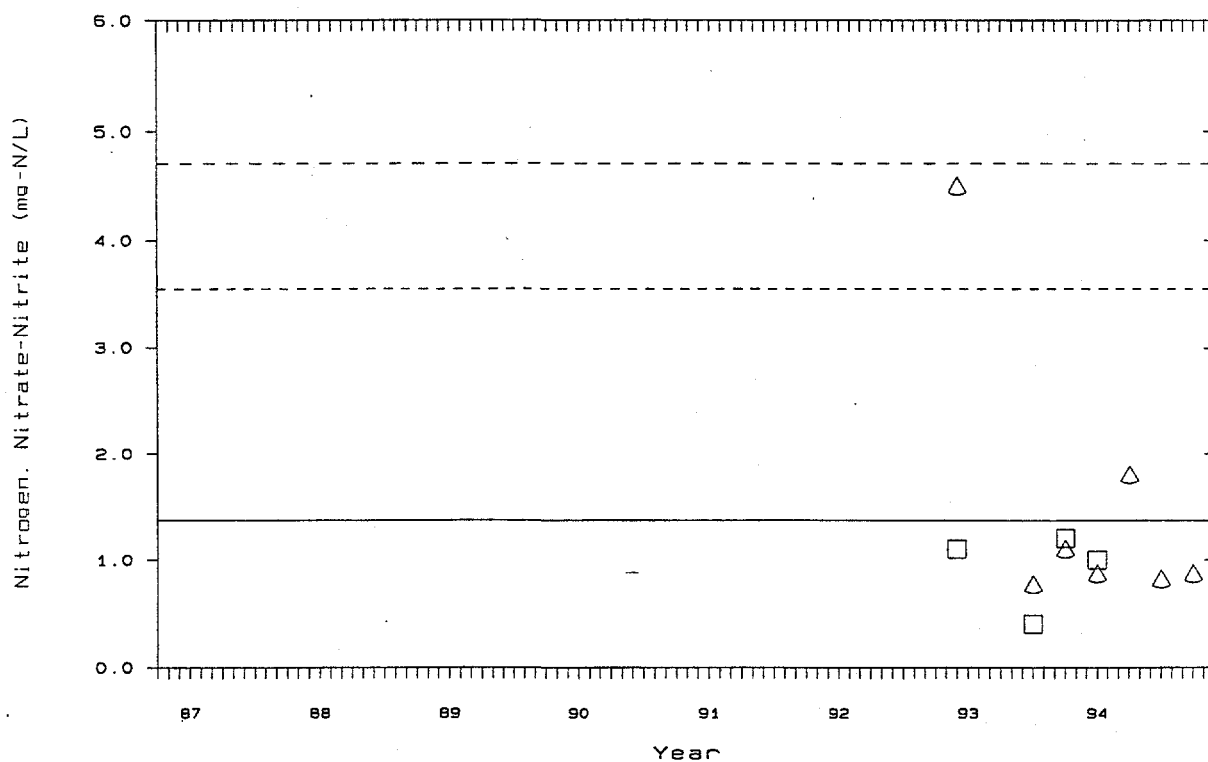
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

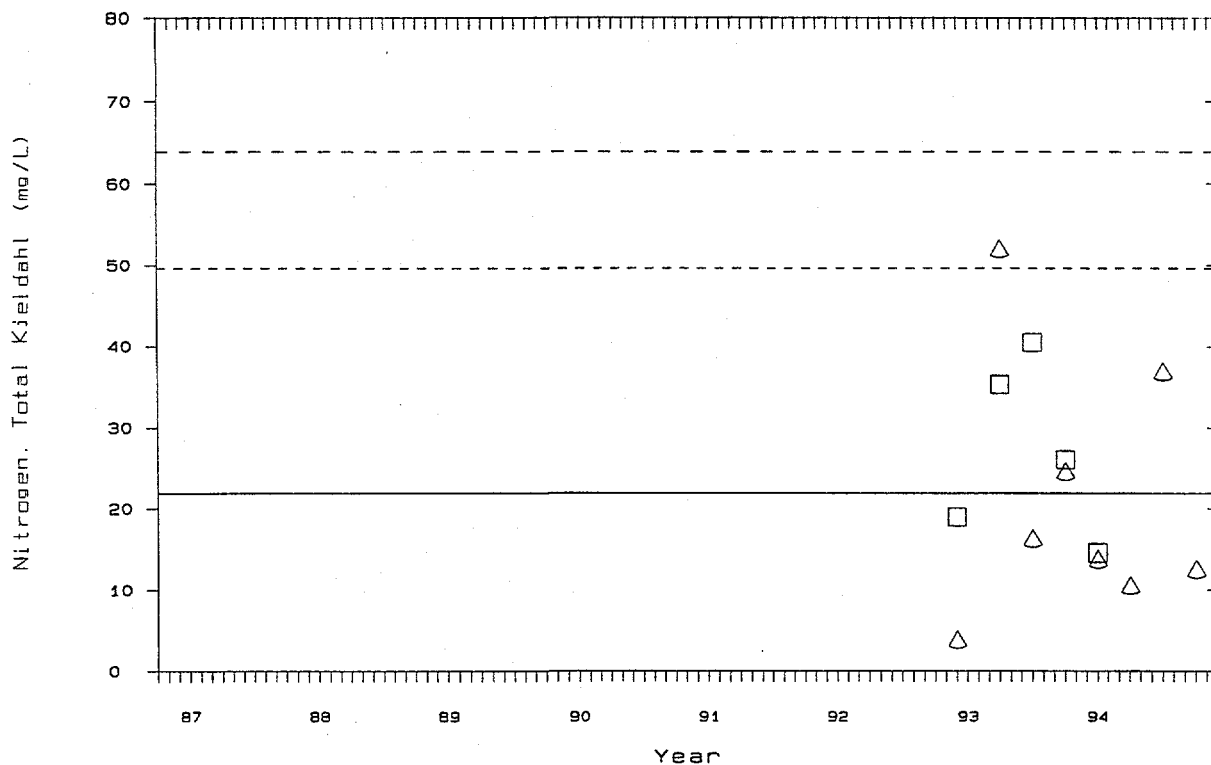
TAN623A Nitrogen, Nitrate-Nitrite Concentrations

RCRA Guideline Not Applicable



TAN623A Nitrogen, Total Kjeldahl Concentrations

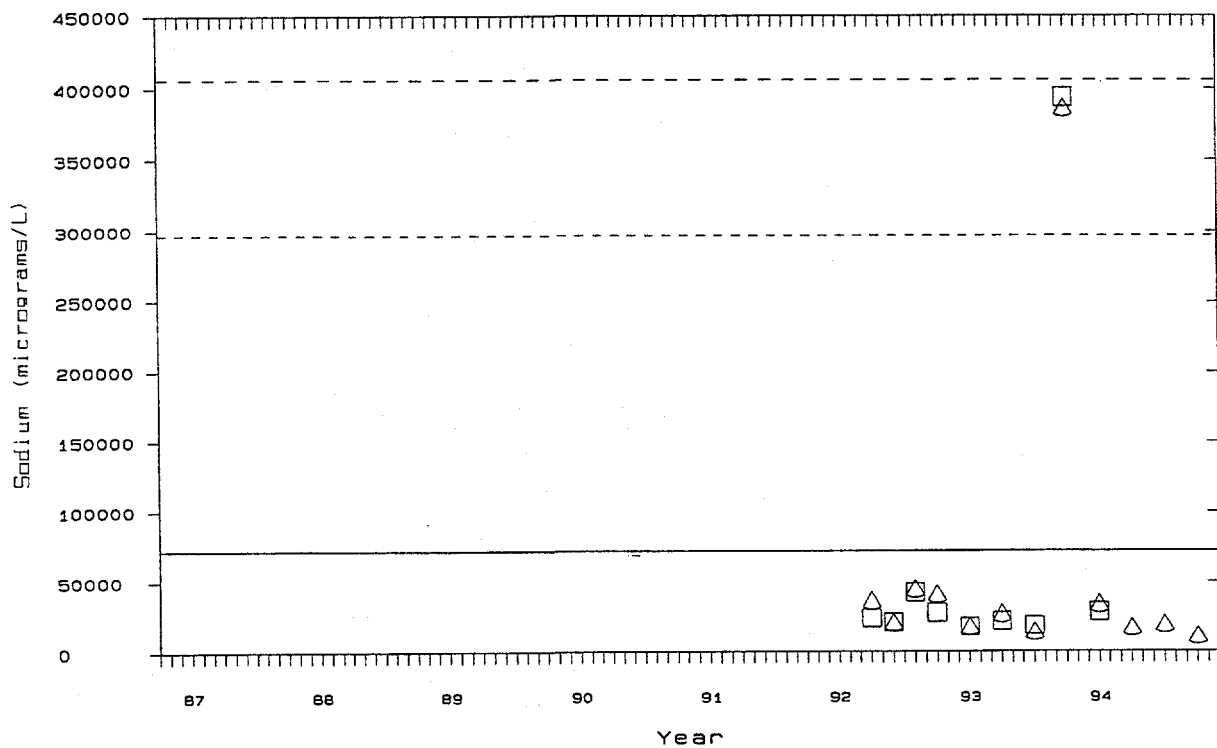
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

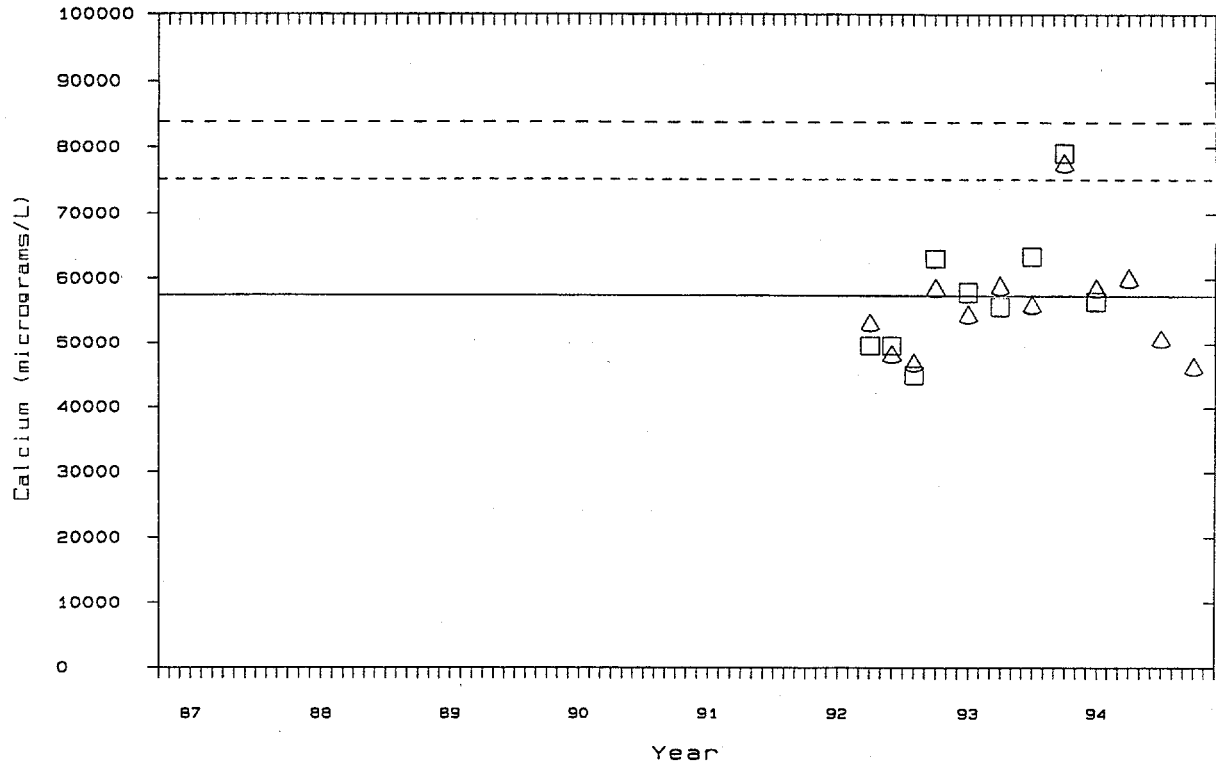
TAN623A Sodium Concentrations

RCRA Guideline Not Applicable



TAN623A Calcium Concentrations

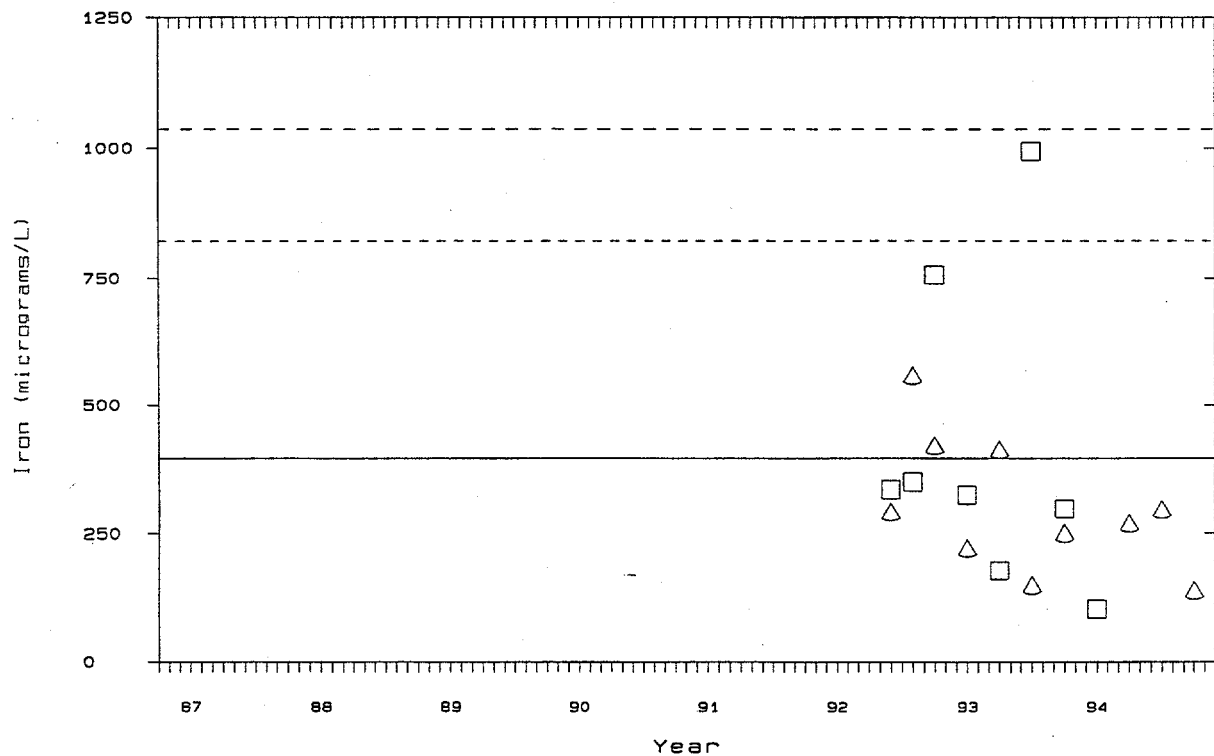
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

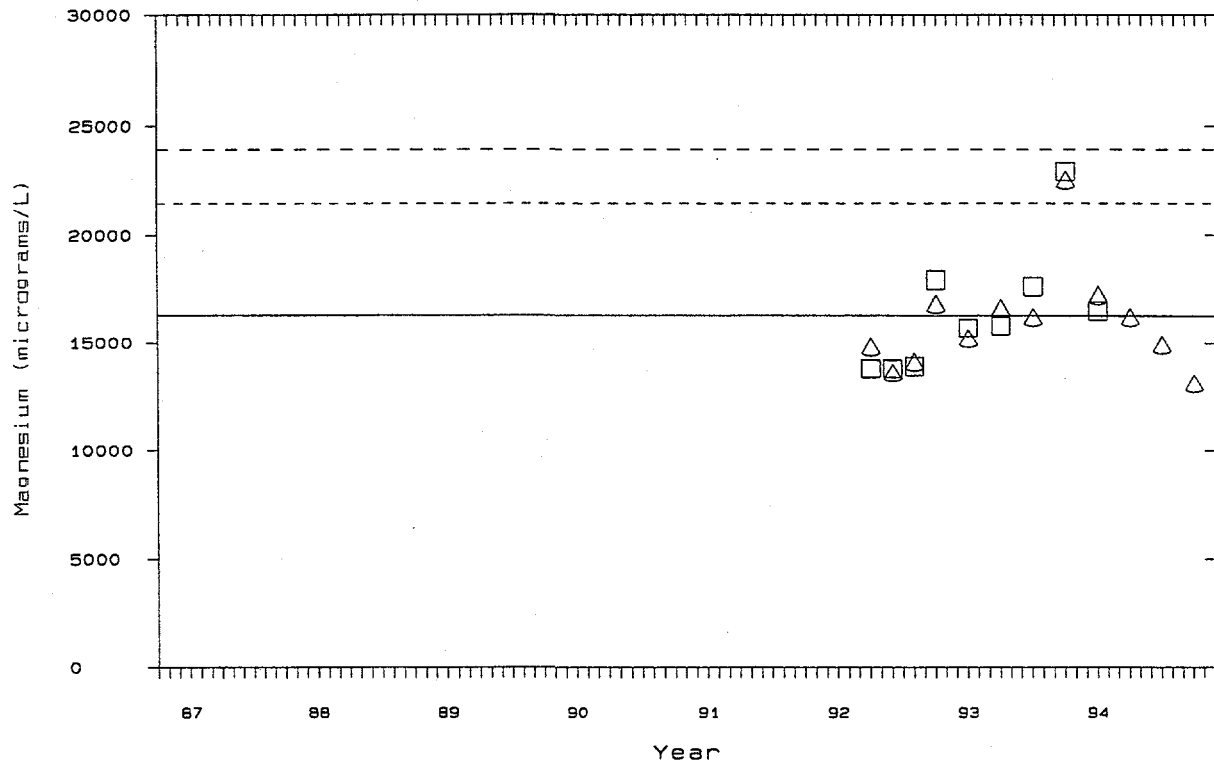
TAN623A Iron Concentrations

RCRA Guideline Not Applicable



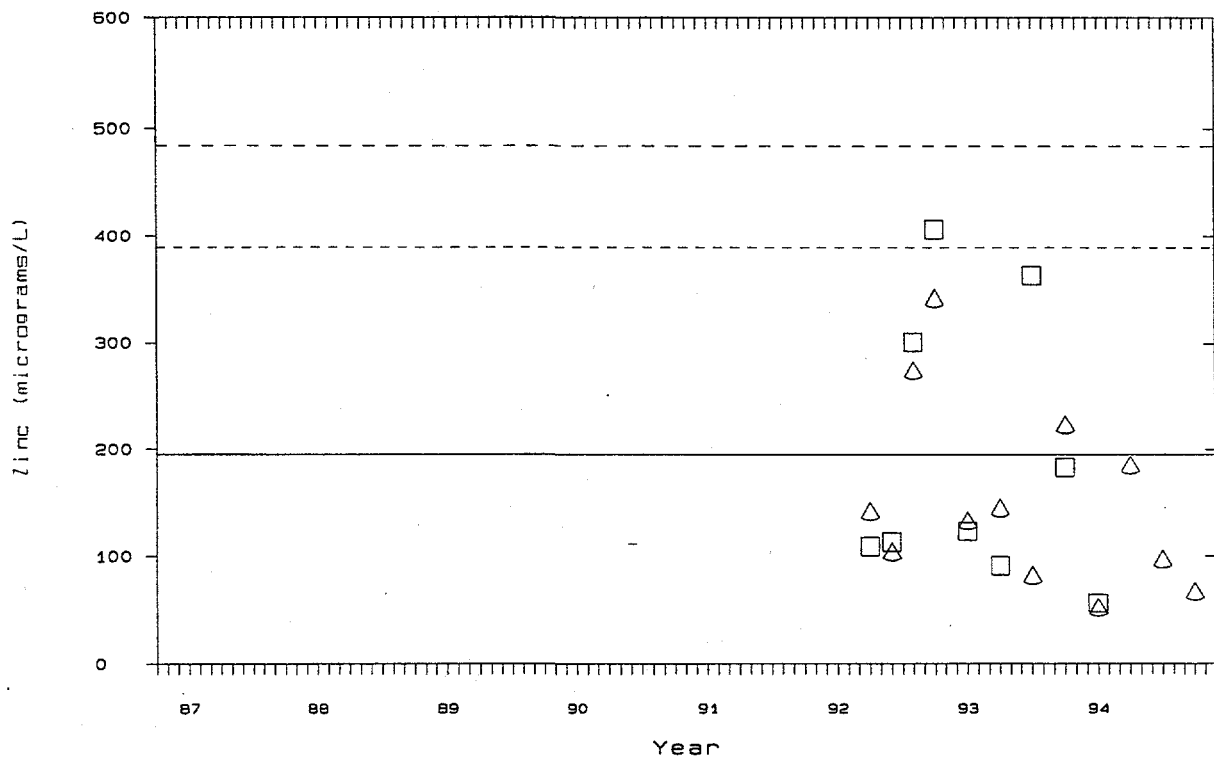
TAN623A Magnesium Concentrations

RCRA Guideline Not Applicable



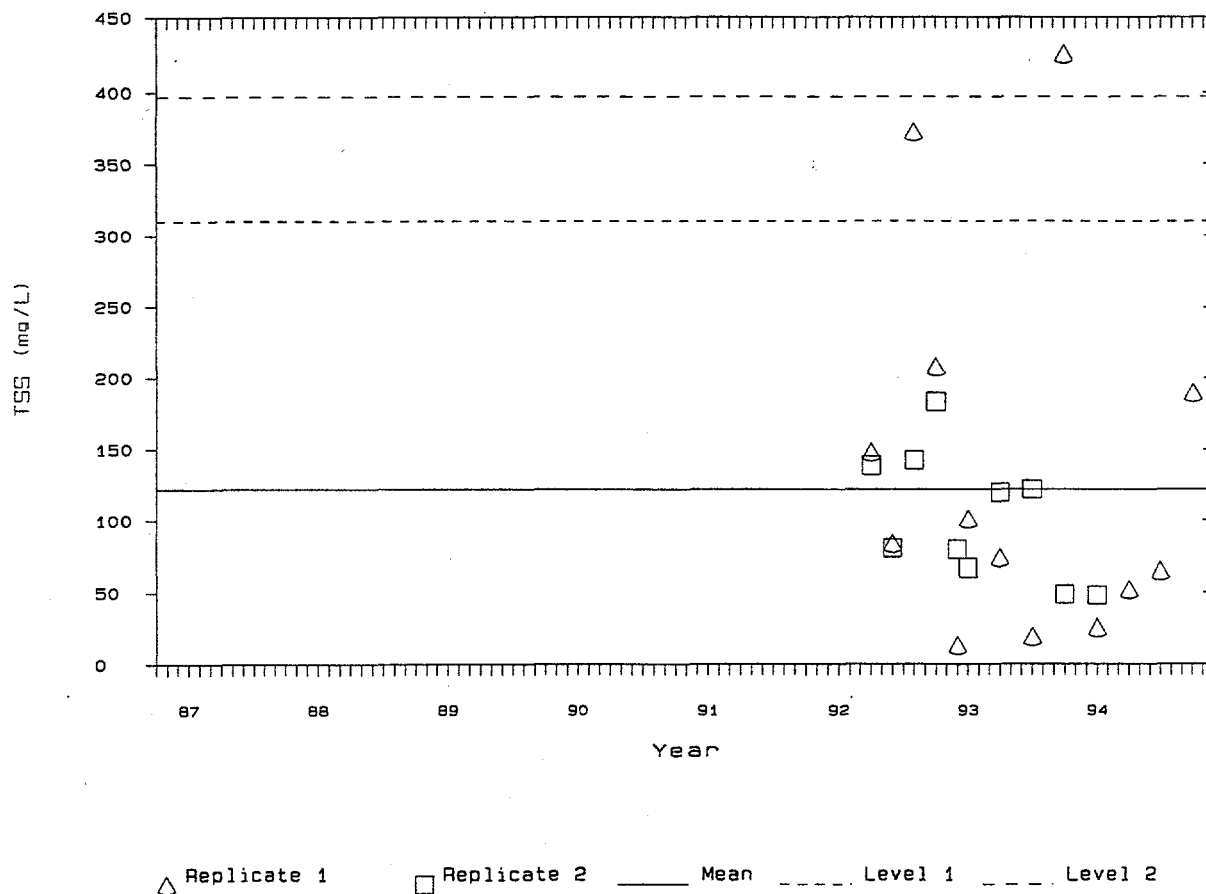
TAN623A Zinc Concentrations

RCRA Guideline Not Applicable



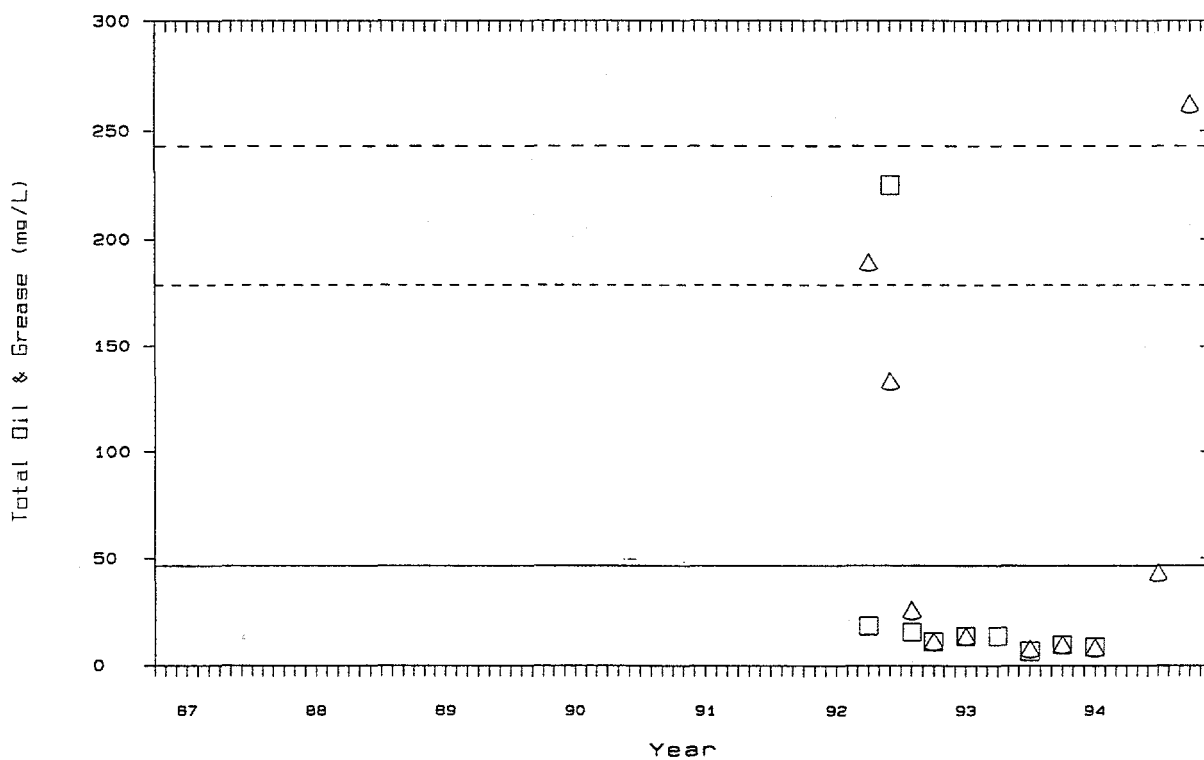
TAN623A TSS Concentrations

RCRA Guideline Not Applicable



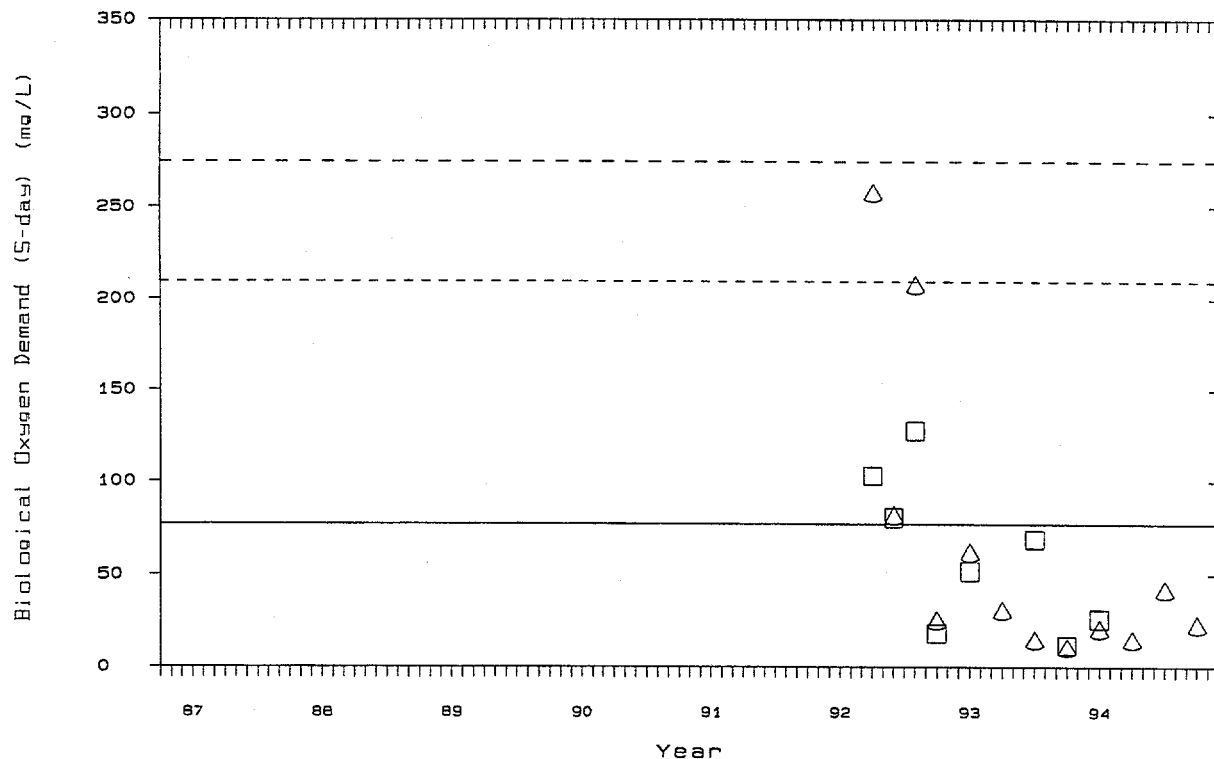
TAN623A Total Oil & Grease Concentrations

RCRA Guideline Not Applicable



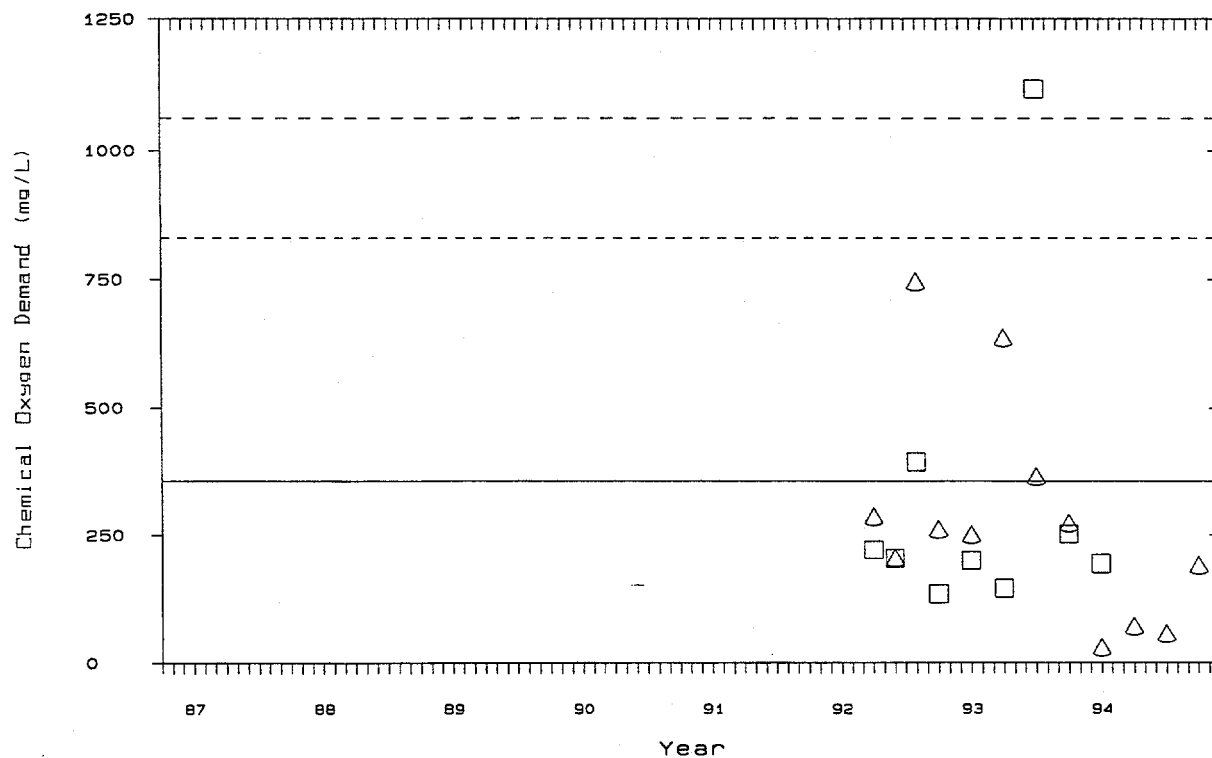
TAN623A Biological Oxygen Demand (5-day) Concentrations

RCRA Guideline Not Applicable



TAN623A Chemical Oxygen Demand Concentrations

RCRA Guideline Not Applicable



**Effluent Monitoring Data for
TAN-623 (Effluent from Sewage Treatment Plant)**

Table B-50. 1994 effluent monitoring data for TAN-623.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/20/94	01/20/94	04/13/94	07/12/94	10/06/94			
Biological Oxygen Demand (5-day) (mg/L)	NR	NR	10.0	7.0	7.0			
Conductivity (μ S)	431	394	480	377	410			
pH	7.1	8.1	9.6	7.5	7.4			
Chloride (mg/L)	78.7	76.0	64.4	2.0	57.3			
Chemical Oxygen Demand (mg/L)	NR	NR	33.4	16.1	7.2			
Fluoride (mg/L)	0.23	0.23	0.20	0.22	0.23			
Surfactants (mg/L)	NR	NR	ND	ND	ND			
Nitrogen, Nitrate-Nitrite (mg-N/L)	5.4	4.7	7.7	4.4	5.6			
Total Phosphorus (mg/L)	NR	NR	1.2	0.55	0.87			
Sulfate (mg/L)	NR	NR	45.7	34.0	30.0			
TDS (mg/L)	359	335	406	291	310			
Nitrogen, Total Kjeldahl (mg/L)	6.8	6.8	5.2	1.4	2.0			
TOC (mg/L)	NR	NR	5.9	3.1	4.1			
Total Oil & Grease (mg/L)	NR	NR	ND	ND	131			
TSS (mg/L)	12.0	11.0	17.0	10.0	ND			
Silver (μ g/L)	ND	ND	ND	ND	ND			
Arsenic (μ g/L)	ND	ND	ND	ND	ND			
Barium (μ g/L)	ND	ND	ND	ND	ND			
Beryllium (μ g/L)	ND	ND	ND	ND	ND			
Calcium (μ g/L)	57100	54400	70200	56300	49400			

ND - below practical quantitation level

NR - analysis not requested

Table B-50. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/20/94	01/20/94	04/13/94	07/12/94	10/06/94			
Cadmium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Cobalt ($\mu\text{g/L}$)	NR	NR	ND	ND	ND			
Chromium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Copper ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Iron ($\mu\text{g/L}$)	NR	NR	101	180	148			
Mercury ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Potassium ($\mu\text{g/L}$)	6510	6440	6000	ND	ND			
Magnesium ($\mu\text{g/L}$)	16500	15700	17100	16100	13800			
Manganese ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Sodium ($\mu\text{g/L}$)	40600	38600	32900	10400	23200			
Nickel ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Lead ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Selenium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Zinc ($\mu\text{g/L}$)	44.7	42.4	162	86.0	51.5			

ND - below practical quantitation level
 NR - analysis not requested

Table B-51. 1994 volatile organics data for TAN-623B.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
Methylene Chloride	April	1.00	µg/L	J	
Methylene Chloride	July	8.00	µg/L	B	
Methylene Chloride	October	5.00	µg/L	B	

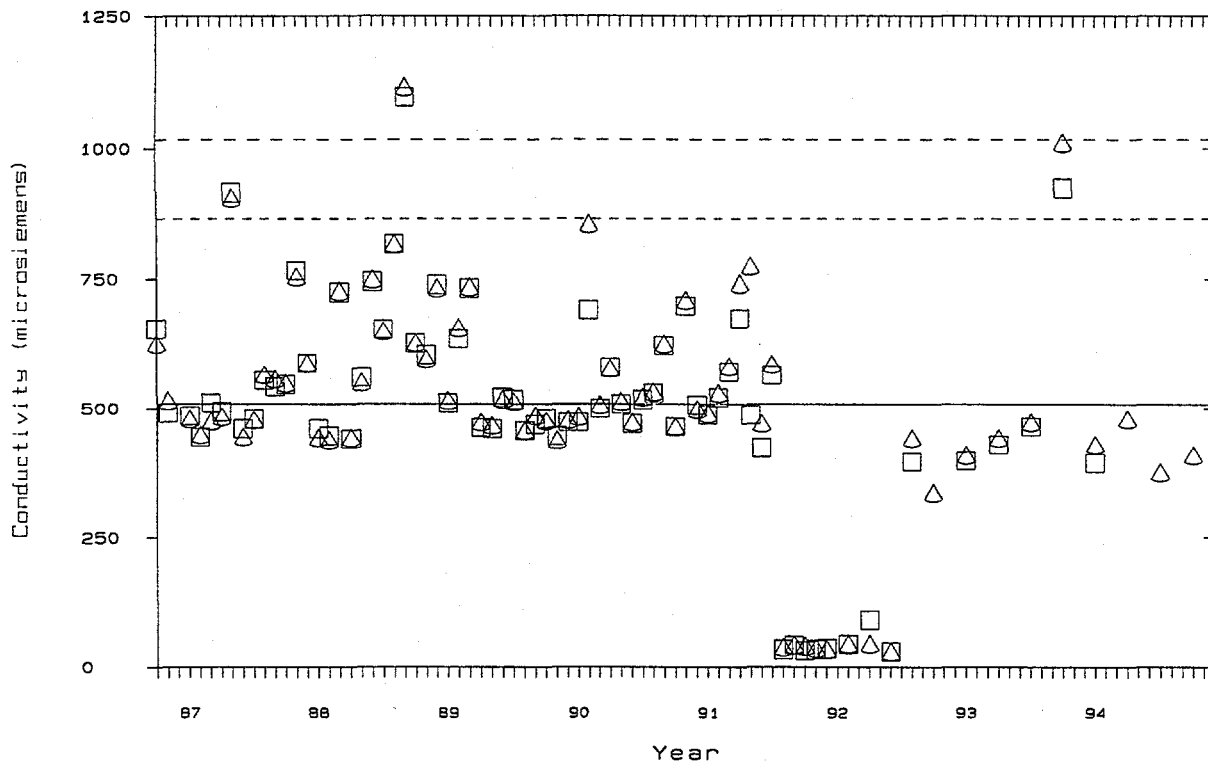
Table B-52. Summary statistics for TAN-623.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Conductivity (μ S)	508	216	141	867	1018	NA
pH	7.4	0.45	143	6.2	8.5	2.5-12
Chloride (mg/L)	50.3	41.3	128	119	148	NA
Fluoride (mg/L)	0.43	1.3	62	2.6	3.5	NA
Nitrogen, Nitrate-Nitrite (mg-N/L)	12.8	15.5	16	40.8	54.3	NA
Nitrate (mg/L)	22.1	8.3	105	36.0	41.9	NA
Nitrogen, as Nitrate (mg-N/L)	5.2	1.8	32	8.3	9.7	NA
Phosphate (mg/L)	4.4	3.9	99	10.9	13.7	NA
Total Phosphorus (mg/L)	2.6	0.83	23	4.0	4.7	NA
Sulfate (mg/L)	36.7	6.6	128	47.7	52.3	NA
Nitrogen, Total Kjeldahl (mg/L)	6.9	3.5	15	13.3	16.4	NA
TOC (mg/L)	18.2	26.8	88	63.0	82.1	NA
Silver (μ g/L)	120	269	14	613	858	5000
Arsenic (μ g/L)	19.9	55.6	39	115	157	5000
Barium (μ g/L)	104	37.1	95	166	193	100,000
Calcium (μ g/L)	54019	5540	26	63662	68049	NA
Cadmium (μ g/L)	5.1	1.3	29	7.4	8.4	1000
Chromium (μ g/L)	12.7	18.9	58	44.6	58.3	5000
Copper (μ g/L)	25.7	41.0	88	94.2	123	NA
Iron (μ g/L)	368	358	12	1036	1379	NA
Mercury (μ g/L)	0.38	0.33	51	0.94	1.2	200
Magnesium (μ g/L)	15108	1685	26	18042	19376	NA
Manganese (μ g/L)	9.7	3.5	16	16.0	19.0	NA
Sodium (μ g/L)	32677	31439	26	87402	112294	NA
Nickel (μ g/L)	45.5	72.4	12	181	250	NA
Lead (μ g/L)	21.5	48.2	54	103	138	5000
Selenium (μ g/L)	56.0	141	20	307	424	1000
Thallium (μ g/L)	81.9	75.8	9	231	313	NA
Zinc (μ g/L)	112	101	139	279	350	NA

Guideline - RCRA Characteristic Guideline
NA - Not Applicable

TAN623B Conductivity

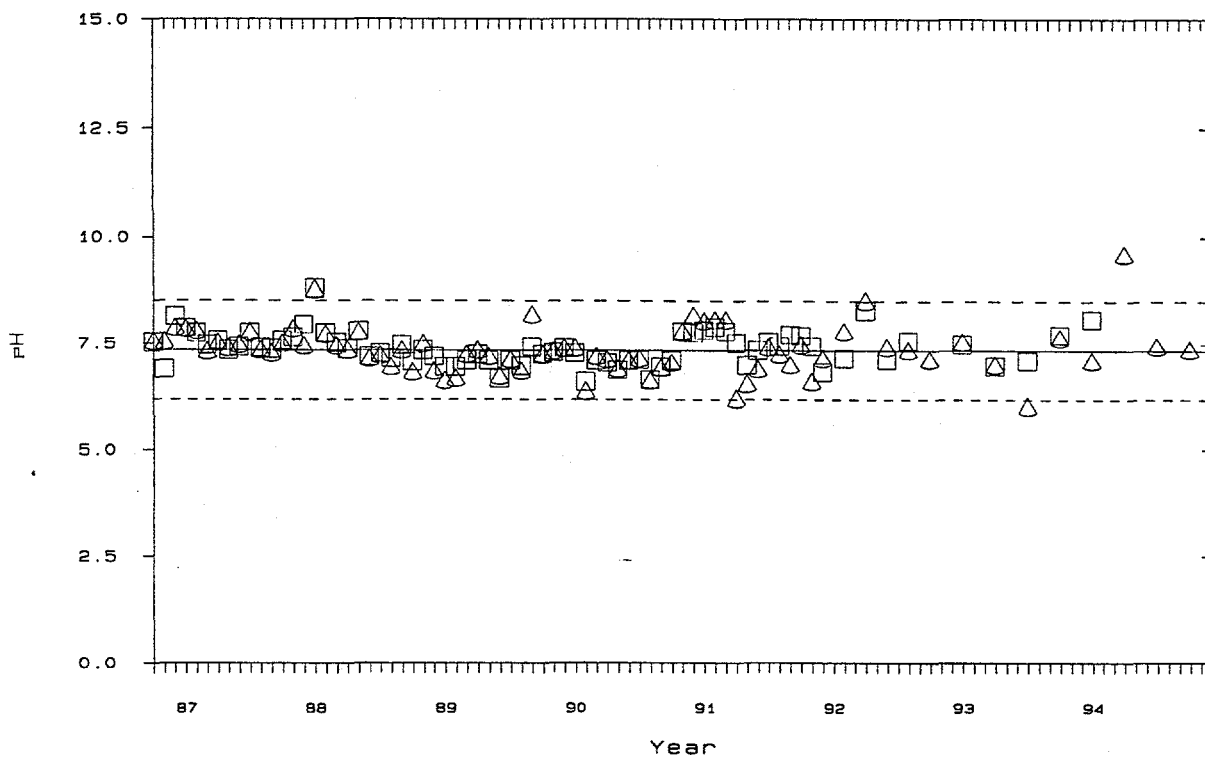
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

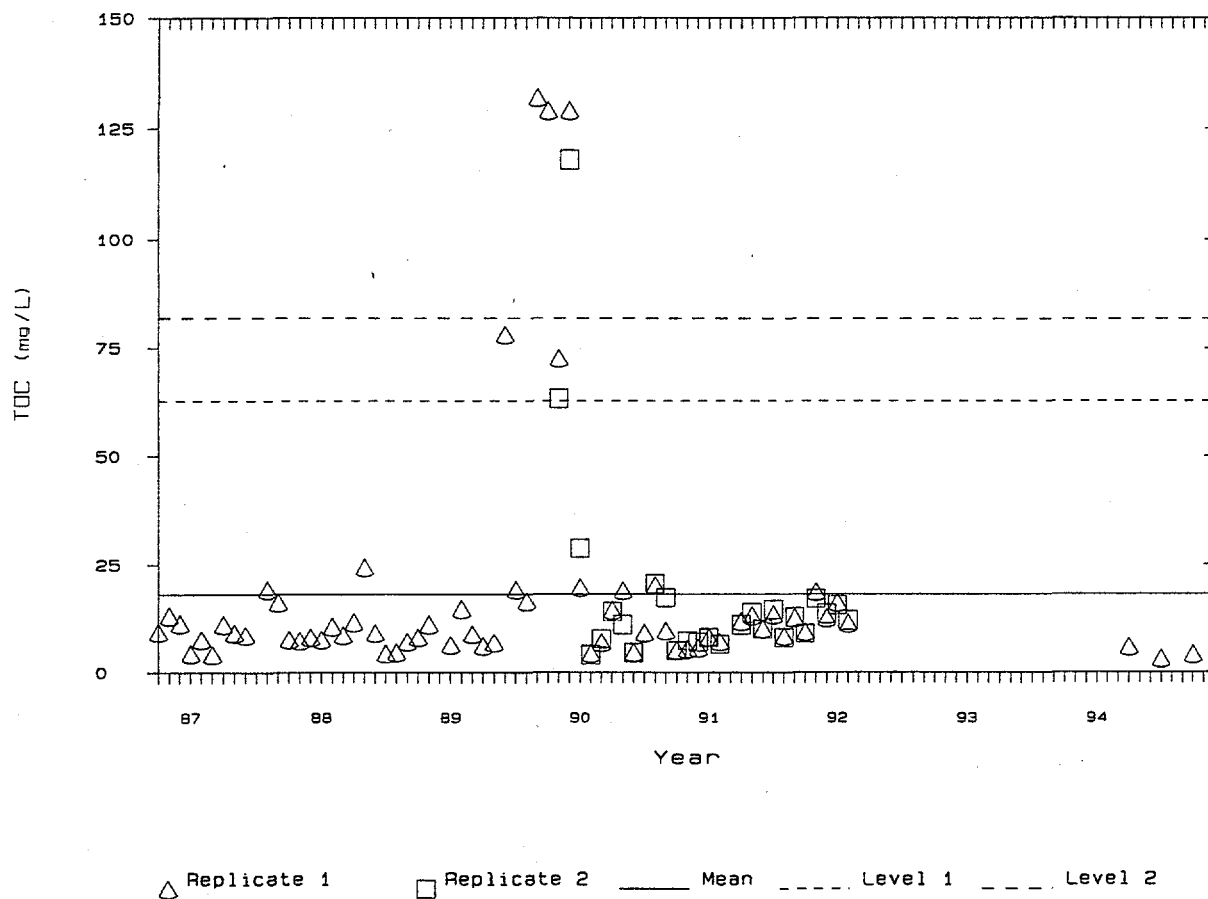
TAN623B pH

RCRA Characteristic Guideline = 2.5-12



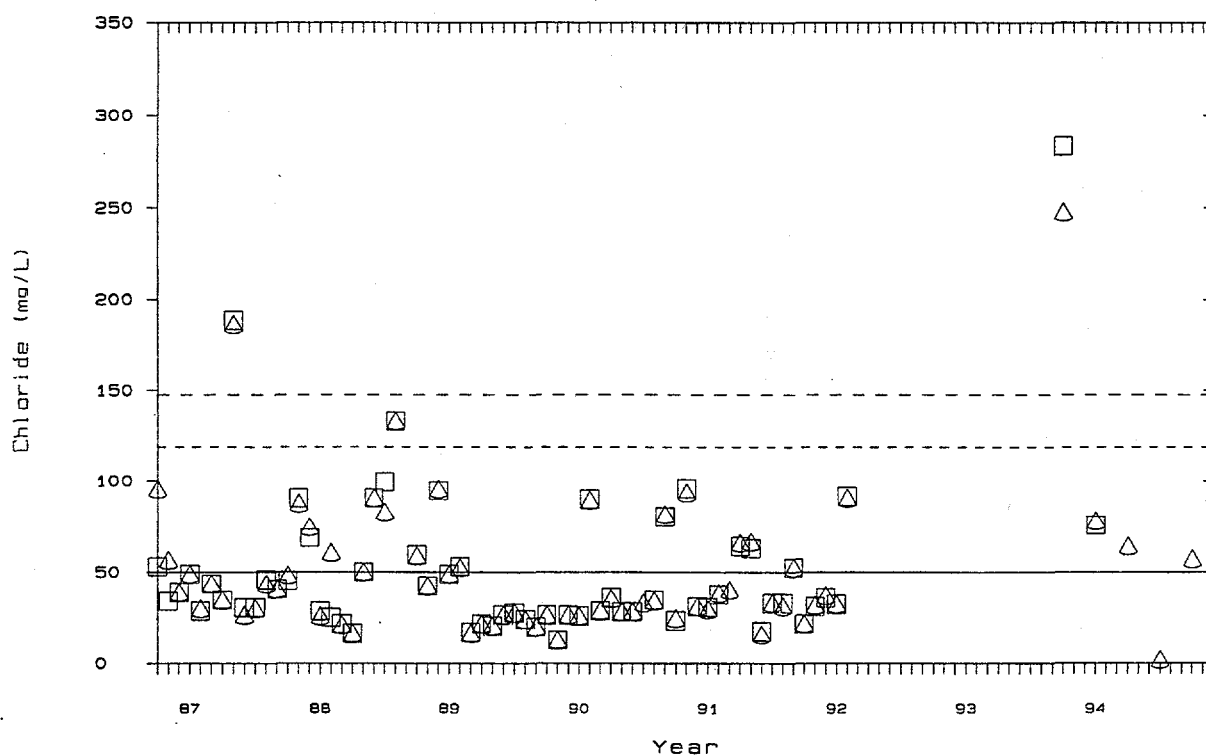
TAN623B TOC Concentrations

RCRA Guideline Not Applicable



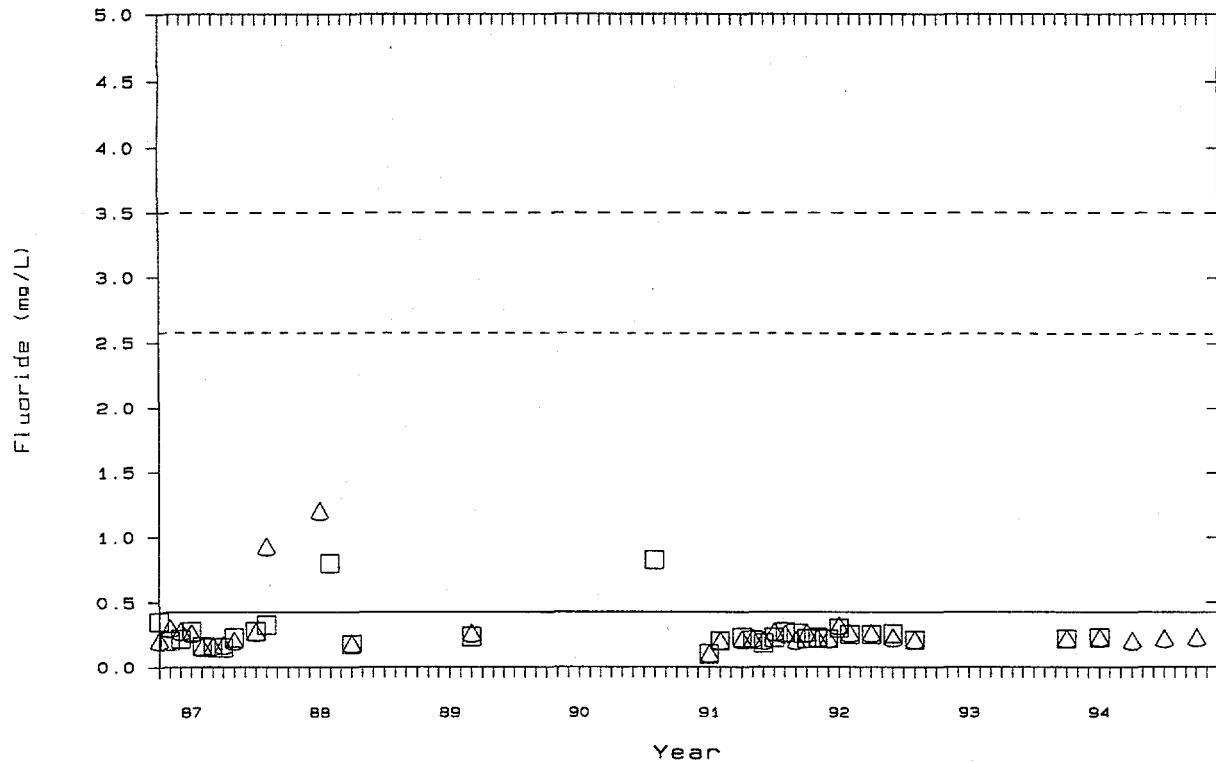
TAN623B Chloride Concentrations

RCRA Guideline Not Applicable



TAN623B Fluoride Concentrations

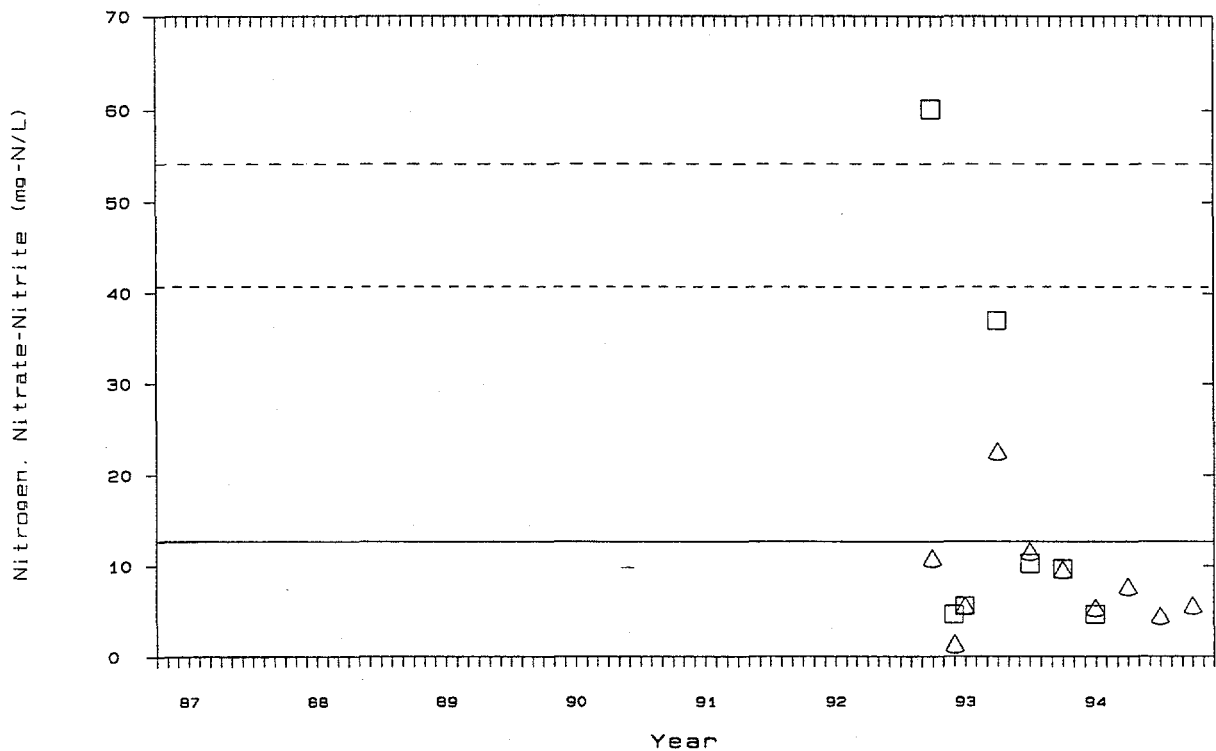
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

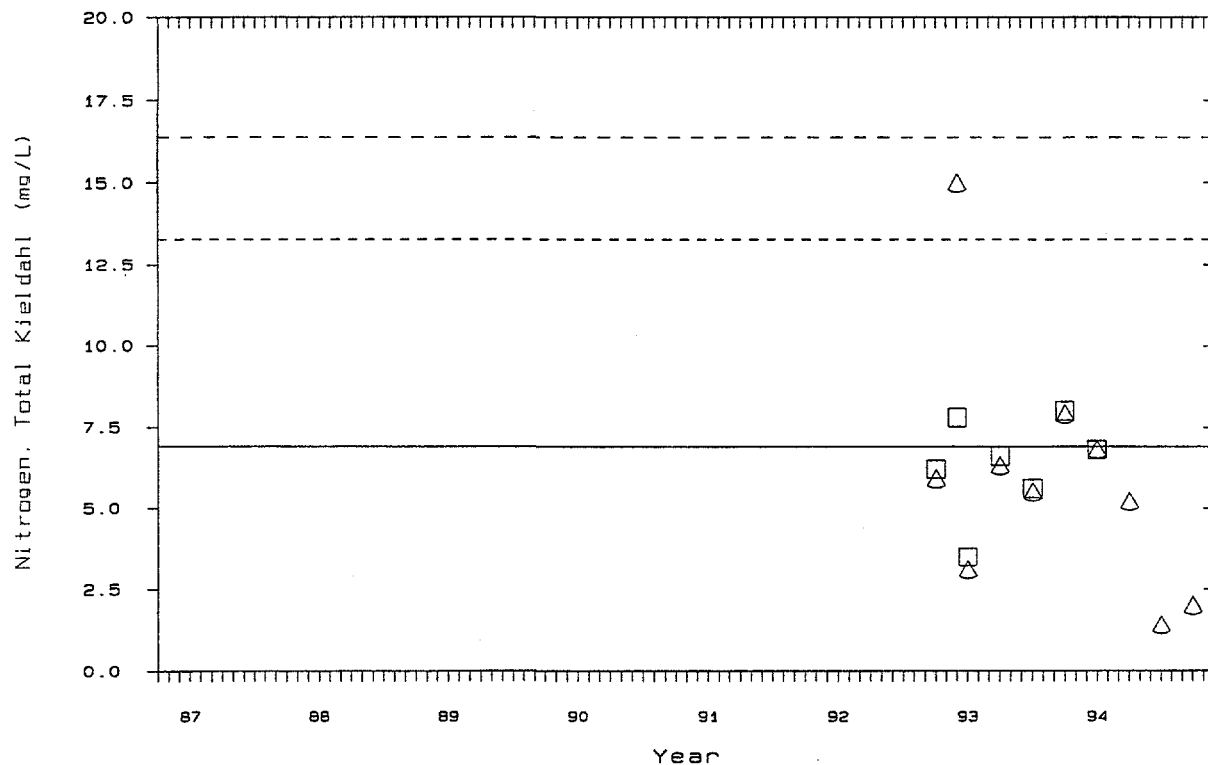
TAN623B Nitrogen, Nitrate-Nitrite Concentrations

RCRA Guideline Not Applicable



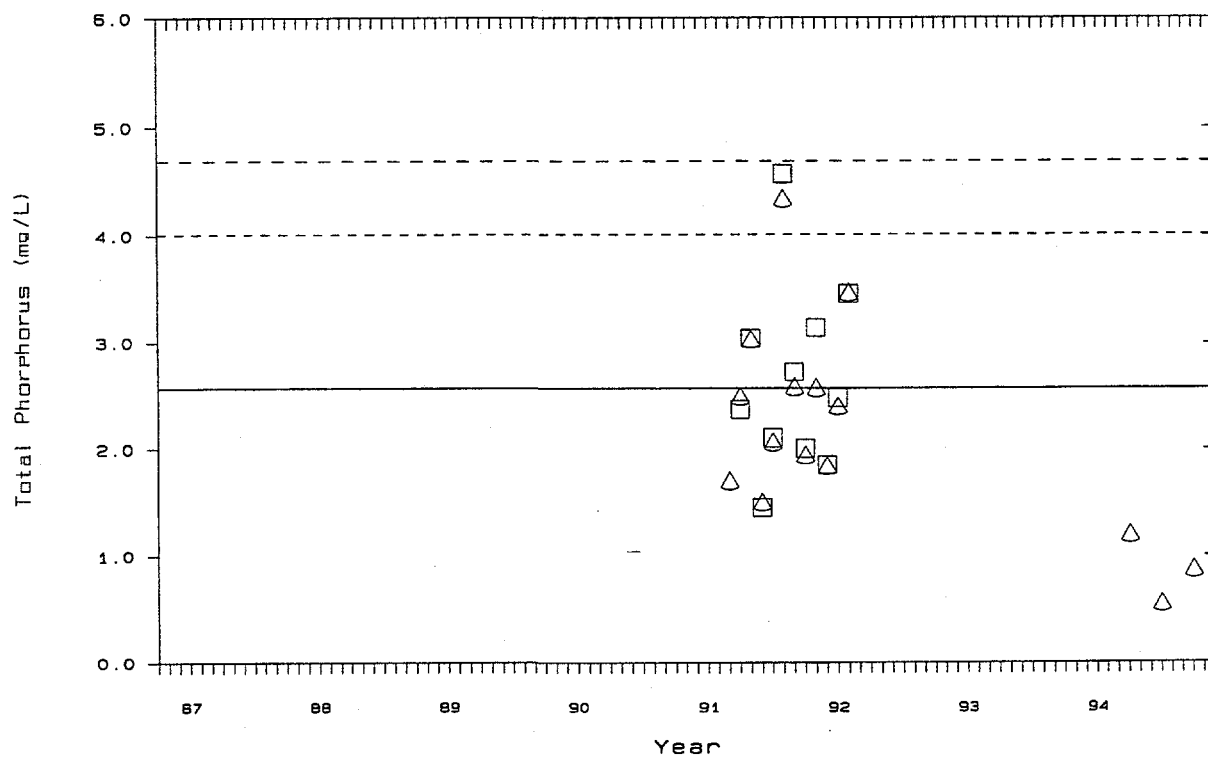
TAN623B Nitrogen, Total Kjeldahl Concentrations

RCRA Guideline Not Applicable



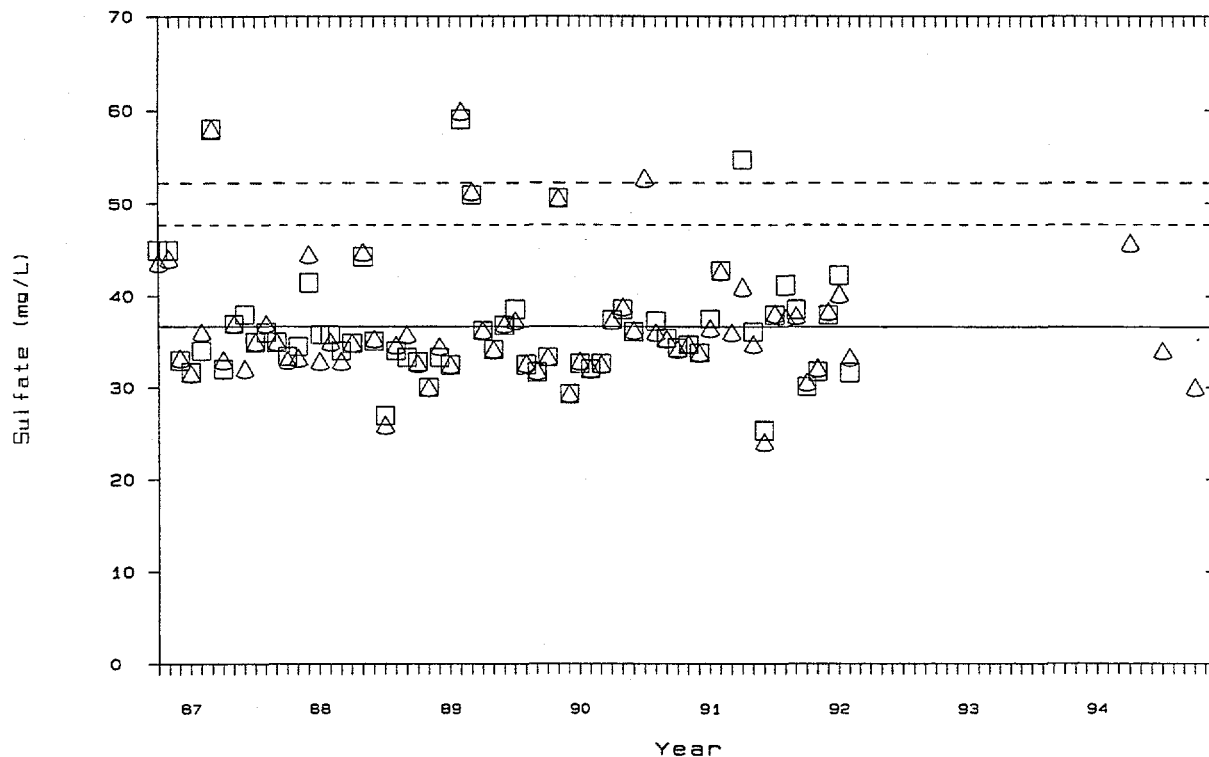
TAN623B Total Phosphorus Concentrations

RCRA Guideline Not Applicable



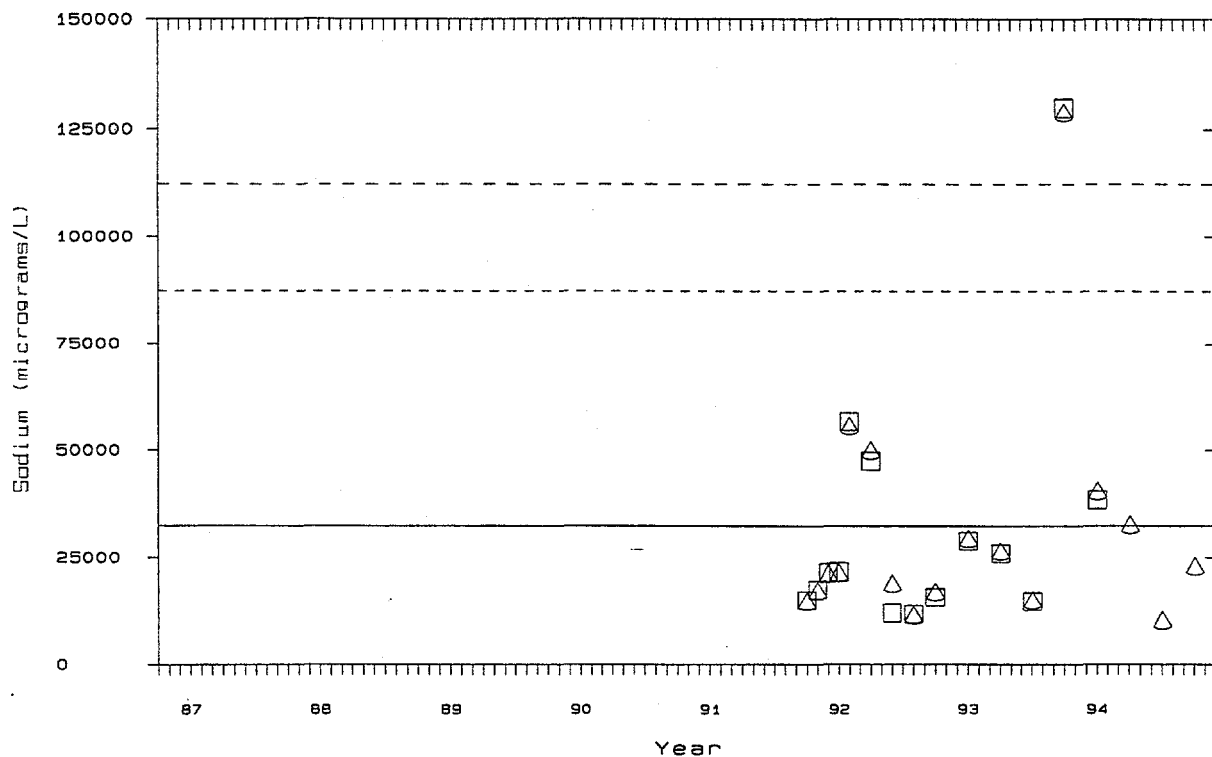
TAN623B Sulfate Concentrations

RCRA Guideline Not Applicable



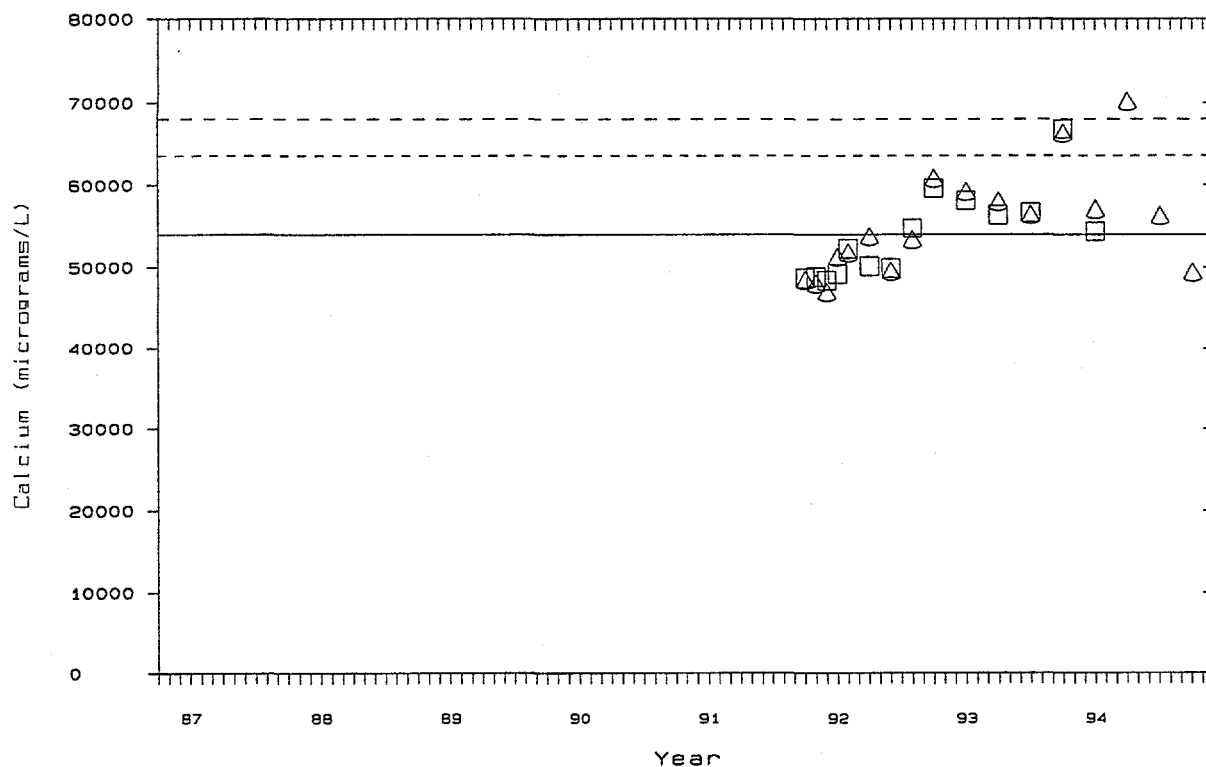
TAN623B Sodium Concentrations

RCRA Guideline Not Applicable



TAN623B Calcium Concentrations

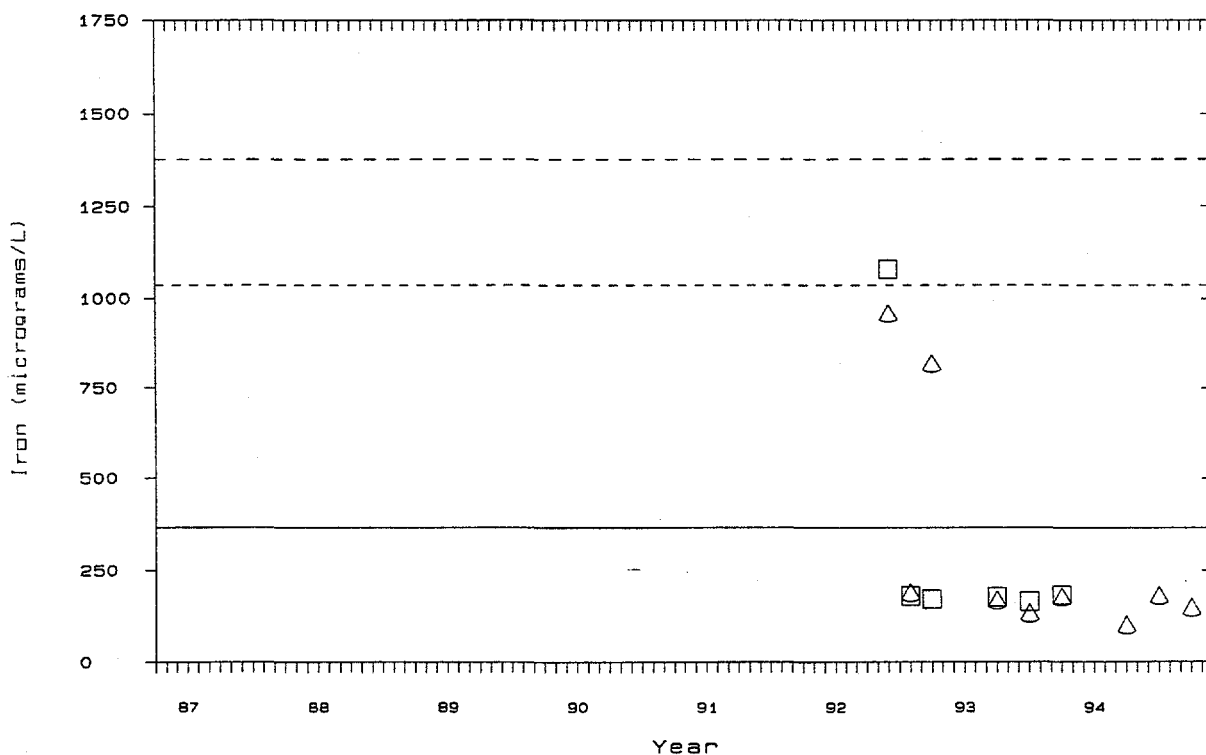
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

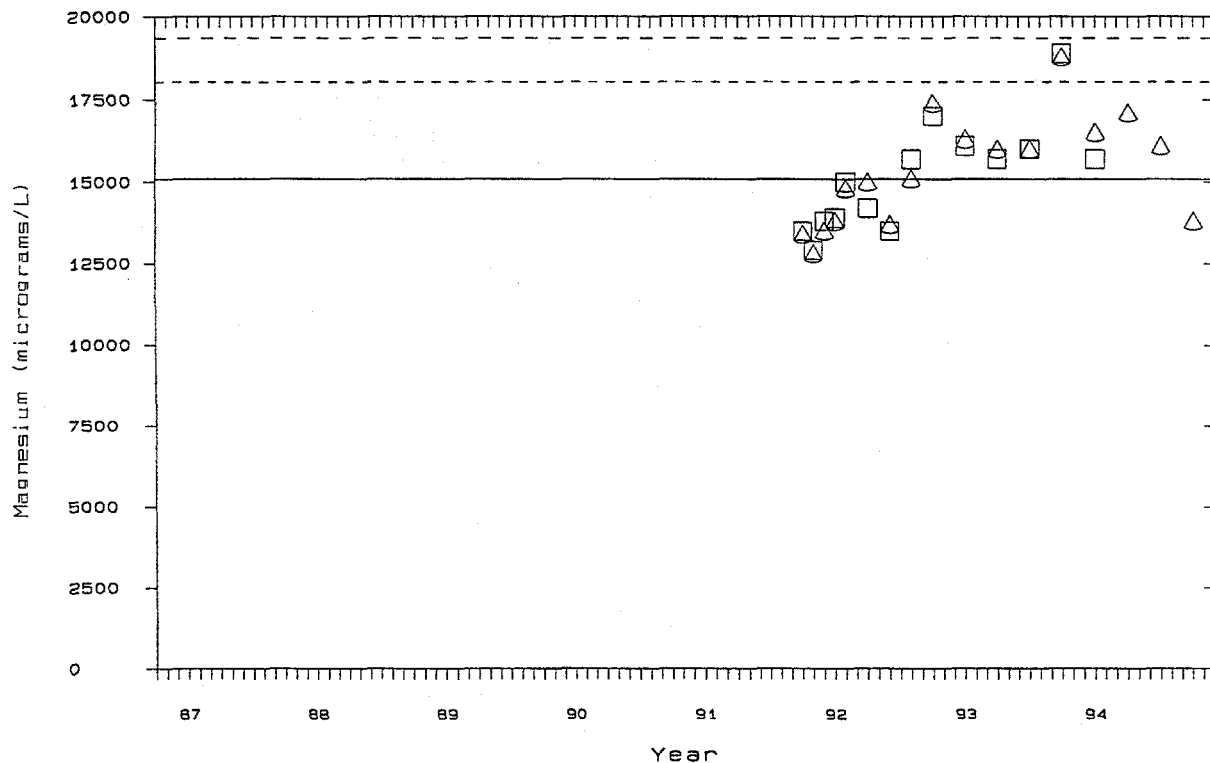
TAN623B Iron Concentrations

RCRA Guideline Not Applicable



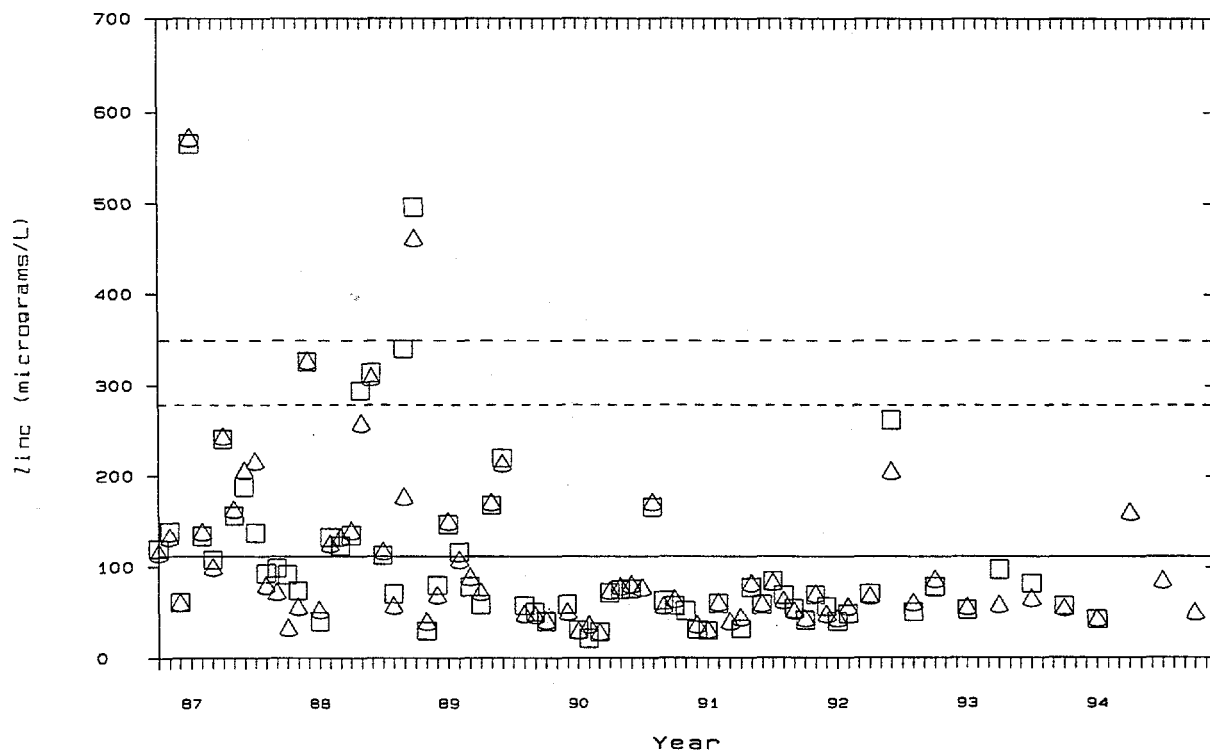
TAN623B Magnesium Concentrations

RCRA Guideline Not Applicable



TAN623B Zinc Concentrations

RCRA Guideline Not Applicable



**Effluent Monitoring Data for
TAN-655 (Effluent from Final Sump to Pond)**

Table B-53. 1994 effluent monitoring data for TAN-655.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	02/02/94	02/02/94	04/13/94	07/12/94	10/06/94			
Biological Oxygen Demand (5-day) (mg/L)	NR	NR	5.0	10.0	7.0			
Conductivity (μ S)	49.0	422	367	403	484			
pH	8.9	9.0	8.5	7.6	7.2			
Chloride (mg/L)	61.0	61.0	47.6	2.3	53.2			
Chemical Oxygen Demand (mg/L)	NR	NR	26.7	17.0	ND			
Fluoride (mg/L)	0.25	0.26	0.22	0.22	0.23			
Surfactants (mg/L)	NR	NR	ND	ND	ND			
Nitrogen, Nitrate-Nitrite (mg-N/L)	2.2	2.3	4.7	4.5	8.6			
Ortho Phosphate (mg/L)	0.57	0.35	NR	NR	NR			
Total Phosphorus (mg/L)	NR	NR	0.79	0.49	0.89			
Sulfate (mg/L)	NR	NR	120	34.7	31.7			
TDS (mg/L)	343	334	491	294	340			
Nitrogen, Total Kjeldahl (mg/L)	0.62	0.45	2.4	1.1	1.7			
TOC (mg/L)	2.7	2.0	4.3	2.4	31.7			
Total Oil & Grease (mg/L)	ND	ND	ND	65.0	188			
TSS (mg/L)	ND	ND	11.0	ND	18.0			
Silver (μ g/L)	ND	ND	ND	ND	ND			
Arsenic (μ g/L)	ND	ND	ND	ND	ND			
Barium (μ g/L)	ND	ND	ND	ND	ND			
Beryllium (μ g/L)	ND	ND	ND	ND	ND			

ND - below practical quantitation level

NR - analysis not requested

Table B-53. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	02/02/94	02/02/94	04/13/94	07/12/94	10/06/94			
Calcium ($\mu\text{g/L}$)	27700	29500	62000	57500	48200			
Cadmium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Cobalt ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Chromium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Copper ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Iron ($\mu\text{g/L}$)	162	195	233	127	589			
Mercury ($\mu\text{g/L}$)	ND	ND	ND	ND	0.34			
Potassium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Magnesium ($\mu\text{g/L}$)	9680	10300	16000	16800	14200			
Manganese ($\mu\text{g/L}$)	ND	ND	ND	ND	15.6			
Sodium ($\mu\text{g/L}$)	40600	43200	73500	11300	29600			
Nickel ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Lead ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Selenium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND			
Zinc ($\mu\text{g/L}$)	22.5	42.2	135	66.7	46.4			

ND - below practical quantitation level

Table B-54. 1994 volatile organics data for TAN-655A.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
Methylene Chloride	July	6.00	µg/L	B	
Methylene Chloride	October	5.00	µg/L	B	
Trichlorofluoromethane	July	2.00	µg/L	J	

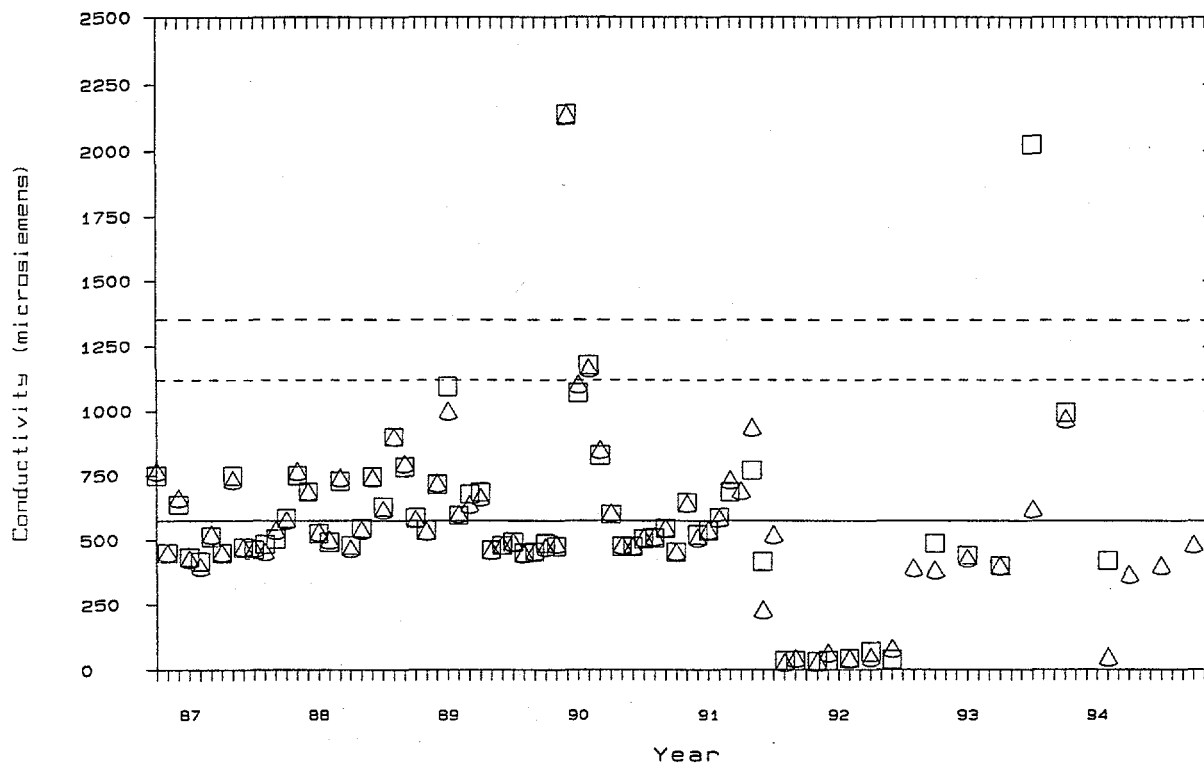
Table B-55. Summary statistics for TAN-655.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Conductivity (μ S)	577	329	139	1124	1354	NA
pH	7.7	0.72	139	5.8	9.6	2.5-12
Chloride (mg/L)	74.6	109	133	255	332	NA
Fluoride (mg/L)	0.37	0.46	70	1.2	1.5	NA
Nitrogen, Nitrate-Nitrite (mg-N/L)	8.8	7.7	16	22.7	29.5	NA
Nitrate (mg/L)	16.8	6.3	105	27.3	31.7	NA
Nitrogen, as Nitrate (mg-N/L)	3.9	1.4	30	6.3	7.4	NA
Phosphate (mg/L)	3.7	4.2	101	10.7	13.7	NA
Total Phosphorus (mg/L)	1.7	0.87	21	3.2	3.9	NA
Sulfate (mg/L)	39.3	9.0	127	54.3	60.6	NA
Nitrogen, Total Kjeldahl (mg/L)	3.7	1.4	14	6.3	7.5	NA
TOC (mg/L)	15.4	27.9	95	62.0	81.8	NA
TSS (mg/L)	30.8	27.6	10	83.9	112	NA
Silver (μ g/L)	13.7	12.5	15	36.4	47.5	5000
Arsenic (μ g/L)	15.4	39.7	39	83.2	113	5000
Barium (μ g/L)	112	68.9	95	227	276	100,000
Calcium (μ g/L)	70825	52766	24	163124	205453	NA
Cadmium (μ g/L)	6.2	2.4	28	10.4	12.3	1000
Chromium (μ g/L)	13.5	10.1	55	30.6	38.0	5000
Copper (μ g/L)	50.4	94.2	109	207	274	NA
Iron (μ g/L)	522	498	13	1443	1908	NA
Mercury (μ g/L)	1.4	4.1	56	8.4	11.4	200
Magnesium (μ g/L)	15100	2627	24	19695	21803	NA
Manganese (μ g/L)	75.8	128	16	308	420	NA
Sodium (μ g/L)	54163	58173	24	155920	202587	NA
Nickel (μ g/L)	17.5	6.9	19	29.7	35.4	NA
Lead (μ g/L)	20.7	34.2	59	78.4	103	5000
Selenium (μ g/L)	67.5	125	15	296	408	1000
Zinc (μ g/L)	120	134	139	343	437	NA

Guideline - RCRA Characteristic Guideline
NA - Not Applicable

TAN655A Conductivity

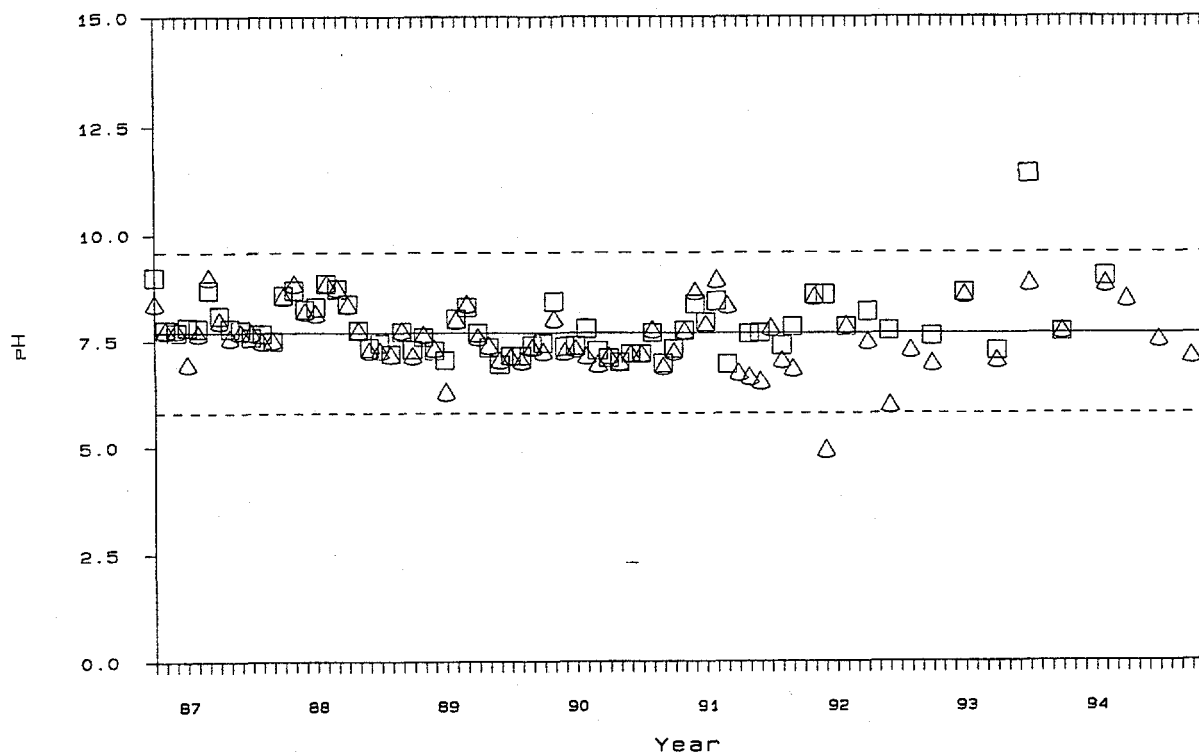
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

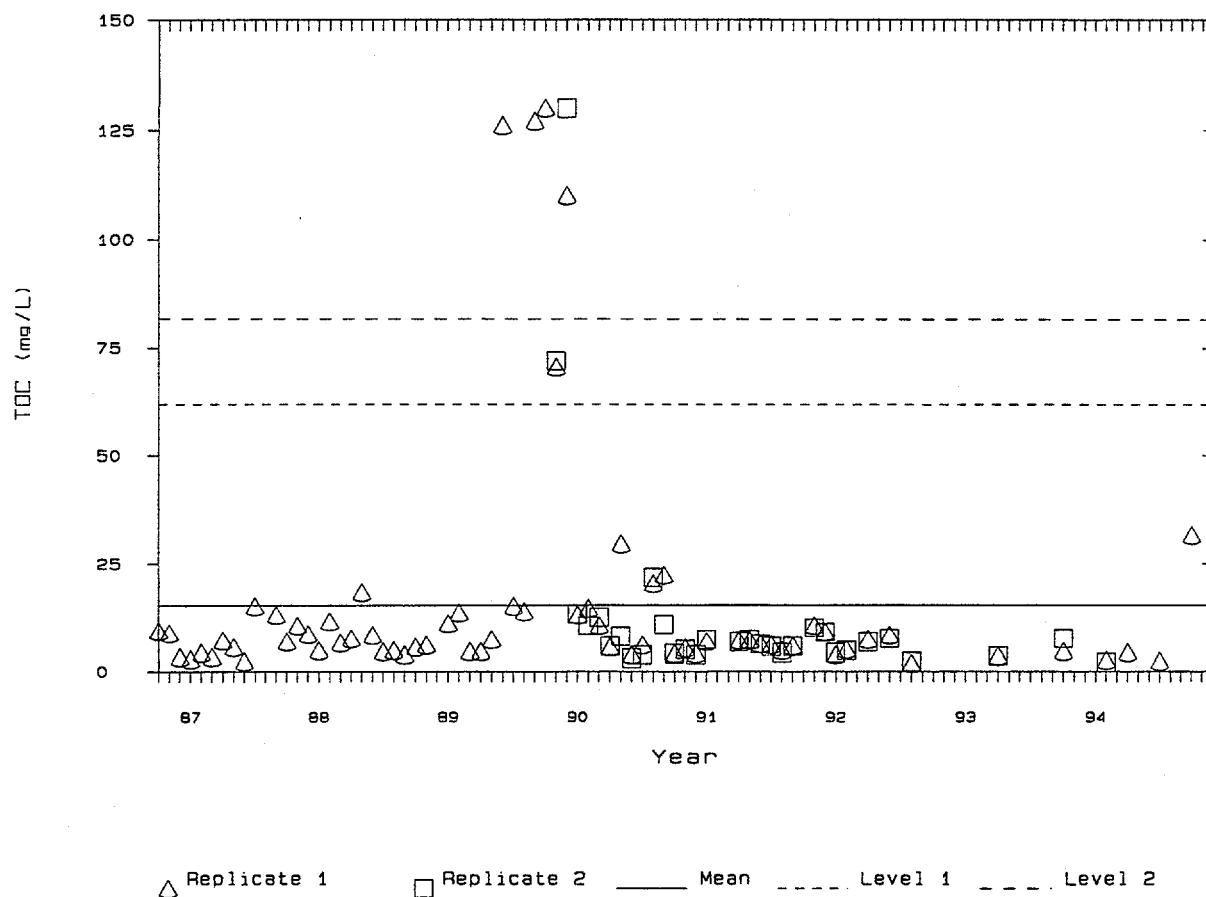
TAN655A pH

RCRA Characteristic Guideline = 2.5-12



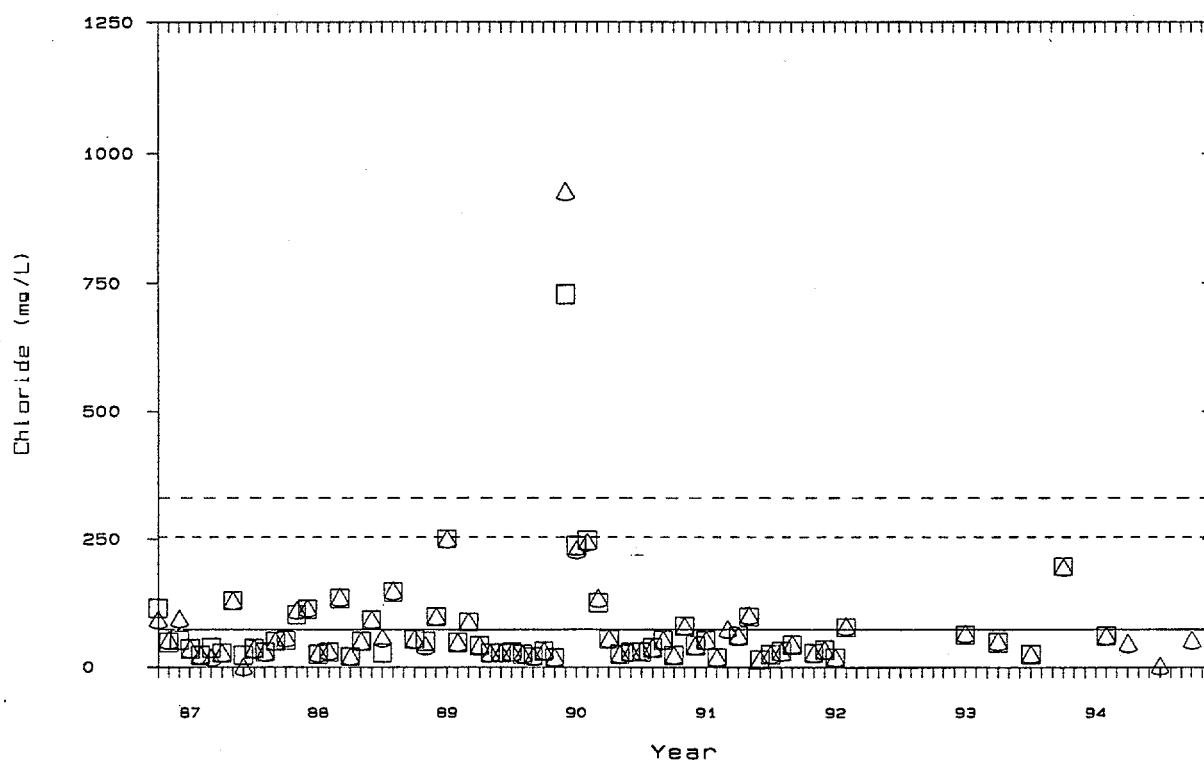
TAN655A TOC Concentrations

RCRA Guideline Not Applicable



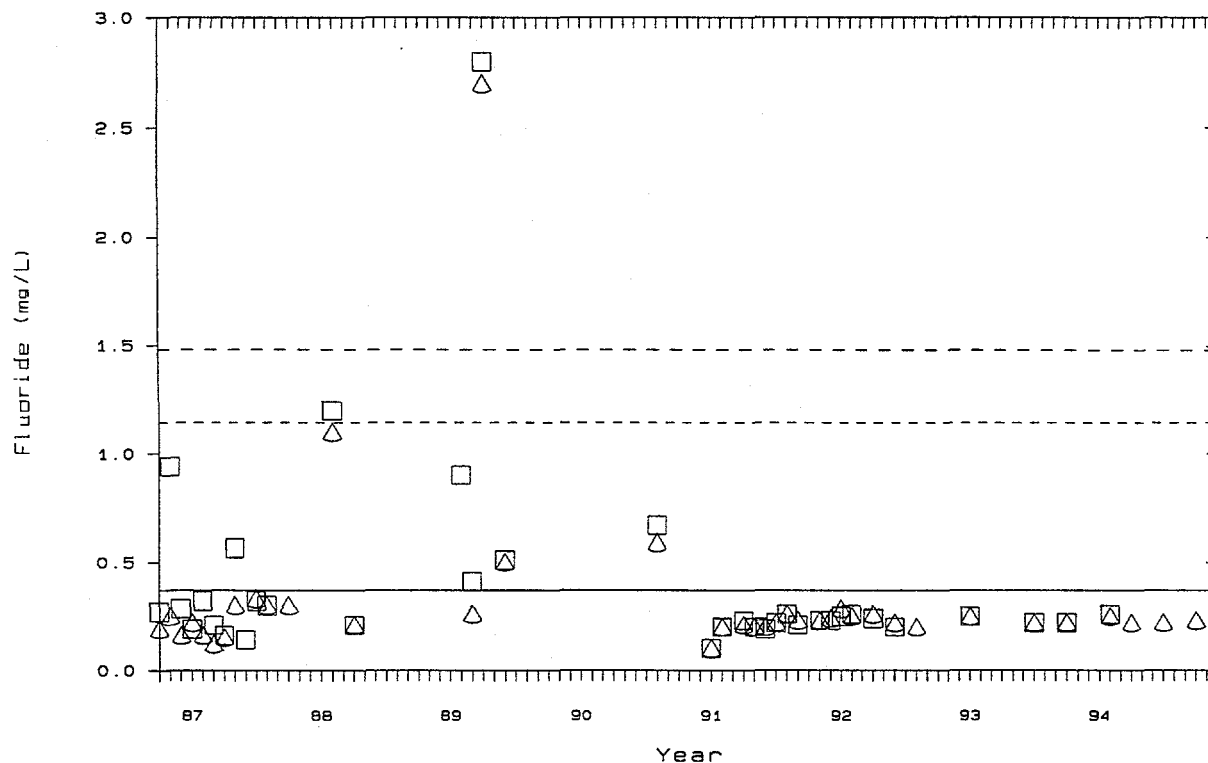
TAN655A Chloride Concentrations

RCRA Guideline Not Applicable



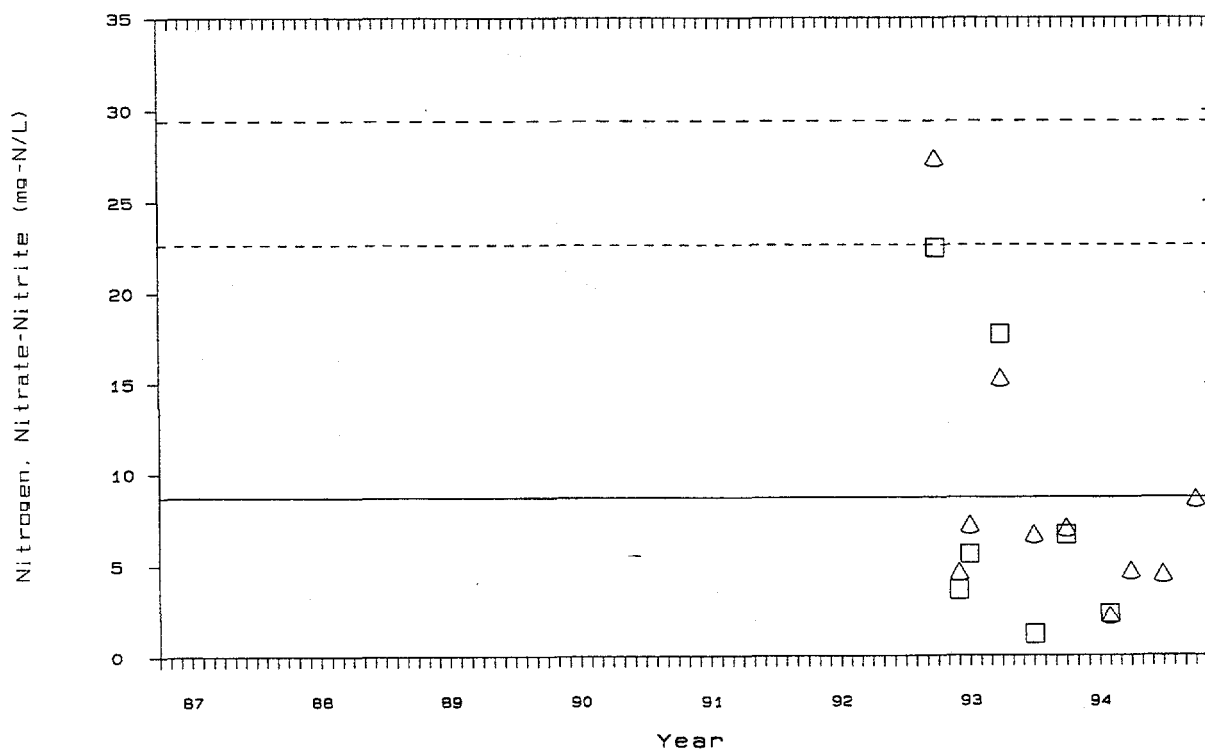
TAN655A Fluoride Concentrations

RCRA Guideline Not Applicable



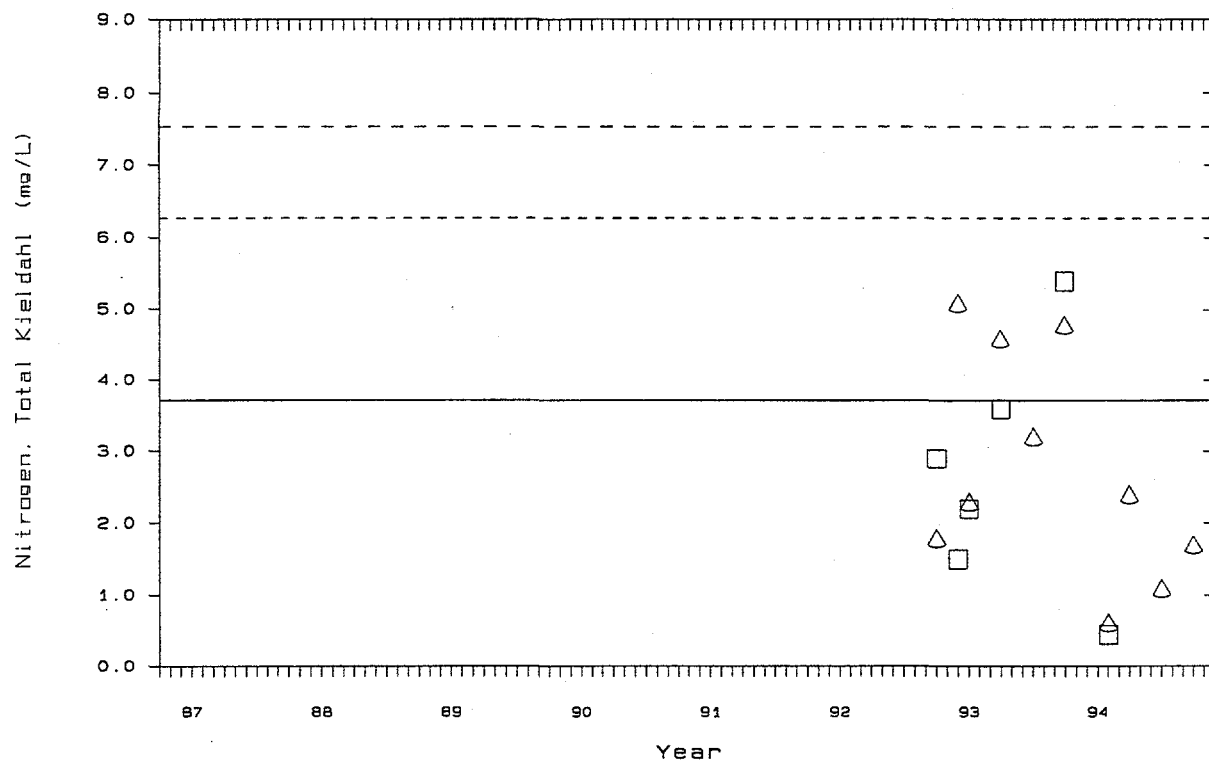
TAN655A Nitrogen, Nitrate-Nitrite Concentrations

RCRA Guideline Not Applicable



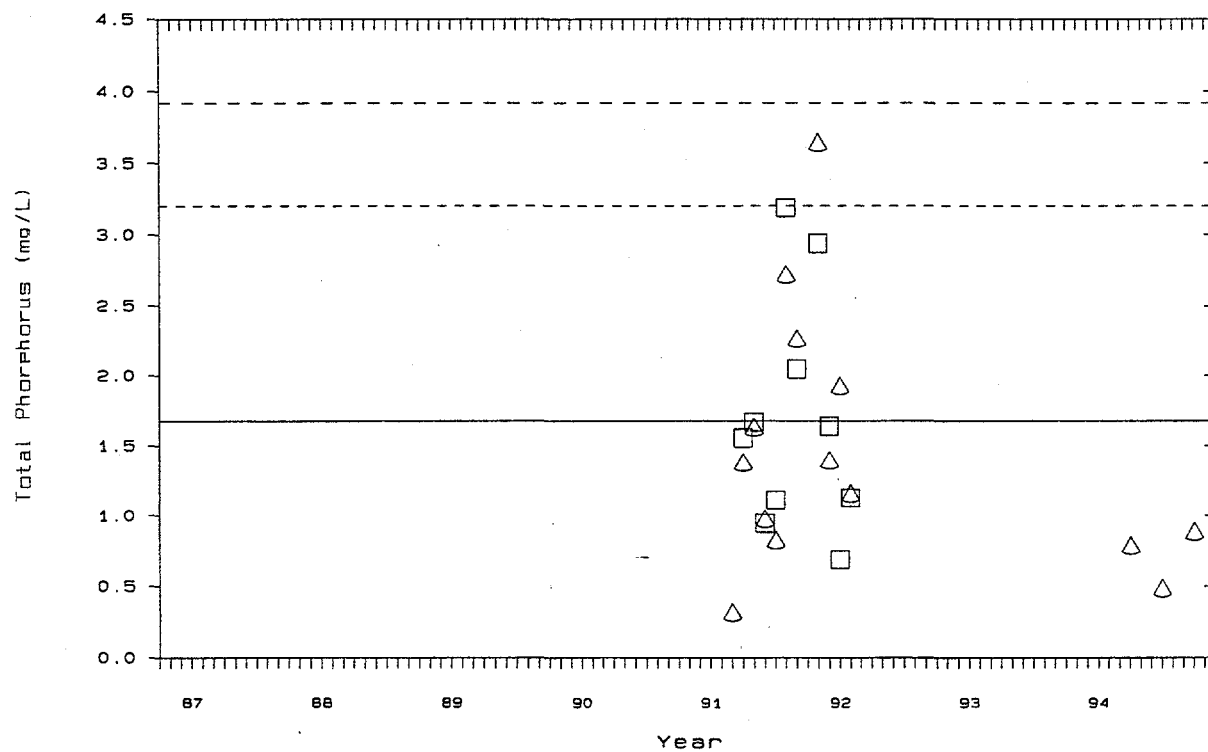
TAN655A Nitrogen, Total Kjeldahl Concentrations

RCRA Guideline Not Applicable



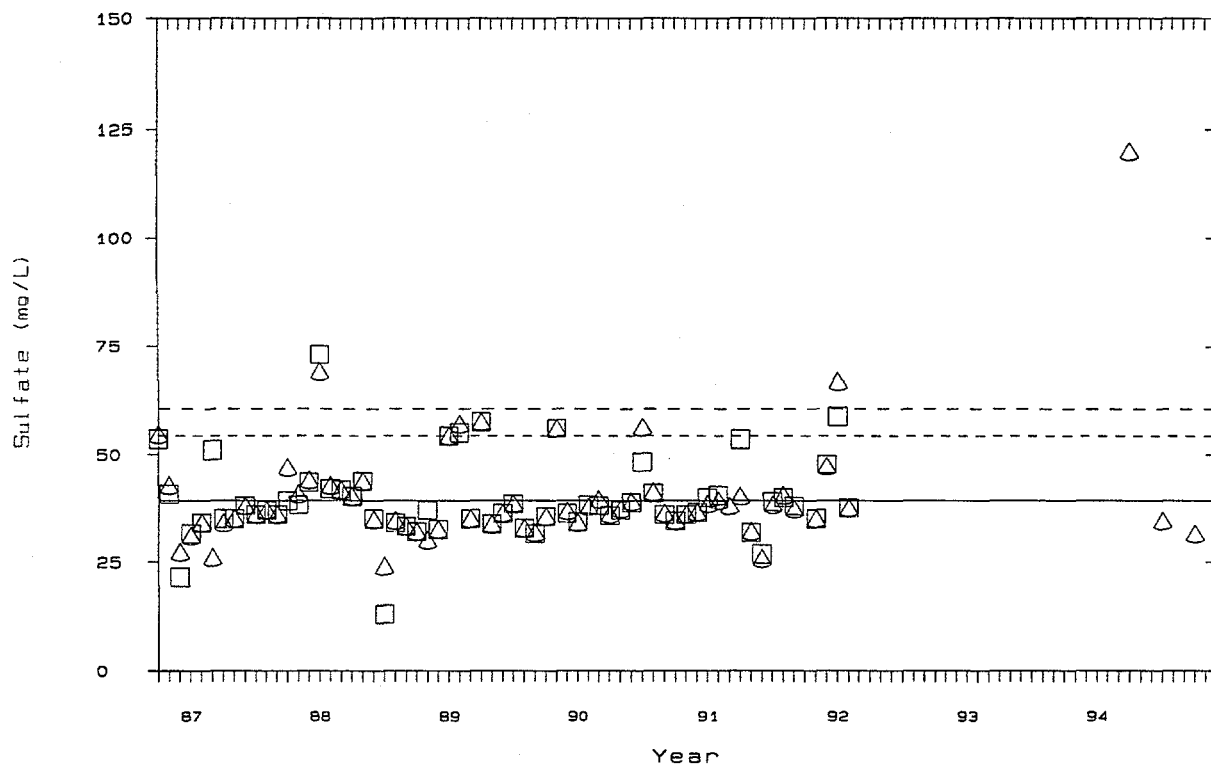
TAN655A Total Phosphorus Concentrations

RCRA Guideline Not Applicable



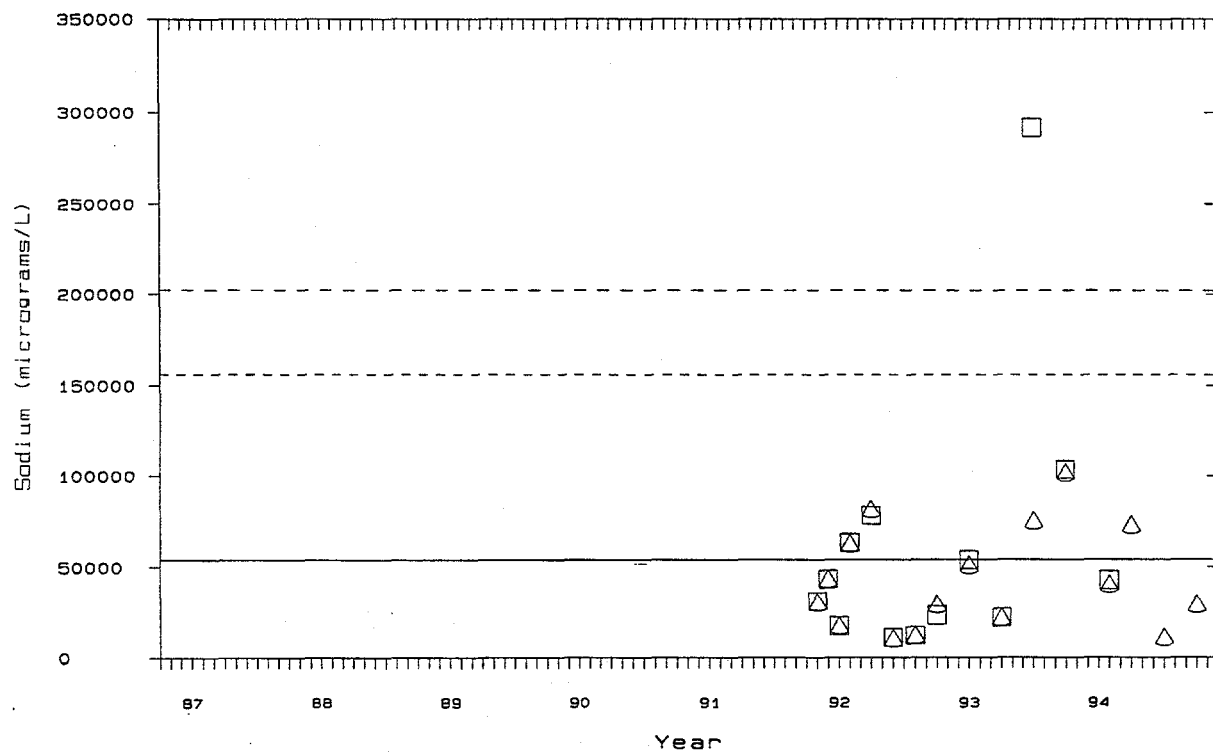
TAN655A Sulfate Concentrations

RCRA Guideline Not Applicable



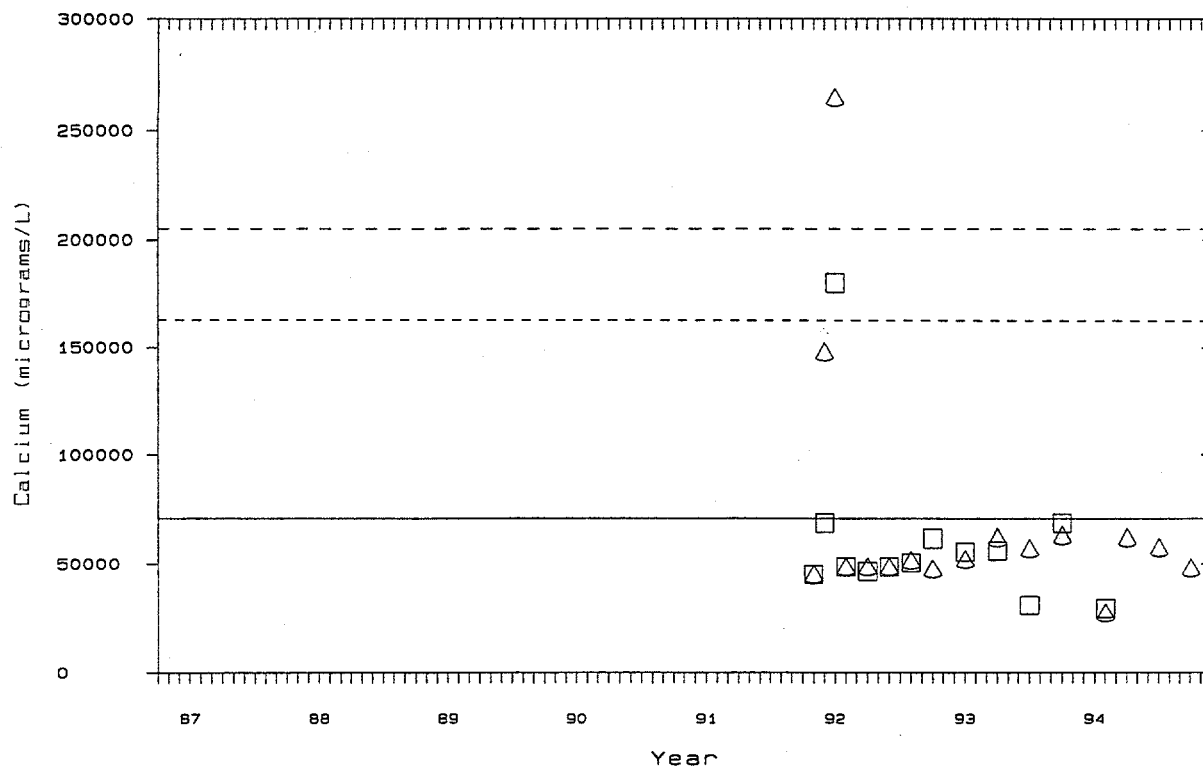
TAN655A Sodium Concentrations

RCRA Guideline Not Applicable



TAN655A Calcium Concentrations

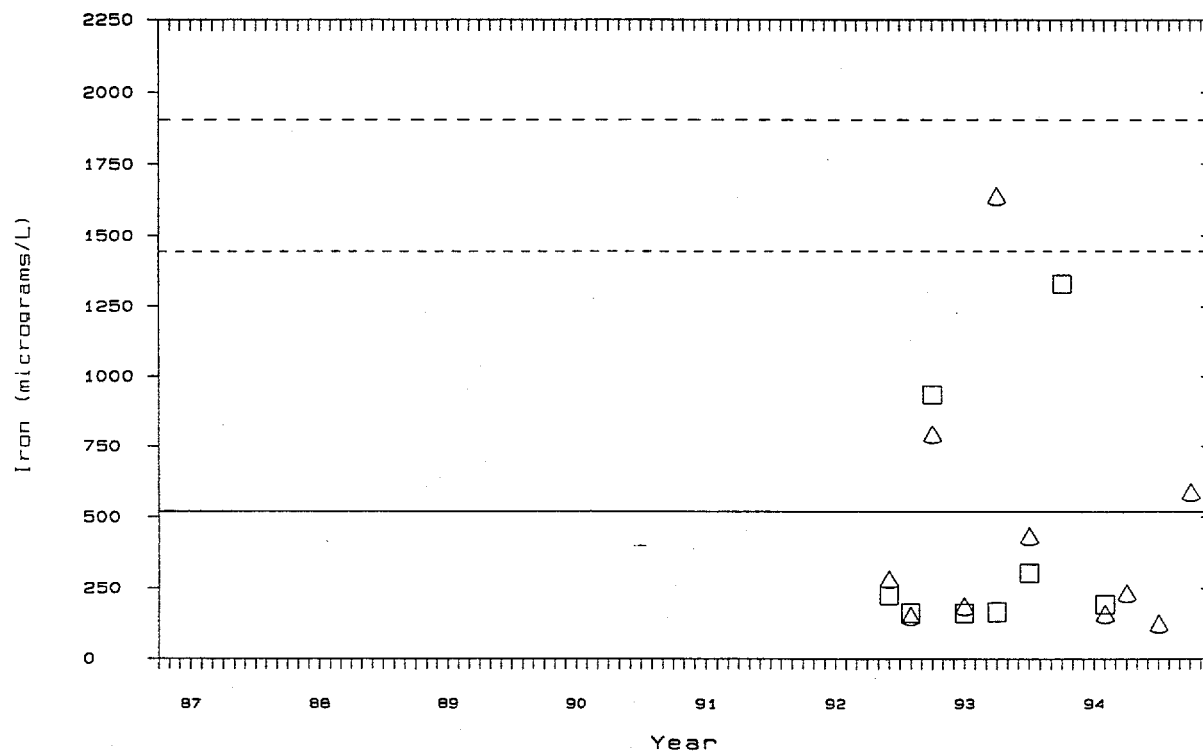
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

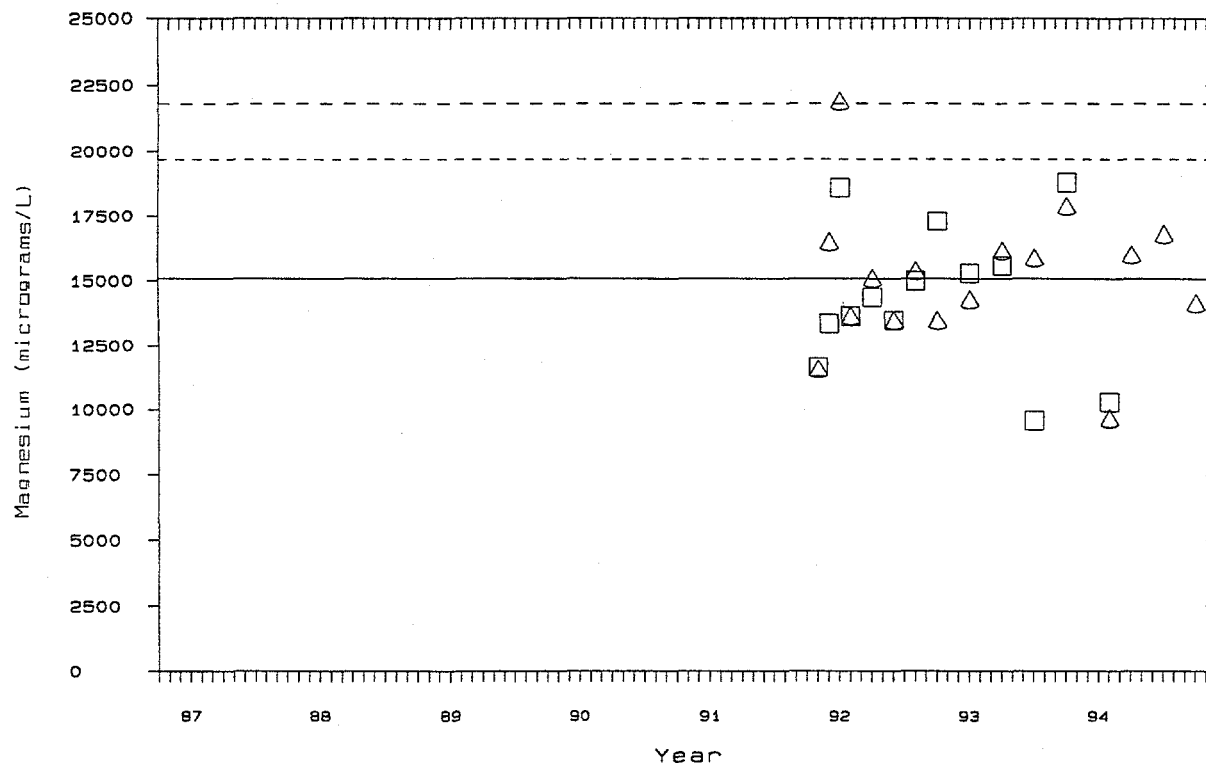
TAN655A Iron Concentrations

RCRA Guideline Not Applicable



TAN655A Magnesium Concentrations

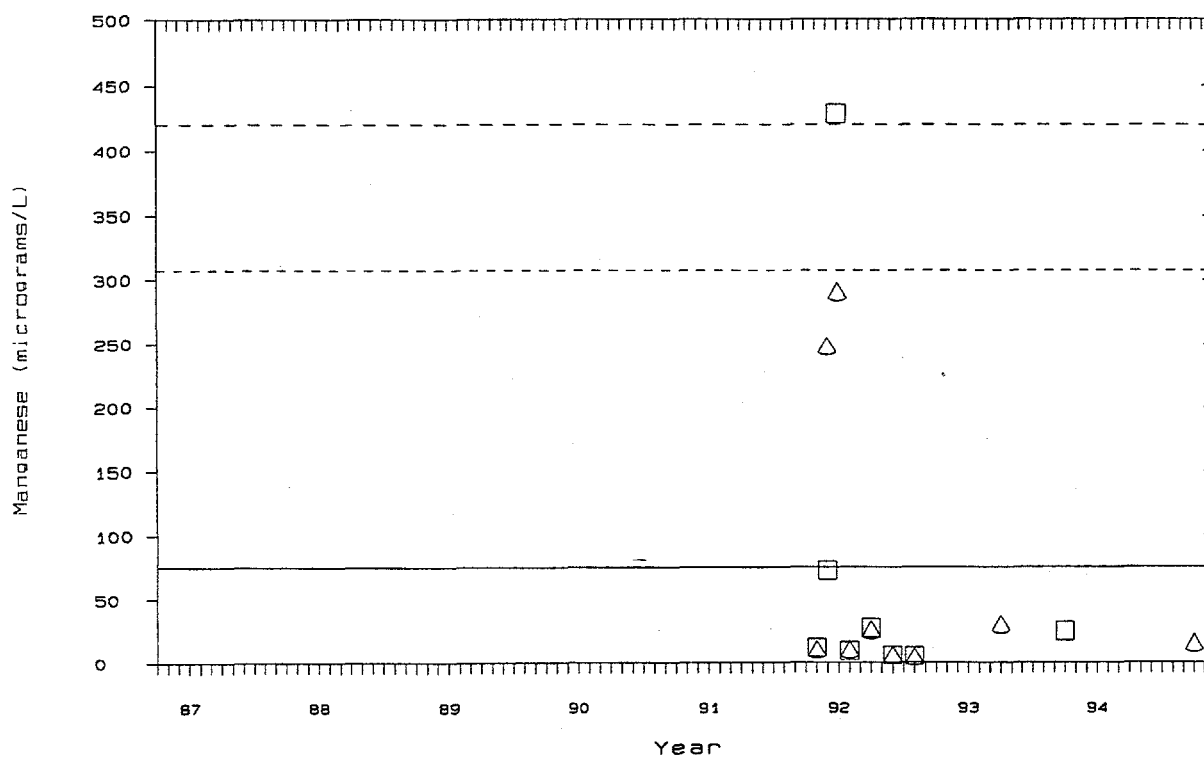
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

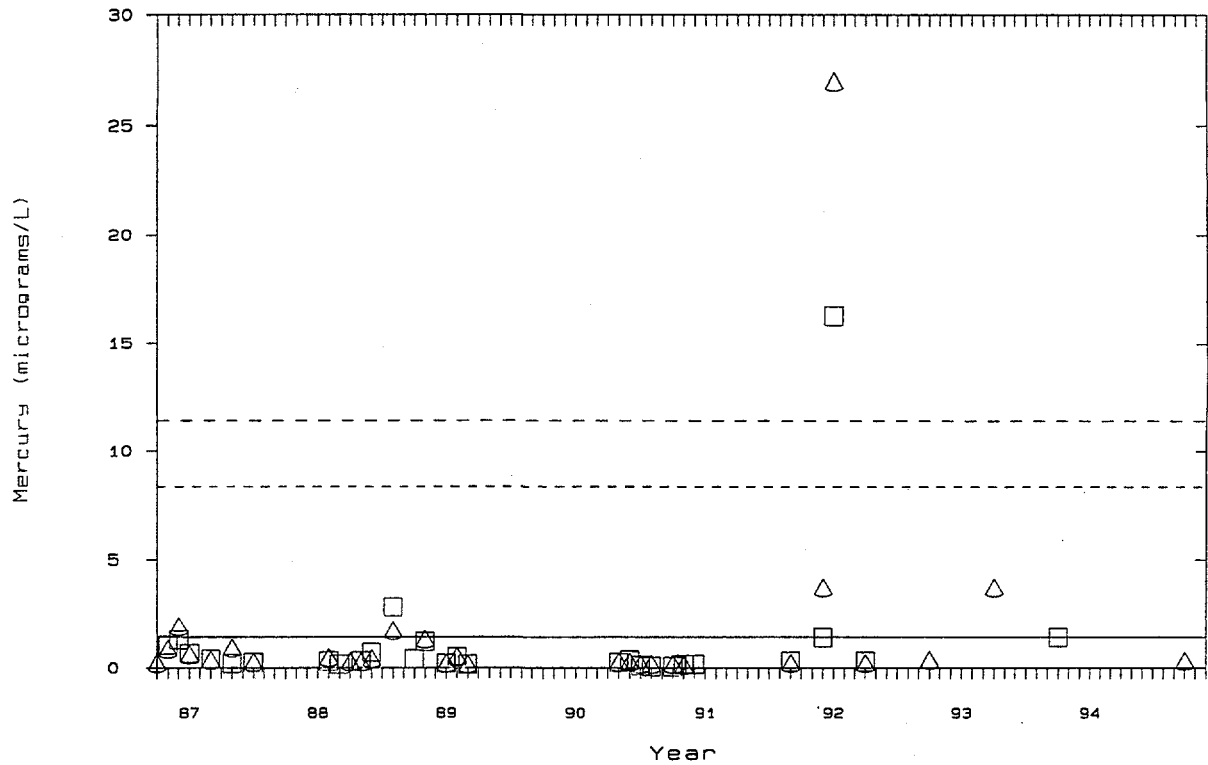
TAN655A Manganese Concentrations

RCRA Guideline Not Applicable



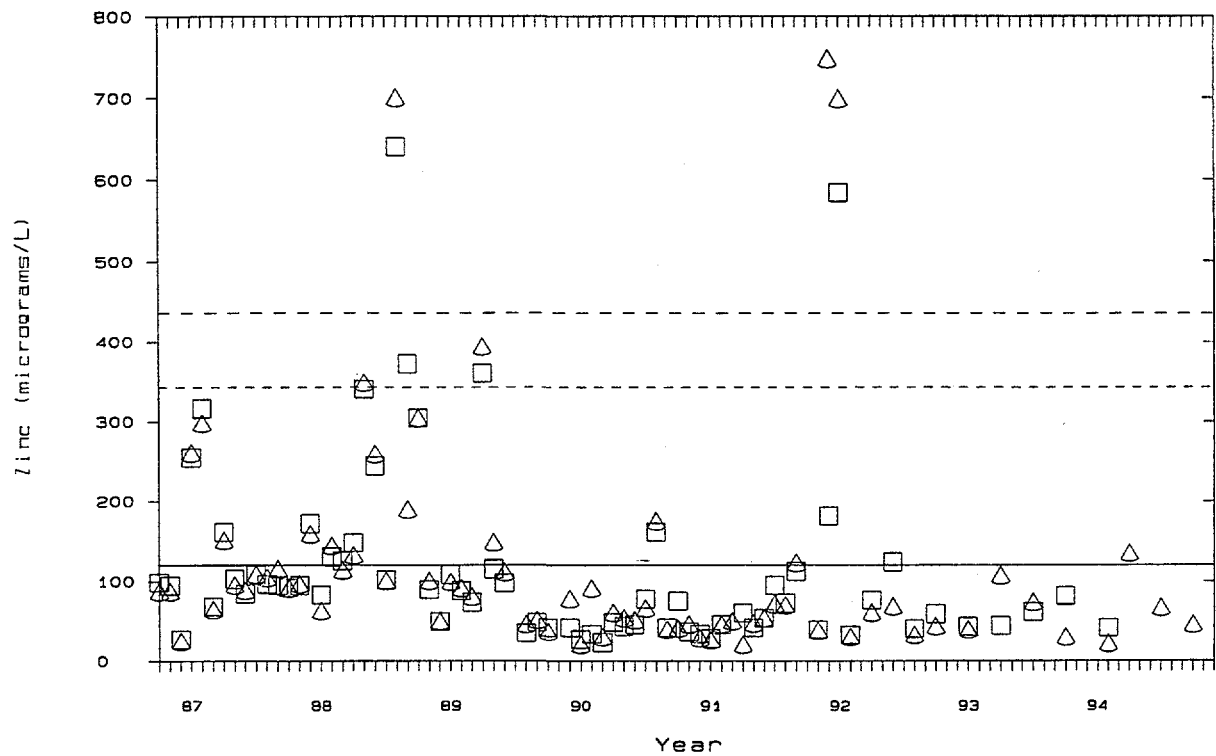
TAN655A Mercury Concentrations

RCRA Characteristic Guideline = 200 micrograms/L



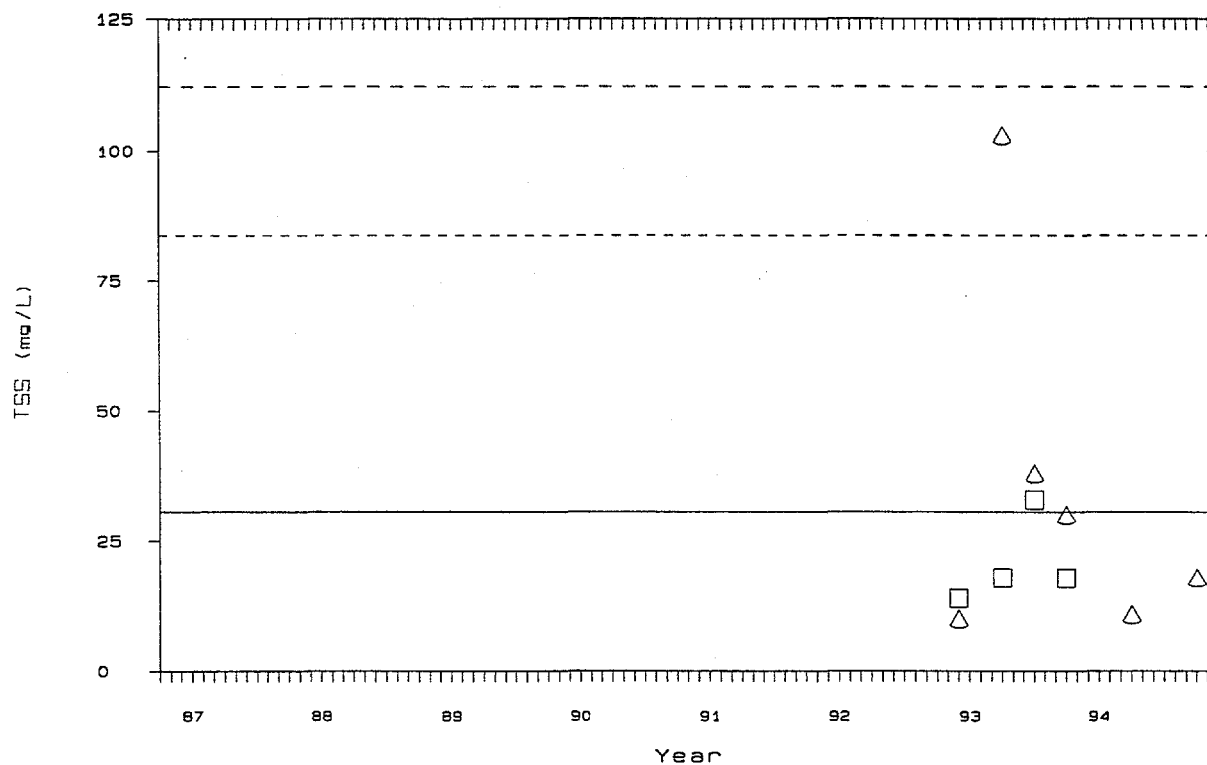
TAN655A Zinc Concentrations

RCRA Guideline Not Applicable



TAN655A TSS Concentrations

RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

**Effluent Monitoring Data for
LOFT-1B (Sump behind Containment Test Facility)**

Table B-56. 1994 effluent monitoring data for LOFT-1B.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	02/02/94	02/02/94	02/02/94	05/17/94	08/16/94		
Biological Oxygen Demand (5-day) (mg/L)	NR	NR	NR	130	31.0		
Conductivity (μ S)	1716	1693	1324	1324	948		
pH	7.0	7.0	7.2	7.2	6.4		
Chloride (mg/L)	NR	NR	258	258	139		
Chemical Oxygen Demand (mg/L)	NR	NR	647	647	56.0		
Fluoride (mg/L)	0.24	0.24	0.25	0.25	0.33		
Nitrogen, Nitrate-Nitrite (mg-N/L)	0.09	0.08	0.03	0.03	ND		
Total Phosphorus (mg/L)	NR	NR	2.9	2.9	0.69		
Sulfate (mg/L)	NR	NR	44.4	44.4	61.2		
TDS (mg/L)	1490	1520	722	722	680		
Nitrogen, Total Kjeldahl (mg/L)	33.0	33.4	45.4	45.4	21.4		
TOC (mg/L)	69.0	64.2	75.5	75.5	18.0		
TSS (mg/L)	52.9	64.0	192	192	18.0		
Silver (μ g/L)	ND	ND	ND	ND	ND		
Arsenic (μ g/L)	ND	ND	ND	ND	ND		
Barium (μ g/L)	ND	203	ND	ND	ND		
Beryllium (μ g/L)	ND	ND	ND	ND	ND		
Calcium (μ g/L)	90300	102000	72800	72800	83800		
Cadmium (μ g/L)	ND	ND	ND	ND	ND		
Cobalt (μ g/L)	ND	ND	ND	ND	ND		

ND - below practical quantitation level

NR - analysis not requested

Table B-56. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	02/02/94	02/02/94	02/02/94	05/17/94	08/16/94				
Chromium ($\mu\text{g/L}$)	ND	ND	ND	14.7	ND				
Copper ($\mu\text{g/L}$)	33.6	41.3	151	ND	ND				
Iron ($\mu\text{g/L}$)	488	693	5490	402	ND				
Mercury ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Potassium ($\mu\text{g/L}$)	13600	14900	12600	9710	ND				
Magnesium ($\mu\text{g/L}$)	27500	31100	22800	29100	ND				
Manganese ($\mu\text{g/L}$)	19.0	21.7	34.7	16.6	ND				
Sodium ($\mu\text{g/L}$)	288000	325000	117000	84300	ND				
Nickel ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Lead ($\mu\text{g/L}$)	ND	ND	4.1	ND	ND				
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Selenium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND	ND				
Zinc ($\mu\text{g/L}$)	56.5	79.3	222	78.6	ND				

ND - below practical quantitation level

Table B-57. 1994 volatile organics data for LOFT-1BB.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
1,1,2,2-Tetrachloroethane	May	72.00	µg/L		
1,4-Dichlorobenzene	May	27.00	µg/L		
1,4-Dichlorobenzene	August	30.00	µg/L		
Acetone (TIC)	May	30.00	µg/L	XB	5.90
Dimethyl-disulfide (TIC)	May	6.00	µg/L	JN	15.17
Methylene Chloride	May	4.00	µg/L	JB	
Methylene Chloride	August	6.00	µg/L	B	
Toluene	August	31.00	µg/L		
Trichlorofluoromethane	May	2.00	µg/L	J	

**Effluent Monitoring Data for
LOFT-1B (Lift Station behind
Containment Test Facility)**

Table B-58. 1994 effluent monitoring data for LOFT-1B.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	11/30/94								
Biological Oxygen Demand (5-day) (mg/L)	67.0								
Conductivity (μ S)	961								
pH	8.1								
Chloride (mg/L)	508								
Chemical Oxygen Demand (mg/L)	330								
Fluoride (mg/L)	0.20								
Nitrogen, Nitrate-Nitrite (mg-N/L)	0.63								
Total Phosphorus (mg/L)	3.3								
Sulfate (mg/L)	31.5								
TDS (mg/L)	1100								
Nitrogen, Total Kjeldahl (mg/L)	29.6								
TOC (mg/L)	120								
TSS (mg/L)	52.0								
Silver (μ g/L)	ND								
Arsenic (μ g/L)	ND								
Barium (μ g/L)	ND								
Beryllium (μ g/L)	ND								
Calcium (μ g/L)	114000								
Cadmium (μ g/L)	ND								
Cobalt (μ g/L)	ND								
Chromium (μ g/L)	10.8								
Copper (μ g/L)	75.4								

ND - below practical quantitation level

Table B-58. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	11/30/94								
Iron ($\mu\text{g/L}$)	354								
Mercury ($\mu\text{g/L}$)	ND								
Potassium ($\mu\text{g/L}$)	13200								
Magnesium ($\mu\text{g/L}$)	40400								
Manganese ($\mu\text{g/L}$)	16.5								
Sodium ($\mu\text{g/L}$)	181000								
Nickel ($\mu\text{g/L}$)	ND								
Lead ($\mu\text{g/L}$)	ND								
Antimony ($\mu\text{g/L}$)	ND								
Selenium ($\mu\text{g/L}$)	5.1								
Thallium ($\mu\text{g/L}$)	ND								
Zinc ($\mu\text{g/L}$)	71.6								

ND - below practical quantitation level

Table B-59. 1994 volatile organics data for LOFT-1BC.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
1,4-Dichlorobenzene	November	25.00	µg/L		
Acetone (TIC)	November	100.00	µg/L	X	2.97
Chloroform	November	6.00	µg/L	B	
Methylene Chloride	November	1.00	µg/L	J	
Unknown (TIC)	November	20.00	µg/L	J	3.60

**Effluent Monitoring Data for
WRRTF 1 (Effluent to Sewage Lagoon)**

Table B-60. 1994 effluent monitoring data for WRRTF1.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	03/15/94	06/14/94	09/08/94	12/06/94			
Biological Oxygen Demand (5-day) (mg/L)	4.0	7.0	6.0	2.0			
Conductivity (μ S)	314	550	470	496			
pH	7.2	7.3	7.2	7.4			
Chloride (mg/L)	22.4	18.0	22.9	33.9			
Chemical Oxygen Demand (mg/L)	10.2	23.0	ND	21.0			
Fluoride (mg/L)	0.21	0.22	0.17	0.20			
Nitrogen, Nitrate-Nitrite (mg-N/L)	0.20	0.56	0.38	0.04			
Total Phosphorus (mg/L)	NR	1.1	NR	NR			
Sulfate (mg/L)	31.1	35.2	37.6	28.6			
TDS (mg/L)	275	310	340	340			
Nitrogen, Total Kjeldahl (mg/L)	5.0	4.9	9.4	16.8			
TOC (mg/L)	2.6	3.6	5.2	5.4			
TSS (mg/L)	ND	8.0	7.0	10.0			
Silver (μ g/L)	ND	ND	ND	ND			
Arsenic (μ g/L)	ND	ND	ND	ND			
Barium (μ g/L)	ND	ND	ND	ND			
Beryllium (μ g/L)	ND	ND	ND	ND			
Calcium (μ g/L)	53100	60200	74600	68500			
Cadmium (μ g/L)	ND	ND	ND	ND			
Cobalt (μ g/L)	ND	ND	ND	ND			

ND - below practical quantitation level

NR - analysis not requested

Table B-60. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	03/15/94	06/14/94	09/08/94	12/06/94				
Chromium ($\mu\text{g/L}$)	ND	ND	ND	ND				
Copper ($\mu\text{g/L}$)	ND	ND	ND	ND				
Iron ($\mu\text{g/L}$)	463	2900	2870	790				
Mercury ($\mu\text{g/L}$)	ND	ND	ND	ND				
Potassium ($\mu\text{g/L}$)	6130	6030	7530	10600				
Magnesium ($\mu\text{g/L}$)	14500	15300	18700	17800				
Manganese ($\mu\text{g/L}$)	96.3	136	316	121				
Sodium ($\mu\text{g/L}$)	13100	11300	16800	19800				
Nickel ($\mu\text{g/L}$)	ND	ND	ND	ND				
Lead ($\mu\text{g/L}$)	15.0	ND	ND	ND				
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND				
Selenium ($\mu\text{g/L}$)	ND	ND	ND	ND				
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND				
Zinc ($\mu\text{g/L}$)	22.7	30.1	75.8	ND				

ND - below practical quantitation level

Table B-61. 1994 volatile organics data for WRRTF1A.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
Methylene Chloride	March	1.00	$\mu\text{g/L}$	JB	
Methylene Chloride	September	1.00	$\mu\text{g/L}$	JB	

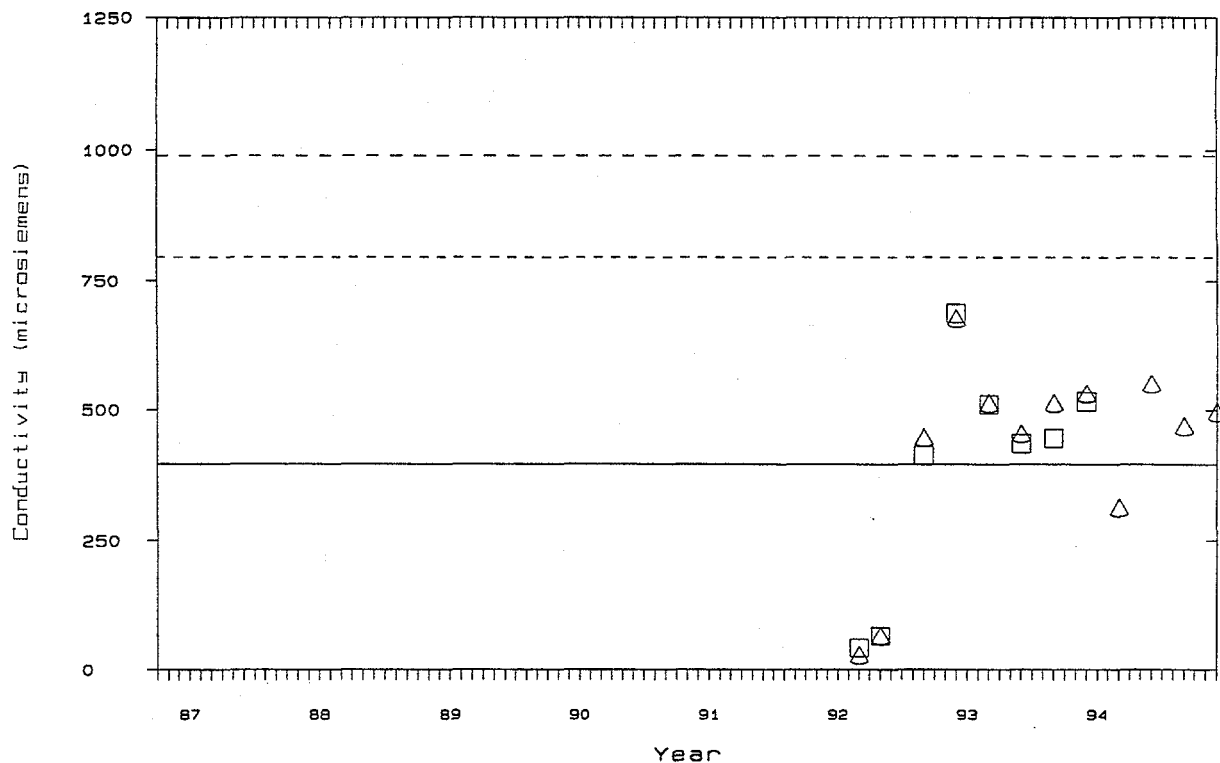
Table B-62. Summary statistics for WRRTF1.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Conductivity (μ S)	398	221	16	797	990	NA
pH	7.4	0.87	16	4.8	10.0	2.5-12
Fluoride (mg/L)	0.23	0.02	14	0.27	0.29	NA
Nitrogen, Nitrate-Nitrite (mg-N/L)	4.1	3.6	10	11.0	14.7	NA
Nitrogen, Total Kjeldahl (mg/L)	17.0	12.8	10	41.7	55.0	NA
TOC (mg/L)	9.3	8.1	16	23.9	31.0	NA
Calcium (μ g/L)	80169	35669	16	144624	175855	NA
Iron (μ g/L)	2641	2714	10	7859	10672	NA
Potassium (μ g/L)	13135	5667	10	24030	29903	NA
Magnesium (μ g/L)	19675	4316	16	27474	31253	NA
Manganese (μ g/L)	126	115	16	334	434	NA
Sodium (μ g/L)	27606	16475	16	57377	71802	NA
Lead (μ g/L)	7.2	6.9	10	20.4	27.6	5000
Zinc (μ g/L)	102	83.3	16	252	325	NA

Guideline - RCRA Characteristic Guideline
 NA - Not Applicable

WRRTF1A Conductivity

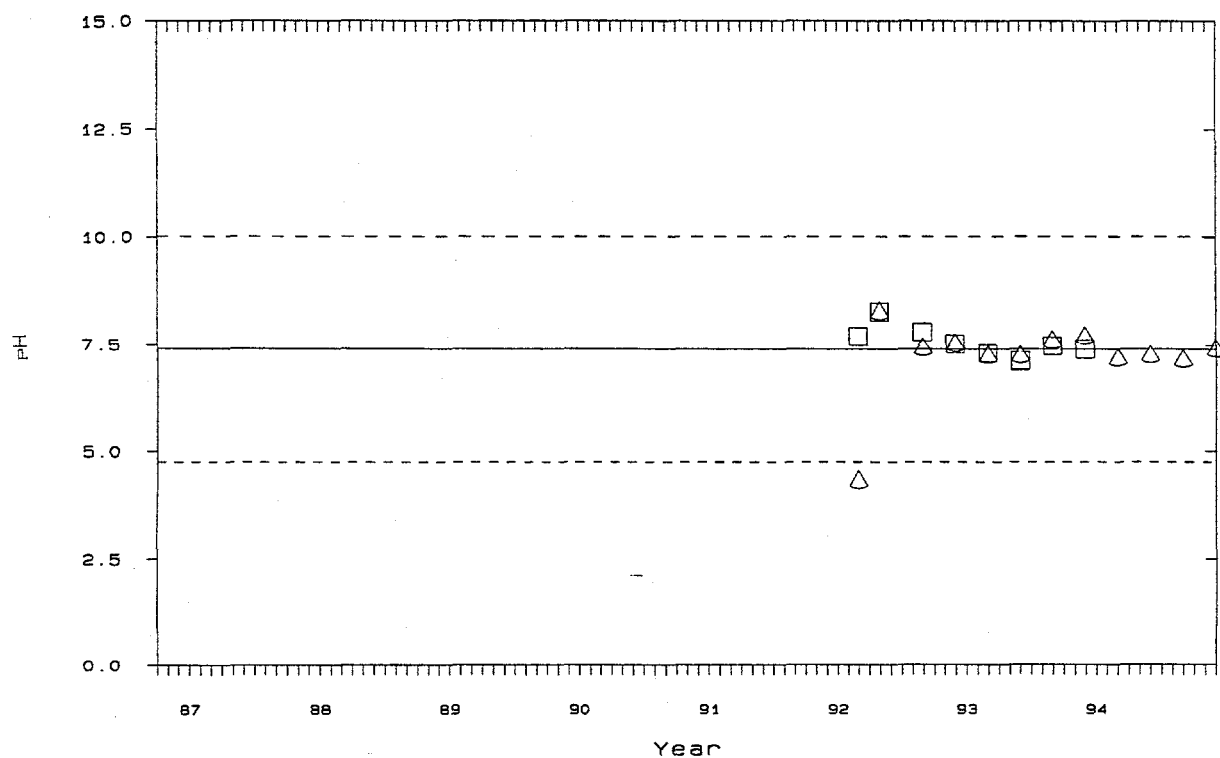
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

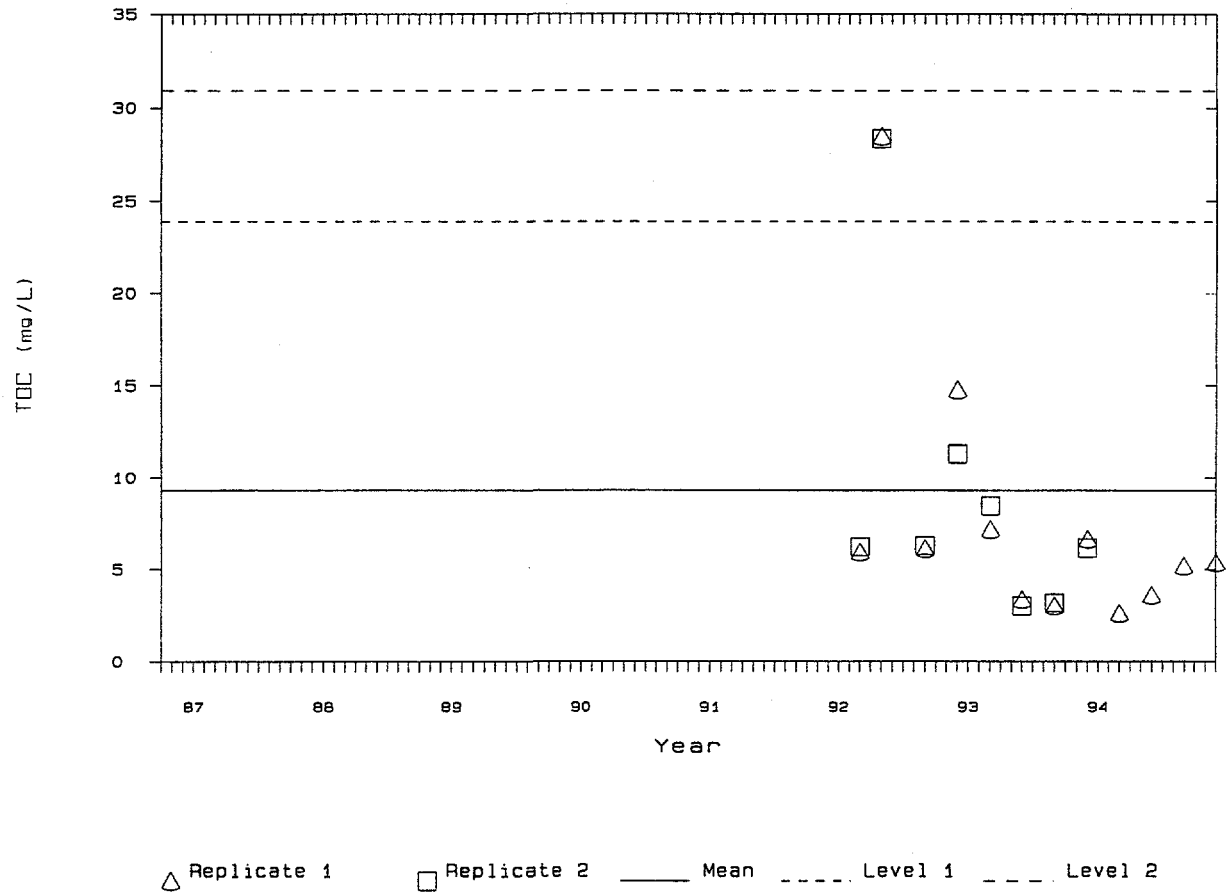
WRRTF1A pH

RCRA Characteristic Guideline = 2.5-12



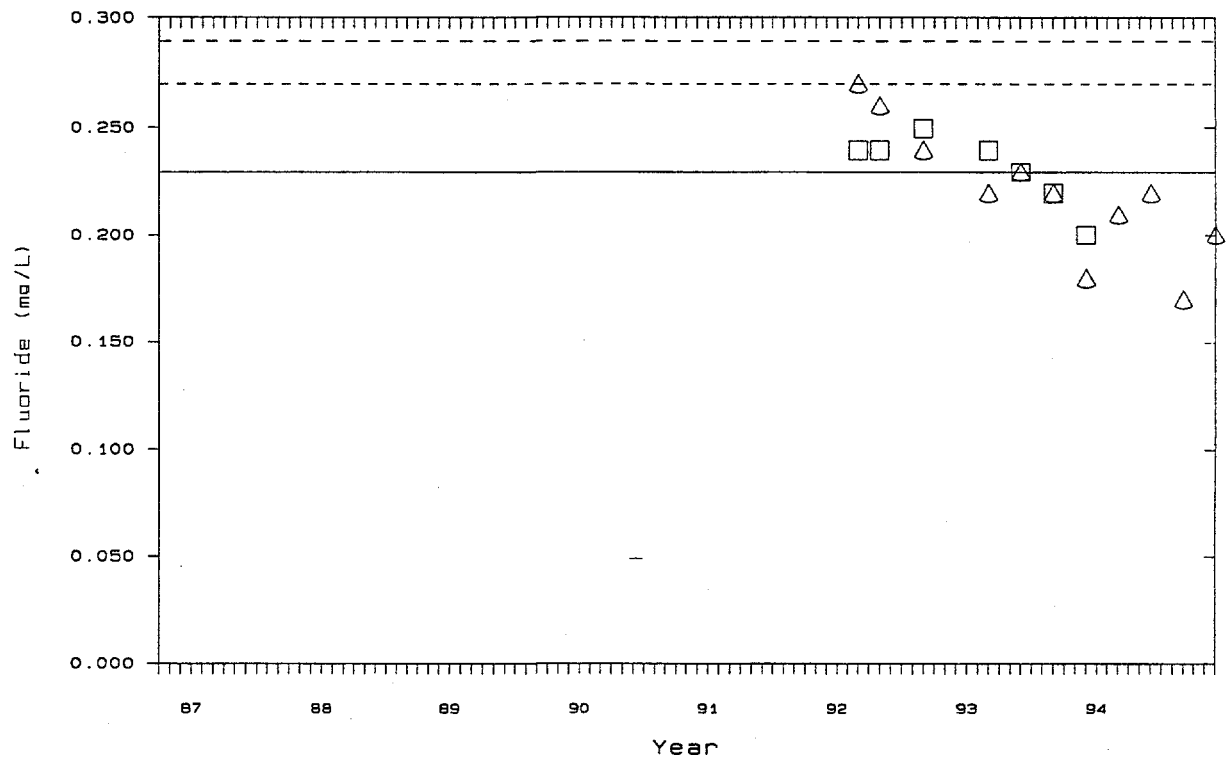
WRRTF1A TOC Concentrations

RCRA Guideline Not Applicable



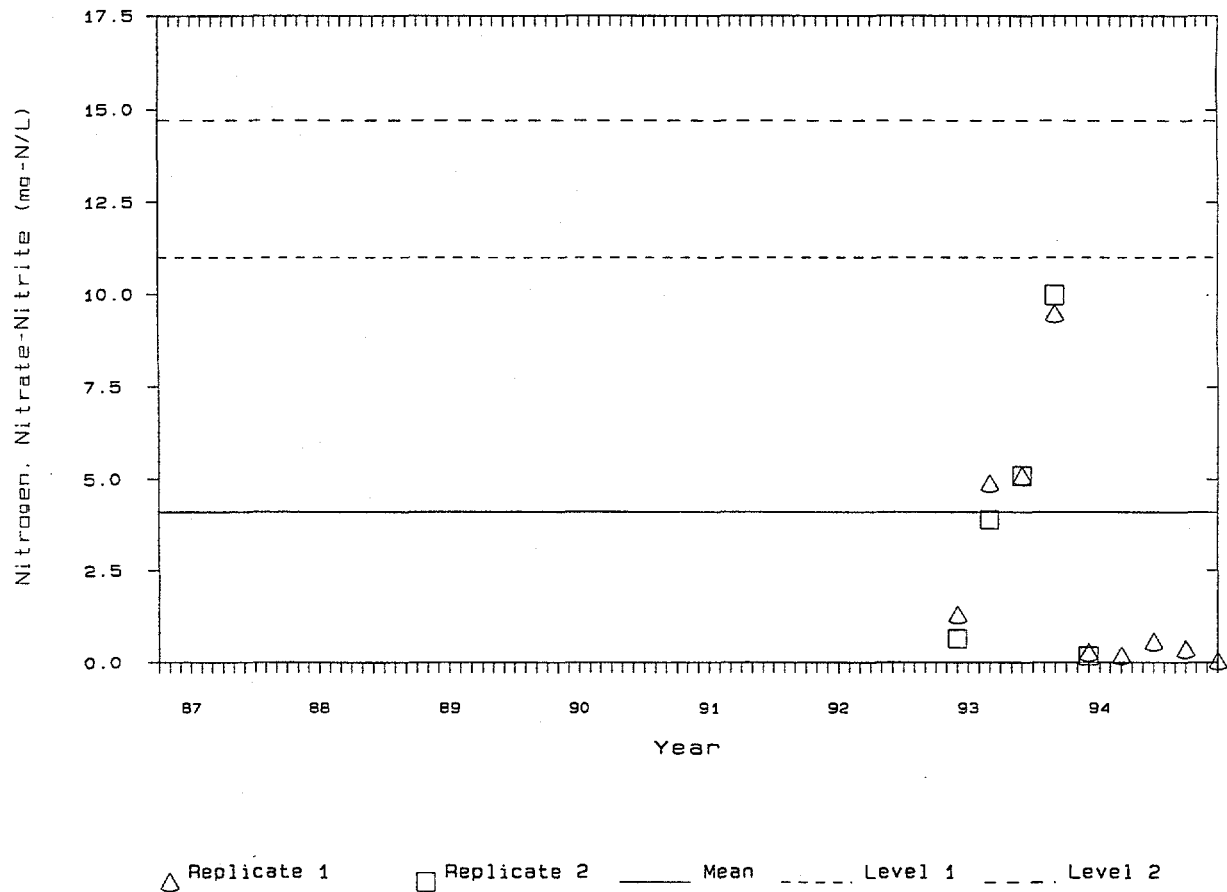
WRRTF1A Fluoride Concentrations

RCRA Guideline Not Applicable



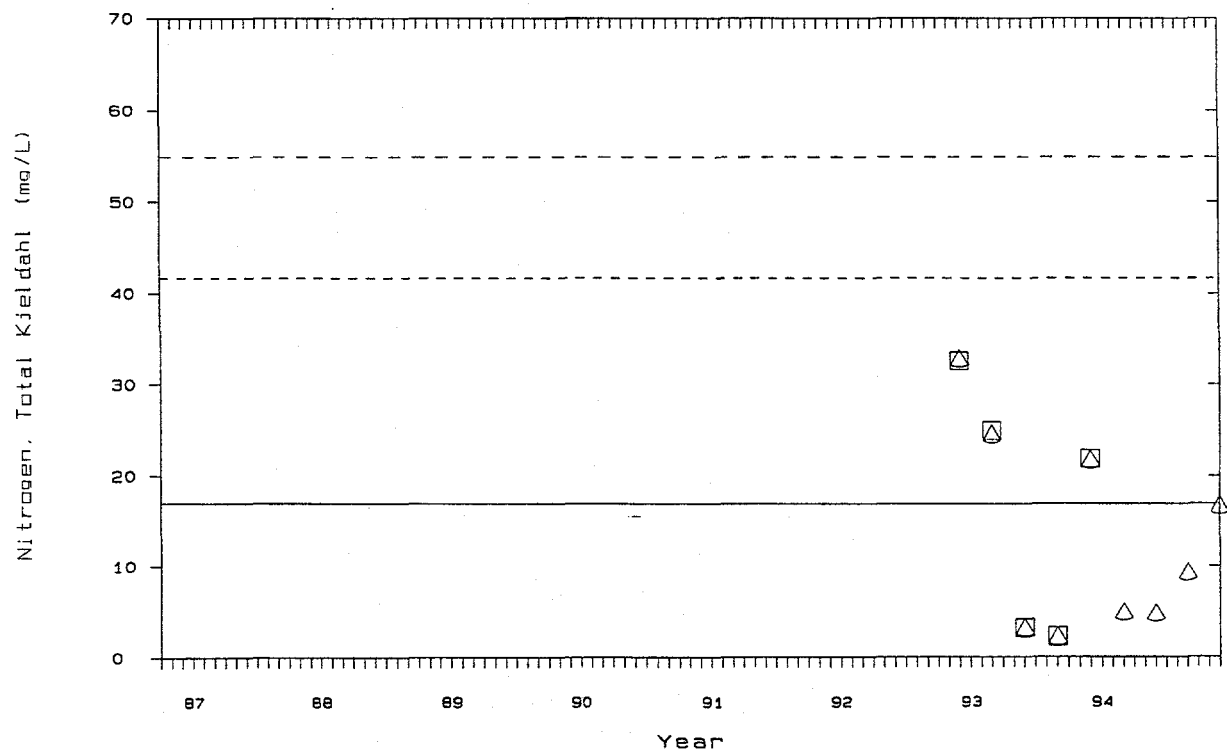
WRRTF1A Nitrogen, Nitrate-Nitrite Concentrations

RCRA Guideline Not Applicable



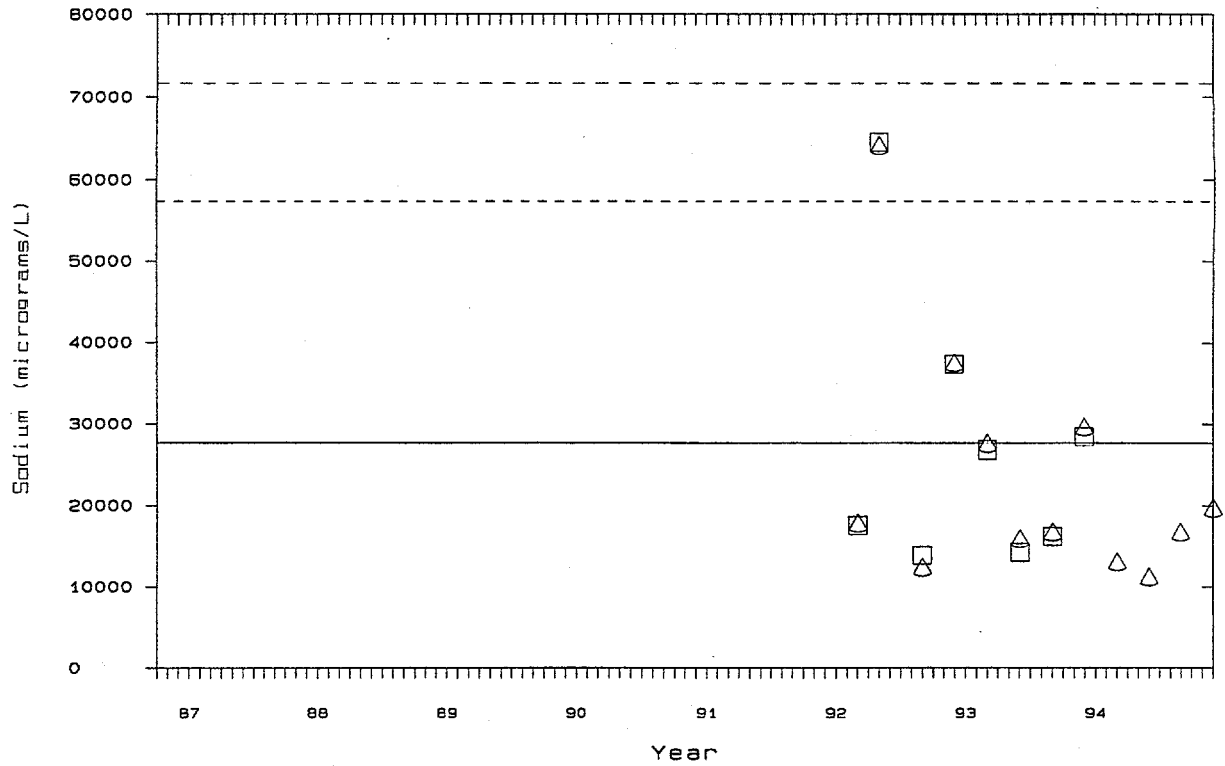
WRRTF1A Nitrogen, Total Kjeldahl Concentrations

RCRA Guideline Not Applicable



WRRTF1A Sodium Concentrations

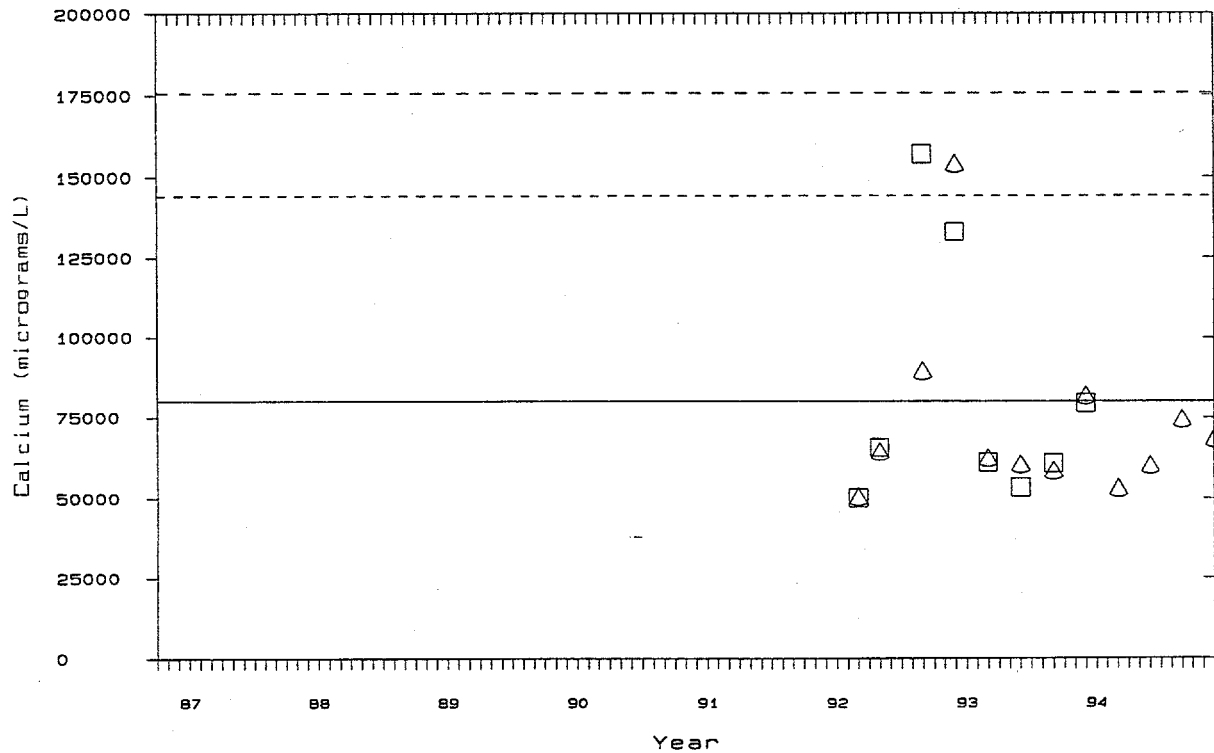
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

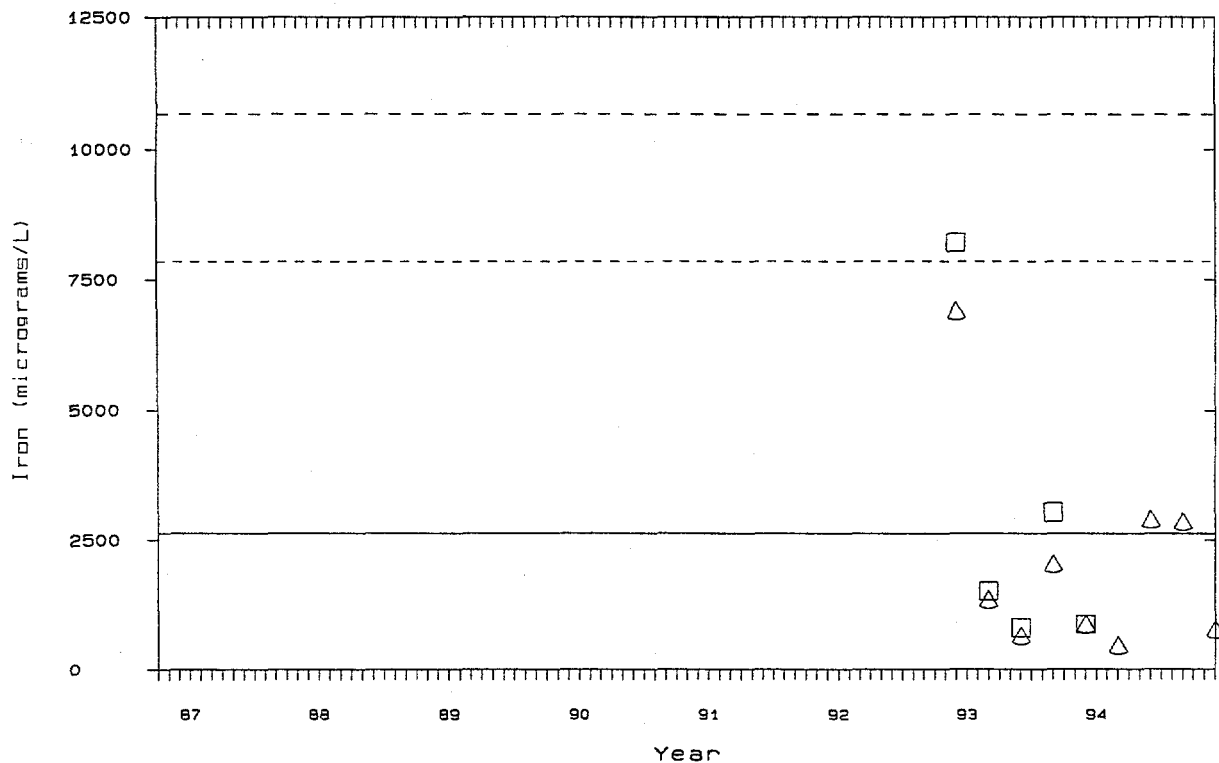
WRRTF1A Calcium Concentrations

RCRA Guideline Not Applicable



WRTF1A Iron Concentrations

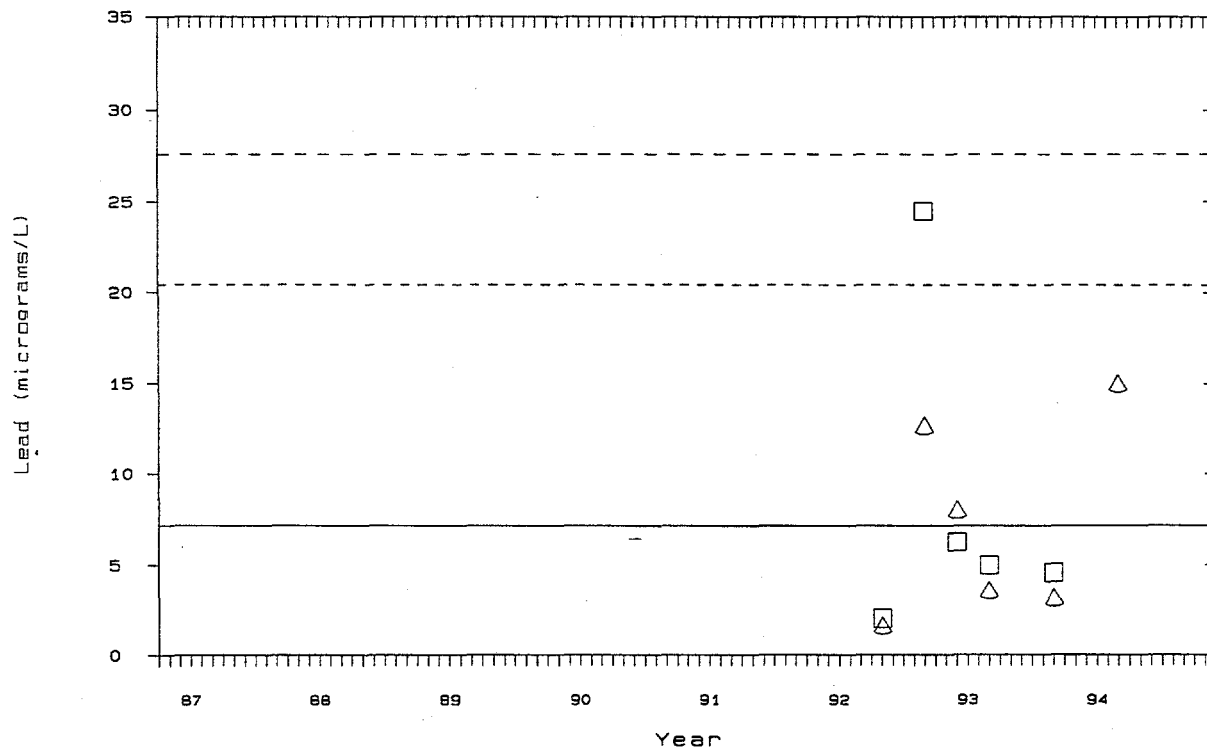
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

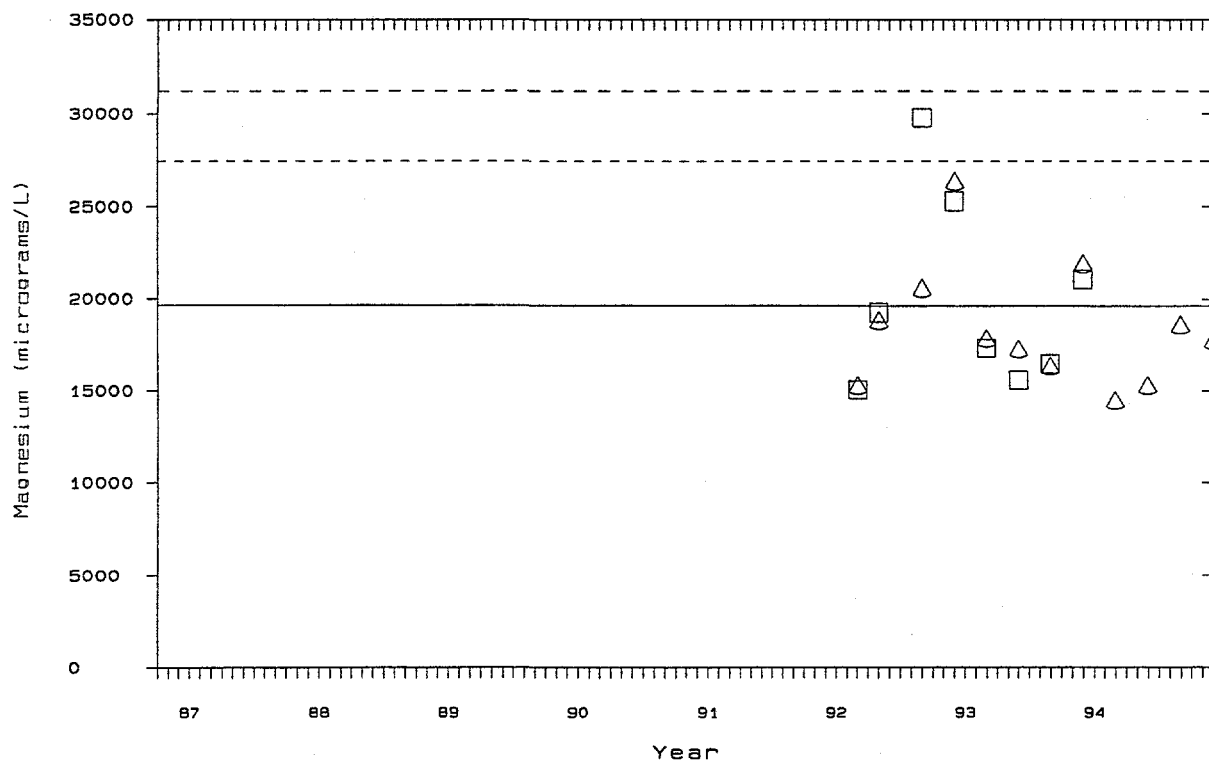
WRTF1A Lead Concentrations

RCRA Characteristic Guideline = 5000 micrograms/L



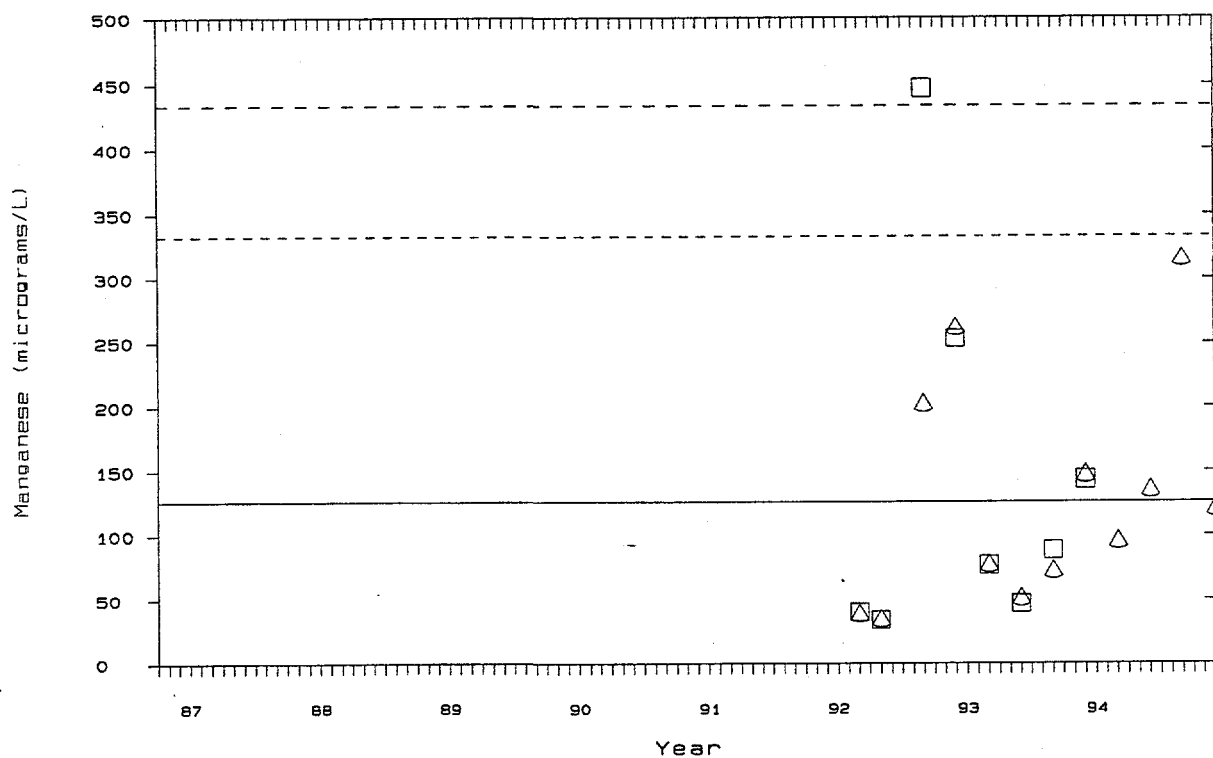
WRRTF1A Magnesium Concentrations

RCRA Guideline Not Applicable



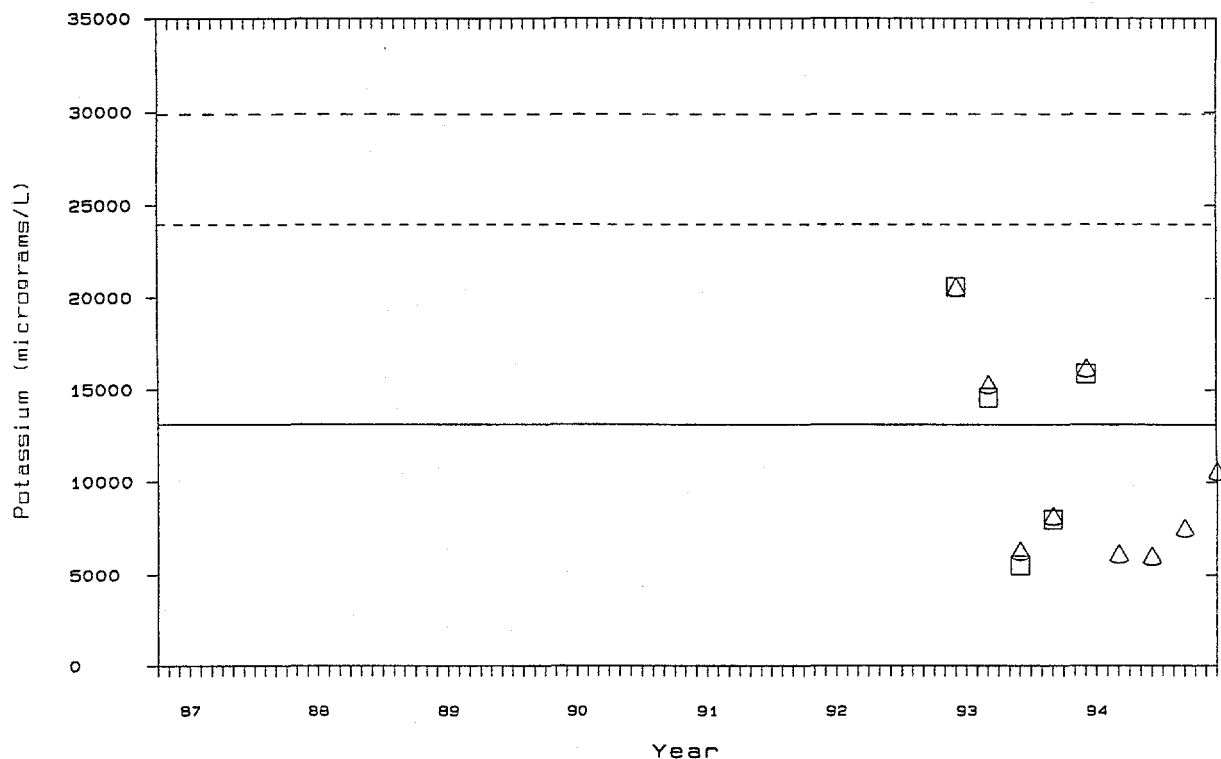
WRRTF1A Manganese Concentrations

RCRA Guideline Not Applicable



WRRTF1A Potassium Concentrations

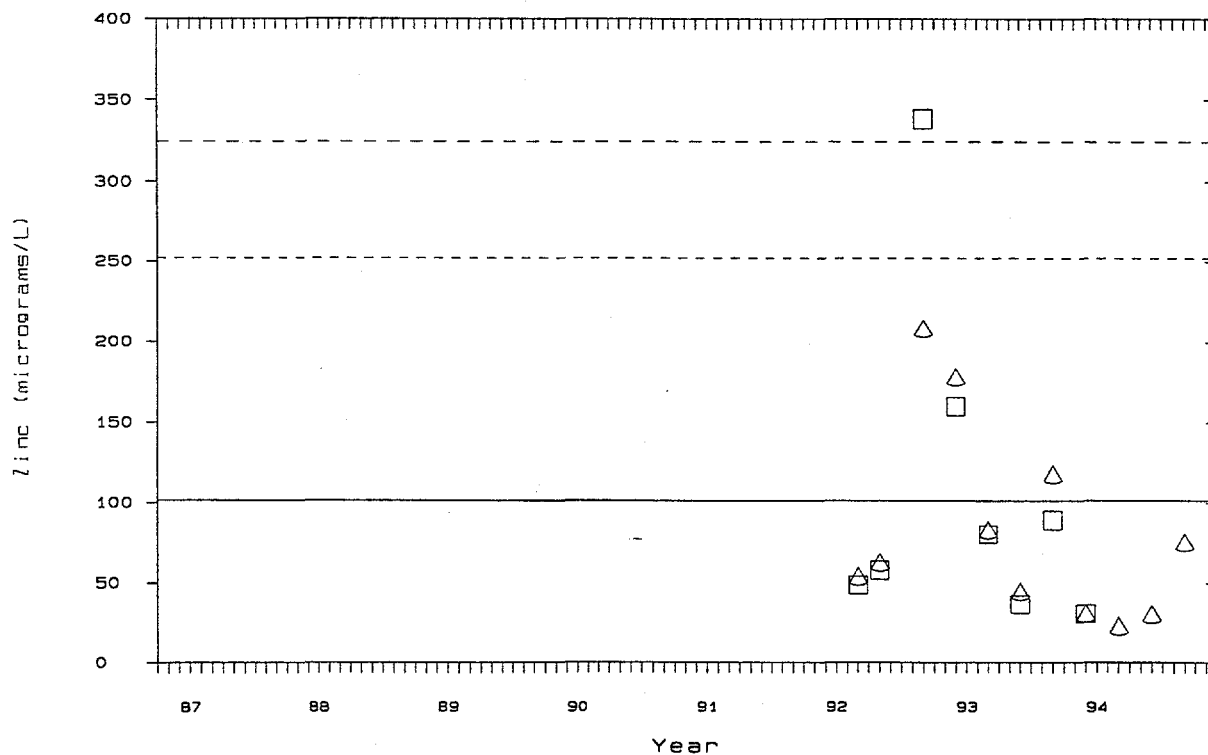
RCRA Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

WRRTF1A Zinc Concentrations

RCRA Guideline Not Applicable



**Effluent Monitoring Data for
WRRTF 2 (Effluent to Evaporation Pond)**

Table B-63. 1994 effluent monitoring data for WRRTF2.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	03/15/94	06/14/94	09/08/94	12/06/94			
Biological Oxygen Demand (5-day) (mg/L)	3.0	2.0	2.0	3.0			
Conductivity (μ S)	966	402	264	681			
pH	8.7	8.6	7.8	8.6			
Chloride (mg/L)	296	12.6	14.8	125			
Chemical Oxygen Demand (mg/L)	48.7	12.0	ND	22.0			
Fluoride (mg/L)	0.47	0.23	0.20	0.36			
Nitrogen, Nitrate-Nitrite (mg-N/L)	1.7	0.72	0.83	1.6			
Total Phosphorus (mg/L)	2.1	0.94	0.12	0.64			
Sulfate (mg/L)	100.0	33.0	31.9	127			
TDS (mg/L)	706	250	250	660			
Nitrogen, Total Kjeldahl (mg/L)	1.9	0.16	ND	2.5			
TOC (mg/L)	4.1	0.80	1.0	8.0			
TSS (mg/L)	1290	75.0	ND	25.0			
Silver (μ g/L)	ND	ND	ND	ND			
Arsenic (μ g/L)	14.8	ND	ND	ND			
Barium (μ g/L)	728	ND	ND	ND			
Beryllium (μ g/L)	ND	ND	ND	ND			
Calcium (μ g/L)	288000	53600	49600	55500			
Cadmium (μ g/L)	5.9	ND	ND	ND			
Cobalt (μ g/L)	ND	ND	ND	ND			

ND - below practical quantitation level

Table B-63. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	03/15/94	06/14/94	09/08/94	12/06/94					
Chromium ($\mu\text{g/L}$)	74.3	10.7	ND	ND					
Copper ($\mu\text{g/L}$)	1260	98.8	ND	168					
Iron ($\mu\text{g/L}$)	61400	5800	ND	2310					
Mercury ($\mu\text{g/L}$)	1.9	ND	ND	ND					
Potassium ($\mu\text{g/L}$)	9610	ND	ND	5640					
Magnesium ($\mu\text{g/L}$)	66300	15800	16200	17600					
Manganese ($\mu\text{g/L}$)	855	67.4	ND	81.3					
Sodium ($\mu\text{g/L}$)	123000	7420	10200	148000					
Nickel ($\mu\text{g/L}$)	79.8	ND	ND	ND					
Lead ($\mu\text{g/L}$)	218	15.6	ND	12.5					
Antimony ($\mu\text{g/L}$)	ND	ND	ND	ND					
Selenium ($\mu\text{g/L}$)	ND	ND	ND	ND					
Thallium ($\mu\text{g/L}$)	ND	ND	ND	ND					
Zinc ($\mu\text{g/L}$)	1880	140	31.1	278					

ND - below practical quantitation level

Table B-64. 1994 volatile organics data for WRRTF2A.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
Methylene Chloride	March	1.00	$\mu\text{g/L}$	JB	
Methylene Chloride	September	7.00	$\mu\text{g/L}$	B	
Trichloroethene	June	2.00	$\mu\text{g/L}$	J	

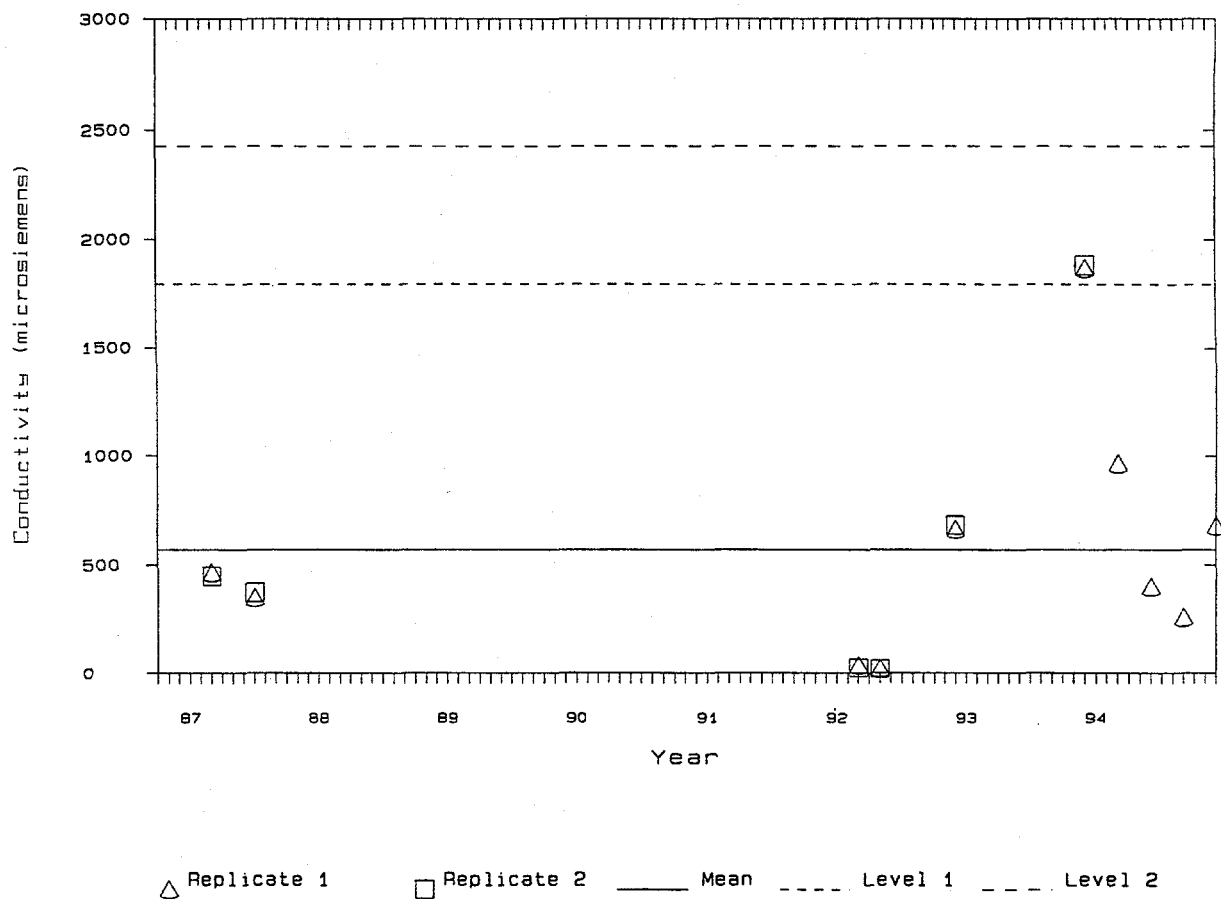
Table B-65. Summary statistics for WRRTF2.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Conductivity (μ S)	572	655	12	1797	2426	NA
pH	8.2	0.64	12	6.1	10.2	2.5-12
Fluoride (mg/L)	0.24	0.03	10	0.29	0.32	NA
TOC (mg/L)	2.9	2.6	10	7.9	10.7	NA
Barium (μ g/L)	113	50.6	10	211	263	100,000
Zinc (μ g/L)	40.3	38.5	11	113	151	NA

Guideline - RCRA Characteristic Guideline
 NA - Not Applicable

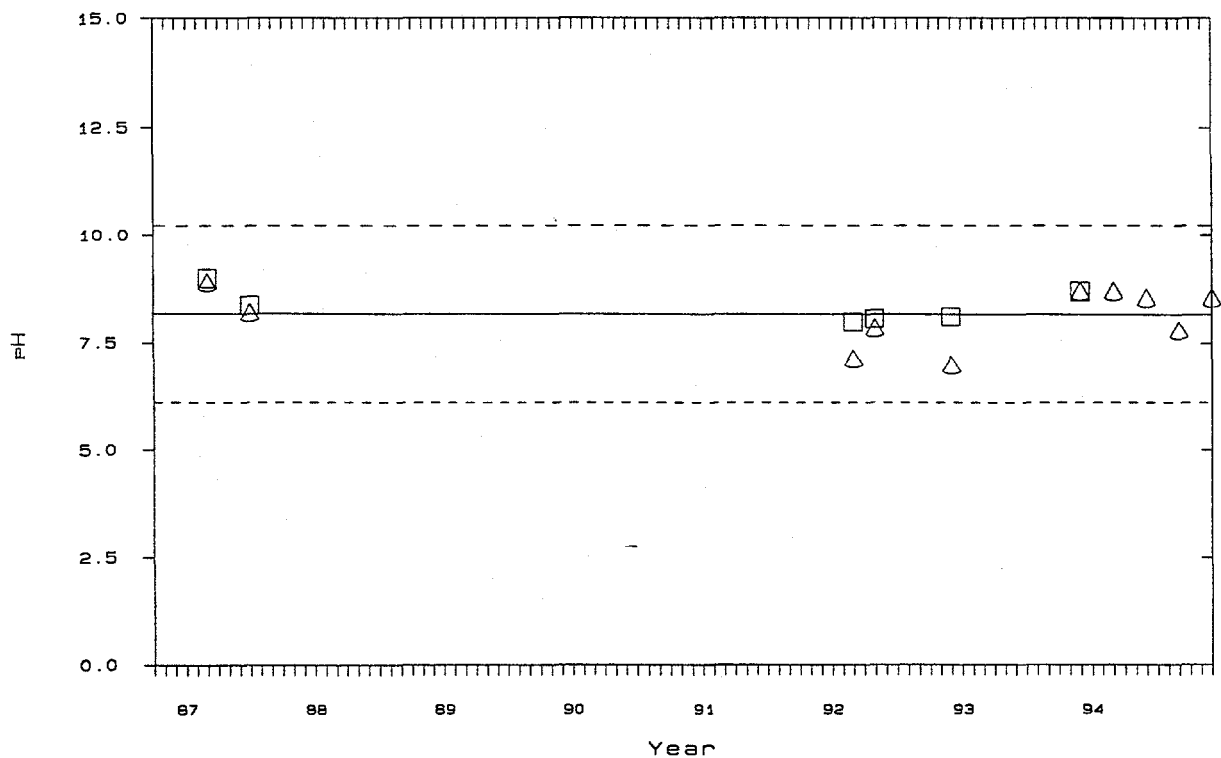
WRRTF2A Conductivity

RCRA Guideline Not Applicable



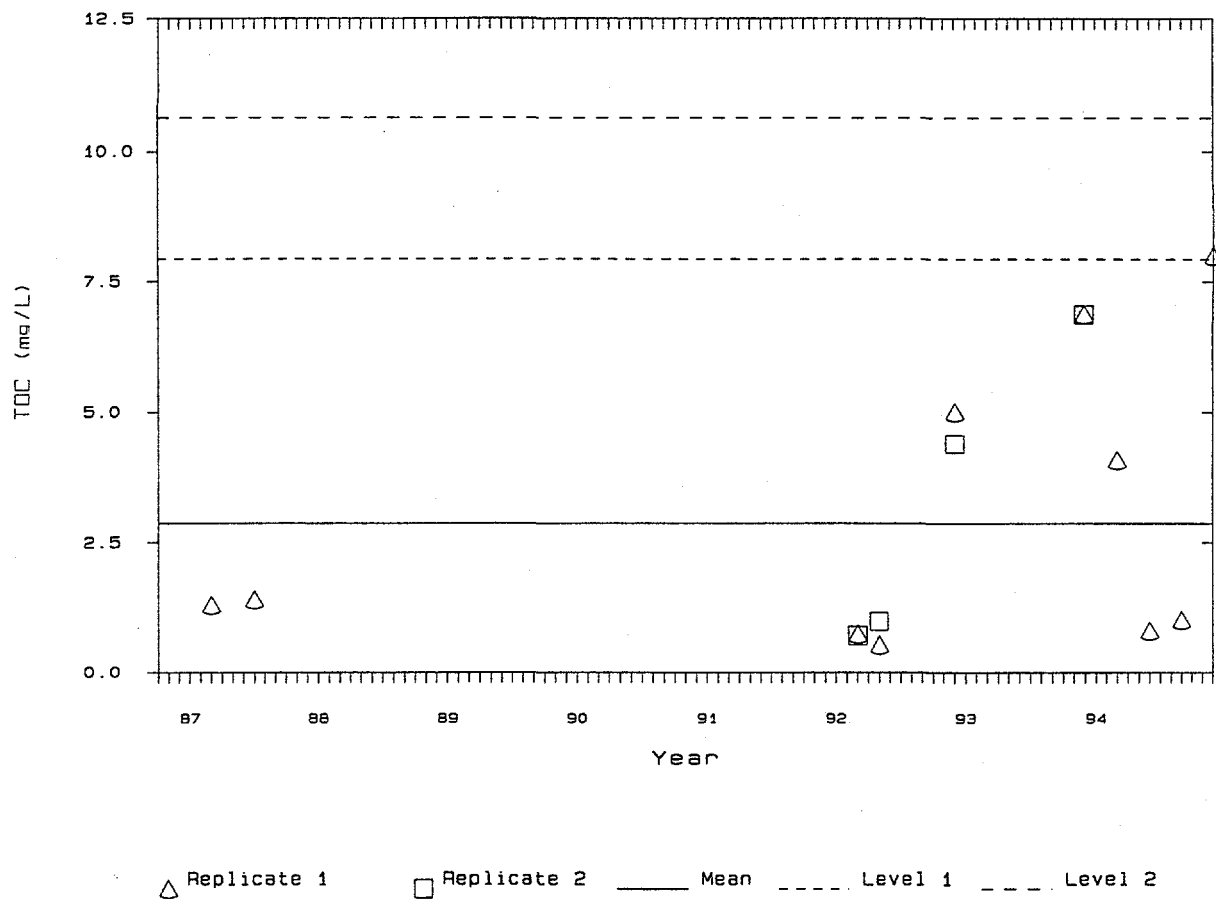
WRRTF2A pH

RCRA Characteristic Guideline = 2.5-12



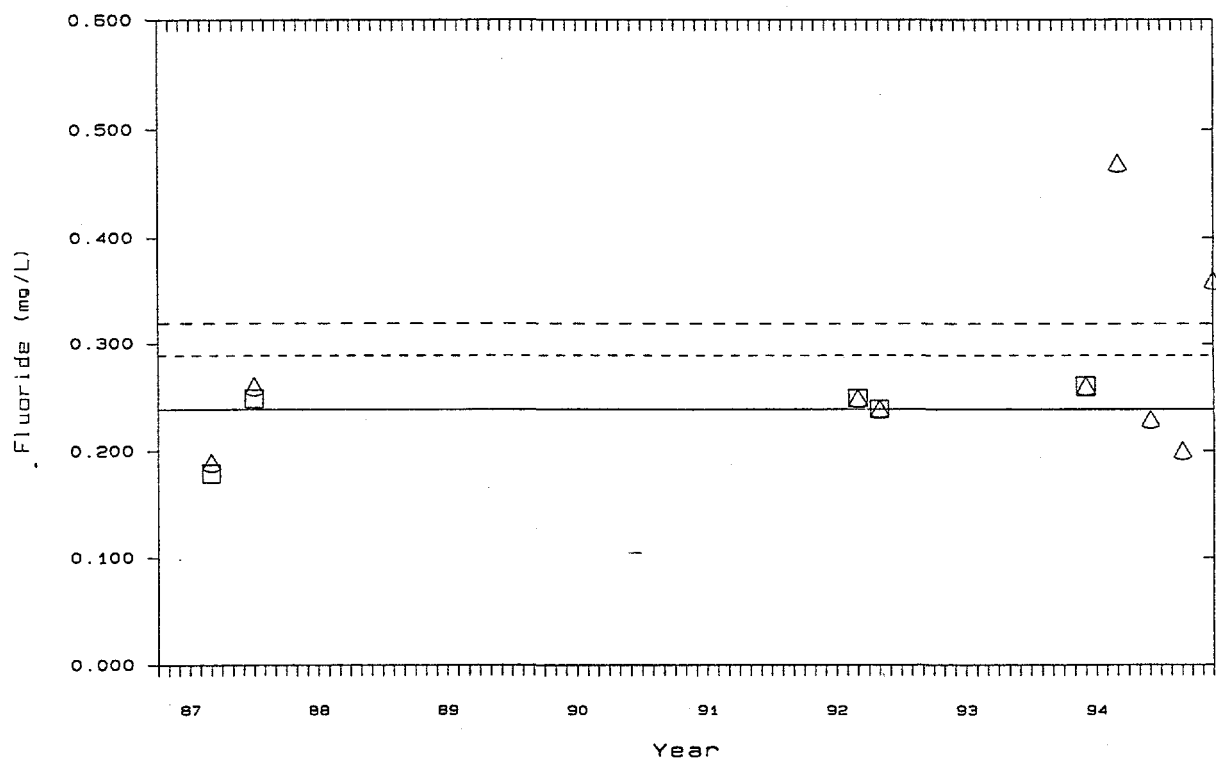
WRRTF2A TOC Concentrations

RCRA Guideline Not Applicable



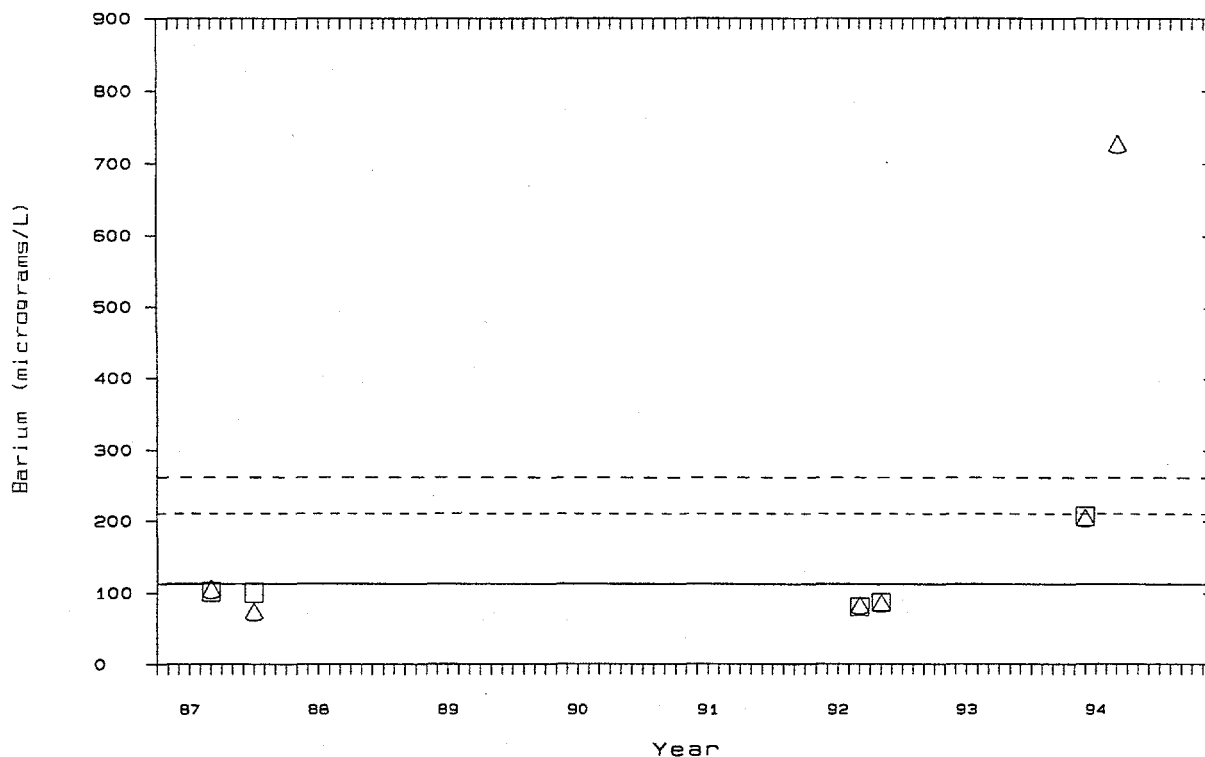
WRRTF2A Fluoride Concentrations

RCRA Guideline Not Applicable



WRRTF2A Barium Concentrations

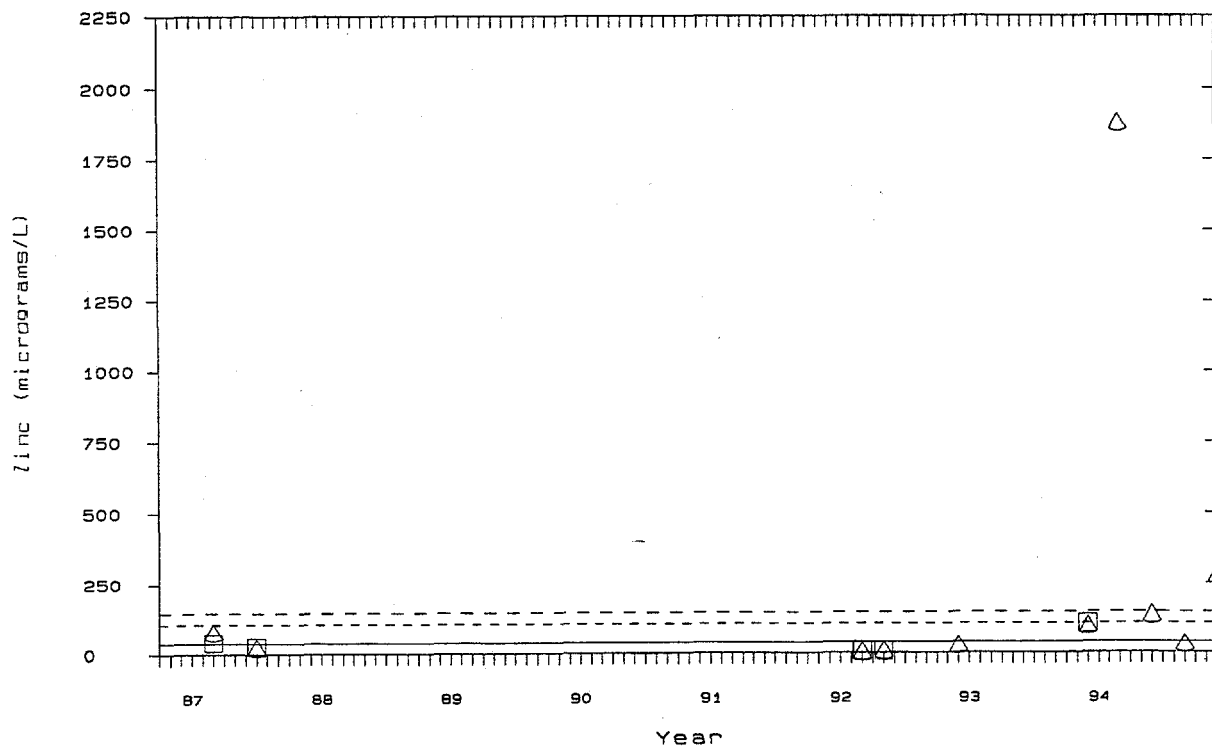
RCRA Characteristic Guideline = 100,000 micrograms/L



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

WRRTF2A Zinc Concentrations

RCRA Guideline Not Applicable



**Effluent Monitoring Data for
IFF-603 (INEL Research Center - West
Access Port Access)**

Table B-66. 1994 effluent monitoring data for IFF-603.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/12/94	01/12/94	02/08/94	03/23/94	04/06/94	06/29/94	07/19/94	07/27/94		
Conductivity (μ S)	352	346	358	418	429	582	495	441		
pH	7.9	7.2	7.6	8.0	7.4	7.6	7.8	7.7		
Cyanide (μ g/L)	ND	ND	ND	5.3	ND	ND	NR	ND		
Chromium VI (μ g/L)	NR	NR	NR	NR	NR	NR	NR	NR		
Silver (μ g/L)	ND	ND	ND	ND	ND	ND	ND	NR		
Arsenic (μ g/L)	ND	ND	ND	ND	ND	ND	ND	NR		
Barium (μ g/L)	ND	ND	ND	ND	ND	ND	ND	NR		
Cadmium (μ g/L)	ND	ND	ND	ND	ND	ND	ND	NR		
Chromium (μ g/L)	ND	ND	ND	ND	ND	ND	ND	NR		
Copper (μ g/L)	31.5	28.0	32.3	ND	26.6	35.0	40.5	NR		
Mercury (μ g/L)	ND	ND	ND	ND	ND	ND	ND	NR		
Nickel (μ g/L)	ND	ND	ND	ND	ND	ND	ND	NR		
Lead (μ g/L)	ND	ND	ND	ND	ND	ND	ND	NR		
Selenium (μ g/L)	ND	ND	ND	ND	ND	ND	ND	NR		
Zinc (μ g/L)	84.8	30.1	81.3	39.2	37.5	24.6	29.3	NR		

ND - below practical quantitation level

NR - analysis not requested

Table B-66. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	08/23/94	09/12/94	11/17/94	12/08/94			
Conductivity (μS)	443	566	401	405			
pH	8.0	6.4	7.1	7.6			
Cyanide ($\mu\text{g/L}$)	ND	ND	ND	ND			
Chromium VI ($\mu\text{g/L}$)	ND	ND	ND	ND			
Silver ($\mu\text{g/L}$)	ND	ND	ND	ND			
Arsenic ($\mu\text{g/L}$)	ND	ND	ND	ND			
Barium ($\mu\text{g/L}$)	ND	ND	ND	ND			
Cadmium ($\mu\text{g/L}$)	ND	ND	ND	ND			
Chromium ($\mu\text{g/L}$)	ND	ND	ND	ND			
Copper ($\mu\text{g/L}$)	48.2	32.8	ND	35.6			
Mercury ($\mu\text{g/L}$)	ND	ND	ND	ND			
Nickel ($\mu\text{g/L}$)	ND	ND	ND	ND			
Lead ($\mu\text{g/L}$)	ND	ND	ND	ND			
Selenium ($\mu\text{g/L}$)	ND	ND	ND	ND			
Zinc ($\mu\text{g/L}$)	60.8	27.7	21.7	20.5			

ND - below practical quantitation level

Table B-67. 1994 volatile organics data for IFF-603A.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
Acetone (TIC)	January	200.00	µg/L	XJ	2.93
Acetone (TIC)	March	60.00	µg/L	J	2.97
Acetone (TIC)	April	240.00	µg/L	X	3.00
Acetone (TIC)	June	100.00	µg/L	X	2.97
Acetone (TIC)	November	100.00	µg/L	XB	3.03
Acetone (TIC)	December	200.00	µg/L	X	3.03
Alkane (TIC)	July	10.00	µg/L	J	15.90
Chloroform	February	1.00	µg/L	J	
Chloroform	July	5.00	µg/L		
Ethyl Acetate (TIC)	December	200.00	µg/L	JN	9.47
Heptane (TIC)	December	800.00	µg/L	JN	19.50
Hydrocarbon (TIC)	July	70.00	µg/L	J	13.87
Methylene Chloride	January	1.00	µg/L	J	
Methylene Chloride	February	6.00	µg/L	B	
Methylene Chloride	June	840.00	µg/L	E	
Methylene Chloride	July	44.00	µg/L	B	
Methylene Chloride	August	2.00	µg/L	JB	
Methylene Chloride	December	3.00	µg/L	J	
Toluene	January	6.00	µg/L		
Toluene	February	11.00	µg/L		
Toluene	April	11.00	µg/L		
Toluene	June	3.00	µg/L	J	
Trichloroethene	September	1.00	µg/L	J	
Unknown (TIC)	July	20.00	µg/L	J	10.77
Unknown (TIC)	July	500.00	µg/L	J	17.83
Xylene (total)	January	12.00	µg/L		

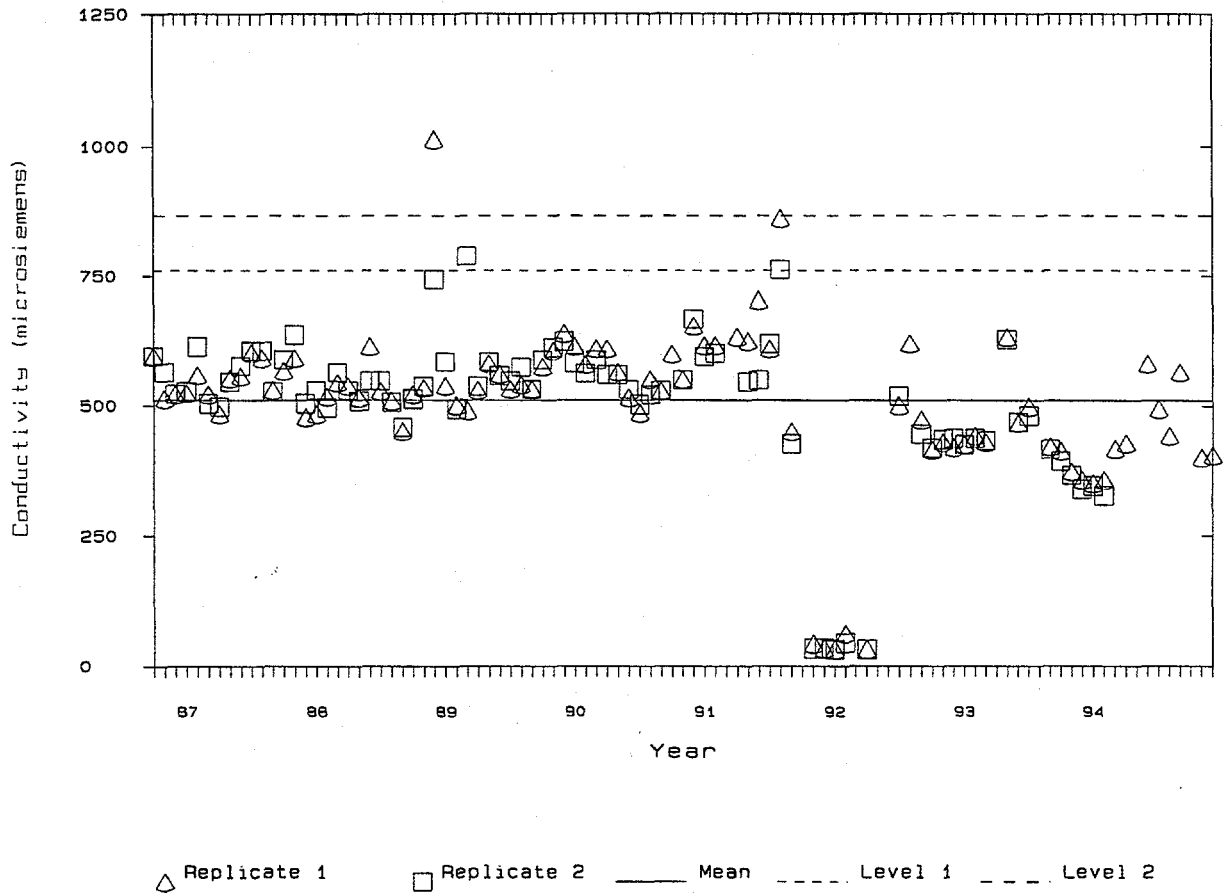
Table B-68. Summary statistics for IFF-603.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Conductivity (μ S)	511	151	157	762	867	NA
pH	7.6	0.38	157	6.6	8.6	5.5-9.0
Chloride (mg/L)	19.0	9.8	116	35.3	42.2	NA
Chromium VI (μ g/L)	10.8	9.6	21	27.8	35.7	90
Fluoride (mg/L)	0.79	1.1	47	2.7	3.5	NA
Nitrate (mg/L)	10.5	4.1	104	17.4	20.3	NA
Nitrogen, as Nitrate (mg-N/L)	3.5	2.8	11	8.7	11.5	NA
Phosphate (mg/L)	2.7	6.5	35	13.9	18.9	NA
Total Phosphorus (mg/L)	2.1	4.0	11	9.6	13.6	NA
Sulfate (mg/L)	44.9	9.9	116	61.4	68.3	NA
TDS (mg/L)	303	82.9	117	441	500	NA
TOC (mg/L)	7.2	8.1	113	20.8	26.5	NA
TSS (mg/L)	12.7	21.4	27	49.8	66.7	NA
Silver (μ g/L)	21.7	31.8	31	76.6	101	500
Arsenic (μ g/L)	2.8	1.7	30	5.6	6.9	500
Barium (μ g/L)	96.4	34.0	100	153	177	NA
Calcium (μ g/L)	60850	5689	10	71788	77685	NA
Cadmium (μ g/L)	7.2	2.4	10	11.8	14.3	500
Chromium (μ g/L)	14.7	10.0	51	31.7	39.0	500
Copper (μ g/L)	61.9	33.2	156	117	140	1500
Mercury (μ g/L)	0.71	0.95	42	2.3	3.0	50
Magnesium (μ g/L)	16400	733	10	17810	18570	NA
Sodium (μ g/L)	22150	6235	10	34137	40601	NA
Nickel (μ g/L)	218	693	30	1415	1953	500
Lead (μ g/L)	11.5	9.1	85	26.7	33.2	1500
Zinc (μ g/L)	55.0	28.1	156	102	121	1500

Guideline - RCRA Characteristic Guideline
NA - Not Applicable

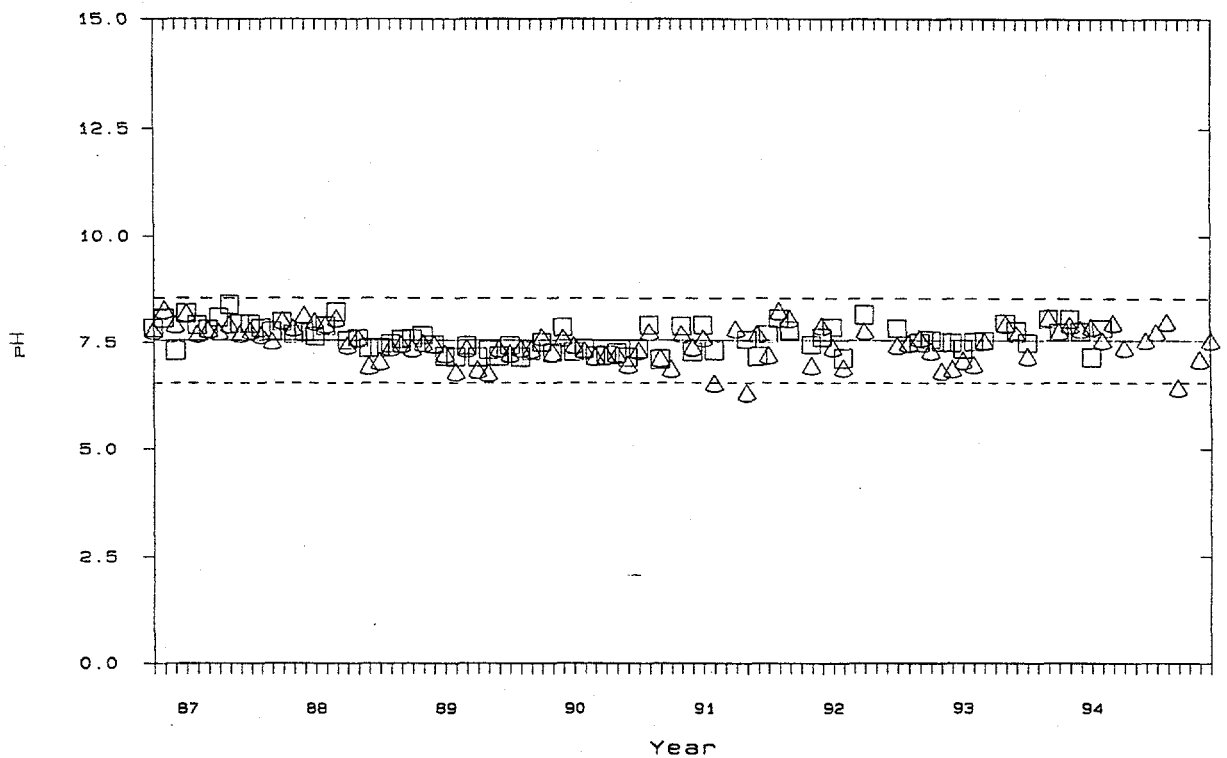
IFF603A Conductivity

Idaho Falls City Sewer Guideline Not Applicable



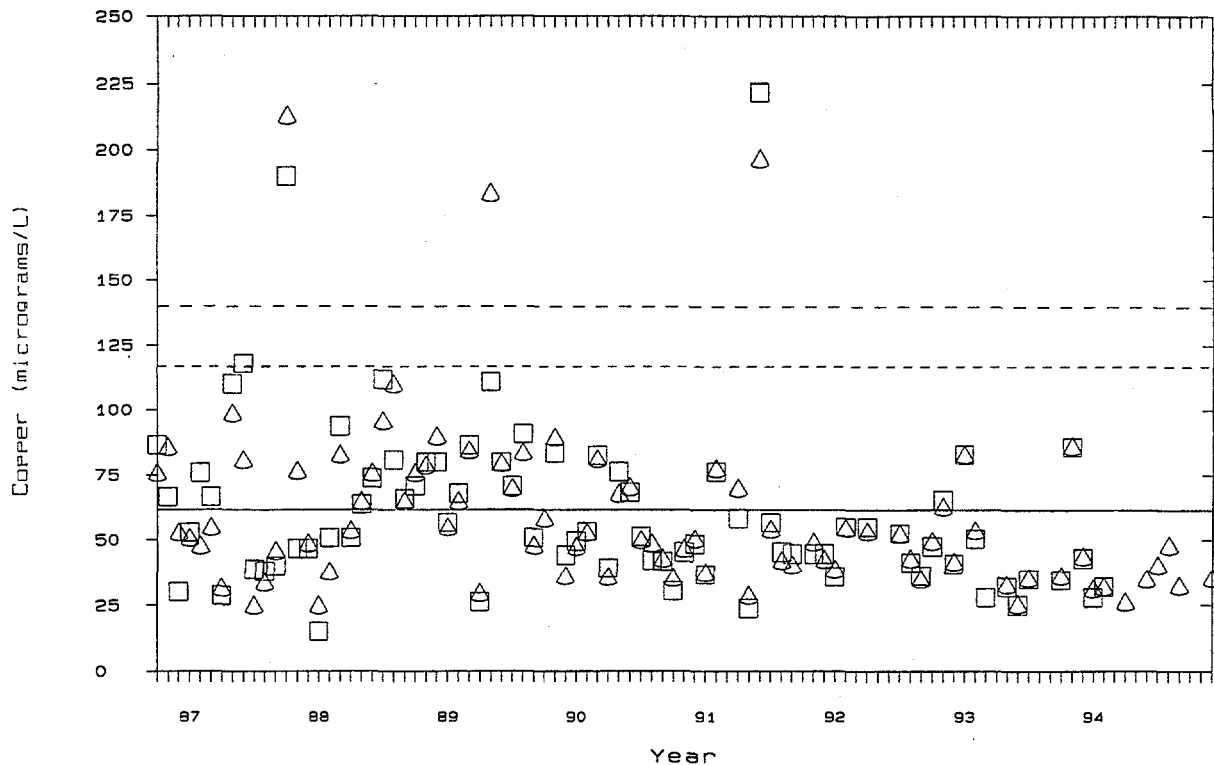
IFF603A pH

Idaho Falls City Sewer Guideline = 5.5-9.0



IFF603A Copper Concentrations

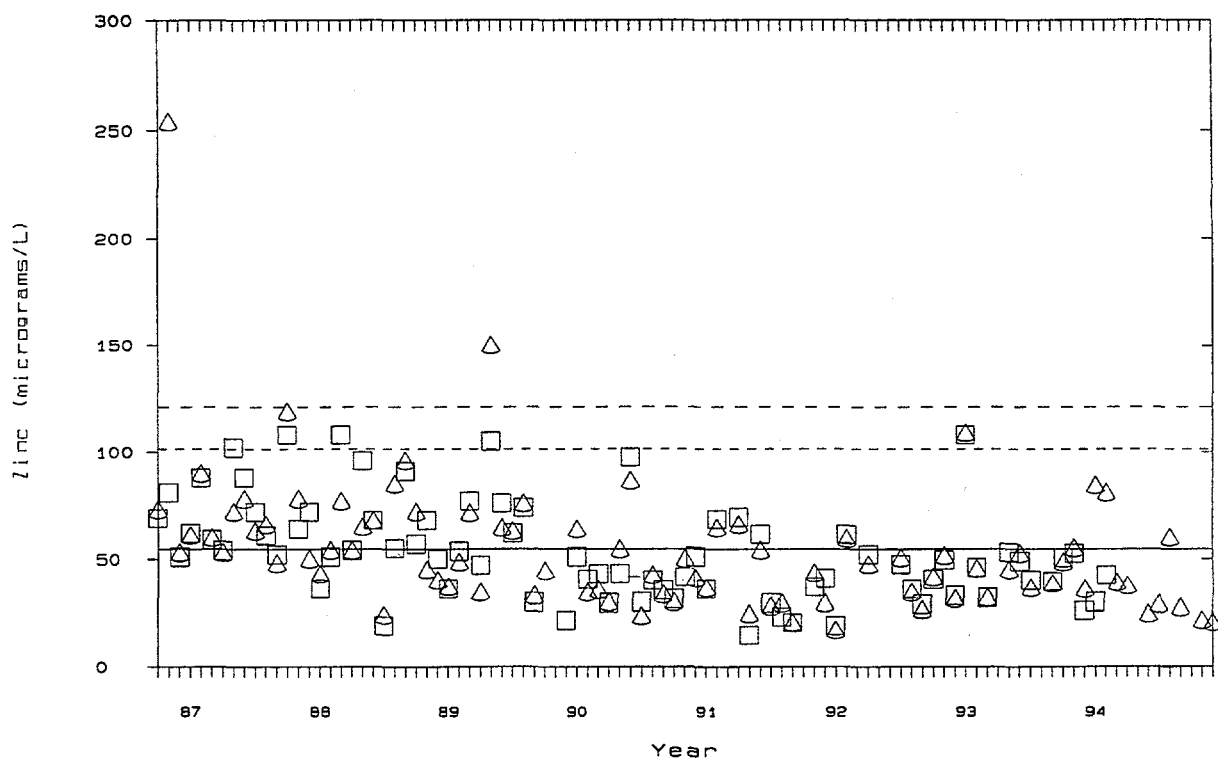
Idaho Falls City Sewer Guideline = 1500 micrograms/L



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

IFF603A Zinc Concentrations

Idaho Falls City Sewer Guideline = 1500 micrograms/L



**Effluent Monitoring Data for
IFF-603 (INEL Research Center - Total
Building Effluent)**

Table B-69. 1994 effluent monitoring data for IFF-603.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	05/03/94	05/03/94	10/12/94	10/12/94	10/12/94	10/12/94	10/12/94	10/12/94
Conductivity (μ S)	564	NA	432	443				
pH	7.4	NA	7.9	8.1				
Cyanide (μ g/L)	ND	ND	ND	ND				
Chromium VI (μ g/L)	ND	ND	ND	ND				
Phenols (μ g/L)	6.2	7.0	ND	9.2				
Total Oil & Grease (mg/L)	6.6	ND	231	160				
Total Petroleum Hydrocarbons (mg/L)	1.5	1.4	1.7	1.7				
Silver (μ g/L)	ND	ND	ND	ND				
Arsenic (μ g/L)	ND	ND	ND	ND				
Barium (μ g/L)	ND	ND	ND	ND				
Cadmium (μ g/L)	ND	ND	ND	ND				
Chromium (μ g/L)	ND	ND	ND	ND				
Copper (μ g/L)	46.2	43.0	43.5	42.5				
Mercury (μ g/L)	ND	ND	ND	ND				
Nickel (μ g/L)	ND	ND	ND	ND				
Lead (μ g/L)	ND	ND	ND	ND				
Selenium (μ g/L)	ND	ND	ND	ND				
Zinc (μ g/L)	43.7	38.1	39.9	46.5				

ND - below practical quantitation level
NA - result not available

Table B-70. 1994 volatile organics data for IFF-603B.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
Acetone (TIC)	May	90.00	µg/L	X	3.00
Acetone (TIC)	May	100.00	µg/L	X	3.03

Table B-71. Summary statistics for IFF-603.

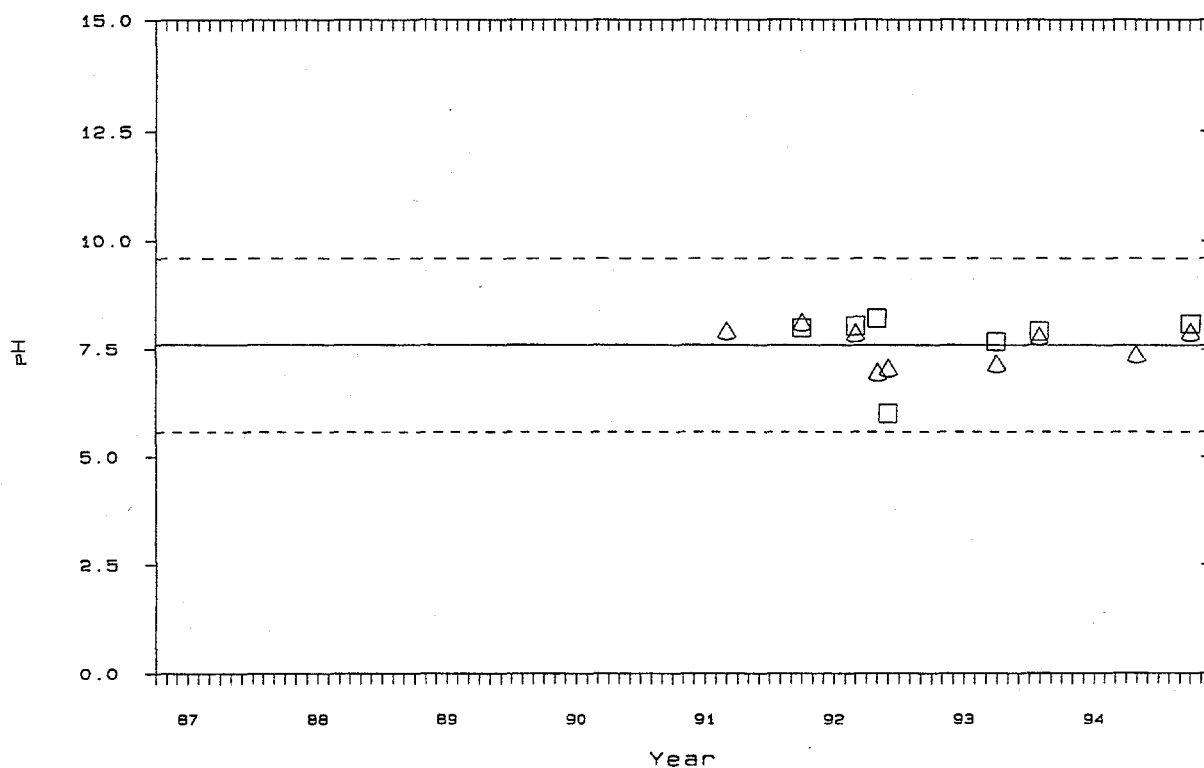
Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Conductivity (μ S)	254	283	13	777	1040	NA
pH	7.6	0.64	13	5.6	9.6	5.5-9.0
Copper (μ g/L)	46.0	14.0	13	71.9	84.9	1500
Zinc (μ g/L)	43.3	20.4	13	81.0	100.0	1500

Guideline - RCRA Characteristic Guideline

NA - Not Applicable

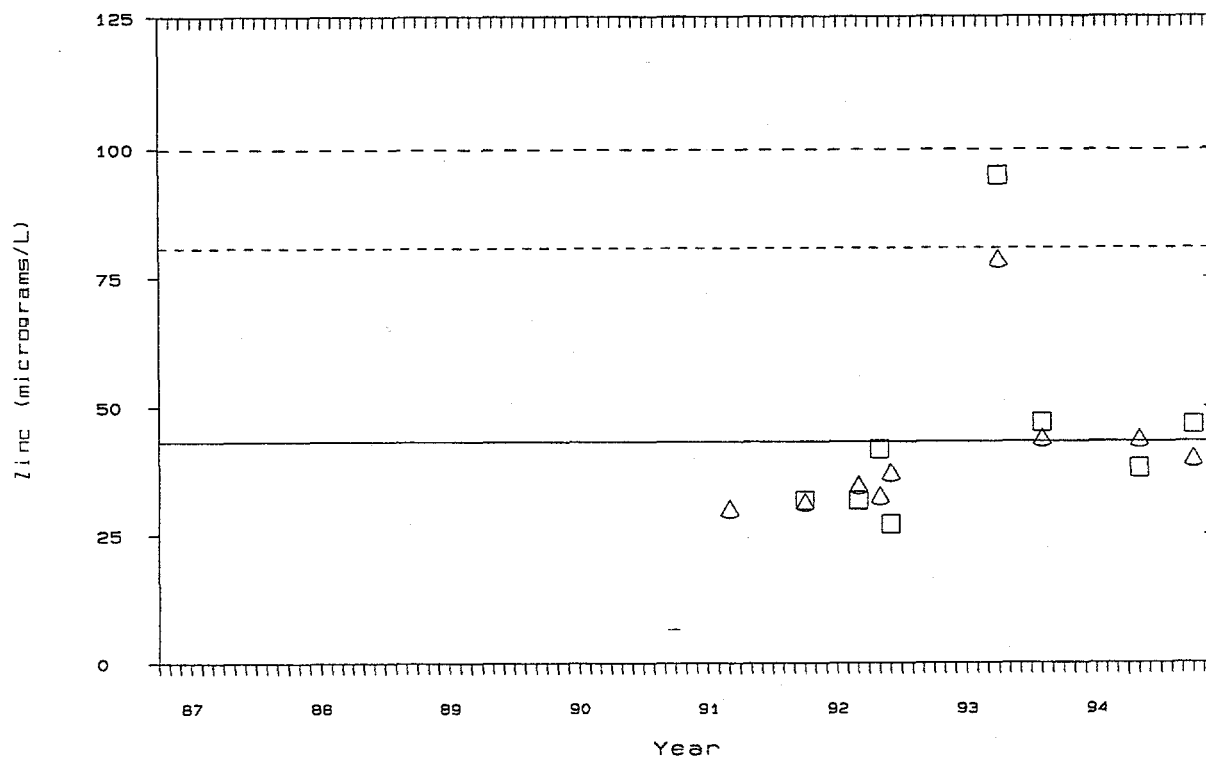
IFF603B pH

Idaho Falls City Sewer Guideline = 5.5-9.0



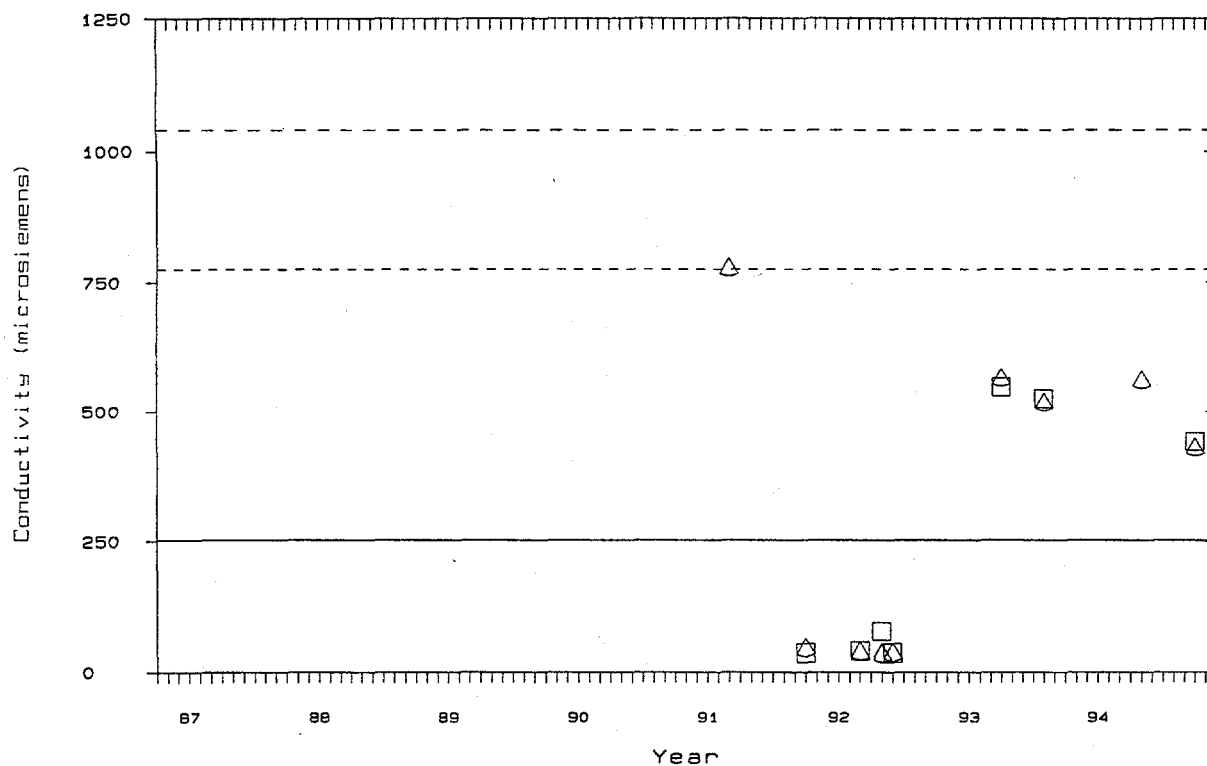
IFF603B Zinc Concentrations

Idaho Falls City Sewer Guideline = 1500 micrograms/L



IFF603B Conductivity

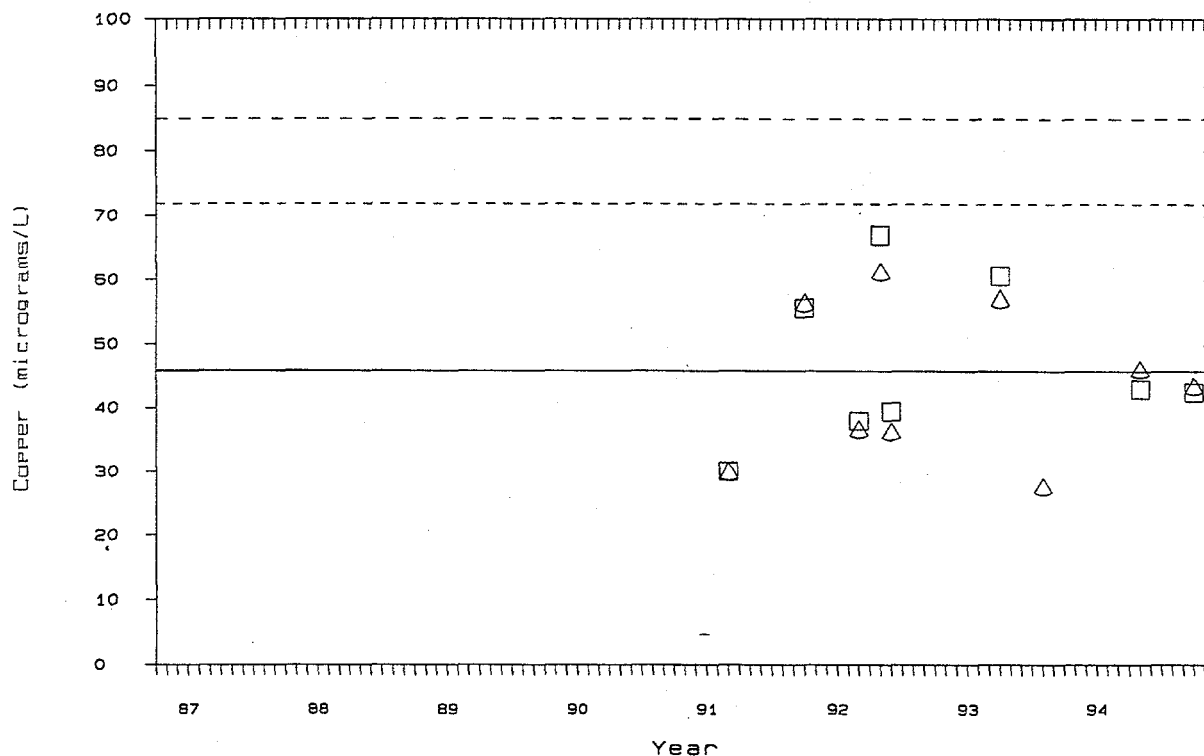
Idaho Falls City Sewer Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

IFF603B Copper Concentrations

Idaho Falls City Sewer Guideline = 1500 micrograms/L



**Effluent Monitoring Data for
IFF-616 (Willow Creek Building - Main
Drive Access Port Access)**

Table B-72. 1994 effluent monitoring data for IFF-616.

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	01/12/94	01/12/94	02/08/94	02/08/94	03/23/94	04/06/94	05/03/94	05/03/94	05/03/94	06/29/94
Conductivity (μ S)	618	628	714	732	657	746	817	819	819	383
pH	7.9	8.0	8.7	8.7	7.9	8.2	7.9	7.8	7.8	7.2
Cyanide (μ g/L)	11.7	10.8	23.5	18.6	ND	ND	17.5	18.5	18.5	ND
Chromium VI (μ g/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver (μ g/L)	31.8	23.2	507	478	73.0	125	94.1	91.1	91.1	71.4
Arsenic (μ g/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Barium (μ g/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium (μ g/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chromium (μ g/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper (μ g/L)	67.7	69.2	73.0	68.3	43.1	63.3	94.9	96.6	96.6	107
Mercury (μ g/L)	ND	ND	ND	ND	ND	0.50	ND	ND	ND	0.22
Nickel (μ g/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Lead (μ g/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium (μ g/L)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc (μ g/L)	77.1	61.8	228	124	38.5	70.3	113	58800	58800	52.3

ND - below practical quantitation level

Table B-72. (continued).

Parameter	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result	Sample Result
Date	07/19/94	07/27/94	08/23/94	09/21/94	10/12/94	10/12/94	11/17/94	12/08/94		
Conductivity (μ S)	969	200	940	798	864	NA	969	545		
pH	8.0	8.8	8.4	6.9	7.9	NA	7.6	7.5		
Cyanide (μ g/L)	NR	ND	ND	ND	9.5	7.6	ND	ND		
Chromium VI (μ g/L)	NR	ND	ND	ND	ND	ND	ND	ND		
Silver (μ g/L)	161	NR	35.4	11.7	ND	ND	16.1	81.3		
Arsenic (μ g/L)	ND	NR	ND	ND	ND	ND	ND	ND		
Barium (μ g/L)	ND	NR	ND	ND	ND	ND	ND	ND		
Cadmium (μ g/L)	ND	NR	ND	ND	ND	ND	ND	ND		
Chromium (μ g/L)	ND	NR	ND	ND	ND	ND	ND	ND		
Copper (μ g/L)	79.8	NR	73.2	67.0	61.7	69.4	71.9	70.9		
Mercury (μ g/L)	0.22	NR	ND	ND	ND	ND	ND	ND		
Nickel (μ g/L)	ND	NR	ND	ND	ND	ND	ND	ND		
Lead (μ g/L)	ND	NR	ND	ND	ND	ND	ND	ND		
Selenium (μ g/L)	ND	NR	ND	ND	ND	ND	ND	ND		
Zinc (μ g/L)	99.4	NR	79.6	51.6	64.5	72.4	68.6	56.0		

ND - below practical quantitation level

NA - result not available

NR - analysis not requested

Table B-73. 1994 volatile organics data for IFF-616B.

Parameter	Month Sampled	Results	Units	Qualifier Flag	Retention Time
Acetone (TIC)	May	60.00	µg/L	X	3.00
Acetone (TIC)	May	50.00	µg/L	X	3.00
Acetone (TIC)	August	400.00	µg/L	XE	6.27
Benzene	February	2.00	µg/L	J	
Chloroform	January	2.00	µg/L	J	
Chloroform	February	2.00	µg/L	J	
Chloroform	March	1.00	µg/L	J	
Chloroform	June	1.00	µg/L	J	
Chloroform	September	1.00	µg/L	J	
Methylene Chloride	February	2.00	µg/L	JB	
Methylene Chloride	July	3.00	µg/L	JB	
Methylene Chloride	August	4.00	µg/L	JB	
Methylene Chloride	October	2.00	µg/L	J	
Trichlorofluoromethane	August	3.00	µg/L	J	
Trichlorofluoromethane	October	3.00	µg/L	J	
Trichlorofluoromethane	October	3.00	µg/L	J	
Unknown (TIC)	August	20.00	µg/L	J	7.60

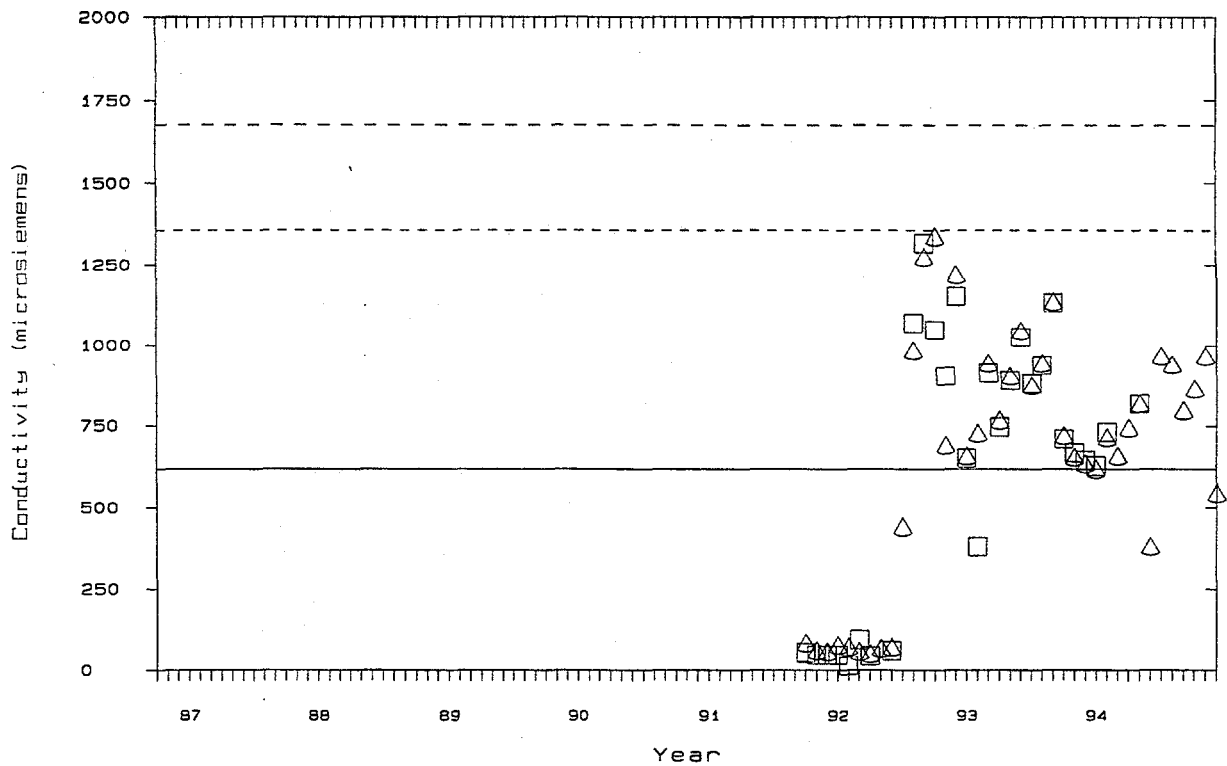
Table B-74. Summary statistics for IFF-616.

Analyte	Historical Mean	STD	N	Level 1	Level 2	Guideline
Conductivity (μ S)	617	437	52	1357	1678	NA
pH	7.8	0.92	52	5.3	10.3	5.5-9.0
Silver (μ g/L)	78.0	75.0	51	205	260	500
Barium (μ g/L)	107	80.3	24	247	311	NA
Calcium (μ g/L)	59057	5418	14	68990	73922	NA
Cyanide (μ g/L)	27.3	30.7	12	84.6	114	500
Copper (μ g/L)	86.1	26.6	54	131	150	1500
Magnesium (μ g/L)	17436	1851	14	20828	22513	NA
Manganese (μ g/L)	20.1	12.6	14	43.2	54.7	NA
Sodium (μ g/L)	62679	21632	14	102333	122023	NA
Lead (μ g/L)	7.5	8.2	15	22.4	29.6	1500
Zinc (μ g/L)	96.8	56.7	54	193	234	1500

Guideline - RCRA Characteristic Guideline
 NA - Not Applicable

IFF616B Conductivity

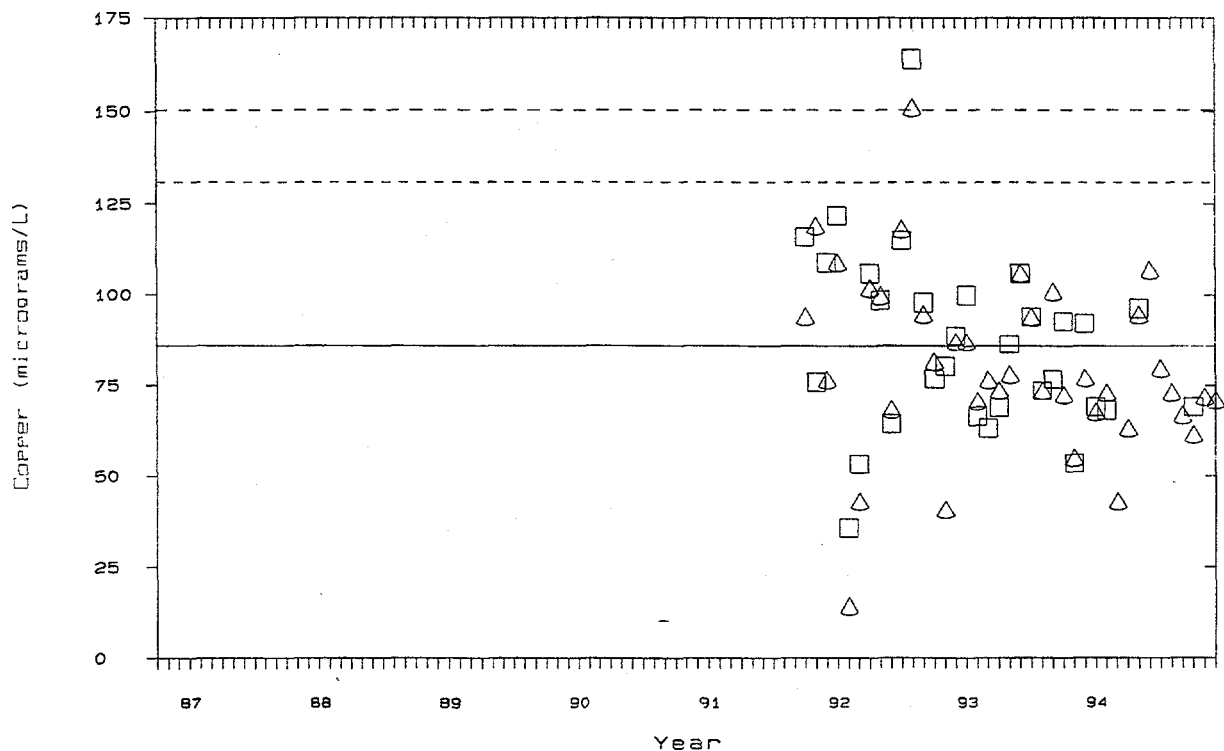
Idaho Falls City Sewer Guideline Not Applicable



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

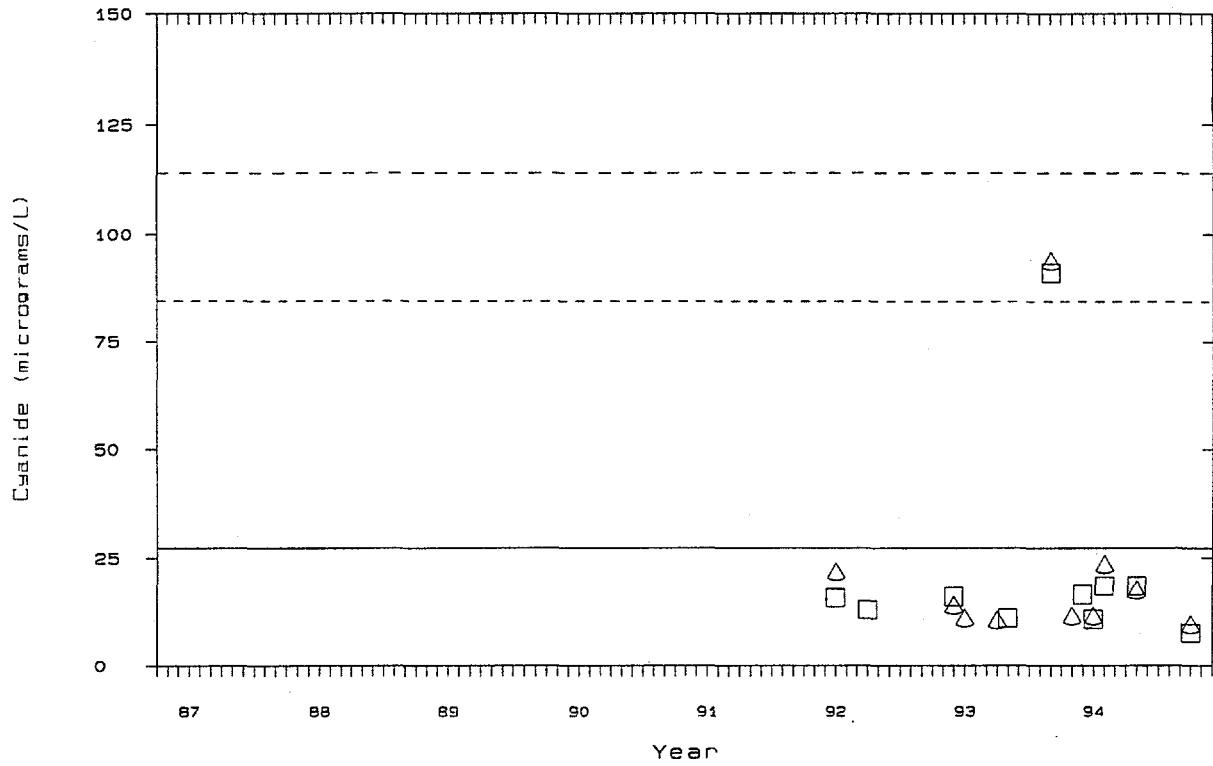
IFF616B Copper Concentrations

Idaho Falls City Sewer Guideline = 1500 micrograms/L



IFF616B Cyanide Concentrations

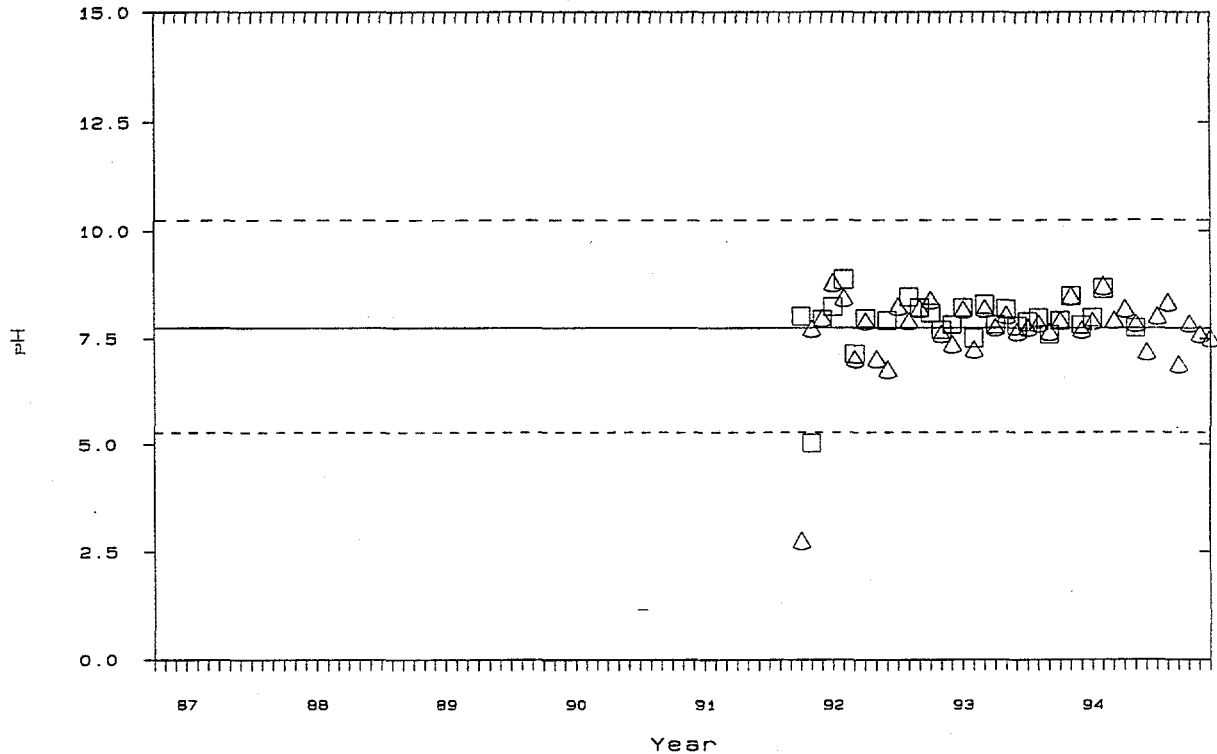
Idaho Falls City Sewer Guideline = 500 micrograms/L



△ Replicate 1 □ Replicate 2 — Mean - - - Level 1 - - - Level 2

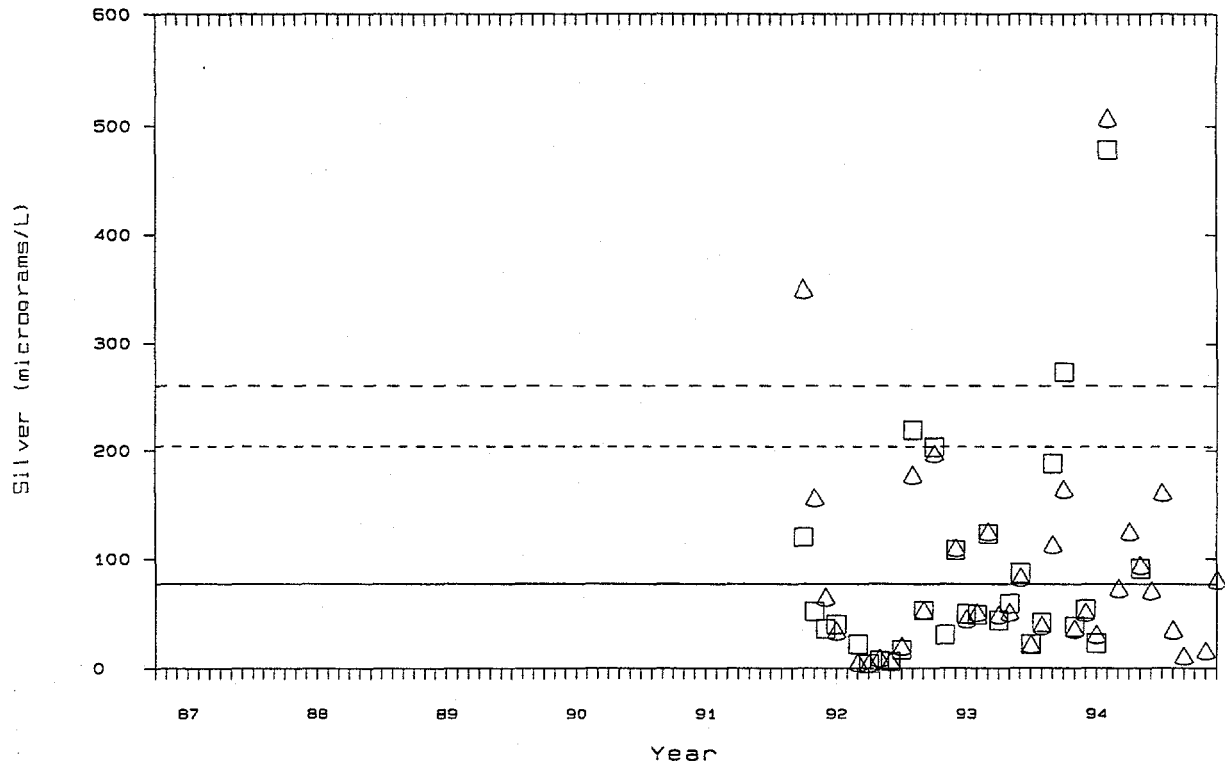
IFF616B pH

Idaho Falls City Sewer Guideline = 5.5-9.0



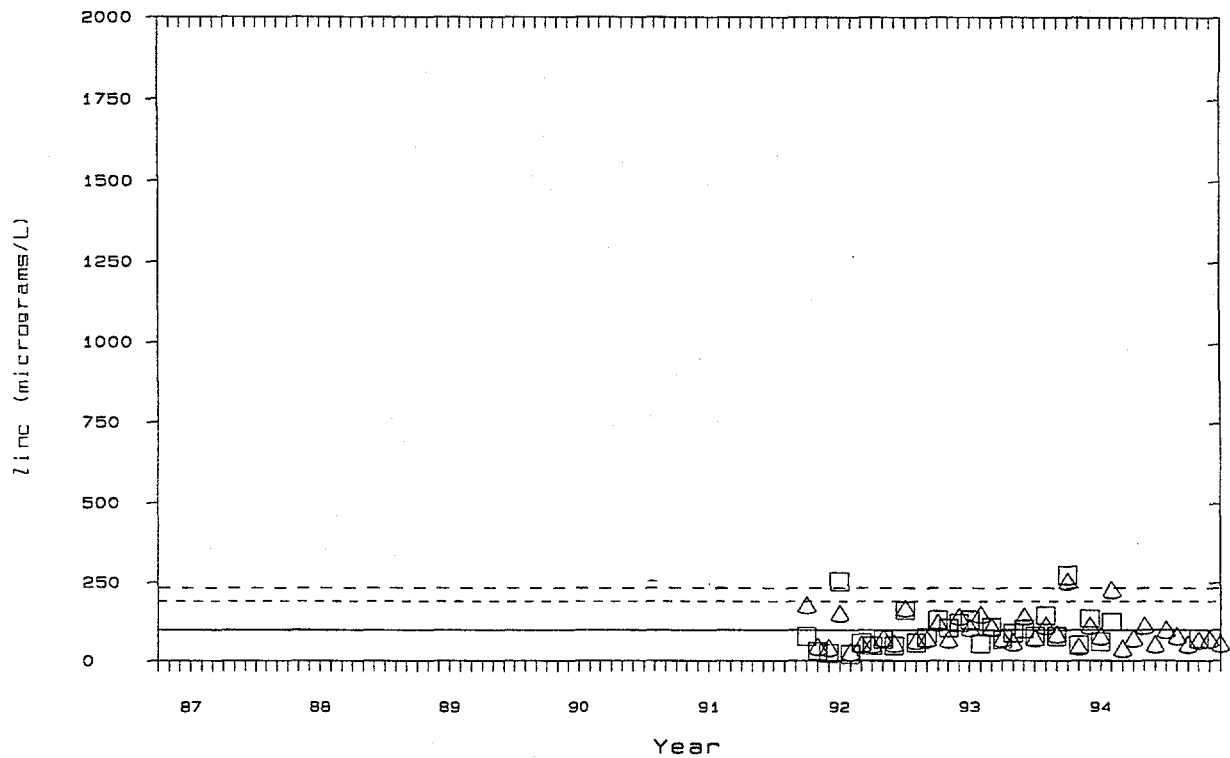
IFF616B Silver Concentrations

Idaho Falls City Sewer Guideline = 500 micrograms/L



IFF616B Zinc Concentrations

Idaho Falls City Sewer Guideline = 1500 micrograms/L



Appendix C

Nonradiological Liquid Effluent Monitoring Program Statistical Methodology

Appendix C

Statistical Methods

CONTROL CHART THEORY

The control chart is a statistical tool used primarily to study a continuous process. The process of concern here is the concentration of an analyte in various wastewater streams. Even under uniform conditions, the analyte concentration is a varying process. The purpose of plotting values on a control chart is to keep track of the process so that management can identify high concentrations indicating that investigation and/or action is necessary.

Among the analyte concentrations, as mentioned, there is bound to be variation; this variation is natural to the process and is due to random or chance causes. If variation in the process is due only to chance causes, the process is said to be in control. If, however, a significant deviation detected in the process can be traced to an assignable cause, the process is said to be out of control, and attempts are made to identify and eliminate the cause.

If an excessively high analyte concentration is detected, it can be attributed to either (a) an assignable cause or (b) a chance cause. If it is the former, change may have taken place in the underlying process. Given a set of data, control chart methods can be used to determine the cause.

The basic concept of control charts is not complicated. Any varying quantity forms a distribution if chance causes are present. The quantity therefore has a mean and variance. Consider the quantity $\bar{x}$; it has a normal distribution parameterized by a mean and variance (see Figure B-1). Very few points of this distribution lie in the tail regions. Specifically, 0.00135 or 0.135% of the area under this curve is beyond $\bar{x} + 3\sigma$ and $\bar{x} - 3\sigma$. So, if variability in the process is due only to chance cause, there is approximately one out of a thousand chances that a value will be larger than $\bar{x} + 3\sigma$. Although it is possible for an analyte concentration to be this large due to chance cause, it is much more likely that it would be high due to an assignable cause.

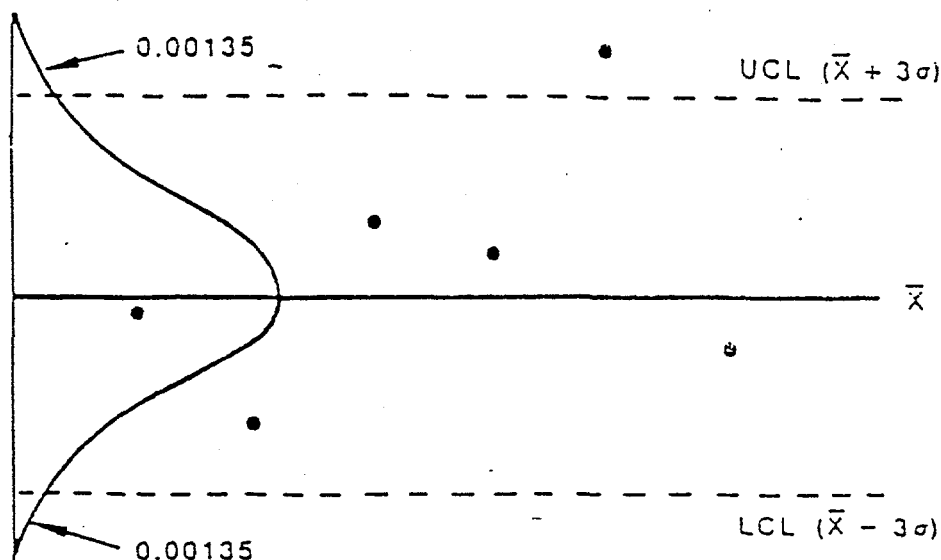


Figure C-1. Basic concept of an $\bar{x}$ control chart.

Thus, the decision rule is this: If a value is outside the determined limits, generally $\bar{x} \pm 3\sigma$, it typically has an assignable cause. The process is said to be out of control until the cause is identified and eliminated. If a value is plotted within the determined limits, it is concluded that no reliable evidence of an assignable cause is present. The process is then said to be in control.

A process in control has obvious advantages over a nonmonitored process:

- The process is free from variation worth identifying. Hence, there is no reason to tamper with it.
- Quality performance is improved simply because the act of getting a process in control entails eliminating assignable causes.
- The process becomes predictable; in cases, decreasing the frequency of inspection or sampling may be justified.

Constructing the $\bar{x}$ Control Chart

A control chart for the process average, $\bar{x}$, has a center line (CL) and two upper and lower control limits. The center line is computed as follows:

CL = $\bar{x}$ = analyte concentration averaged over all past data

For all analytes except Ph, only exclusively high analyte concentrations can signal an out of control state. Therefore, only upper control limits are required. The two upper control limits (UL1 and UL2) are constructed for all analytes (except pH) as follows:

UL1 = $\bar{x} + t_{.95, n-1} s(1 + 1/n)^{1/2}$ = upper concentration 1 limit

UL2 = $\bar{x} + t_{.99, n-1} s(1 + 1/n)^{1/2}$ = upper concentration 2 limit

where $t_{1-\alpha, n-1}$ = t value for the confidence interval $1-\alpha$ with $n-1$ degrees of freedom,

$$s^2 = \sum_i^n (x_i - \bar{x})^2 / n - 1,$$

and n = number of analyte concentrations.

For pH, both upper and lower control limits are required since both high and low pH concentrations can signal an out of control state. The upper and lower control limits (UL1, UL2, LL1, and LL2) for pH are constructed as follows:

UL1 = $\bar{x} + t_{.975, n-1} s(1 + 1/n)^{1/2}$ = upper concentration 1 limit

UL2 = $\bar{x} + t_{.995, n-1} s(1 + 1/n)^{1/2}$ = upper concentration 2 limit

LL1 = $\bar{x} - t_{.975, n-1} s(1 + 1/n)^{1/2}$ = lower concentration 1 limit

LL2 = $\bar{x} - t_{.995, n-1} s(1 + 1/n)^{1/2}$ = lower concentration 2 limit

where $t_{1-\alpha, n-1}$, s^2 , and n are as defined above.

For this program, control limits are calculated at the start of each year for those analytes sampled from selected wastewater streams. For the purposes for this report, a control chart (indicating historical data, the central line, and the control limits) is presented if at least eight past data values exist for an analyte for a given stream. To ensure that the past data are "in control" and are representative of the analyte and stream of interest, those analyte concentrations exceeding the previous year's upper concentration limit (UL2) are treated as outliers and excluded from the calculation of the current year control limits. For Ph, outliers are based on concentrations falling outside either the UL2 or the lower concentration limit (LL2).

Out-of-Control Criteria

It is natural for a process in control to exhibit the following characteristics:

- Most points are near the center line.
- A few points are spread out and approach the three sigma control limits.
- None of the points exceed the three sigma control limits.

If any of the following situations occur, it is unnatural for the process, and an assignable cause should be sought:

- A single point outside the three sigma control limits
- Two out of three successive points outside the two sigma warning limits
- Seven out of eight points in a row on one side of the center line.

It is possible to apply more rules than those listed above. Too many rules, however, will result in a higher probability of incorrect conclusions, such as saying the process is out of control when it is not.

GLOSSARY OF STATISTICAL TERMS

Assignable Cause—An identifiable event in a process that in some way changes the population and affects the control chart. An assignable cause may, for example, result in a change in the process average and/or variability and/or may cause cyclic or erratic shifts in the process.

Chance Cause or Random Cause—Slight, natural changes in conditions of the process causing random variation in the population. This variation is the sum of the effects of all chance causes; no major part of the total variation can be traced to a single cause.

Control Chart—A statistical device used primarily for the study and control of repetitive processes. The chart typically is based on the upper and/or lower control limits; points outside these limits signal a process "out of control."

Controlled Process—A process for which the control chart shows no points outside the limits and no non-random variation within the limits.

Variance—The expectation of $(\chi - \mu)^2$ where μ is the mean of the random variable χ .

Of a sample, $s^2 = \sum_i^n (\chi_i - \bar{\chi})^2 / n - 1$.

