2351

K/HS-135

ORGDP

OAK RIDGE GASEOUS DIFFUSION PLANT

MARTIN MARIETTA

RCRA FACILITY INVESTIGATION PLAN
K-1407 WASTE AREA GROUPING
OAK RIDGE GASEOUS DIFFUSION PLANT
OAK RIDGE, TENNESSEE

DECEMBER 1988

OPERATED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

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Prepared by the
Oak Ridge Gaseous Diffusion Plant
Oak Ridge, Tennessee 37831
operated by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U. S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

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1. INTRODUCTION

Within the confines of the Oak Ridge Gaseous Diffusion Plant (ORGDP) are hazardous waste treatment, storage, and disposal facilities; some are in operation while others are no longer in use. These solid waste management units (SWMUs) are subject to assessment by the U.S. Environmental Protection Agency (EPA), as required by the 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA). The RCRA Facility Investigation (RFI) Plans are scheduled to be submitted for all the SWMUs during calendar years 1987 and 1988. The RFI Plan - General Document (K/HS-132) includes information applicable to all the ORGDP SWMUs and serves as a reference document for the site-specific RFI Plans. This plan is based upon requirements described in the draft document, RFI Guidance, Vols. I-IV, December 1987 (EPA 530/SW-87-001).

This document is the site-specific RFI Plan for the K-1407-A Neutralization Pit, K-1407-B Pond (surface impoundment), K-1700 Stream, and the K-1070-B Classified Burial ground hereafter referred to as the K-1407 Waste Area Grouping (WAG). Because these units are adjacent and hydrologically connected, they are addressed in the same RFI Plan. Contained within this document are geographical, historical, operational, geological and hydrological data specific to each of the components of the K-1407 WAG. The potential for release of contamination through the various media to receptors is addressed. A sampling plan is proposed to further determine the extent (if any) of release of contamination to the surrounding environment. Included are health, safety, quality assurance (QA), and quality control (QC) procedures to be followed when implementing the sampling plan. QC procedures for remedial actions occurring on the

Oak Ridge Reservation (ORR) are presented in Environmental Surveillance Procedures Quality Control Program, Martin Marietta Energy Systems, Inc., (ESH-Sub-87-21706/1) and QA guidelines for ORGDP investigations are contained in The K-25 RFI QA Plan, K/HS-231. Procedures for managing and displaying data collected from the RFI are summarized.

2. OBJECTIVES OF RCRA FACILITY INVESTIGATION PLANNING

2.1 OBJECTIVES

This RFI Plan will identify actions necessary to determine the nature and extent (if any) of releases of hazardous and/or radioactive contamination from the K-1407 WAG. The plan summarizes existing site information and addresses the potential for contamination of soil, groundwater, surface water, and air.

2.2 EVALUATION CRITERIA

In order to prepare and implement a comprehensive sampling plan and to effectively evaluate analytical sampling results, evaluation criteria must first be established. Criteria for evaluating the extent of release of contaminants are based on existing state and federal regulatory guidance and best technical judgment.

The primary media of interest for the K-1407 WAG are groundwater, surface water, and soil. Four quarters of RCRA groundwater monitoring data will be collected covering the parameters listed in Table 2.1 of the RFI Plan - General Document (K/HS-132). Soil and surface water samples will be collected as a part of the RCRA Facility Investigation and analyzed for the contaminants described in Section 8 of this document. The sampling methodology and analytical procedures are designed to characterize the contaminants of interest down to or below levels summarized in Table 2.2 of the RFI Plan - General Document (K/HS-132).

Air is not considered to be a potential pathway of concern at the K-1407-B WAG. Volatilization of chemicals from either the K-1070-B Burial Ground, the K-1407-B Pond, or the K-1700 Stream are suppressed due to the fill material, the water, or the adsorption of chemicals to sediment in each of these areas, respectively. As for the K-1407-A Neutralization pit, the only residuals that would be present to volatilize would be those resulting from leakage around the pit or incoming lines. However, the pit and the lines have been leak tested and were found to be competent.

2.3 SCHEDULE FOR SPECIFIC RFI ACTIVITIES

A list of the sampling and analysis activities that will be performed for this RFI and the duration of each activity is shown in Table 2.1.

2.4 FEASIBLE ALTERNATIVES

Knowledge of feasible corrective measures has been used in preparing this RFI Plan. Based on existing geologic, hydrologic, and contaminant source data, potential corrective measures for the K-1407 WAG have been identified and are shown in Table 2.2. These corrective measures will be re-evaluated after the RFI report is completed.

2.5 RISK ASSESSMENT

The environmental and public health risks associated with possible site contamination and the remedial action alternatives listed in Table 2.2 will be evaluated. This evaluation will consist of a characterization of contaminant sources, the environmental setting, the magnitude of release, pathways to human exposures, and characterization of risks. Risk assessment data requirements have been incorporated in development of the site sampling plan.

Table 2.1. Schedule of RFI activities for the K-1407 WAG

1. Site Preparation and Sample Location	
(a) Soil Sampling	
1. Geophysical Exploration of K-1070-B	4 weeks
2. Location of sampling points	2 weeks
(b) Groundwater Well Construction	Completed 2/87
(c) Surface Water Sampling downgradient from K-1070-B	2 weeks
(d) Water Sampling of K-1700 Creek (Includes design and construction of weir and monitoring equipment)	70 weeks
2. Collection of samples[1,2]	
(a) Soil Samples	2 weeks
(b) Groundwater Samples	52 weeks
(c) Surface Water Samples downgradient from K-1070-B	6 weeks
(d) Water Sampling of K-1700 Stream	6 months
3. Analysis of samples	
(a) Soil Samples	16 weeks
(b) Groundwater samples	66 weeks
(c) Surface Water Samples downgradient from K-1070-B	16 weeks
(d) Water Samples from K-1700 Creek	16 weeks
4. Compilation of data and data presentation	12 weeks
5. Evaluation of results and recommendations	4 weeks
6. Preparation of RFI report and submittal to EPA	12 weeks
7. Additional Sampling Phases as Needed	TBD

[1]Collection of samples will begin after K-1407-B Pond site is closed.

[2]Wells are part of the ORGDP Groundwater Protection Program. Some wells will be relocated due to closure activities. Quarterly groundwater samples will be part of this investigation.

Table 2.2. Potential corrective measures for the K-1407 WAG

General Response Action	Technologies
Monitoring	Surveillance monitoring and analysis
Containment from surface water	Cap - synthetic membrane, clay, asphalt, multimedia cap, concrete, or chemical sealants and stabilizers; grading; revegetation - grasses.
Containment from groundwater	Subsurface collection drains - french drains, tile drains, pipe drains
	Vertical containment barriers - soil bentonite slurry wall, cement-bentonite slurry wall, vibrating beam, grout curtains, steel sheet piling
	Horizontal containment barriers (bottom sealing) - block displacement, grout injection
	Groundwater diversion pumping - well points, deep wells, suction wells, ejector wells
SITE SPECIFIC CORRECTIVE MEASURES	
<u>K-1407-A Neutralization Pit</u>	
Containment from groundwater	Seal pit and process lines. Double contain pit and lines and provide leak detection system.[1]

[1]These corrective measures may be provided as part of the Underground Tank Retrofit Program

Table 2.2 Potential corrective measures (continued)

General Response Action	Technologies
K-1407-B Holding Pond	
Closure of Pond[1]	Drain pond and discharge effluent to CNF. Reroute pipelines currently discharging to pond. Remove sludge and contaminated soil fix in concrete at the Sludge Fixation Facility to render nonhazardous, and store above ground or bury in LLW disposal facility. Capping: fill material 2 feet clay synthetic membrane (i.e. Hypalon) 1 foot sand geotextile fabric topsoil and final grading revegetation - grasses French drain and collection sumps: physical/chemical/biological treatment of collected effluents.
K-1700 Stream	
Removal of contaminated sediment	Dredge creek sediments. Fix dredged sediments in concrete and store above ground or dispose in approved landfill.

[1]Information about the closure of the K-1407-B Pond can be found in the Closure/Post Closure Plan - K-1407-B Holding Pond, (K/HS-216), April 1988.

3. DESCRIPTION OF CURRENT CONDITIONS

3.1 GEOGRAPHICAL INFORMATION

The various components of the K-1407 WAG are located in the same general vicinity at the ORGDP (Figure 3.1). The K-1070-B Classified Burial Ground is located approximately 400 feet north of the K-1401 building and about 400 feet west of the K-1407-B Holding Pond. The K-1700 stream consists primarily of a small surface stream, approximately 0.75 miles long, which originates to the east of ORGDP. The stream flows beside and receives effluents from the K-1407-B Holding Pond. In addition to the NPDES monitoring station on the K-1700 stream (point 001), an NPDES monitoring station (point 003) is located at the outfall of the K-1407-B Pond. However, this point (003) is now abandoned due to the closure of the pond. The K-1700 stream discharges into Poplar Creek. Complete geographical information is located in Section 3.1 of K/HS-132.

3.2 HISTORICAL INFORMATION

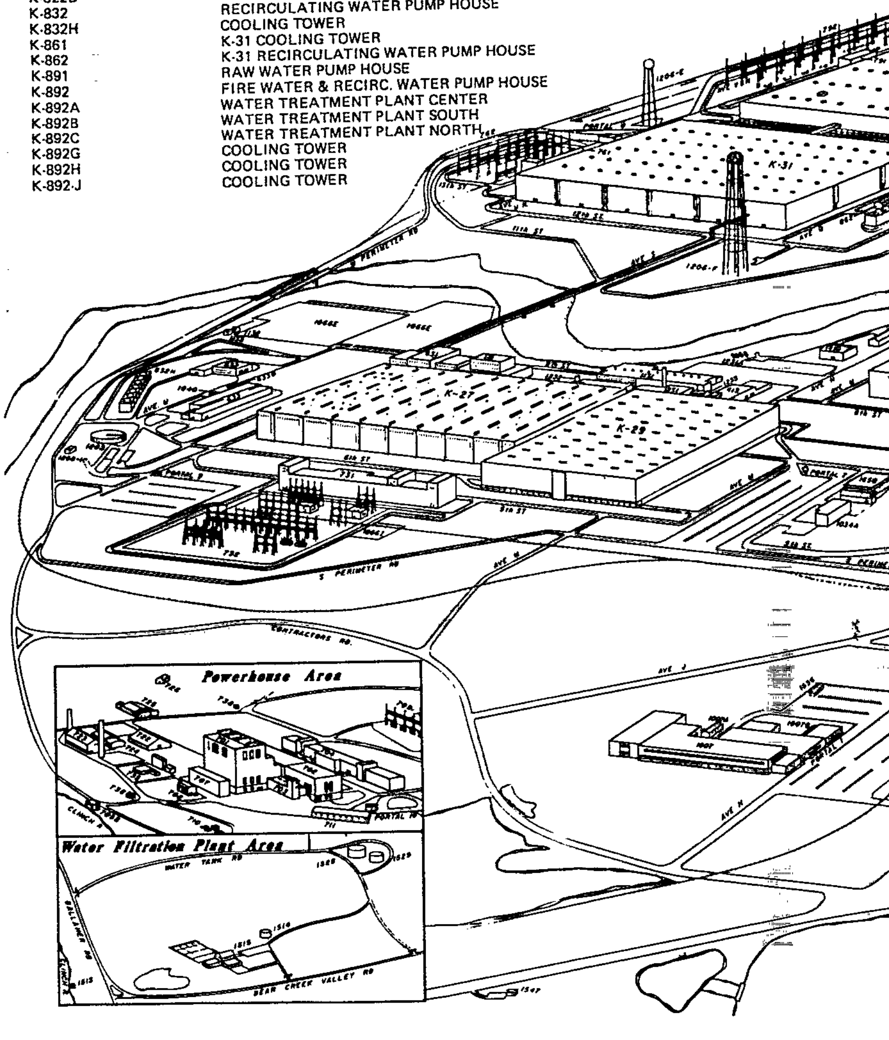
3.2.1 <u>K-1070-B Classified Burial Ground</u>

The K-1070-B Old Classified Burial Ground covers approximately 3.7 acres and has an average depth of approximately 30 feet. This burial ground was opened in the early 1950s when the amount of classified equipment, materials, and parts reached a level that made warehouse storage impractical. The unit is estimated to have been in operation from the 1950s through the mid 1970s. Technological advances in barrier, compressor, and coolant systems resulted in plant improvement programs which generated large quantities of obsolete classified machinery, equipment, materials, and parts for disposal. However, detailed disposal

KEY

K-101	PROCESS (VACANT)
K-131	FIELD MAINT. SHOP & OFFICE
K-303-1 Thru K-312-3	K-25 PROCESS
K-402-1 Thru K-402-9	K-27 PROCESS
K-413	PRODUCT WITHDRAWAL
K-502-1 Thru K-502-3	K-29 PROCESS
K-601	MAINTENANCE TRAINING
K-602-1 Thru K-602-6	K-31 PROCESS
K-631	PROCESS TAILS
K-633	ORGDP TEST LOOP FACILITY
K-701	BOILER HOUSE (VACANT)
K-702	TURBINE ROOM & DISCH. TUNNEL (VACANT)
K-704	K-25 MAIN SWITCH HOUSE
K-709	K-25 SWITCHYARD
K-710	SEWAGE TREATMENT
K-711	WELD TRAINING FACILITY
K-722	STORAGE WAREHOUSE
K-723	STORAGE WAREHOUSE
K-724	EXCESS STORAGE
K-725	WAREHOUSE (VACANT)
K-726	STORAGE BLDG.
K-731	K-27 & K-29 SWITCH HOUSE (CONTROL ROOM)
K-732	K-27 & K-29 SWITCHYARD
K-735	STORAGE BUILDING
K-736	STORAGE BUILDING
K-761	K-31 SWITCH HOUSE (CONTROL ROOM)
K-762	K-31 SWITCHYARD
K-791	K-33 SWITCH HOUSE (CONTROL ROOM)
K-792	K-33 SWITCHYARD
K-796-A	MAINTENANCE STORAGE
K-801	INTAKE WATER PUMP HOUSE
K-801A	WATER TREATMENT PLANT
K-801B	CLARIFLOW TANK
K-801H	COOLING TOWER (PARTIAL BASIN ONLY)
K-802	RECIRCULATING WATER PUMP HOUSE
K-822	PUMP HOUSE
K-822A	COOLING TOWER
K-822B	COOLING TOWER
K-832	RECIRCULATING WATER PUMP HOUSE
K-832H	COOLING TOWER
K-861	K-31 COOLING TOWER
K-862	K-31 RECIRCULATING WATER PUMP HOUSE
K-891	RAW WATER PUMP HOUSE
K-892	FIRE WATER & RECIRC. WATER PUMP HOUSE
K-892A	WATER TREATMENT PLANT CENTER
K-892B	WATER TREATMENT PLANT SOUTH
K-892C	WATER TREATMENT PLANT NORTH
K-892G	COOLING TOWER
K-892H	COOLING TOWER
K-892-J	COOLING TOWER

K-896	COOLIN
K-902-1 Thru K-902-8	K-33 PRO
K-1000	CONFER
K-1001	ADMINIS
K-1002	CAFETE
K-1003	DISPENS
K-1003A	DISPENS
K-1004-A Thru K-1004-C	LABORA
K-1004-D	LABORA
K-1004-H	GAS CYL
K-1004-J	LABORA
K-1004-L	LABORA
K-1004-N	COOLIN
K-1004-N1	COOLIN
K-1004-P	ISOSTAT
K-1006	LABORA
K-1007	COMPUT
K-1008A Thru K-1008D	CHANGE
K-1008E Thru K-1008F	CHANGE
K-1010	LABORA
K-1015	LAUNDR
K-1020	HEALTH
K-1021	OLD FIR
K-1023	LABORA
K-1024	LABORA
K-1025A Thru K-1025E	RAD. SO
K-1030	MAINTE
K-1034A	PLANT F
K-1035	MAINTE
K-1036	MAINTE
K-1037	AVLIS F
K-1039	TELEPH
K-1040	MAINTE
K-1045	STORAG
K-1045A	FIRE TR
K-1052	AMDL L
K-1055	COMPRE
K-1056	LUMBER



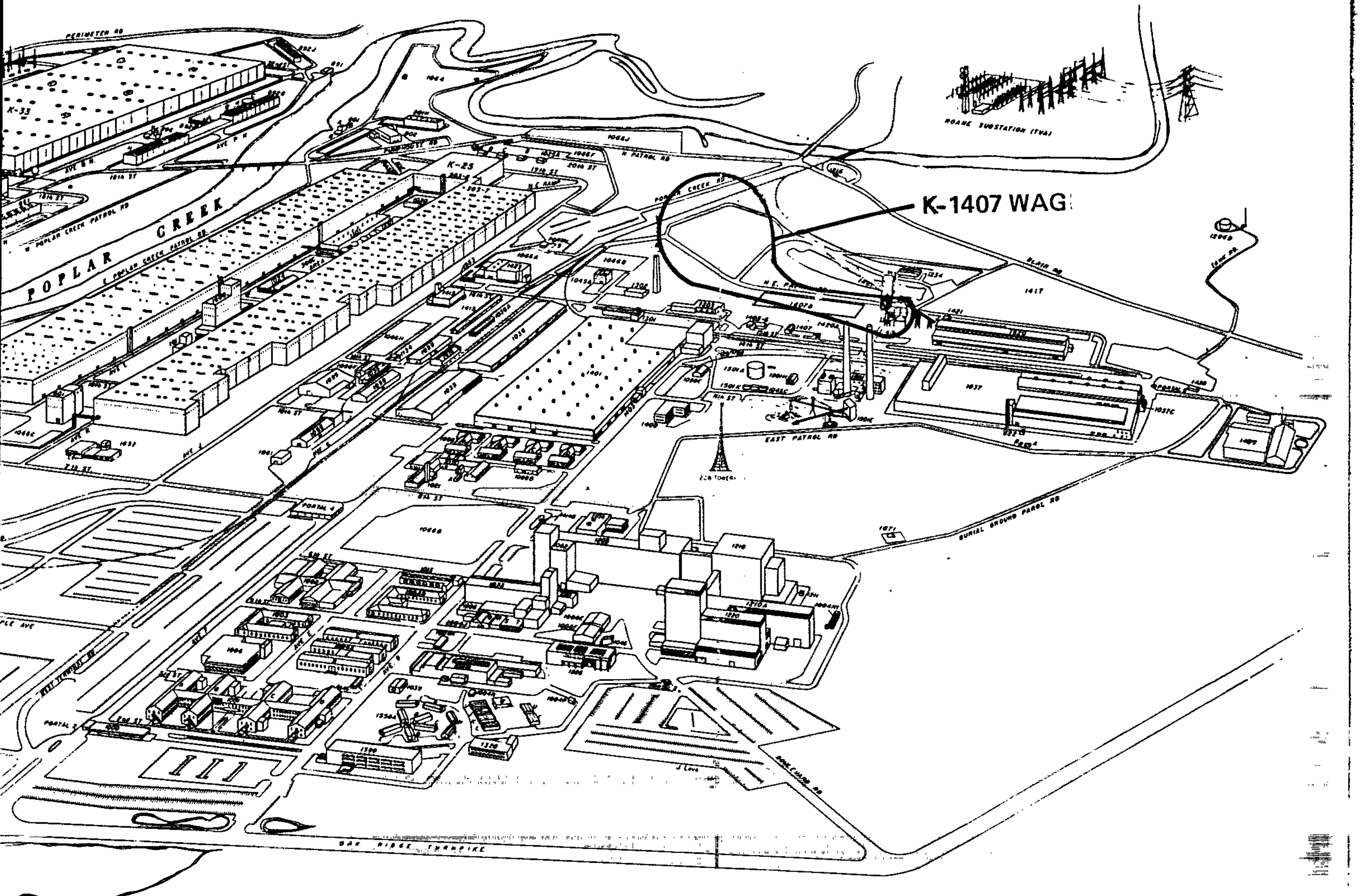
UNCLASSIFIED

TER TREATMENT PLANT
S
E ROOM (PORTAL 2)
TION BUILDING

OFFICE TRAILER
Y FACILITIES
Y FACILITIES
ER STORAGE
Y COMPLEX
Y FACILITY
WER
WER
EST FACILITY
Y FACILITIES
ENTER
USES
USES
Y REC. & HANDLING

ETY & ENVIRONMENTAL AFFAIRS
ADQUARTERS
Y
Y & MAINT. TRAINING
E STORAGE & WHSE. SHIP. DRUMS
CE SHOP & OPERS. ANALYSIS OFF.
RDS VAULT
CE BUILDING
CE STORES-SHIPP. & REC.
ITY
BUILDING
CE SHOP K-633
ILDING
NG FACILITY
RATORY
) GAS CYLINDER STORAGE
REHOUSE

K-1058	BUILDING MATERIAL WAREHOUSE
K-1059	BUILDING MATERIAL WAREHOUSE
K-1061	OIL STORAGE BUILDING
K-1064	SALVAGE YARD
K-1066-A Thru 1066-L	CYLINDER STORAGE YARDS
K-1071	TRASH COMPACTOR
K-1095	PAINT SHOP
K-1097	CARPENTER SHOP
K-1098	CEMENT STORAGE
K-1098E	SAND BLAST FACILITY (OLD)
K-1098F	SAND BLAST FACILITY (NEW)
K-1098-G	MAINTENANCE (SHED)
K-1101	AIR PLANT
K-1131	FEED & TAILS
K-1132 & K-1133	HF STORAGE
K-1200	COMPONENT PREPARATION LAB. (CPL)
K-1201	COMPRESSOR BUILDING
K-1203	WASTE WATER & SEWAGE TREATMENT PLANT
K-1206D	FIRE WATER TANK – 300,000 GALLON
K-1206E	FIRE WATER TANK – 100,000 GALLON
K-1208	METEOROLOGICAL TOWER
K-1026F	FIRE WATER TANK – 400,000 GALLON
K-1210	COMPONENT TEST FACILITY (CTF)
K-1210A	ADVANCED ENGINEERING TEST FACILITY
K-1211	CTF STORAGE
K-1216	SCALE HOUSE
K-1220	CENTRIFUGE PLANT DEMONST. FACILITY
K-1225	S. S. D. OFFICE BUILDING
K-1231	PROCESS
K-1231A	STORAGE
K-1232	CHEMICAL RECOVERY FACILITY
K-1233	COLLECTION FACILITY
K-1234	STORAGE
K-1301	NITROGEN PLANT
K-1302	STORAGE
K-1303	RESEARCH COMPRESSOR BUILDING
K-1320	ENGINEERING OFFICE
K-1328	ENGINEERING OFFICE
K-1400	ENGINEERING OFFICE BUILDING
K-1401	MAINTENANCE BUILDING
K-1405-6	HIGH TEMPERATURE LABORATORY
K-1407	LABORATORY & STORAGE
K-1407-B-F	HOLDING PONDS
K-1410	NICKEL PLATING FACILITY
K-1413	LABORATORY – ENGINEERING
K-1414	GARAGE
K-1414B	VEHICLE WASH FACILITY
K-1415	STORAGE SHED
K-1416	ACID STORAGE
K-1417	CASTING YARD
K-1419	SLUDGE FIXATION FACILITY
K-1420	DECONTAMINATION & URANIUM RECOVERY
K-1423	TOLL ENRICHMENT FACILITY
K-1425	WASTE OIL STORAGE
K-1435	TSCA INCINERATOR
K-1501	STEAM PLANT
K-1501A	FUEL OIL TANK
K-1501E	TRANSFER/CRUSHER BUILDING
K-1501H	MAINTENANCE FACILITY
K-1513	PUMP HOUSE
K-1514	SANITARY WATER TANK – 220,000 GALLON
K-1515	WATER FILTRATION PLANT
K-1528	CONC. WATER STOR. TANK – 2,500,000 GALLON
K-1529	STEEL WATER STOR. TANK – 1,500,000 GALLON
K-1546-C	ENGINEERING TRAILER
K-1547	VISITORS OVERLOOK
K-1548	CANTEEN TRAILER
K-1550 Thru K-1550-W	ENGINEERING OFFICE TRAILERS
K-1556	COMPUTER OFFICE TRAILER
K-1580	ENGINEERING OFFICE BUILDING
K-1600	TECHNOLOGY TEST FACILITY
K-1650	CENTRAL CONTROL FACILITY
K-1652	SECURITY & PLANT PROTECTION DIVISION



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g. 3.1. ORGDP location map for K-1407 WAG records were not maintained. The types of materials that are expected to be in the unit are summarized in Section 4.0. Radioactive materials include uranium and trace quantities of fission products. It is suspected that the burial of liquids (organics-hydrocarbons, oils, solvents, etc.) was minimal. The closure of the burial ground coincided with the opening of the K-1070-C/D Classified Burial Ground in either late 1976 or early 1977.

3.2.2 K-1407-A Neutralization Pit & K-1407-B Holding Pond

The K-1407-A Neutralization Pit consists of a 33,000 gallon reaction pit where sulfuric acid and calcium hydroxide are added to neutralize corrosive wastewater. The K-1407-B Holding Pond consists of a 1.3 acre impoundment with a storage volume of approximately one million gallons. It was used for the settling of metal hydroxide precipitates generated during neutralization and precipitation in the K-1407-A Neutralization Facility as well as a settling basin for waste streams requiring no neutralization which were discharged directly to the K-1407-B Pond.

The K-1407-B Holding Pond appears to have been placed in operation in 1943 by the contractor Ford-Bacon-Davis as a settling basin for neutralized cleaning solutions generated from the cleaning of nickel-plated steel pipe installed in the new K-25 process building. In 1948, cleaning equipment from various process units was decontaminated and the waste stream discharged to the K-1407-B Pond. It is unknown whether the K-1407-A Neutralization Pit was built at this time or if neutralization occurred at the point of generation of these waste streams.

In 1973, metal hydroxide sludges were removed from the K-1407-B Holding Pond and transferred to the K-1407-C Retention Basin, an unlined surface impoundment that is also scheduled for closure (Closure Plan K-1407-C Holding Pond, K/HS-221, May 1988). As of November 8, 1988, both the K-1407-C Pond and the K-1407-B Holding Pond do not receive effluent from any of the surrounding facilities. The K-1407-B Holding Pond currently contains approximately 250,000 cubic feet of sludge.

Completion of the K-1407-H Central Neutralization Facility (CNF), the K-1407-B Pond Capability Replacement (PCR) Facility, and the Effluent Treatment Improvement Facility (ETI) replaced most of the operations of the K-1407-A Neutralization Pit and the K-1407-B Holding Pond. K-1407-A will remain in operation to neutralize coal pile runoff and to serve as a back-up to the CNF. Closure of the K-1407-B Pond is underway because the pond does not meet the regulatory requirements for surface impoundments as specified under the 1984 reauthorized RCRA requirements.

3.2.3 K-1700 Stream

The original drainage pattern of the K-1700 stream appears to have been altered as shown in Figure 3.2. The topography of the area including the K-1700 stream channel, has been modified as a result of construction, excavation, and filling at the site. Originally, three streams fed into one channel in the vicinity of the K-1407-B Pond and eventually discharged into Poplar Creek. At present, the K-1700 stream channel from the K-1407-B Pond is fed by one channel and several area underground storm drains before discharging to Poplar Creek.

A sampling survey revealed that the stream sediments contain elevated levels of heavy metals and uranium. The source of these metals is suspected to be carryover of metals from the K-1407-B Holding Pond which discharges into the stream.

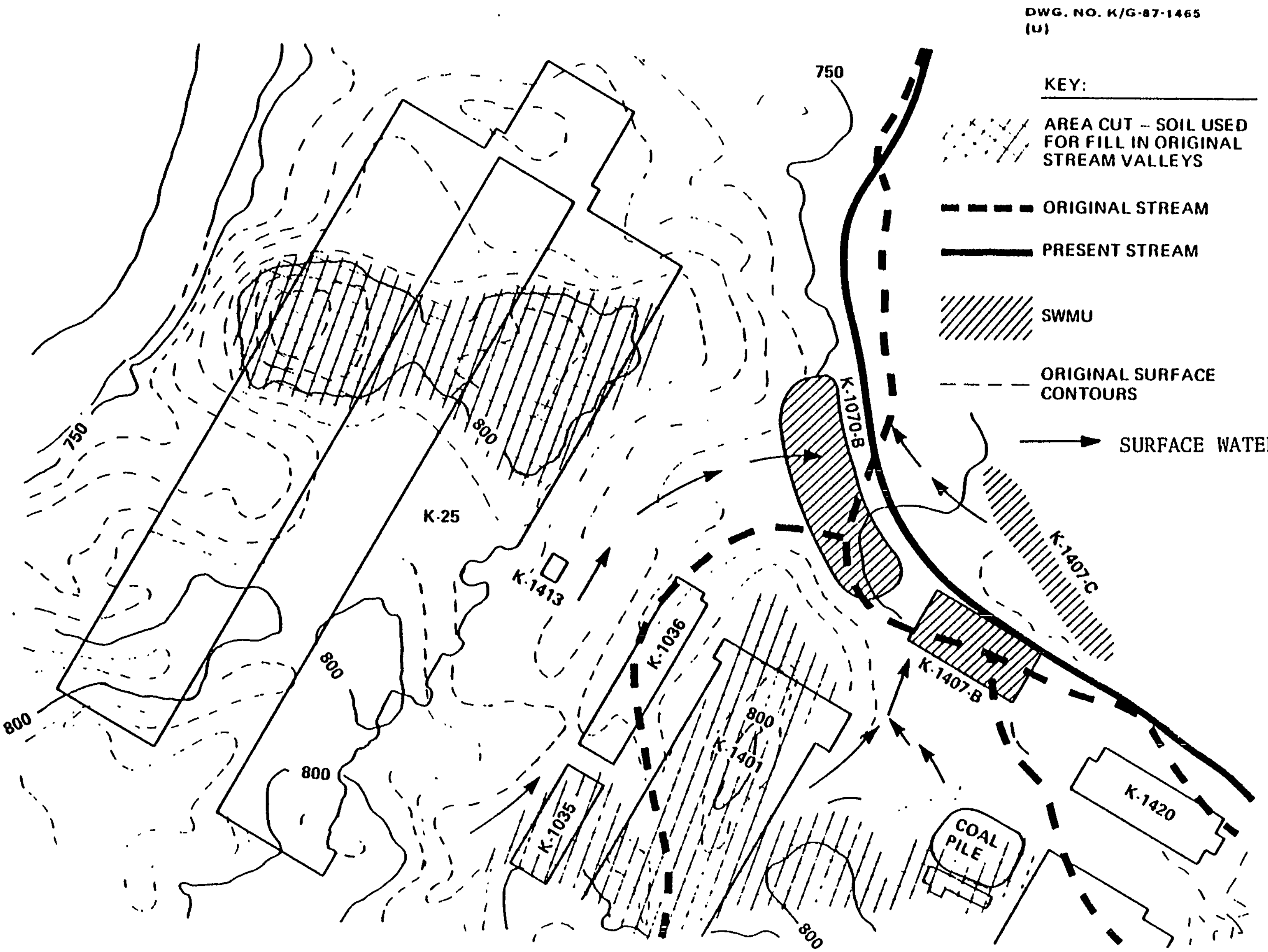


Fig. 3.2. Original K-1700 stream drainage pattern

3.3 OPERATIONAL INFORMATION

3.3.1 K-1070-B Classified Burial Ground

During the 1940s and early 1950s, ORGDP, Y-12, and ORNL utilized a dumping ground, the White Wing Scrap Yard, in an area near the intersection of State Routes 95 and 58. Each plant was allocated an area at the scrap yard in which to dispose materials. Equipment, machinery, parts, and scrap from the K-25 Power House S-50 Plant, the K-1131 Feed Plant, and the K-25, K-27, and K-29 diffusion stages and coolant systems were disposed of in the ORGDP section of the scrap yard. The White Wing Scrap Yard was cleaned up in the mid-1960s, and the ORGDP waste material was buried in the K-1070-B Classified Burial Ground. Disposal operations at the K-1070-B Classified Burial Ground continued until the opening of the K-1070-C/D Classified Burial Ground in the mid-1970s.

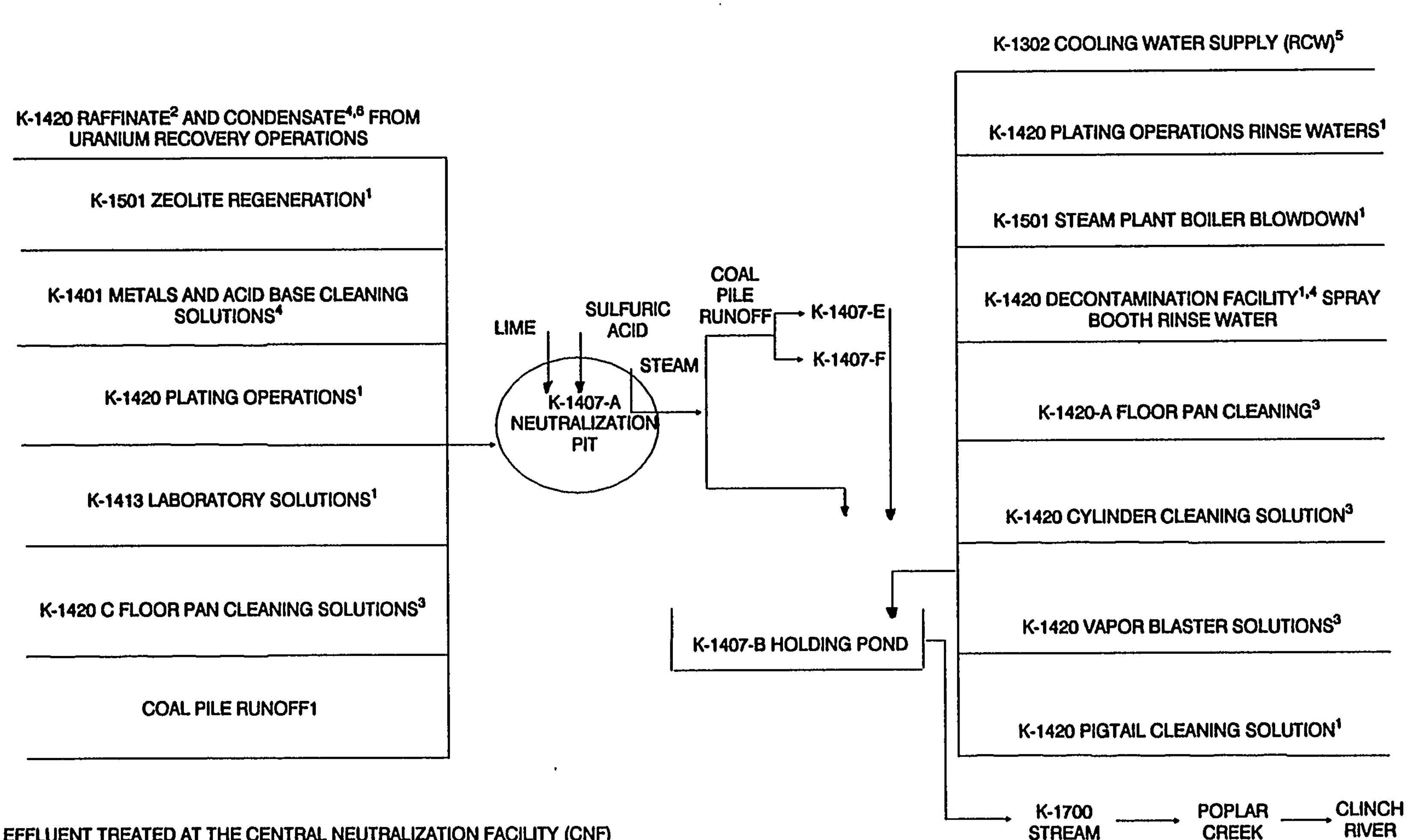
The K-1070-B Old Classified Burial Ground was closed by covering the site with soil, seeding with fescue, and planting black locust trees when operation was discontinued in the mid 1970s. Run-on diversion or leachate collection systems were not installed at the unit.

3.3.2 K-1407-A Neutralization Facility & K-1407-B Holding Pond

The K-1407-A Neutralization Facility has a maximum treatment capacity of 60,000 gpd and a utilized capacity of 15,000 gpd. Effluents from various ORGDP operations flowed into the reaction pit. In the pit, wastes were mixed and neutralized by the addition of either dry lime or 93% sulfuric acid. The pH of the reaction pit was continuously monitored and the flow of lime or sulfuric acid was stopped when the desired pH was attained. After neutralization, the wastewater was discharged by steam eductor to the holding ponds which were primarily for flow equalization and settling of solids. Neutralized coal pile runoff which was not contaminated with radioactivity or hazardous constituents was discharged to the K-1407-E or K-1407-F Settling Ponds. All other K-1407-A effluents were discharged to the K-1407-B Holding Pond. The effluent from the K-1407-B Pond was monitored by a continuous flow proportional sampler at the discharge weir and was released to the K-1700 stream via the NPDES monitoring station (point 003).

The wastewaters discharged to the K-1407-A Neutralization Pit and the K-1407-B Holding Pond are shown in Figure 3.3. Operation of the K-1407-A Neutralization Pit has been replaced by the K-1407-H Central Neutralization Facility. It is currently planned that the K-1407-A Neutralization Pit will remain in standby operation. The integrity of the K-1407-A Neutralization Pit and associated piping has been assessed and the pit and piping were found to be competent. Operation of the K-1407-B Pond has been replaced by a solid/liquid separation treatment facility provided by the K-1407-B PCR Project and effluent is further treated before discharge at the ETI Facility.

The K-1407-B Holding Pond is scheduled to be closed by April 1989. All process drains, sewer lines, and storm drains which previously discharged into K-1407-B have been diverted to CNF or directly to the K-1700 stream if no treatment is required. The pond will be drained and the sludge and contaminated soil removed. The sludge and soil will be fixed in concrete at the K-1419 Concrete Fixation Facility and stored above ground (K-1417 storage) until the material can be delisted as a hazardous waste under RCRA. After all sludge is removed from the K-1407-B Pond, the bottom and



1 EFFLUENT TREATED AT THE CENTRAL NEUTRALIZATION FACILITY (CNF)
2 SINCE 1984 EFFLUENT COLLECTED IN TANKERS AND TREATED AT THE Y-12 WEST END TREATMENT FACILITY (WETF)
3 EFFLUENT TREATED AT THE FLOOR PAN AND CYLINDER CLEANING FACILITY WHICH DISCHARGES TO CNF
4 NO LONGER GENERATED
5 SINCE 1971, CHANGED TO SANITARY WATER SYSTEM
6 FUTURE EFFLUENTS TRANSPORTED TO Y-12, 9212 URANIUM RECOVERY

FIGURE 3.3 Waste water effluents to CNF, PCR, and ETI side walls will be inspected and sampled to ensure that all wastes have been removed. A groundwater collection system consisting of trench liners, collection sumps, and a French drain will be installed. Additional site work will involve backfilling, constructing a RCRA cap, landscaping, and seeding. All above-ground features (e.g. shed, safety shower, and eye wash) will be removed.

3.3.3 K-1700 stream

The K-1700 stream received effluent from the K-1407-B Pond and the K-1407-E and K-1407-F settling basins. Presently, an ORGDP NPDES effluent monitoring station is located on the K-1700 waterway downstream of the K-1407-B Holding Pond discharge point. This NPDES station is expected to experience changes in the future due to the addition of the TSCA incinerator, the Central Neutralization Facility, and the closing of the K-1407-B and K-1407-C surface impoundments. These changes may include expanding the range of permit limits or adding additional NPDES stations for the area. The major future emphasis regarding water pollution control will focus on controlling the effluent from the new CNF. It is anticipated that the outfall of CNF to the stream will be permitted in addition to K-1700 and the ETI.

4. CHARACTERIZATION OF THE CONTAMINANT SOURCE

4.1 K-1070-B CLASSIFIED BURIAL GROUND

Since detailed records were not maintained for the K-1070-B Classified Burial Ground, interviews with personnel associated with the site were conducted in order to provide a basis for characterization of the source. Table 4.1 identifies the materials buried at K-1070-B.

Based on these interviews, it appears that the greatest possible environmental threat from the K-1070-B Burial ground is the transport of leachate containing hazardous metals and radioactivity beyond the site itself. The absence of detailed records requires that the transport of organic material from the site also be considered.

4.2 K-1407-A NEUTRALIZATION PIT AND K-1407-B POND

The K-1407-A Neutralization Pit and the K-1407-B Pond are discussed together because they are two parts of a waste treatment process. The following facilities routinely discharged to the K-1407 treatment facility although on occasion waste acid and basic streams generated at other facilities were transported to the K-1407 facility for treatment.

- K-1401 Metals Cleaning Shop
- K-1420 Decontamination Facility
- K-1501 Steam Plant

A detailed discussion of the operations of the above facilities and their association with the K-1407 treatment facility can be found in

Table 4.1. Materials buried at K-1070-B

Stage gas coolers
Barrier plant manufacturing machinery, equipment, parts
Compressor parts, rotors, stators blades, seals
K-1301 Old Nitrogen Plant demolition scrap
Forklifts
Converter shell parts
Valves and valve parts
Uranium, uranium fluorides, oxy-fluorides, tetrafluorides which would have assays of depleted, normal, and probably slightly enriched
Steel drums which had contained classified material
Aluminum, copper, beryllium, monel, lead
Cast iron, steel, stainless steel, nickel-plated steel
Bronze and brass
Plastic, glass, wood, concrete
Laboratory scrap such as vent ducts, hoods, etc., removed in alterations remodeling, etc.
Process waste - organic/inorganic
Material from the gas centrifuge program--including various metals (steel, aluminum, copper, iron, etc.), composite materials (epoxy resins, aromatic amine hardners, et. al., plastics), and various filamentary materials
Centrifuge rotor raw material
Scrap metal (50% Al, 50% steel) - 375,000 lb
Small quantities of asbestos associated with piping and equipment
Small quantities of mercury associated with machinery and equipment
Instrumentation
Excavations - earth and rock for cover

BAT Review for the K-1407-A and K-1407-B Wastewater Treatment Facility (K/HS-44).

Wastewater from the previously mentioned facilities consisted of K-1420 HCL Stripping bath effluent, K-1420 Hydrochloric Acid cleaning bath effluent, K-1401 Metals HCL cleaning solution effluent, K-1401 Alkaline Cleaning Bath (Sodium Hydroxide) effluent, K-1420-C effluents, and K-1501 Coal Pile Runoff. Each of these different effluents were discharged directly to the K-1407-A Neutralization Pit.

Analytical data obtained on the sludge in the K-1407-B Holding Pond is contained in Appendix A of this document. The data indicates that heavy metals are found to be high in the K-1407-B sludge. Additionally, compositional data on all the input streams indicate that only minimal amounts of organics were discharged to the K-1407 facility and the sludge data support the compositional data. The EP-TOX leaching procedure was performed on samples of the sludge as well as segments of the soil below the sludge.

5. CHARACTERIZATION OF THE ENVIRONMENTAL SETTING

The K-1407 WAG is located in the northeast part of the ORGDP area on the south side of the K-1700 stream (Mitchell Branch). The surrounding land surface slopes generally northward toward the stream.

Two bedrock wells, BRW-7 and BRW-8, and fourteen unconsolidated zone wells are installed in the immediate vicinity of the K-1407 WAG. Locations of the wells are shown on Figure 5.1 and their logs are included as Appendix B. The logs of these wells are the basis for the lithologic descriptions and the geologic interpretations presented herein. Figure 5.2 is a general areal geologic map of the ORGDP.

The general geology of the ORGDP area is shown in Figure 5.2 and has been compiled from three major sources: (1) Hydrogeology of the Oak Ridge Gaseous Diffusion Plant Site, Geraghty & Miller, 1986, (2) recent unpublished work by R. H. Ketelle, Oak Ridge National Laboratory, and (3) "Geologic Map of the Oak Ridge Area, Tennessee," by W. M. McMaster, U.S. Geological Survey, 1958. The following geologic descriptions and discussions of hydrogeology are based on these sources, and specific data, permeabilities, etc., are referenced as applicable.

5.1 HYDROGEOLOGY

The K-1407 WAG area is underlain by rocks of the upper to middle parts of the Conasauga Group which typically consists of massive limestone and limestone interbedded with calcareous shale (Appendix B). The limestone is generally gray to blue-gray and fine-grained with prominent oolitic horizons. Some chert will normally occur in the Conasauga limestones but is not conspicuous. The upper Conasauga, which may also contain some dolomite or dolomitic limestone, grades stratigraphically downward (to the

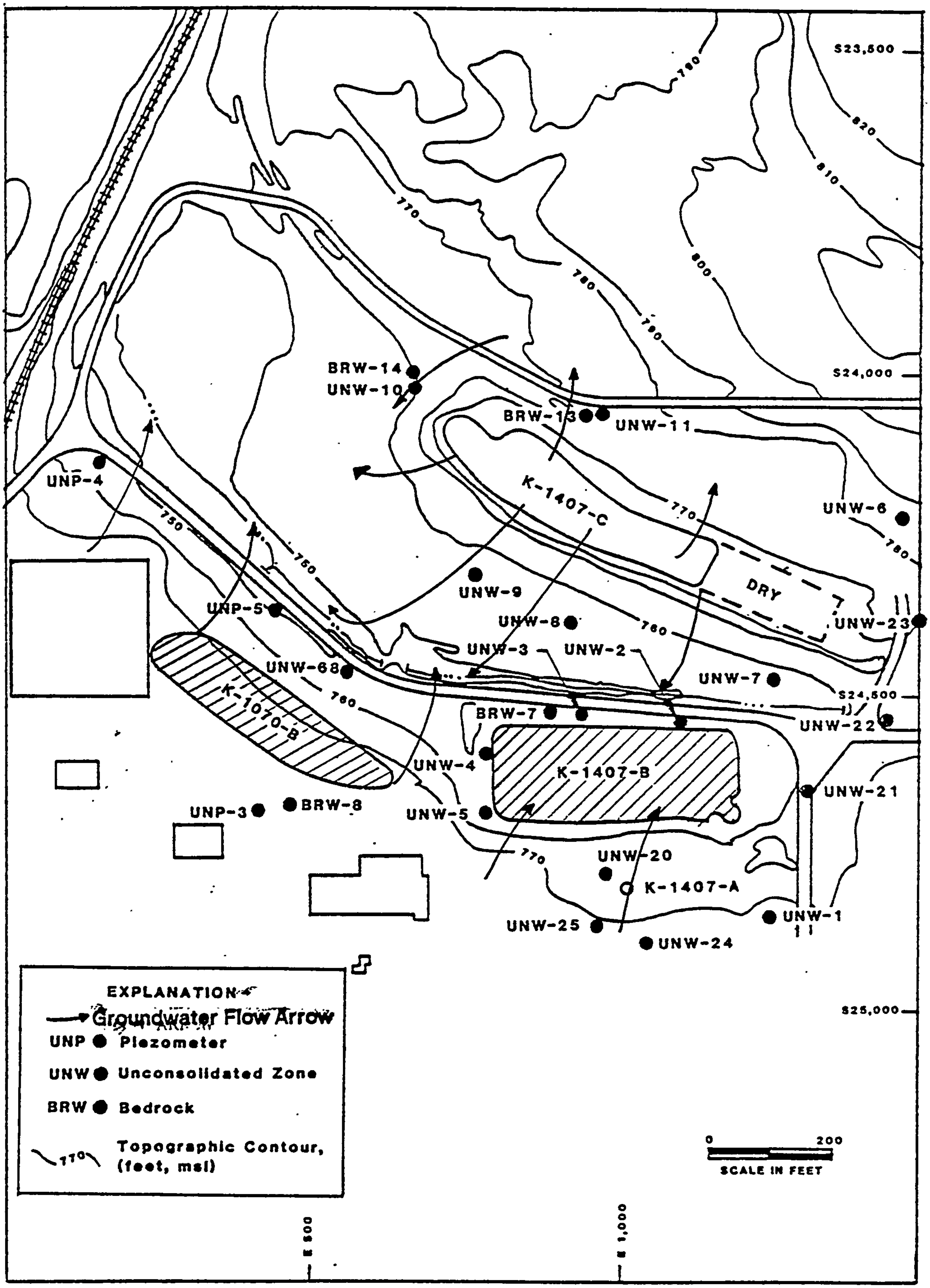


Figure 5.1 Location of monitoring wells in the K-1407 WAG Area.

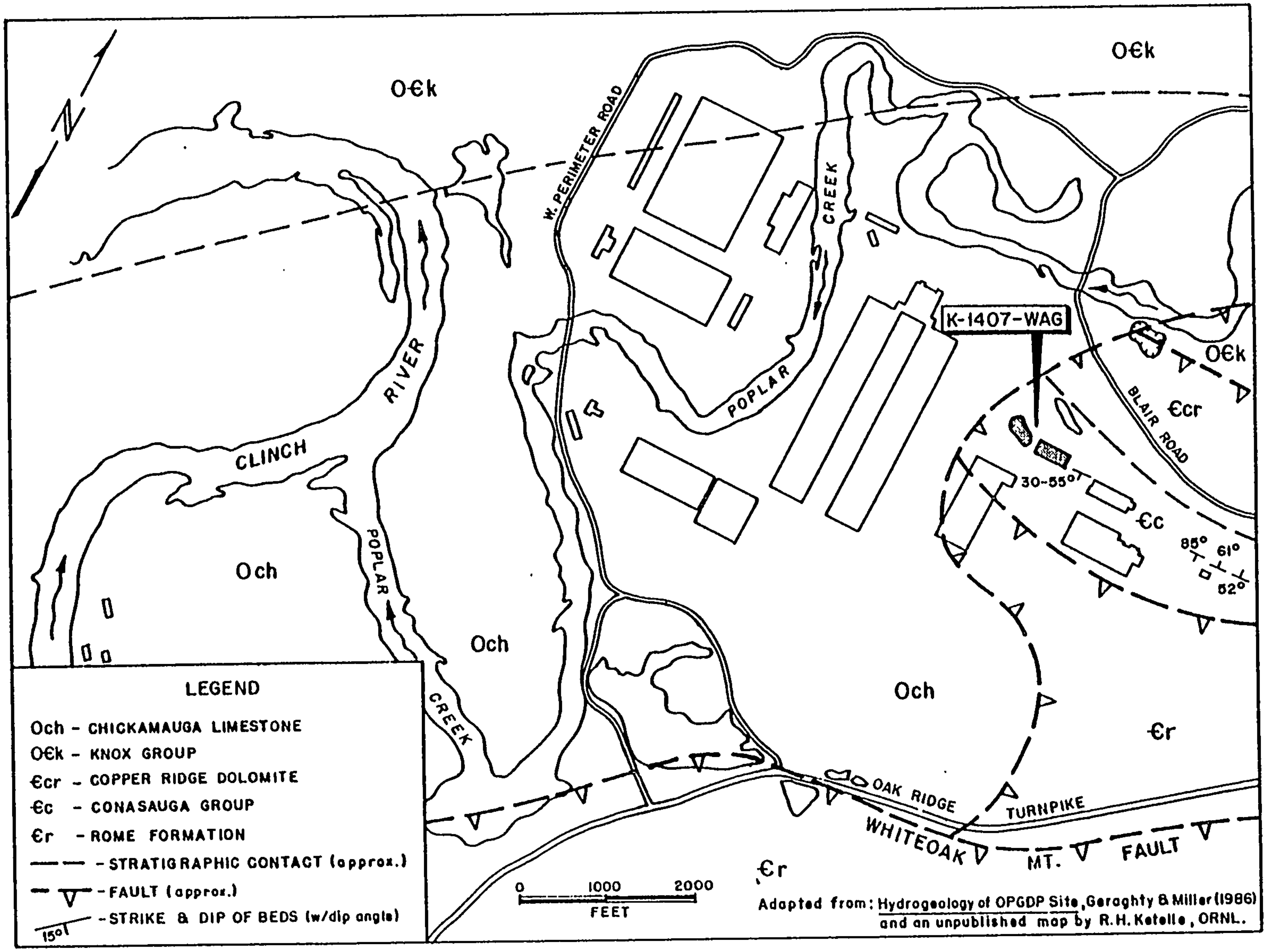


Figure 5.2 Areal Geology of the ORGDP

south) into predominantly calcareous shale. The shale, as described in the logs (Appendix B), is gray to green-gray in color.

Bedrock structure in the K-1407 WAG area is inferred from field measurements in the nearby area by R. H. Ketelle of Oak Ridge National Laboratory (unpublished geologic map), and certain dip and strike determinations which relate to this area are indicated on Figure 5.2. The bedrock strata are very steeply inclined, probably dipping mainly to the south, although some northward dips may occur. The strike of the inclined beds is approximately east-west. The steep and variable dips are indicative of structural deformation related to faulting and fault block movements. The Conasauga strata, with the Copper Ridge dolomite just to the north, have been thrust against and/or over the Chickamauga limestone by a branch of the Whiteoak Mountain fault. The trace of the branch fault is only a short distance west of the K-1407 WAG (Figure 5.2). The faulting and related stresses have caused extensive fracturing and jointing within the local bedrock strata, particularly in the more competent formations such as limestone and dolomite. The secondary calcite noted in the logs of the bedrock wells (Appendix B) is indicative of fracture filling.

The unconsolidated zone in the K-1407 WAG area consists primarily of silty clay with scattered, weathered limestone and chert fragments. The clays may be either residual from weathering of the underlying bedrock or colluvial from weathered materials upslope from the site. Also, some areas are covered with fill materials (clay, gravel, etc.) of varying thickness. The thickness of the unconsolidated zone ranges from about 10 feet to as much as 40 feet (Appendix B). The soil cover is relatively thin in the vicinity of the K-1700 stream and becomes thicker upslope, to the south.

Groundwater storage and flow in the K-1407 WAG area occurs mainly in the limestone bedrock within a system of interconnecting, solution-enlarged fractures, joints and bedding planes. Flow in the bedrock aquifer should be generally northward toward the K-1700 stream, but locally the flow of groundwater is probably westward along strike or northwestward along joint planes.

Permeability tests of BRW-7 and BRW-8 have indicated hydraulic conductivities of 3.58×10^{-5} and 6.71×10^{-5} cm/sec, respectively; Table 5.1 summarizes permeability tests of several wells in this area in both bedrock and the unconsolidated zone.

Groundwater also occurs in the unconsolidated zone where it moves northward, generally parallel with the slopes, toward the K-1700 stream and eventual discharge. Hydraulic conductivity in the unconsolidated zone is indicated to range from 2.79×10^{-6} to 6.11×10^{-4} cm/sec (Table 5.1). This considerable range of permeabilities is indicative of variable soil conditions (e.g., residual, colluvial, etc.).

In addition to receiving recharge from the unconsolidated zone, the K-1700 stream may also receive recharge from the bedrock aquifer in the K-1407 WAG area because of upward groundwater flow as a result of hydraulic pressure from the topographically higher area to the south.

Groundwater beneath the K-1407 WAG area is indicated by Geraghty and Miller to occur at relatively shallow depths (Phase II- Detection Monitoring at the Oak Ridge Gaseous Diffusion Plant, Appendix B: K/SUB/85-2224/4, June 1987).

Table 5.1. Results of hydraulic conductivity tests for the K-1407-B and K-1070-B areas.*

Well or Piezometer Number	Location	Method of Analysis Bouwer (cm/sec)	Hvorslov (cm/sec)	Aver. Hydraulic Conductivity (cm/sec, rounded)
UNP-3	K-1070-B	5.40×10^{-6}	1.66×10^{-5}	10^{-5}
UNP-4	K-1070-B	2.79×10^{-6}	8.19×10^{-5}	10^{-5}
UNP-5	K-1070-B	3.23×10^{-6}	4.28×10^{-6}	10^{-6}
UNW-1	K-1407-B	3.56×10^{-4}	4.21×10^{-4}	10^{-4}
UNW-2	K-1407-B	1.44×10^{-4}	6.11×10^{-4}	10^{-4}
UNW-3	K-1407-B	2.33×10^{-4}	4.83×10^{-4}	10^{-4}
UNW-4	K-1407-B	1.08×10^{-4}	4.01×10^{-4}	10^{-4}
UNW-5	K-1407-B	2.38×10^{-4}	2.16×10^{-4}	10^{-4}
BRW-7	K-1407-B	3.58×10^{-5}		10^{-5}
BRW-8	K-1070-B	6.71×10^{-5}		10^{-4}

*"Hydrogeology of the Oak Ridge Gaseous Diffusion Plant Site", Geraghty & Miller, Inc., K/SUB/85-22224/1, p. 4-13.

5.2 SURFACE WATER

The main surface water feature in the area is K-1700 stream which acts as the receiving water for local surface runoff, groundwater discharge, K-1407-B Pond discharge, and stormwater runoff from a portion of ORGDP's stormwater collection system. The stormwater collection system will be addressed in the following section.

The K-1700 stream, upstream of the NPDES discharge station, has a drainage area of 1.7 square kilometers. This area does not account for any additional area which may be associated with drainage collection via the stormwater collection system. The NPDES station is approximately 140 meters from the confluence with Poplar Creek at PCK 7.2 km (4.5 miles).

Table 5.2 contains average monthly flow for recent months through the K-1700 and K-1407-B NPDES discharge stations to K-1700 stream.

From personal communications, it has been found that the process wastewater inflow into K-1407-B is significantly less than the effluent discharge. This discrepancy, even when adjusted for precipitation, indicates a significant amount of groundwater discharge to the B pond. This is confirmed by the groundwater data as discussed in the previous section.

5.3 STORM AND PROCESS LINES

The site is criss-crossed by numerous buried drains and lines. These include process drains, stormwater drains, and a firewater line. The process drains will be addressed in a future RFI plan. The stormwater drains are part of the surface water drainage collection system discharging into the K-1700 stream. Figure 5.3 contains a drawing showing the locations of the major storm drains and the points where they

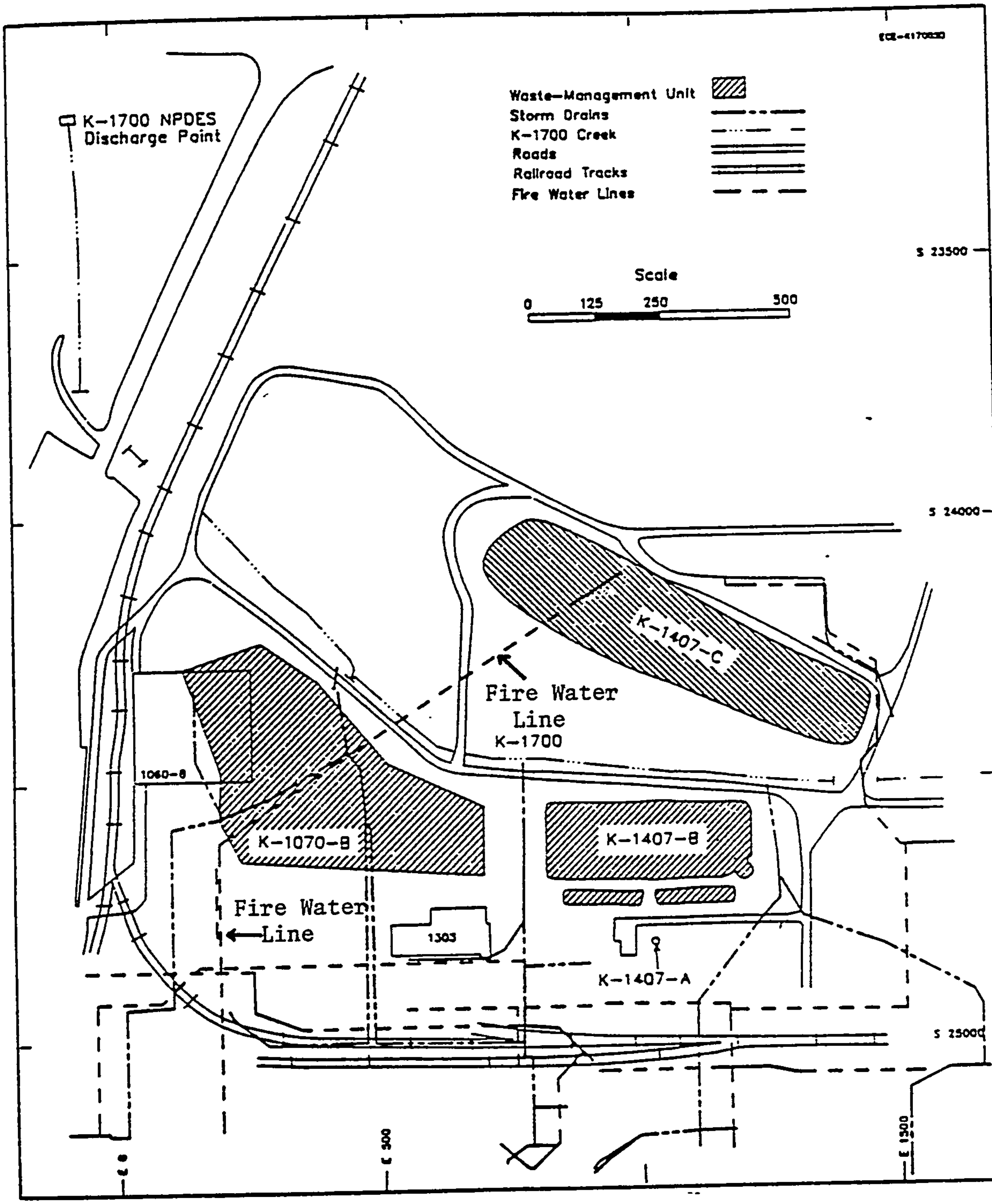


Figure 5.3 Location of major stormwater collection lines and their outfall to Mitchell Creek. (K-1700 Stream)

Table 5.2. Monthly average flows for the K-1700 Stream at the K-1700 NPDES location and the K-1407-B Effluent.

Month	Year	K-1700 (MGD)	K-1407-B[1] (MGD)
January	1986	0.227	---
February		0.737	---
March		0.552	---
April		0.200	---
May		0.341	---
June		0.058	---
July		0.046	---
August		0.163	---
September		0.070	0.058
October		0.107	0.104
November		0.310	0.100
December		0.624	0.150
January	1987	0.400	0.150
February		0.432	0.144

[1]Date prior to September 1986 is unavailable.

discharge into the K-1700 stream. Currently, a separate effort is obtaining flow and water quality data from every significant stormwater discharge in the ORGDP facility. No data is available from the study at this time.

5.4 AIR

No site-specific air quality or meteorological data is available for this SWMU. However, Martin Marietta Energy Systems has an ongoing study of the air quality and meteorological conditions or ORGDP, and this study should be representative of the conditions at this SWMU. The general ORGDP data is available in Section 4.4 of the RFI Plan - General Document (K/HS-132).

6.0 IDENTIFICATION OF POTENTIAL PATHWAYS AND RECEPTORS

Assessments of inactive hazardous waste disposal or storage sites are required to evaluate the site's potential for health or safety risks to the personnel, public, or environment. Determination of such risks must be based on evaluations of both the potential pathways of toxic release and the possible receptors of the contamination. Evaluations of the pathways which might release contaminants from the K-1407 WAG and possible receptors of the contamination will be based on (1) extensive interviews with persons having knowledge of the items treated or buried at the site, and (2) the results of monitoring programs. K/HS-132 will serve as a general reference concerning the potential pathways and receptors for the ORGDP. Since the topography and hydrogeology of the area will not permit discreet analysis of the contributions of the individual components to possible pollution, the entire site will be evaluated.

Soil, groundwater, and surface water pollution could result from any combination of the SWMU's four components. Surface water and soil may be contaminated from the K-1070-B burial ground by leakage or leaching from buried wastes and equipment or fouled surface run-off. Further, the bottom of the burial ground lies close to the measured groundwater level, presenting the potential for groundwater contamination. Since hydrogeological maps indicate that both groundwater and surface water through the area would reach the K-1700 watershed, it seems likely that the K-1700 stream could exhibit contamination from the burial ground. Discharge from K-1407-A Neutralization pit presents the possibility for contamination of surrounding soil and surface run-off due to leakage. Similar fouling from K-1407-B could occur due to breaching or erosion of the pond's embankments. A sediment survey of ORGDP streams (ORNL/TM-9791) indicated that at least some heavy metal and organic contamination of the K-1700 stream came from either the K-1407-B effluent or from pond leakage (See section 7).

Since any volatiles buried in K-1070-B have probably evaporated, atmospheric transport will not be considered as a viable pathway of contamination for this composite site. Similarly, the site is covered only by shallow-rooted grasses and locust trees. This shallow-root system coupled with the relatively short life span of the area flora eliminates vegetation as a pathway of contamination.

6.1 POTENTIAL PATHWAYS OF MIGRATION

6.1.1 Soil

Clay residuum found at the site has a typically low hydraulic conductivity and a relatively high capacity for the immobilization or exchange of metals and the filtering of particulates. This characteristic makes it likely that some hazardous and radioactive waste components will be held in the soil cover, and although there is the possibility that these wastes could contaminate surface run-off or groundwater, the adsorptive qualities generally associated with clay would tend to inhibit migration. However, particularly in the burial ground section of the site, imported fill has been used (confirmed by the erratic distribution of different types of soil and rock) and may facilitate groundwater migration. Additional sampling of the site soil is proposed.

6.1.2 Groundwater

Groundwater in the unconsolidated zone beneath the K-1407 WAG occurs at shallow depths and is, therefore, a potential pathway for contaminant migration. Flow in the unconsolidated zone is north and northeastward to the K-1700 stream.

The bedrock aquifer, while also flowing generally northward, is probably discharging upward to some extent into the unconsolidated zone, and it is thus not likely to receive leakage from the K-1407 WAG.

6.1.3 Surface Water

The most-likely pathway of contaminant migration via surface waters is the K-1700 stream. The K-1700 stream is a natural drainage which traverses the site from K-1407-B Holding Pond to the NPDES location K-1700, where it converges with Poplar Creek. The stream is the receptor of surface run-off from the burial ground to the southwest, the K-1407-C pond clean-up operation to the north, and uncontained coal-pile run-off from south. Further, contamination probably also reaches the stream via discharging groundwater. Finally, K-1700 stream also receives effluents from the K-1407-B Holding Pond.

Monitoring of the pond waters, sludge,and surrounding soils confirms heavy metal contamination (Ag, Cd, Cu, Ni, and Zn). In addition to high levels of uranium isotopes, sediment sampling of streams in the ORGDP by Ashwood et al. (ORNL/TM-9791 and Section 7 of this document) detected high levels of arsenic, lead, and total organic content. Samples taken from the K-1700 weir and analyzed for PCB content were inconclusive. Surface water monitoring will be performed to fully characterize the contaminants and the range of migration.

6.2 POTENTIAL RECEPTORS

6.2.1 Human Population

Due to the security requirements regulating access to the ORGDP, the only public populations of interest as potential receptors are those near the reservation boundary and those down gradient from the site. These populations may risk exposure through possible groundwater or surface water contamination. Ten public water supplies withdraw from the Clinch-Tennessee River system downstream of the K-1407-B WAG. As documented in the RFI Plan - General Document (K/HS-132, Table 5.1), none of these are nearer than eight miles to the ORR making direct contamination from the K-1407 WAG unlikely. Contaminant problems effecting industrial water withdrawal from and general recreational use of the Clinch River system are also not likely due the site's location within the interior of the ORGDP.

6.2.2 Flora and Fauna

Section 5.3 of the RFI Plan - General Document (K/HS-132) discusses the rare, threatened, and endangered plant and animal species which are thought to inhabit the area. To date, there has been no report that any of these species exist on the K-1407 Waste Area Grouping or are directly threatened by any possible contamination present there. The risk of contamination released from the site to the local flora and fauna will be assessed subsequent to the RFI.

7. EXISTING MONITORING DATA

7.1 SEDIMENTS IN K-1700 WATERSHED

7.1.1 K-1700 Stream

The K-1700 stream would be the primary means of transport of contamination away from the K-1407/K-1070-B area. For this reason, an extensive survey of the sediment from the stream and the swampy area north of the stream was performed in June 1986. The stream was segmented into 19 one hundred foot segments. Five sediment samples were taken from randomly selected locations within each one hundred foot segment (three sediment samples from the stream and one from each bank). In addition to the stream samples, the swampy area (K-1700 Low Area) associated with the stream was gridded and surface samples taken at randomly selected grid locations. All samples were analyzed for metals, extractable organics, and gross alpha, beta and gamma. Additional samples were taken at random locations within the stream and the swampy area and submitted for volatile organic analysis (VOA). Randomly selected sediment samples were also submitted for EP-TOX Extractions (EPA Method 1310). A detailed description of the sampling as well as the data obtained as a result of this sampling is contained in its entirety in Sample and Analysis Plan-CERCLA Sampling K-1700 Watershed . This section will summarize the results of the above document. Also, graphic representations of the NPDES data from the K-1700 monitoring station (001) have been plotted and are located in Appendix C.

7.1.1.1 Metals Results

In an attempt to keep the cost of analysis to a minimum it was decided to analyze the majority of the sediment samples for total metals content with only a selected few samples being submitted for the EP-TOX Extraction (EPA Method 1310). The concentration of metals in soil/sediment necessary to exceed regulatory limits defined by the EP-TOX Extraction Procedure are listed in the RFI Plan - General Document (K/HS-132), Table 2.2 as the Maximum Limit, soil. Figure 7.1 depicts the concentration of the metals regulated at the 100 mg/kg level as a function of position within the K-1700 stream. Segment 1 is at the confluence with Poplar Creek. Segment 19 is approximately 200 feet upstream from the NPDES discharge at K-1407-B. Only chromium and lead are found in the stream at levels which could exceed regulatory limits set forth in the EP-TOX Extraction Procedure. This data is in good agreement with that obtained by Ashwood et. al. (Sediment Contamination in Streams Surrounding the Oak Ridge Gaseous Diffusion Plant, ORNL/TM-9791).

Figure 7.2 depicts the distribution of metals regulated at the 20 mg/kg level (cadmium and selenium). As can be seen, none of the samples had metal concentrations which could exceed regulatory limits. The cadmium data is in good agreement with that obtained by Ashwood et. al. Selenium, on the other hand, was found to be higher concentration at various points within the K-1700 stream by Ashwood et. al.

Figure 7.3 shows the distribution of mercury within the K-1700 stream; concentrations range from 1 to 4.9 mg/kg.

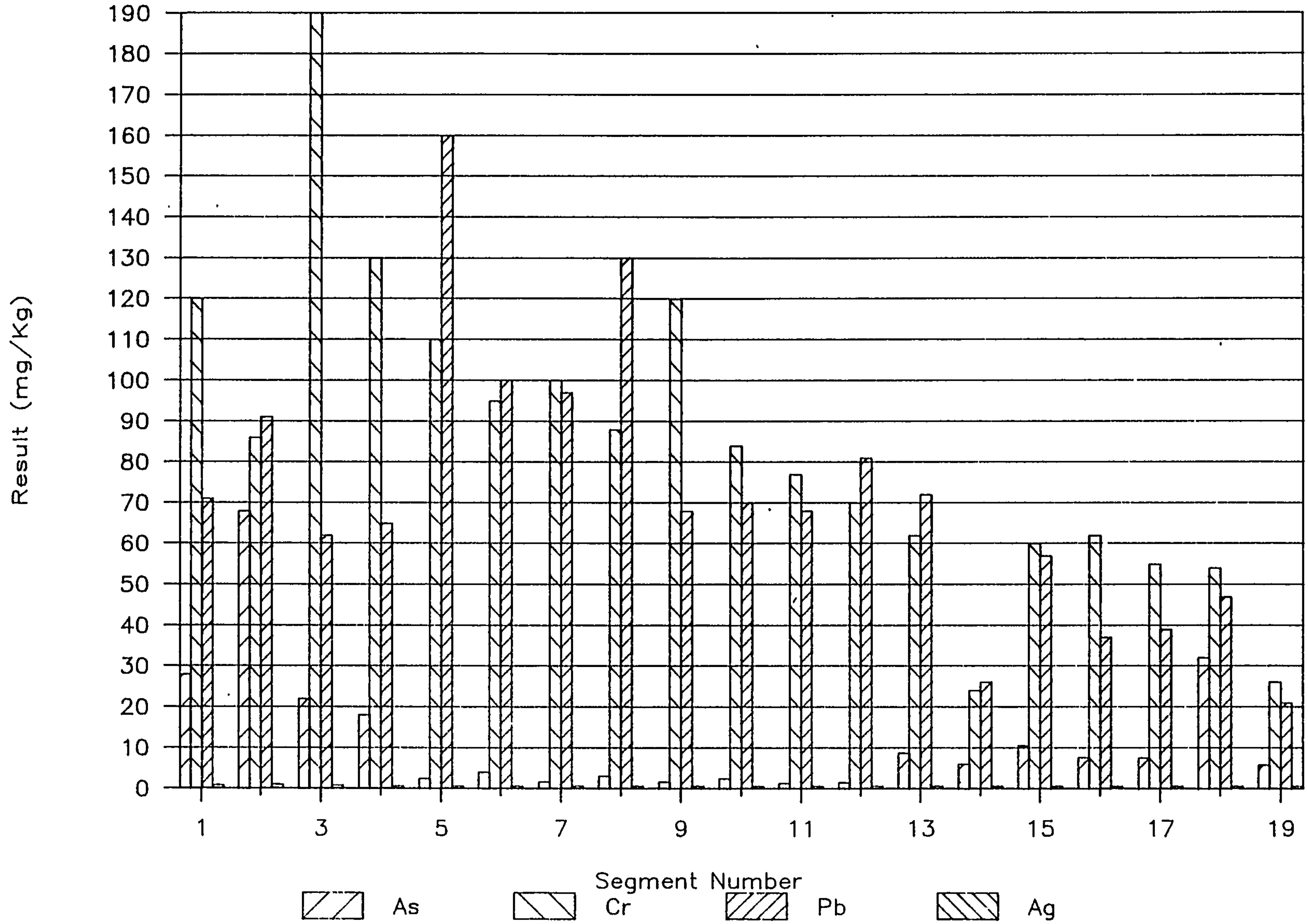


Fig. 7.1. Regulated metals (100 mg/Kg limit) withint K-1700 stream.

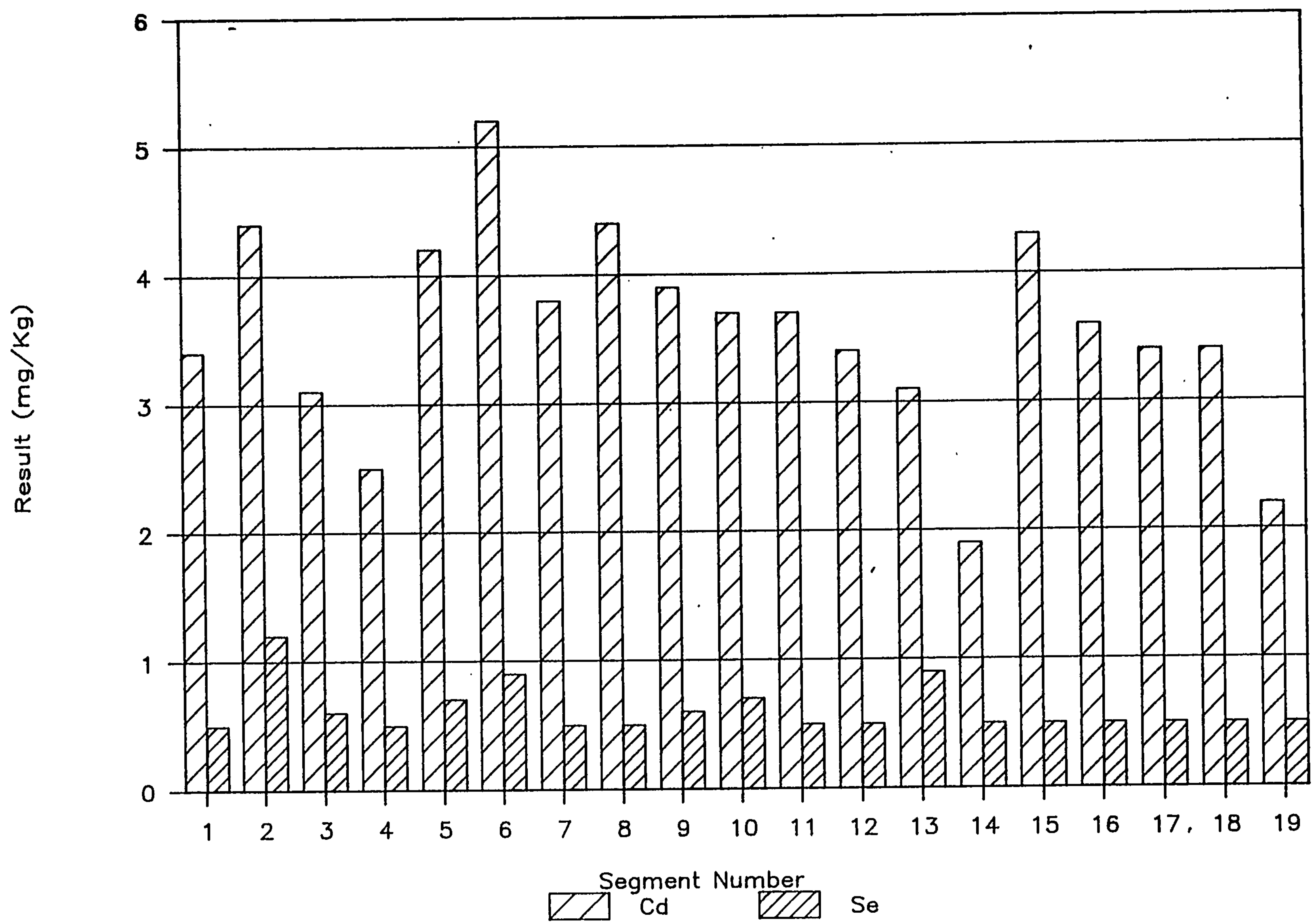


Fig. 7.2. Regulated metals (20 mg/Kg limit) within K-1700 stream.

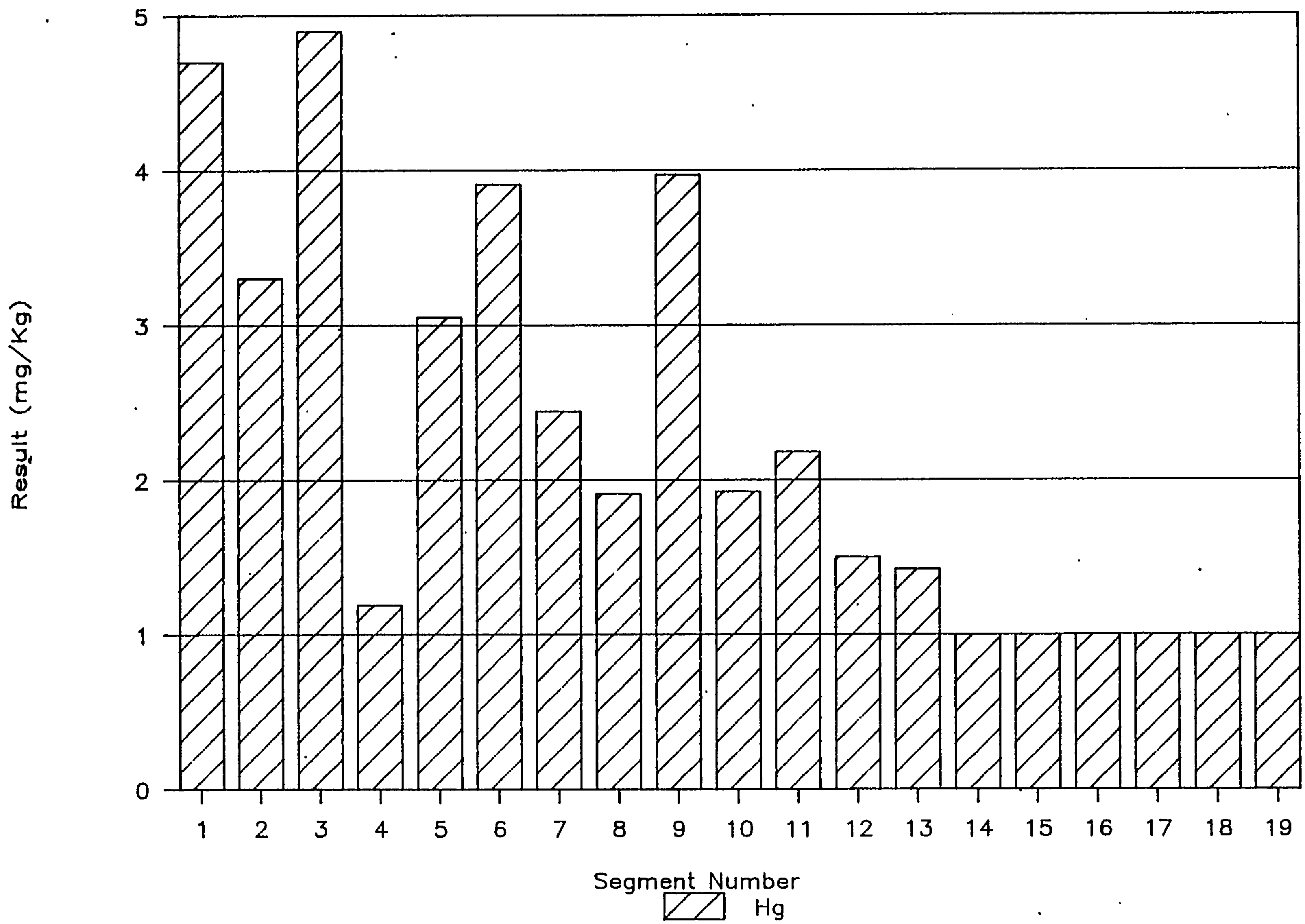


Fig. 7.3. Mercury (4.0 mg/Kg limit) within K-1700 stream.

K-1700 NPDES point and are assumed to be high as a result of sediment being backwashed into the K-1700 stream from Poplar Creek.

Figure 7.4 shows the distribution of both uranium and nickel along the K-1700 stream. Nickel exceeds the regulatory limit (400 mg/g) contained within Table 2.2 of the RFI Plan - General Document (K/HS-132) in all but a few of the K-1700 stream segments. Uranium, which has no established regulatory limit, is found to have elevated concentrations in the sediments close to the K-1700 NPDES discharge point with lower levels being found further upstream from the discharge point.

The EP-TOX data obtained indicated that none of the regulated metals would exceed established EP-TOX limits. Neither uranium nor nickel have established EP-TOX limits. Uranium was undetected in the EP-TOX extract. Nickel, although detected, was detected at very low levels (<2.0 mg/l).

7.1.1.2 Volatile Organics Results

As stated, VOA samples were taken at random locations within the stream. Only a small number of volatile organic compounds were found and they were at concentrations significantly below that which would be necessary to exceed the limits set forth in the proposed Toxicity Characteristic Leach Procedure (TCLP).

7.1.1.3 Basic, Neutral, and Acidic Organics (BNA) Results

BNA data was obtained on each stream segment sample. The organics analyzed for are contained in Section 7.6 of the RFI Plan - General Document (K/HS-132). Polycyclic-Aromatic Hydrocarbons (PAH) were the only extractables found to be present which could not be accounted for after

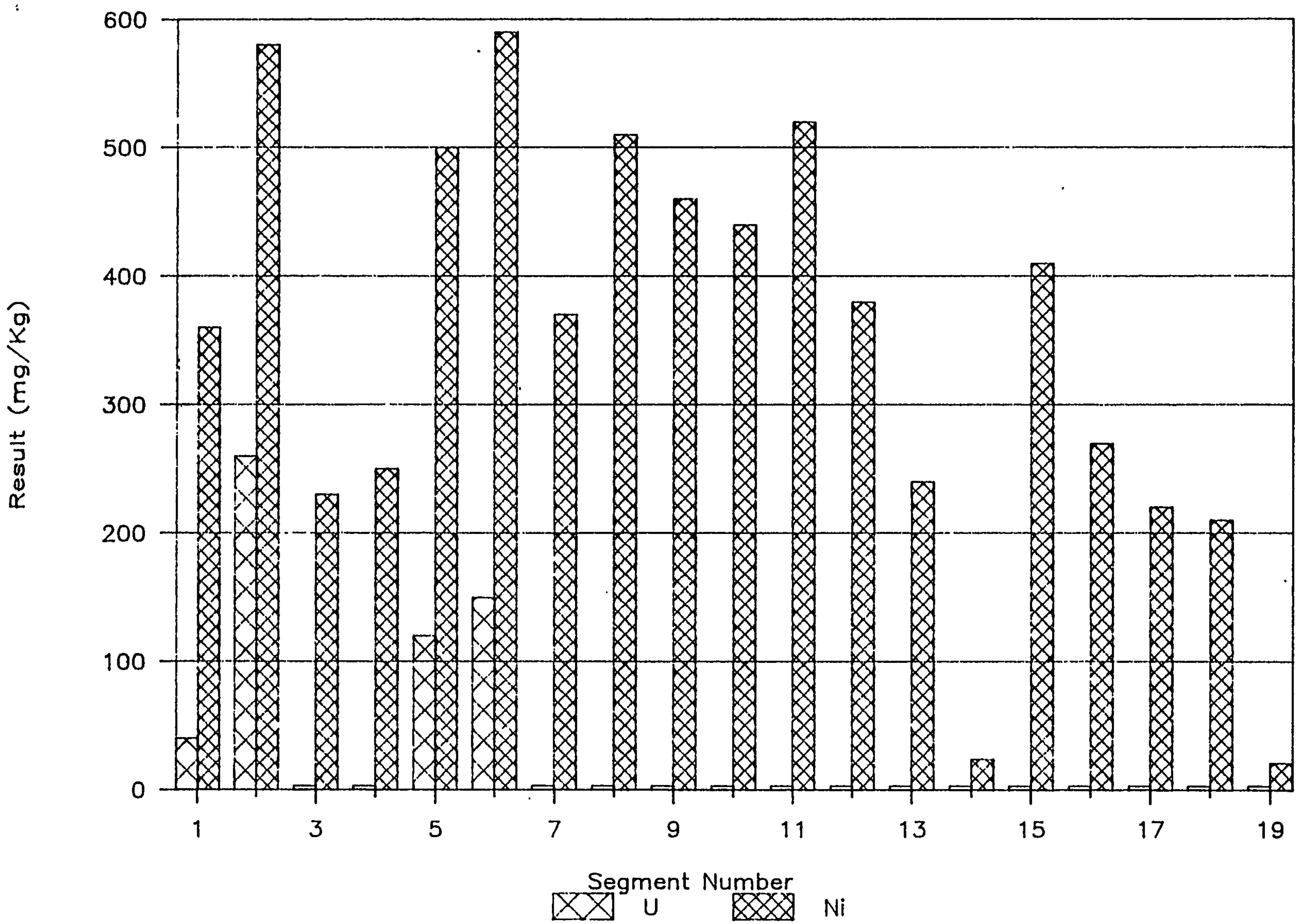


Fig. 7.4. Uranium and nickel distribution within K-1700 stream.

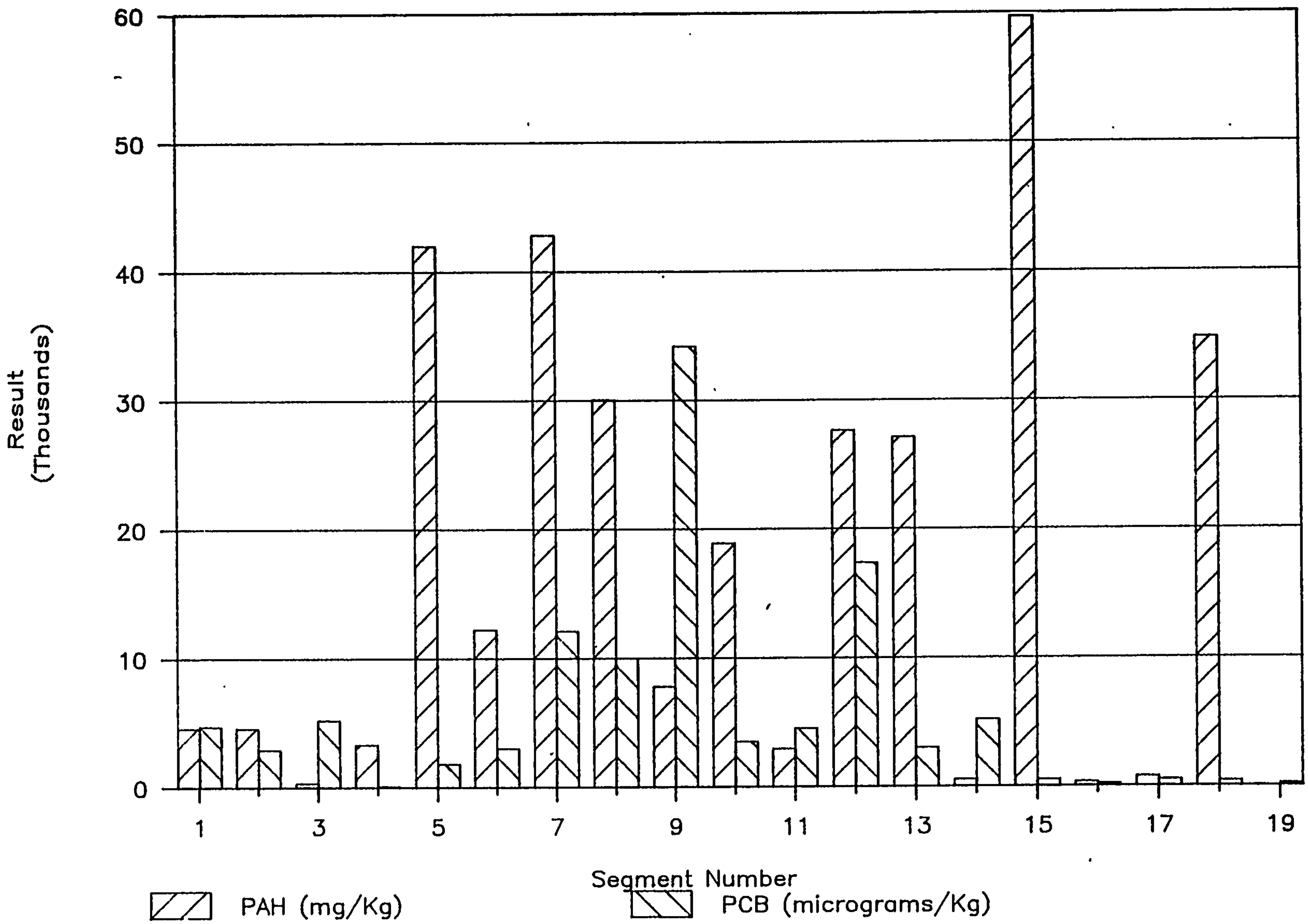


Fig. 7.5. Distribution of organics (PCBs & PAHs) within the K-1700 stream.

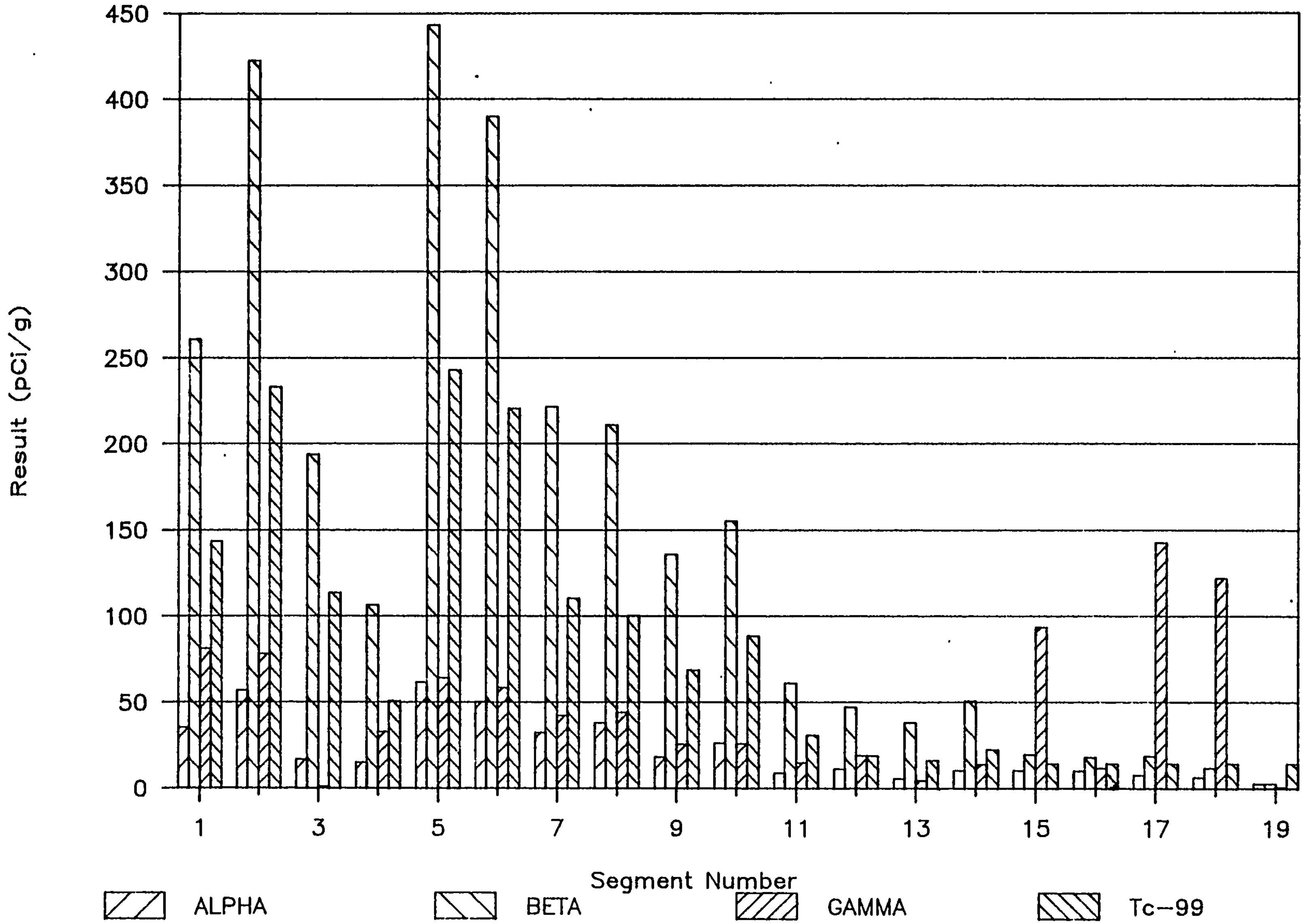


Fig. 7.6. Distribution of radioactivity within the K-1700 stream.

DWG. NO. K/G-87-1466
(U)

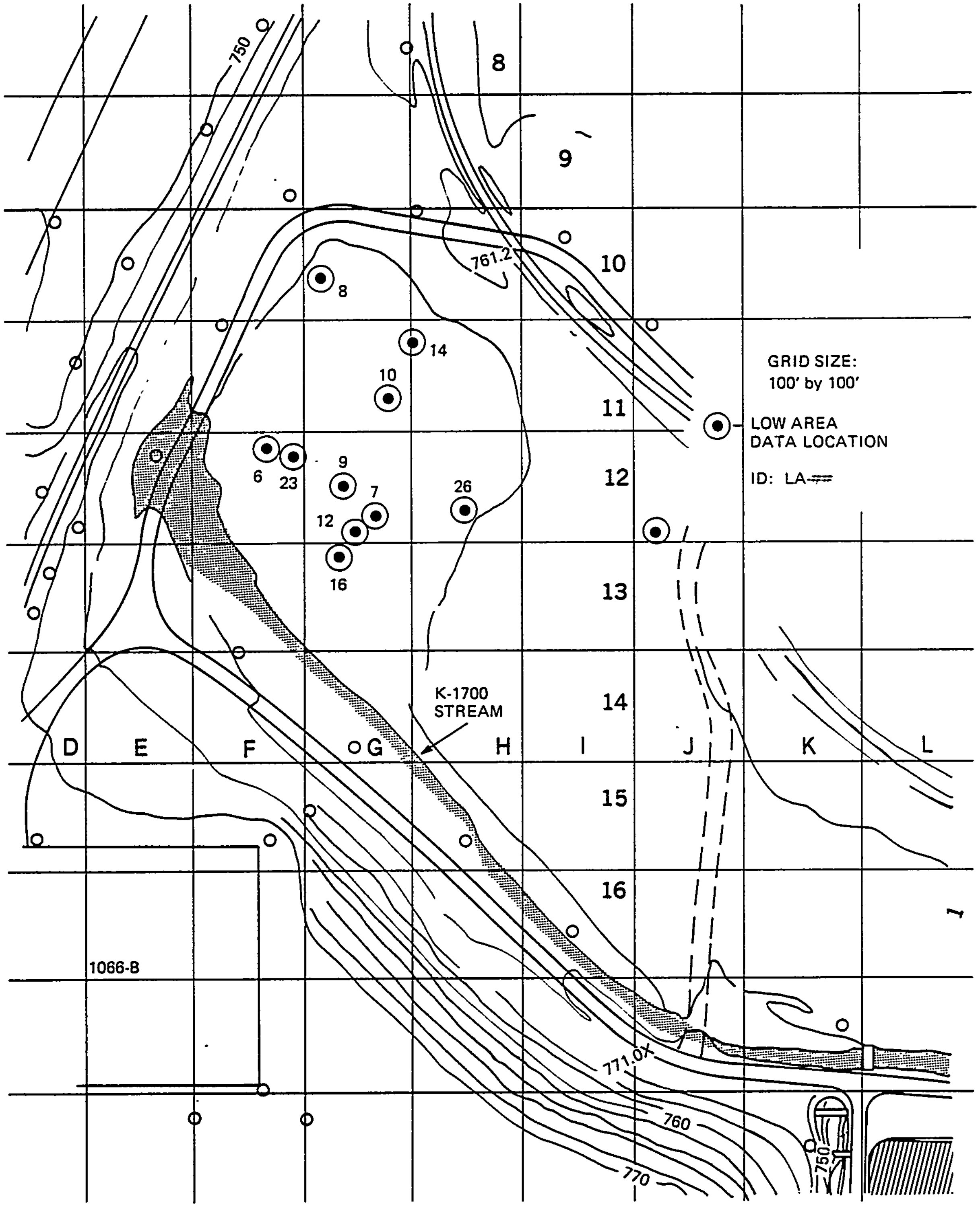


Fig. 7.7. Sampling at K-1700 low area

7.1.2.1 Metals Results

The Low area data indicates that arsenic is the only regulated metal found in a concentration great enough to exceed the limits set by the EP-TOX Procedure. This differs significantly from the stream findings which showed both lead and chromium having concentrations high enough to exceed EP-TOX limits. Uranium shows a significant variation in concentration within the low area. Figures 7.8 through 7.23 are three dimensional depictions of the variation of the metals within the Low Area.

EP-TOX Extractions were performed on two randomly selected samples of the low area. As was the case with the stream, only nickel had sufficient extractability to be detected. The concentration of nickel in the two EP-TOX extracts was 11 and 1.8 mg/l.

7.1.2.2 Volatile Organics Results

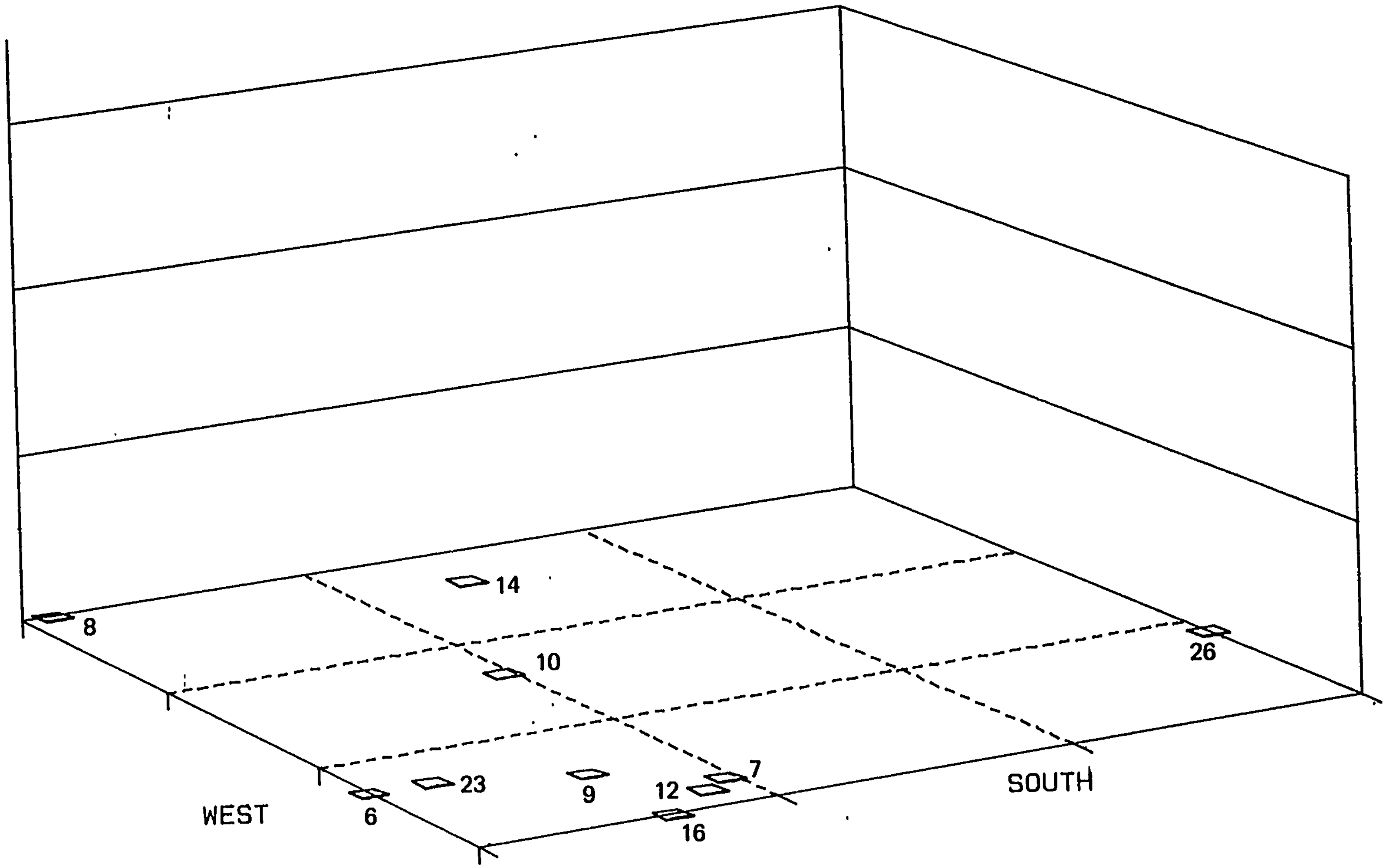
As with the stream, no significant concentration of volatile organics were found.

7.1.2.3 Basic, Neutral, and Acidic Organics (BNA) Results

No significant concentration of any BNAs were detected. Figure 7.22 is a three dimensional plot of the PAH distribution within the low area.

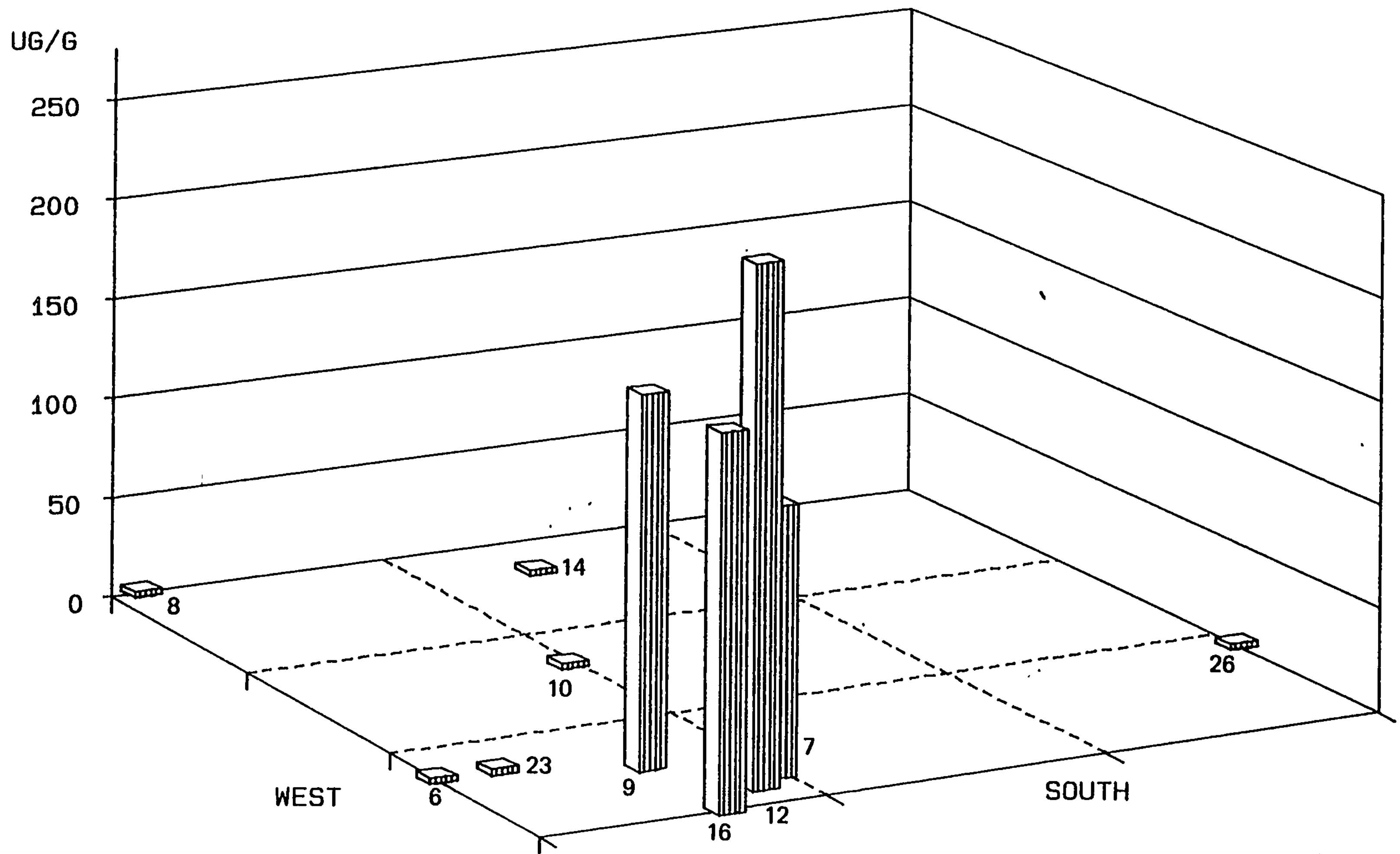
7.1.2.4 PCB Results

Detectable concentrations of PCBs were found in the samples taken from the Low Area. Figure 7.23 is a three dimensional plot of the PCB distribution.



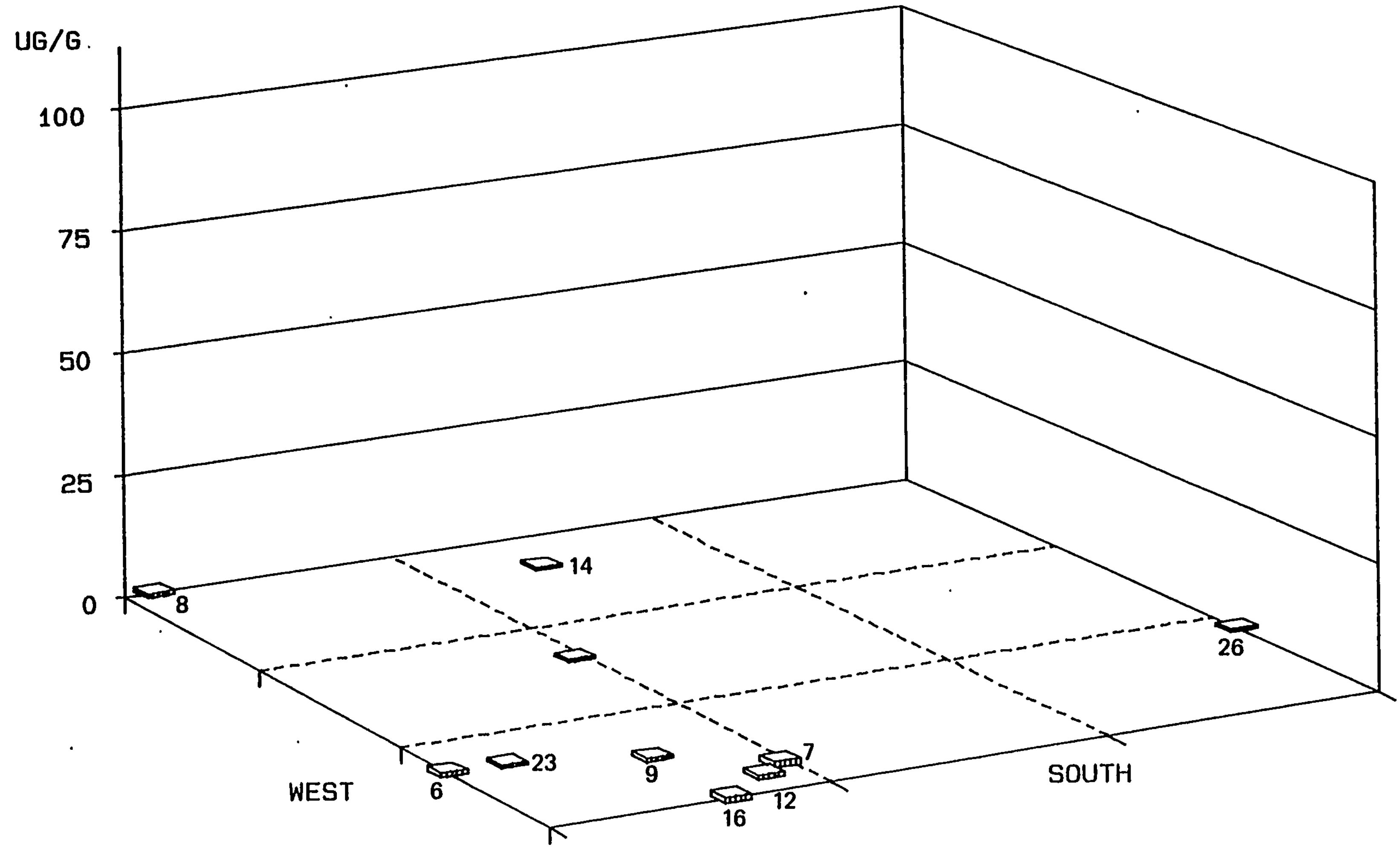
SHOWN ARE SAMPLE LOCATION ID NUMBERS

Fig. 7.8. Relative sample locations at K-1700 low area.



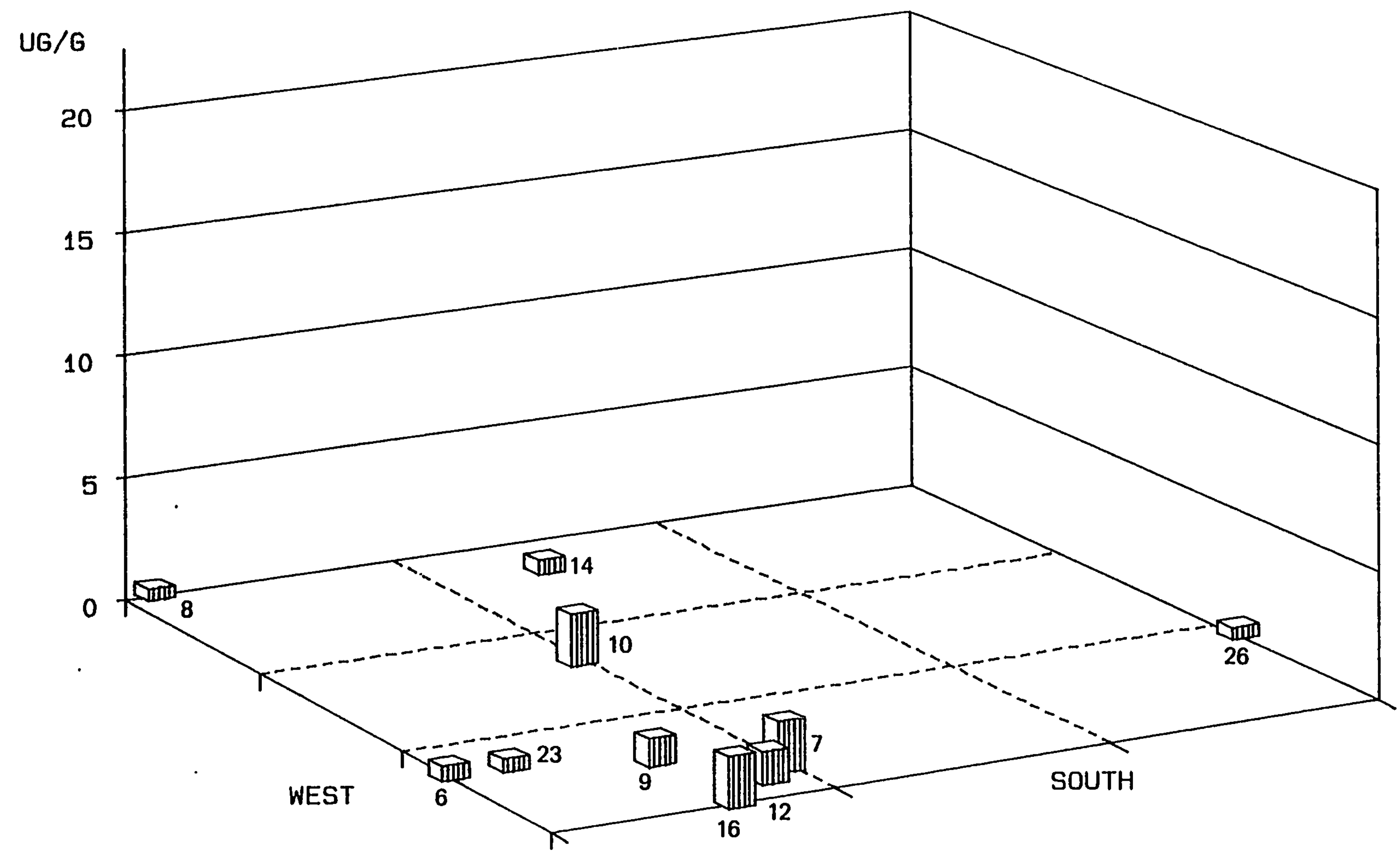
NO K/HS–132 TABLE 2.2 MAX LIMIT FOR SOIL

Fig. 7.9. Uranium concentration in K-1700 low area samples.



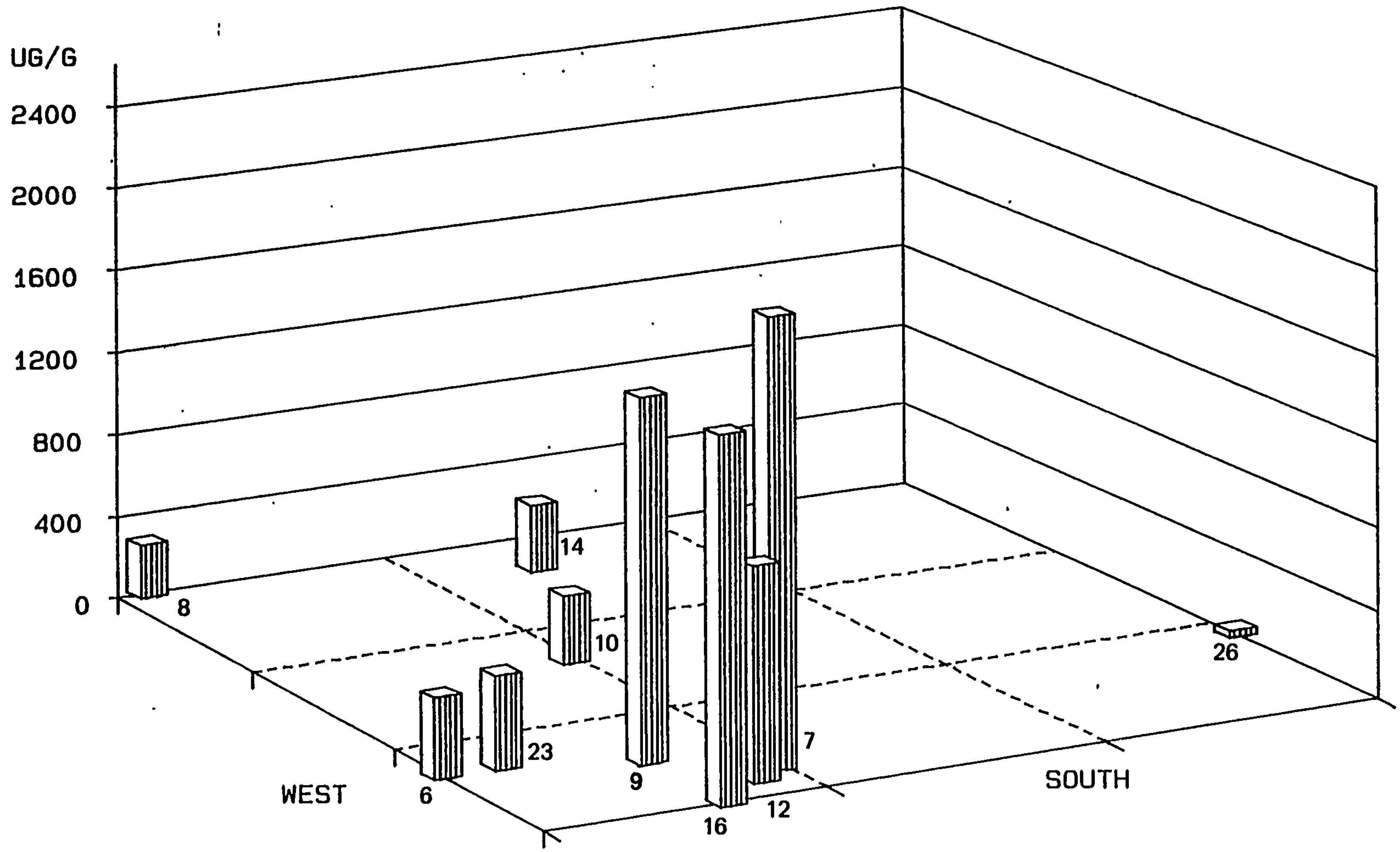
K/HS–132 TABLE 2.2 MAX LIMIT FOR SOIL = 100 UG/G

Fig. 7.10. Silver concentration in K-1700 low area samples.



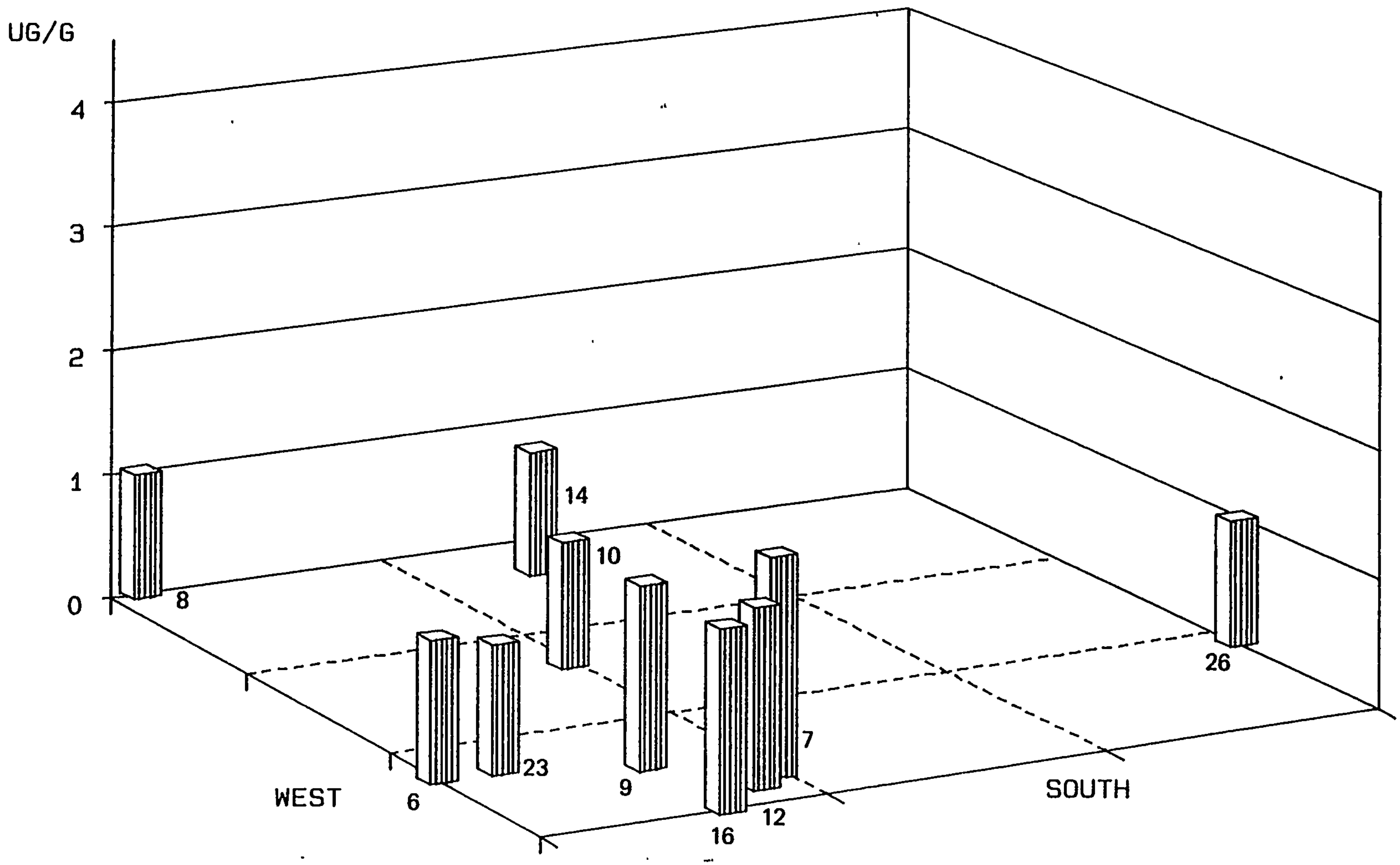
K/HS−132 TABLE 2.2 MAX LIMIT FOR SOIL = 20 UG/G

Fig. 7.11. Selenium concentration in K-1700 low area samples.



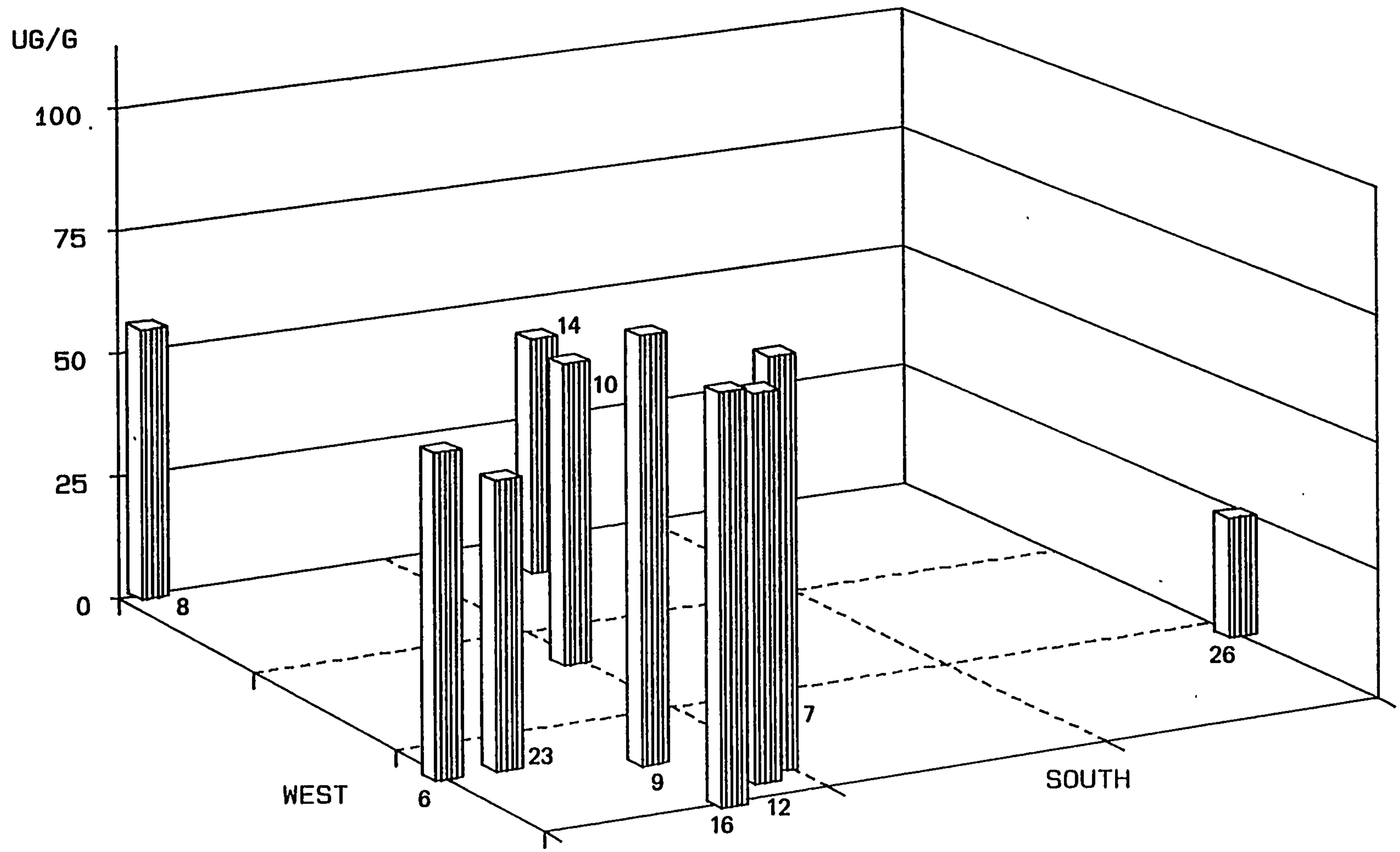
K/HS–132 TABLE 2.2 MAX LIMIT FOR SOIL = 400 UG/G

Fig. 7.12. Nickel concentration in K-1700 low area samples.



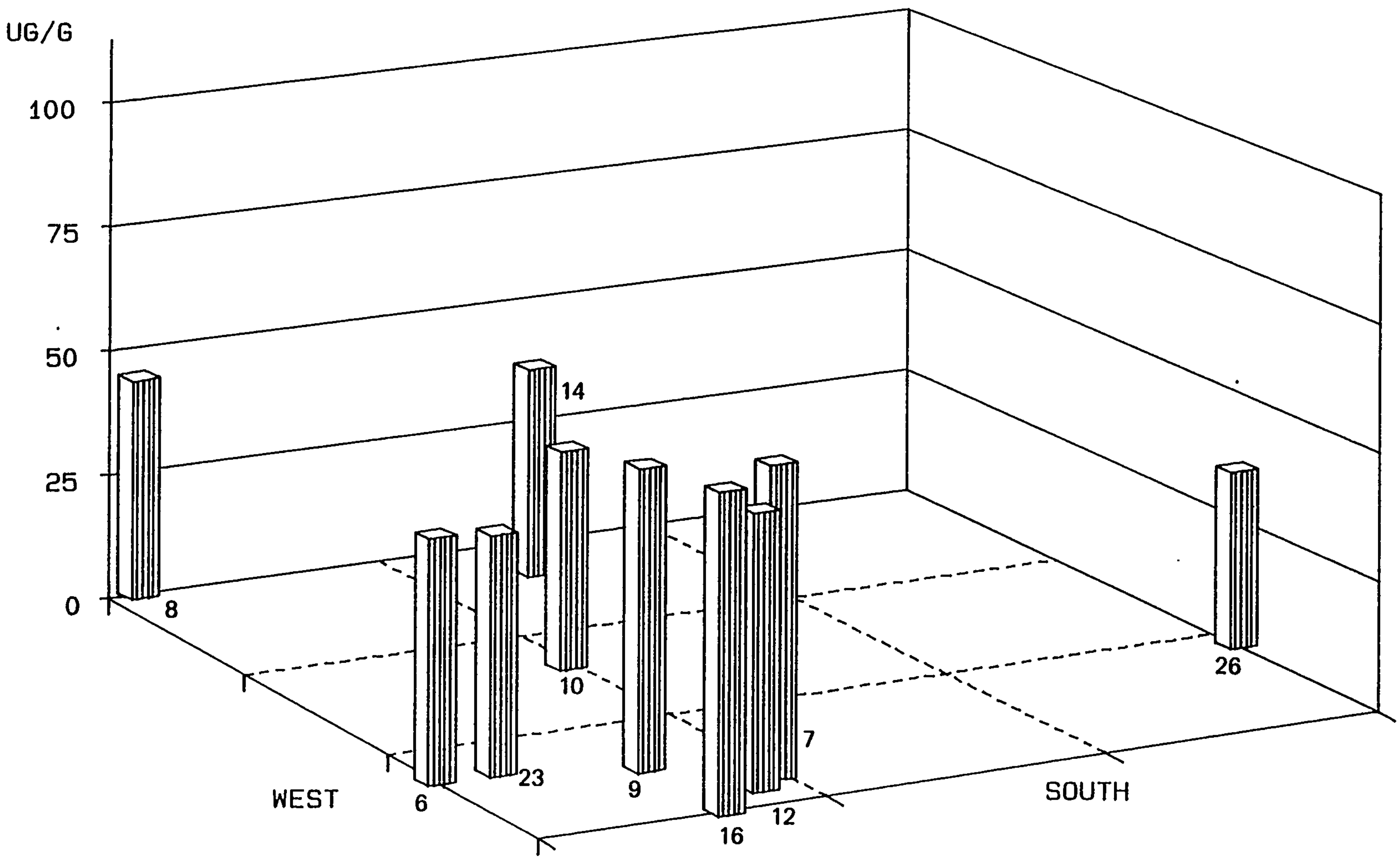
K/HS−132 TABLE 2.2 MAX LIMIT FOR SOIL = 4 UG/G

Fig. 7.13. Mercury concentration in K-1700 low area samples.



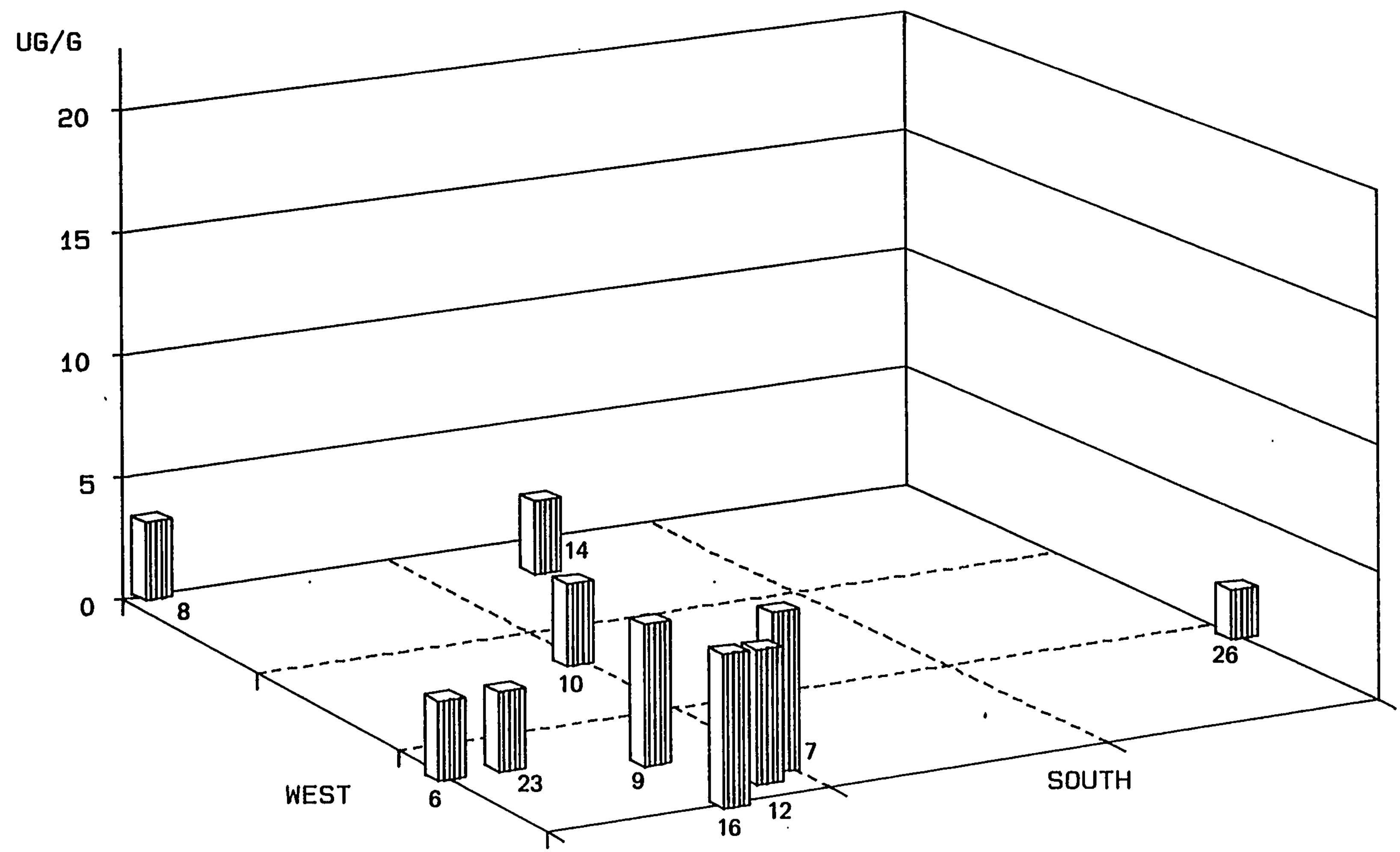
K/HS−132 TABLE 2.2 MAX LIMIT FOR SOIL = 100 UG/G

Fig. 7.14. Lead concentration in K-1700 low area samples.



K/HS-132 TABLE 2.2 MAX LIMIT FOR SOIL = 100 UG/G

Fig. 7.16. Chromium concentration in K-1700 low area samples.



K/HS−132 TABLE 2.2 MAX LIMIT FOR SOIL = 20 UG/G

Fig. 7.17. Cadmium concentration in K-1700 low area samples.

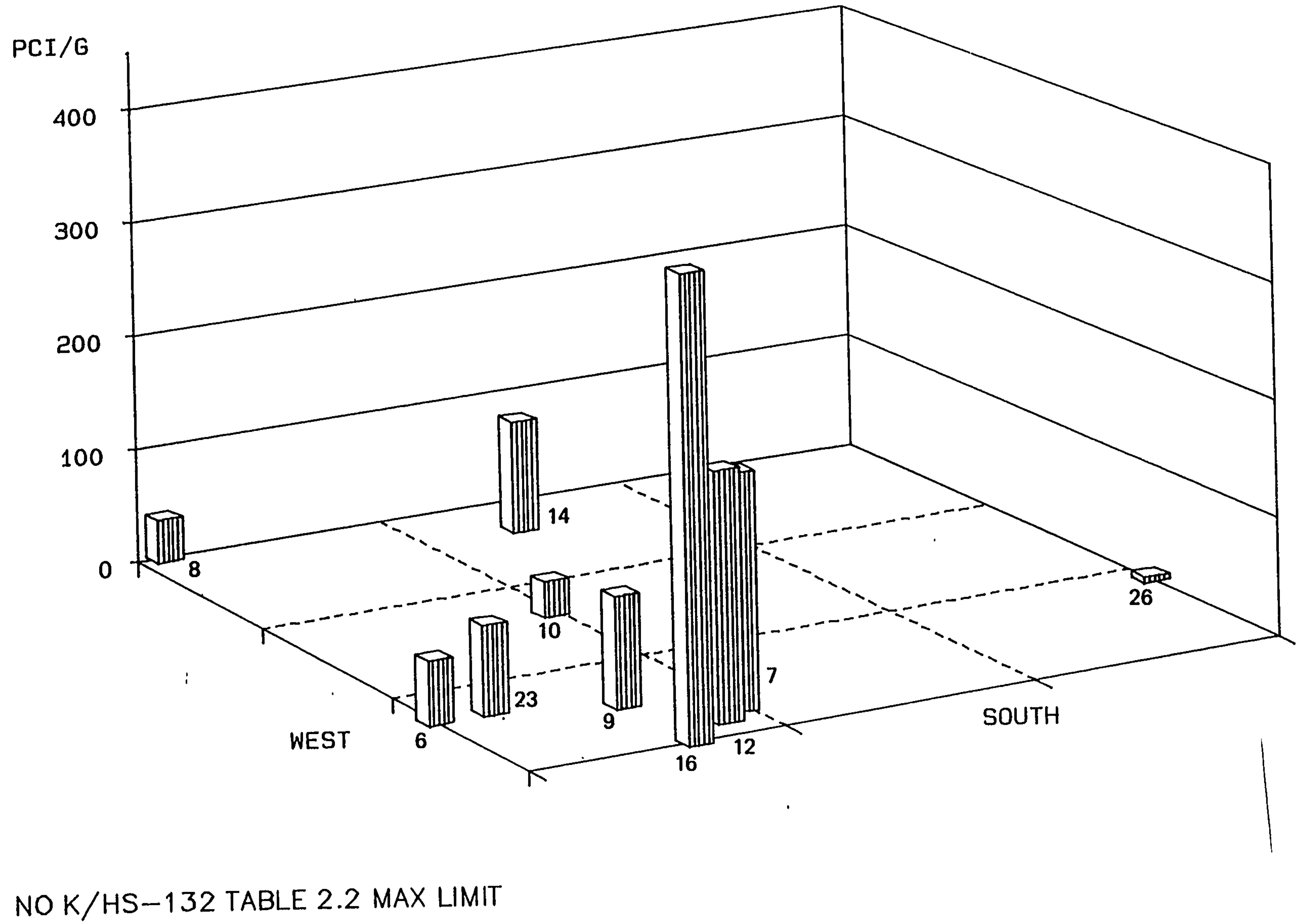
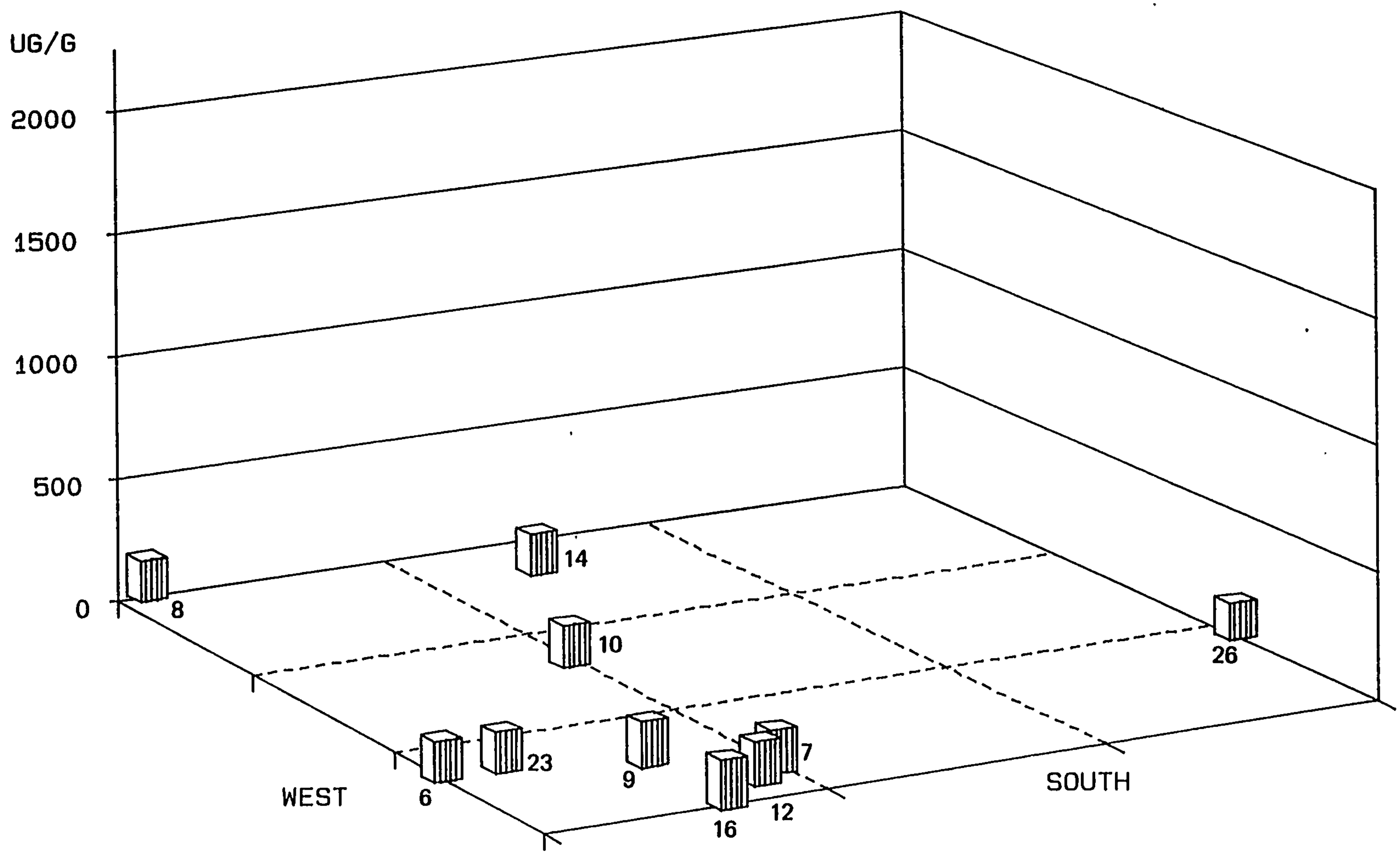
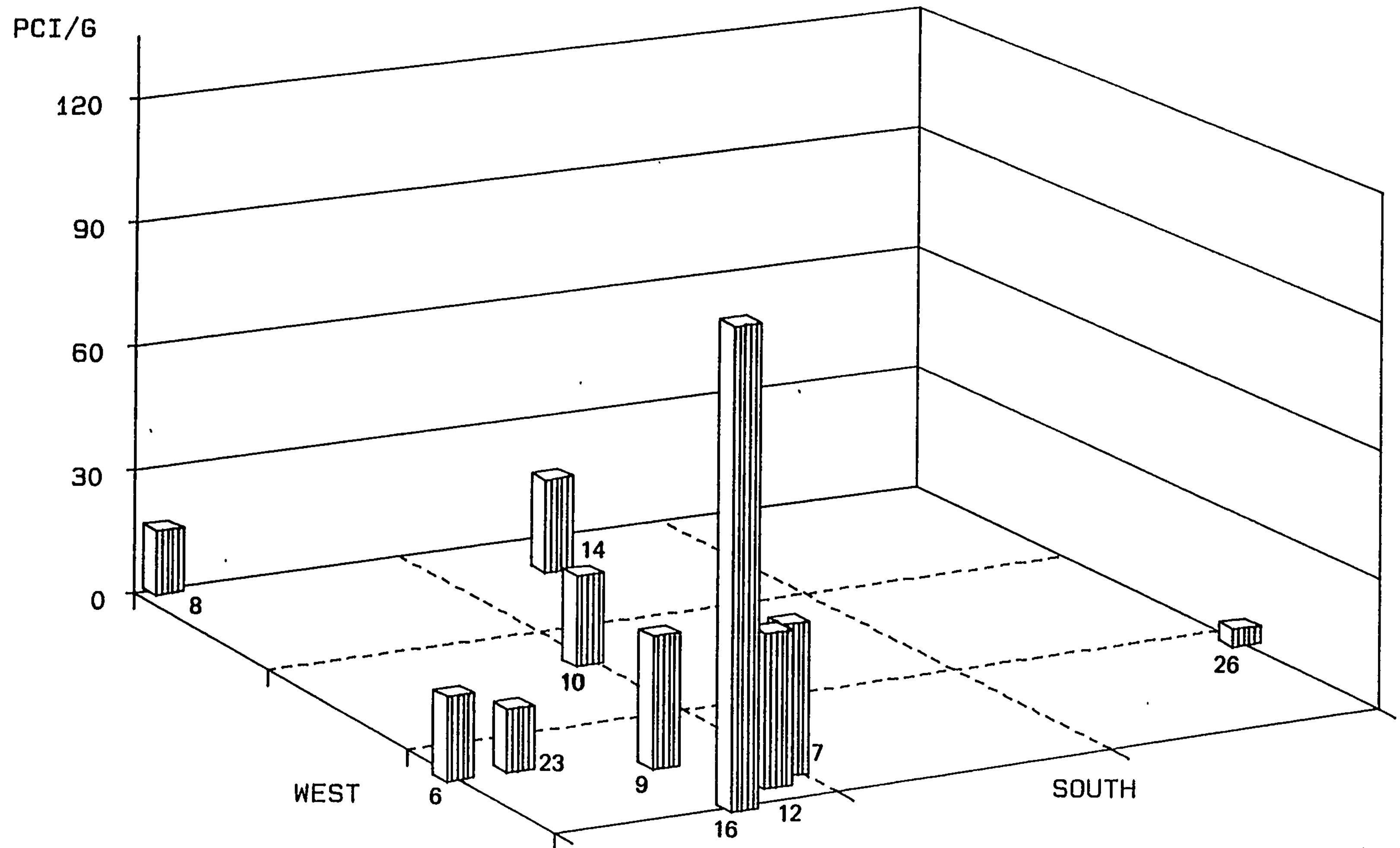


Fig. 7.18. Beta activity of K-1700 low area samples.



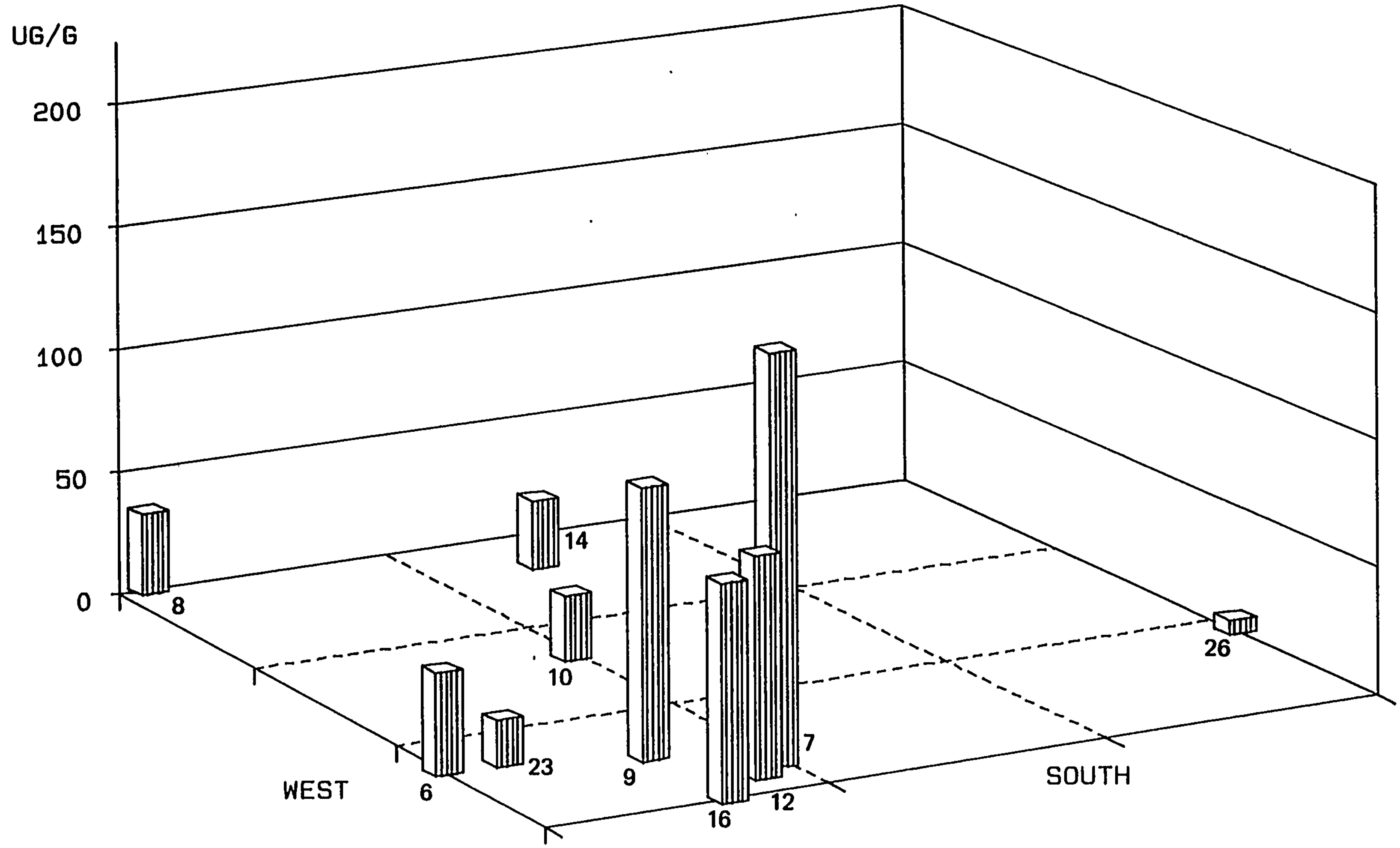
K/HS—132 TABLE 2.2 MAX LIMIT FOR SOIL = 2000 UG/G

Fig. 7.19. Barium concentration in K-1700 low area samples.



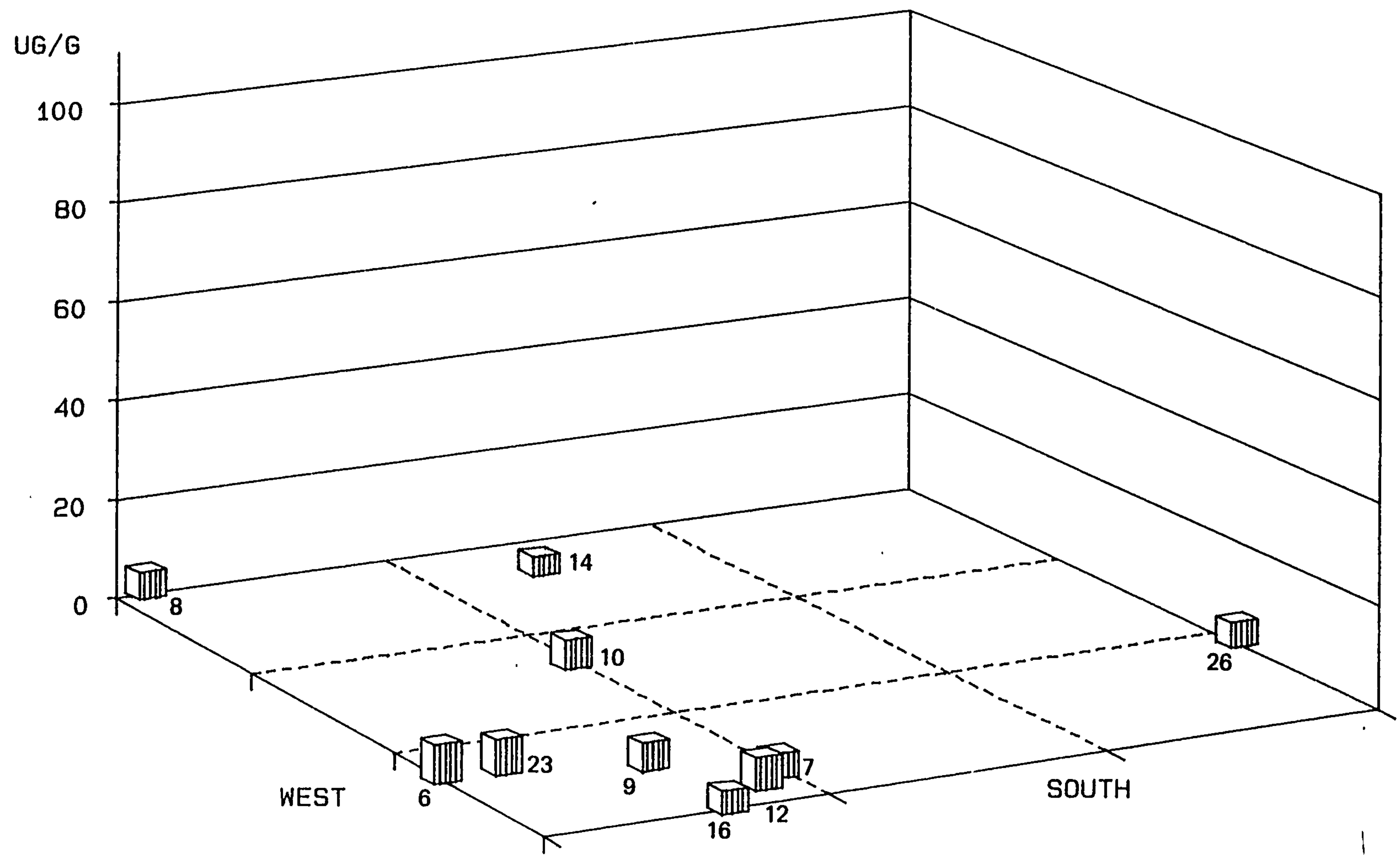
NO K/HS—132 TABLE 2.2 MAX LIMIT

Fig. 7.20. Alpha activity of K-1700 low area samples.



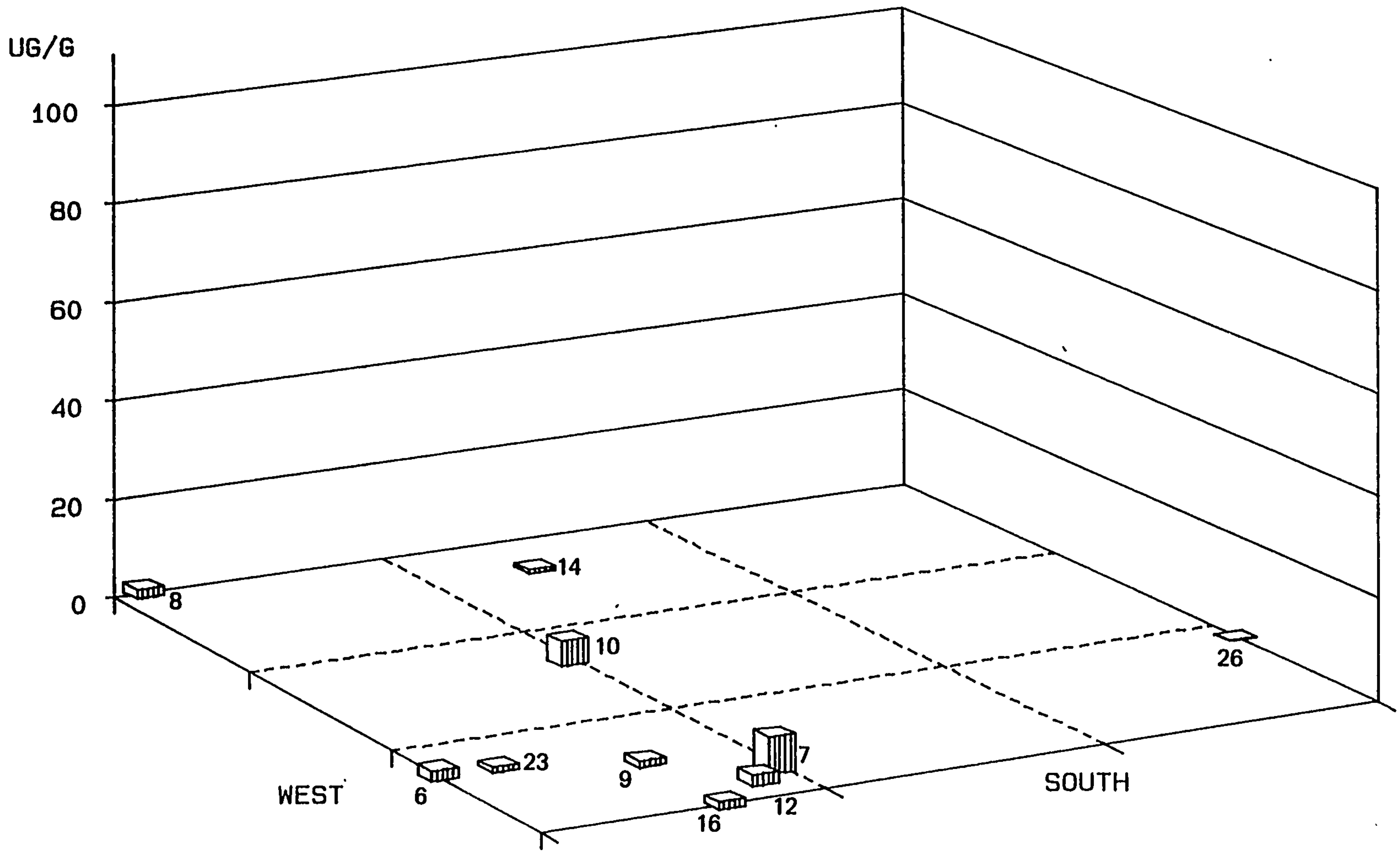
K/HS–132 TABLE 2.2 MAX LIMIT FOR SOIL = 100 UG/G

Fig. 7.21. Arsenic concentration in K-1700 low area samples.



K/HS−132 TABLE 2.2 MAX LIMIT FOR SOIL = 100 UG/G

Fig. 7.22. PAH concentration in K-1700 low area samples.



K/HS–132 TABLE 2.2 MAX LIMIT FOR SOIL = 100 UG/G

Fig. 7.23. PCB concentration in K-1700 low area samples.

7.1.2.5 Alpha, Beta, and Gamma Results

The alpha, beta, and gamma results on the Low Area mimicked those found in the stream. Maximum and minimum levels were about the same with a similar variation in results. Three dimensional plots of the data are contained as Figures 7.15 (gamma), 7.18 (beta), and 7.20 (alpha).

7.1.3 Summary of Results

An overview of the results just presented indicates that discharges to the K-1700 Stream/Low Area either past or present have contained metals, organics, and possible radioactive contaminants. The metal contamination is primarily nickel but lead, chromium, and arsenic are all elevated and should be included in any sampling and analysis plan.

The organic contamination detected is primarily in the form of polycyclic aromatic hydrocarbons (PAH) and PCBs. Because of the large area drained by the K-1700 Stream it will be necessary to analyze for these organics despite their generally low concentration within the stream sediments.

Finally, the presence of gross alpha, beta, and gamma contamination above the best available background sample (segment 19) is indicative of the discharge or seepage of water containing low levels of radioactivity into the stream. Gross alpha, beta, and gamma will also be included in any further sampling efforts.

7.2 NPDES MONITORING DATA

7.2.1 K-1407-B Pond Outfall

Effluent discharged from the K-1407-B Holding Pond is subject to an NPDES permit and is monitored to verify compliance with the permit limitations. Data collected from the permit point is presented in Appendix C, Table 1 and 2.

7.2.2 K-1700 Stream

The K-1700 Stream is monitored at the mouth of Poplar Creek to comply with NPDES permit limitations. Appendix C, Table 3 presents monitoring data for the permit point and plots of the NPDES monitoring parameters.

7.3 K-1070-B STORM DRAIN

Monitoring data has been collected from various ORGDP storm drains as a part of the ORGDP Storm Drain Monitoring Program. A storm drain is located in the middle of the K-1070-B Classified Burial Ground and discharges on the north side of the burial ground. At this point, storm waters have been sampled and analyzed; data is presented in Appendix C, Table 4.

7.4 GROUNDWATER MONITORING

During FY 1986 and FY 1987 groundwater monitoring data was collected from some of the wells shown on Figure 5.2. The groundwater monitoring data is presented in Appendix D.

Analysis of these data indicate the presence of some inorganic and organic constituents in the wells surrounding the WAG. UNW-1 serves as the background well for this WAG; UNW-5, although upgradient of the WAG, is influenced by the SWMU and cannot serve as a true background well. For most parameters sampled during FY 1986 and FY 1987, constituent levels are below detection limits for all sampling points in all wells, irrespective of their relationship to the WAG. However, data from UNW-3 show elevated levels of several metals (aluminum, barium, chromium, manganese, and vanadium) for at least one sampling point (November 5, 1987). Levels detected in UNW-3 of aluminum, barium, chromium, and lead exceed the MCL for this sampling date. In addition, antimony and zirconium also appear above detection limits in UNW-3 for sampling date November 23, 1987.

Some organic constituents have also been detected in the WAG wells. These constituents appear principally in UNW-2 and UNW-5. 1,1,2-dichloroethane, trichlorethene, vinyl chloride, 1,1-dichlorethene, 1,1,1-trichloroethane, and 1,2-dichloroethane all appear at levels which exceed the MCL for several sampling periods. Further, although 1,1,2-dichlorethane, trichloroethene, and vinyl chloride appear in UNW-1, the highest levels of all organic constituents consistently occur in UNW-2 and UNW-5. In the case of trichloroethene, levels in UNW-2 reach 5200 ug per liter. In addition, other organic constituents appear for which MCLs have not been set--cyclohexanone, di-N-octylphehalate, 1,1,2-trichloroethane, tetrachloroethene, trans-1,2-dichloroethene, vinyl acetate, 2-hexanone, and 4-methyl-2-pentanone.

7.5 BIOLOGICAL MONITORING AND ABATEMENT PROGRAM (BMAP) FOR K-1700 STREAM

In September 1986, a modified NPDES permit was issued for ORGDP. As specified in Part III (L) of the permit, a plan for biological monitoring of K-1700 stream was submitted to EPA and TDHE. The Biological Monitoring and Abatement Program (BMAP) was developed to meet this requirement. The proposed program will be conducted for the duration of the modified NPDES permit; it is based on preliminary discussions held on October 14-15, 1986, between staff of ORNL and ORGDP, EPA, and TDHE. Because the composition of existing effluent streams entering K-1700 stream will be altered shortly after the modified NPDES permit is issued, baseline (preoperational) conditions in K-1700 stream may exist only for the next few months. Consequently, preliminary sampling of the benthic invertebrate and fish populations was initiated in August and September 1986, respectively.

The overall strategy of the BMAP is to use the results obtained in the initial characterization studies to define the scope of future monitoring efforts. Such efforts may require more intensive sampling than initially proposed in some areas (e.g., additional toxicity testing if initial results indicate poor survival or growth) and a reduction in sampling intensity in others (e.g., reduction in benthic invertebrate sampling frequency from monthly to bimonthly or quarterly after the first year).

8. SAMPLING PLAN

8.1 SAMPLING AND ANALYTICAL STRATEGY

Data collected from the previous sampling of the K-1700 stream and sediments, NPDES reports from K-1700, data collected on K-1407-B Pond, descriptions of the discharges to K-1407-A Neutralization Pit, and information gathered in personal interviews concerning the K-1070-B burial ground are the basis for the preparation of the sampling plan for this site. The types of samples to be taken at this site are soil corings, groundwater samples from existing wells, surface water runoff samples, and surface water samples from the K-1700 stream. Also the data generated to comply with current NPDES regulations on discharges to the K-1700 stream will be used to further define this site. No additional pathways for migration are suspected.

Previous analytical data at this site indicates primarily the presence of metals, BNA extractable organics, radionuclides, and PCBs. The BNAs are generally polycyclic-aromatic hydrocarbons resulting probably from the coal pile runoff.

8.2 STATISTICAL SET-UP FOR SAMPLING

8.2.1 Soil Sampling

Monitoring will occur in phases. Each phase will consist of soil sampling, chemical analyses, and statistical analysis of resultant data and will continue until such time that conclusions can be drawn regarding the extent of the release and decisions can be made about appropriate remedial actions. The first phase of sampling will provide initial estimates of contaminant levels in the potential release area and in background, indicate the general directions of possible contaminant movement, and identify sources and estimate their magnitude. This information will be used to direct the next phase of monitoring, if needed.

Figure 8.1 shows the general placement of 27 sampling points, 15 for obtaining surface samples and 12 for drilling to bedrock. There are 5 background locations, 2 surface and 3 bedrock. Of the 22 potential release area locations, 8 primarily associate with the K-1070-B Burial Ground, one with the K-1407-A Neutralization pit and K-1407-B Pond, and 13 with the K-1700 stream. Many of these sampling locations are in potential pathways of more than one possible source.

Three background drillings will be made. There are two for the K-1070-B Burial Ground, and one for the K-1407-A Neutralization Pit and K-1407-B Pond. There are two background locations for surface samples for the K-1700 stream.

Where first-phase sampling is conducted, there is approximately one coring per each 100 by 100 foot sector or 10,000 square feet. This is prompted by guidelines given in EPA/530-SW-85-003, April 1985, Petitions to Delist Hazardous Wastes: A Guidance Manual, page 40.

For each drilling to bedrock, a soil sample will be taken from: (a) every distinct layer of soil which might be affected by a release, (b) boundaries between soil layers, and (c) regular intervals of four feet of depth in thick homogeneous layers. The fist sample will be taken at

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(U)

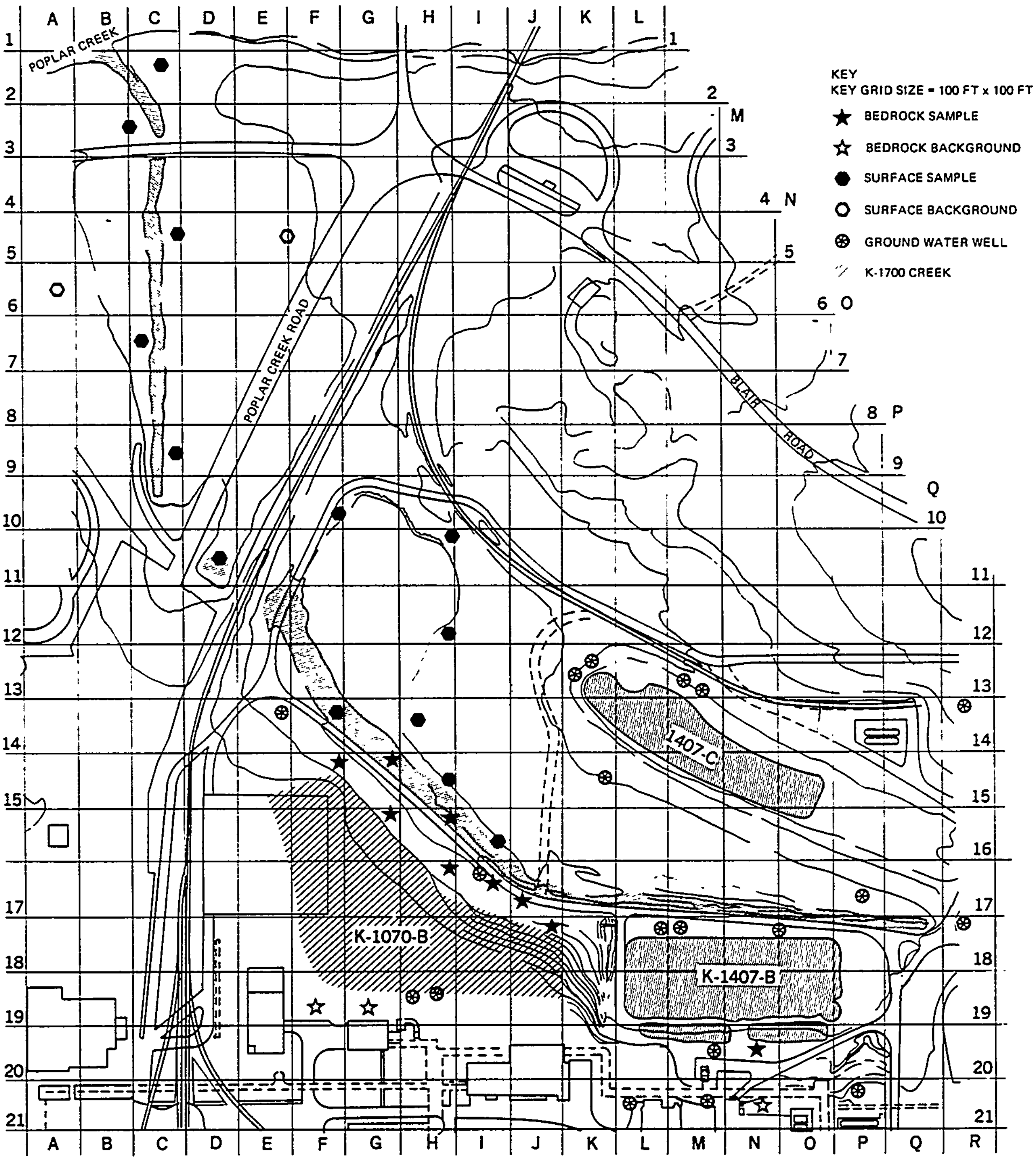

Fig. 8.1. Sampling locations

surface level. For thicker layers, soil from 2 adjacent two-foot split barrels will be composited, with care not to composite across soil layer types or layer boundaries. Sampling will be to refusal. A portion of each sample from the borehole will go into a single borehole composite, and a portion of each sample will be individually saved in case better resolution on the composite or a backup analysis is needed. The sampling approach is based on "RCRA Facility Investigation Guidance, Volume II," pages 8-34 (Figure 8.2).

Each surface sampling location will be a coring taken to a depth of two feet. A soil sample will be taken from: (a) every distinct layer of soil, and (b) boundaries between soil layers (Figure 8.2). Should refusal occur prior to reaching a depth of two feet, then either (a) a "bottom" sample will be taken at the point of refusal, or (b) the sample will be relocated in order to avoid a small obstruction. Samples will be divided with a portion of each sample will be saved in case better resolution on the composite or a backup analysis is needed.

For Quality Assurance and Quality Control (QA and QC) purposes on the sampling and analytical procedures, approximately 10% of the soil samples will be sampled and analyzed in duplicate.

The drilling order of the boreholes will be randomized. See Table 8.1 for the randomization schedule. The order of taking samples within each drilling will not be randomized since the sampling depths depend on the nature of the core and the method of soil removal from the borehole.

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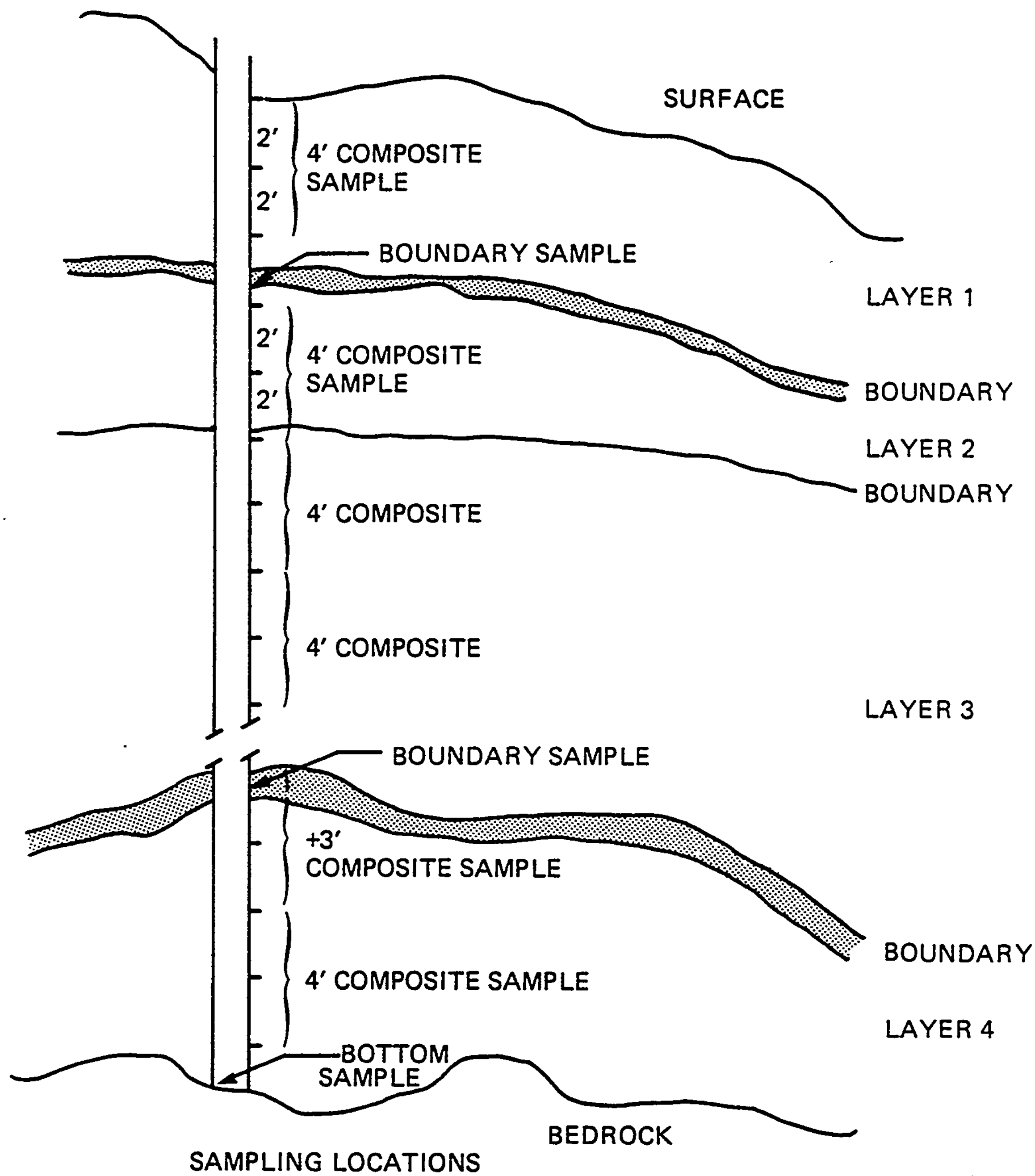

Fig. 8.2. Sampling Within A Core

Table 8.1. Drilling order

BEDROCK SAMPLES

DRILLING ORDER	FIGURE 8.1 COORDINATES	SAMPLE TYPE
1	19F	BEDROCK BACKGROUND
2	17H	BEDROCK 1070-B
3	17I	BEDROCK 1070-B
4	21N	BEDROCK BACKGROUND
5	17J	BEDROCK 1070-B
6	15F	BEDROCK 1070-B
7	15G	BEDROCK 1070-B
8	20N	BEDROCK 1407-A
9	16G	BEDROCK 1070-B
10	16H	BEDROCK 1070-B
11	18J	BEDROCK 1070-B
12	19G	BEDROCK BACKGROUND

SURFACE SAMPLES

1	14F	SURFACE 1700
2	7C	SURFACE 1700
3	5E	SURFACE BACKGROUND
4	16I	SURFACE 1700
5	14H	SURFACE 1700
6	3B	SURFACE 1700
7	10F	SURFACE 1700
8	11P	SURFACE 1700
9	11H	SURFACE 1700
10	15H	SURFACE 1700
11	5C	SURFACE 1700
12	9C	SURFACE 1700
13	2C	SURFACE 1700
14	6A	SURFACE BACKGROUND
15	12H	SURFACE 1700

The sampling location within each 100 by 100 foot sector is not randomly located within the sector. Figure 8.1 shows the relative drilling locations with respect to physical landmarks and potential release sources. The locations will be determined by the physical terrain in the local areas and the ability to obtain representative samples. Exact coordinates will be determined by surveying the site. The systematic nature of the drilling locations will improve statistical properties of modeling efforts by providing more uniform coverage of the region than would be provided by a random sampling effort.

There are 12 drillings to bedrock, including the 3 background drillings. If it is an average of 15 feet to bedrock and only one distinct soil layer, there will be approximately 4 samples per coring. This gives 12 * 4 = 48 samples. There are 15 surface type corings, including the 2 background. Assuming one sample per coring, this gives 15 samples. Adding 10% for QA and QC duplicates gives 63 + 6 = 69 samples available for first phase analysis.

Statistical modeling of contaminants in radial directions away from the contaminant sources and estimation of changes in concentration with distance from the sources will be possible only in those directions for which there is more than one row of sampling. This is true only for the K-1070-B Classified Burial Ground in the area of the K-1700 stream.

8.2.2 Surface Water Sampling

8.2.2.1 K-1070-B Surface Water

Surface water runoff due to rainfall will be collected at two naturally occurring flow points on the north side of the K-1070-B site.

These will be in the general vicinity of a line between grid locations 15G and 18I of Figure 8.1. Duplicate sampling will occur during at least two periods of heavy rain. Duplicate grab samples will be taken at all locations and from a background location. There will be approximately six samples for analysis.

8.2.2.2 K-1700 Surface Water

Surface water sampling of the K-1700 stream will occur at the two NPDES sampling points located at grid coordinates 5C and 18K and at a weir which will be constructed upstream from the K-1407-B pond. The weir should be located at or just east of the intersection of the stream and a line extending north from and coincident with Avenue C. Each month for at least six months, a 72-hour composite will be taken at each location. At least three months of sampling will occur prior to soil sampling of the area. Flow rates will also be measured at each location. In addition, grab samples will be taken at storm drain openings into K-1700 during at least two discrete rainfall events. Every other sampling period, duplicate samples will be taken at all locations. There will be at least 36 samples for analysis.

8.3 FIELD SAMPLING

All field sampling procedures discussed in Section 8.2 are more fully described and documented in The Environmental Surveillance Procedures Quality Control Program, Martin Marietta Energy Systems, Inc., (ESH/SUB/87-21706/1). No detailed records are available that locate the perimeter of the K-1070-B Classified Burial Ground. The boundaries of the K-1070-B Classified Burial Ground will be defined using electromagnetic surveying methods. A detailed map of the entire area will be drawn depicting the sampling sites to determine the locations of the soil samples and surface water samples. The sampling team will locate the sampling locations utilizing this map. The corings designated as surface samples are to be collected with a hand auger to the depth of two feet. The other corings are to bedrock. Surface water runoff samples will be the grab type. Surface water collected from K-1700 will be the composite type as specified in the NPDES permit.

Surface water runoff sampling will be arranged with the sampling team to occur after rainfall has provided adequate surface water for collection. The frequency for collecting surface water from K-1700 will be as specified by the NPDES permit regulations.

The drillers will provide all necessary drilling equipment (hollow core auger, split spoon sampler, etc.). The following field sampling supplies will be required.

- Nonionic detergent, Micro (International Products Corp.)
- Deionized water
- Isopropyl alcohol
- Glass containers, pre-cleaned, with teflon lined lids, one quart capacity
- Logbook
- Chain of custody seals
- Sample labels
- Chain of custody forms
- Stainless steel trays
- Aluminum foil

- Stainless steel spatulas
- Hand auger

Collection of core samples taken to bedrock from this site will follow ASTM method D 1586-84 Penetration Test Split-Barrel Sampling of Soils. The drilling will be performed by private drilling contractors. In this method a hollow core auger will be used to remove the soil above each segment to be sampled and the split-barrel sampler will be driven into the soil through the center of the auger. This technique will obtain a sample that is undisturbed by the auger operation.

Using a split-barrel sampler of 2 foot length, samples will be removed from each position in 2 foot segments. Two 2 foot segments will be composited in the lab to form one sample every four feet. These composites are illustrated in Figure 8.3. At each 2 foot increment, the split-barrel sampler will be removed from the drilling rig (to be performed by the drilling crew) and separated to expose the sample.

Those samples located along the bank of the K-1700 stream will be collected using Method EPA 600/4-84-076 Method II-2 for auger and thin-wall tube sampler as referenced in Table 7.1 of the RFI Plan - General Document (K/HS-132).

Between core segments, the equipment used for sample transfer shall be cleaned with non-ionic detergent and water and rinsed with deionized water and isopropyl alcohol. The split-barrel samplers will be detergent cleaned and rinsed with water by the drilling company.

After sampling of each coring is complete, coring will be filled with a grout column as described in Section 7.1.3 in the RFI Plan - General

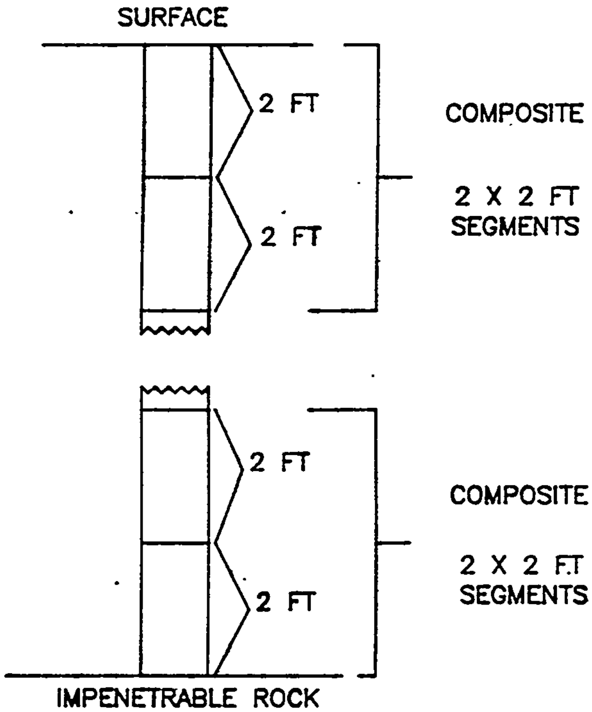

Fig. 8.3. Compositing Protocol

Document (K/HS-132) to prevent any further contamination of the groundwater.

Surface waters will be collected from K-1700, the new weir, and runoff from K-1070-B utilizing the applicable methods listed in Table 7.3 of the RFI - General Document (K/HS-132).

From 10% of the core segments and surface water samples, duplicate samples will be submitted to the laboratory to fulfill duplicate requirements per RFI Plan - General Document (K/HS-132), Section 7.3.

Sample containers will be labelled with the site identification, date, time, sample I. D., and sampler's name, and coordinates of sample will be recorded. In addition to the required entries any other pertinent information and/or observations shall be recorded. The log book used for these records will contain a copy of the map of the area and a copy of the sampling plan.

The sample containers shall be sealed and transported to the laboratory under chain of custody protocol as referenced in the RFI Plan-General Document (K/HS-132) in Section 7.4.

8.4 ANALYTICAL PROTOCOL

Analytical sampling with the following salient features is proposed. The four foot composites taken from corings drilled to bed rock will be analyzed for the analytes listed in Table 8.2 using the referenced EPA procedures. The surface samples taken to a depth of two feet with a hand auger will be analyzed for the analytes listed in Table 8.2 using the referenced EPA procedures. EP toxicity extraction will be performed on those samples whose total inorganic species content exceeds the EP Toxicity limits. Specific radionuclide analyses will be conducted on

Table 8.2 Sample types, number of samples, and analytical procedures.

Type of sample	Number[1]	Analyses
Soil	63[2]	Metals Radioactivity[3] VOA Semivolatiles[4]
Surface runoff (Water)	6	Metals Semivolatiles[4]
Creek Waters	36	Metals pH Temp., Turbidity Solids[5] F^-, NO_3^- Oil and Grease VOA Semivolatiles[4]

[1]Includes field duplicate samples.
[2]An estimate, actual number depends on depth to bedrock.
[3]Gross alpha, beta and gamma
[4]Includes analysis for PCBs
[5]Includes both dissolved and total suspended solids

those samples whose gross alpha, beta, or gamma exceed levels established based on best technical judgement.

Surface water samples from the K-1700 stream will be analyzed for the analytes required by the NPDES permit for that discharge with the additional parameters of PCB and BNA extractables added. The complete list of analytes for the K-1700 stream and the appropriate EPA procedures are shown in Table 8.2. Surface water runoff from the K-1070-B burial ground will be analyzed for ICP metals, PCB, VOA, BNA extractables, and radionuclides. Table 8.2 shows the complete analyte list and the proper EPA procedures to be used at this site. The new weir, that is to be constructed up-stream of the K-1407-B discharge to the K-1700 stream as part of this sampling plan, will have the same analytes shown in Table 8.2. In addition, the samples will be analyzed for the expanded NPDES parameters. This site will be sampled with the same frequency as the NPDES permit requires for the K-1407-B discharge into K-1700.

RCRA groundwater data will be obtained from existing monitoring wells within the K-1407 area as part of the ORGDP Groundwater Monitoring Program.

8.5 SAMPLE ANALYSIS

After reception by the analytical laboratory of the surface water samples and core segments, the segments will be composited as proposed. The analyses to be performed and the procedures to be used for the different sample types are shown previously in Table 8.2.

Groundwater analysis will follow standard EPA protocol as outlined in Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020). The

QA/QC requirements outlined in the RFI Plan - General Document (K/HS-132) in Section 7.3 shall be adhered to for all analyses.

9. DATA MANAGEMENT PROCEDURES

The results of the chemical analyses of samples from the potential release area will be presented in a clear and logical format, so as to best illustrate any patterns in the data. These will include tabular, graphical, and other visual displays such as maps and contour plots described in the RFI Plan - General Document (K/HS-132) in Table 8.1, as appropriate to the data.

Statistical analyses will provide for treatment of duplicate sampling and duplicate laboratory analyses and results which are reported as less that detection limit, and for examination for statistical outliers. Specifically, values which are recorded as less than detection limits will be handled according to "RCRA Groundwater Monitoring Enforcement Guidance Document", OSWER 9950.1, September 1986, which directs calculation through the use of Cohen's statistical methodology. This is found in "Tables for Maximum Likelihood Estimates from Single Truncated and Singly Censored Samples," Technometrics, Volume 3, pages 535-541, 1961.

Statistical modeling methods such as least squares and kriging will be used to estimate response surfaces for use in developing concentration contours for the contaminants, where appropriate.

10. HEALTH AND SAFETY PROCEDURES

10.1 INTRODUCTION

Special requirements and procedures to protect the health and safety of the investigating team, the ORGDP site personnel, and the general public during the RCRA Facility Investigations of the K-1407 Waste Area Grouping are addressed in this section. Section 9 of K/HS-132 details the health, safety, environmental, security, plant protection, and emergency response organizations which are in place at the ORGDP. These organizations provide the support to the ORGDP line organizations to meet the requirements for health and safety during the RFIs. They provide the communications, response, and reporting for any plant emergency; on-site medical facilities with medical surveillance, treatment, monitoring, and periodic physical examinations; health physics and industrial hygiene surveillance hazard evaluation and control; operational safety, accident prevention, and control; plant security and visitor control.

In addition, K/HS-132 identifies the organizational responsibilities for health and safety at SWMUs during the RFIs. The document includes the methodology for establishing the work zones of each SWMU, the level of protection required in the exclusion zone, decontamination procedures, personnel exposure limits, monitoring requirements, and respiratory protection requirements.

10.2 KNOWN HAZARDS AND RISKS

Information gained from field monitoring during groundwater well installation at the site during the fall and winter of 1985 and supplemental data on the specific site was utilized to develop this plan.

The site was monitored for airborne ionizable pollutants, combustible gases, and radioactivity during the time wells were being drilled. Field monitoring indicated workers were not exposed to concentrations of gases or radioactivity above the permissible exposure limits established by Martin Marietta Energy Systems. These data established the personnel protection as Level D for this SWMU.

10.3 LEVEL OF PROTECTION AND MONITORING PARAMETERS

The level of personnel protection and monitoring is designated below.

Level of Designation		Monitoring Parameters	
A		Airborne Pollutants	X
B			
C		Explosion Potential	
D	X	Radiation	X

10.4 DESIGNATION OF WORK AREA ZONES

The three zones (Exclusion, Contamination Reduction, and Support) will be established for each sampling/drilling work activity area in accordance with the methodology developed in Section 9 of K/HS-132. The safety equipment required for the designated level of protection and the decontamination procedures are also covered in K/HS - 132. As work activity requires, the exclusion zone will move to encompass areas of sampling.

10.5 LEVEL OF PROTECTION AND EXPOSURE LIMITS

The personnel protection recommended for work activity in the exclusion zone of this SWMU is Level D.

Employee exposure to airborne pollutants (e.g., organics, combustible gases) throughout the course of the investigation will be monitored through the use of air monitoring equipment. If any of the following conditions occur, work will be stopped, the exclusion zone will be evacuated, and the ORGDP Industrial Hygiene Department will be contacted to determine necessary actions to mitigate health and safety concerns:

1. Organic vapor levels exceed background conditions for more than one minute.

2. Unusual odors are detected.

3. Combustible gas levels exceed 10% of the lower explosive limit (LEL).

The responsibility for limiting the exposure of the workers to nonhazardous levels of radiation resides in the Site Health Safety Officer (SHSO) using instruments described in Section 9 of K/HS-132. The SHSO will monitor for radiation in the air and adjacent to sample drillings and/or diggings with a radiation meter capable of measuring 0.1 mR/hr. Should the reading exceed 0.1 mR/hr, the SHSO will order work to be stopped and the crew removed from the exclusion zone. The SHSO will request the presence of a health physicist on site who will assess the potential hazard of the conditions and determine whether or not work should continue.

Sampling personnel must be aware that equipment used for soil sampling could become contaminated with radioactive material. Also, personal safety shoes and other protective equipment could become contaminated. Surveys should be performed on such equipment in the soil sampling areas before and after each operation. Each survey should include monitoring all applicable personnel and equipment. Equipment that is found to be contaminated above the guidelines for unrestricted release (alpha - 5,000 dpm/100cm^2 surface, 1,000 dpm/100 cm^2 transferrable, and 0.1 mR/hr beta and gamma) will be decontaminated. Should the reading exceed an action level of 2 mR/hr (set by ORGDP Health Physics as an action point), the SHSO will order work to be stopped and the crew will be removed. The SHSO will request the presence of a health physicist on site who will assess the potential hazard of the conditions and determine whether or not work should continue.

11. REFERENCES

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APPENDIX A

APPENDIX A

K-1407-B Retention Basin

Sludge Data

B Pond data
summary of all of the data
except the leach test

parameter	mean	maximum	minimum	units
	metals			
Aluminum	36294	62000	15000	ug/g
Arsenic	53	250	5	ug/g
Barium	152	630	48	ug/g
Beryllium	1.2	3.1	.19	ug/g
Boron	80	190	19	ug/g
Cadmium	.84	5.6	.3	ug/g
Calcium	22826	20000	1400	ug/g
Chromium	463	3200	31	ug/g
Cobalt	25	61	6.9	ug/g
Copper	538	1700	4.2	ug/g
Iron	49387	20000	13000	ug/g
Lead	58	220	5	ug/g
Lithium	29	53	14	ug/g
Magnesium	5070	16000	1300	ug/g
Manganese	812	5400	240	ug/g
Molybdenum	10	49	1	ug/g
Nickel	2051	9700	33	ug/g
Niobium	.7	.7	.7	ug/g
Phosphorus	5111	21000	280	ug/g
Potassium	4750	11000	110	ug/g
Selenium	77	140	5	ug/g
Sodium	634	3100	88	ug/g
Strontium	53	190	6.9	ug/g
Thorium	21	58	20	ug/g
Titanium	250	460	120	ug/g
Vanadium	44	76	17	ug/g
Zinc	288	1300	29	ug/g
	radionuclides			
Cesium	15	20	15	DPM/G
Neptunium	4.7	17	.1	DPM/G
Plutonium	4.8	19	.05	DPM/G
Technetium	5284	15000	84	DPM/G

B Pond data
summary of all of the data
except the leach test

parameter	mean	maximum	minimum	units
Uranium	272	1416	1.7	UG/G
U-235	1.6	2.8	.76	Wt. %
	organics			
acetone	.001	.001	.001	ug/g
bromoform	.001	.001	.001	ug/g
carbon tetrachloride	.003	.003	.003	ug/g
chlorobenzene	.001	.001	.001	ug/g
cis-1,3-dichloropropene	.001	.001	.001	ug/g
ethyl benzene	.001	.001	.001	ug/g
fluorocarbons	.001	.001	.001	ug/g
freon-113	.001	.001	.001	ug/g
freon-114	.001	.001	.001	ug/g
freon-123	.001	.001	.001	ug/g
Methyl Chloroform	.013	.025	.001	ug/g
methyl ethyl ketone (MEK)	.001	.001	.001	ug/g
other halomethanes	.001	.001	.001	ug/g
PCB	.001	.001	.001	ug/g
tetrachloroethylene	.029	.082	.002	ug/g
toluene	.001	.001	.001	ug/g
toxaphene	.0018	.003	.001	ug/g
trans-1,2-dichloroethylene	.0022	.003	.001	ug/g
trans-1,3-dichloropropene	.001	.001	.001	ug/g
trichloroethylene	.035	.069	.001	ug/g
trichlorofluoromethane	.001	.001	.001	ug/g
1,1-dichloroethane	.001	.001	.001	ug/g
1,1,2-trichloroethane	.001	.001	.001	ug/g
1,1,2,2,-tetrachloroethane	.001	.001	.001	ug/g
1,2-dichloropropane	.001	.001	.001	ug/g
	other analyses			
Density	1.1	1.2	1.1	G/ML
pH	7	7.4	6.7	
Phosphate (Total)	15334	63000	840	ug/g

B Pone leach test data
summary of all of the leach test data

parameter	mean	maximum	minimum	units
endrin	.000085	.00013	.00007	mg/L
lindane	.0091	.036	.00002	mg/L
methoxychlor	.000068	.0001	.00006	mg/L
silvex	.013	.074	.0003	mg/L
2,4-D	.041	.12	.002	mg/L
	metals			
Arsenic	.0071	.022	.005	mg/L
Barium	.26	.92	.1	mg/L
Cadmium	.028	.085	.002	mg/L
Chromium	.023	.31	.01	mg/L
Lead	.0075	.025	.004	mg/L
Mercury	.0014	.012	.001	mg/L
Nickel	9.3	38	.01	mg/L
Selenium	.0051	.011	.005	mg/L
Silver	.01	.01	.01	mg/L

B Pond data
summary of the data for the sludge layer
except the leach test

parameter	mean	maximum	minimum	units
	metals			
Aluminum	36200	49000	19000	ug/g
Arsenic	162	250	5	ug/g
Barium	221	290	120	ug/g
Beryllium	2	3.1	1.4	ug/g
Boron	110	190	77	ug/g
Cadmium	2	5.6	.3	ug/g
Calcium	58000	20000	29000	ug/g
Chromium	815	2400	290	ug/g
Cobalt	42	61	22	ug/g
Copper	1030	1600	420	ug/g
Iron	75500	20000	35000	ug/g
Lead	121	180	66	ug/g
Lithium	23	37	16	ug/g
Magnesium	6790	16000	4700	ug/g
Manganese	642	830	460	ug/g
Molybdenum	17	49	1	ug/g
Nickel	4133	7100	34	ug/g
Niobium	.7	.7	.7	ug/g
Phosphorus	12790	21000	6200	ug/g
Potassium	4100	7300	2000	ug/g
Selenium	88	140	5	ug/g
Sodium	1151	3100	390	ug/g
Strontium	136	190	81	ug/g
Thorium	21	30	20	ug/g
Titanium	363	460	220	ug/g
Vanadium	44	61	17	ug/g
Zinc	607	810	480	ug/g
	radionuclides			
Cesium	15	16	15	DPM/G
Neptunium	7.2	17	1.3	DPM/G
Plutonium	7.1	19	1.9	DPM/G
Technetium	8088	15000	2500	DPM/G
Uranium	516	1044	69	UG/G
U-235	1.2	1.3	1.1	Wt. %

B Pond data
summary of the data for the sludge layer
except the leach test

parameter	mean	maximum	minimum	units
	organics			
acetone	.001	.001	.001	ug/g
fluorocarbons	.001	.001	.001	ug/g
PCB	.001	.001	.001	ug/g
trans-1,2-dichloroethylene	.003	.003	.003	ug/g
	other analyses			
Density	1.1	1.2	1.1	G/ML
pH	7	7.4	6.7	
Phosphate (Total)	38370	63000	18600	ug/g

B Pond data
summary of the leach test data for the sludge layer

parameter	mean	maximum	minimum	units
	pesticides			
endrin	.0001	.00013	.00007	mg/L
lindane	.023	.036	.011	mg/L
methoxychlor	.00008	.0001	.00006	mg/L
silvex	.038	.074	.003	mg/L
toxaphene	.002	.003	.001	mg/L
2,4-D	.079	.12	.03	mg/L
	metals			
Arsenic	.01	.022	.005	mg/L
Barium	.42	.92	.2	mg/L
Cadmium	.055	.085	.025	mg/L
Chromium	.045	.31	.01	mg/L
Lead	.0083	.025	.004	mg/L
Mercury	.0021	.012	.001	mg/L
Nickel	21	33	3.7	mg/L
Selenium	.005	.005	.005	mg/L
Silver	.01	.01	.01	mg/L

B Pond data
summary of the data for the top six inches of the soil layer
except the leach test

parameter	mean	maximum	minimum	units
	metals			
Aluminum	39153	62000	26000	ug/g
Arsenic	10	66	5	ug/g
Barium	97	190	52	ug/g
Beryllium	.77	1.5	.19	ug/g
Boron	52	88	19	ug/g
Cadmium	.36	1.2	.3	ug/g
Calcium	12076	68000	1400	ug/g
Chromium	481	3200	48	ug/g
Cobalt	19	48	8	ug/g
Copper	239	1700	26	ug/g
Iron	41000	93000	25000	ug/g
Lead	44	220	5	ug/g
Lithium	33	53	16	ug/g
Magnesium	4415	8000	1300	ug/g
Manganese	588	1800	250	ug/g
Molybdenum	5.8	24	1.7	ug/g
Nickel	1859	9700	71	ug/g
Niobium	.7	.7	.7	ug/g
Phosphorus	2840	20000	350	ug/g
Potassium	4293	9300	110	ug/g
Selenium	76	140	43	ug/g
Sodium	437	1200	88	ug/g
Strontium	23	89	7.2	ug/g
Thorium	22	58	20	ug/g
Titanium	212	310	170	ug/g
Vanadium	46	76	23	ug/g
Zinc	220	1300	50	ug/g
	radionuclides			
Cesium	15	20	15	DPM/G
Neptunium	2.6	9	.1	DPM/G
Plutonium	3	9	.05	DPM/G
Technetium	2990	15000	84	DPM/G
Uranium	297	1416	12	UG/G
U-235	1.9	2.8	1.2	Wt. %
	organics			
acetone	.001	.001	.001	ug/g
PCB	.0012	.004	.001	ug/g
trans-1,2-dichloroethylene	.002	.002	.002	ug/g

B Pond data
summary of the data for the top six inches of the soil layer
except the leach test

parameter	mean	maximum	minimum	units
trichloroethylene	.001	.001	.001	ug/g
tetrachloroethylene	.003	.003	.003	ug/g
other analyses				
Phosphate (Total)	8522	60000	1050	ug/g

B Pond data
summary of the leach test data
for the top six inches of the soil layer

parameter	mean	maximum	minimum	units
	pesticides			
endrin	.000075	.00008	.00007	mg/L
lindane	.004	.008	.00002	mg/L
methoxychlor	.000065	.00007	.00006	mg/L
silvex	.0011	.002	.0003	mg/L
toxaphene	.0015	.002	.001	mg/L
2,4-D	.043	.084	.002	mg/L
	metals			
Arsenic	.0056	.011	.005	mg/L
Barium	.22	.65	.1	mg/L
Cadmium	.02	.07	.002	mg/L
Chromium	.014	.07	.01	mg/L
Lead	.0085	.016	.004	mg/L
Mercury	.0012	.003	.001	mg/L
Nickel	5.7	38	.06	mg/L
Selenium	.0054	.011	.005	mg/L
Silver	.01	.01	.01	mg/L

B Pond data
summary of the data for the dirt from 6 to 12 inches
from the top of the soil layer
except the leach test

parameter	mean	maximum	minimum	units
	metals			
Aluminum	33000	48000	15000	ug/g
Arsenic	5	5	5	ug/g
Barium	153	630	48	ug/g
Beryllium	.97	1.5	.57	ug/g
Boron	87	140	41	ug/g
Cadmium	.3	.3	.3	ug/g
Calcium	3554	10000	1900	ug/g
Chromium	121	760	31	ug/g
Cobalt	17	30	6.9	ug/g
Copper	24	44	4.2	ug/g
Iron	39545	67000	13000	ug/g
Lead	19	79	5	ug/g
Lithium	29	50	14	ug/g
Magnesium	4281	7000	2100	ug/g
Manganese	1230	5400	240	ug/g
Molybdenum	8.6	19	1	ug/g
Nickel	386	2700	33	ug/g
Niobium	.7	.7	.7	ug/g
Phosphorus	814	2500	280	ug/g
Potassium	5881	11000	2800	ug/g
Selenium	69	110	21	ug/g
Sodium	398	590	250	ug/g
Strontium	13	33	6.9	ug/g
Thorium	20	24	20	ug/g
Titanium	191	380	120	ug/g
Vanadium	42	72	23	ug/g
Zinc	80	250	29	ug/g
	radionuclides			
Uranium	20	71	1.7	UG/G
U-235	1.5	2.6	.76	Wt. %
	organics			
acetone	.001	.001	.001	ug/g
bromoform	.001	.001	.001	ug/g
carbon tetrachloride	.003	.003	.003	ug/g
chlorobenzene	.001	.001	.001	ug/g
cis-1,3-dichloropropene	.001	.001	.001	ug/g

B Pond data
summary of the data for the dirt from 6 to 12 inches
from the top of the soil layer
except the leach test

parameter	mean	maximum	minimum	units
ethyl benzene	.001	.001	.001	ug/g
freon-113	.001	.001	.001	ug/g
freon-114	.001	.001	.001	ug/g
freon-123	.001	.001	.001	ug/g
methyl ethyl ketone (MEK)	.001	.001	.001	ug/g
other halomethanes	.001	.001	.001	ug/g
PCB	.001	.001	.001	ug/g
tetrachloroethylene	.042	.082	.002	ug/g
toluene	.001	.001	.001	ug/g
trans-1,2-dichloroethylene	.001	.001	.001	ug/g
trans-1,3-dichloropropene	.001	.001	.001	ug/g
trichloroethylene	.069	.069	.069	ug/g
trichlorofluoromethane	.001	.001	.001	ug/g
1,1-dichloroethane	.001	.001	.001	ug/g
1,1,2-trichloroethane	.001	.001	.001	ug/g
1,1,2,2-tetrachloroethane	.001	.001	.001	ug/g
1,2-dichloropropane	.001	.001	.001	ug/g
other analyses				
Phosphate (Total)	2443	7500	840	ug/g

B Pond data
summary of the leach test data
for the dirt from 6 to 12 inches
from the top of the soil layer

parameter	mean	maximum	minimum	units
	pesticides			
endrin	.00008	.00008	.00008	mg/L
lindane	.00002	.00002	.00002	mg/L
Methyl Chloroform	.013	.025	.001	mg/L
methoxychlor	.00006	.00006	.00006	mg/L
silvex	.0003	.0003	.0003	mg/L
toxaphene	.002	.002	.002	mg/L
2,4-D	.002	.002	.002	mg/L
	metals			
Arsenic	.005	.006	.005	mg/L
Barium	.15	.31	.1	mg/L
Cadmium	.0075	.03	.002	mg/L
Chromium	.01	.01	.01	mg/L
Lead	.0054	.012	.004	mg/L
Mercury	.001	.001	.001	mg/L
Nickel	.61	3.8	.01	mg/L
Selenium	.005	.005	.005	mg/L
Silver	.01	.01	.01	mg/L

B Pond data
summary of data
for the east end of B pond
except the leach test

parameter	mean	maximum	minimum	units
metals				
Aluminum	41875	62000	19000	ug/g
Arsenic	52	250	5	ug/g
Barium	137	290	48	ug/g
Beryllium	1.1	2.9	.48	ug/g
Boron	84	190	37	ug/g
Cadmium	.31	.59	.3	ug/g
Calcium	26993	20000	1700	ug/g
Chromium	482	3200	50	ug/g
Cobalt	23	49	6.9	ug/g
Copper	558	1700	38	ug/g
Iron	50875	20000	27000	ug/g
Lead	62	220	5	ug/g
Lithium	35	53	16	ug/g
Magnesium	5400	16000	2300	ug/g
Manganese	453	790	250	ug/g
Molybdenum	9.9	29	1	ug/g
Nickel	2206	9700	34	ug/g
Niobium	.7	.7	.7	ug/g
Phosphorus	4684	20000	340	ug/g
Potassium	4950	11000	2500	ug/g
PCB	.001	.001	.001	ug/g
Selenium	84	140	19	ug/g
Sodium	568	1200	220	ug/g
Strontium	60	190	7.4	ug/g
Thorium	23	58	20	ug/g
Titanium	257	430	130	ug/g
Vanadium	51	76	29	ug/g
Zinc	304	1300	63	ug/g
radionuclides				
Cesium	15	15	15	DPM/G
Neptunium	4.8	9	.7	DPM/G
Plutonium	5.1	9	1	DPM/G
Technetium	5125	15000	2500	DPM/G
Uranium	299	1416	8.8	UG/G
U-235	1.5	2.6	.76	Wt. %

B Pond data
summary of data
for the east end of B pond
except the leach test

parameter	mean	maximum	minimum	units
	organics			
acetone	.001	.001	.001	ug/g
bromoform	.001	.001	.001	ug/g
carbon tetrachloride	.003	.003	.003	ug/g
chlorobenzene	.001	.001	.001	ug/g
cis-1,3-dichloropropene	.001	.001	.001	ug/g
ethyl benzene	.001	.001	.001	ug/g
fluorocarbons	.001	.001	.001	ug/g
freon-113	.001	.001	.001	ug/g
freon-114	.001	.001	.001	ug/g
freon-123	.001	.001	.001	ug/g
methyl ethyl ketone (MEK)	.001	.001	.001	ug/g
other halomethanes	.001	.001	.001	ug/g
tetrachloroethylene	.042	.082	.003	ug/g
toluene	.001	.001	.001	ug/g
trans-1,2-dichloroethylene	.0015	.002	.001	ug/g
trans-1,3-dichloropropene	.001	.001	.001	ug/g
trichloroethylene	.035	.069	.001	ug/g
trichlorofluoromethane	.001	.001	.001	ug/g
1,1-dichloroethane	.001	.001	.001	ug/g
1,1,2-trichloroethane	.001	.001	.001	ug/g
1,1,2,2-tetrachloroethane	.001	.001	.001	ug/g
1,2-dichloropropane	.001	.001	.001	ug/g
	other analyses			
Density	1.1	1.2	1.1	G/ML
pH	7.1	7.4	7	
Phosphate (Total)	14053	60000	1020	ug/g

B Pond data
summary of leach test data
for the east end of B pond

parameter	mean	maximum	minimum	units
	pesticides			
endrin	.000073	.00008	.00007	mg/L
lindane	.0063	.011	.00002	mg/L
methoxychlor	.00006	.00006	.00006	mg/L
silvex	.025	.074	.0003	mg/L
toxaphene	.0013	.002	.001	mg/L
2,4-D	.038	.084	.002	mg/L
	metals			
Arsenic	.0076	.022	.005	mg/L
Barium	.26	.67	.1	mg/L
Cadmium	.032	.07	.002	mg/L
Chromium	.014	.07	.01	mg/L
Lead	.0084	.015	.004	mg/L
Mercury	.0011	.003	.001	mg/L
Methyl Chloroform	.013	.025	.001	mg/L
Nickel	8.9	38	.02	mg/L
Selenium	.0053	.011	.005	mg/L
Silver	.01	.01	.01	mg/L

B Pond data
summary of data
for the west end of B pond
except the leach test

parameter	mean	maximum	minimum	units
	metals			
Aluminum	31333	49000	15000	ug/g
Arsenic	54	220	5	ug/g
Barium	165	630	55	ug/g
Beryllium	1.2	3.1	.19	ug/g
Boron	77	130	19	ug/g
Cadmium	1.3	5.6	.3	ug/g
Calcium	19122	75000	1400	ug/g
Chromium	445	2400	31	ug/g
Cobalt	28	61	9	ug/g
Copper	523	1600	4.2	ug/g
Iron	47800	95000	13000	ug/g
Lead	55	180	5	ug/g
Lithium	23	44	14	ug/g
Magnesium	4777	7700	1300	ug/g
Manganese	1130	5400	240	ug/g
Molybdenum	10	49	1	ug/g
Nickel	1913	7100	33	ug/g
Niobium	.7	.7	.7	ug/g
Phosphorus	5491	21000	280	ug/g
Potassium	4572	9300	110	ug/g
Selenium	72	120	5	ug/g
Sodium	693	3100	88	ug/g
Strontium	47	170	6.9	ug/g
Thorium	20	20	20	ug/g
Titanium	243	460	120	ug/g
Vanadium	37	61	17	ug/g
Zinc	275	810	29	ug/g
	radionuclides			
Cesium	15	20	15	DPM/G
Neptunium	4.6	17	.1	DPM/G
Plutonium	4.7	19	.05	DPM/G
Technetium	5391	15000	84	DPM/G
Uranium	248	1044	1.7	UG/G
U-235	1.6	2.8	1	Wt. %
	organics			
acetone	.001	.001	.001	ug/g

B Pond data
summary of data
for the west end of B pond
except the leach test

parameter	mean	maximum	minimum	units
fluorocarbons	.001	.001	.001	ug/g
PCB	.0011	.004	.001	ug/g
tetrachloroethylene	.002	.002	.002	ug/g
trans-1,2-dichloroethylene	.003	.003	.003	ug/g
other analyses				
density	1.1	1.2	1.1	G/ML
pH	6.9	7.3	6.7	
Phosphate (Total)	16473	63000	840	ug/g

B Pond data
summary of leach test data
for the west end of B pond

parameter	mean	maximum	minimum	units
	pesticides			
endrin	.00009	.00013	.00008	mg/L
lindane	.012	.036	.00002	mg/L
methoxychlor	.000076	.0001	.00006	mg/L
silvex	.0012	.003	.0003	mg/L
toxaphene	.0023	.003	.002	mg/L
2,4-D	.044	.12	.002	mg/L
	metals			
Arsenic	.0067	.013	.005	mg/L
Barium	.27	.92	.1	mg/L
Cadmium	.024	.085	.002	mg/L
Chromium	.03	.31	.01	mg/L
Lead	.0068	.025	.004	mg/L
Mercury	.0017	.012	.001	mg/L
Nickel	9.6	33	.01	mg/L
Selenium	.005	.005	.005	mg/L
Silver	.01	.01	.01	mg/L

APPENDIX B

GERAGHTY & MILLER, INC.
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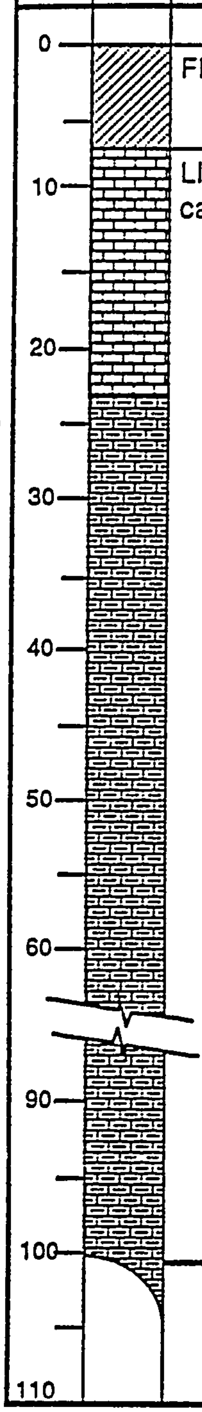
LITHOLOGIC LOG

BORING NO.	BRW-7
PROJECT	ORGDP Monitor-Well Installation Program - Phase I

LOCATION	K-25 PLANT COORDINATES	SURFACE ELEVATION	TOTAL DEPTH
K-25 Plant, K-1407-B	SOUTH 24,509.81 EAST 910.07	754.31 ft msl	100.0 ft
GEOLOGIST	**SAMPLE INTERVAL**	**SAMPLE TYPE**	**DATE WELL COMPLETED**
D. Hubert/D. Brice	5 feet	Cuttings	02-04-86
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
A. Pippin	Alsay, Inc.	Air Rotary	Failing 1250
PURPOSE OF BORING	**GEOPHYSICAL CONTRACTOR**	**GEOPHYSICAL LOGS**	
Monitor Well	Century Geophysical	Natural Gamma, Density, Single Arm Caliper, Gamma-Gamma Compensated Density	

DEPTH IN FEET / GRAPHIC LOG	DESCRIPTION	COMMENTS
	FILL (100%), plasticity clay with rock fragments.	
	LIMESTONE (100%), blue-gray, cherty, micritic, with secondary calcite.	
	22.0' - 100.0' LIMESTONE (50%), blue-gray, micritic to lightly oolitic, cherty in places, with some secondary calcite; shale (50%), gray, blue-gray and green-gray, calcareous in places.	

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LITHOLOGIC LOG

BORING NO.	BRW-8
PROJECT	ORGDP Monitor-Well Installation Program - Phase I

LOCATION	K-25 PLANT COORDINATES	SURFACE ELEVATION	TOTAL DEPTH
K-25 Plant, K-1070-B	SOUTH 24,663.84 EAST 477.00	778.65 ft msl	100.0 ft
GEOLOGIST	**SAMPLE INTERVAL**	**SAMPLE TYPE**	**DATE WELL COMPLETED**
D. Hubert/G. Weiss	5 feet	Cuttings - Core	02-04-86
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
J. Cason	Alsay, Inc.	Air Rotary	Failing 1250
PURPOSE OF BORING	**GEOPHYSICAL CONTRACTOR**	**GEOPHYSICAL LOGS**	
Monitor Well	Century Geophysical	Natural Gamma, Density, Single Arm Caliper, Gamma-Gamma Compensated Density	

DEPTH IN FEET	DESCRIPTION	COMMENTS
0	FILL (100%), orange-brown, low plasticity clay with rock fragments, coal, brick and wood.	
30		Slight loss of circulation at 30 ft
	LIMESTONE (50%), gray to dark gray, oolitic with secondary calcite; shale (50%), gray, green and maroon.	
40	40.0' - 65.0' Limestone (60%); shale (40%).	
50		Slight loss of circulation at 51 ft
65	65.0' - 90.0' Limestone (70%); shale (30%).	
90	90.0' - 100.0' Limestone (80%); shale (20%).	Interval cored from 89.5 ft to 100.0 ft
100		
110		

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
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LITHOLOGIC LOG

BORING NO. UNP-3			
PROJECT ORGDP Monitor-Well Installation Program - Phase I			
LOCATION K-25 Plant, K-1070-B	K-25 PLANT COORDINATES SOUTH 24,667.35 EAST 427.81	SURFACE ELEVATION 779.29 ft msl	TOTAL DEPTH 40.0 ft
GEOLOGIST G. Weiss	SAMPLE INTERVAL Continuous	SAMPLE TYPE Split Spoon	DATE WELL COMPLETED 11-11-85
DRILLER J. Cason	DRILLING CONTRACTOR Alsay, Inc.	DRILLING METHOD Hollow-Stem Auger	RIG TYPE Diedrich D-50
PURPOSE OF BORING Piezometer	GEOPHYSICAL CONTRACTOR None	GEOPHYSICAL LOGS None	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0		CLAY (100%), dark reddish-brown, low plasticity.	
		14.0' - 20.0' Brown, contains silt and fragments of maroon siltstone.	
		20.0' - 34.0' Mottled brown and orange.	
30			Wet at 30 ft
		SILTSTONE (100%), maroon, soft and crumbly.	
40			Auger refusal at 40 ft
10, 20, 50, 60, 70, 80, 90			

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
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LITHOLOGIC LOG

BORING NO.	UNP-4
PROJECT	ORGDP Monitor-Well Installation Program - Phase I

LOCATION	K-25 PLANT COORDINATES	SURFACE ELEVATION	TOTAL DEPTH
K-25 Plant, K-1070-B	SOUTH 24,119.45 EAST 178.07	754.83 ft msl	14.0 ft
GEOLOGIST	**SAMPLE INTERVAL**	**SAMPLE TYPE**	**DATE WELL COMPLETED**
G. Weiss	Continuous	Split Spoon	11-12-85
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
J. Cason	Alsay, Inc.	Hollow-Stem Auger	Diedrich D-50
PURPOSE OF BORING	**GEOPHYSICAL CONTRACTOR**	**GEOPHYSICAL LOGS**	
Piezometer	None	None	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0		CLAY (100%), dark orange to brown, low plasticity, contains some coarse sand, limestone and chert fragments. 5.0' - 14.0' Orange and moderately plastic.	Wet at 4 ft
14			Auger refusal at 14 ft
10			
20			
30			
40			
50			
60			
70			
80			
90			

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
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LITHOLOGIC LOG

BORING NO.	UNP-5
PROJECT	ORGDP Monitor-Well Installation Program - Phase I

LOCATION	K-25 PLANT COORDINATES	SURFACE ELEVATION	TOTAL DEPTH
K-25 Plant, K-1070-B	SOUTH 24,352.48 EAST 475.62	748.95 ft msl	11.5 ft
GEOLOGIST	**SAMPLE INTERVAL**	**SAMPLE TYPE**	**DATE WELL COMPLETED**
D. Hubert	Continuous	Split Spoon	11-13-85
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
J. Cason	Alsay, Inc.	Hollow-Stem Auger	Diedrich D-50
PURPOSE OF BORING	**GEOPHYSICAL CONTRACTOR**	**GEOPHYSICAL LOGS**	
Piezometer	None	None	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0–11.5		CLAY (100%), orange and brown, slightly plastic and contains some rock fragments. 2.0' - 4.0' Moderately plastic. 4.0' - 6.0' Highly plastic. 6.0' - 11.5' Gray, silty, contains some coarse sand.	Wet at 6 ft Auger refusal at 11.5 ft

Depth scale: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90

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LITHOLOGIC LOG

BORING NO. UNW-1	PROJECT ORGDP Monitor-Well Installation Program - Phase I		
LOCATION K-25 Plant, K-1407-B	K-25 PLANT COORDINATES SOUTH 24,839.34 EAST 1,258.57	SURFACE ELEVATION 775.05 ft msl	TOTAL DEPTH 20.0 ft
GEOLOGIST A. Laase	SAMPLE INTERVAL 5 feet	SAMPLE TYPE Cuttings	DATE WELL COMPLETED 10-25-85
DRILLER R. Gossage	DRILLING CONTRACTOR Geotek	DRILLING METHOD Hollow-Stem Auger	RIG TYPE Mobile B-53
PURPOSE OF BORING Monitor Well	GEOPHYSICAL CONTRACTOR None	GEOPHYSICAL LOGS None	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0–20		CLAY (100%), red.	
20			Refusal at 20 ft

Depth scale: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
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LITHOLOGIC LOG

BORING NO.	UNW-2
PROJECT	ORGDP Monitor-Well Installation Program - Phase I

LOCATION K-25 Plant, K-1407-B	K-25 PLANT COORDINATES SOUTH 24,523.20 EAST 1,115.48	SURFACE ELEVATION 755.29 ft msl	TOTAL DEPTH 12.3 ft
GEOLOGIST A. Laase	SAMPLE INTERVAL 5 feet	SAMPLE TYPE Cuttings	DATE WELL COMPLETED 10-23-85
DRILLER R. Gossage	DRILLING CONTRACTOR Geotek	DRILLING METHOD Hollow-Stem Auger	RIG TYPE Mobile B-53
PURPOSE OF BORING Monitor Well	GEOPHYSICAL CONTRACTOR None	GEOPHYSICAL LOGS None	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0		CLAY (100%), red.	
10		10.0' - 12.3' Gray and tan.	Refusal at 12.3 ft
20			
30			
40			
50			
60			
70			
80			
90			

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LITHOLOGIC LOG

BORING NO.	UNW-3
PROJECT	ORGDP Monitor-Well Installation Program - Phase I

LOCATION	K-25 PLANT COORDINATES	SURFACE ELEVATION	TOTAL DEPTH
K-25 Plant, K-1407-B	SOUTH 24,512.62 EAST 945.13	754.29 ft msl	11.5 ft
GEOLOGIST	**SAMPLE INTERVAL**	**SAMPLE TYPE**	**DATE WELL COMPLETED**
A. Laase	5 feet	Cuttings	10-23-85
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
R. Gossage	Geotek	Hollow-Stem Auger	Mobile B-53
PURPOSE OF BORING	**GEOPHYSICAL CONTRACTOR**	**GEOPHYSICAL LOGS**	
Monitor Well	None	None	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0			
0–11.5		CLAY (100%), gray and tan.	
11.5			Refusal at 11.5 ft

Depth scale: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
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LITHOLOGIC LOG

BORING NO.	UNW-4
PROJECT	ORGDP Monitor-Well Installation Program - Phase I

LOCATION	K-25 PLANT COORDINATES	SURFACE ELEVATION	TOTAL DEPTH
K-25 Plant, K-1407-B	SOUTH 24,575.84 EAST 799.64	757.73 ft msl	17.0 ft
GEOLOGIST	**SAMPLE INTERVAL**	**SAMPLE TYPE**	**DATE WELL COMPLETED**
A. Laase	5 feet	Cuttings	10-25-85
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
R. Gossage	Geotek	Hollow-Stem Auger	Mobile B-53
PURPOSE OF BORING	**GEOPHYSICAL CONTRACTOR**	**GEOPHYSICAL LOGS**	
Monitor Well	None	None	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0			
		FILL (100%) rock.	
		CLAY (100%), red.	
10			
		15.0' - 17.0' Clay, red and brown, hard.	Refusal at 17 ft
20			
30			
40			
50			
60			
70			
80			
90			

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
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LITHOLOGIC LOG

BORING NO. UNW-5			
PROJECT ORGDP Monitor-Well Installation Program - Phase I			
LOCATION K-25 Plant, K-1407-B	K-25 PLANT COORDINATES SOUTH 24,670.00 EAST 798.62	SURFACE ELEVATION 758.11 ft msl	TOTAL DEPTH 14.0 ft
GEOLOGIST A. Laase	SAMPLE INTERVAL 5 feet	SAMPLE TYPE Cuttings	DATE WELL COMPLETED 10-29-85
DRILLER R. Gossage	DRILLING CONTRACTOR Geotek	DRILLING METHOD Hollow-Stem Auger	RIG TYPE Mobile B-53
PURPOSE OF BORING Monitor Well	GEOPHYSICAL CONTRACTOR None	GEOPHYSICAL LOGS None	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0			
		SHALE, (100%), weathered, maroon and clay.	
10		CLAY, (100%), gray.	
		SHALE, (100%)	Refusal at 14 ft
20			
30			
40			
50			
60			
70			
80			
90			

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
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LITHOLOGIC LOG

BORING NO.	UNW-20
PROJECT	ORGDP Monitor-Well Installation Program - Phase II

LOCATION	K-25 PLANT COORDINATES	SURFACE ELEVATION	TOTAL DEPTH
K-25 Plant, K-1407-B	SOUTH 24,764.33 EAST 985.41	765.12 ft msl	17.5 ft
GEOLOGIST	**SAMPLE INTERVAL**	**SAMPLE TYPE**	**DATE WELL COMPLETED**
A. Motley	5 feet	Cuttings	01-09-87
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
R. Lenning	Middle Georgia	Hollow-Stem Auger	Mobile B-53
PURPOSE OF BORING	**GEOPHYSICAL CONTRACTOR**	**GEOPHYSICAL LOGS**	
Monitor Well	None	None	

DEPTH IN FEET	DESCRIPTION	COMMENTS
0	FILL (100%), clay, silty, dark brown with gravel.	
	CLAY (80%), soft, moist, plastic, dark brown; sand (20%), angular, tan to brown; scattered shale chips.	
10	12.0' - 15.0' Clay is yellowish-brown.	Hit water at 12 ft
	15.0' - 17.5' Clay is grayish-brown.	Refusal at 17.5 ft
20		
30		
40		
50		
60		
70		
80		
90		

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LITHOLOGIC LOG

BORING NO.	UNW-21
PROJECT	ORGDP Monitor-Well Installation Program - Phase II

LOCATION	K-25 PLANT COORDINATES	SURFACE ELEVATION	TOTAL DEPTH
K-25 Plant, K-1407-B	SOUTH 24,640.26 EAST 1,324.06	761.06 ft msl	19.0 ft
GEOLOGIST	**SAMPLE INTERVAL**	**SAMPLE TYPE**	**DATE WELL COMPLETED**
G. Weiss	5 feet	Cuttings	01-27-87
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
D. Wood	Graves Drilling	Air Rotary	Dresser T-70-W
PURPOSE OF BORING	**GEOPHYSICAL CONTRACTOR**	**GEOPHYSICAL LOGS**	
Monitor Well	None	None	

DEPTH IN FEET	DESCRIPTION	COMMENTS
0	ASPHALT	
	FILL (100%), limestone gravel and dark gray, silty clay.	
10	CLAY (100%), brown and orange, contains fragments of weathered shale and limestone, silty in places.	
	SILT (100%), brown, contains fragments of limestone.	
20		Bedrock at 19 ft
30		
40		
50		
60		
70		
80		
90		

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
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LITHOLOGIC LOG

BORING NO. UNW-22			
PROJECT ORGDP Monitor-Well Installation Program - Phase II			
LOCATION K-25 Plant, K-1407-B	K-25 PLANT COORDINATES SOUTH 24,532.53 EAST 1,436.31	SURFACE ELEVATION 763.71 ft msl	TOTAL DEPTH 16.5 ft
GEOLOGIST J. Walker	SAMPLE INTERVAL 5 feet	SAMPLE TYPE Cuttings	DATE WELL COMPLETED 01-03-87
DRILLER R. Lenning	DRILLING CONTRACTOR Middle Georgia	DRILLING METHOD Hollow-Stem Auger	RIG TYPE Mobile B-53
PURPOSE OF BORING Monitor Well	GEOPHYSICAL CONTRACTOR None	GEOPHYSICAL LOGS None	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0			
		FILL (100%), clay and gravel for road base.	
		CLAY (90%), soft, plastic, reddish-brown; silt (10%), brown with scattered limestone fragments.	
10		13.0' - 16.3' Clay is gray-brown with increased silt (30%).	Clay is wet at 10 ft
			Refusal at 16.5 ft
20			
30			
40			
50			
60			
70			
80			
90			

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
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LITHOLOGIC LOG

BORING NO.	UNW-24
PROJECT	ORGDP Monitor-Well Installation Program - Phase II

LOCATION	K-25 PLANT COORDINATES	SURFACE ELEVATION	TOTAL DEPTH
K-25 Plant, K-1407-A	SOUTH 24,877.91 EAST 1,055.30	780.15 ft msl	31.0 ft
GEOLOGIST	**SAMPLE INTERVAL**	**SAMPLE TYPE**	**DATE WELL COMPLETED**
A. Motley	5 feet	Cuttings	01-09-87
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
R. Lenning	Middle Georgia	Hollow-Stem Auger	Mobile B-53
PURPOSE OF BORING	**GEOPHYSICAL CONTRACTOR**	**GEOPHYSICAL LOGS**	
Monitor Well	None	None	

DEPTH IN FEET	DESCRIPTION	COMMENTS
0		
	FILL (100%), clay, gray to brown with gravel.	
10	CLAY (85%), moderately plastic, reddish-brown; silt (15%), brown.	Hit water at 12 ft
	15.0' - 20.0' Scattered, weathered limestone fragments.	
20		
	25.0' - 31.0' Clay is yellowish-brown with silt (10%).	
30		Refusal at 31 ft
40		
50		
60		
70		
80		
90		

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LITHOLOGIC LOG

BORING NO.	UNW-25
PROJECT	ORGDP Monitor-Well Installation Program - Phase II

LOCATION K-25 Plant, K-1407-B	K-25 PLANT COORDINATES SOUTH 24,848.87 EAST 968.27	SURFACE ELEVATION 779.73 ft msl	TOTAL DEPTH 30.0 ft
GEOLOGIST J. Walker	SAMPLE INTERVAL 5 feet	SAMPLE TYPE Cuttings	DATE WELL COMPLETED 01-03-87
DRILLER R. Lenning	DRILLING CONTRACTOR Middle Georgia	DRILLING METHOD Hollow-Stem Auger	RIG TYPE Mobile B-53
PURPOSE OF BORING Monitor Well	GEOPHYSICAL CONTRACTOR None	GEOPHYSICAL LOGS None	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0			
1–6		FILL (100%), clay, gray to brown with gravel.	
6–30		CLAY (90%), soft-firm, plastic, reddish-brown; silt (10%), brown; occasionally sandy.	Clay is wet at 20 ft
30			Refusal at 30 ft

Depth scale: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90

SHEET 1 OF 1

APPENDIX C

K-1700 NPDES DATA

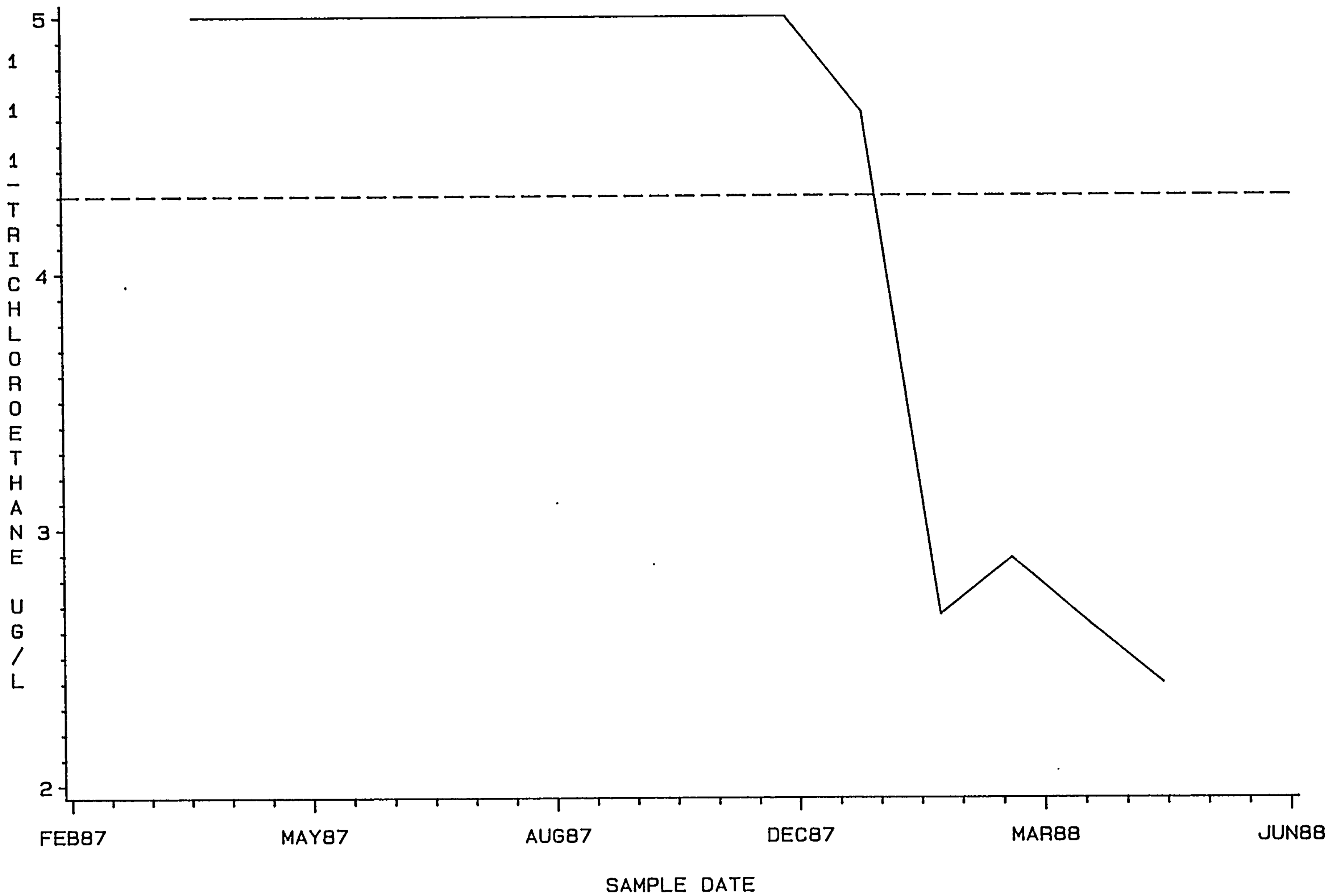
The following graphs present NPDES data for monitoring performed at the K-1700 discharge to Poplar Creek. The following is a key for these graphs:

- UPPER DASHED LINE - NPDES PERMIT LIMIT
- LOWER OR ONLY DASHED LINE - MEAN OF DATA
- CONTINUOUS LINE - ACTUAL DATA

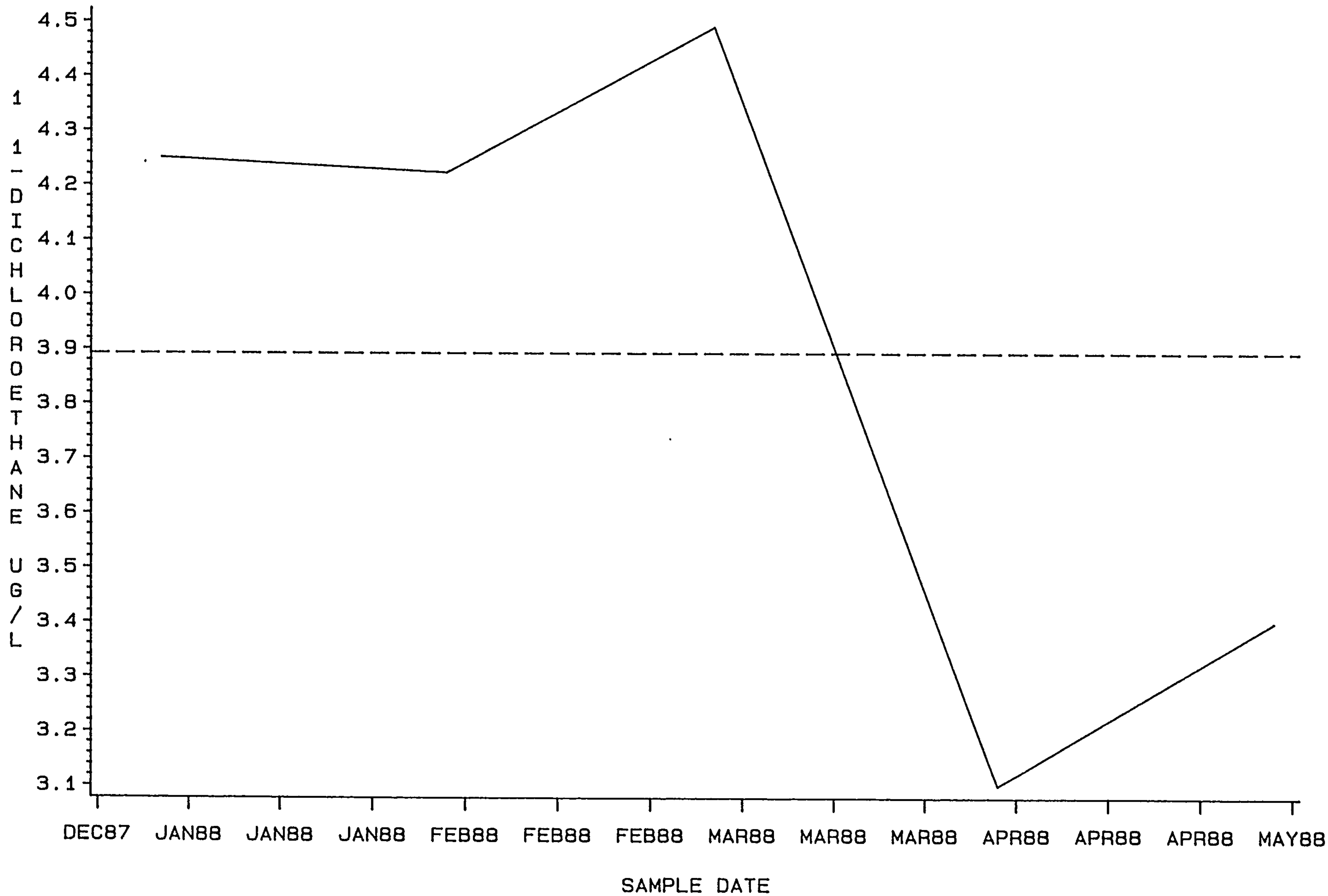
In addition to the analytes illustrated on the following graphs, below are analytes that were monitored (December 1987 - May 1988) but not detected:

- 1,1,2,2-Tetrachloroethane
- 1,1,2-Trichoroethane
- 1,2-Dicholorethane
- 1,2-Dichloropropane
- 2-Chloroethyvinyl ether
- Benzene
- Bromoform
- Chloroethane
- Chloromethane
- CIS-1,3-Dichloropropene
- Dibromochloromethane
- Trans-1,3-dichloropropene

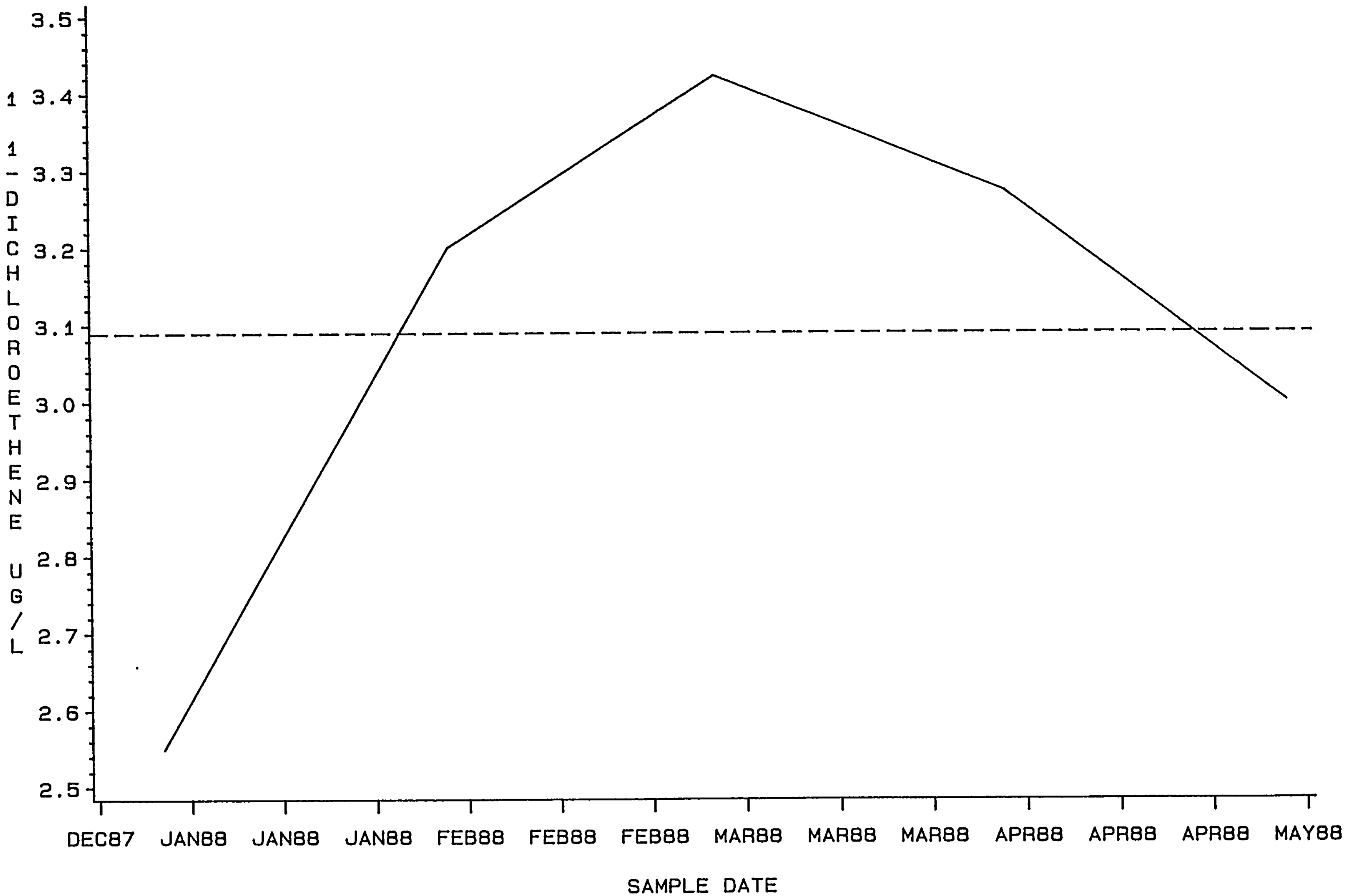
K1700 NPDES DATA – 1 1 1–TRICHLOROETHANE UG/L

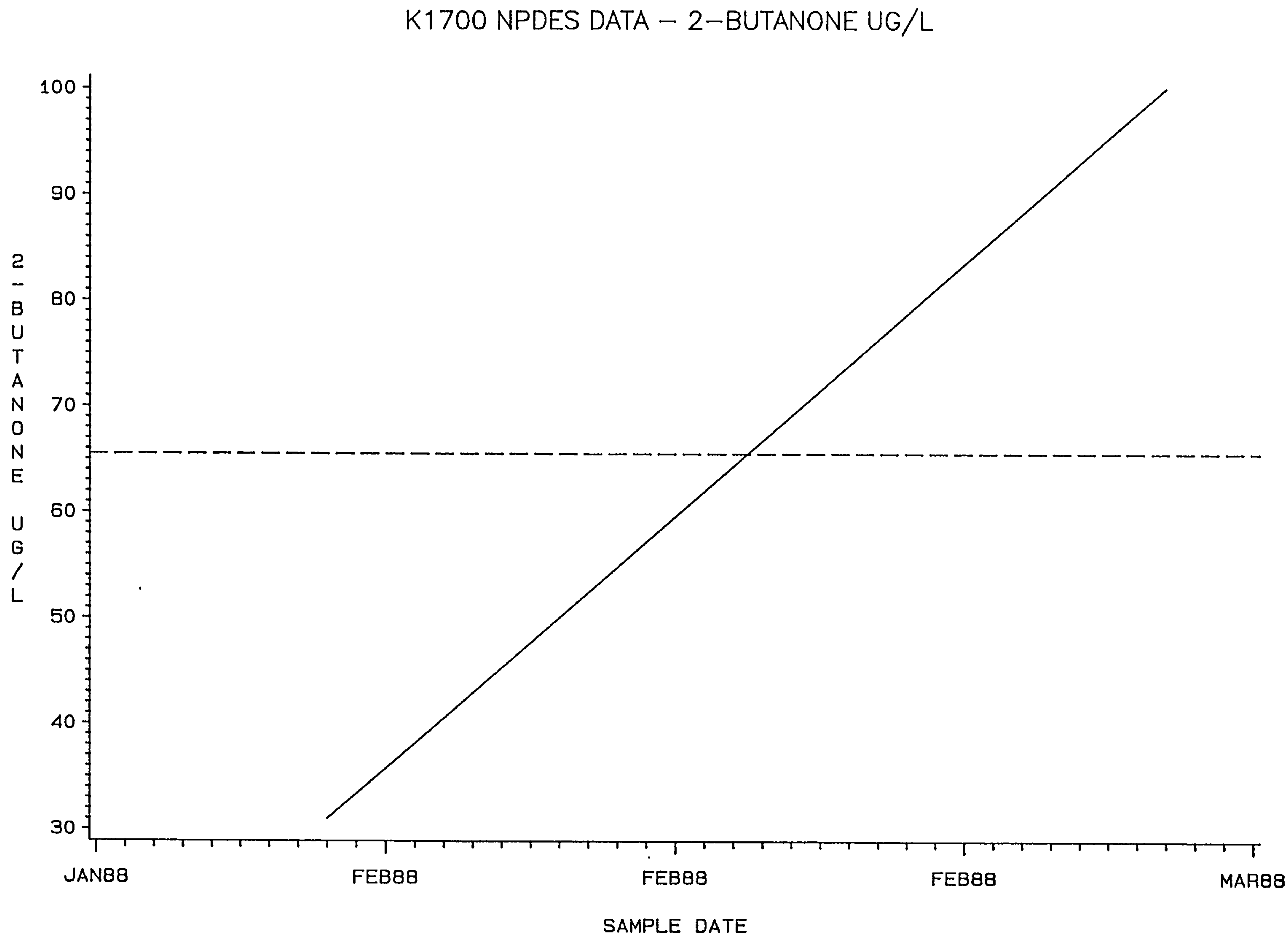


K1700 NPDES DATA – 1 1–DICHLOROETHANE UG/L



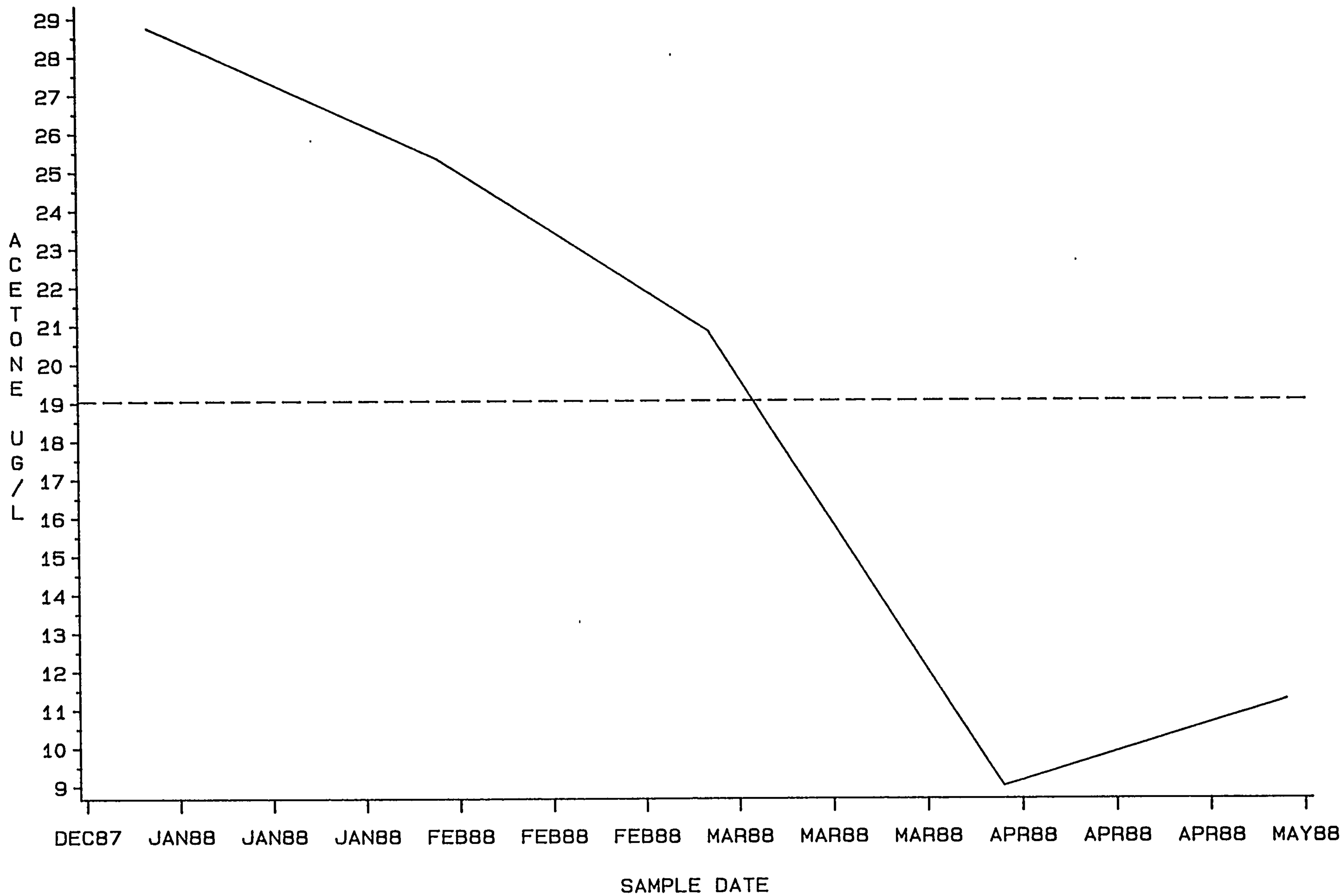
K1700 NPDES DATA – 1 1–DICHLOROETHENE UG/L



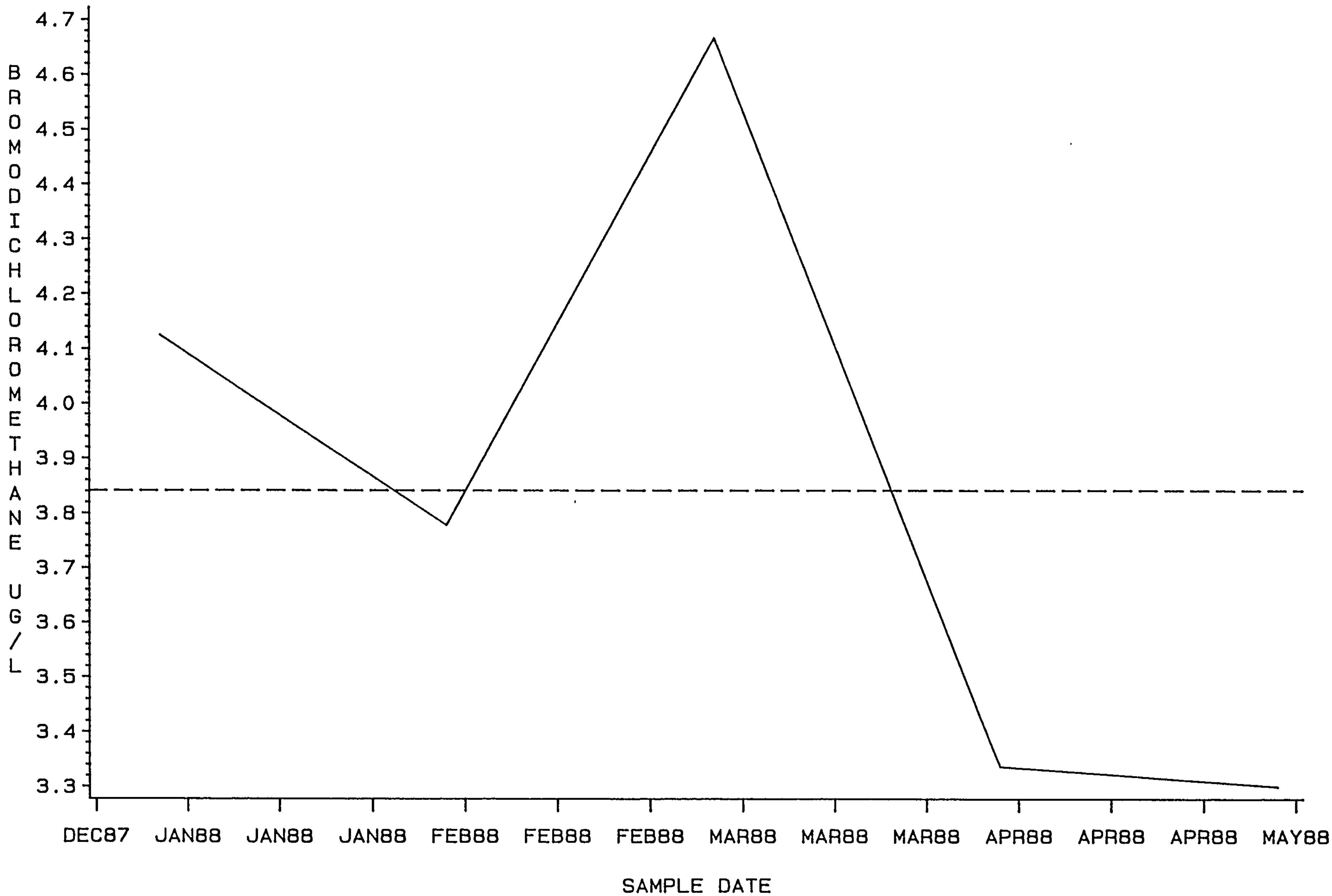


K1700 NPDES DATA – 2–BUTANONE UG/L
2-BUTANONE UG/L
100
90
80
70
60
50
40
30
JAN88
FEB88
FEB88
FEB88
MAR88
SAMPLE DATE

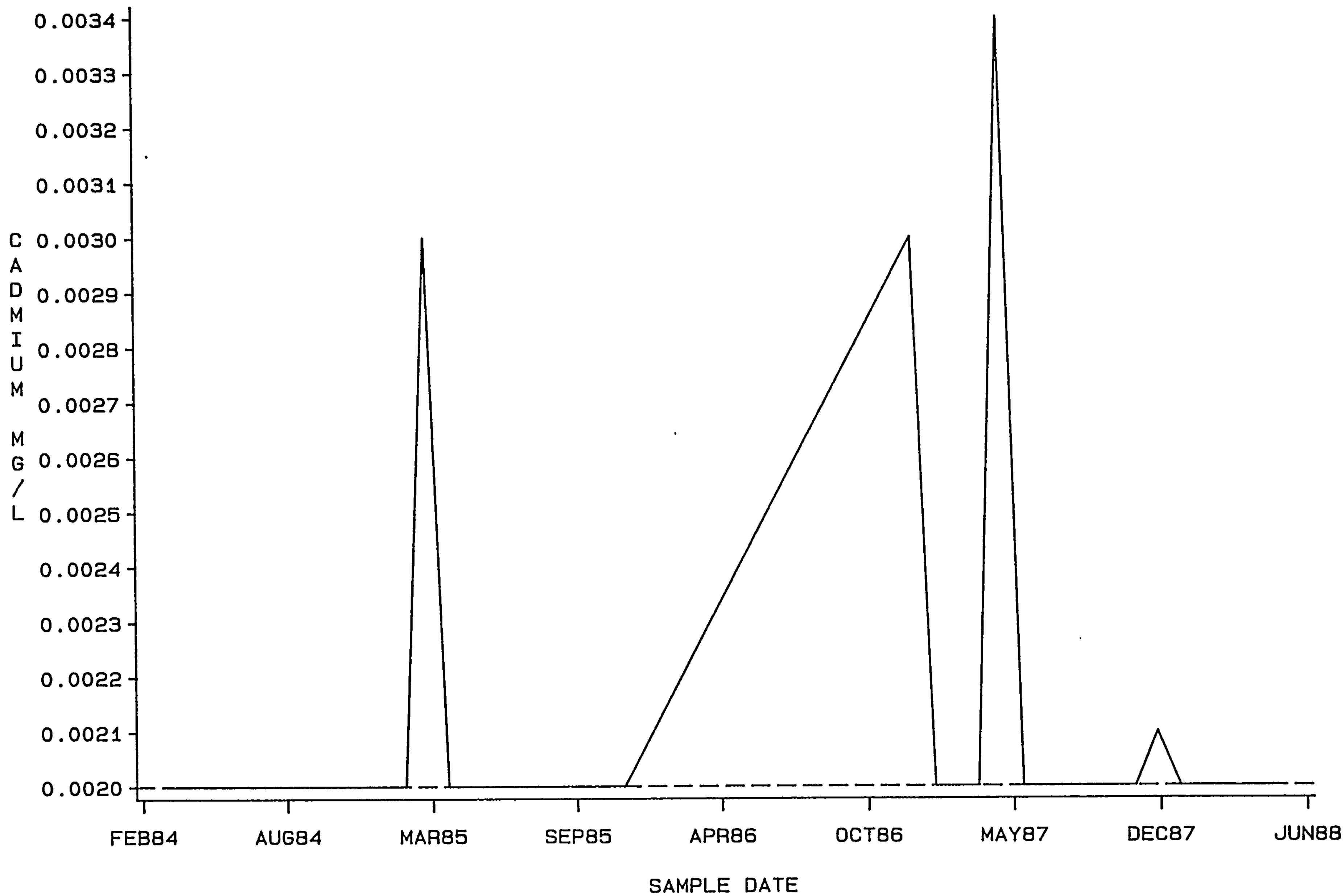
K1700 NPDES DATA – ACETONE UG/L



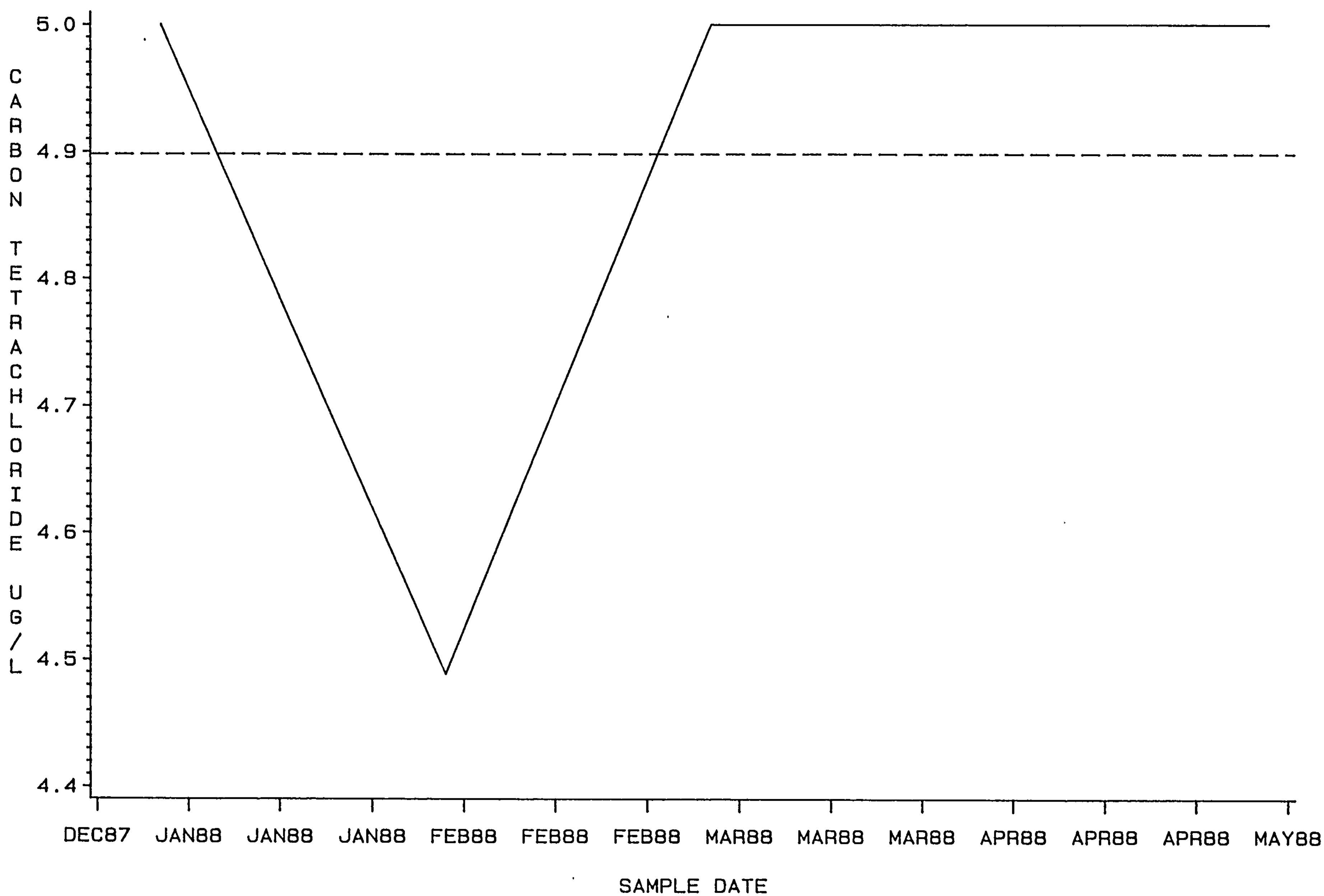
K1700 NPDES DATA – BROMODICHLOROMETHANE UG/L



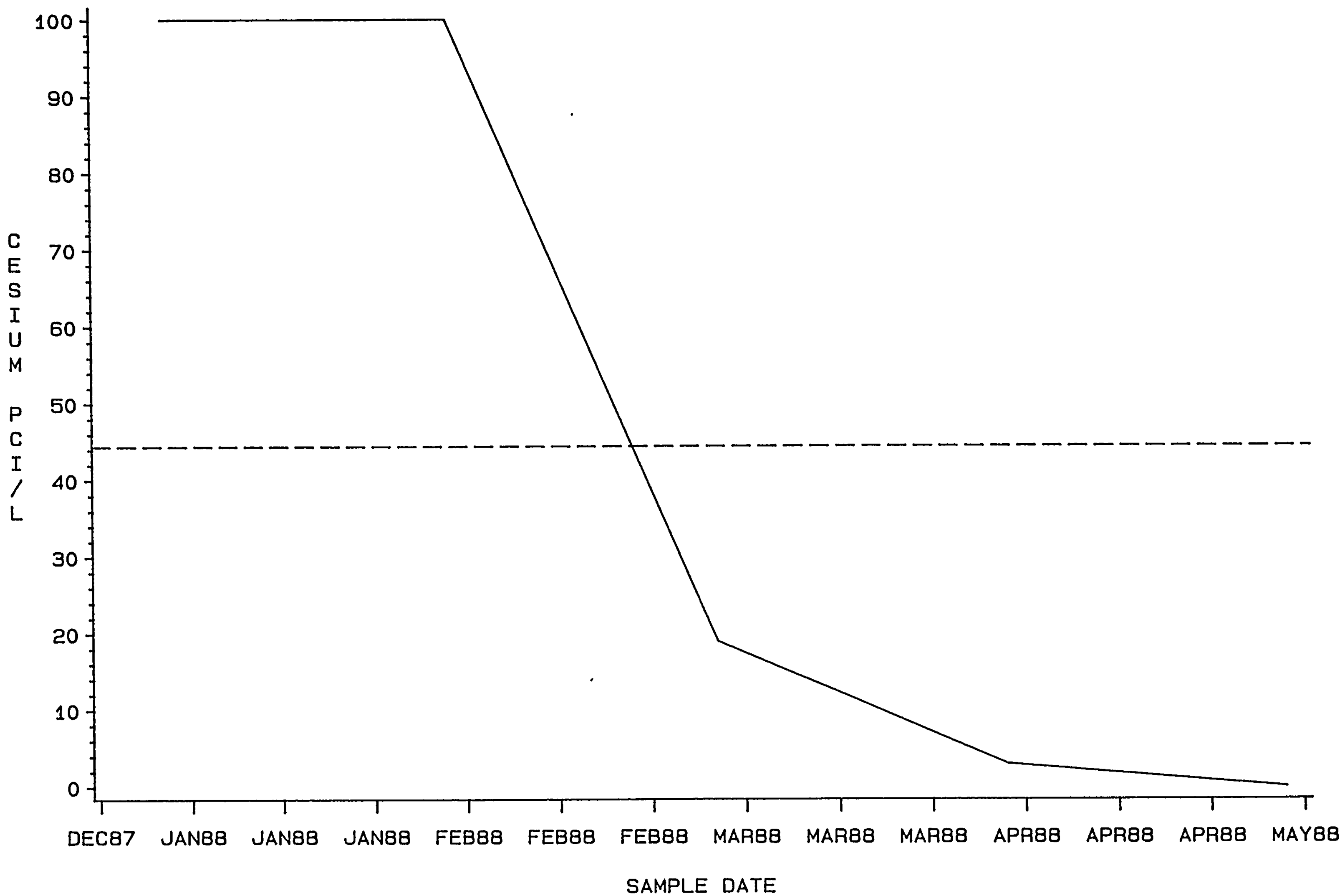
K1700 NPDES DATA – CADMIUM MG/L



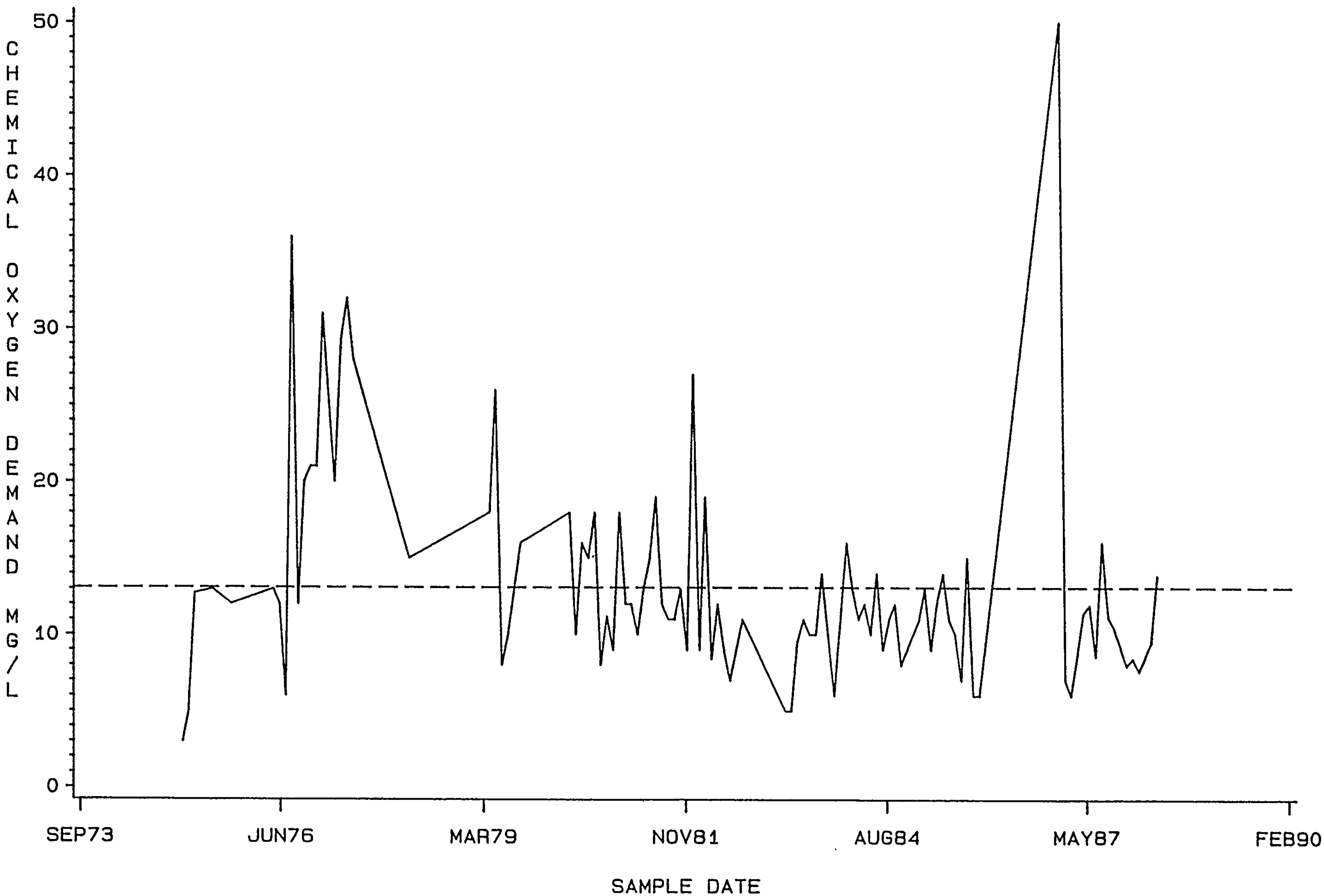
K1700 NPDES DATA – CARBON TETRACHLORIDE UG/L

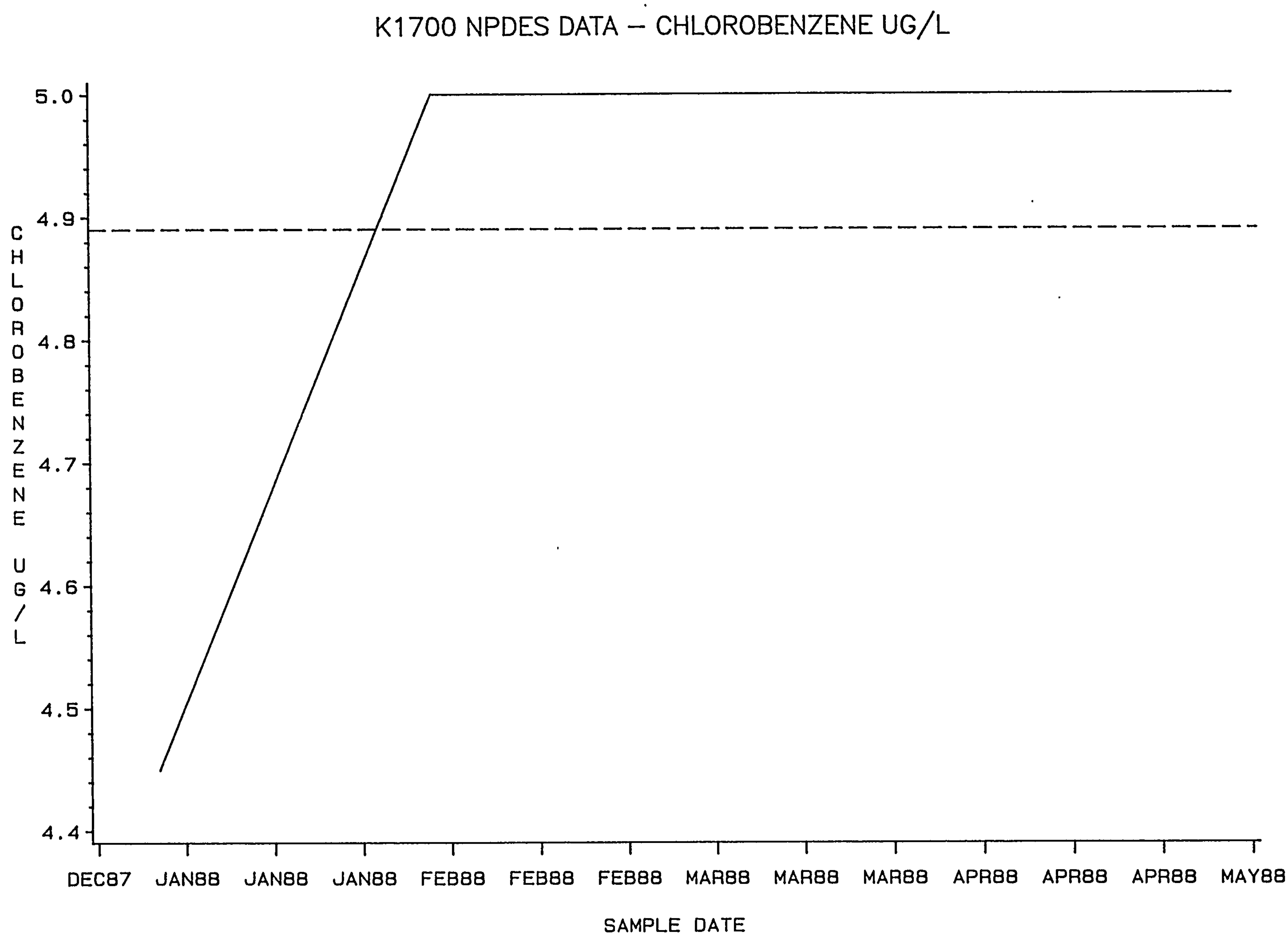


K1700 NPDES DATA – CESIUM PCI/L

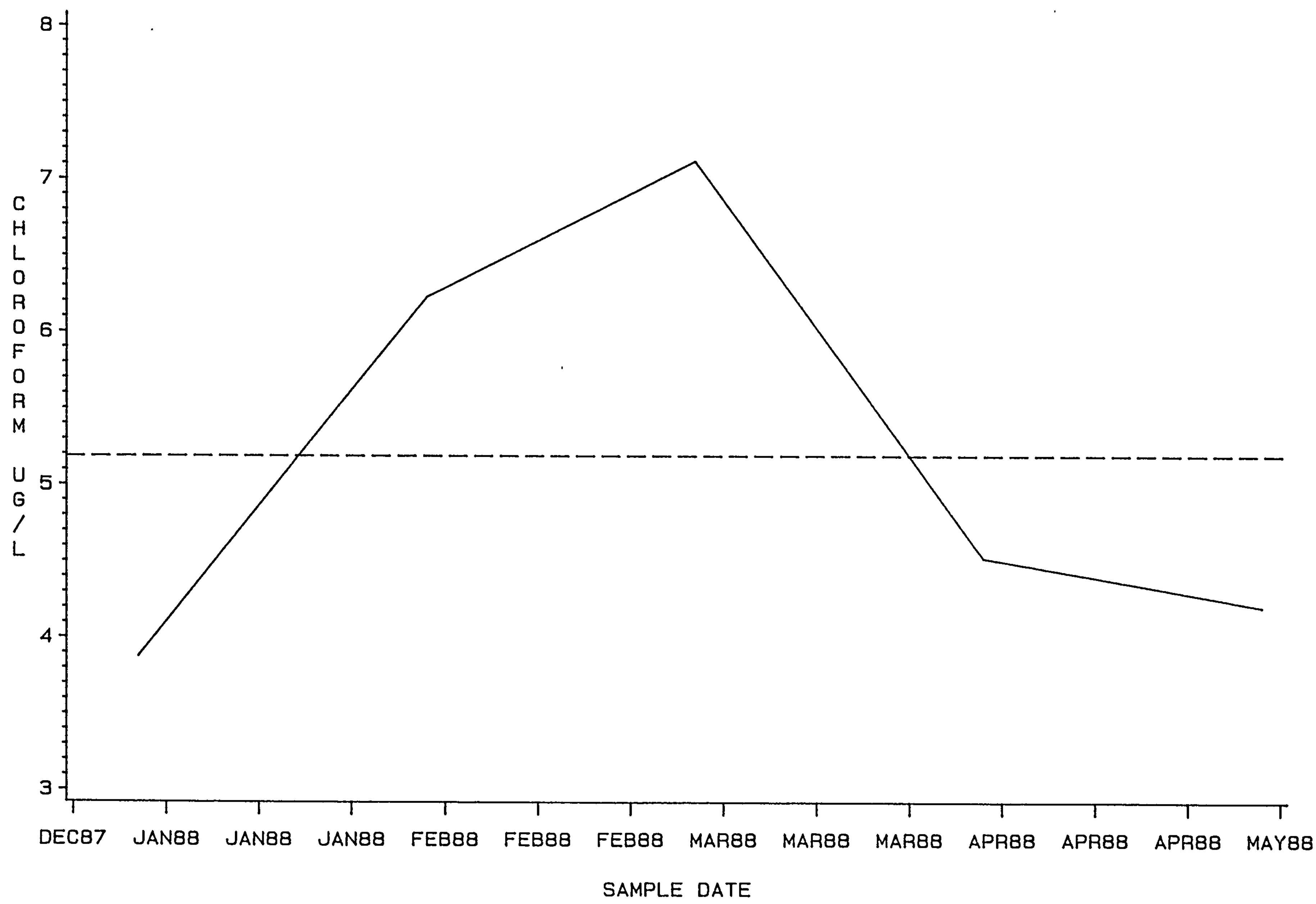


K1700 NPDES DATA — CHEMICAL OXYGEN DEMAND MG/L

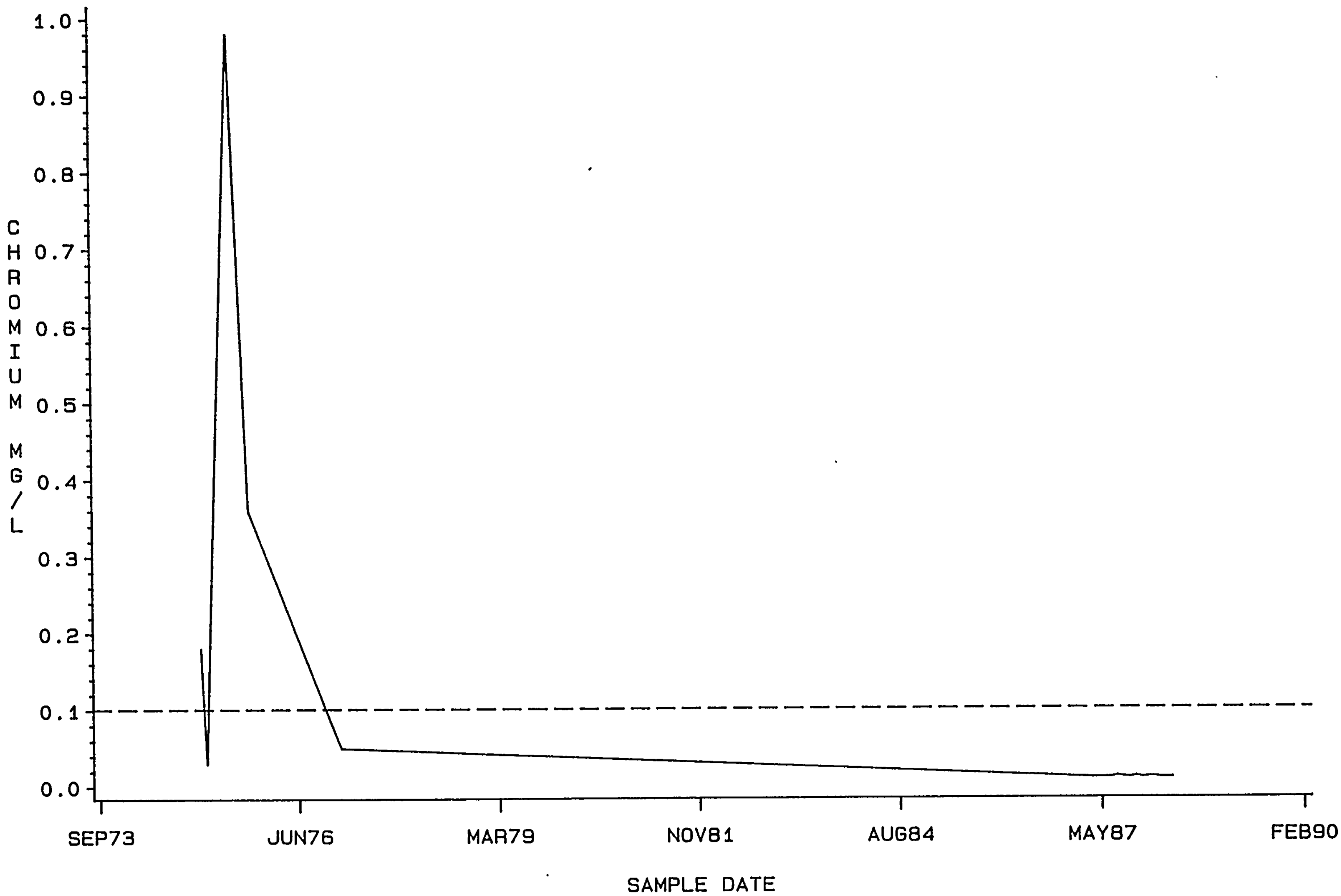



K1700 NPDES DATA – CHLOROBENZENE UG/L
CHLOROBENZENE UG/L
5.0
4.9
4.8
4.7
4.6
4.5
4.4
DEC87
JAN88
JAN88
JAN88
FEB88
FEB88
FEB88
MAR88
MAR88
MAR88
APR88
APR88
APR88
MAY88
SAMPLE DATE

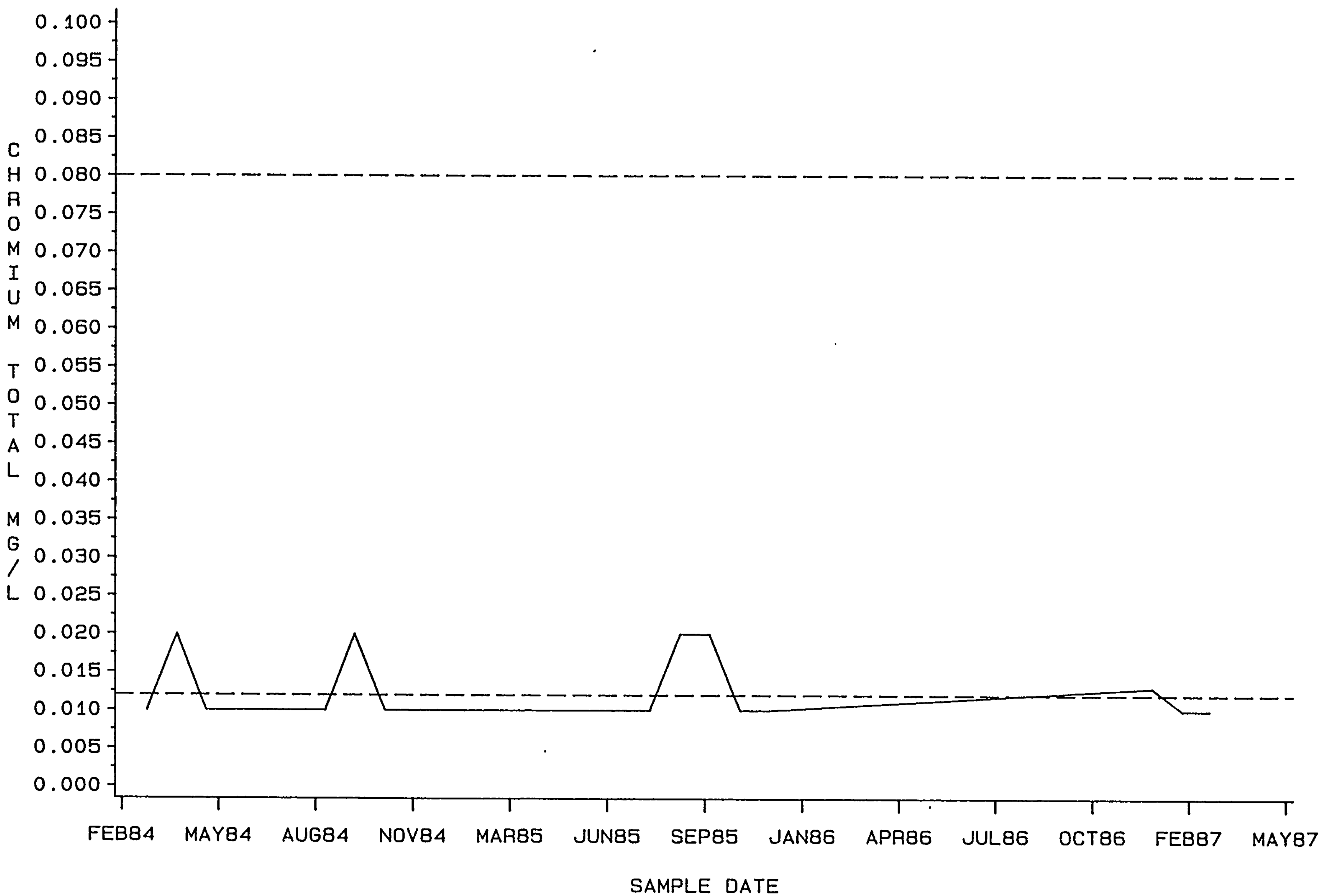
K1700 NPDES DATA — CHLOROFORM UG/L



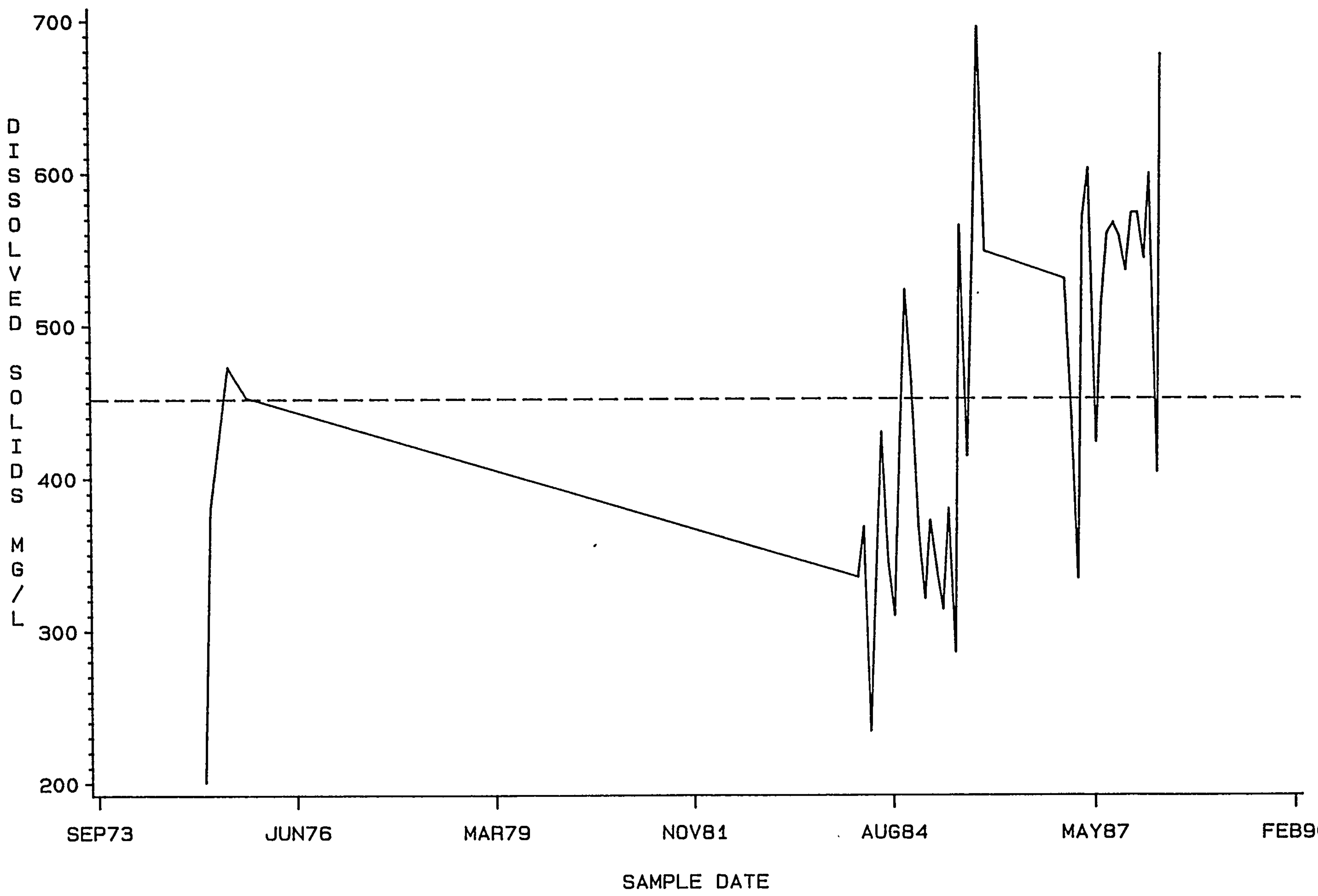
K1700 NPDES DATA – CHROMIUM MG/L



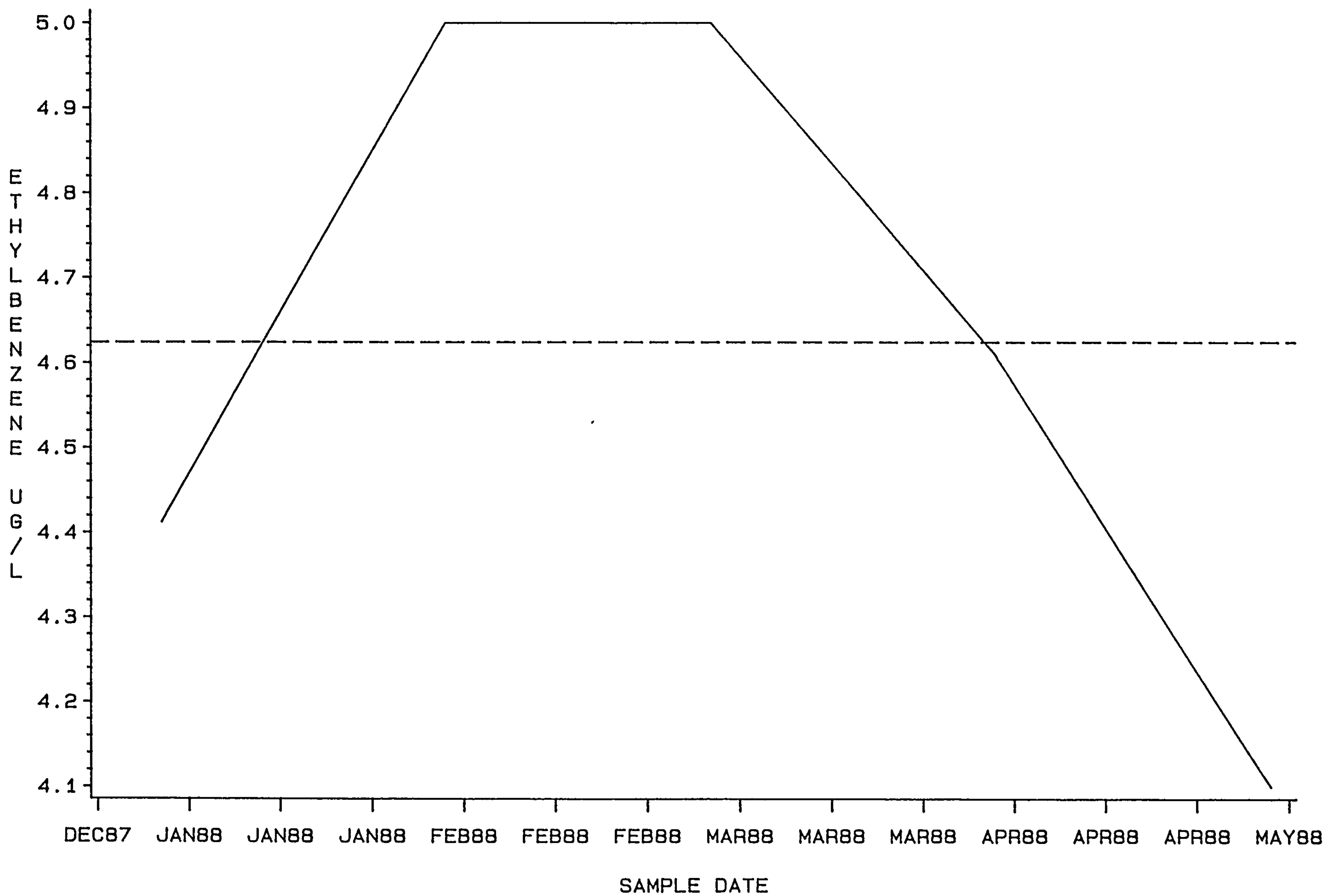
K1700 NPDES DATA – CHROMIUM (TOTAL) MG/L



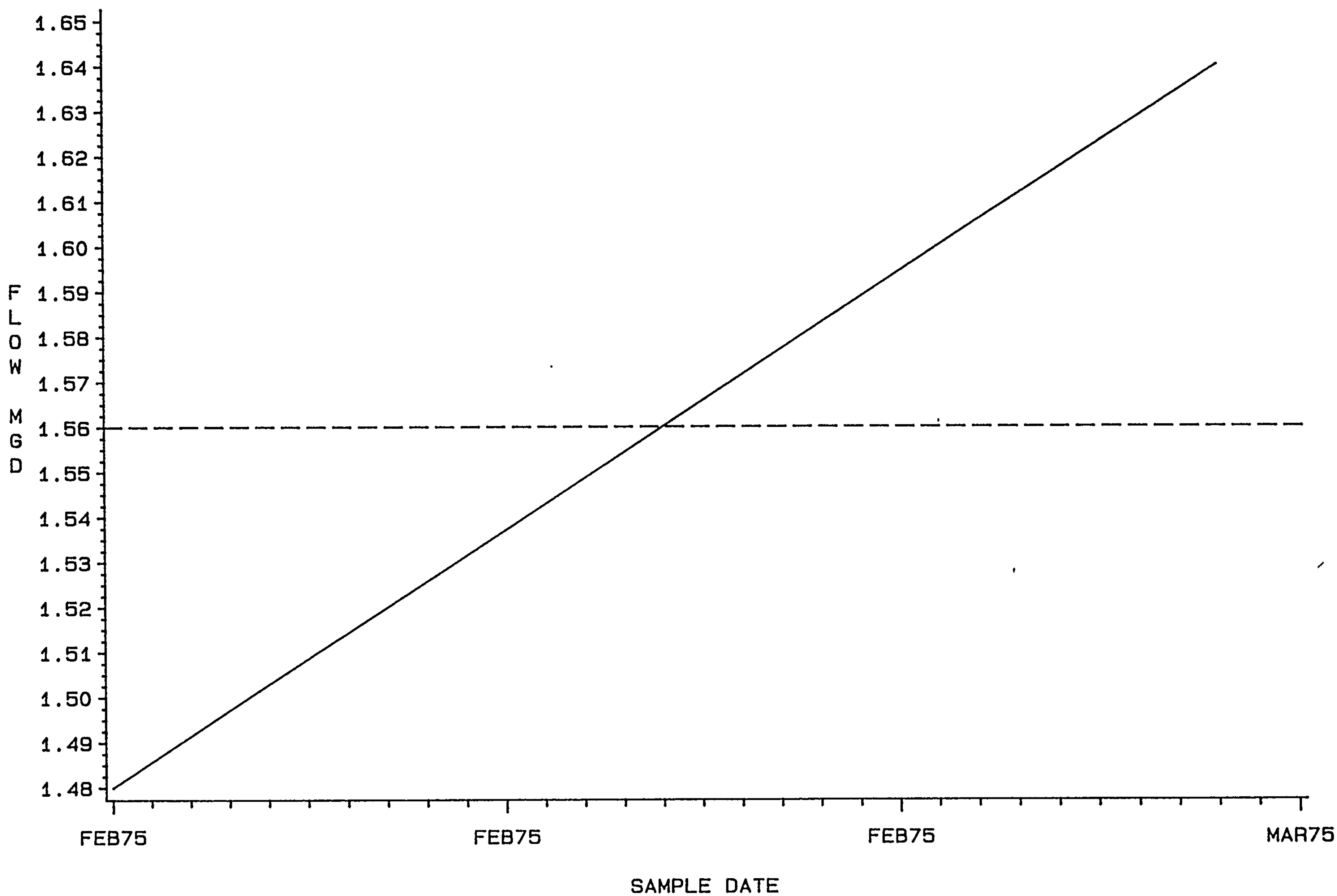
K1700 NPDES DATA – DISSOLVED SOLIDS MG/L



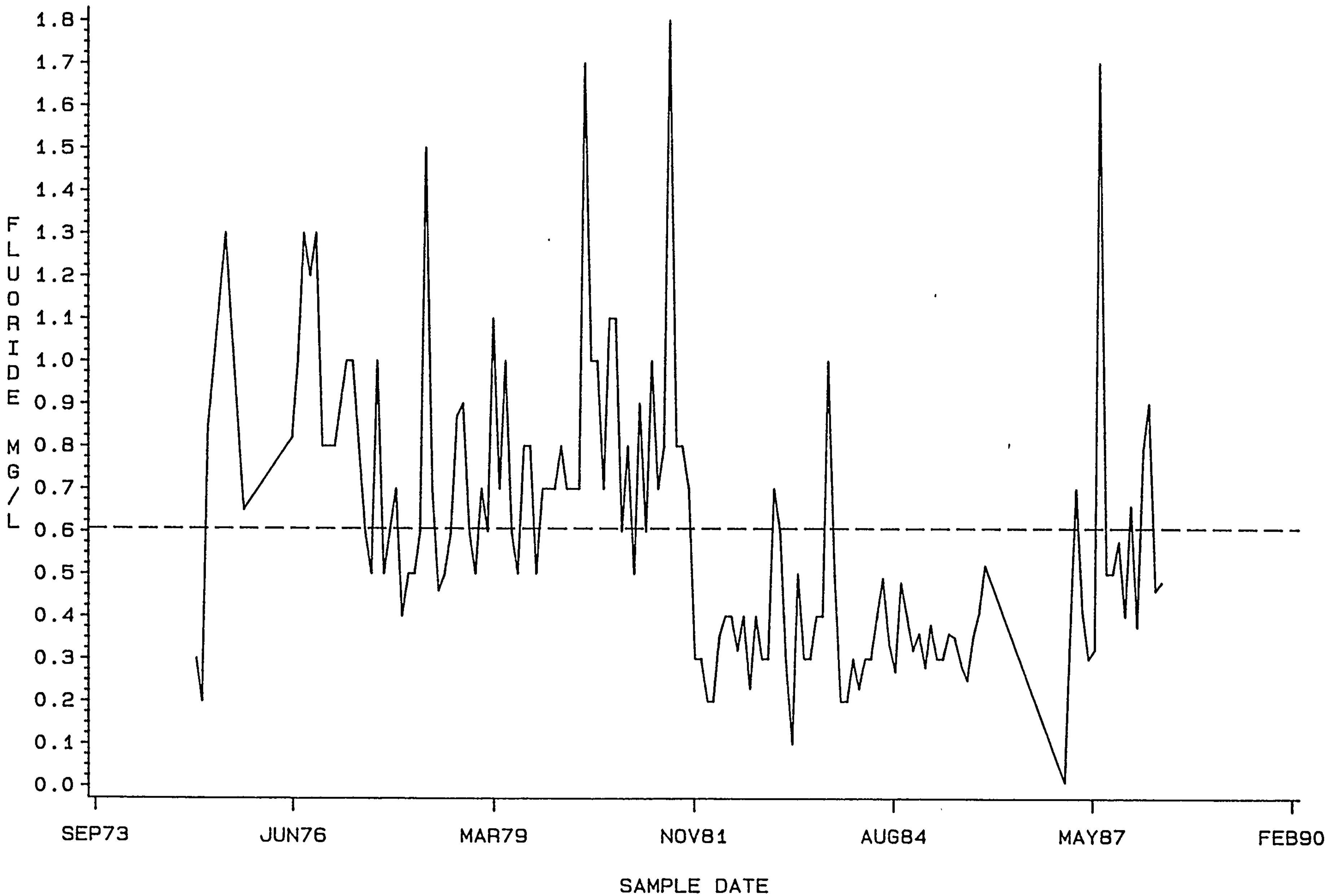
K1700 NPDES DATA – ETHYLBENZENE UG/L



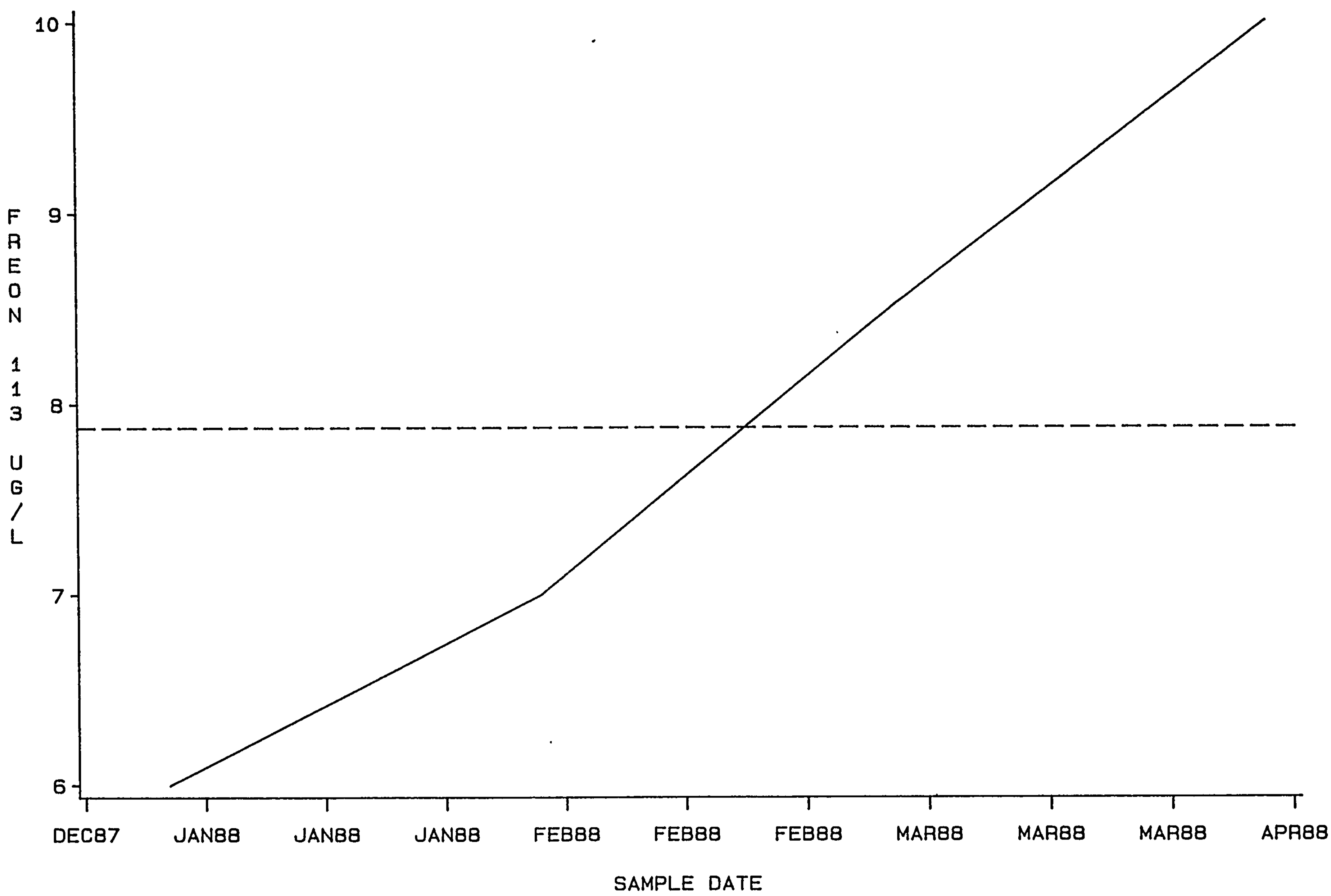
K1700 NPDES DATA — FLOW MGD



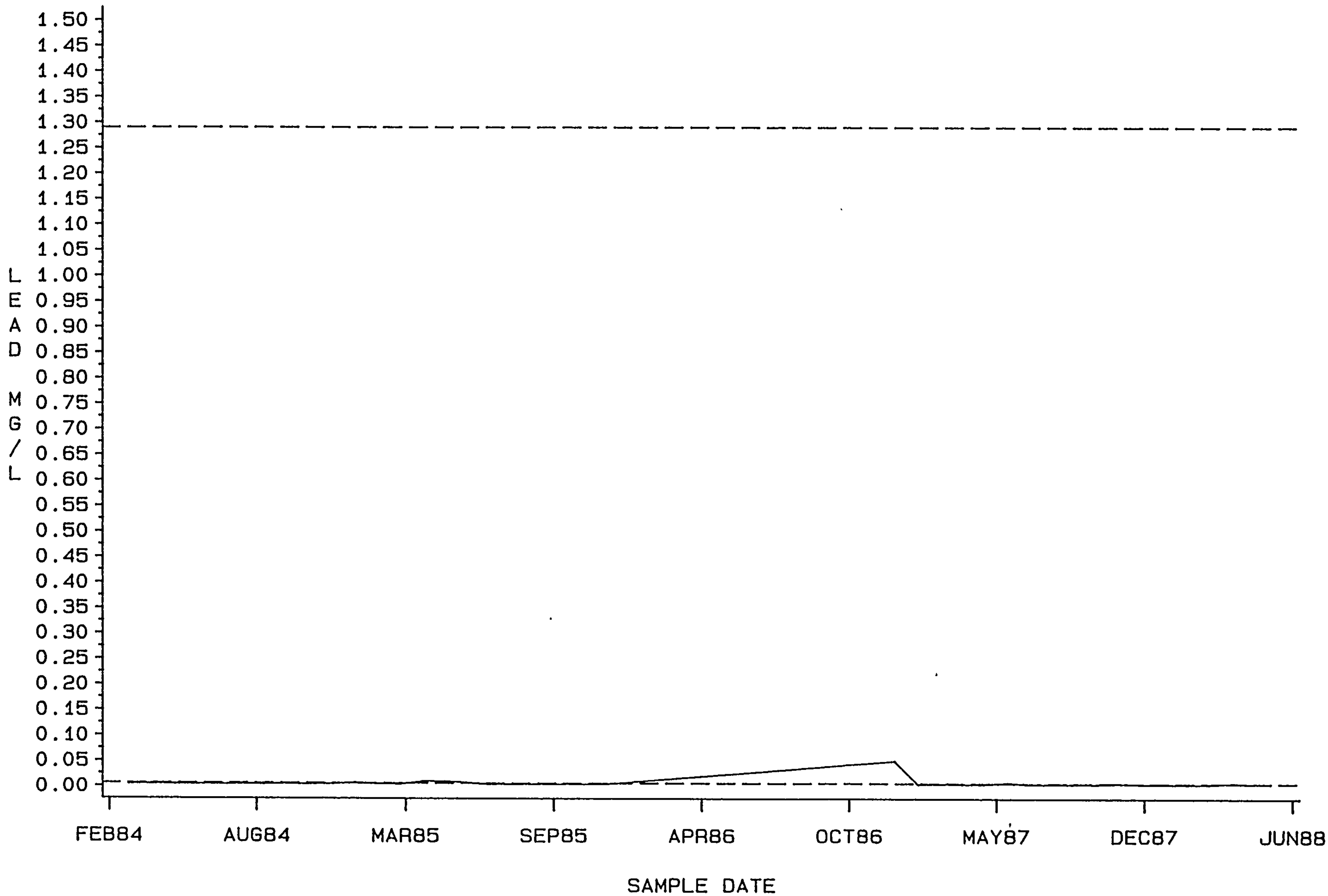
K1700 NPDES DATA – FLUORIDE MG/L



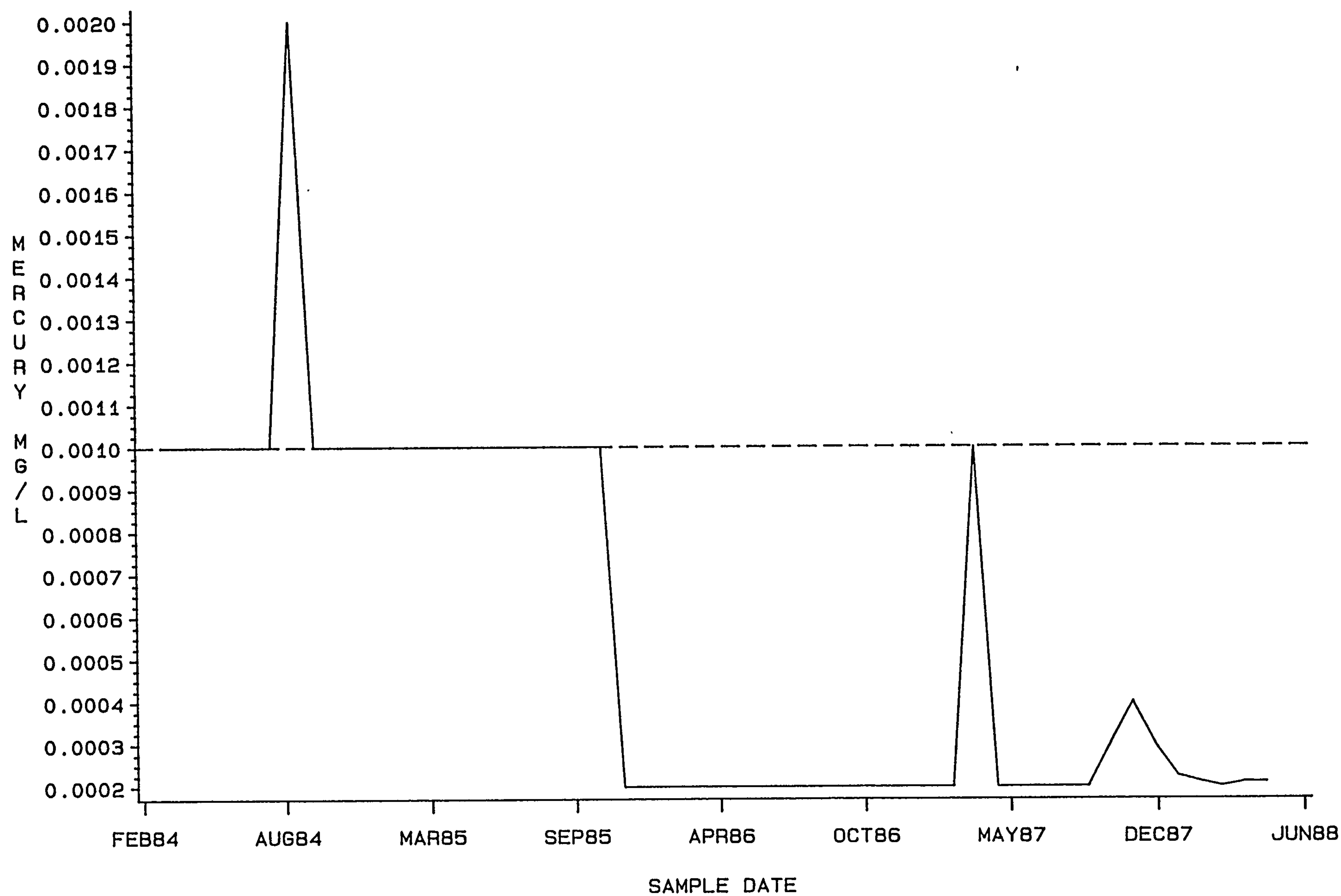
K1700 NPDES DATA — FREON 113 UG/L



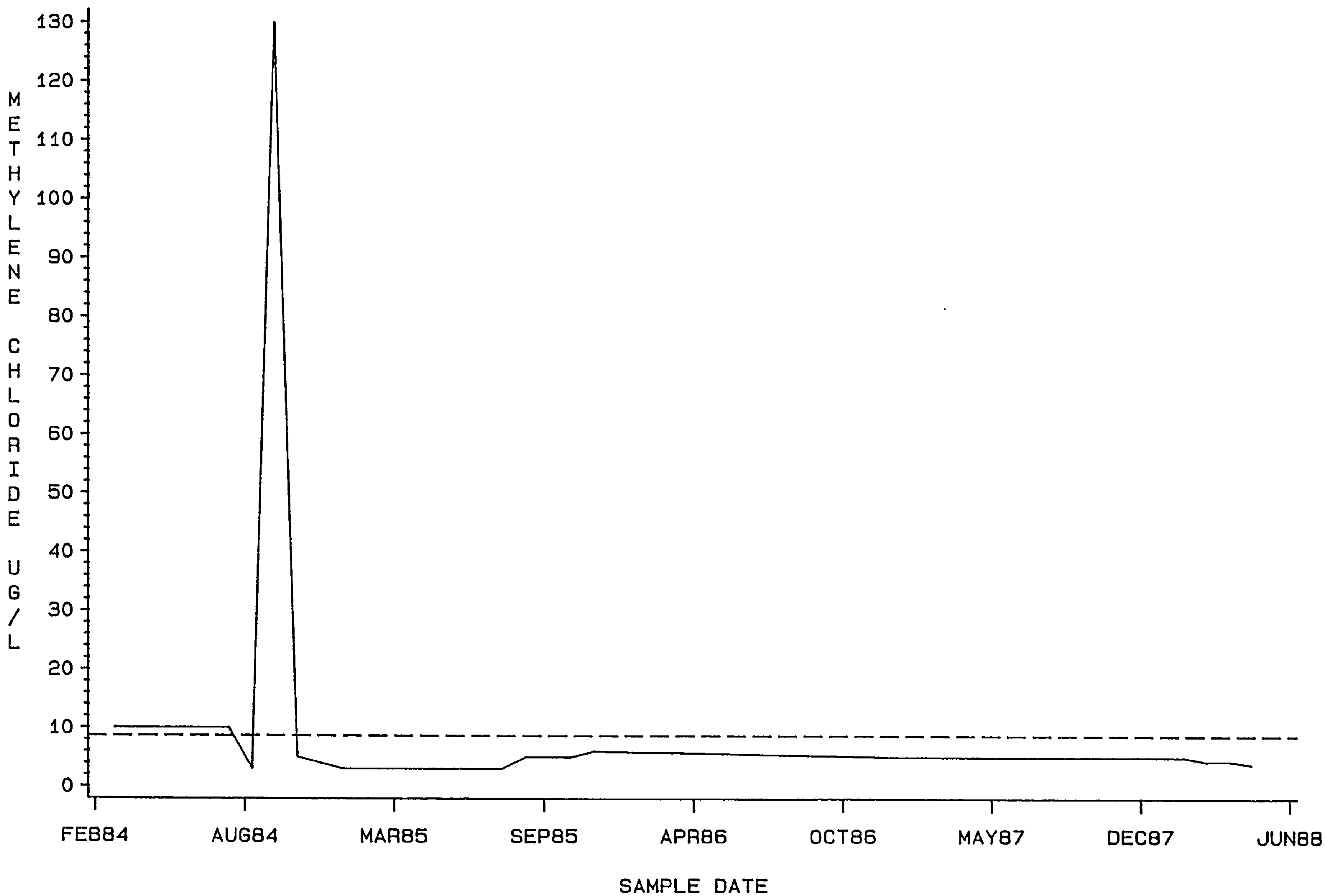
K1700 NPDES DATA – LEAD MG/L



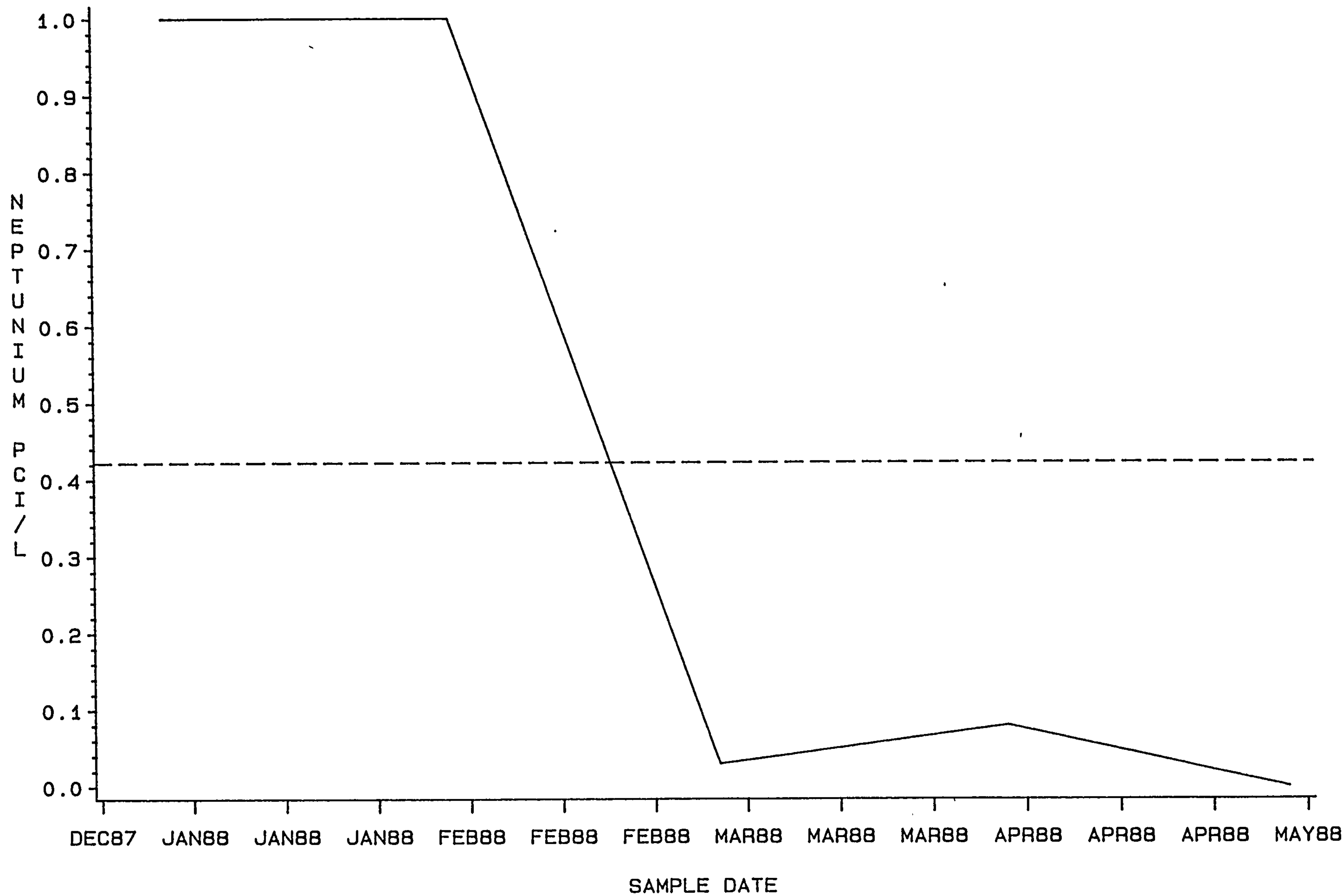
K1700 NPDES DATA — MERCURY MG/L



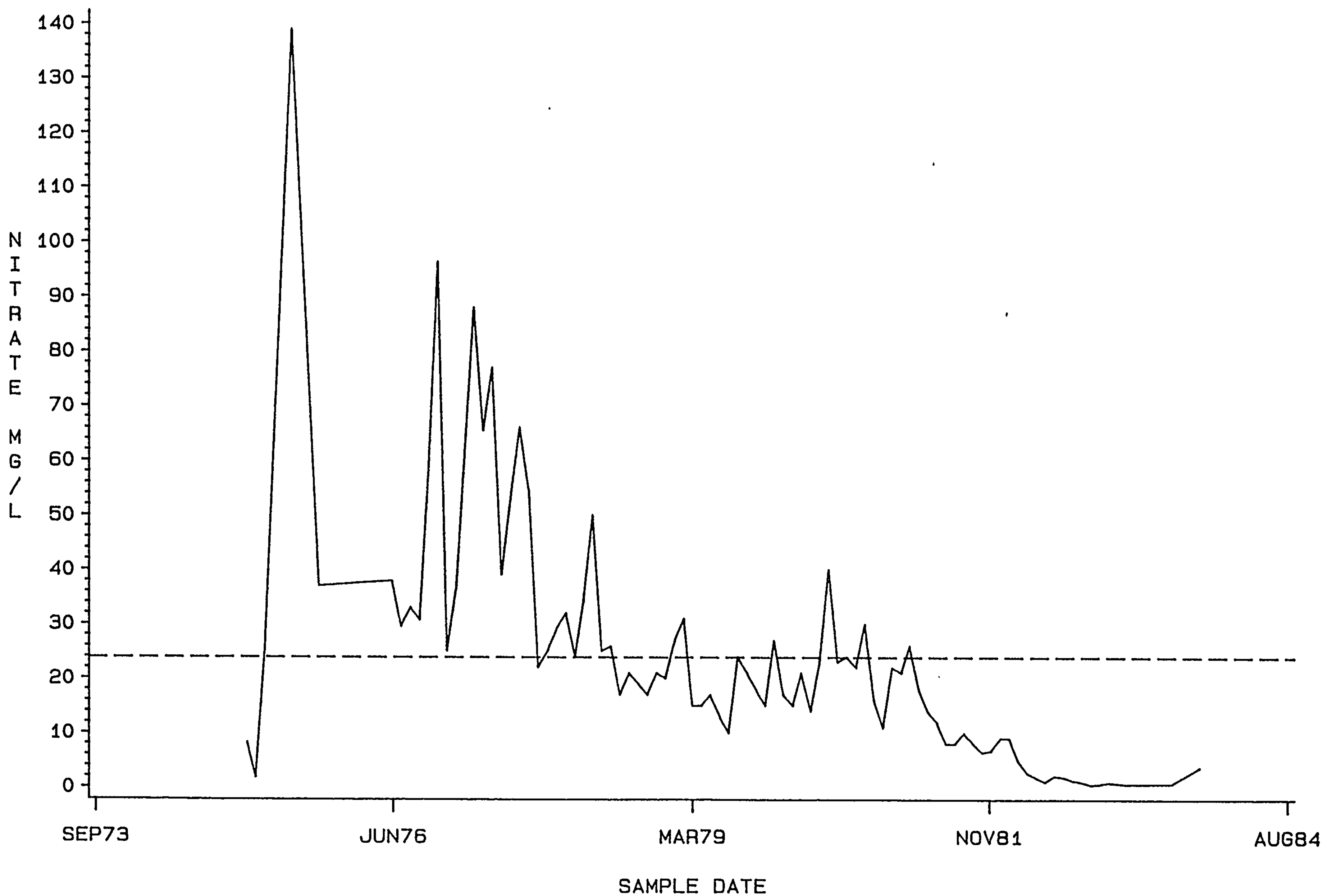
K1700 NPDES DATA – METHYLENE CHLORIDE UG/L



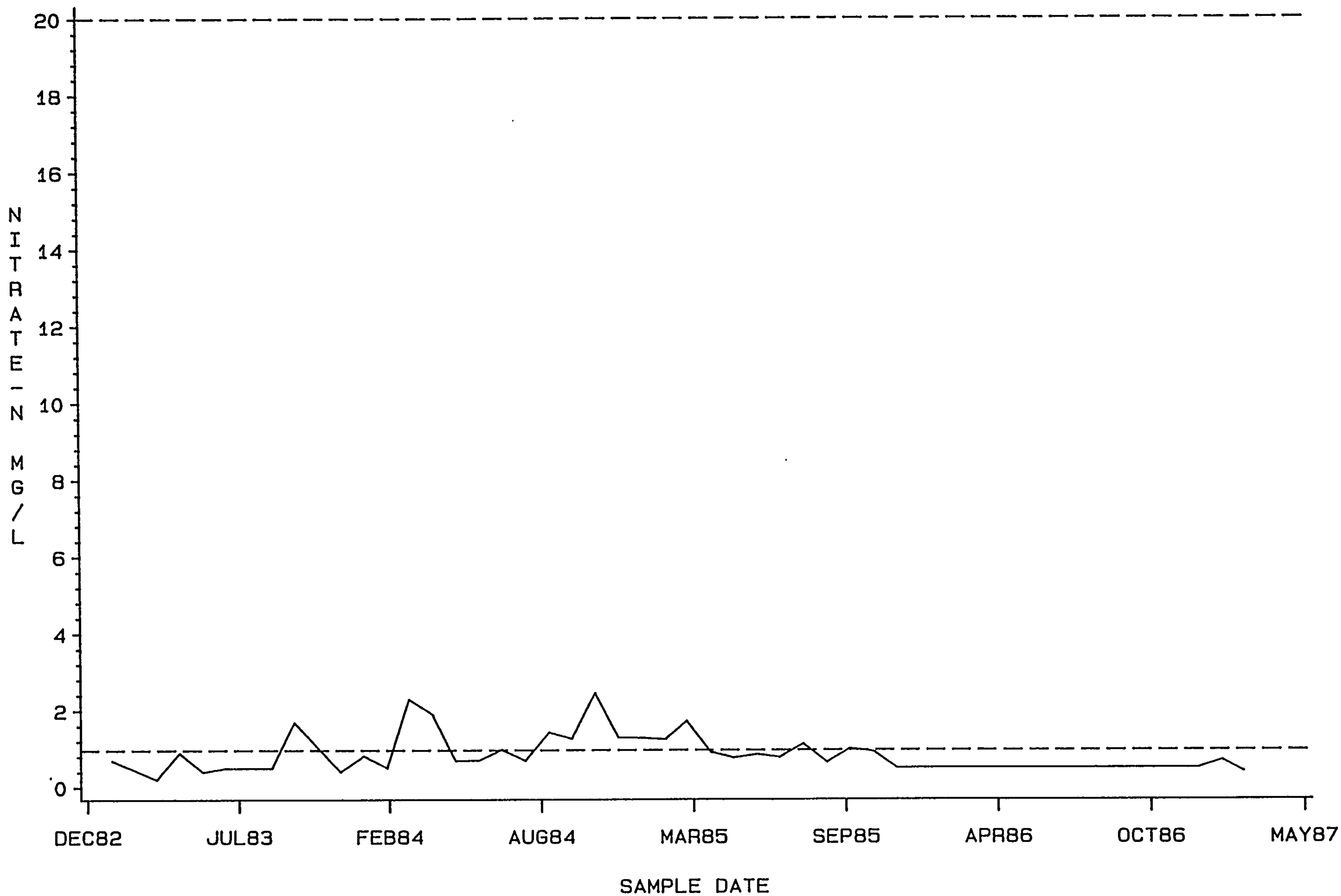
K1700 NPDES DATA – NEPTUNIUM PCI/L



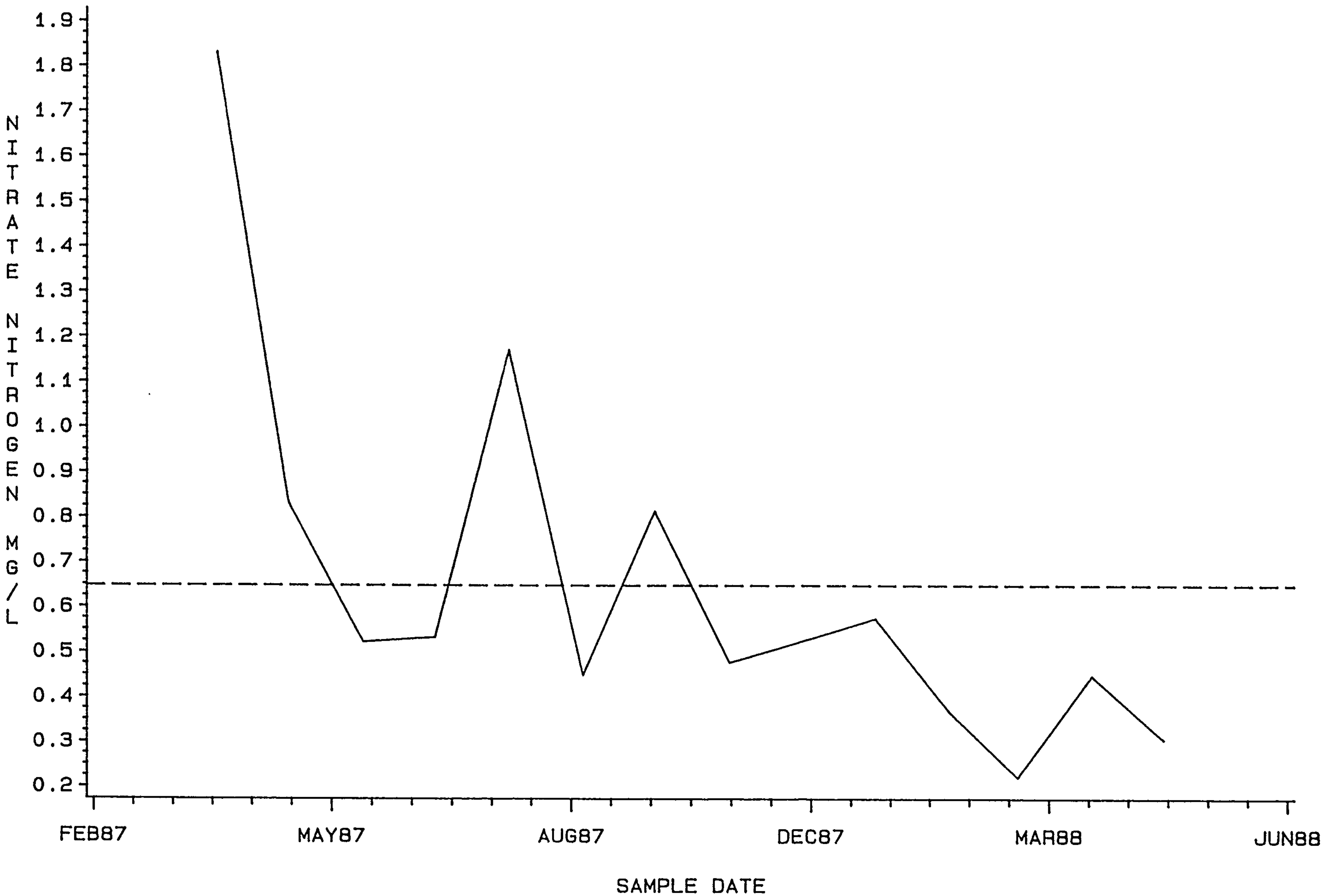
K1700 NPDES DATA – NITRATE MG/L



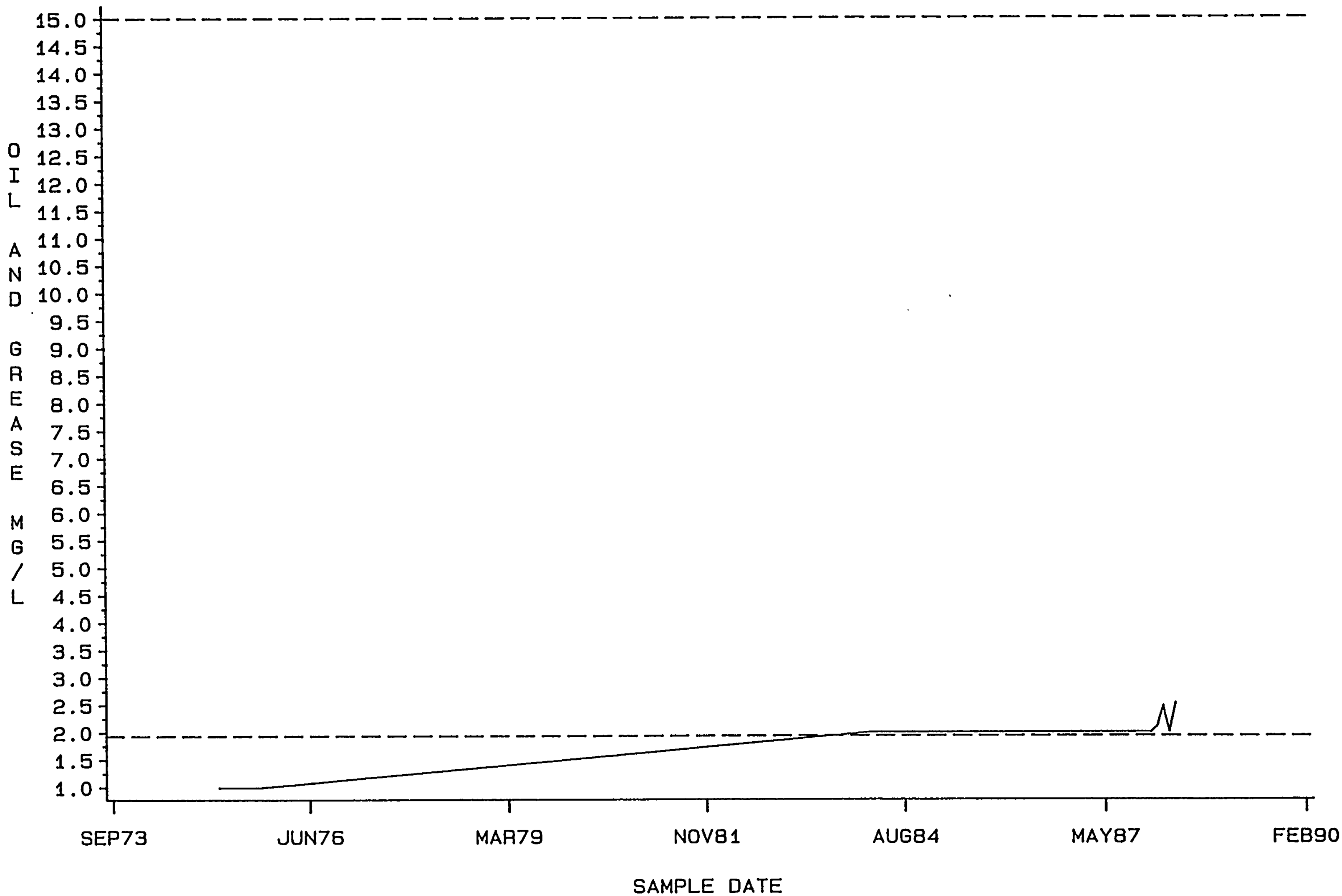
K1700 NPDES DATA – NITRATE–N MG/L



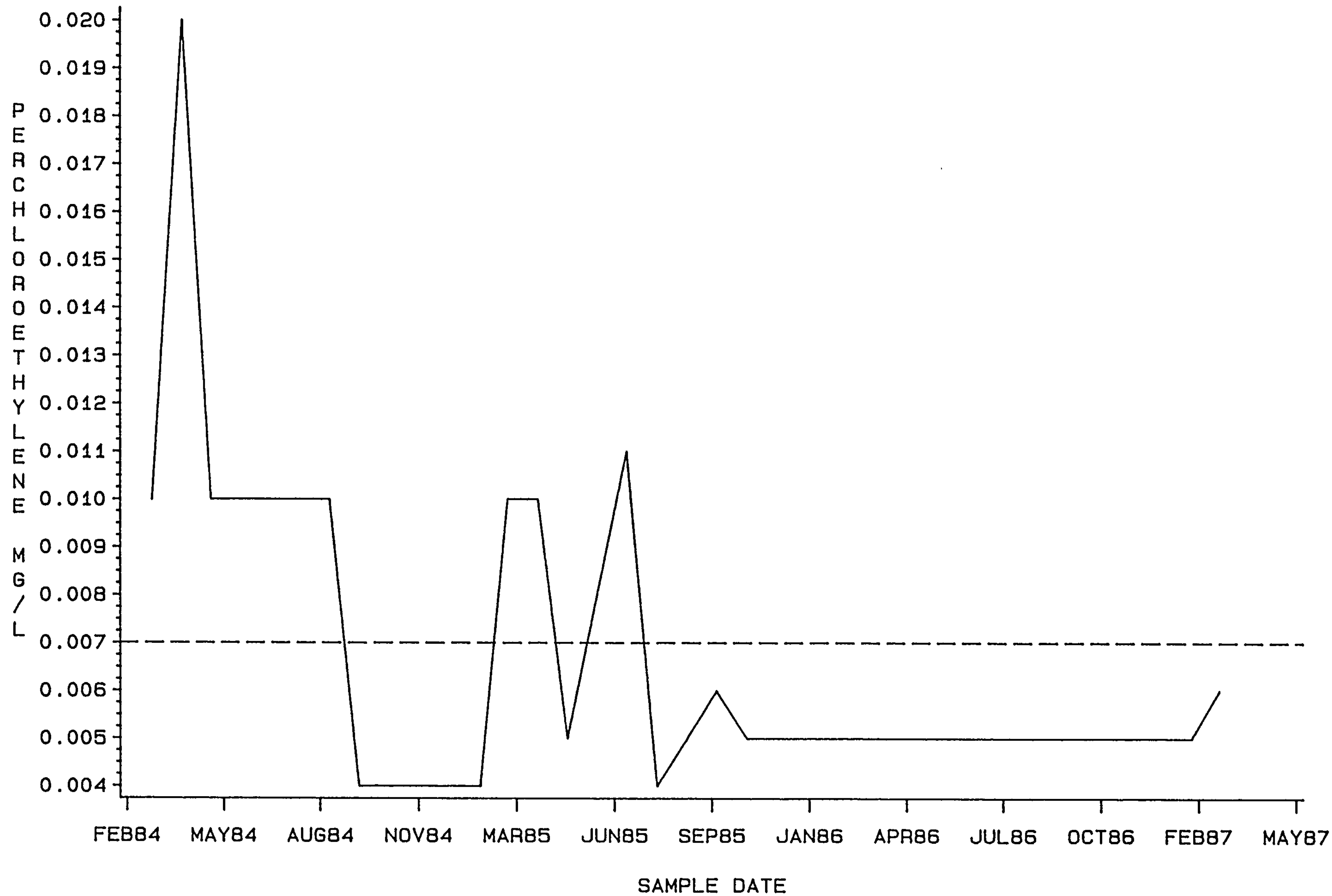
K1700 NPDES DATA – NITRATE NITROGEN MG/L

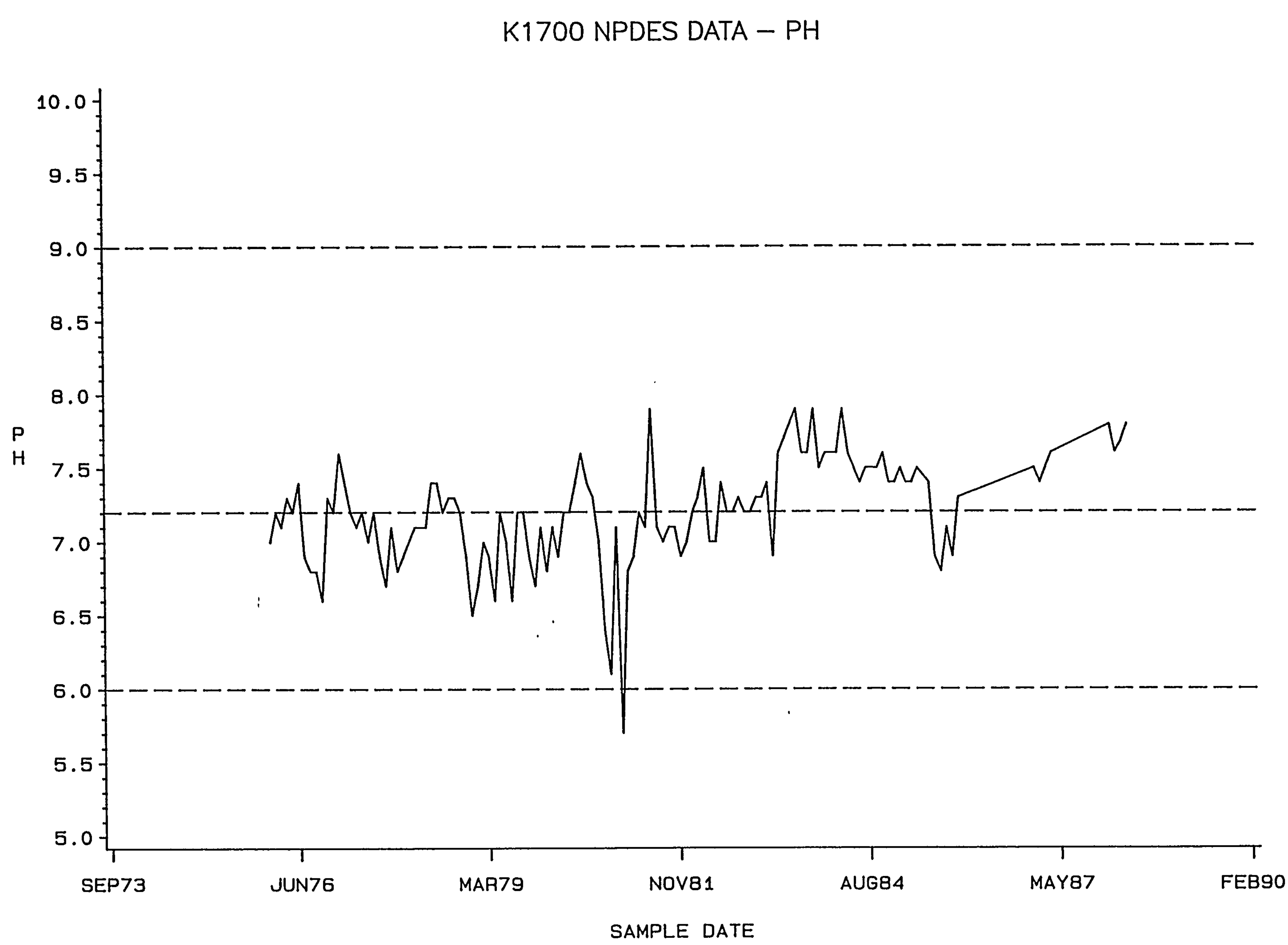


K1700 NPDES DATA — OIL AND GREASE MG/L

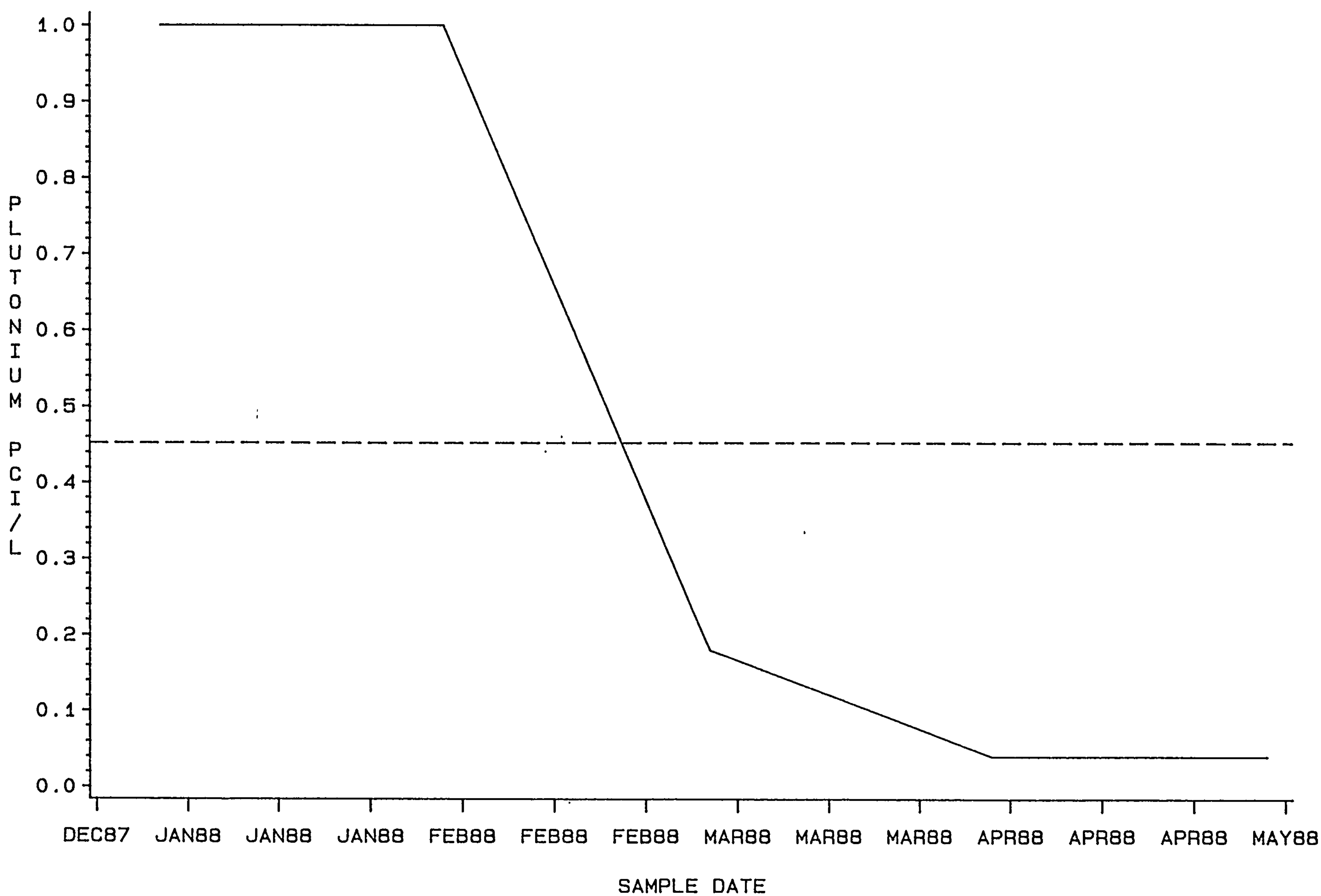


K1700 NPDES DATA – PERCHLOROETHYLENE MG/L

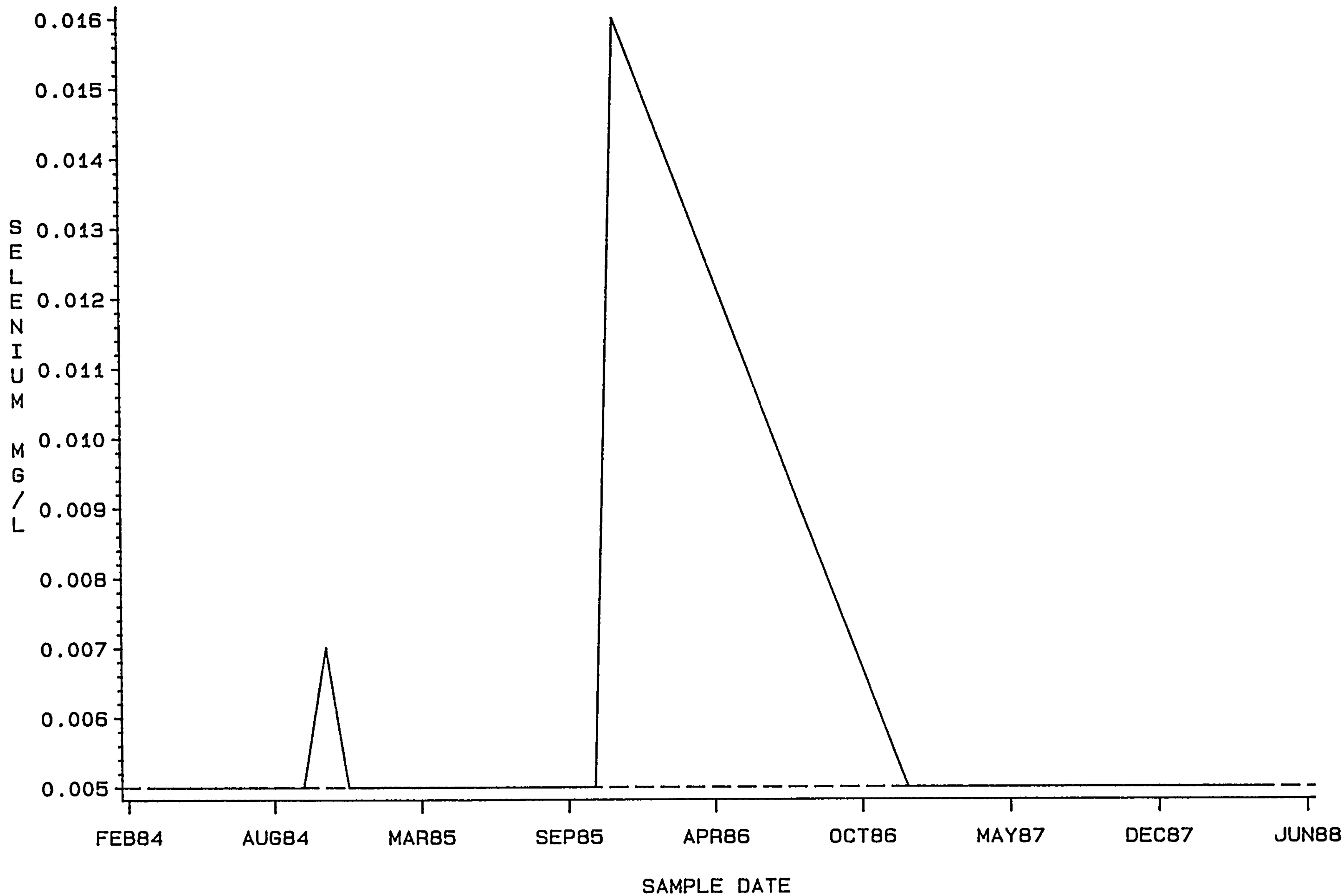



K1700 NPDES DATA – PH
10.0
9.5
9.0
8.5
8.0
7.5
7.0
6.5
6.0
5.5
5.0
PH
SEP73
JUN76
MAR79
NOV81
AUG84
MAY87
FEB90
SAMPLE DATE

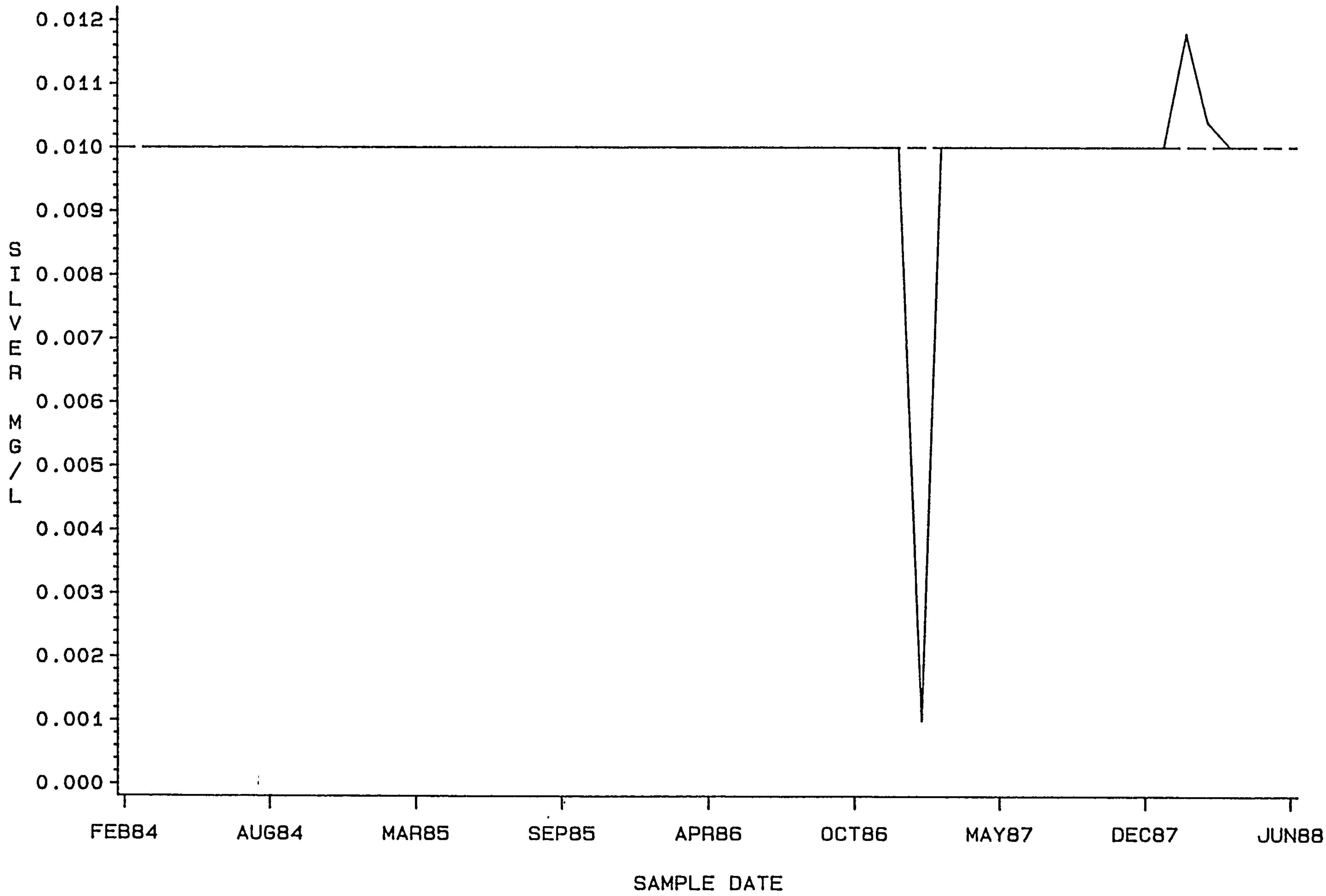
K1700 NPDES DATA – PLUTONIUM PCI/L



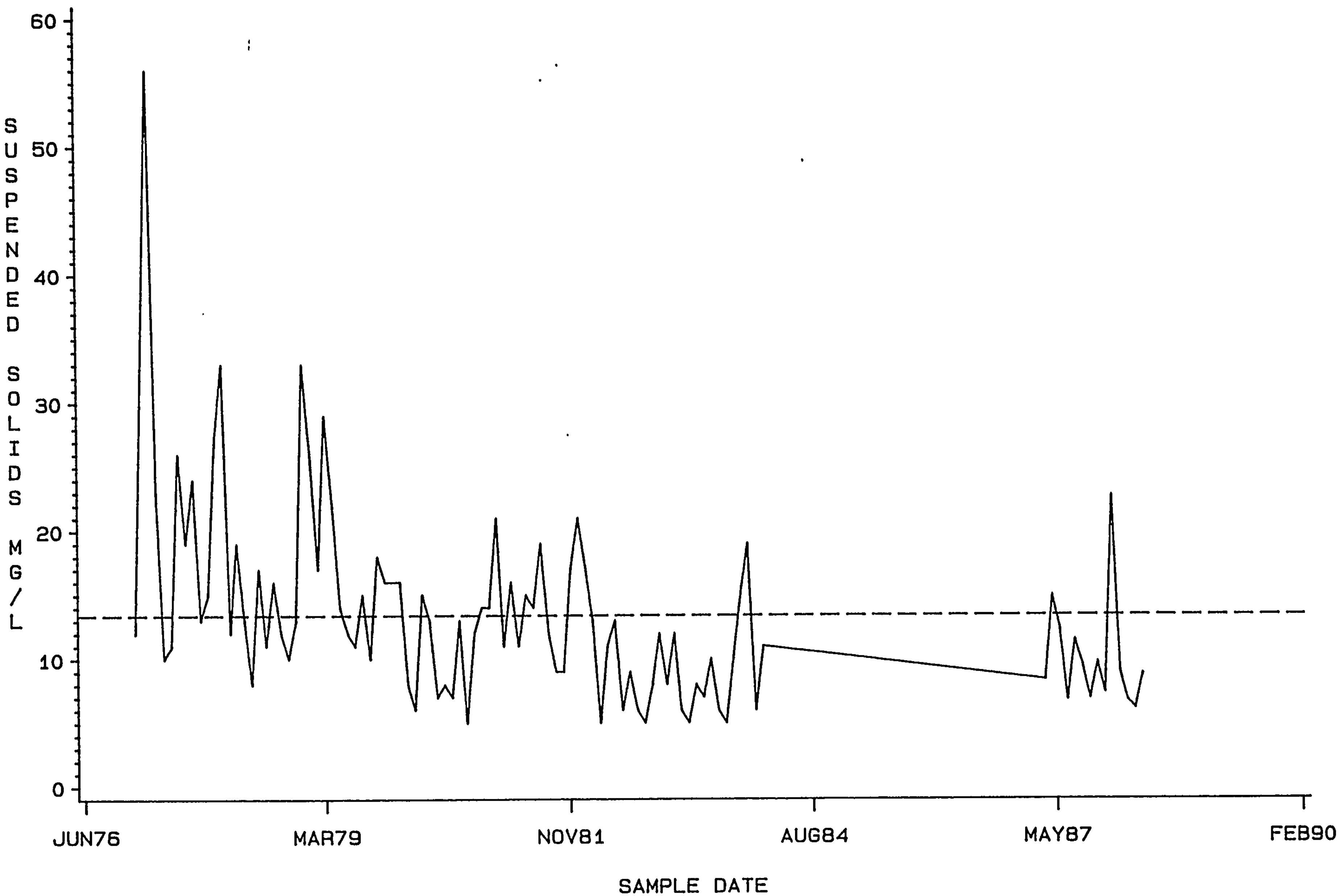
K1700 NPDES DATA – SELENIUM MG/L



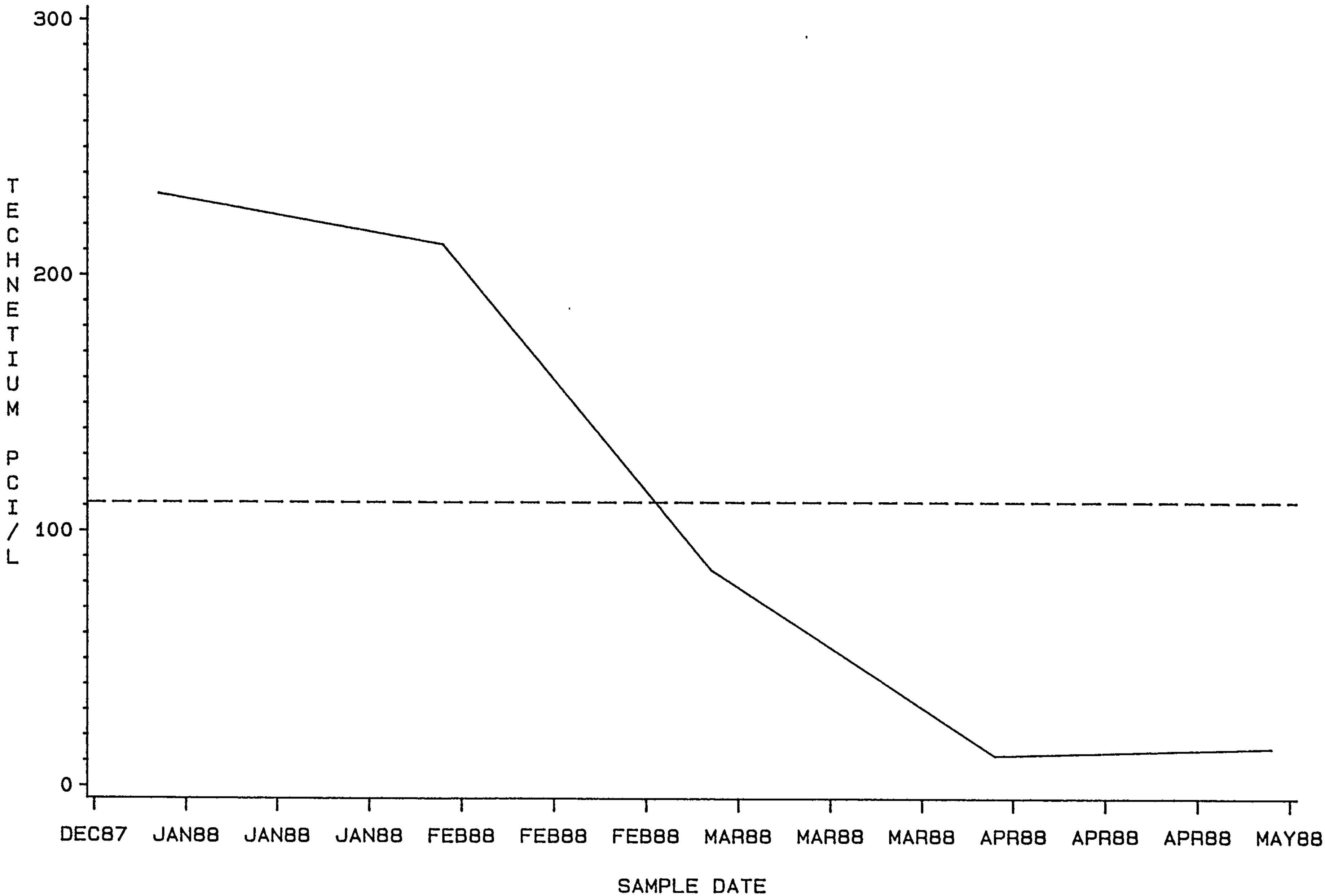
K1700 NPDES DATA – SILVER MG/L

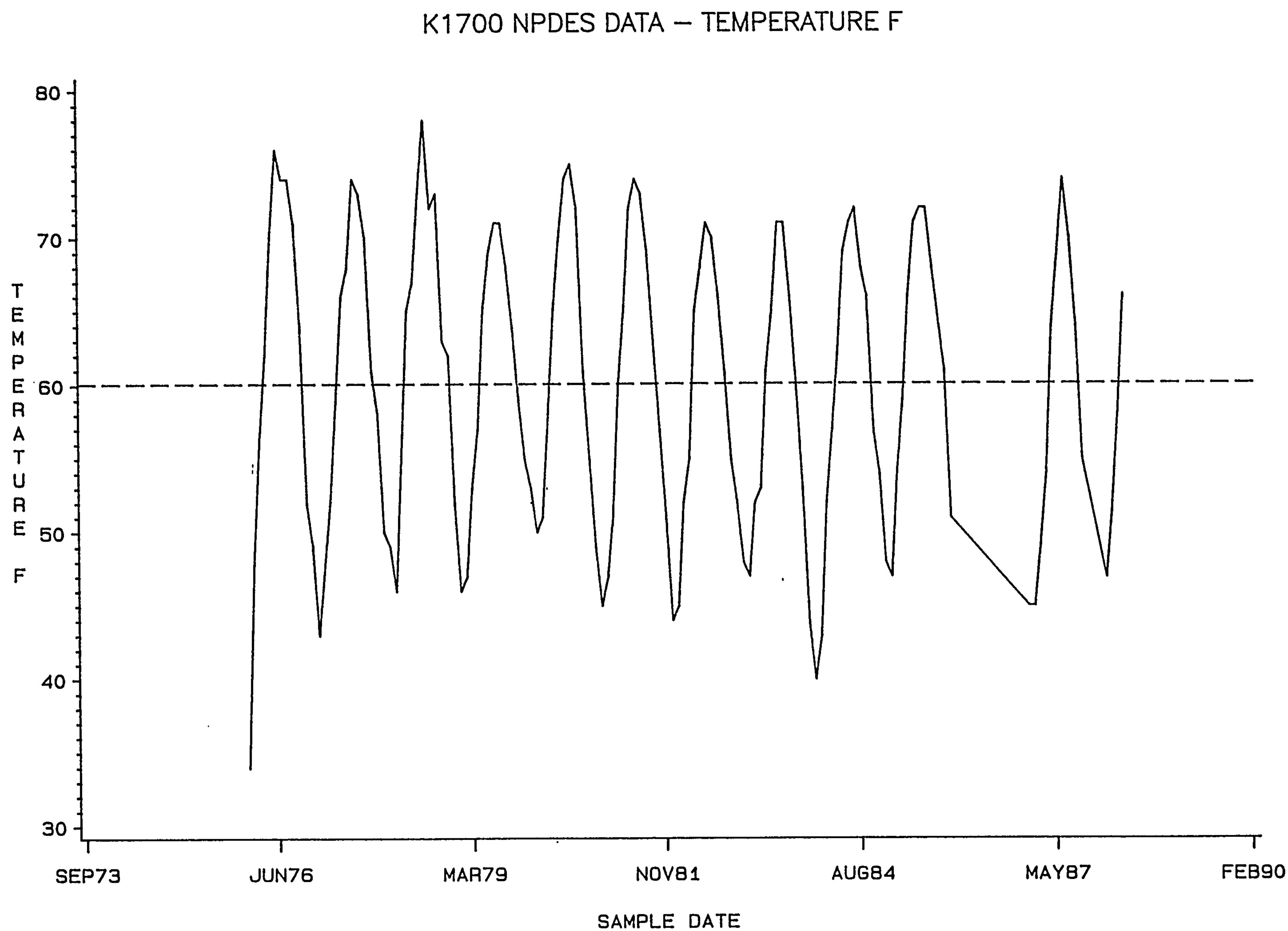


K1700 NPDES DATA – SUSPENDED SOLIDS MG/L

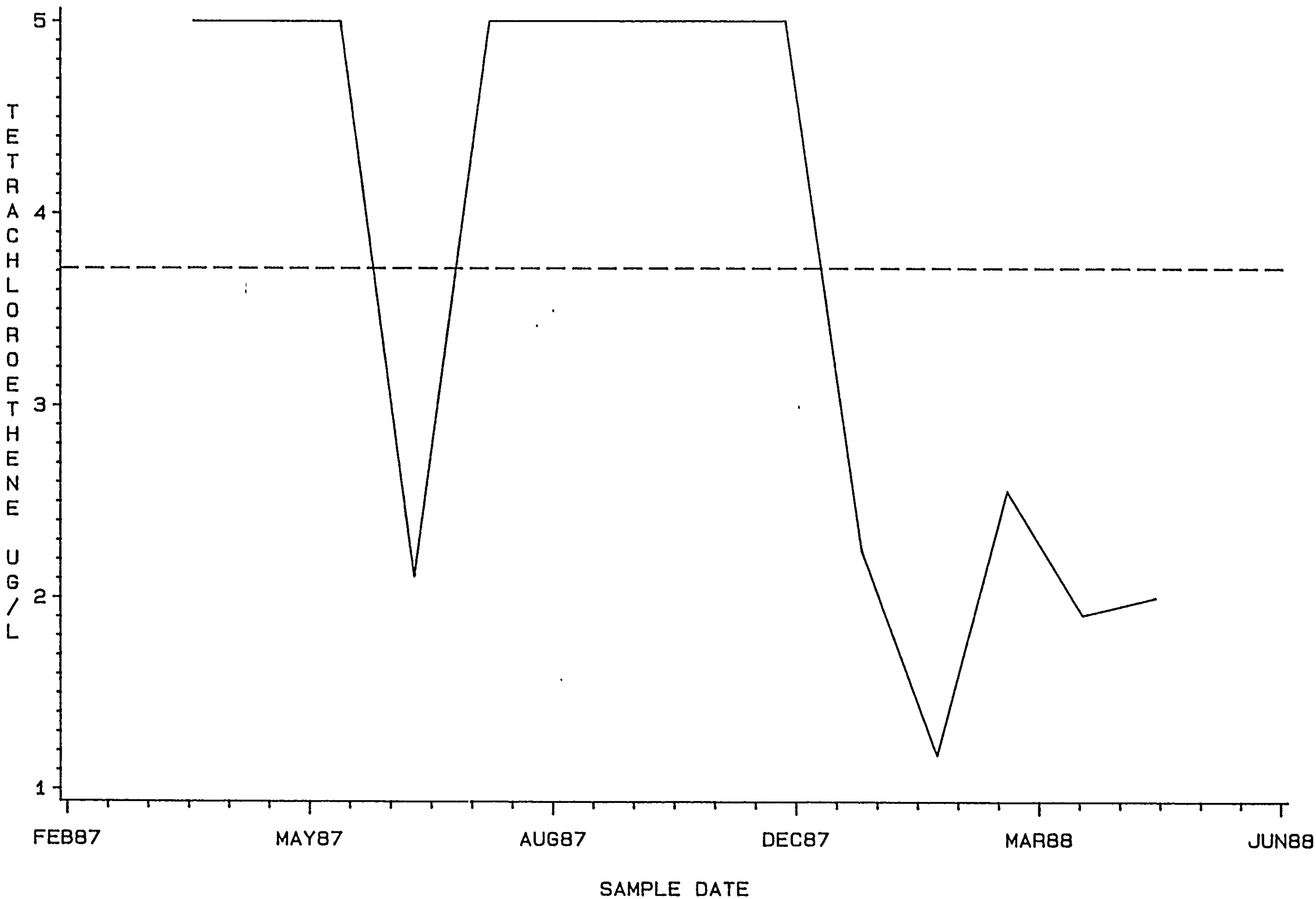


K1700 NPDES DATA – TECHNETIUM PCI/L

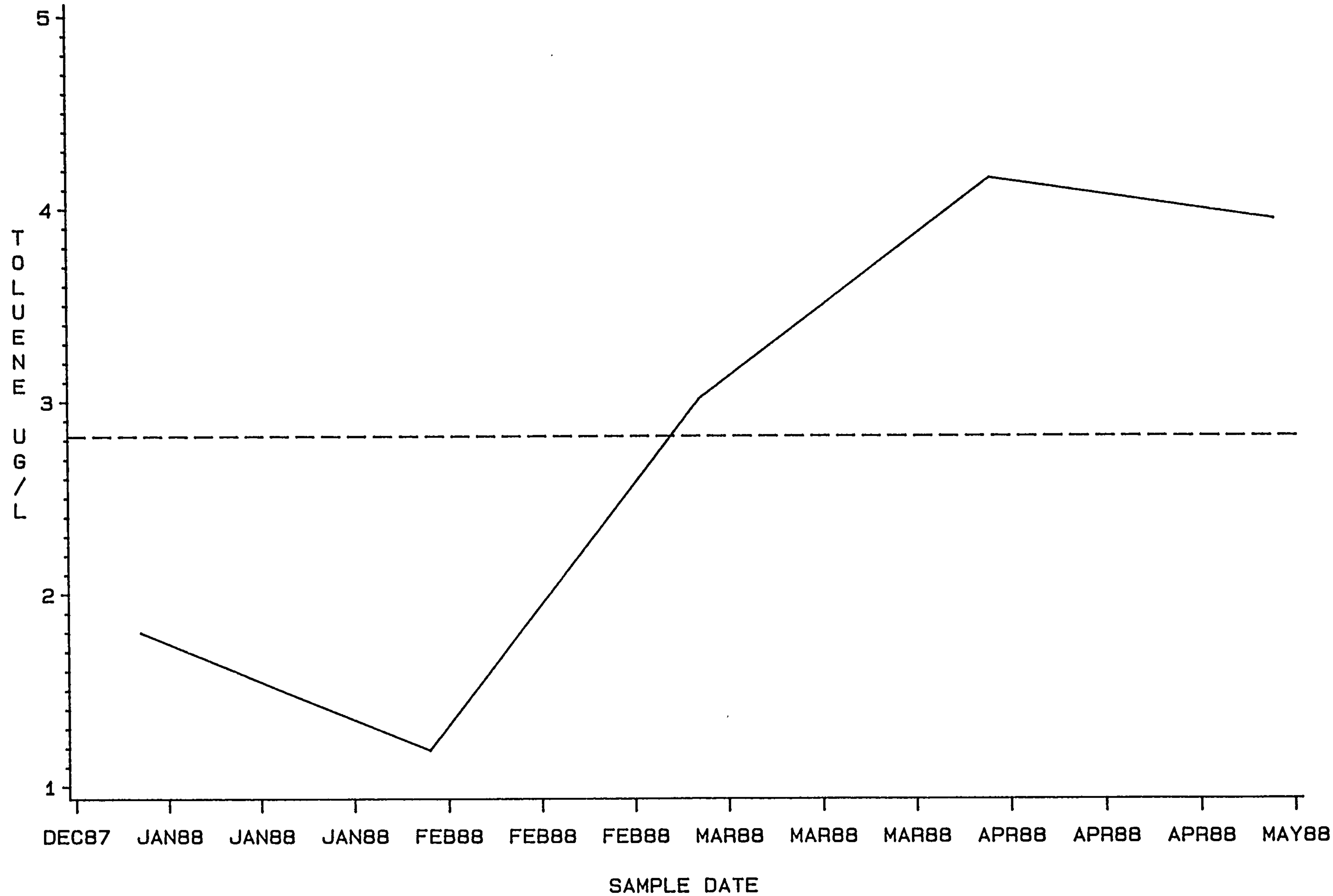



K1700 NPDES DATA – TEMPERATURE F
80
70
60
50
40
30
TEMPERATURE F
SEP73
JUN76
MAR79
NOV81
AUG84
MAY87
FEB90
SAMPLE DATE

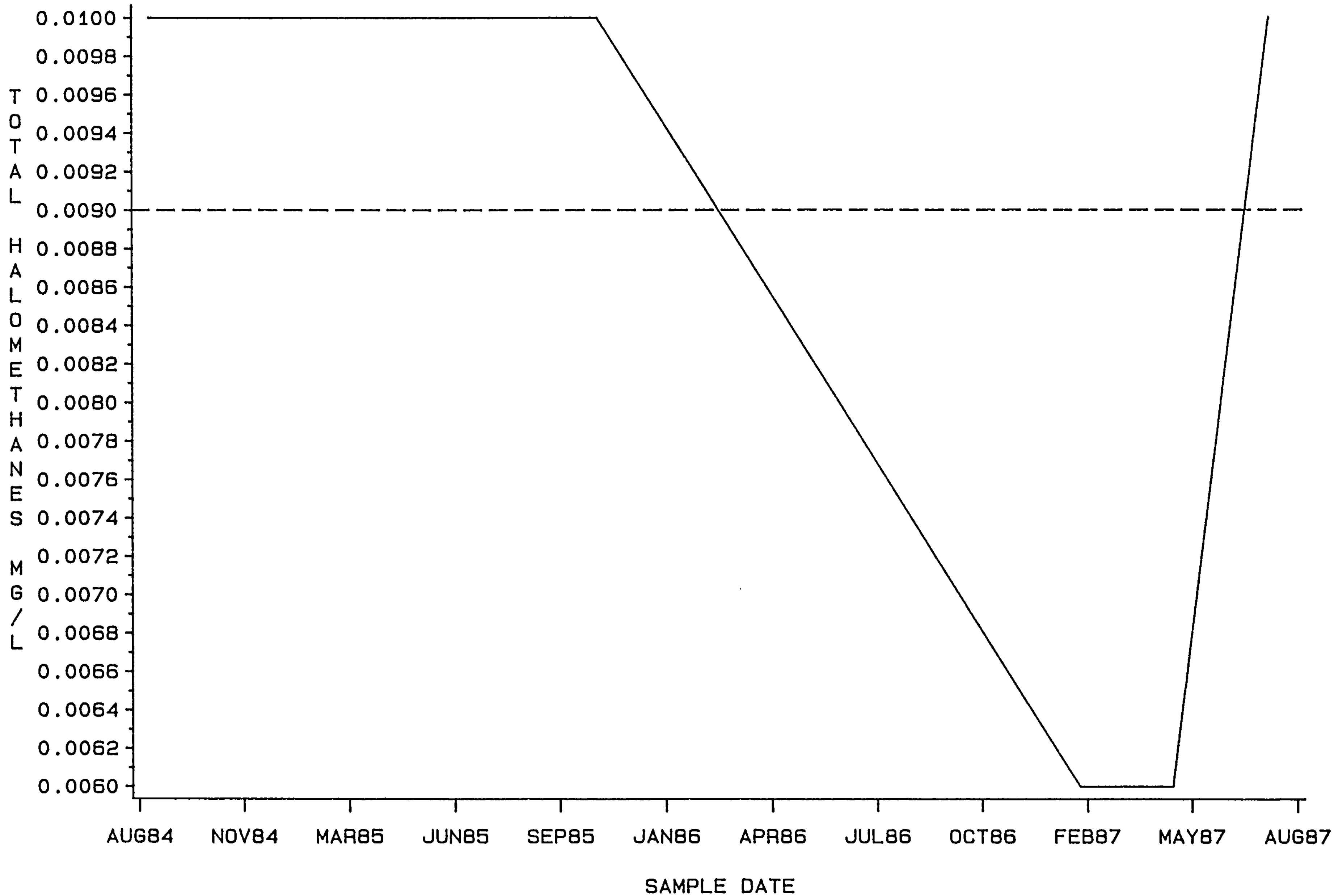
K1700 NPDES DATA – TETRACHLOROETHENE UG/L



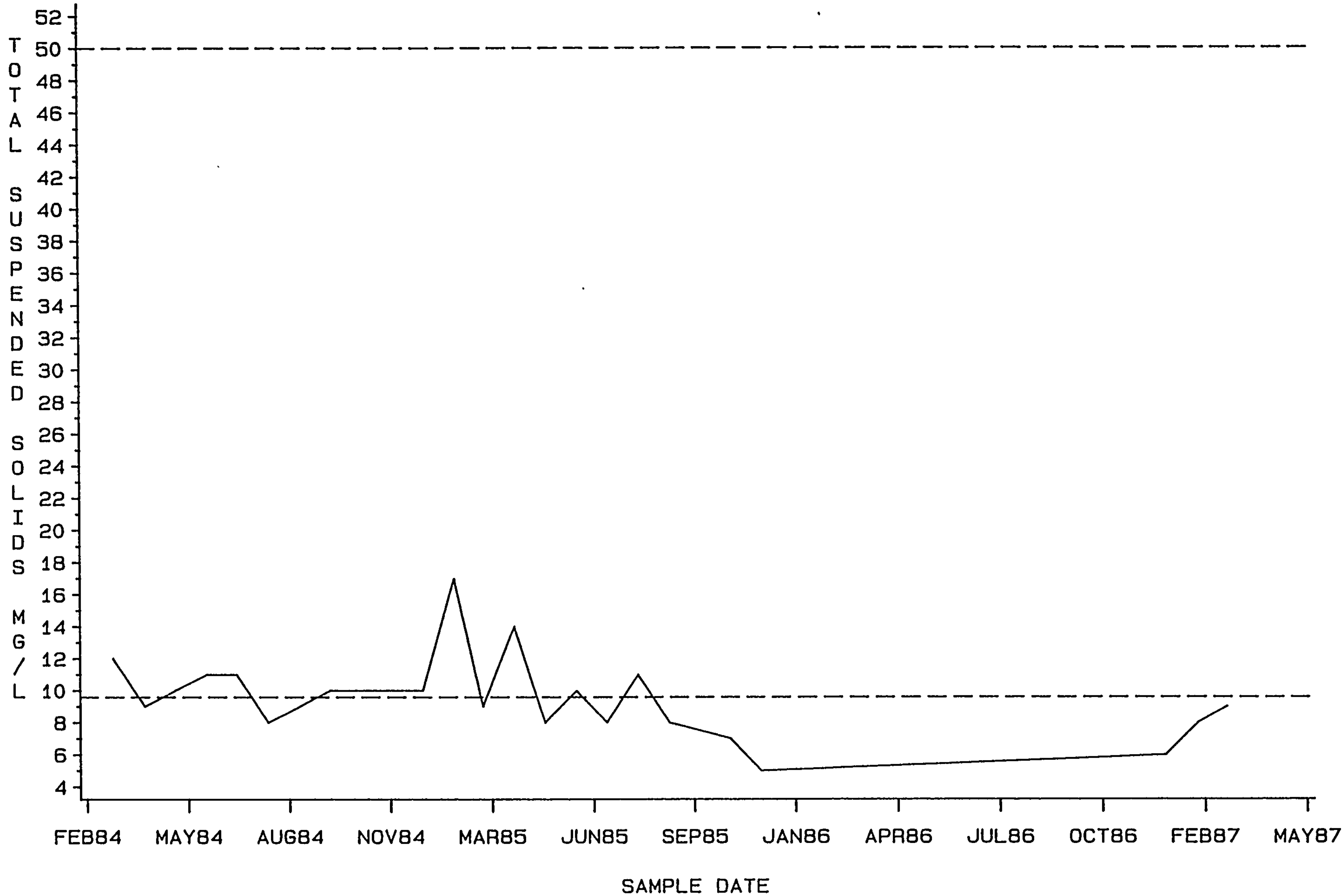
K1700 NPDES DATA – TOLUENE UG/L



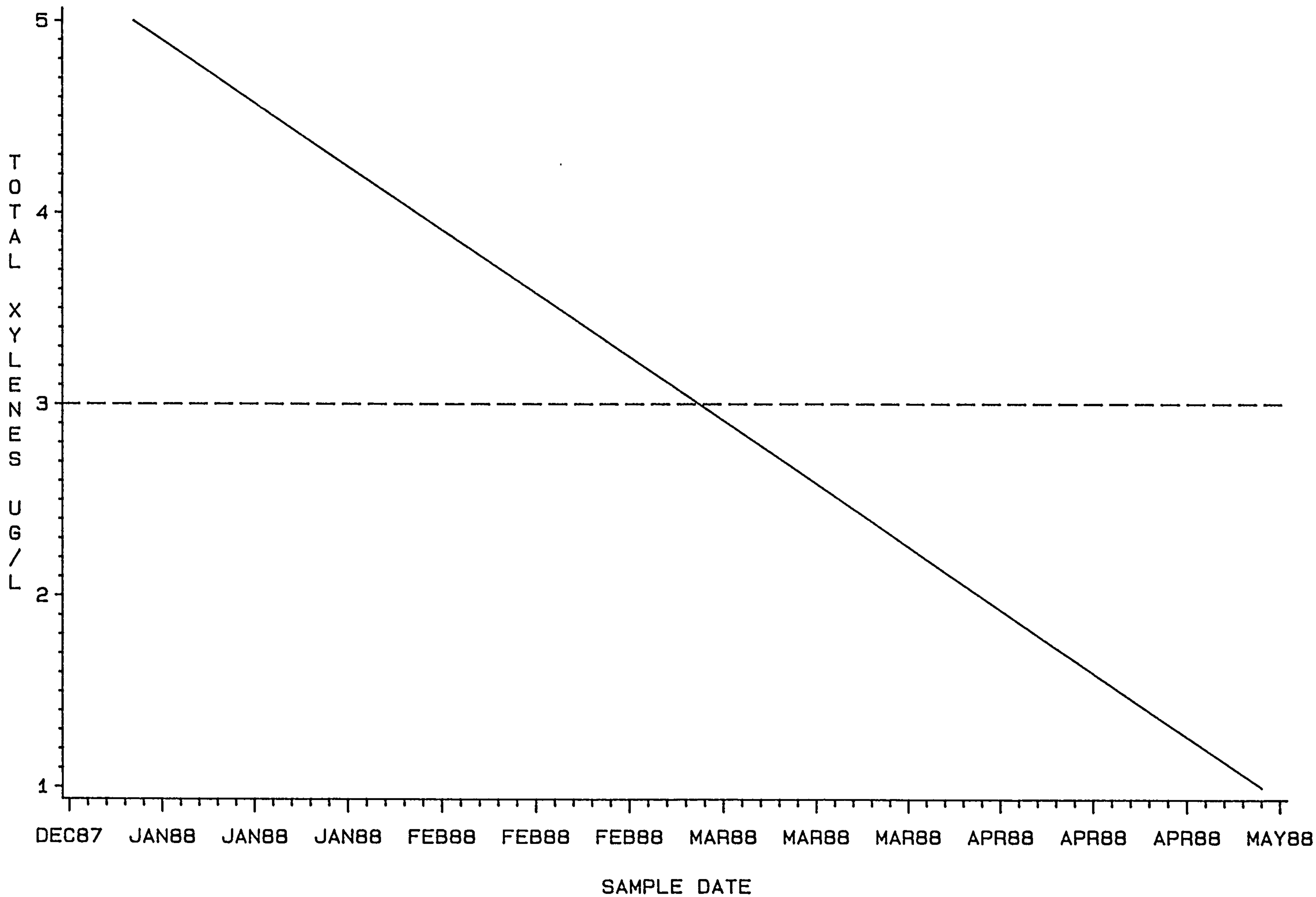
K1700 NPDES DATA – TOTAL HALOMETHANES MG/L



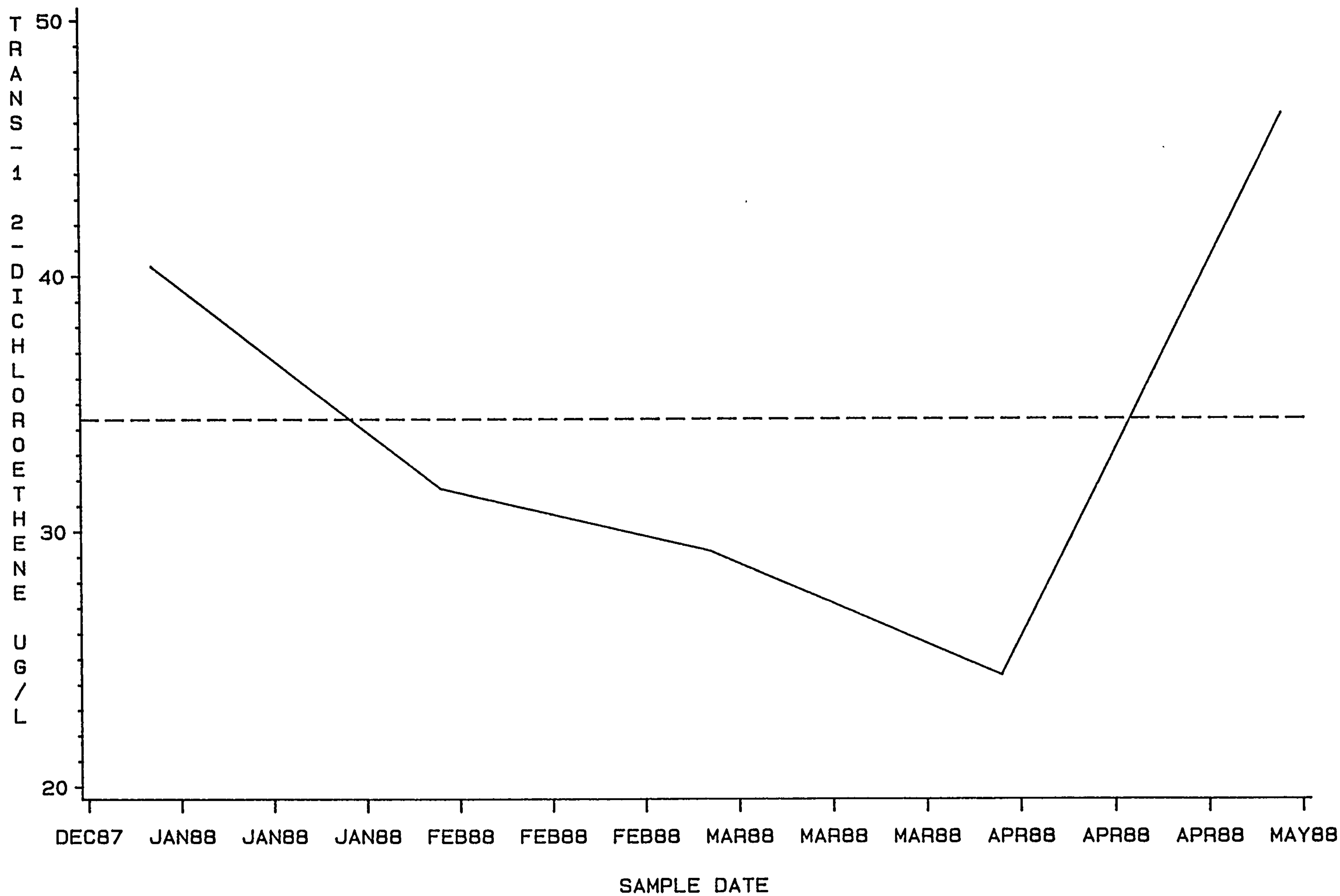
K1700 NPDES DATA — TOTAL SUSPENDED SOLIDS MG/L



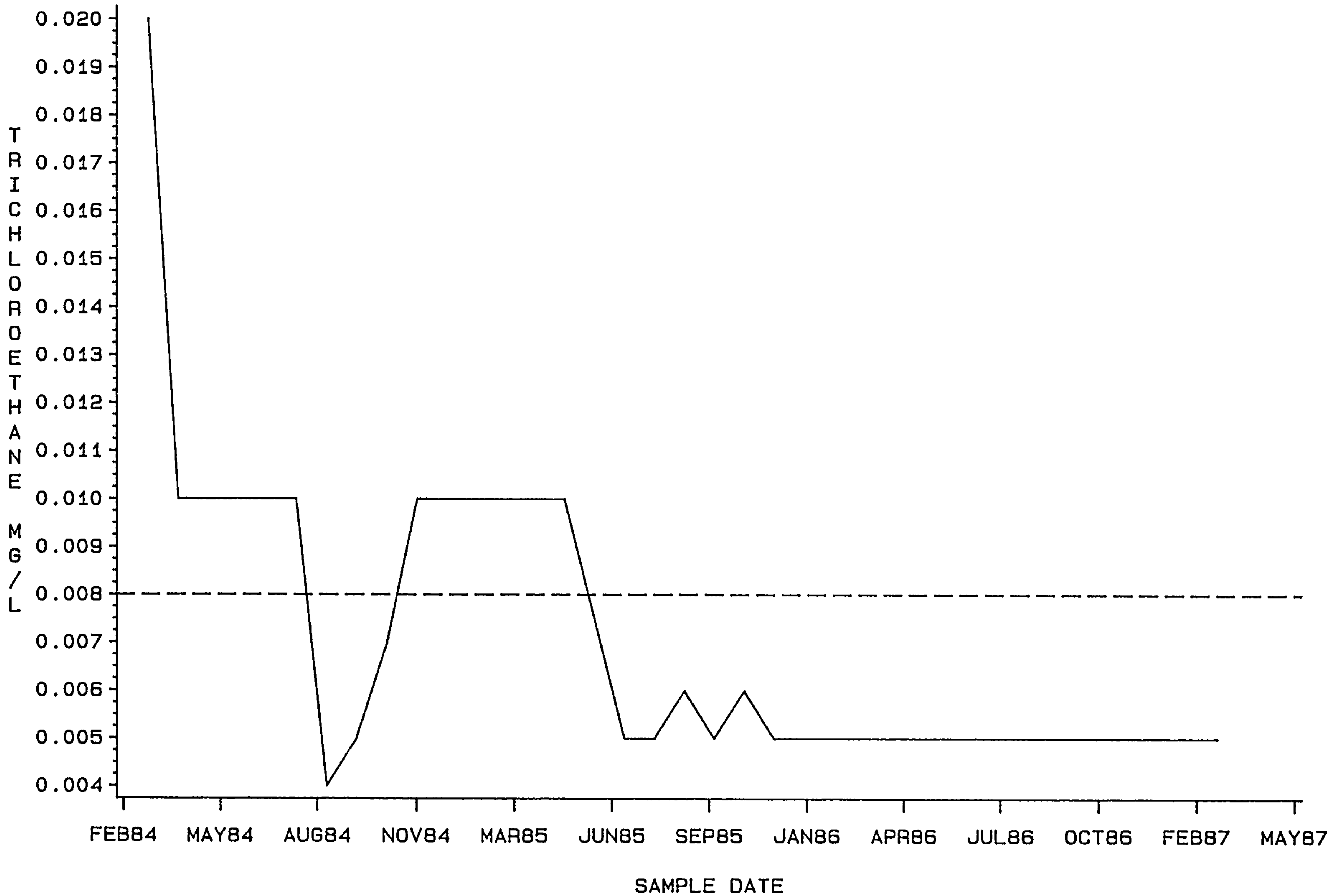
K1700 NPDES DATA – TOTAL XYLENES UG/L



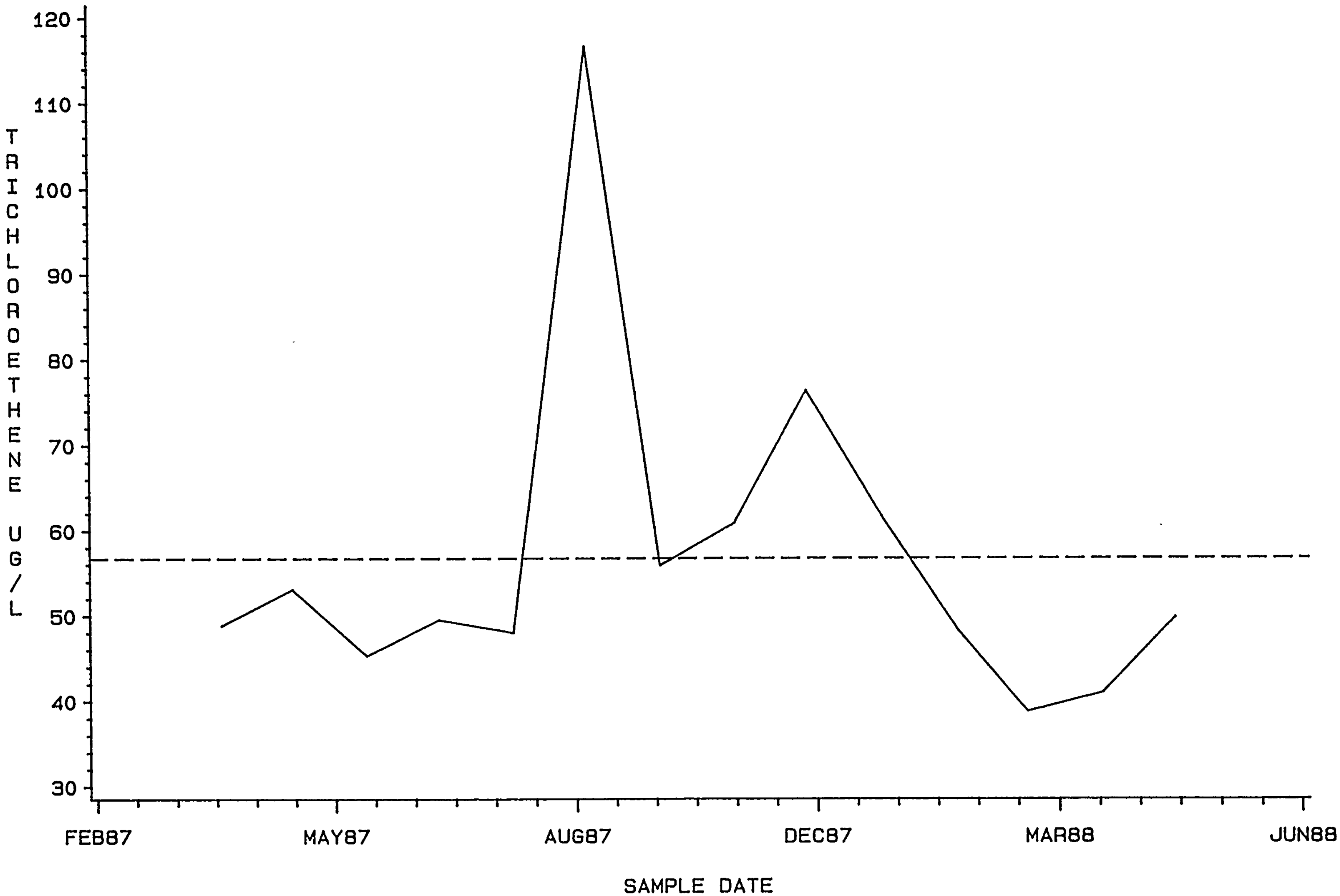
K1700 NPDES DATA – TRANS–1 2–DICHLOROETHENE UG/L



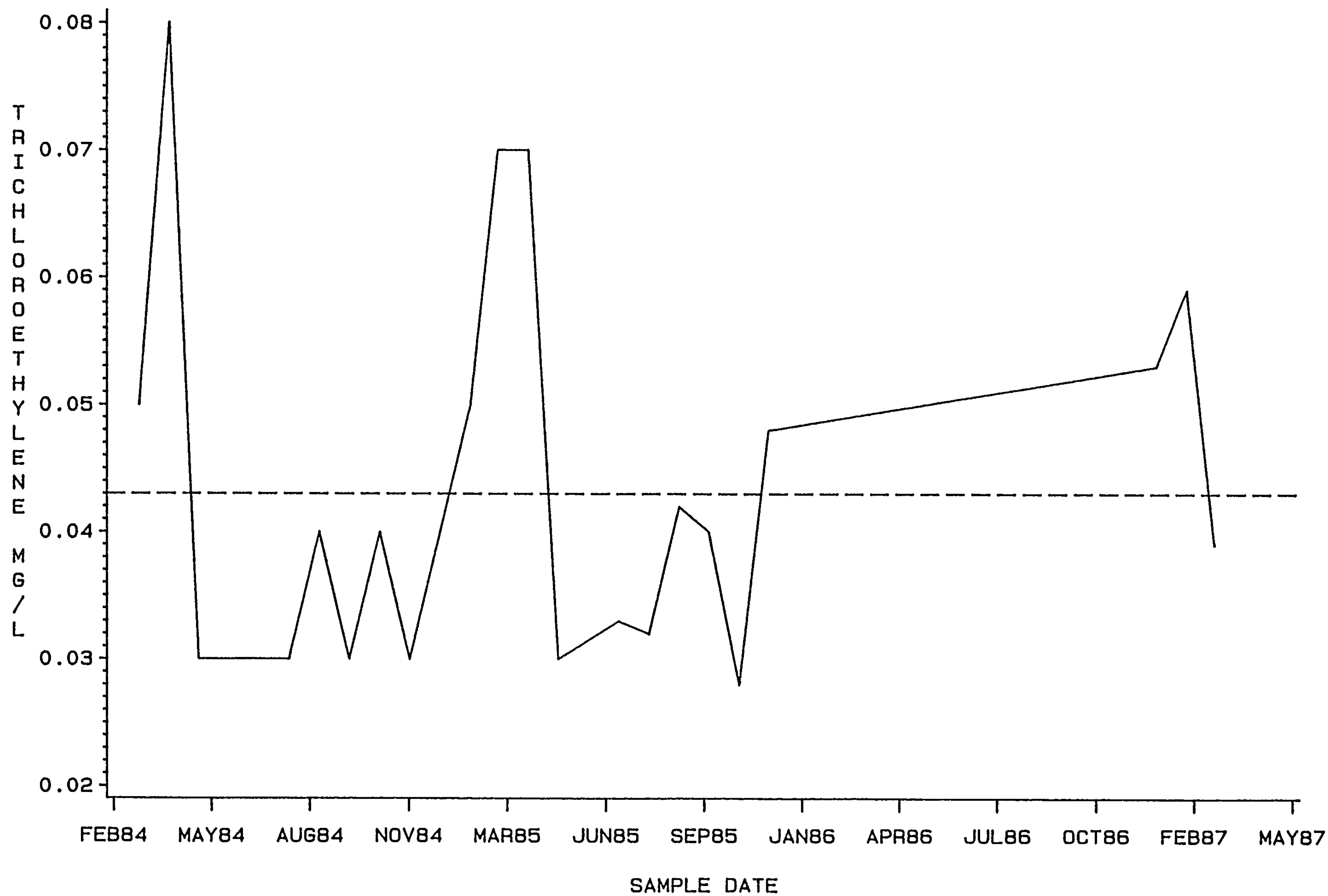
K1700 NPDES DATA – TRICHLOROETHANE MG/L



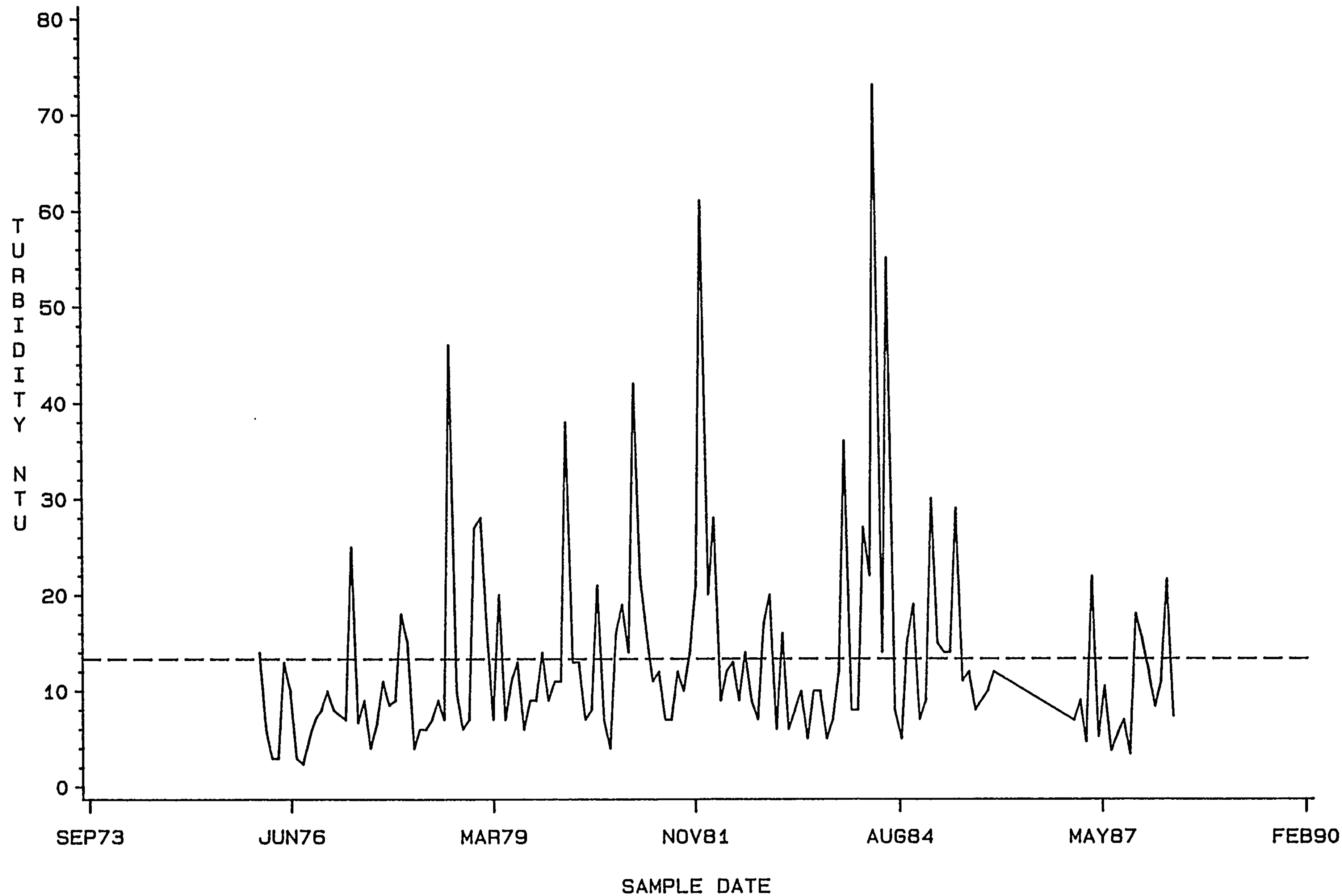
K1700 NPDES DATA – TRICHLOROETHENE UG/L



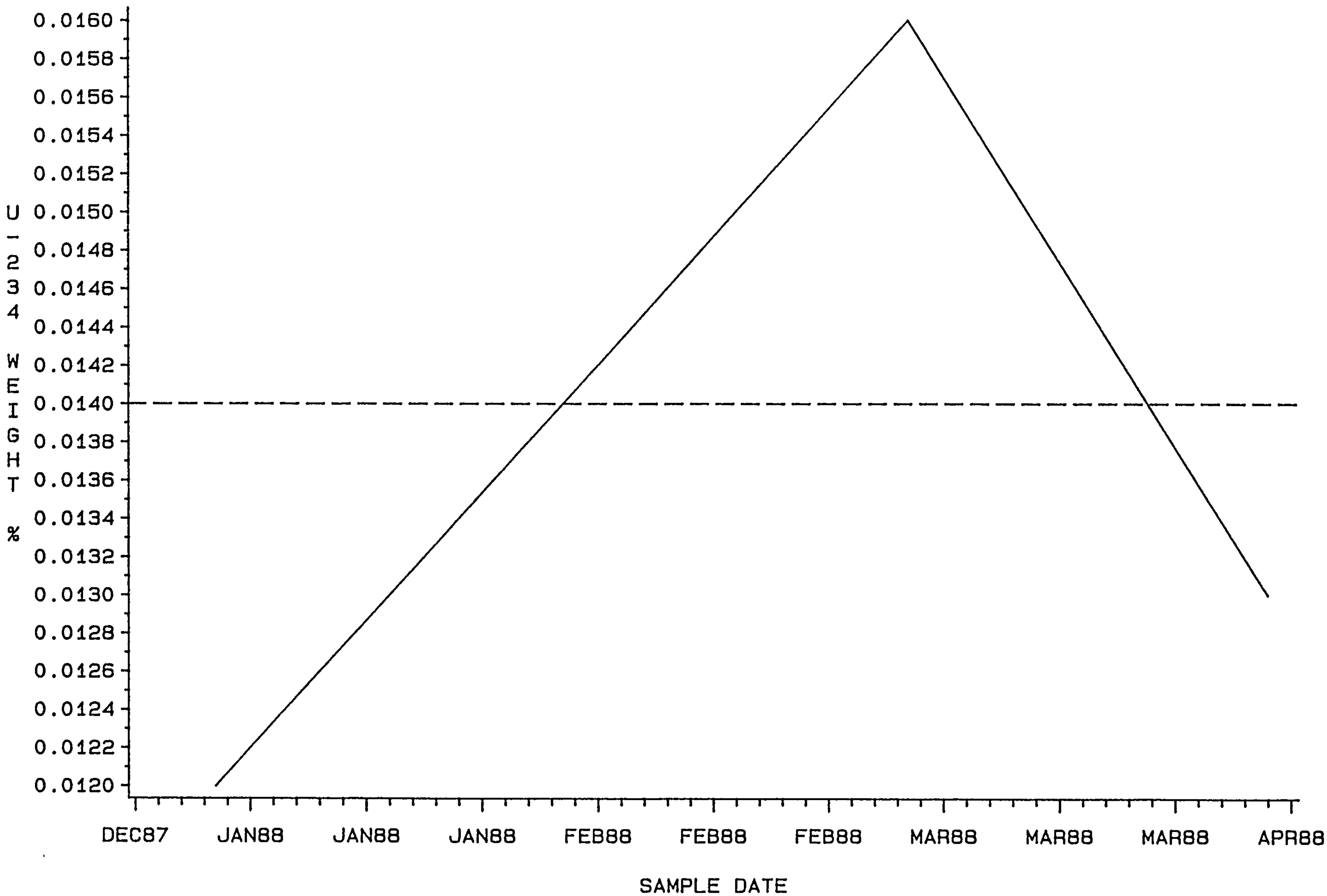
K1700 NPDES DATA – TRICHLOROETHYLENE MG/L

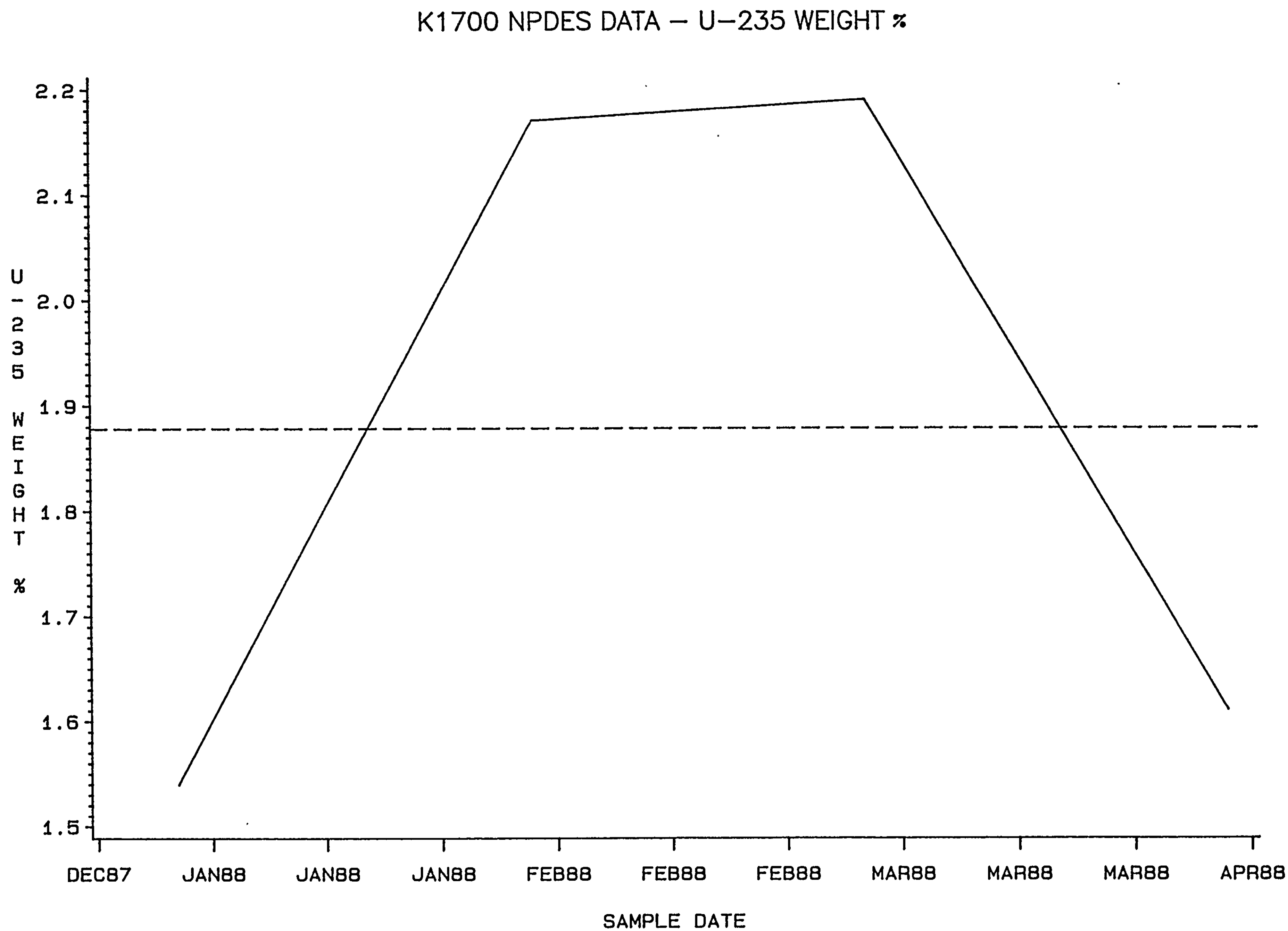


K1700 NPDES DATA – TURBIDITY NTU

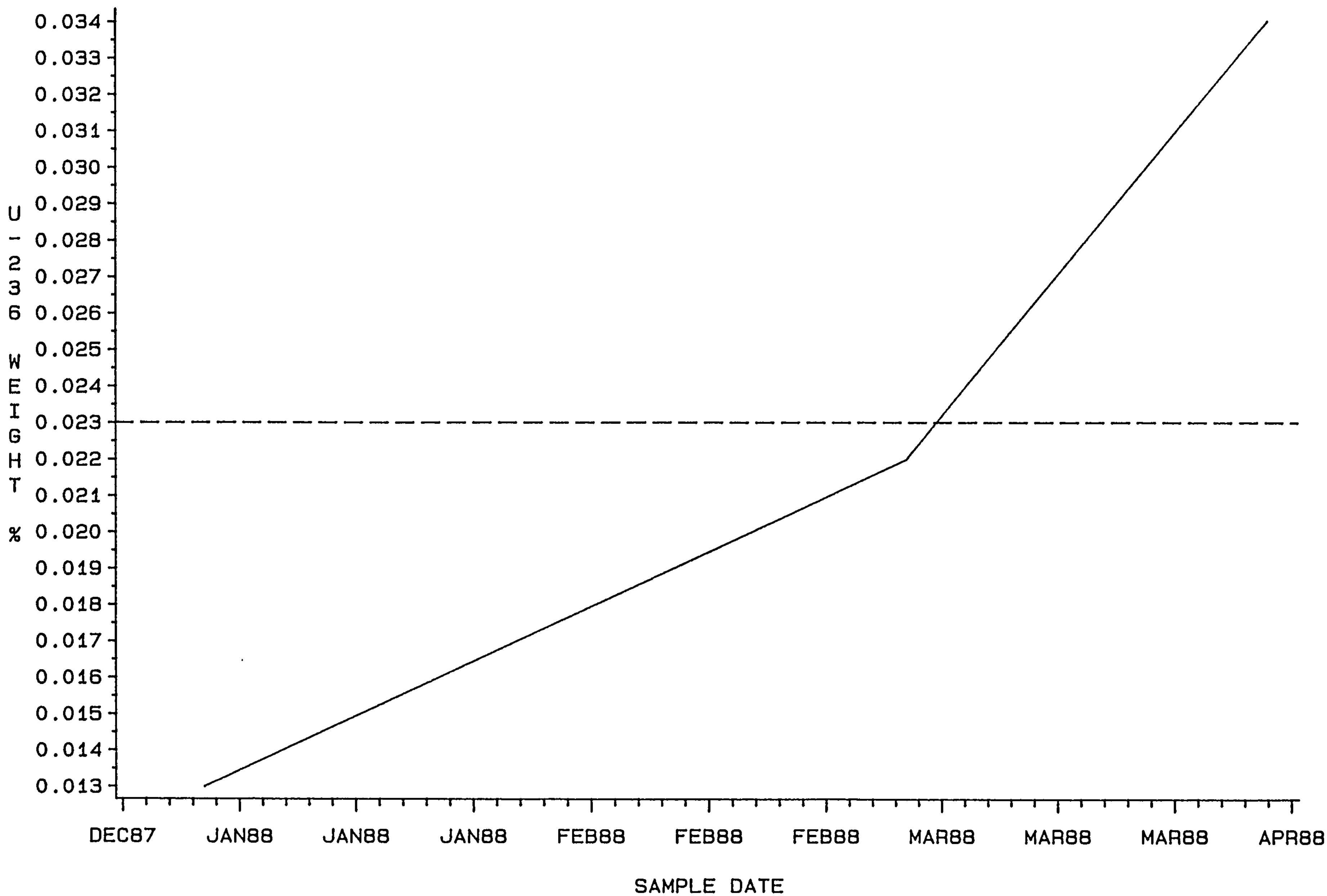


K1700 NPDES DATA – U–234 WEIGHT %

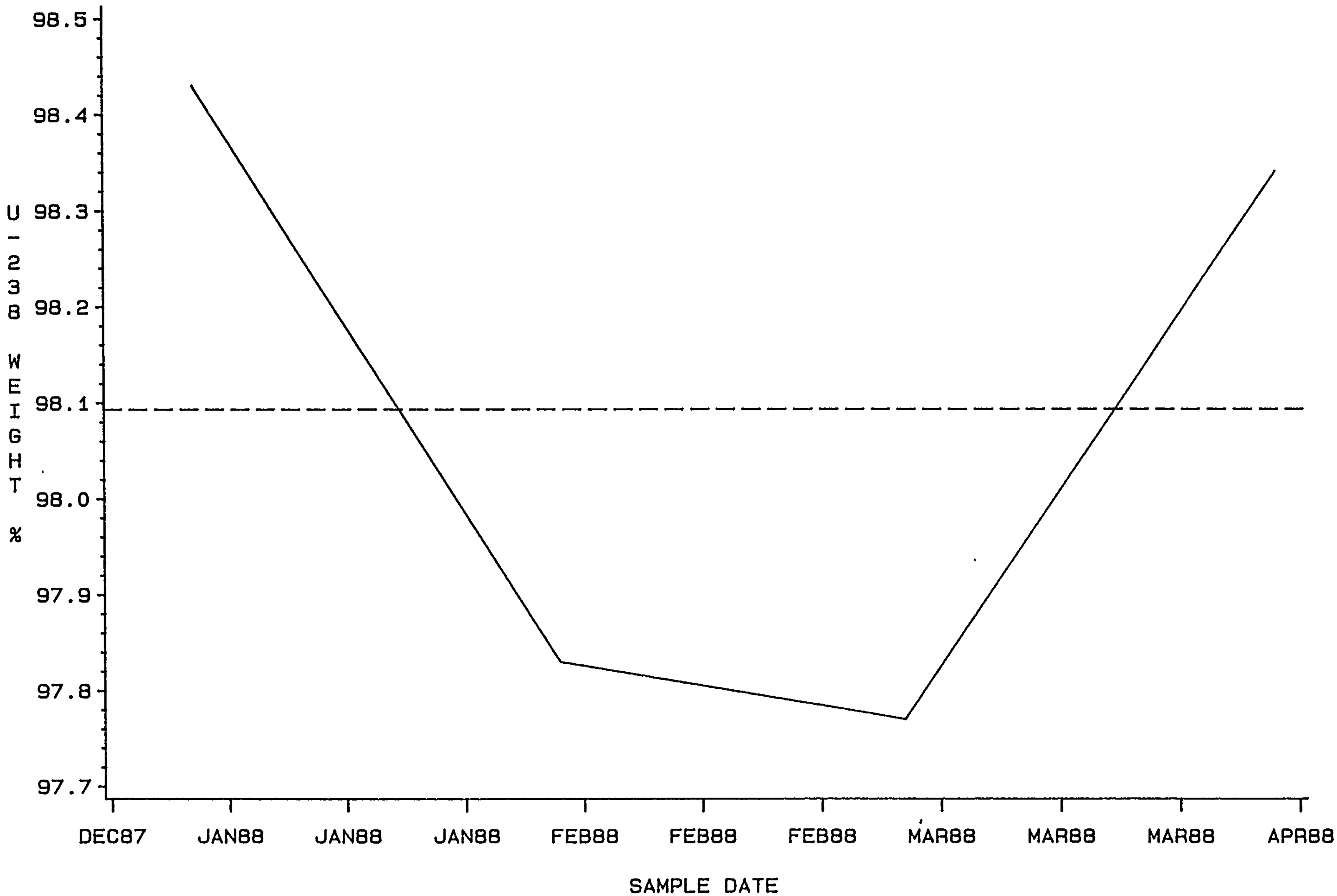



K1700 NPDES DATA – U–235 WEIGHT %
U-235 WEIGHT %
2.2
2.1
2.0
1.9
1.8
1.7
1.6
1.5
DEC87
JAN88
JAN88
JAN88
FEB88
FEB88
FEB88
MAR88
MAR88
MAR88
APR88
SAMPLE DATE

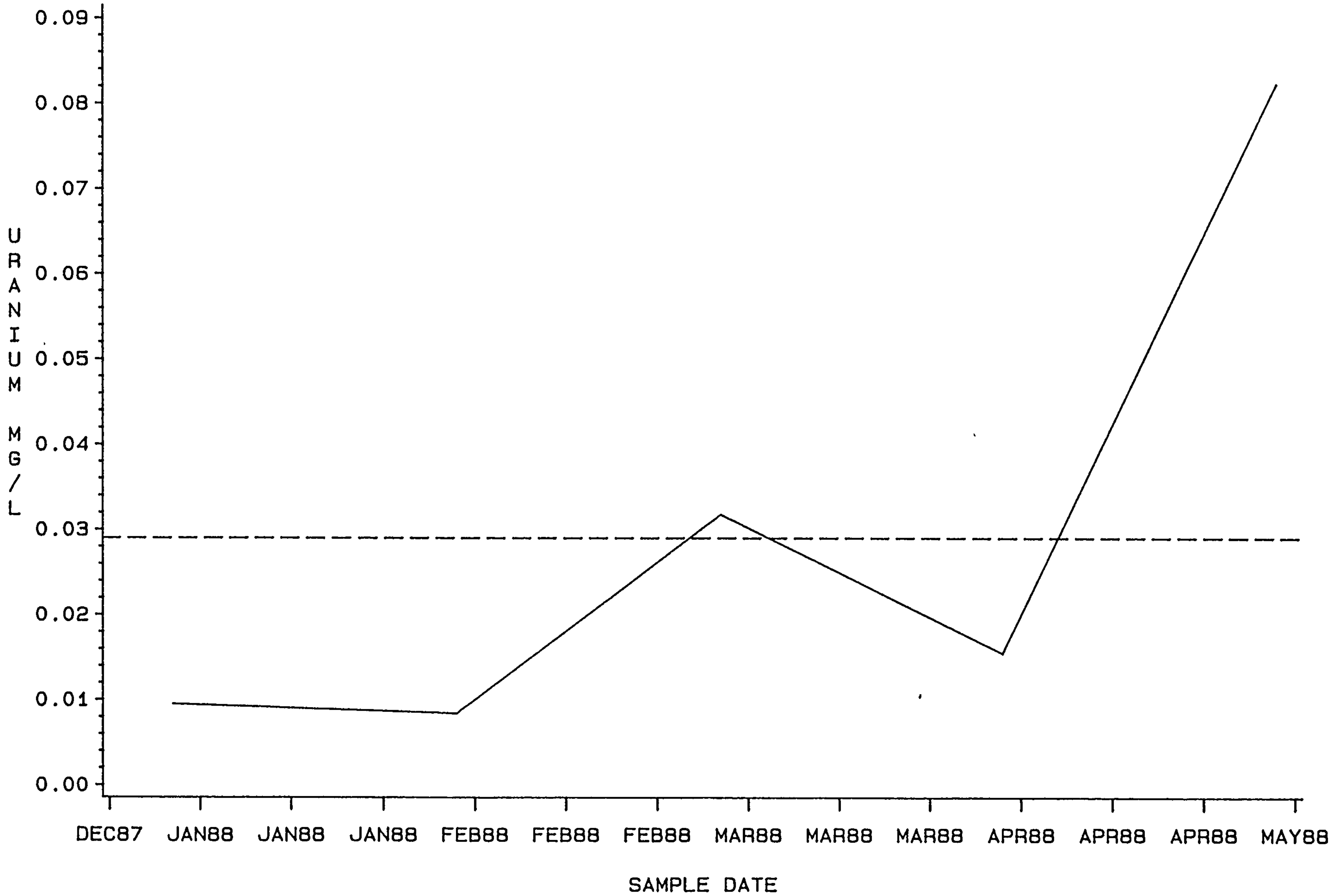
K1700 NPDES DATA – U–236 WEIGHT %

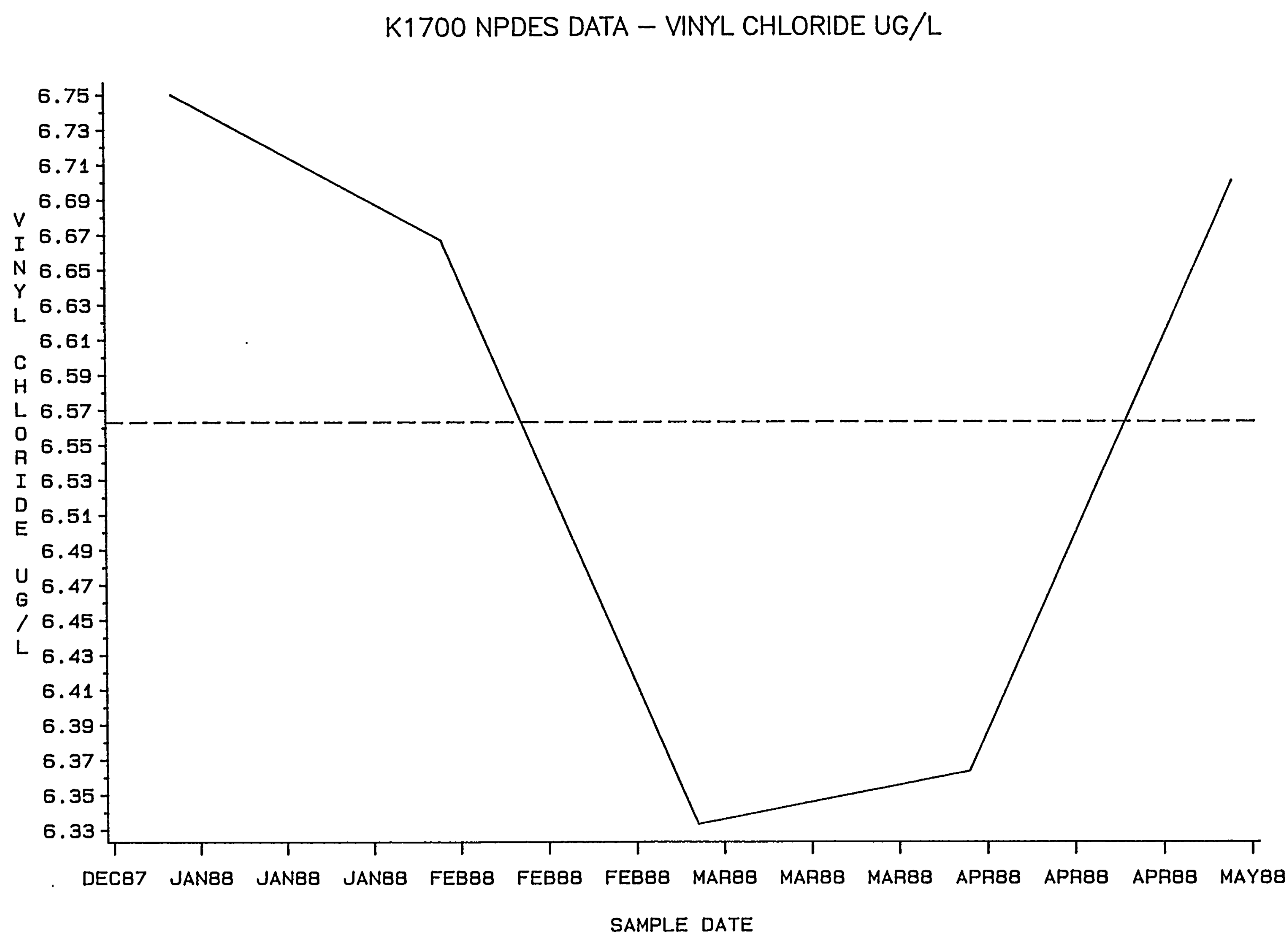


K1700 NPDES DATA – U–238 WEIGHT %

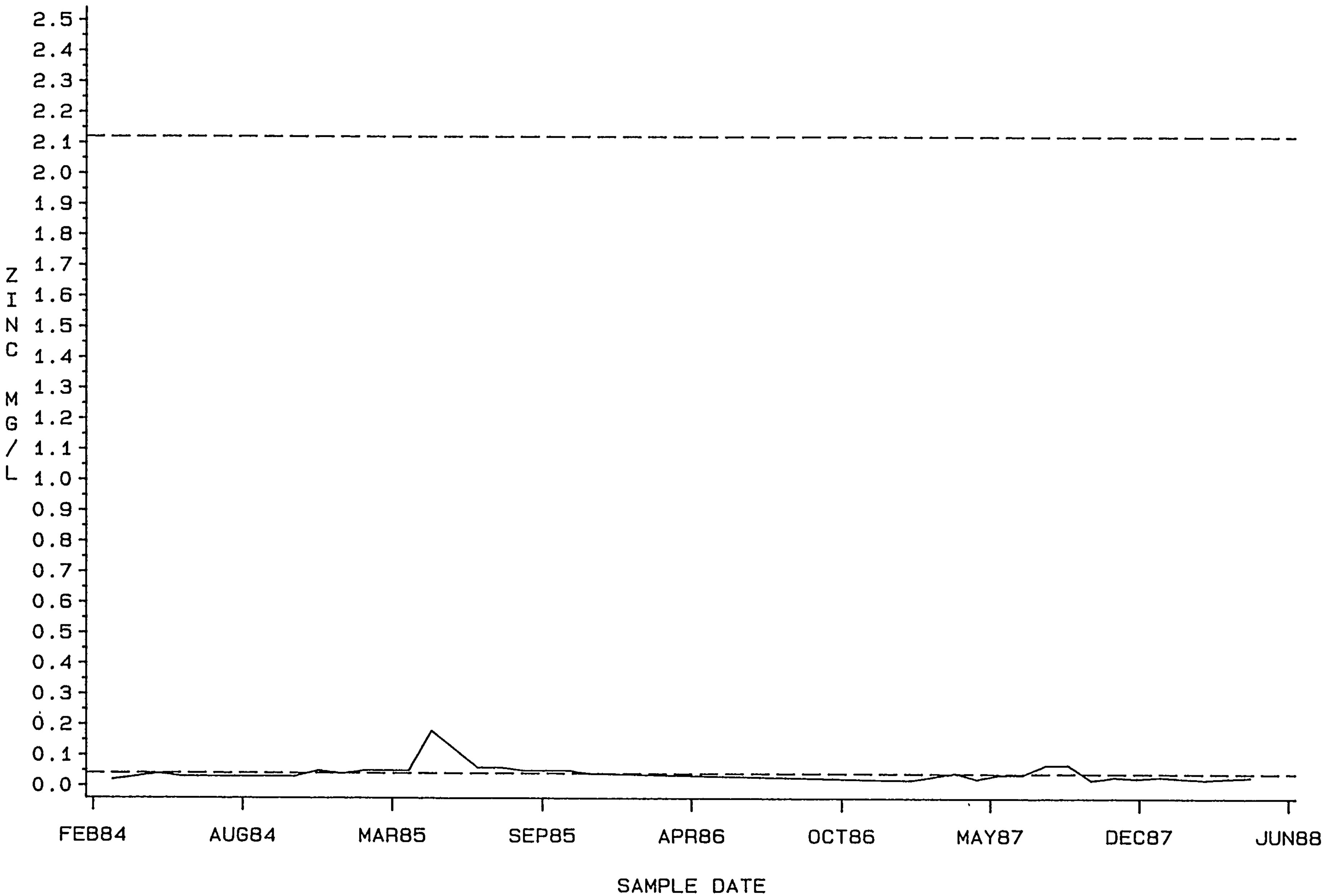


K1700 NPDES DATA – URANIUM MG/L




K1700 NPDES DATA – VINYL CHLORIDE UG/L
VINYL CHLORIDE UG/L
6.75
6.73
6.71
6.69
6.67
6.65
6.63
6.61
6.59
6.57
6.55
6.53
6.51
6.49
6.47
6.45
6.43
6.41
6.39
6.37
6.35
6.33
DEC87
JAN88
JAN88
JAN88
FEB88
FEB88
FEB88
MAR88
MAR88
MAR88
APR88
APR88
APR88
MAY88
SAMPLE DATE

K1700 NPDES DATA – ZINC MG/L



K-1407-B NPDES DATA

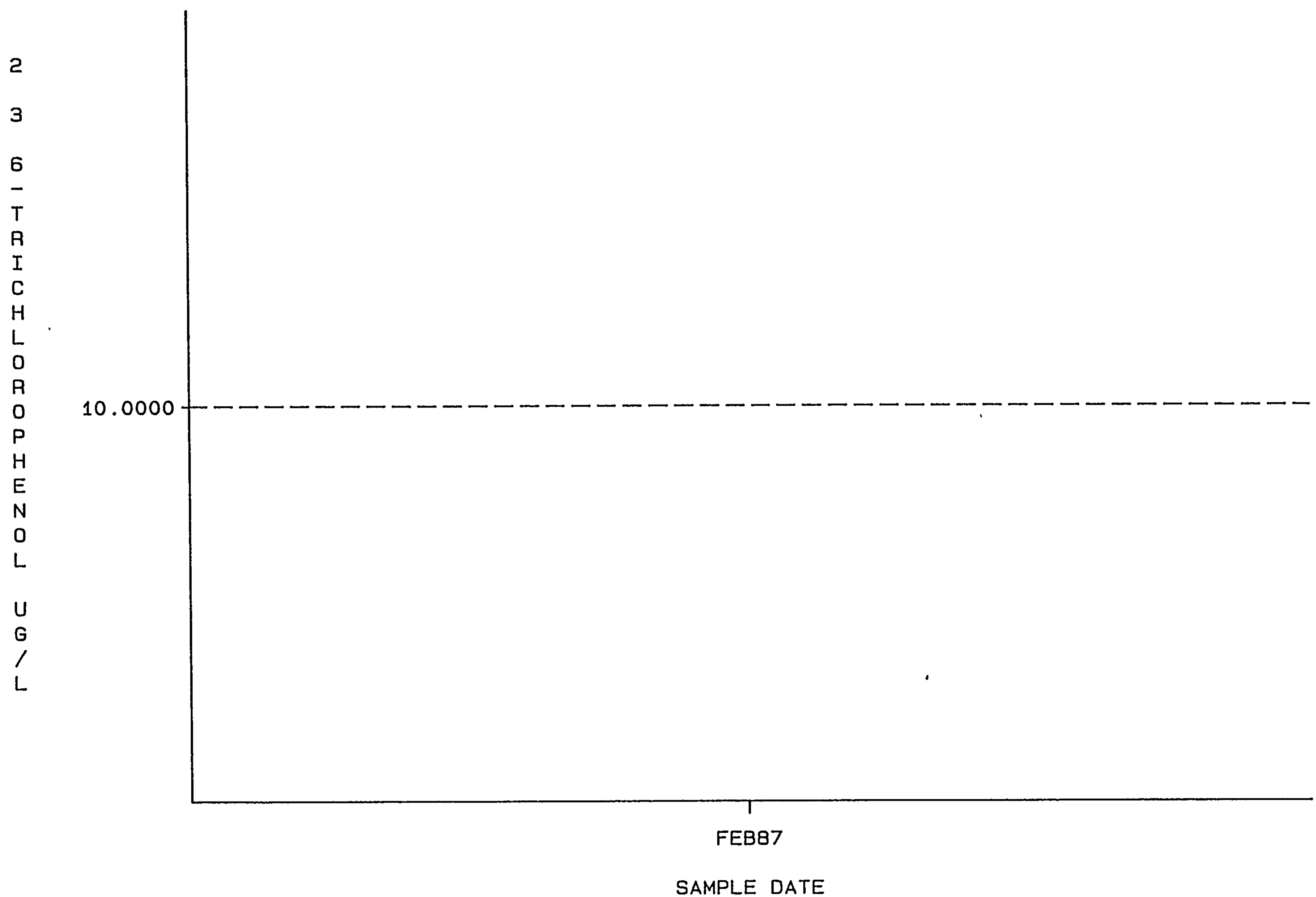
The following graphs present NPDES data for monitoring performed at the K-1407-B pond discharge to the K-1700 stream. The following is a key for these graphs:

- DASHED LINE - MEAN OF DATA
- CONTINUOUS LINE - ACTUAL DATA

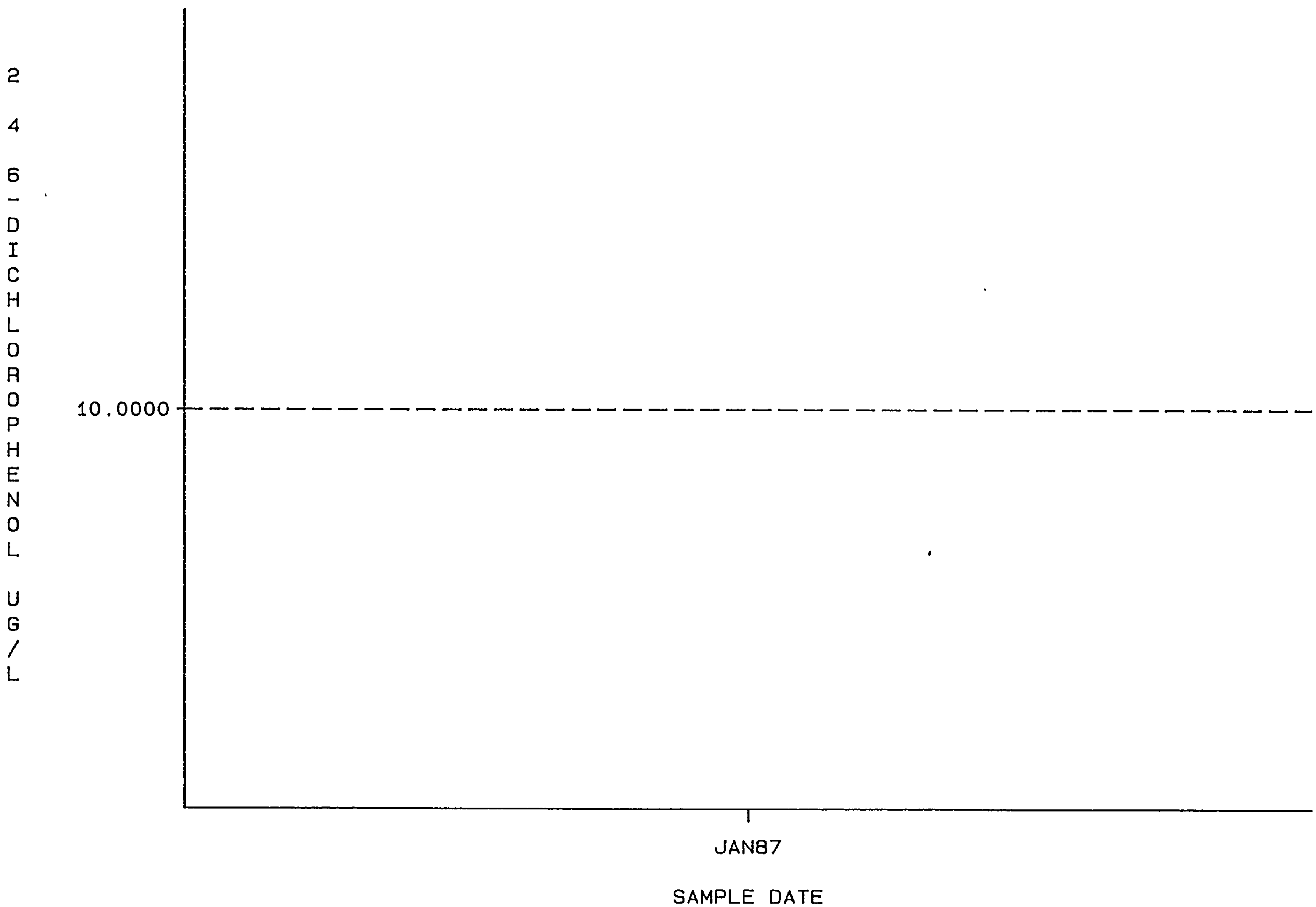
Only one sample was obtained and analyzed for the following analytes:

- 236-Trichorophenol
- 2,4,6-Dichlorophenol
- 2,4-Dichlorobenzene
- 4-Isopropyl Phenol
- Bis(chloroisopropyl) ether
- Carbon disulfide
- Carboxylic acid ester
- CIS-1,2-Dichloroethane
- CIS(2-chloroethyl) ether
- CIS-1,3-Dichloropropane
- Cyclohexanone
- Palmitic acid
- Styrene
- Tetrachloroethane
- Triphenylphosphate
- 4-Methyl-2Pentanone

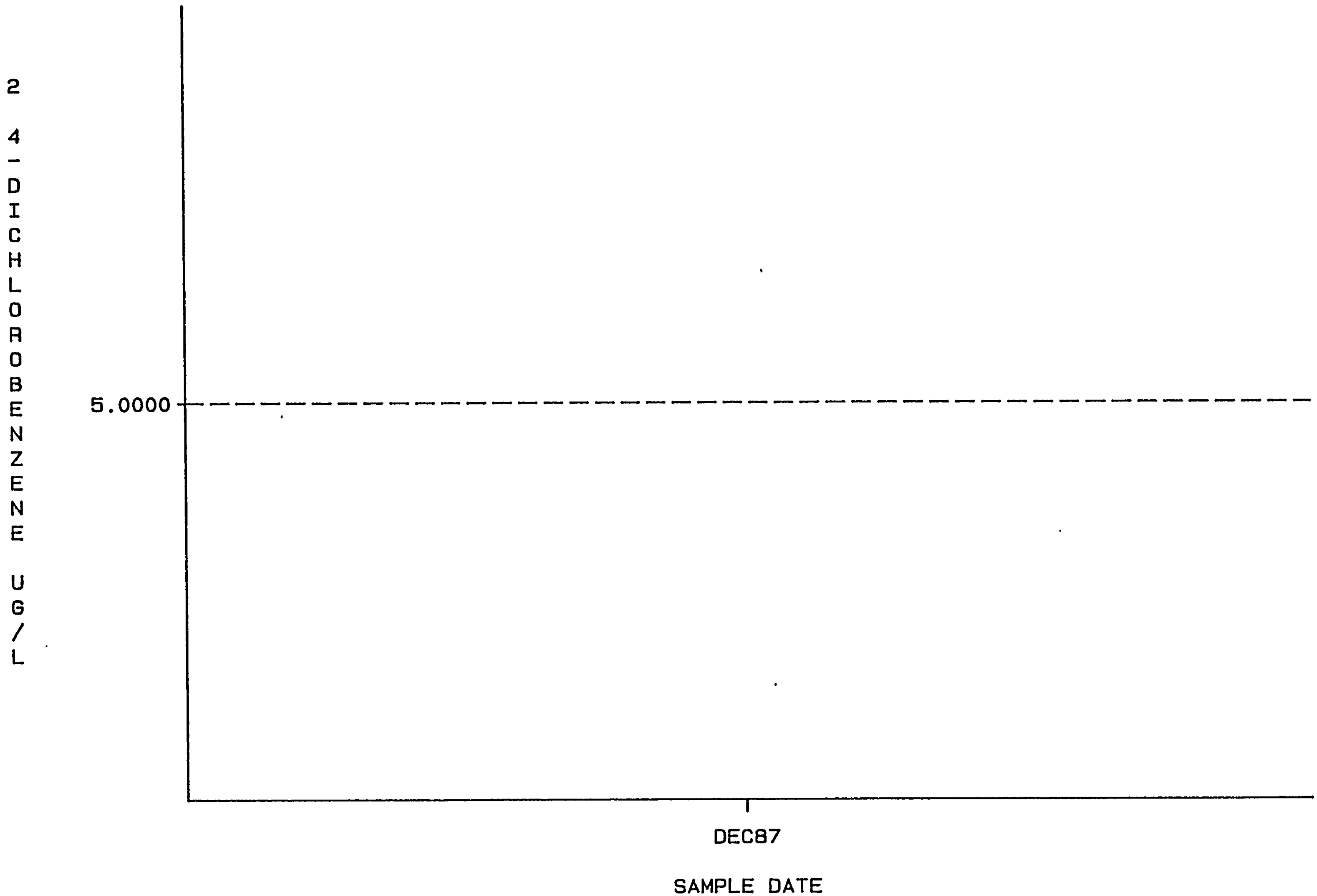
K1407B NPDES DATA – 2 3 6–TRICHLOROPHENOL UG/L



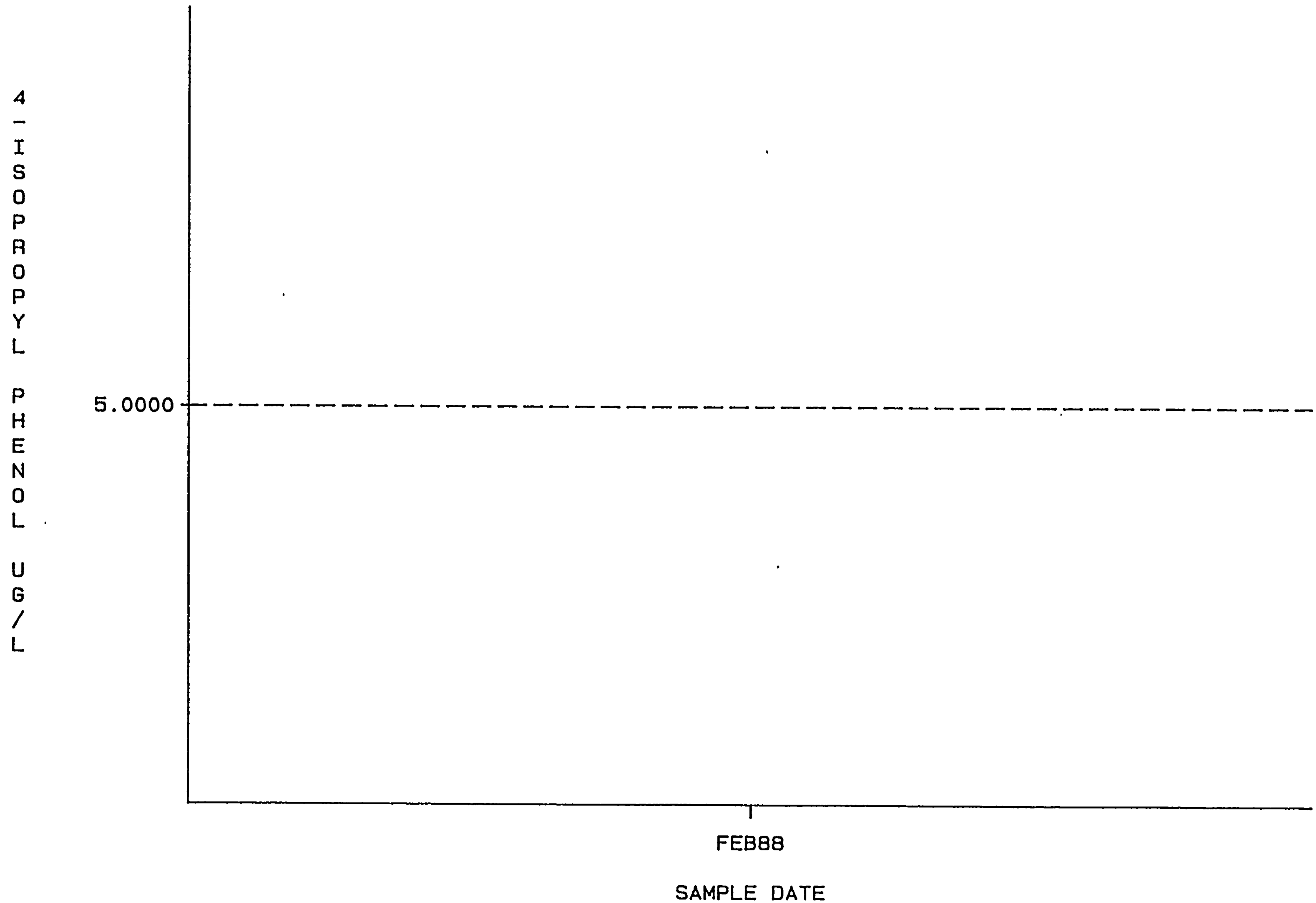
K1407B NPDES DATA – 2 4 6–DICHLOROPHENOL UG/L



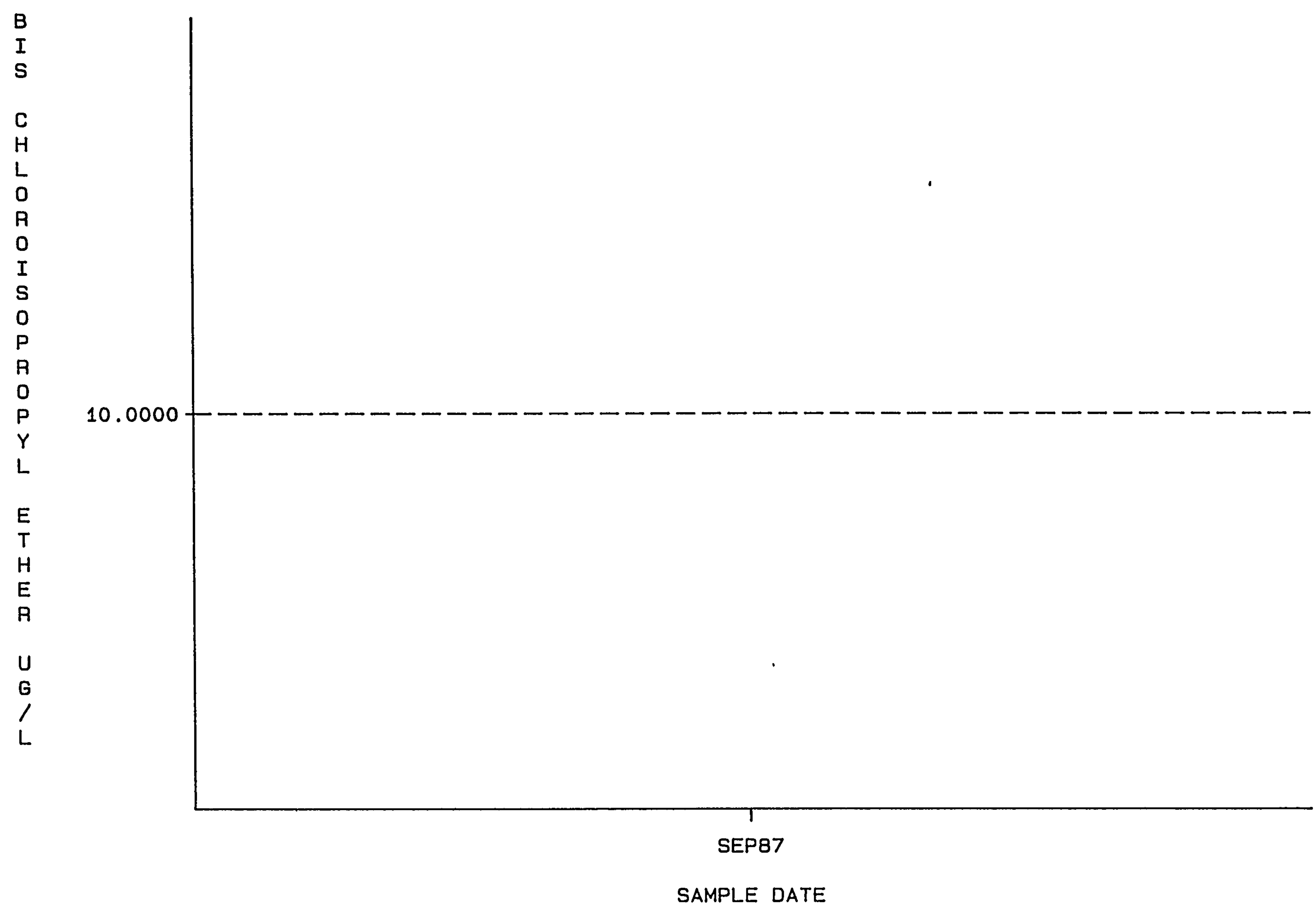
K1407B NPDES DATA – 2 4–DICHLOROBENZENE UG/L



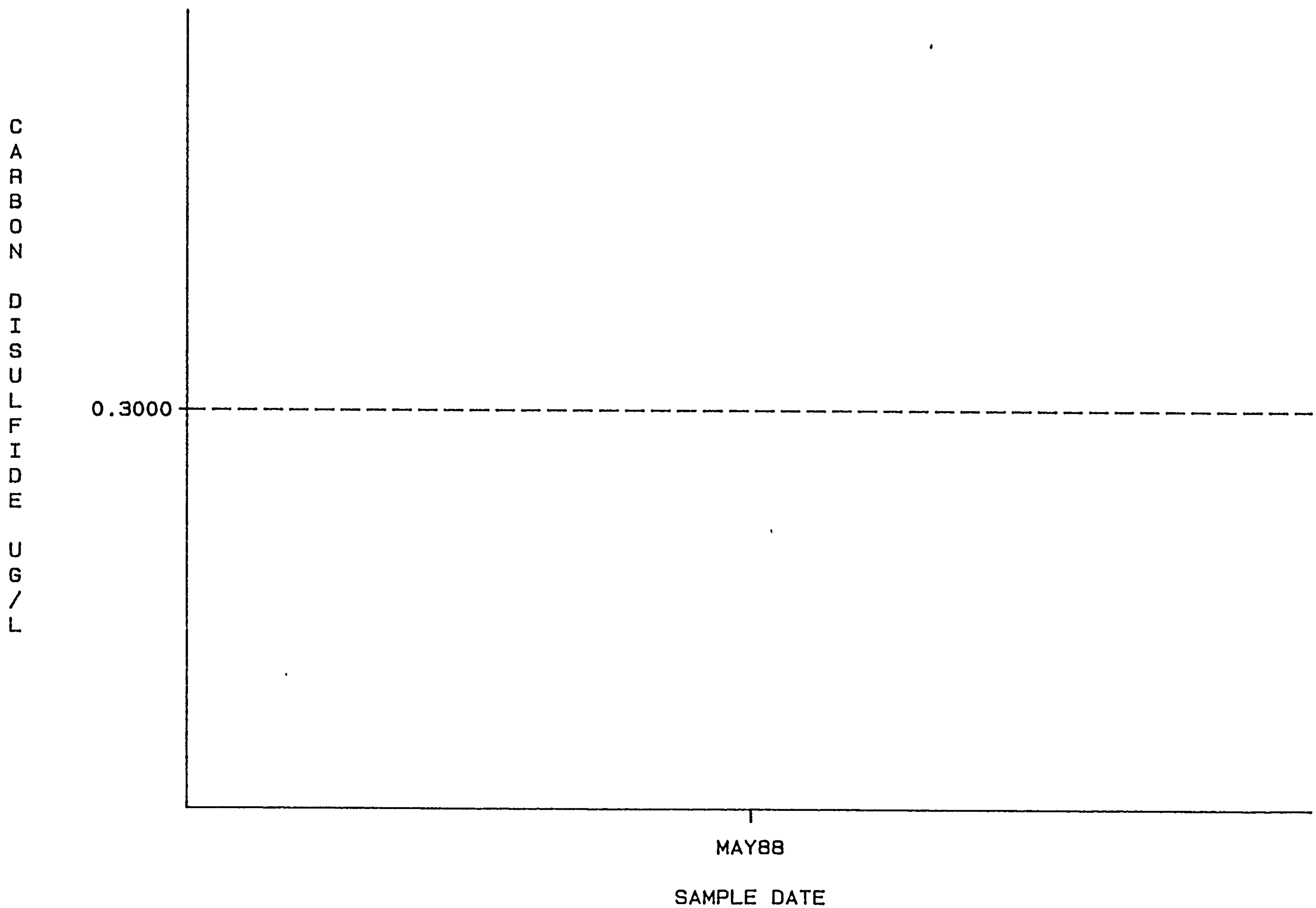
K1407B NPDES DATA – 4–ISOPROPYL PHENOL UG/L



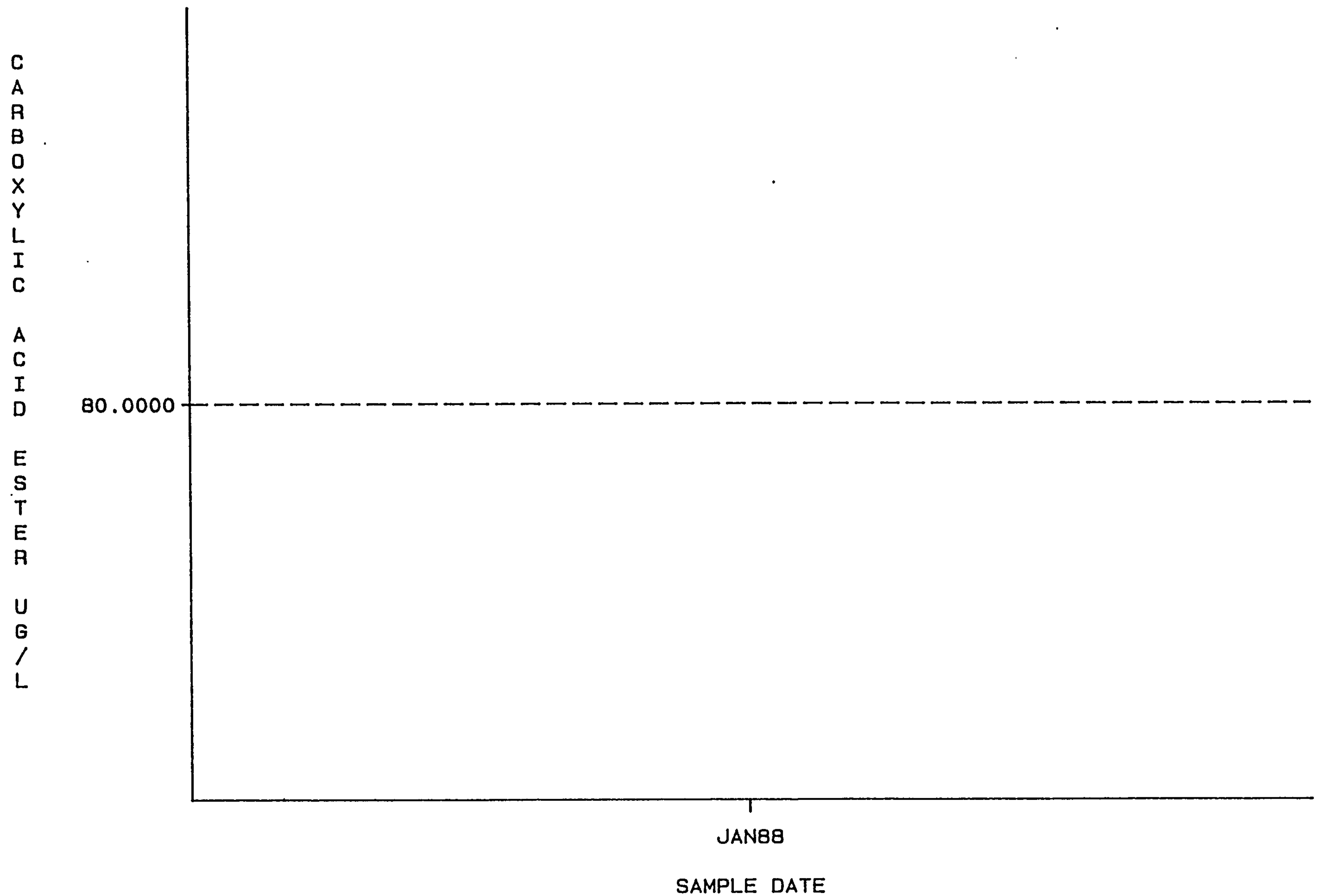
K1407B NPDES DATA – BIS(CHLOROISOPROPYL)ETHER UG/L



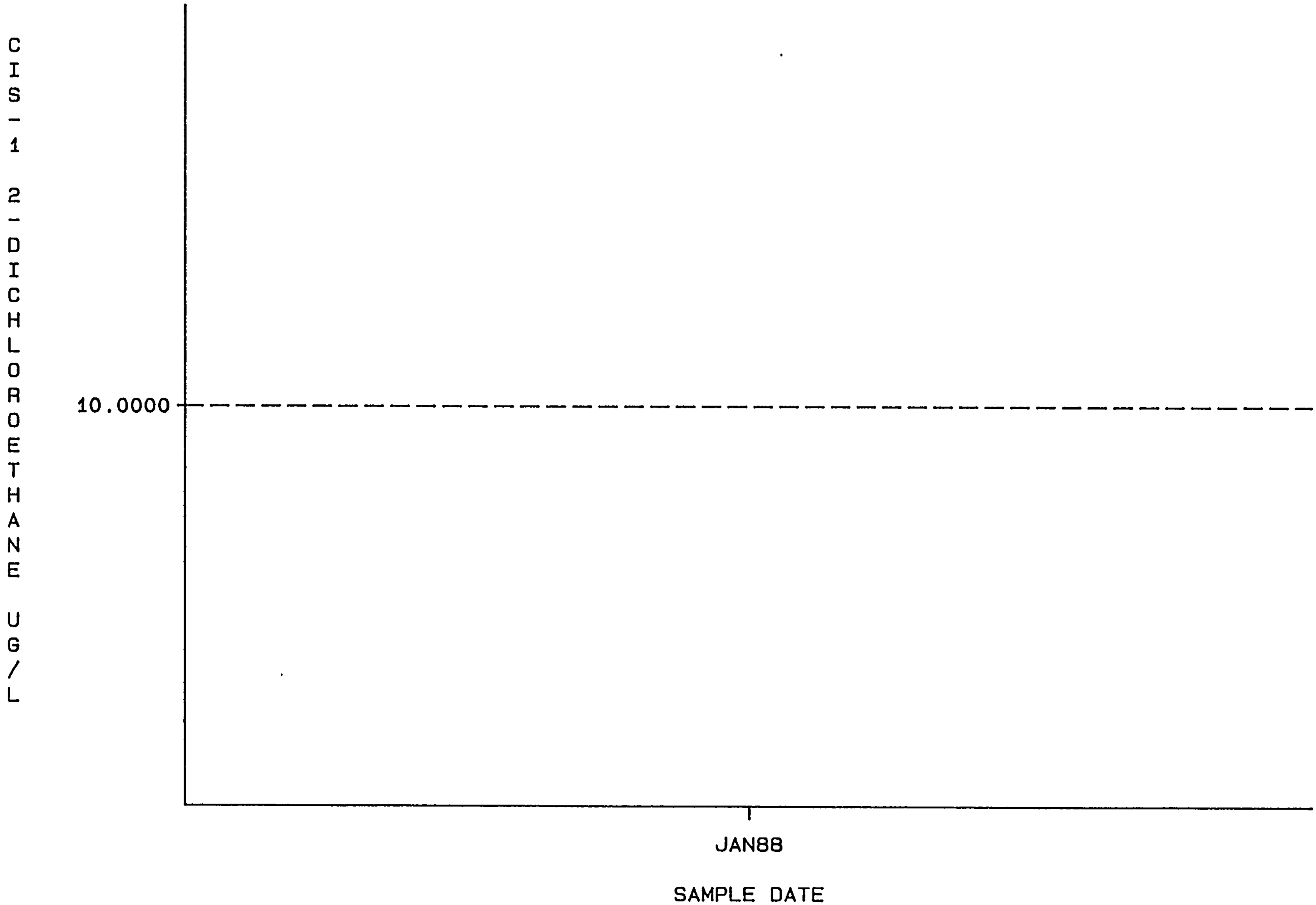
K1407B NPDES DATA – CARBON DISULFIDE UG/L



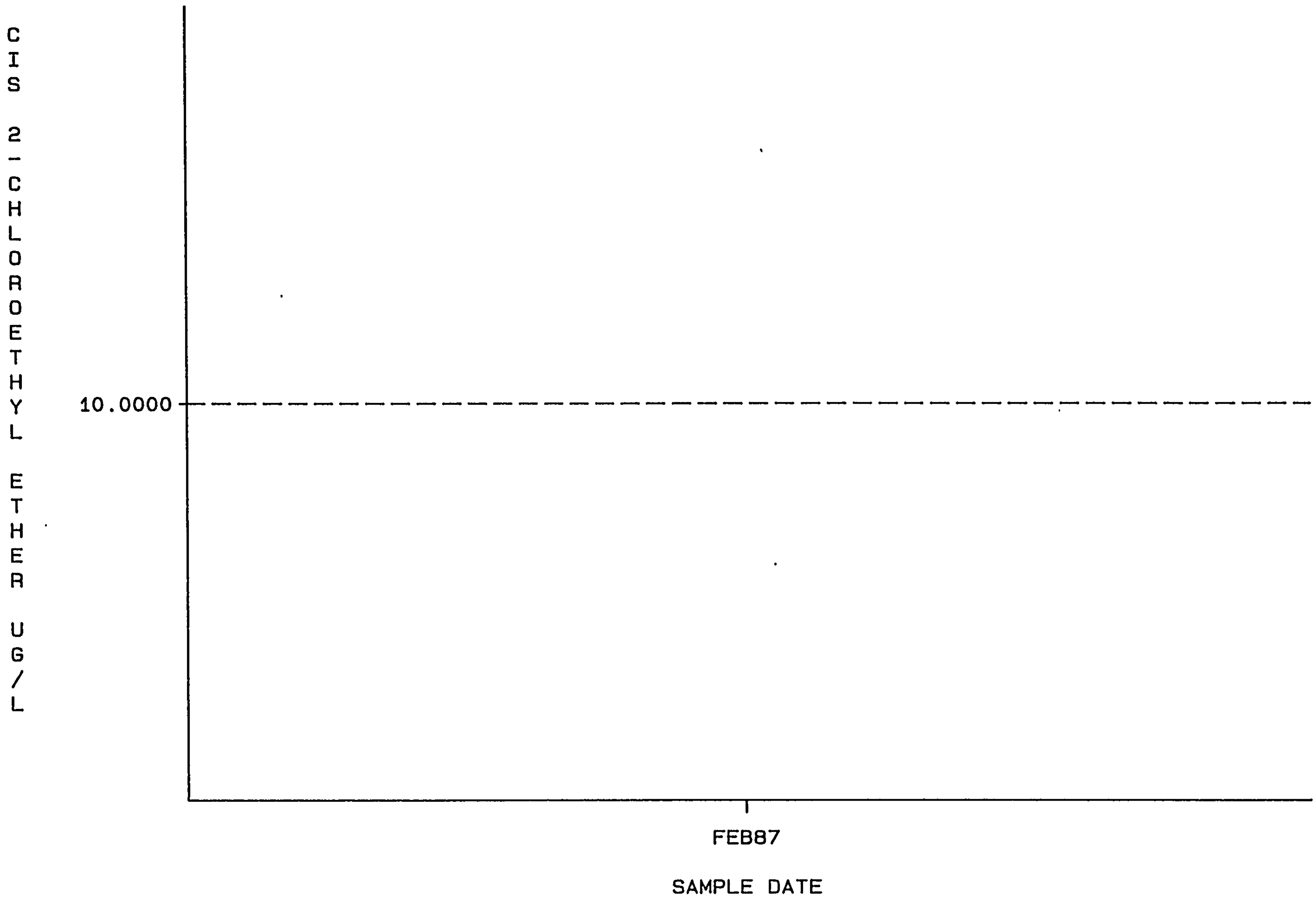
K1407B NPDES DATA – CARBOXYLIC ACID ESTER UG/L



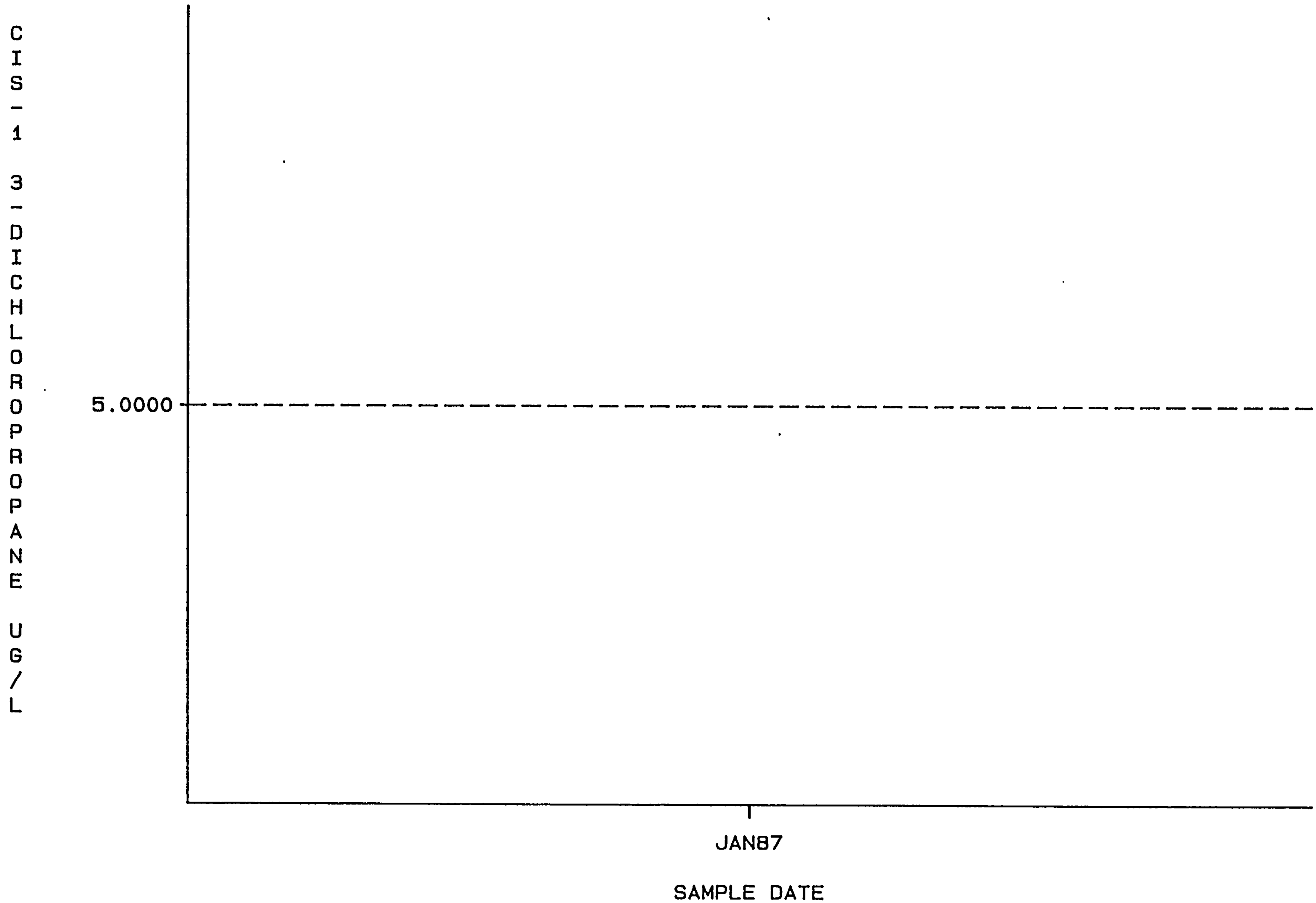
K1407B NPDES DATA – CIS–1 2–DICHLOROETHANE UG/L



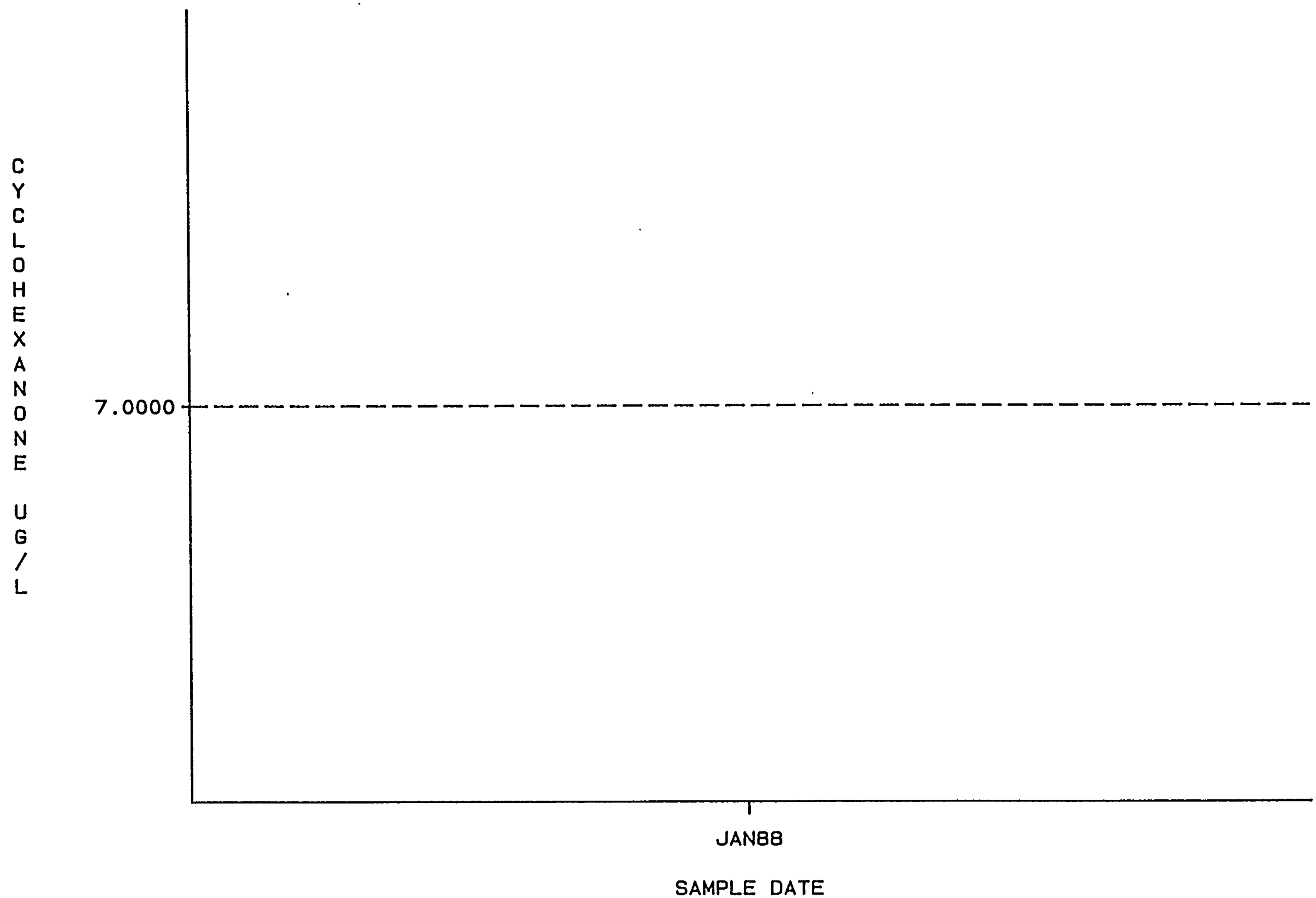
K1407B NPDES DATA — CIS(2—CHLOROETHYL)ETHER UG/L



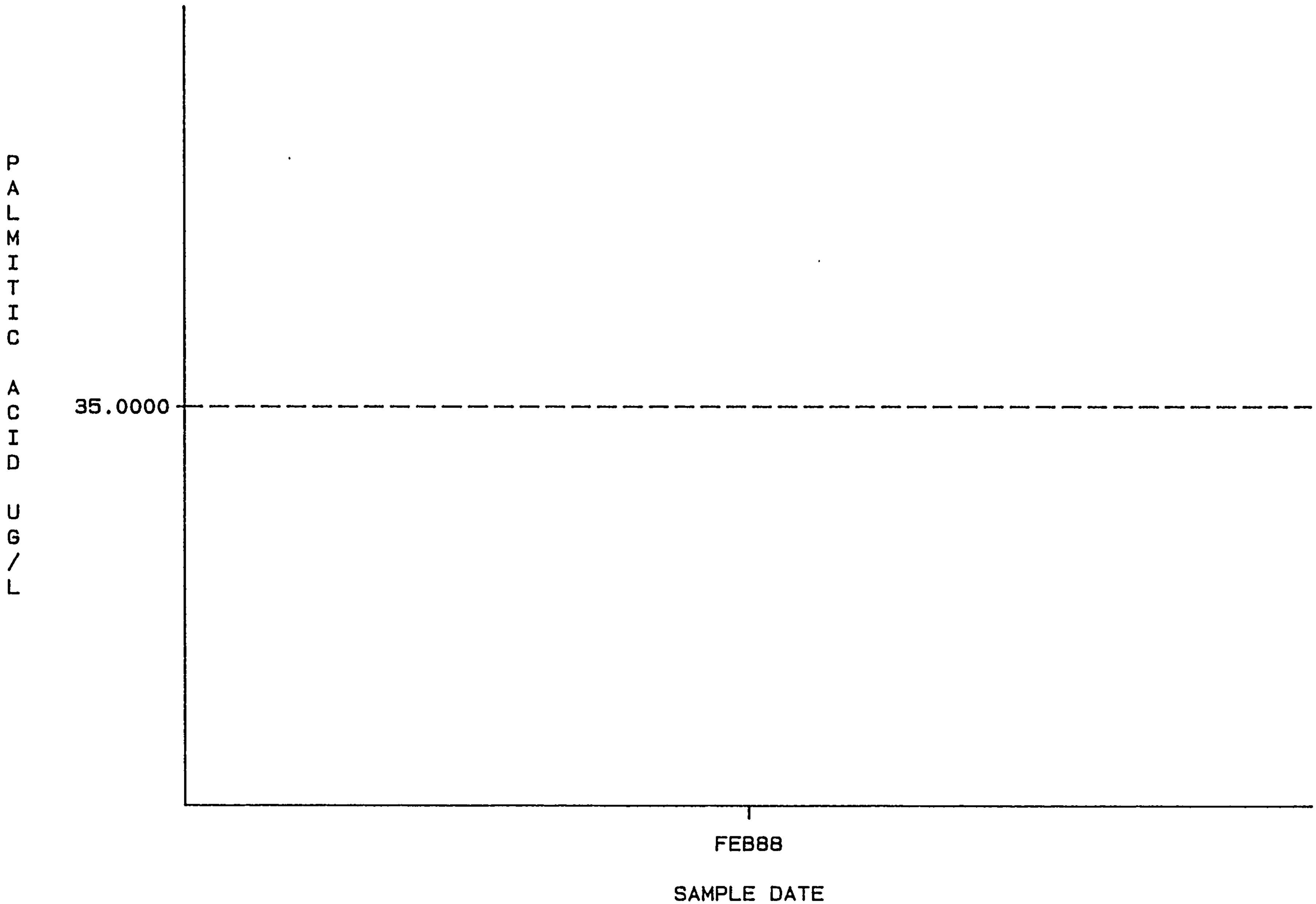
K1407B NPDES DATA – CIS–1 3–DICHLOROPROPANE UG/L



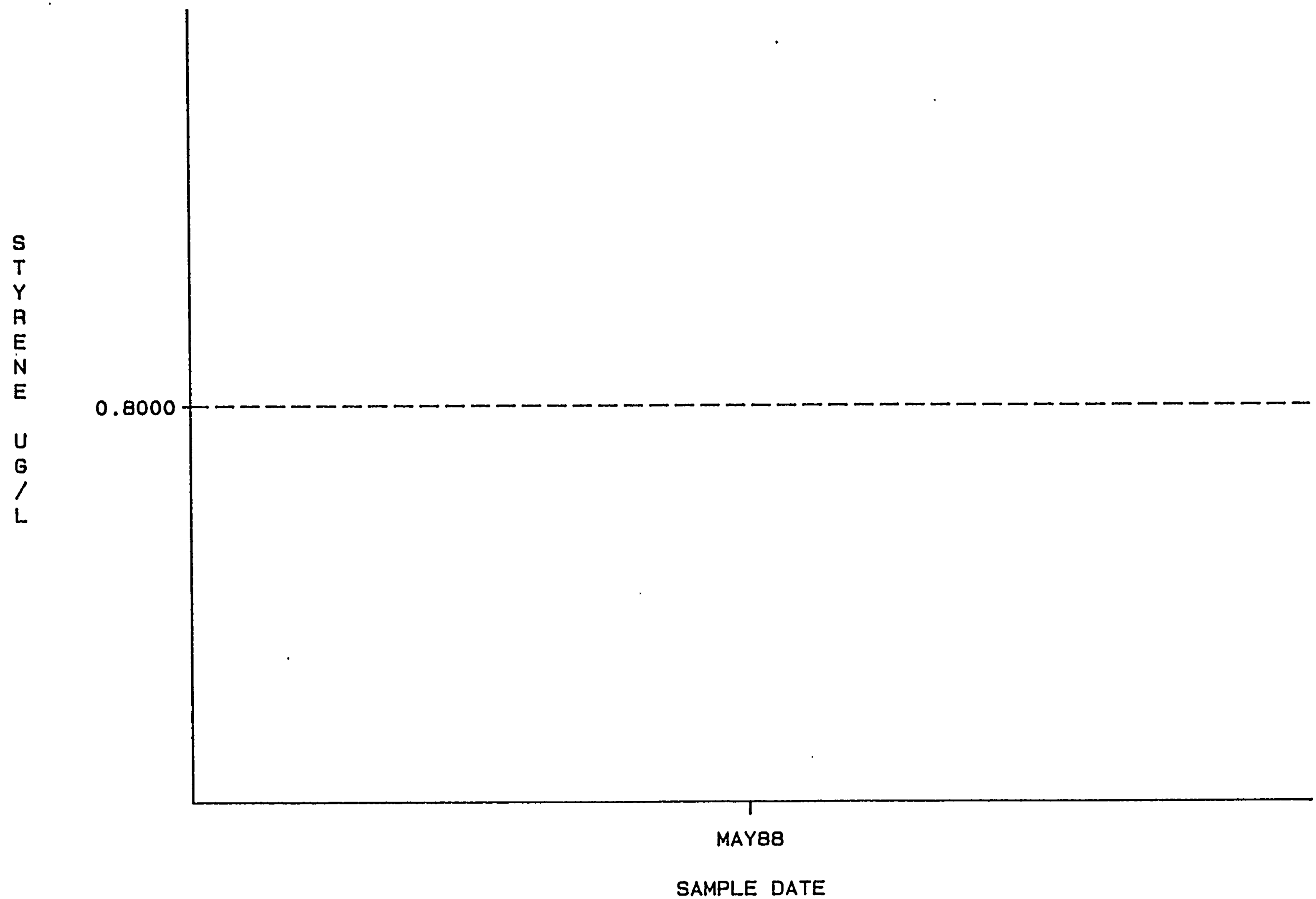
K1407B NPDES DATA – CYCLOHEXANONE UG/L



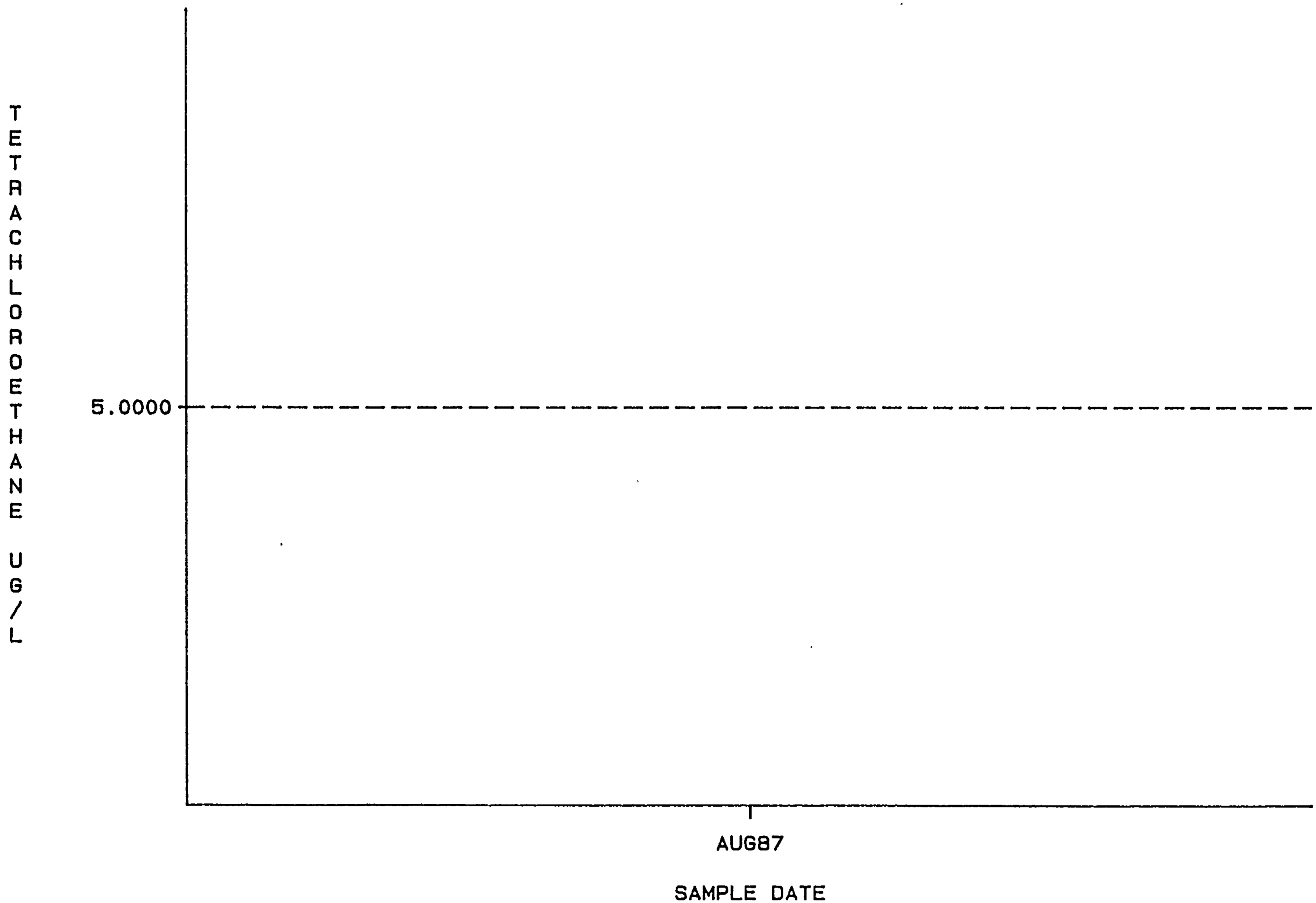
K1407B NPDES DATA – PALMITIC ACID UG/L



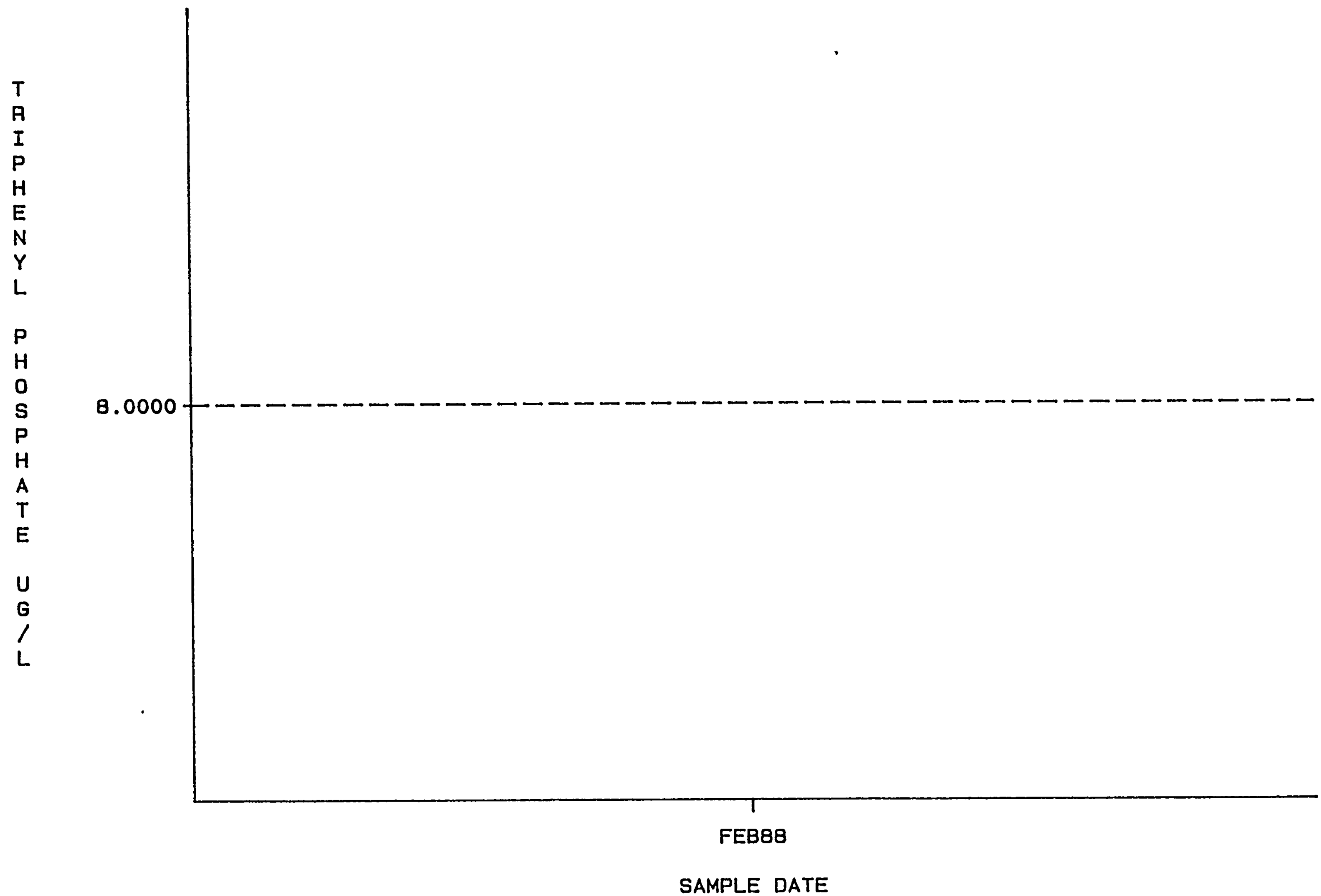
K1407B NPDES DATA – STYRENE UG/L



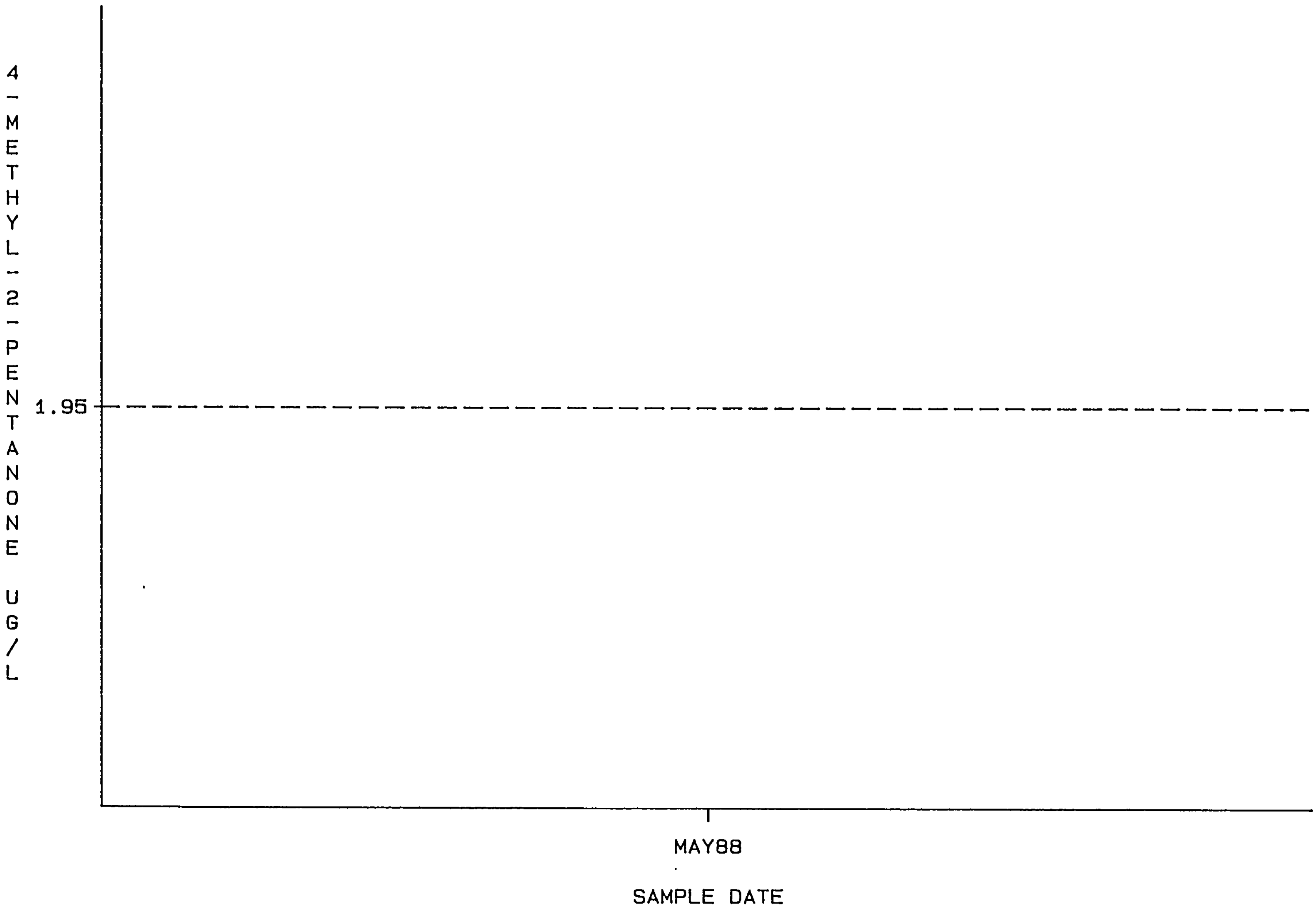
K1407B NPDES DATA – TETRACHLOROETHANE UG/L



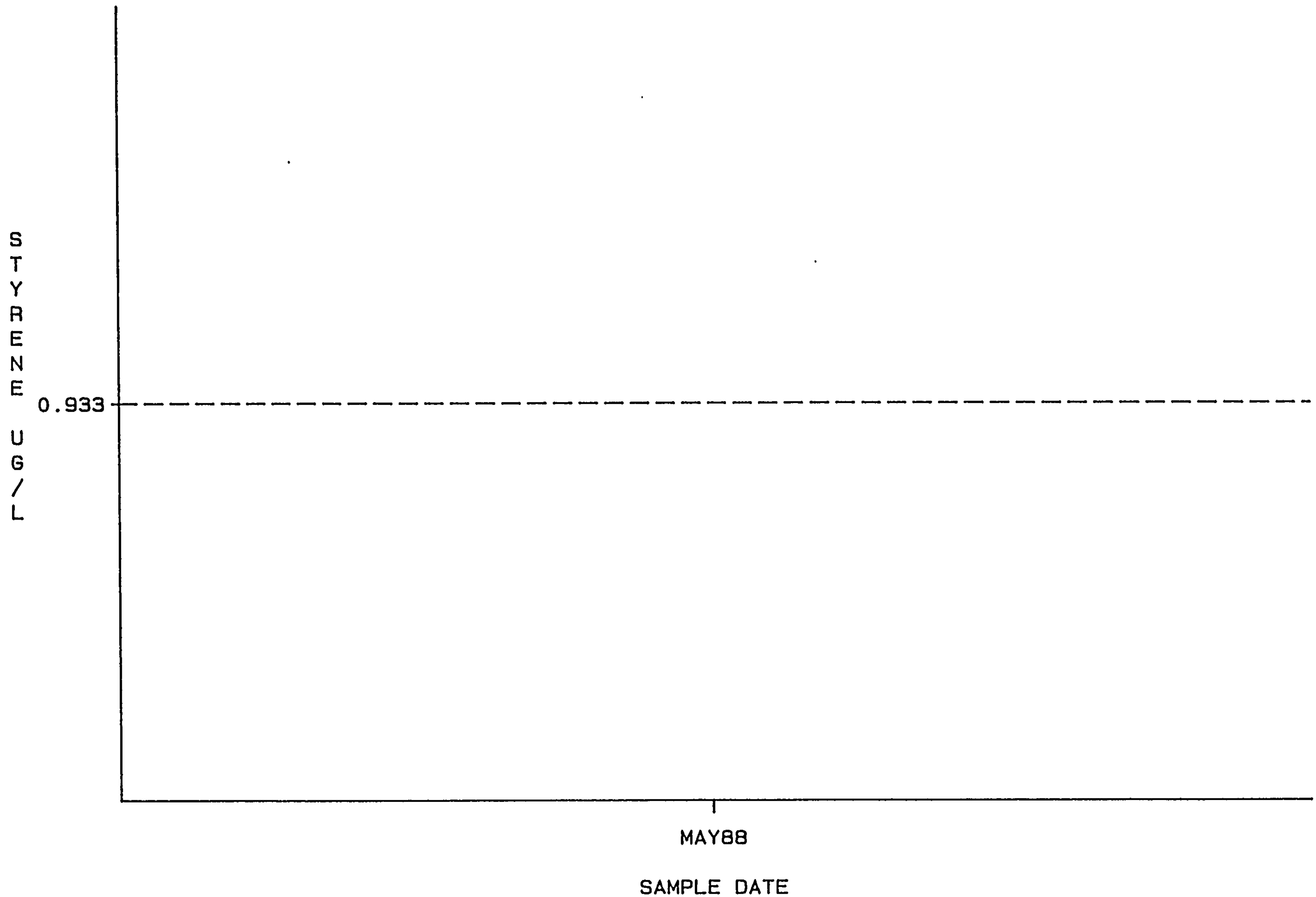
K1407B NPDES DATA – TRIPHENYL PHOSPHATE UG/L



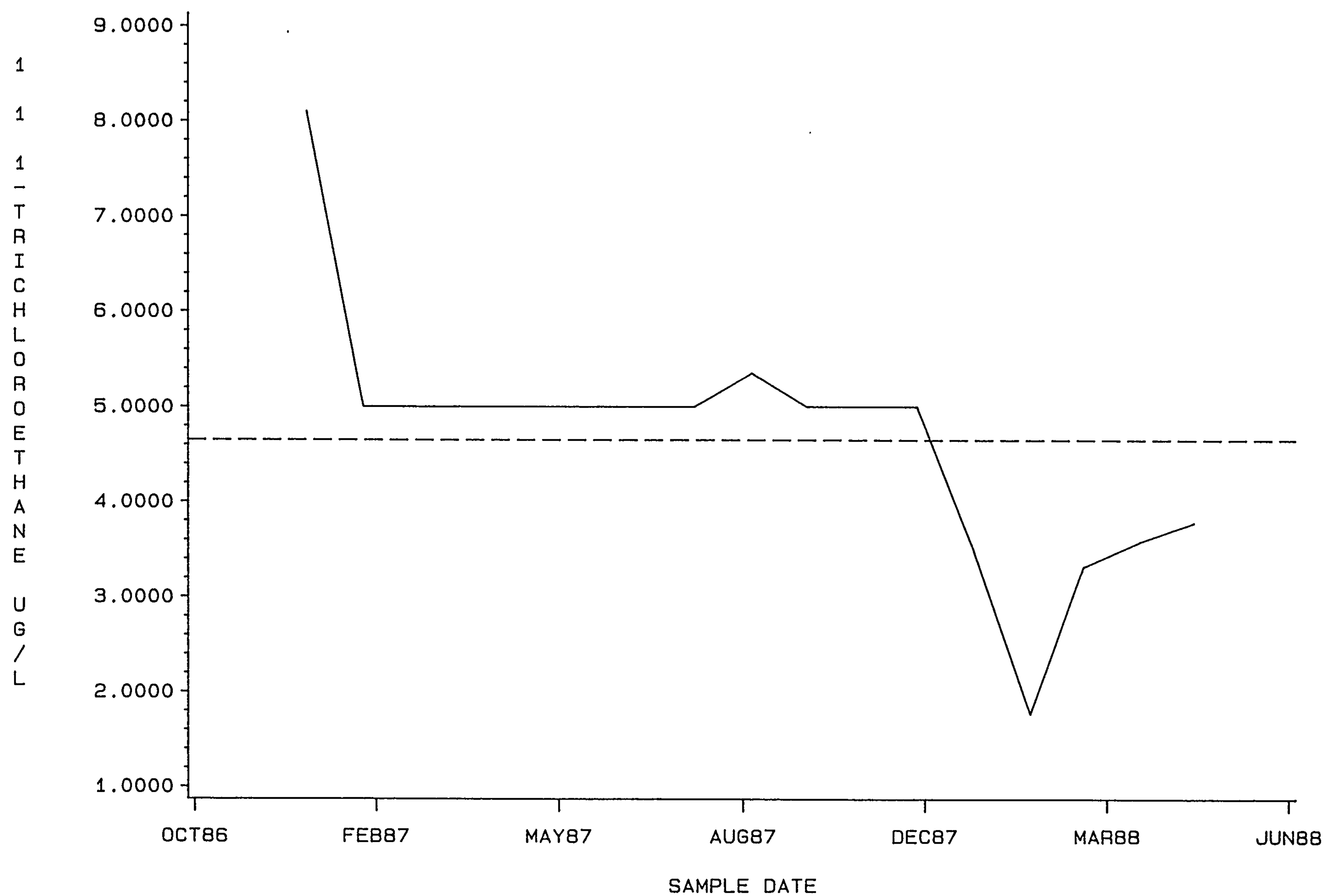
K1700 NPDES DATA — 4—METHYL—2—PENTANONE UG/L



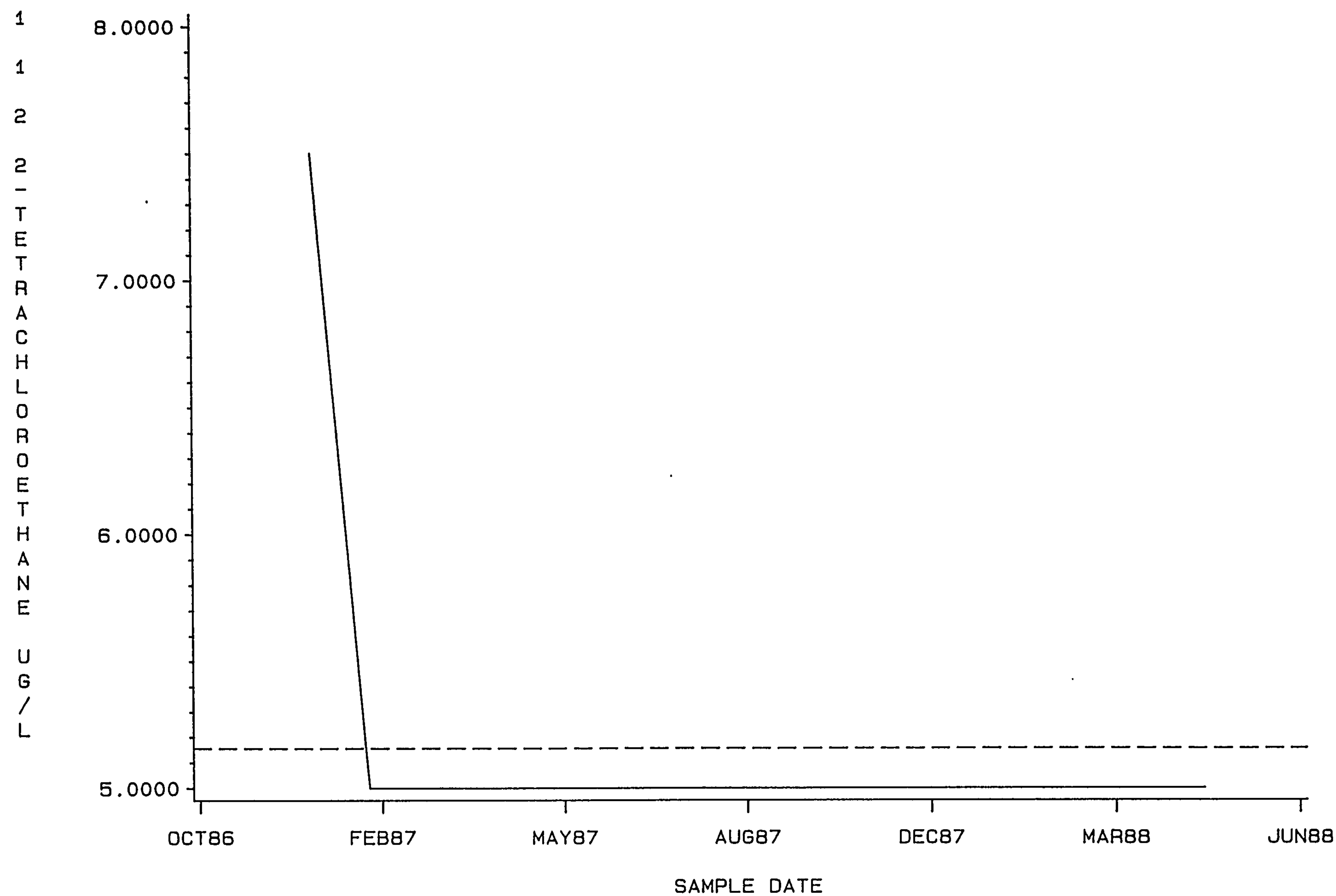
K1700 NPDES DATA – STYRENE UG/L



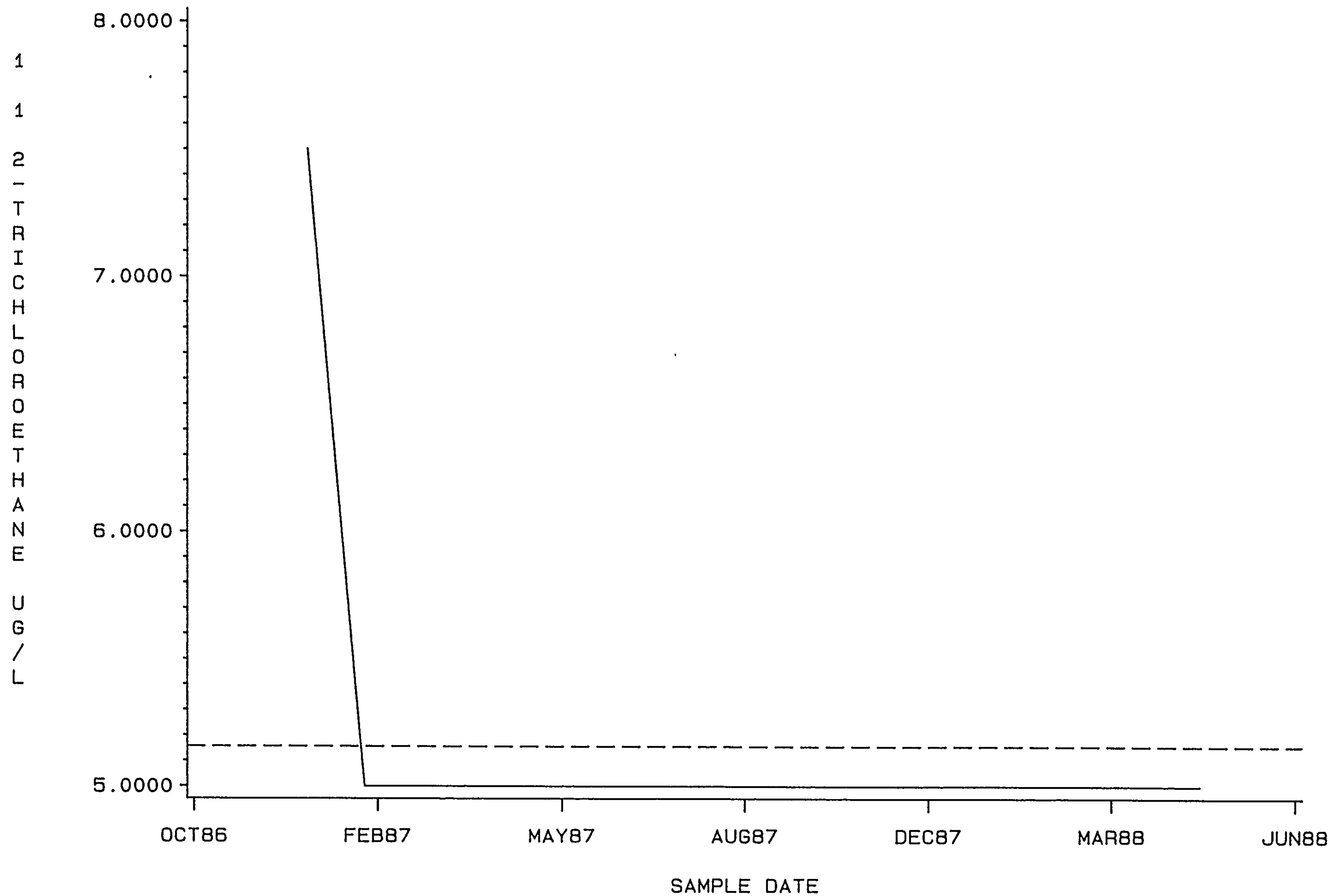
K1407B NPDES DATA – 1 1 1–TRICHLOROETHANE UG/L



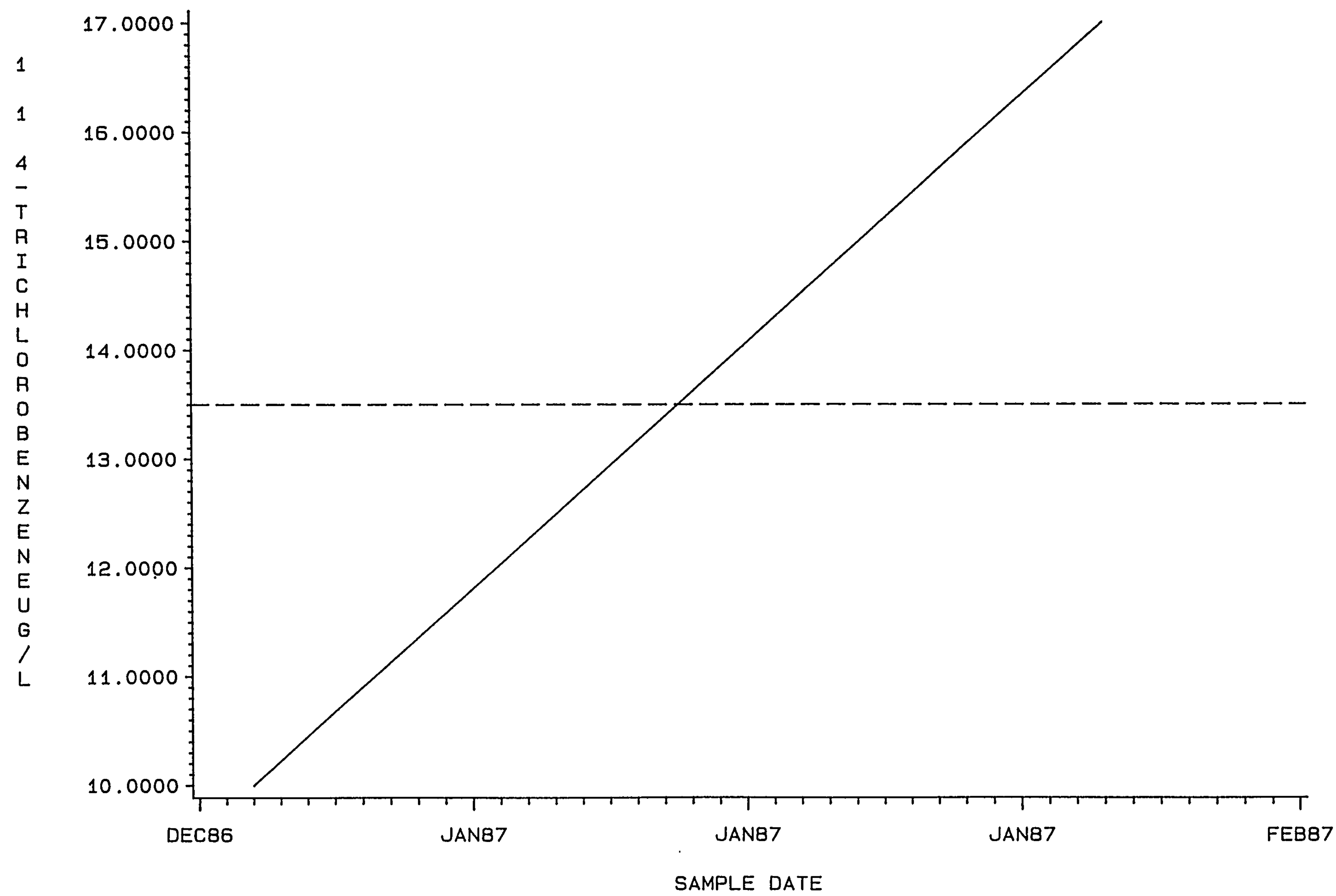
K1407B NPDES DATA – 1 1 2 2–TETRACHLOROETHANE UG/L



K1407B NPDES DATA – 1 1 2–TRICHLOROETHANE UG/L



K1407B NPDES DATA – 1 1 4–TRICHLOROBENZENEUG/L



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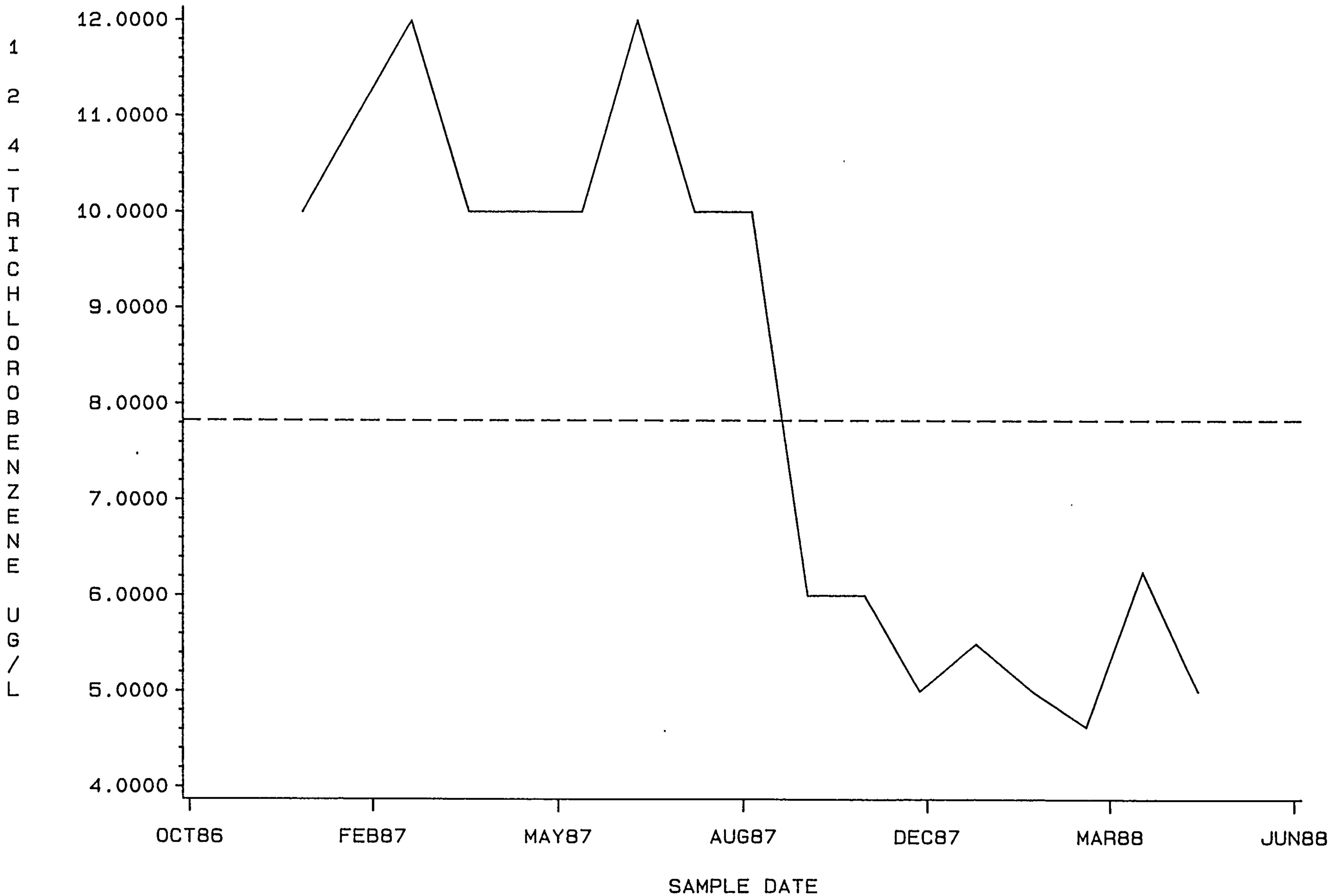

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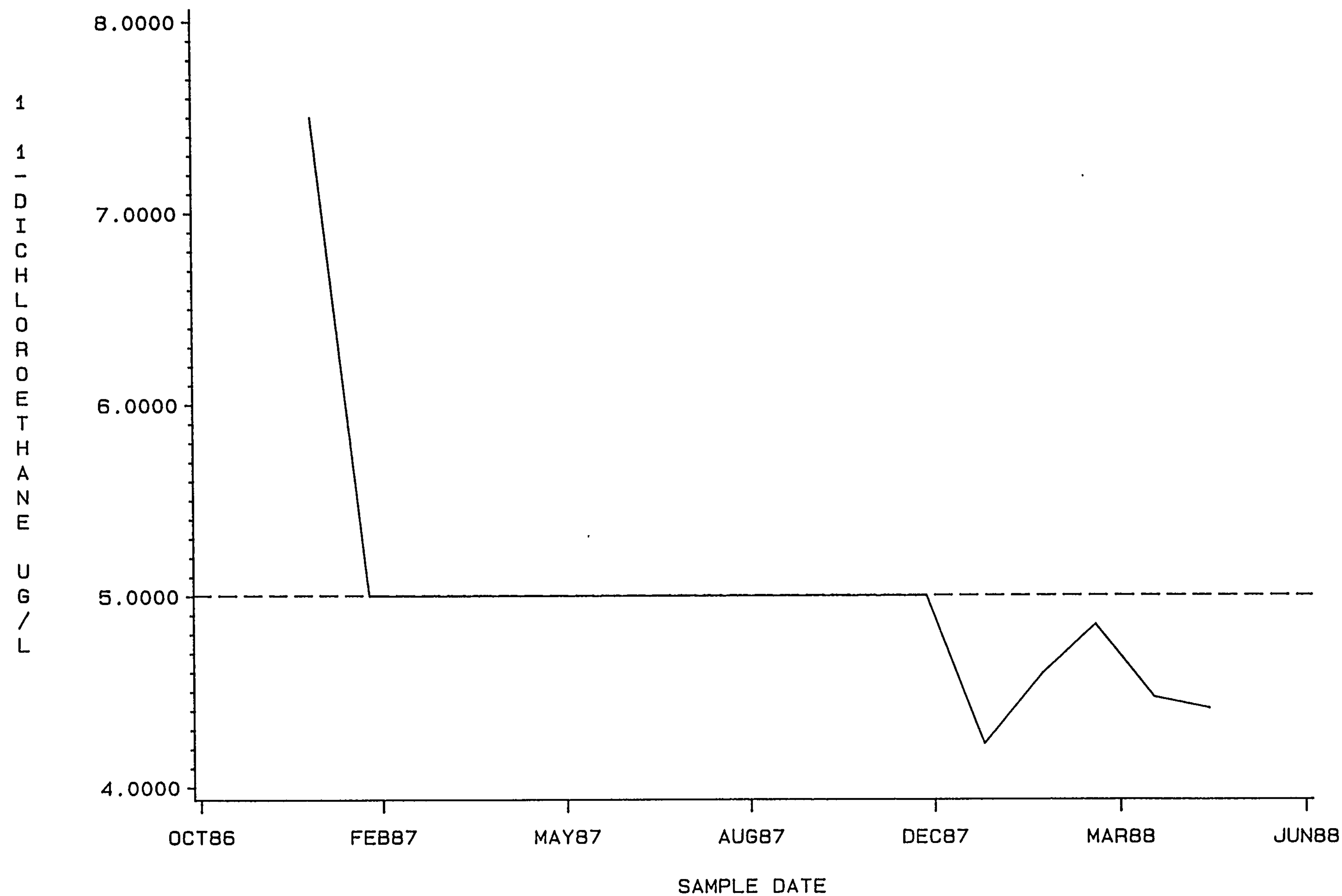

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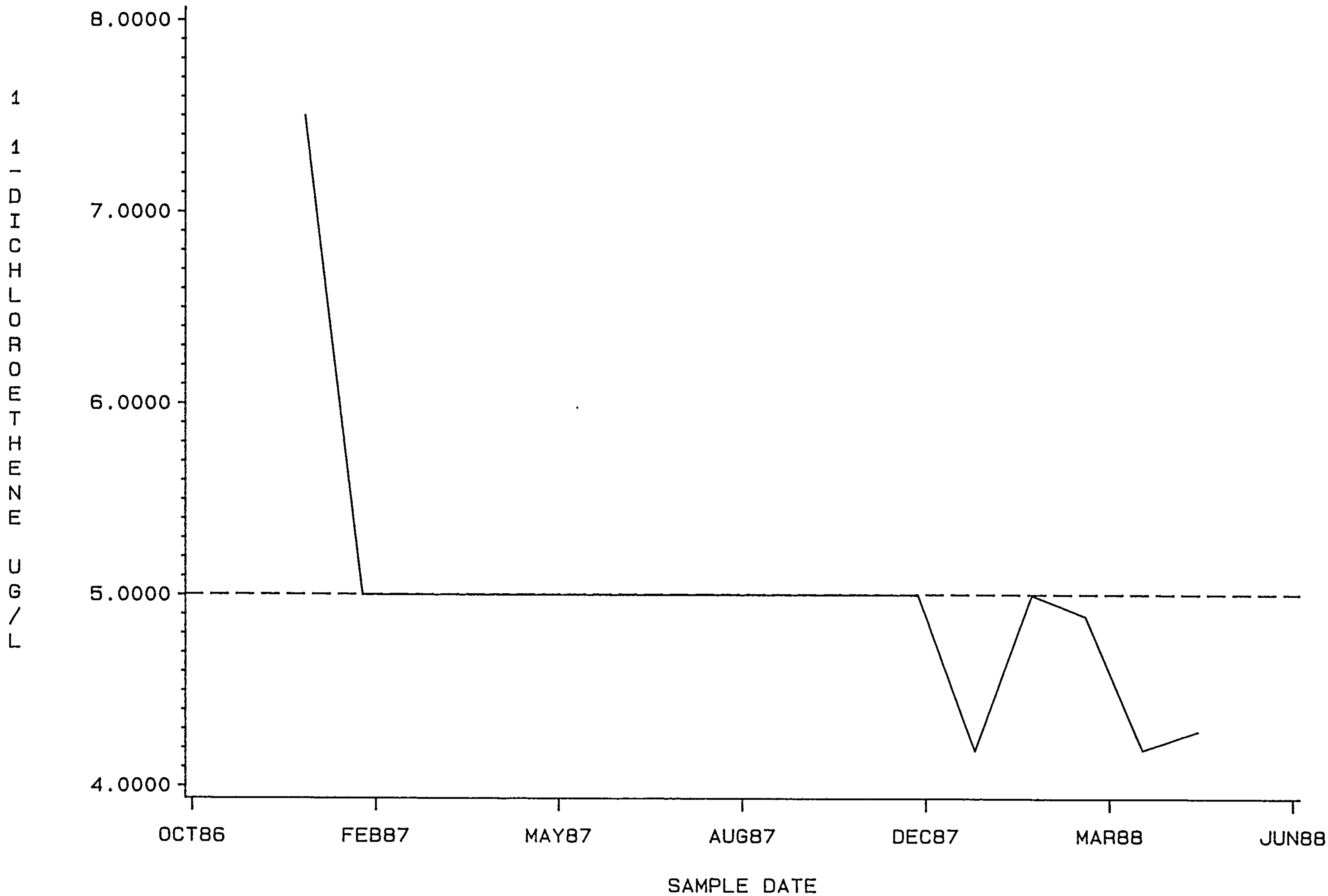

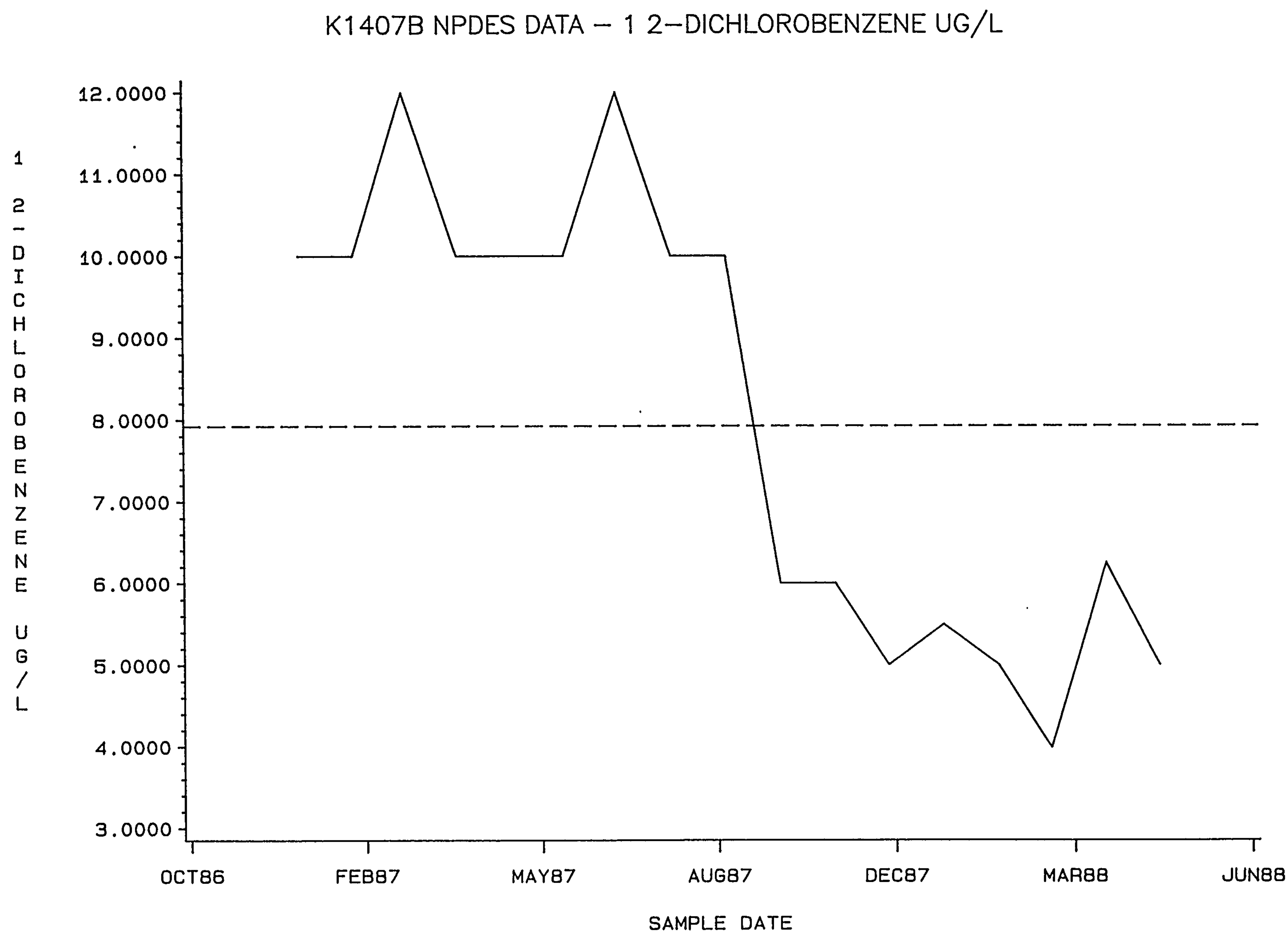
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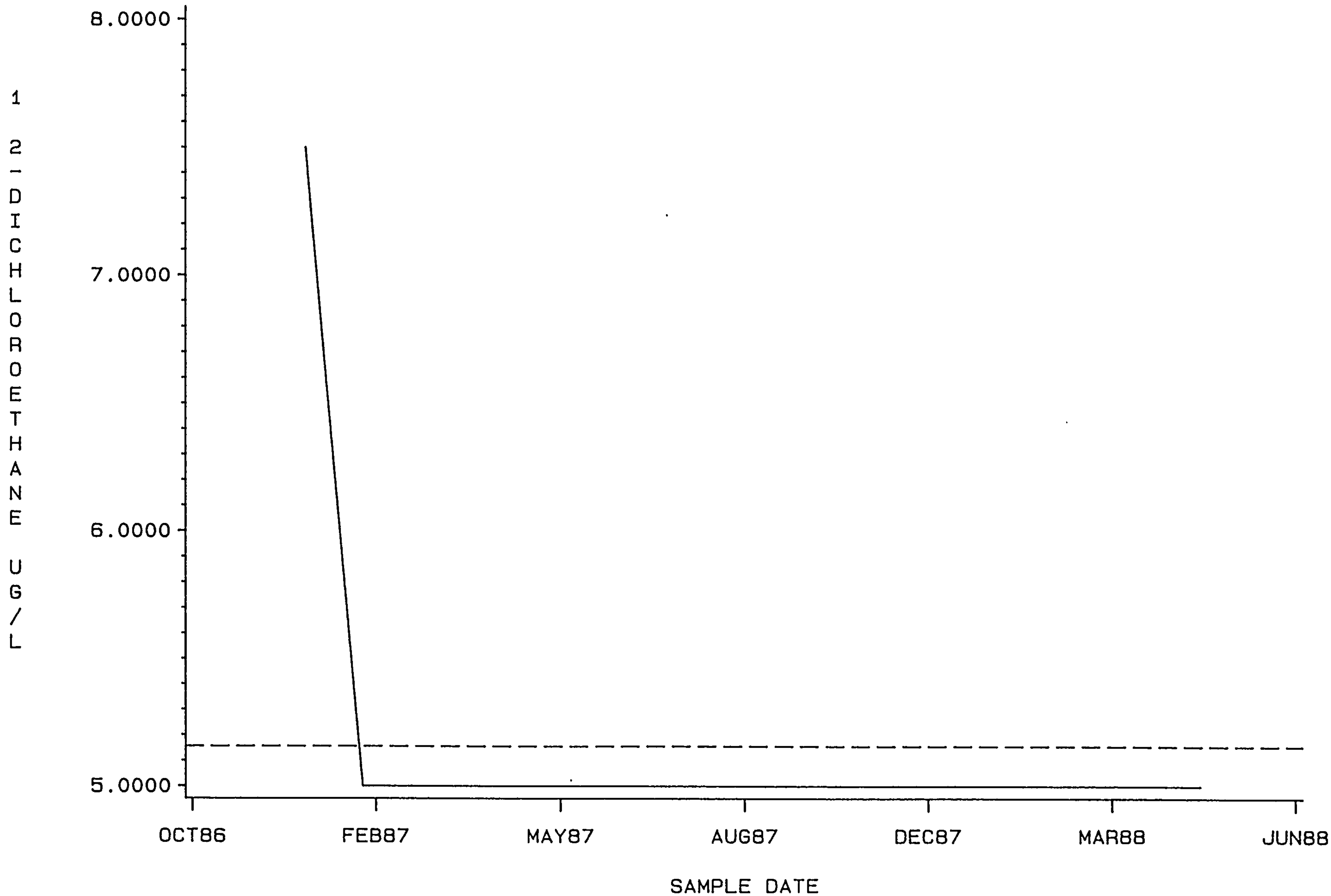

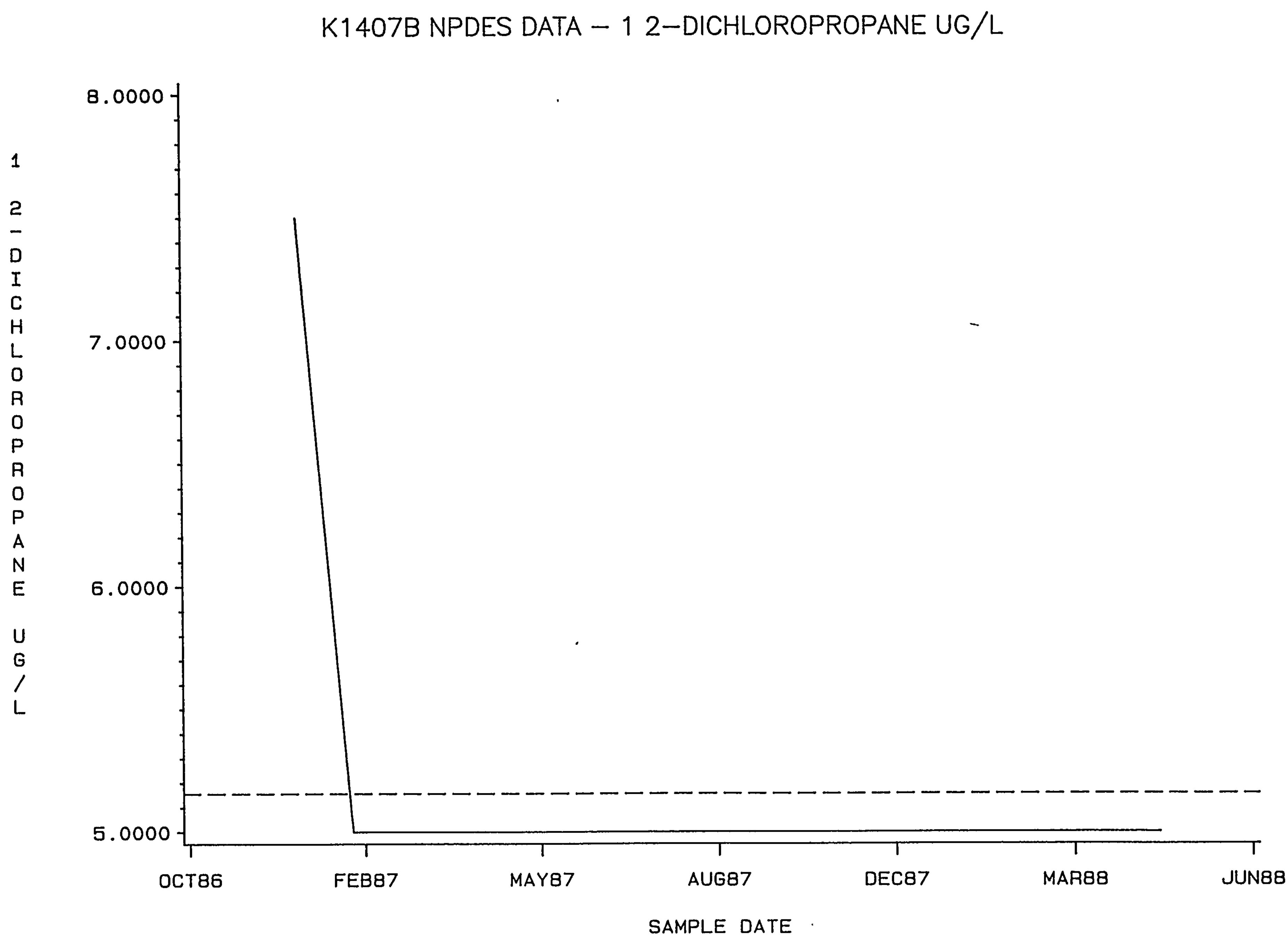
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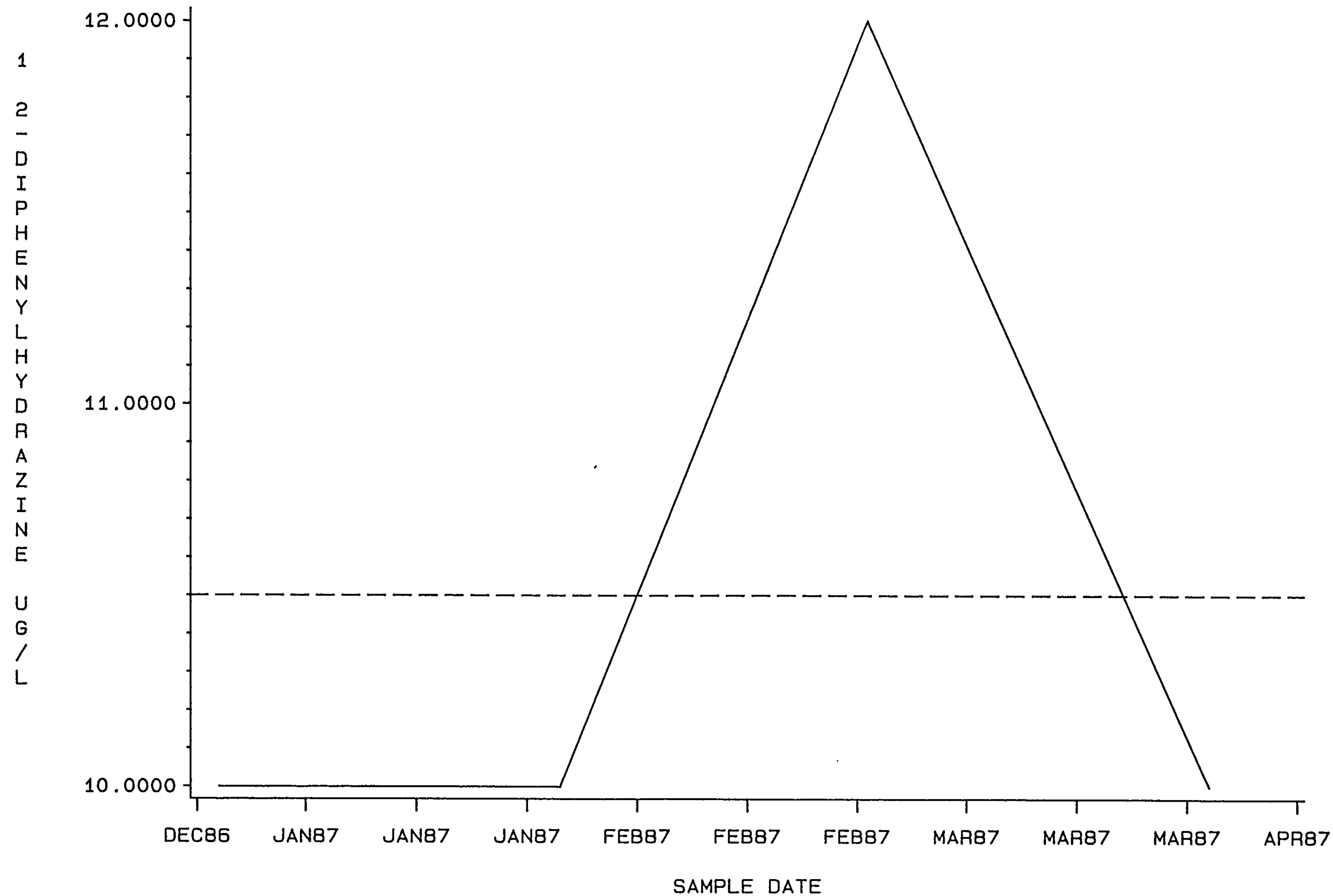

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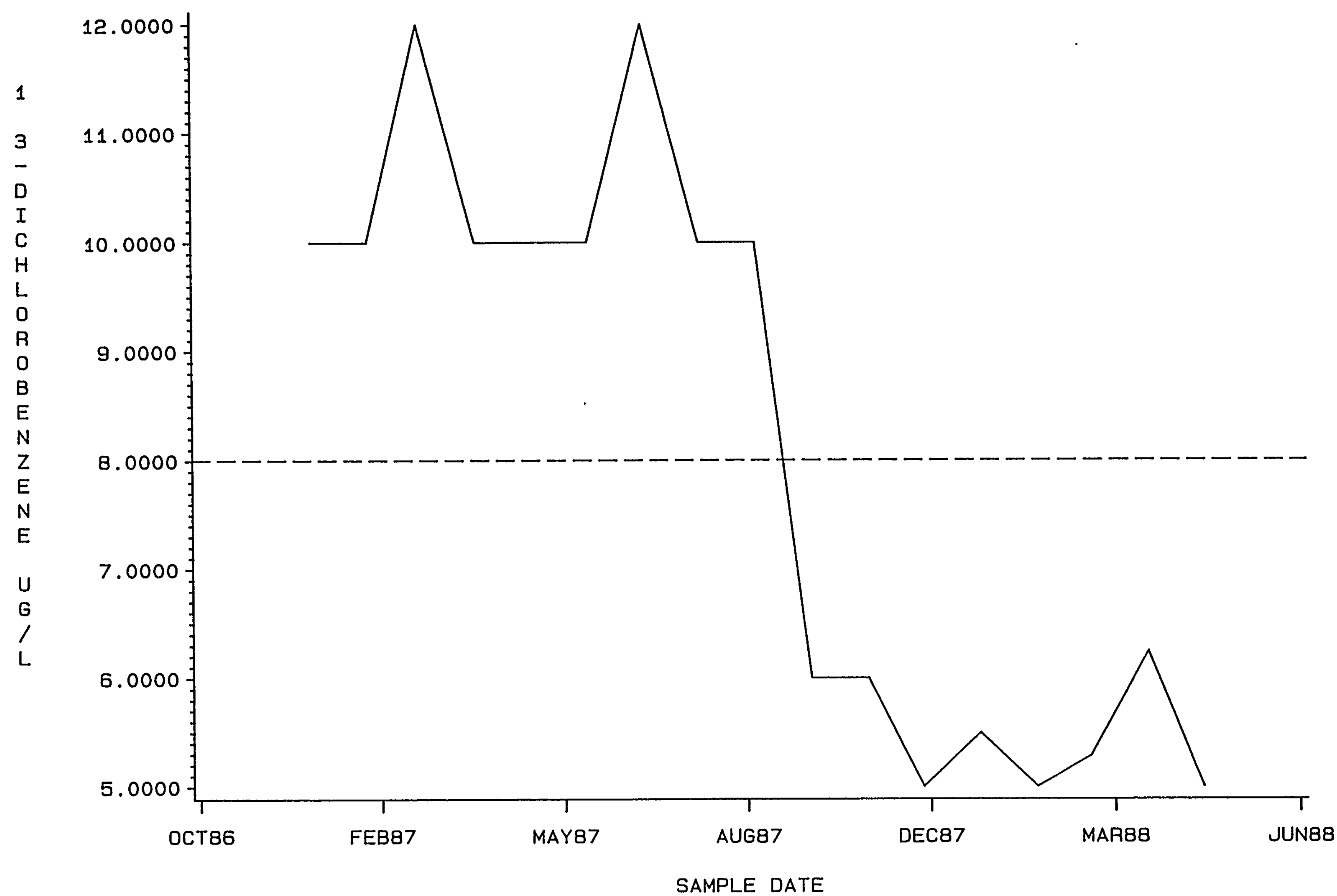

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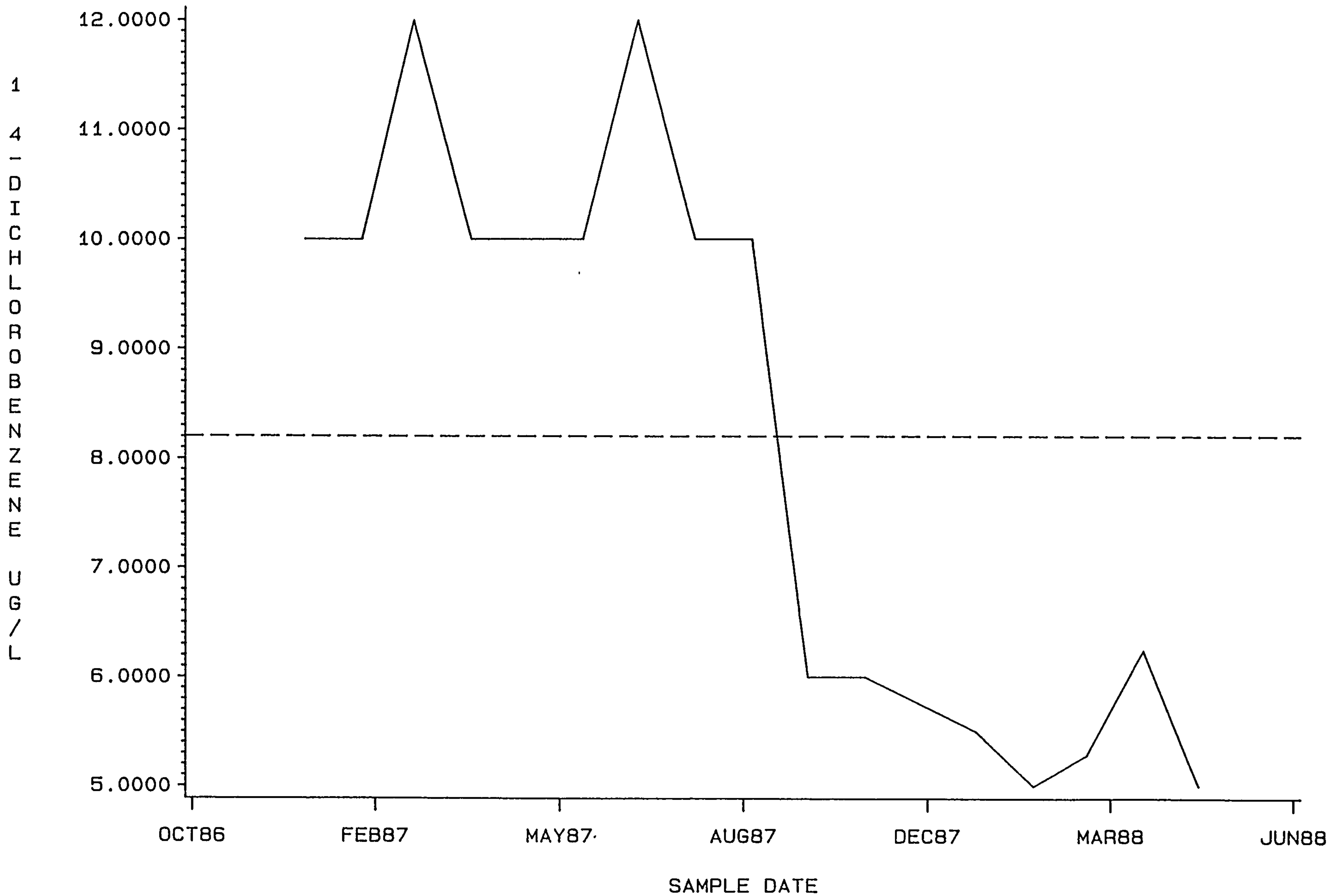

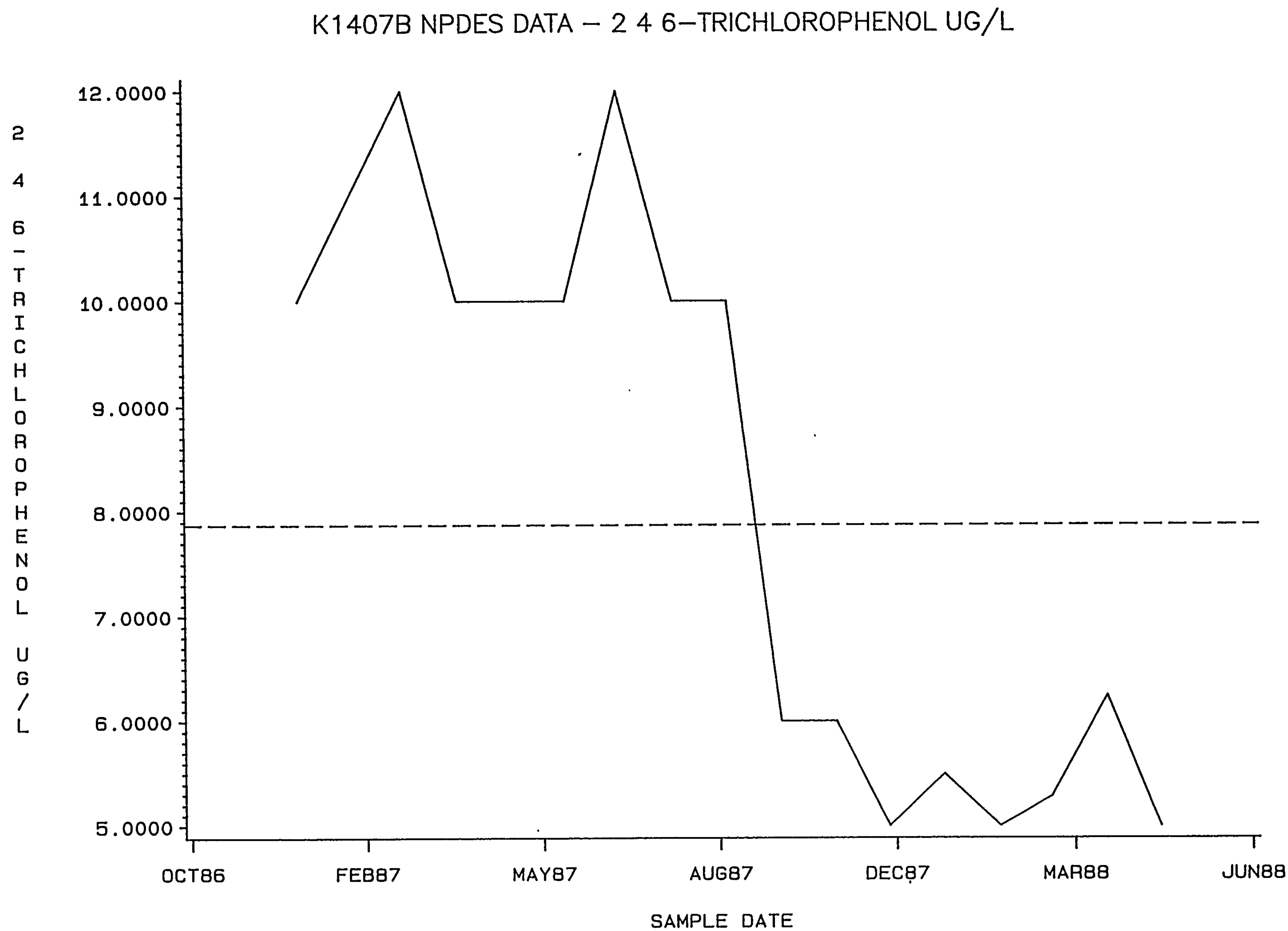
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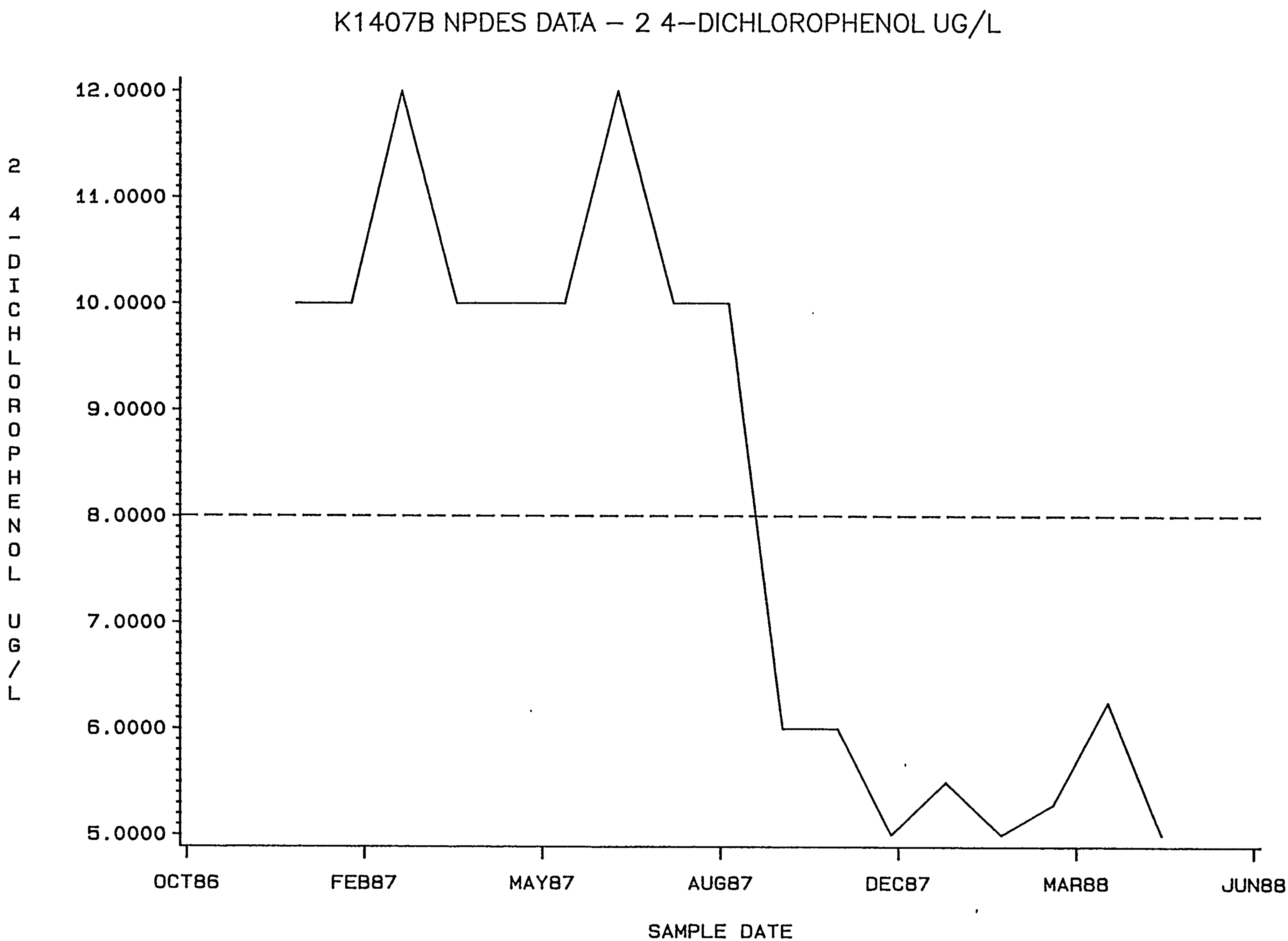
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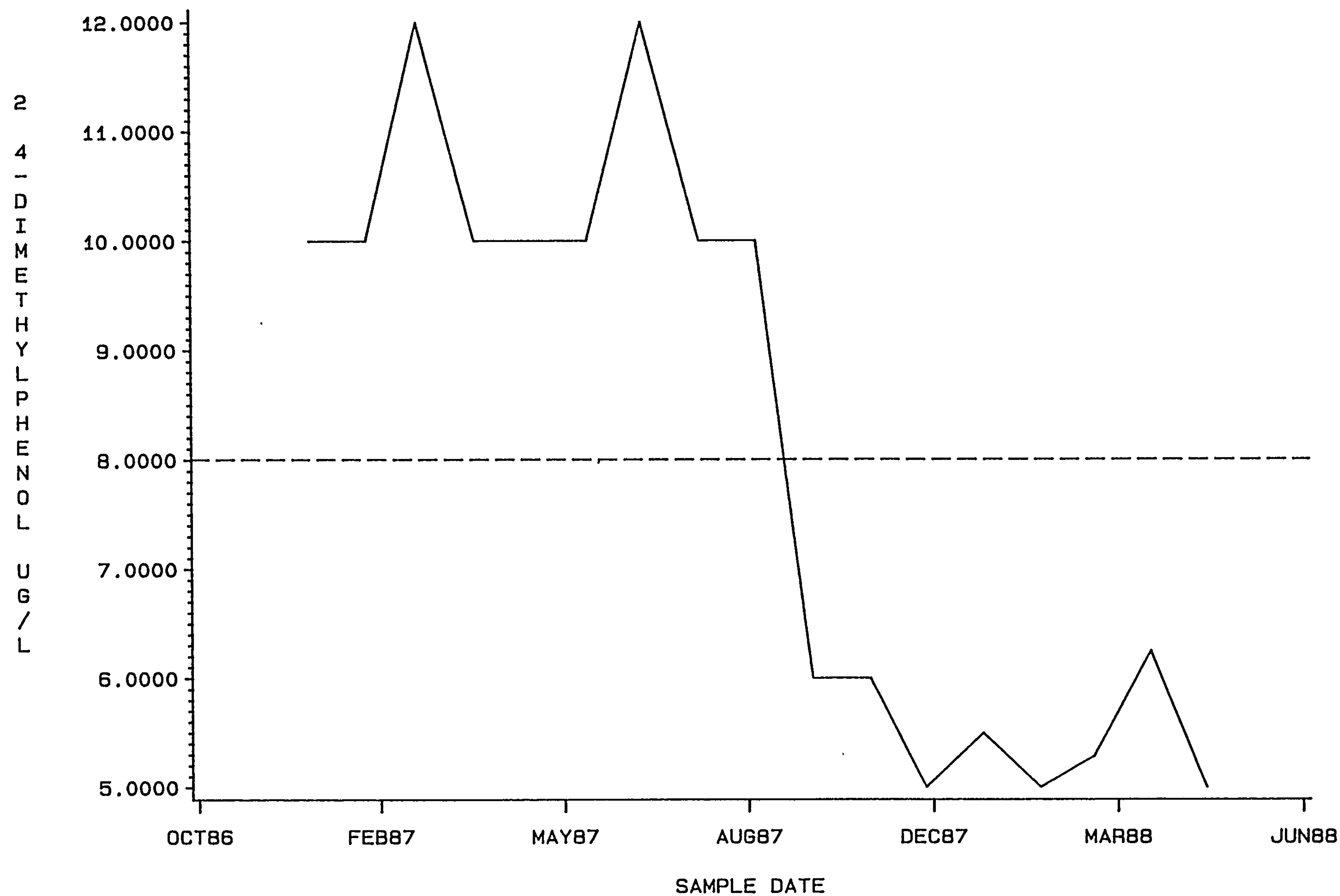

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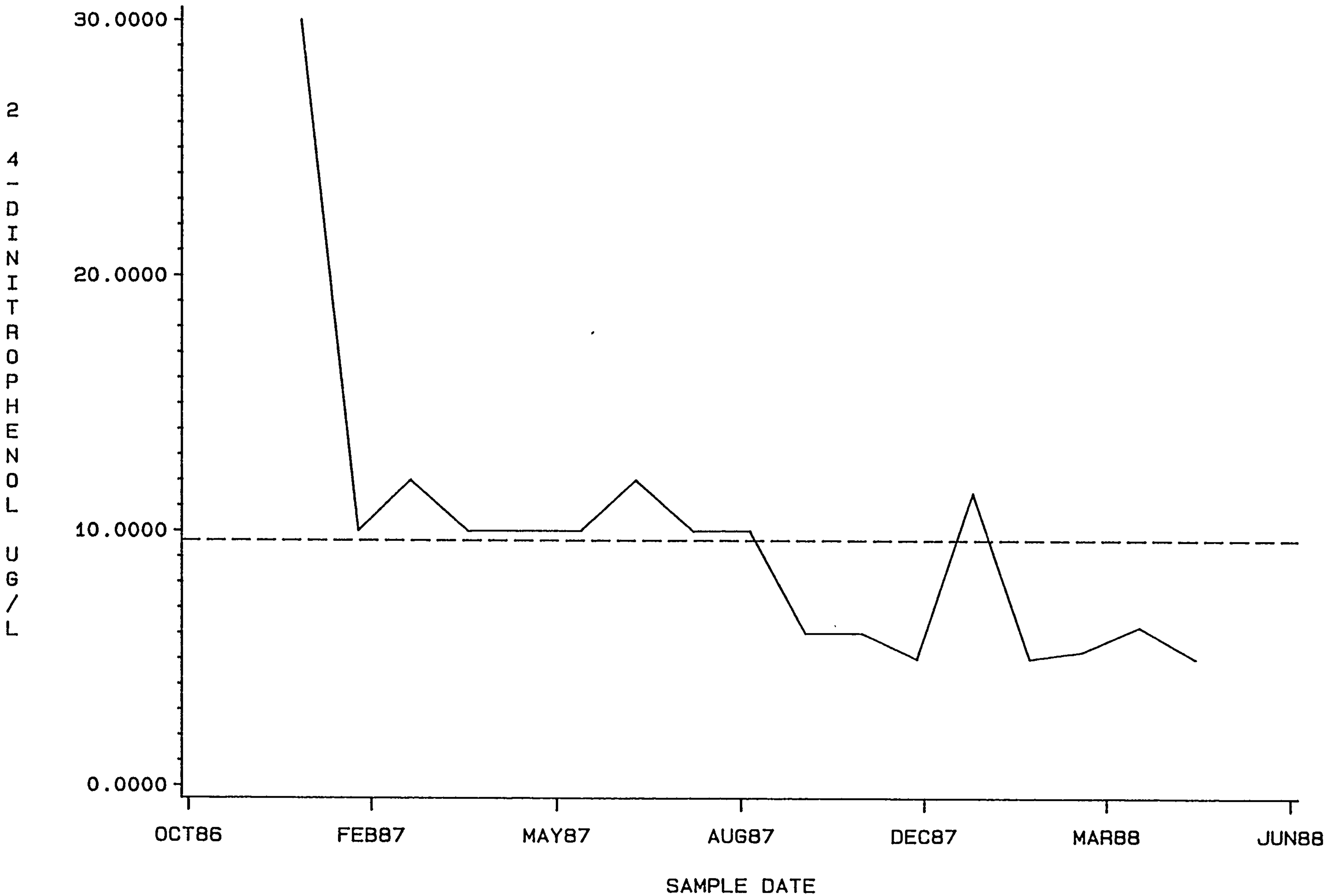

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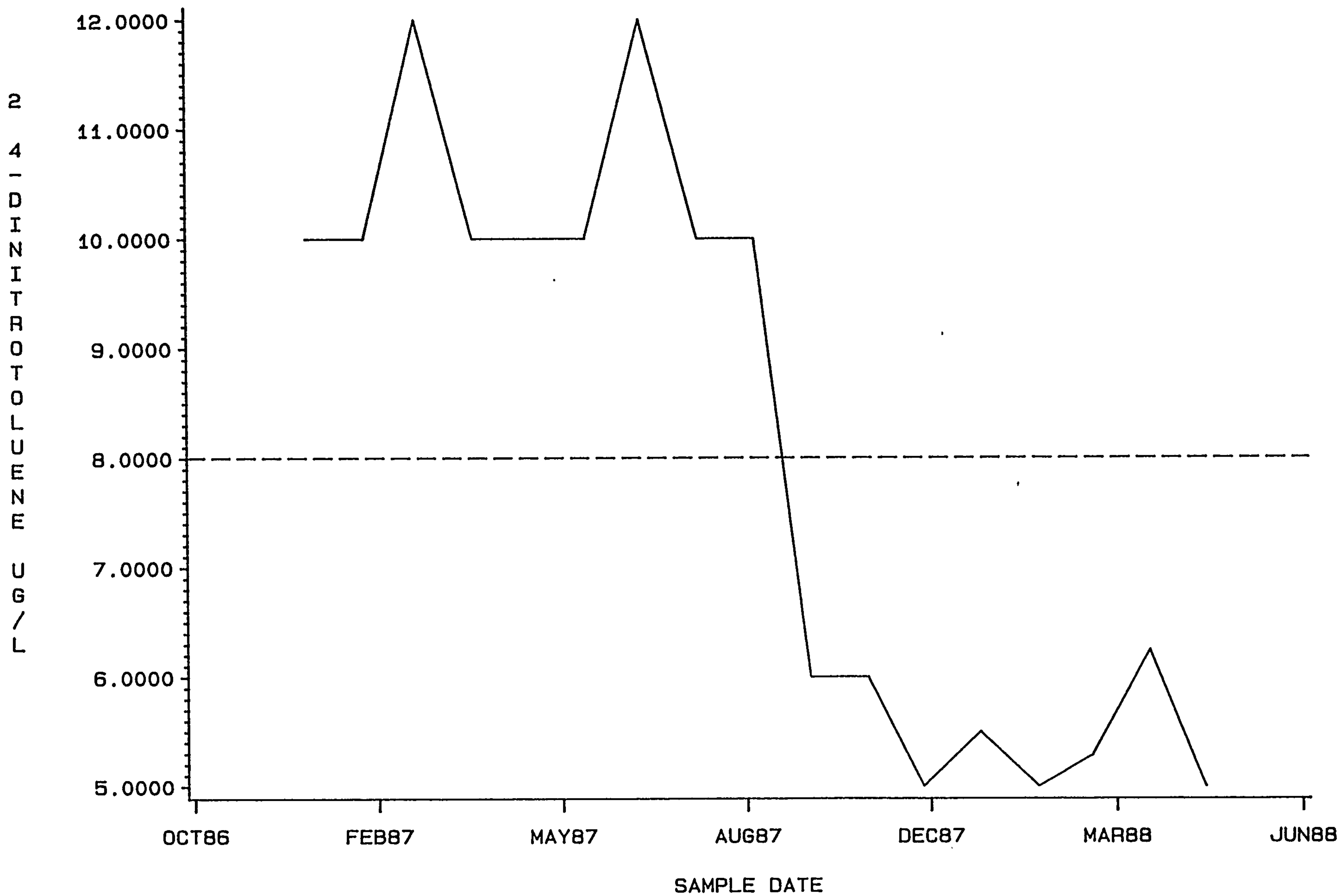

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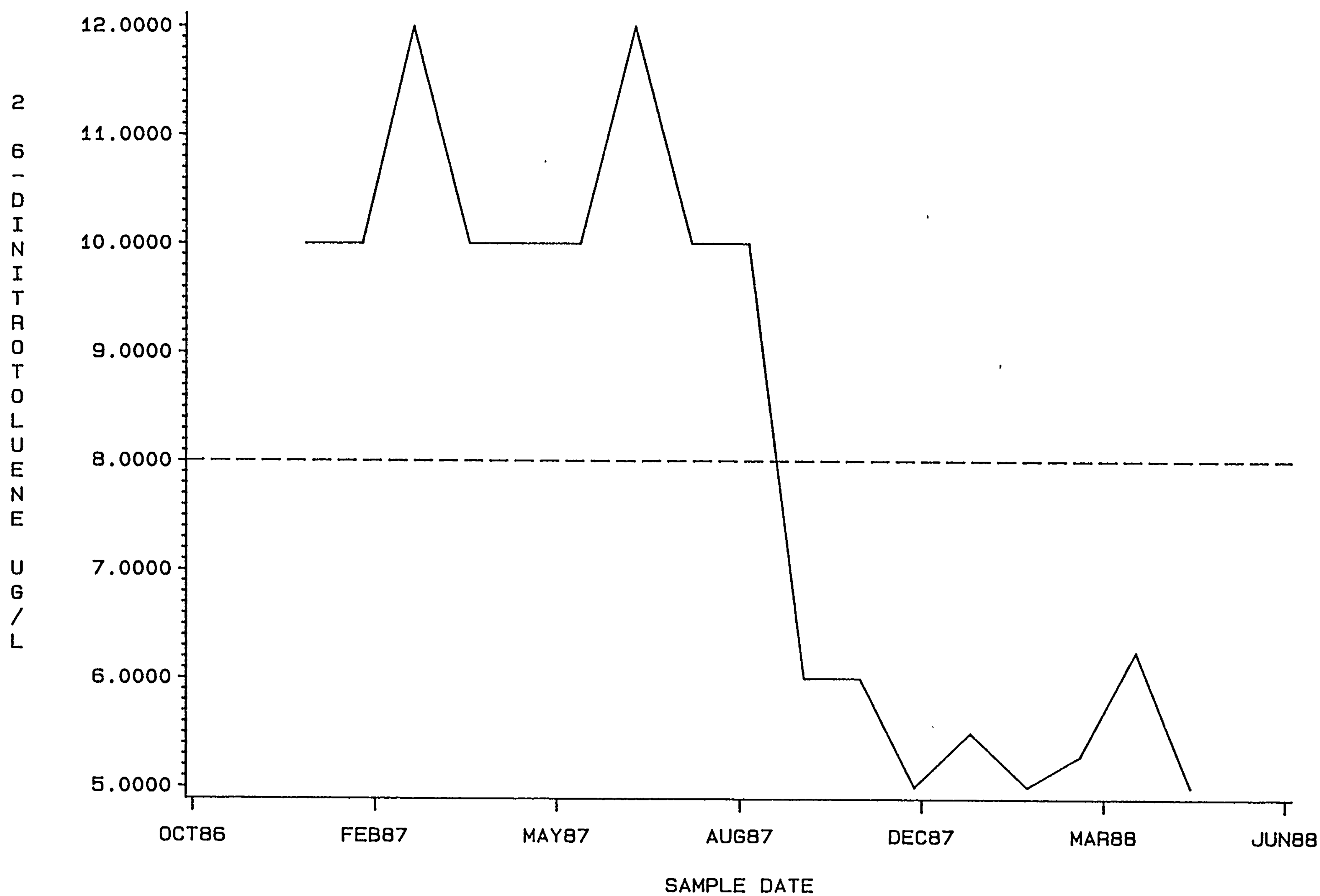

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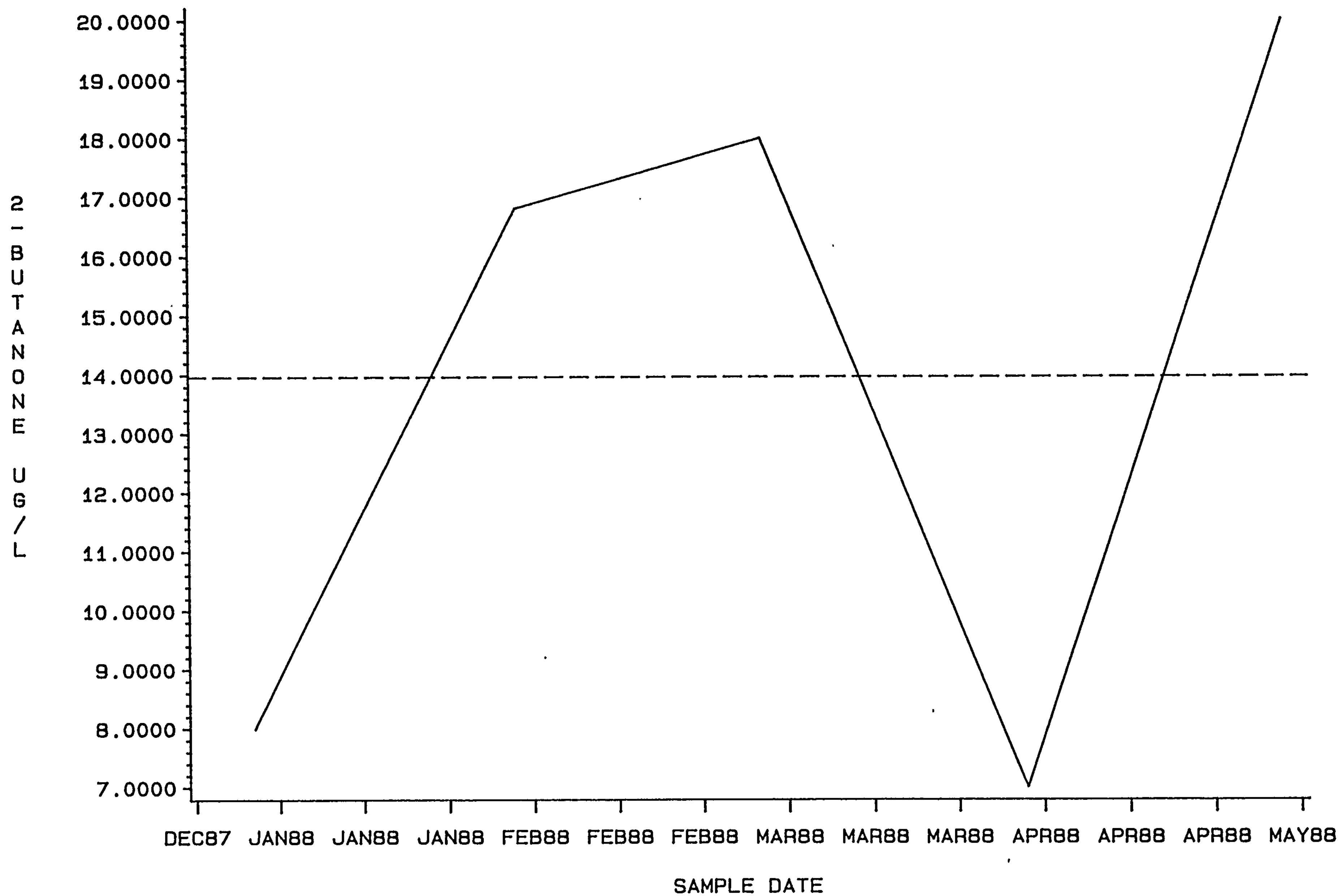

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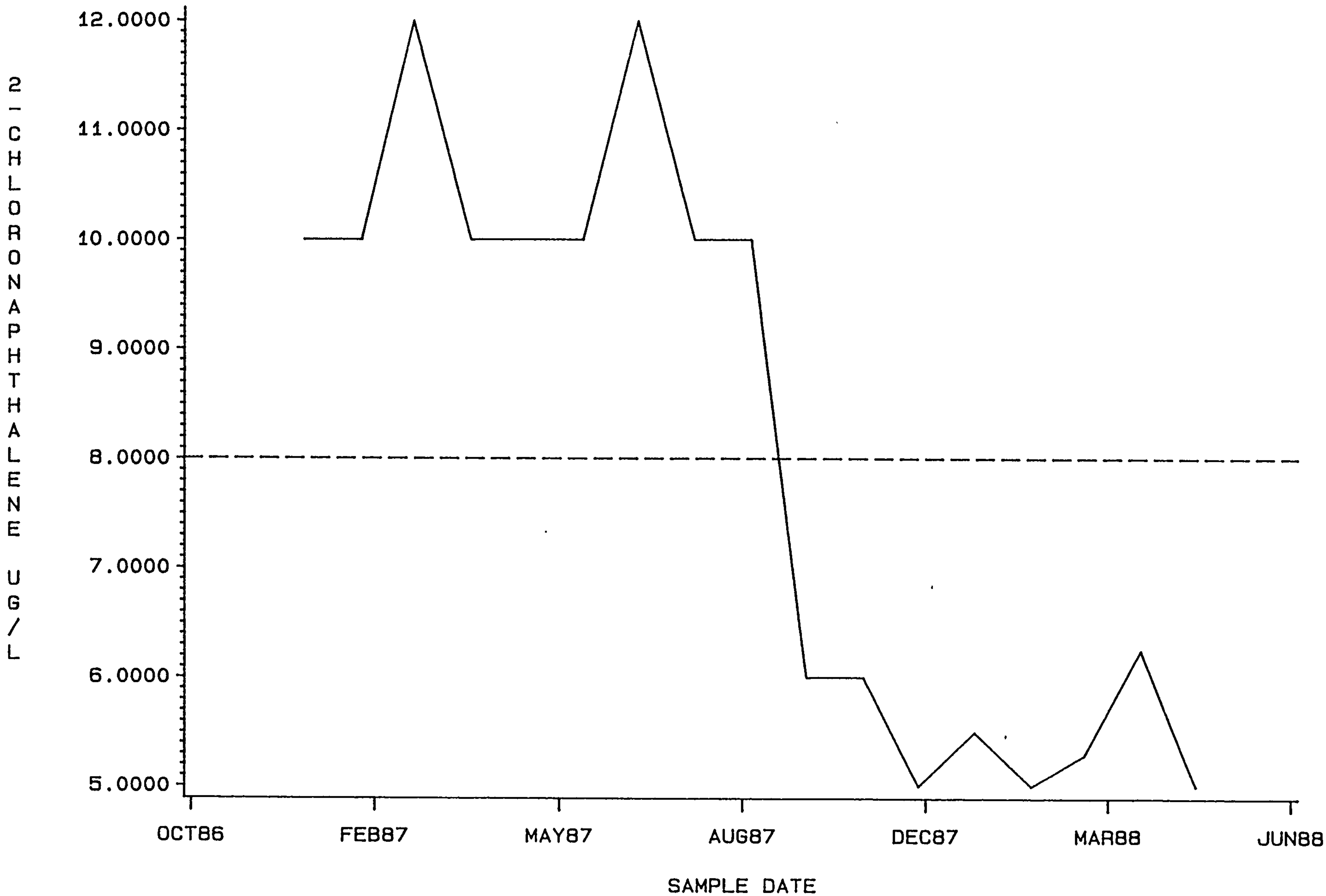

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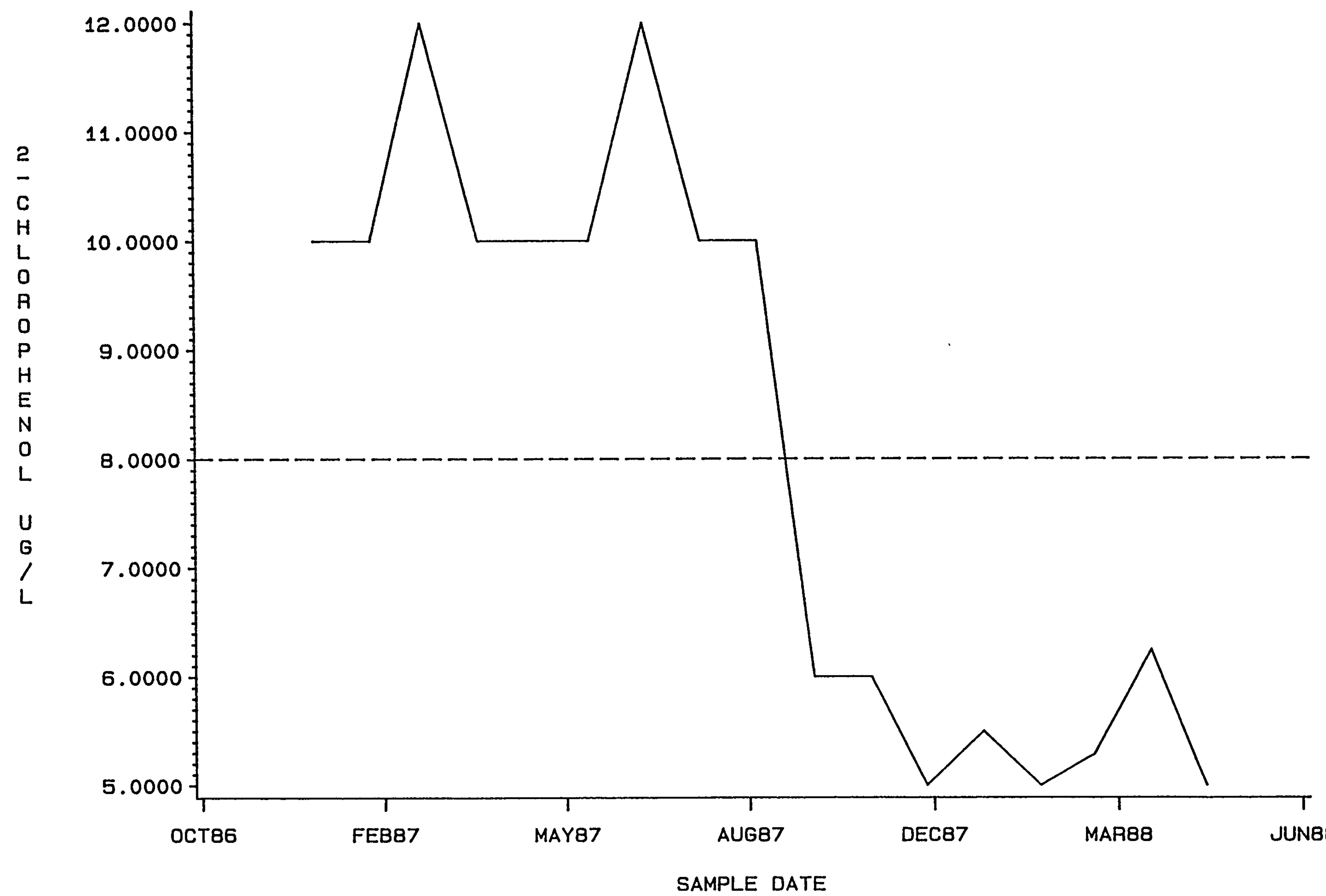

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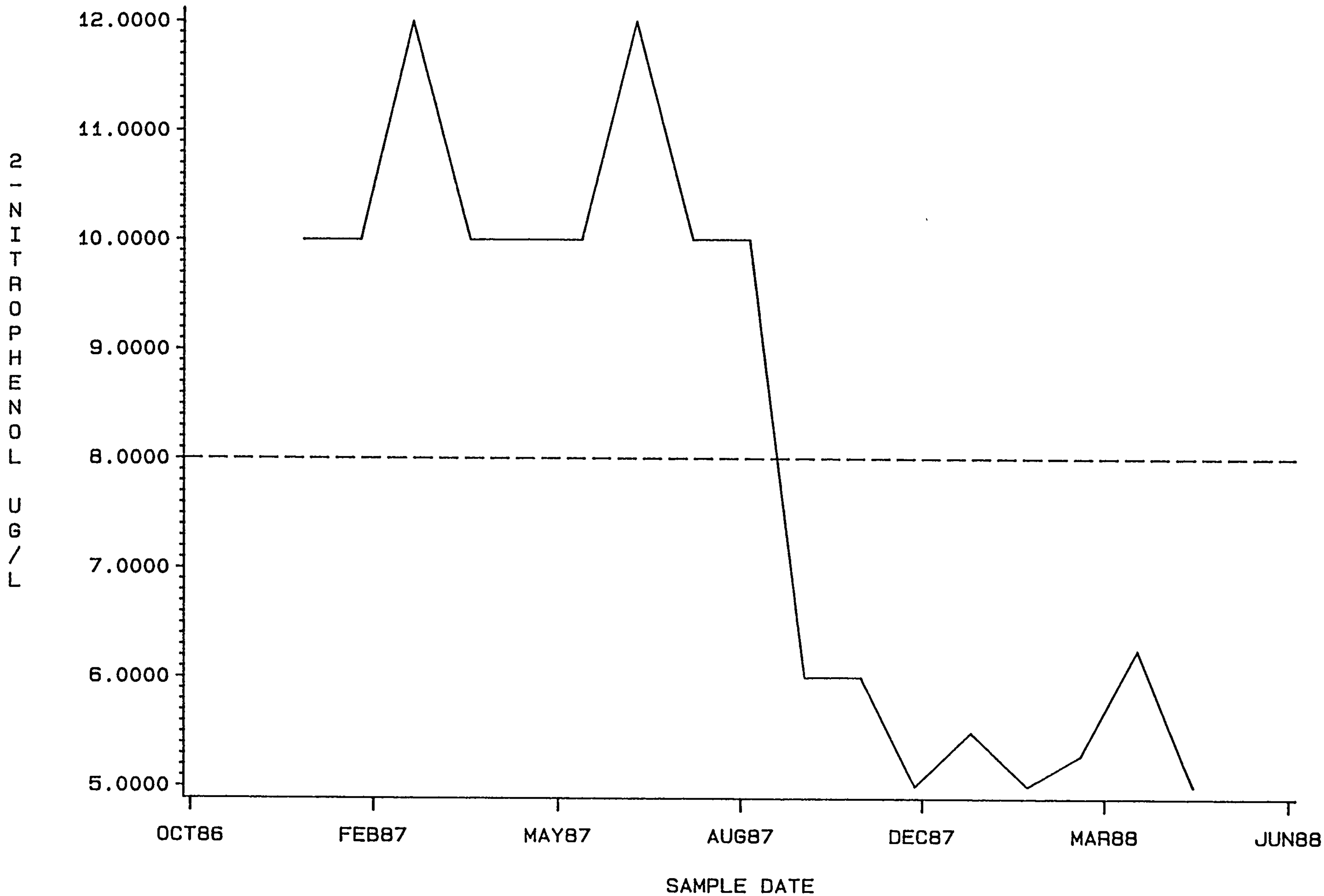

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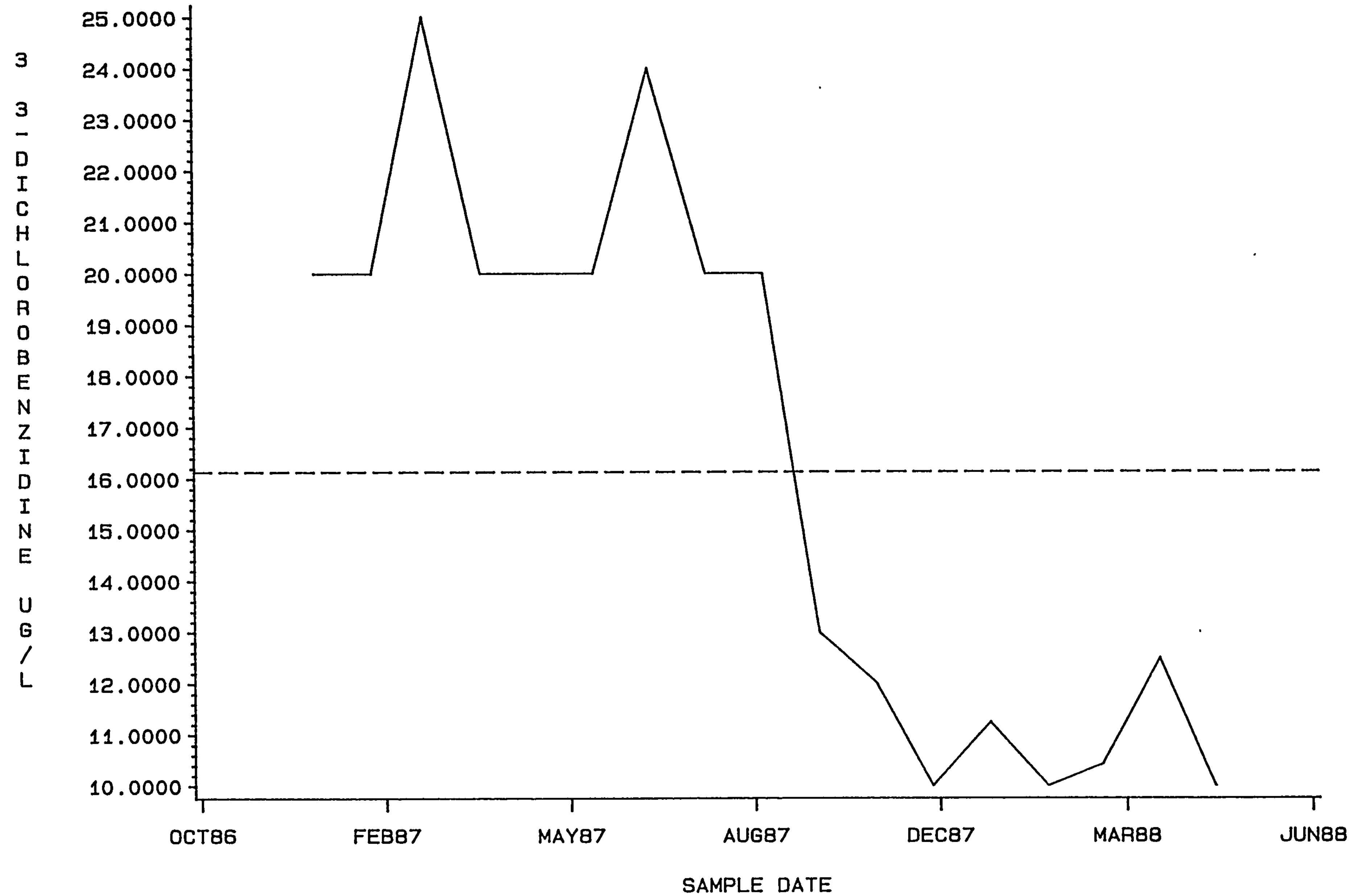

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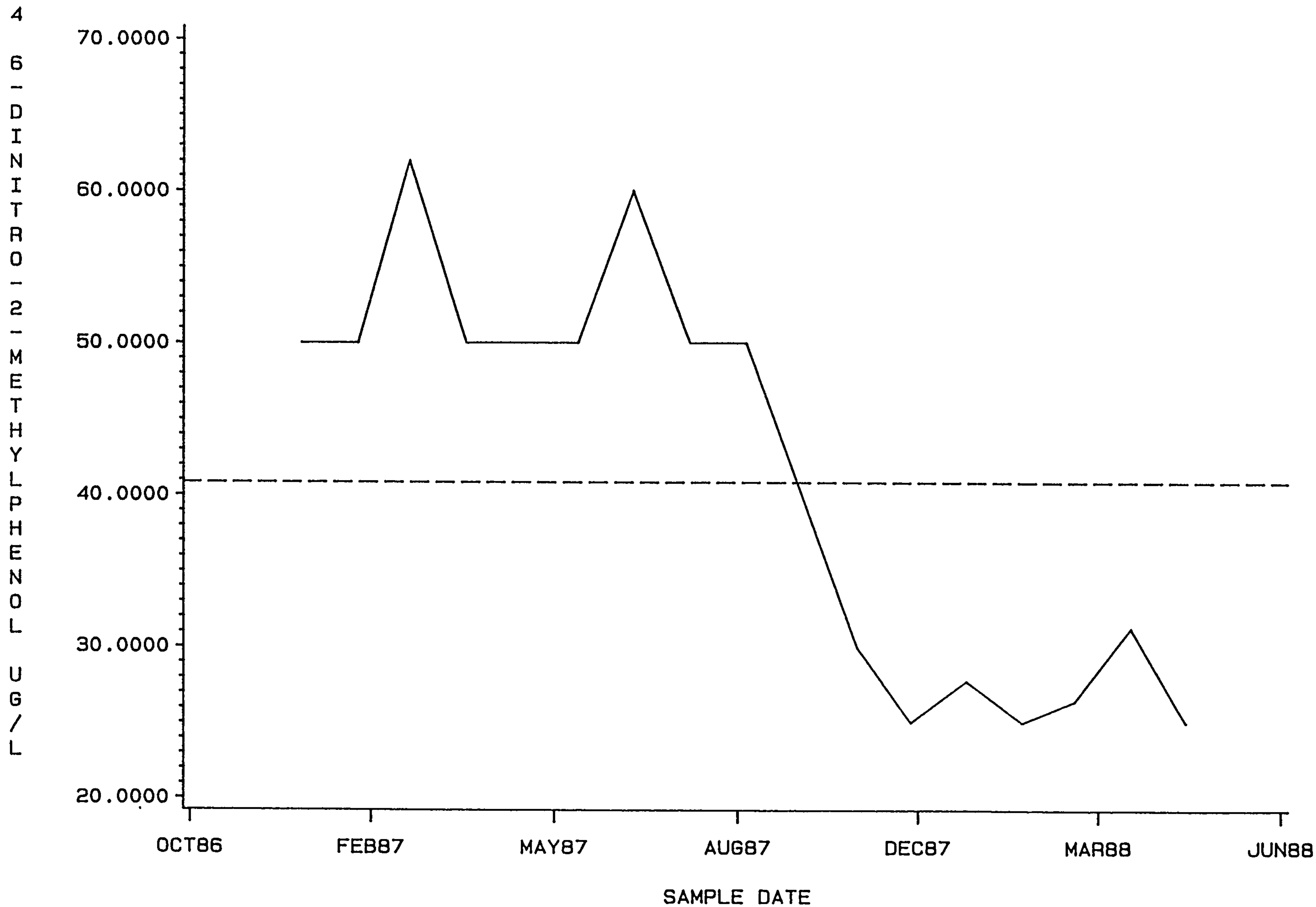

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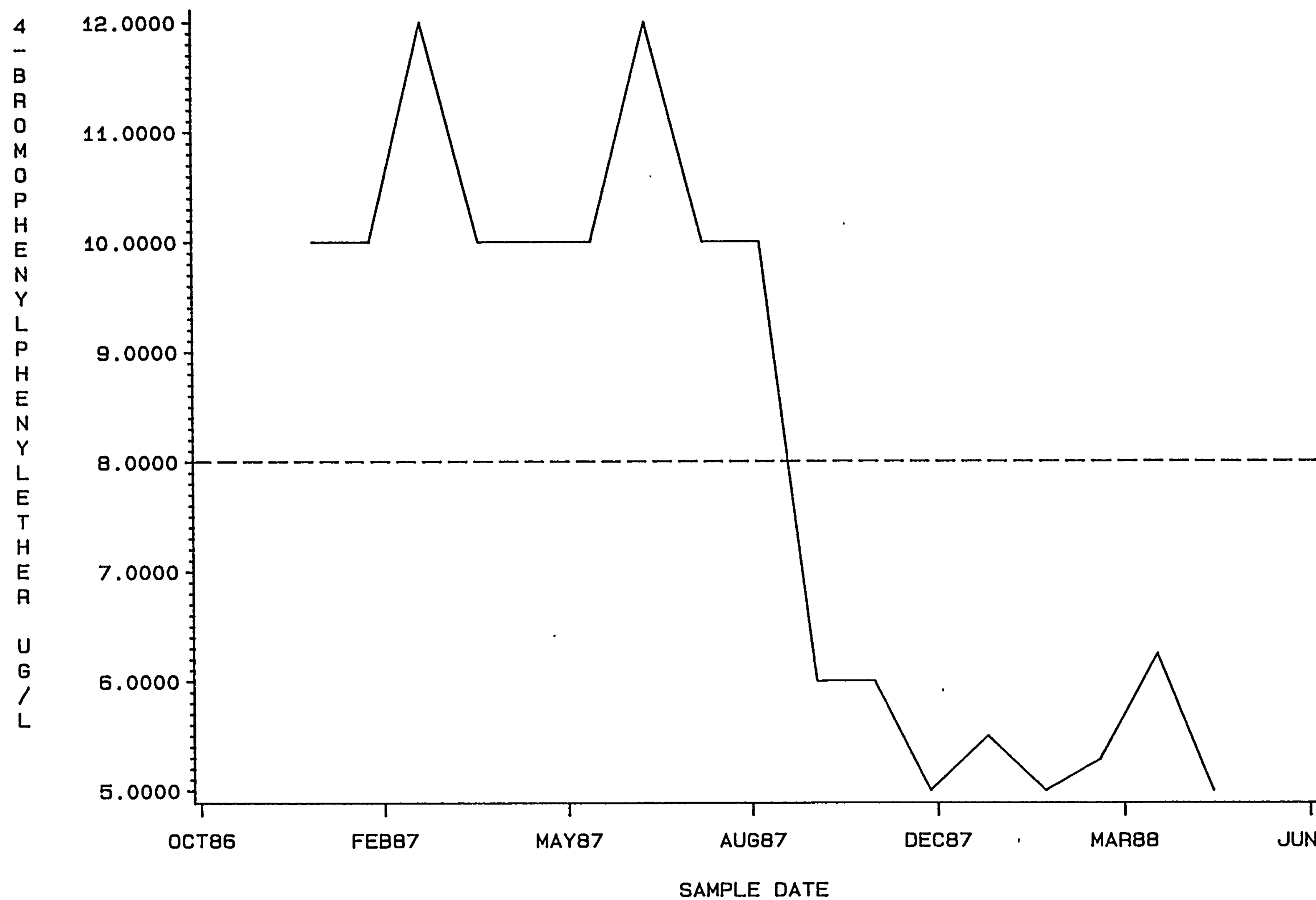

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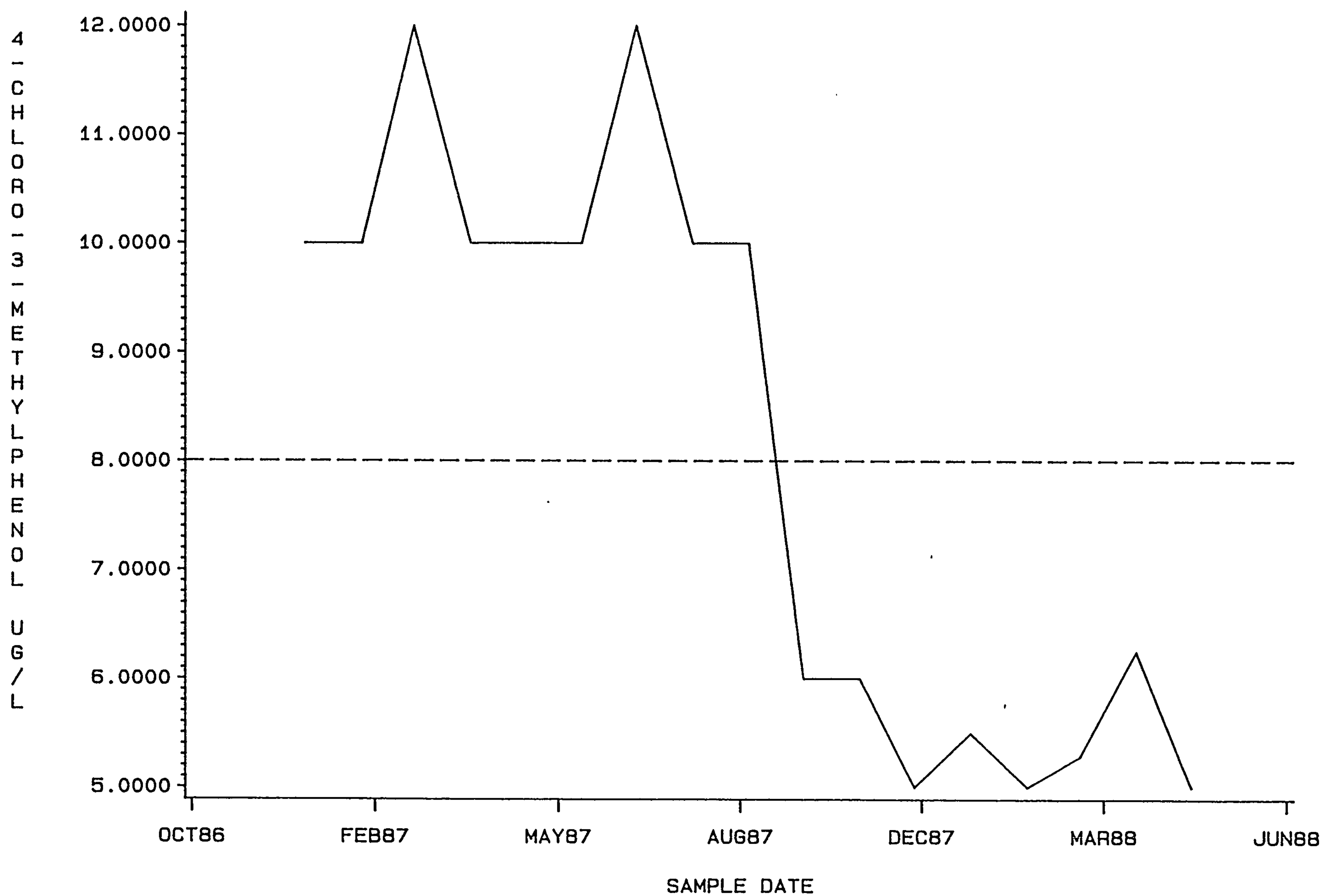

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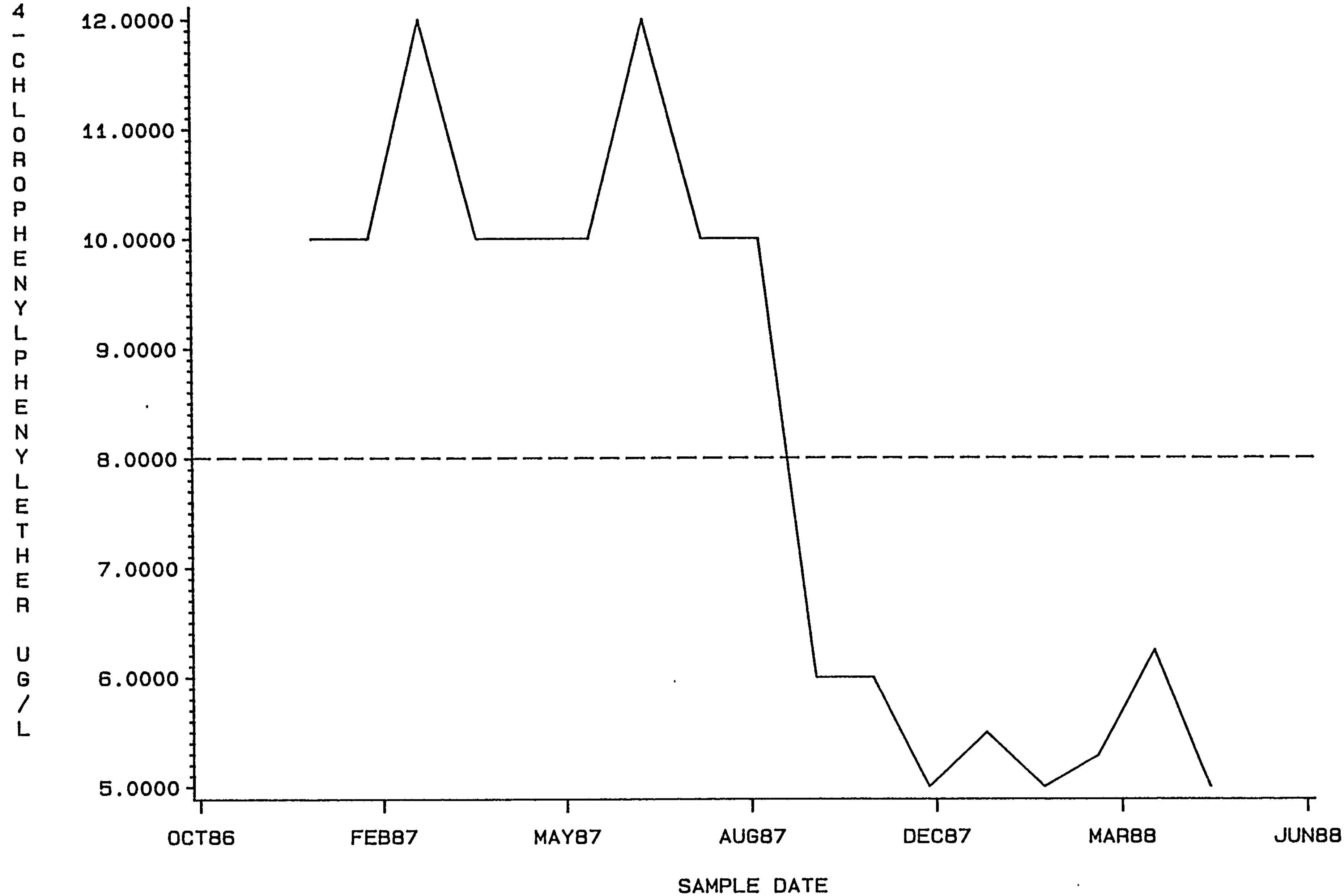

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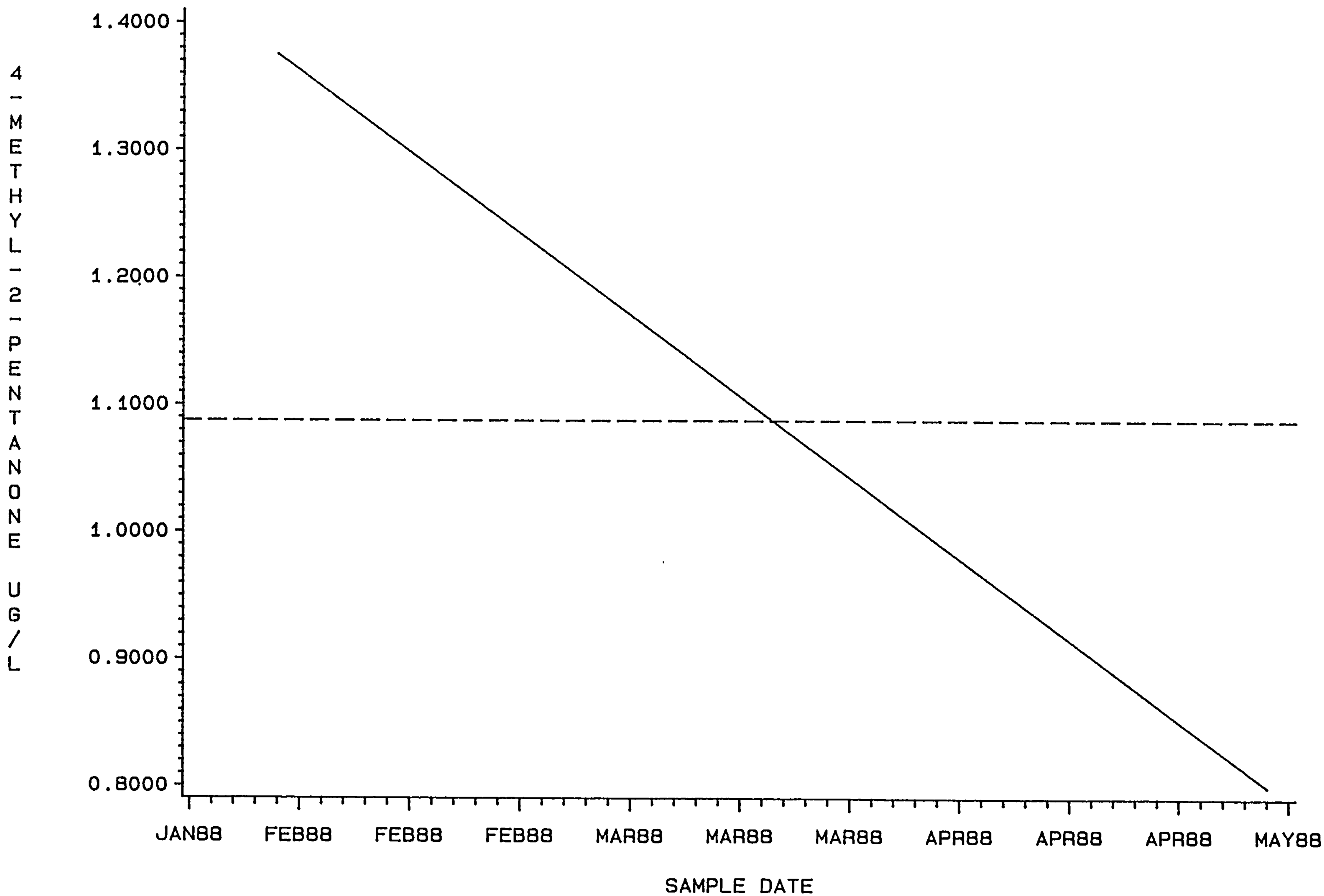

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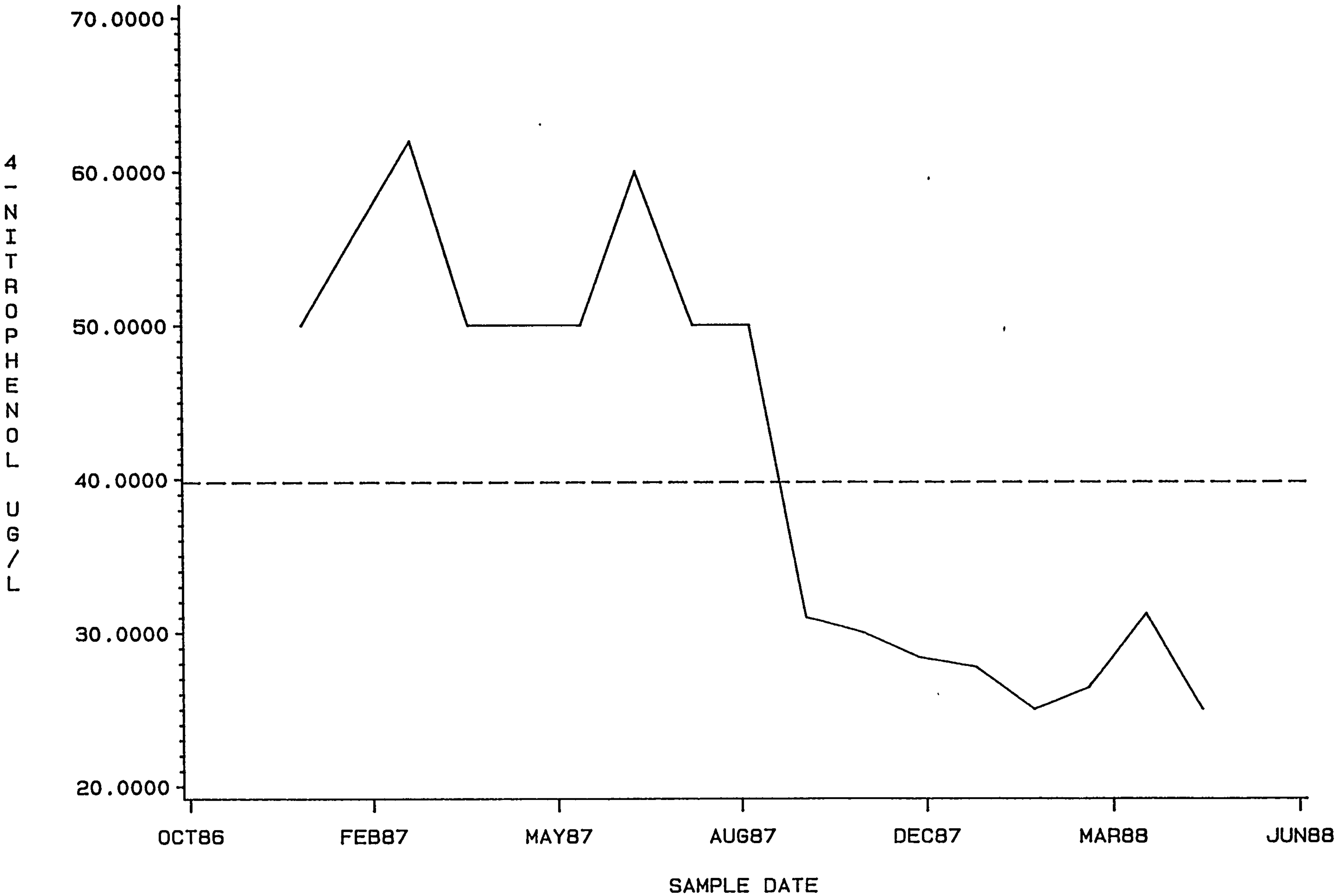

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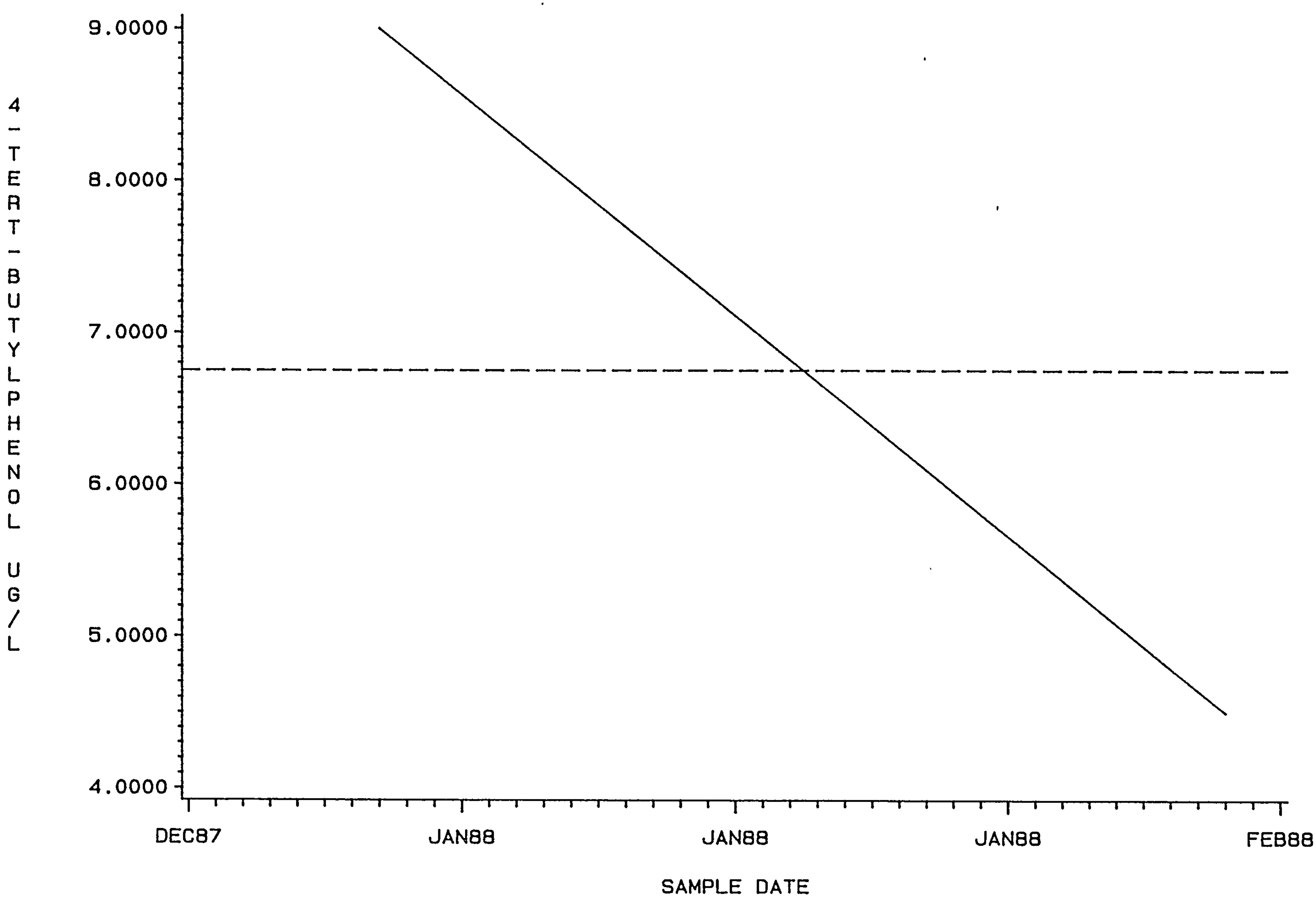

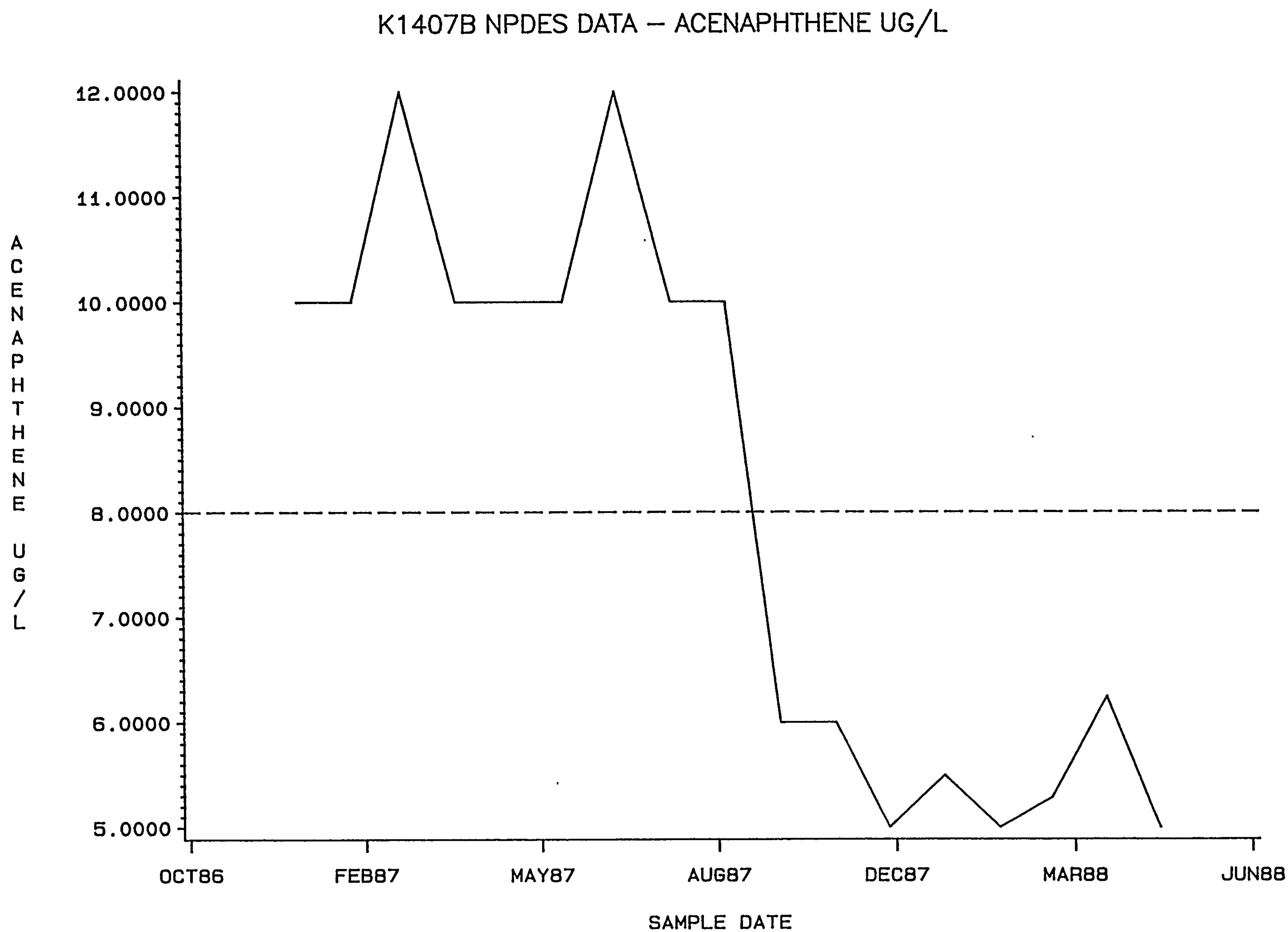
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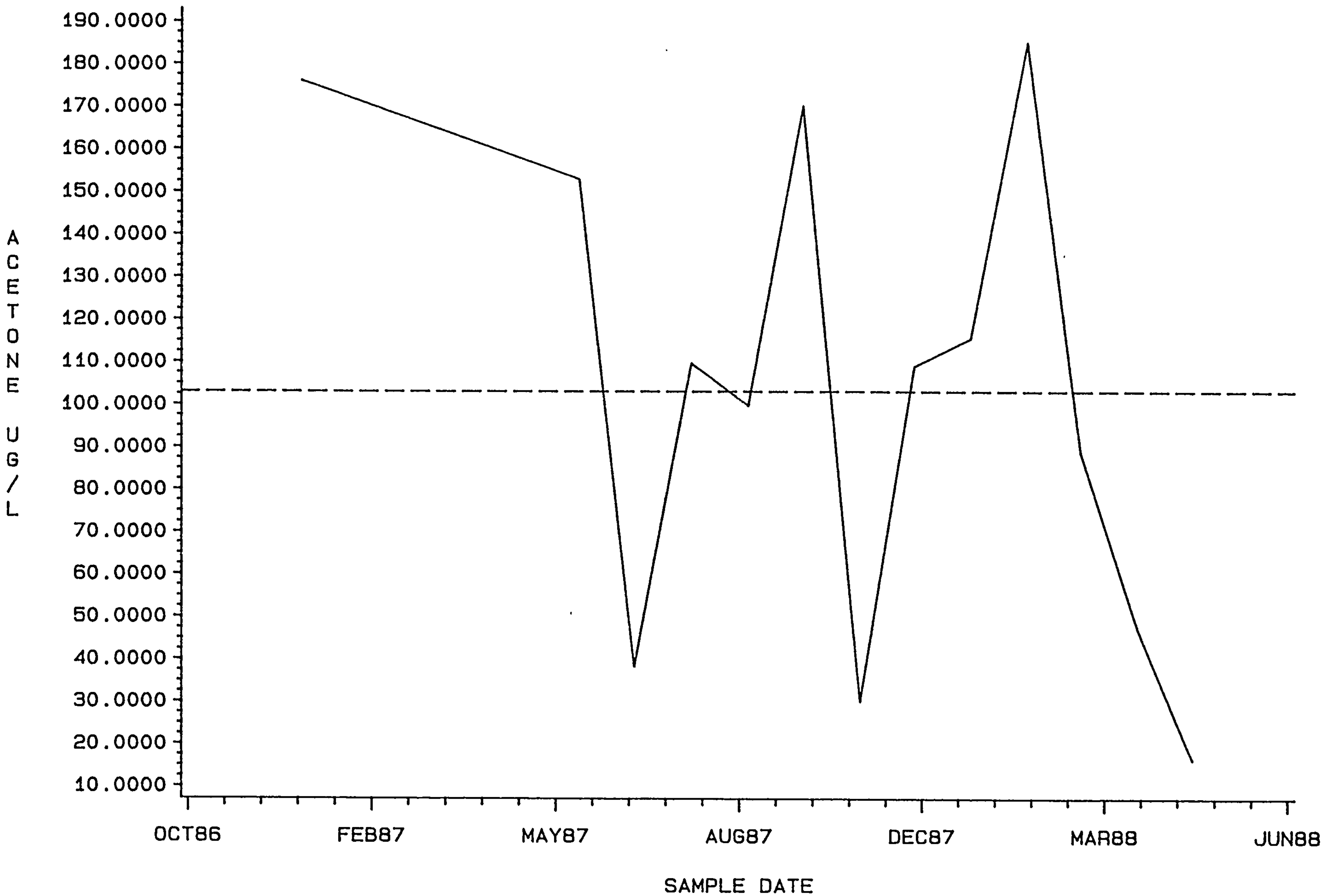

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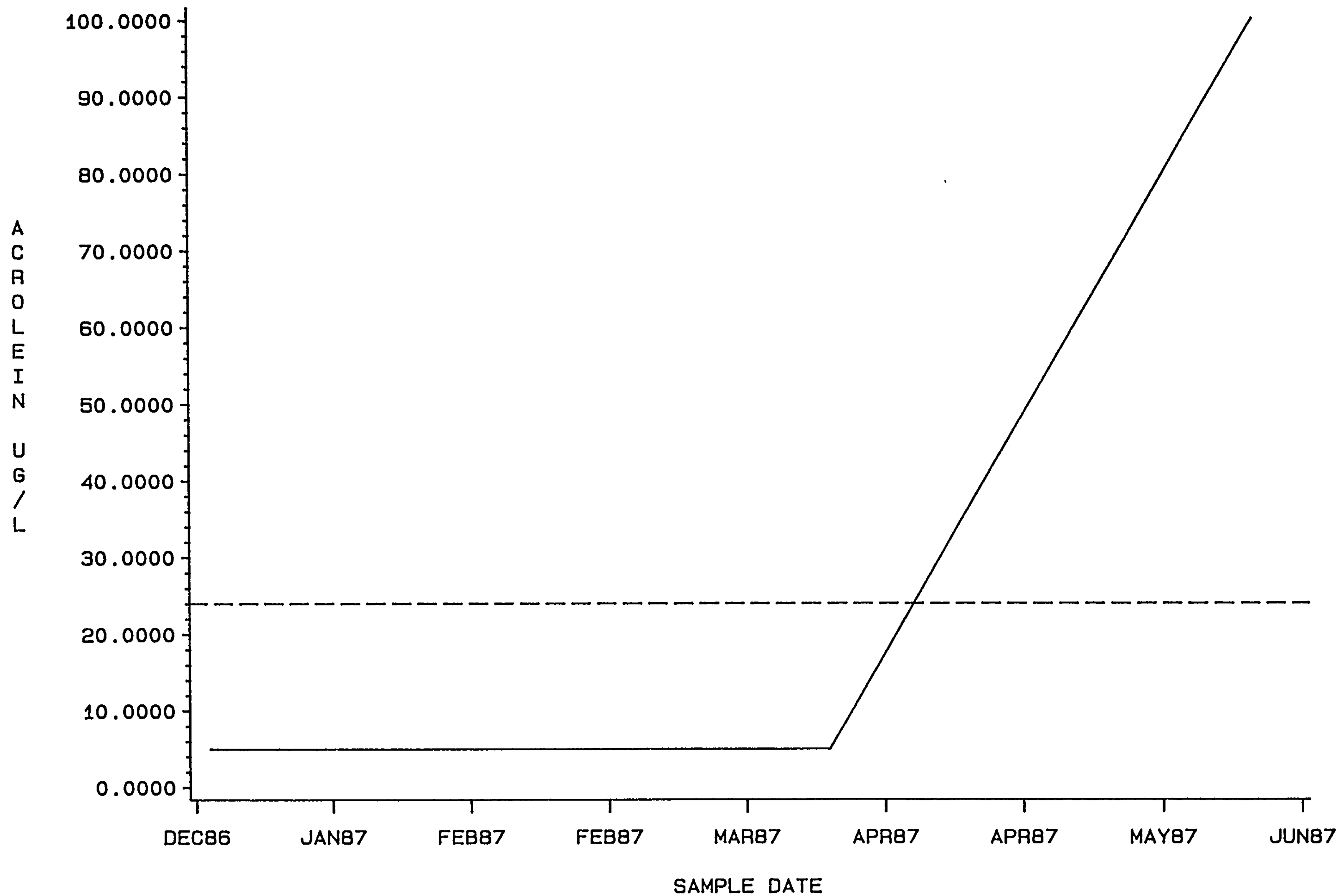

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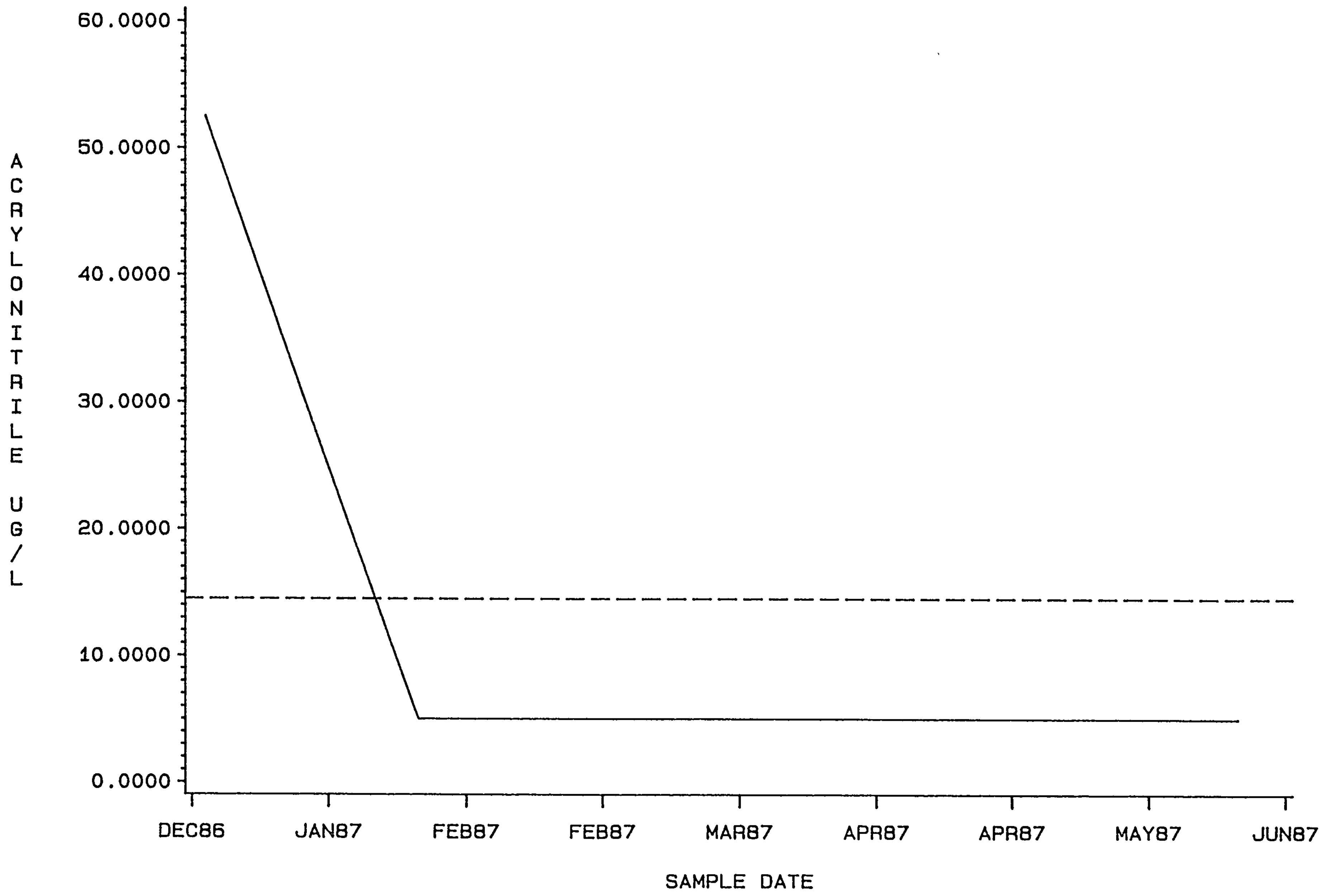

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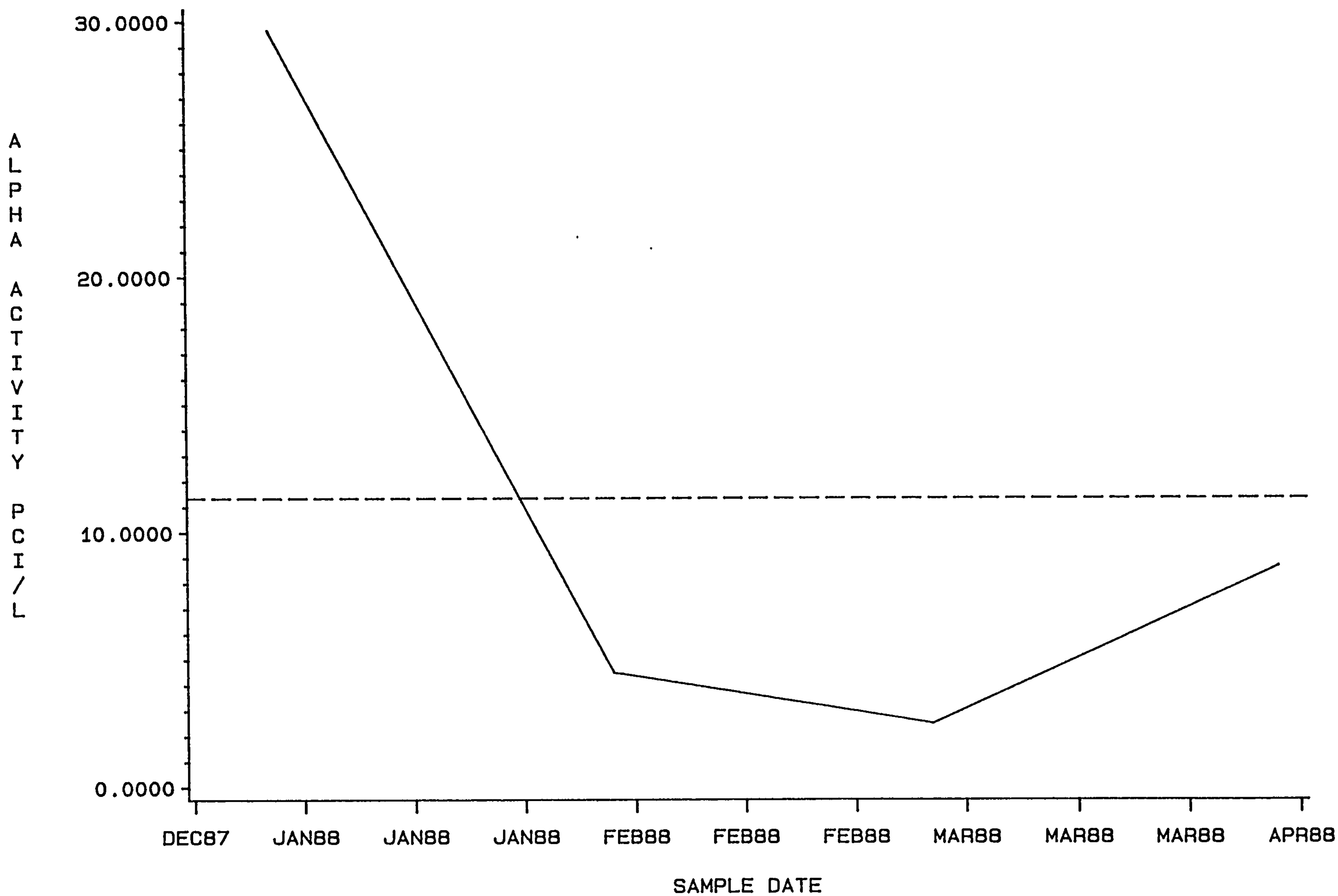

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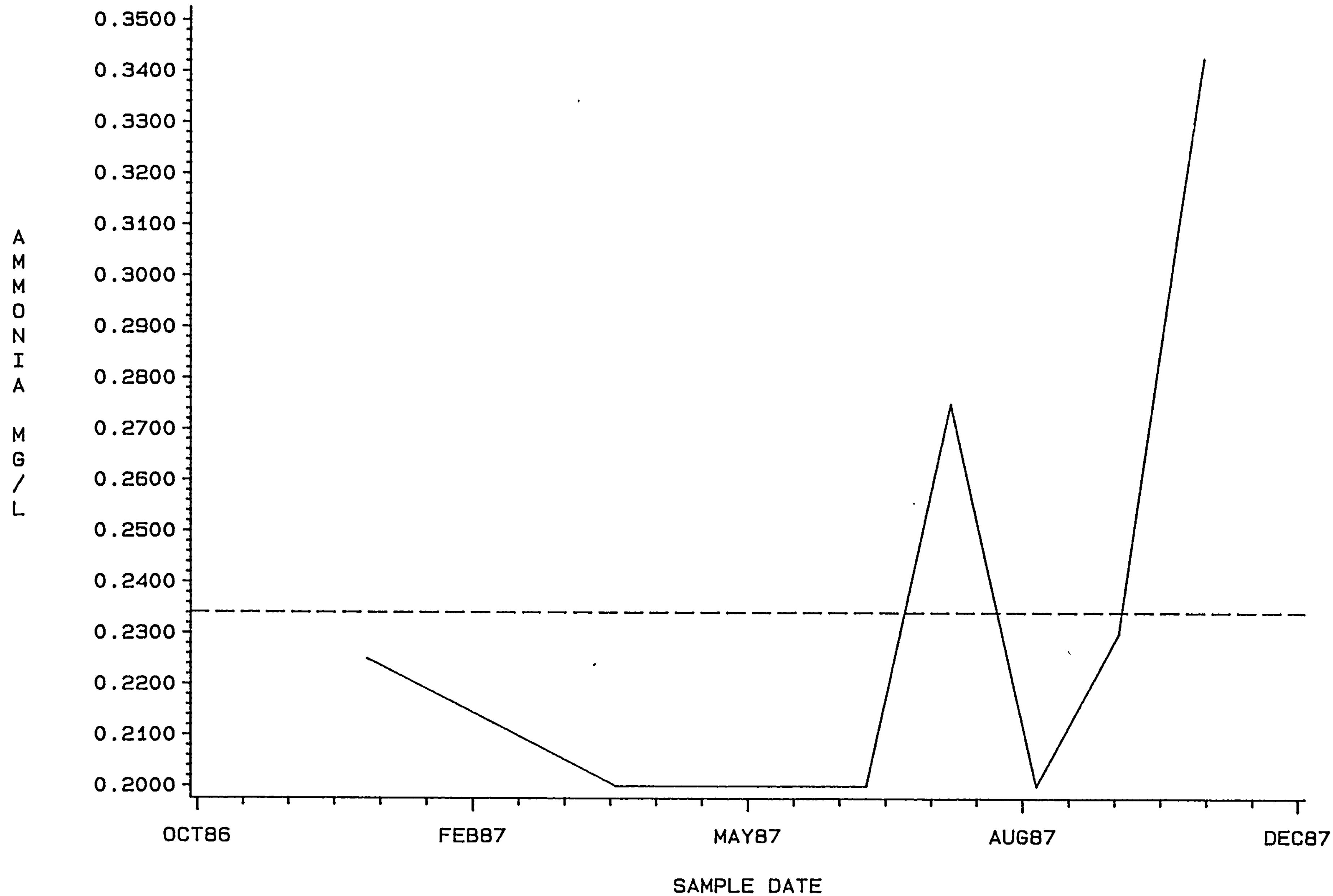

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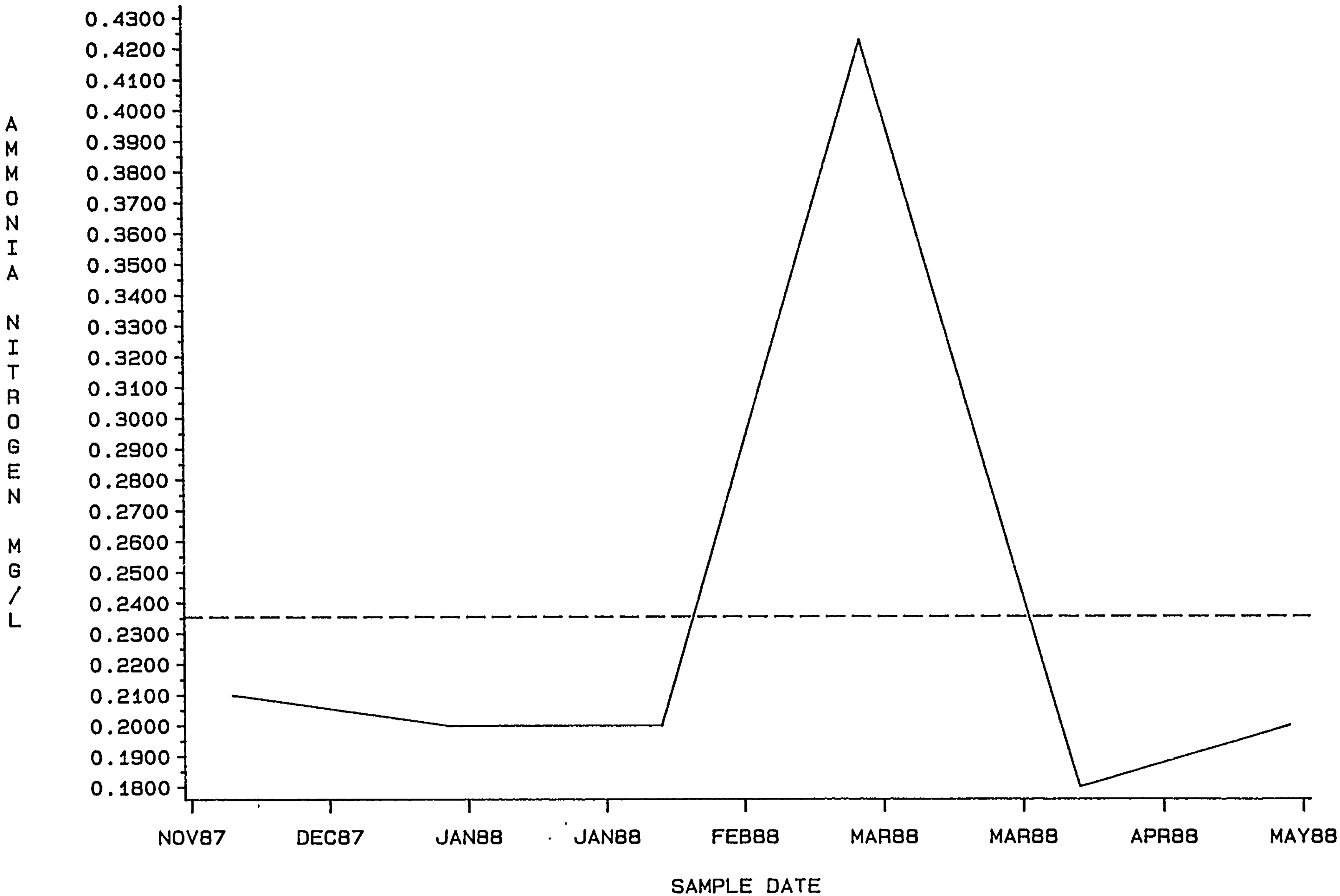

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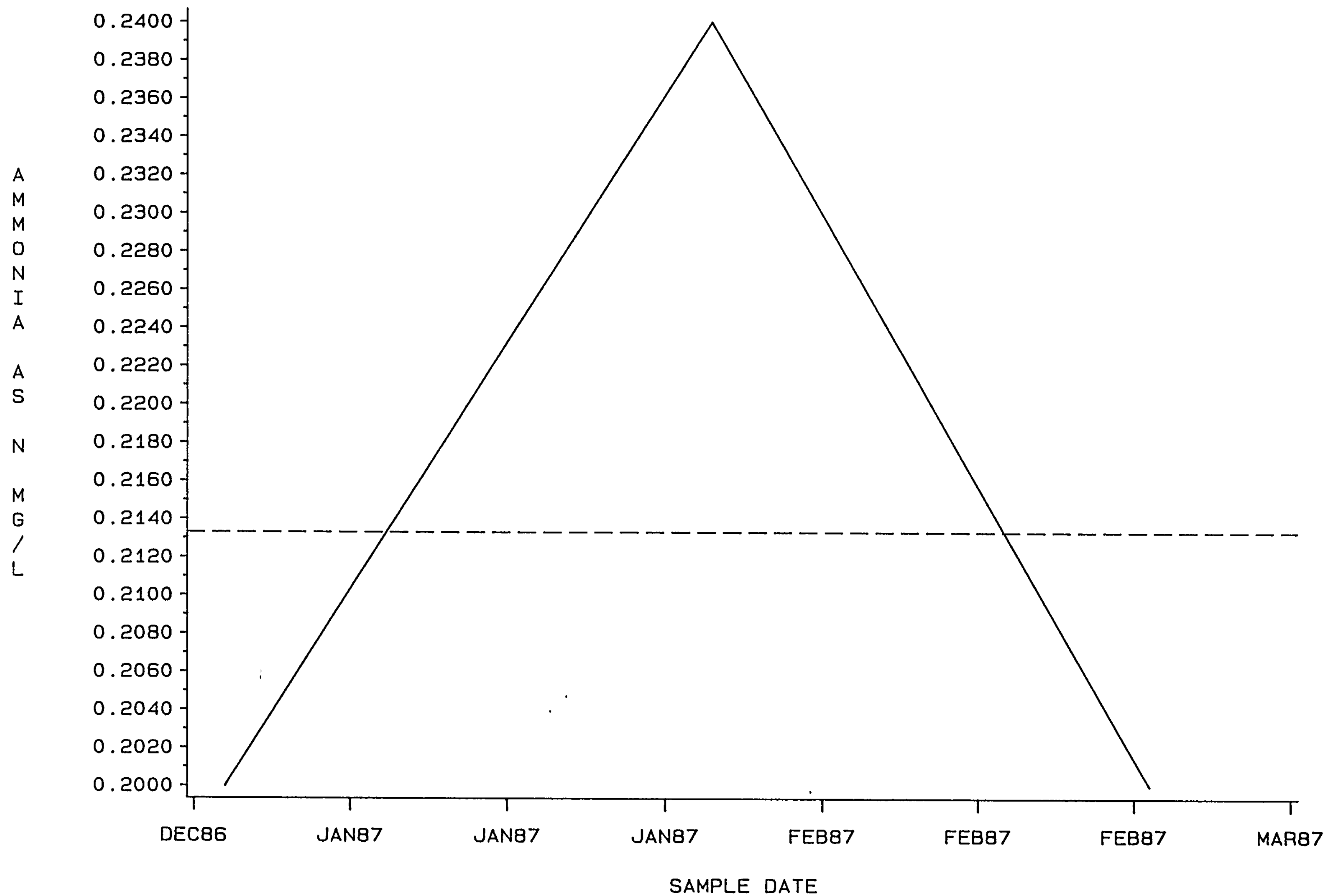

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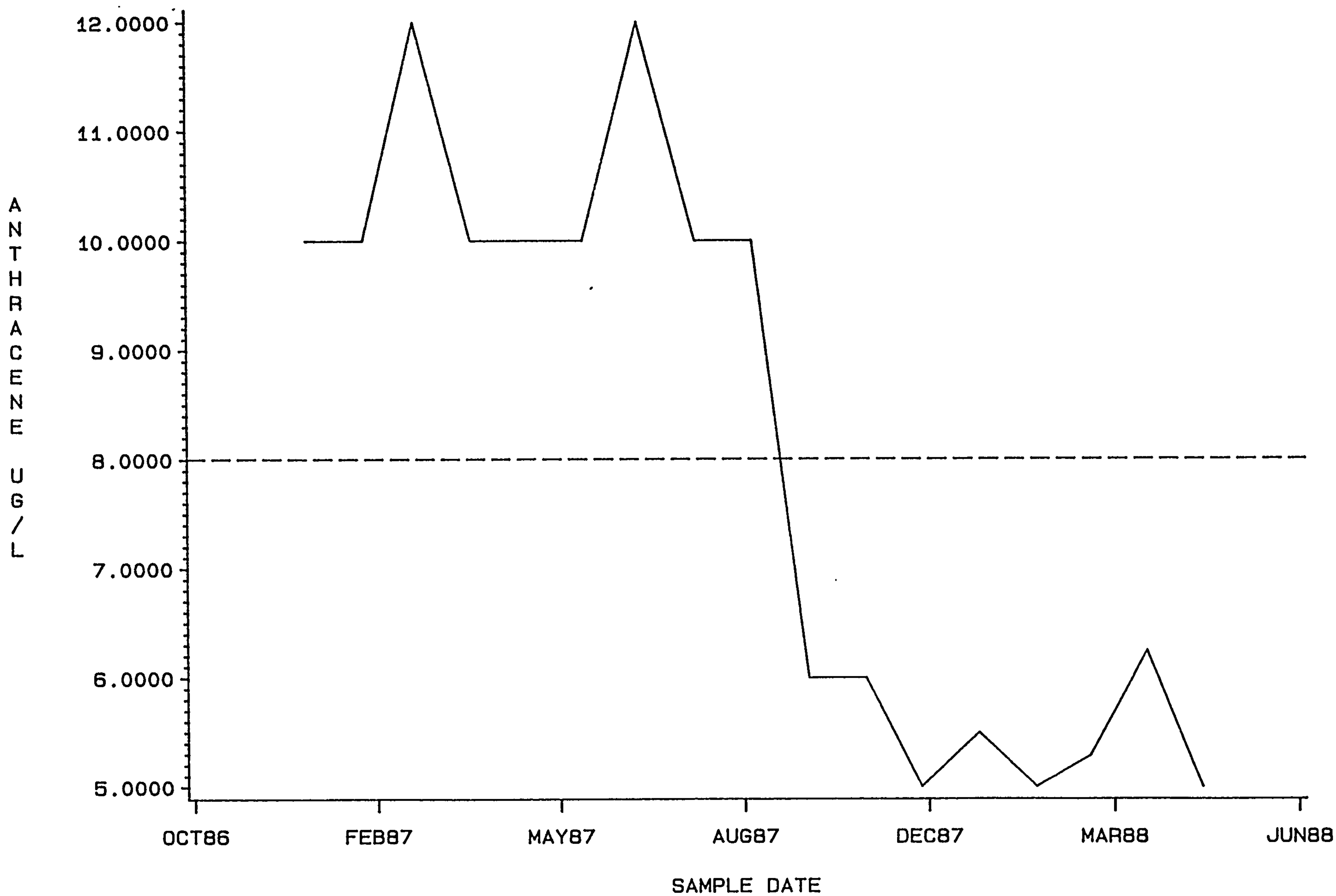

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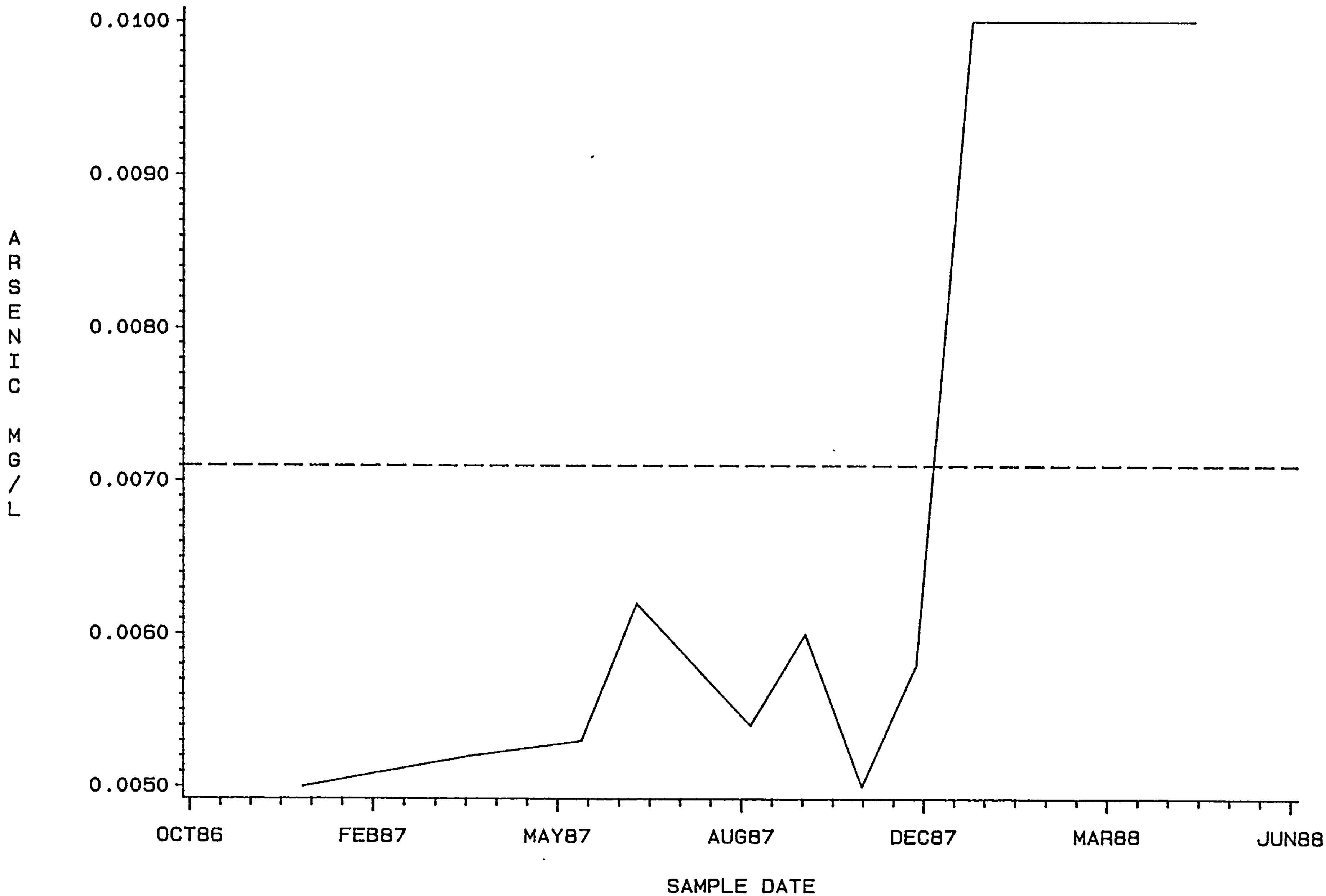

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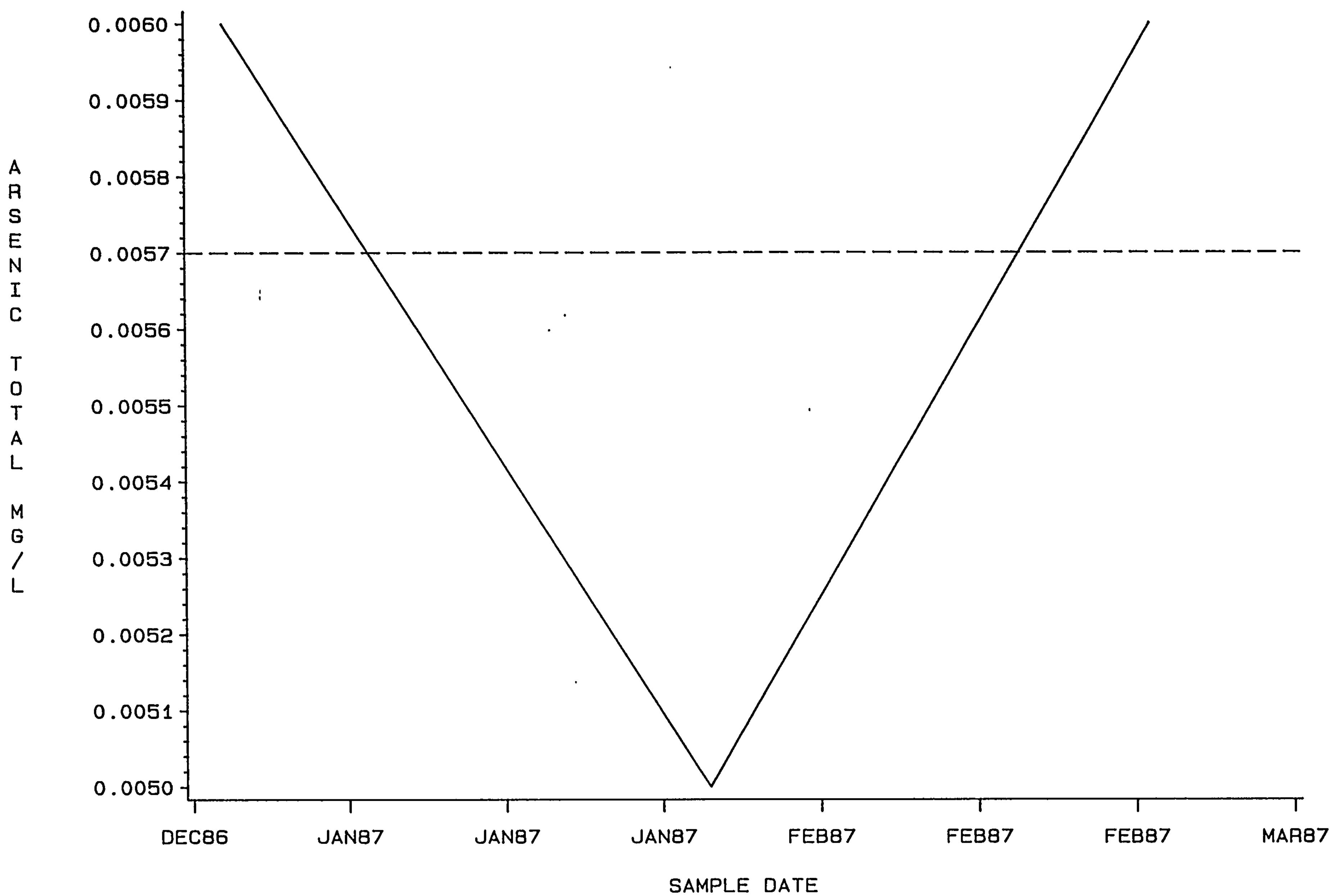

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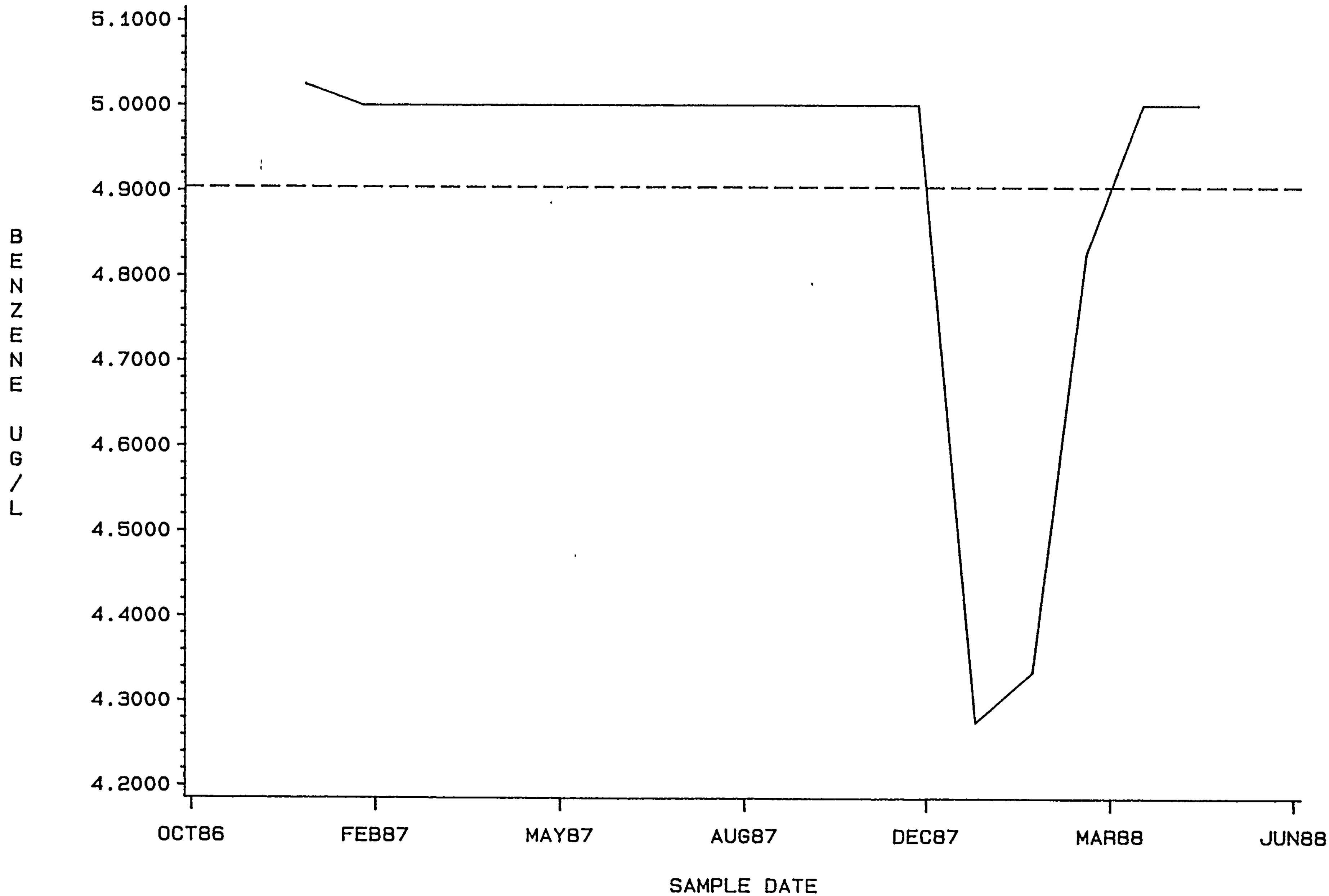

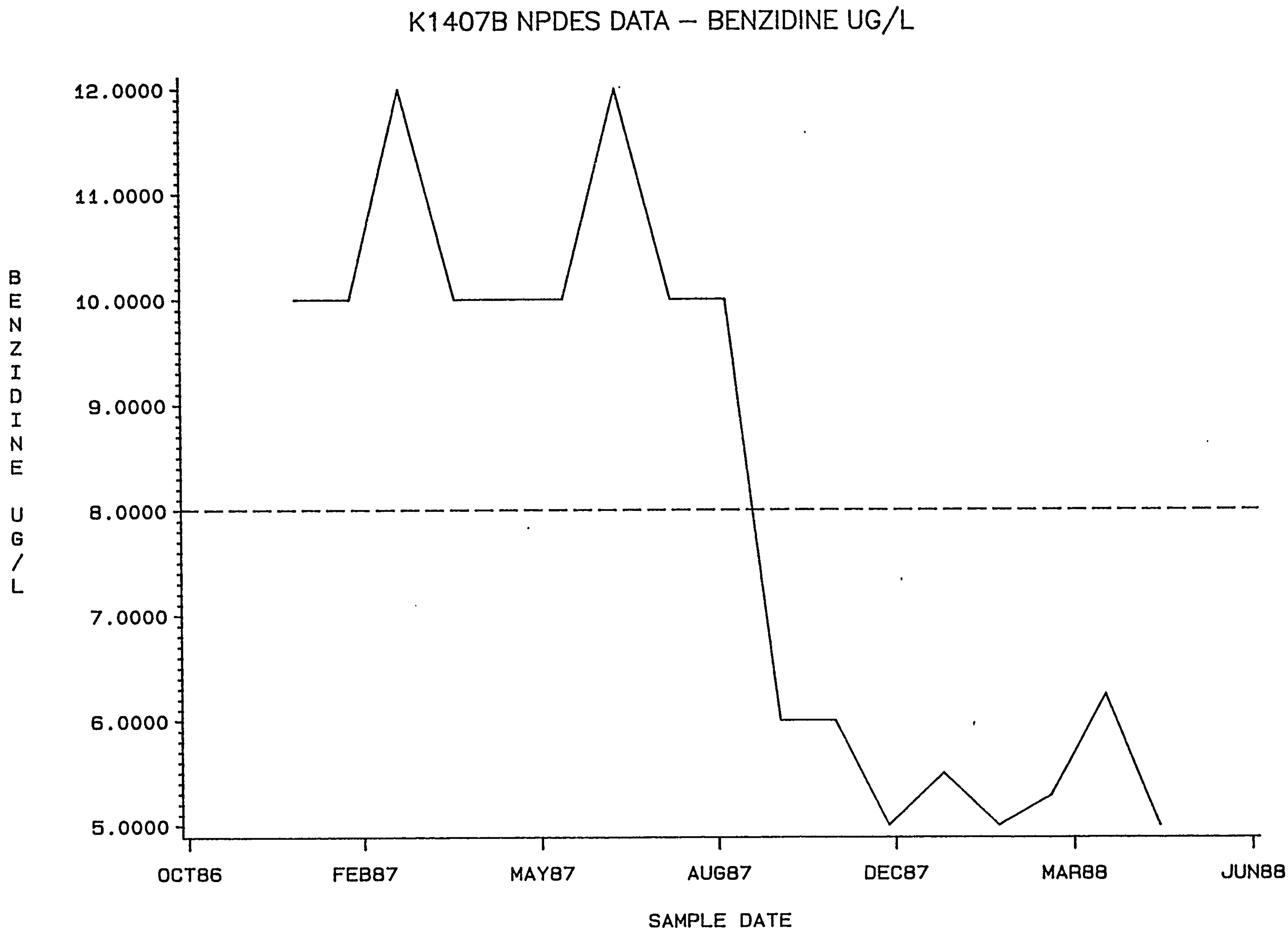
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BENZIDINE UG/L
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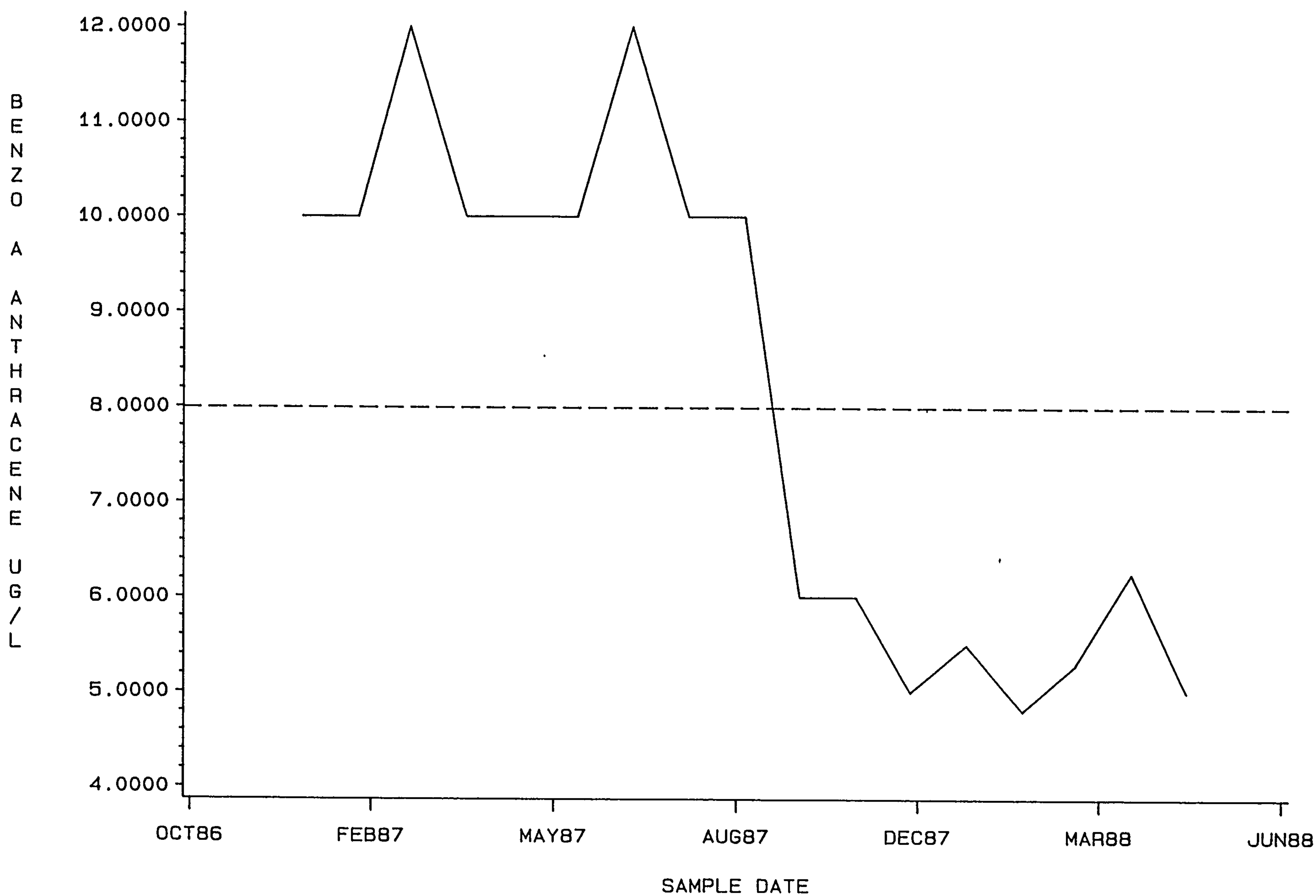

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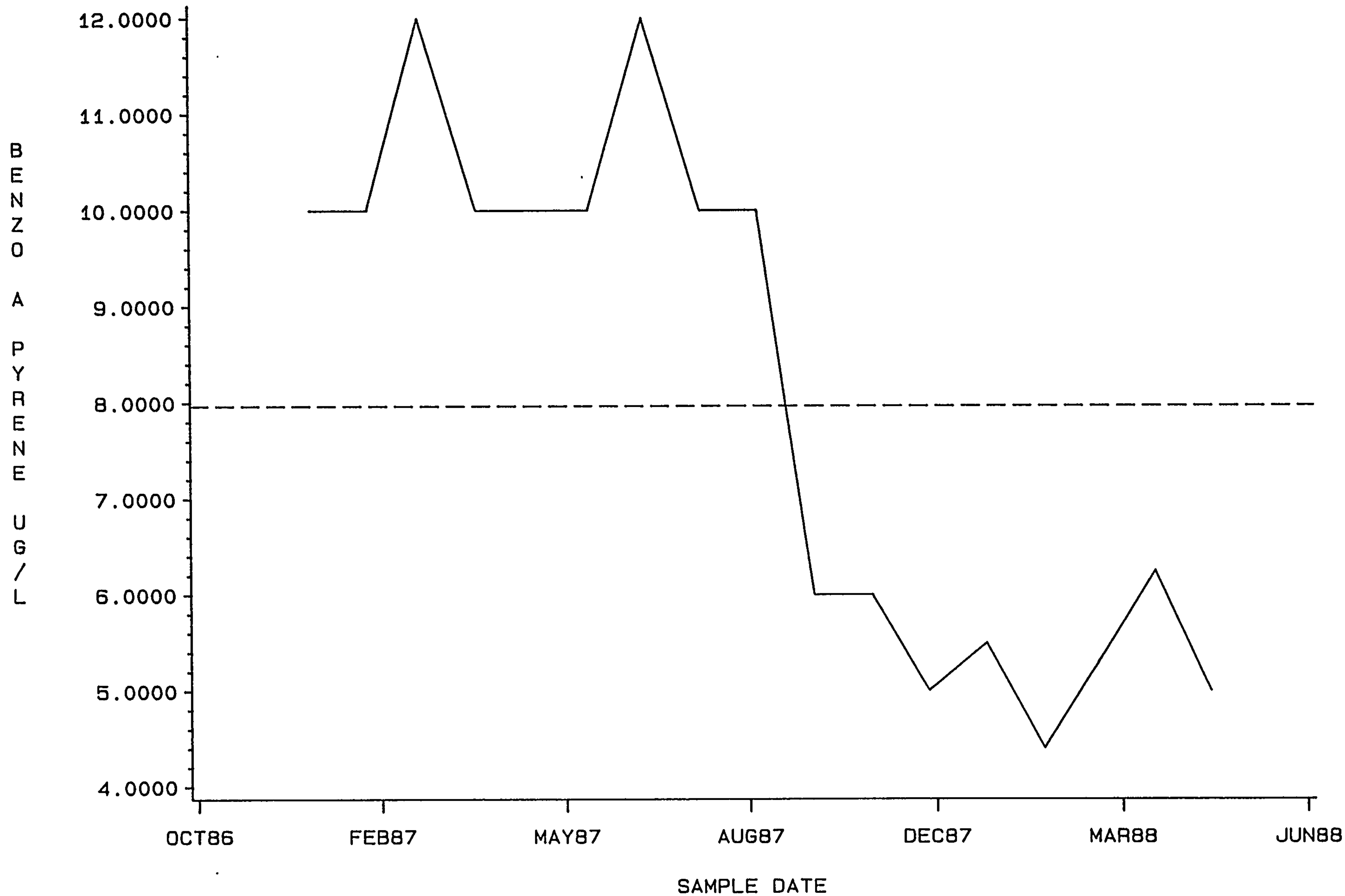

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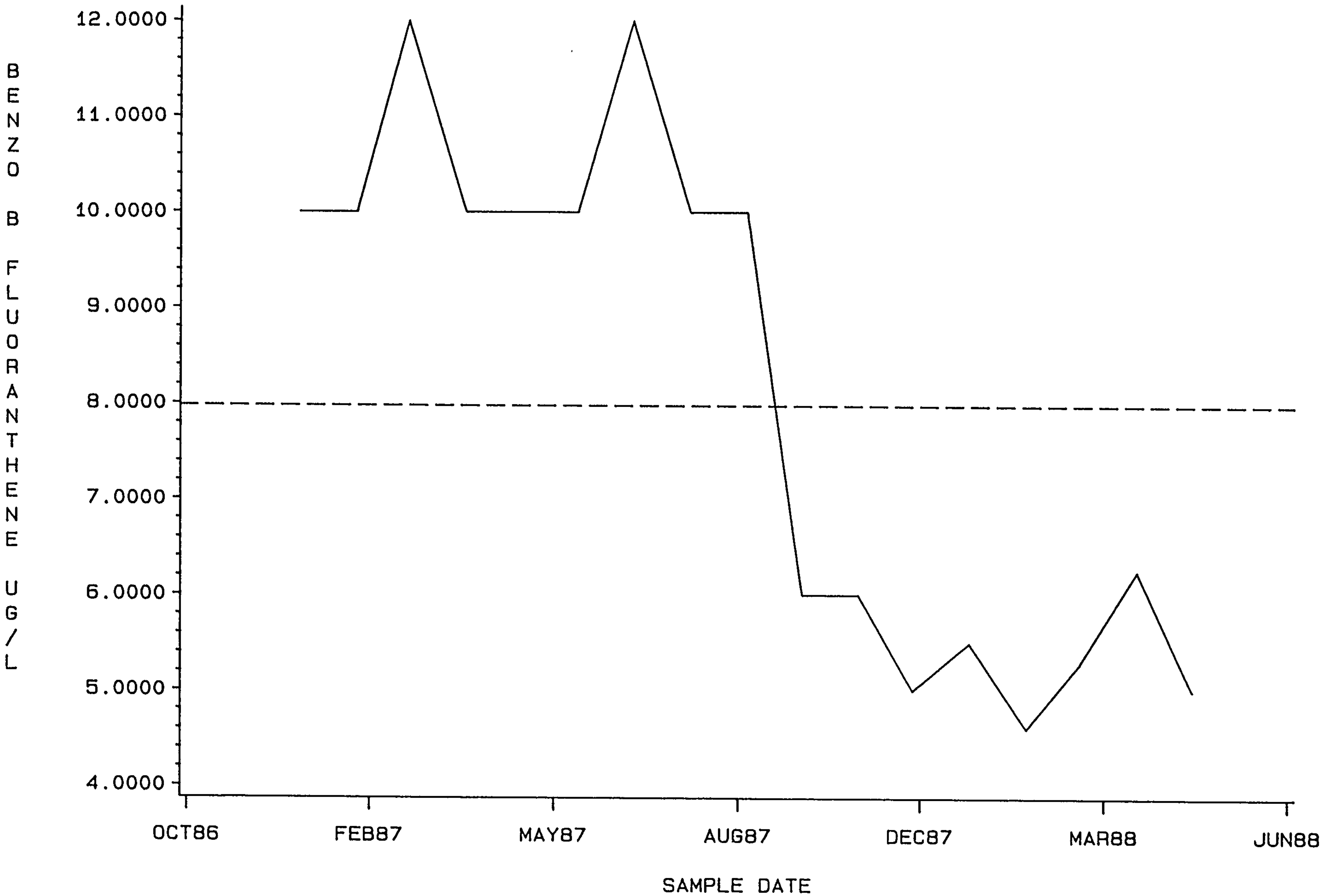

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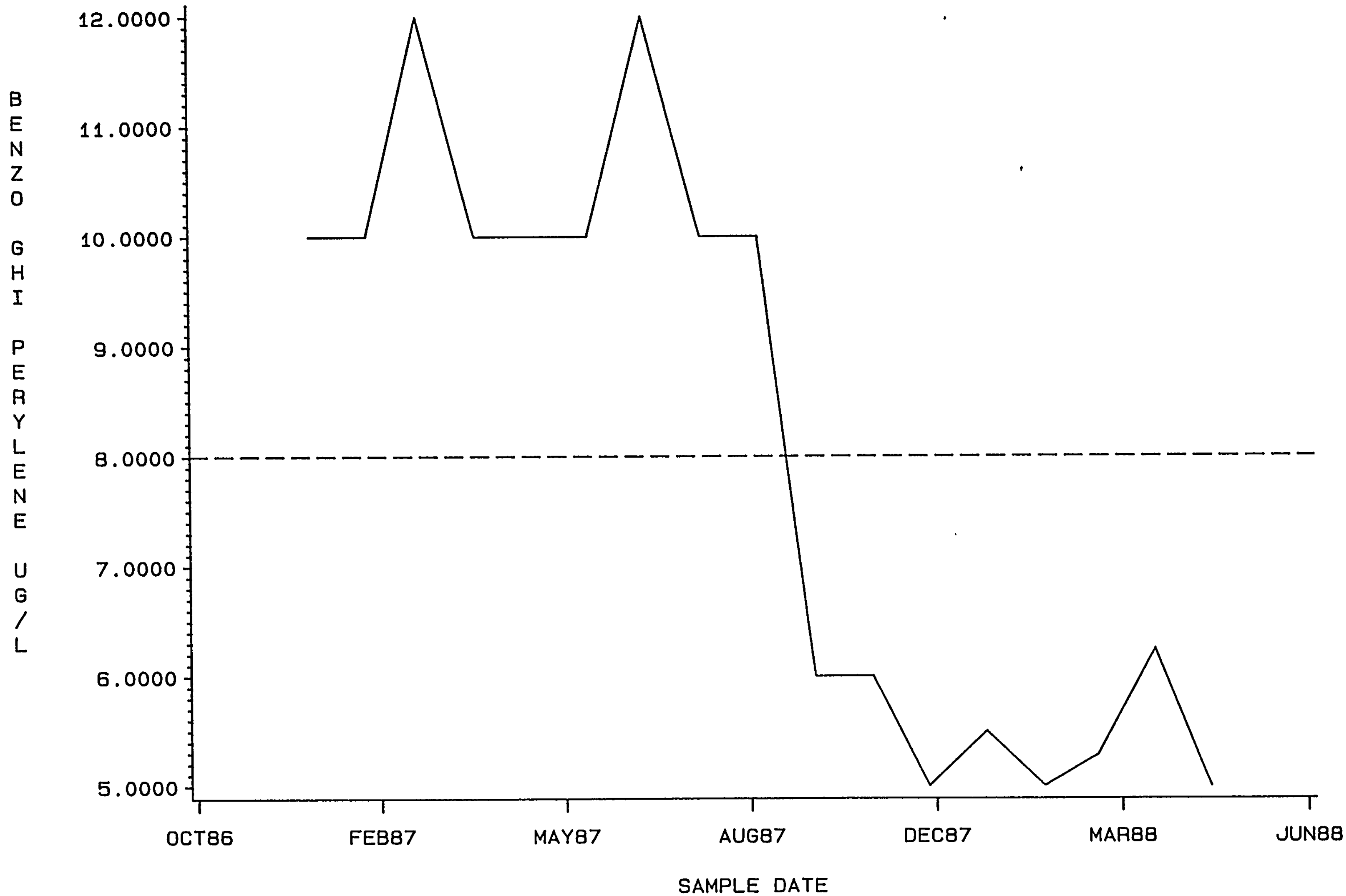

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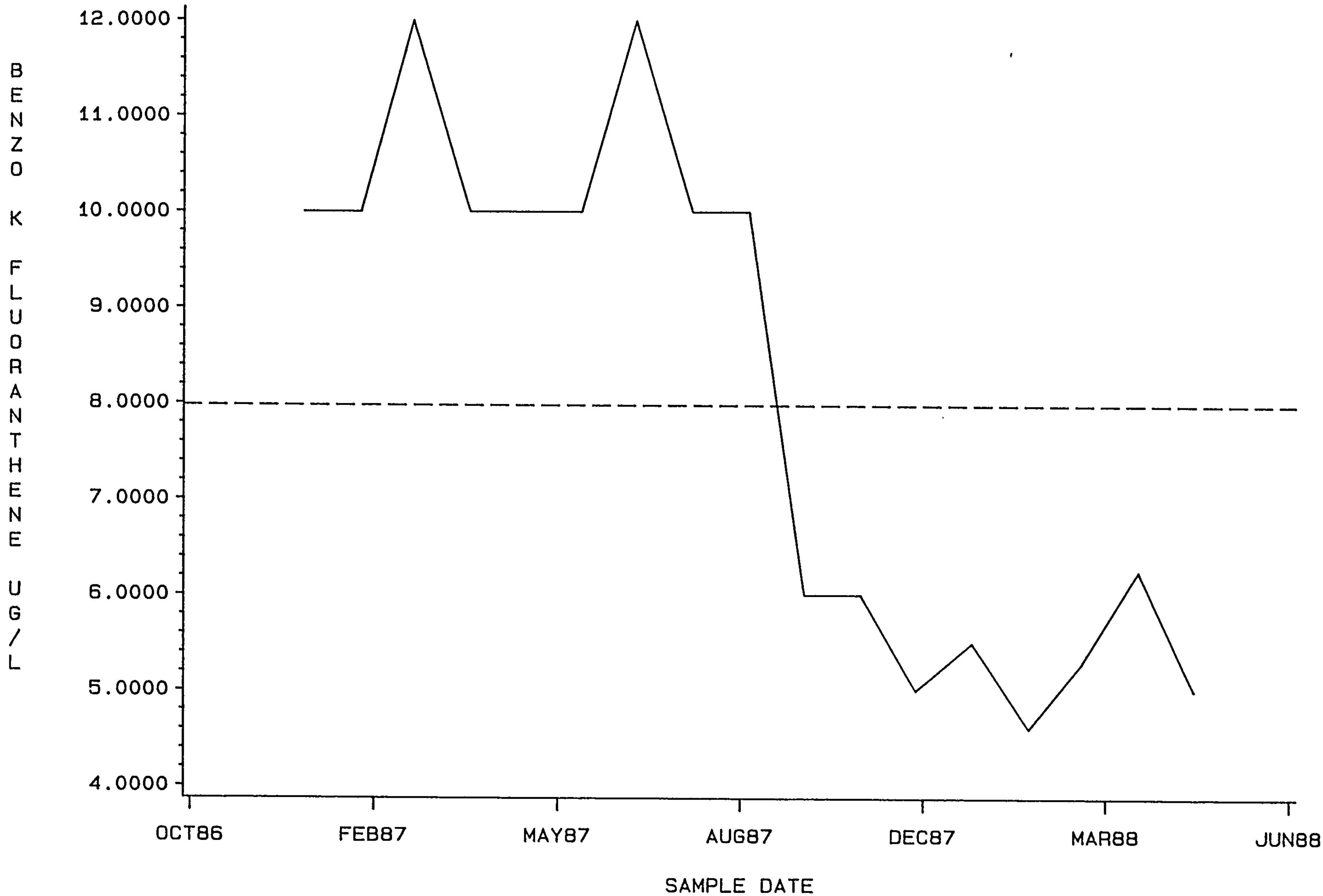

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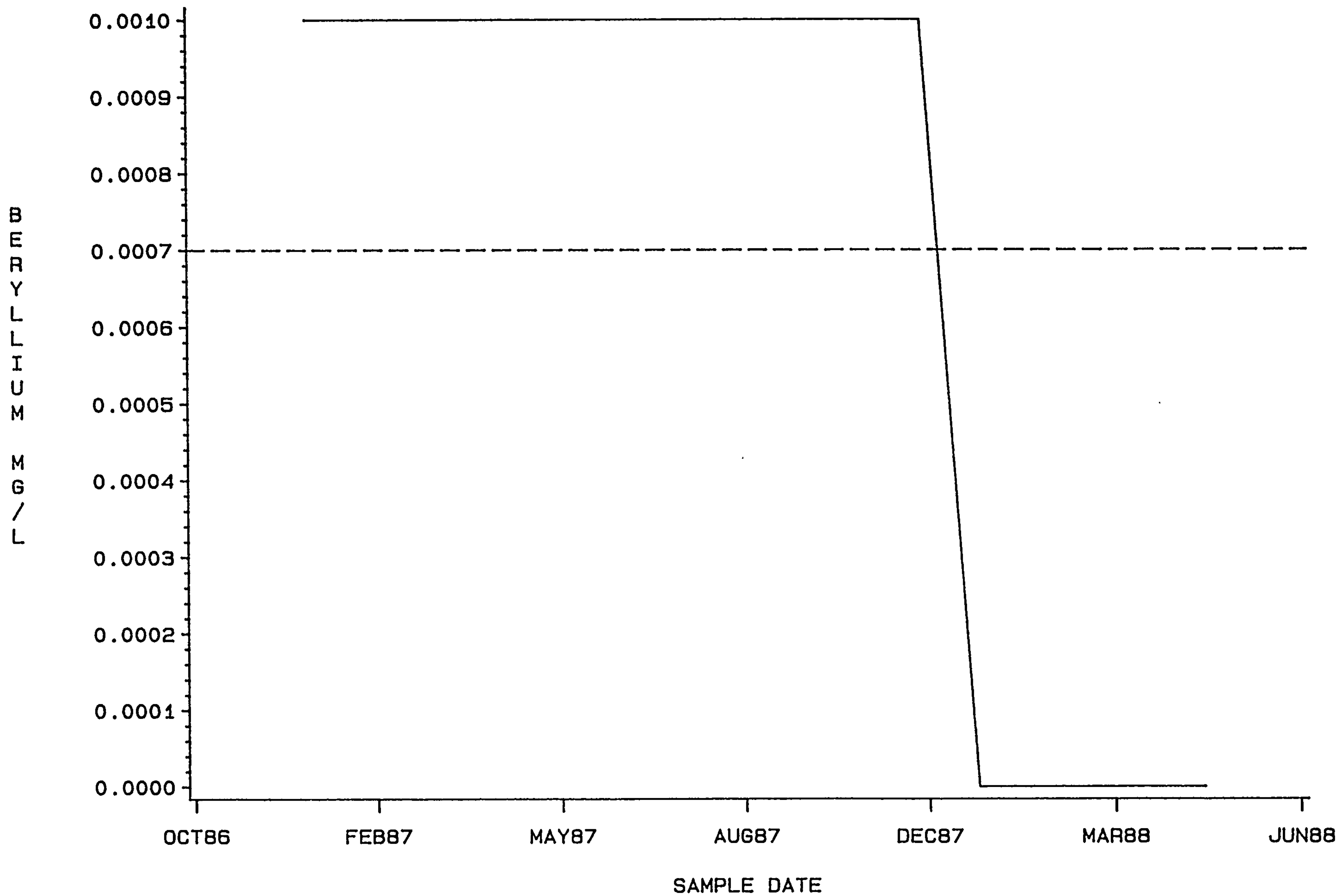

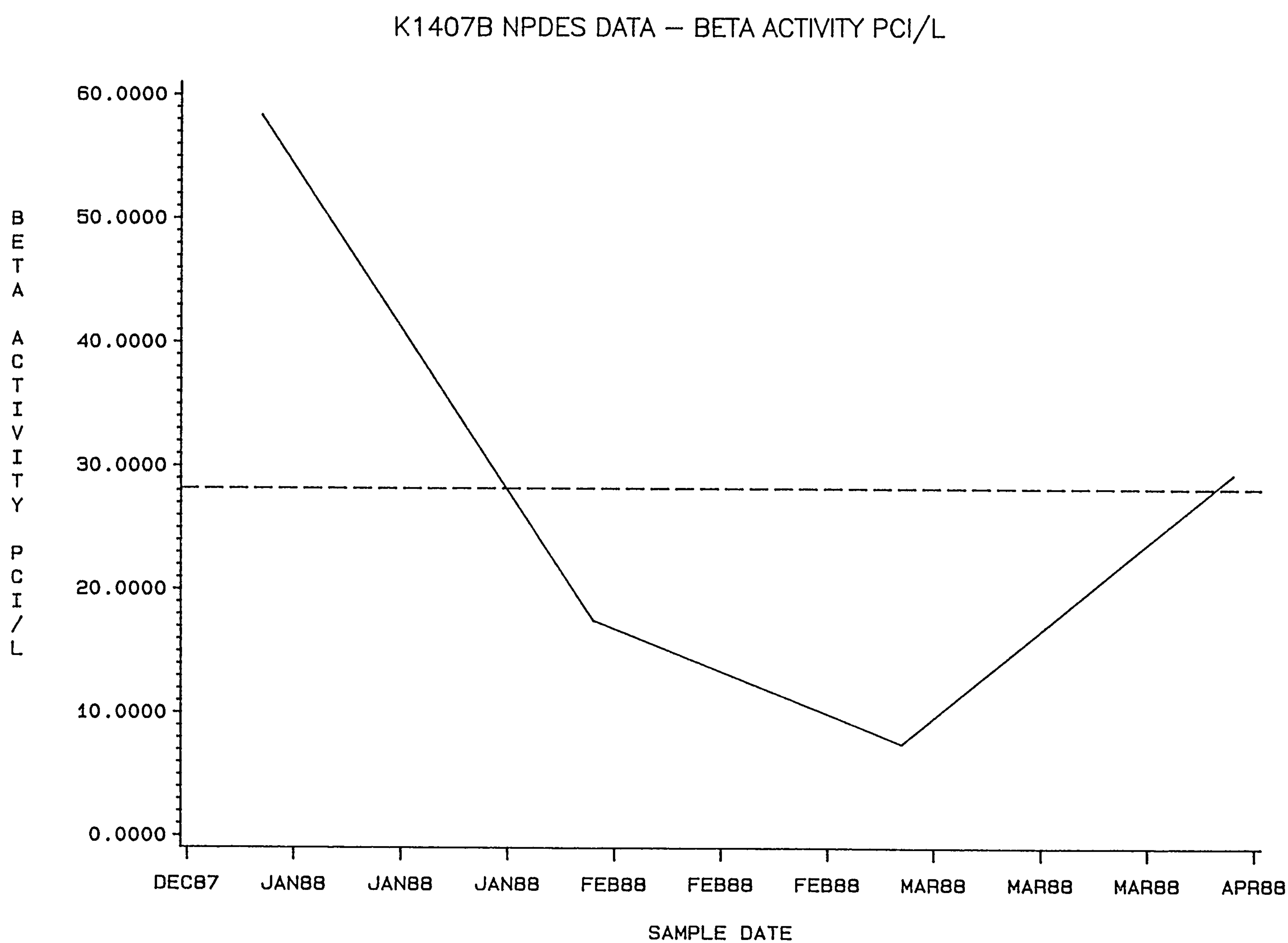
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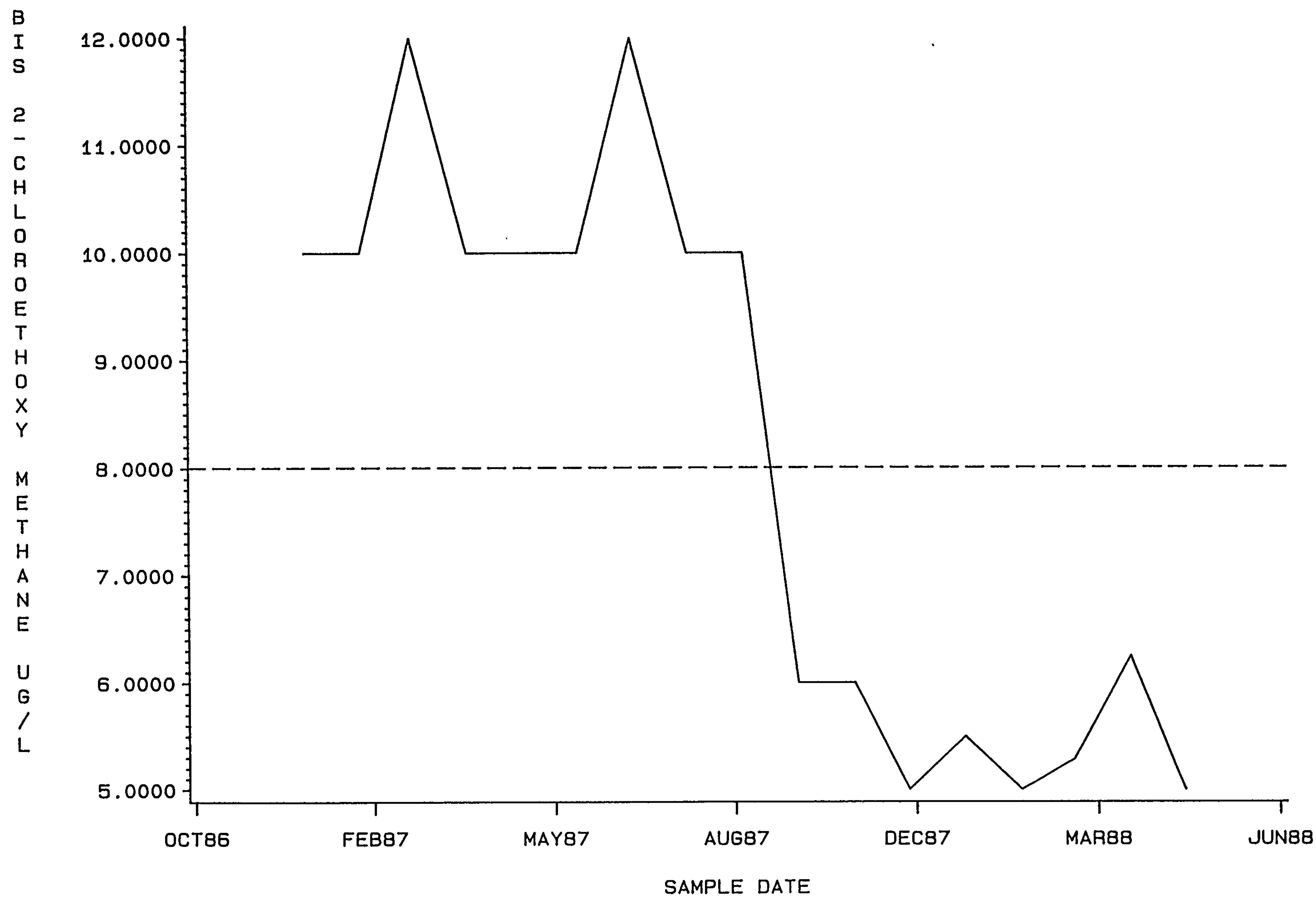

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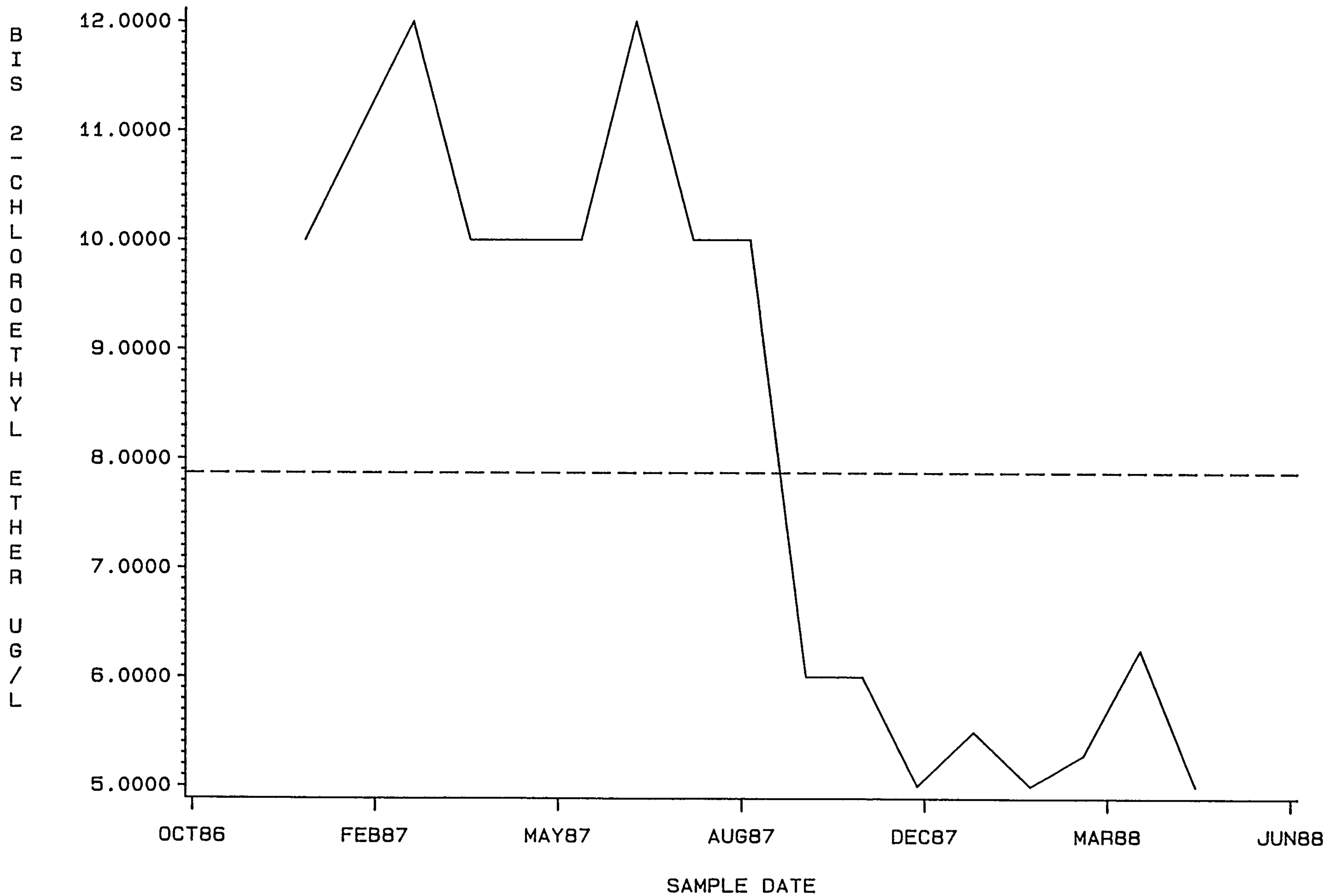

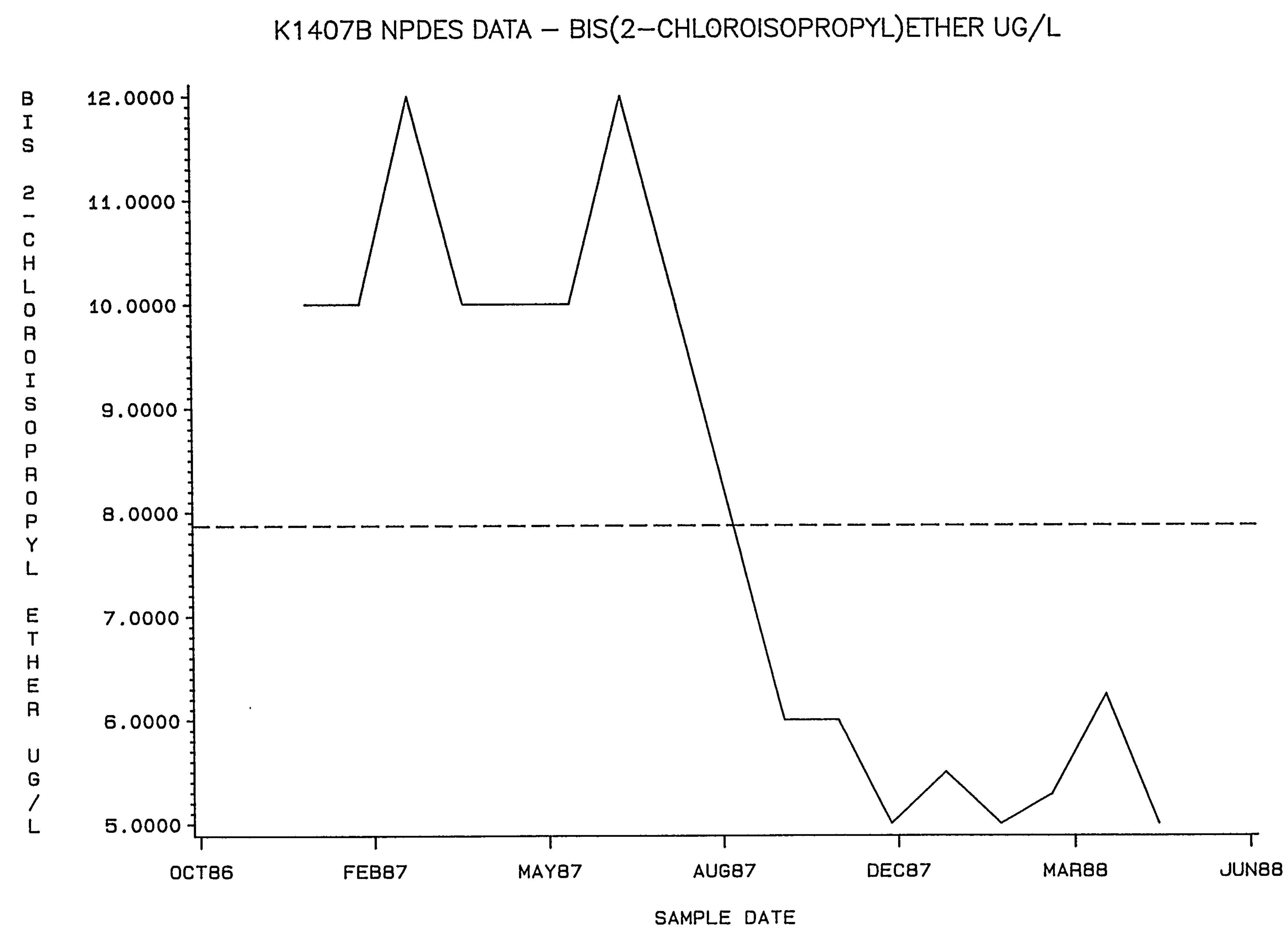
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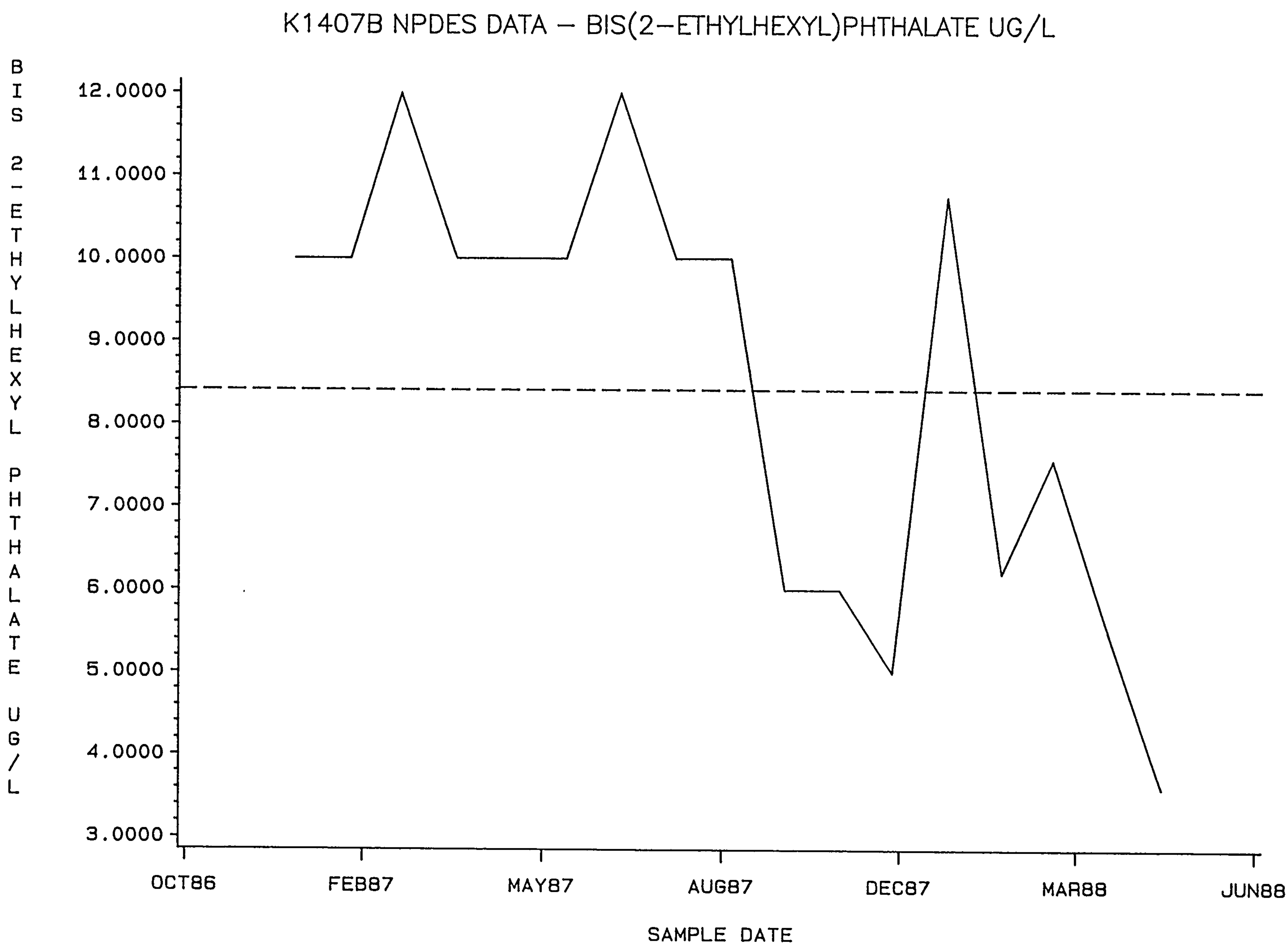
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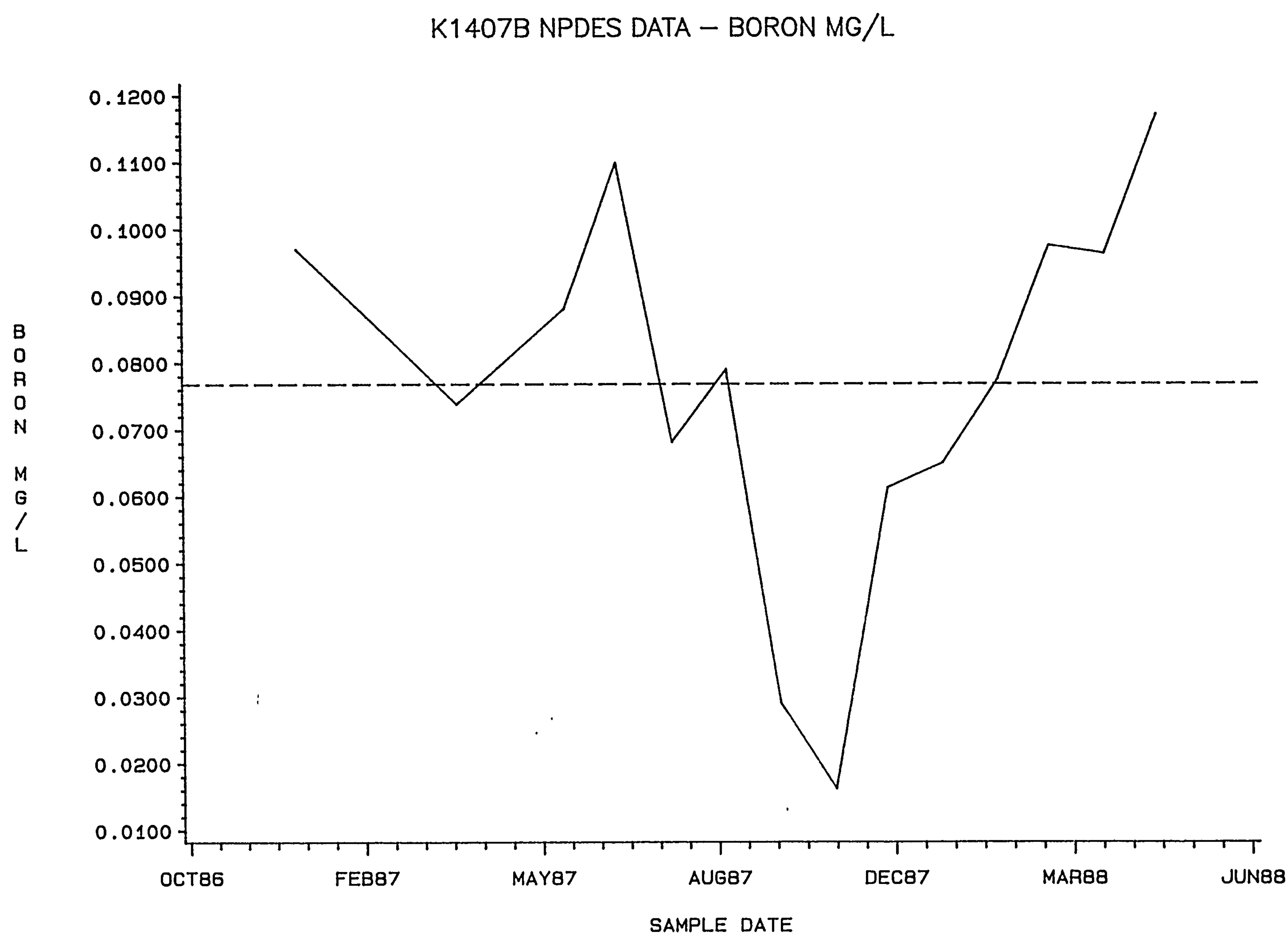
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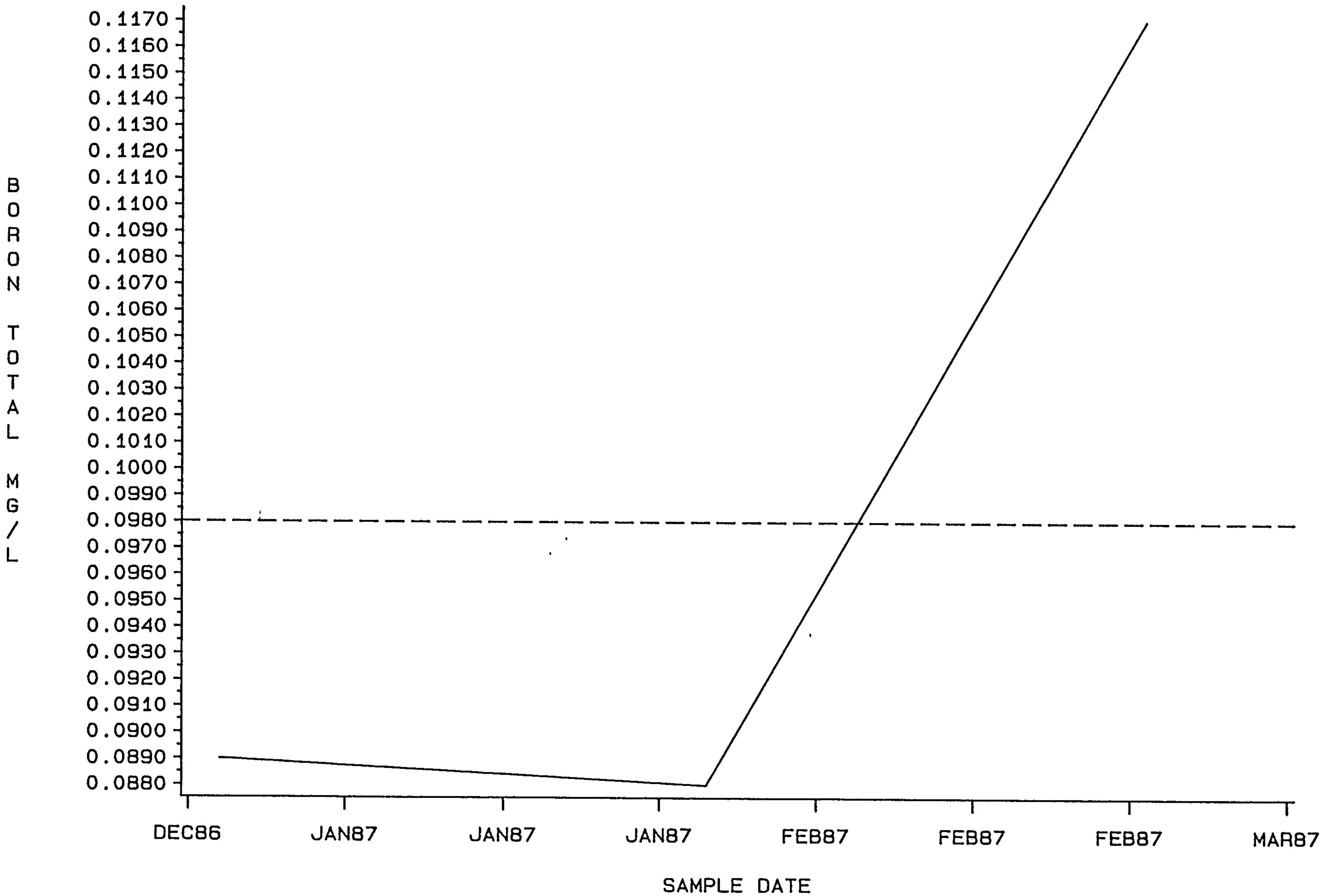
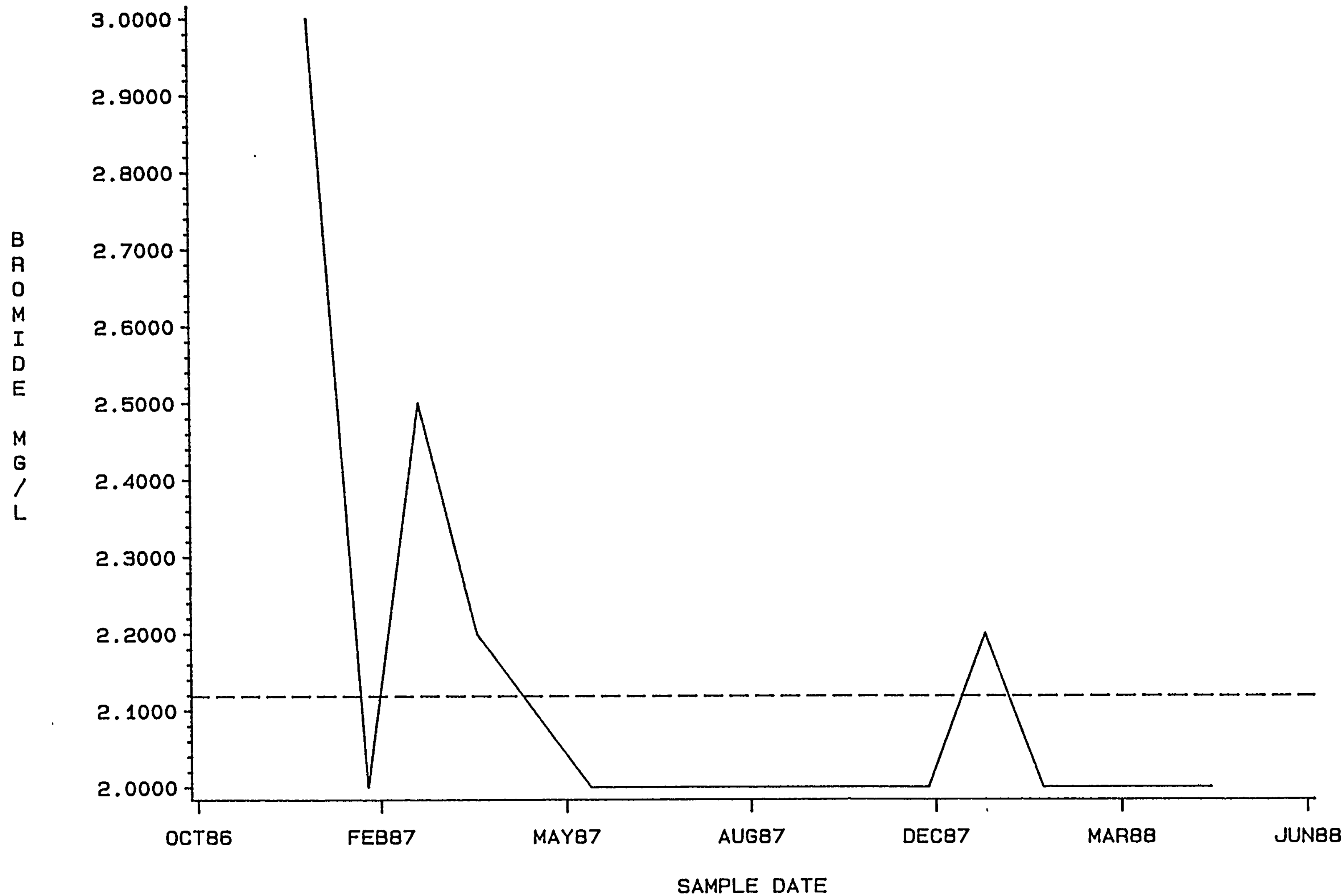
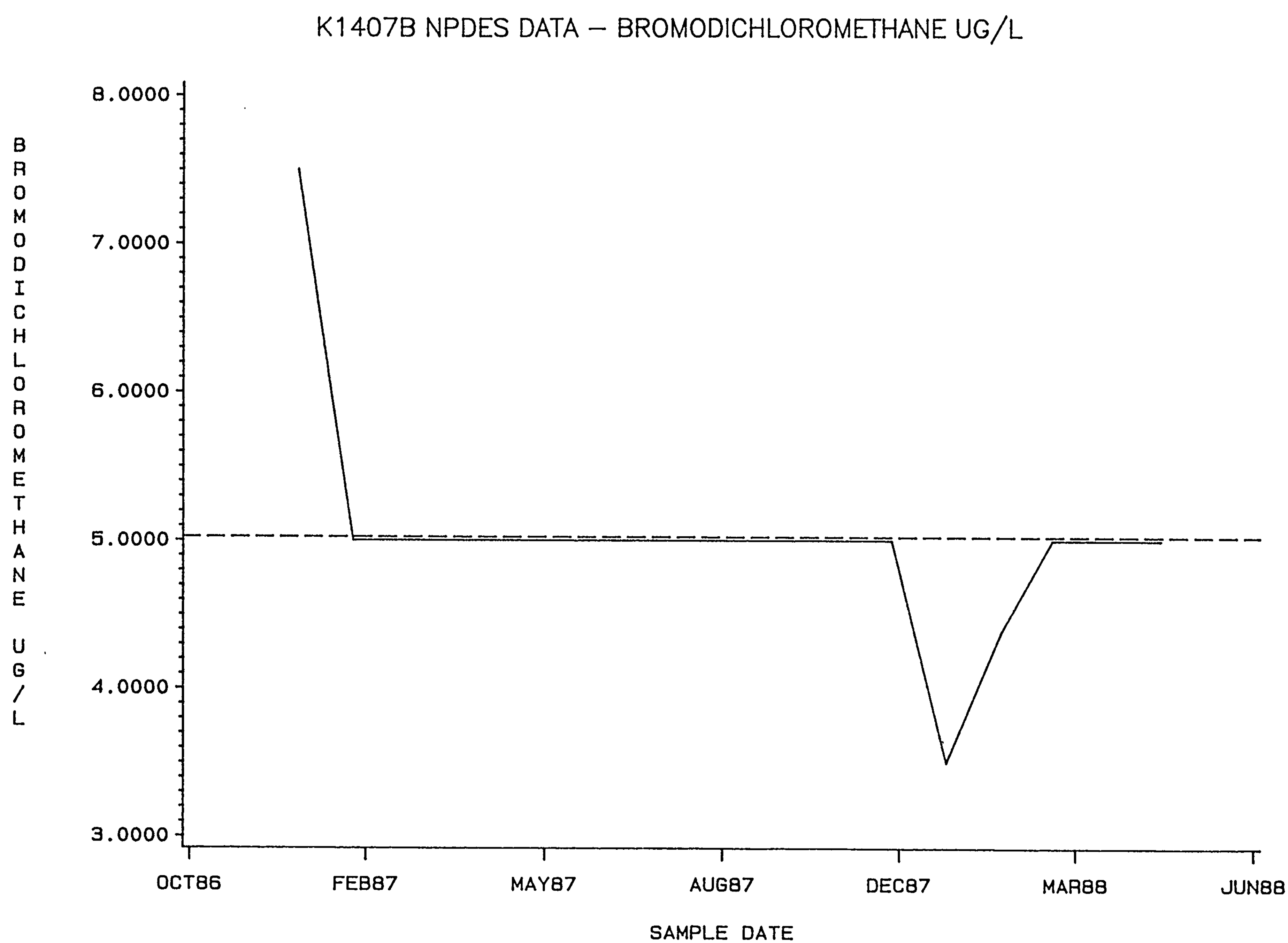
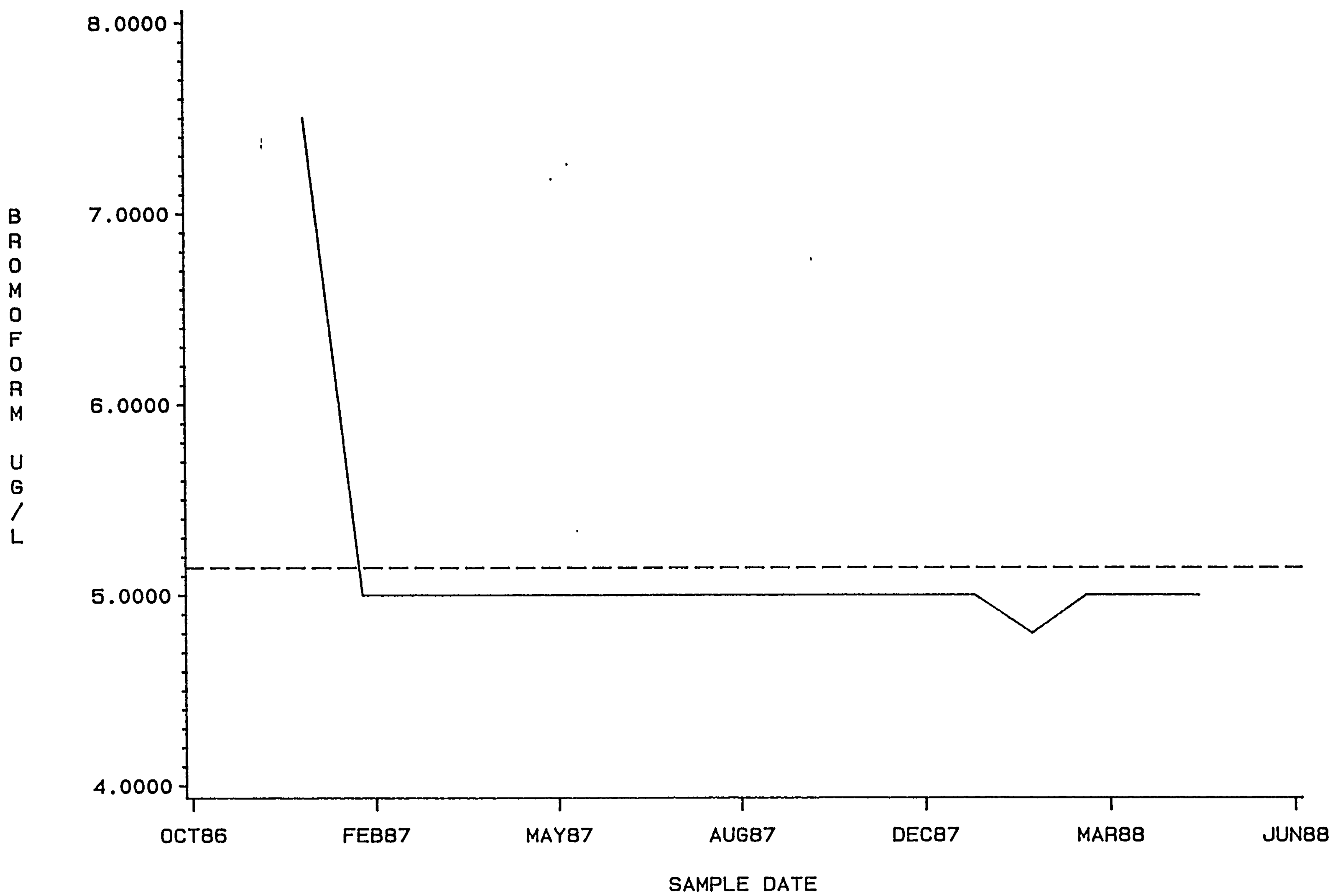


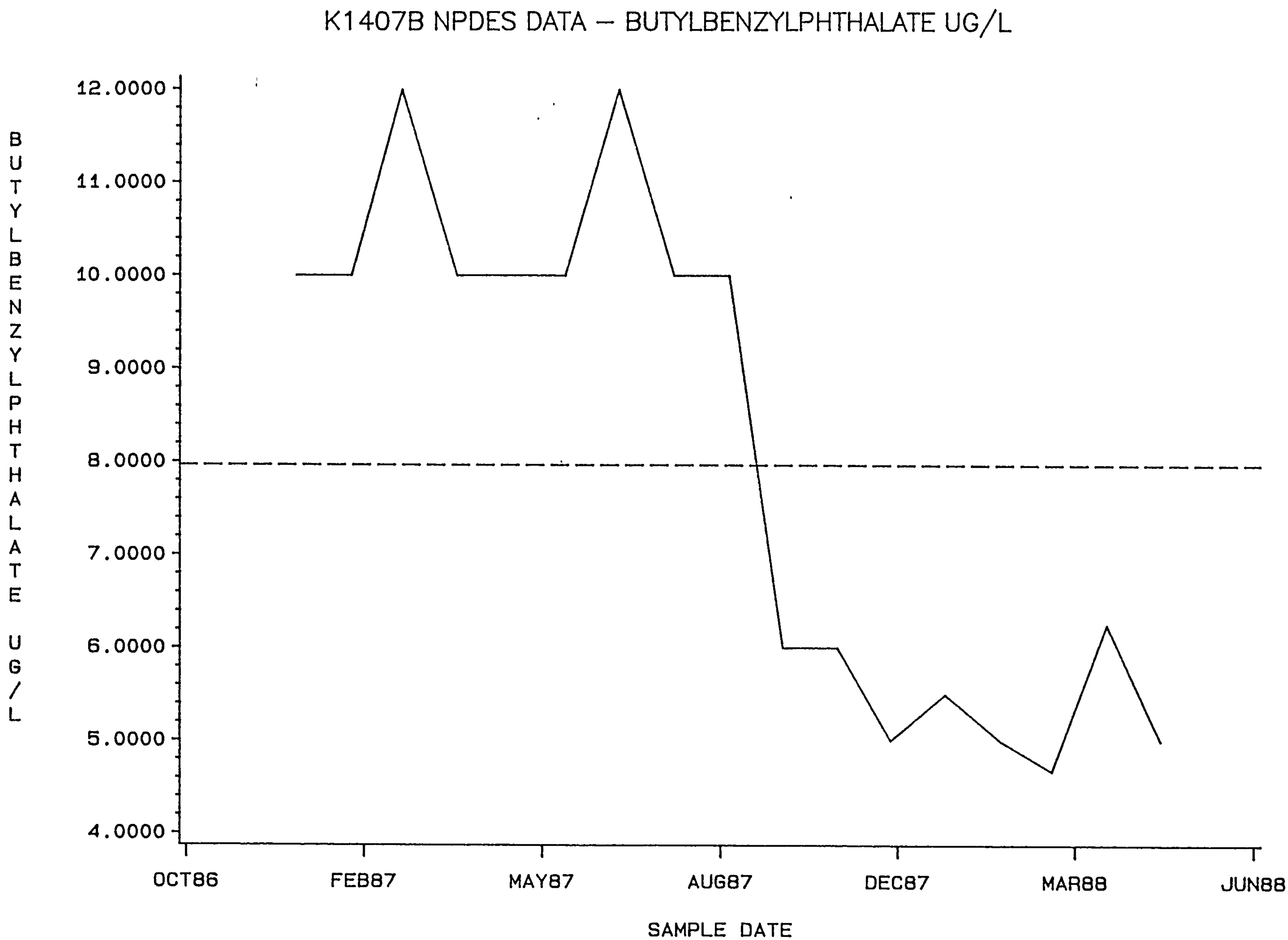
K1407B NPDES DATA – BROMIDE MG/L



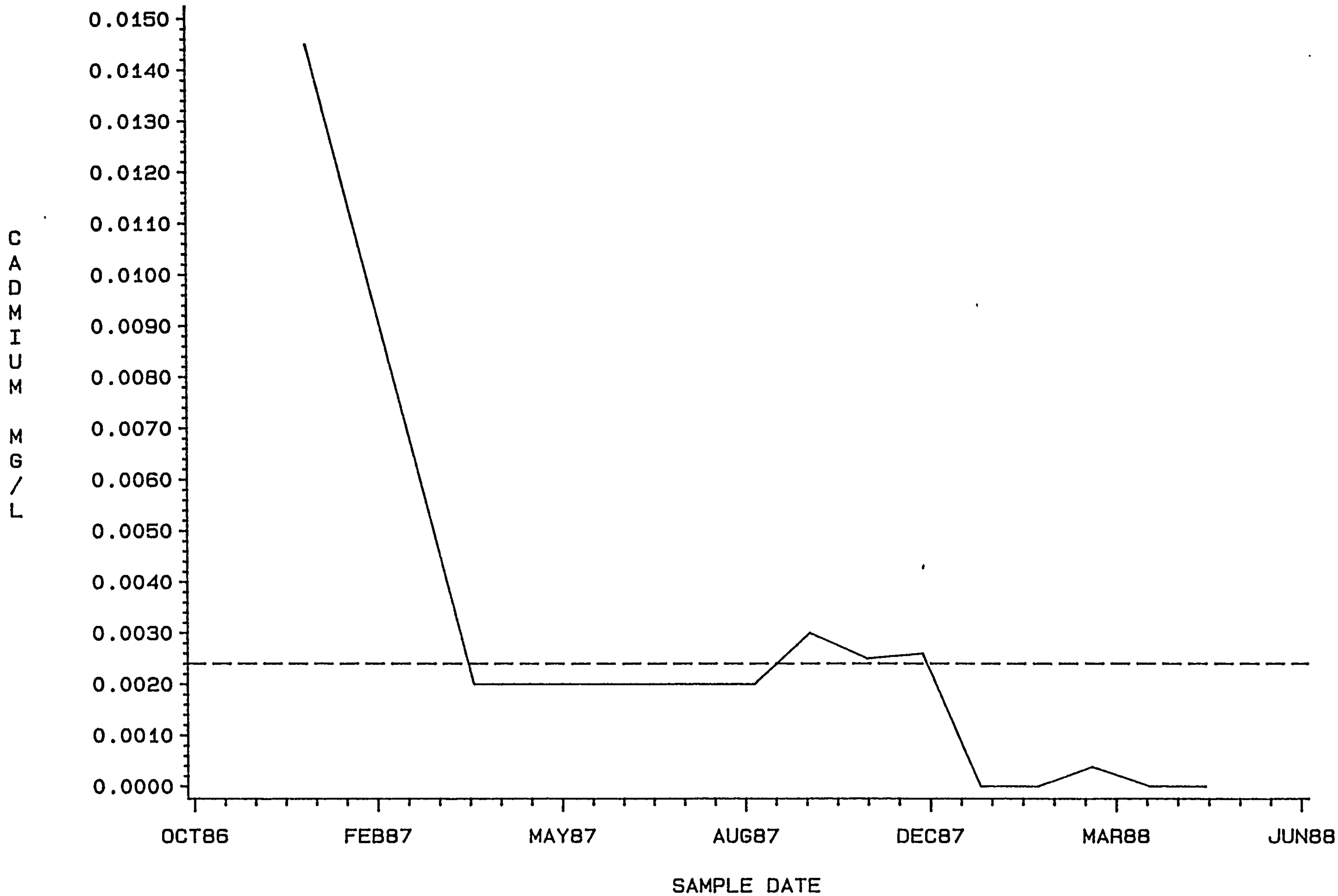

K1407B NPDES DATA — BROMODICHLOROMETHANE UG/L
BROMODICHLOROMETHANE UG/L
8.0000
7.0000
6.0000
5.0000
4.0000
3.0000
OCT86
FEB87
MAY87
AUG87
DEC87
MAR88
JUN88
SAMPLE DATE

K1407B NPDES DATA — BROMOFORM UG/L

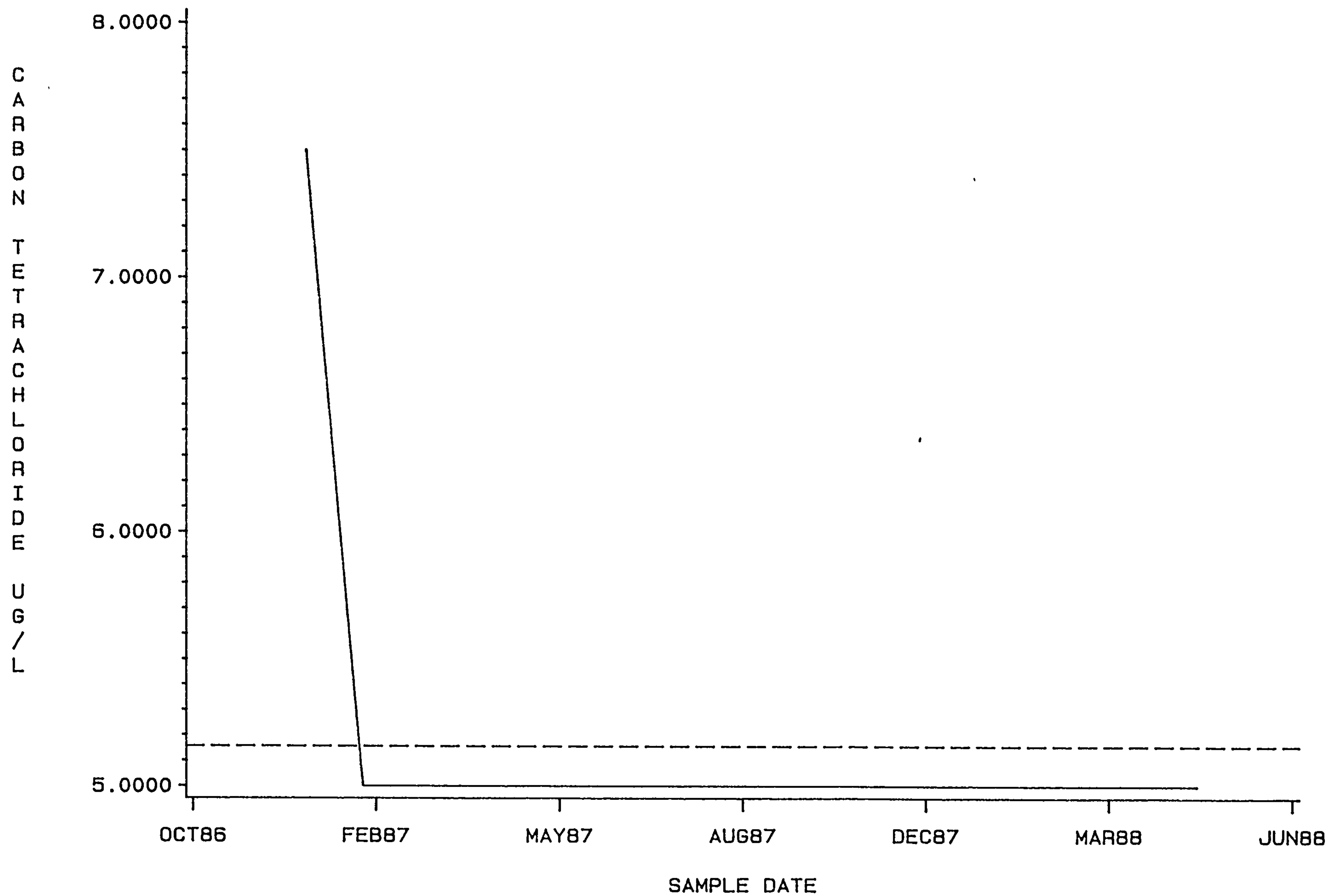



K1407B NPDES DATA — BUTYLBENZYLPHTHALATE UG/L
BUTYLBENZYLPHTHALATE UG/L
12.0000
11.0000
10.0000
9.0000
8.0000
7.0000
6.0000
5.0000
4.0000
OCT86
FEB87
MAY87
AUG87
DEC87
MAR88
JUN88
SAMPLE DATE

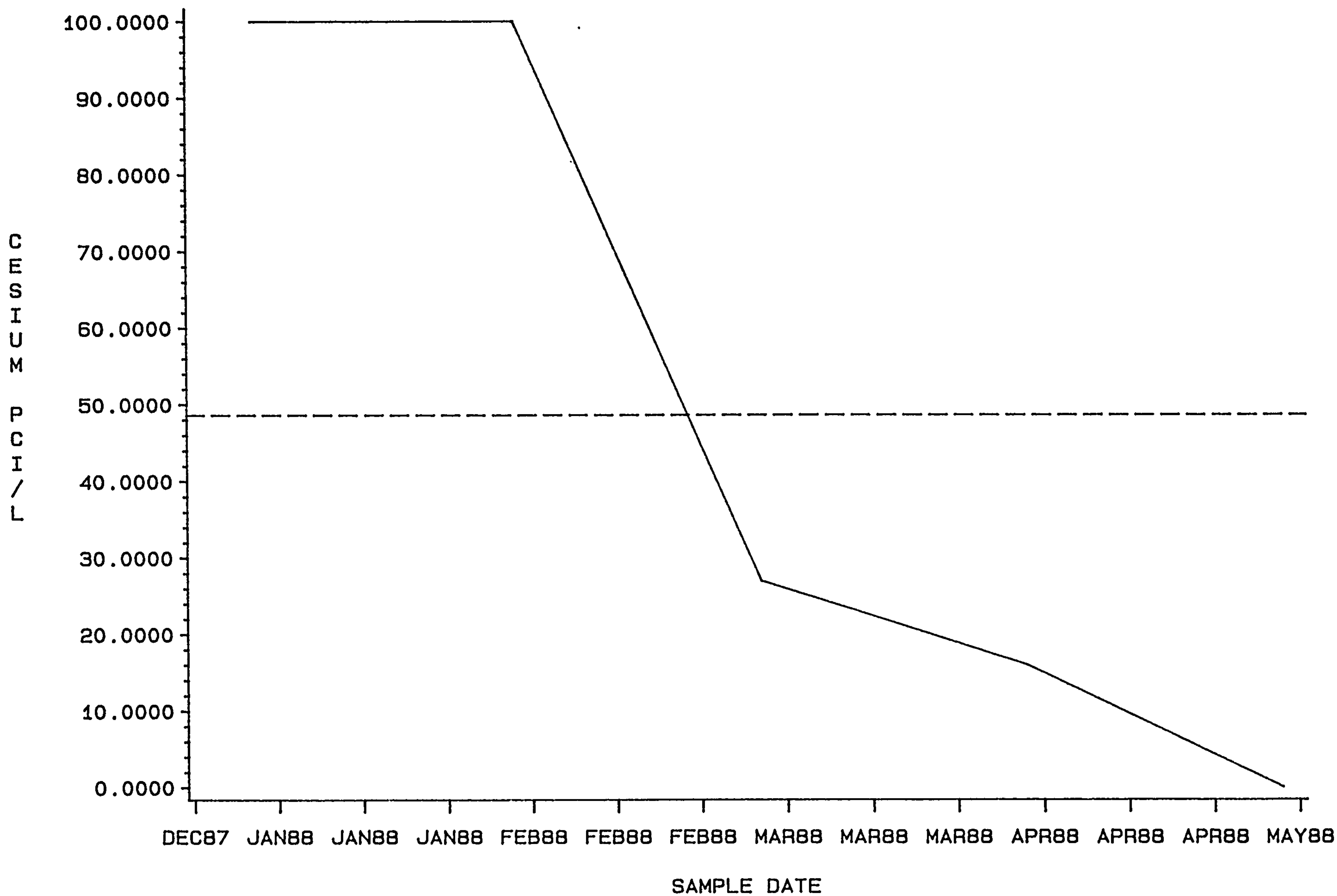
K1407B NPDES DATA – CADMIUM MG/L



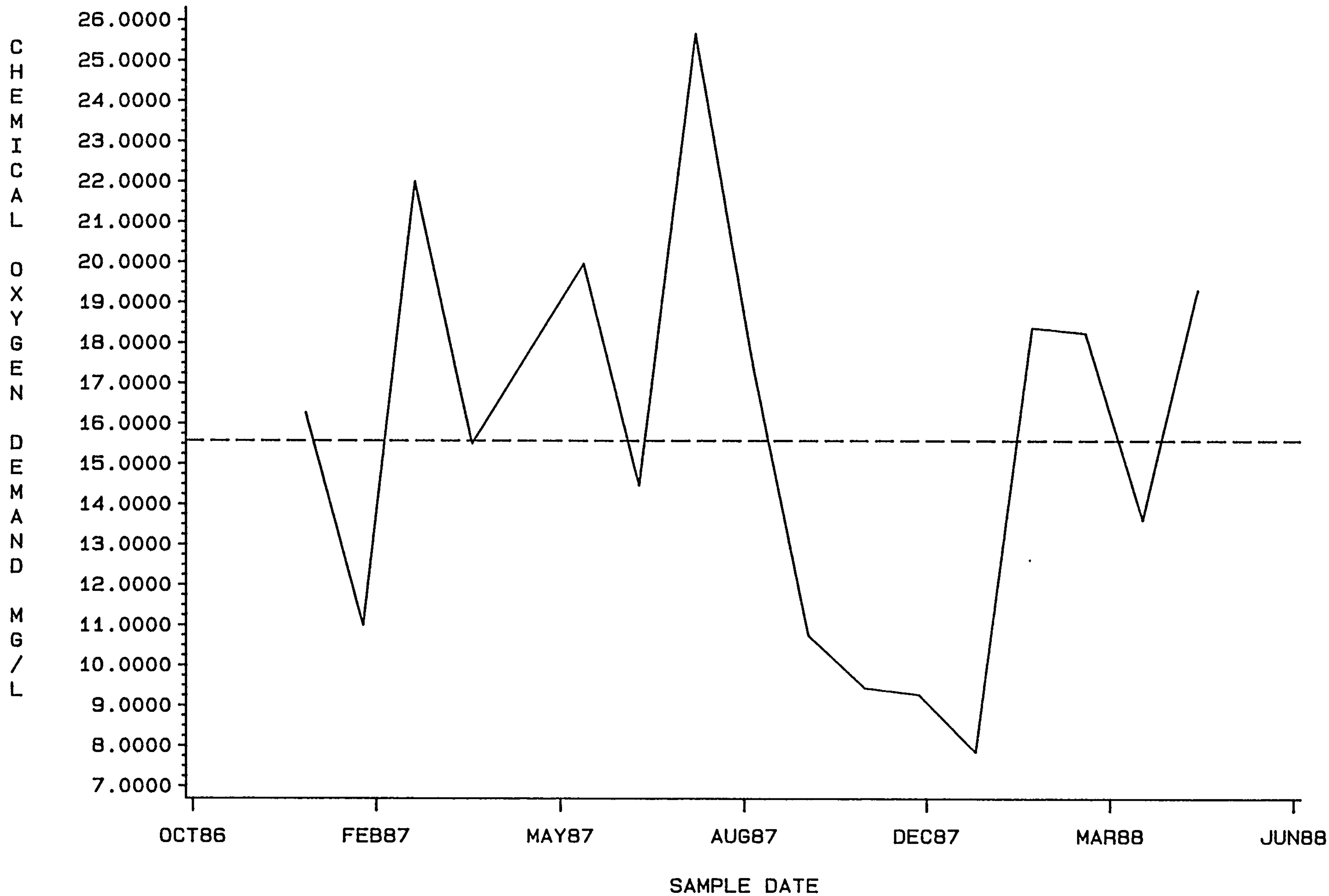
K1407B NPDES DATA – CARBON TETRACHLORIDE UG/L

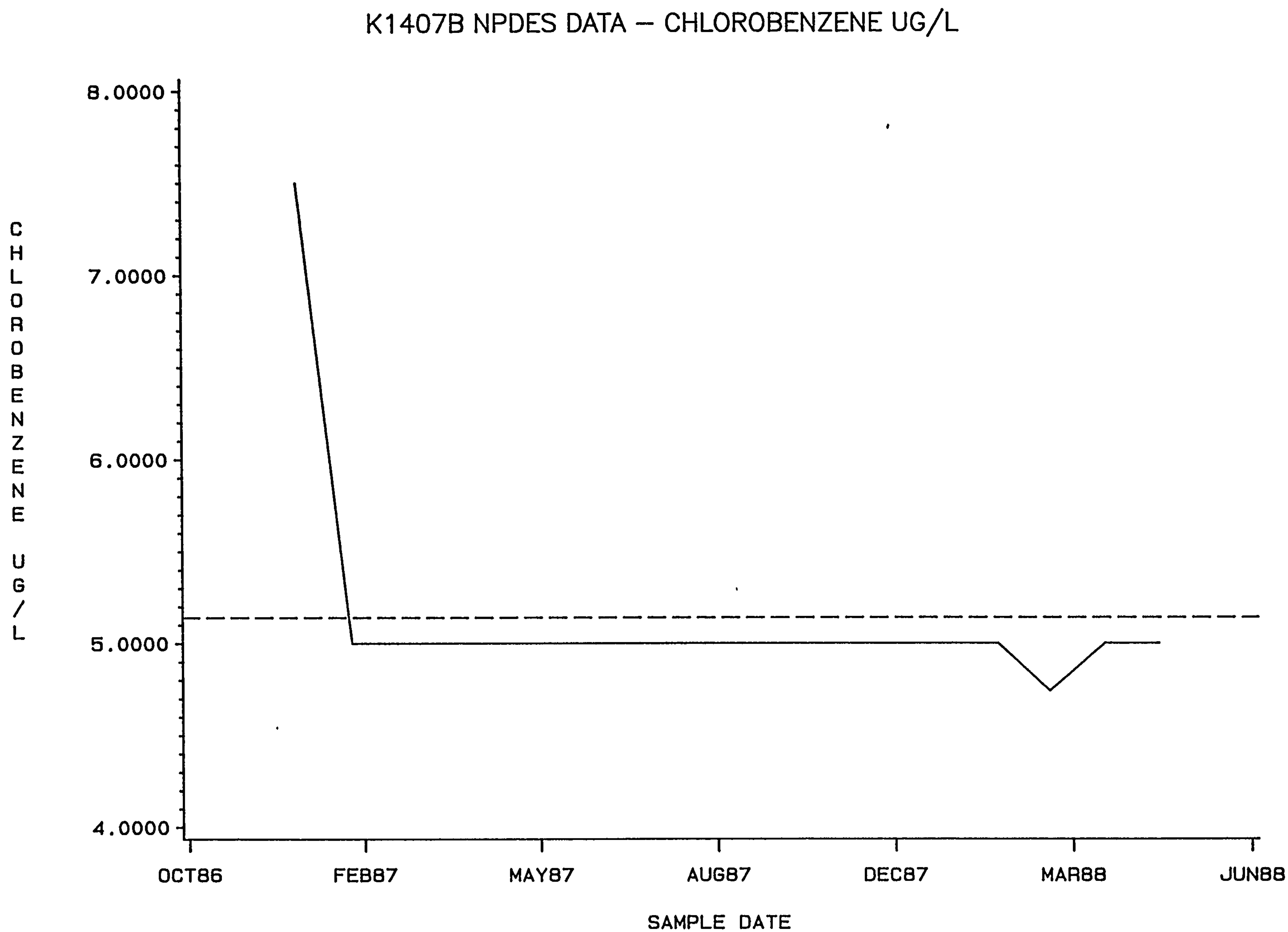


K1407B NPDES DATA – CESIUM PCI/L

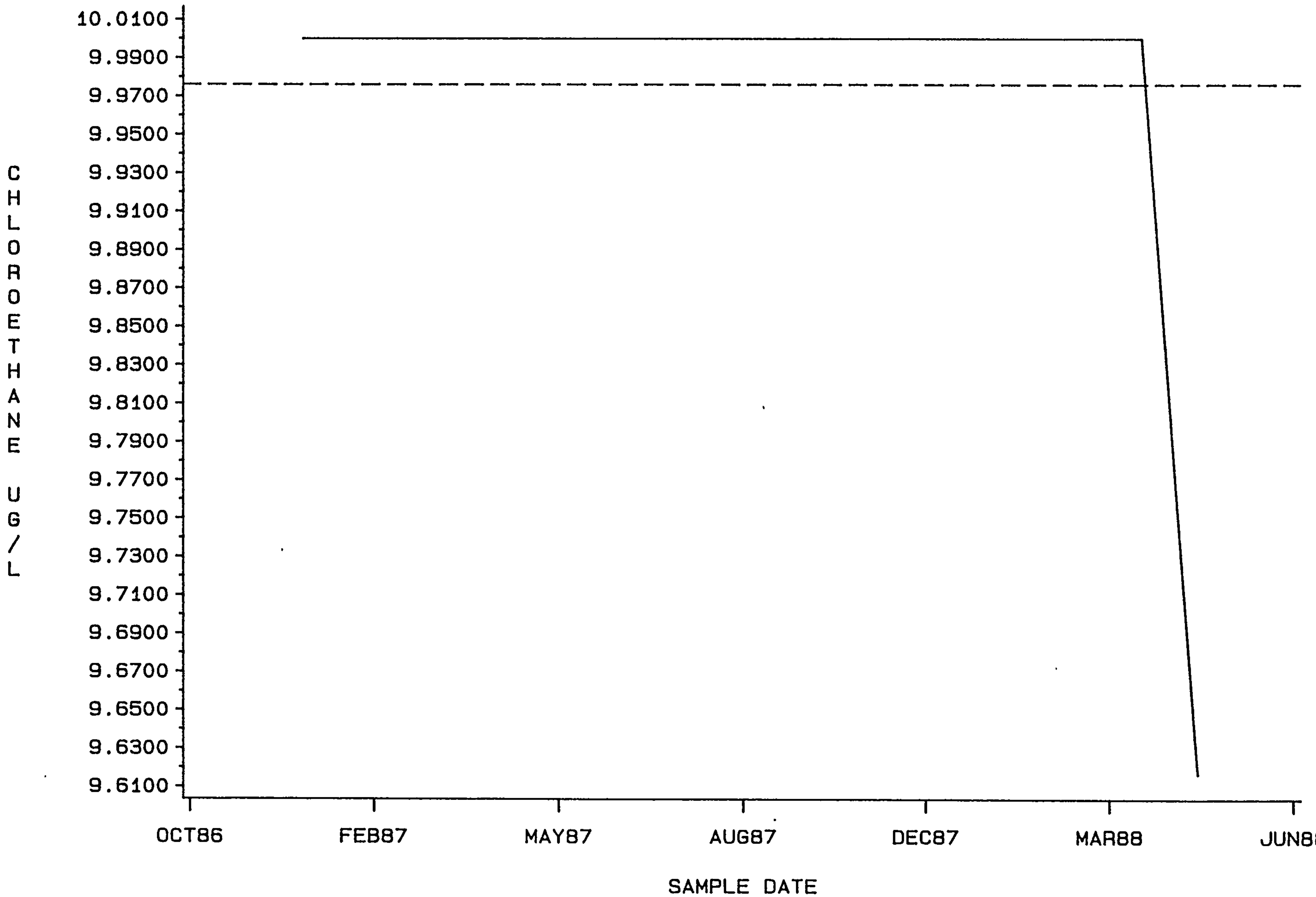


K1407B NPDES DATA — CHEMICAL OXYGEN DEMAND MG/L

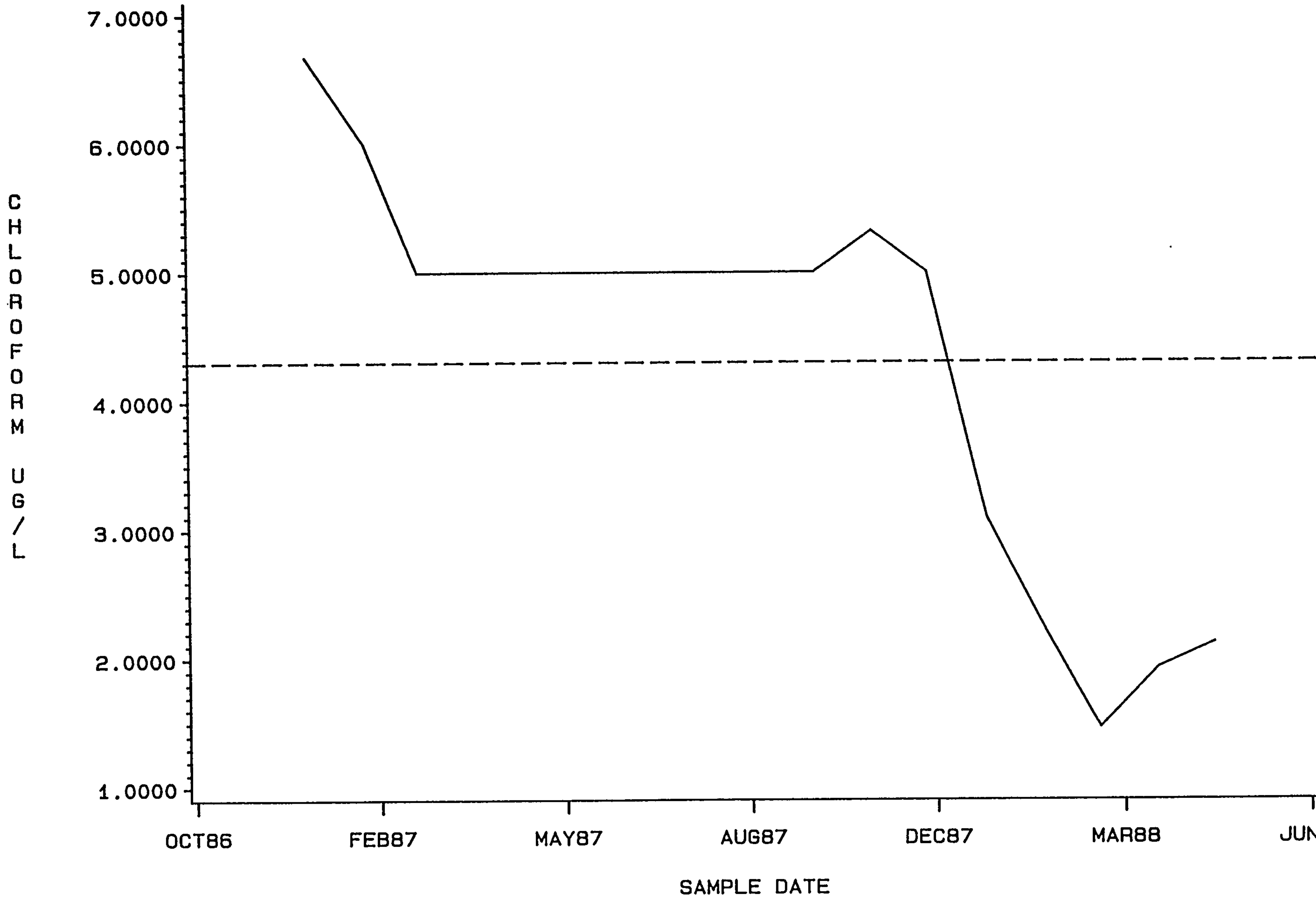



K1407B NPDES DATA – CHLOROBENZENE UG/L
8.0000
7.0000
6.0000
5.0000
4.0000
CHLOROBENZENE UG/L
OCT86
FEB87
MAY87
AUG87
DEC87
MAR88
JUN88
SAMPLE DATE

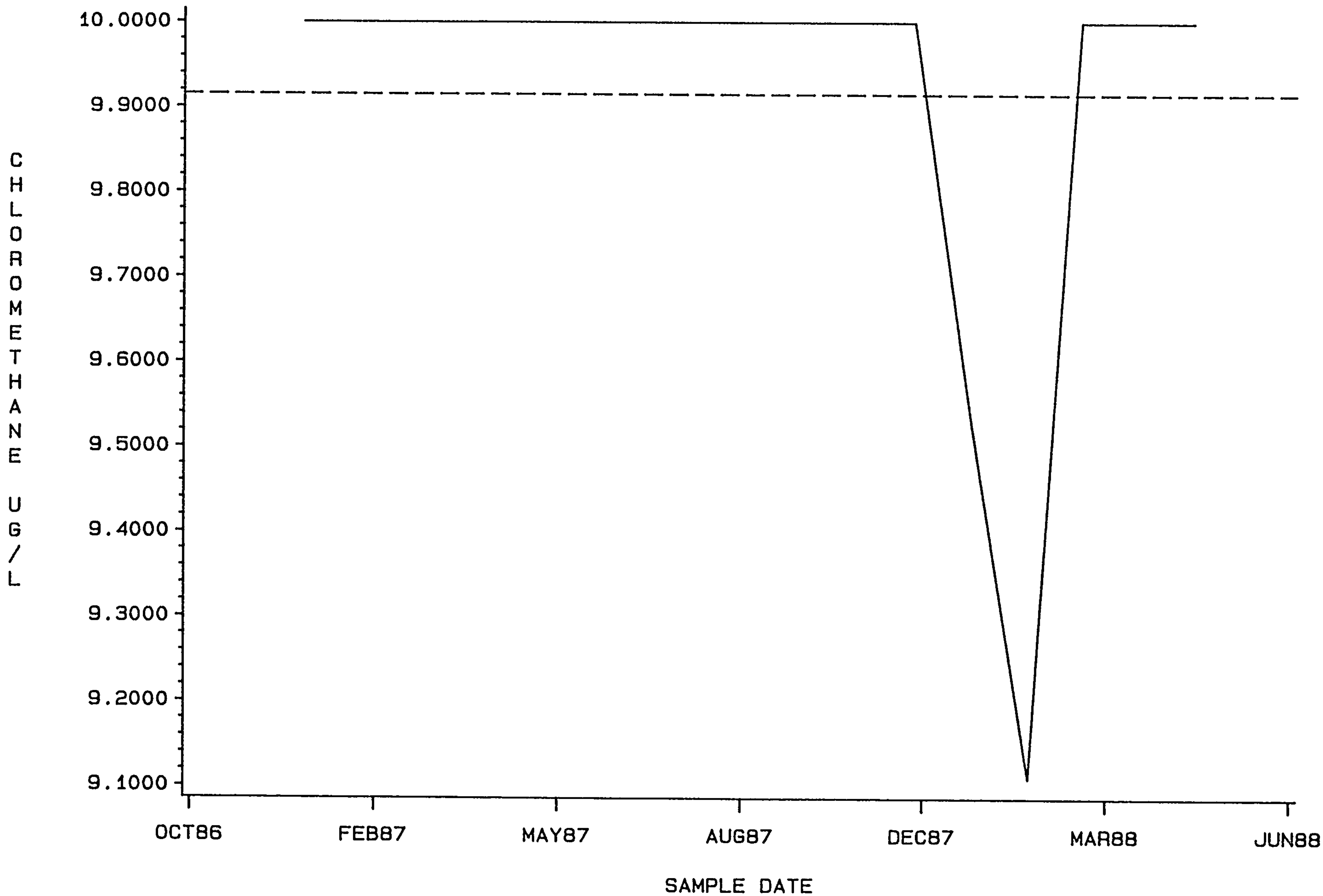
K1407B NPDES DATA – CHLOROETHANE UG/L



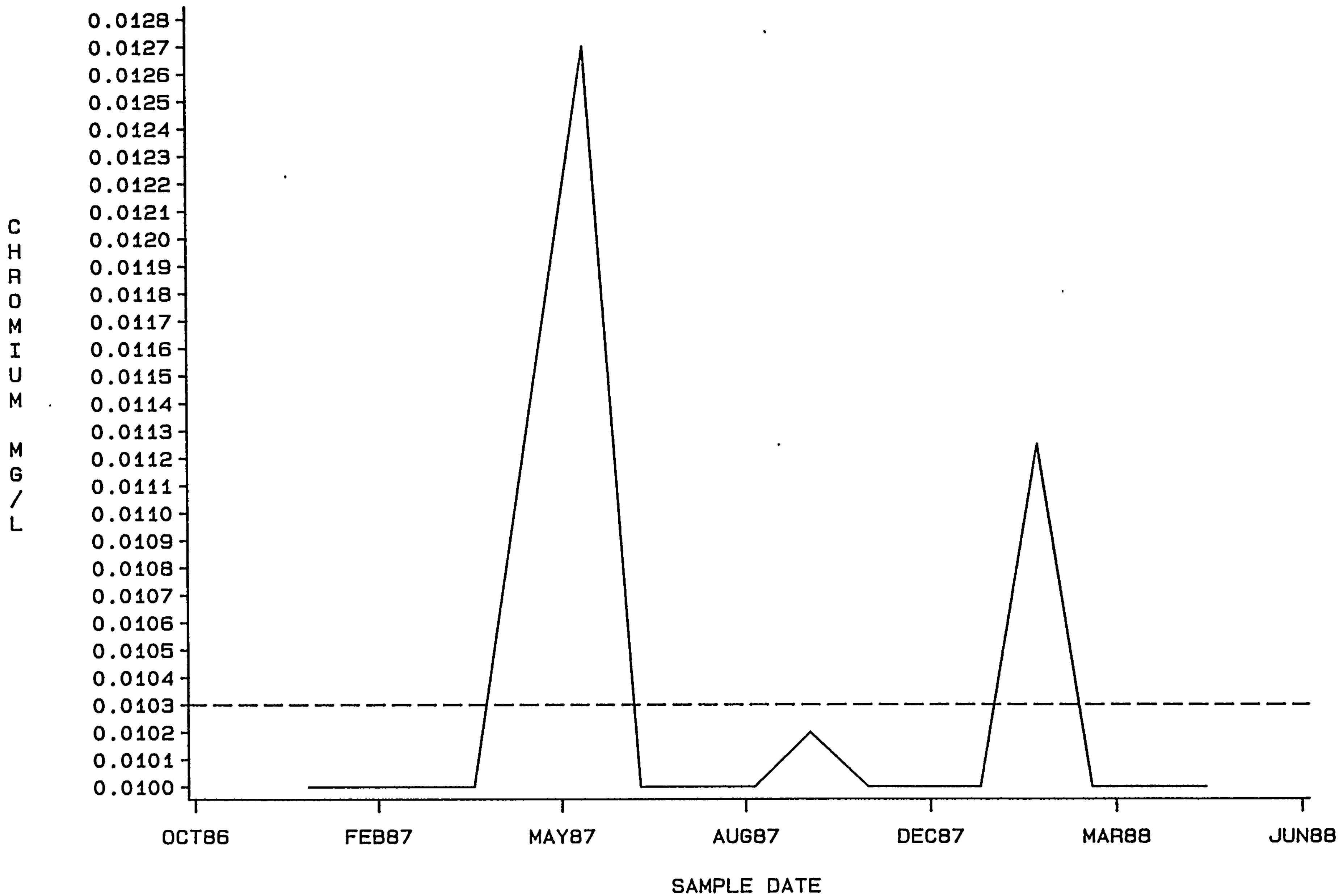
K1407B NPDES DATA – CHLOROFORM UG/L



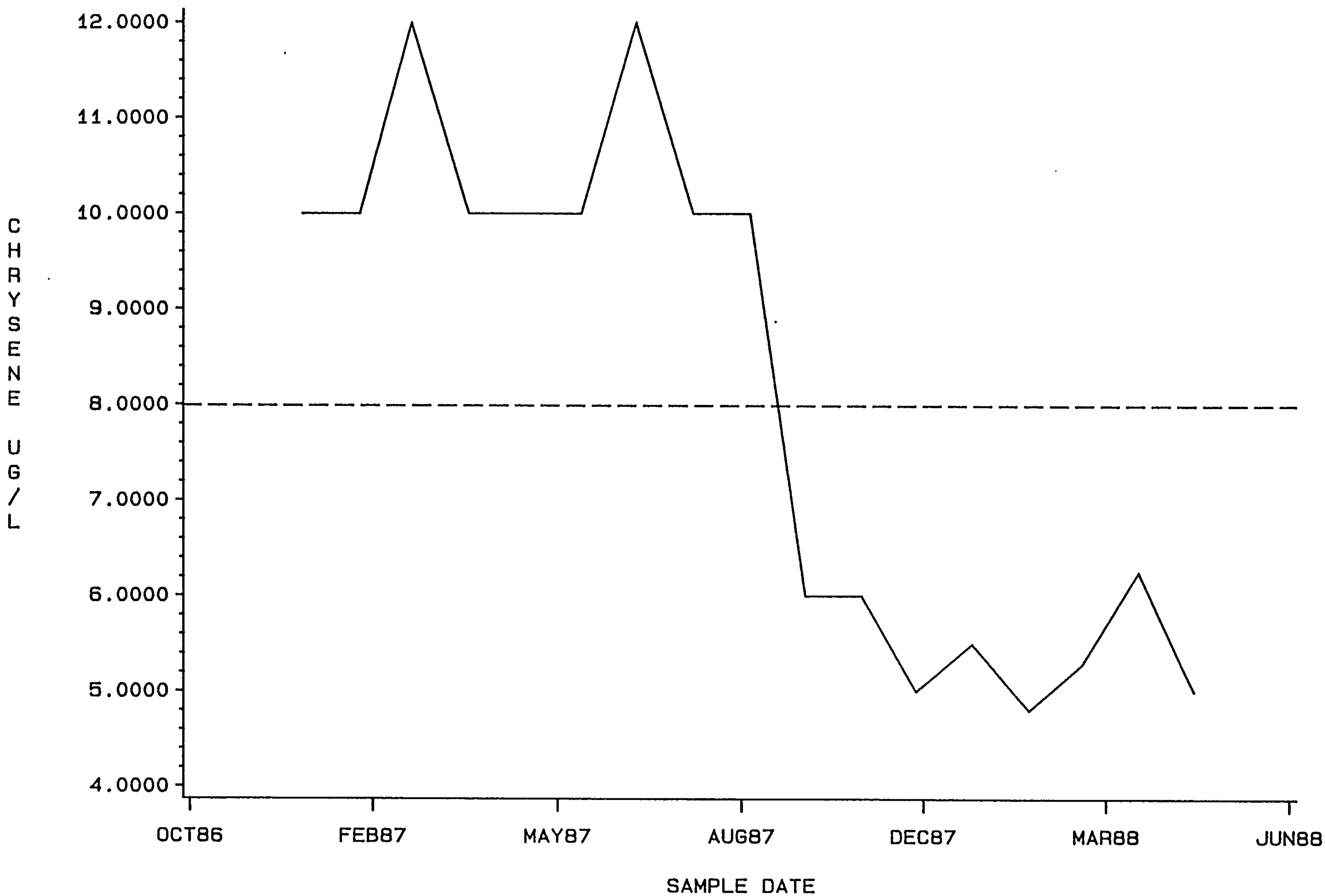
K1407B NPDES DATA – CHLOROMETHANE UG/L



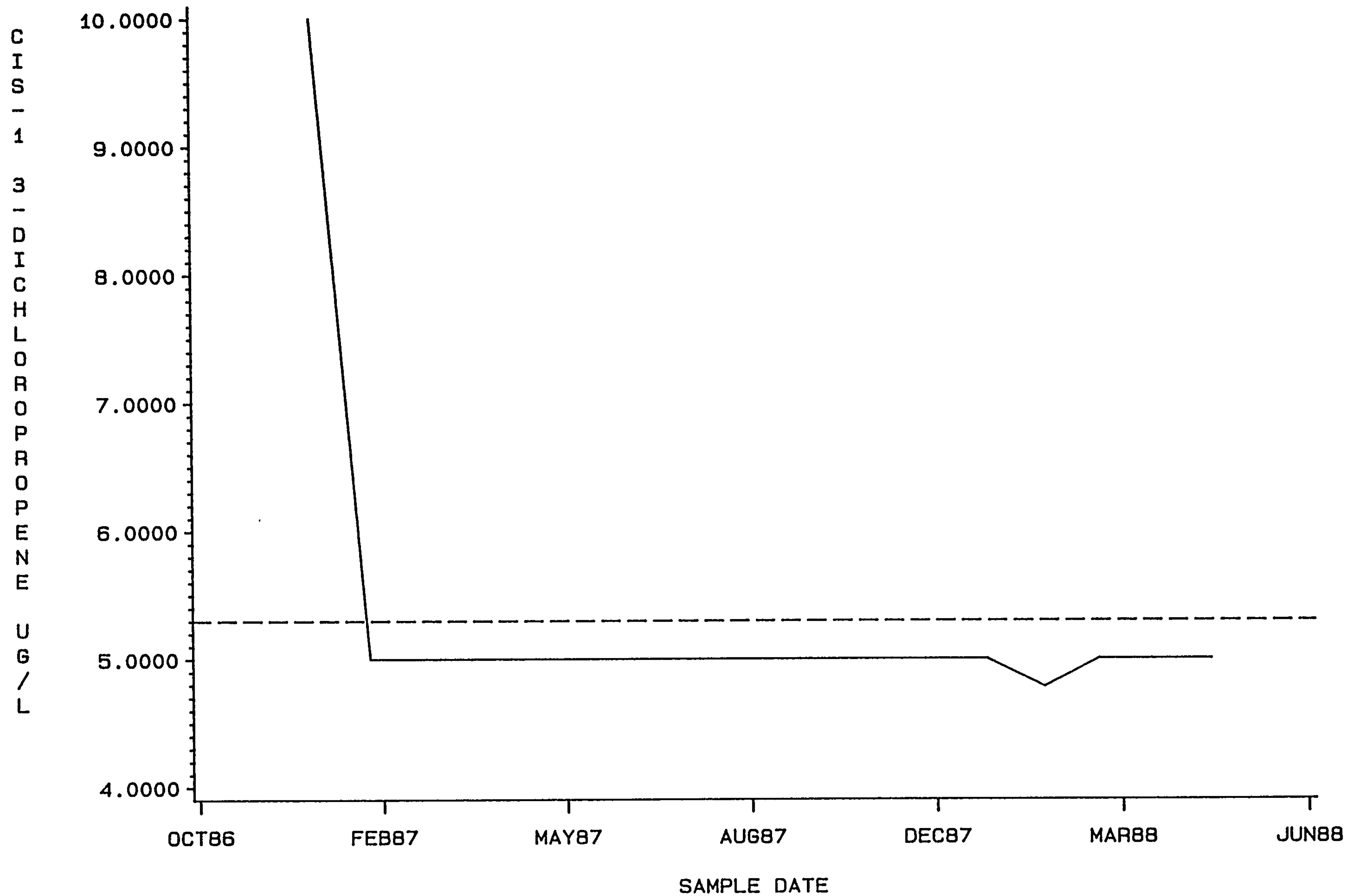
K1407B NPDES DATA – CHROMIUM MG/L



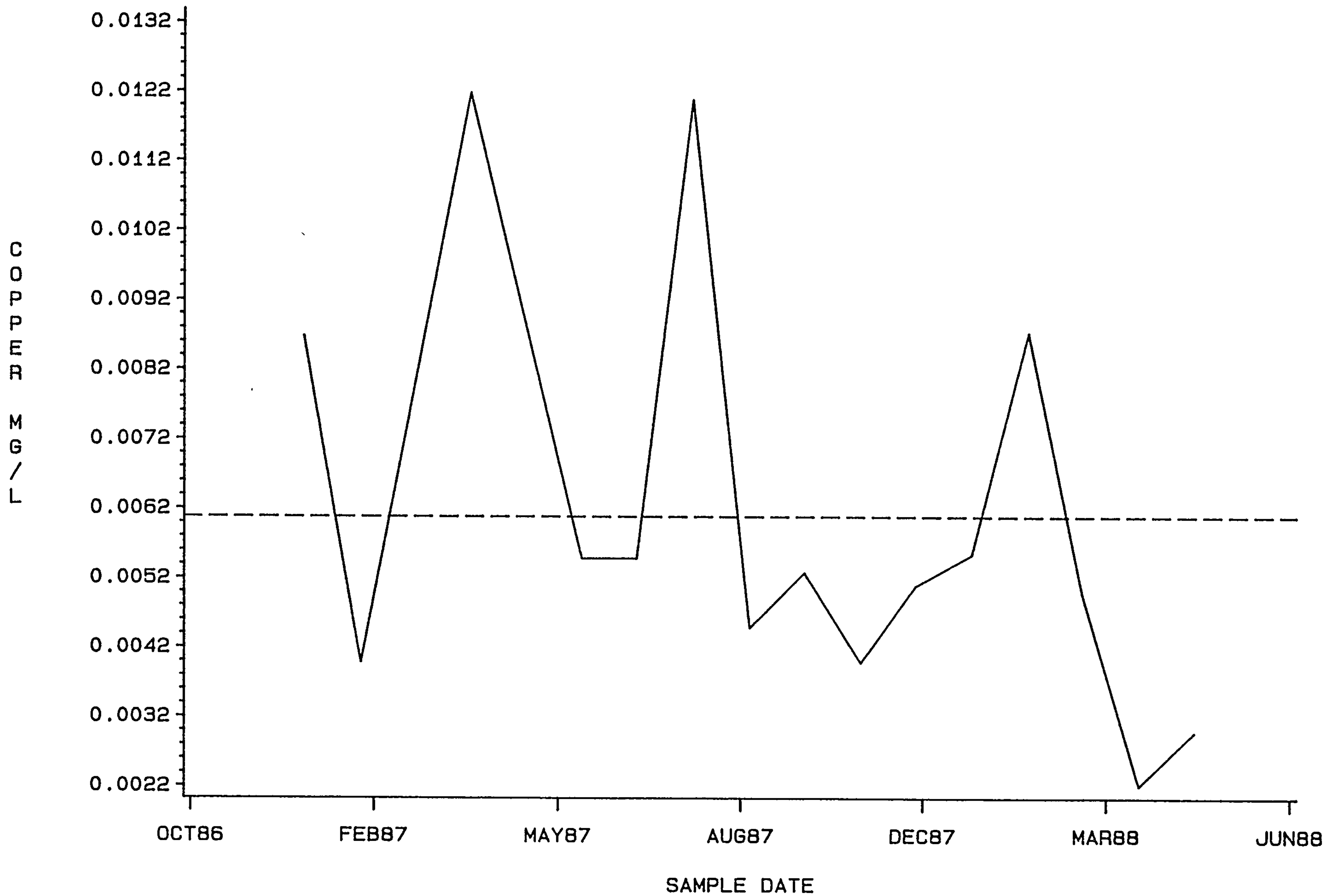
K1407B NPDES DATA – CHRYSENE UG/L

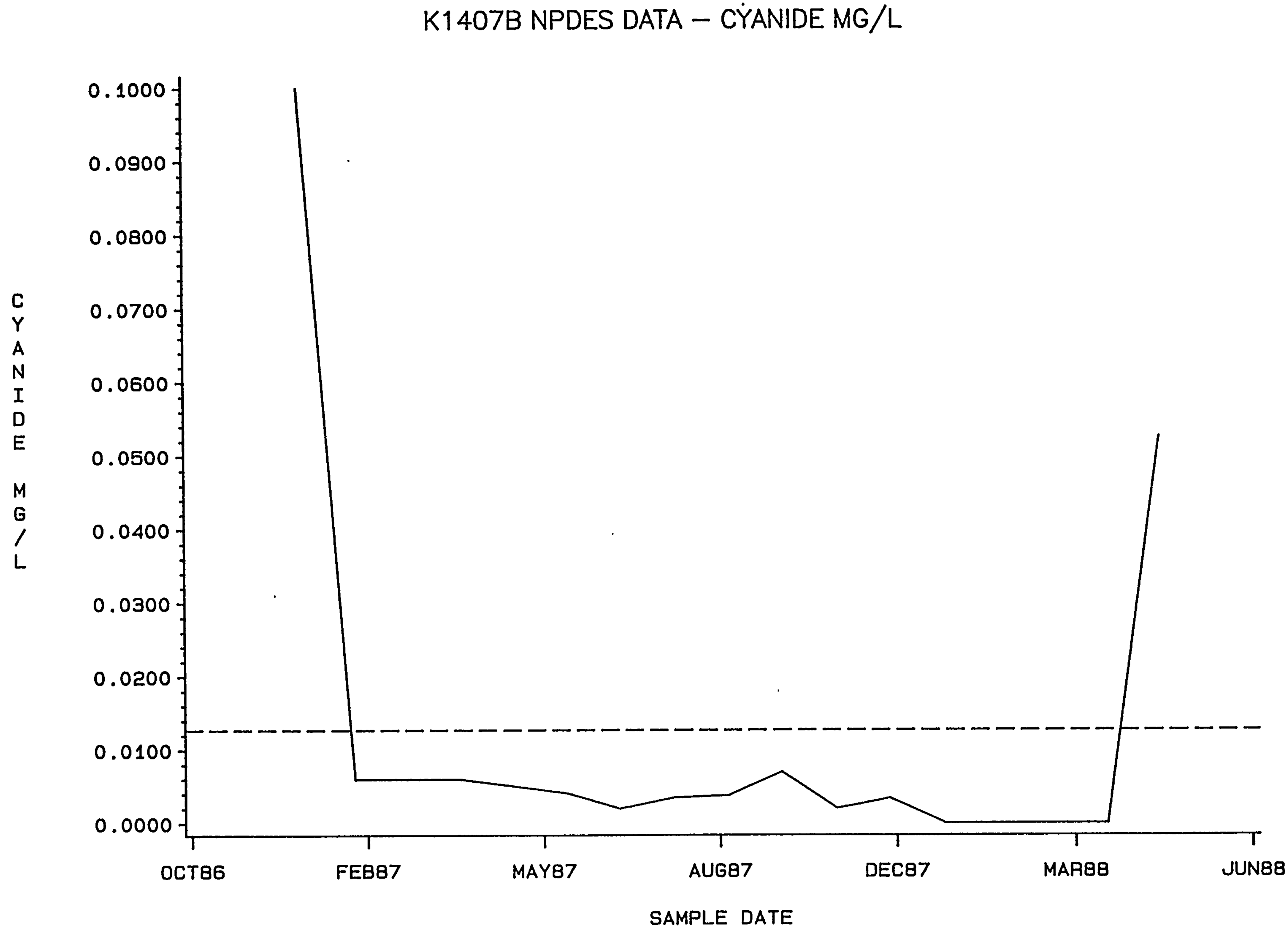


K1407B NPDES DATA — CIS—1 3—DICHLOROPROPENE UG/L

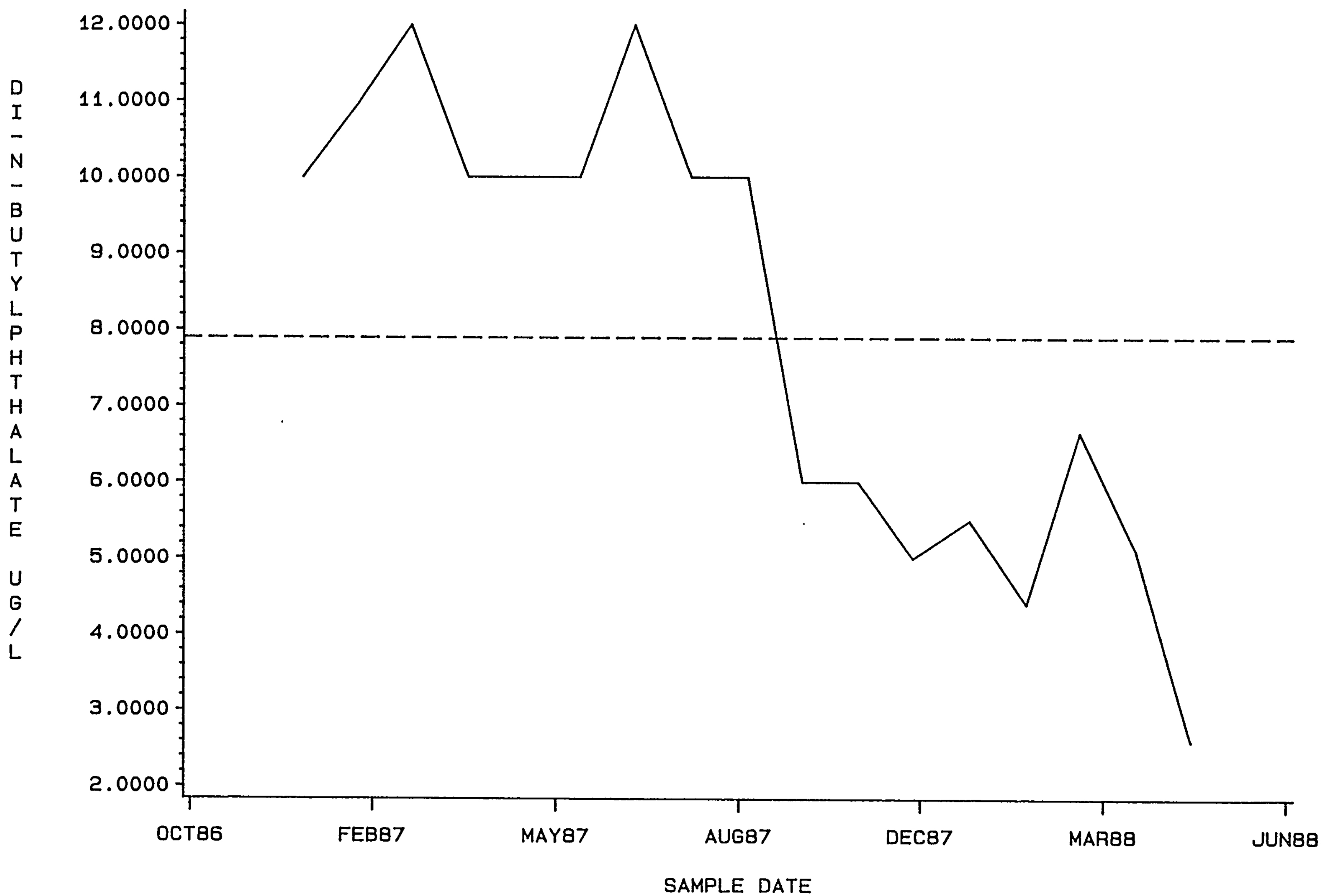


K1407B NPDES DATA – COPPER MG/L

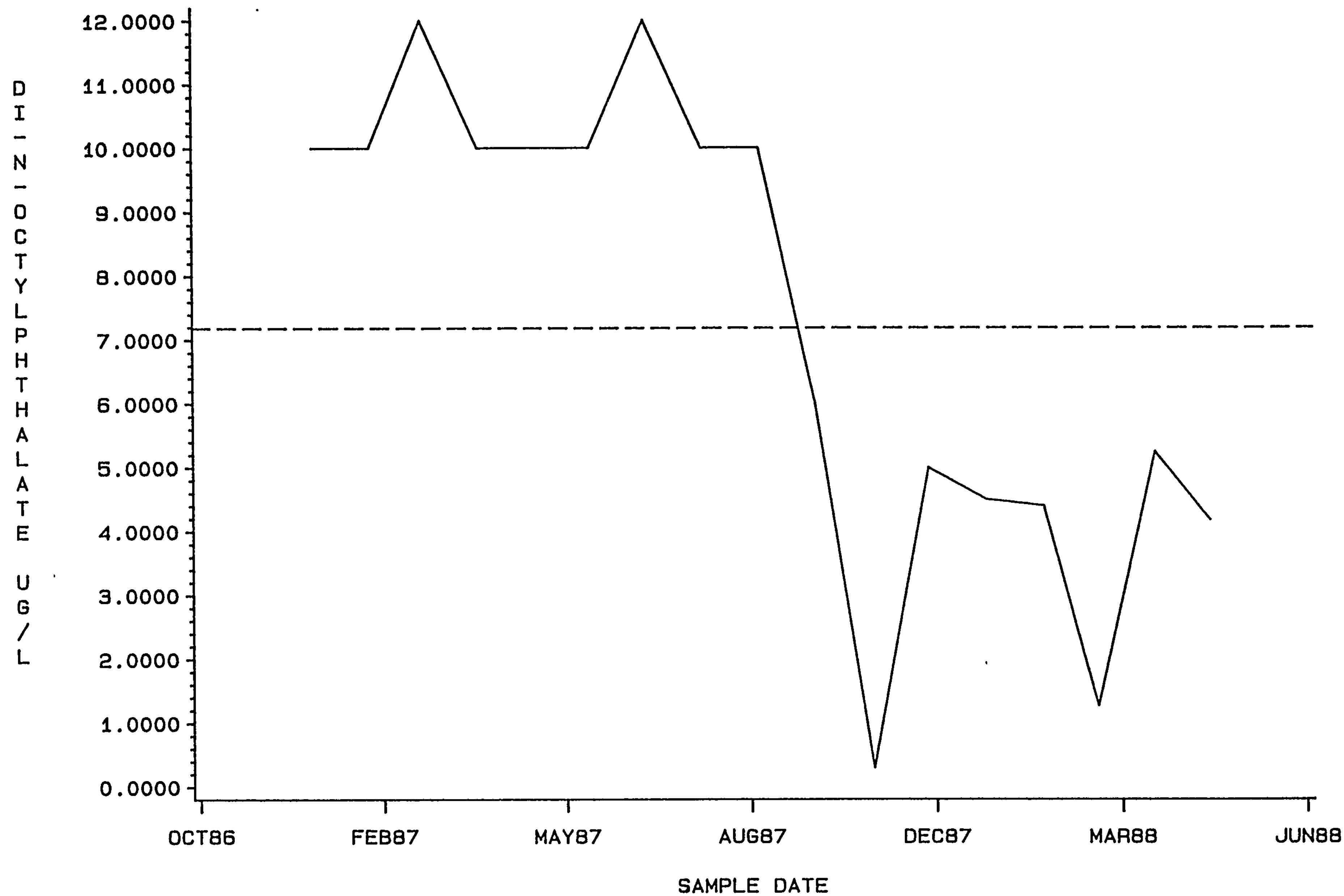



K1407B NPDES DATA – CYANIDE MG/L
CYANIDE MG/L
0.1000
0.0900
0.0800
0.0700
0.0600
0.0500
0.0400
0.0300
0.0200
0.0100
0.0000
OCT86
FEB87
MAY87
AUG87
DEC87
MAR88
JUN88
SAMPLE DATE

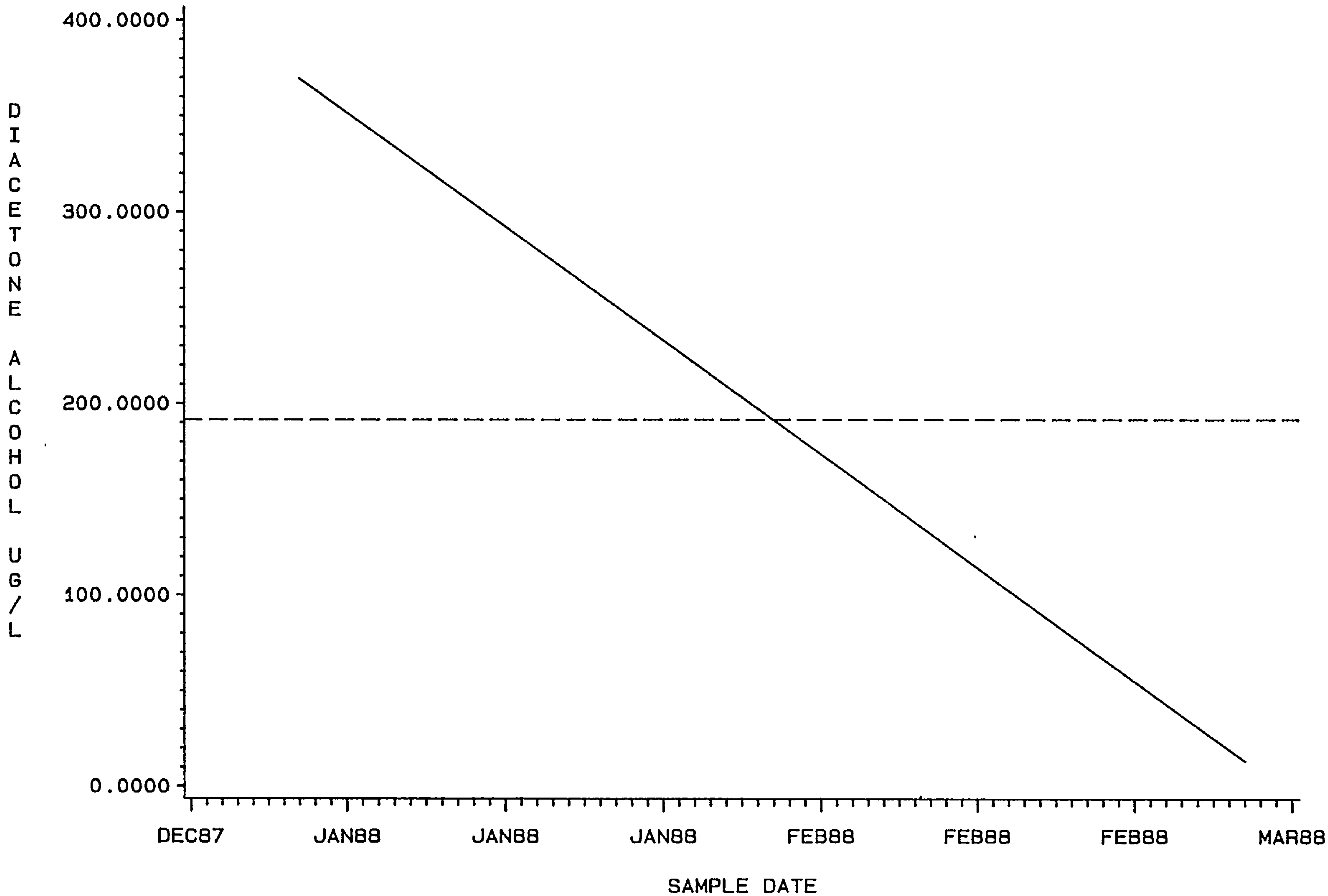
K1407B NPDES DATA – DI–N–BUTYLPHTHALATE UG/L



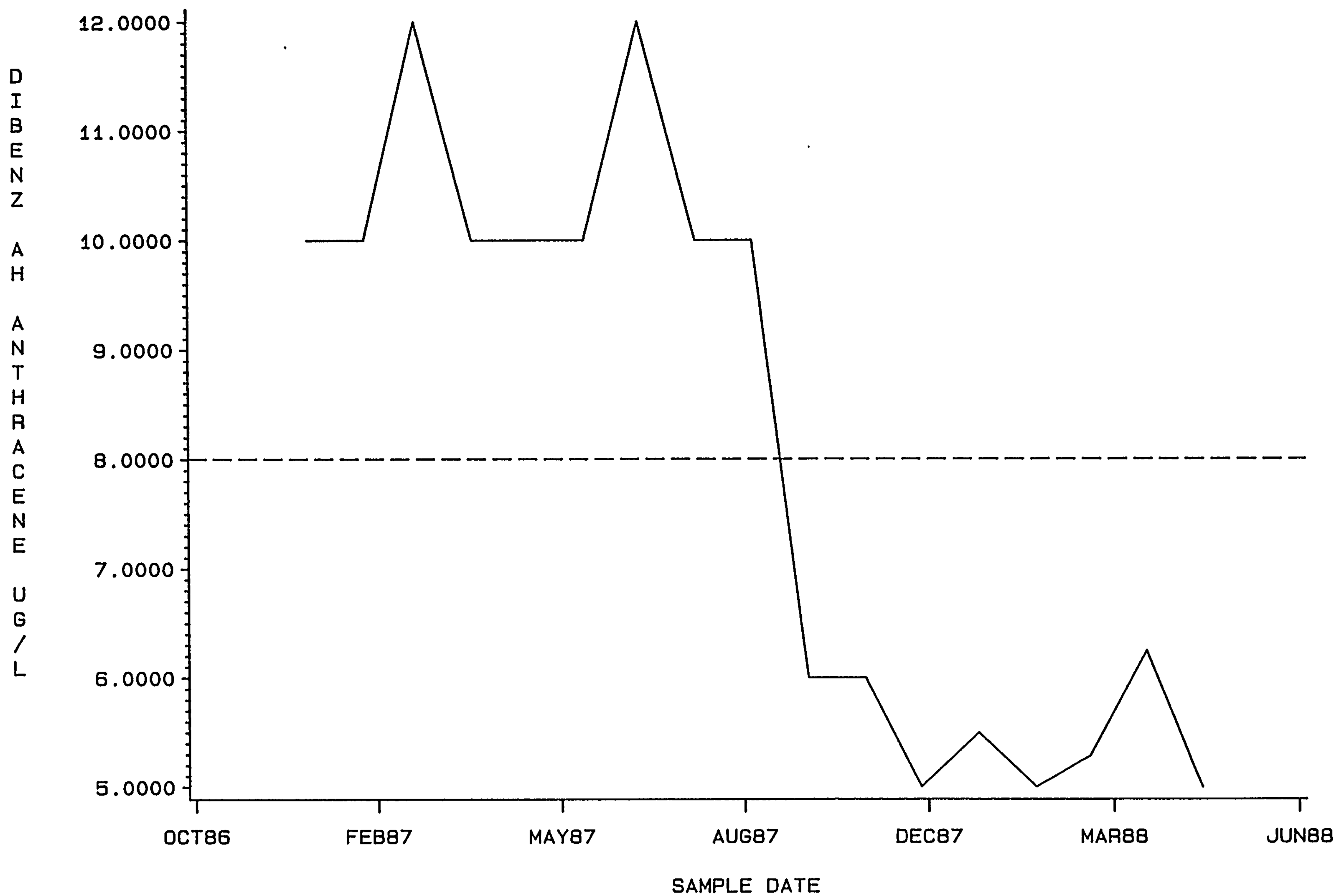
K1407B NPDES DATA – DI-N-OCTYLPHTHALATE UG/L



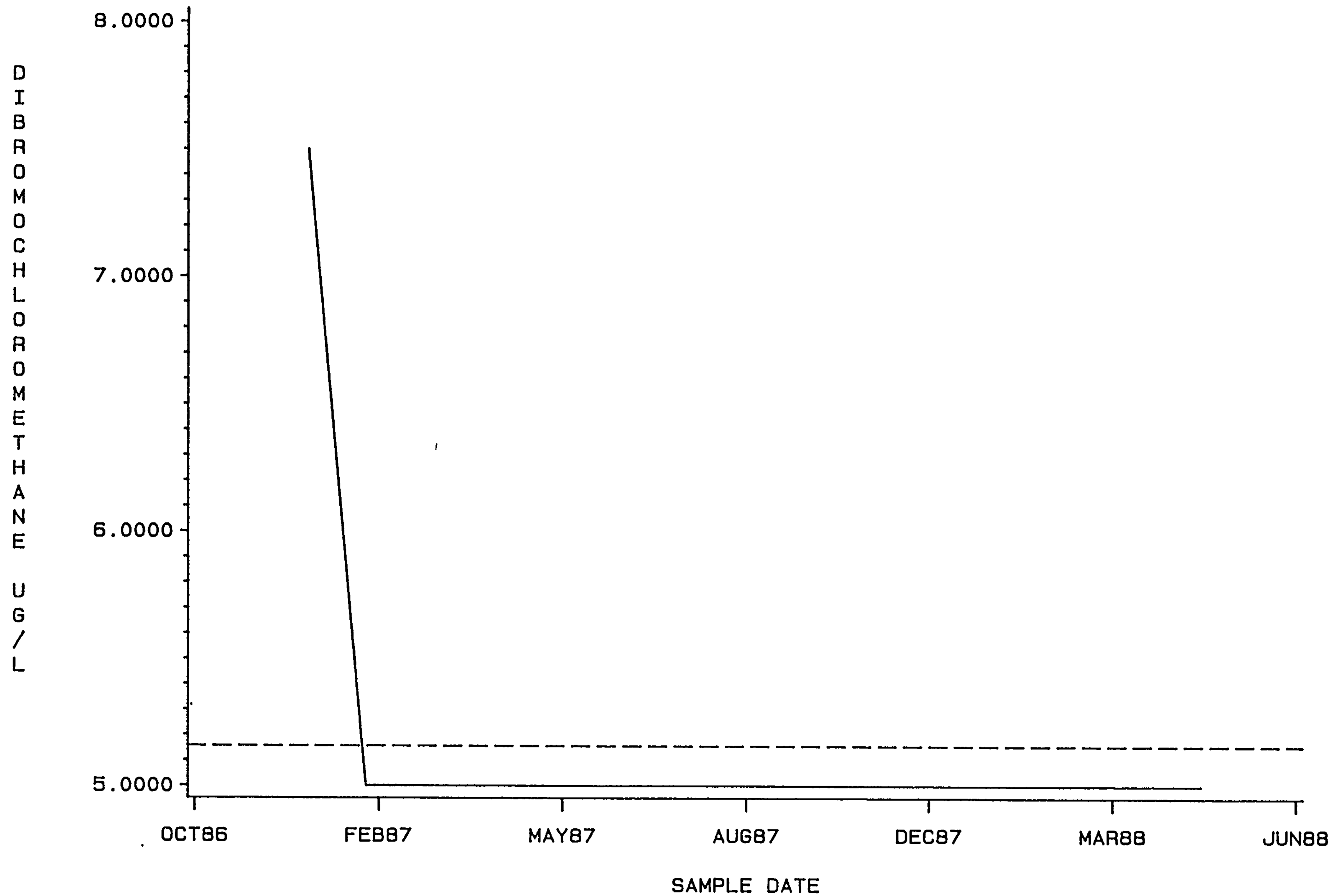
K1407B NPDES DATA – DIACETONE ALCOHOL UG/L



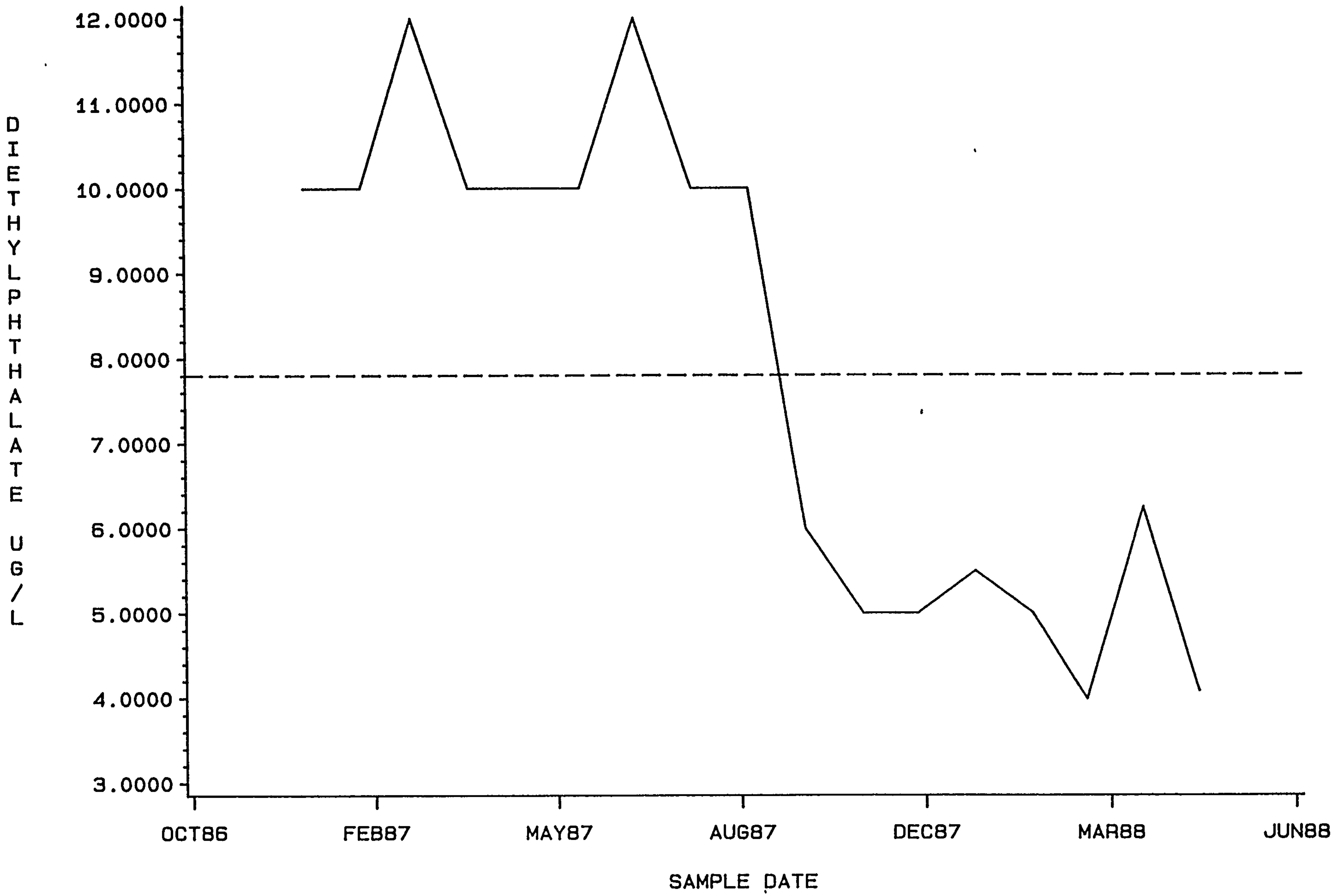
K1407B NPDES DATA — DIBENZ(A H)ANTHRACENE UG/L



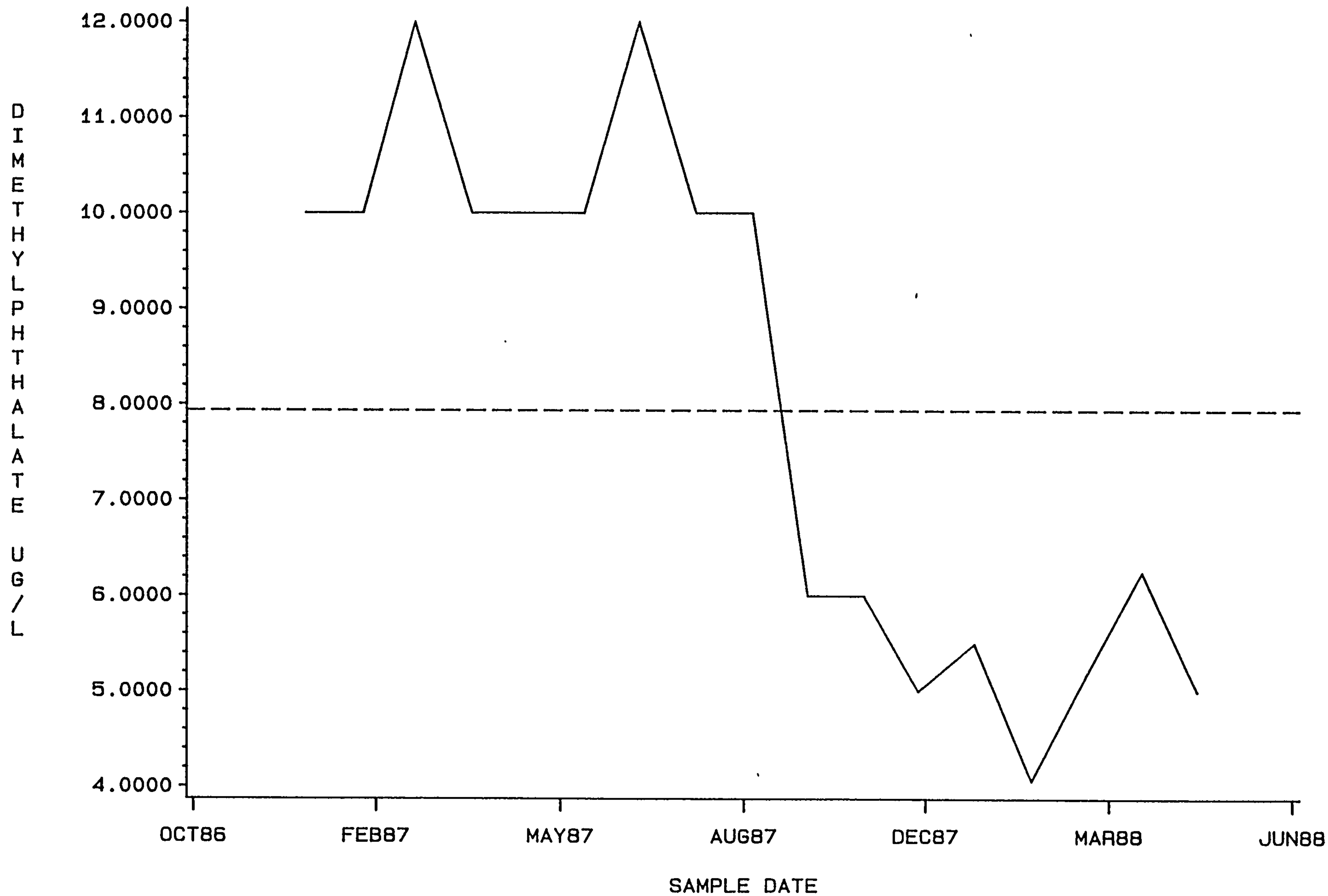
K1407B NPDES DATA — DIBROMOCHLOROMETHANE UG/L

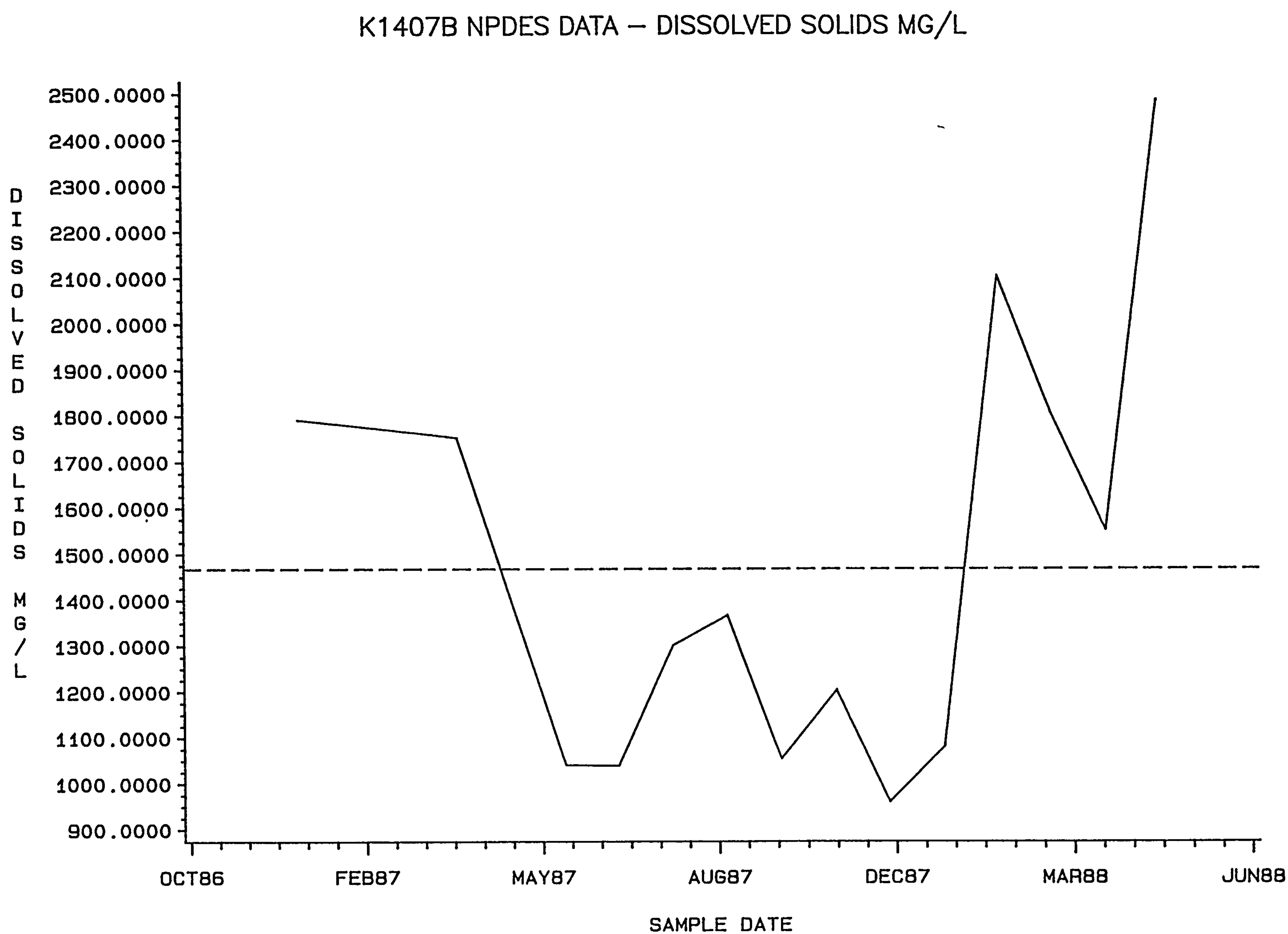


K1407B NPDES DATA – DIETHYLPHTHALATE UG/L

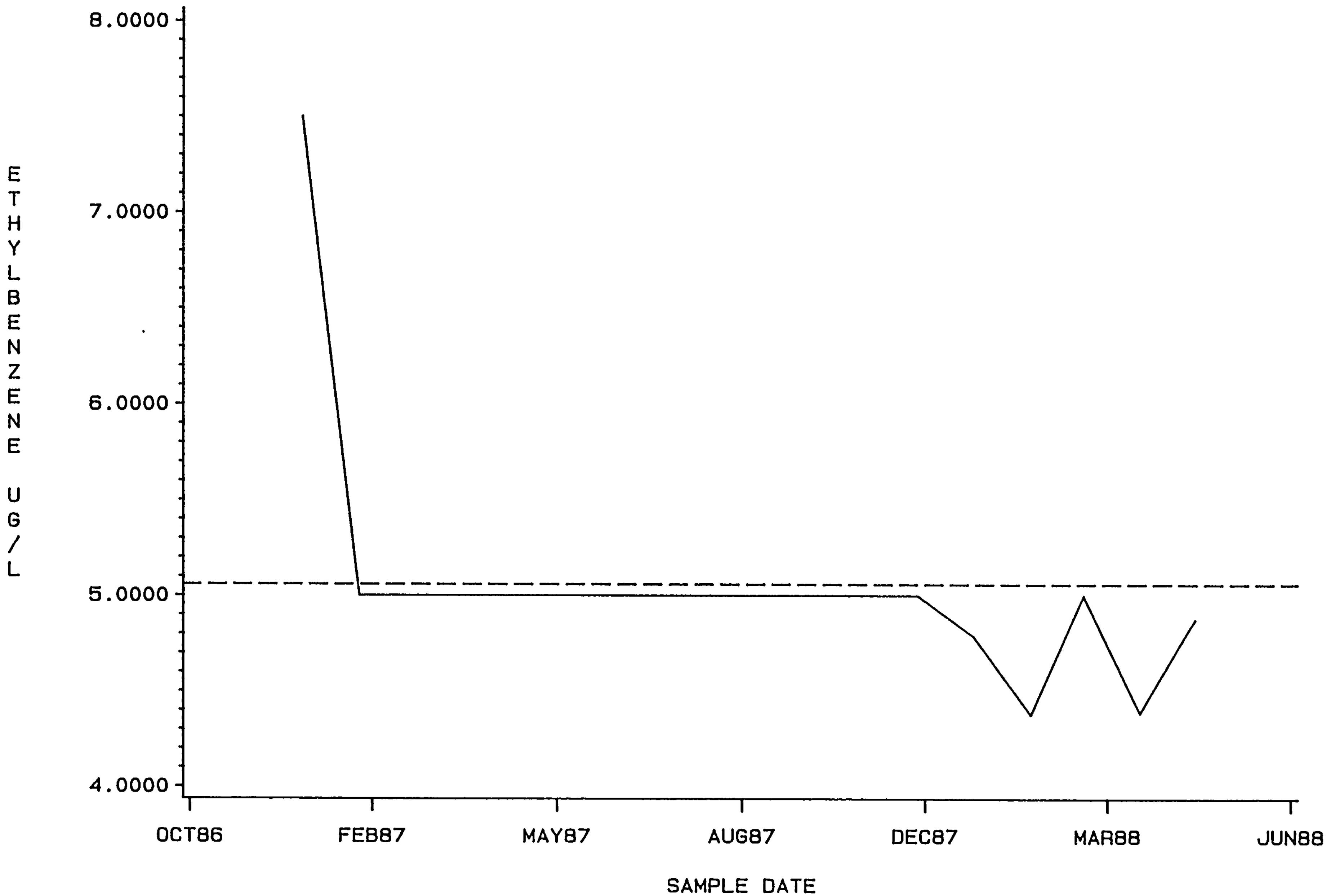


K1407B NPDES DATA – DIMETHYLPHTHALATE UG/L

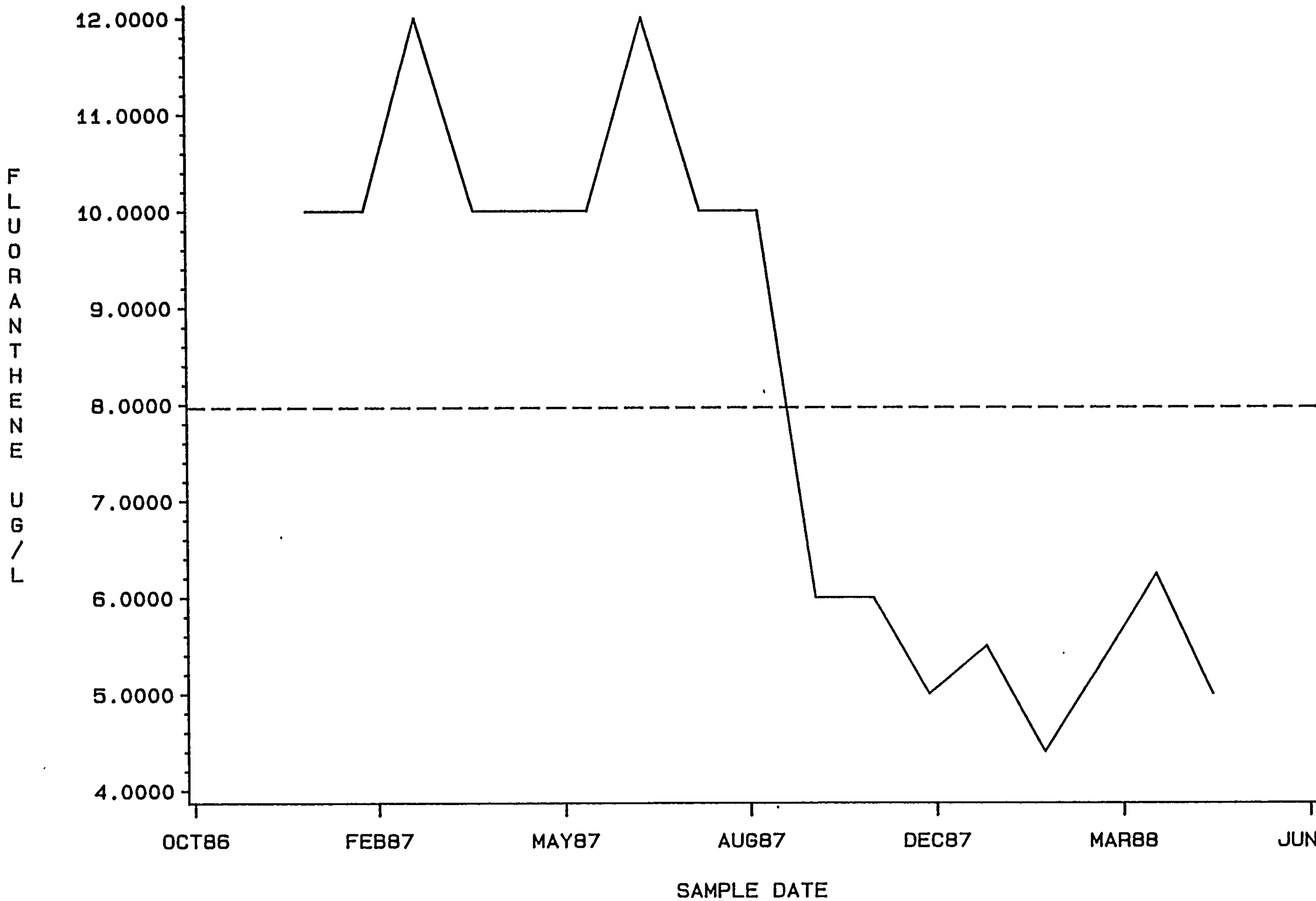



K1407B NPDES DATA – DISSOLVED SOLIDS MG/L
DISSOLVED SOLIDS MG/L
2500.0000
2400.0000
2300.0000
2200.0000
2100.0000
2000.0000
1900.0000
1800.0000
1700.0000
1600.0000
1500.0000
1400.0000
1300.0000
1200.0000
1100.0000
1000.0000
900.0000
OCT86
FEB87
MAY87
AUG87
DEC87
MAR88
JUN88
SAMPLE DATE

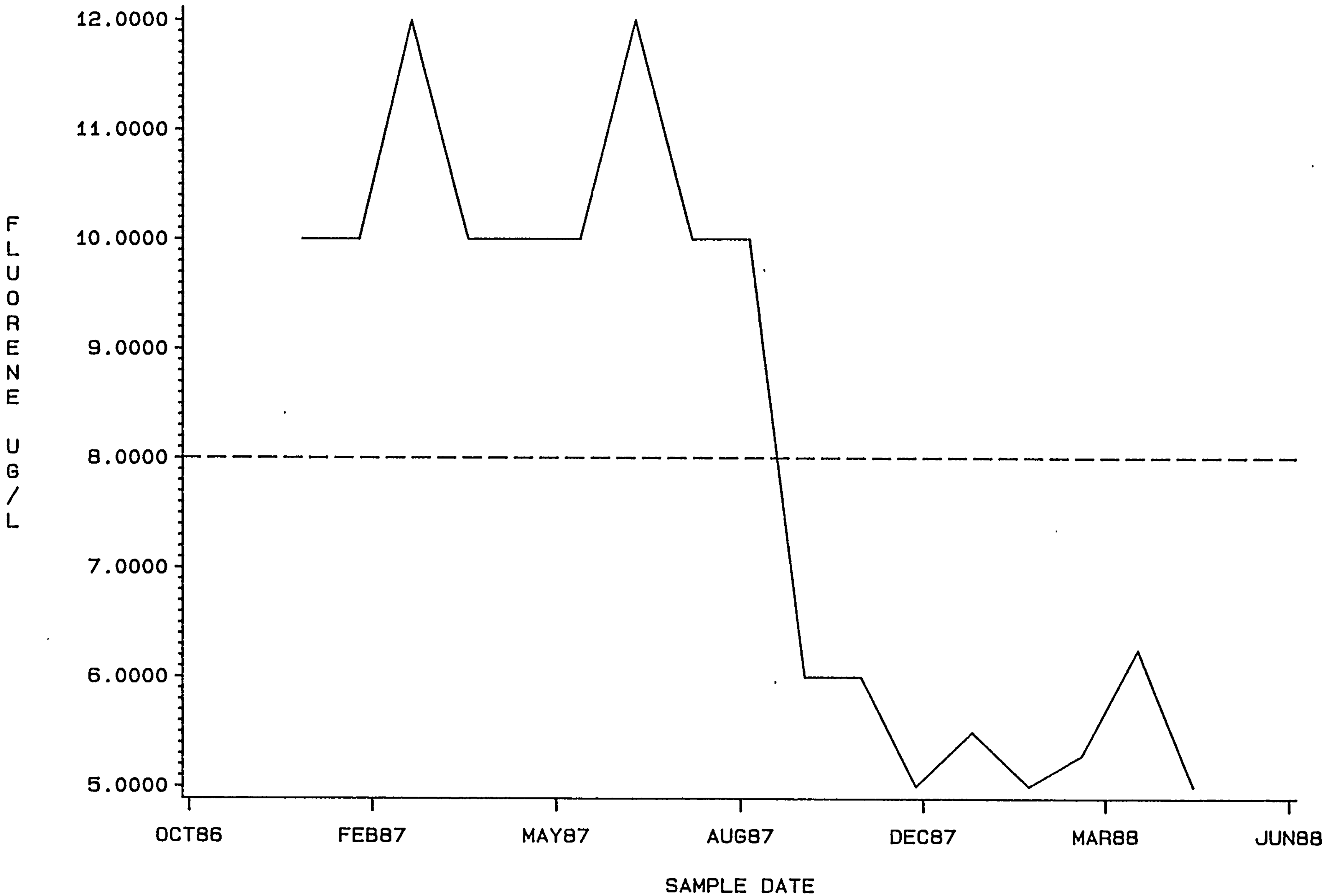
K1407B NPDES DATA – ETHYLBENZENE UG/L



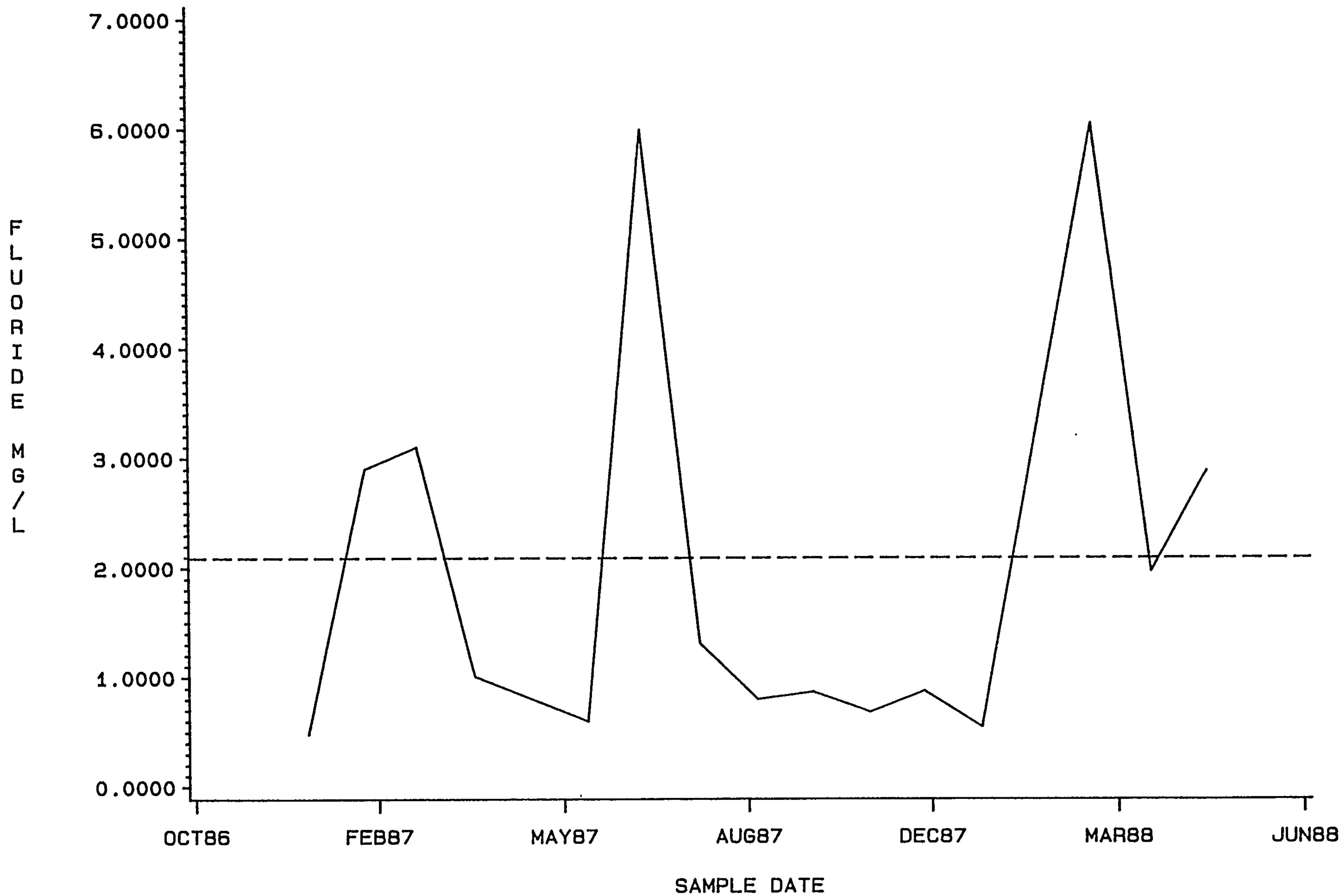
K1407B NPDES DATA — FLUORANTHENE UG/L



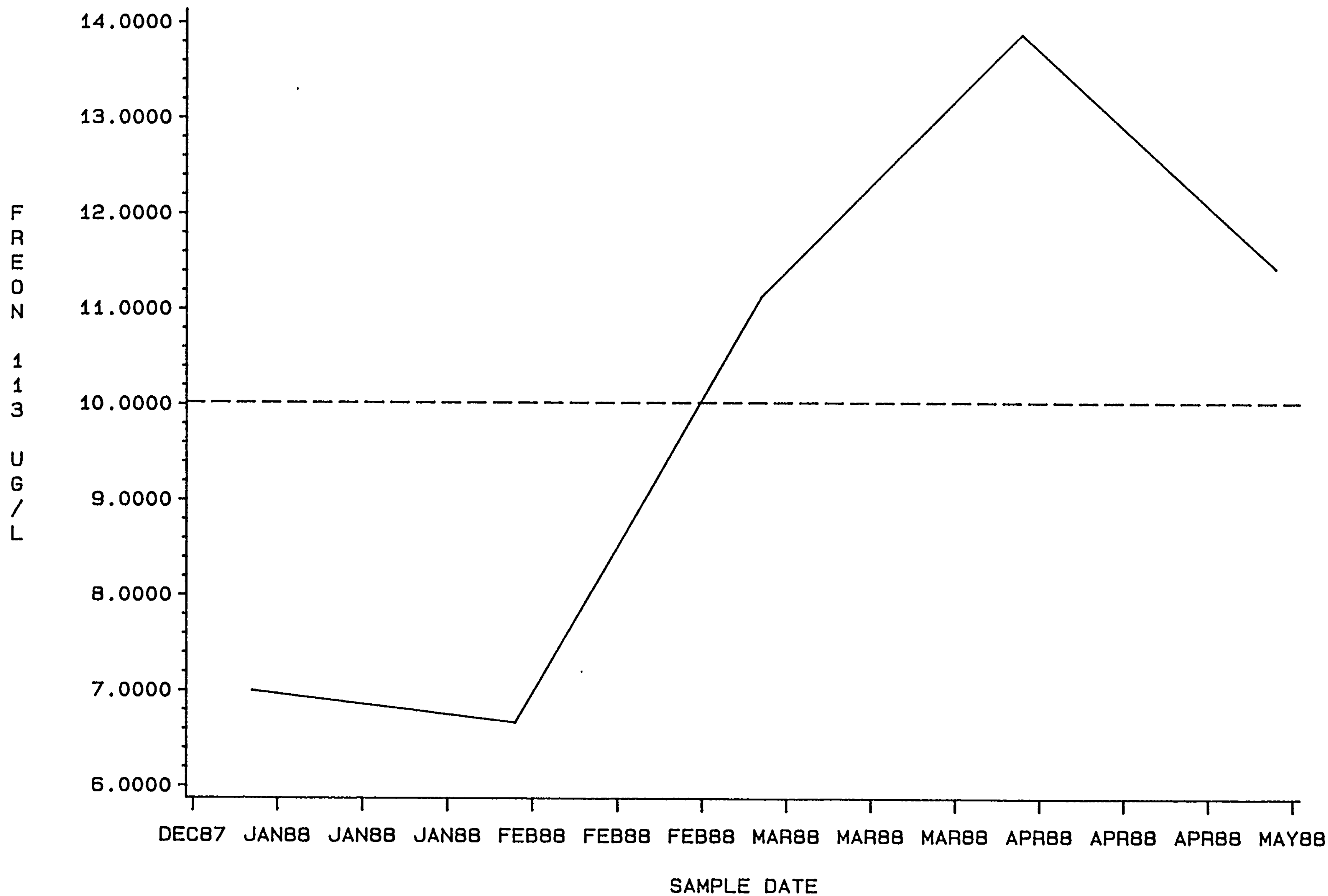
K1407B NPDES DATA – FLUORENE UG/L



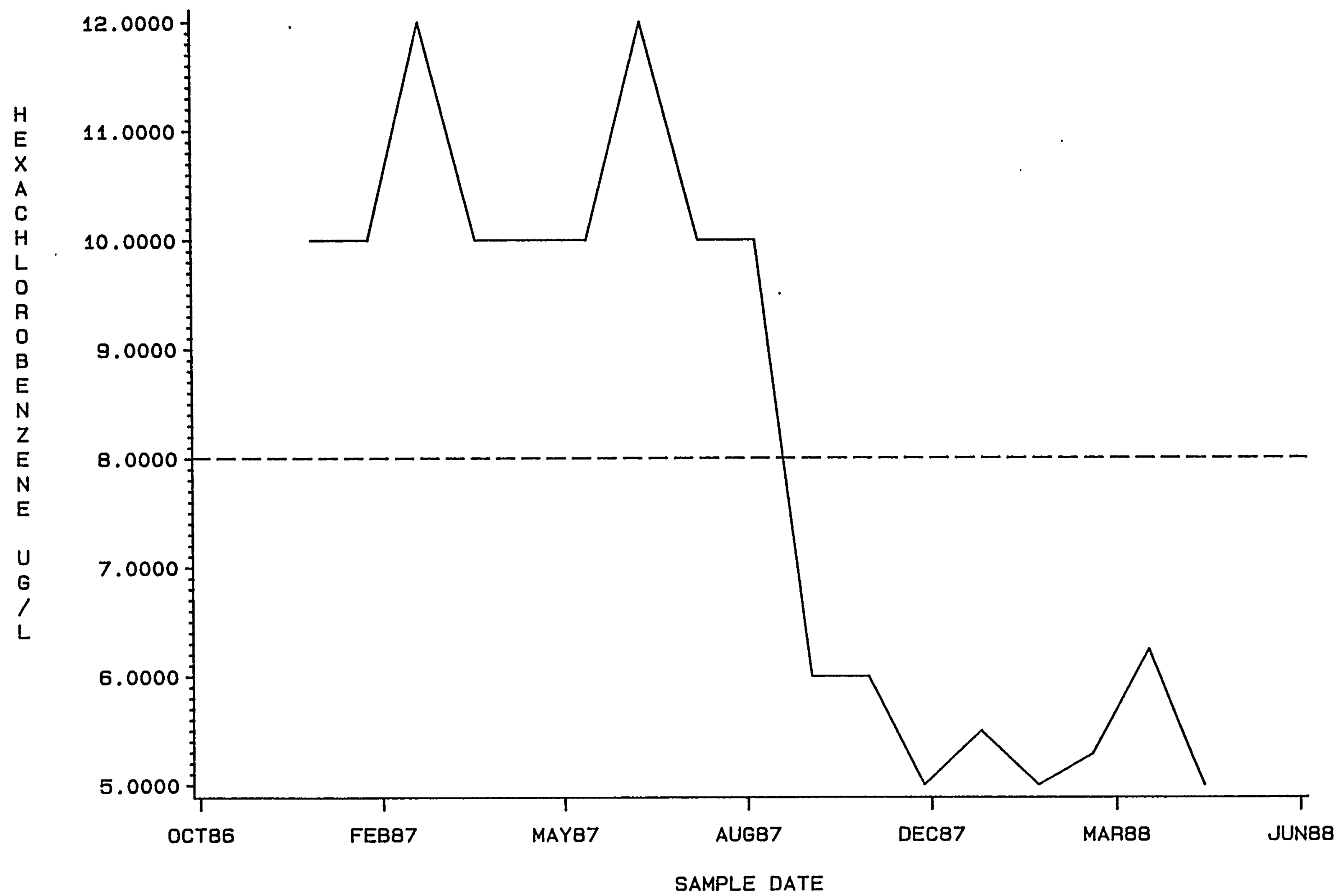
K1407B NPDES DATA — FLUORIDE MG/L



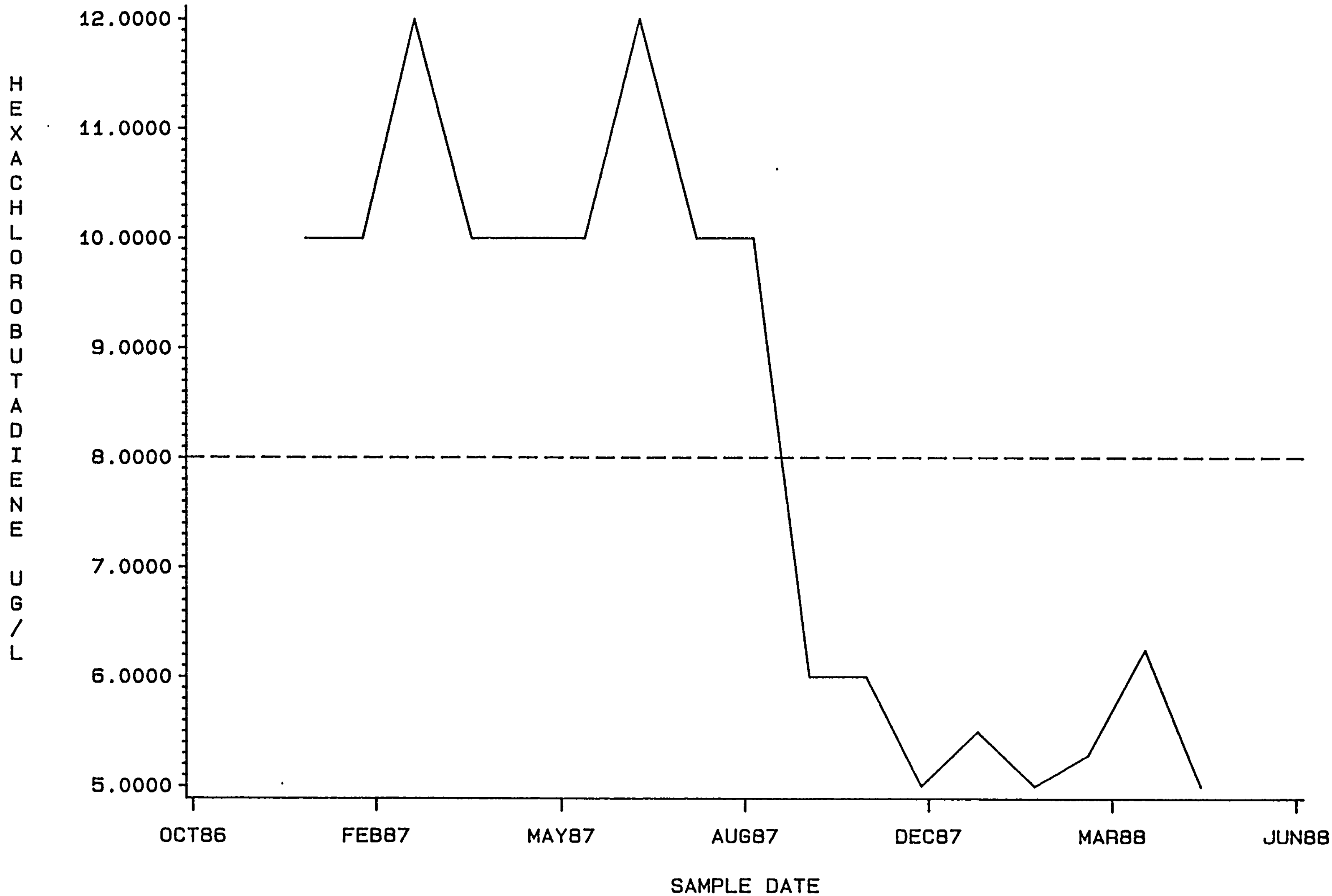
K1407B NPDES DATA – FREON 113 UG/L



K1407B NPDES DATA – HEXACHLOROBENZENE UG/L



K1407B NPDES DATA – HEXACHLOROBUTADIENE UG/L



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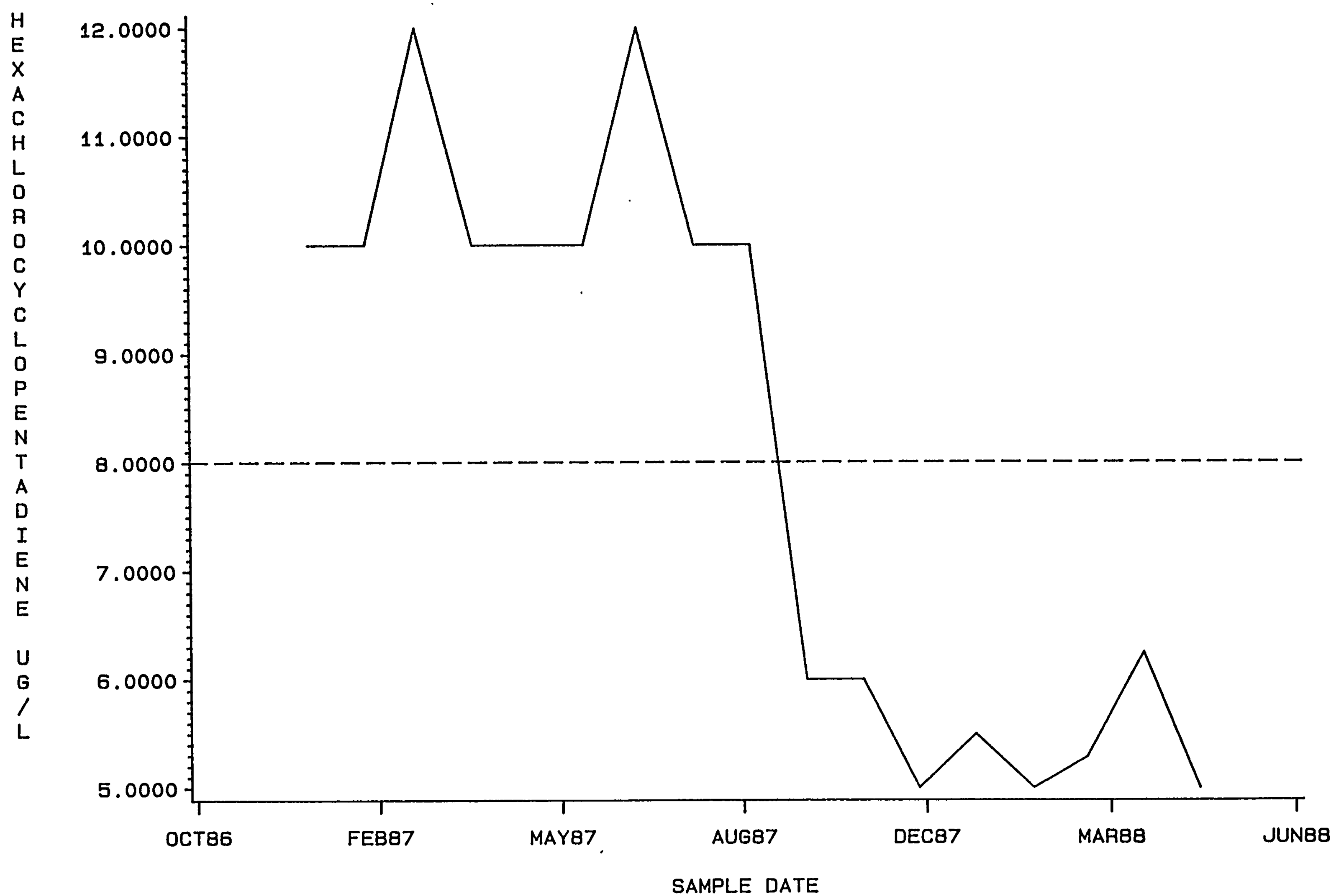
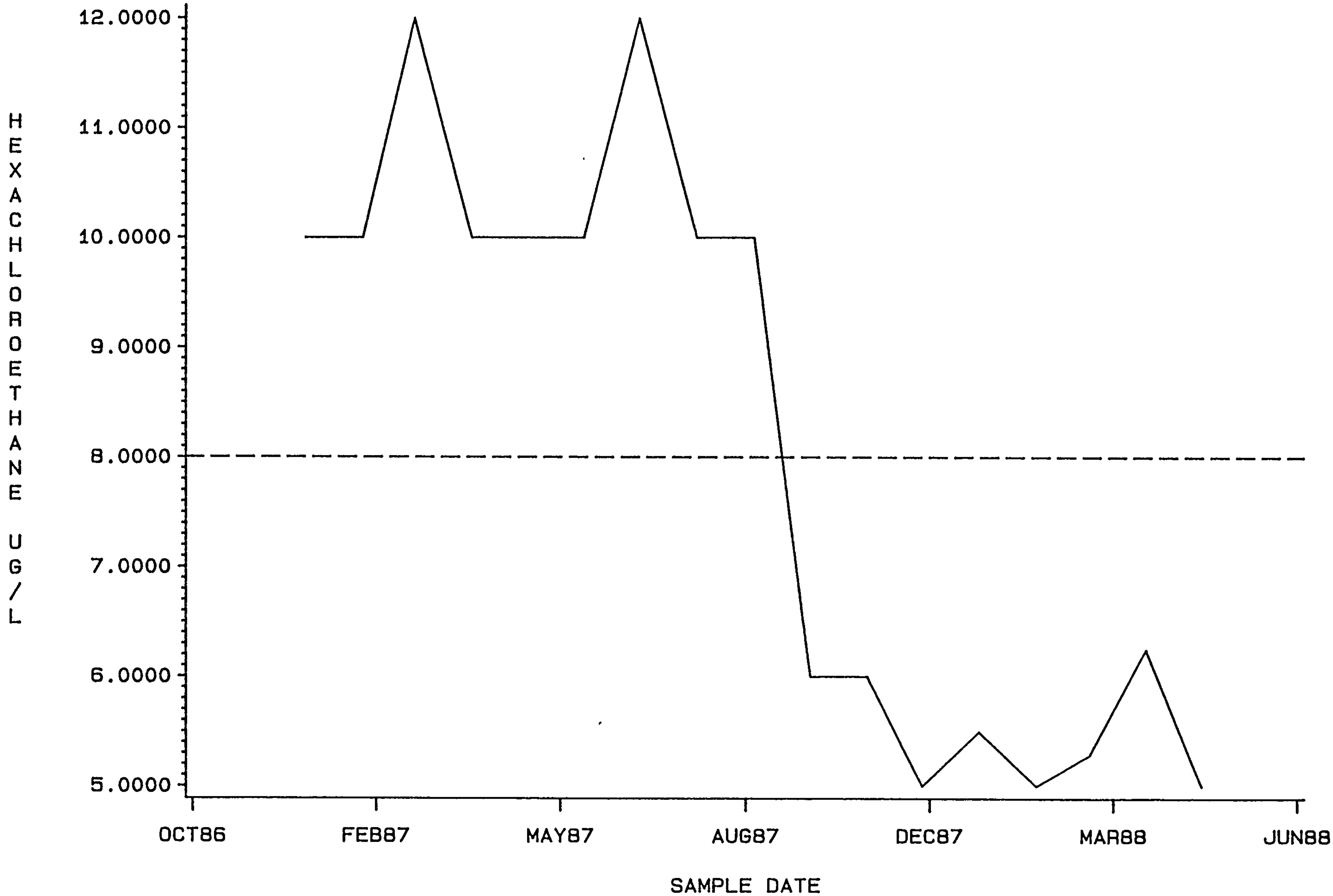
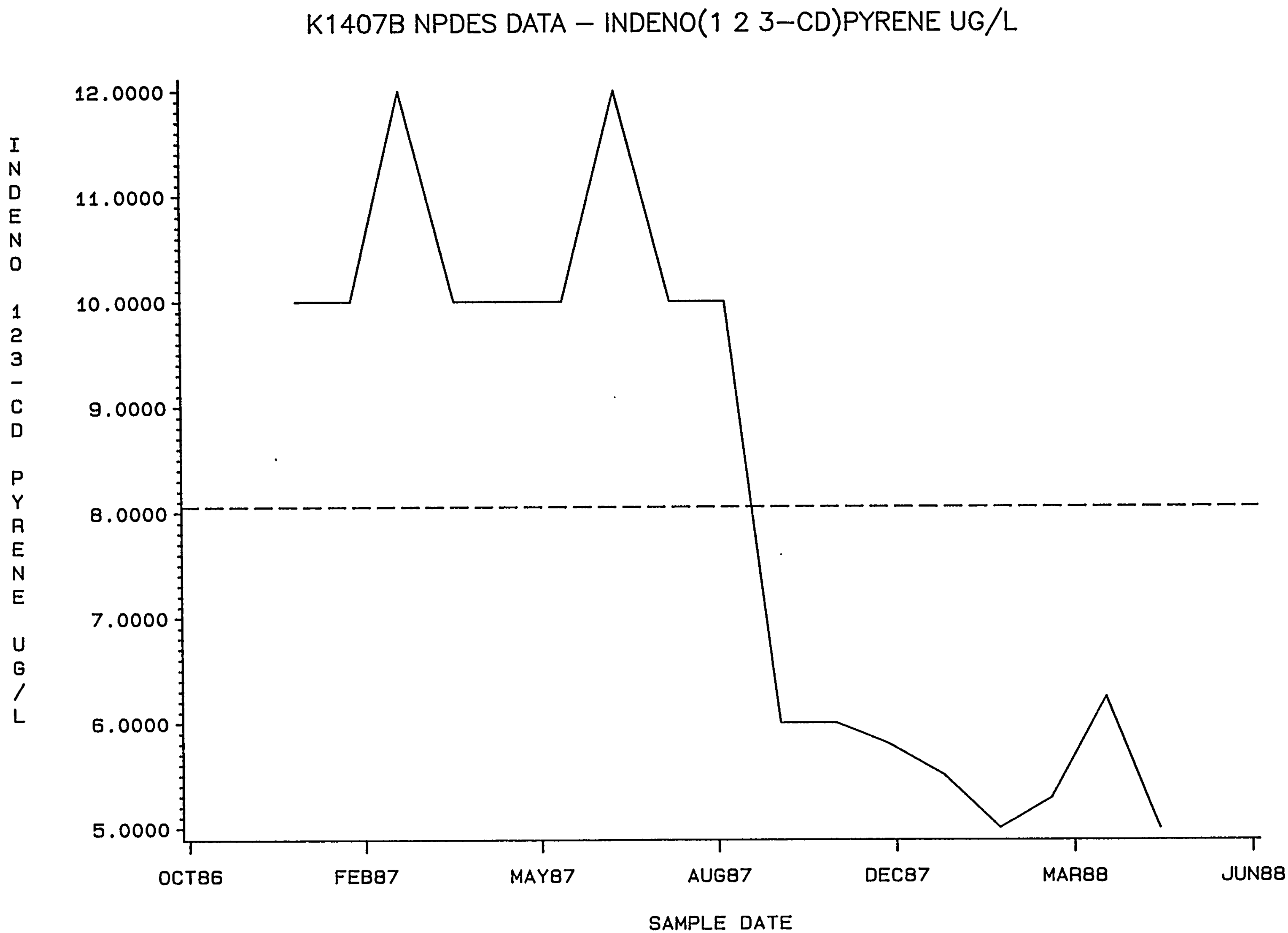


K1407B NPDES DATA – HEXACHLOROETHANE UG/L




K1407B NPDES DATA – INDENO(1 2 3–CD)PYRENE UG/L
INDENO 123-CD PYRENE UG/L
12.0000
11.0000
10.0000
9.0000
8.0000
7.0000
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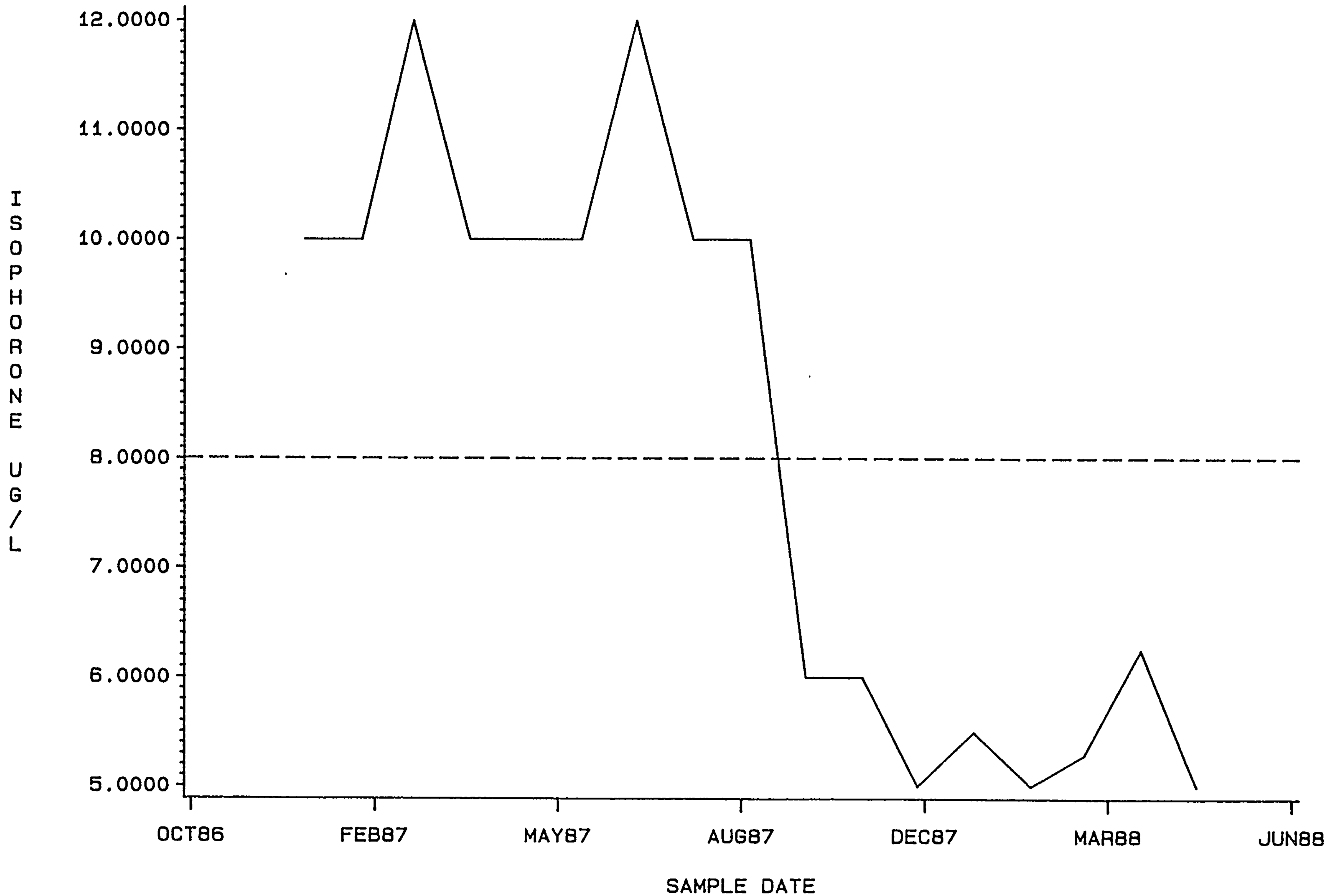
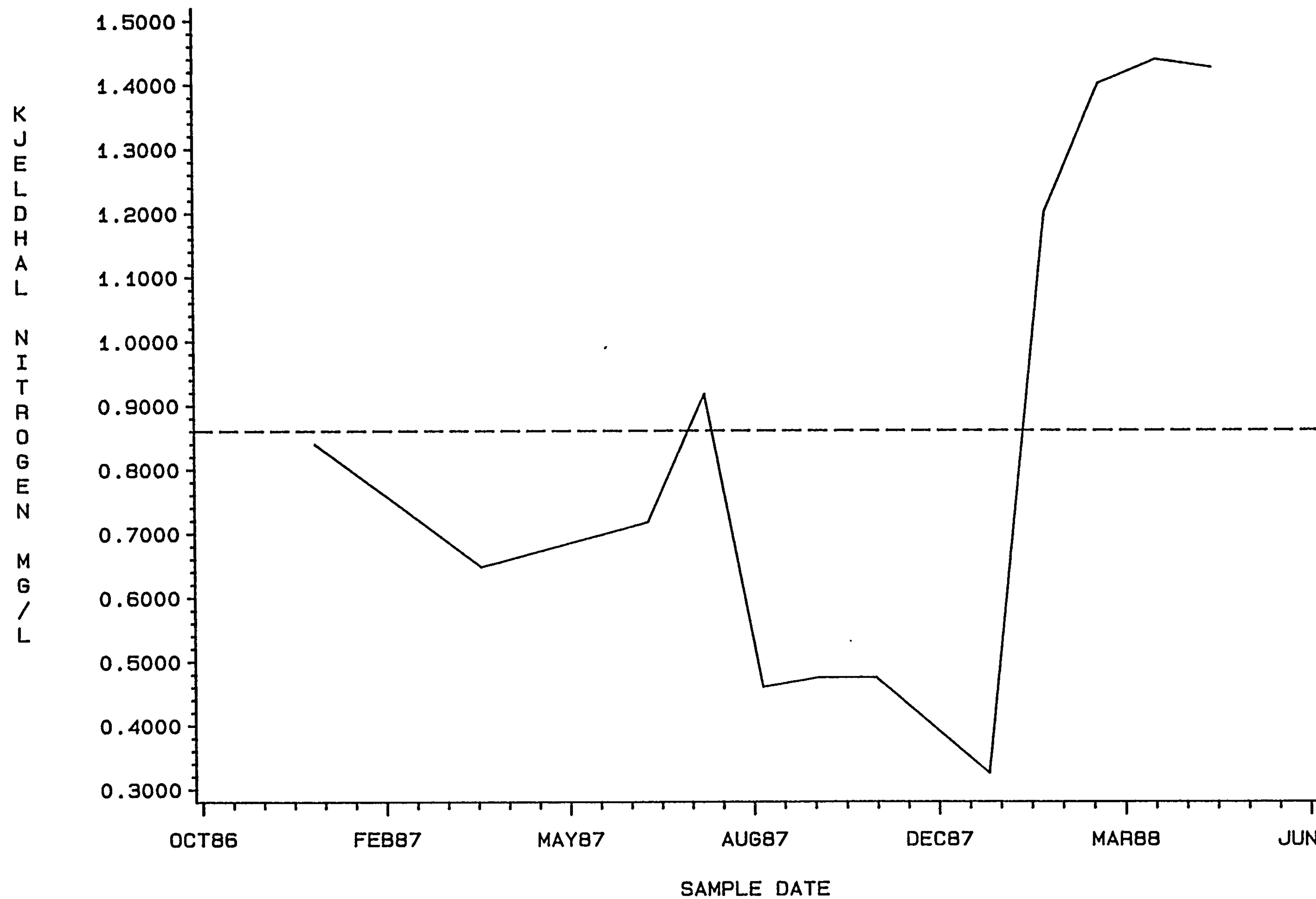
OCT86
FEB87
MAY87
AUG87
DEC87
MAR88
JUN88
SAMPLE DATE

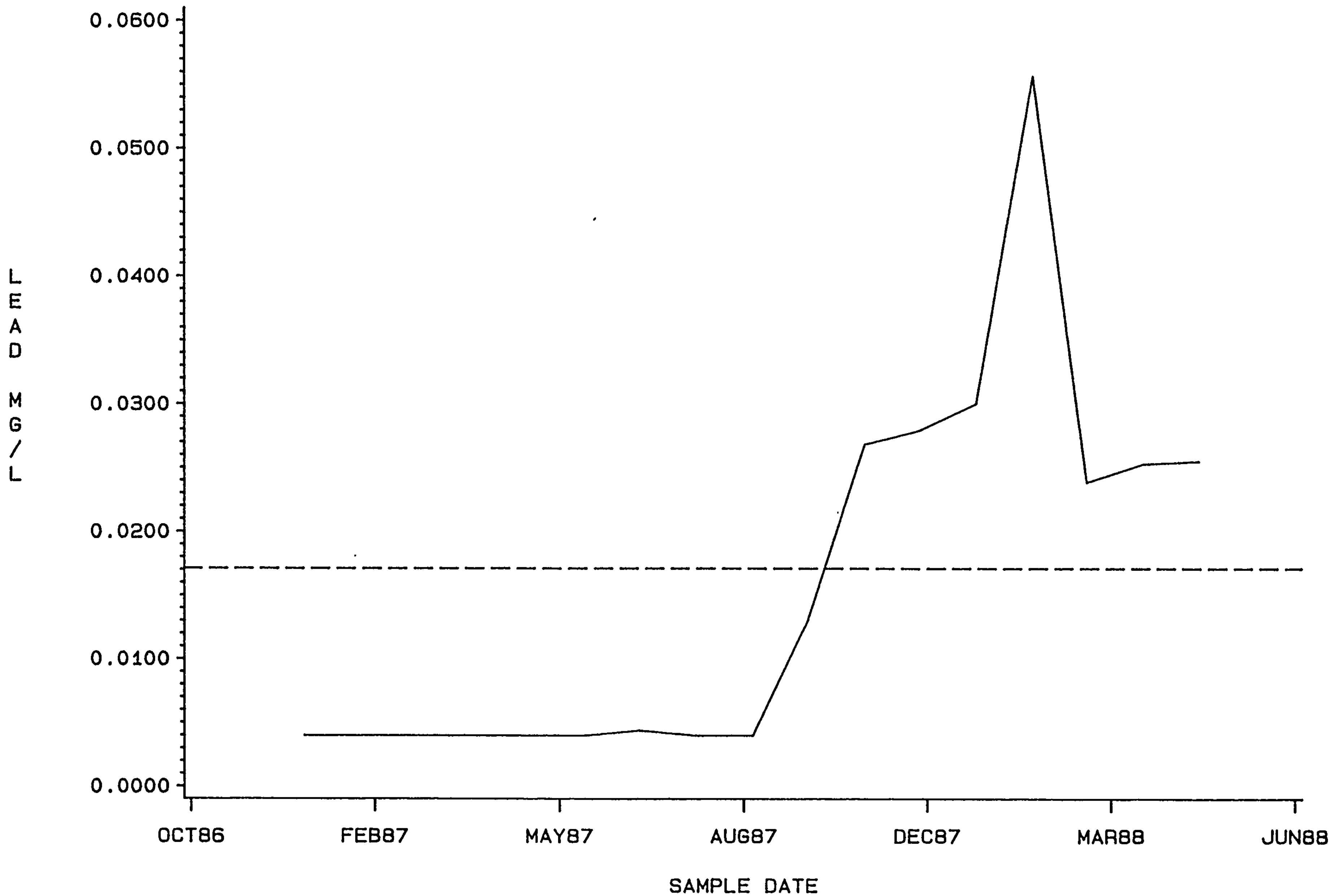
K1407B NPDES DATA – ISOPHORONE UG/L



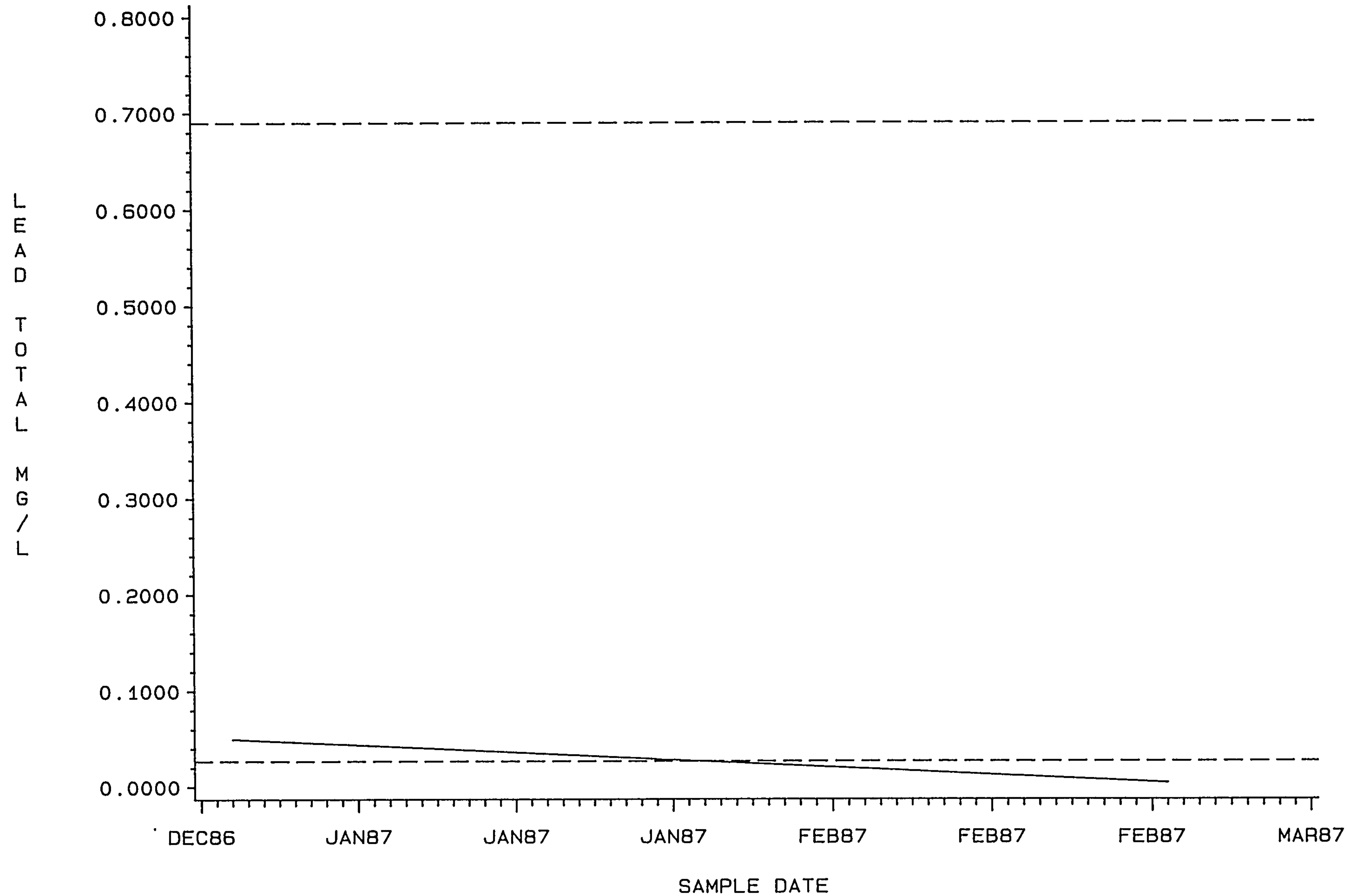
K1407B NPDES DATA – KJELDHAL NITROGEN MG/L



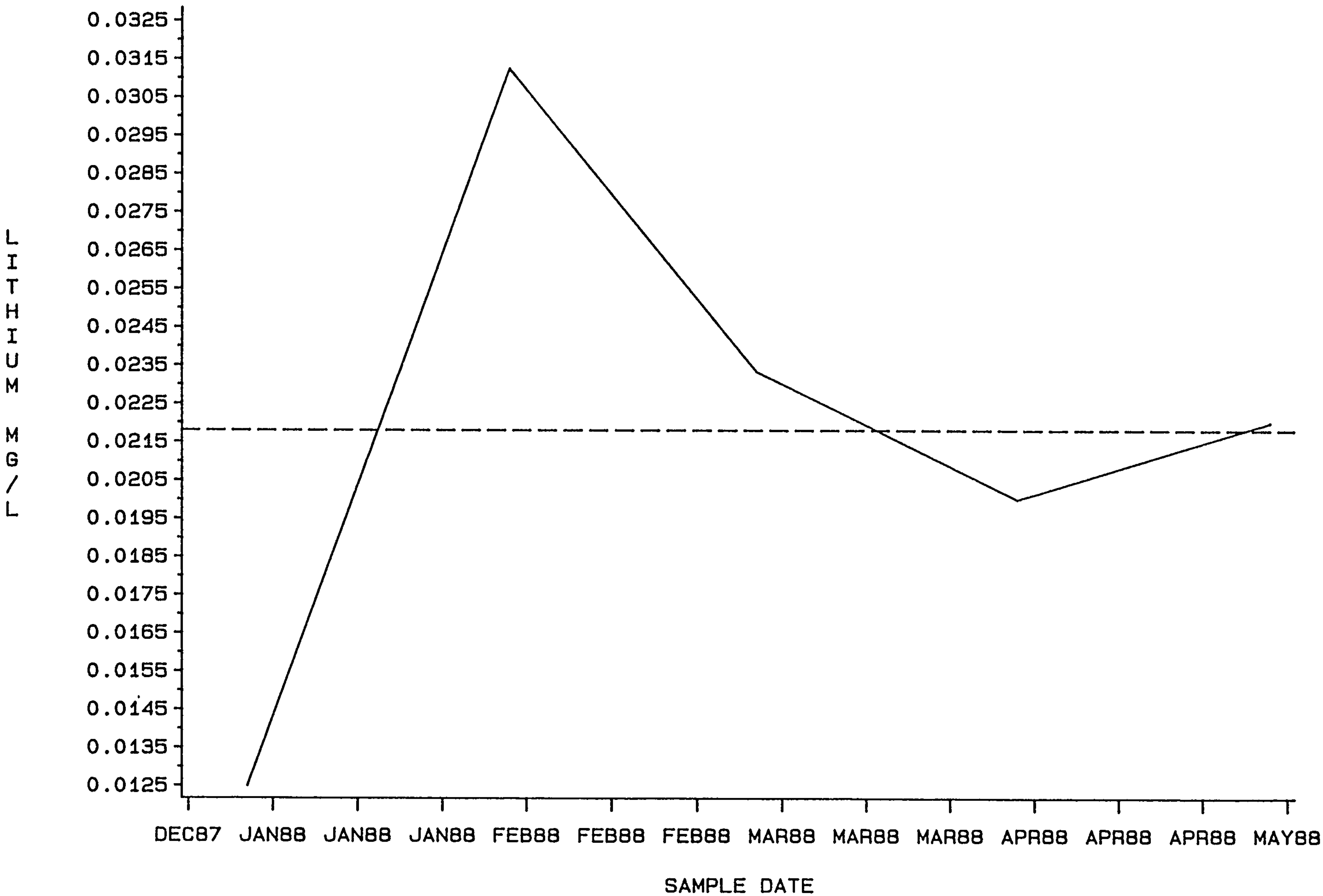
K1407B NPDES DATA — LEAD MG/L



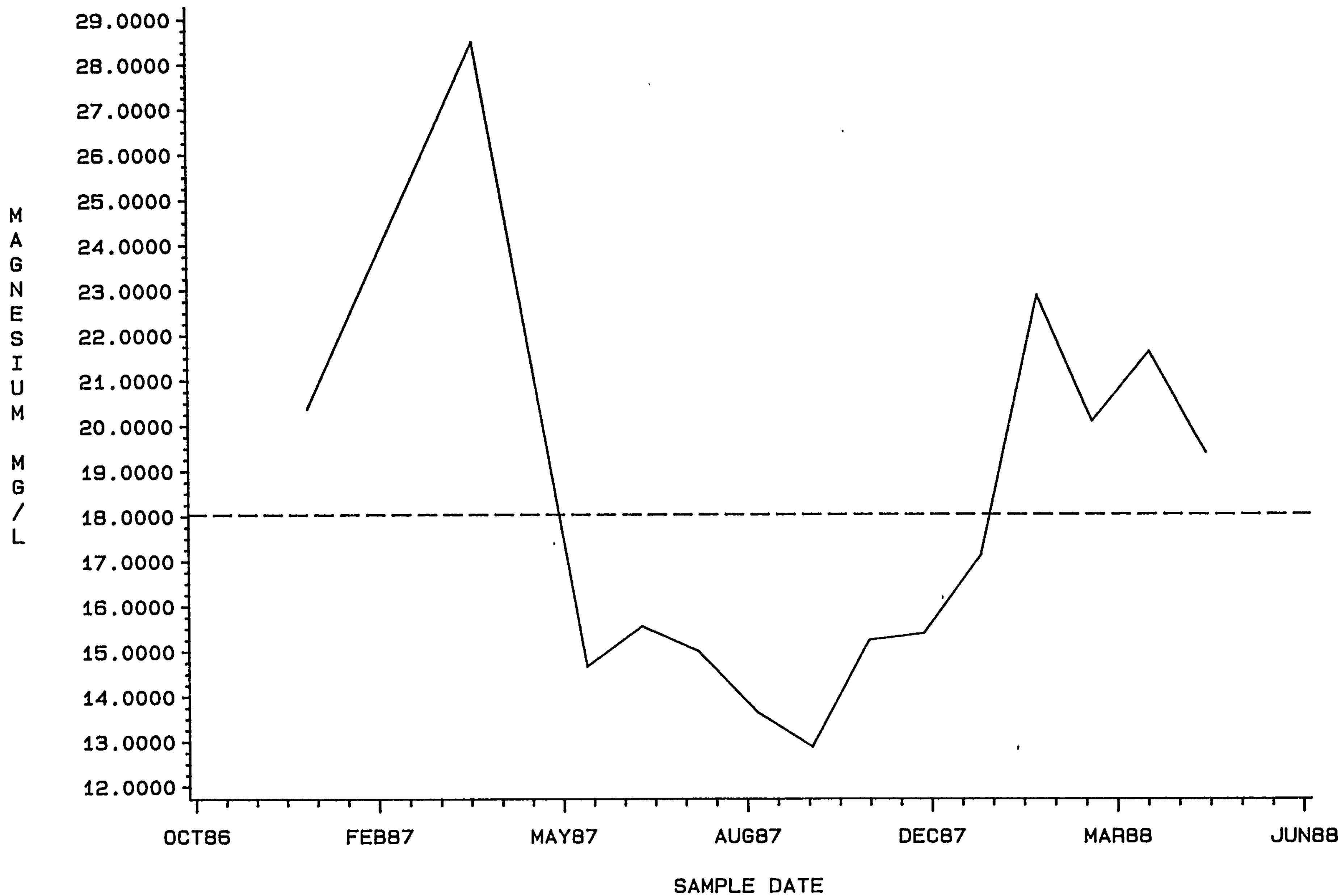
K1407B NPDES DATA – LEAD (TOTAL) MG/L



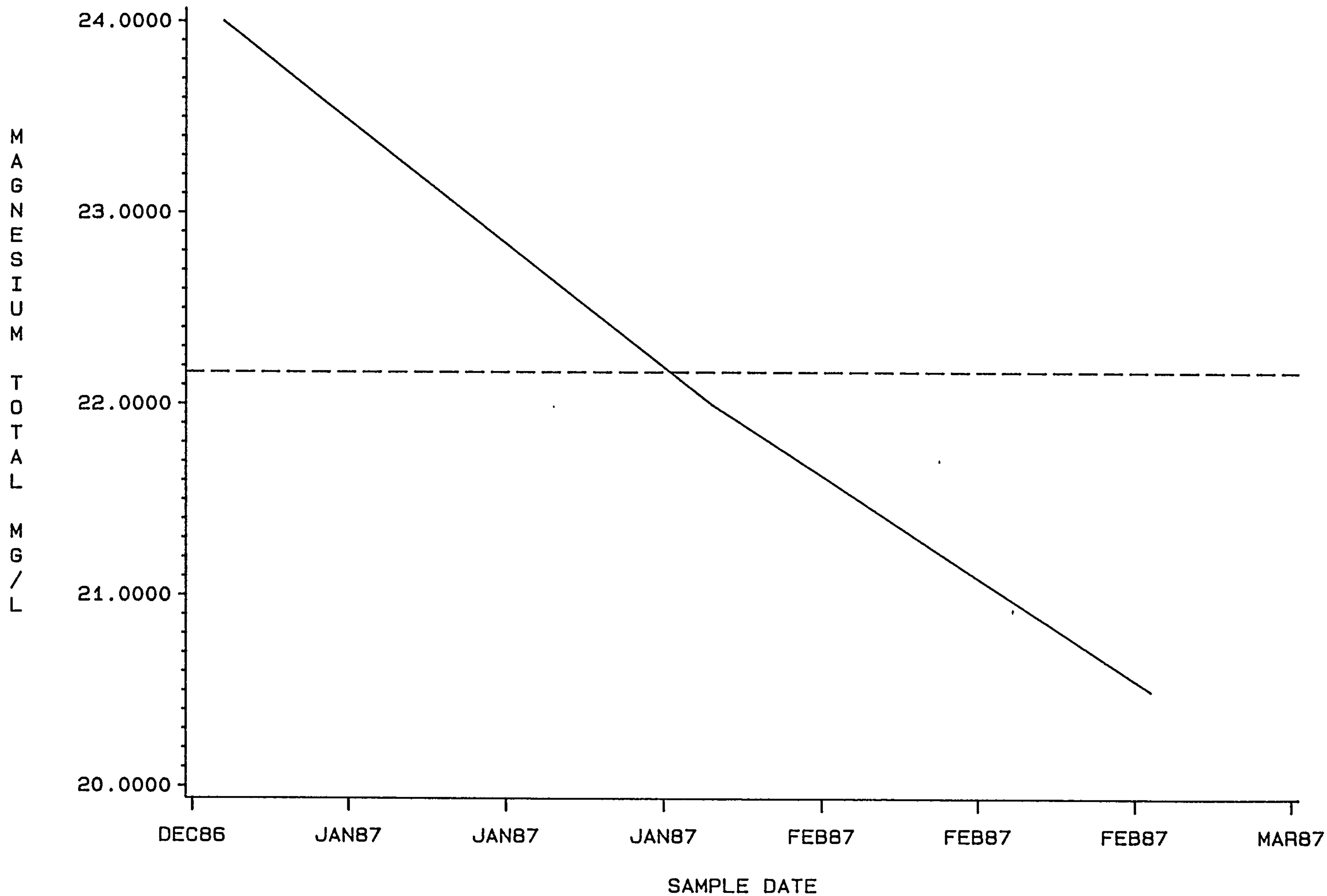
K1407B NPDES DATA – LITHIUM MG/L



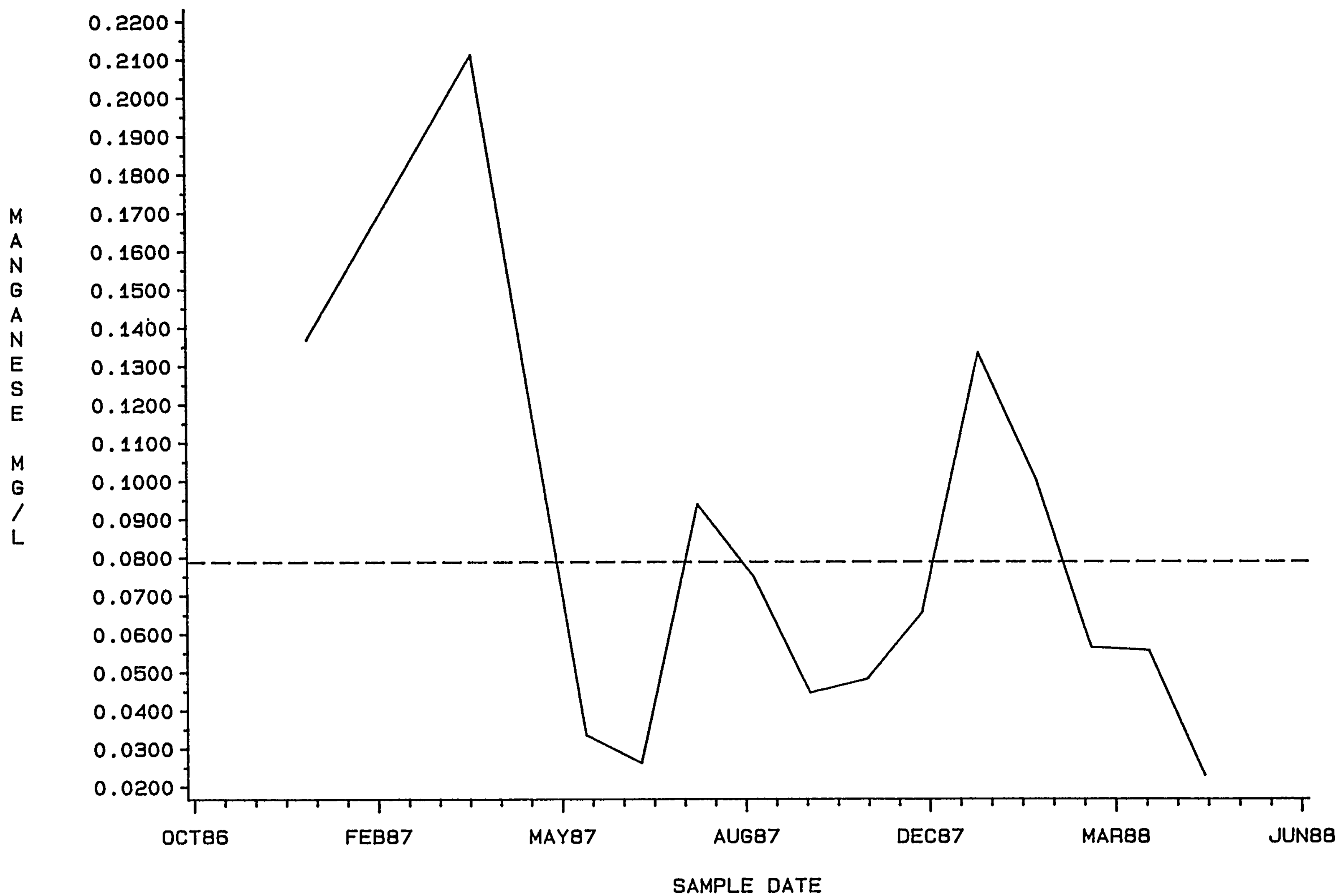
K1407B NPDES DATA — MAGNESIUM MG/L



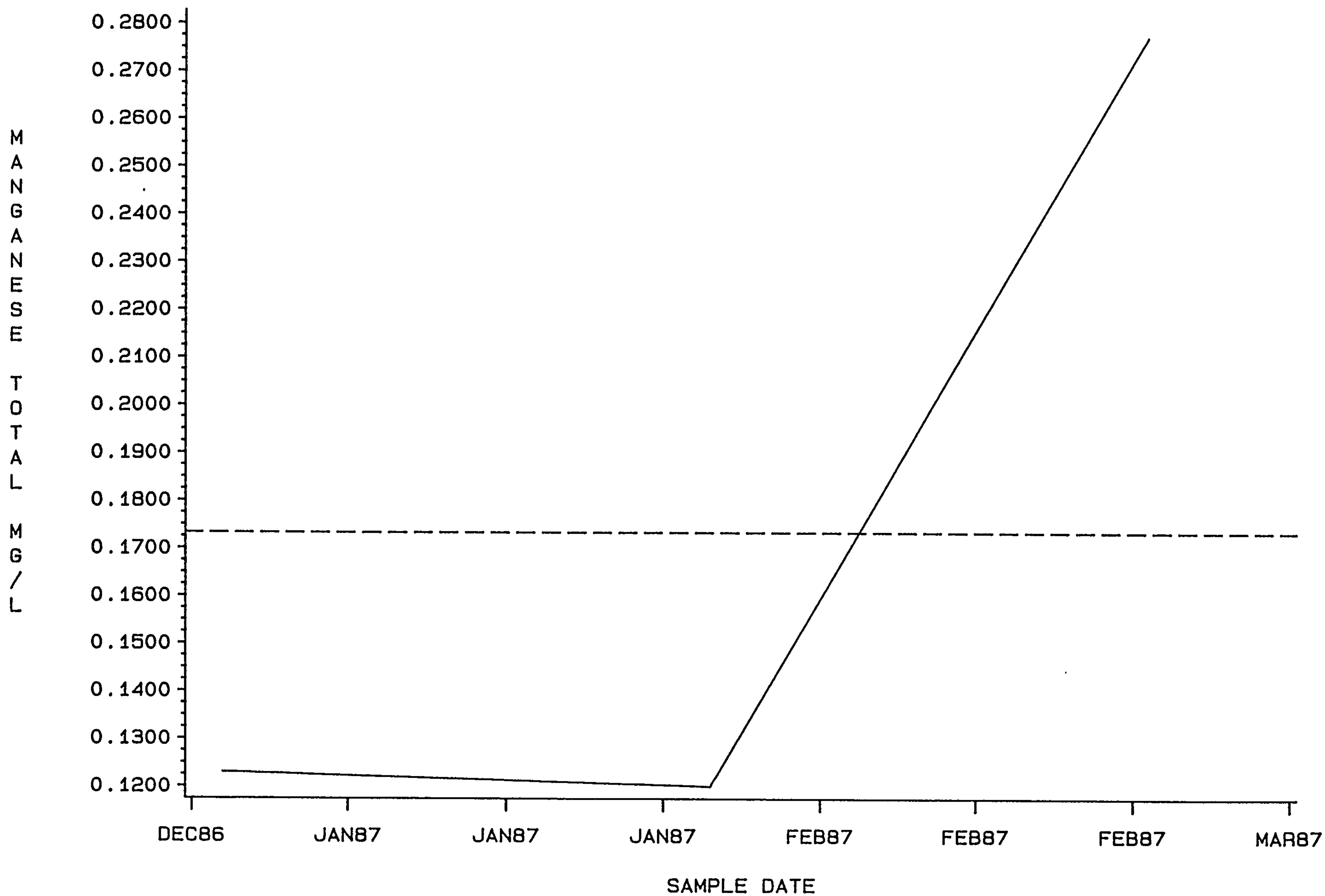
K1407B NPDES DATA – MAGNESIUM (TOTAL) MG/L



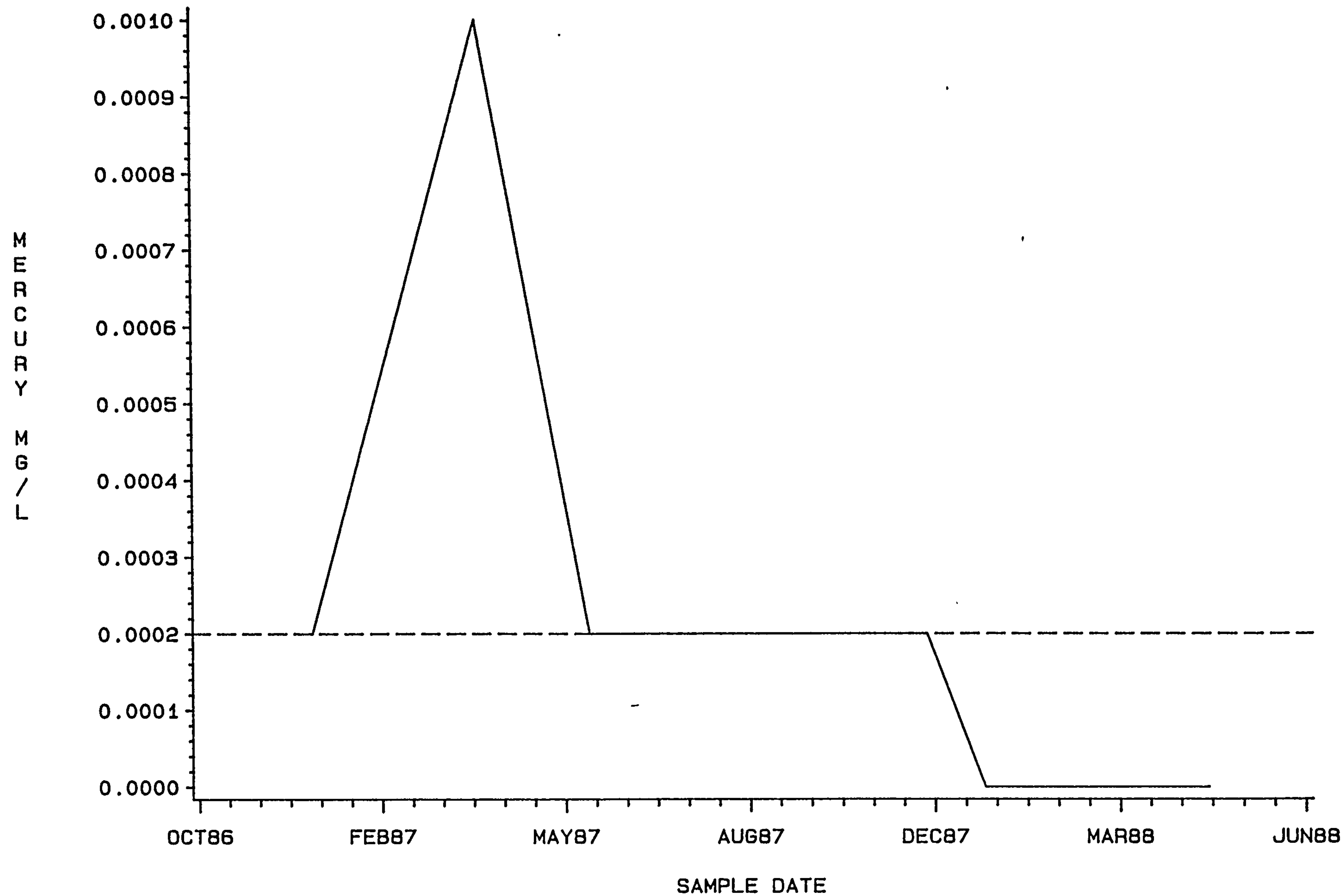
K1407B NPDES DATA — MANGANESE MG/L

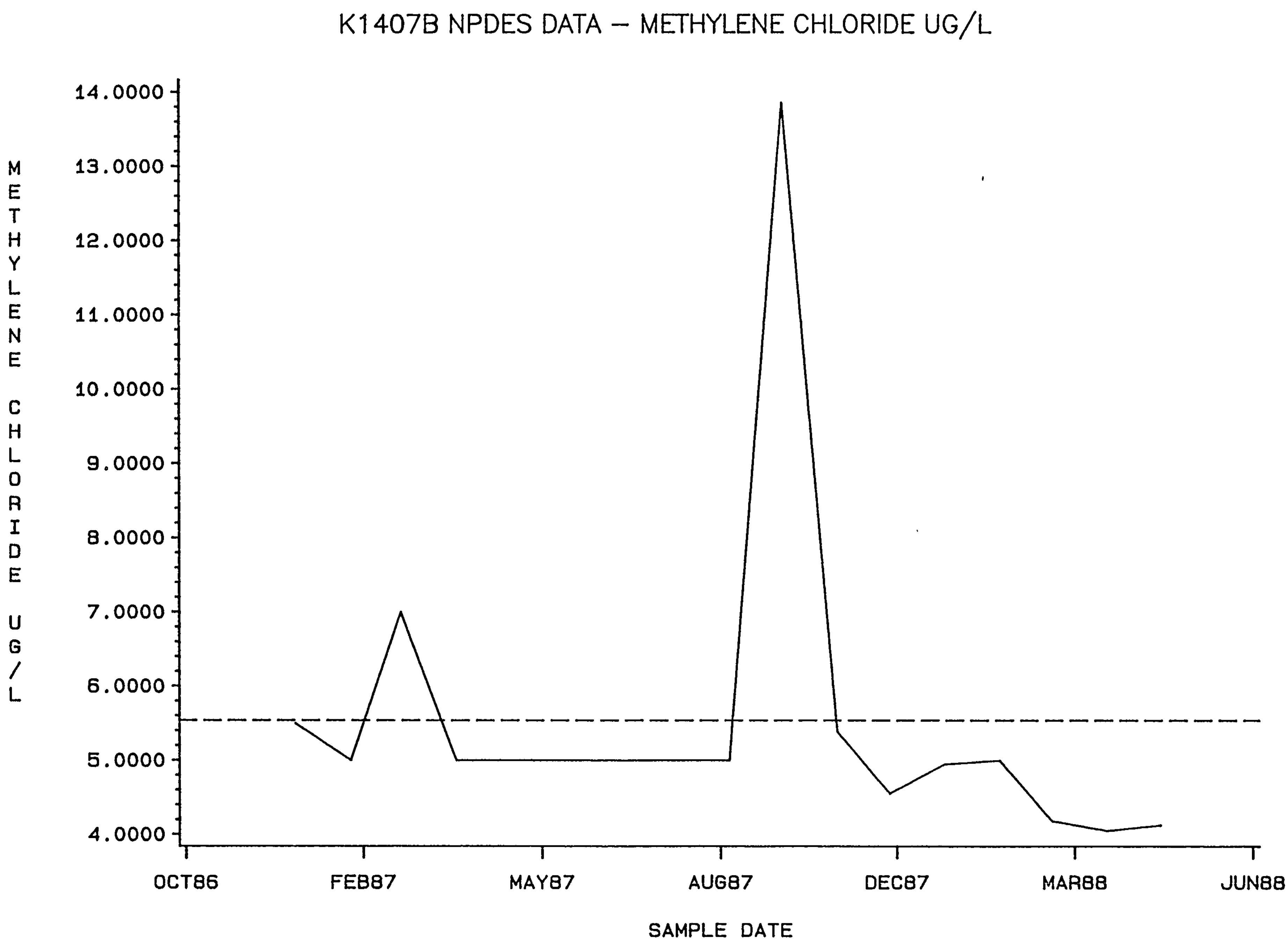


K1407B NPDES DATA – MANGANESE (TOTAL) MG/L



K1407B NPDES DATA – MERCURY MG/L




K1407B NPDES DATA – METHYLENE CHLORIDE UG/L
METHYLENE CHLORIDE UG/L
14.0000
13.0000
12.0000
11.0000
10.0000
9.0000
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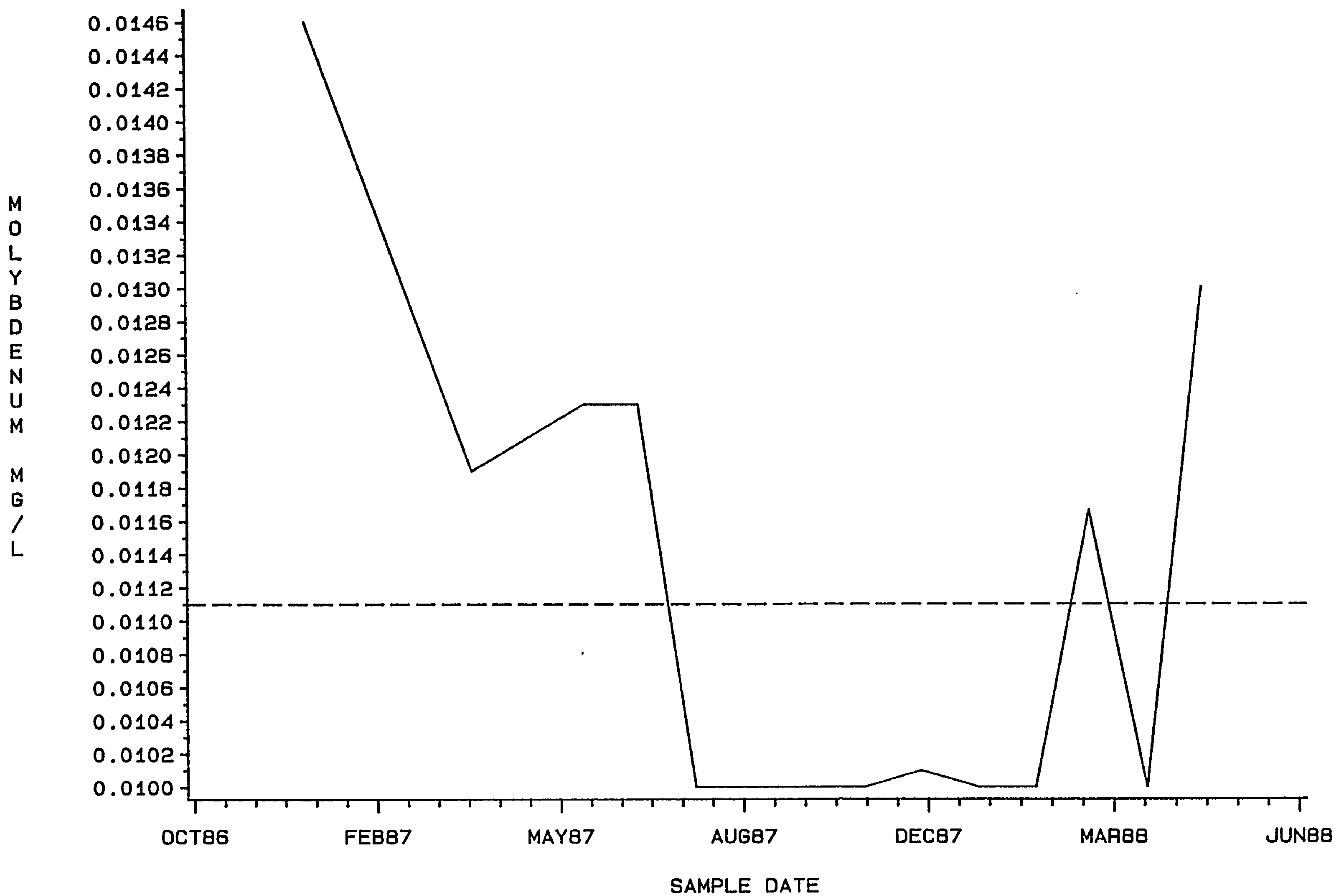
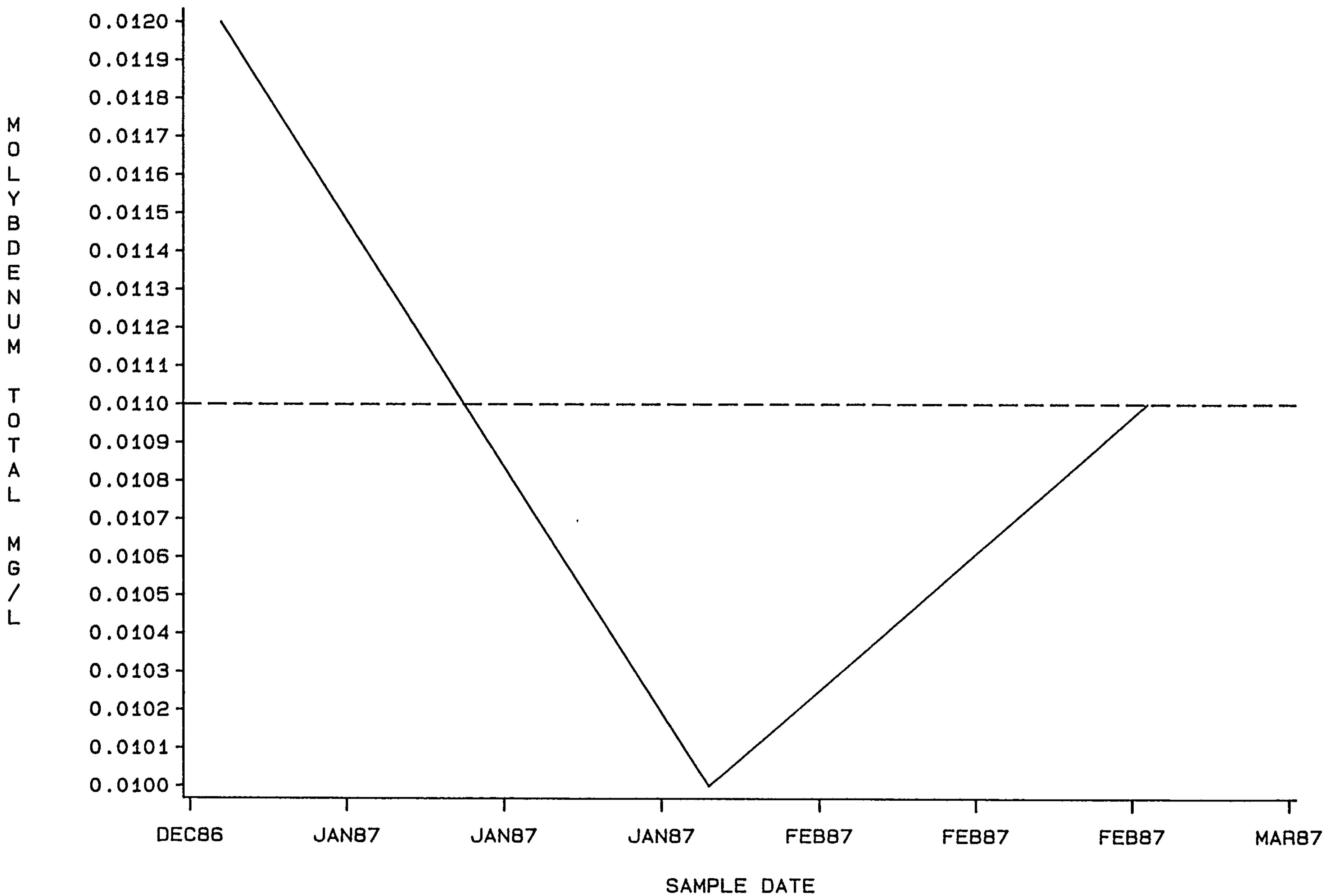
OCT86
FEB87
MAY87
AUG87
DEC87
MAR88
JUN88
SAMPLE DATE

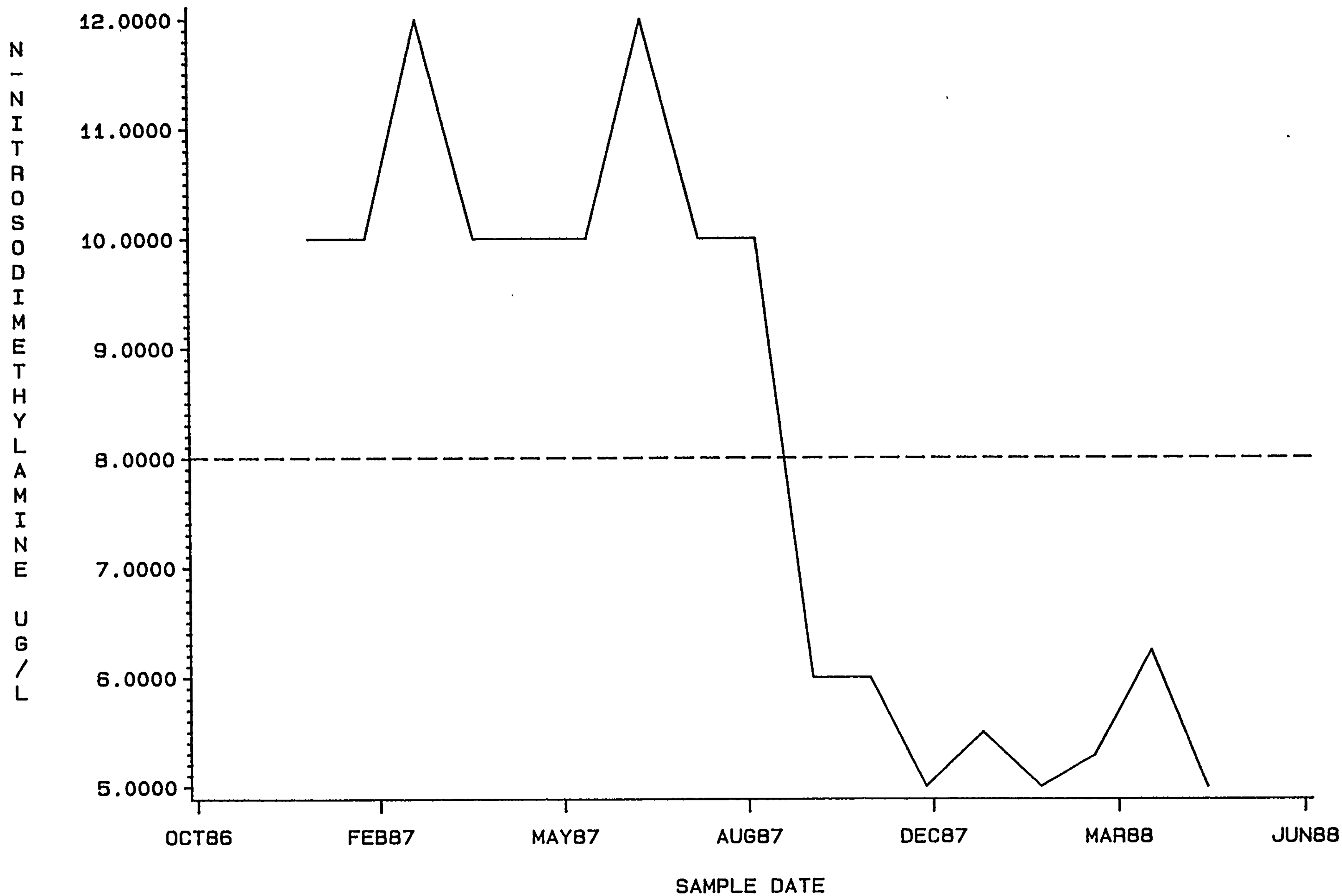
K1407B NPDES DATA – MOLYBDENUM MG/L



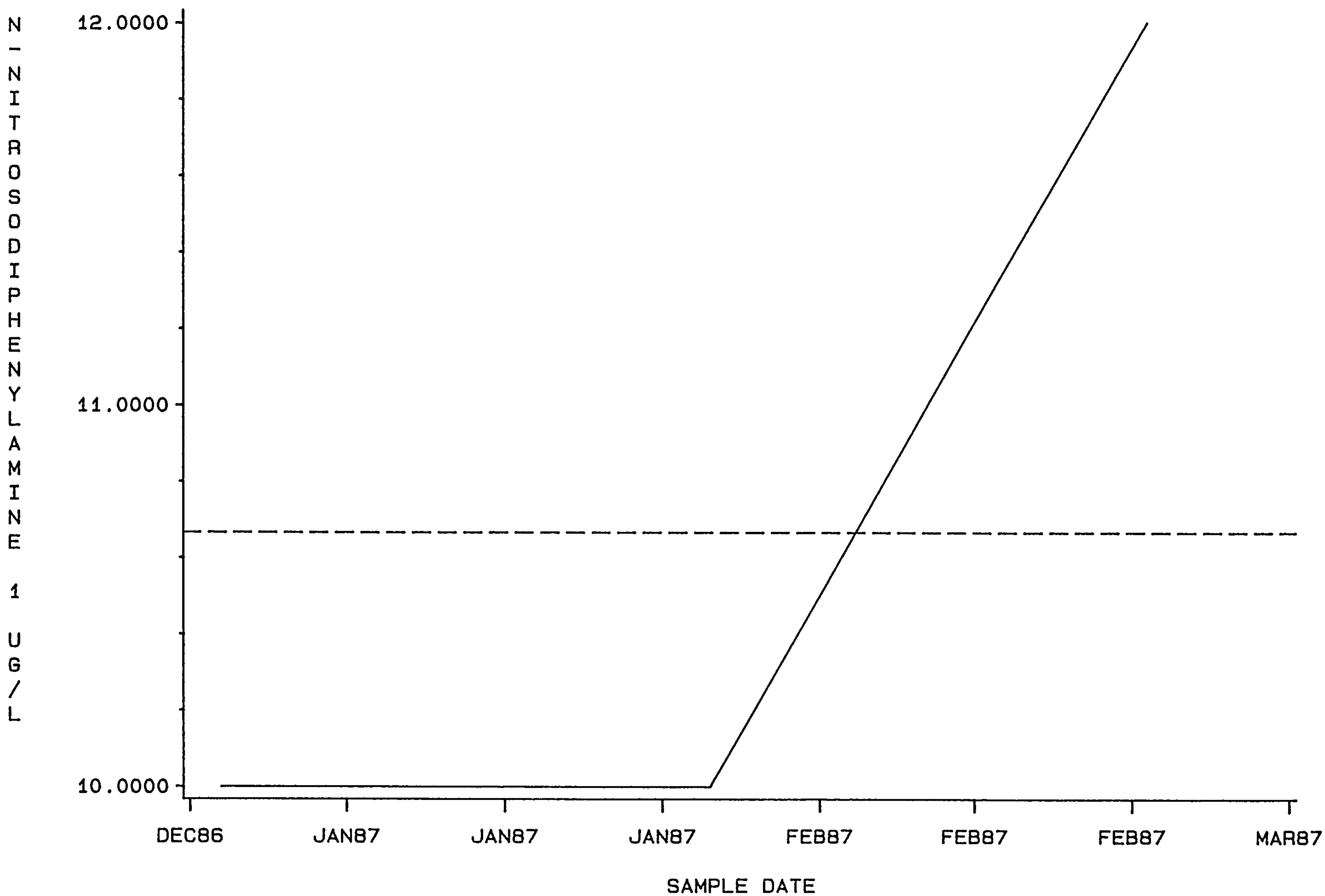
K1407B NPDES DATA – MOLYBDENUM (TOTAL) MG/L

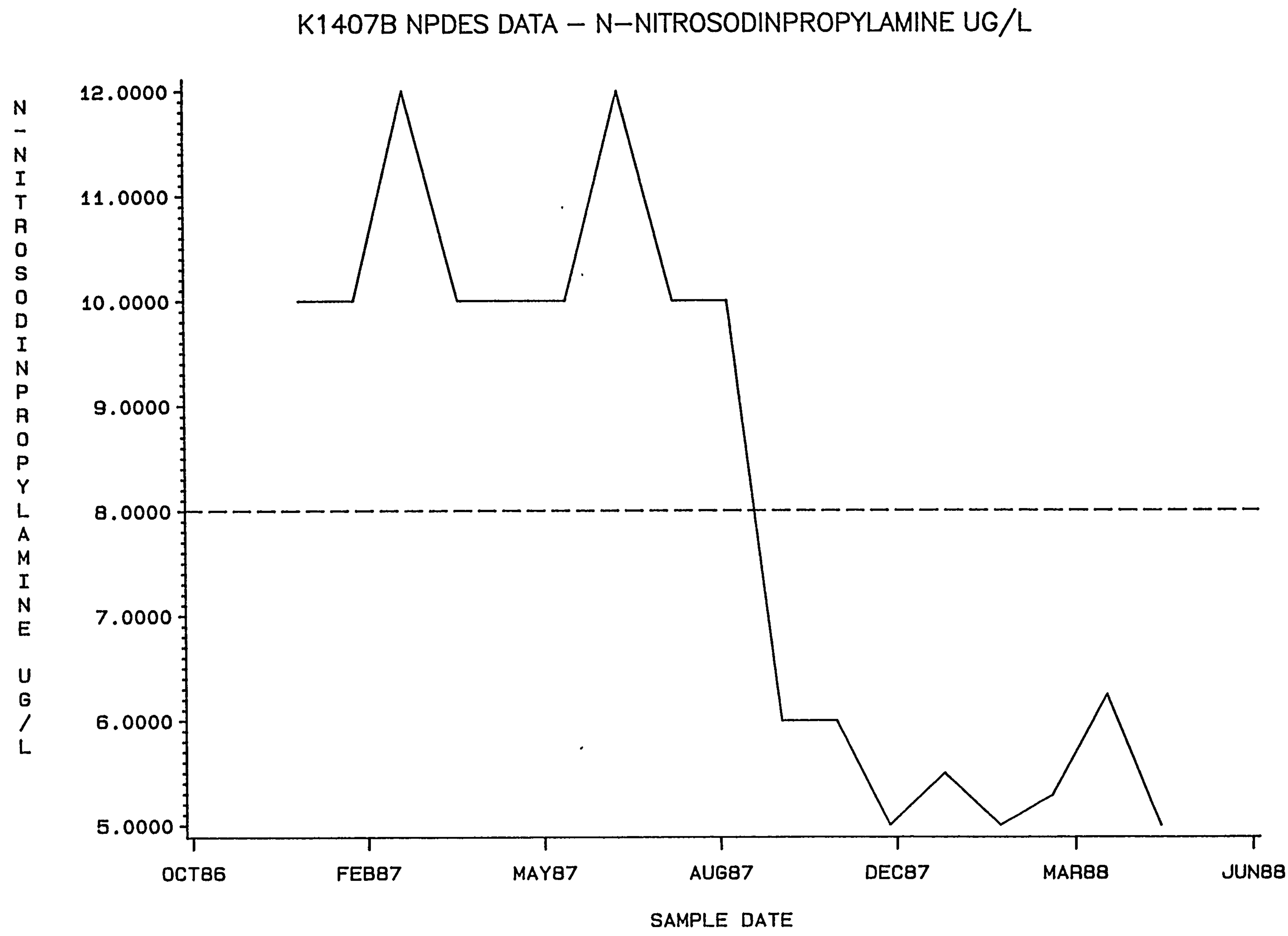


K1407B NPDES DATA — N—NITROSODIMETHYLAMINE UG/L



K1407B NPDES DATA – N–NITROSODIPHENYLAMINE(1) UG/L




K1407B NPDES DATA – N–NITROSODINPROPYLAMINE UG/L
N-NITROSODINPROPYLAMINE UG/L
12.0000
11.0000
10.0000
9.0000
8.0000
7.0000
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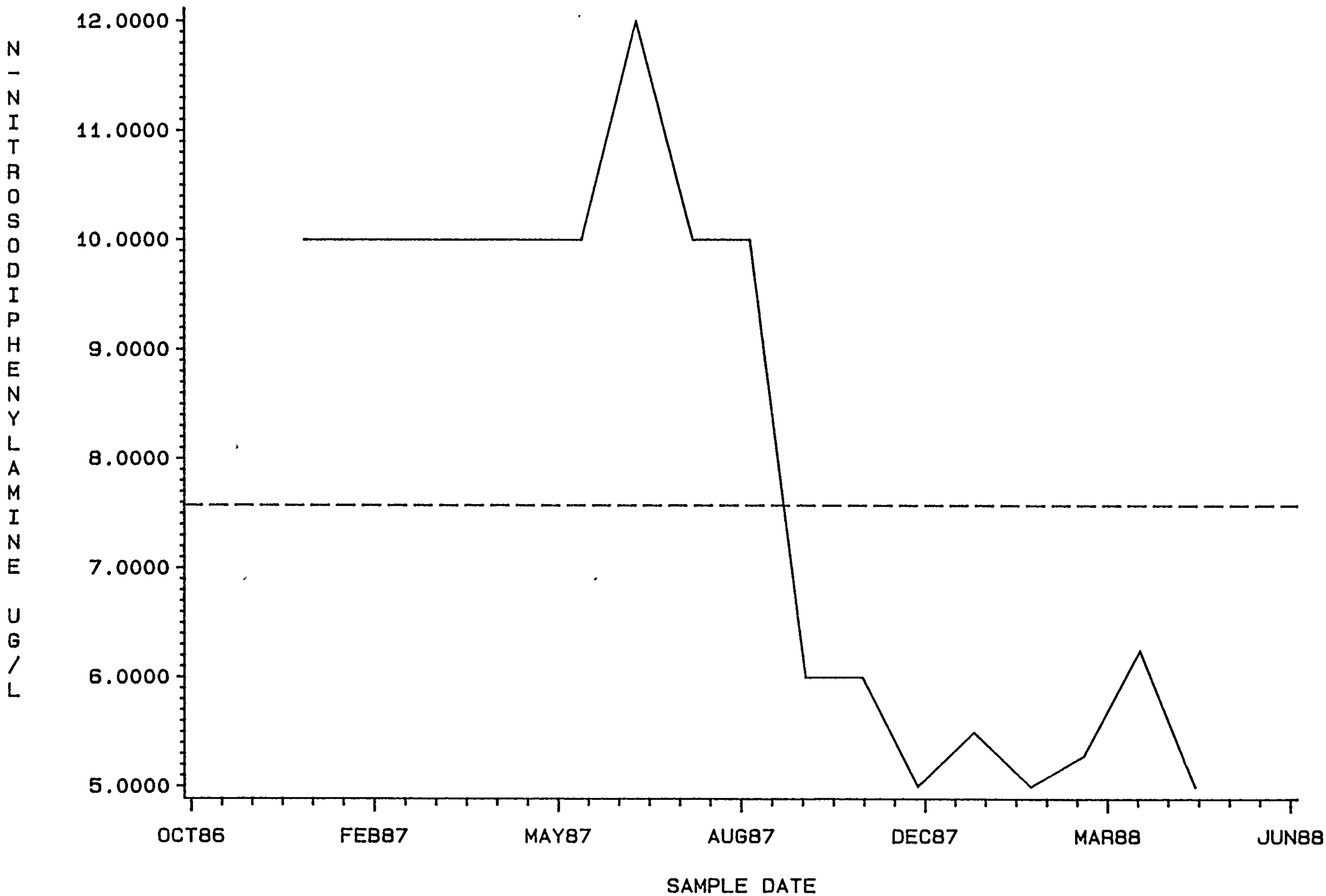
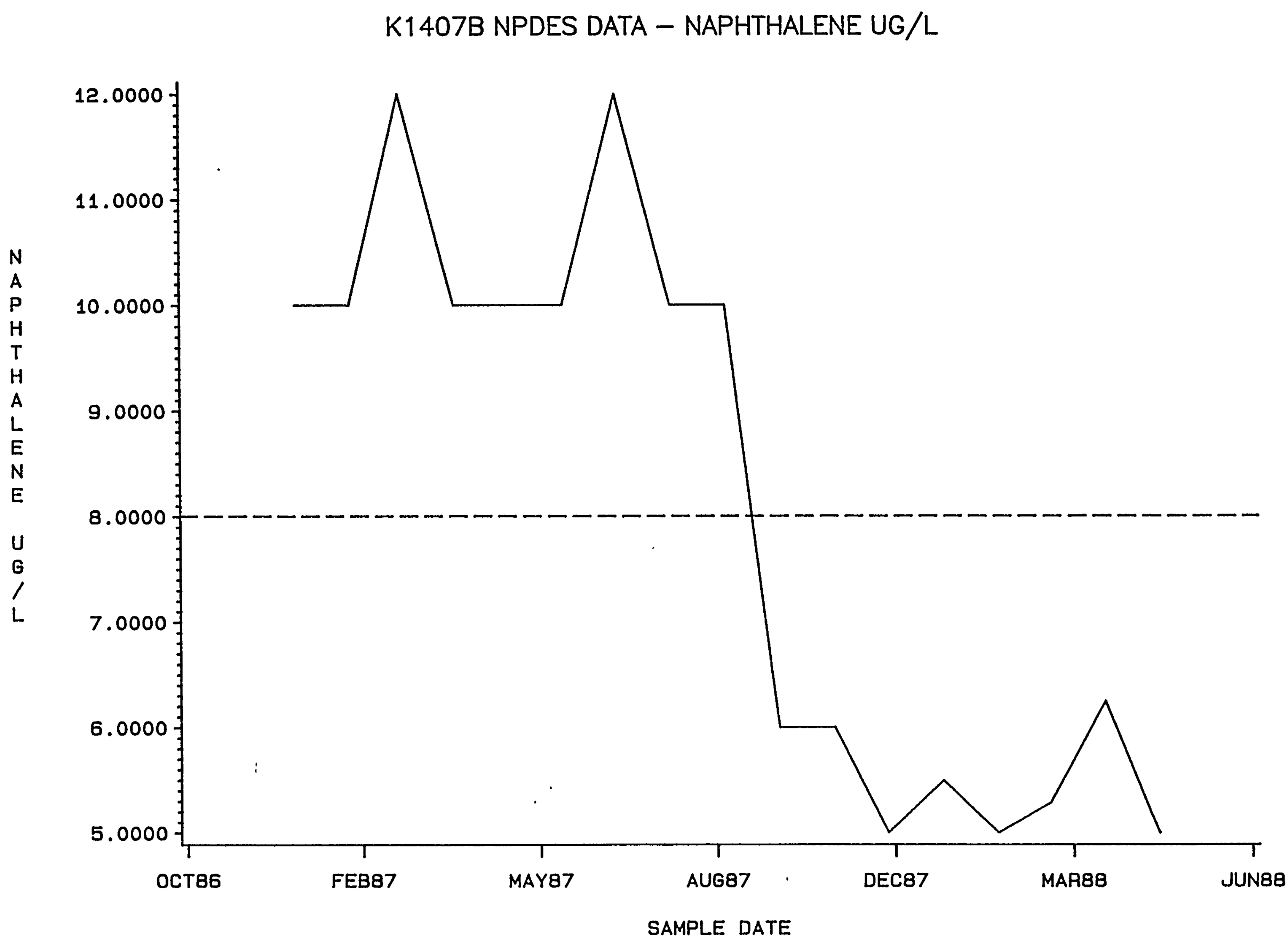
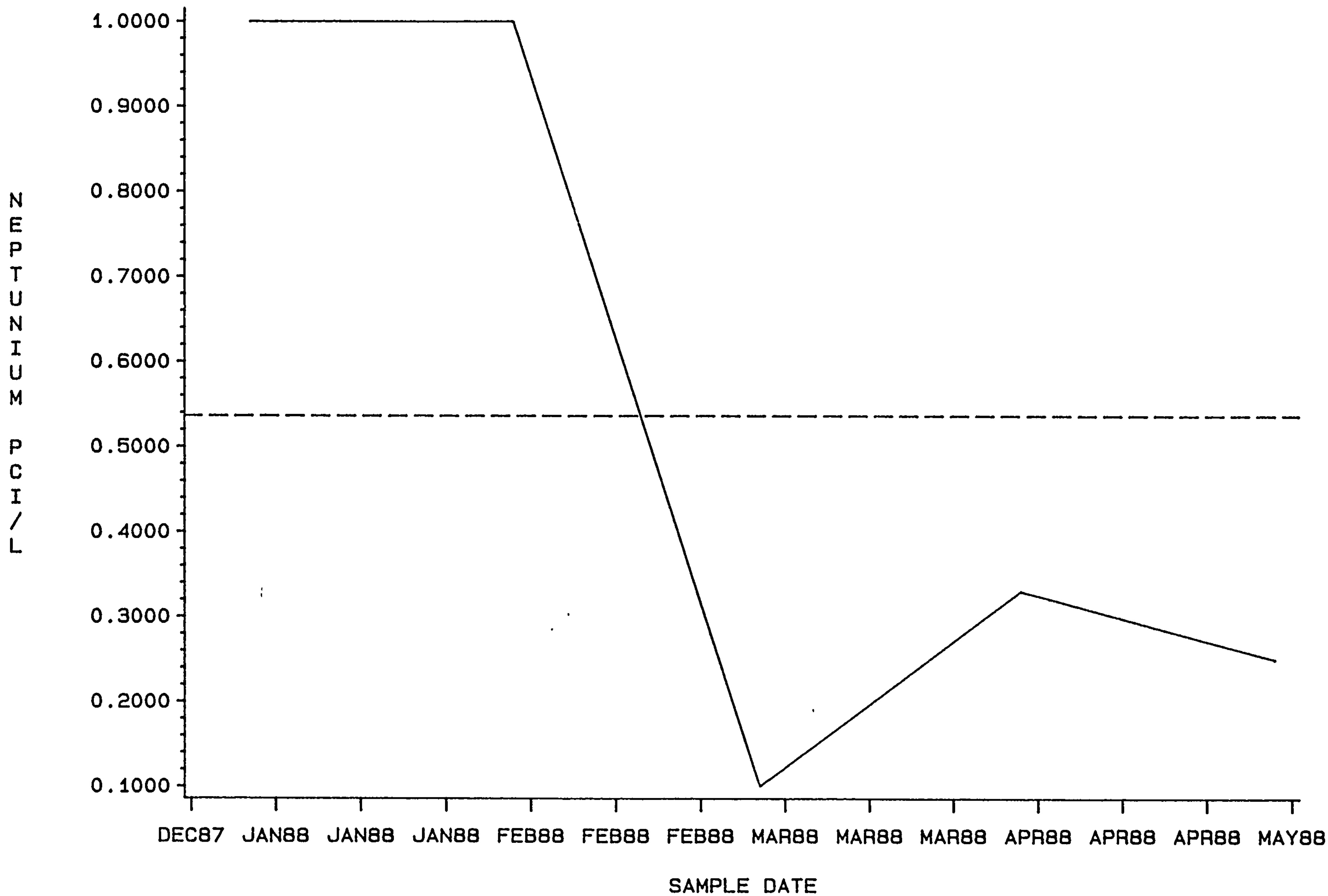
OCT86
FEB87
MAY87
AUG87
DEC87
MAR88
JUN88
SAMPLE DATE

K1407B NPDES DATA – N–NITROSODIPHENYLAMINE UG/L

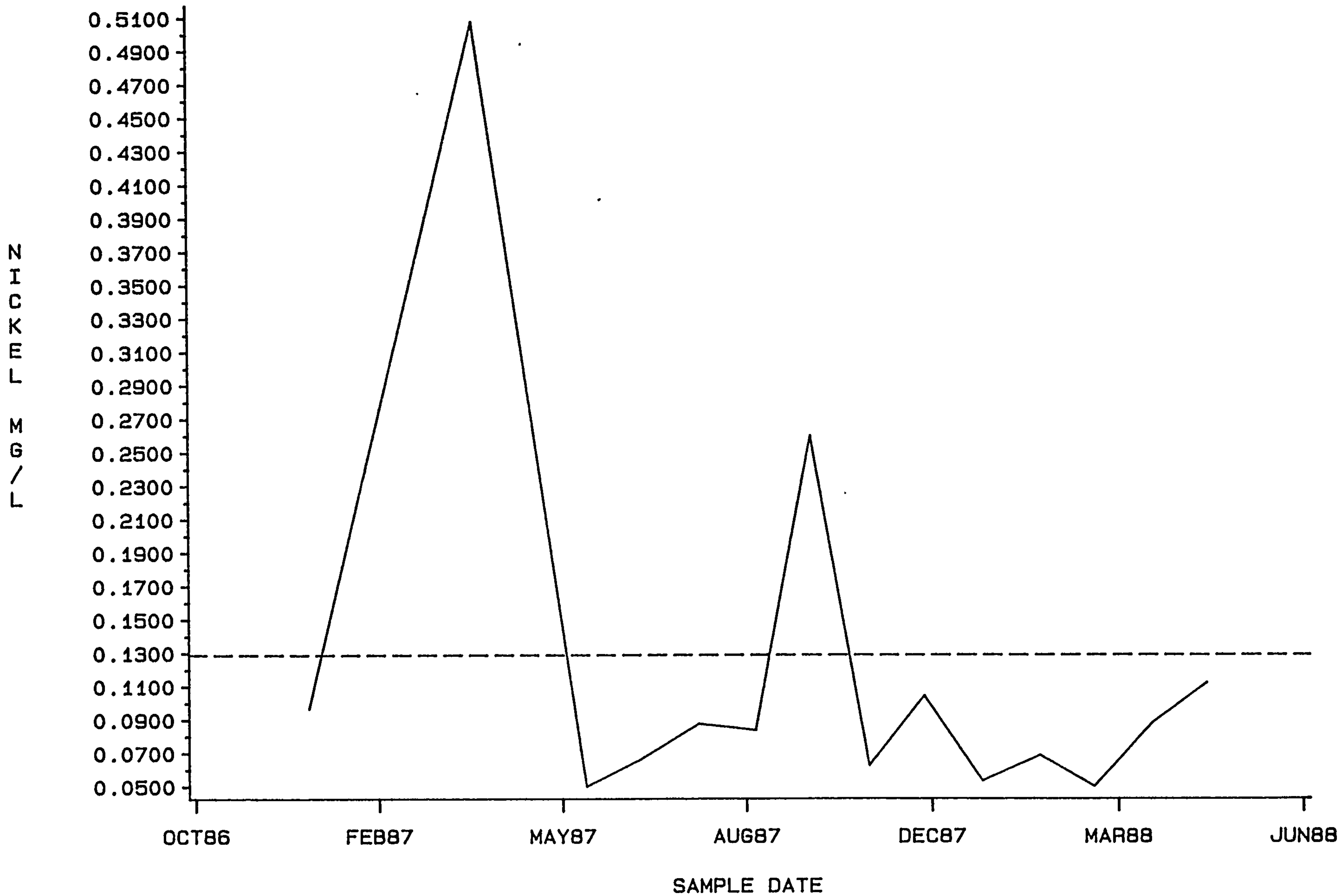



K1407B NPDES DATA – NAPHTHALENE UG/L
NAPHTHALENE UG/L
12.0000
11.0000
10.0000
9.0000
8.0000
7.0000
6.0000
5.0000
OCT86
FEB87
MAY87
AUG87
DEC87
MAR88
JUN88
SAMPLE DATE

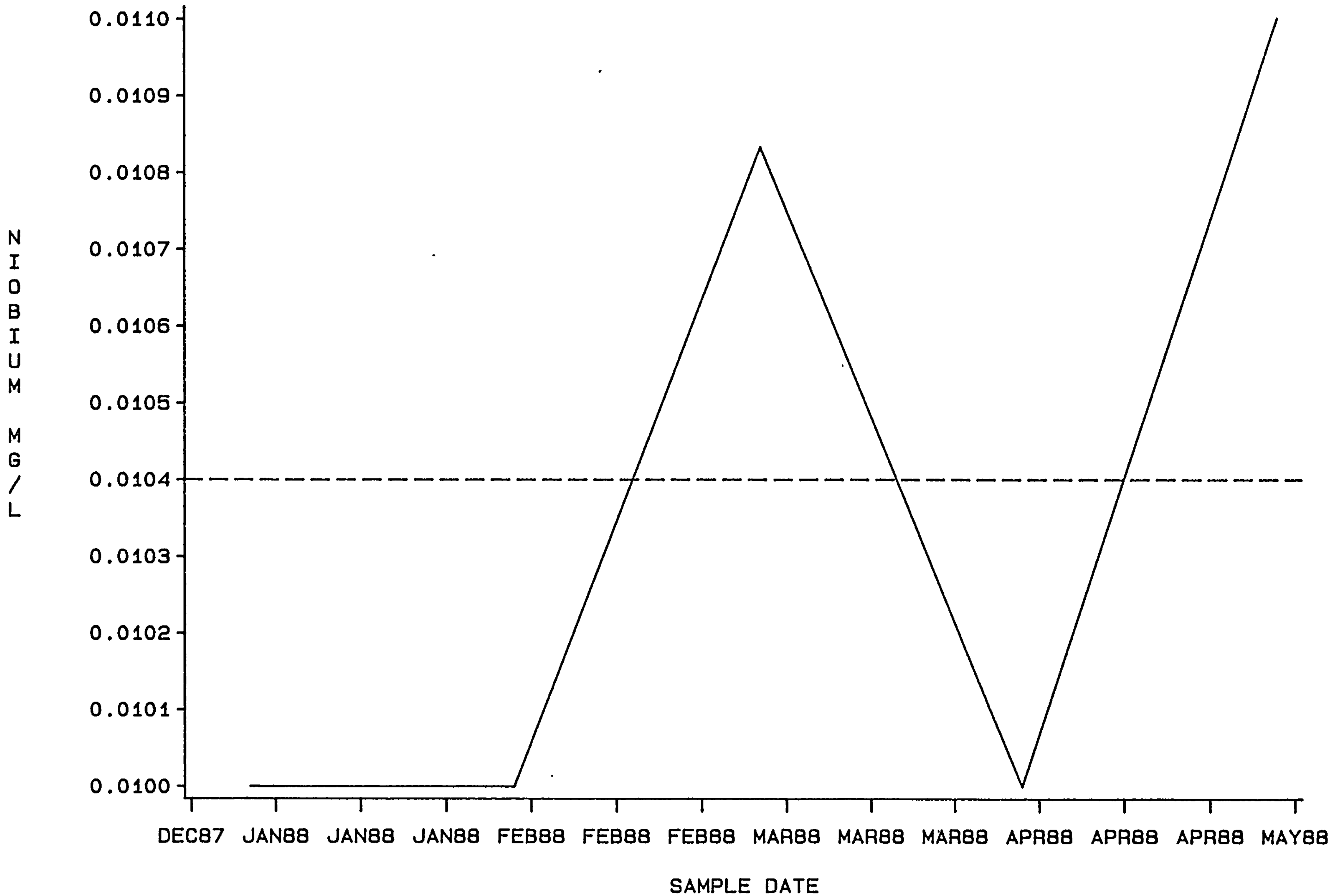
K1407B NPDES DATA — NEPTUNIUM PCI/L



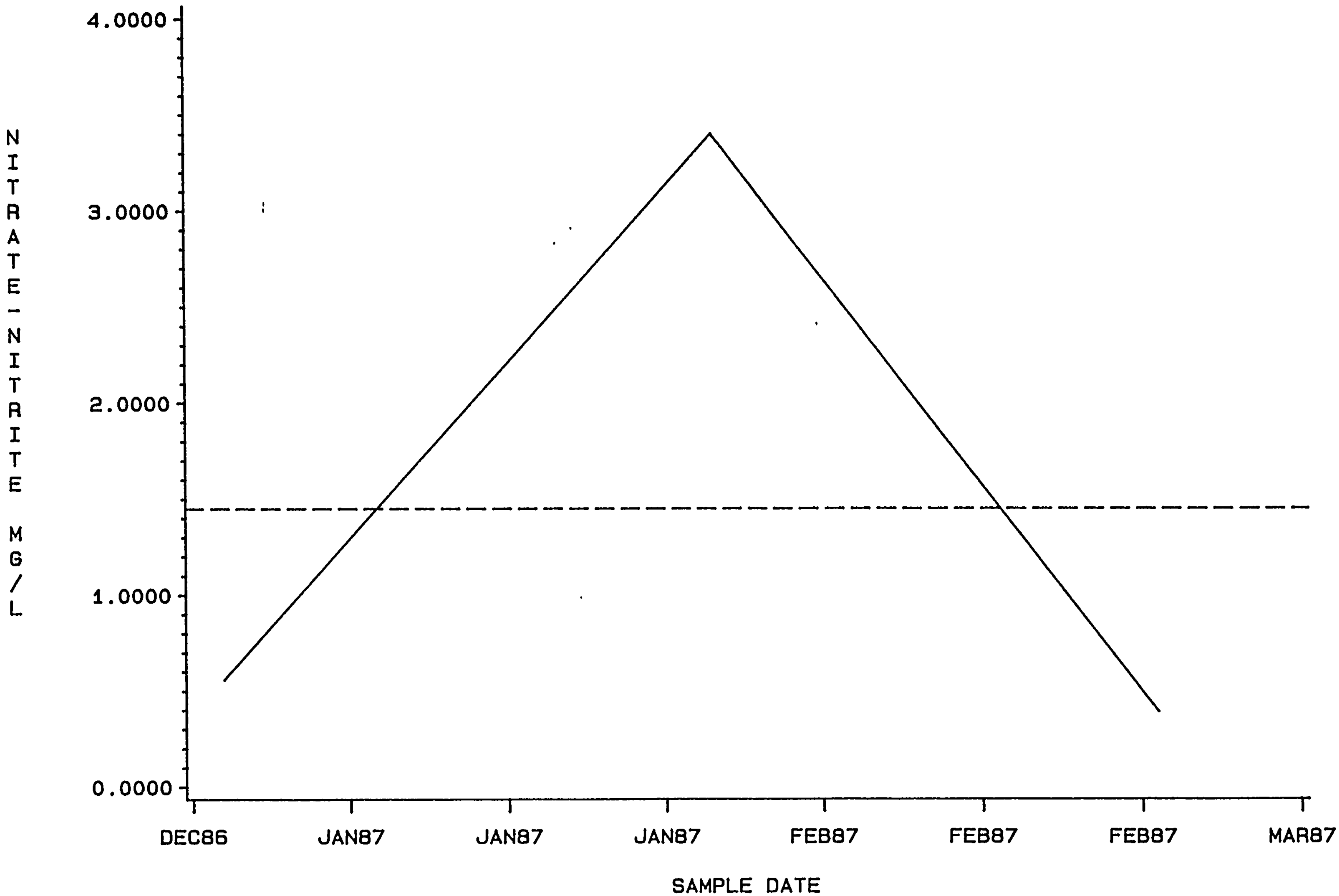
K1407B NPDES DATA — NICKEL MG/L



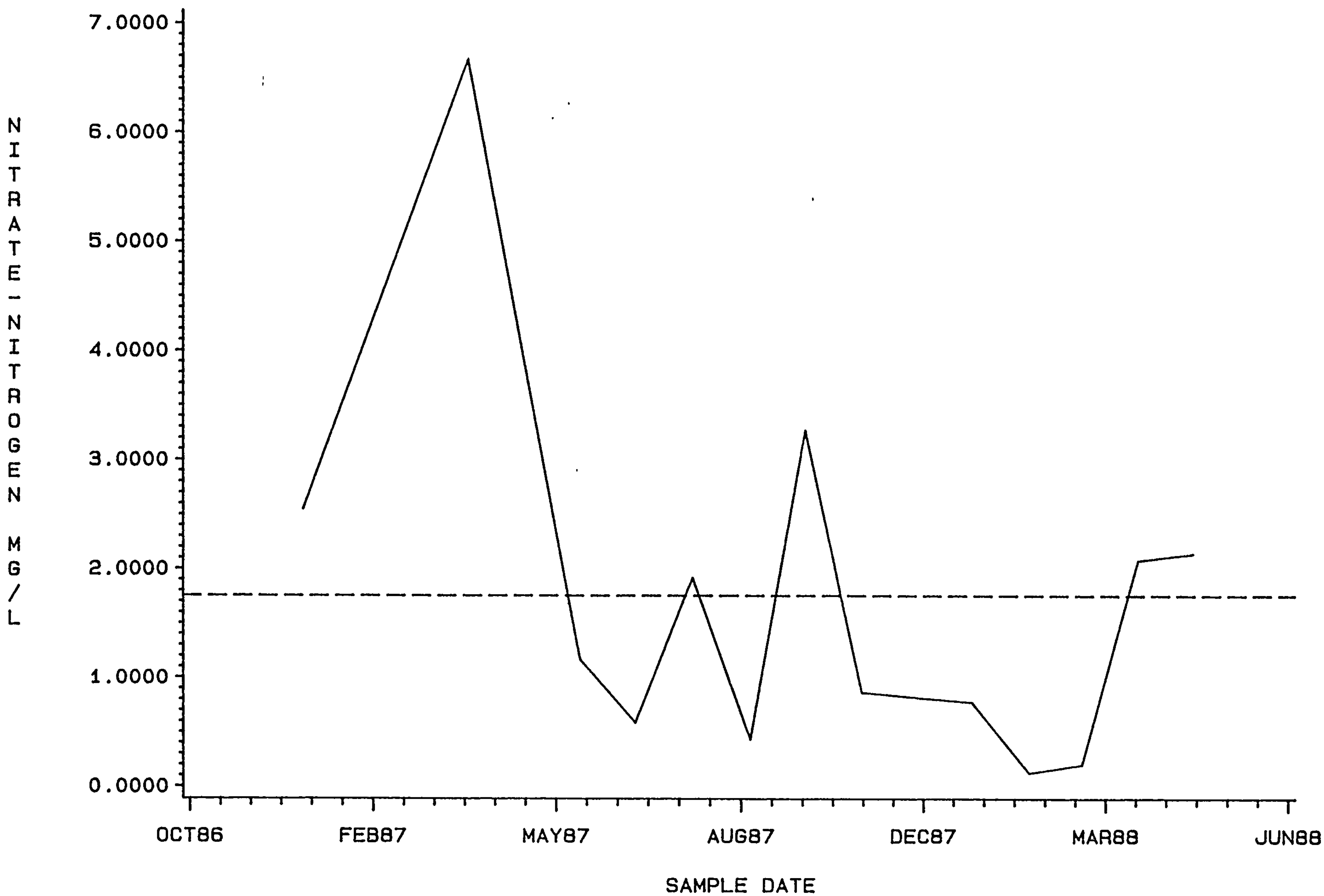
K1407B NPDES DATA — NIOBIUM MG/L

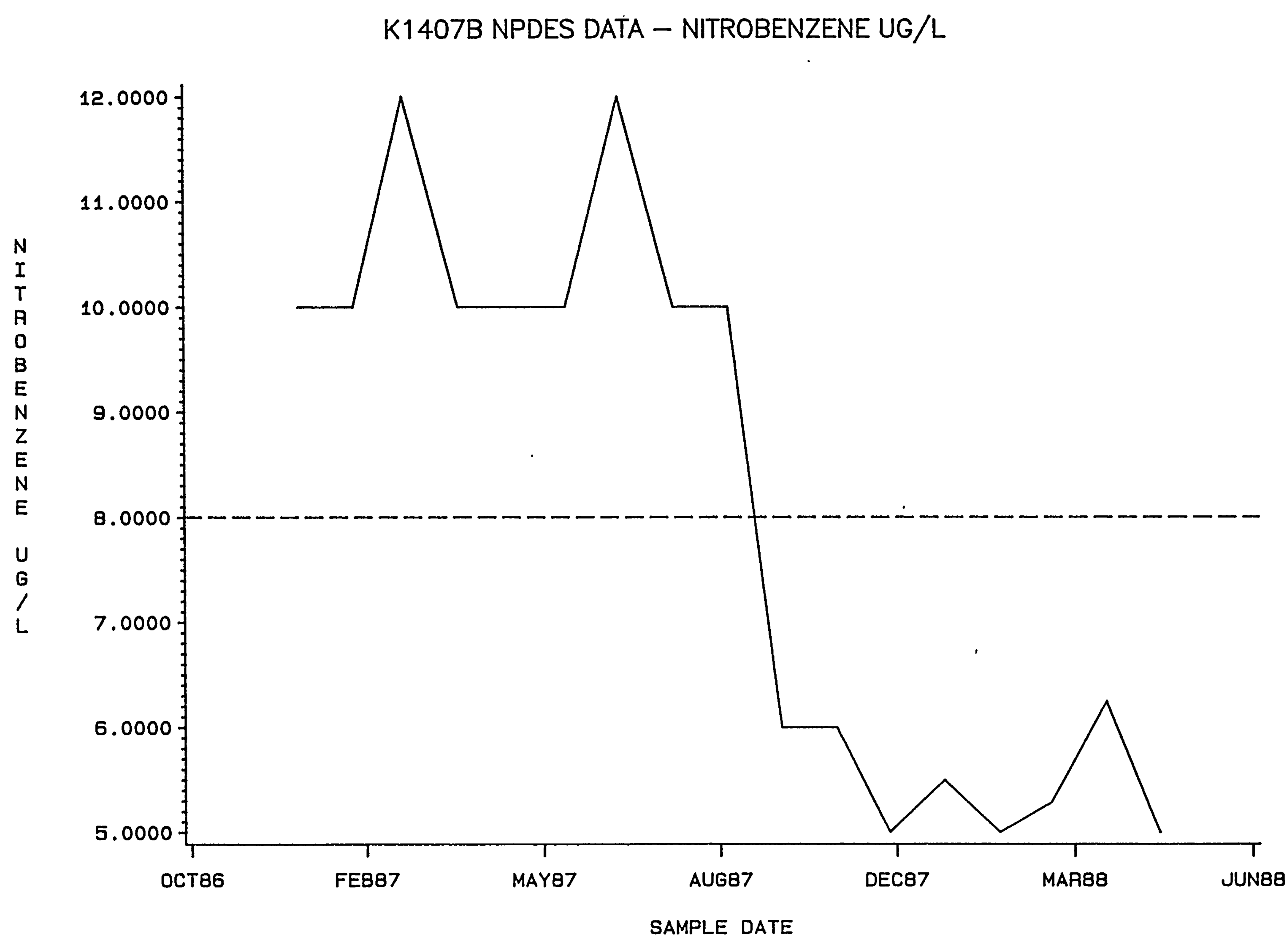


K1407B NPDES DATA — NITRATE—NITRITE MG/L

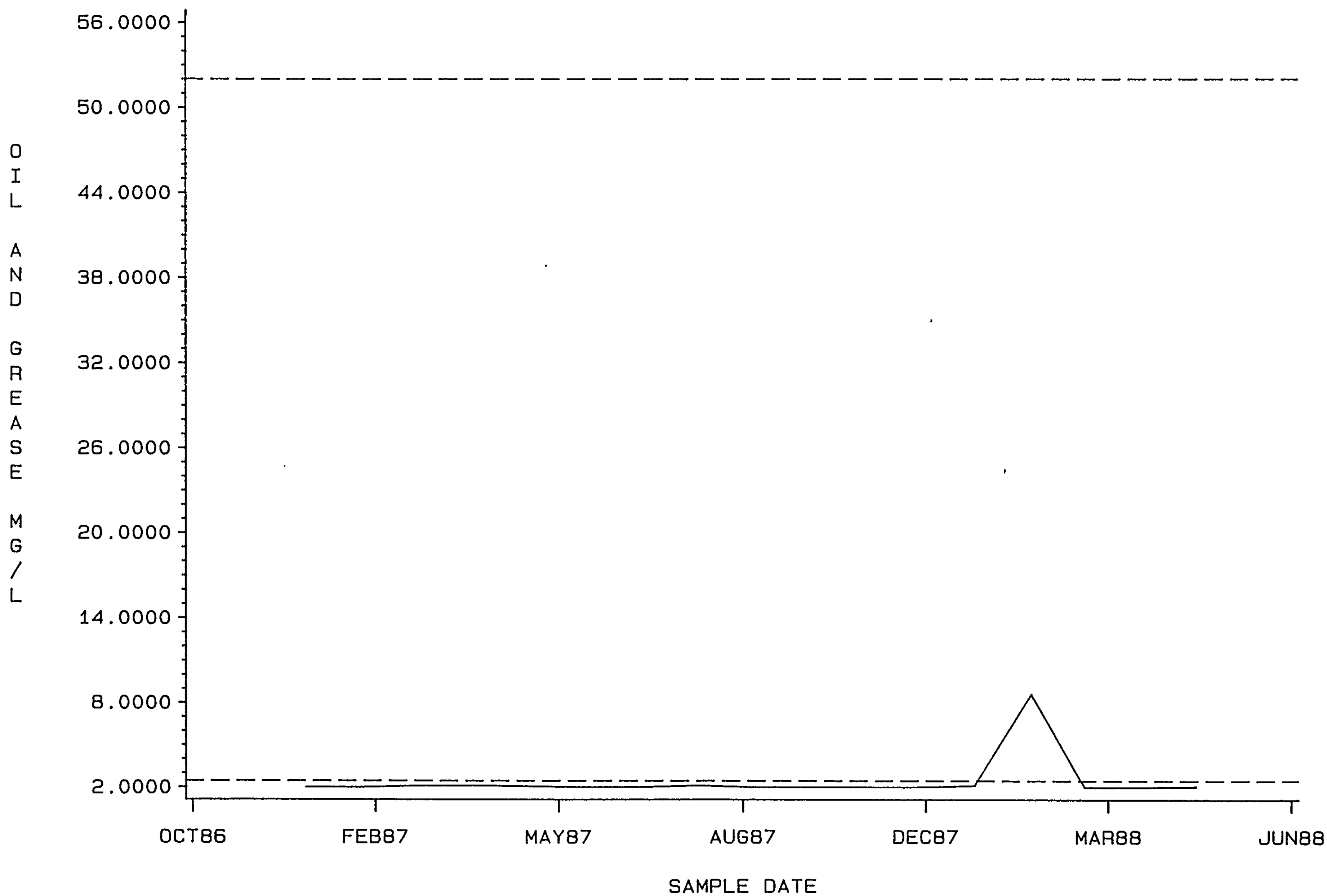


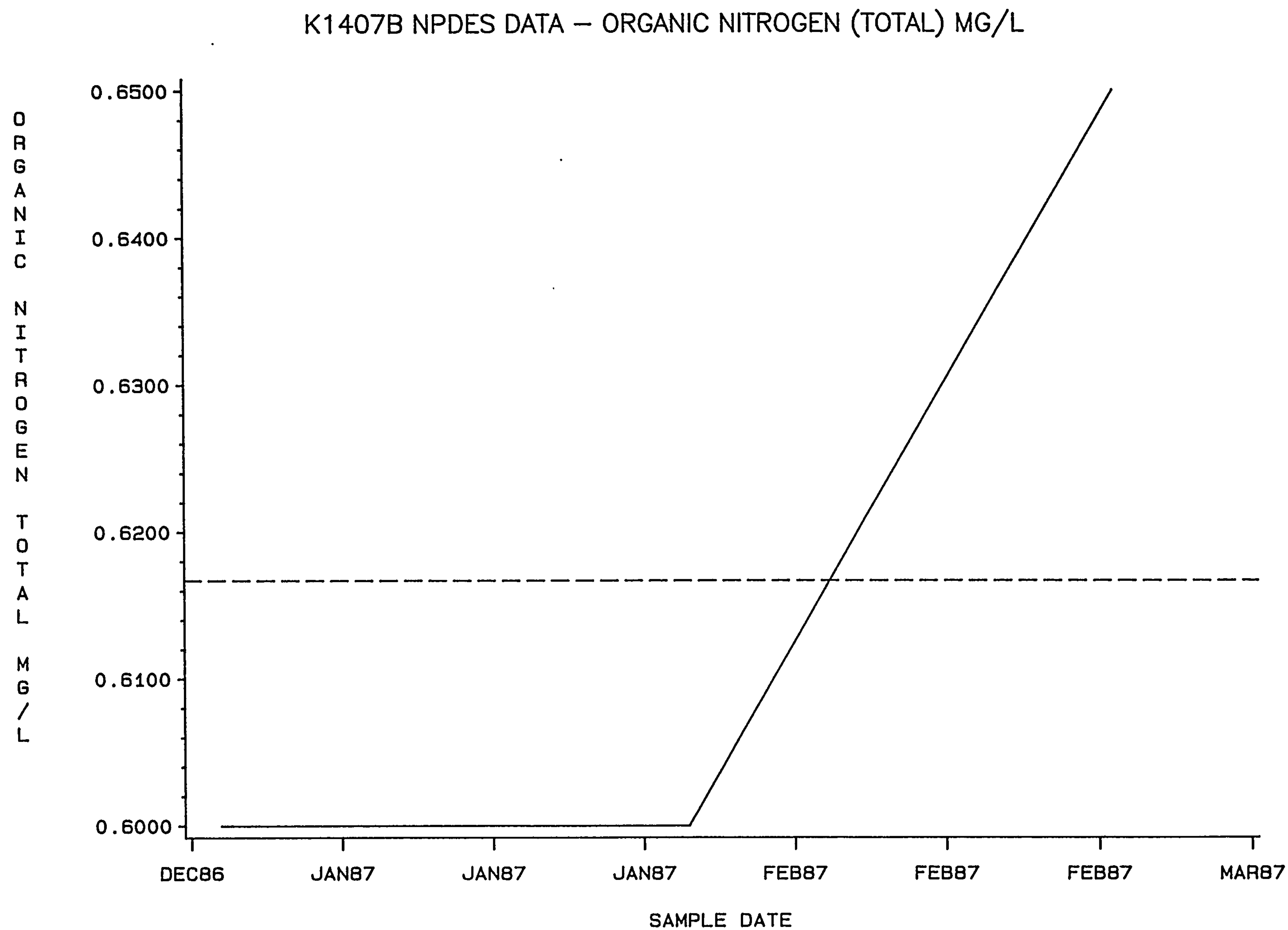
K1407B NPDES DATA – NITRATE–NITROGEN MG/L



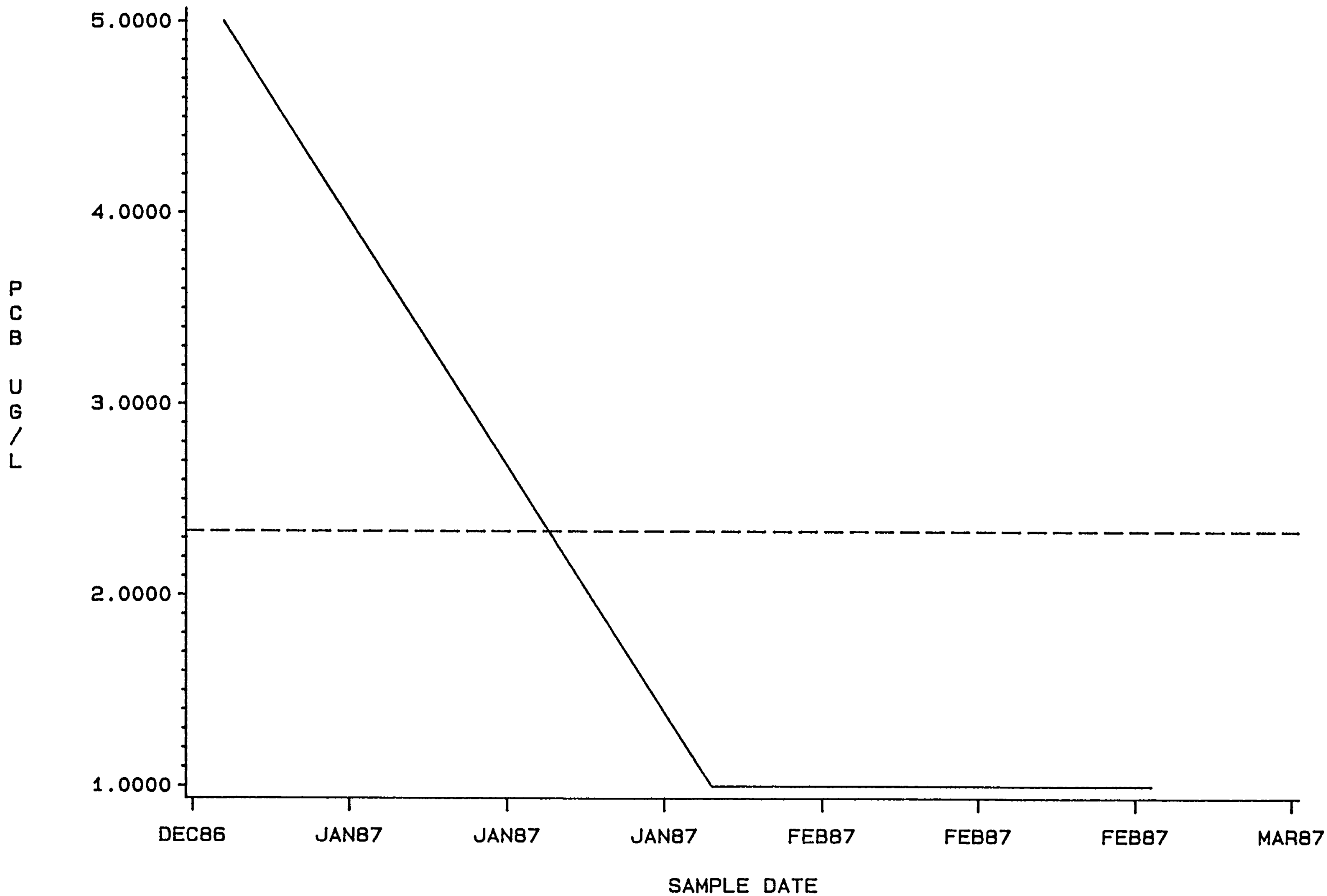

K1407B NPDES DATA – NITROBENZENE UG/L
NITROBENZENE UG/L
12.0000
11.0000
10.0000
9.0000
8.0000
7.0000
6.0000
5.0000
OCT86
FEB87
MAY87
AUG87
DEC87
MAR88
JUN88
SAMPLE DATE

K1407B NPDES DATA – OIL AND GREASE MG/L

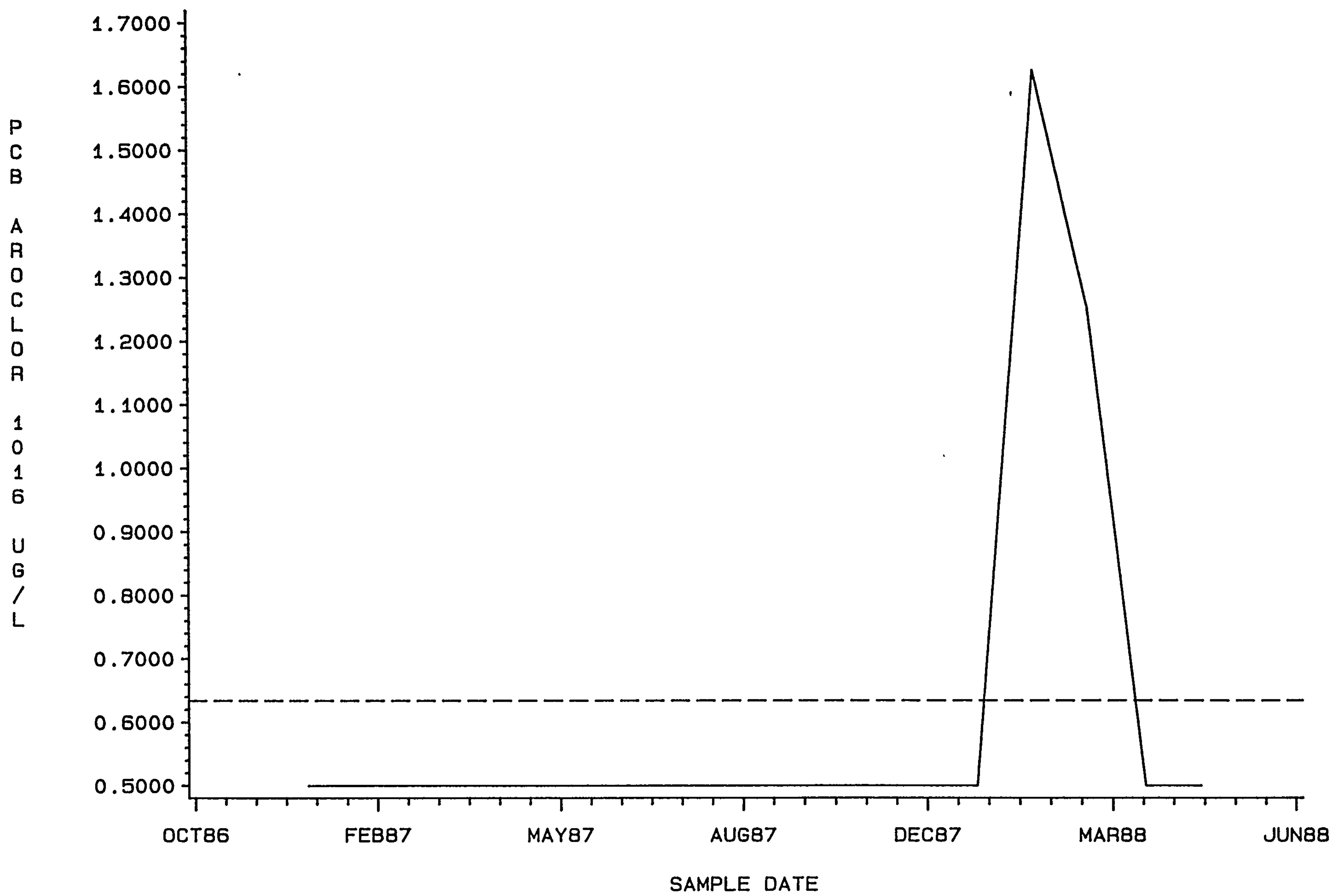



K1407B NPDES DATA — ORGANIC NITROGEN (TOTAL) MG/L
ORGANIC NITROGEN TOTAL MG/L
0.6500
0.6400
0.6300
0.6200
0.6100
0.6000
DEC86
JAN87
JAN87
JAN87
FEB87
FEB87
FEB87
MAR87
SAMPLE DATE

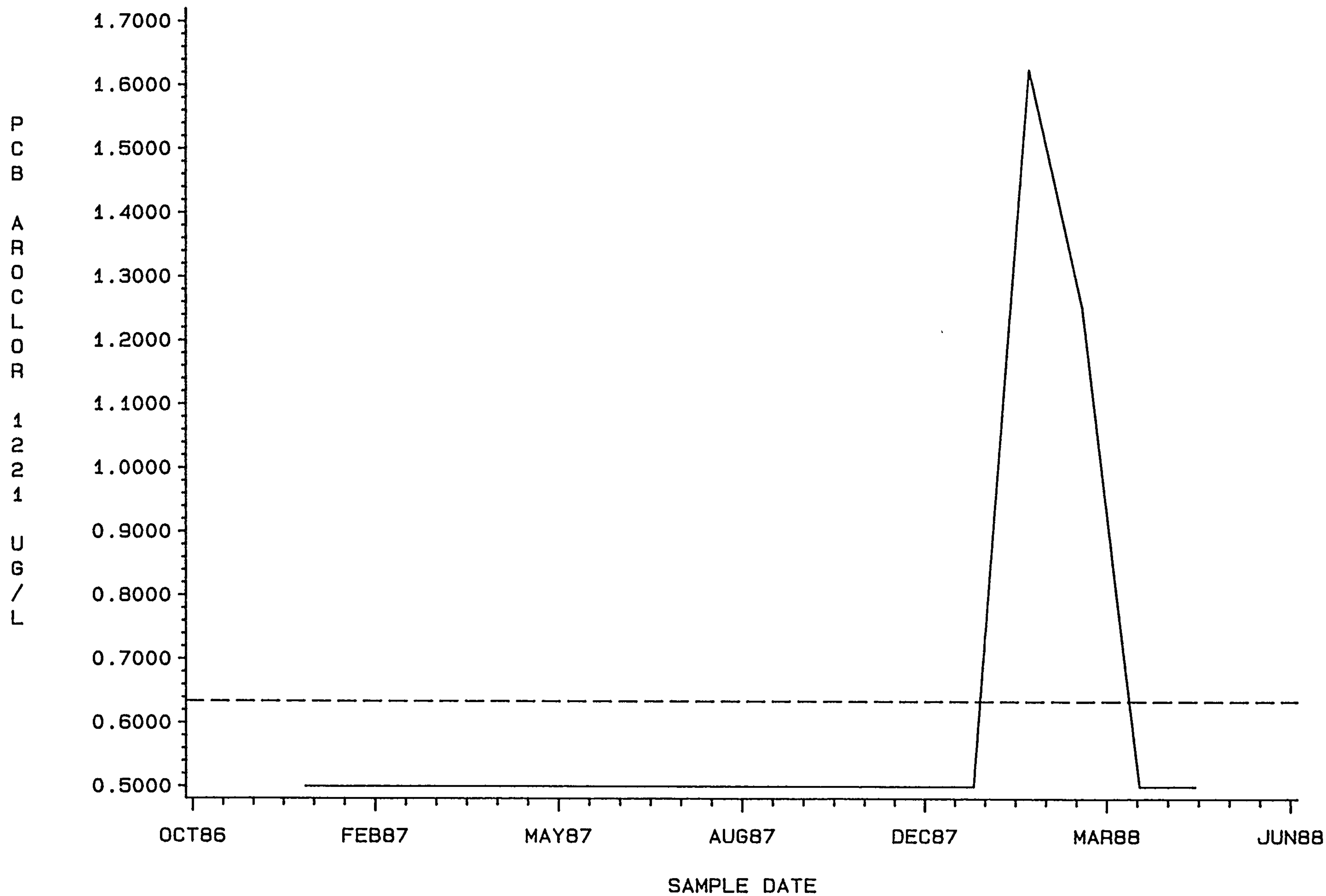
K1407B NPDES DATA – PCB UG/L



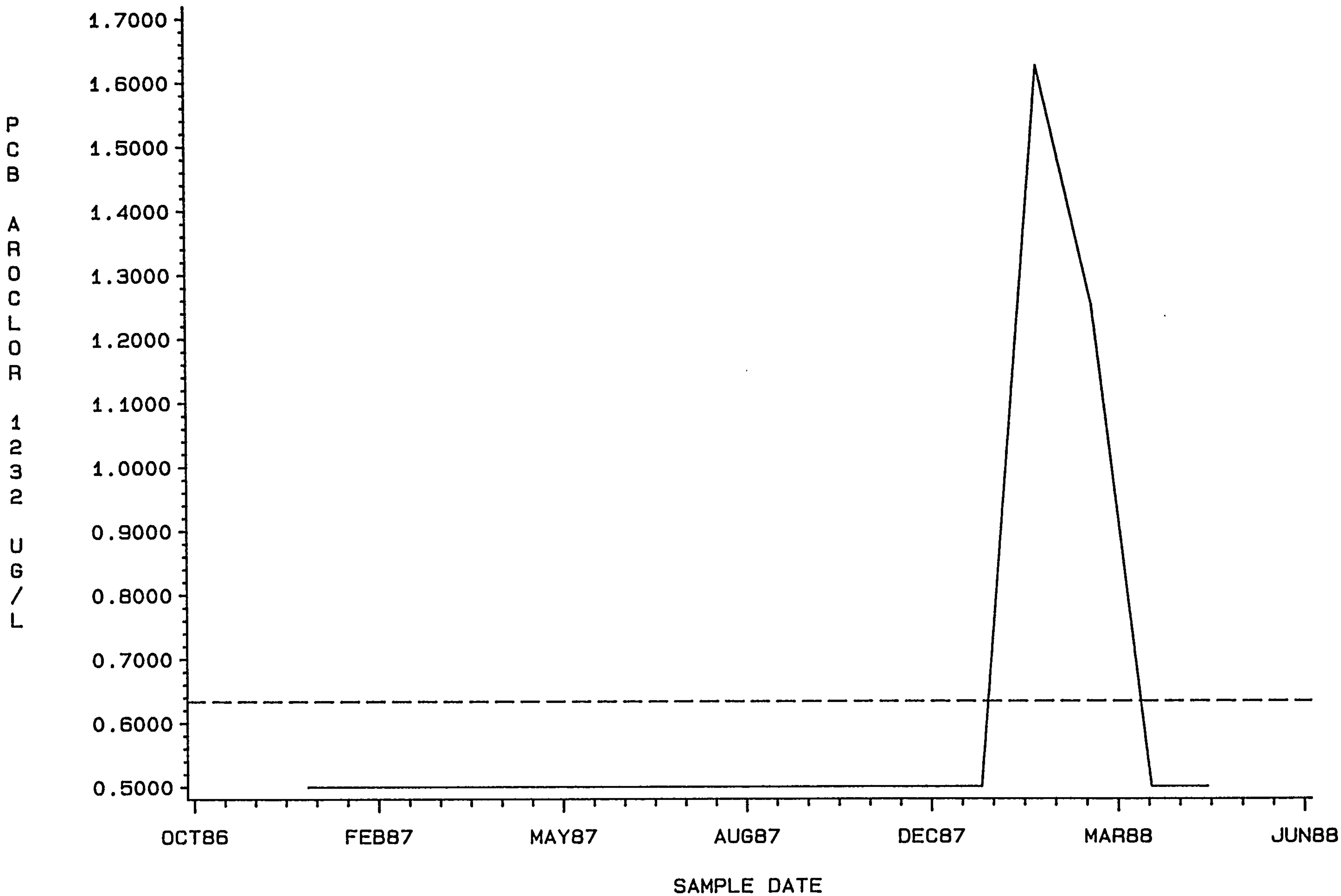
K1407B NPDES DATA – PCB (AROCLOR–1016) UG/L



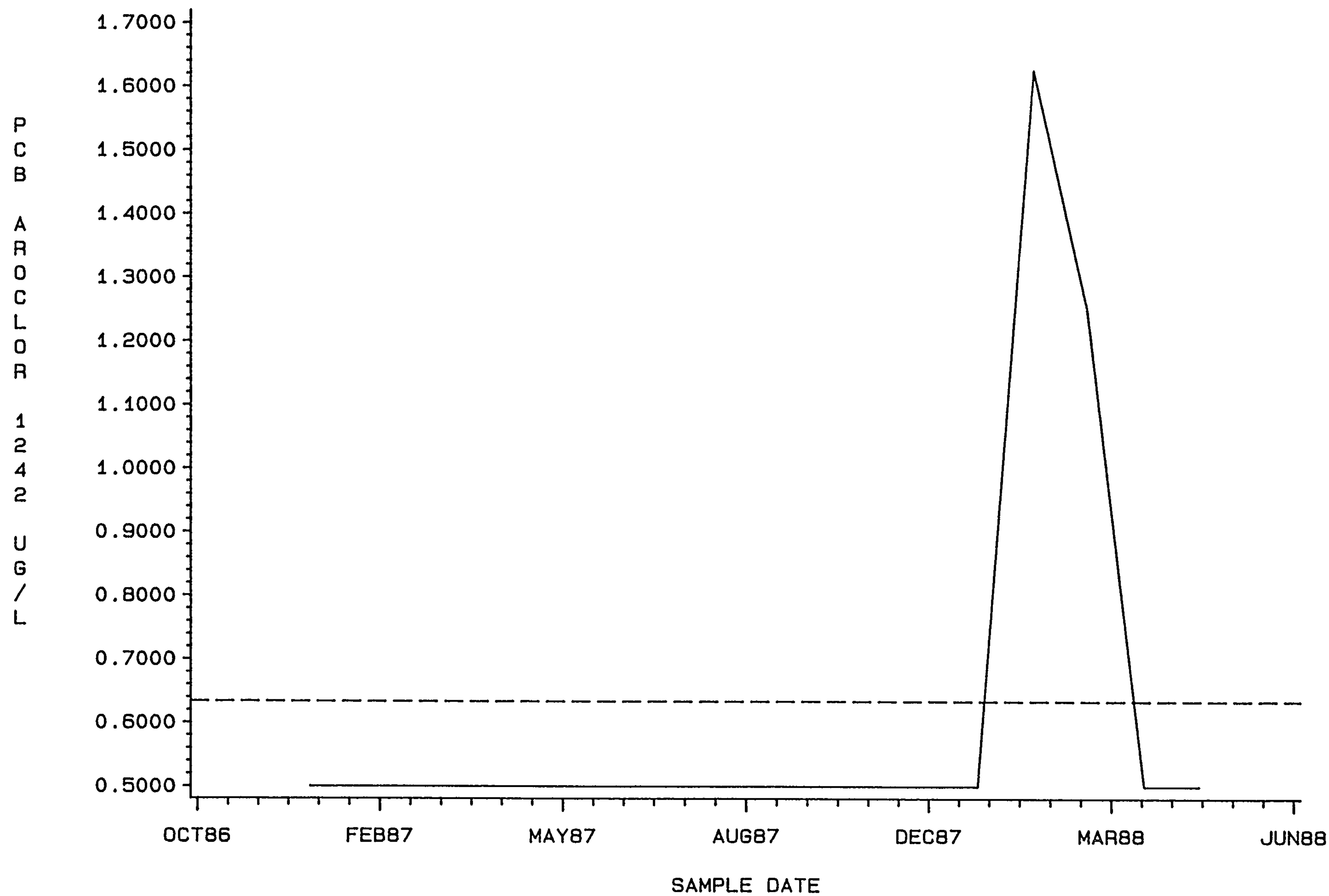
K1407B NPDES DATA – PCB (AROCLOR–1221) UG/L



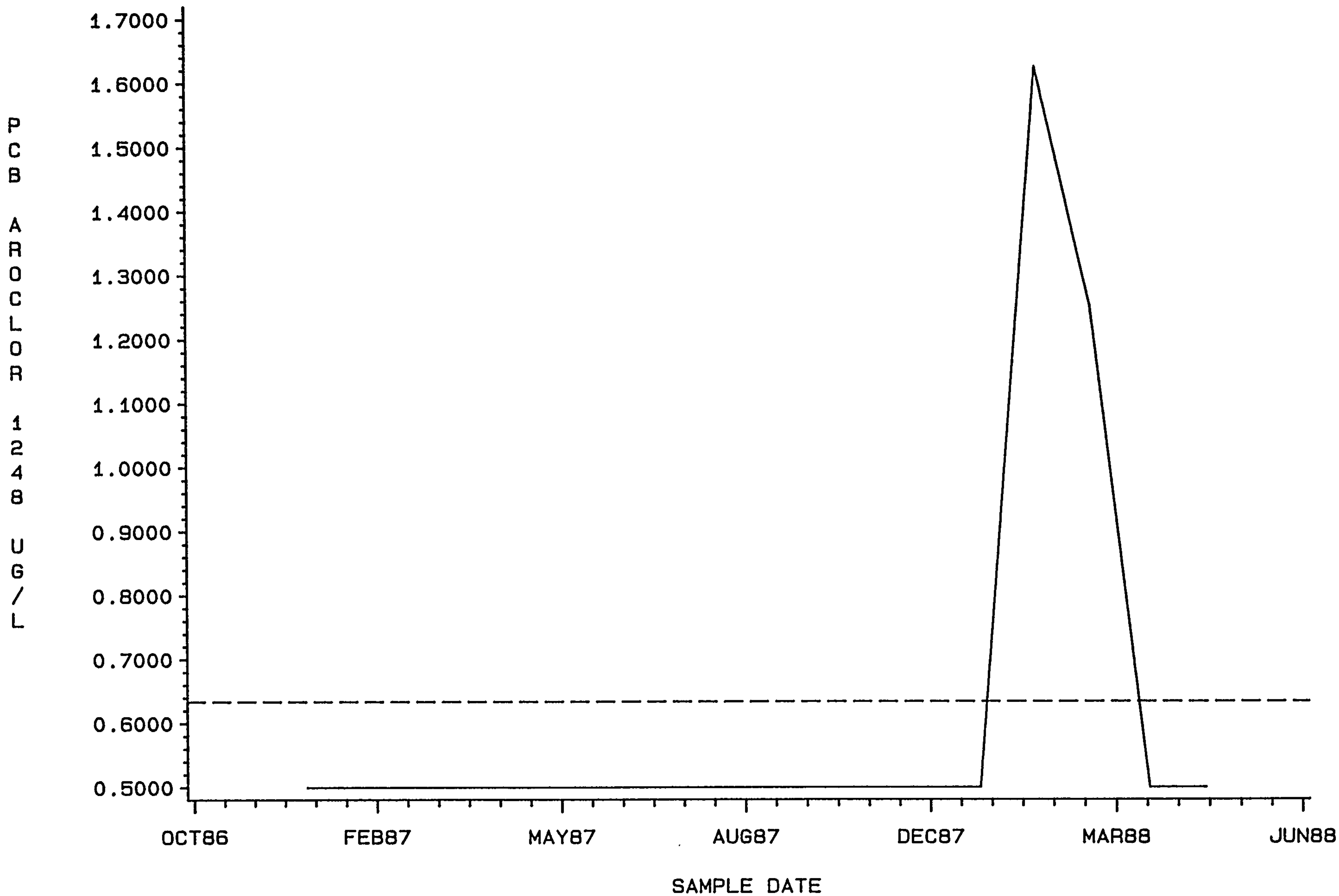
K1407B NPDES DATA – PCB (AROCLOR–1232) UG/L



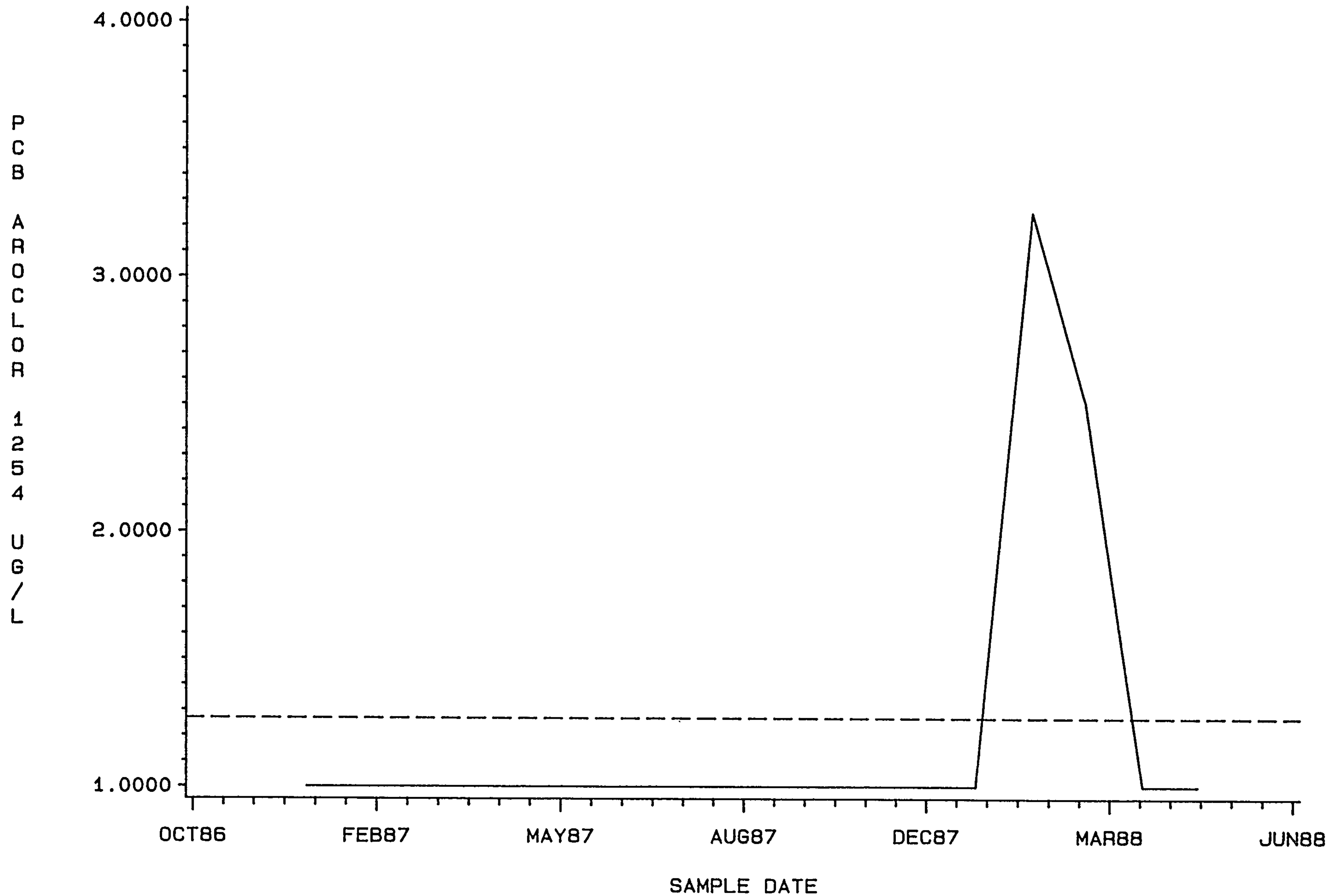
K1407B NPDES DATA – PCB (AROCLOR–1242) UG/L



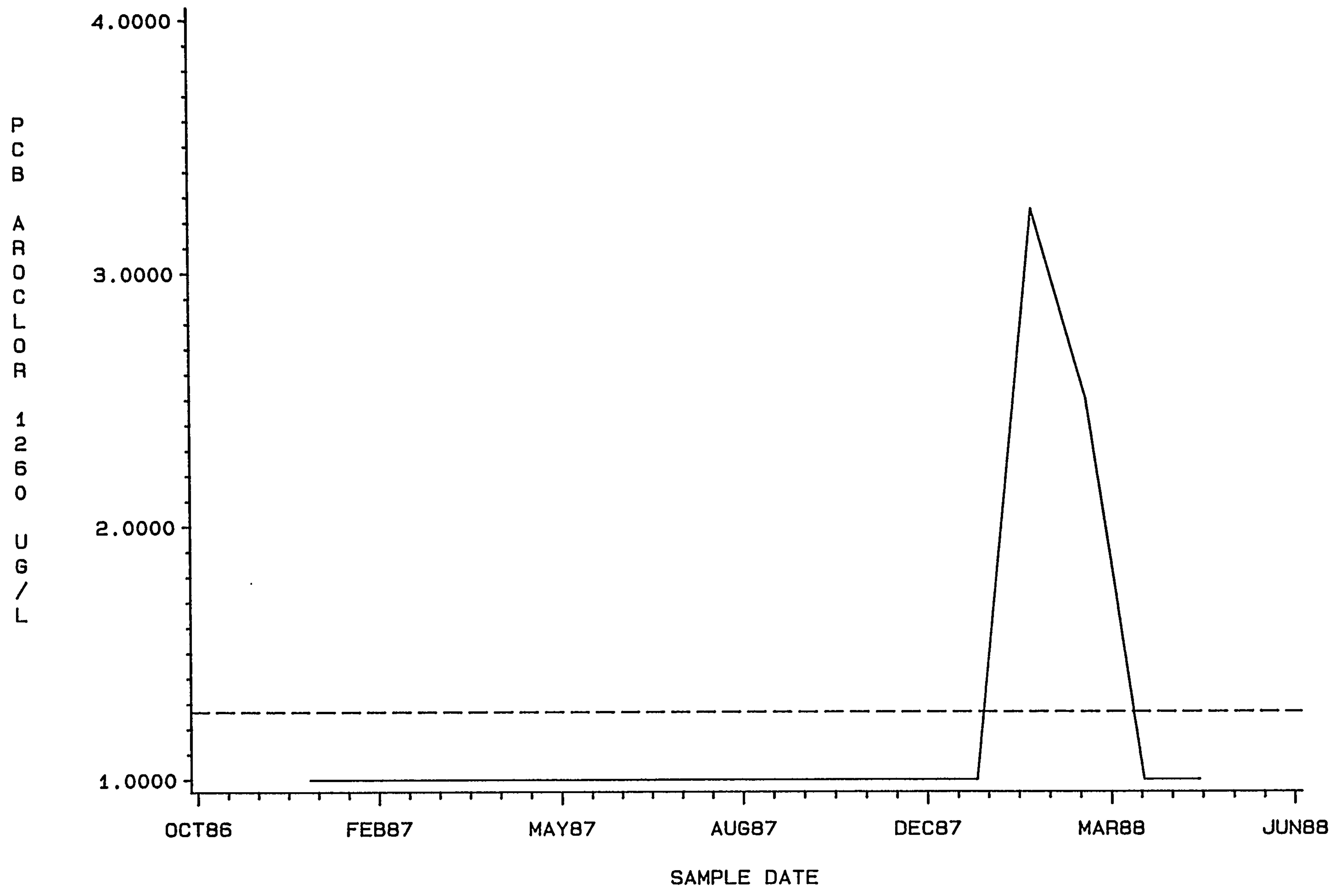
K1407B NPDES DATA – PCB (AROCLOR–1248) UG/L



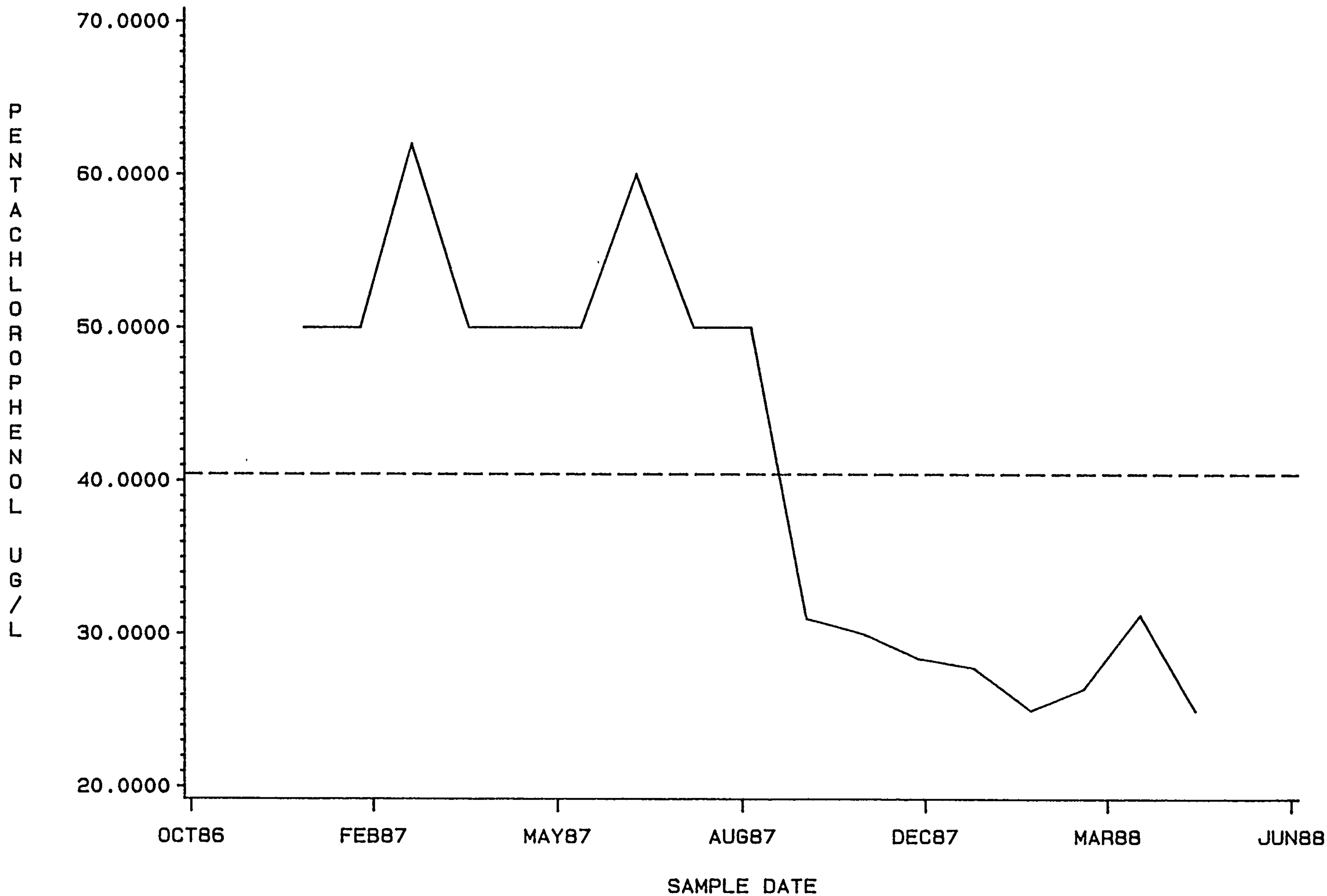
K1407B NPDES DATA – PCB (AROCLOR–1254) UG/L



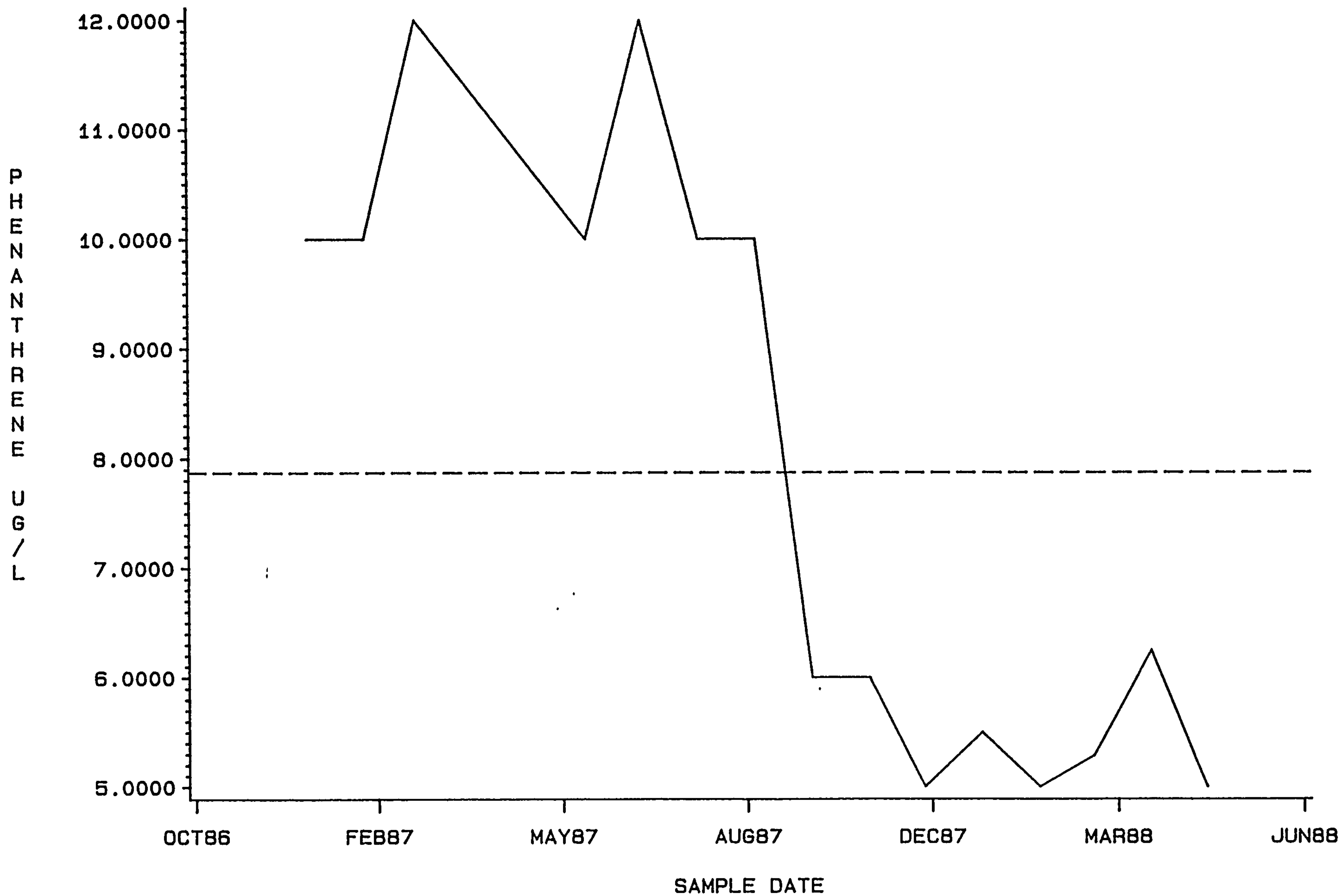
K1407B NPDES DATA – PCB (AROCLOR–1260) UG/L

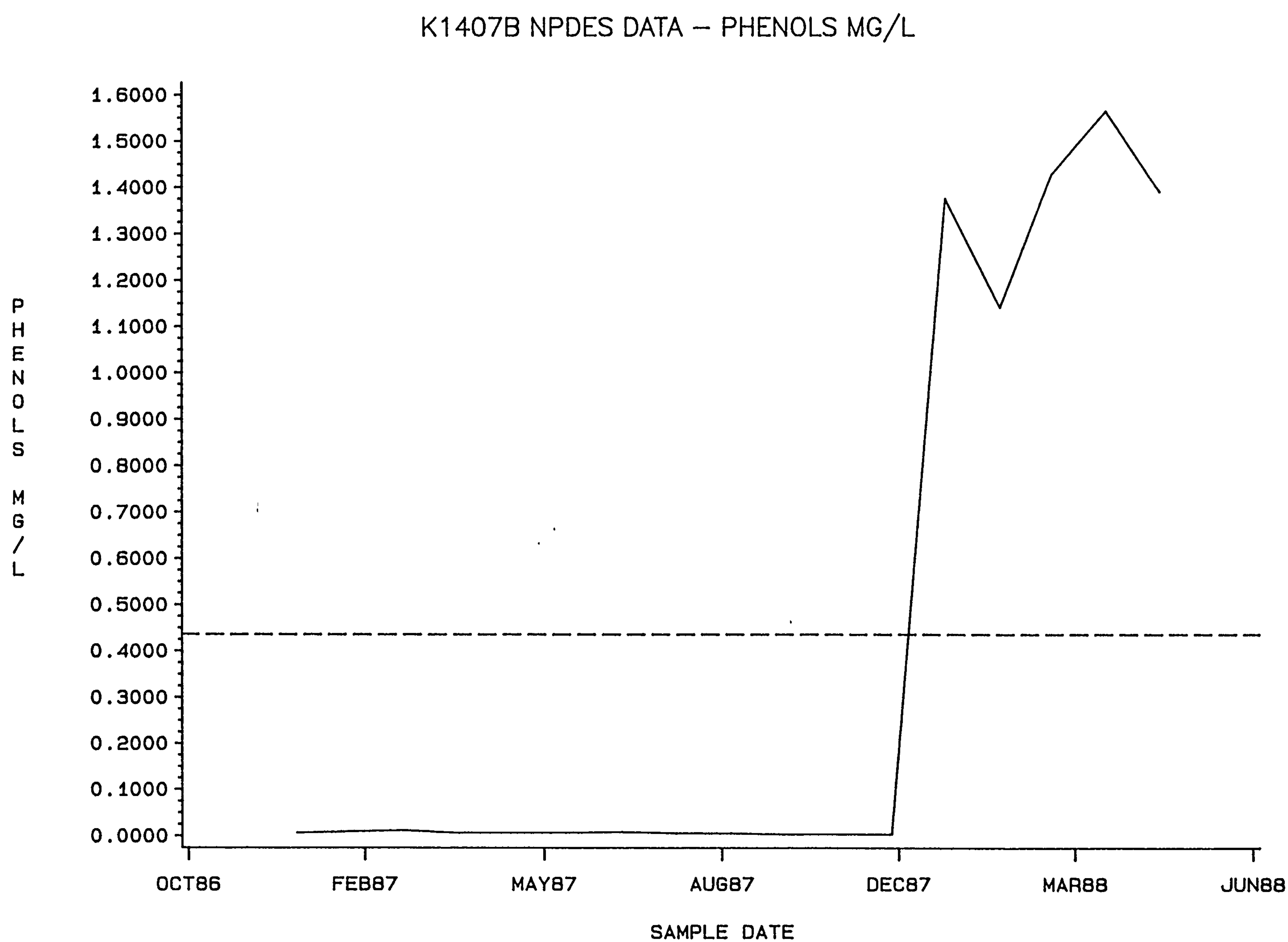


K1407B NPDES DATA — PENTACHLOROPHENOL UG/L

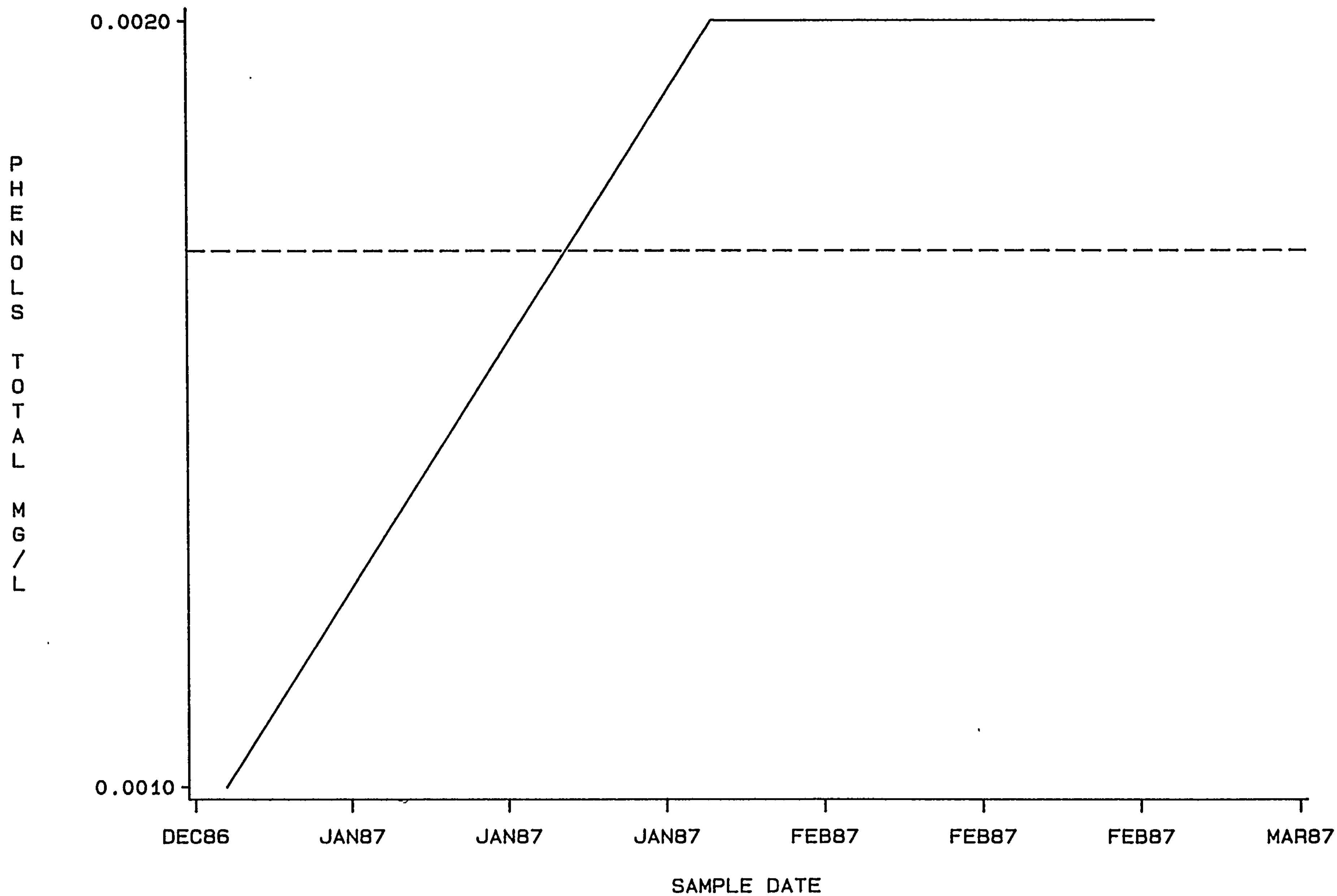


K1407B NPDES DATA – PHENANTHRENE UG/L

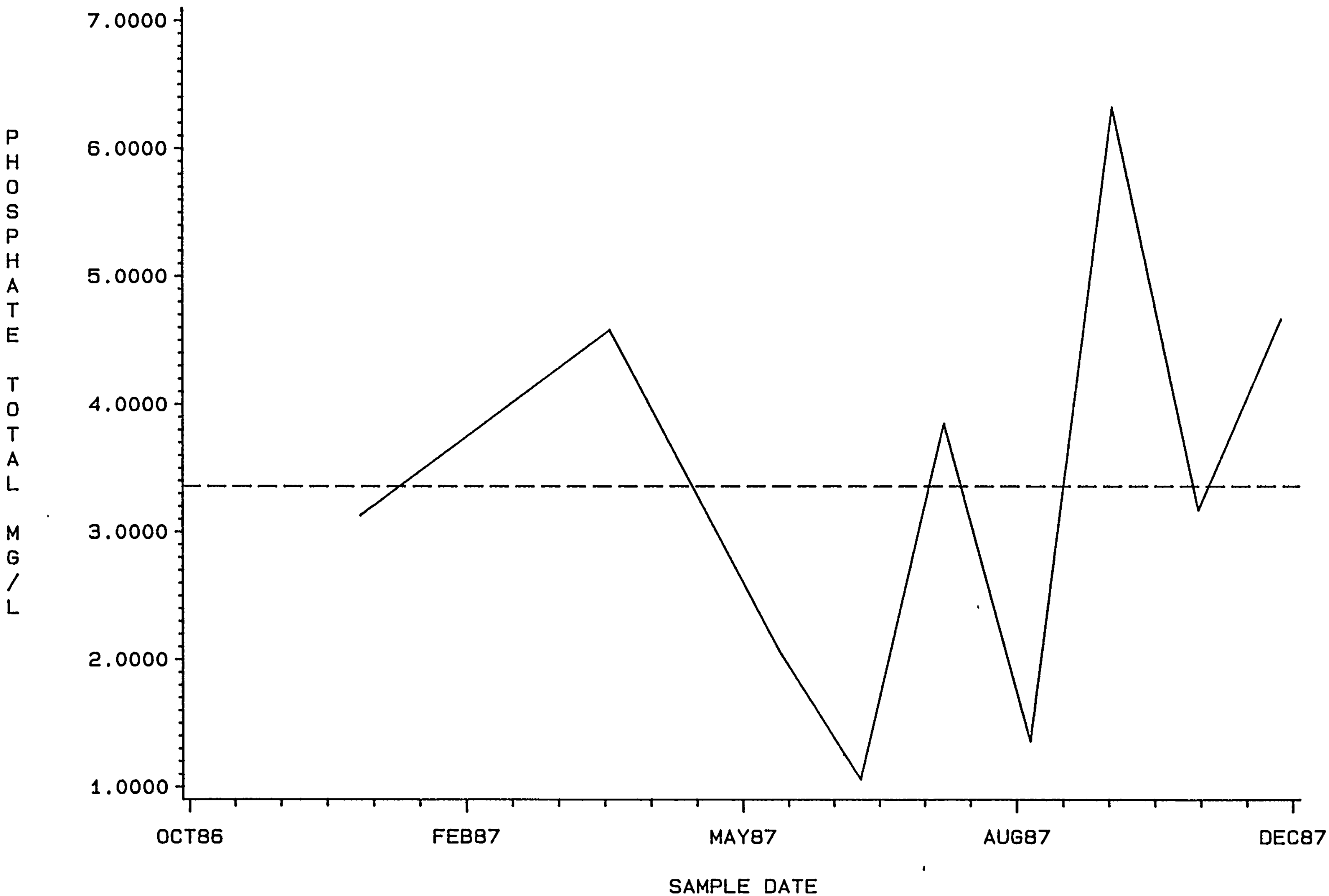



K1407B NPDES DATA – PHENOLS MG/L
PHENOLS MG/L
1.6000
1.5000
1.4000
1.3000
1.2000
1.1000
1.0000
0.9000
0.8000
0.7000
0.6000
0.5000
0.4000
0.3000
0.2000
0.1000
0.0000
OCT86
FEB87
MAY87
AUG87
DEC87
MAR88
JUN88
SAMPLE DATE

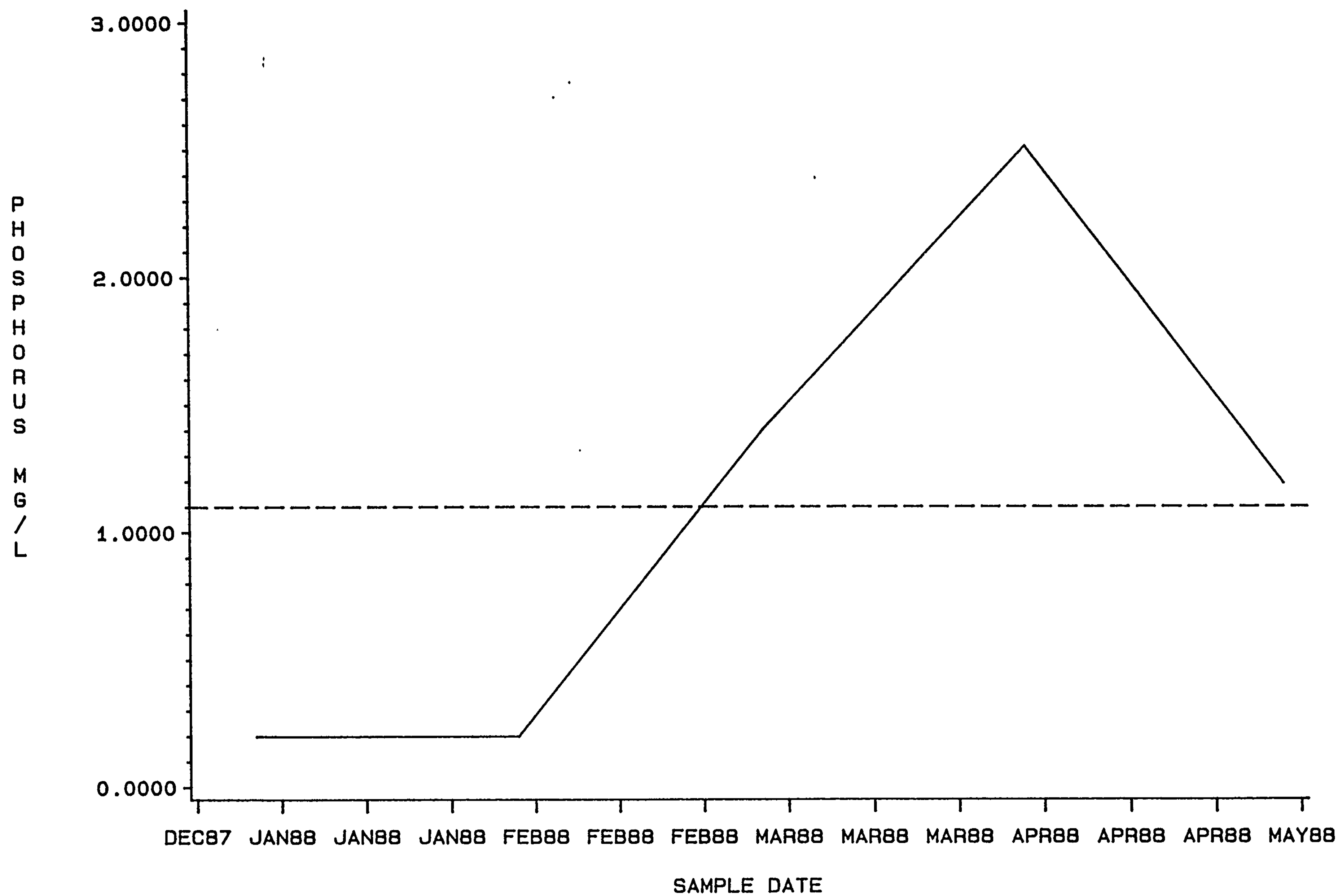
K1407B NPDES DATA – PHENOLS (TOTAL) MG/L



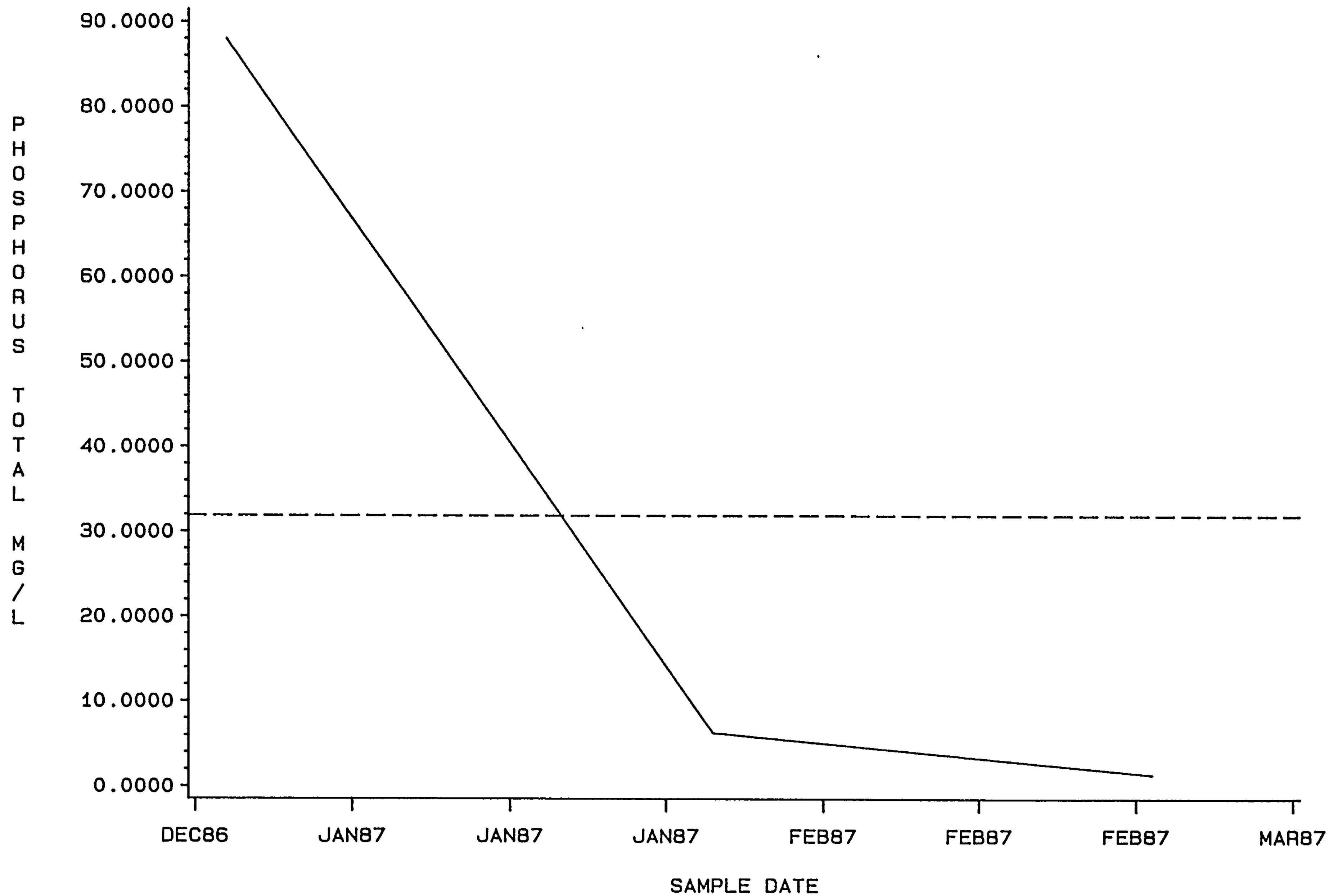
K1407B NPDES DATA — PHOSPHATE (TOTAL) MG/L

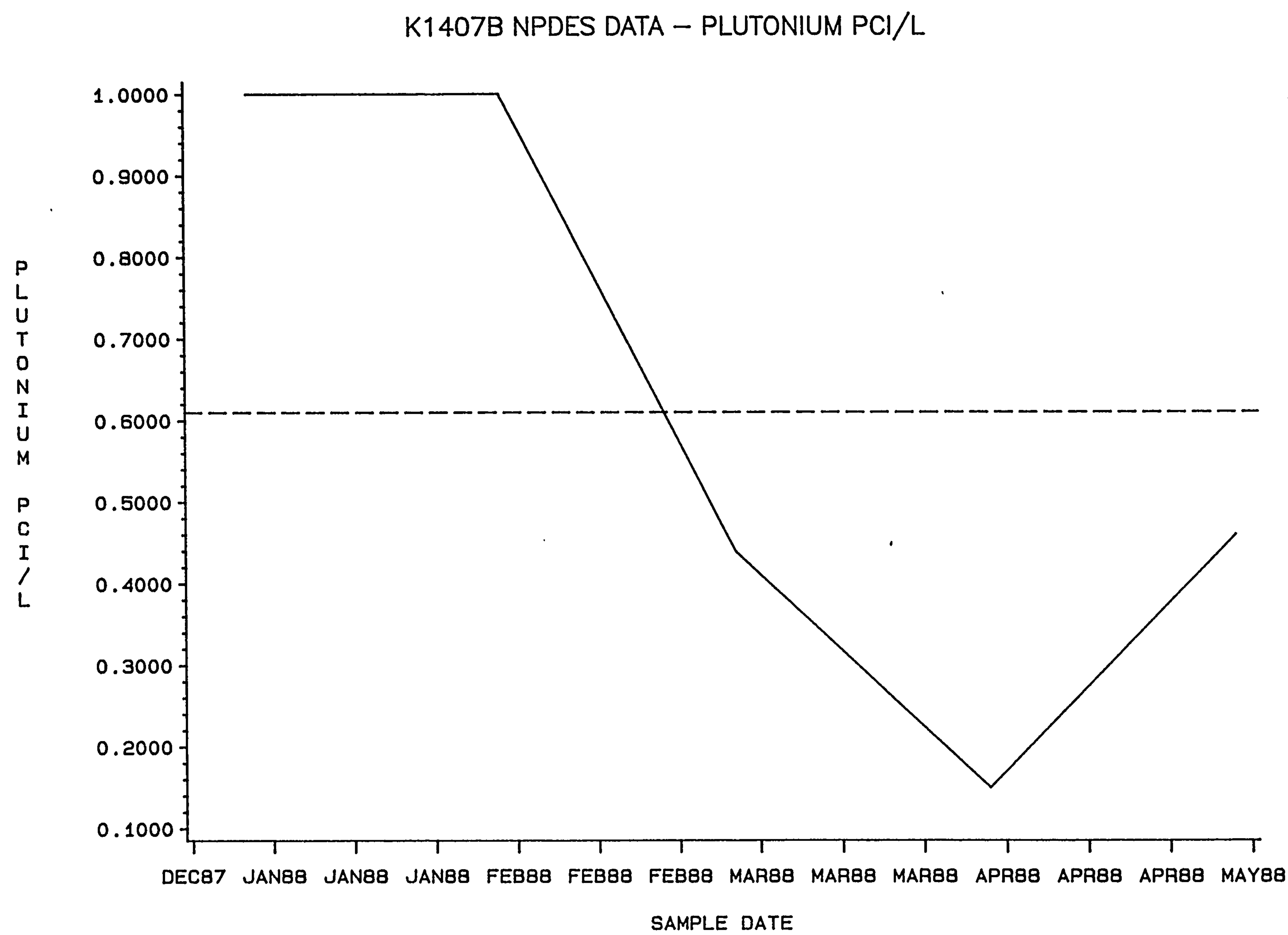


K1407B NPDES DATA – PHOSPHORUS MG/L

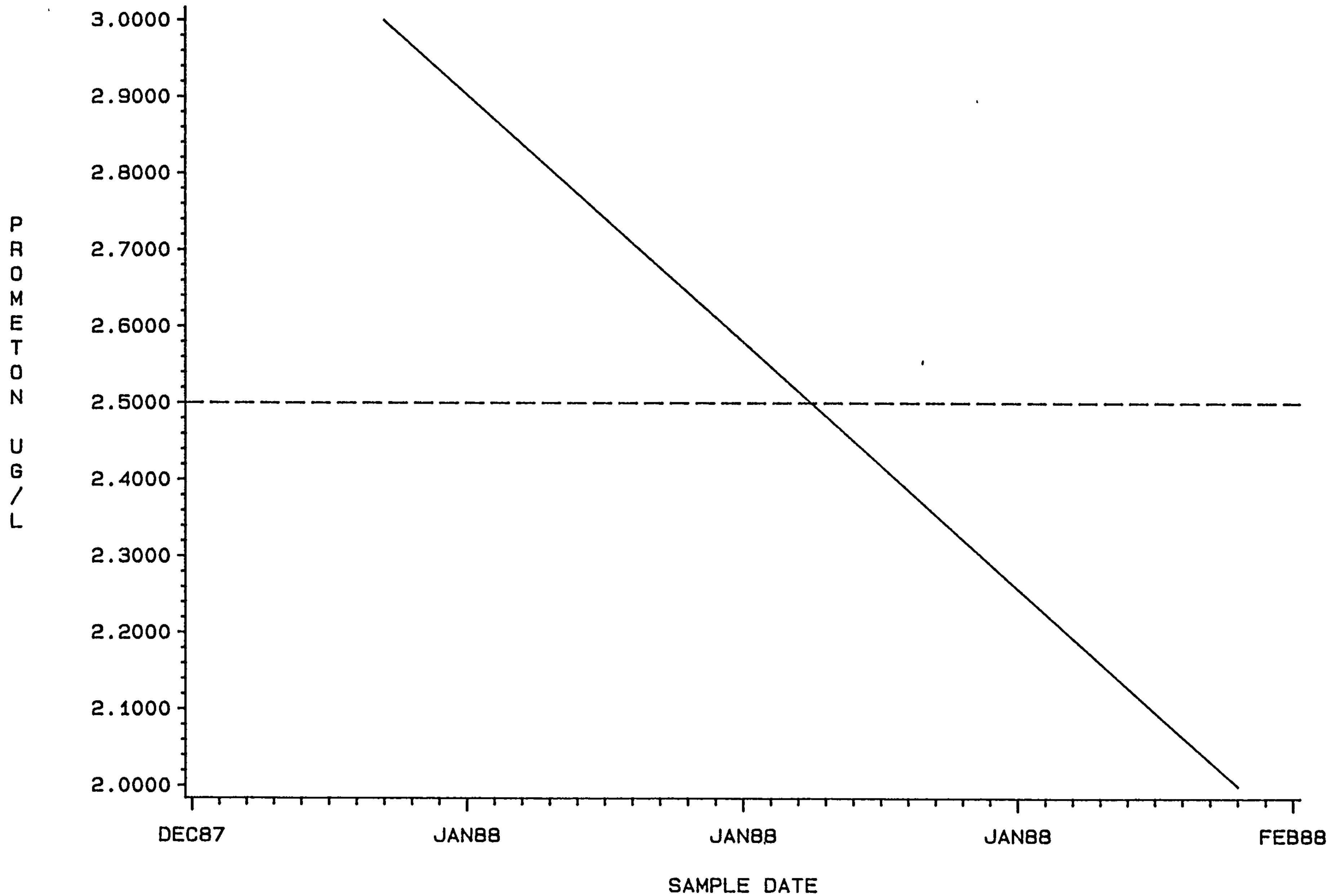


K1407B NPDES DATA – PHOSPHORUS (TOTAL) MG/L

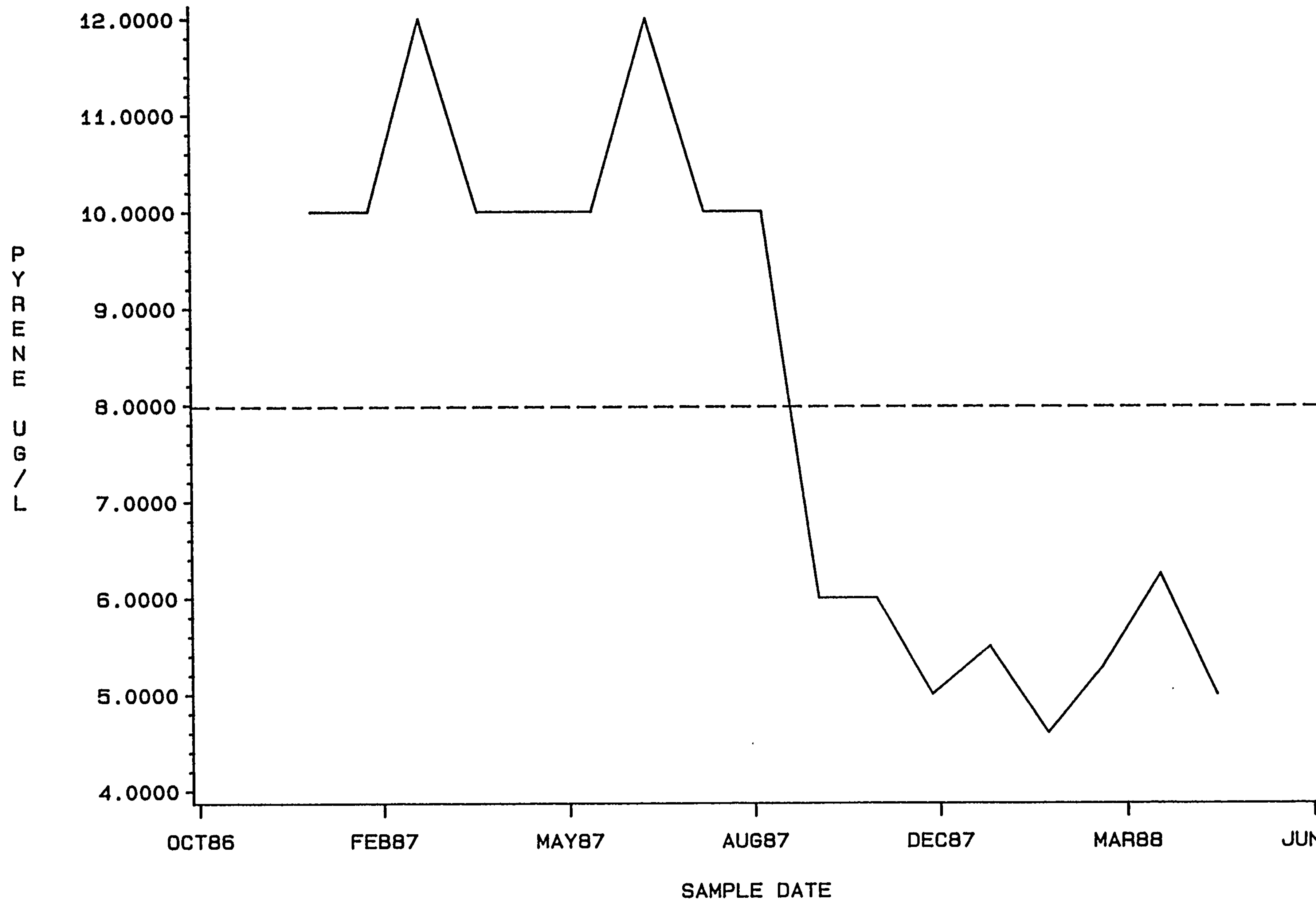



K1407B NPDES DATA – PLUTONIUM PCI/L
1.0000
0.9000
0.8000
0.7000
0.6000
0.5000
0.4000
0.3000
0.2000
0.1000
PLUTONIUM PCI/L
DEC87
JAN88
JAN88
JAN88
FEB88
FEB88
FEB88
MAR88
MAR88
MAR88
APR88
APR88
APR88
MAY88
SAMPLE DATE

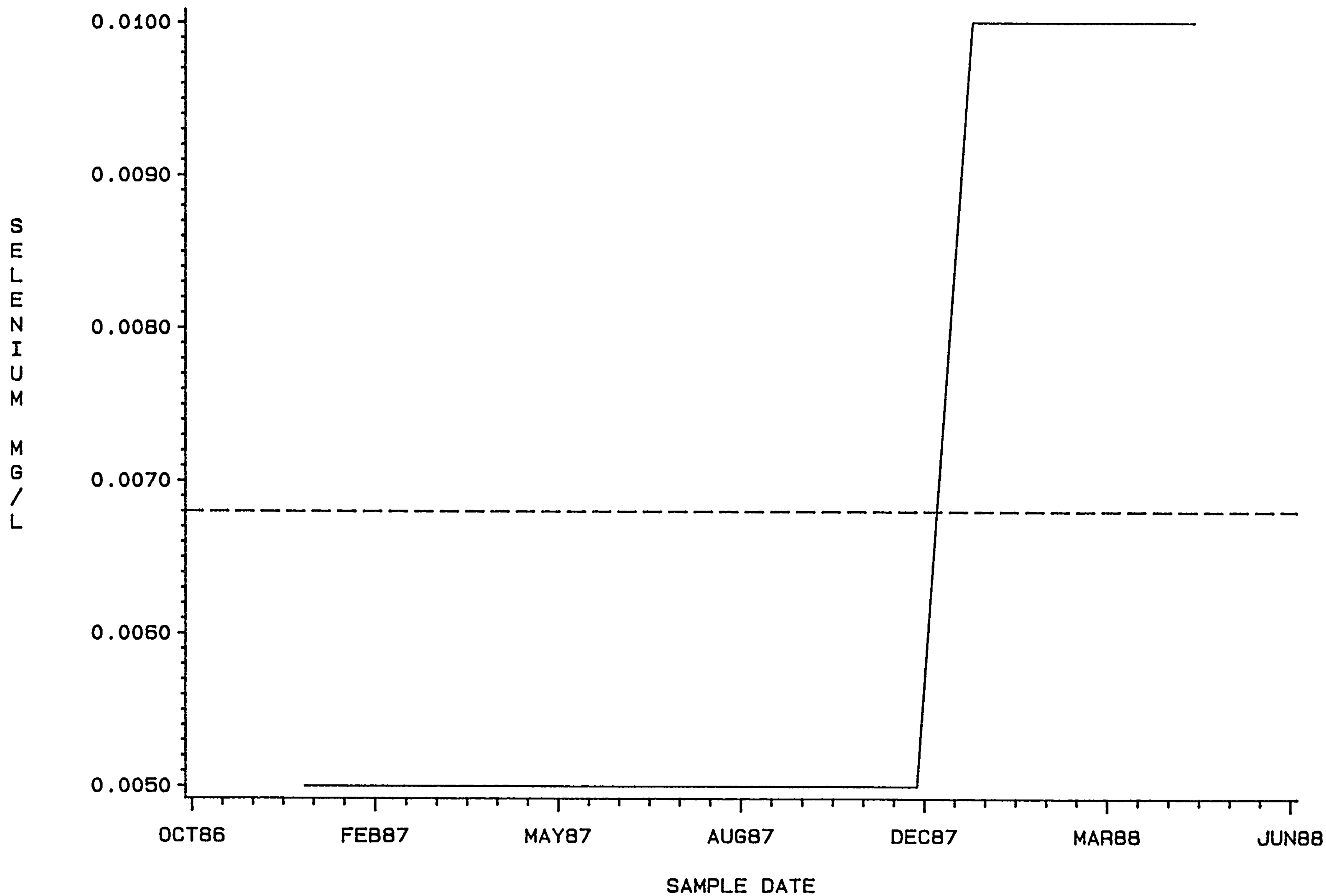
K1407B NPDES DATA – PROMETON UG/L



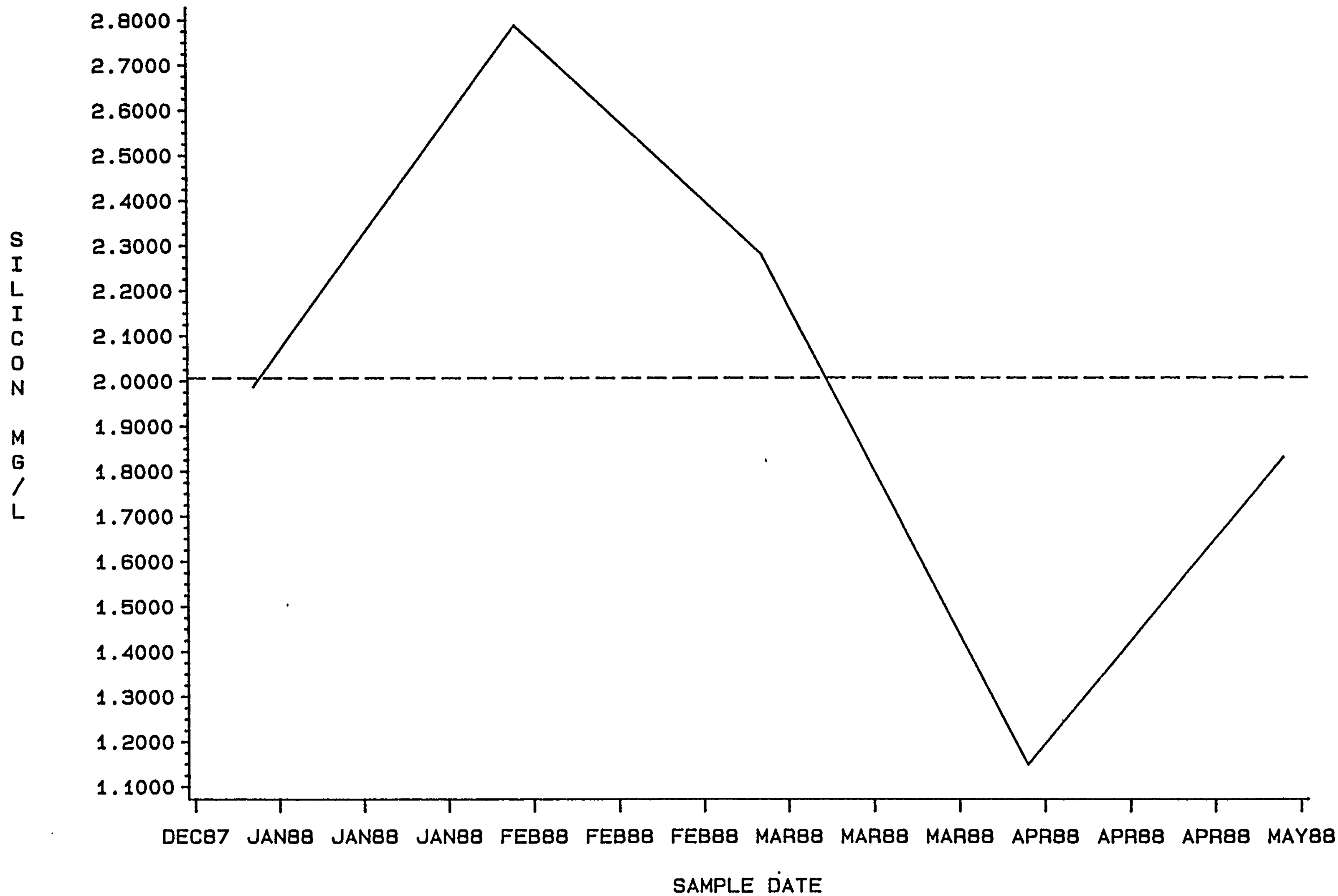
K1407B NPDES DATA – PYRENE UG/L



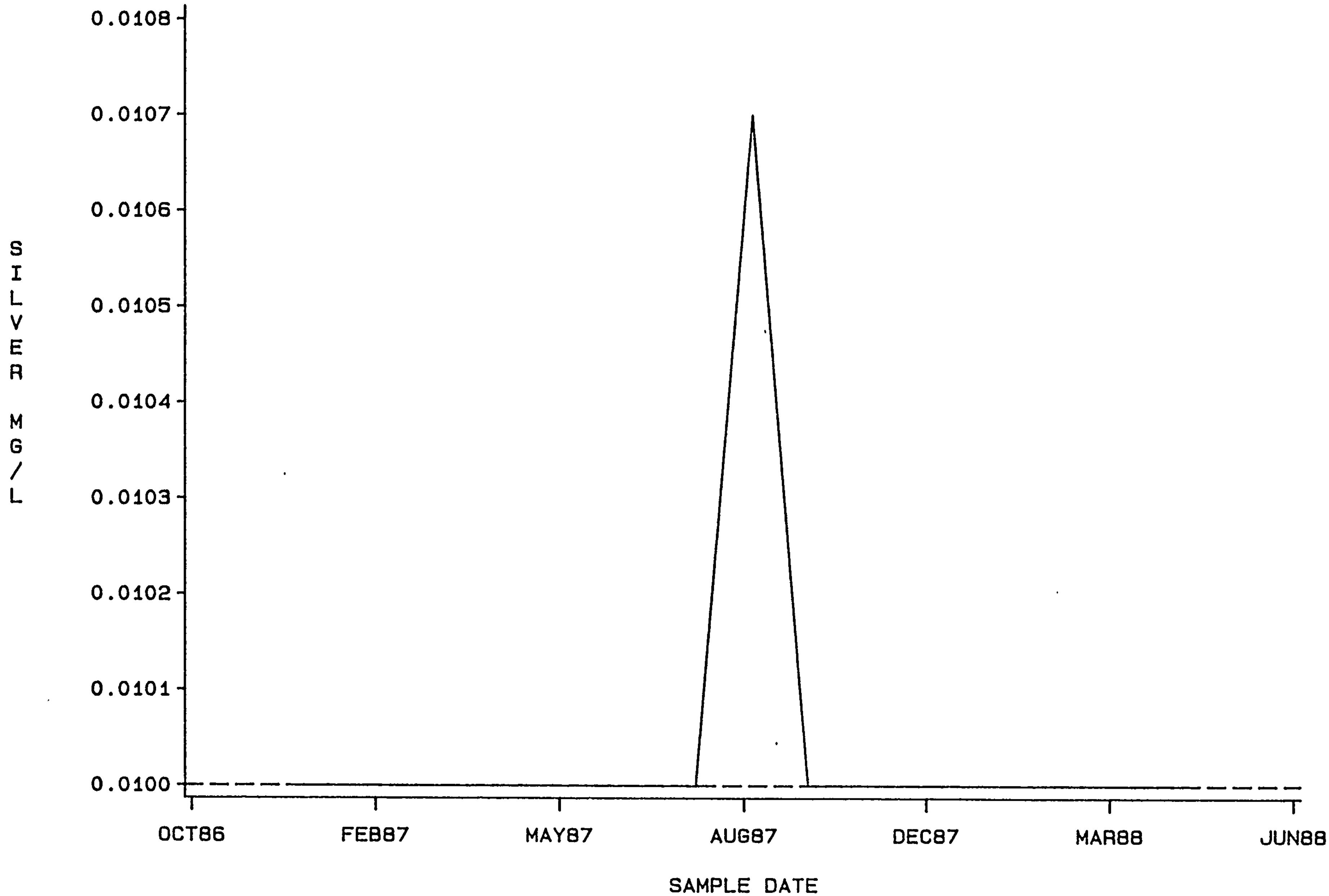
K1407B NPDES DATA – SELENIUM MG/L

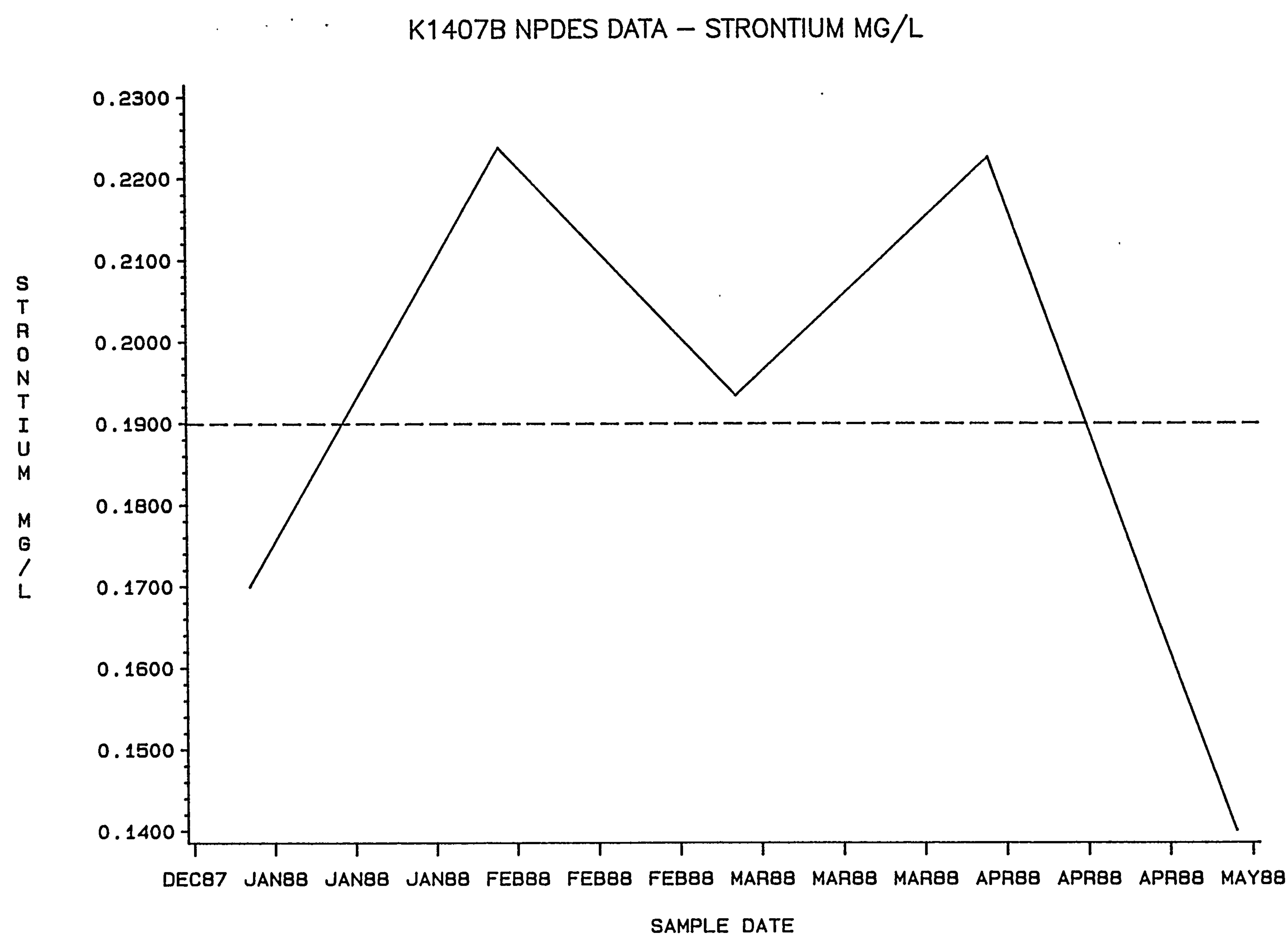


K1407B NPDES DATA – SILICON MG/L

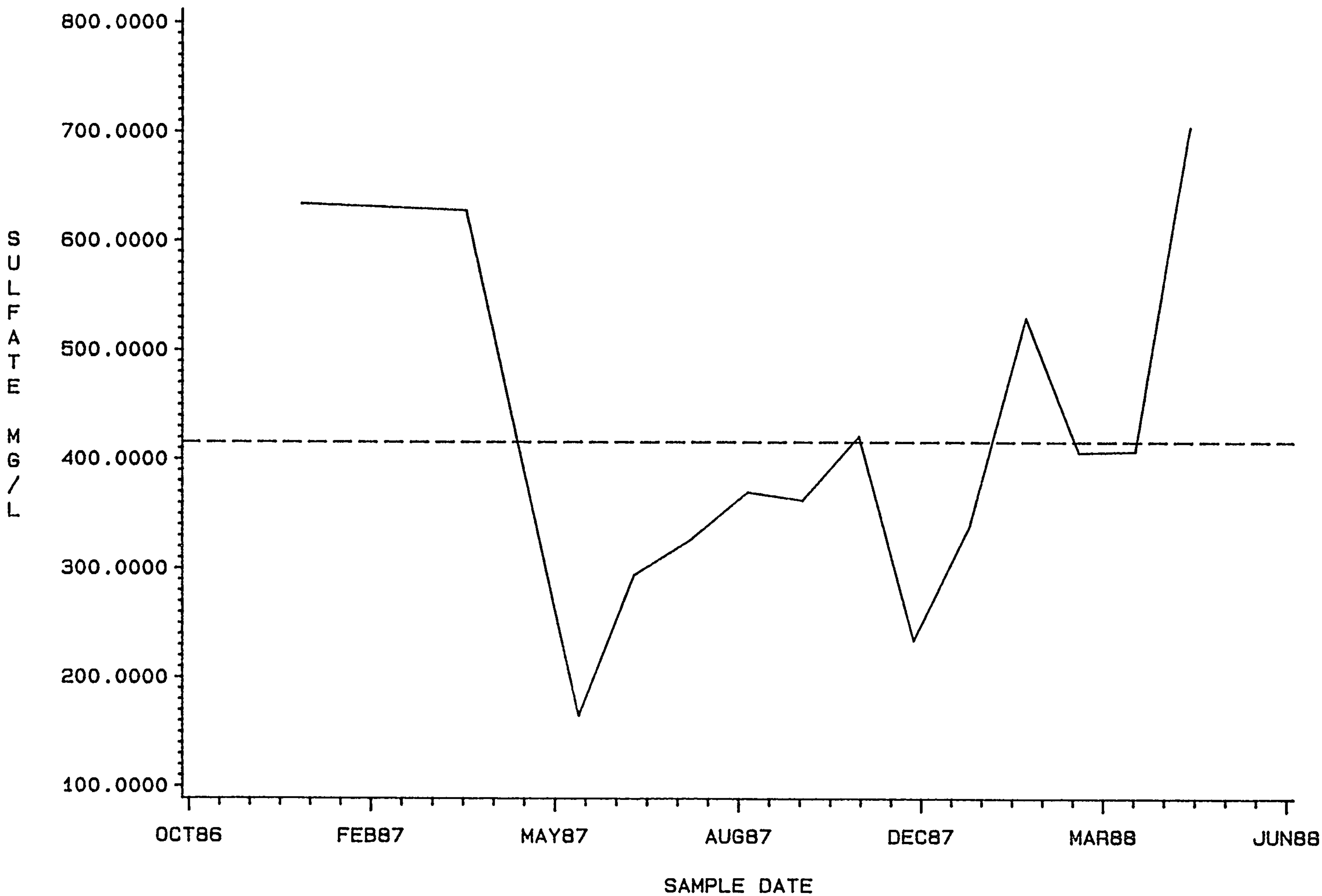


K1407B NPDES DATA – SILVER MG/L

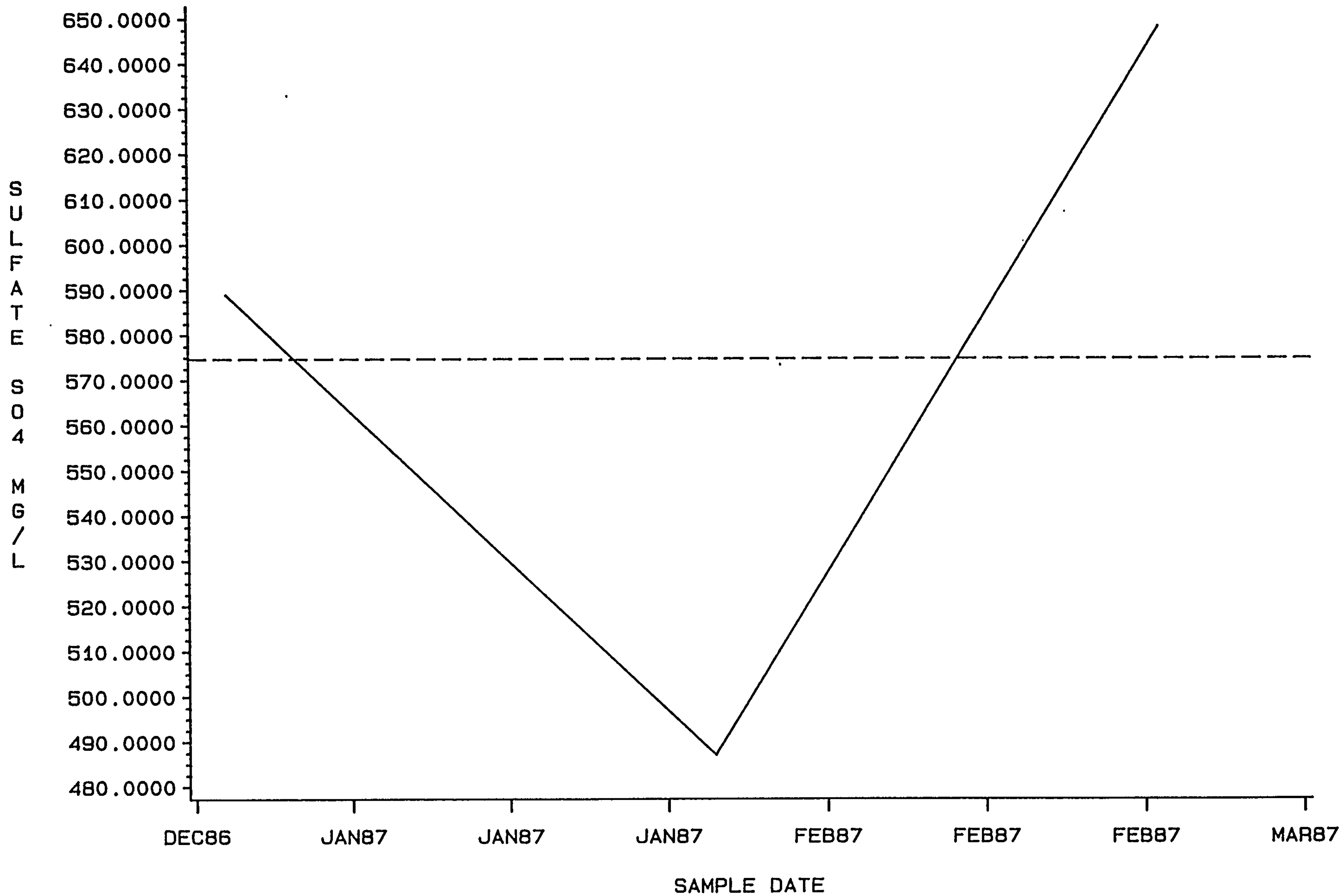



K1407B NPDES DATA – STRONTIUM MG/L
STRONTIUM MG/L
0.2300
0.2200
0.2100
0.2000
0.1900
0.1800
0.1700
0.1600
0.1500
0.1400
DEC87
JAN88
JAN88
JAN88
FEB88
FEB88
FEB88
MAR88
MAR88
MAR88
APR88
APR88
APR88
MAY88
SAMPLE DATE

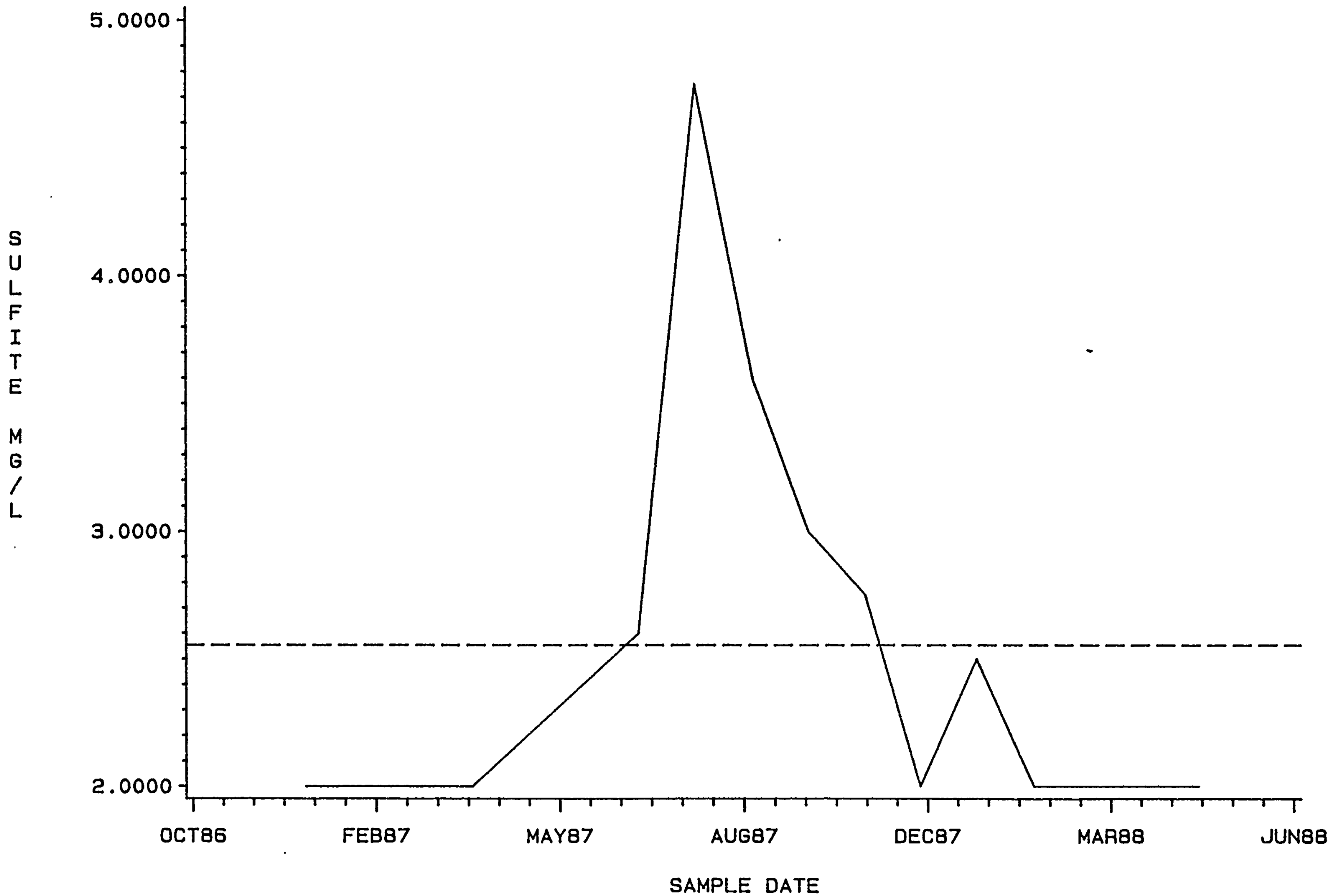
K1407B NPDES DATA – SULFATE MG/L



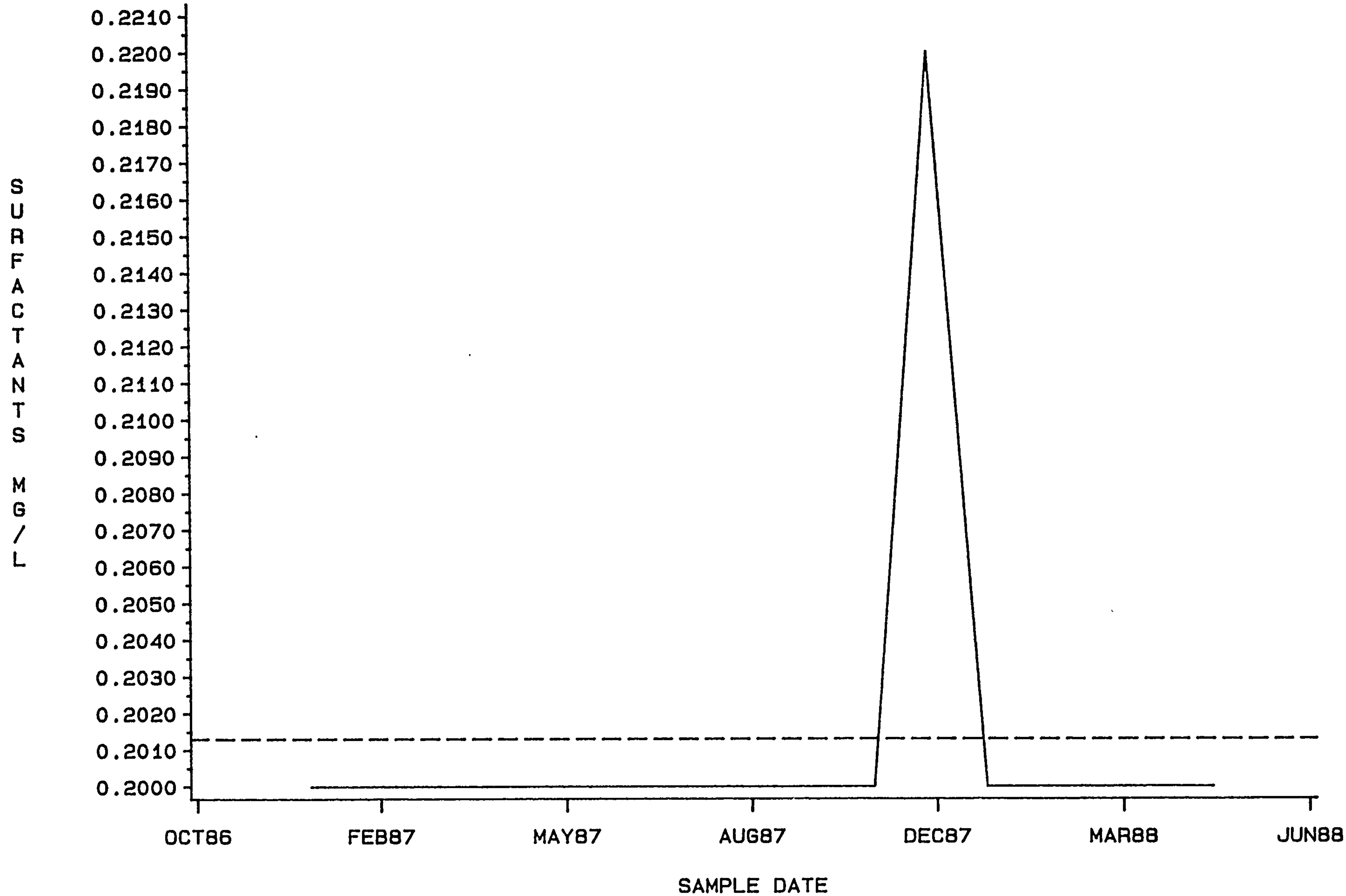
K1407B NPDES DATA – SULFATE (SO4) MG/L



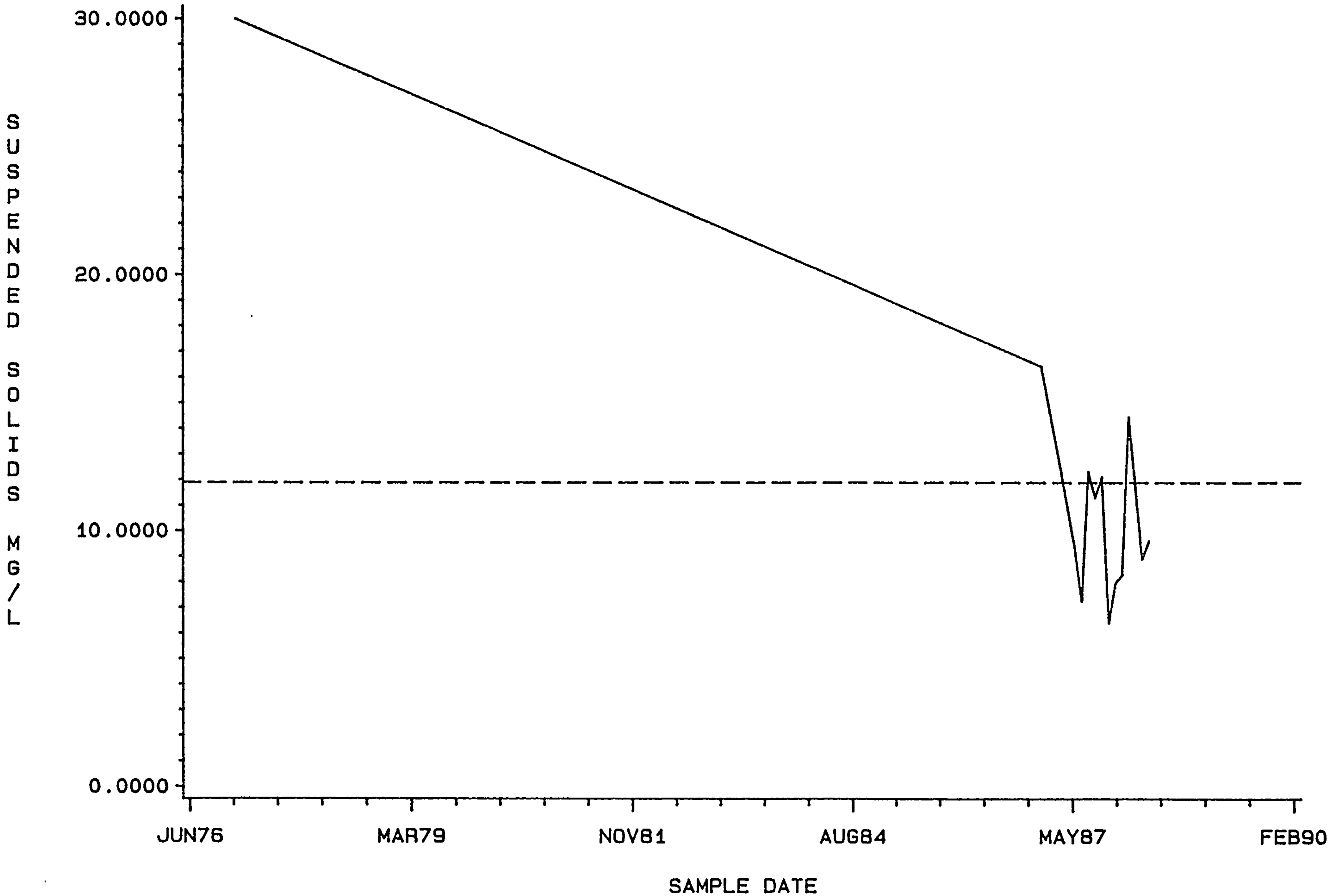
K1407B NPDES DATA – SULFITE MG/L



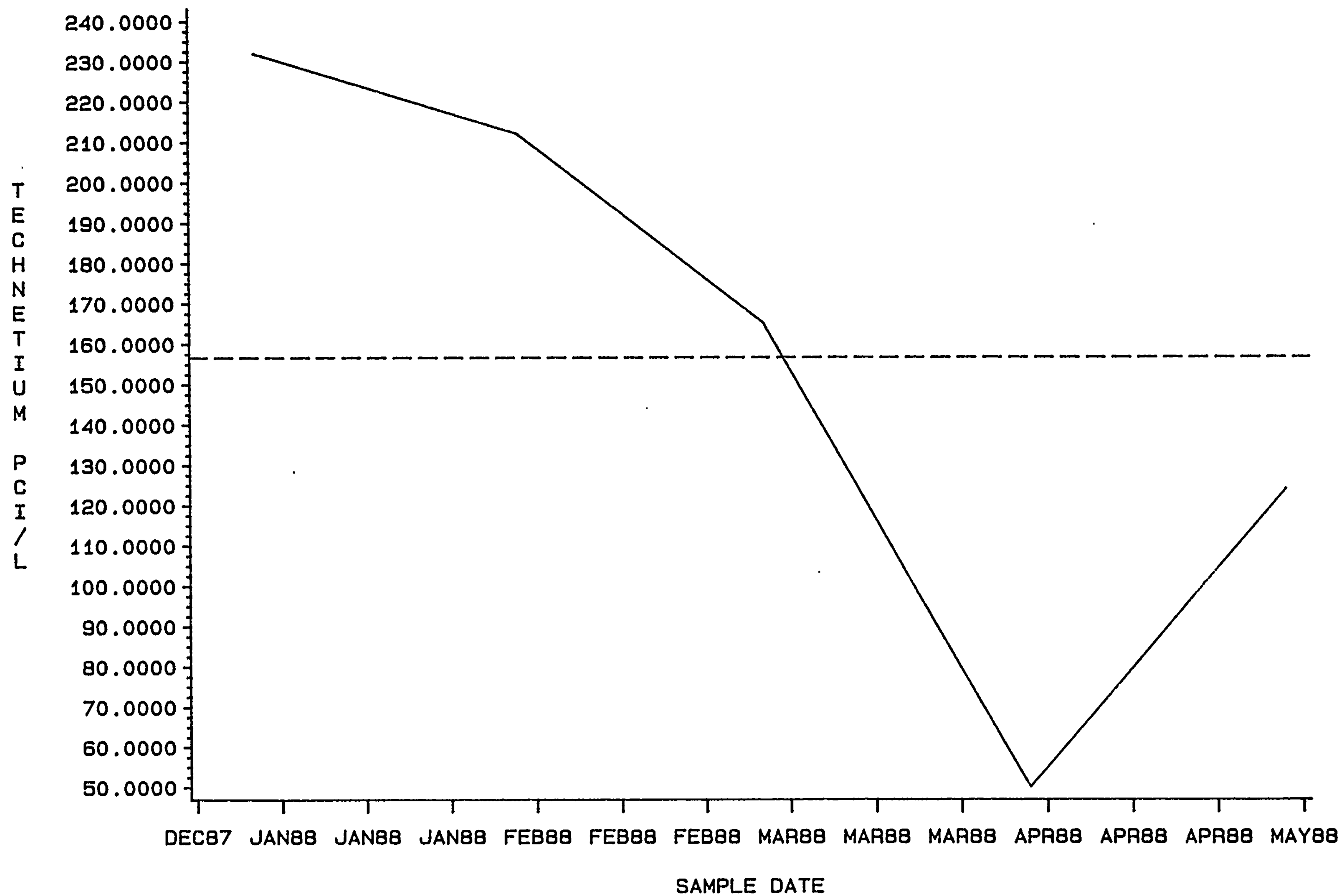
K1407B NPDES DATA – SURFACTANTS MG/L



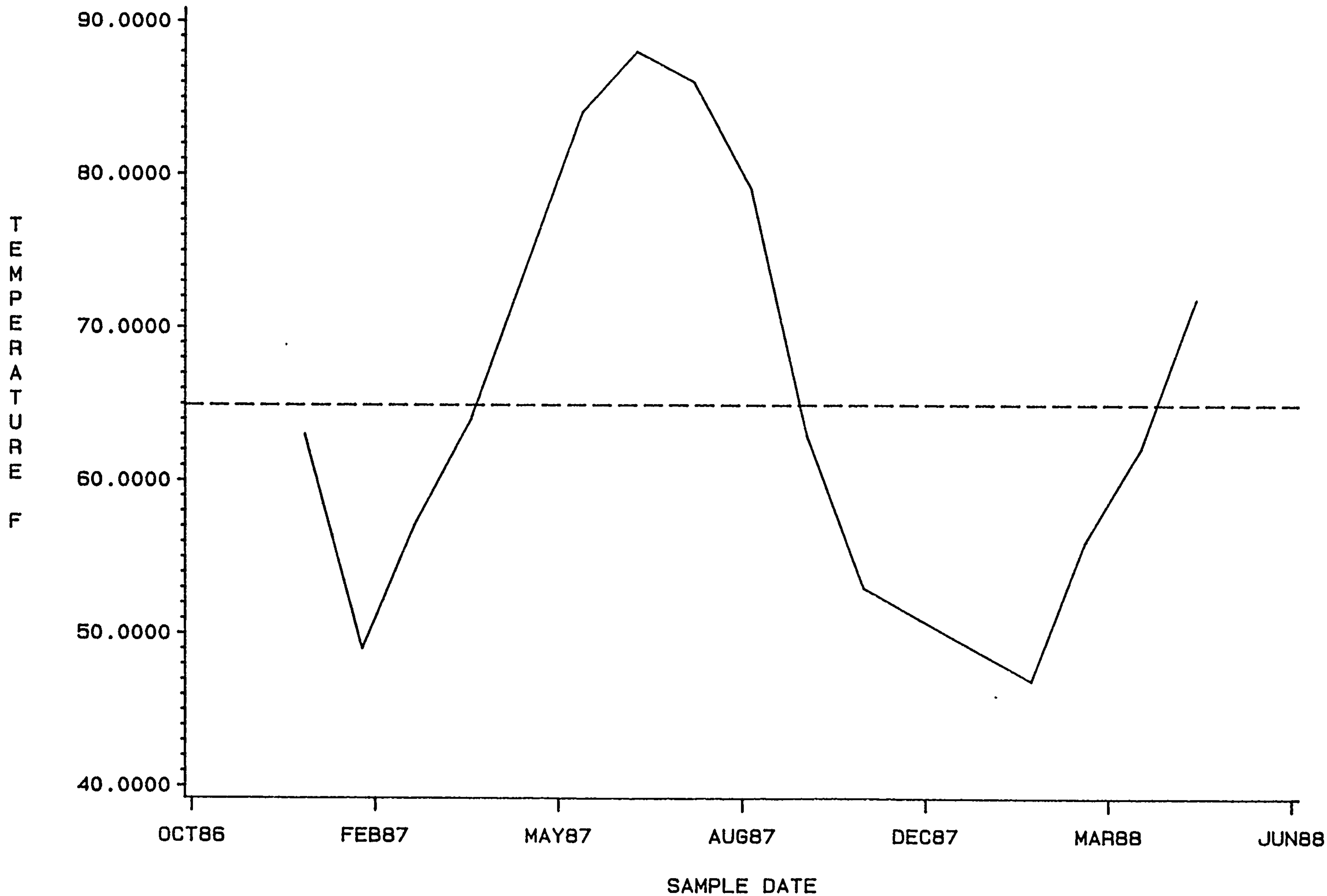
K1407B NPDES DATA — SUSPENDED SOLIDS MG/L



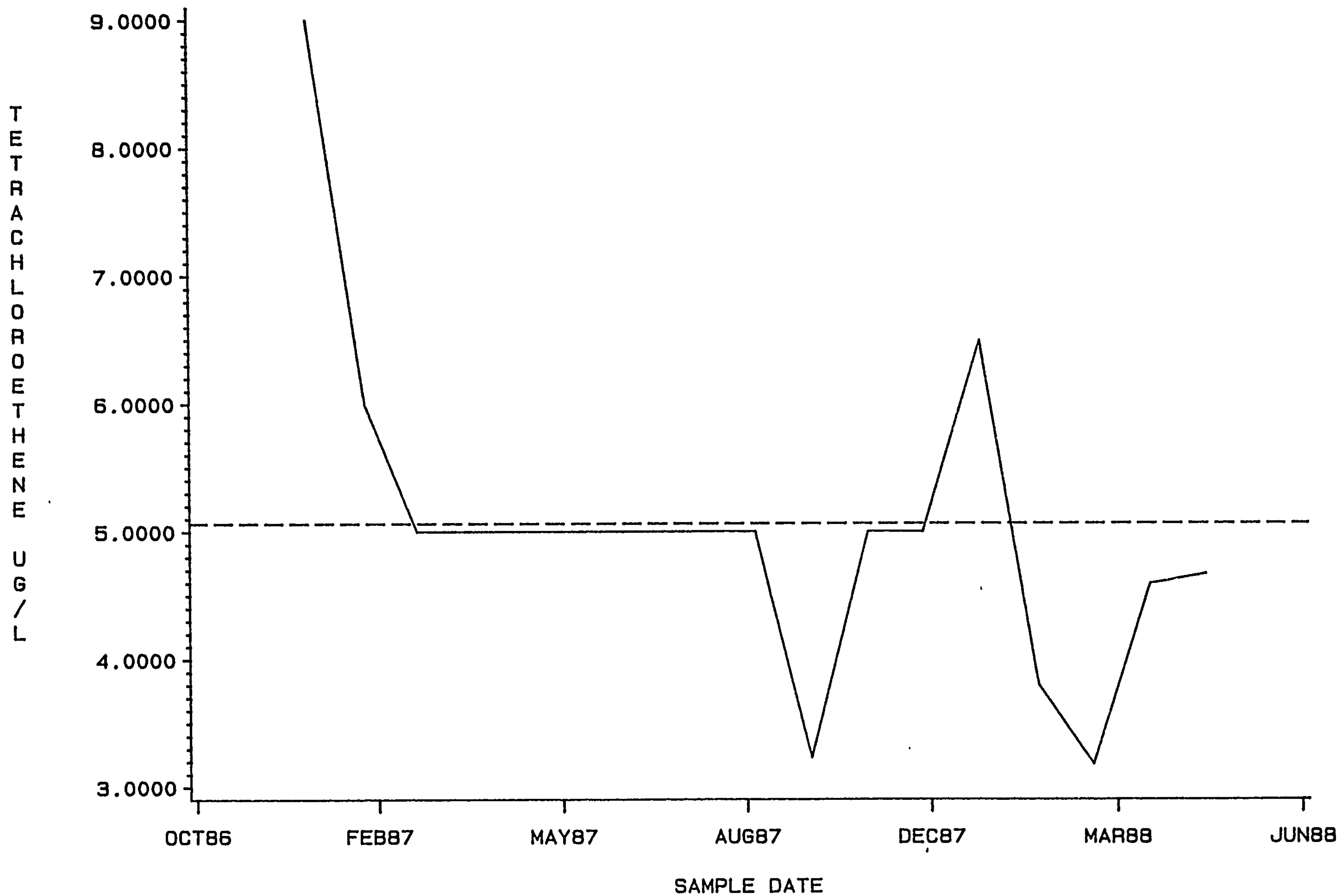
K1407B NPDES DATA – TECHNETIUM PCI/L



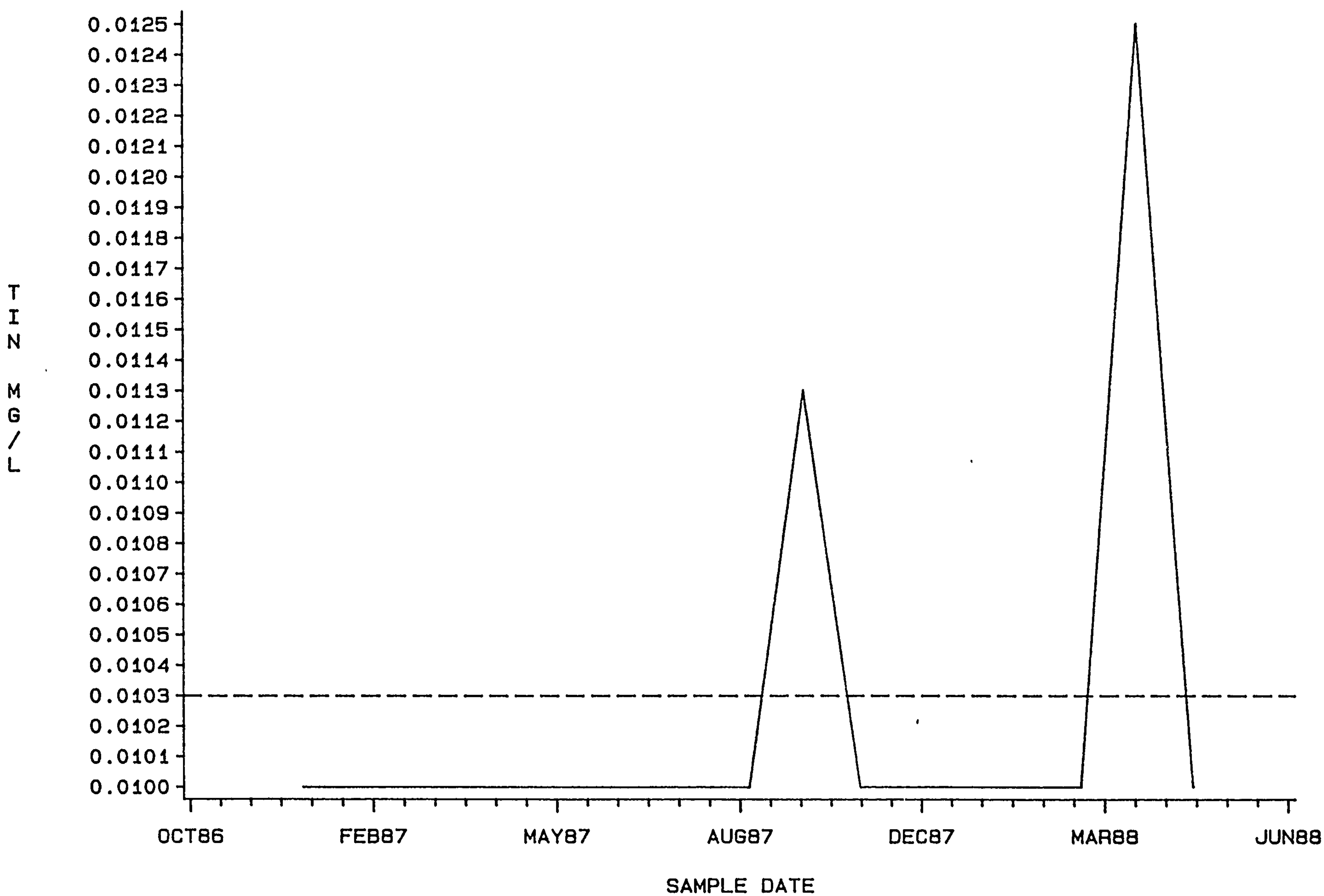
K1407B NPDES DATA – TEMPERATURE F



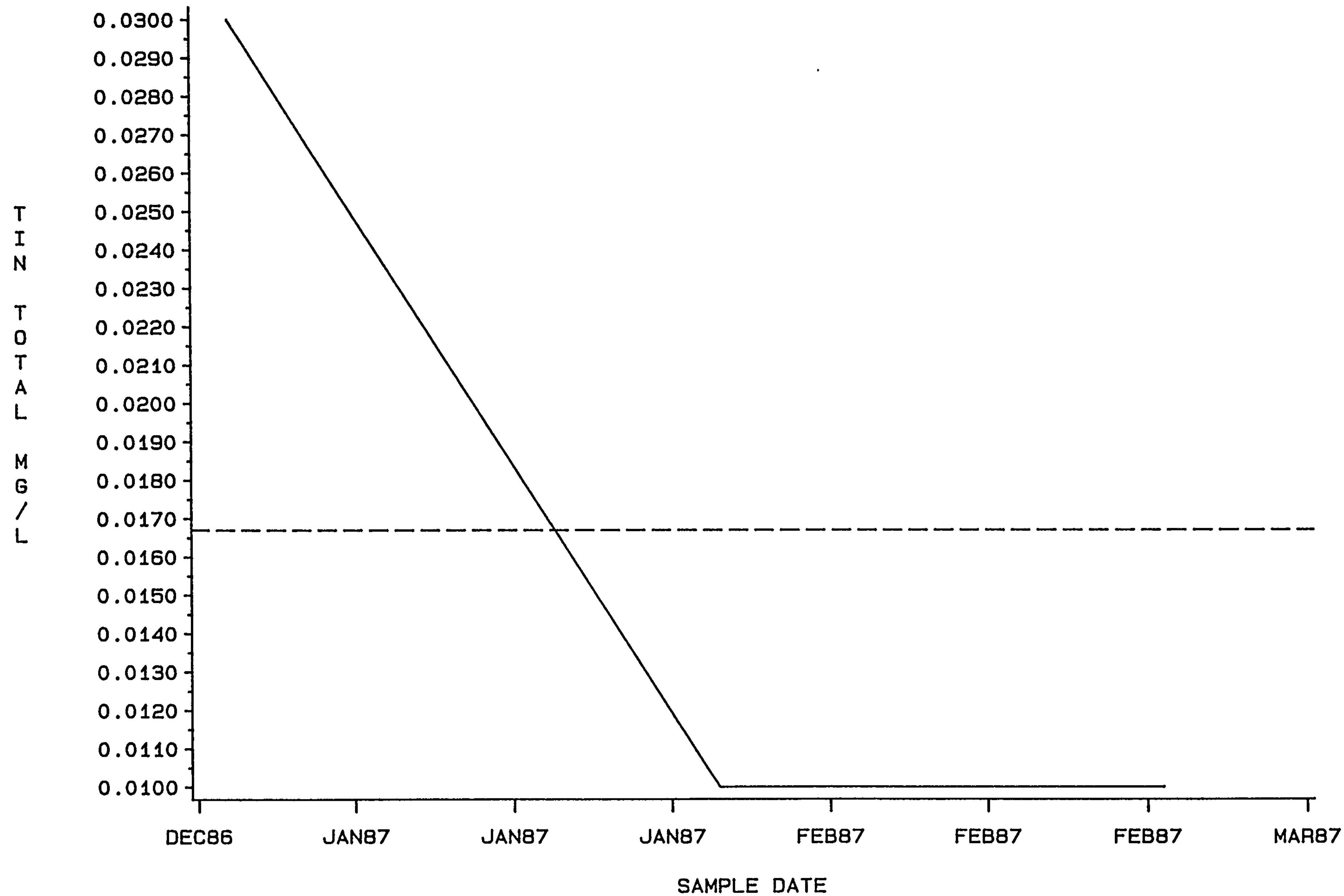
K1407B NPDES DATA — TETRACHLOROETHENE UG/L



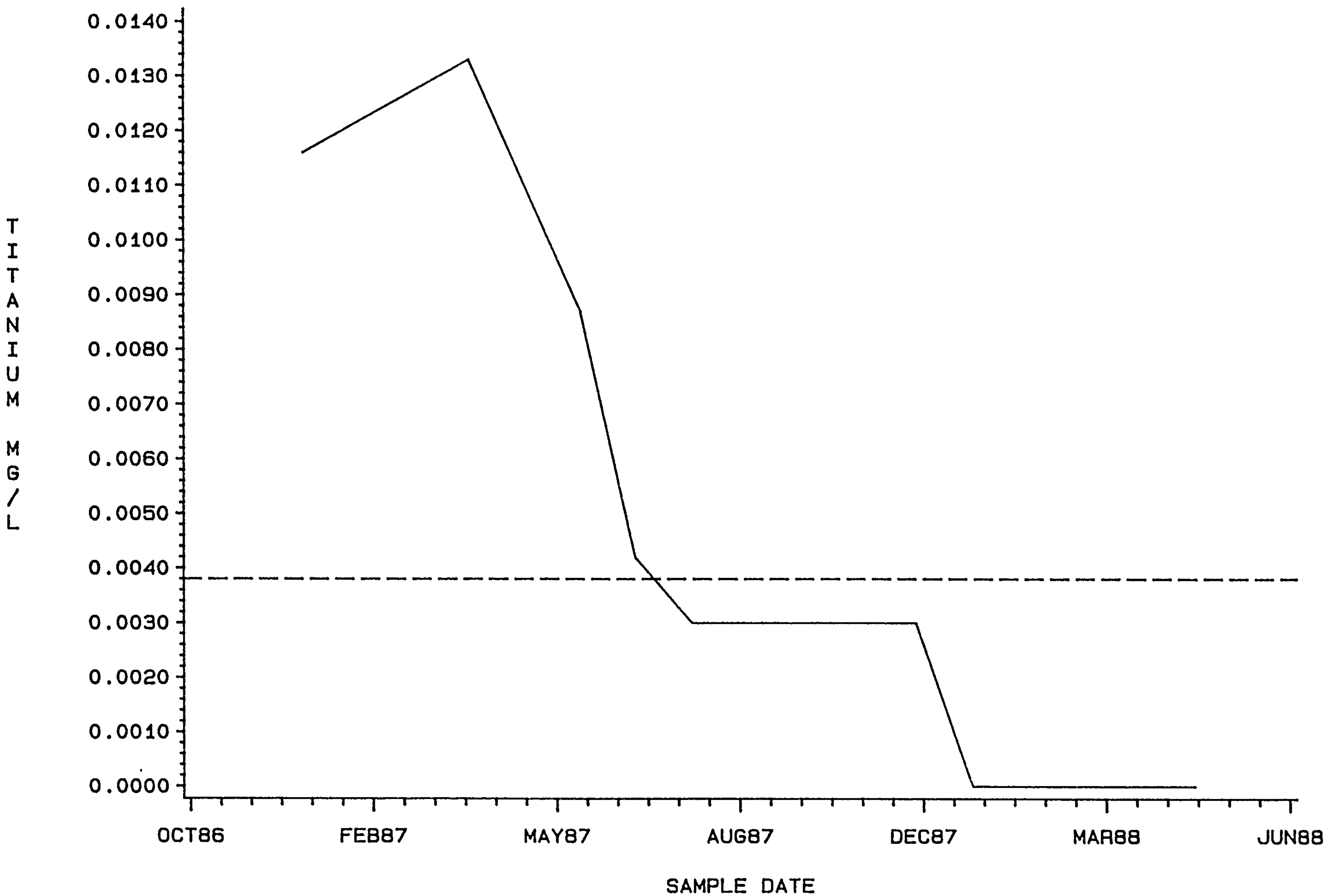
K1407B NPDES DATA – TIN MG/L



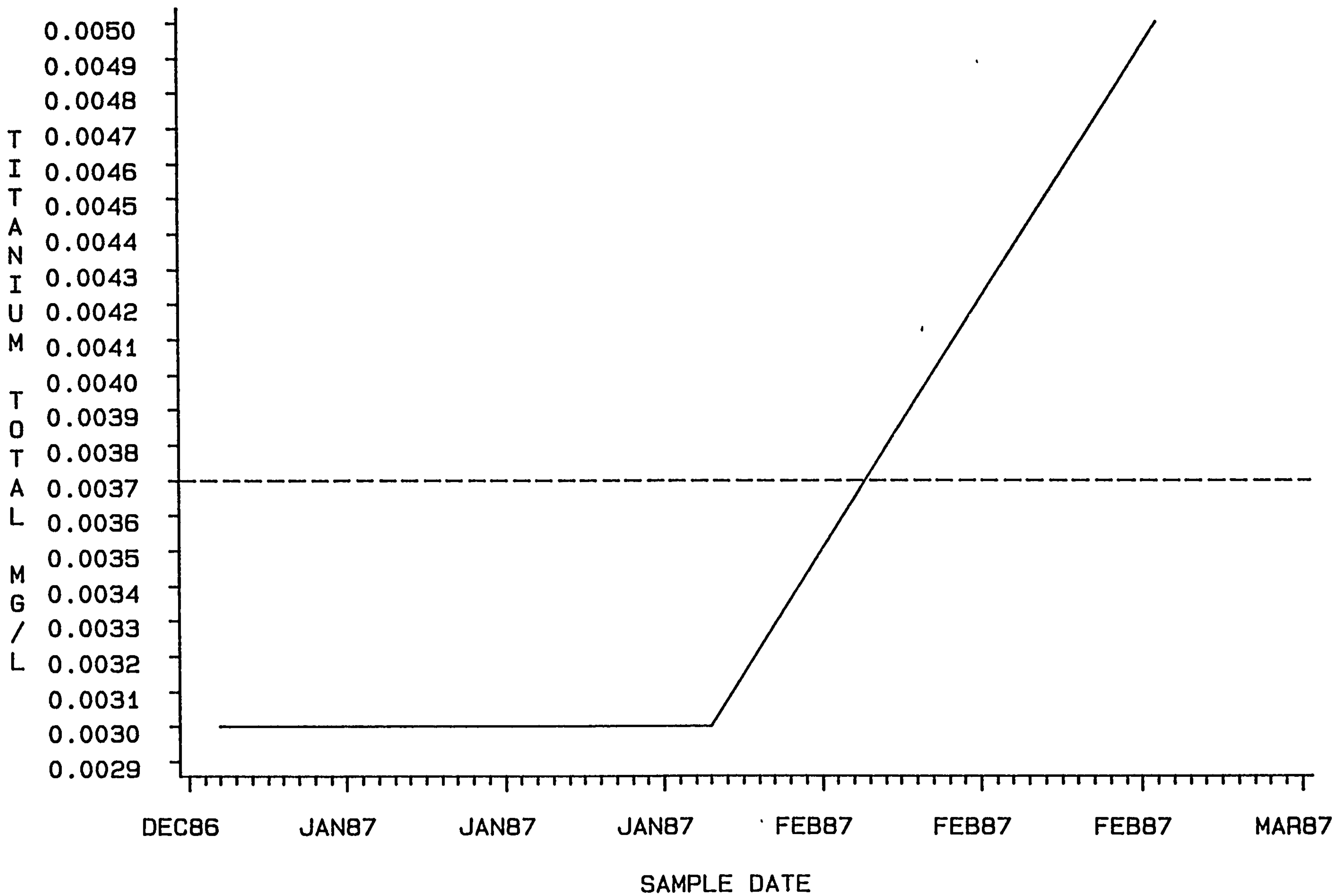
K1407B NPDES DATA – TIN (TOTAL) MG/L



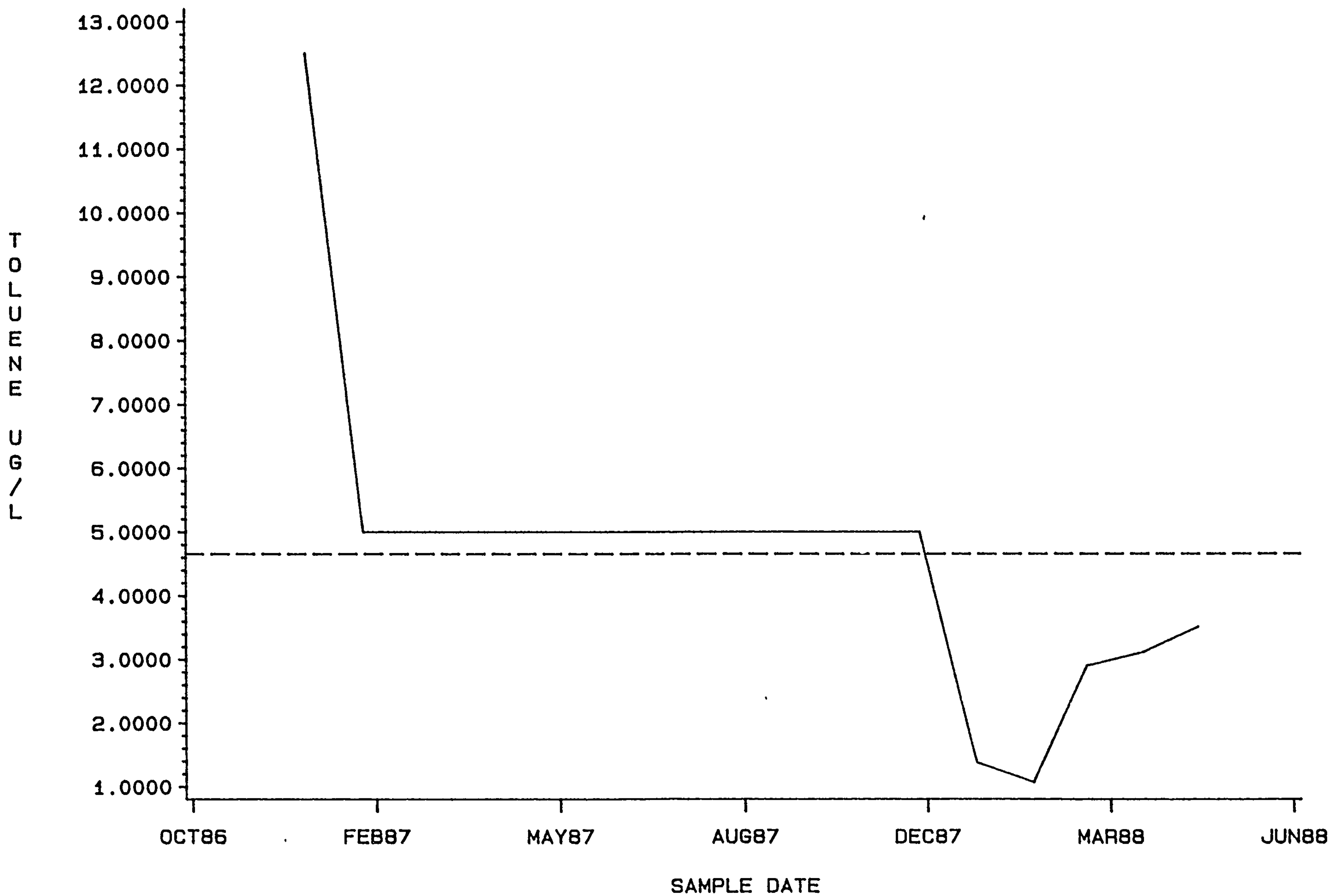
K1407B NPDES DATA — TITANIUM MG/L



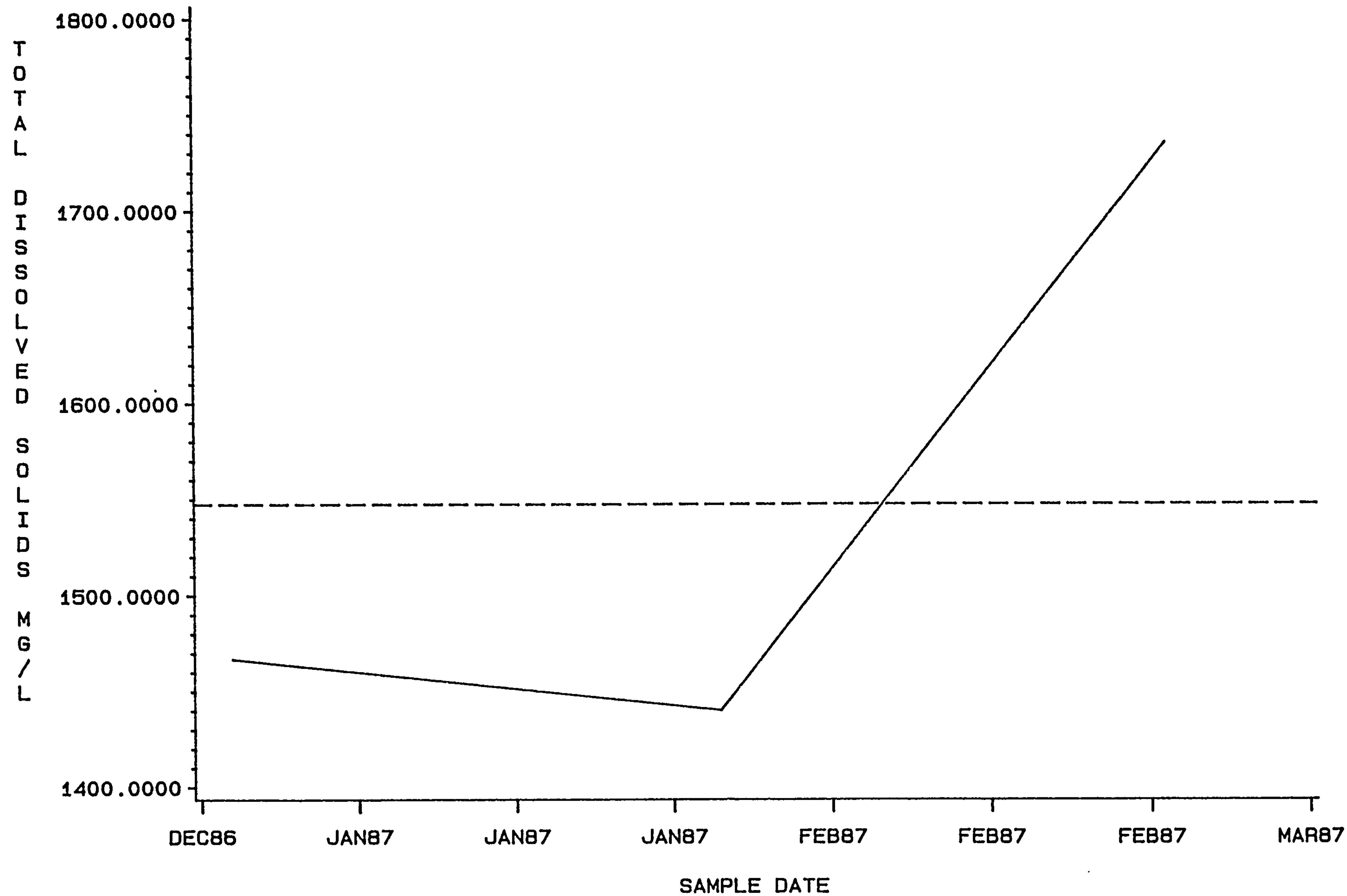
K1407B NPDES DATA–TITANIUM (TOTAL) MG/L



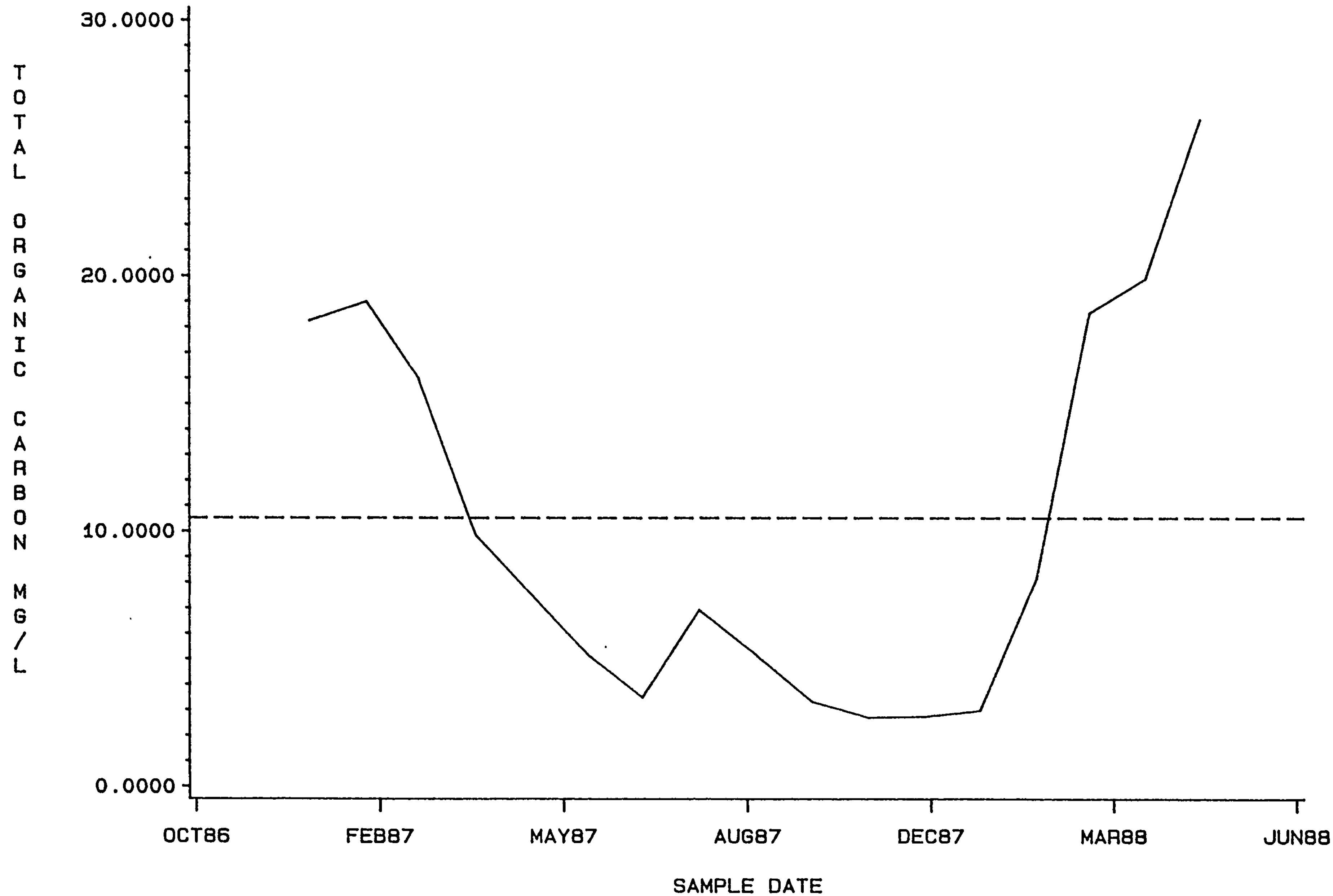
K1407B NPDES DATA – TOLUENE UG/L



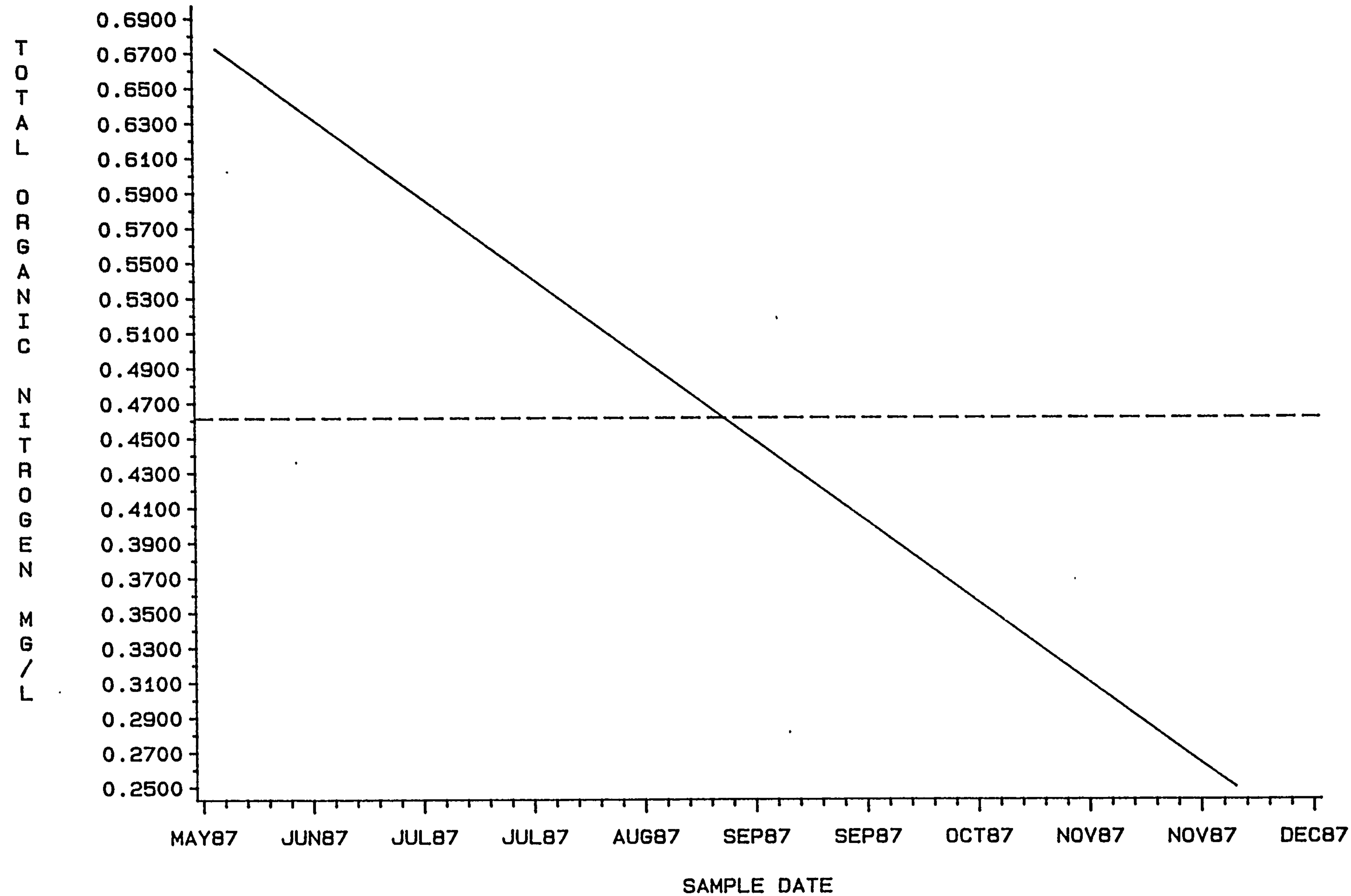
K1407B NPDES DATA – TOTAL DISSOLVED SOLIDS MG/L



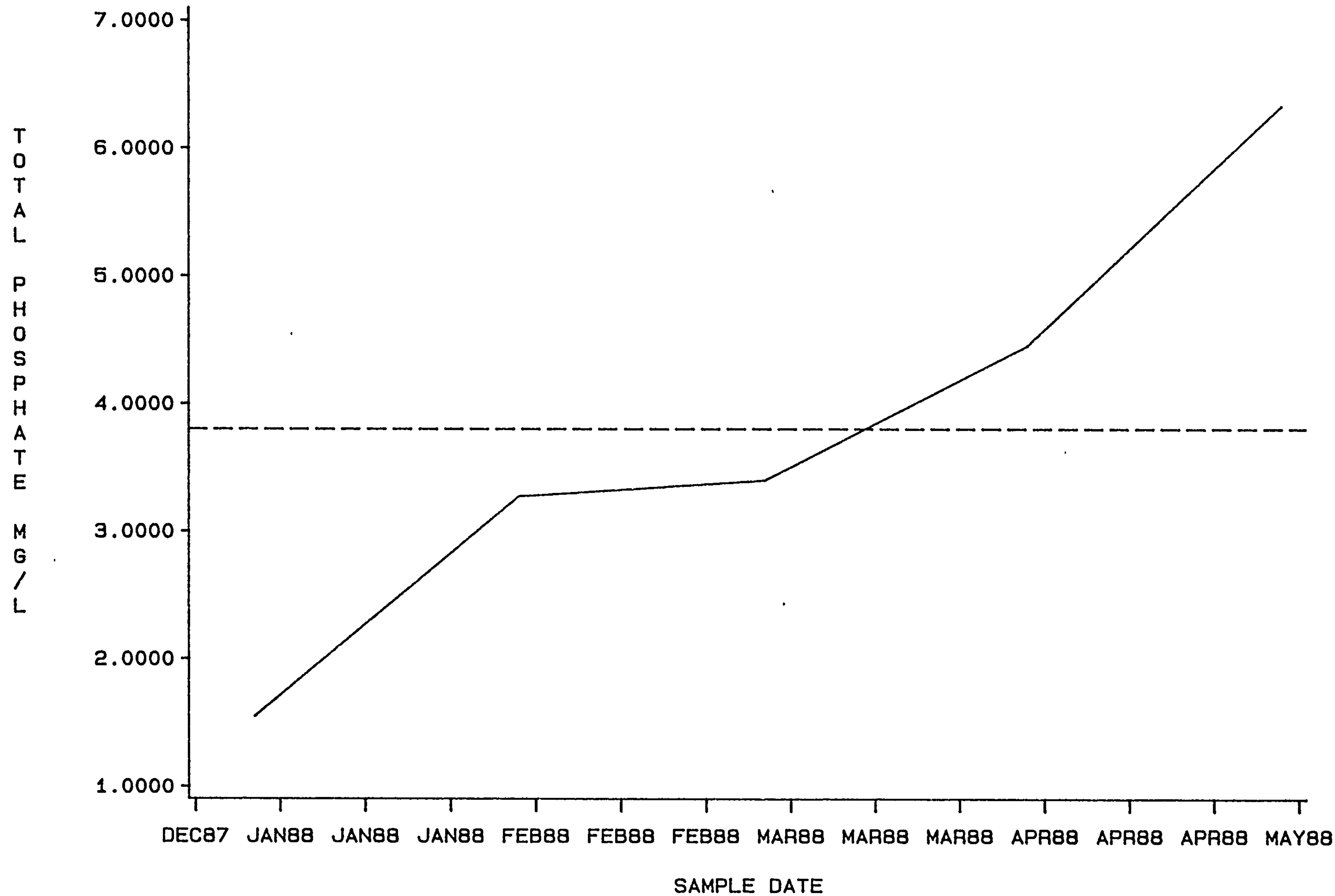
K1407B NPDES DATA — TOTAL ORGANIC CARBON MG/L



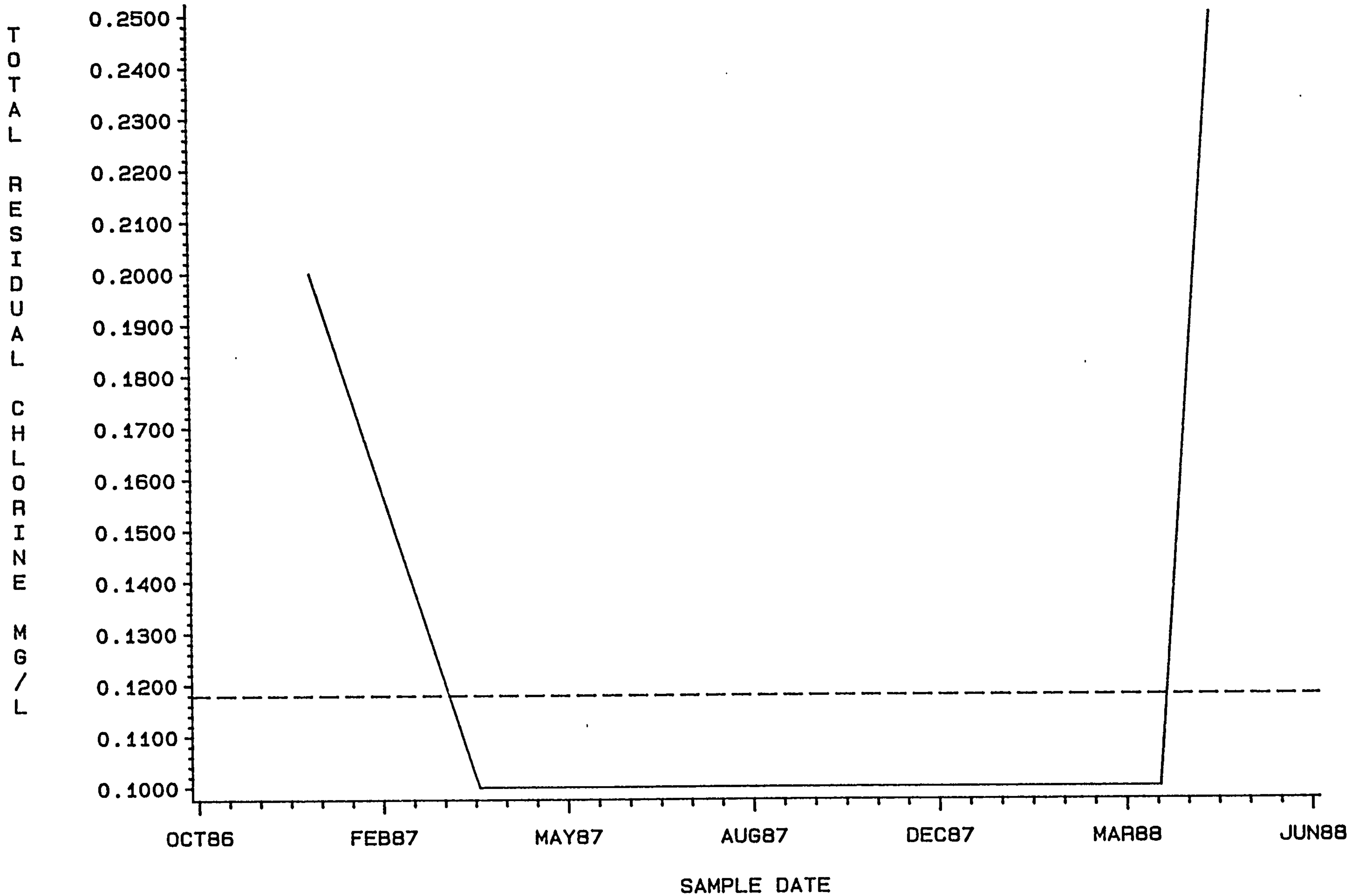
K1407B NPDES DATA – TOTAL ORGANIC NITROGEN MG/L



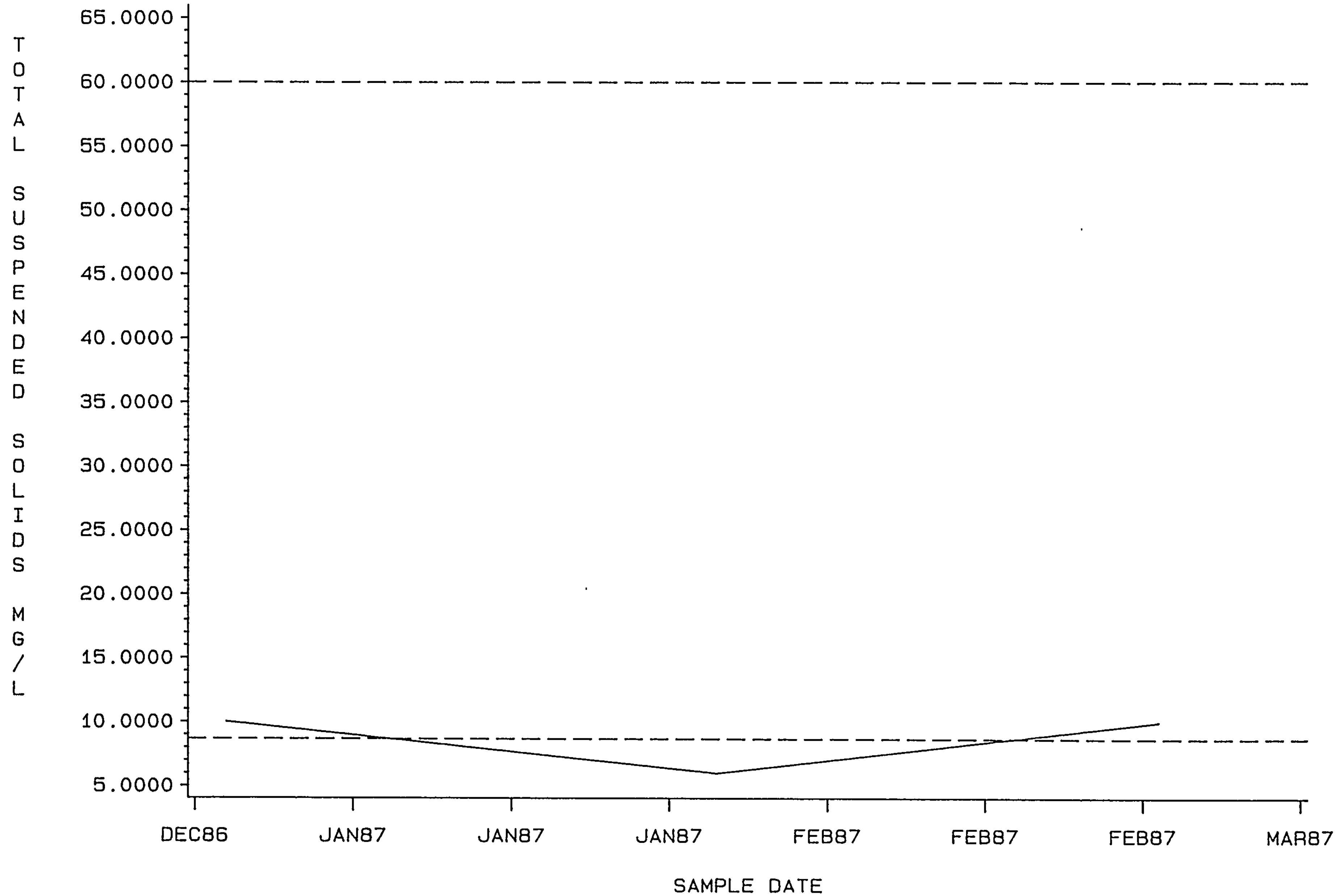
K1407B NPDES DATA – TOTAL PHOSPHATE MG/L



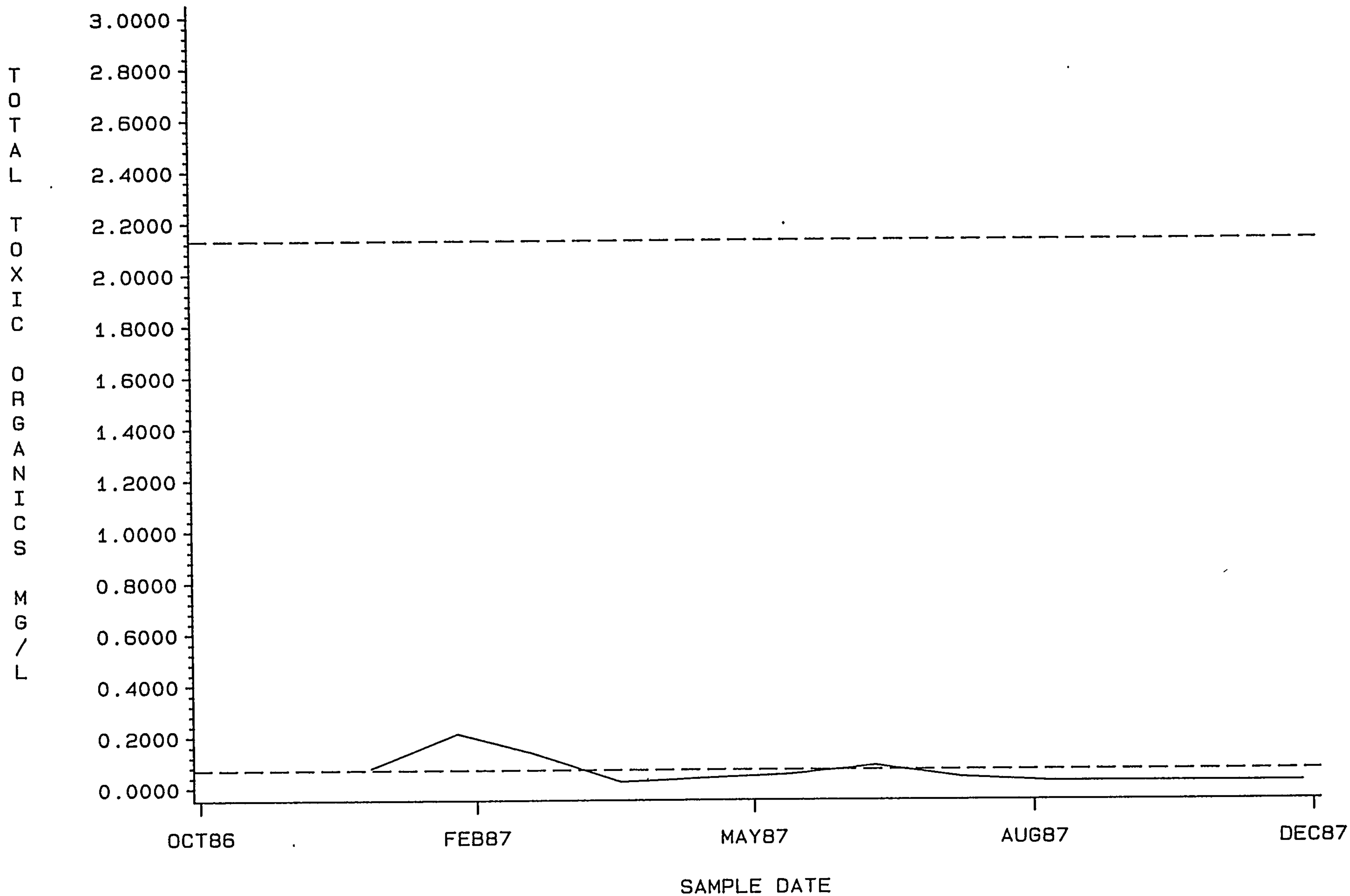
K1407B NPDES DATA – TOTAL RESIDUAL CHLORINE MG/L



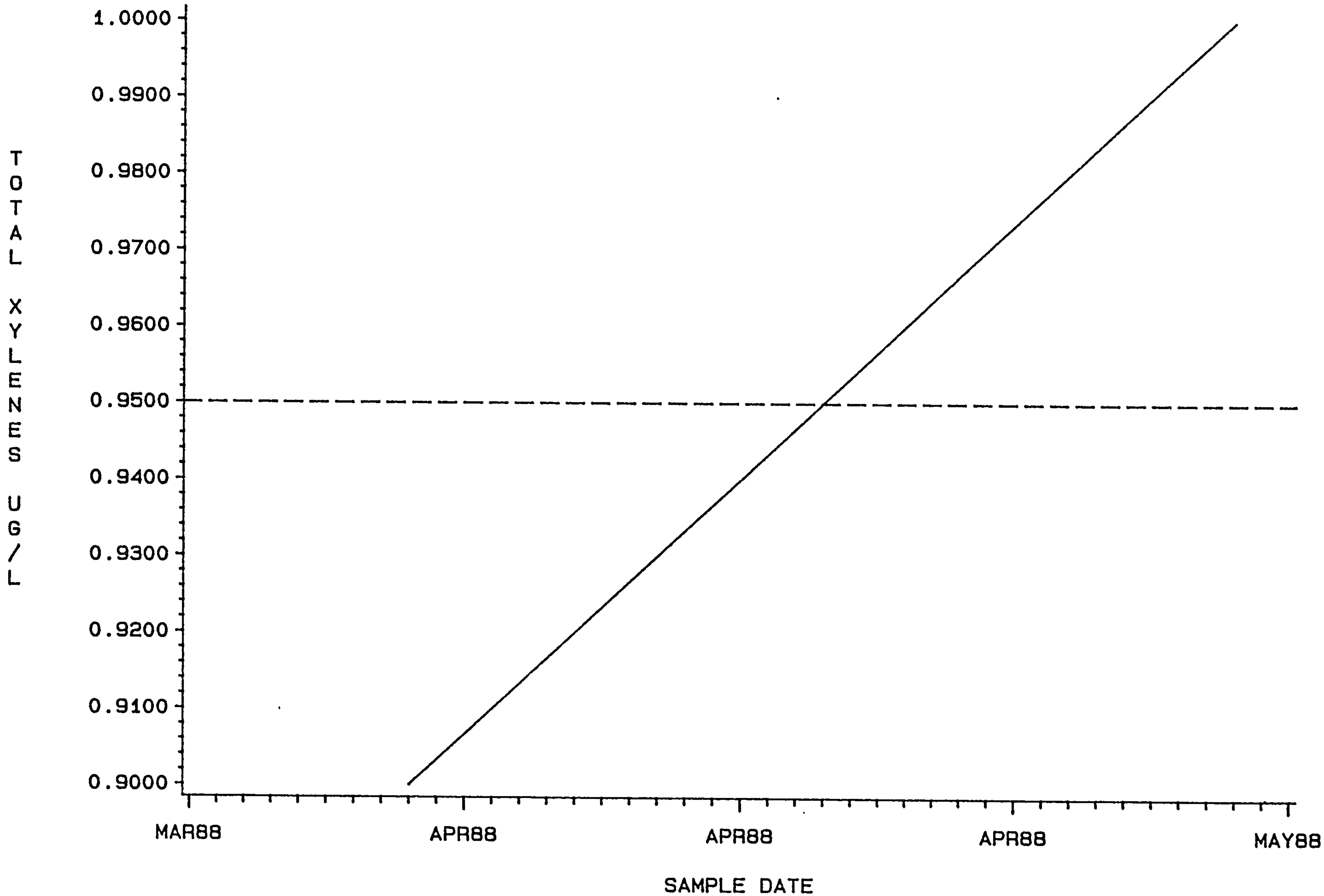
K1407B NPDES DATA – TOTAL SUSPENDED SOLIDS MG/L



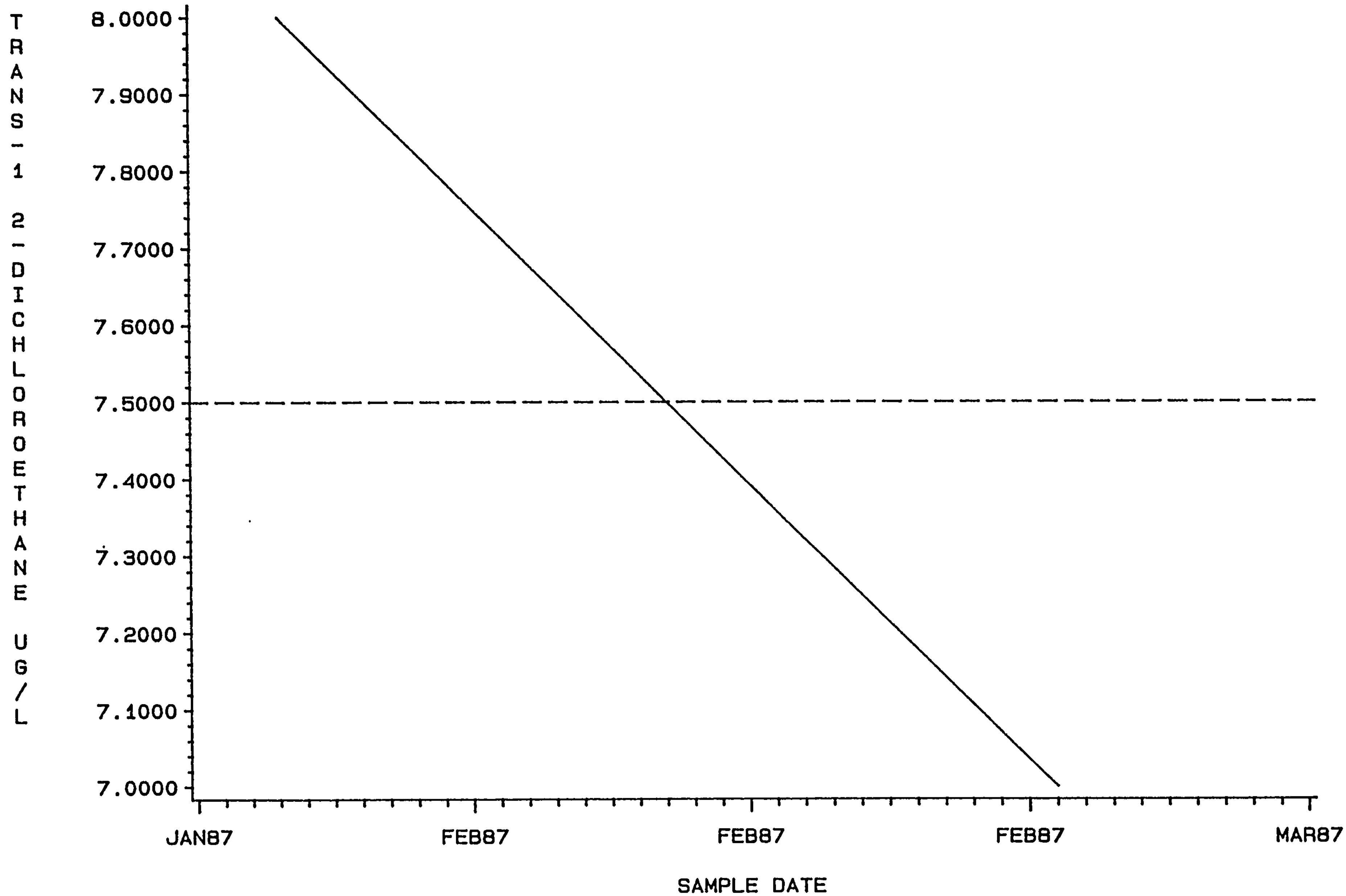
K1407B NPDES DATA – TOTAL TOXIC ORGANICS MG/L



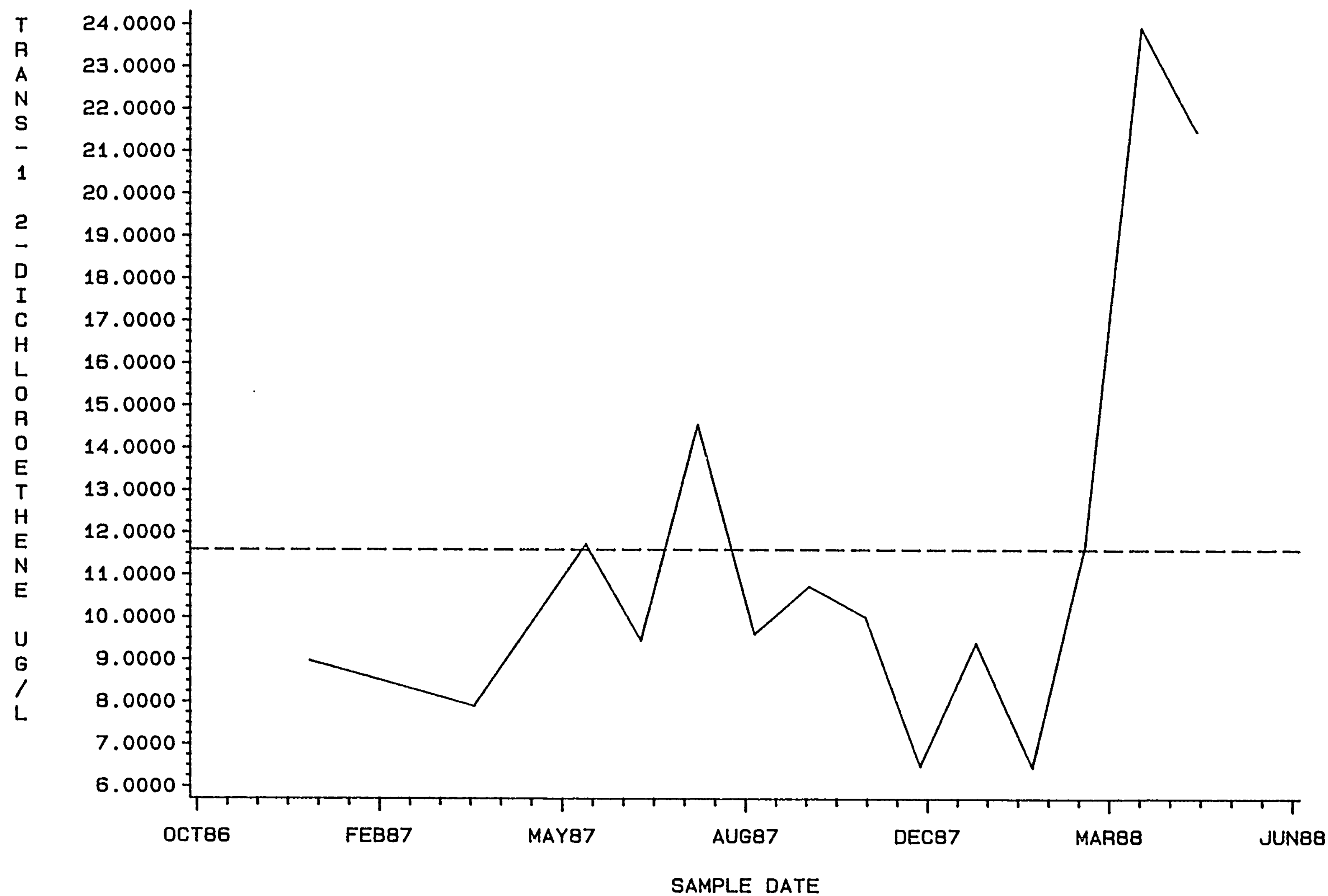
K1407B NPDES DATA – TOTAL XYLENES UG/L



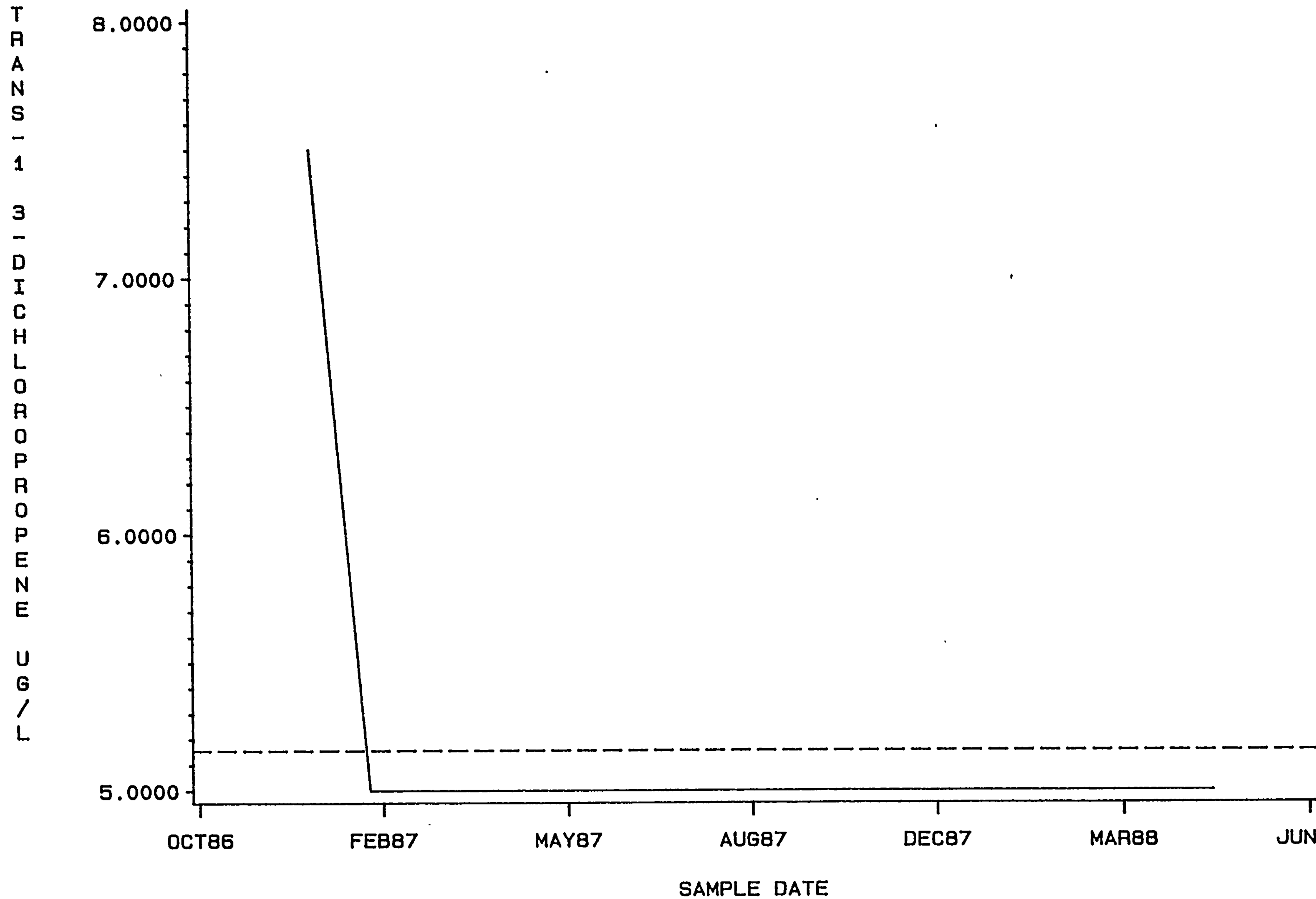
K1407B NPDES DATA — TRANS-1 2-DICHLOROETHANE UG/L



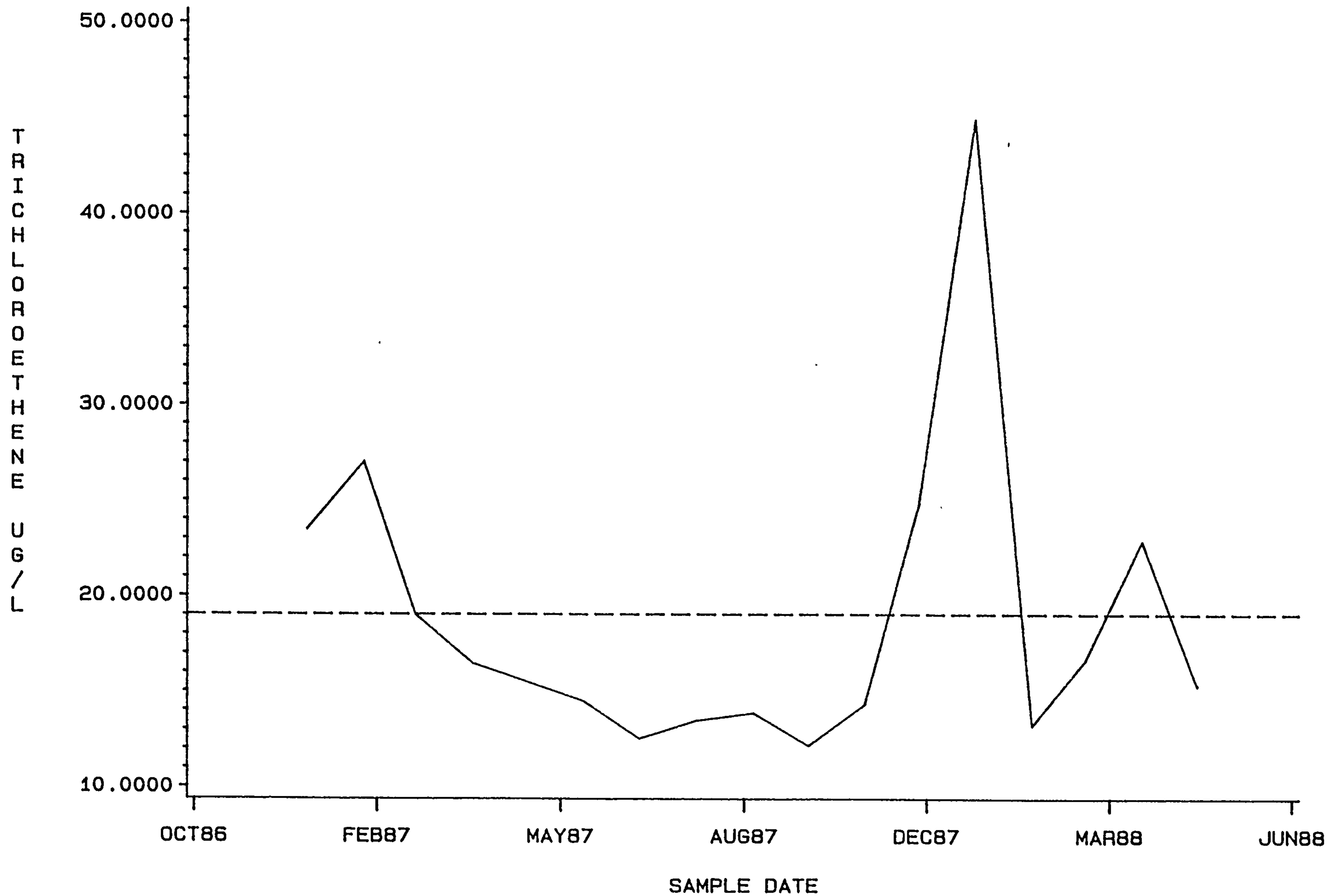
K1407B NPDES DATA — TRANS-1 2-DICHLOROETHENE UG/L



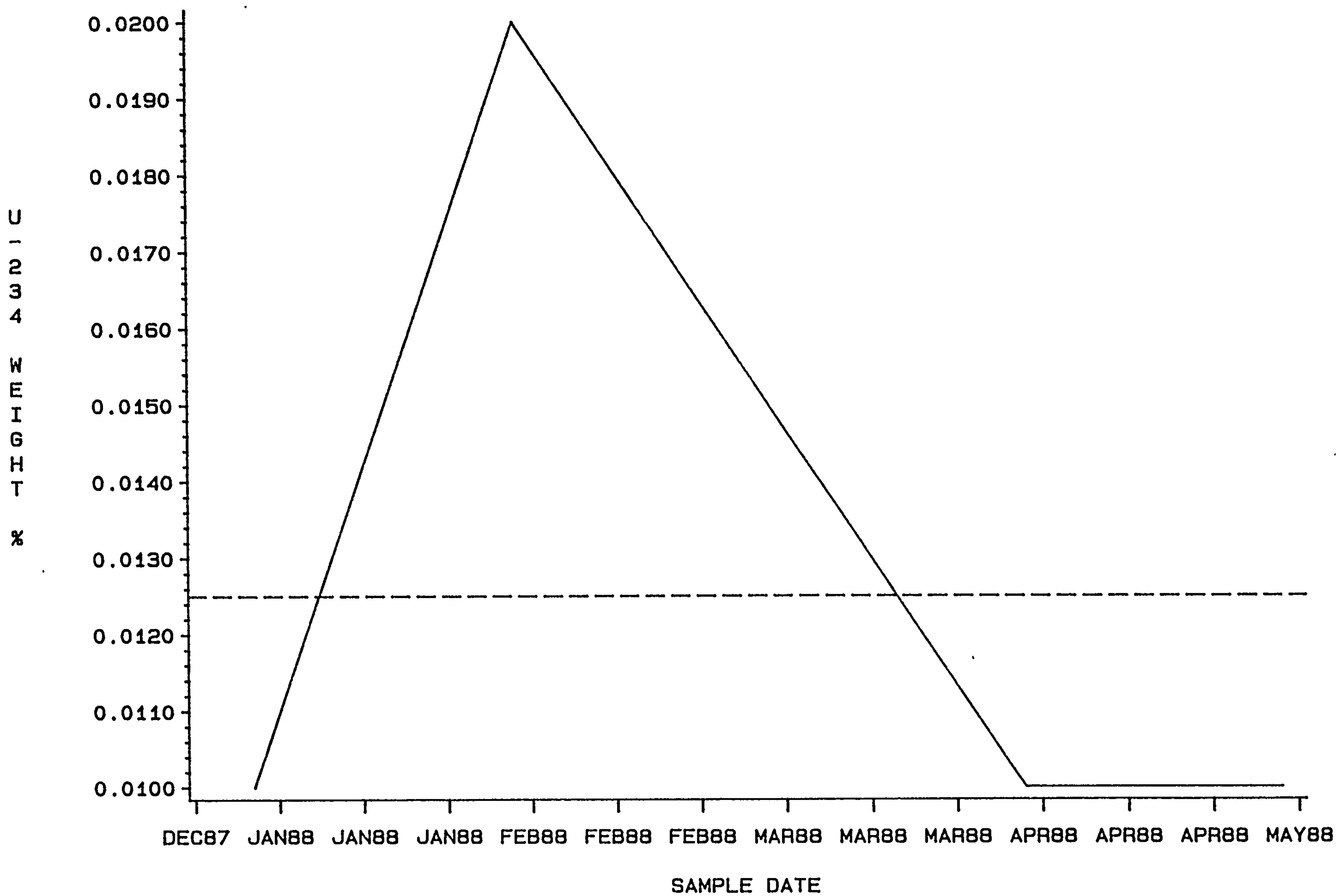
K1407B NPDES DATA – TRANS–1 3–DICHLOROPROPENE UG/L



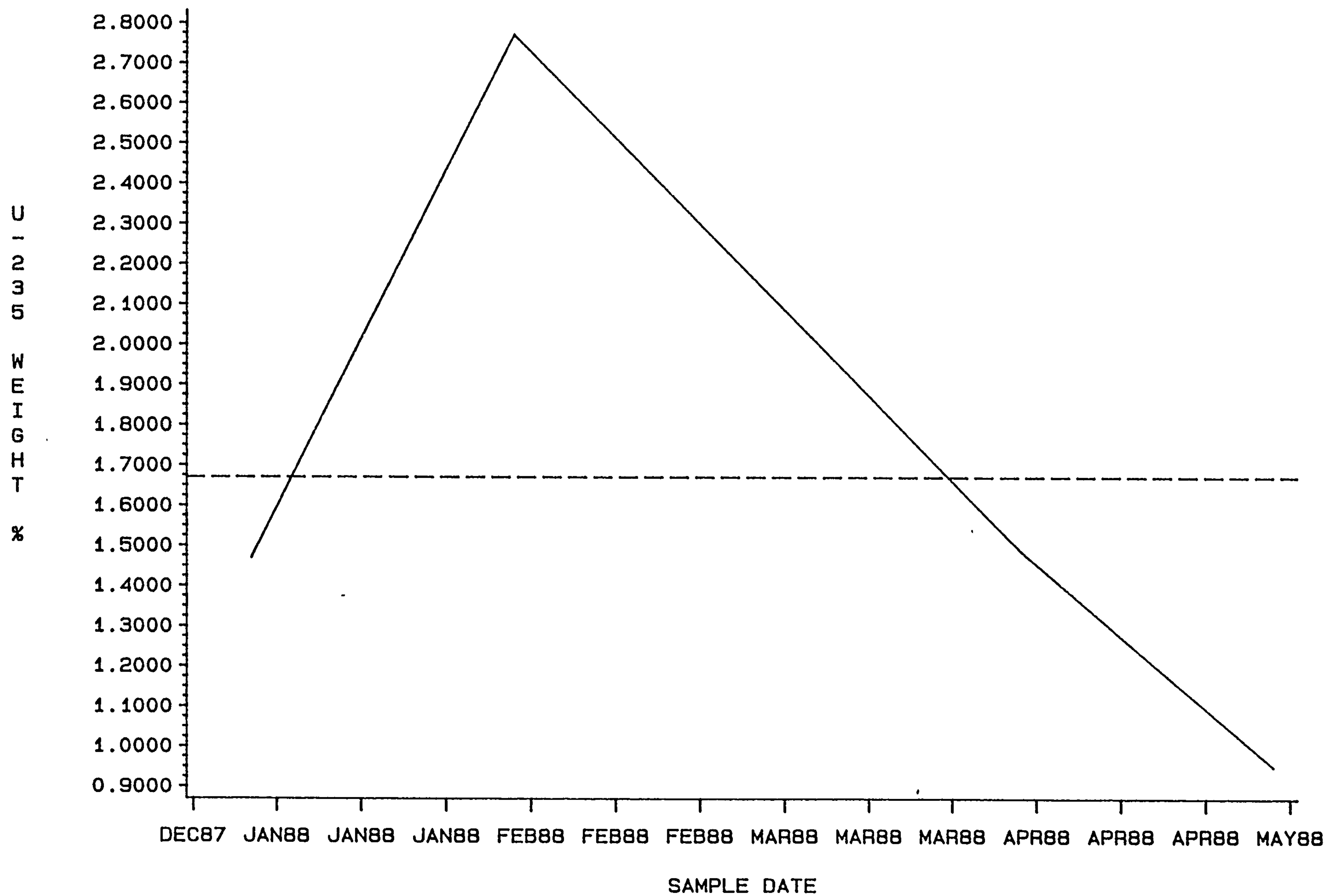
K1407B NPDES DATA – TRICHLOROETHENE UG/L



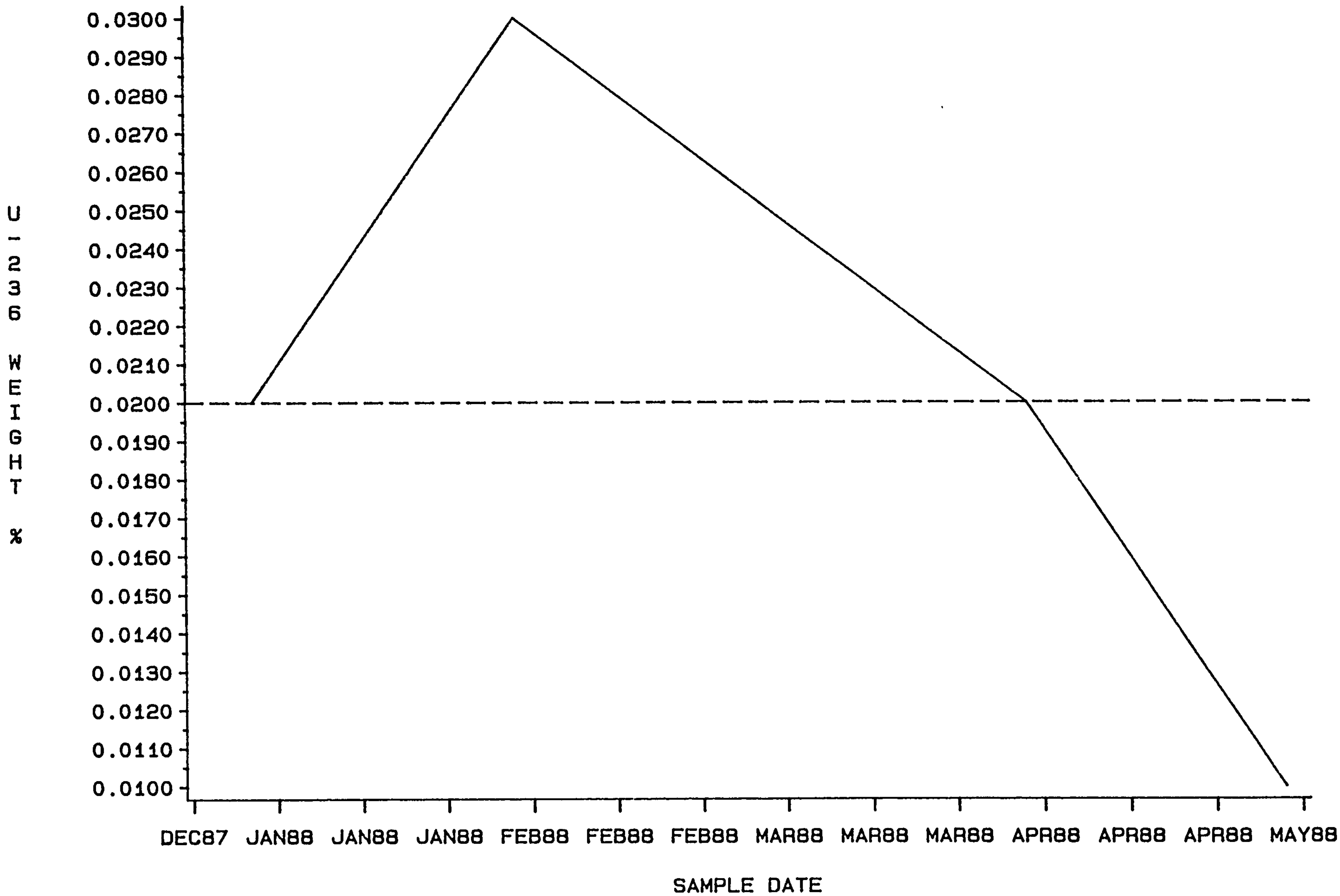
K1407B NPDES DATA – U–234 WEIGHT %



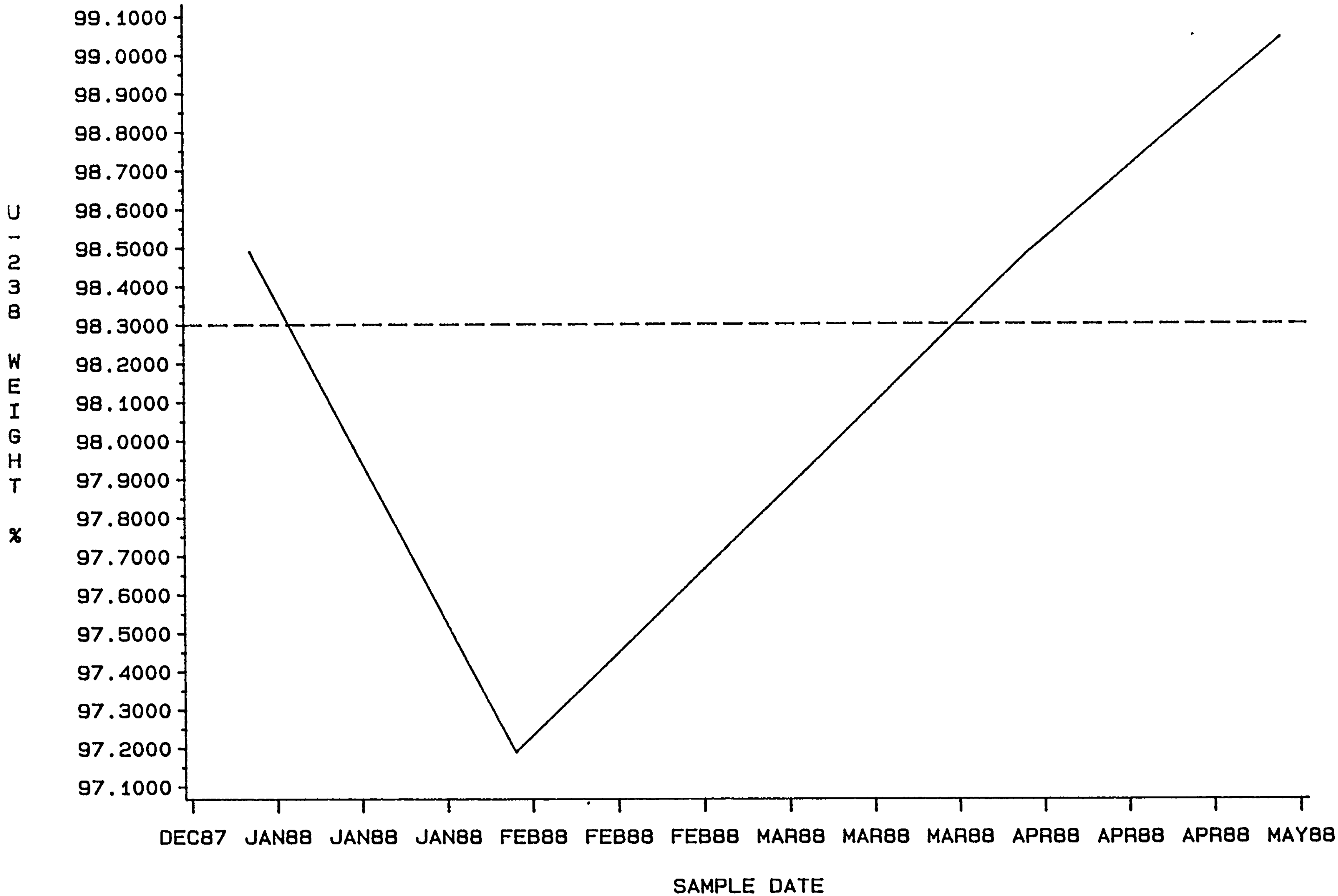
K1407B NPDES DATA – U–235 WEIGHT %



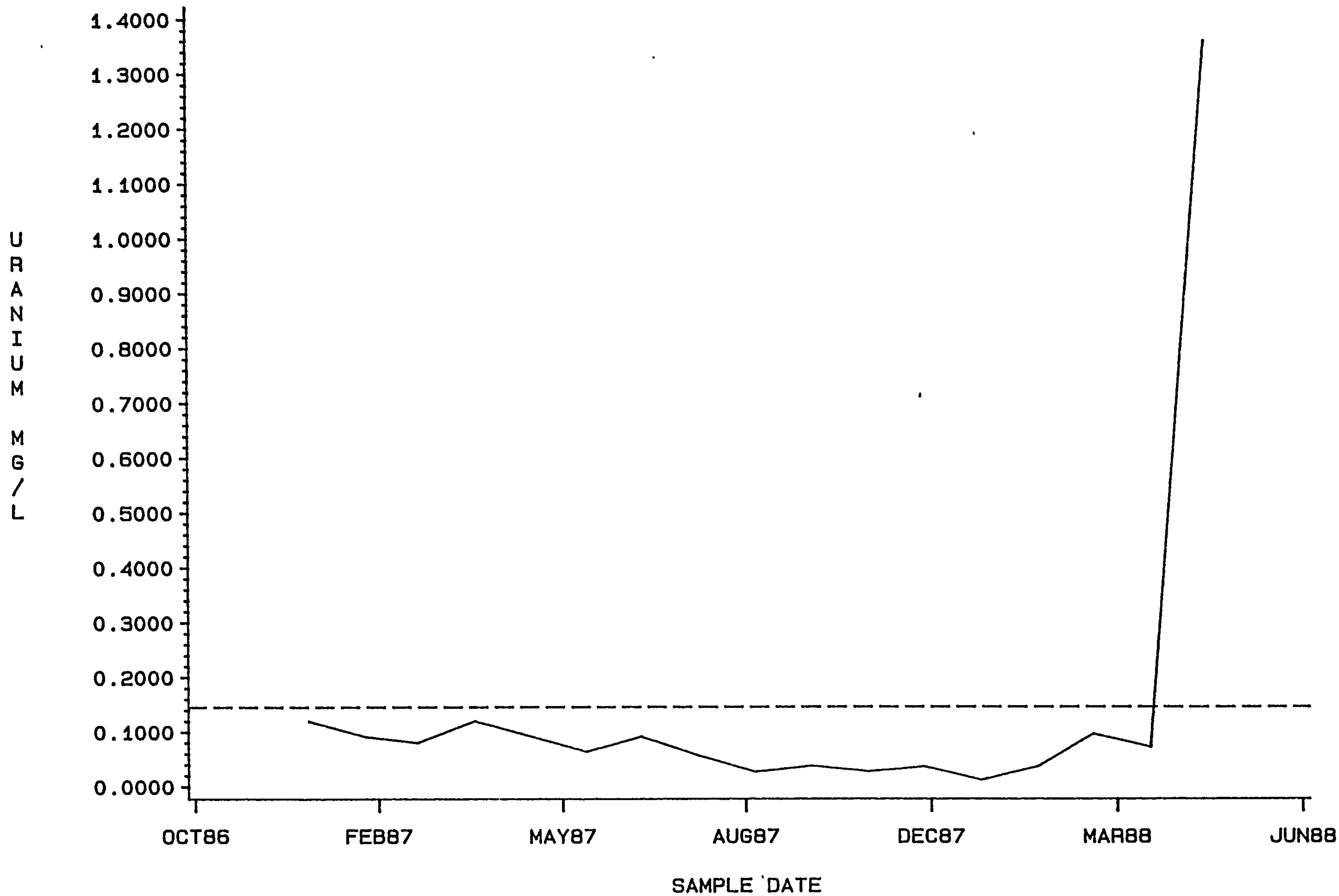
K1407B NPDES DATA — U-236 WEIGHT %

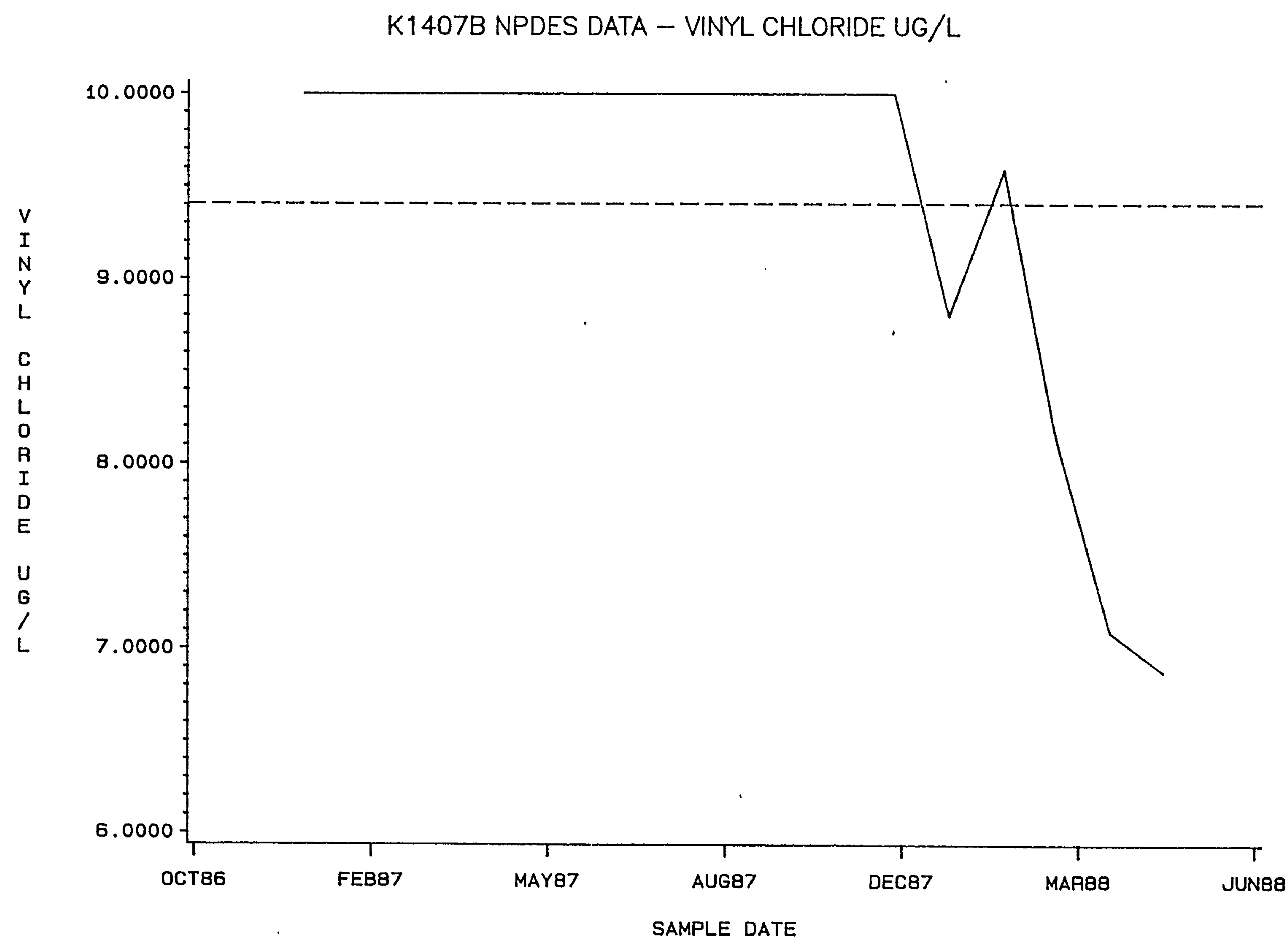


K1407B NPDES DATA – U–238 WEIGHT %

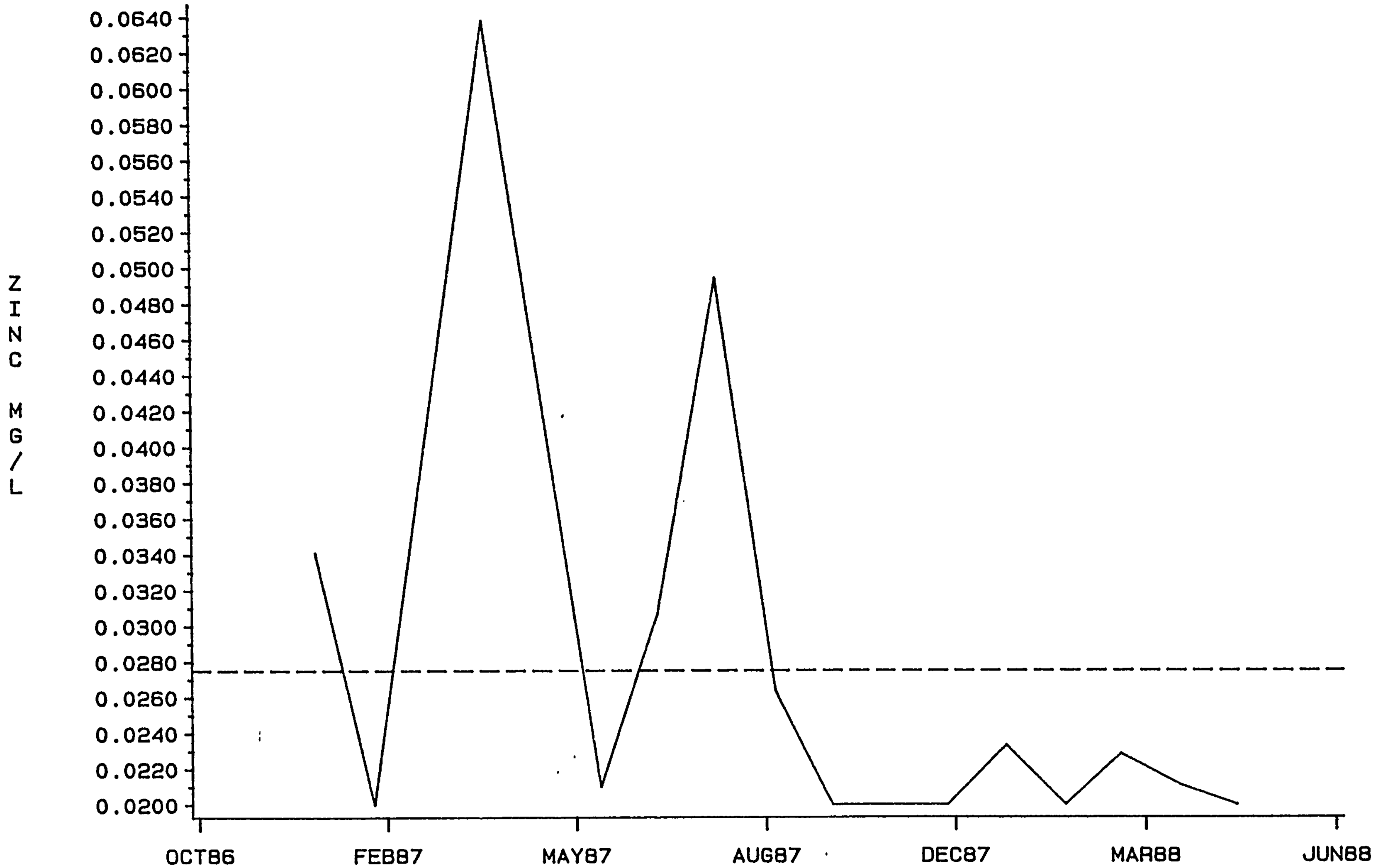


K1407B NPDES DATA – URANIUM MG/L

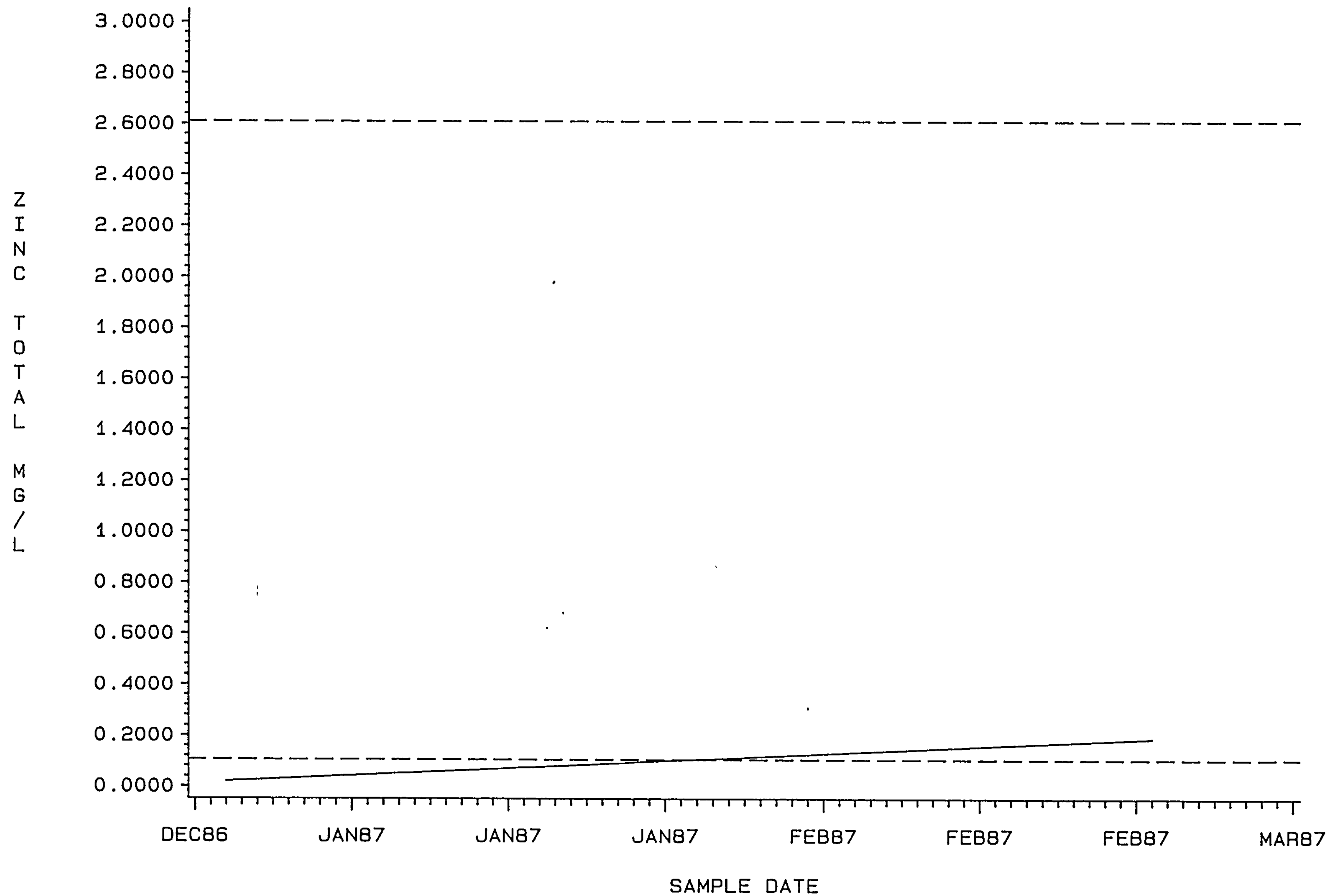



K1407B NPDES DATA – VINYL CHLORIDE UG/L
VINYL CHLORIDE UG/L
10.0000
9.0000
8.0000
7.0000
6.0000
OCT86
FEB87
MAY87
AUG87
DEC87
MAR88
JUN88
SAMPLE DATE

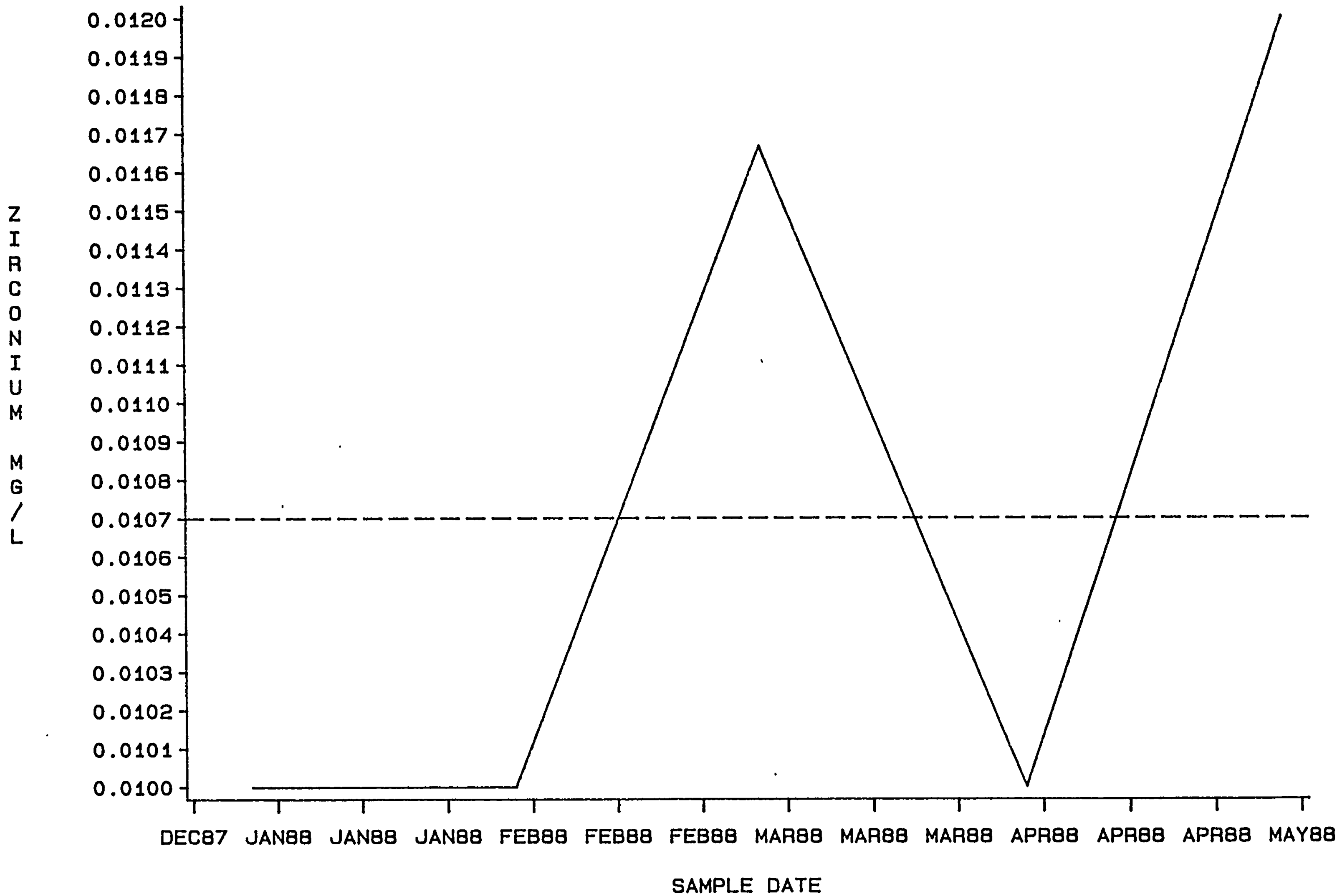
K1407B NPDES DATA – ZINC MG/L



K1407B NPDES DATA – ZINC (TOTAL) MG/L



K1407B NPDES DATA – ZIRCONIUM MG/L



APPENDIX D

APPENDIX D

FIRST YEAR INTERIM STATUS
ORGDP GROUNDWATER MONITORING WELL DATA

K-1407-B

PARAMETER	QTR	WELL IDENTIFICATION UNW-1[1]	UNW-2	UNW-3	UNW-4	UNW-5[2]
Aluminum-U[3] (mg/l)	1ST	4.1	0.52	1.0	0.90	0.15
	2ND	6.5	9.1	4.9	3.8	1.1
	3RD	8.8	1.8	1.2	3.2	< 0.020
	4TH	8.7	5.0	4.2	8.4	0.35
Aluminum-F[4] (mg/l)	1ST	0.91	0.13	< 0.020	< 0.020	< 0.020
	2ND	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
	3RD	0.043	< 0.020	< 0.020	< 0.020	< 0.020
	4TH	< 0.020	< 0.020	< 0.020	< 0.020	< 0.020
Antimony-U (mg/l)	1ST	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
	2ND					
	3RD	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
	4TH	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Antimony-F (mg/l)	1ST	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
	2ND					
	3RD	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
	4TH	< 0.050	< 0.050	< 0.050	< 0.050	< 0.050
Arsenic-U (mg/l)	1ST	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	2ND	< 0.005	< 0.005	< 0.005	< 0.005	0.007
	3RD	< 0.005	< 0.005	< 0.005	< 0.005	0.006
	4TH	0.005	< 0.005	< 0.005	0.005	0.011
Arsenic-F (mg/l)	1ST	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	2ND	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	3RD	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	4TH	< 0.005	< 0.005	< 0.005	< 0.005	0.009
Barium-U (mg/l)	1ST	0.17	0.055	0.91	0.020	0.30
	2ND	0.18	0.086	0.11	0.018	0.30
	3RD	0.18	0.046	0.062	0.078	0.35
	4TH	0.24	0.075	0.089	0.027	0.40

[1] Upgradient well

[2] Upgradient Well

[3] U = Unfiltered Sample (Total Metals)

[4] F = Filtered Sample (Dissolved Metals)

FIRST YEAR INTERIM STATUS
ORGDP GROUNDWATER MONITORING WELL DATA

K-1407-B, Continued

PARAMETER	QTR	UNW-1	UNW-2	UNW-3	UNW-4	UNW-5
		WELL IDENTIFICATION				
Barium-F (mg/l)	1ST	0.13	0.056	0.077	0.016	0.29
	2ND	0.14	0.039	0.061	0.0079	0.26
	3RD	0.11	0.036	0.048	0.022	0.32
	4TH	0.16	0.045	0.049	< 0.0010	0.38
Beryllium-U (mg/l)	1ST	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003
	2ND	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003
	3RD	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003
	4TH	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003
Beryllium-F (mg/l)	1ST	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003
	2ND	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003
	3RD	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003
	4TH	< 0.0003	< 0.0003	< 0.0003	< 0.0003	< 0.0003
Boron-U (mg/l)	1ST	0.020	0.024	0.056	0.029	0.019
	2ND	0.027	0.15	0.81	0.051	0.083
	3RD	0.0057	0.014	0.048	0.013	0.045
	4TH	0.0099	0.037	0.066	0.042	0.0067
Boron-F (mg/l)	1ST	0.014	0.025	0.057	0.028	0.030
	2ND	0.73	0.041	0.86	0.67	0.046
	3RD	< 0.0040	0.0082	0.038	0.016	0.039
	4TH	0.041	0.039	0.067	0.054	0.0094
Cadmium-U (mg/l)	1ST	< 0.0030	< 0.0030	< 0.0030	< 0.0030	< 0.0030
	2ND	< 0.0030	< 0.0030	< 0.0030	< 0.0030	< 0.0030
	3RD	< 0.0030	< 0.0030	< 0.0030	< 0.0030	< 0.0030
	4TH	0.0050	< 0.0030	0.0060	0.0086	0.0034
Cadmium-F (mg/l)	1ST	< 0.0030	< 0.0030	< 0.0030	< 0.0030	< 0.0030
	2ND	< 0.0030	< 0.0030	< 0.0030	< 0.0030	< 0.0030
	3RD	< 0.0030	< 0.0030	< 0.0030	< 0.0030	< 0.0030
	4TH	< 0.0030	< 0.0030	< 0.0030	< 0.0030	0.0044
Calcium-U (mg/l)	1ST	47	200	240	140	160
	2ND	67	230	270	160	180
	3RD	59	250	290	190	200
	4TH	62	270	300	220	220

FIRST YEAR INTERIM STATUS
ORGDP GROUNDWATER MONITORING WELL DATA

K-1407-B, Continued

PARAMETER	QTR	UNW-1	UNW-2	UNW-3	UNW-4	UNW-5
		WELL IDENTIFICATION				
Calcium-F (mg/l)	1ST	46	190	230	140	160
	2ND	65	130	280	170	180
	3RD	57	240	290	190	200
	4TH	66	280	300	200	220
Chloride (mg/l)	1ST	16	137	274	66	199
	2ND	17.9	189	348	8.7	174
	3RD	21	162	321	91	277
	4TH	20	235	356	210	265
Chromium-U (mg/l)	1ST	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	2ND	< 0.010	0.010	< 0.010	< 0.010	< 0.010
	3RD	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	4TH	0.013	< 0.010	< 0.010	0.023	< 0.010
Chromium-F (mg/l)	1ST	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	2ND	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	3RD	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	4TH	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Cobalt-U (mg/l)	1ST	0.020	< 0.0050	0.0053	< 0.0050	0.011
	2ND	0.0051	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	3RD	0.013	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	4TH	0.018	0.0067	0.0061	0.0092	0.0090
Cobalt-F (mg/l)	1ST	0.017	< 0.0050	< 0.0050	< 0.0050	0.091
	2ND	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	3RD	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	4TH	0.011	< 0.0050	0.0086	< 0.0050	0.0094
Copper-U (mg/l)	1ST	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
	2ND	< 0.0040	< 0.0040	< 0.0040	< 0.0040	0.0048
	3RD	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
	4TH	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
Copper-F (mg/l)	1ST	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
	2ND	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
	3RD	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
	4TH	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040

FIRST YEAR INTERIM STATUS
ORGDP GROUNDWATER MONITORING WELL DATA

K-1407-B, Continued

PARAMETER	QTR	WELL IDENTIFICATION UNW-1	UNW-2	UNW-3	UNW-4	UNW-5
Iron-U (mg/l)	1ST	1.2	0.20	0.23	0.11	17
	2ND	9.7	11	8.9	4.6	28
	3RD	12	1.8	1.5	3.2	19
	4TH	18	5.1	5.6	9.7	22
Iron-F (mg/l)	1ST	6.2	0.60	1.7	1.4	18
	2ND	0.029	0.15	0.097	0.053	15
	3RD	0.030	0.039	< 0.0040	< 0.0040	16
	4TH	0.90	< 0.0040	< 0.0040	< 0.0040	18
Lead-U (mg/l)	1ST	0.006	0.004	< 0.004	0.005	< 0.004
	2ND	< 0.004	0.010	< 0.004	< 0.004	< 0.004
	3RD	0.008	0.007	0.004	0.006	0.004
	4TH	0.010	0.006	0.009	0.004	0.005
Lead-F (mg/l)	1ST	0.005	< 0.004	< 0.004	0.005	0.008
	2ND	< 0.004	0.004	< 0.004	< 0.004	< 0.004
	3RD	0.005	< 0.004	< 0.004	0.004	0.004
	4TH	< 0.004	0.004	0.008	0.006	< 0.004
Lithium-U (mg/l)	1ST	0.0048	< 0.0040	0.0048	0.0058	< 0.0040
	2ND	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
	3RD	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
	4TH	0.0073	0.0045	0.0058	0.012	< 0.0040
Lithium-F (mg/l)	1ST	< 0.0040	< 0.0040	0.0048	0.0050	< 0.0040
	2ND	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
	3RD	< 0.0040	< 0.0040	< 0.0040	< 0.0040	< 0.0040
	4TH	< 0.0040	< 0.0040	0.0043	0.0042	< 0.0040
Magnesium-U (mg/l)	1ST	19	23	37	16	19
	2ND	23	25	37	16	18
	3RD	19	24	36	17	21
	4TH	20	26	37	20	21
Magnesium-F (mg/l)	1ST	18	25	39	15	18
	2ND	22	24	38	16	18
	3RD	16	23	36	16	21
	4TH	19	26	36	16	21

FIRST YEAR INTERIM STATUS
ORGDP GROUNDWATER MONITORING WELL DATA

K-1407-B, Continued

PARAMETER	QTR	UNW-1	UNW-2	UNW-3	UNW-4	UNW-5
		WELL IDENTIFICATION				
Manganese-U (mg/l)	1ST	6.5	0.20	6.7	0.40	19
	2ND	4.8	0.59	6.0	0.36	17
	3RD	7.1	0.27	7.4	0.36	19
	4TH	4.4	0.50	7.4	0.50	19
Manganese-F (mg/l)	1ST	7.5	0.21	7.0	0.38	19
	2ND	5.0	0.0026	6.2	0.30	17
	3RD	6.4	0.17	7.1	0.31	19
	4TH	4.0	0.21	7.6	0.25	19
Mercury-U (mg/l)	1ST	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
	2ND	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
	3RD	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
	4TH	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Mercury-F (mg/l)	1ST	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
	2ND	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
	3RD	< 0.0002	< 0.0002	< 0.0002	< 0.0002	0.0002
	4TH	< 0.0002	< 0.0002	< 0.0002	< 0.0002	< 0.0002
Molybdenum-U (mg/l)	1ST	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	2ND	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	3RD	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	4TH	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Molybdenum-F (mg/l)	1ST	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	2ND	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	3RD	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	4TH	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
Nickel-U (mg/l)	1ST	0.015	< 0.010	0.024	< 0.010	< 0.010
	2ND	< 0.010	< 0.010	0.015	< 0.010	< 0.010
	3RD	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	4TH	< 0.010	< 0.010	0.018	0.020	< 0.010
Nickel-F (mg/l)	1ST	0.012	< 0.010	0.026	< 0.010	0.010
	2ND	< 0.010	0.018	< 0.010	< 0.010	< 0.010
	3RD	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010
	4TH	< 0.010	< 0.010	0.016	< 0.010	< 0.010

FIRST YEAR INTERIM STATUS
ORGDP GROUNDWATER MONITORING WELL DATA

K-1407-B, Continued

PARAMETER	QTR	UNW-1	UNW-2	UNW-3	UNW-4	UNW-5
		WELL IDENTIFICATION				
Niobium-U (mg/l)	1ST	< 0.0070	< 0.0070	< 0.0070	< 0.0070	< 0.0070
	2ND	< 0.0070	< 0.0070	< 0.0070	< 0.0070	< 0.0070
	3RD	< 0.0070	< 0.0070	< 0.0070	< 0.0070	< 0.0070
	4TH	< 0.0070	< 0.0070	< 0.0070	< 0.0070	< 0.0070
Niobium-F (mg/l)	1ST	< 0.0070	< 0.0070	< 0.0070	< 0.0070	< 0.0070
	2ND	< 0.0070	< 0.0070	< 0.0070	< 0.0070	< 0.0070
	3RD	< 0.0070	< 0.0070	< 0.0070	< 0.0070	< 0.0070
	4TH	< 0.0070	< 0.0070	< 0.0070	< 0.0070	< 0.0070
Nitrate (as Nitrogen) (mg/l)	1ST	< 0.11	2.6	< 0.11	< 0.11	< 0.11
	2ND	< 0.11	0.66	< 0.11	< 0.5	< 0.11
	3RD	< 0.11	0.32	< 0.11	< 0.11	< 0.11
	4TH	< 0.11	0.27	< 0.11	< 0.11	< 0.11
Phenols (mg/l)	1ST	0.002	0.002	0.003	0.003	0.002
	2ND	0.002	< 0.003	0.004	0.002	< 0.001
	3RD	0.011	< 0.001	< 0.001	0.002	< 0.001
	4TH	< 0.001	< 0.001	< 0.001	< 0.001	0.007
Phosphorus-U (mg/l)	1ST	0.25	0.24	< 0.20	< 0.20	0.45
	2ND	< 0.20	0.20	< 0.20	< 0.20	< 0.20
	3RD	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
	4TH	0.65	< 0.20	0.87	0.27	0.26
Phosphorus-F (mg/l)	1ST	< 0.20	< 0.20	< 0.20	< 0.20	0.52
	2ND	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
	3RD	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
	4TH	0.31	< 0.20	< 0.20	< 0.20	0.29
Potassium-U (mg/l)	1ST	2.8	2.9	3.9	2.9	1.9
	2ND	3.8	5.4	4.8	4.2	0.68
	3RD	3.4	1.5	2.3	2.9	1.1
	4TH	5.1	4.2	4.4	8.3	1.0
Potassium-F (mg/l)	1ST	2.3	3.3	4.2	3.0	1.9
	2ND	1.2	1.6	2.9	1.6	< 0.60
	3RD	0.89	1.3	2.2	1.4	1.3
	4TH	2.6	3.0	3.6	2.8	1.6

FIRST YEAR INTERIM STATUS
ORGDP GROUNDWATER MONITORING WELL DATA

K-1407-B, Continued

PARAMETER	QTR	UNW-1	UNW-2	UNW-3	UNW-4	UNW-5
		WELL IDENTIFICATION				
Selenium-U (mg/l)	1ST	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	2ND	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	3RD	< 0.005	< 0.005	< 0.005	< 0.005	0.006
	4TH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Selenium-F (mg/l)	1ST	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	2ND	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
	3RD	< 0.005	< 0.005	< 0.005	< 0.005	0.007
	4TH	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005
Silicon-U (mg/l)	1ST	7.5	6.0	6.6	8.7	6.5
	2ND	11	15	12	12	6.4
	3RD	14	7.7	6.4	11	5.7
	4TH	14	13	12	19	6.7
Silicon-F (mg/l)	1ST	4.0	5.8	5.7	7.4	6.1
	2ND	2.3	5.3	5.0	6.5	5.1
	3RD	2.2	4.4	4.6	6.5	5.5
	4TH	2.4	5.2	4.8	6.5	5.8
Silver-U (mg/l)	1ST	< 0.0060	< 0.0060	< 0.0060	< 0.0060	< 0.0060
	2ND	< 0.0060	< 0.0060	< 0.0060	< 0.0060	< 0.0060
	3RD	< 0.0060	< 0.0060	< 0.0060	< 0.0060	< 0.0060
	4TH	< 0.0060	< 0.0060	< 0.0060	< 0.0060	< 0.0060
Silver-F (mg/l)	1ST	< 0.0060	< 0.0060	< 0.0060	< 0.0060	< 0.0060
	2ND	< 0.0060	< 0.0060	< 0.0060	< 0.0060	< 0.0060
	3RD	< 0.0060	< 0.0060	< 0.0060	< 0.0060	< 0.0060
	4TH	< 0.0060	< 0.0060	< 0.0060	< 0.0060	< 0.0060
Sodium-U (mg/l)	1ST	6.9	42	140	23	14
	2ND	7.2	44	130	25	15
	3RD	6.9	47	130	26	22
	4TH	6.2	57	140	31	21
Sodium-F (mg/l)	1ST	7.3	43	150	23	13
	2ND	8.2	46	130	26	16
	3RD	6.7	49	130	26	23
	4TH	6.4	60	140	29	21

FIRST YEAR INTERIM STATUS
ORGDP GROUNDWATER MONITORING WELL DATA

K-1407-B, Continued

PARAMETER	QTR	UNW-1	UNW-2	UNW-3	UNW-4	UNW-5
		WELL IDENTIFICATION				
Strontium-U (mg/l)	1ST	0.13	0.24	0.47	0.23	0.41
	2ND	0.14	0.23	0.48	0.22	0.37
	3RD	0.13	0.21	0.44	0.25	0.43
	4TH	0.12	0.25	0.46	0.27	0.41
Strontium-F (mg/l)	1ST	0.13	0.25	0.50	0.24	0.40
	2ND	0.14	0.24	0.49	0.23	0.37
	3RD	0.12	0.21	0.43	0.24	0.42
	4TH	0.12	0.25	0.44	0.24	0.41
Sulfate (mg/l)	1ST	30	190	455	58	5
	2ND	30	211	472	72	12
	3RD	30	229	455	78	19
	4TH	25	246	480	180	13
Thallium-U (mg/l)	1ST	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	2ND	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	3RD	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	4TH	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thallium-F (mg/l)	1ST	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	2ND	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	3RD	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	4TH	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Thorium-U (mg/l)	1ST	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
	2ND	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
	3RD	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
	4TH	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Thorium-F (mg/l)	1ST	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
	2ND	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
	3RD	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
	4TH	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20
Titanium-U (mg/l)	1ST	0.16	0.017	0.031	0.049	0.0083
	2ND	0.15	0.12	0.092	0.12	0.021
	3RD	0.29	0.062	0.056	0.12	0.0041
	4TH	0.37	0.20	0.20	0.38	0.039

FIRST YEAR INTERIM STATUS
ORGDP GROUNDWATER MONITORING WELL DATA

K-1407-B, Continued

PARAMETER	QTR	WELL IDENTIFICATION UNW-1	UNW-2	UNW-3	UNW-4	UNW-5
Titanium-F (mg/l)	1ST	0.027	0.0074	0.0064	0.0044	0.038
	2ND	< 0.0030	< 0.0030	< 0.0030	< 0.0030	< 0.0030
	3RD	0.0069	0.013	0.0053	0.0065	< 0.0030
	4TH	0.022	0.015	0.021	0.023	0.023
Total Organic Carbon (mg/l)	1ST	90	110	80	85	255
	2ND	6.2	5.1	4.1	3.0	8.2
	2ND	6.3	5.4	4.4	2.1	9.1
	2ND	5.1	5.9	3.5	4.0	9.3
	2ND	8.3	5.9	4.0	3.8	
	3RD	96	130	67	101	112
	3RD	94	170	67	98	112
	3RD	90	140	67	104	112
	3RD	91	140	66	97	115
	4TH	101	96	65	107	111
	4TH	101	92	67	107	112
	4TH	102	94	67	107	108
	4TH	99	101	67	98	111
Total Organic Chloride (ug/l)	1ST	23	200	280	131	320
	1ST	22	200	280	133	340
	1ST	23	200	300	118	380
	1ST	24	180	300	125	360
	2ND	97	520	37	50	17
	2ND	92	500	30	48	16
	2ND	93	530	28	50	18
	2ND	96	540	35	47	18
	3RD	1400	140	140	100	380
	3RD	1400	140	140	100	380
	3RD	1400	130	140	90	380
	3RD	1400	170	140	50	390
	4TH	53	560	300	150	1040
	4TH	53	570	290	180	980
	4TH	54	560	330	190	1010
	4TH	51	550	330	190	990
Uranium-U (ug/l)	1ST	0.007	0.006	0.007	0.009	0.009
	2ND	0.004	0.004	0.005	0.006	0.004
	3RD	< 0.001	0.001	< 0.001	0.002	0.002
	4TH	< 0.001	0.001	< 0.001	0.001	0.001

FIRST YEAR INTERIM STATUS
ORGDP GROUNDWATER MONITORING WELL DATA

K-1407-B, Continued

PARAMETER	QTR	WELL IDENTIFICATION				
		UNW-1	UNW-2	UNW-3	UNW-4	UNW-5
Uranium-F (ug/l)	1ST	0.009	0.016	0.018	0.018	0.015
	2ND	0.003	0.001	0.003	0.005	0.005
	3RD	0.004	0.004	< 0.001	< 0.001	< 0.001
	4TH	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Vanadium-U (mg/l)	1ST	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	2ND	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	3RD	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	4TH	0.0094	0.0055	< 0.0050	0.011	< 0.0050
Vanadium-F (mg/l)	1ST	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	2ND	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	3RD	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	4TH	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
Zinc-U (mg/l)	1ST	0.062	0.062	0.051	0.16	0.066
	2ND	0.015	< 0.0010	< 0.0010	0.019	0.0078
	3RD	0.048	0.059	0.053	0.038	0.016
	4TH	0.030	0.024	0.014	0.044	0.029
Zinc-F (mg/l)	1ST	0.043	0.062	0.037	0.061	0.043
	2ND	< 0.0010	< 0.0010	< 0.0010	< 0.0010	0.0021
	3RD	0.044	0.060	0.051	0.013	0.033
	4TH	0.0038	0.0061	0.0053	0.0077	0.026
Zirconium-U (mg/l)	1ST	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	2ND	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	3RD	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	4TH	< 0.0050	< 0.0050	0.010	< 0.0050	< 0.0050
Zirconium-F (mg/l)	1ST	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	2ND	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	3RD	< 0.0050	< 0.0050	< 0.0050	< 0.0050	< 0.0050
	4TH	< 0.0050	< 0.0050	< 0.0050	0.0071	< 0.0050
2,4-D (ug/l)	1ST	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	2ND	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	3RD	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
	4TH	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

FIRST YEAR INTERIM STATUS
ORGDP GROUNDWATER MONITORING WELL DATA

K-1407-B, Continued

PARAMETER	QTR	WELL IDENTIFICATION UNW-1	UNW-2	UNW-3	UNW-4	UNW-5
Endrin (ug/l)	1ST	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	2ND	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
	3RD	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
	4TH	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoride (ug/l)	1ST	0.12	0.06	0.06	0.07	0.11
	2ND	IS[5]	IS	IS	IS	IS
	3RD	0.2	0.1	0.1	0.1	0.1
	4TH	0.3	0.2	0.1	0.1	0.2
Lindane (ug/l)	1ST	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	2ND	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
	3RD	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
	4TH	< 0.02	< 0.02	< 0.02	< 0.02	< 0.02
Methoxychlor (ug/l)	1ST	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
	2ND	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
	3RD	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
	4TH	< 0.08	< 0.08	< 0.08	< 0.08	< 0.08
Silvex (ug/l)	1ST	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	2ND	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	3RD	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
	4TH	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Toxaphene (ug/l)	1ST	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	2ND	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
	3RD	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
	4TH	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0

[5] Insufficient sample for analysis

FIRST YEAR INTERIM STATUS
ORGDP GROUNDWATER MONITORING WELL DATA

K-1407-B, Continued

PARAMETER	QTR	WELL IDENTIFICATION UNW-1	UNW-2	UNW-3	UNW-4	UNW-5
Alpha Activity (pCi/l)	1ST	72.41[6]	79[7]	61.43[8]	47.39[9]	28.65[10]
	2ND	6	14.6	1.93	2.25	8.14
	3RD	< 3	< 3	< 3	< 3	7.7
	4TH	< 1	5	9	2	< 1.2
Beta Activity (pCi/l)	1ST	98.83[11]	2027[12]	96.40[13]	63.60[14]	44.95[15]
	2ND	6.5	1105[16]	30	12.8	3.60
	3RD	< 7	923[17]	29	3.5	1.8
	4TH	3	753[18]	26	8	< 1.7

[6]Exceeds EPA Primary Interim Drinking Water Standards

[7]Exceeds EPA Primary Interim Drinking Water Standards

[8]Exceeds EPA Primary Interim Drinking Water Standards

[9]Exceeds EPA Primary Interim Drinking Water Standards

[10]Exceeds EPA Interim Primary Drinking Water Standards

[11]Exceeds EPA Primary Interim Drinking Water Standards

[12]Exceeds EPA Primary Interim Drinking Water Standards

[13]Exceeds EPA Primary Interim Drinking Water Standards

[14]Exceeds EPA Primary Interim Drinking Water Standards

[15]Exceeds EPA Primary Interim Drinking Water Standards

[16]Exceeds EPA Primary Interim Drinking Water Standards

[17]Exceeds EPA Primary Interim Drinking Water Standards

[18]Exceeds EPA Primary Interim Drinking Water Standards

FIRST YEAR INTERIM STATUS
ORGDP GROUNDWATER MONITORING WELL DATA

K-1407-B, Continued

PARAMETER	QTR	WELL IDENTIFICATION UNW-1	UNW-2	UNW-3	UNW-4	UNW-5
Conductivity (umho/cm)	1ST	320	800	1600	800	1000
	2ND	518	1260	1963	1140	1270
	2ND	547	1305	2060	1040	1270
	2ND	530	1303	2070	1010	1270
	2ND	527	1306	2070	1020	1280
	3RD	423	1352	1934	964	1210
	3RD	421	1343	1934	956	1273
	3RD	421	1350	1937	958	1226
	3RD	420	1349	1943	963	1206
	4TH	465	1643	2250	1147	1349
	4TH	463	1642	2240	1125	1296
	4TH	465	1617	2240	1123	1339
	4TH	462	1641	2240	1129	1357
Temperature (deg. C)	1ST	19	17	16.5	18	16
	2ND	16	10.9	15	15	12.9
	3RD	25.3	24.4	24.1	26.7	20
	4TH	25.0	26.0	23.0	22.4	22.3
Total Coliform Bacteria (cc/100 ml)	1ST	NF[19]	NF	NF	NF	NF
	2ND	NF	NF	NF	NF	NF
	3RD	NF	NF	NF	NF	NF
	4TH	2[20]	NF	NF	NF	NF
Total Radium (pCi/l)	1ST	< 2.70	< 2.70	< 2.70	< 2.70	< 2.70
	2ND	< 2.70	< 2.70	< 2.70	< 2.70	< 2.70
	3RD	< 2.70	< 2.70	< 2.70	< 2.70	< 2.70
	4TH	< 2.70	< 2.70	< 2.70	< 2.70	< 2.70
Uranium-235 (wt. %)	1ST	IU[21]	IU	1.35	IU	IU
	2ND	IU	IU	IU	IU	IU
	3RD	IU	IU	IU	IU	IU
	4TH	IU	IU	IU	IU	IU

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[19]Not found
[20]Exceeds EPA Primary Interim Drinking Water Standards

FIRST YEAR INTERIM STATUS
ORGDP GROUNDWATER MONITORING WELL DATA

K-1407-B, Continued

PARAMETER	QTR	UNW-1	UNW-2	UNW-3	UNW-4	UNW-5
		WELL IDENTIFICATION				
pH	1ST	5.92	6.39	6.16	6.66	6.20
(units)	2ND	6.5	7.0	6.7	6.9	6.7
	2ND	6.5	7.1	6.7	6.8	6.7
	2ND	6.5	7.1	6.7	6.8	6.7
	2ND	7.1	7.2	7.4	7.1	7.2
	3RD	6.6	7.1	7.4	7.2	6.8
	3RD	6.6	7.1	7.2	7.2	6.8
	3RD	6.5	7.1	7.4	7.1	6.8
	3RD	6.5	7.3	7.2	7.3	6.9
	4TH	6.5	7.1	7.1	7.2	6.8
	4TH	6.5	7.1	7.1	7.2	7.1
	4TH	6.5	7.1	7.1	7.2	6.7
	4TH	6.6	7.0	7.0	7.2	6.7
Groundwater	1ST	762.5	751.8	751.7	751.8	760.0
Elevation	2ND	762.9	751.6	752.0	753.6	759.6
(ft.)	3RD	761.7	753.9	754.0	754.4	762.2
	4TH	761.5	749.6	752.0	750.8	759.2

ORGDP GROUNDWATER MONITORING WELL DATA

K-1407-B

PARAMETER ACENAPHTHENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER ACENAPHTHYLENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER ACETONE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	32.0000	ug/L
UNW-1	11/11/87	21.0000	ug/L
UNW-1	11/19/87	<10.0000	ug/L
UNW-1	11/30/87	<10.0000	ug/L
UNW-2	11/05/87	<10.0000	ug/L
UNW-2	11/11/87	40.0000	ug/L
UNW-2	11/19/87	<10.0000	ug/L

PARAMETER ACETONE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-2	11/30/87	<10.0000	ug/L
UNW-2-D	11/11/87	27.0000	ug/L
UNW-5	11/05/87	<10.0000	ug/L
UNW-5	11/11/87	<10.0000	ug/L
UNW-5	11/19/87	5.0000	ug/L
UNW-5	11/30/87	6.0000	ug/L
UNW-5-D	11/19/87	48.0000	ug/L

PARAMETER ALUMINUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	1.2000	mg/L
UNW-1	11/11/87	0.3400	mg/L
UNW-1	11/19/87	1.1000	mg/L
UNW-1	11/30/87	1.1000	mg/L
UNW-1-F	11/05/87	<0.0200	mg/L
UNW-1-F	11/11/87	<0.0200	mg/L
UNW-1-F	11/19/87	0.0630	mg/L
UNW-1-F	11/30/87	0.0370	mg/L
UNW-3	11/05/87	57.0000	mg/L
UNW-3	11/11/87	2.2000	mg/L
UNW-3	11/23/87	5.2000	mg/L
UNW-3	11/30/87	2.5000	mg/L
UNW-3-F	11/05/87	0.0690	mg/L
UNW-3-F	11/11/87	0.0540	mg/L
UNW-3-F	11/23/87	0.1400	mg/L
UNW-3-F	11/30/87	0.1200	mg/L
UNW-5	11/05/87	0.2300	mg/L
UNW-5	11/11/87	0.3100	mg/L
UNW-5	11/19/87	0.5300	mg/L
UNW-5	11/30/87	0.4800	mg/L
UNW-5-D	11/19/87	0.6600	mg/L
UNW-5-D-F	11/19/87	0.0740	mg/L
UNW-5-F	11/05/87	0.0320	mg/L
UNW-5-F	11/11/87	0.0290	mg/L
UNW-5-F	11/19/87	0.0300	mg/L
UNW-5-F	11/30/87	0.0750	mg/L

PARAMETER ANTHRACENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L

PARAMETER ANTHRACENE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER ANTIMONY

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.0500	mg/L
UNW-1	11/11/87	<0.0500	mg/L
UNW-1	11/19/87	<0.0500	mg/L
UNW-1	11/30/87	<0.0500	mg/L
UNW-1-F	11/05/87	<0.0500	mg/L
UNW-1-F	11/11/87	<0.0500	mg/L
UNW-1-F	11/19/87	<0.0500	mg/L
UNW-1-F	11/30/87	<0.0500	mg/L
UNW-3	11/05/87	<0.0500	mg/L
UNW-3	11/11/87	<0.0500	mg/L
UNW-3	11/23/87	0.1200	mg/L
UNW-3	11/30/87	<0.0500	mg/L
UNW-3-F	11/05/87	<0.0500	mg/L
UNW-3-F	11/11/87	<0.0500	mg/L
UNW-3-F	11/23/87	<0.0500	mg/L
UNW-3-F	11/30/87	<0.0500	mg/L
UNW-5	11/05/87	<0.0500	mg/L
UNW-5	11/11/87	<0.0500	mg/L
UNW-5	11/19/87	<0.0500	mg/L
UNW-5	11/30/87	<0.0500	mg/L
UNW-5-D	11/19/87	<0.0500	mg/L
UNW-5-D-F	11/19/87	<0.0500	mg/L
UNW-5-F	11/05/87	<0.0500	mg/L
UNW-5-F	11/11/87	<0.0500	mg/L
UNW-5-F	11/19/87	<0.0500	mg/L
UNW-5-F	11/30/87	<0.0500	mg/L

PARAMETER ARSENIC

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.0050	mg/L
UNW-1	11/11/87	<0.0050	mg/L
UNW-1	11/19/87	<0.0050	mg/L
UNW-1	11/30/87	<0.0050	mg/L
UNW-1-F	11/05/87	<0.0050	mg/L
UNW-1-F	11/11/87	<0.0050	mg/L
UNW-1-F	11/19/87	<0.0050	mg/L

PARAMETER ARSENIC (continued)

WELL ID	DATE	RESULT	UNITS
UNW-1-F	11/30/87	<0.0050	mg/L
UNW-3	11/05/87	0.0400	mg/L
UNW-3	11/11/87	<0.0050	mg/L
UNW-3	11/23/87	<0.0050	mg/L
UNW-3	11/30/87	<0.0050	mg/L
UNW-3-F	11/05/87	<0.0050	mg/L
UNW-3-F	11/11/87	<0.0050	mg/L
UNW-3-F	11/23/87	<0.0050	mg/L
UNW-3-F	11/30/87	<0.0050	mg/L
UNW-5	11/05/87	0.0130	mg/L
UNW-5	11/11/87	0.0100	mg/L
UNW-5	11/19/87	0.0110	mg/L
UNW-5	11/30/87	0.0100	mg/L
UNW-5-D	11/19/87	0.0090	mg/L
UNW-5-D-F	11/19/87	<0.0050	mg/L
UNW-5-F	11/05/87	<0.0050	mg/L
UNW-5-F	11/11/87	<0.0050	mg/L
UNW-5-F	11/19/87	<0.0050	mg/L
UNW-5-F	11/30/87	<0.0050	mg/L

PARAMETER BARIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	0.1400	mg/L
UNW-1	11/11/87	0.1200	mg/L
UNW-1	11/19/87	0.1200	mg/L
UNW-1	11/30/87	0.1300	mg/L
UNW-1-F	11/05/87	0.1200	mg/L
UNW-1-F	11/11/87	0.1200	mg/L
UNW-1-F	11/19/87	0.1200	mg/L
UNW-1-F	11/30/87	0.1200	mg/L
UNW-3	11/05/87	1.7000	mg/L
UNW-3	11/11/87	0.0950	mg/L
UNW-3	11/23/87	0.2100	mg/L
UNW-3	11/30/87	0.0960	mg/L
UNW-3-F	11/05/87	<0.0010	mg/L
UNW-3-F	11/11/87	0.0330	mg/L
UNW-3-F	11/23/87	0.0180	mg/L
UNW-3-F	11/30/87	0.0130	mg/L
UNW-5	11/05/87	0.4100	mg/L
UNW-5	11/11/87	0.4200	mg/L
UNW-5	11/19/87	0.4500	mg/L
UNW-5	11/30/87	0.4300	mg/L
UNW-5-D	11/19/87	0.4500	mg/L
UNW-5-D-F	11/19/87	0.3900	mg/L
UNW-5-F	11/05/87	0.1700	mg/L
UNW-5-F	11/11/87	0.3300	mg/L
UNW-5-F	11/19/87	0.3900	mg/L
UNW-5-F	11/30/87	0.3900	mg/L

PARAMETER BENZENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER BENZO(A)ANTHRACENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER BENZO(A)PYRENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L

PARAMETER BENZO(A)PYRENE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER BENZO(B)FLUORANTHENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER BENZO(G,H,I)PERYLENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER BENZO(K)FLUORANTHENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L

PARAMETER BENZO(K)FLUORANTHENE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER BENZOIC ACID

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<25.0000	ug/L
UNW-1	11/11/87	<25.0000	ug/L
UNW-1	11/19/87	<25.0000	ug/L
UNW-1	11/30/87	<25.0000	ug/L
UNW-2	11/05/87	<25.0000	ug/L
UNW-2	11/11/87	<25.0000	ug/L
UNW-2	11/19/87	<25.0000	ug/L
UNW-2	11/30/87	<25.0000	ug/L
UNW-2-D	11/11/87	<25.0000	ug/L
UNW-5	11/05/87	<25.0000	ug/L
UNW-5	11/11/87	<25.0000	ug/L
UNW-5	11/19/87	<25.0000	ug/L
UNW-5	11/30/87	<25.0000	ug/L
UNW-5-D	11/19/87	<25.0000	ug/L

PARAMETER BENZYL ALCOHOL

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER BERYLLIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.0003	mg/L
UNW-1	11/11/87	<0.0003	mg/L
UNW-1	11/19/87	<0.0003	mg/L
UNW-1	11/30/87	<0.0003	mg/L
UNW-1-F	11/05/87	<0.0003	mg/L
UNW-1-F	11/11/87	<0.0003	mg/L
UNW-1-F	11/19/87	<0.0003	mg/L
UNW-1-F	11/30/87	<0.0003	mg/L
UNW-3	11/05/87	0.0056	mg/L
UNW-3	11/11/87	<0.0003	mg/L
UNW-3	11/23/87	0.0009	mg/L
UNW-3	11/30/87	<0.0003	mg/L
UNW-3-F	11/05/87	<0.0003	mg/L
UNW-3-F	11/11/87	<0.0003	mg/L
UNW-3-F	11/23/87	<0.0003	mg/L
UNW-3-F	11/30/87	<0.0003	mg/L
UNW-5	11/05/87	<0.0003	mg/L
UNW-5	11/11/87	<0.0003	mg/L
UNW-5	11/19/87	<0.0003	mg/L
UNW-5	11/30/87	<0.0003	mg/L
UNW-5-D	11/19/87	<0.0003	mg/L
UNW-5-D-F	11/19/87	<0.0003	mg/L
UNW-5-F	11/05/87	<0.0003	mg/L
UNW-5-F	11/11/87	<0.0003	mg/L
UNW-5-F	11/19/87	<0.0003	mg/L
UNW-5-F	11/30/87	<0.0003	mg/L

PARAMETER BIS(2-CHLOROETHOXY)METHANE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER BIS(2-CHLOROETHYL)ETHER

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER BIS(2-CHLOROISOPROPYL)ETHER

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER BIS(2-ETHYLHEXYL)PHTHALATE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	0.9000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	76.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	1.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	2.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L

PARAMETER BIS(2-ETHYLHEXYL)PHTHALATE
(continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	2.0000	ug/L

PARAMETER BORON

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	0.0350	mg/L
UNW-1	11/11/87	0.0330	mg/L
UNW-1	11/19/87	0.0200	mg/L
UNW-1	11/30/87	0.0130	mg/L
UNW-1-F	11/05/87	0.0060	mg/L
UNW-1-F	11/11/87	0.0340	mg/L
UNW-1-F	11/19/87	0.0370	mg/L
UNW-1-F	11/30/87	0.0049	mg/L
UNW-3	11/05/87	0.2100	mg/L
UNW-3	11/11/87	0.0790	mg/L
UNW-3	11/23/87	0.0850	mg/L
UNW-3	11/30/87	0.0510	mg/L
UNW-3-F	11/05/87	0.0460	mg/L
UNW-3-F	11/11/87	0.0750	mg/L
UNW-3-F	11/23/87	0.0830	mg/L
UNW-3-F	11/30/87	0.0550	mg/L
UNW-5	11/05/87	0.0330	mg/L
UNW-5	11/11/87	0.0430	mg/L
UNW-5	11/19/87	0.0140	mg/L
UNW-5	11/30/87	0.0400	mg/L
UNW-5-D	11/19/87	0.0120	mg/L
UNW-5-D-F	11/19/87	<0.0040	mg/L
UNW-5-F	11/05/87	0.0130	mg/L
UNW-5-F	11/11/87	0.0250	mg/L
UNW-5-F	11/19/87	0.0410	mg/L
UNW-5-F	11/30/87	0.0260	mg/L

PARAMETER BROMODICHLOROMETHANE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L

PARAMETER BROMODICHLOROMETHANE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER BROMOFORM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER BROMOMETHANE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<10.0000	ug/L
UNW-1	11/11/87	<10.0000	ug/L
UNW-1	11/19/87	<10.0000	ug/L
UNW-1	11/30/87	<10.0000	ug/L
UNW-2	11/05/87	<10.0000	ug/L
UNW-2	11/11/87	<10.0000	ug/L
UNW-2	11/19/87	<10.0000	ug/L
UNW-2	11/30/87	<10.0000	ug/L
UNW-2-D	11/11/87	<10.0000	ug/L
UNW-5	11/05/87	<10.0000	ug/L
UNW-5	11/11/87	<10.0000	ug/L
UNW-5	11/19/87	<10.0000	ug/L
UNW-5	11/30/87	<10.0000	ug/L
UNW-5-D	11/19/87	<10.0000	ug/L

PARAMETER BUTYLBENZYLPHTHALATE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L

PARAMETER BUTYLBENZYLPHTHALATE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	1.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER CADMIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.0030	mg/L
UNW-1	11/11/87	<0.0030	mg/L
UNW-1	11/19/87	<0.0030	mg/L
UNW-1	11/30/87	<0.0030	mg/L
UNW-1-F	11/05/87	<0.0030	mg/L
UNW-1-F	11/11/87	<0.0030	mg/L
UNW-1-F	11/19/87	<0.0030	mg/L
UNW-1-F	11/30/87	<0.0030	mg/L
UNW-3	11/05/87	0.0056	mg/L
UNW-3	11/11/87	<0.0030	mg/L
UNW-3	11/23/87	<0.0030	mg/L
UNW-3	11/30/87	<0.0030	mg/L
UNW-3-F	11/05/87	0.0033	mg/L
UNW-3-F	11/11/87	<0.0030	mg/L
UNW-3-F	11/23/87	<0.0030	mg/L
UNW-3-F	11/30/87	<0.0030	mg/L
UNW-5	11/05/87	<0.0030	mg/L
UNW-5	11/11/87	<0.0030	mg/L
UNW-5	11/19/87	<0.0030	mg/L
UNW-5	11/30/87	<0.0030	mg/L
UNW-5-D	11/19/87	0.0045	mg/L
UNW-5-D-F	11/19/87	<0.0030	mg/L
UNW-5-F	11/05/87	<0.0030	mg/L
UNW-5-F	11/11/87	<0.0030	mg/L
UNW-5-F	11/19/87	<0.0030	mg/L
UNW-5-F	11/30/87	<0.0030	mg/L

PARAMETER CALCIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	54.0000	mg/L
UNW-1	11/11/87	44.0000	mg/L
UNW-1	11/19/87	44.0000	mg/L
UNW-1	11/30/87	48.0000	mg/L

PARAMETER CALCIUM (continued)

WELL ID	DATE	RESULT	UNITS
UNW-1-F	11/05/87	48.0000	mg/L
UNW-1-F	11/11/87	47.0000	mg/L
UNW-1-F	11/19/87	50.0000	mg/L
UNW-1-F	11/30/87	44.0000	mg/L
UNW-3	11/05/87	350.0000	mg/L
UNW-3	11/11/87	270.0000	mg/L
UNW-3	11/23/87	290.0000	mg/L
UNW-3	11/30/87	280.0000	mg/L
UNW-3-F	11/05/87	250.0000	mg/L
UNW-3-F	11/11/87	270.0000	mg/L
UNW-3-F	11/23/87	290.0000	mg/L
UNW-3-F	11/30/87	290.0000	mg/L
UNW-5	11/05/87	220.0000	mg/L
UNW-5	11/11/87	190.0000	mg/L
UNW-5	11/19/87	220.0000	mg/L
UNW-5	11/30/87	200.0000	mg/L
UNW-5-D	11/19/87	220.0000	mg/L
UNW-5-D-F	11/19/87	210.0000	mg/L
UNW-5-F	11/05/87	150.0000	mg/L
UNW-5-F	11/11/87	170.0000	mg/L
UNW-5-F	11/19/87	210.0000	mg/L
UNW-5-F	11/30/87	210.0000	mg/L

PARAMETER CARBON DISULFIDE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER CARBON TETRACHLORIDE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L

PARAMETER CARBON TETRACHLORIDE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER CHLORIDE

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	17.0000	mg/L
UNW-1	08/27/87	22.0000	mg/L
UNW-1	09/02/87	20.4000	mg/L
UNW-1	11/05/87	24.0000	mg/L
UNW-1	11/11/87	23.0000	mg/L
UNW-1	11/19/87	26.0000	mg/L
UNW-1	11/30/87	23.7000	mg/L
UNW-1	02/23/88	22.0000	mg/L
UNW-2	04/30/87	254.0000	mg/L
UNW-2	08/27/87	280.0000	mg/L
UNW-2	09/02/87	290.0000	mg/L
UNW-2	02/22/88	200.0000	mg/L
UNW-3	04/28/87	418.0000	mg/L
UNW-3	08/27/87	390.0000	mg/L
UNW-3	09/02/87	390.0000	mg/L
UNW-3	11/05/87	365.0000	mg/L
UNW-3	11/11/87	380.0000	mg/L
UNW-3	11/23/87	380.0000	mg/L
UNW-3	11/30/87	380.0000	mg/L
UNW-3	02/22/88	308.0000	mg/L
UNW-4	04/28/87	114.0000	mg/L
UNW-4	08/27/87	139.0000	mg/L
UNW-4	09/02/87	157.0000	mg/L
UNW-4	02/23/88	102.0000	mg/L
UNW-5	04/30/87	280.0000	mg/L
UNW-5	08/27/87	294.0000	mg/L
UNW-5	09/02/87	330.0000	mg/L
UNW-5	11/05/87	360.0000	mg/L
UNW-5	11/11/87	330.0000	mg/L
UNW-5	11/19/87	310.0000	mg/L
UNW-5	11/30/87	330.0000	mg/L
UNW-5	02/23/88	270.0000	mg/L
UNW-5-D	09/02/87	310.0000	mg/L
UNW-5-D	11/19/87	310.0000	mg/L

PARAMETER CHLOROBENZENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER CHLOROETHANE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<10.0000	ug/L
UNW-1	11/11/87	<10.0000	ug/L
UNW-1	11/19/87	<10.0000	ug/L
UNW-1	11/30/87	<10.0000	ug/L
UNW-2	11/05/87	<10.0000	ug/L
UNW-2	11/11/87	<10.0000	ug/L
UNW-2	11/19/87	<10.0000	ug/L
UNW-2	11/30/87	<10.0000	ug/L
UNW-2-D	11/11/87	<10.0000	ug/L
UNW-5	11/05/87	<10.0000	ug/L
UNW-5	11/11/87	<10.0000	ug/L
UNW-5	11/19/87	<10.0000	ug/L
UNW-5	11/30/87	<10.0000	ug/L
UNW-5-D	11/19/87	<10.0000	ug/L

PARAMETER CHLOROFORM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	1.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	1.0000	ug/L
UNW-2	11/11/87	3.0000	ug/L
UNW-2	11/19/87	2.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	3.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	1.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L

PARAMETER CHLOROFORM (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	11/30/87	0.2000	ug/L
UNW-5-D	11/19/87	2.0000	ug/L

PARAMETER CHLOROMETHANE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<10.0000	ug/L
UNW-1	11/11/87	<10.0000	ug/L
UNW-1	11/19/87	<10.0000	ug/L
UNW-1	11/30/87	<10.0000	ug/L
UNW-2	11/05/87	<10.0000	ug/L
UNW-2	11/11/87	<10.0000	ug/L
UNW-2	11/19/87	<10.0000	ug/L
UNW-2	11/30/87	<10.0000	ug/L
UNW-2-D	11/11/87	<10.0000	ug/L
UNW-5	11/05/87	<10.0000	ug/L
UNW-5	11/11/87	<10.0000	ug/L
UNW-5	11/19/87	<10.0000	ug/L
UNW-5	11/30/87	<10.0000	ug/L
UNW-5-D	11/19/87	<10.0000	ug/L

PARAMETER CHROMIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.0100	mg/L
UNW-1	11/11/87	<0.0100	mg/L
UNW-1	11/19/87	<0.0100	mg/L
UNW-1	11/30/87	<0.0100	mg/L
UNW-1-F	11/05/87	<0.0100	mg/L
UNW-1-F	11/11/87	<0.0100	mg/L
UNW-1-F	11/19/87	0.0100	mg/L
UNW-1-F	11/30/87	<0.0100	mg/L
UNW-3	11/05/87	0.1000	mg/L
UNW-3	11/11/87	<0.0100	mg/L
UNW-3	11/23/87	0.0150	mg/L
UNW-3	11/30/87	<0.0100	mg/L
UNW-3-F	11/05/87	<0.0100	mg/L
UNW-3-F	11/11/87	<0.0100	mg/L
UNW-3-F	11/23/87	0.0150	mg/L
UNW-3-F	11/30/87	<0.0100	mg/L
UNW-5	11/05/87	<0.0100	mg/L
UNW-5	11/11/87	<0.0100	mg/L
UNW-5	11/19/87	<0.0100	mg/L
UNW-5	11/30/87	<0.0100	mg/L
UNW-5-D	11/19/87	<0.0100	mg/L
UNW-5-D-F	11/19/87	<0.0100	mg/L
UNW-5-F	11/05/87	<0.0100	mg/L
UNW-5-F	11/11/87	<0.0100	mg/L

PARAMETER CHROMIUM (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5-F	11/19/87	<0.0100	mg/L
UNW-5-F	11/30/87	<0.0100	mg/L

PARAMETER CHRYSENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER CIS-1,3-DICHLOROPROPENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER COBALT

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	0.0100	mg/L
UNW-1	11/11/87	0.0088	mg/L
UNW-1	11/19/87	0.0095	mg/L
UNW-1	11/30/87	0.0099	mg/L
UNW-1-F	11/05/87	0.0093	mg/L

PARAMETER COBALT (continued)

WELL ID	DATE	RESULT	UNITS
UNW-1-F	11/11/87	0.0066	mg/L
UNW-1-F	11/19/87	0.0110	mg/L
UNW-1-F	11/30/87	0.0079	mg/L
UNW-3	11/05/87	0.0730	mg/L
UNW-3	11/11/87	<0.0050	mg/L
UNW-3	11/23/87	0.0074	mg/L
UNW-3	11/30/87	<0.0050	mg/L
UNW-3-F	11/05/87	<0.0050	mg/L
UNW-3-F	11/11/87	<0.0050	mg/L
UNW-3-F	11/23/87	<0.0050	mg/L
UNW-3-F	11/30/87	<0.0050	mg/L
UNW-5	11/05/87	0.0088	mg/L
UNW-5	11/11/87	0.0060	mg/L
UNW-5	11/19/87	0.0099	mg/L
UNW-5	11/30/87	0.0070	mg/L
UNW-5-D	11/19/87	0.0100	mg/L
UNW-5-D-F	11/19/87	0.0080	mg/L
UNW-5-F	11/05/87	<0.0050	mg/L
UNW-5-F	11/11/87	0.0057	mg/L
UNW-5-F	11/19/87	0.0120	mg/L
UNW-5-F	11/30/87	0.0067	mg/L

PARAMETER CONDUCTIVITY

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	520.0000	umho/cm
UNW-1	04/28/87	533.0000	umho/cm
UNW-1	04/28/87	536.0000	umho/cm
UNW-1	04/28/87	537.0000	umho/cm
UNW-1	08/27/87	455.0000	umho/cm
UNW-1	08/27/87	455.0000	umho/cm
UNW-1	08/27/87	460.0000	umho/cm
UNW-1	08/27/87	456.0000	umho/cm
UNW-1	08/27/87	464.0000	umho/cm
UNW-1	09/02/87	620.0000	umho/cm
UNW-1	09/02/87	658.0000	umho/cm
UNW-1	09/02/87	567.0000	umho/cm
UNW-1	09/02/87	549.0000	umho/cm
UNW-1	09/02/87	560.0000	umho/cm
UNW-1	11/05/87	370.0000	umho/cm
UNW-1	11/05/87	429.0000	umho/cm
UNW-1	11/05/87	425.0000	umho/cm
UNW-1	11/05/87	426.0000	umho/cm
UNW-1	11/05/87	425.0000	umho/cm
UNW-1	11/11/87	370.0000	umho/cm
UNW-1	11/11/87	415.0000	umho/cm
UNW-1	11/11/87	419.0000	umho/cm
UNW-1	11/11/87	411.0000	umho/cm
UNW-1	11/11/87	413.0000	umho/cm

PARAMETER CONDUCTIVITY (continued)

WELL ID	DATE	RESULT	UNITS
UNW-1	11/19/87	392.0000	umho/cm
UNW-1	11/19/87	372.0000	umho/cm
UNW-1	11/19/87	384.0000	umho/cm
UNW-1	11/19/87	370.0000	umho/cm
UNW-1	11/19/87	390.0000	umho/cm
UNW-1	11/30/87	360.0000	umho/cm
UNW-1	11/30/87	394.0000	umho/cm
UNW-1	11/30/87	392.0000	umho/cm
UNW-1	11/30/87	392.0000	umho/cm
UNW-1	11/30/87	391.0000	umho/cm
UNW-1	02/23/88	490.0000	umho/cm
UNW-1	02/23/88	575.0000	umho/cm
UNW-1	02/23/88	562.0000	umho/cm
UNW-1	02/23/88	565.0000	umho/cm
UNW-1	02/23/88	568.0000	umho/cm
UNW-2	04/30/87	1640.0000	umho/cm
UNW-2	04/30/87	1880.0000	umho/cm
UNW-2	04/30/87	1890.0000	umho/cm
UNW-2	04/30/87	1900.0000	umho/cm
UNW-2	08/27/87	1753.0000	umho/cm
UNW-2	08/27/87	1860.0000	umho/cm
UNW-2	08/27/87	1820.0000	umho/cm
UNW-2	08/27/87	1830.0000	umho/cm
UNW-2	08/27/87	1820.0000	umho/cm
UNW-2	09/02/87	1660.0000	umho/cm
UNW-2	09/02/87	1890.0000	umho/cm
UNW-2	09/02/87	1890.0000	umho/cm
UNW-2	09/02/87	1900.0000	umho/cm
UNW-2	09/02/87	1910.0000	umho/cm
UNW-2	11/05/87	1330.0000	umho/cm
UNW-2	11/11/87	1480.0000	umho/cm
UNW-2	11/19/87	1816.0000	umho/cm
UNW-2	11/30/87	1810.0000	umho/cm
UNW-2	02/22/88	1460.0000	umho/cm
UNW-2	02/22/88	1810.0000	umho/cm
UNW-2	02/22/88	1800.0000	umho/cm
UNW-2	02/22/88	1800.0000	umho/cm
UNW-2	02/22/88	1810.0000	umho/cm
UNW-2-D	11/11/87	1480.0000	umho/cm
UNW-3	04/28/87	2225.0000	umho/cm
UNW-3	04/28/87	2540.0000	umho/cm
UNW-3	04/28/87	2550.0000	umho/cm
UNW-3	04/28/87	2560.0000	umho/cm
UNW-3	08/27/87	2180.0000	umho/cm
UNW-3	08/27/87	2470.0000	umho/cm
UNW-3	08/27/87	2450.0000	umho/cm
UNW-3	08/27/87	2460.0000	umho/cm
UNW-3	08/27/87	2460.0000	umho/cm
UNW-3	09/02/87	2180.0000	umho/cm
UNW-3	09/02/87	2480.0000	umho/cm

PARAMETER CONDUCTIVITY (continued)

WELL ID	DATE	RESULT	UNITS
UNW-3	09/02/87	2480.0000	umho/cm
UNW-3	09/02/87	2470.0000	umho/cm
UNW-3	09/02/87	2480.0000	umho/cm
UNW-3	11/05/87	1480.0000	umho/cm
UNW-3	11/05/87	2440.0000	umho/cm
UNW-3	11/05/87	2440.0000	umho/cm
UNW-3	11/05/87	2430.0000	umho/cm
UNW-3	11/05/87	2440.0000	umho/cm
UNW-3	11/11/87	1530.0000	umho/cm
UNW-3	11/11/87	2420.0000	umho/cm
UNW-3	11/11/87	2420.0000	umho/cm
UNW-3	11/11/87	2420.0000	umho/cm
UNW-3	11/11/87	2410.0000	umho/cm
UNW-3	11/23/87	1960.0000	umho/cm
UNW-3	11/23/87	2420.0000	umho/cm
UNW-3	11/23/87	2430.0000	umho/cm
UNW-3	11/23/87	2430.0000	umho/cm
UNW-3	11/23/87	2430.0000	umho/cm
UNW-3	11/30/87	2180.0000	umho/cm
UNW-3	11/30/87	2350.0000	umho/cm
UNW-3	11/30/87	2330.0000	umho/cm
UNW-3	11/30/87	2340.0000	umho/cm
UNW-3	11/30/87	2350.0000	umho/cm
UNW-3	02/22/88	1600.0000	umho/cm
UNW-3	02/22/88	2150.0000	umho/cm
UNW-3	02/22/88	2140.0000	umho/cm
UNW-3	02/22/88	2140.0000	umho/cm
UNW-3	02/22/88	2140.0000	umho/cm
UNW-4	04/28/87	1050.0000	umho/cm
UNW-4	04/28/87	1080.0000	umho/cm
UNW-4	04/28/87	1090.0000	umho/cm
UNW-4	08/27/87	1103.0000	umho/cm
UNW-4	08/27/87	1200.0000	umho/cm
UNW-4	08/27/87	1190.0000	umho/cm
UNW-4	08/27/87	1180.0000	umho/cm
UNW-4	08/27/87	1190.0000	umho/cm
UNW-4	09/02/87	1090.0000	umho/cm
UNW-4	09/02/87	1230.0000	umho/cm
UNW-4	09/02/87	1230.0000	umho/cm
UNW-4	09/02/87	1230.0000	umho/cm
UNW-4	09/02/87	1240.0000	umho/cm
UNW-4	02/23/88	953.0000	umho/cm
UNW-4	02/23/88	1040.0000	umho/cm
UNW-4	02/23/88	1030.0000	umho/cm
UNW-4	02/23/88	1030.0000	umho/cm
UNW-4	02/23/88	1040.0000	umho/cm
UNW-5	04/30/87	1210.0000	umho/cm
UNW-5	04/30/87	1220.0000	umho/cm
UNW-5	04/30/87	1240.0000	umho/cm
UNW-5	04/30/87	1250.0000	umho/cm

PARAMETER CONDUCTIVITY (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	04/30/87	1260.0000	umho/cm
UNW-5	08/27/87	1504.0000	umho/cm
UNW-5	08/27/87	1450.0000	umho/cm
UNW-5	08/27/87	1440.0000	umho/cm
UNW-5	08/27/87	1440.0000	umho/cm
UNW-5	08/27/87	1450.0000	umho/cm
UNW-5	09/02/87	1390.0000	umho/cm
UNW-5	09/02/87	1490.0000	umho/cm
UNW-5	09/02/87	1470.0000	umho/cm
UNW-5	09/02/87	1480.0000	umho/cm
UNW-5	09/02/87	1490.0000	umho/cm
UNW-5	11/05/87	1580.0000	umho/cm
UNW-5	11/05/87	1580.0000	umho/cm
UNW-5	11/05/87	1580.0000	umho/cm
UNW-5	11/05/87	1580.0000	umho/cm
UNW-5	11/05/87	.	umho/cm
UNW-5	11/11/87	1400.0000	umho/cm
UNW-5	11/11/87	1520.0000	umho/cm
UNW-5	11/11/87	1520.0000	umho/cm
UNW-5	11/11/87	1520.0000	umho/cm
UNW-5	11/11/87	1520.0000	umho/cm
UNW-5	11/19/87	1462.0000	umho/cm
UNW-5	11/19/87	1440.0000	umho/cm
UNW-5	11/19/87	1440.0000	umho/cm
UNW-5	11/19/87	1430.0000	umho/cm
UNW-5	11/19/87	1410.0000	umho/cm
UNW-5	11/30/87	1150.0000	umho/cm
UNW-5	11/30/87	1460.0000	umho/cm
UNW-5	11/30/87	1460.0000	umho/cm
UNW-5	11/30/87	1470.0000	umho/cm
UNW-5	11/30/87	1470.0000	umho/cm
UNW-5	02/23/88	1303.0000	umho/cm
UNW-5	02/23/88	1420.0000	umho/cm
UNW-5	02/23/88	1350.0000	umho/cm
UNW-5	02/23/88	1350.0000	umho/cm
UNW-5	02/23/88	1360.0000	umho/cm
UNW-5-D	09/02/87	1390.0000	umho/cm
UNW-5-D	09/02/87	1470.0000	umho/cm
UNW-5-D	09/02/87	1480.0000	umho/cm
UNW-5-D	09/02/87	1460.0000	umho/cm
UNW-5-D	09/02/87	1480.0000	umho/cm
UNW-5-D	11/19/87	1462.0000	umho/cm
UNW-5-D	11/19/87	1430.0000	umho/cm
UNW-5-D	11/19/87	1450.0000	umho/cm
UNW-5-D	11/19/87	1430.0000	umho/cm
UNW-5-D	11/19/87	1440.0000	umho/cm

PARAMETER CONDUCTIVITY - INIT

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	720.0000	umho/cm
UNW-1	08/27/87	703.0000	umho/cm
UNW-1	09/02/87	620.0000	umho/cm
UNW-1	11/05/87	540.0000	umho/cm
UNW-1	11/11/87	490.0000	umho/cm
UNW-1	11/19/87	596.0000	umho/cm
UNW-1	11/30/87	610.0000	umho/cm
UNW-2	04/30/87	1740.0000	umho/cm
UNW-2	08/27/87	1676.0000	umho/cm
UNW-2	09/02/87	1590.0000	umho/cm
UNW-2	11/05/87	1310.0000	umho/cm
UNW-2	11/11/87	1550.0000	umho/cm
UNW-2	11/19/87	1759.0000	umho/cm
UNW-2	11/30/87	1730.0000	umho/cm
UNW-2-D	11/11/87	1550.0000	umho/cm
UNW-3	04/28/87	2320.0000	umho/cm
UNW-3	08/27/87	2130.0000	umho/cm
UNW-3	09/02/87	2110.0000	umho/cm
UNW-3	11/05/87	1550.0000	umho/cm
UNW-3	11/11/87	1150.0000	umho/cm
UNW-3	11/23/87	1040.0000	umho/cm
UNW-3	11/30/87	.	umho/cm
UNW-4	04/28/87	1020.0000	umho/cm
UNW-4	08/27/87	1012.0000	umho/cm
UNW-4	09/02/87	1130.0000	umho/cm
UNW-5	04/30/87	1320.0000	umho/cm
UNW-5	08/27/87	1441.0000	umho/cm
UNW-5	09/02/87	1500.0000	umho/cm
UNW-5	11/05/87	1090.0000	umho/cm
UNW-5	11/11/87	1464.0000	umho/cm
UNW-5	11/19/87	1292.0000	umho/cm
UNW-5	11/30/87	1100.0000	umho/cm
UNW-5-D	09/02/87	1500.0000	umho/cm
UNW-5-D	11/19/87	1292.0000	umho/cm

PARAMETER COPPER

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.0040	mg/L
UNW-1	11/11/87	<0.0040	mg/L
UNW-1	11/19/87	<0.0040	mg/L
UNW-1	11/30/87	<0.0040	mg/L
UNW-1-F	11/05/87	<0.0040	mg/L
UNW-1-F	11/11/87	<0.0040	mg/L
UNW-1-F	11/19/87	0.0046	mg/L
UNW-1-F	11/30/87	<0.0040	mg/L
UNW-3	11/05/87	0.0760	mg/L
UNW-3	11/11/87	<0.0040	mg/L
UNW-3	11/23/87	0.0051	mg/L

PARAMETER COPPER (continued)

WELL ID	DATE	RESULT	UNITS
UNW-3	11/30/87	<0.0040	mg/L
UNW-3-F	11/05/87	<0.0040	mg/L
UNW-3-F	11/11/87	<0.0040	mg/L
UNW-3-F	11/23/87	<0.0040	mg/L
UNW-3-F	11/30/87	<0.0040	mg/L
UNW-5	11/05/87	<0.0040	mg/L
UNW-5	11/11/87	<0.0040	mg/L
UNW-5	11/19/87	<0.0040	mg/L
UNW-5	11/30/87	<0.0040	mg/L
UNW-5-D	11/19/87	<0.0040	mg/L
UNW-5-D-F	11/19/87	<0.0040	mg/L
UNW-5-F	11/05/87	<0.0040	mg/L
UNW-5-F	11/11/87	<0.0040	mg/L
UNW-5-F	11/19/87	<0.0040	mg/L
UNW-5-F	11/30/87	<0.0040	mg/L

PARAMETER CYCLOHEXANONE

WELL ID	DATE	RESULT	UNITS
UNW-2	11/30/87	1.0000	ug/L
UNW-5	11/30/87	2.0000	ug/L

PARAMETER DEPTH

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	13.5000	feet
UNW-1	08/27/87	8.3000	feet
UNW-1	09/02/87	14.4000	feet
UNW-2	04/30/87	4.6000	feet
UNW-2	08/27/87	4.1000	feet
UNW-2	09/02/87	4.3000	feet
UNW-3	04/28/87	4.5000	feet
UNW-3	08/27/87	3.1000	feet
UNW-3	09/02/87	2.9000	feet
UNW-4	04/28/87	5.5000	feet
UNW-4	08/27/87	6.6000	feet
UNW-4	09/02/87	7.0000	feet
UNW-5	04/30/87	0.2000	feet
UNW-5	08/27/87	0.5000	feet
UNW-5	09/02/87	0.4000	feet
UNW-5-D	09/02/87	0.4000	feet

PARAMETER DEPTH TO WATER

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	14.2000	feet
UNW-1	11/11/87	13.1000	feet

PARAMETER DEPTH TO WATER (continued)

WELL ID	DATE	RESULT	UNITS
UNW-1	11/19/87	13.0000	feet
UNW-1	11/30/87	13.8000	feet
UNW-2	11/05/87	4.6000	feet
UNW-2	11/11/87	4.7000	feet
UNW-2	11/19/87	5.0000	feet
UNW-2	11/30/87	4.7000	feet
UNW-2-D	11/11/87	4.7000	feet
UNW-3	11/05/87	3.2000	feet
UNW-3	11/11/87	3.4000	feet
UNW-3	11/23/87	3.3000	feet
UNW-3	11/30/87	3.6000	feet
UNW-5	11/05/87	0.6000	feet
UNW-5	11/11/87	0.8000	feet
UNW-5	11/19/87	0.9000	feet
UNW-5	11/30/87	0.5000	feet
UNW-5-D	11/19/87	0.9000	feet

PARAMETER DI-N-BUTYLPHTHALATE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	1.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER DI-N-OCTYLPHTHALATE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	0.8000	ug/L
UNW-1	11/11/87	0.6000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	0.6000	ug/L
UNW-2	11/11/87	0.8000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	0.2000	ug/L
UNW-2-D	11/11/87	1.0000	ug/L
UNW-5	11/05/87	0.4000	ug/L

PARAMETER DI-N-OCTYLPHTHALATE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	11/11/87	0.9000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	0.2000	ug/L

PARAMETER DIACETONE ALCOHOL

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	6.0000	ug/L
UNW-1	11/11/87	150.0000	ug/L
UNW-1	11/19/87	12.0000	ug/L
UNW-1	11/30/87	270.0000	ug/L
UNW-2	11/05/87	11.0000	ug/L
UNW-2	11/11/87	4.0000	ug/L
UNW-2	11/19/87	87.0000	ug/L
UNW-2	11/30/87	180.0000	ug/L
UNW-5	11/05/87	5.0000	ug/L
UNW-5	11/19/87	56.0000	ug/L
UNW-5	11/30/87	130.0000	ug/L
UNW-5-D	11/19/87	110.0000	ug/L

PARAMETER DIBENZ(A,H)ANTHRACENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER DIBENZOFURAN

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L

PARAMETER DIBENZOFURAN (continued)

WELL ID	DATE	RESULT	UNITS
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER DIBROMOCHLOROMETHANE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER DIETHYLPHTHALATE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	0.8000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	0.6000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	0.7000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	0.9000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER DIMETHYLPHTHALATE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER DISSOLVED OXYGEN

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	2.9000	ppm
UNW-1	08/27/87	8.0000	ppm
UNW-1	09/02/87	1.8000	ppm
UNW-1	11/05/87	2.9000	ppm
UNW-1	11/11/87	3.5000	ppm
UNW-1	11/19/87	5.6000	ppm
UNW-1	11/30/87	2.4000	ppm
UNW-1	02/23/88	2.6000	ppm
UNW-2	04/30/87	8.2000	ppm
UNW-2	08/27/87	9.2000	ppm
UNW-2	09/02/87	5.9000	ppm
UNW-2	11/05/87	3.4000	ppm
UNW-2	11/11/87	6.2000	ppm
UNW-2	11/19/87	.	ppm
UNW-2	11/30/87	5.9000	ppm
UNW-2	02/22/88	5.1000	ppm
UNW-2-D	11/11/87	6.2000	ppm
UNW-3	04/28/87	1.7000	ppm
UNW-3	08/27/87	.	ppm
UNW-3	09/02/87	2.6000	ppm
UNW-3	11/05/87	4.0000	ppm
UNW-3	11/11/87	4.2000	ppm
UNW-3	11/23/87	9.5000	ppm
UNW-3	11/30/87	9.2000	ppm
UNW-3	02/22/88	1.8000	ppm
UNW-4	04/28/87	2.2000	ppm
UNW-4	08/27/87	2.0000	ppm
UNW-4	09/02/87	3.0000	ppm
UNW-4	02/23/88	10.2000	ppm
UNW-5	04/30/87	4.3000	ppm
UNW-5	08/27/87	2.8000	ppm

PARAMETER DISSOLVED OXYGEN (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	09/02/87	2.5000	ppm
UNW-5	11/05/87	2.2000	ppm
UNW-5	11/11/87	1.4000	ppm
UNW-5	11/19/87	6.2000	ppm
UNW-5	11/30/87	1.9000	ppm
UNW-5	02/23/88	4.4000	ppm
UNW-5-D	09/02/87	2.5000	ppm
UNW-5-D	11/19/87	6.2000	ppm

PARAMETER DISSOLVED OXYGEN - INIT

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	6.5000	ppm
UNW-1	08/27/87	2.6000	ppm
UNW-1	09/02/87	1.7000	ppm
UNW-1	11/05/87	2.2000	ppm
UNW-1	11/11/87	11.5000	ppm
UNW-1	11/19/87	3.6000	ppm
UNW-1	11/30/87	1.9000	ppm
UNW-2	04/30/87	4.5000	ppm
UNW-2	08/27/87	4.2000	ppm
UNW-2	09/02/87	6.1000	ppm
UNW-2	11/05/87	4.2000	ppm
UNW-2	11/11/87	5.8000	ppm
UNW-2	11/19/87	.	ppm
UNW-2	11/30/87	6.4000	ppm
UNW-2-D	11/11/87	5.8000	ppm
UNW-3	04/28/87	3.2000	ppm
UNW-3	08/27/87	3.5000	ppm
UNW-3	09/02/87	1.9000	ppm
UNW-3	11/05/87	2.5000	ppm
UNW-3	11/11/87	3.2000	ppm
UNW-3	11/23/87	11.8000	ppm
UNW-3	11/30/87	4.8000	ppm
UNW-4	04/28/87	3.0000	ppm
UNW-4	08/27/87	3.7000	ppm
UNW-4	09/02/87	1.6000	ppm
UNW-5	04/30/87	5.6000	ppm
UNW-5	08/27/87	3.0000	ppm
UNW-5	09/02/87	2.8000	ppm
UNW-5	11/05/87	1.9000	ppm
UNW-5	11/11/87	1.8000	ppm
UNW-5	11/19/87	6.7000	ppm
UNW-5	11/30/87	2.6000	ppm
UNW-5-D	09/02/87	2.8000	ppm
UNW-5-D	11/19/87	6.7000	ppm

PARAMETER ETHANE,1,1,2-TRICHLORO-1,2,2-T

WELL ID	DATE	RESULT	UNITS
UNW-1	11/30/87	1.0000	ug/L
UNW-2	11/19/87	61.0000	ug/L
UNW-2	11/30/87	60.0000	ug/L
UNW-5	11/19/87	400.0000	ug/L
UNW-5	11/30/87	380.0000	ug/L

PARAMETER ETHANE,1,2-DICHLORO-1,1,2-TRIF

WELL ID	DATE	RESULT	UNITS
UNW-1	11/19/87	49.0000	ug/L
UNW-1	11/30/87	30.0000	ug/L
UNW-2	11/30/87	15.0000	ug/L
UNW-5	11/19/87	120.0000	ug/L
UNW-5	11/30/87	110.0000	ug/L

PARAMETER ETHENE,CHLOROFLUORO-

WELL ID	DATE	RESULT	UNITS
UNW-5	11/19/87	28.0000	ug/L

PARAMETER ETHYLBENZENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER FLUORANTHENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L

PARAMETER FLUORANTHENE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER FLUORENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER FLUORIDE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	0.1000	mg/L
UNW-1	11/11/87	0.3000	mg/L
UNW-1	11/19/87	0.5000	mg/L
UNW-1	11/30/87	0.6000	mg/L
UNW-3	11/05/87	0.1000	mg/L
UNW-3	11/11/87	0.2000	mg/L
UNW-3	11/23/87	0.1000	mg/L
UNW-3	11/30/87	0.1000	mg/L
UNW-5	11/05/87	0.1000	mg/L
UNW-5	11/11/87	0.2000	mg/L
UNW-5	11/19/87	0.8000	mg/L
UNW-5	11/30/87	0.6000	mg/L
UNW-5-D	11/19/87	0.1000	mg/L

PARAMETER FREON 113

WELL ID	DATE	RESULT	UNITS
UNW-5	11/05/87	370.0000	ug/L
UNW-5	11/11/87	260.0000	ug/L
UNW-5-D	11/19/87	320.0000	ug/L

PARAMETER HEXACHLOROBENZENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER HEXACHLOROBUTADIENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER HEXACHLOROCYCLOPENTADIENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L

PARAMETER HEXACHLOROCYCLOPENTADIENE
(continued)

WELL ID	DATE	RESULT	UNITS
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER HEXACHLOROETHANE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER INDENO(1,2,3-CD)PYRENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER FREON 113

WELL ID	DATE	RESULT	UNITS
UNW-5	11/05/87	370.0000	ug/L
UNW-5	11/11/87	260.0000	ug/L
UNW-5-D	11/19/87	320.0000	ug/L

PARAMETER HEXACHLOROBENZENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER HEXACHLOROBUTADIENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER HEXACHLOROCYCLOPENTADIENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L

PARAMETER HEXACHLOROCYCLOPENTADIENE
(continued)

WELL ID	DATE	RESULT	UNITS
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER HEXACHLOROETHANE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER INDENO(1,2,3-CD)PYRENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER IRON

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	24.0000	mg/L
UNW-1	08/27/87	11.0000	mg/L
UNW-1	09/02/87	12.0000	mg/L
UNW-1	11/05/87	9.3000	mg/L
UNW-1	11/11/87	2.2000	mg/L
UNW-1	11/19/87	3.0000	mg/L
UNW-1	11/30/87	4.2000	mg/L
UNW-1	02/23/88	0.8400	mg/L
UNW-1-F	04/28/87	0.2600	mg/L
UNW-1-F	08/27/87	5.4000	mg/L
UNW-1-F	09/02/87	0.0990	mg/L
UNW-1-F	11/05/87	0.0560	mg/L
UNW-1-F	11/11/87	0.5000	mg/L
UNW-1-F	11/19/87	0.2000	mg/L
UNW-1-F	11/30/87	0.0470	mg/L
UNW-1-F	02/23/88	0.0230	mg/L
UNW-2	04/30/87	3.9000	mg/L
UNW-2	08/27/87	7.9000	mg/L
UNW-2	09/02/87	27.0000	mg/L
UNW-2	02/22/88	2.2000	mg/L
UNW-2-F	04/30/87	<0.0040	mg/L
UNW-2-F	08/27/87	0.0520	mg/L
UNW-2-F	09/02/87	5.4000	mg/L
UNW-2-F	02/22/88	0.0950	mg/L
UNW-3	04/28/87	6.6000	mg/L
UNW-3	08/27/87	3.0000	mg/L
UNW-3	09/02/87	14.0000	mg/L
UNW-3	11/05/87	140.0000	mg/L
UNW-3	11/11/87	5.3000	mg/L
UNW-3	11/23/87	9.1000	mg/L
UNW-3	11/30/87	3.4000	mg/L
UNW-3	02/22/88	6.7000	mg/L
UNW-3-F	04/28/87	0.0480	mg/L
UNW-3-F	08/27/87	0.0600	mg/L
UNW-3-F	09/02/87	0.0240	mg/L
UNW-3-F	11/05/87	<0.0040	mg/L
UNW-3-F	11/11/87	0.0250	mg/L
UNW-3-F	11/23/87	0.1000	mg/L
UNW-3-F	11/30/87	0.0270	mg/L
UNW-3-F	02/22/88	0.1400	mg/L
UNW-4	04/28/87	0.7300	mg/L
UNW-4	08/27/87	0.9200	mg/L
UNW-4	09/02/87	1.3000	mg/L
UNW-4	02/23/88	1.5000	mg/L
UNW-4-F	04/28/87	0.0150	mg/L
UNW-4-F	08/27/87	0.0770	mg/L
UNW-4-F	09/02/87	0.0049	mg/L
UNW-4-F	02/23/88	0.0120	mg/L
UNW-5	04/30/87	45.0000	mg/L
UNW-5	08/27/87	21.0000	mg/L

PARAMETER IRON (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	09/02/87	38.0000	mg/L
UNW-5	11/05/87	23.0000	mg/L
UNW-5	11/11/87	20.0000	mg/L
UNW-5	11/19/87	24.0000	mg/L
UNW-5	11/30/87	22.0000	mg/L
UNW-5	02/23/88	43.0000	mg/L
UNW-5-D	09/02/87	22.0000	mg/L
UNW-5-D	11/19/87	24.0000	mg/L
UNW-5-D-F	11/19/87	0.0790	mg/L
UNW-5-F	04/30/87	18.0000	mg/L
UNW-5-F	08/27/87	16.0000	mg/L
UNW-5-F	09/02/87	0.1100	mg/L
UNW-5-F	11/05/87	<0.0040	mg/L
UNW-5-F	11/11/87	2.7000	mg/L
UNW-5-F	11/19/87	<0.0040	mg/L
UNW-5-F	11/30/87	8.2000	mg/L
UNW-5-F	02/23/88	0.0041	mg/L
UNW-5-F-D	09/02/87	0.0510	mg/L

PARAMETER ISOPHORONE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER LEAD

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	0.0090	mg/L
UNW-1	11/05/87	<0.0500	mg/L
UNW-1	11/11/87	<0.0040	mg/L
UNW-1	11/11/87	<0.0500	mg/L
UNW-1	11/19/87	<0.0040	mg/L
UNW-1	11/19/87	<0.0500	mg/L
UNW-1	11/30/87	0.0060	mg/L
UNW-1	11/30/87	<0.0500	mg/L

PARAMETER LEAD (continued)

WELL ID	DATE	RESULT	UNITS
UNW-1-F	11/05/87	0.0100	mg/L
UNW-1-F	11/05/87	<0.0500	mg/L
UNW-1-F	11/11/87	<0.0040	mg/L
UNW-1-F	11/11/87	<0.0500	mg/L
UNW-1-F	11/19/87	0.0050	mg/L
UNW-1-F	11/19/87	<0.0500	mg/L
UNW-1-F	11/30/87	<0.0040	mg/L
UNW-1-F	11/30/87	<0.0500	mg/L
UNW-3	11/05/87	0.0740	mg/L
UNW-3	11/05/87	0.2100	mg/L
UNW-3	11/11/87	<0.0040	mg/L
UNW-3	11/11/87	0.0740	mg/L
UNW-3	11/23/87	0.0070	mg/L
UNW-3	11/23/87	0.0710	mg/L
UNW-3	11/30/87	<0.0040	mg/L
UNW-3	11/30/87	0.0580	mg/L
UNW-3-F	11/05/87	<0.0040	mg/L
UNW-3-F	11/05/87	<0.0500	mg/L
UNW-3-F	11/11/87	<0.0040	mg/L
UNW-3-F	11/11/87	<0.0500	mg/L
UNW-3-F	11/23/87	<0.0040	mg/L
UNW-3-F	11/23/87	0.0690	mg/L
UNW-3-F	11/30/87	<0.0040	mg/L
UNW-3-F	11/30/87	0.0580	mg/L
UNW-5	11/05/87	0.0080	mg/L
UNW-5	11/05/87	<0.0500	mg/L
UNW-5	11/11/87	<0.0040	mg/L
UNW-5	11/11/87	<0.0500	mg/L
UNW-5	11/19/87	0.0050	mg/L
UNW-5	11/19/87	<0.0500	mg/L
UNW-5	11/30/87	0.0040	mg/L
UNW-5	11/30/87	<0.0500	mg/L
UNW-5-D	11/19/87	0.0050	mg/L
UNW-5-D	11/19/87	<0.0500	mg/L
UNW-5-D-F	11/19/87	0.0040	mg/L
UNW-5-D-F	11/19/87	<0.0500	mg/L
UNW-5-F	11/05/87	<0.0040	mg/L
UNW-5-F	11/05/87	<0.0500	mg/L
UNW-5-F	11/11/87	<0.0040	mg/L
UNW-5-F	11/11/87	<0.0500	mg/L
UNW-5-F	11/19/87	0.0060	mg/L
UNW-5-F	11/19/87	<0.0500	mg/L
UNW-5-F	11/30/87	<0.0040	mg/L
UNW-5-F	11/30/87	<0.0500	mg/L

PARAMETER LITHIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.0040	mg/L
UNW-1	11/11/87	<0.0040	mg/L
UNW-1	11/19/87	<0.0040	mg/L
UNW-1	11/30/87	<0.0040	mg/L
UNW-1-F	11/05/87	<0.0040	mg/L
UNW-1-F	11/11/87	<0.0040	mg/L
UNW-1-F	11/19/87	<0.0040	mg/L
UNW-1-F	11/30/87	<0.0040	mg/L
UNW-3	11/05/87	0.0620	mg/L
UNW-3	11/11/87	0.0059	mg/L
UNW-3	11/23/87	0.0073	mg/L
UNW-3	11/30/87	0.0044	mg/L
UNW-3-F	11/05/87	<0.0040	mg/L
UNW-3-F	11/11/87	<0.0040	mg/L
UNW-3-F	11/23/87	<0.0040	mg/L
UNW-3-F	11/30/87	<0.0040	mg/L
UNW-5	11/05/87	<0.0040	mg/L
UNW-5	11/11/87	<0.0040	mg/L
UNW-5	11/19/87	<0.0040	mg/L
UNW-5	11/30/87	<0.0040	mg/L
UNW-5-D	11/19/87	<0.0040	mg/L
UNW-5-D-F	11/19/87	<0.0040	mg/L
UNW-5-F	11/05/87	<0.0040	mg/L
UNW-5-F	11/11/87	<0.0040	mg/L
UNW-5-F	11/19/87	<0.0040	mg/L
UNW-5-F	11/30/87	<0.0040	mg/L

PARAMETER MAGNESIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	17.0000	mg/L
UNW-1	11/11/87	14.0000	mg/L
UNW-1	11/19/87	14.0000	mg/L
UNW-1	11/30/87	14.0000	mg/L
UNW-1-F	11/05/87	16.0000	mg/L
UNW-1-F	11/11/87	14.0000	mg/L
UNW-1-F	11/19/87	14.0000	mg/L
UNW-1-F	11/30/87	14.0000	mg/L
UNW-3	11/05/87	53.0000	mg/L
UNW-3	11/11/87	35.0000	mg/L
UNW-3	11/23/87	36.0000	mg/L
UNW-3	11/30/87	36.0000	mg/L
UNW-3-F	11/05/87	38.0000	mg/L
UNW-3-F	11/11/87	34.0000	mg/L
UNW-3-F	11/23/87	35.0000	mg/L
UNW-3-F	11/30/87	38.0000	mg/L
UNW-5	11/05/87	24.0000	mg/L
UNW-5	11/11/87	21.0000	mg/L
UNW-5	11/19/87	22.0000	mg/L

PARAMETER MAGNESIUM (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	11/30/87	22.0000	mg/L
UNW-5-D	11/19/87	23.0000	mg/L
UNW-5-D-F	11/19/87	22.0000	mg/L
UNW-5-F	11/05/87	25.0000	mg/L
UNW-5-F	11/11/87	18.0000	mg/L
UNW-5-F	11/19/87	22.0000	mg/L
UNW-5-F	11/30/87	22.0000	mg/L

PARAMETER MANGANESE

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	3.1000	mg/L
UNW-1	08/27/87	3.9000	mg/L
UNW-1	09/02/87	2.9000	mg/L
UNW-1	11/05/87	4.8000	mg/L
UNW-1	11/11/87	4.6000	mg/L
UNW-1	11/19/87	5.0000	mg/L
UNW-1	11/30/87	5.1000	mg/L
UNW-1	02/23/88	2.4000	mg/L
UNW-1-F	04/28/87	2.9000	mg/L
UNW-1-F	08/27/87	4.1000	mg/L
UNW-1-F	09/02/87	3.1000	mg/L
UNW-1-F	11/05/87	4.4000	mg/L
UNW-1-F	11/11/87	4.5000	mg/L
UNW-1-F	11/19/87	5.2000	mg/L
UNW-1-F	11/30/87	4.7000	mg/L
UNW-1-F	02/23/88	2.2000	mg/L
UNW-2	04/30/87	0.6000	mg/L
UNW-2	08/27/87	0.7800	mg/L
UNW-2	09/02/87	1.5000	mg/L
UNW-2	02/22/88	0.2000	mg/L
UNW-2-F	04/30/87	0.1900	mg/L
UNW-2-F	08/27/87	0.3000	mg/L
UNW-2-F	09/02/87	1.1000	mg/L
UNW-2-F	02/22/88	0.1600	mg/L
UNW-3	04/28/87	9.8000	mg/L
UNW-3	08/27/87	9.9000	mg/L
UNW-3	09/02/87	9.2000	mg/L
UNW-3	11/05/87	12.0000	mg/L
UNW-3	11/11/87	8.9000	mg/L
UNW-3	11/23/87	9.2000	mg/L
UNW-3	11/30/87	7.6000	mg/L
UNW-3	02/22/88	8.5000	mg/L
UNW-3-F	04/28/87	9.7000	mg/L
UNW-3-F	08/27/87	9.8000	mg/L
UNW-3-F	09/02/87	9.4000	mg/L
UNW-3-F	11/05/87	1.1000	mg/L
UNW-3-F	11/11/87	8.7000	mg/L
UNW-3-F	11/23/87	8.1000	mg/L

PARAMETER MANGANESE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-3-F	11/30/87	7.3000	mg/L
UNW-3-F	02/22/88	8.1000	mg/L
UNW-4	04/28/87	0.3200	mg/L
UNW-4	08/27/87	0.2900	mg/L
UNW-4	09/02/87	0.3300	mg/L
UNW-4	02/23/88	0.1600	mg/L
UNW-4-F	04/28/87	0.3100	mg/L
UNW-4-F	08/27/87	0.2700	mg/L
UNW-4-F	09/02/87	0.3100	mg/L
UNW-4-F	02/23/88	0.2300	mg/L
UNW-5	04/30/87	18.0000	mg/L
UNW-5	08/27/87	19.0000	mg/L
UNW-5	09/02/87	21.0000	mg/L
UNW-5	11/05/87	22.0000	mg/L
UNW-5	11/11/87	20.0000	mg/L
UNW-5	11/19/87	21.0000	mg/L
UNW-5	11/30/87	20.0000	mg/L
UNW-5	02/23/88	21.0000	mg/L
UNW-5-D	09/02/87	21.0000	mg/L
UNW-5-D	11/19/87	21.0000	mg/L
UNW-5-D-F	11/19/87	21.0000	mg/L
UNW-5-F	04/30/87	19.0000	mg/L
UNW-5-F	08/27/87	17.0000	mg/L
UNW-5-F	09/02/87	19.0000	mg/L
UNW-5-F	11/05/87	0.7700	mg/L
UNW-5-F	11/11/87	17.0000	mg/L
UNW-5-F	11/19/87	21.0000	mg/L
UNW-5-F	11/30/87	21.0000	mg/L
UNW-5-F	02/23/88	21.0000	mg/L
UNW-5-F-D	09/02/87	20.0000	mg/L

PARAMETER MERCURY

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.0002	mg/L
UNW-1	11/11/87	0.0010	mg/L
UNW-1	11/19/87	<0.0002	mg/L
UNW-1	11/30/87	<0.0002	mg/L
UNW-1-F	11/05/87	<0.0002	mg/L
UNW-1-F	11/11/87	<0.0002	mg/L
UNW-1-F	11/19/87	<0.0002	mg/L
UNW-1-F	11/30/87	<0.0002	mg/L
UNW-3	11/05/87	0.0003	mg/L
UNW-3	11/11/87	<0.0002	mg/L
UNW-3	11/23/87	0.0003	mg/L
UNW-3	11/30/87	0.0002	mg/L
UNW-3-F	11/05/87	<0.0002	mg/L
UNW-3-F	11/11/87	<0.0002	mg/L
UNW-3-F	11/23/87	0.0002	mg/L

PARAMETER MERCURY (continued)

WELL ID	DATE	RESULT	UNITS
UNW-3-F	11/30/87	<0.0002	mg/L
UNW-5	11/05/87	<0.0002	mg/L
UNW-5	11/11/87	<0.0002	mg/L
UNW-5	11/19/87	<0.0002	mg/L
UNW-5	11/30/87	<0.0002	mg/L
UNW-5-D	11/19/87	<0.0002	mg/L
UNW-5-D-F	11/19/87	<0.0002	mg/L
UNW-5-F	11/05/87	<0.0002	mg/L
UNW-5-F	11/11/87	<0.0002	mg/L
UNW-5-F	11/19/87	<0.0002	mg/L
UNW-5-F	11/30/87	<0.0002	mg/L

PARAMETER METHYLENE CHLORIDE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	7.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	5.0000	ug/L
UNW-2	11/11/87	8.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	10.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	8.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	4.0000	ug/L

PARAMETER MOLYBDENUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.0100	mg/L
UNW-1	11/11/87	<0.0100	mg/L
UNW-1	11/19/87	<0.0100	mg/L
UNW-1	11/30/87	<0.0100	mg/L
UNW-1-F	11/05/87	<0.0100	mg/L
UNW-1-F	11/11/87	<0.0100	mg/L
UNW-1-F	11/19/87	<0.0100	mg/L
UNW-1-F	11/30/87	<0.0100	mg/L
UNW-3	11/05/87	<0.0100	mg/L
UNW-3	11/11/87	<0.0100	mg/L
UNW-3	11/23/87	<0.0100	mg/L
UNW-3	11/30/87	<0.0100	mg/L
UNW-3-F	11/05/87	<0.0100	mg/L
UNW-3-F	11/11/87	<0.0100	mg/L
UNW-3-F	11/23/87	<0.0100	mg/L

PARAMETER MOLYBDENUM (continued)

WELL ID	DATE	RESULT	UNITS
UNW-3-F	11/30/87	<0.0100	mg/L
UNW-5	11/05/87	<0.0100	mg/L
UNW-5	11/11/87	<0.0100	mg/L
UNW-5	11/19/87	<0.0100	mg/L
UNW-5	11/30/87	<0.0100	mg/L
UNW-5-D	11/19/87	<0.0100	mg/L
UNW-5-D-F	11/19/87	<0.0100	mg/L
UNW-5-F	11/05/87	<0.0100	mg/L
UNW-5-F	11/11/87	<0.0100	mg/L
UNW-5-F	11/19/87	<0.0100	mg/L
UNW-5-F	11/30/87	<0.0100	mg/L

PARAMETER N-NITROSODI-N-PROPYLAMINE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER N-NITROSODIPHENYLAMINE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER NAPHTHALENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER NICKEL

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.0100	mg/L
UNW-1	11/11/87	<0.0100	mg/L
UNW-1	11/19/87	<0.0100	mg/L
UNW-1	11/30/87	<0.0100	mg/L
UNW-1-F	11/05/87	<0.0100	mg/L
UNW-1-F	11/11/87	<0.0100	mg/L
UNW-1-F	11/19/87	<0.0100	mg/L
UNW-1-F	11/30/87	<0.0100	mg/L
UNW-3	11/05/87	0.1200	mg/L
UNW-3	11/11/87	0.0240	mg/L
UNW-3	11/23/87	0.0270	mg/L
UNW-3	11/30/87	0.0150	mg/L
UNW-3-F	11/05/87	0.0190	mg/L
UNW-3-F	11/11/87	0.0150	mg/L
UNW-3-F	11/23/87	0.0150	mg/L
UNW-3-F	11/30/87	0.0140	mg/L
UNW-5	11/05/87	<0.0100	mg/L
UNW-5	11/11/87	<0.0100	mg/L
UNW-5	11/19/87	<0.0100	mg/L
UNW-5	11/30/87	<0.0100	mg/L
UNW-5-D	11/19/87	<0.0100	mg/L
UNW-5-D-F	11/19/87	<0.0100	mg/L
UNW-5-F	11/05/87	<0.0100	mg/L
UNW-5-F	11/11/87	<0.0100	mg/L
UNW-5-F	11/19/87	<0.0100	mg/L
UNW-5-F	11/30/87	<0.0100	mg/L

PARAMETER NIOBIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.0070	mg/L
UNW-1	11/11/87	<0.0070	mg/L
UNW-1	11/19/87	0.0180	mg/L
UNW-1	11/30/87	<0.0070	mg/L
UNW-1-F	11/05/87	<0.0070	mg/L
UNW-1-F	11/11/87	0.0085	mg/L
UNW-1-F	11/19/87	<0.0070	mg/L
UNW-1-F	11/30/87	<0.0070	mg/L
UNW-3	11/05/87	<0.0070	mg/L
UNW-3	11/11/87	<0.0070	mg/L
UNW-3	11/23/87	0.0190	mg/L
UNW-3	11/30/87	<0.0070	mg/L
UNW-3-F	11/05/87	<0.0070	mg/L
UNW-3-F	11/11/87	<0.0070	mg/L
UNW-3-F	11/23/87	0.0130	mg/L
UNW-3-F	11/30/87	<0.0070	mg/L
UNW-5	11/05/87	<0.0070	mg/L
UNW-5	11/11/87	0.0130	mg/L
UNW-5	11/19/87	<0.0070	mg/L
UNW-5	11/30/87	<0.0070	mg/L
UNW-5-D	11/19/87	<0.0070	mg/L
UNW-5-D-F	11/19/87	<0.0070	mg/L
UNW-5-F	11/05/87	<0.0070	mg/L
UNW-5-F	11/11/87	<0.0070	mg/L
UNW-5-F	11/19/87	<0.0070	mg/L
UNW-5-F	11/30/87	<0.0070	mg/L

PARAMETER NITRATE-NITROGEN

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.1100	mg/L
UNW-1	11/11/87	<0.1100	mg/L
UNW-1	11/19/87	<0.1100	mg/L
UNW-1	11/30/87	<0.1100	mg/L
UNW-3	11/05/87	<2.2600	mg/L
UNW-3	11/11/87	<2.2600	mg/L
UNW-3	11/23/87	<0.1100	mg/L
UNW-3	11/30/87	<0.1100	mg/L
UNW-5	11/05/87	<0.1100	mg/L
UNW-5	11/11/87	<0.1100	mg/L
UNW-5	11/19/87	<0.1100	mg/L
UNW-5	11/30/87	<0.1100	mg/L
UNW-5-D	11/19/87	<0.1100	mg/L

PARAMETER NITROBENZENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER PENTACHLOROPHENOL

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<25.0000	ug/L
UNW-1	11/11/87	<25.0000	ug/L
UNW-1	11/19/87	<25.0000	ug/L
UNW-1	11/30/87	<25.0000	ug/L
UNW-2	11/05/87	<25.0000	ug/L
UNW-2	11/11/87	<25.0000	ug/L
UNW-2	11/19/87	<25.0000	ug/L
UNW-2	11/30/87	<25.0000	ug/L
UNW-2-D	11/11/87	<25.0000	ug/L
UNW-5	11/05/87	<25.0000	ug/L
UNW-5	11/11/87	<25.0000	ug/L
UNW-5	11/19/87	<25.0000	ug/L
UNW-5	11/30/87	<25.0000	ug/L
UNW-5-D	11/19/87	<25.0000	ug/L

PARAMETER PH

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	6.5000	-
UNW-1	04/28/87	6.6000	-
UNW-1	04/28/87	7.2000	-
UNW-1	08/27/87	6.1000	-
UNW-1	08/27/87	5.7000	-
UNW-1	08/27/87	5.7000	-
UNW-1	08/27/87	5.9000	-
UNW-1	08/27/87	6.5000	-
UNW-1	09/02/87	6.8000	-
UNW-1	09/02/87	6.4000	-
UNW-1	09/02/87	6.4000	-
UNW-1	09/02/87	6.5000	-

PARAMETER PH (continued)

WELL ID	DATE	RESULT	UNITS
UNW-1	09/02/87	6.4000	-
UNW-1	11/05/87	7.1000	-
UNW-1	11/11/87	7.7000	-
UNW-1	11/11/87	7.0000	-
UNW-1	11/11/87	6.4000	-
UNW-1	11/11/87	6.3000	-
UNW-1	11/11/87	6.6000	-
UNW-1	11/19/87	5.6000	-
UNW-1	11/19/87	6.5000	-
UNW-1	11/19/87	6.4000	-
UNW-1	11/19/87	7.1000	-
UNW-1	11/19/87	6.9000	-
UNW-1	11/30/87	5.9000	-
UNW-1	11/30/87	6.7000	-
UNW-1	11/30/87	6.4000	-
UNW-1	11/30/87	6.3000	-
UNW-1	11/30/87	6.3000	-
UNW-1	02/23/88	7.0000	-
UNW-1	02/23/88	6.7000	-
UNW-1	02/23/88	6.6000	-
UNW-1	02/23/88	6.7000	-
UNW-1	02/23/88	6.6000	-
UNW-2	04/30/87	5.6000	-
UNW-2	04/30/87	6.8000	-
UNW-2	04/30/87	6.9000	-
UNW-2	08/27/87	6.8000	-
UNW-2	08/27/87	6.9000	-
UNW-2	08/27/87	7.5000	-
UNW-2	08/27/87	6.9000	-
UNW-2	08/27/87	6.9000	-
UNW-2	09/02/87	7.0000	-
UNW-2	09/02/87	6.8000	-
UNW-2	09/02/87	7.1000	-
UNW-2	09/02/87	6.9000	-
UNW-2	09/02/87	6.9000	-
UNW-2	11/05/87	7.6000	-
UNW-2	11/11/87	7.2000	-
UNW-2	11/19/87	6.8000	-
UNW-2	11/30/87	7.5000	-
UNW-2	02/22/88	6.8000	-
UNW-2	02/22/88	7.1000	-
UNW-2	02/22/88	6.9000	-
UNW-2	02/22/88	7.0000	-
UNW-2	02/22/88	6.9000	-
UNW-2-D	11/11/87	7.2000	-
UNW-3	04/28/87	6.8000	-
UNW-3	04/28/87	7.0000	-
UNW-3	04/28/87	7.5000	-
UNW-3	08/27/87	7.3000	-
UNW-3	08/27/87	6.9000	-

PARAMETER PH (continued)

WELL ID	DATE	RESULT	UNITS
UNW-3	08/27/87	7.0000	-
UNW-3	08/27/87	6.9000	-
UNW-3	08/27/87	6.9000	-
UNW-3	09/02/87	7.0000	-
UNW-3	09/02/87	7.1000	-
UNW-3	09/02/87	7.0000	-
UNW-3	09/02/87	7.0000	-
UNW-3	09/02/87	7.1000	-
UNW-3	11/05/87	7.2000	-
UNW-3	11/11/87	7.7000	-
UNW-3	11/11/87	7.4000	-
UNW-3	11/11/87	7.3000	-
UNW-3	11/11/87	6.9000	-
UNW-3	11/11/87	7.1000	-
UNW-3	11/23/87	7.2000	-
UNW-3	11/23/87	7.7000	-
UNW-3	11/23/87	7.5000	-
UNW-3	11/23/87	7.2000	-
UNW-3	11/23/87	7.7000	-
UNW-3	11/30/87	7.7000	-
UNW-3	11/30/87	6.7000	-
UNW-3	11/30/87	6.9000	-
UNW-3	11/30/87	7.0000	-
UNW-3	11/30/87	7.1000	-
UNW-3	02/22/88	6.9000	-
UNW-3	02/22/88	7.0000	-
UNW-3	02/22/88	6.9000	-
UNW-3	02/22/88	7.0000	-
UNW-3	02/22/88	7.0000	-
UNW-4	04/28/87	7.0000	-
UNW-4	04/28/87	7.9000	-
UNW-4	08/27/87	7.0000	-
UNW-4	08/27/87	7.1000	-
UNW-4	08/27/87	7.3000	-
UNW-4	08/27/87	7.1000	-
UNW-4	08/27/87	7.1000	-
UNW-4	09/02/87	7.3000	-
UNW-4	09/02/87	7.2000	-
UNW-4	09/02/87	7.2000	-
UNW-4	09/02/87	7.1000	-
UNW-4	09/02/87	7.1000	-
UNW-4	02/23/88	7.3000	-
UNW-4	02/23/88	7.0000	-
UNW-4	02/23/88	7.0000	-
UNW-4	02/23/88	7.0000	-
UNW-4	02/23/88	6.9000	-
UNW-5	04/30/87	6.7000	-
UNW-5	04/30/87	6.8000	-
UNW-5	04/30/87	7.2000	-
UNW-5	08/27/87	6.8200	-

PARAMETER PH (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	08/27/87	6.7000	-
UNW-5	08/27/87	6.7000	-
UNW-5	08/27/87	6.7000	-
UNW-5	08/27/87	6.8000	-
UNW-5	09/02/87	6.9000	-
UNW-5	09/02/87	6.8000	-
UNW-5	09/02/87	6.7000	-
UNW-5	09/02/87	6.7000	-
UNW-5	09/02/87	6.9000	-
UNW-5	11/05/87	7.5000	-
UNW-5	11/11/87	6.8000	-
UNW-5	11/11/87	6.8000	-
UNW-5	11/11/87	6.7000	-
UNW-5	11/11/87	6.9000	-
UNW-5	11/11/87	6.9000	-
UNW-5	11/19/87	6.6000	-
UNW-5	11/19/87	6.7000	-
UNW-5	11/19/87	6.8000	-
UNW-5	11/19/87	6.7000	-
UNW-5	11/19/87	7.8000	-
UNW-5	11/30/87	6.2000	-
UNW-5	11/30/87	6.6000	-
UNW-5	11/30/87	6.6000	-
UNW-5	11/30/87	6.6000	-
UNW-5	11/30/87	6.6000	-
UNW-5	02/23/88	7.1000	-
UNW-5	02/23/88	6.7000	-
UNW-5	02/23/88	6.8000	-
UNW-5	02/23/88	6.6000	-
UNW-5	02/23/88	6.9000	-
UNW-5-D	09/02/87	6.9000	-
UNW-5-D	09/02/87	6.7000	-
UNW-5-D	09/02/87	6.7000	-
UNW-5-D	09/02/87	6.8000	-
UNW-5-D	09/02/87	6.8000	-
UNW-5-D	11/19/87	6.6000	-
UNW-5-D	11/19/87	6.8000	-
UNW-5-D	11/19/87	6.6000	-
UNW-5-D	11/19/87	6.9000	-
UNW-5-D	11/19/87	6.9000	-

PARAMETER PH - INIT

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	7.1000	-
UNW-1	08/27/87	6.7000	-
UNW-1	09/02/87	6.7000	-
UNW-1	11/05/87	6.2000	-
UNW-1	11/11/87	6.8000	-

PARAMETER PH - INIT (continued)

WELL ID	DATE	RESULT	UNITS
UNW-1	11/19/87	5.9000	-
UNW-1	11/30/87	6.8000	-
UNW-2	04/30/87	6.1000	-
UNW-2	08/27/87	6.6000	-
UNW-2	09/02/87	6.9000	-
UNW-2	11/05/87	7.6000	-
UNW-2	11/11/87	7.5000	-
UNW-2	11/19/87	6.9000	-
UNW-2	11/30/87	7.4000	-
UNW-2-D	11/11/87	7.5000	-
UNW-3	04/28/87	7.4000	-
UNW-3	08/27/87	7.4000	
UNW-3	09/02/87	7.1000	-
UNW-3	11/05/87	7.3000	-
UNW-3	11/11/87	7.4000	-
UNW-3	11/23/87	7.3000	-
UNW-3	11/30/87	7.6000	-
UNW-4	04/28/87	7.6000	-
UNW-4	08/27/87	7.0000	-
UNW-4	09/02/87	7.1000	-
UNW-5	04/30/87	7.1000	-
UNW-5	08/27/87	6.8700	-
UNW-5	09/02/87	6.8000	-
UNW-5	11/05/87	7.5000	-
UNW-5	11/11/87	6.5000	-
UNW-5	11/19/87	6.4000	-
UNW-5	11/30/87	6.2000	-
UNW-5-D	09/02/87	6.8000	-
UNW-5-D	11/19/87	6.4000	-

PARAMETER PHENANTHRENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER PHENOLS

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	0.0030	mg/L
UNW-1	08/27/87	0.0020	mg/L
UNW-1	09/02/87	0.0030	mg/L
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-1	02/23/88	<0.0010	mg/L
UNW-1-F	12/13/85	0.0020	mg/L
UNW-2	04/30/87	<0.0010	mg/L
UNW-2	08/27/87	<0.0010	mg/L
UNW-2	09/02/87	<0.0010	mg/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2	02/22/88	<0.0010	mg/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-2-F	12/13/85	0.0020	mg/L
UNW-3	04/28/87	<0.0010	mg/L
UNW-3	08/27/87	0.0010	mg/L
UNW-3	09/02/87	<0.0010	mg/L
UNW-3	02/22/88	<0.0010	mg/L
UNW-3-F	12/13/85	0.0030	mg/L
UNW-4	04/28/87	0.0020	mg/L
UNW-4	08/27/87	<0.0010	mg/L
UNW-4	09/02/87	<0.0010	mg/L
UNW-4	02/23/88	<0.0010	mg/L
UNW-4-F	12/13/85	0.0030	mg/L
UNW-5	04/30/87	0.0040	mg/L
UNW-5	08/27/87	0.0010	mg/L
UNW-5	09/02/87	<0.0010	mg/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5	02/23/88	<0.0010	mg/L
UNW-5-D	09/02/87	0.0040	mg/L
UNW-5-D	11/19/87	<5.0000	ug/L
UNW-5-F	12/13/85	0.0020	mg/L

PARAMETER PHOSPHORUS

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.2000	mg/L
UNW-1	11/11/87	<0.2000	mg/L
UNW-1	11/19/87	<0.2000	mg/L
UNW-1	11/30/87	<0.2000	mg/L
UNW-1-F	11/05/87	<0.2000	mg/L

PARAMETER PHOSPHORUS (continued)

WELL ID	DATE	RESULT	UNITS
UNW-1-F	11/11/87	<0.2000	mg/L
UNW-1-F	11/19/87	<0.2000	mg/L
UNW-1-F	11/30/87	<0.2000	mg/L
UNW-3	11/05/87	<0.2000	mg/L
UNW-3	11/11/87	<0.2000	mg/L
UNW-3	11/23/87	<0.2000	mg/L
UNW-3	11/30/87	<0.2000	mg/L
UNW-3-F	11/05/87	<0.2000	mg/L
UNW-3-F	11/11/87	<0.2000	mg/L
UNW-3-F	11/23/87	<0.2000	mg/L
UNW-3-F	11/30/87	<0.2000	mg/L
UNW-5	11/05/87	<0.2000	mg/L
UNW-5	11/11/87	<0.2000	mg/L
UNW-5	11/19/87	<0.2000	mg/L
UNW-5	11/30/87	<0.2000	mg/L
UNW-5-D	11/19/87	<0.2000	mg/L
UNW-5-D-F	11/19/87	<0.2000	mg/L
UNW-5-F	11/05/87	<0.2000	mg/L
UNW-5-F	11/11/87	<0.2000	mg/L
UNW-5-F	11/19/87	<0.2000	mg/L
UNW-5-F	11/30/87	<0.2000	mg/L

PARAMETER POTASSIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	4.3000	mg/L
UNW-1	11/11/87	1.8000	mg/L
UNW-1	11/19/87	2.7000	mg/L
UNW-1	11/30/87	4.7000	mg/L
UNW-1-F	11/05/87	3.9000	mg/L
UNW-1-F	11/11/87	3.7000	mg/L
UNW-1-F	11/19/87	1.2000	mg/L
UNW-1-F	11/30/87	4.9000	mg/L
UNW-3	11/05/87	11.0000	mg/L
UNW-3	11/11/87	4.4000	mg/L
UNW-3	11/23/87	6.0000	mg/L
UNW-3	11/30/87	5.0000	mg/L
UNW-3-F	11/05/87	2.7000	mg/L
UNW-3-F	11/11/87	3.8000	mg/L
UNW-3-F	11/23/87	3.7000	mg/L
UNW-3-F	11/30/87	4.7000	mg/L
UNW-5	11/05/87	<0.6000	mg/L
UNW-5	11/11/87	1.6000	mg/L
UNW-5	11/19/87	1.0000	mg/L
UNW-5	11/30/87	2.2000	mg/L
UNW-5-D	11/19/87	1.1000	mg/L
UNW-5-D-F	11/19/87	3.6000	mg/L
UNW-5-F	11/05/87	0.8300	mg/L
UNW-5-F	11/11/87	5.6000	mg/L

PARAMETER POTASSIUM (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5-F	11/19/87	1.0000	mg/L
UNW-5-F	11/30/87	1.6000	mg/L

PARAMETER PYRENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER REDOX

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	225.0000	mv
UNW-1	08/27/87	27.9000	mv
UNW-1	09/02/87	162.0000	mv
UNW-1	11/05/87	83.0000	mv
UNW-1	11/11/87	144.0000	mv
UNW-1	11/19/87	386.0000	mv
UNW-1	11/30/87	252.0000	mv
UNW-1	02/23/88	238.0000	mv
UNW-2	04/30/87	387.0000	mv
UNW-2	08/27/87	153.0000	mv
UNW-2	09/02/87	65.0000	mv
UNW-2	11/05/87	320.0000	mv
UNW-2	11/11/87	290.0000	mv
UNW-2	11/19/87	213.0000	mv
UNW-2	11/30/87	313.0000	mv
UNW-2	02/22/88	191.0000	mv
UNW-2-D	11/11/87	290.0000	mv
UNW-3	04/28/87	212.0000	mv
UNW-3	08/27/87	.	mv
UNW-3	09/02/87	126.0000	mv
UNW-3	11/05/87	185.0000	mv
UNW-3	11/11/87	169.0000	mv
UNW-3	11/23/87	340.0000	mv
UNW-3	11/30/87	267.0000	mv

PARAMETER REDOX (continued)

WELL ID	DATE	RESULT	UNITS
UNW-3	02/22/88	150.0000	mv
UNW-4	04/28/87	222.0000	mv
UNW-4	08/27/87	41.5000	mv
UNW-4	09/02/87	120.0000	mv
UNW-4	02/23/88	247.0000	mv
UNW-5	04/30/87	55.2000	mv
UNW-5	08/27/87	42.5000	mv
UNW-5	09/02/87	31.1000	mv
UNW-5	11/05/87	12.7000	mv
UNW-5	11/11/87	16.7000	mv
UNW-5	11/19/87	38.3000	mv
UNW-5	11/30/87	92.0000	mv
UNW-5	02/23/88	12.0000	mv
UNW-5-D	09/02/87	31.1000	mv
UNW-5-D	11/19/87	38.3000	mv

PARAMETER REDOX - INIT

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	194.0000	mv
UNW-1	08/27/87	39.7000	mv
UNW-1	09/02/87	154.0000	mv
UNW-1	11/05/87	89.0000	mv
UNW-1	11/11/87	310.0000	mv
UNW-1	11/19/87	226.0000	mv
UNW-1	11/30/87	265.0000	mv
UNW-2	04/30/87	253.0000	mv
UNW-2	08/27/87	153.0000	mv
UNW-2	09/02/87	43.0000	mv
UNW-2	11/05/87	220.0000	mv
UNW-2	11/11/87	297.0000	mv
UNW-2	11/19/87	193.0000	mv
UNW-2	11/30/87	311.0000	mv
UNW-2-D	11/11/87	297.0000	mv
UNW-3	04/28/87	270.0000	mv
UNW-3	08/27/87	196.0000	mv
UNW-3	09/02/87	130.0000	mv
UNW-3	11/05/87	310.0000	mv
UNW-3	11/11/87	244.0000	mv
UNW-3	11/23/87	354.0000	mv
UNW-3	11/30/87	270.0000	mv
UNW-4	04/28/87	255.0000	mv
UNW-4	08/27/87	73.8000	mv
UNW-4	09/02/87	120.0000	mv
UNW-5	04/30/87	53.8000	mv
UNW-5	08/27/87	34.9000	mv
UNW-5	09/02/87	12.0000	mv
UNW-5	11/05/87	219.0000	mv
UNW-5	11/11/87	53.9000	mv

PARAMETER REDOX - INIT (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	11/19/87	29.1000	mv
UNW-5	11/30/87	124.0000	mv
UNW-5-D	09/02/87	12.0000	mv
UNW-5-D	11/19/87	29.1000	mv

PARAMETER SELENIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.0050	mg/L
UNW-1	11/11/87	<0.0050	mg/L
UNW-1	11/19/87	<0.0050	mg/L
UNW-1	11/30/87	<0.0050	mg/L
UNW-1-F	11/05/87	<0.0050	mg/L
UNW-1-F	11/11/87	<0.0050	mg/L
UNW-1-F	11/19/87	<0.0050	mg/L
UNW-1-F	11/30/87	<0.0050	mg/L
UNW-3	11/05/87	<0.0050	mg/L
UNW-3	11/11/87	<0.0050	mg/L
UNW-3	11/23/87	<0.0050	mg/L
UNW-3	11/30/87	<0.0050	mg/L
UNW-3-F	11/05/87	<0.0050	mg/L
UNW-3-F	11/11/87	<0.0050	mg/L
UNW-3-F	11/23/87	<0.0050	mg/L
UNW-3-F	11/30/87	<0.0050	mg/L
UNW-5	11/05/87	<0.0050	mg/L
UNW-5	11/11/87	<0.0050	mg/L
UNW-5	11/19/87	<0.0050	mg/L
UNW-5	11/30/87	<0.0050	mg/L
UNW-5-D	11/19/87	<0.0050	mg/L
UNW-5-D-F	11/19/87	<0.0050	mg/L
UNW-5-F	11/05/87	<0.0050	mg/L
UNW-5-F	11/11/87	<0.0050	mg/L
UNW-5-F	11/19/87	<0.0050	mg/L
UNW-5-F	11/30/87	<0.0050	mg/L

PARAMETER SILICON

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	4.9000	mg/L
UNW-1	11/11/87	3.1000	mg/L
UNW-1	11/19/87	4.0000	mg/L
UNW-1	11/30/87	1.6000	mg/L
UNW-1-F	11/05/87	2.7000	mg/L
UNW-1-F	11/11/87	2.3000	mg/L
UNW-1-F	11/19/87	2.5000	mg/L
UNW-1-F	11/30/87	2.1000	mg/L
UNW-3	11/05/87	76.0000	mg/L
UNW-3	11/11/87	8.2000	mg/L

PARAMETER SILICON (continued)

WELL ID	DATE	RESULT	UNITS
UNW-3	11/23/87	4.9000	mg/L
UNW-3	11/30/87	8.7000	mg/L
UNW-3-F	11/05/87	5.6000	mg/L
UNW-3-F	11/11/87	4.9000	mg/L
UNW-3-F	11/23/87	4.9000	mg/L
UNW-3-F	11/30/87	4.5000	mg/L
UNW-5	11/05/87	7.5000	mg/L
UNW-5	11/11/87	6.9000	mg/L
UNW-5	11/19/87	7.3000	mg/L
UNW-5	11/30/87	6.9000	mg/L
UNW-5-D	11/19/87	7.6000	mg/L
UNW-5-D-F	11/19/87	6.0000	mg/L
UNW-5-F	11/05/87	6.6000	mg/L
UNW-5-F	11/11/87	5.3000	mg/L
UNW-5-F	11/19/87	6.2000	mg/L
UNW-5-F	11/30/87	6.3000	mg/L

PARAMETER SILVER

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.0060	mg/L
UNW-1	11/11/87	<0.0060	mg/L
UNW-1	11/19/87	<0.0060	mg/L
UNW-1	11/30/87	<0.0060	mg/L
UNW-1-F	11/05/87	<0.0060	mg/L
UNW-1-F	11/11/87	<0.0060	mg/L
UNW-1-F	11/19/87	<0.0060	mg/L
UNW-1-F	11/30/87	<0.0060	mg/L
UNW-3	11/05/87	<0.0060	mg/L
UNW-3	11/11/87	<0.0060	mg/L
UNW-3	11/23/87	<0.0060	mg/L
UNW-3	11/30/87	<0.0060	mg/L
UNW-3-F	11/05/87	<0.0060	mg/L
UNW-3-F	11/11/87	<0.0060	mg/L
UNW-3-F	11/23/87	<0.0060	mg/L
UNW-3-F	11/30/87	<0.0060	mg/L
UNW-5	11/05/87	<0.0060	mg/L
UNW-5	11/11/87	<0.0060	mg/L
UNW-5	11/19/87	<0.0060	mg/L
UNW-5	11/30/87	<0.0060	mg/L
UNW-5-D	11/19/87	<0.0060	mg/L
UNW-5-D-F	11/19/87	<0.0060	mg/L
UNW-5-F	11/05/87	<0.0060	mg/L
UNW-5-F	11/11/87	<0.0060	mg/L
UNW-5-F	11/19/87	<0.0060	mg/L
UNW-5-F	11/30/87	<0.0060	mg/L

PARAMETER SODIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	6.5000	mg/L
UNW-1	08/27/87	5.5000	mg/L
UNW-1	09/02/87	6.3000	mg/L
UNW-1	11/05/87	6.1000	mg/L
UNW-1	11/11/87	6.0000	mg/L
UNW-1	11/19/87	6.2000	mg/L
UNW-1	11/30/87	6.5000	mg/L
UNW-1	02/23/88	7.8000	mg/L
UNW-1-F	04/28/87	6.5000	mg/L
UNW-1-F	08/27/87	5.8000	mg/L
UNW-1-F	09/02/87	6.4000	mg/L
UNW-1-F	11/05/87	6.2000	mg/L
UNW-1-F	11/11/87	6.1000	mg/L
UNW-1-F	11/19/87	6.4000	mg/L
UNW-1-F	11/30/87	6.3000	mg/L
UNW-1-F	02/23/88	8.6000	mg/L
UNW-2	04/30/87	71.0000	mg/L
UNW-2	08/27/87	72.0000	mg/L
UNW-2	09/02/87	82.0000	mg/L
UNW-2	02/22/88	96.0000	mg/L
UNW-2-F	04/30/87	74.0000	mg/L
UNW-2-F	08/27/87	74.0000	mg/L
UNW-2-F	09/02/87	82.0000	mg/L
UNW-2-F	02/22/88	87.0000	mg/L
UNW-3	04/28/87	160.0000	mg/L
UNW-3	08/27/87	170.0000	mg/L
UNW-3	09/02/87	170.0000	mg/L
UNW-3	11/05/87	170.0000	mg/L
UNW-3	11/11/87	170.0000	mg/L
UNW-3	11/23/87	180.0000	mg/L
UNW-3	11/30/87	170.0000	mg/L
UNW-3	02/22/88	160.0000	mg/L
UNW-3-F	04/28/87	160.0000	mg/L
UNW-3-F	08/27/87	170.0000	mg/L
UNW-3-F	09/02/87	170.0000	mg/L
UNW-3-F	11/05/87	180.0000	mg/L
UNW-3-F	11/11/87	170.0000	mg/L
UNW-3-F	11/23/87	180.0000	mg/L
UNW-3-F	11/30/87	180.0000	mg/L
UNW-3-F	02/22/88	160.0000	mg/L
UNW-4	04/28/87	29.0000	mg/L
UNW-4	08/27/87	34.0000	mg/L
UNW-4	09/02/87	37.0000	mg/L
UNW-4	02/23/88	36.0000	mg/L
UNW-4-F	04/28/87	30.0000	mg/L
UNW-4-F	08/27/87	34.0000	mg/L
UNW-4-F	09/02/87	37.0000	mg/L
UNW-4-F	02/23/88	38.0000	mg/L
UNW-5	04/30/87	23.0000	mg/L
UNW-5	08/27/87	23.0000	mg/L

PARAMETER SODIUM (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	09/02/87	24.0000	mg/L
UNW-5	11/05/87	27.0000	mg/L
UNW-5	11/11/87	25.0000	mg/L
UNW-5	11/19/87	26.0000	mg/L
UNW-5	11/30/87	27.0000	mg/L
UNW-5	02/23/88	24.0000	mg/L
UNW-5-D	09/02/87	25.0000	mg/L
UNW-5-D	11/19/87	26.0000	mg/L
UNW-5-D-F	11/19/87	25.0000	mg/L
UNW-5-F	04/30/87	23.0000	mg/L
UNW-5-F	08/27/87	21.0000	mg/L
UNW-5-F	09/02/87	24.0000	mg/L
UNW-5-F	11/05/87	29.0000	mg/L
UNW-5-F	11/11/87	22.0000	mg/L
UNW-5-F	11/19/87	25.0000	mg/L
UNW-5-F	11/30/87	27.0000	mg/L
UNW-5-F	02/23/88	24.0000	mg/L
UNW-5-F-D	09/02/87	25.0000	mg/L

PARAMETER STRONTIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	0.1200	mg/L
UNW-1	11/11/87	0.1000	mg/L
UNW-1	11/19/87	0.1100	mg/L
UNW-1	11/30/87	0.1100	mg/L
UNW-1-F	11/05/87	0.1100	mg/L
UNW-1-F	11/11/87	0.1100	mg/L
UNW-1-F	11/19/87	0.1100	mg/L
UNW-1-F	11/30/87	0.1100	mg/L
UNW-3	11/05/87	0.6500	mg/L
UNW-3	11/11/87	0.4300	mg/L
UNW-3	11/23/87	0.4400	mg/L
UNW-3	11/30/87	0.4700	mg/L
UNW-3-F	11/05/87	0.4600	mg/L
UNW-3-F	11/11/87	0.4200	mg/L
UNW-3-F	11/23/87	0.4300	mg/L
UNW-3-F	11/30/87	0.4900	mg/L
UNW-5	11/05/87	0.5100	mg/L
UNW-5	11/11/87	0.4500	mg/L
UNW-5	11/19/87	0.4800	mg/L
UNW-5	11/30/87	0.4800	mg/L
UNW-5-D	11/19/87	0.4900	mg/L
UNW-5-D-F	11/19/87	0.4700	mg/L
UNW-5-F	11/05/87	0.4800	mg/L
UNW-5-F	11/11/87	0.3900	mg/L
UNW-5-F	11/19/87	0.4700	mg/L
UNW-5-F	11/30/87	0.4900	mg/L

PARAMETER STYRENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER SULFATE

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	32.0000	mg/L
UNW-1	08/27/87	24.0000	mg/L
UNW-1	09/02/87	16.0000	mg/L
UNW-1	11/05/87	24.0000	mg/L
UNW-1	11/11/87	26.0000	mg/L
UNW-1	11/19/87	31.0000	mg/L
UNW-1	11/30/87	29.0000	mg/L
UNW-1	02/23/88	40.0000	mg/L
UNW-2	04/30/87	290.0000	mg/L
UNW-2	08/27/87	325.0000	mg/L
UNW-2	09/02/87	298.0000	mg/L
UNW-2	02/22/88	298.0000	mg/L
UNW-3	04/28/87	646.0000	mg/L
UNW-3	08/27/87	570.0000	mg/L
UNW-3	09/02/87	610.0000	mg/L
UNW-3	11/05/87	63.0000	mg/L
UNW-3	11/11/87	608.0000	mg/L
UNW-3	11/23/87	579.0000	mg/L
UNW-3	11/30/87	564.0000	mg/L
UNW-3	02/22/88	471.0000	mg/L
UNW-4	04/28/87	78.0000	mg/L
UNW-4	08/27/87	100.0000	mg/L
UNW-4	09/02/87	108.0000	mg/L
UNW-4	02/23/88	73.0000	mg/L
UNW-5	04/30/87	20.0000	mg/L
UNW-5	08/27/87	14.0000	mg/L
UNW-5	09/02/87	15.0000	mg/L
UNW-5	11/05/87	16.0000	mg/L
UNW-5	11/11/87	15.0000	mg/L
UNW-5	11/19/87	15.0000	mg/L
UNW-5	11/30/87	15.0000	mg/L

PARAMETER SULFATE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	02/23/88	28.0000	mg/L
UNW-5-D	09/02/87	14.0000	mg/L
UNW-5-D	11/19/87	16.0000	mg/L

PARAMETER SULFUR

WELL ID	DATE	RESULT	UNITS
UNW-1	11/11/87	8.0000	ug/L
UNW-5	11/05/87	7.0000	ug/L
UNW-5	11/19/87	11.0000	ug/L

PARAMETER TEMPERATURE

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	14.6000	Deg C
UNW-1	08/27/87	19.4000	Deg C
UNW-1	09/02/87	16.9000	Deg C
UNW-1	11/05/87	19.5000	Deg C
UNW-1	11/11/87	15.6000	Deg C
UNW-1	11/19/87	17.1000	Deg C
UNW-1	11/30/87	17.5000	Deg C
UNW-1	02/23/88	20.7000	Deg C
UNW-2	04/30/87	15.0000	Deg C
UNW-2	08/27/87	23.1000	Deg C
UNW-2	09/02/87	17.6000	Deg C
UNW-2	11/05/87	18.9000	Deg C
UNW-2	11/11/87	12.6000	Deg C
UNW-2	11/19/87	17.5000	Deg C
UNW-2	11/30/87	18.8000	Deg C
UNW-2	02/22/88	15.8000	Deg C
UNW-2-D	11/11/87	12.6000	Deg C
UNW-3	04/28/87	15.0000	Deg C
UNW-3	08/27/87	22.5000	Deg C
UNW-3	09/02/87	21.8000	Deg C
UNW-3	11/05/87	19.7000	Deg C
UNW-3	11/11/87	16.4000	Deg C
UNW-3	11/23/87	11.6000	Deg C
UNW-3	11/30/87	19.9000	Deg C
UNW-3	02/22/88	17.5000	Deg C
UNW-4	04/28/87	18.4000	Deg C
UNW-4	08/27/87	21.7000	Deg C
UNW-4	09/02/87	25.3000	Deg C
UNW-4	02/23/88	19.5000	Deg C
UNW-5	04/30/87	16.1000	Deg C
UNW-5	08/27/87	19.8000	Deg C
UNW-5	09/02/87	20.0000	Deg C
UNW-5	11/05/87	17.3000	Deg C
UNW-5	11/11/87	14.5000	Deg C

PARAMETER TEMPERATURE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	11/19/87	16.7000	Deg C
UNW-5	11/30/87	16.8000	Deg C
UNW-5	02/23/88	14.8000	Deg C
UNW-5-D	09/02/87	20.0000	Deg C
UNW-5-D	11/19/87	16.7000	Deg C

PARAMETER TEMPERATURE - INIT

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	15.0000	Deg C
UNW-1	08/27/87	21.3000	Deg C
UNW-1	09/02/87	17.5000	Deg C
UNW-1	11/05/87	15.1000	Deg C
UNW-1	11/11/87	5.0000	Deg C
UNW-1	11/19/87	16.3000	Deg C
UNW-1	11/30/87	25.0000	Deg C
UNW-2	04/30/87	18.4000	Deg C
UNW-2	08/27/87	24.4000	Deg C
UNW-2	09/02/87	18.0000	Deg C
UNW-2	11/05/87	18.5000	Deg C
UNW-2	11/11/87	15.0000	Deg C
UNW-2	11/19/87	16.0000	Deg C
UNW-2	11/30/87	16.6000	Deg C
UNW-2-D	11/11/87	15.0000	Deg C
UNW-3	04/28/87	13.9000	Deg C
UNW-3	08/27/87	24.4000	Deg C
UNW-3	09/02/87	21.0000	Deg C
UNW-3	11/05/87	19.8000	Deg C
UNW-3	11/11/87	8.0000	Deg C
UNW-3	11/23/87	10.4000	Deg C
UNW-3	11/30/87	17.9000	Deg C
UNW-4	04/28/87	14.5000	Deg C
UNW-4	08/27/87	27.1000	Deg C
UNW-4	09/02/87	24.1000	Deg C
UNW-5	04/30/87	20.0000	Deg C
UNW-5	08/27/87	24.7000	Deg C
UNW-5	09/02/87	22.0000	Deg C
UNW-5	11/05/87	15.9000	Deg C
UNW-5	11/11/87	13.5000	Deg C
UNW-5	11/19/87	15.0000	Deg C
UNW-5	11/30/87	15.2000	Deg C
UNW-5-D	09/02/87	22.0000	Deg C
UNW-5-D	11/19/87	15.0000	Deg C

PARAMETER TETRACHLOROETHENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	7.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	220.0000	ug/L
UNW-2	11/11/87	360.0000	ug/L
UNW-2	11/19/87	340.0000	ug/L
UNW-2	11/30/87	260.0000	ug/L
UNW-2-D	11/11/87	340.0000	ug/L
UNW-5	11/05/87	2.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	2.0000	ug/L
UNW-5	11/30/87	2.0000	ug/L
UNW-5-D	11/19/87	3.0000	ug/L

PARAMETER THALLIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.0100	mg/L
UNW-1	11/11/87	<0.0100	mg/L
UNW-1	11/19/87	<0.0100	mg/L
UNW-1	11/30/87	<0.0100	mg/L
UNW-1-F	11/05/87	<0.0100	mg/L
UNW-1-F	11/11/87	<0.0100	mg/L
UNW-1-F	11/19/87	<0.0100	mg/L
UNW-1-F	11/30/87	<0.0100	mg/L
UNW-3	11/05/87	<0.0100	mg/L
UNW-3	11/11/87	<0.0100	mg/L
UNW-3	11/23/87	<0.0100	mg/L
UNW-3	11/30/87	<0.0100	mg/L
UNW-3-F	11/05/87	<0.0100	mg/L
UNW-3-F	11/11/87	<0.0100	mg/L
UNW-3-F	11/23/87	<0.0100	mg/L
UNW-3-F	11/30/87	<0.0100	mg/L
UNW-5	11/05/87	<0.0100	mg/L
UNW-5	11/11/87	<0.0100	mg/L
UNW-5	11/19/87	<0.0100	mg/L
UNW-5	11/30/87	<0.0100	mg/L
UNW-5-D	11/19/87	<0.0100	mg/L
UNW-5-D-F	11/19/87	<0.0100	mg/L
UNW-5-F	11/05/87	<0.0100	mg/L
UNW-5-F	11/11/87	<0.0100	mg/L
UNW-5-F	11/19/87	<0.0100	mg/L
UNW-5-F	11/30/87	<0.0100	mg/L

PARAMETER THORIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.2000	mg/L
UNW-1	11/11/87	<0.2000	mg/L
UNW-1	11/19/87	<0.2000	mg/L
UNW-1	11/30/87	<0.2000	mg/L
UNW-1-F	11/05/87	<0.2000	mg/L
UNW-1-F	11/11/87	<0.2000	mg/L
UNW-1-F	11/19/87	<0.2000	mg/L
UNW-1-F	11/30/87	<0.2000	mg/L
UNW-3	11/05/87	<0.2000	mg/L
UNW-3	11/11/87	<0.2000	mg/L
UNW-3	11/23/87	<0.2000	mg/L
UNW-3	11/30/87	<0.2000	mg/L
UNW-3-F	11/05/87	<0.2000	mg/L
UNW-3-F	11/11/87	<0.2000	mg/L
UNW-3-F	11/23/87	<0.2000	mg/L
UNW-3-F	11/30/87	<0.2000	mg/L
UNW-5	11/05/87	<0.2000	mg/L
UNW-5	11/11/87	<0.2000	mg/L
UNW-5	11/19/87	<0.2000	mg/L
UNW-5	11/30/87	<0.2000	mg/L
UNW-5-D	11/19/87	<0.2000	mg/L
UNW-5-D-F	11/19/87	<0.2000	mg/L
UNW-5-F	11/05/87	<0.2000	mg/L
UNW-5-F	11/11/87	<0.2000	mg/L
UNW-5-F	11/19/87	<0.2000	mg/L
UNW-5-F	11/30/87	<0.2000	mg/L

PARAMETER TITANIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	0.0540	mg/L
UNW-1	11/11/87	0.0150	mg/L
UNW-1	11/19/87	0.0290	mg/L
UNW-1	11/30/87	0.0078	mg/L
UNW-1-F	11/05/87	<0.0030	mg/L
UNW-1-F	11/11/87	0.0087	mg/L
UNW-1-F	11/19/87	<0.0030	mg/L
UNW-1-F	11/30/87	<0.0030	mg/L
UNW-3	11/05/87	0.2100	mg/L
UNW-3	11/11/87	0.0330	mg/L
UNW-3	11/23/87	0.0520	mg/L
UNW-3	11/30/87	0.0900	mg/L
UNW-3-F	11/05/87	<0.0030	mg/L
UNW-3-F	11/11/87	0.0040	mg/L
UNW-3-F	11/23/87	<0.0030	mg/L
UNW-3-F	11/30/87	<0.0030	mg/L
UNW-5	11/05/87	0.0130	mg/L
UNW-5	11/11/87	0.0100	mg/L
UNW-5	11/19/87	0.0150	mg/L

PARAMETER TITANIUM (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	11/30/87	0.0096	mg/L
UNW-5-D	11/19/87	0.0150	mg/L
UNW-5-D-F	11/19/87	0.0039	mg/L
UNW-5-F	11/05/87	<0.0030	mg/L
UNW-5-F	11/11/87	0.0037	mg/L
UNW-5-F	11/19/87	0.0086	mg/L
UNW-5-F	11/30/87	<0.0030	mg/L

PARAMETER TOLUENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	0.7000	ug/L
UNW-1	11/30/87	0.6000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	0.7000	ug/L
UNW-2	11/30/87	0.7000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	4.0000	ug/L
UNW-5	11/11/87	4.0000	ug/L
UNW-5	11/19/87	4.0000	ug/L
UNW-5	11/30/87	4.0000	ug/L
UNW-5-D	11/19/87	4.0000	ug/L

PARAMETER TOTAL ORGANIC CARBON (TOC)

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	4.0000	mg/L
UNW-1	04/28/87	5.0000	mg/L
UNW-1	04/28/87	6.0000	mg/L
UNW-1	08/27/87	2.0000	mg/L
UNW-1	08/27/87	2.1000	mg/L
UNW-1	08/27/87	2.0000	mg/L
UNW-1	08/27/87	2.0000	mg/L
UNW-1	09/02/87	3.1000	mg/L
UNW-1	09/02/87	3.4000	mg/L
UNW-1	09/02/87	3.0000	mg/L
UNW-1	09/02/87	2.8000	mg/L
UNW-1	11/05/87	1.8000	mg/L
UNW-1	11/05/87	1.9000	mg/L
UNW-1	11/05/87	1.8000	mg/L
UNW-1	11/05/87	1.8000	mg/L
UNW-1	11/11/87	2.2000	mg/L
UNW-1	11/11/87	2.2000	mg/L
UNW-1	11/11/87	2.0000	mg/L
UNW-1	11/11/87	2.0000	mg/L

PARAMETER TOTAL ORGANIC CARBON (TOC)
(continued)

WELL ID	DATE	RESULT	UNITS
UNW-1	11/19/87	2.8000	mg/L
UNW-1	11/19/87	3.6000	mg/L
UNW-1	11/19/87	2.5000	mg/L
UNW-1	11/19/87	2.5000	mg/L
UNW-1	11/30/87	1.6000	mg/L
UNW-1	11/30/87	1.6000	mg/L
UNW-1	11/30/87	1.6000	mg/L
UNW-1	11/30/87	1.7000	mg/L
UNW-1	02/23/88	2.7000	mg/L
UNW-1	02/23/88	2.7000	mg/L
UNW-1	02/23/88	2.9000	mg/L
UNW-1	02/23/88	5.5000	mg/L
UNW-2	04/30/87	1.0000	mg/L
UNW-2	04/30/87	2.0000	mg/L
UNW-2	08/27/87	2.1000	mg/L
UNW-2	08/27/87	1.6000	mg/L
UNW-2	08/27/87	1.3000	mg/L
UNW-2	08/27/87	1.3000	mg/L
UNW-2	09/02/87	2.0000	mg/L
UNW-2	09/02/87	1.6000	mg/L
UNW-2	09/02/87	1.7000	mg/L
UNW-2	09/02/87	1.7000	mg/L
UNW-2	11/05/87	1.4000	mg/L
UNW-2	11/05/87	1.3000	mg/L
UNW-2	11/05/87	1.6000	mg/L
UNW-2	11/05/87	1.5000	mg/L
UNW-2	11/11/87	1.4000	mg/L
UNW-2	11/11/87	1.2000	mg/L
UNW-2	11/11/87	1.3000	mg/L
UNW-2	11/11/87	1.2000	mg/L
UNW-2	11/19/87	3.0000	mg/L
UNW-2	11/19/87	3.6000	mg/L
UNW-2	11/19/87	2.5000	mg/L
UNW-2	11/19/87	2.9000	mg/L
UNW-2	11/30/87	1.3000	mg/L
UNW-2	11/30/87	1.3000	mg/L
UNW-2	11/30/87	1.4000	mg/L
UNW-2	11/30/87	1.5000	mg/L
UNW-2	02/22/88	1.5000	mg/L
UNW-2	02/22/88	1.7000	mg/L
UNW-2	02/22/88	1.5000	mg/L
UNW-2	02/22/88	1.6000	mg/L
UNW-2-D	11/11/87	1.3000	mg/L
UNW-2-D	11/11/87	1.2000	mg/L
UNW-2-D	11/11/87	1.3000	mg/L
UNW-2-D	11/11/87	1.2000	mg/L
UNW-3	04/28/87	1.0000	mg/L
UNW-3	04/28/87	3.0000	mg/L
UNW-3	08/27/87	1.9000	mg/L

PARAMETER TOTAL ORGANIC CARBON (TOC)
(continued)

WELL ID	DATE	RESULT	UNITS
UNW-3	08/27/87	1.8000	mg/L
UNW-3	08/27/87	1.6000	mg/L
UNW-3	08/27/87	1.7000	mg/L
UNW-3	09/02/87	1.6000	mg/L
UNW-3	09/02/87	1.6000	mg/L
UNW-3	09/02/87	1.6000	mg/L
UNW-3	09/02/87	1.7000	mg/L
UNW-3	02/22/88	2.9000	mg/L
UNW-3	02/22/88	2.7000	mg/L
UNW-3	02/22/88	2.8000	mg/L
UNW-3	02/22/88	3.0000	mg/L
UNW-4	04/28/87	2.0000	mg/L
UNW-4	04/28/87	3.0000	mg/L
UNW-4	04/28/87	4.0000	mg/L
UNW-4	08/27/87	<1.0000	mg/L
UNW-4	08/27/87	1.1000	mg/L
UNW-4	08/27/87	1.6000	mg/L
UNW-4	08/27/87	1.2000	mg/L
UNW-4	09/02/87	<1.0000	mg/L
UNW-4	09/02/87	<1.0000	mg/L
UNW-4	09/02/87	<1.0000	mg/L
UNW-4	09/02/87	<1.0000	mg/L
UNW-4	02/23/88	2.2000	mg/L
UNW-4	02/23/88	1.9000	mg/L
UNW-4	02/23/88	2.0000	mg/L
UNW-4	02/23/88	1.9000	mg/L
UNW-5	04/30/87	3.3000	mg/L
UNW-5	04/30/87	3.5000	mg/L
UNW-5	04/30/87	3.6000	mg/L
UNW-5	08/27/87	3.6000	mg/L
UNW-5	08/27/87	3.6000	mg/L
UNW-5	08/27/87	3.7000	mg/L
UNW-5	08/27/87	3.5000	mg/L
UNW-5	09/02/87	4.2000	mg/L
UNW-5	09/02/87	4.0000	mg/L
UNW-5	09/02/87	3.7000	mg/L
UNW-5	09/02/87	3.7000	mg/L
UNW-5	11/05/87	3.4000	mg/L
UNW-5	11/05/87	3.5000	mg/L
UNW-5	11/05/87	3.4000	mg/L
UNW-5	11/05/87	3.4000	mg/L
UNW-5	11/11/87	3.3000	mg/L
UNW-5	11/11/87	3.4000	mg/L
UNW-5	11/11/87	3.3000	mg/L
UNW-5	11/11/87	3.2000	mg/L
UNW-5	11/19/87	4.2000	mg/L
UNW-5	11/19/87	4.2000	mg/L
UNW-5	11/19/87	3.7000	mg/L
UNW-5	11/19/87	3.7000	mg/L

PARAMETER TOTAL ORGANIC CARBON (TOC) (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	11/30/87	3.3000	mg/L
UNW-5	11/30/87	3.4000	mg/L
UNW-5	11/30/87	3.3000	mg/L
UNW-5	11/30/87	3.3000	mg/L
UNW-5	02/23/88	3.2000	mg/L
UNW-5	02/23/88	3.4000	mg/L
UNW-5	02/23/88	3.1000	mg/L
UNW-5	02/23/88	3.2000	mg/L
UNW-5-D	09/02/87	3.8000	mg/L
UNW-5-D	09/02/87	4.0000	mg/L
UNW-5-D	09/02/87	3.7000	mg/L
UNW-5-D	09/02/87	3.6000	mg/L
UNW-5-D	11/19/87	5.0000	mg/L
UNW-5-D	11/19/87	6.0000	mg/L
UNW-5-D	11/19/87	4.6000	mg/L
UNW-5-D	11/19/87	3.7000	mg/L

PARAMETER TOTAL XYLENES

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER TOX

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	91.0000	ug/L
UNW-1	04/28/87	101.0000	ug/L
UNW-1	04/28/87	137.0000	ug/L
UNW-1	04/28/87	151.0000	ug/L
UNW-1	08/27/87	94.0000	ug/L
UNW-1	08/27/87	81.0000	ug/L
UNW-1	08/27/87	94.0000	ug/L
UNW-1	08/27/87	97.0000	ug/L
UNW-1	09/02/87	91.0000	ug/L

PARAMETER TOX (continued)

WELL ID	DATE	RESULT	UNITS
UNW-1	09/02/87	90.0000	ug/L
UNW-1	09/02/87	74.0000	ug/L
UNW-1	09/02/87	135.0000	ug/L
UNW-1	11/05/87	84.0000	ug/L
UNW-1	11/05/87	68.0000	ug/L
UNW-1	11/05/87	89.0000	ug/L
UNW-1	11/05/87	71.0000	ug/L
UNW-1	11/11/87	122.0000	ug/L
UNW-1	11/11/87	137.0000	ug/L
UNW-1	11/11/87	91.0000	ug/L
UNW-1	11/11/87	117.0000	ug/L
UNW-1	11/19/87	124.0000	ug/L
UNW-1	11/19/87	105.0000	ug/L
UNW-1	11/19/87	108.0000	ug/L
UNW-1	11/19/87	111.0000	ug/L
UNW-1	11/30/87	141.0000	ug/L
UNW-1	11/30/87	78.0000	ug/L
UNW-1	11/30/87	106.0000	ug/L
UNW-1	11/30/87	100.0000	ug/L
UNW-1	02/23/88	83.0000	ug/L
UNW-1	02/23/88	93.0000	ug/L
UNW-1	02/23/88	.	ug/L
UNW-1	02/23/88	.	ug/L
UNW-2	04/30/87	1489.0000	ug/L
UNW-2	04/30/87	1679.0000	ug/L
UNW-2	04/30/87	1948.0000	ug/L
UNW-2	04/30/87	2047.0000	ug/L
UNW-2	08/27/87	727.0000	ug/L
UNW-2	08/27/87	1852.0000	ug/L
UNW-2	08/27/87	2460.0000	ug/L
UNW-2	08/27/87	2050.0000	ug/L
UNW-2	09/02/87	4353.0000	ug/L
UNW-2	09/02/87	6000.0000	ug/L
UNW-2	09/02/87	2430.0000	ug/L
UNW-2	09/02/87	4630.0000	ug/L
UNW-2	11/05/87	1038.0000	ug/L
UNW-2	11/05/87	2740.0000	ug/L
UNW-2	11/05/87	3630.0000	ug/L
UNW-2	11/05/87	2360.0000	ug/L
UNW-2	11/11/87	9300.0000	ug/L
UNW-2	11/11/87	5660.0000	ug/L
UNW-2	11/11/87	12440.0000	ug/L
UNW-2	11/11/87	3620.0000	ug/L
UNW-2	11/19/87	2740.0000	ug/L
UNW-2	11/19/87	3220.0000	ug/L
UNW-2	11/19/87	3020.0000	ug/L
UNW-2	11/19/87	3180.0000	ug/L
UNW-2	11/30/87	2490.0000	ug/L
UNW-2	11/30/87	3790.0000	ug/L
UNW-2	11/30/87	2830.0000	ug/L

PARAMETER TOX (continued)

WELL ID	DATE	RESULT	UNITS
UNW-2	11/30/87	2380.0000	ug/L
UNW-2	02/22/88	2870.0000	ug/L
UNW-2	02/22/88	3174.0000	ug/L
UNW-2	02/22/88	2088.0000	ug/L
UNW-2	02/22/88	3348.0000	ug/L
UNW-2-D	11/11/87	10370.0000	ug/L
UNW-2-D	11/11/87	5140.0000	ug/L
UNW-2-D	11/11/87	4670.0000	ug/L
UNW-2-D	11/11/87	3020.0000	ug/L
UNW-3	04/28/87	483.0000	ug/L
UNW-3	04/28/87	502.0000	ug/L
UNW-3	04/28/87	522.0000	ug/L
UNW-3	04/28/87	548.0000	ug/L
UNW-3	08/27/87	128.0000	ug/L
UNW-3	08/27/87	190.0000	ug/L
UNW-3	08/27/87	203.0000	ug/L
UNW-3	08/27/87	198.0000	ug/L
UNW-3	09/02/87	223.0000	ug/L
UNW-3	09/02/87	234.0000	ug/L
UNW-3	09/02/87	101.0000	ug/L
UNW-3	09/02/87	192.0000	ug/L
UNW-3	02/22/88	246.0000	ug/L
UNW-3	02/22/88	278.0000	ug/L
UNW-3	02/22/88	202.0000	ug/L
UNW-3	02/22/88	361.0000	ug/L
UNW-4	04/28/87	179.0000	ug/L
UNW-4	04/28/87	227.0000	ug/L
UNW-4	04/28/87	255.0000	ug/L
UNW-4	04/28/87	286.0000	ug/L
UNW-4	08/27/87	168.0000	ug/L
UNW-4	08/27/87	190.0000	ug/L
UNW-4	08/27/87	275.0000	ug/L
UNW-4	08/27/87	260.0000	ug/L
UNW-4	09/02/87	252.0000	ug/L
UNW-4	09/02/87	228.0000	ug/L
UNW-4	09/02/87	348.0000	ug/L
UNW-4	09/02/87	310.0000	ug/L
UNW-4	02/23/88	219.0000	ug/L
UNW-4	02/23/88	259.0000	ug/L
UNW-4	02/23/88	262.0000	ug/L
UNW-4	02/23/88	272.0000	ug/L
UNW-5	04/30/87	1564.0000	ug/L
UNW-5	04/30/87	1593.0000	ug/L
UNW-5	04/30/87	1782.0000	ug/L
UNW-5	04/30/87	2125.0000	ug/L
UNW-5	08/27/87	1113.0000	ug/L
UNW-5	08/27/87	1843.0000	ug/L
UNW-5	08/27/87	1840.0000	ug/L
UNW-5	08/27/87	1932.0000	ug/L
UNW-5	09/02/87	1918.0000	ug/L

PARAMETER TOX (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	09/02/87	1836.0000	ug/L
UNW-5	09/02/87	1644.0000	ug/L
UNW-5	09/02/87	1988.0000	ug/L
UNW-5	11/05/87	4790.0000	ug/L
UNW-5	11/05/87	4360.0000	ug/L
UNW-5	11/05/87	5860.0000	ug/L
UNW-5	11/05/87	3750.0000	ug/L
UNW-5	11/11/87	8230.0000	ug/L
UNW-5	11/11/87	7280.0000	ug/L
UNW-5	11/11/87	6700.0000	ug/L
UNW-5	11/11/87	7000.0000	ug/L
UNW-5	11/19/87	5080.0000	ug/L
UNW-5	11/19/87	2700.0000	ug/L
UNW-5	11/19/87	2950.0000	ug/L
UNW-5	11/19/87	3320.0000	ug/L
UNW-5	11/30/87	1830.0000	ug/L
UNW-5	11/30/87	1630.0000	ug/L
UNW-5	11/30/87	1900.0000	ug/L
UNW-5	11/30/87	1900.0000	ug/L
UNW-5	02/23/88	1569.0000	ug/L
UNW-5	02/23/88	4520.0000	ug/L
UNW-5	02/23/88	1280.0000	ug/L
UNW-5	02/23/88	1120.0000	ug/L
UNW-5-D	09/02/87	1900.0000	ug/L
UNW-5-D	09/02/87	1476.0000	ug/L
UNW-5-D	09/02/87	1658.0000	ug/L
UNW-5-D	09/02/87	1996.0000	ug/L
UNW-5-D	11/19/87	4650.0000	ug/L
UNW-5-D	11/19/87	2750.0000	ug/L
UNW-5-D	11/19/87	2870.0000	ug/L
UNW-5-D	11/19/87	2800.0000	ug/L

PARAMETER TRANS-1,2-DICHLOROETHENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	55.0000	ug/L
UNW-1	11/19/87	38.0000	ug/L
UNW-1	11/30/87	44.0000	ug/L
UNW-2	11/05/87	680.0000	ug/L
UNW-2	11/11/87	850.0000	ug/L
UNW-2	11/19/87	490.0000	ug/L
UNW-2	11/30/87	550.0000	ug/L
UNW-2-D	11/11/87	840.0000	ug/L
UNW-5	11/05/87	6200.0000	ug/L
UNW-5	11/11/87	6600.0000	ug/L
UNW-5	11/19/87	1800.0000	ug/L
UNW-5	11/30/87	1700.0000	ug/L
UNW-5-D	11/19/87	5700.0000	ug/L

PARAMETER TRANS-1,3-DICHLOROPROPENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L

PARAMETER TRANS-1,3-DICHLOROPROPENE

WELL ID	DATE	RESULT	UNITS
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER TRICHLOROETHENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	65.0000	ug/L
UNW-1	11/11/87	59.0000	ug/L
UNW-1	11/19/87	56.0000	ug/L
UNW-1	11/30/87	60.0000	ug/L
UNW-2	11/05/87	5600.0000	ug/L
UNW-2	11/11/87	4000.0000	ug/L
UNW-2	11/19/87	1500.0000	ug/L
UNW-2	11/30/87	1600.0000	ug/L
UNW-2-D	11/11/87	4000.0000	ug/L
UNW-5	11/05/87	2100.0000	ug/L
UNW-5	11/11/87	1100.0000	ug/L
UNW-5	11/19/87	700.0000	ug/L
UNW-5	11/30/87	710.0000	ug/L
UNW-5-D	11/19/87	930.0000	ug/L

PARAMETER URANIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	04/28/87	<0.0010	mg/L
UNW-1	08/27/87	<0.0010	mg/L
UNW-1	09/02/87	<0.0010	mg/L
UNW-1	02/23/88	0.0050	mg/L
UNW-1-F	04/28/87	<0.0010	mg/L
UNW-1-F	08/27/87	<0.0010	mg/L

PARAMETER URANIUM (continued)

WELL ID	DATE	RESULT	UNITS
UNW-1-F	09/02/87	<0.0010	mg/L
UNW-1-F	02/23/88	<0.0010	mg/L
UNW-2	04/30/87	0.0020	mg/L
UNW-2	08/27/87	0.0020	mg/L
UNW-2	09/02/87	<0.0010	mg/L
UNW-2	02/22/88	0.0010	mg/L
UNW-2-F	04/30/87	<0.0010	mg/L
UNW-2-F	08/27/87	<0.0010	mg/L
UNW-2-F	09/02/87	0.0030	mg/L
UNW-2-F	02/22/88	0.0020	mg/L
UNW-3	04/28/87	<0.0010	mg/L
UNW-3	08/27/87	<0.0010	mg/L
UNW-3	09/02/87	-0.0020	mg/L
UNW-3	02/22/88	0.0010	mg/L
UNW-3-F	04/28/87	<0.0010	mg/L
UNW-3-F	08/27/87	<0.0010	mg/L
UNW-3-F	09/02/87	0.0030	mg/L
UNW-3-F	02/22/88	0.0020	mg/L
UNW-4	04/28/87	<0.0010	mg/L
UNW-4	08/27/87	<0.0010	mg/L
UNW-4	09/02/87	<0.0010	mg/L
UNW-4	02/23/88	0.0020	mg/L
UNW-4-F	04/28/87	<0.0010	mg/L
UNW-4-F	08/27/87	0.0020	mg/L
UNW-4-F	09/02/87	0.0030	mg/L
UNW-4-F	02/23/88	0.0020	mg/L
UNW-5	04/30/87	0.0010	mg/L
UNW-5	08/27/87	<0.0010	mg/L
UNW-5	09/02/87	<0.0010	mg/L
UNW-5	02/23/88	0.0040	mg/L
UNW-5-D	09/02/87	<0.0010	mg/L
UNW-5-F	04/30/87	<0.0010	mg/L
UNW-5-F	08/27/87	0.0020	mg/L
UNW-5-F	09/02/87	0.0030	mg/L
UNW-5-F	02/23/88	0.0030	mg/L
UNW-5-F-D	09/02/87	0.0020	mg/L

PARAMETER VANADIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.0050	mg/L
UNW-1	11/11/87	<0.0050	mg/L
UNW-1	11/19/87	<0.0050	mg/L
UNW-1	11/30/87	<0.0050	mg/L
UNW-1-F	11/05/87	<0.0050	mg/L
UNW-1-F	11/11/87	<0.0050	mg/L
UNW-1-F	11/19/87	<0.0050	mg/L
UNW-1-F	11/30/87	<0.0050	mg/L
UNW-3	11/05/87	0.0710	mg/L

PARAMETER VANADIUM (continued)

WELL ID	DATE	RESULT	UNITS
UNW-3	11/11/87	<0.0050	mg/L
UNW-3	11/23/87	<0.0050	mg/L
UNW-3	11/30/87	<0.0050	mg/L
UNW-3-F	11/05/87	<0.0050	mg/L
UNW-3-F	11/11/87	<0.0050	mg/L
UNW-3-F	11/23/87	<0.0050	mg/L
UNW-3-F	11/30/87	<0.0050	mg/L
UNW-5	11/05/87	<0.0050	mg/L
UNW-5	11/11/87	<0.0050	mg/L
UNW-5	11/19/87	<0.0050	mg/L
UNW-5	11/30/87	<0.0050	mg/L
UNW-5-D	11/19/87	<0.0050	mg/L
UNW-5-D-F	11/19/87	<0.0050	mg/L
UNW-5-F	11/05/87	<0.0050	mg/L
UNW-5-F	11/11/87	<0.0050	mg/L
UNW-5-F	11/19/87	<0.0050	mg/L
UNW-5-F	11/30/87	<0.0050	mg/L

PARAMETER VINYL ACETATE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<10.0000	ug/L
UNW-1	11/11/87	<10.0000	ug/L
UNW-1	11/19/87	<10.0000	ug/L
UNW-1	11/30/87	<10.0000	ug/L
UNW-2	11/05/87	6.0000	ug/L
UNW-2	11/11/87	<10.0000	ug/L
UNW-2	11/19/87	<10.0000	ug/L
UNW-2	11/30/87	<10.0000	ug/L
UNW-2-D	11/11/87	<10.0000	ug/L
UNW-5	11/05/87	<10.0000	ug/L
UNW-5	11/11/87	<10.0000	ug/L
UNW-5	11/19/87	<10.0000	ug/L
UNW-5	11/30/87	<10.0000	ug/L
UNW-5-D	11/19/87	<10.0000	ug/L

PARAMETER VINYL CHLORIDE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<10.0000	ug/L
UNW-1	11/11/87	<10.0000	ug/L
UNW-1	11/19/87	15.0000	ug/L
UNW-1	11/30/87	20.0000	ug/L
UNW-2	11/05/87	<10.0000	ug/L
UNW-2	11/11/87	<10.0000	ug/L
UNW-2	11/19/87	67.0000	ug/L
UNW-2	11/30/87	63.0000	ug/L
UNW-2-D	11/11/87	<10.0000	ug/L

PARAMETER VINYL CHLORIDE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	11/05/87	<10.0000	ug/L
UNW-5	11/11/87	<10.0000	ug/L
UNW-5	11/19/87	480.0000	ug/L
UNW-5	11/30/87	350.0000	ug/L
UNW-5-D	11/19/87	600.0000	ug/L

PARAMETER ZINC

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	0.0104	mg/L
UNW-1	11/11/87	0.0022	mg/L
UNW-1	11/19/87	0.0290	mg/L
UNW-1	11/30/87	0.0130	mg/L
UNW-1-F	11/05/87	0.0050	mg/L
UNW-1-F	11/11/87	0.0016	mg/L
UNW-1-F	11/19/87	0.0250	mg/L
UNW-1-F	11/30/87	0.0570	mg/L
UNW-3	11/05/87	0.2200	mg/L
UNW-3	11/11/87	<0.0010	mg/L
UNW-3	11/23/87	0.0470	mg/L
UNW-3	11/30/87	0.0063	mg/L
UNW-3-F	11/05/87	<0.0010	mg/L
UNW-3-F	11/11/87	<0.0010	mg/L
UNW-3-F	11/23/87	0.0960	mg/L
UNW-3-F	11/30/87	<0.0010	mg/L
UNW-5	11/05/87	0.0110	mg/L
UNW-5	11/11/87	<0.0010	mg/L
UNW-5	11/19/87	0.0024	mg/L
UNW-5	11/30/87	<0.0010	mg/L
UNW-5-D	11/19/87	0.0019	mg/L
UNW-5-D-F	11/19/87	<0.0010	mg/L
UNW-5-F	11/05/87	<0.0010	mg/L
UNW-5-F	11/11/87	<0.0010	mg/L
UNW-5-F	11/19/87	<0.0010	mg/L
UNW-5-F	11/30/87	<0.0010	mg/L

PARAMETER ZIRCONIUM

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<0.0050	mg/L
UNW-1	11/11/87	<0.0050	mg/L
UNW-1	11/19/87	<0.0050	mg/L
UNW-1	11/30/87	<0.0050	mg/L
UNW-1-F	11/05/87	<0.0050	mg/L
UNW-1-F	11/11/87	<0.0050	mg/L
UNW-1-F	11/19/87	<0.0050	mg/L
UNW-1-F	11/30/87	<0.0050	mg/L
UNW-3	11/05/87	<0.0050	mg/L

PARAMETER ZIRCONIUM (continued)

WELL ID	DATE	RESULT	UNITS
UNW-3	11/11/87	<0.0050	mg/L
UNW-3	11/23/87	0.0100	mg/L
UNW-3	11/30/87	<0.0050	mg/L
UNW-3-F	11/05/87	<0.0050	mg/L
UNW-3-F	11/11/87	<0.0050	mg/L
UNW-3-F	11/23/87	<0.0050	mg/L
UNW-3-F	11/30/87	<0.0050	mg/L
UNW-5	11/05/87	<0.0050	mg/L
UNW-5	11/11/87	<0.0050	mg/L
UNW-5	11/19/87	<0.0050	mg/L
UNW-5	11/30/87	<0.0050	mg/L
UNW-5-D	11/19/87	<0.0050	mg/L
UNW-5-D-F	11/19/87	<0.0050	mg/L
UNW-5-F	11/05/87	<0.0050	mg/L
UNW-5-F	11/11/87	<0.0050	mg/L
UNW-5-F	11/19/87	<0.0050	mg/L
UNW-5-F	11/30/87	<0.0050	mg/L

PARAMETER 1,1-DICHLOROETHANE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	430.0000	ug/L
UNW-2	11/11/87	490.0000	ug/L
UNW-2	11/19/87	370.0000	ug/L
UNW-2	11/30/87	420.0000	ug/L
UNW-2-D	11/11/87	540.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	130.0000	ug/L
UNW-5	11/19/87	120.0000	ug/L
UNW-5	11/30/87	120.0000	ug/L
UNW-5-D	11/19/87	140.0000	ug/L

PARAMETER 1,1-DICHLOROETHENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	180.0000	ug/L
UNW-2	11/11/87	210.0000	ug/L
UNW-2	11/19/87	190.0000	ug/L
UNW-2	11/30/87	210.0000	ug/L
UNW-2-D	11/11/87	240.0000	ug/L

PARAMETER 1,1-DICHLOROETHENE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	73.0000	ug/L
UNW-5	11/30/87	71.0000	ug/L
UNW-5-D	11/19/87	110.0000	ug/L

PARAMETER 1,1,1-TRICHLOROETHANE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	147.0000	ug/L
UNW-2	11/11/87	290.0000	ug/L
UNW-2	11/19/87	220.0000	ug/L
UNW-2	11/30/87	240.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	6.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	8.0000	ug/L
UNW-5	11/30/87	9.0000	ug/L
UNW-5-D	11/19/87	12.0000	ug/L

PARAMETER 1,1,2-TRICHLOROETHANE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	4.0000	ug/L
UNW-5	11/11/87	3.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 1,1,2,2-TETRACHLOROETHANE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L

PARAMETER 1,1,2,2-TETRACHLOROETHANE
(continued)

WELL ID	DATE	RESULT	UNITS
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 1,2-DICHLOROBENZENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 1,2-DICHLOROETHANE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	7.0000	ug/L
UNW-2	11/11/87	12.0000	ug/L
UNW-2	11/19/87	10.0000	ug/L
UNW-2	11/30/87	12.0000	ug/L
UNW-2-D	11/11/87	14.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	2.0000	ug/L
UNW-5	11/19/87	2.0000	ug/L
UNW-5	11/30/87	2.0000	ug/L

PARAMETER 1,2-DICHLOROETHANE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 1,2-DICHLOROPROPANE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 1,2,4-TRICHLOROBENZENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 1,3-DICHLOROBENZENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L

PARAMETER 1,3-DICHLOROBENZENE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 1,4-DICHLOROBENZENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 2-BUTANONE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<10.0000	ug/L
UNW-1	11/11/87	12.0000	ug/L
UNW-1	11/19/87	<10.0000	ug/L
UNW-1	11/30/87	<10.0000	ug/L
UNW-2	11/05/87	56.0000	ug/L
UNW-2	11/11/87	<10.0000	ug/L
UNW-2	11/19/87	<10.0000	ug/L
UNW-2	11/30/87	<10.0000	ug/L
UNW-2-D	11/11/87	<10.0000	ug/L
UNW-5	11/05/87	<10.0000	ug/L
UNW-5	11/11/87	3.0000	ug/L
UNW-5	11/19/87	<10.0000	ug/L
UNW-5	11/30/87	<10.0000	ug/L
UNW-5-D	11/19/87	<10.0000	ug/L

PARAMETER 2-CHLOROETHYLVINYL ETHER

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<10.0000	ug/L
UNW-1	11/11/87	<10.0000	ug/L
UNW-1	11/19/87	<10.0000	ug/L
UNW-1	11/30/87	<10.0000	ug/L
UNW-2	11/05/87	<10.0000	ug/L
UNW-2	11/11/87	<10.0000	ug/L
UNW-2	11/19/87	<10.0000	ug/L
UNW-2	11/30/87	<10.0000	ug/L
UNW-2-D	11/11/87	<10.0000	ug/L
UNW-5	11/05/87	<10.0000	ug/L
UNW-5	11/11/87	<10.0000	ug/L
UNW-5	11/19/87	<10.0000	ug/L
UNW-5	11/30/87	<10.0000	ug/L
UNW-5-D	11/19/87	<10.0000	ug/L

PARAMETER 2-CHLORONAPHTHALENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 2-CHLOROPHENOL

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L

PARAMETER 2-CHLOROPHENOL (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 2-HEXANONE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<10.0000	ug/L
UNW-1	11/11/87	<10.0000	ug/L
UNW-1	11/19/87	<10.0000	ug/L
UNW-1	11/30/87	<10.0000	ug/L
UNW-2	11/05/87	<10.0000	ug/L
UNW-2	11/11/87	<10.0000	ug/L
UNW-2	11/19/87	<10.0000	ug/L
UNW-2	11/30/87	<10.0000	ug/L
UNW-2-D	11/11/87	4.0000	ug/L
UNW-5	11/05/87	<10.0000	ug/L
UNW-5	11/11/87	3.0000	ug/L
UNW-5	11/19/87	<10.0000	ug/L
UNW-5	11/30/87	<10.0000	ug/L
UNW-5-D	11/19/87	<10.0000	ug/L

PARAMETER 2-METHYLNAPHTHALENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 2-METHYLPHENOL

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L

PARAMETER 2-METHYLPHENOL (continued)

WELL ID	DATE	RESULT	UNITS
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 2-NITROANILINE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<25.0000	ug/L
UNW-1	11/11/87	<25.0000	ug/L
UNW-1	11/19/87	<25.0000	ug/L
UNW-1	11/30/87	<25.0000	ug/L
UNW-2	11/05/87	<25.0000	ug/L
UNW-2	11/11/87	<25.0000	ug/L
UNW-2	11/19/87	<25.0000	ug/L
UNW-2	11/30/87	<25.0000	ug/L
UNW-2-D	11/11/87	<25.0000	ug/L
UNW-5	11/05/87	<25.0000	ug/L
UNW-5	11/11/87	<25.0000	ug/L
UNW-5	11/19/87	<25.0000	ug/L
UNW-5	11/30/87	<25.0000	ug/L
UNW-5-D	11/19/87	<25.0000	ug/L

PARAMETER 2-NITROPHENOL

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 2,4-DICHLOROPHENOL

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 2,4-DIMETHYLPHENOL

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 2,4-DINITROPHENOL

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<25.0000	ug/L
UNW-1	11/11/87	<25.0000	ug/L
UNW-1	11/19/87	<25.0000	ug/L
UNW-1	11/30/87	<25.0000	ug/L
UNW-2	11/05/87	<25.0000	ug/L
UNW-2	11/11/87	<25.0000	ug/L
UNW-2	11/19/87	<25.0000	ug/L
UNW-2	11/30/87	<25.0000	ug/L
UNW-2-D	11/11/87	<25.0000	ug/L
UNW-5	11/05/87	<25.0000	ug/L
UNW-5	11/11/87	<25.0000	ug/L
UNW-5	11/19/87	<25.0000	ug/L

PARAMETER 2,4-DINITROPHENOL (continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	11/30/87	<25.0000	ug/L
UNW-5-D	11/19/87	<25.0000	ug/L

PARAMETER 2,4-DINITROTOLUENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 2,4,5-TRICHLOROPHENOL

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<25.0000	ug/L
UNW-1	11/11/87	<25.0000	ug/L
UNW-1	11/19/87	<25.0000	ug/L
UNW-1	11/30/87	<25.0000	ug/L
UNW-2	11/05/87	<25.0000	ug/L
UNW-2	11/11/87	<25.0000	ug/L
UNW-2	11/19/87	<25.0000	ug/L
UNW-2	11/30/87	<25.0000	ug/L
UNW-2-D	11/11/87	<25.0000	ug/L
UNW-5	11/05/87	<25.0000	ug/L
UNW-5	11/11/87	<25.0000	ug/L
UNW-5	11/19/87	<25.0000	ug/L
UNW-5	11/30/87	<25.0000	ug/L
UNW-5-D	11/19/87	<25.0000	ug/L

PARAMETER 2,4,6-TRICHLOROPHENOL

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L

PARAMETER 2,4,6-TRICHLOROPHENOL (continued)

WELL ID	DATE	RESULT	UNITS
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 2,6-DINITROTOLUENE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 3-NITROANILINE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<25.0000	ug/L
UNW-1	11/11/87	<25.0000	ug/L
UNW-1	11/19/87	<25.0000	ug/L
UNW-1	11/30/87	<25.0000	ug/L
UNW-2	11/05/87	<25.0000	ug/L
UNW-2	11/11/87	<25.0000	ug/L
UNW-2	11/19/87	<25.0000	ug/L
UNW-2	11/30/87	<25.0000	ug/L
UNW-2-D	11/11/87	<25.0000	ug/L
UNW-5	11/05/87	<25.0000	ug/L
UNW-5	11/11/87	<25.0000	ug/L
UNW-5	11/19/87	<25.0000	ug/L
UNW-5	11/30/87	<25.0000	ug/L
UNW-5-D	11/19/87	<25.0000	ug/L

PARAMETER 3,3-DICHLOROBENZIDINE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<10.0000	ug/L
UNW-1	11/11/87	<10.0000	ug/L
UNW-1	11/19/87	<10.0000	ug/L
UNW-1	11/30/87	<10.0000	ug/L
UNW-2	11/05/87	<10.0000	ug/L
UNW-2	11/11/87	<10.0000	ug/L
UNW-2	11/19/87	<10.0000	ug/L
UNW-2	11/30/87	<10.0000	ug/L
UNW-2-D	11/11/87	<10.0000	ug/L
UNW-5	11/05/87	<10.0000	ug/L
UNW-5	11/11/87	<10.0000	ug/L
UNW-5	11/19/87	<10.0000	ug/L
UNW-5	11/30/87	<10.0000	ug/L
UNW-5-D	11/19/87	<10.0000	ug/L

PARAMETER 4-BROMOPHENYL-PHENYLETHER

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 4-CHLORO-3-METHYLPHENOL

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L

PARAMETER 4-CHLORO-3-METHYLPHENOL
(continued)

WELL ID	DATE	RESULT	UNITS
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 4-CHLOROANILINE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 4-CHLOROPHENYL-PHENYLETHER

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 4-METHYL-2-PENTANONE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<10.0000	ug/L
UNW-1	11/11/87	2.0000	ug/L
UNW-1	11/19/87	<10.0000	ug/L
UNW-1	11/30/87	<10.0000	ug/L

PARAMETER 4-METHYL-2-PENTANONE (continued)

WELL ID	DATE	RESULT	UNITS
UNW-2	11/05/87	<10.0000	ug/L
UNW-2	11/11/87	<10.0000	ug/L
UNW-2	11/19/87	<10.0000	ug/L
UNW-2	11/30/87	<10.0000	ug/L
UNW-2-D	11/11/87	<10.0000	ug/L
UNW-5	11/05/87	3.0000	ug/L
UNW-5	11/11/87	<10.0000	ug/L
UNW-5	11/19/87	<10.0000	ug/L
UNW-5	11/30/87	<10.0000	ug/L
UNW-5-D	11/19/87	<10.0000	ug/L

PARAMETER 4-METHYLPHENOL

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<5.0000	ug/L
UNW-1	11/11/87	<5.0000	ug/L
UNW-1	11/19/87	<5.0000	ug/L
UNW-1	11/30/87	<5.0000	ug/L
UNW-2	11/05/87	<5.0000	ug/L
UNW-2	11/11/87	<5.0000	ug/L
UNW-2	11/19/87	<5.0000	ug/L
UNW-2	11/30/87	<5.0000	ug/L
UNW-2-D	11/11/87	<5.0000	ug/L
UNW-5	11/05/87	<5.0000	ug/L
UNW-5	11/11/87	<5.0000	ug/L
UNW-5	11/19/87	<5.0000	ug/L
UNW-5	11/30/87	<5.0000	ug/L
UNW-5-D	11/19/87	<5.0000	ug/L

PARAMETER 4-NITROANILINE

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<25.0000	ug/L
UNW-1	11/11/87	<25.0000	ug/L
UNW-1	11/19/87	<25.0000	ug/L
UNW-1	11/30/87	<25.0000	ug/L
UNW-2	11/05/87	<25.0000	ug/L
UNW-2	11/11/87	<25.0000	ug/L
UNW-2	11/19/87	<25.0000	ug/L
UNW-2	11/30/87	<25.0000	ug/L
UNW-2-D	11/11/87	<25.0000	ug/L
UNW-5	11/05/87	<25.0000	ug/L
UNW-5	11/11/87	<25.0000	ug/L
UNW-5	11/19/87	<25.0000	ug/L
UNW-5	11/30/87	<25.0000	ug/L
UNW-5-D	11/19/87	<25.0000	ug/L

PARAMETER 4-NITROPHENOL

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<25.0000	ug/L
UNW-1	11/11/87	<25.0000	ug/L
UNW-1	11/19/87	<25.0000	ug/L
UNW-1	11/30/87	<25.0000	ug/L
UNW-2	11/05/87	<25.0000	ug/L
UNW-2	11/11/87	<25.0000	ug/L
UNW-2	11/19/87	<25.0000	ug/L
UNW-2	11/30/87	<25.0000	ug/L
UNW-2-D	11/11/87	<25.0000	ug/L
UNW-5	11/05/87	<25.0000	ug/L
UNW-5	11/11/87	<25.0000	ug/L
UNW-5	11/19/87	<25.0000	ug/L
UNW-5	11/30/87	<25.0000	ug/L
UNW-5-D	11/19/87	<25.0000	ug/L

PARAMETER 4,6-DINITRO-2-METHYLPHENOL

WELL ID	DATE	RESULT	UNITS
UNW-1	11/05/87	<25.0000	ug/L
UNW-1	11/11/87	<25.0000	ug/L
UNW-1	11/19/87	<25.0000	ug/L
UNW-1	11/30/87	<25.0000	ug/L
UNW-2	11/05/87	<25.0000	ug/L
UNW-2	11/11/87	<25.0000	ug/L
UNW-2	11/19/87	<25.0000	ug/L
UNW-2	11/30/87	<25.0000	ug/L
UNW-2-D	11/11/87	<25.0000	ug/L
UNW-5	11/05/87	<25.0000	ug/L
UNW-5	11/11/87	<25.0000	ug/L
UNW-5	11/19/87	<25.0000	ug/L
UNW-5	11/30/87	<25.0000	ug/L
UNW-5-D	11/19/87	<25.0000	ug/L

ChemRisk/Shonka Research Associates, Inc., Document Request Form

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(This section to be completed by subcontractor requesting document)

TEBENNETT / K-25 ER DMC

Requestor — Document Center (is requested to provide the following document)

Date of request 9/5/95 Expected receipt of document ________

Document number ERD25098 Date of document DEC 1988

Title and author (if document is unnumbered) K/HS-155

Name ADC Reviewer ________

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Date request received 9/1/95

Date submitted to ADC NA

Date submitted to HSA Coordinator 9/18/95

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Date submitted to CICO NA

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Date submitted to ChemRisk/Shonka and DOE 9/19/95

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K/HS-155

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ORGDP

OAK RIDGE GASEOUS DIFFUSION PLANT

MARTIN MARIETTA

RCRA FACILITY INVESTIGATION PLAN K-1410 BUILDING OAK RIDGE GASEOUS DIFFUSION PLANT OAK RIDGE, TENNESSEE

DECEMBER 1988

Name: General
No.: PF7-1

PROJECT FILE COPY

OPERATED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

DECEMBER 1988 K/HS-155

RCRA FACILITY INVESTIGATION PLAN
K-1410 BUILDING
OAK RIDGE GASEOUS DIFFUSION PLANT
OAK RIDGE, TENNESSEE

Prepared by the
Oak Ridge Gaseous Diffusion Plant
Oak Ridge, Tennessee 37831
Operated by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

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TABLE OF CONTENTS

1. INTRODUCTION

Within the confines of the Oak Ridge Gaseous Diffusion Plant (ORGDP) are hazardous waste treatment, storage, and disposal facilities; some are in operation while others are no longer in use. These solid waste management units (SWMUs) are subject to assessment by the U.S. Environmental Protection Agency (EPA), as required by the 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA). The RCRA Facility Investigation (RFI) Plans are scheduled to be submitted for all SWMUs during calendar years 1987 and 1988. The RFI Plan - General Document (K/HS-132) includes information applicable to all ORGDP SWMUs and serves as a reference document for the site-specific RFI Plans. Quality control procedures for remedial action occurring on the Oak Ridge Reservation (ORR) are presented in The Environmental Surveillance Procedures Quality Control Program (ESH/Sub/87-21706/1), and quality assurance guidelines for ORGDP investigations are contained in The K-25 RFI Quality Assurance Plan, K/HS-231.

This document is the RFI Plan for the K-1410 building. This plan is based upon requirements described in the draft document, RFI Guidance (Vols. I-IV, December 1987, EPA-530/SW-87-001). Contained within this document are geographical, historical, operational, geological, and hydrological data specific to the K-1410 building. The potential for release of contamination through the various media to receptors is addressed. A sampling plan is proposed to further determine the extent (if any) of contamination to the surrounding environment. Included are health and safety procedures to be followed when implementing the sampling plan.

2. OBJECTIVES OF RCRA FACILITY INVESTIGATION PLANNING

2.1 OBJECTIVES

This RFI plan will identify actions necessary to determine the nature and extent of releases of hazardous and/or radioactive contamination from the K-1410 building. The plan summarizes existing site information and addresses the potential for contamination of the soil, groundwater, surface water, and air.

2.2 EVALUATION CRITERIA

In order to prepare and implement a comprehensive sampling plan and to effectively evaluate analytical sampling results, evaluation criteria must first be established. Criteria for evaluating the extent of release of contaminants are based on existing state and federal regulatory guidance and best technical judgement.

The primary media of interest for the K-1410 Building are surface water, groundwater, and soil. Under the ORGDP Groundwater Protection Program, four quarters of groundwater monitoring data will be collected and analyzed for the parameters listed in Table 2.1 of K/HS-132. Soil and surface water samples will be collected as part of the RFI and analyzed for contaminants as described in Section 8. The sampling methodology and analytical procedures are designed to characterize the contaminants of interest down to or below levels summarized in Table 2.2 of K/HS-132.

2.3 SCHEDULE FOR SPECIFIC RFI ACTIVITIES

The RFI activities to be performed and the duration of each activity are shown in Table 2.1.

Table 2.1. Duration of RFI activities for the K-1410 building

	Activities	Duration
1.	Site preparation and sample location	
	(a) Soil samples	4 weeks
	(b) Surface water samples	2 weeks
	(c) Groundwater samples (includes well construction)	8 weeks
2.	Collection of samples	
	(a) Soil samples	12 weeks
	(b) Surface water samples	6 weeks
	(c) Groundwater samples	52 weeks
3.	Analyses of samples	
	(a) Soil samples	32 weeks
	(b) Surface water samples	16 weeks
	(c) Groundwater samples*	66 weeks
4.	Radiation survey	3 weeks
5.	Compilation of data and data presentation	24 weeks
6.	Evaluation of results and recommendations	8 weeks
7.	Preparation of RFI report and submittal to EPA	8 weeks
8.	Additional sampling phases as needed	TBD

*Groundwater sample analysis will occur concurrently with groundwater sample collection.

Table 2.2. Potential corrective measures for the K-1410 building

General Response Action	Technologies
Monitoring	Surveillance monitoring and analysis.
Removal of source	Excavate and treat/dispose of contaminated soil at an approved landfill or place in long-term storage.
Containment from surface water	Construction of drainage channels, dikes to divert surface and stormwater runoff around contaminated soils.
	Cap contaminated area with clay, synthetic membranes, fabrics, etc.
Containment from groundwater	Subsurface collection drains - french drains, tile drains, pipe drains.
	Vertical containment barriers - soil bentonite slurry wall, cement-bentonite slurry wall, vibrating beam, grout curtains, steel-sheet piling.
	Groundwater diversion pumping - well points, deep wells, suction wells, ejector wells.
Treatment of groundwater	Collect the groundwater and pump to an existing wastewater treatment plant or treat by aeration, filtration, carbon adsorption, or biological processes at a new facility.
In situ treatment	Encapsulate process lines with grout or epoxy to prevent migration of contaminants.

2.4 FEASIBLE ALTERNATIVES

Knowledge of feasible corrective measures has been used in preparing the RFI. Based on existing geologic, hydrologic, and contaminant source data, potential corrective measures for the K-1410 building have been identified and are shown in Table 2.2. These corrective measures will be reevaluated after the RFI report is completed.

2.5 RISK ASSESSMENT

The environmental and public health risks associated with possible site contamination and each of the remedial action alternatives listed in Table 2.2 will be evaluated. This evaluation will consist of a characterization of contaminant sources, environmental setting, magnitude of release, pathways to human exposure, and characterization of risk. The site sampling plan has been designed to provide data necessary for performing risk assessments.

3. DESCRIPTION OF CURRENT CONDITIONS

3.1 GEOGRAPHICAL INFORMATION

The K-1410 building is located within the ORGDP security fence on East Poplar Creek Patrol Road west of the K-25 building (Figure 3.1). The K-1410 RFI will address the following components:

- the K-1410 building;
- the process drain system associated with the decontamination operations; and
- a ravine to the west of the K-1410 building, which drains into Poplar Creek (Figure 3.2).

Complete ORGDP geographical information is located in Section 3.1 of K/HS-132.

3.2 HISTORICAL AND OPERATIONAL INFORMATION

The K-1410 building was constructed in 1944 as an operations auxiliary building for the K-25 building. Originally, spent cascade traps from the K-25 building were transferred to K-1410 where they were emptied and refilled with clean trapping material. Raw trapping material, such as alumina and sodium fluoride, was also stored in K-1410.

In 1946, K-1410 was converted to a cleaning facility for the purpose of decontaminating uranium-contaminated equipment. The conversion included the installation of two spray facilities in the west end of the building which were used to decontaminate large pieces of equipment. These facilities consisted of two 8' x 2' x 25' stainless steel spray tanks in separate pits with floor pans to collect spray for recycling. Cleaning was done with nitric acid in order to solubilize the uranium compounds. Initially, the uranium was to be recovered; however, since economic criteria for recovery was not met, the bulk of the cleaning

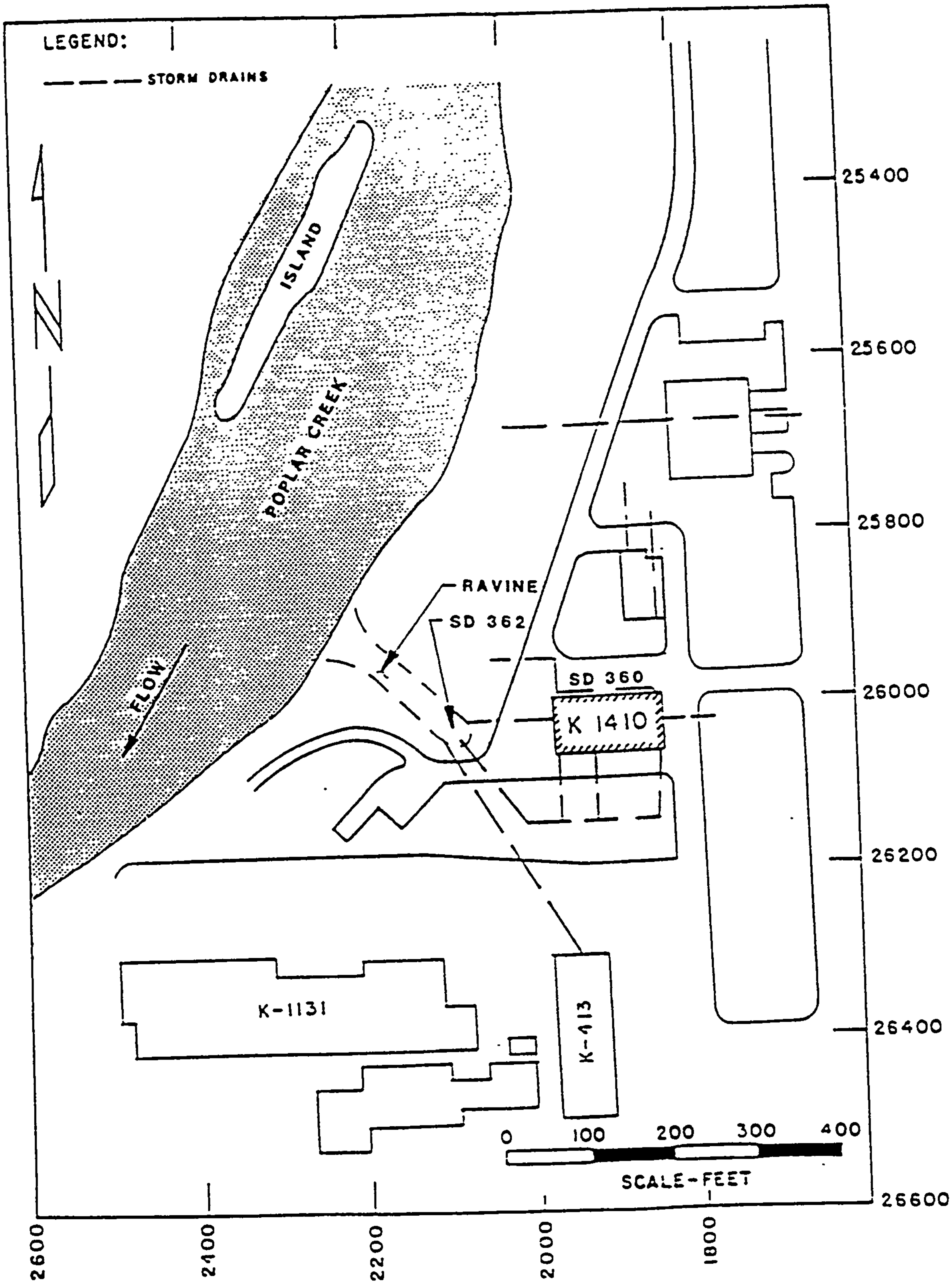
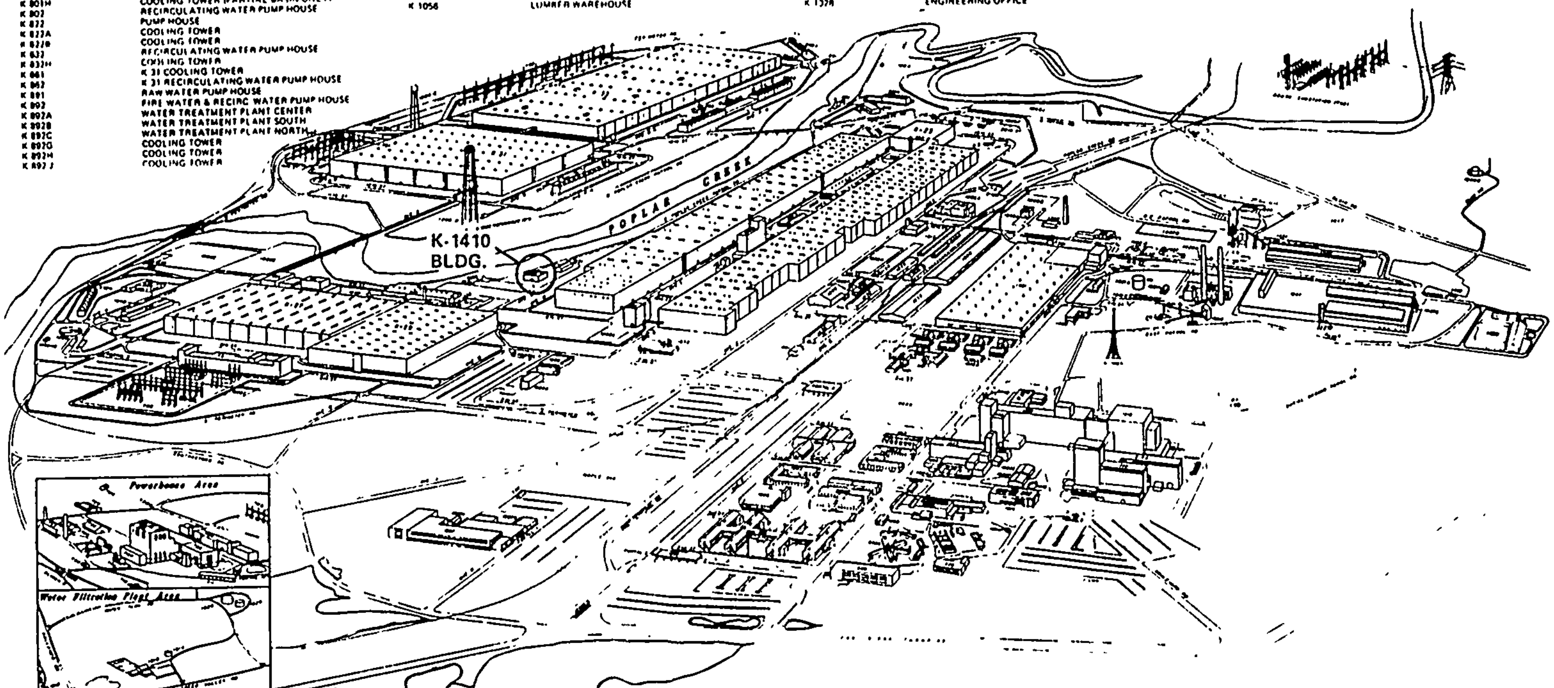


Fig. B.1. Storm Drains for K-1410

KEY

K 101	PROCESS (VACANT)
K 131	FIELD MAINT SHOP & OFFICE
K 303 1 Thru K 312 3	K 25 PROCESS
K 402 1 Thru K 402 9	K 27 PROCESS
K 413	PRODUCT WITHDRAWAL
K 502 1 Thru K 602 3	K 29 PROCESS
K 601	MAINTENANCE TRAINING
K 602 1 Thru K 602 8	K 31 PROCESS
K 631	PROCESS TAILS
K 633	ORGDP TEST LOOP FACILITY
K 701	BOILER HOUSE (VACANT)
K 702	TURBINE ROOM & DISCH TUNNEL (VACANT)
K 704	K 25 MAIN SWITCH HOUSE
K 708	K 25 SWITCHYARD
K 710	SEWAGE TREATMENT
K 711	WELD TRAINING FACILITY
K 722	STORAGE WAREHOUSE
K 723	STORAGE WAREHOUSE
K 724	EXCESS STORAGE
K 725	WAREHOUSE (VACANT)
K 726	STORAGE BLDG
K 731	K 27 & K 29 SWITCH HOUSE (CONTROL ROOM)
K 732	K 27 & K 29 SWITCHYARD
K 735	STORAGE BUILDING
K 736	STORAGE BUILDING
K 761	K 31 SWITCH HOUSE (CONTROL ROOM)
K 762	K 31 SWITCHYARD
K 791	K 33 SWITCH HOUSE (CONTROL ROOM)
K 792	K 33 SWITCHYARD
K 796 A	MAINTENANCE STORAGE
K 801	INTAKE WATER PUMP HOUSE
K 801A	WATER TREATMENT PLANT
K 801B	CLARIFLOW TANK
K 801H	COOLING TOWER (PARTIAL BASIN ONLY)
K 802	RECIRCULATING WATER PUMP HOUSE
K 822	PUMP HOUSE
K 822A	COOLING TOWER
K 822B	COOLING TOWER
K 832	RECIRCULATING WATER PUMP HOUSE
K 832H	COOLING TOWER
K 861	K 31 COOLING TOWER
K 862	K 31 RECIRCULATING WATER PUMP HOUSE
K 891	RAW WATER PUMP HOUSE
K 892	FIRE WATER & RECIRC WATER PUMP HOUSE
K 892A	WATER TREATMENT PLANT CENTER
K 892B	WATER TREATMENT PLANT SOUTH
K 892C	WATER TREATMENT PLANT NORTH
K 892G	COOLING TOWER
K 892H	COOLING TOWER
K 892 J	COOLING TOWER
K 896	COOLING WATER TREATMENT PLANT
K 902 1 Thru K 902 8	K 33 PROCESS
K 1000	CONFERENCE ROOM (PORTAL 2)
K 1001	ADMINISTRATION BUILDING
K 1002	CAFETERIA
K 1003	DISPENSARY
K 1003A	DISPENSARY OFFICE TRAILER
K 1004 A Thru K 1004 C	LABORATORY FACILITIES
K 1004 D	LABORATORY FACILITIES
K 1004 H	GAS CYLINDER STORAGE
K 1004 J	LABORATORY COMPLEX
K 1004 L	LABORATORY FACILITY
K 1004 N	COOLING TOWER
K 1004 N1	COOLING TOWER
K 1004 P	ISOSTATIC TEST FACILITY
K 1006	LABORATORY FACILITIES
K 1007	COMPUTER CENTER
K 1008A Thru K 1008D	CHANGE HOUSES
K 1008E Thru K 1008F	CHANGE HOUSES
K 1010	LABORATORY REC & HANDLING
K 1015	LAUNDRY
K 1020	HEALTH SAFETY & ENVIRONMENTAL AFFAIRS
K 1021	OLD FIRE HEADQUARTERS
K 1023	LABORATORY
K 1024	LABORATORY & MAINT TRAINING
K 1025A Thru K 1025E	RAD SOURCE STORAGE & WHSE SHIP DRUMS
K 1030	MAINTENANCE SHOP & OPERS ANALYSIS OFF
K 1034A	PLANT RECORDS VAULT
K 1035	MAINTENANCE BUILDING
K 1036	MAINTENANCE STORES SHIPP & REC
K 1037	AVLIS FACILITY
K 1039	TELEPHONE BUILDING
K 1040	MAINTENANCE SHOP K 633
K 1045	STORAGE BUILDING
K 1045A	FIRE TRAINING FACILITY
K 1052	AMOL LABORATORY
K 1055	COMPRESSED GAS CYLINDER STORAGE
K 1056	LUMBER WAREHOUSE
K 1058	BUILDING MATERIAL WAREHOUSE
K 1059	BUILDING MATERIAL WAREHOUSE
K 1061	OIL STORAGE BUILDING
K 1064	SALVAGE YARD
K 1066 A Thru 1066 I	CYLINDER STORAGE YARDS
K 1071	TRASH COMPACTOR
K 1095	PAINT SHOP
K 1097	CARPENTER SHOP
K 1098	CEMENT STORAGE
K 1098E	SAND BLAST FACILITY (OLD)
K 1098F	SAND BLAST FACILITY (NEW)
K 1098 G	MAINTENANCE (SHED)
K 1101	AIR PLANT
K 1131	FEED & TAILS
K 1132 & K 1133	HF STORAGE
K 1200	COMPONENT PREPARATION LAB (CPL)
K 1201	COMPRESSOR BUILDING
K 1203	WASTE WATER & SEWAGE TREATMENT PLANT
K 1206D	FIRE WATER TANK 300 000 GALLON
K 1206E	FIRE WATER TANK - 100 000 GALLON
K 1208	METEOROLOGICAL TOWER
K 1026F	FIRE WATER TANK 400 000 GALLON
K 1210	COMPONENT TEST FACILITY (CTF)
K 1210A	ADVANCED ENGINEERING TEST FACILITY
K 1211	CTF STORAGE
K 1216	SCALE HOUSE
K 1220	CENTRIFUGE PLANT DEMONST FACILITY
K 1225	S S D OFFICE BUILDING
K 1231	PROCESS
K 1231A	STORAGE
K 1232	CHEMICAL RECOVERY FACILITY
K 1233	COLLECTION FACILITY
K 1234	STORAGE
K 1301	NITROGEN PLANT
K 1302	STORAGE
K 1303	RESEARCH COMPRESSOR BUILDING
K 1320	ENGINEERING OFFICE
K 1328	ENGINEERING OFFICE
K 1400	ENGINEERING OFFICE BUILDING
K 1401	MAINTENANCE BUILDING
K 1405 B	HIGH TEMPERATURE LABORATORY
K 1407	LABORATORY & STORAGE
K 1407 B F	HOLDING PONDS
K 1410	NICKEL PLATING FACILITY
K 1413	LABORATORY ENGINEERING
K 1414	GARAGE
K 1414B	VEHICLE WASH FACILITY
K 1415	STORAGE SHED
K 1416	ACID STORAGE
K 1417	CASTING YARD
K 1419	SLUDGE FIXATION FACILITY
K 1420	DECONTAMINATION & URANIUM RECOVERY
K 1423	TOLL ENRICHMENT FACILITY
K 1425	WASTE OIL STORAGE
K 1435	TSCA INCINERATOR
K 1501	STEAM PLANT
K 1501A	FUEL OIL TANK
K 1501E	TRANSFER/CRUSHER BUILDING
K 1501H	MAINTENANCE FACILITY
K 1513	PUMP HOUSE
K 1514	SANITARY WATER TANK - 220,000 GALLON
K 1515	WATER FILTRATION PLANT
K 1528	CONC WATER STOR TANK - 2 600 000 GALLON
K 1529	STEEL WATER STOR. TANK - 1 600 000 GALLON
K 1546 C	ENGINEERING TRAILER
K 1547	VISITORS OVERLOOK
K 1548	CANTEEN TRAILER
K 1550 Thru K 1550 W	ENGINEERING OFFICE TRAILERS
K 1556	COMPUTER OFFICE TRAILER
K 1580	ENGINEERING OFFICE BUILDING
K 1600	TECHNOLOGY TEST FACILITY
K 1650	CENTRAL CONTROL FACILITY
K 1652	SECURITY & PLANT PROTECTION DIVISION



Oak Ridge Gaseous Diffusion Plant

Operated by
Martin Marietta Energy Systems Inc
for the
U S Department of Energy

Fig. 3.1. ORGDP location map for the K-1410 Building

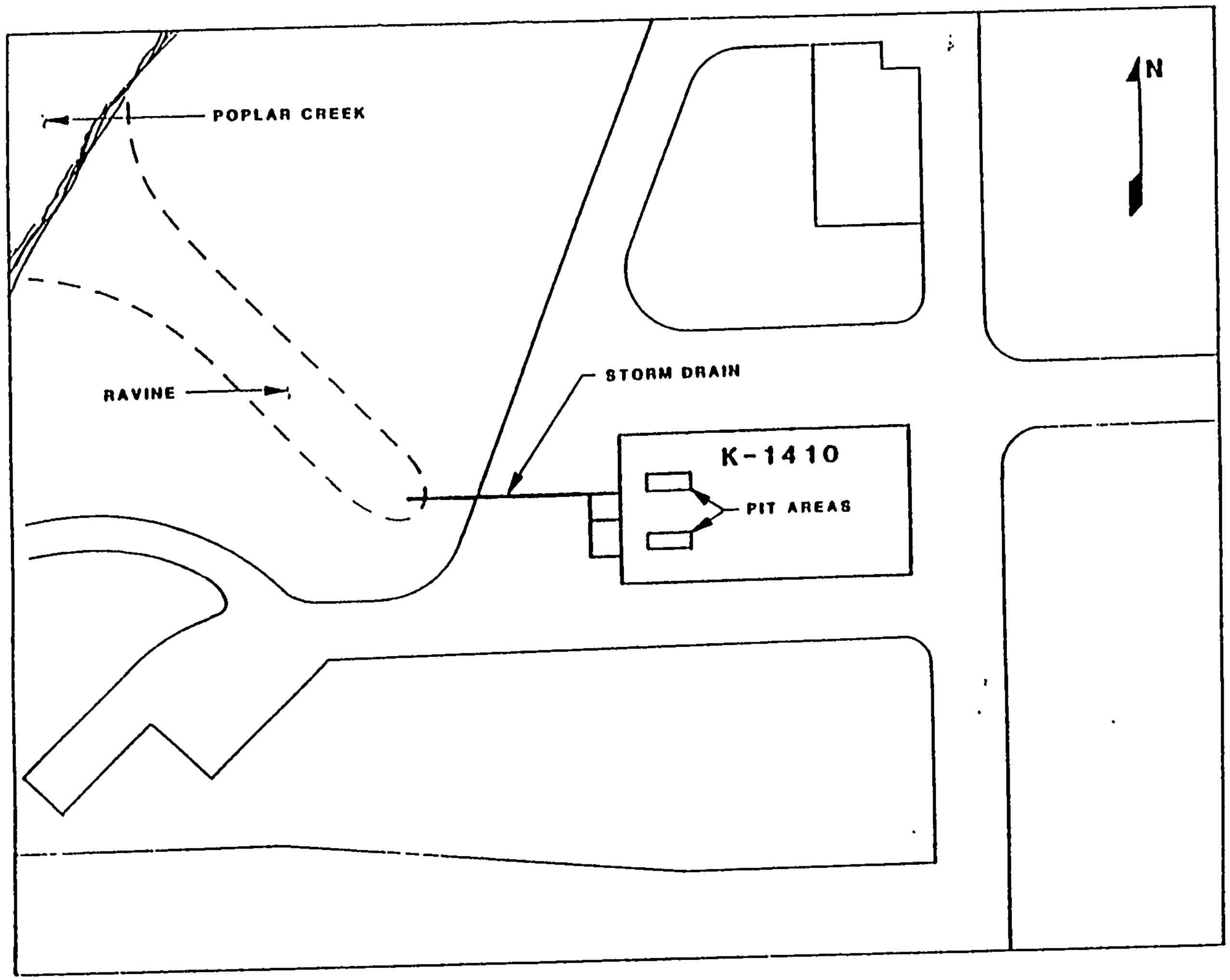


Fig. 3.2. K–1410 RFI components

solutions was discarded to the process drain lines. A degreaser which used either perchloroethylene or carbon tetrachloride (and later trichloroethylene) was installed between the two pits. Degreasing agents were routinely recovered through distillation; however, distillation still bottoms were occasionally discharged to the process drain lines.

In 1955, when the K-1420 facility was placed in operation, decontamination of small pieces of equipment in K-1410 ceased, and a portion of the building was again utilized to service cascade traps. However, some utilization of the larger spray facilities continued. For example, equipment from the K-1131 UF_6 production facility and process equipment, such as ash receivers and filters from the fluorination towers, were decontaminated in K-1410 until 1962. This equipment contained fission product residues from uranium oxides, transuranic elements, and minor uranium isotopes and exhibited a high level of radioactivity.

In 1963, the building was again modified and was equipped solely for electroplating operations. The stainless steel tanks were removed, decontaminated, and sent to the salvage yard. The pits were filled with concrete, and an electrical load center for the plating equipment was installed above the pits.

In 1975, a neutralization facility was constructed just northwest of the K-1410 building to collect and treat solutions discharged from the electroplating facility. The neutralization facility and its associated process lines are addressed in the K-1410 Neutralization Pit RFI Plan (K/HS-138). In 1979, the K-1410 facility was deactivated after the Cascade Improvement Program and Cascade Uprating Program (CIP/CUP) needs were met. Complete historical and operational information on the ORGDP is located in Section 3.2 of K/HS-132.

4. CHARACTERIZATION OF THE CONTAMINANT SOURCE

Records of the quantities of chemicals utilized throughout the history of the K-1410 building and discharged through the process lines are not available; however, chemicals from the plating and degreasing operations are discussed in The K-1410 Neutralization Pit RFI (K/HS-138) and are summarized below:

- alkaline cleaners
- boric acid
- nickel sulfamate
- MFL oil
- trichloroethylene
- perchloroethylene
- hydrochloric acid
- sulfuric acid
- lime
- carbon tetrachloride
- detergents (inorganic degreasers)
- alkali and acid dips with trace amounts of organic degreasers

Chemicals from the decontamination operations which were possibly released from the pit areas or discharged to the K-1410 process lines are summarized below:

- uranium compounds
- organic compounds
- nitric acid
- transuranics

Spent trapping material also contained low-level uranium which may have been released from the K-1410 building.

Recent observations of the K-1410 building interior revealed contamination of the floor and wall surfaces by nickel oxide particulate from the electroplating operations. No sampling has been conducted inside the building; therefore, concentration levels of this contaminant are unknown.

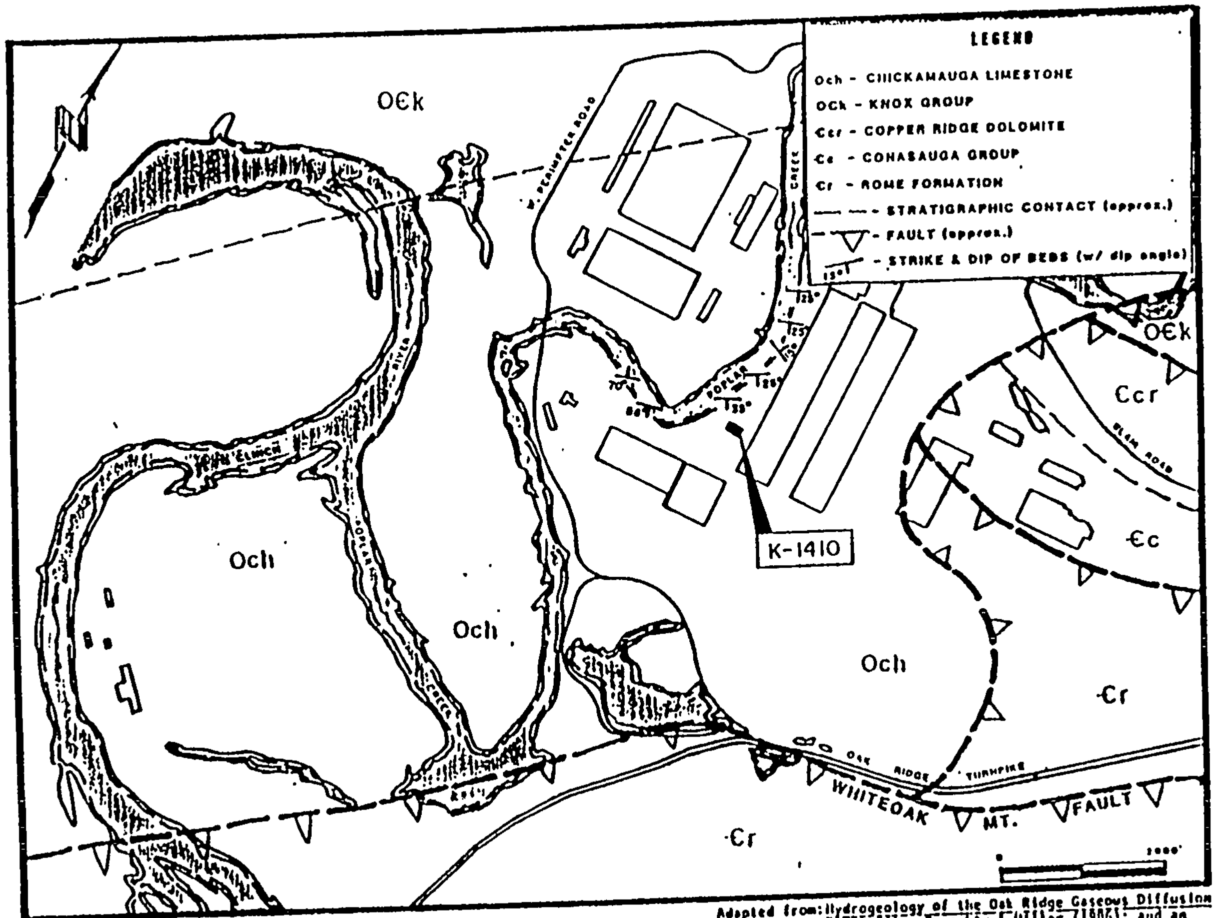
5. CHARACTERIZATION OF THE ENVIRONMENTAL SETTING

The K-1410 building is situated on relatively flat-lying ground about 300 feet east of Poplar Creek. The land surface slopes very gently to the west for about 150 feet and then becomes much steeper toward the creek. Building K-1410 is approximately 30 feet (in elevation) above the full pool level of the Poplar Creek embayment of the Watts Bar Reservoir.

There is no available drill hole information specific to K-1410, but subsurface conditions here may be surmised from observations and drill hole logs from nearby areas underlain by the same geologic formation. Well BRW-16 is located approximately 800 feet to the southwest of K-1232 where the bedrock formation is the same as that beneath K-1410. The logs of BRW-16, and other referenced wells are included in Appendix A. The general geology of ORGDP area is shown on the geologic map in Figure 5.1 and has been compliled from three major sources: (1) Hydrogeology of the Oak Ridge Gaseous Diffusion Plant Site, Geraghty and Miller, 1986, (2) recent, unpublished work by R.H. Ketelle, Oak Ridge National Laboratory, and (3) "Geologic Map of the Oak Ridge Area, Tennessee," by W. M. McMaster, U.S. Geological Survey, 1958. The following discussions of hydrogeology are based on these sources, and specific data (i.e., permeabilities, etc.) are referenced as applicable.

5.1 HYDROGEOLOGY

Bedrock in the K-1410 area is Chickamauga limestone which, in the ORGDP area, consists mainly of gray to blue-gray or green, very fine-grained (micritic) limestone with interbedded calcareous shale and shaley limestone. The limestone may be relatively "pure" or argillaceous (contains clay), and it is mostly medium to thinly bedded. Bedding planes in the limestone units are generally comprised of thin, dark shaley partings. Some of the shaley or more argillaceous limestones may have a "nodular" fabric. Chert occurs at some horizons in the Chickamauga, either as zones of nodules or in thin, irregular layers. The calcareous shales are mostly gray to green and contain occasional thin beds of micritic limestone.



Adapted from: Hydrogeology of the Oak Ridge Gaseous Diffusion Plant Site, Geraghty & Miller (1986); and an unpublished map by R.H. Ketelle, ORNL.

Fig. 5.1. Areal Geology of the ORGDP

The unconsolidated zone will consist mainly of residual soil with some soil and/or rock fill. There are no available descriptions of soils in the immediate vicinity of K-1410, but the drill logs of wells near K-1232 are presumed to characterize the soils of this area as well (see Appendix A). Residuum derived from the Chickamauga is typically yellow or red brown to brown silty clay which may contain scattered fragments of shale, chert, and weathered limestone. The depth to bedrock is variable and probably ranges from approximately 15 to 30 feet.

The dominant geologic structural feature of the area is the Whiteoak Mountain fault, the trace of which extends across the southeast side of ORGDP approximately 3500 feet from the subject site (Figure 5.1). The rocks of this area have been subjected to varying degrees of folding, and the strata beneath K-1410 are generally inclined to the southeast. However, the variable dips (Figure 5.1) are indicative of localized smaller flexures and probably minor faults. The structural deformation has caused extensive fracturing and jointing in the bedrock, especially in the more competent lithologies such as limestone and dolomite.

Groundwater storage and movement in the Chickamauga bedrock occur in a system of interconnecting, solution-enlarged channels developed mainly within the carbonate units along fractures, joints, and bedding planes. Fractures in the more insoluble shales are relatively "tight," and water movement within these rocks is very limited; however, the more shaley units tend to contain groundwater flow within the interbedded carbonates and direct it along bedding planes parallel to strike. The direction of groundwater flow in the bedrock beneath K-1410 is probably west or southwest, generally along strike, toward Poplar Creek.

There are no permeability data presently available for bedrock in the K-1410 area, but tests of wells in other areas of ORGDP indicate the Chickamauga limestone to have an average hydraulic conductivity of approximately 3.5 x 10-3 centimeters per second (cm/sec). This value is presumed to be representative of the Chickamauga limestone beneath K-1410.

Groundwater flow in the unconsolidated zone should be westward toward Poplar Creek. Based on water table elevations and permeabilities in the area, the hydraulic gradient will likely be very low in the immediate vicinity of K-1410 and become very steep approaching the creek. No site-specific permeability data are available for the soils here, but testing of Well UNP-7 at K-1232 indicates an average hydraulic conductivity in the range of 10^{-5} to 10^{-6} cm/sec which should apply to the unconsolidated zone of the K-1410 area as well. The fill materials here should have no significant effect on the groundwater recharge or storage potential.

Interaquifer flow may occur in the K-1410 area. Water-level data for wells at K-1232 (RFI Plan for the K-1232 Treatment Facility, K/HS-145) infer a downward flow (i.e., the soil aquifer leaking into the bedrock system), and hydrogeologic conditions there appear to be very similar to those at K-1410. No sinks, bedrock outcrops, or other features which could enhance groundwater recharge were observed at K-1410. General information on the subsurface geology and hydrogeology at ORGDP can be found in Section 4.2 of K/HS-132.

5.2 SURFACE WATER

There are no natural surface water features in the immediate vicinity of K-1410. Most of the surface runoff is diverted to a storm drain system which is discharged into a wide, deep, and heavily vegetated ravine about 100 feet west of K-1410 and which carries the flow further westward to Poplar Creek. This ditch also receives internal drainage from the K-1410 building as well as storm water drainage from other nearby ORGDP facilities. Any runoff water not intercepted by the storm drain will also flow westward to Poplar Creek. Figure 5.2 shows the storm drain system in the K-1410 area. Appendix B contains storm water data from storm drain No. 362. General surface water flow information at ORGDP can be found in Section 4.3 of K/HS-132.

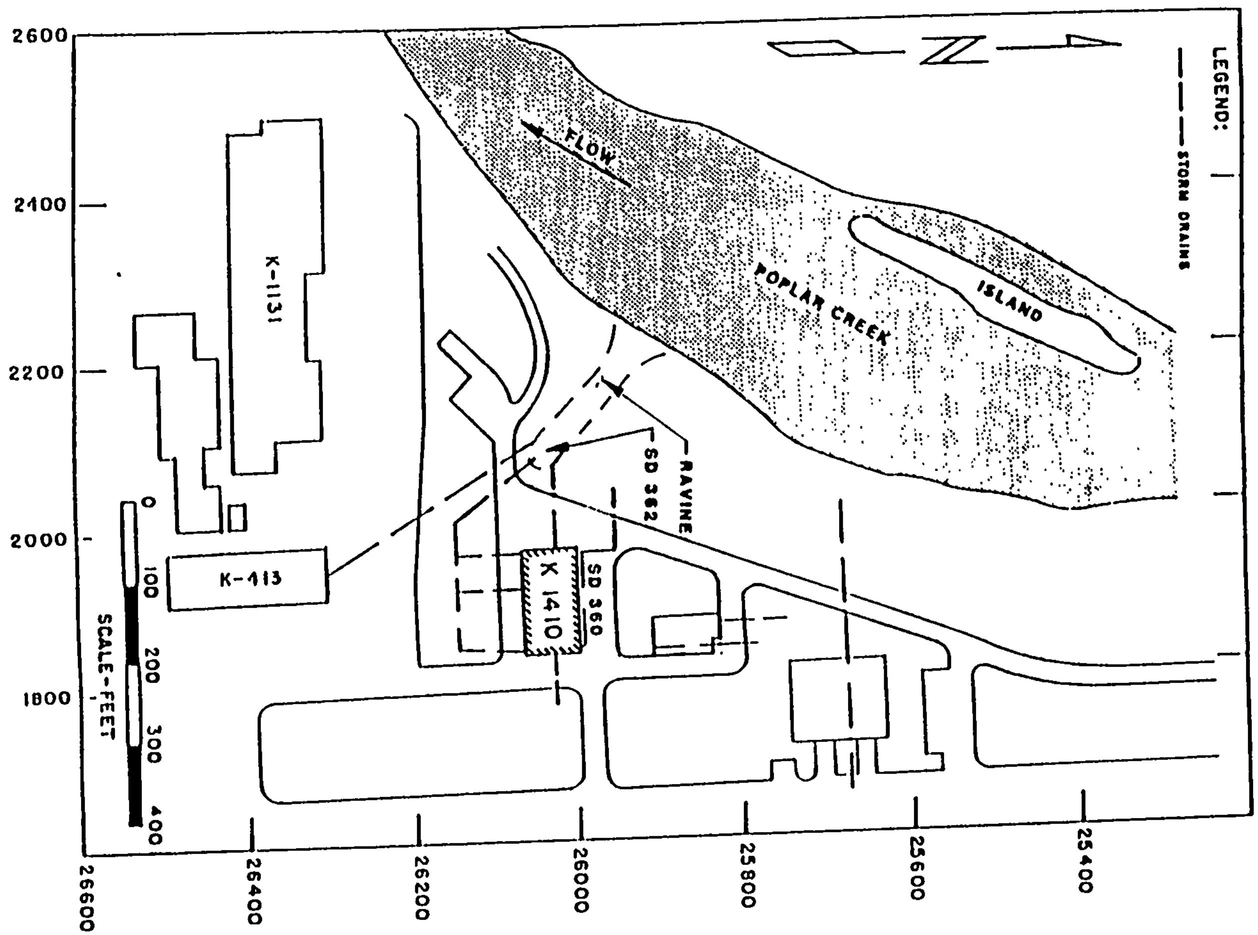


Fig. 5.2. Storm Drains for K-1410

5.3 AIR

No site-specific air quality data are available for this SWMU. Martin Marietta Energy Systems, Inc., has an ongoing study of the meteorological conditions, and general data for ORGDP are available in Section 4.4 of K/HS-132. The most recent air quality data from the ORGDP monitoring system is available in The Environmental Surveillance of the U.S. Department of Energy Oak Ridge Reservation and Surrounding Environs During 1987, Volume 1, ES/ESH-4/V1.

6. IDENTIFICATION OF POTENTIAL PATHWAYS AND RECEPTORS AND PRELIMINARY ASSESSMENT OF EXPOSURE

Assessment of an inactive hazardous waste disposal or storage site is required to evaluate the site's potential for health or safety risks to the environment, the public, and site personnel. Determination of such risks must be based on evaluations of both the potential pathways of contaminant migration from toxic releases and the possible receptors of the contamination. Information used in the evaluations of the pathways which might release contaminants from the K-1410 building has been obtained from interviews with personnel familiar with operations at the site and on-site observations. K/HS-132 will serve as a general reference concerning the potential pathways and receptors for ORGDP.

The practice of discharging cleaning solutions from pits via a pipe into a nearby ravine, and the possibility of pit and pipe leakage present the potential for soil, surface water, and groundwater contamination at the K-1410 site. A Phase I investigation of soil, surface water, and groundwater is proposed to assess the extent (if any) of contamination. A radiation survey of the K-1410 building will be conducted to determine if contamination exists that exceeds recommended standards. A Phase II investigation will be conducted if any radiation measurements exceed standards. This Phase II investigation may include taking wipe samples in indoor areas where concentrations exceed standards and monitoring air concentrations at ventilation inlets and outlets of the K-1410 building.

Air contamination could possibly result from the resuspension of nickel oxide particulates inside the building and its subsequent transport by wind currents. However, because of the institutional controls imposed on building access and the lack of receptors in the immediate area, inhalation of nickel oxide contaminated air is not likely to be a significant exposure pathway. A risk assessment conducted on the nickel concentrations detected by an ambient air monitoring station at ORGDP is presented in Section 6.3.

6.1 POTENTIAL PATHWAYS OF MIGRATION

6.1.1 Soil

The practice of discharging cleaning solutions from pits inside of the K-1410 building into a nearby ravine and the possibility of pit and pipe leakage, present the potential for soil contamination. The extent of this contamination will be assessed by soil sampling along the discharge process line and the ravine.

6.1.2 Surface Water

Residual contamination in the ravine may be contaminating surface water flow into Poplar Creek. Surface water grab samples will be taken from the ravine at the locations described in Section 8 and analyzed to assess the nature and extent of possible surface water contamination.

6.1.3 Groundwater

If the solutions leaked from the pits and process drains associated with K-1410 operations, the possibility for groundwater contamination exists. The low hydraulic gradient and the proximity of a discharge zone (i.e., Poplar Creek) suggest that any groundwater contamination would remain in the unconsolidated zone prior to being flushed out into nearby Poplar Creek. Therefore, groundwater will be sampled from the unconsolidated zone in the area according to the protocol of the ORGDP Groundwater Protection Program.

6.1.4 Air

As documented in Section 4, particulates released during the electroplating processes have settled onto the floor and wall surfaces inside K-1410, and nickel oxide particulate is the primary constituent of concern. The K-1410 building is currently abandoned and locked, the windows and doors are secured, and access can only be obtained by permission. Thus, these particulates are currently unlikely to be disturbed by air currents or activity within the building and are unlikely to be transported to workers around the building or to the closest public populations outside of the security perimeter fence.

The atmospheric concentrations of pollutants in the vicinity of the ORGDP are currently monitored by a network of ambient air sampling stations, which are positioned in the predominant wind directions. The samples collected from these stations provide a means for determining the concentrations of both radioactive and nonradioactive constituents in the air, and the analysis parameters include nickel. Table 6.1 presents monitoring results for nickel from these air monitoring stations for 1987. Station K-5 is the closest station to the K-1410 building and lies in line with the K-1410 building and the closest public populations as identified in Section 6.2. Even though the nickel concentrations detected at this station are not necessarily totally attributable to the K-1410 building, data from this station will be used to assess the impact of nickel-contaminated airborne particulates from the K-1410 building on potential on-site and off-site receptors. Based on the abandoned nature of the building and the conclusions derived by the risk assessment, no air monitoring in the vicinity of the K-1410 building is proposed in this RFI.

6.1.5 Summary

The extent and nature of soil, surface water, and groundwater contamination will be assessed subsequent to the Phase I sampling activities proposed in this RFI. Data from Phase I may prompt further characterization in the area. Because the building is abandoned and sealed, contamination of the ambient air by the K-1410 building is not likely to occur. Should contaminant releases occur, the receptors of any contamination emanating from the components of the K-1410 building are identified in Section 6.2. A risk assessment on the data from the ORGDP ambient air monitoring system has been conducted for these receptors and is presented in Section 6.3. General ORGDP information on potential pathways of contaminant migration is available in Section 5.1 of K/HS-132.

Table 6.1. 1987 ORGDP air monitoring data for Nickel Concentrations in ug/m^3

Air Monitor Station Number	No. of Samples	Minimum	Maximum	Geometric Average
K-1	58	<0.0024	0.0139	<0.0036 + 0.0006
K-2	61	<0.0024	0.0125	<0.0037 + 0.0005
K-3	61	<0.0014	0.0122	<0.0034 + 0.0006
K-4	59	<0.0022	0.0133	<0.0042 + 0.0007
K-5	56	<0.0023	0.0136	<0.0034 + 0.0007

[1]Locations of air monitor stations are shown on Figure 2.1.17 in The Environmental Surveillance of the U.S. Department of Energy Oak Ridge Reservation and Surrounding Environs During 1987, Volume 1 (ES/ESH-4/V1).

6.2 POTENTIAL RECEPTORS

6.2.1 Human Populations

The current security controls required by the Department of Energy (DOE) on entrance to ORGDP prevent public access to the K-1410 building. Thus, the only public populations of concern are those which might come into contact with one of the exposure pathways beyond the boundaries of the plant site (i.e., through the reach of the surface water, groundwater, or air).

There are 25 potable water wells within one mile of ORGDP, none of which are in proximity to the K-1410 building, and none are believed to occupy the same hydrogeological environment as the groundwater at the site. Further, the 10 public water supplies which withdraw from the Clinch - Tennessee River system (into which Poplar Creek drains) are at least eight miles downstream from the ORR. While direct discharge of surface runoff and site groundwater presents the potential for contamination, distance and dilution effects make pollution of public water supplies a low probability. Finally, the effects of distance and dilution also make unlikely the possibility that contamination of surface water and groundwater would reach the waters used downstream in the Clinch - Tennessee River system for recreational and industrial use.

Airborne nickel oxide particulates present the only other potential health risk to the general public and site personnel in the vicinity of the K-1410 building. The closest public population is in a residential area approximately one mile away from ORGDP across Blackoak Ridge, in a line perpendicular to the prevailing wind direction.

Although ORGDP personnel do not routinely frequent the area immediately surrounding the K-1410 building, they may be exposed to nickel oxide particulates transported by wind currents away from the building to other parts of ORGDP. Assessment of risk to the closest public population and to the ORGDP personnel will be addressed in Section 6.3. General information on potential human receptors at the ORGDP is available in Section 5.2 of K/HS-132.

6.2.2 Fauna and Flora

The rare, threatened, and endangered plant and animal species which are thought to inhabit the area surrounding ORGDP are discussed in Section 5.3 of K/HS-132. To date, there has been no report that any of these species in the vicinity of the K-1410 building or surrounding area are directly threatened by any possible contamination present there. The risk of contamination released from the site to the local environment and its impact on the local flora and fauna will be assessed subsequent to the RFI.

6.3 RISK ASSESSMENT

Nickel oxide contaminated dust in the K-1410 Building could potentially become resuspended and subsequently transported from the K-1410 Building and, therefore, could be inhaled by the general public or workers. The measured atmospheric concentrations of nickel oxide will be used to assess the health implications to ORGDP personnel and public populations. Once the air concentrations at exposure points have been specified, the dose of nickel oxide to individuals can be estimated. Comparison of measured concentrations and estimated dose with appropriate health guideline values will provide perspective on the health significance of possible human exposure to nickel oxide released from the K-1410 building. Since nickel oxide may be implicated in both carcinogenic and noncarcinogenic effects, both the lifetime excess cancer risk and the hazard index will be estimated.

6.3.1 Inhalation Dose Calculations

The dose of nickel oxide received by individuals can be estimated by (Superfund Exposure Assessment Manual):

$$D_I = \frac{(C)\ (IR)\ (AF)\ (EF)}{(BW)}$$

where, D_I = inhalation dose (mg/kg/day)
C = contaminant concentration (mg/m^3)
IR = inhalation rate (m^3/day)
AF = absorption factor
EF = exposure factors
BW = body weight (kg)

The inhalation rate is assumed to be 20 m^3/day for adults, and body weight is assumed to be 70 kg. The absorption factor is conservatively assumed to be 100 percent (or 1). Exposure factors consider the duration and frequency of exposure episodes. For public populations, exposure is considered to be continuous, lifetime exposure, so the factor is 1. For worker populations, exposure is considered to occur 8 hours per day (8/24), 5 days per week (5/7), 50 weeks per year (50/52), 30 years out of a 70 year lifetime (30/70), for a combined exposure factor product of .098.

Combination of these values with the maximum measured concentration of nickel oxide at station K-5 yields a dose estimate (for on-site personnel) of:

$$D_I = \frac{(1.4 \times 10\text{-}5 \text{ mg/m3})\ (20 \text{ m3/day})\ (.098)}{70 \text{ kg}} = 3.9 \times 10\text{-}7 \text{ mg/kg/day}$$

Similar application of this equation for the closest off-site public populations will assume the same concentration (to assess "worst-case" risk) at an exposure factor of one to yield a dose estimate of:

$$D_I = \frac{(1.4 \times 10\text{-}5 \text{ mg/m3})\ (20 \text{ m3/day})\ (1)}{70 \text{ kg}} = 4.6 \times 10\text{-}6 \text{ mg/kg/day}$$

6.3.2 Comparison to Applicable Limits

In Table 6.2, the concentration measured and inhalation dose estimated for on-site personnel in Section 6.3.1 are compared to the appropriate occupational concentration limit to provide perspective on the health significance of human exposure to nickel oxide. As shown in Table 6.2 the measured concentration at station K-5 and inhalation dose estimated for on-site personnel are orders of magnitude below the suggested occupational standard for nickel oxide.

In the previous step a comparison was made between a projected dose and an occupational reference level for nickel oxide as a noncarcinogen. However, nickel oxide has been shown to be carcinogenic via inhalation. To address carcinogenic risk associated with site contamination, comparisons are made between calculated risks and acceptable risk. EPA's Carcinogen Assessment Group (CAG) has defined a carcinogen potency factor (q*1) (also known as unit carcinogenic risk) as the upper limit on the lifetime probability that the carcinogen will cause cancer at a dose of one mg/kg/day. The term "upper limit" means that the actual risk is probably lower than the predicted risk or may even be zero. The potency factor is the slope of a substance's carcinogenicity dose-response curve at low exposure levels. CAG uses the linearized multi-stage dose-response model and the 95 percent upper confidence limit of the potency slope (q*1) to estimate carcinogenic risks at low dose levels. (ie., only 5 percent chance that the probability of response could be greater than the estimated value on the basis of the experimental data used). Consequently, predicted risk may overestimate the actual risk at a site. However, this method is used so that carcinogenic risk will not be underestimated. Assuming a continuous, lifetime exposure to a carcinogen, the risk (R) and the dose (D) in mg/kg/day are related by the equation, R = (q*1) x (D). The carcinogenic potency factor for inhalation of nickel oxide is 1.2 $(mg/kg/day)^{-1}$. Thus, the excess cancer risk values associated with the inhalation doses estimated in Section 6.4.1 are as follows:

Table 6.2. Comparison of contaminant concentrations and inhalation doses to applicable limits

Nickel oxide		Monitoring Data (station K-5)
TLV* 1	Concentration mg/m^3	1.4×10^{-5}
2.9×10^{-1}**	Dose mg/kg/day	3.9×10^{-7}

*Threshold Limit Value (TLV) - Airborne concentrations of substances and represents conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effect. TLVs are based on the best available information from industrial experience, from experimental human and animal studies, and, when possible, from a combination of the three. The TLVs in this table are TLV-TWAs (Time Weighted Average) which represent concentrations for a normal 8-hour workday and 40-hour workweek.

**Dose calculated from TLV assuming an inhalation rate of 20 m^3/day, an exposure factor of 1, and a body weight of 70 kg.

on-site personnel $(3.9 \times 10^{-7})\ (1.2) = 4.7 \times 10^{-7}$

public populations $(4.0 \times 10^{-6})\ (1.2) = 4.8 \times 10^{-6}$

These values are within the range (10^{-5} - 10^{-7}) of acceptable risk levels as referenced in The Superfund Public Health Evaluation Manual, EPA 540/1-86/060.

6.4 SUMMARY AND CONCLUSIONS

The nature of the materials disposed of at the K-1410 building, the method of disposal, and the site hydrogeology indicate the potential for soil, groundwater, surface water, and air contamination. Evaluation of the potential pathways of contaminant migration in soil, groundwater, and surface water shows sufficient potential for environmental contamination and warrants an investigation of the site. While nickel oxide contamination inside the K-1410 building could potentially be released to the atmosphere and affect on-site personnel and nearby public populations, a quantitative assessment of the exposure route, under "worst case" assumptions, gives concentrations and doses which are well below occupational guidelines. Further, assuming a "no-threshold" scenario for exposure (i.e., any dose of nickel oxide will produce some carcinogenic risk) excess cancer risk values are calculated to be within an acceptable range of risk as defined by EPA. In conclusion, nickel oxide-contaminated air in the ORGDP area is not likely to adversely affect the public or site personnel and, consequently, this medium requires no further characterization and no remedial action to protect human health. The human health impacts associated with exposure to soil, surface water, and groundwater contaminated by the K-1410 building will be assessed subsequent to the completion of the sampling and analysis activities proposed in this RFI plan.

7. EXISTING MONITORING DATA

Data from Storm drain No. 362 are presented in Appendix B. Storm drain No. 362 is located south and west of Building K-1410 and drains to Poplar Creek. This storm drain drains the area directly south of Building K-1410 and includes K-1410, the K-25 complex, and Avenue "N". Storm drain No. 350 is located west of the facility and drains the area west of the K-1410 building, including runoff. Storm drain No. 352 is located north of the facility and drains the north of K-1410 building. Storm drain No. 360 is located south of Building K-1410 and drains the area around Building K-1413. No storm drain data are available for storm drains 350, 352, and 360. The available storm drain data are compiled from the report ORGDP Storm Drain Characterization (1987). Air monitoring data for nickel for 1987 are summarized in Table 6.1 of this RFI plan.

8. SAMPLING PLAN

8.1 SAMPLING AND ANALYTICAL STRATEGY

Since no prior characterization or environmental monitoring has been performed at the K-1410 site, historical information describing the operation of the facility serves as the basis for preparation of the sampling plan. The types of samples to be taken as part of this study will be soil, surface water, and groundwater samples. Groundwater monitoring wells will be installed and samples will be collected from these wells as part of the ORGDP Groundwater Protection Program. Since the building has been used for the servicing of spent process operation traps, radioactively contaminated trapping materials could have lead to contamination of the building by various radionuclides. A radiation survey of the interior floor and walls of the K-1410 building will be conducted to determine if contamination exists inside the building.

Samples collected for characterization of this area will initially be analyzed for volatile and semi-volatile organic compounds, inorganic elements, and radioactivity. Soil samples will be collected in order to determine if leakage from the drainage pipes has occurred. Surface water samples will be collected to determine whether residual contamination is being leached from the ravine leading to Poplar Creek.

8.2 SAMPLING STRATEGY

8.2.1 K-1410 Building

A radiation survey of the interior floor and walls of the K-1410 building will be conducted by the ORGDP Health Physics Department to determine the extent (if any) of contamination inside the building. If the survey reveals radiation levels at or above DOE action levels, a second phase of monitoring consisting of wipe samples and air monitoring of inlet and outlet air concentrations will be implemented. Locations for the wipe samples will be determined based on information from the survey.

8.2.2 Soil Sampling

The K-1410 facility is divided into two areas for soil sampling: the underground drainage pipes outside of the building, the ravine, and the hillside down to Poplar Creek (Figure 8.1). Soil sampling is designed to provide initial estimates of contaminant levels in the potential release area, indicate the general direction of contaminant movement, and identify variation sources and estimate their magnitude. This information will be compared to background values and will be used to direct the next phase of monitoring.

8.2.2.1 Underground Pipe Lines

Soil corings to bedrock will be taken every 25 feet along the underground drainage lines. Corings to bedrock will also be made at locations which would be most likely to detect any contamination plume originating beneath the K-1410 building. These corings essentially form a grid of approximately 70' x 15' x 15' on the downgradient side of K-1410. The site will be surveyed and the coring locations marked prior to obtaining the samples. The exact number of corings will be determined at that time, and the coring order will be randomized. From each drilling to bedrock, a soil sample will be taken from every distinct soil layer, from boundaries between soil layers, and at regular intervals of four feet of depth in thick homogeneous layers (Figure 8.2). For thicker layers, soil from two adjacent two-foot split barrels will be composited, with care not to composite across soil layer types or layer boundaries. Individual samples will be divided with a portion of each sample saved in case a backup analysis is needed. The order of the lab analyses of the samples will be randomized. Initially, no analyses will be conducted on samples from soil above the pipe lines.

8.2.2.2 Hillside Area

The ravine and hillside will have surface soil samples analyzed from 20 randomly selected grid locations as indicated in Figure 8.3. Each of the 20 samples analyzed will be a composite of four six-inch deep samples from

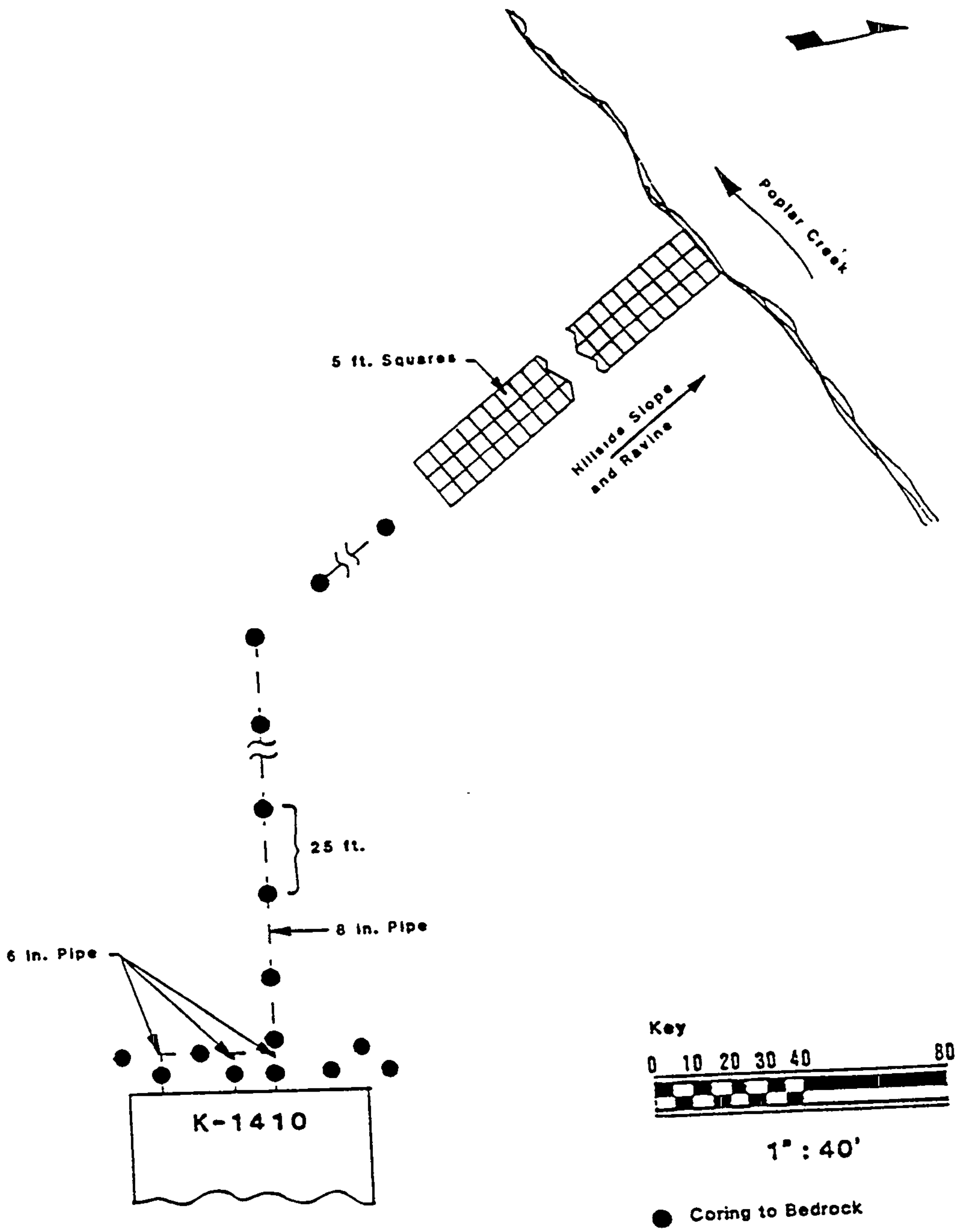


Fig. 8.1. K-1410 Facility soil sampling locations for drainage piping

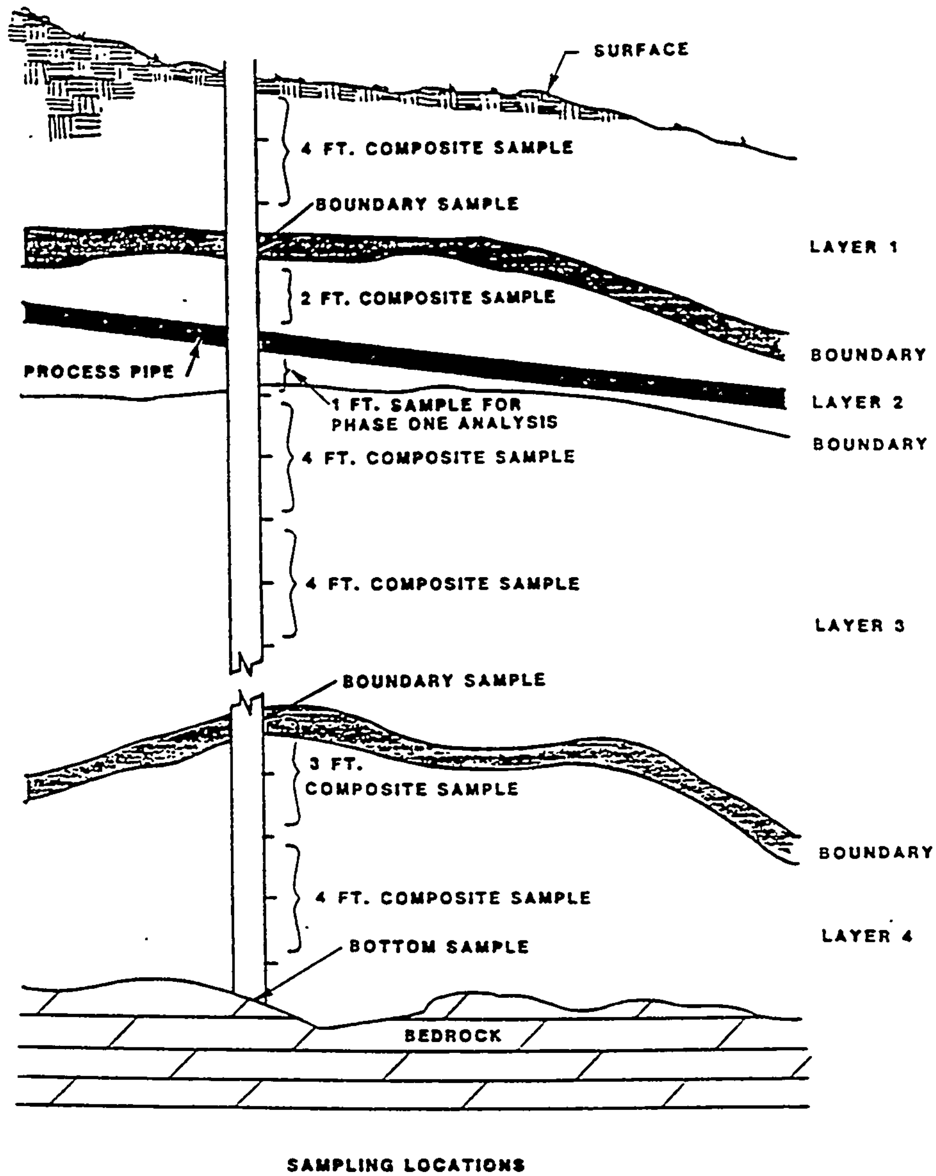


Fig. 8.2. Sampling to bedrock

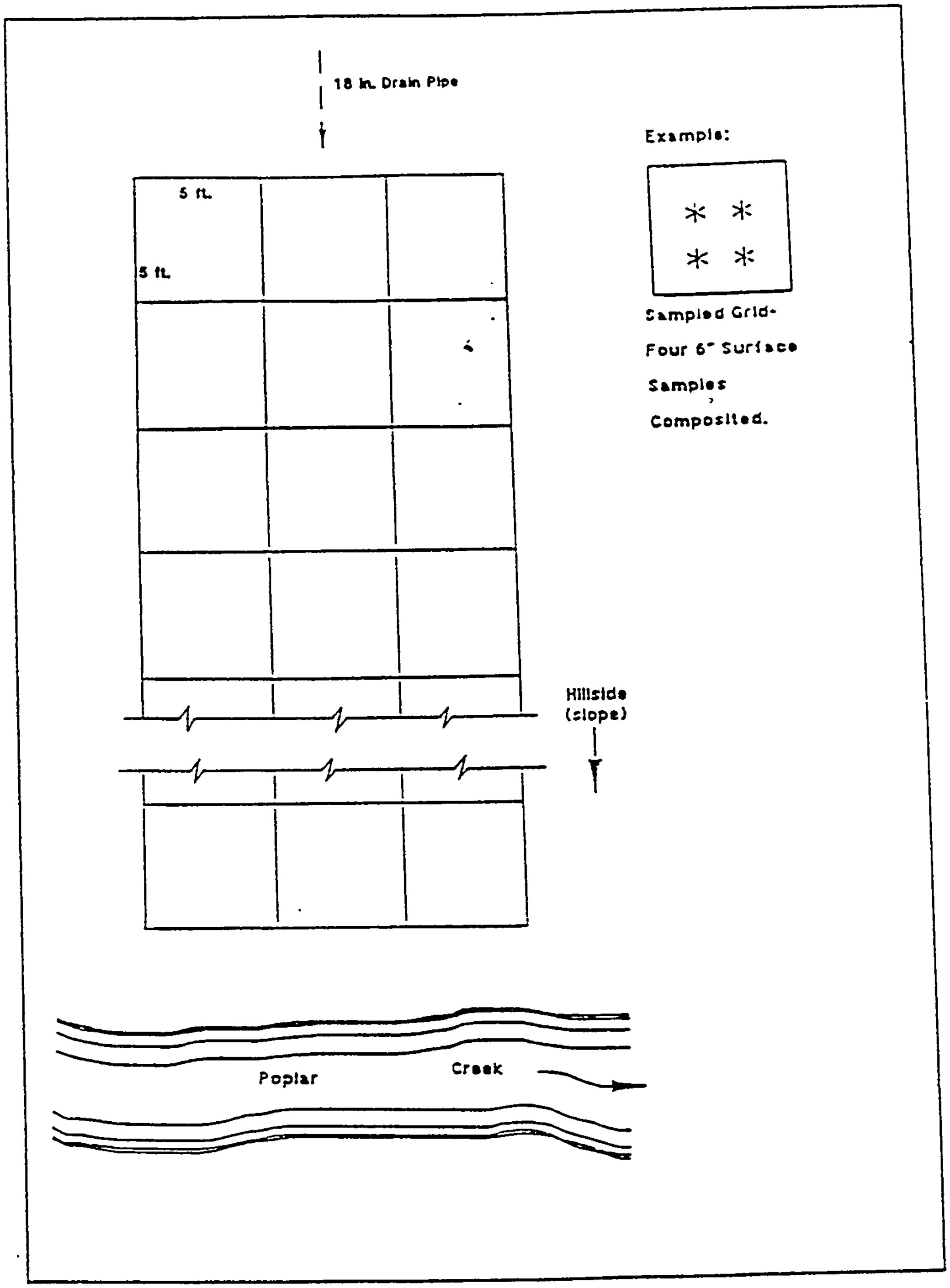


Fig. 8.3. Soil sampling locations for the ravine and hillside area

within a five foot square. The ravine and hillside will be surveyed and the grid system laid out prior to the random selection of sampling locations and random sampling order.

8.2.2.3 Background Sampling

Figure 8.4 shows the general location of three background corings to bedrock. Samples will be taken and composited according to the discussion in 8.2.1.1 and Figure 8.2.

8.2.3 Surface Water Sampling

Rainfall runoff will be sampled from the bottom of the hillside just above Poplar Creek after three discrete storm events.

8.2.4 Groundwater Monitoring

One groundwater monitoring well is proposed to determine if leaks or spills at the K-1410 Building have contaminated the uppermost aquifer. The unconsolidated zone well will be located approximately 70 feet west of the building as shown on Figure 8.4. This well will be incorporated into the ORGDP Groundwater Protection Program and is, therefore, subject to the established protocol and standards of that program. Installation and monitoring of the well will be in compliance with RCRA Groundwater Monitoring Enforcement Guidance Document (OSWER Directive 9950.1).

Results from the soil sampling program, described in Section 8.2.1, may indicate a need for additional groundwater monitoring wells, and if so, the number and placement of such wells will be assessed at that time.

8.3 FIELD SAMPLING

All field sampling procedures discussed in Section 8.3 are more fully described and documented in The Environmental Surveillance Procedures Quality Control Program, Martin Marietta Energy Systems, Inc., (ESH/SUB/87-21706/1).

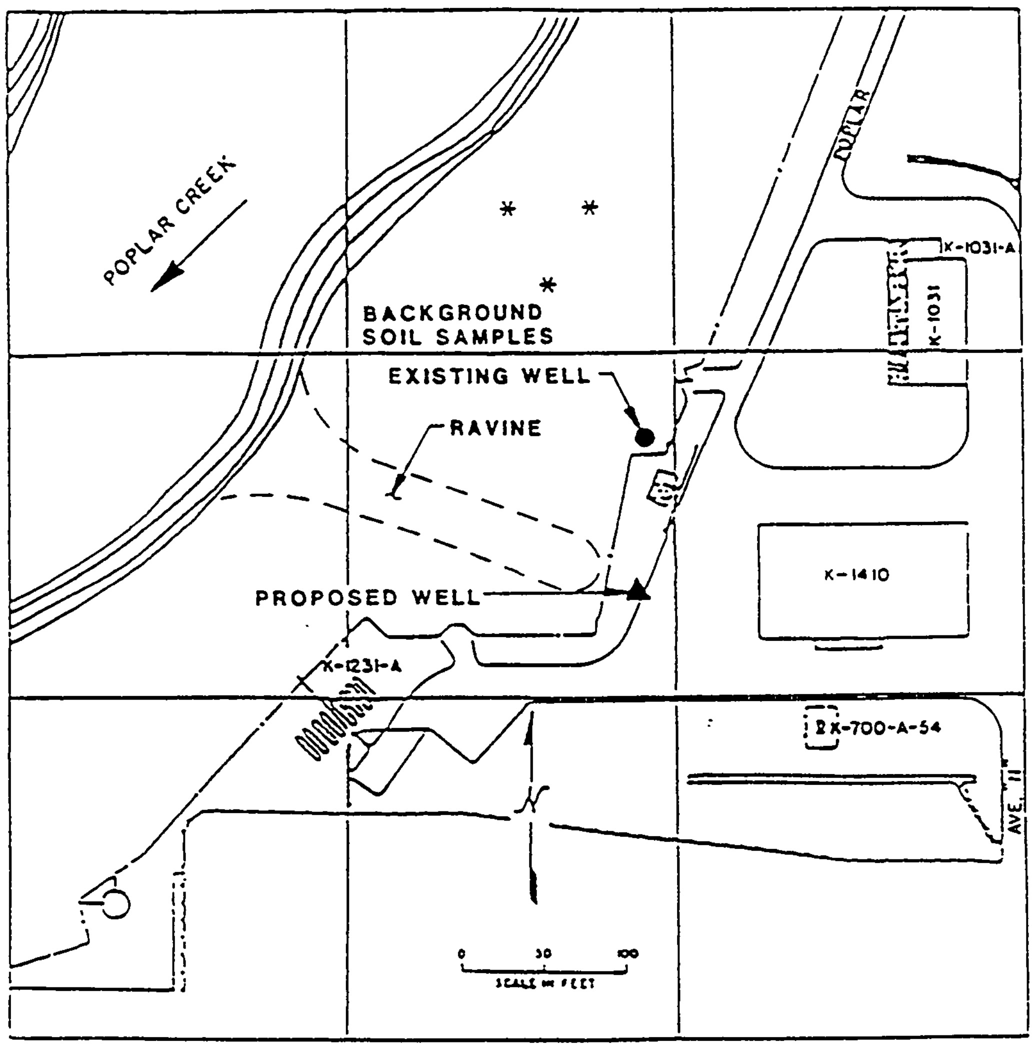


Fig. 8.4. Background soil sampling and monitoring well locations

8.3.1 Site Preparation

The use of a drilling rig in the proximity of overhead electrical lines will require special arrangements with plant operations to eliminate the possibility of the drilling rig contacting live overhead electrical lines.

The sampling sites will be located and marked with stakes prior to drilling. Arrangements will be made through Martin Marietta Energy Systems, Inc., to have the locations surveyed, after which they will be indicated according to their coordinates on an accurate map of the area. If any of the sampling sites are covered with pavement, the pavement will be removed prior to drilling.

8.3.2 Equipment and Supplies

The drillers will provide all necessary drilling equipment (i.e., hollow core auger, split spoon sampler, etc.). The following field sampling supplies will be required:

- nonionic detergent, Micro (International Products Corp.)
- deionized water
- isopropyl alcohol
- glass containers, pre-cleaned, with Teflon lined lids, one quart capacity
- bound logbook
- chain-of-custody seals
- sample labels
- chain-of-custody forms
- stainless steel trays
- aluminum foil
- stainless steel spatulas
- hand auger
- VOA bottles
- Alpha, beta, gamma radiation detection instruments
- Micro-R meter for detection of gamma radiation

8.3.3 Soil Sampling Procedure

Collection of samples from this site will follow ASTM Method D 1586-84 Penetration Test Split-Barrel Sampling of Soils. The drilling will be performed by private drilling contractors. A hollow core auger will be used to remove the soil above each segment to be sampled, and the split-barrel sampler will be driven into the soil through the center of the auger. This technique will obtain a sample that is undisturbed by the auger operation. Using a split-barrel sampler of two-foot length, samples will be removed from each position in two-foot segments and collected to refusal. At each two foot increment, the split-barrel sampler will be removed from the drilling rig (to be performed by the drilling crew) and separated to expose the sample. Soils to be composited will be placed in stainless steel pans, homogenized, and transferred to quart jars. The samples taken for VOA will be transferred immediately to VOA bottles and refrigerated. From 10 percent of the core segments, duplicate samples will be submitted to the laboratory to fulfill duplicate requirements of Section 7.3 of K/HS-132.

Between samples, the equipment used for sample transfer will be cleaned with nonionic detergent and water and rinsed with deionized water and isopropyl alcohol. The split-barrel samplers will be detergent cleaned and rinsed with water by the drilling company. After the sampling of each coring is complete, drilled wells will be filled with a grout column (see Section 7.1.3 of K/HS-132) to prevent any contamination of the groundwater.

A hand auger will be used for the collection of surface soil samples from the hillside area. The sampling should be performed according to EPA 600/4-84-076 Method II-2. The auger should be detergent cleaned and rinsed with deionized water and isopropyl alcohol between sample collections.

8.3.4 Surface Water Sampling

Surface water sampling will be collected at the times and locations described in Section 8.2.2. Collection of surface water samples will be performed utilizing EPA 600/4-84-076 Method III-1. Except for VOA designated samples, samples will be transferred to quart jars and the appropriate preservative (if any) added. The appropriate preservation methods are listed in Table 8.1. VOA samples will be placed in VOA bottles and immediately refrigerated.

Sample containers will be labelled with the site identification, date, time, sample identification, and sampler's name. Sample date, site identification, time, sample identification, sampler's name, and coordinates of sample will be recorded in the logbook. In addition to the required entries, any other pertinent information and/or observations will be recorded and a copy of the sampling plan. The sample containers will be sealed and transported to the laboratory under chain-of-custody protocol as referenced in Section 7.4 of K/HS-132.

8.4 ANALYTICAL PROTOCOL

The analytical sampling protocol for the samples described in Section 8.3 should have the following salient features:

(1) Because there appears to be a definite possibility for organic, inorganic, and radioactive contamination, samples designated for analysis will be analyzed for radioactivity (gross alpha, beta, and gamma) per procedures listed in Table 7.8, and inorganic elements listed in Table 7.4, and organic elements listed in Table 7.7 of the K/HS-132 (includes all regulated metals and uranium).

(2) EP toxicity extractions will only be performed on soil samples whose total regulated inorganic species content would exceed the EP toxicity limits, if the sample was 100 percent extractable.

(3) Radionuclide analysis will only be conducted on those samples whose gross alpha, beta, or gamma exceed accepted levels.

Table 8.1. Recommended sample preservation methods

Analyte	Container	Preservative
Total Metals	glass, plastic	HNO_3 to pH < 2
Radioactivity	glass, plastic	HNO_3 to pH < 2
Volatile organics	VOA bottle	Cool, 4°C
Extractable organics	glass	Cool, 4°C

8.5 SAMPLE ANALYSIS

After collection, all samples will be recorded in a randomized manner. After reception by the analytical laboratory, samples will be archived, if so designated, or scheduled for analyses. Surface water and groundwater analyses will follow standard EPA protocol as outlined in Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020). Soil sample analyses will follow standard EPA protocol as outlined in Test Methods for Evaluating Solid Waste (SW-846, 3rd Edition). The QA/QC requirements outlined in Section 7.3 of K/HS-132 will be adhered to for all analyses.

9. DATA MANAGEMENT PROCEDURES

The results of the chemical analyses of samples from the potential release areas will be presented in a clear and logical format, so as to best illustrate any patterns in the data. These will include tabular, graphic, and other visual displays such as maps and contour plots described in Table 8.1 of K/HS-132.

Statistical analyses will provide for treatment of duplicate laboratory analyses, for results which are reported as less than detection limit, and for examination of statistical outliers. Whenever possible, values which are recorded as less than detection limits will be handled according to RCRA Ground-Water Monitoring Enforcement Guidance Document, (OSWER-9950.1), September 1986, which directs calculation through the use of Cohen's statistical methodology. This is found in "Tables for Maximum Likelihood Estimates from Single Truncated and Singly Censored Samples," (Technometrics, Volume 3, pages 535-541, 1961).

Statistical modeling methods such as least squares and kriging will be used to estimate response surfaces for use in developing concentration contours for the contaminants where appropriate. Statistical confidence bounds (upper, lower, or both) will be determined for the contaminants at a given location, where appropriate.

10. HEALTH AND SAFETY PROCEDURES

10.1 INTRODUCTION

Special requirements and procedures to protect health and safety of the investigating team, ORGDP site personnel, and the general public during the K-1410 RFI are addressed in this section.

Health, safety, environmental, security, plant protection, and emergency response organizations which are in place at ORGDP line organizations to meet the requirements for health and safety during the RFIs are detailed in K/HS-132. They provide communications, response, and reporting for any plant emergency; on-site medical facilities with medical surveillance, treatment, monitoring, and periodic physical examinations; health physics and industrial hygiene surveillance hazard evaluation and control; operational safety accident prevention and control; plant security and visitor control.

In addition, K/HS-132 identifies the organizational responsibilities for health and safety during RFIs. K/HS-132 includes the methodology for establishing the work zones, the level of protection required in the exclusion zone, decontamination procedures, personnel exposure limits, monitoring requirements, and respiratory protection requirements.

10.2 KNOWN HAZARDS AND RISKS

Substances of safety and health concern in the K-1410 RFI are radioactive wastes, corrosive liquids, and organic solvents.

10.3 LEVEL OF PROTECTION

The level of personnel protection recommended for work activity in the exclusion zone is Level D. Airborne pollutants and radiation will be monitored during the work activity.

10.4 DESIGNATION OF WORK AREA ZONES

The three zones (exclusion, contamination reduction, and support) will be established for each drilling in accordance with the methodology developed in Section 9 of the K/HS-132. The safety equipment required for the designated level of protection and the decontamination procedures are also covered in K/HS-132.

10.5 EXPOSURE LIMITS

In the exclusion zone, airborne pollutants will be monitored with instruments described in Section 9.4.9 of the K/HS-132. If pollutants or unusual odors are detected, work will be stopped and the area will be evacuated. The ORGDP Industrial Hygiene Department will be contacted to determine necessary actions to mitigate health and safety concerns.

The responsibility for limiting the exposure of the workers to nonhazardous levels of radiation resides in the ORGDP site health and safety officer (SHSO) using instruments described in Section 9 of K/HS-132. The SHSO will monitor for radiation in the air with a radiation meter capable of measuring 0.1 mR/hr. If the contamination exceeds 2 mR/hr (ORGDP Health Physics action level), the SHSO shall order work to be stopped and all personnel shall be removed from the exclusion zone. The SHSO shall request that a health physicist assess the potential hazard of site conditions and determine if the sampling operations may continue.

All participants in the K-1410 building sampling, including contractors, must be aware that excavation equipment, shoes, and other protective clothing could become contaminated with radioactive material. Surveys will be performed on all such items before and after each sampling operation. Each survey will include monitoring all applicable personnel and equipment. Any equipment found to be contaminated above the guidelines for unrestricted release (alpha-5,000 dpm/100 cm2 of surface, 1000 dpm/100 cm^2 transferrable, and 0.1 mR/hr beta and gamma) will be decontaminated.

11. REFERENCES

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APPENDIX A

GERAGHTY & MILLER, INC.
Ground-Water Consultants

LITHOLOGIC LOG

BORING NO. BRW-16		PROJECT Phase II Monitor-Well Installation, K-25 Plant	
LOCATION K-1232	COORDINATES (PLANT GRID) S26,357.73 W 2,724.15	SURFACE ELEVATION 771.92 ft msl	TOTAL DEPTH 47.0 ft
GEOLOGIST G. Weiss	SAMPLE INTERVAL 5 ft	SAMPLE TYPE Cuttings	DATE COMPLETED 11-26-86
DRILLER D. Wood	DRILLING CONTRACTOR Graves	DRILLING METHOD Air Rotary	RIG TYPE Dresser T-70-W
PURPOSE OF BORING Monitor Well	GEOPHYSICAL CONTRACTOR None	GEOPHYSICAL LOGS None	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0		Asphalt	
		FILL (100%), limestone gravel.	
		CLAY (100%), orange-red, plastic, some weathered limestone.	
10			
20			
		LIMESTONE (100%), gray to white, micritic, abundant secondary calcite.	
30			Borehole producing water (≈30 gpm) at 38 ft
40			
50			
60			
70			

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
Ground-Water Consultants

LITHOLOGIC LOG

BORING NO. UNP-7	PROJECT Hydrogeologic Site Characterization, K-25 Plant		
LOCATION K-1232	COORDINATES Plant Grid S26341.48 W 2651.31	SURFACE ELEVATION 791.52 feet msl	TOTAL DEPTH 29 feet
GEOLOGIST D. Hubert	SAMPLE INTERVAL Continuous	SAMPLE TYPE Split Spoon	DATE COMPLETED 11/27/85
DRILLER J. Cason	DRILLING CONTRACTOR Alsav, Inc.	DRILLING METHOD Hollow Stem Auger	RIG TYPE Diedrich D-50
PURPOSE OF BORING Piezometer	GEOPHYSICAL CONTRACTOR None	GEOPHYSICAL LOGS None	

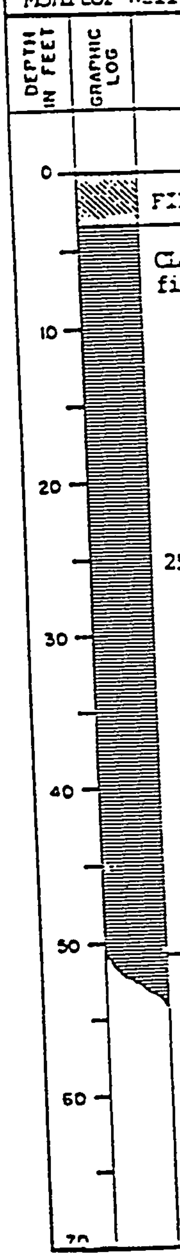
DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0		ASPHALT: 0' - 0.5' Road fill. CLAY: Orange, yellow and tan; mottled in places, low plasticity, slightly silty.	
10			
20			Wet at 20'.
29			Auger refusal at 29'.
30			
40			
50			
60			
70			

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
Ground-Water Consultants

LITHOLOGIC LOG

BORING NO. UNW-28		PROJECT Phase II Monitor-Well Installation, Y-25 Plant	
LOCATION K-1232	COORDINATES (PLANT GRID) S26,601.53 W 2,608.04	SURFACE ELEVATION 787.41 ft msl	TOTAL DEPTH 51.0 ft
GEOLOGIST J.Walker	SAMPLE INTERVAL 5 ft	SAMPLE TYPE Cuttings	DATE COMPLETED 01-09-87
DRILLER R. Lenning	DRILLING CONTRACTOR Middle Georgia	DRILLING METHOD Hollow-stem Auger	RIG TYPE Mobile B-53
PURPOSE OF BORING Monitor Well	GEOPHYSICAL CONTRACTOR None	GEOPHYSICAL LOGS None	



DESCRIPTION	COMMENTS
FILL (100%), clay with gravel.	
CLAY (70%), soft, plastic, orange-brown; Sand (30%), fine, angular.	Clay is very moist from 3 ft to 25 ft
25.0' - 51.0' Clay (95%); Silt (5%).	
	Hit water at 40 ft
	Refusal at 51 ft

SHEET 1 OF 1

GERAGHTY & MILLER, INC. Ground-Water Consultants

LITHOLOGIC LOG

BORING NO.	UNW-29
PROJECT	Phase II Monitor-well Installation, K-25 Plant
LOCATION	K-1232
COORDINATES (PLANT GRID)	S26,512.15 W 2,689.63
SURFACE ELEVATION	788.04 ft msl
TOTAL DEPTH	70.0 ft
GEOLOGIST	A.Motley/I.Gurney
SAMPLE INTERVAL	5 ft
SAMPLE TYPE	Cuttings
DATE COMPLETED	01-09-87
DRILLER	R. Lenning
DRILLING CONTRACTOR	Middle Georgia
DRILLING METHOD	Hollow-stem Auger
RIG TYPE	Mobile B-53
PURPOSE OF BORING	Monitor Well
GEOPHYSICAL CONTRACTOR	None
GEOPHYSICAL LOGS	None

DEPTH IN FEET	DESCRIPTION	COMMENTS
0	CLAY (85%), soft, brown; Silt (15%), brown.	
	5'-10' Clay is yellowish-brown.	
10		
	15'-70' Clay is reddish-brown and stiff.	
20		
30	30'-45' Scattered weathered shale fragments.	
40		
50		Clay is wet at 50 ft
60		
70		Refusal at 70 ft

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
Ground-Water Consultants

LITHOLOGIC LOG

BORING NO.	UNW-30
PROJECT	Phase II Monitor-well Installation, K-25 Plant
LOCATION	K-1232
COORDINATES (PLANT GRID)	S26,352.15 @ 2,724.64
SURFACE ELEVATION	772.00 ft msl
TOTAL DEPTH	21.5 ft
GEOLOGIST	A.Motley
SAMPLE INTERVAL	5 ft
SAMPLE TYPE	Cuttings
DATE COMPLETED	01-03-87
DRILLER	R. Lenning
DRILLING CONTRACTOR	Middle Georgia
DRILLING METHOD	Hollow-stem Auger
RIG TYPE	Mobile B-53
PURPOSE OF BORING	Monitor Well
GEOPHYSICAL CONTRACTOR	None
GEOPHYSICAL LOGS	None

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0		FILL (100%), clay, silty, brown with limestone gravel.	
		CLAY (85%), soft, reddish-brown; Silt (15%), brown.	
10		15'-21' Clay is primarily gray.	
20			Refusal at 21.5 ft
30			
40			
50			
60			
70			

SHEET 1 OF 1

APPENDIX B

STORM DRAIN DATA FOR SD-362

LOCATION	DATE	TEST COMPOUND	RESULTS	UNITS
** SD-362				
SD-362	10-Apr-1987	1 1 1-TRICHLOROETHANE	<5	ug/L
SD-362	10-Apr-1987	1 1 2 2-TETRACHLOROETHANE	<5	ug/L
SD-362	10-Apr-1987	1 1 2-TRICHLOROETHANE	<5	ug/L
SD-362	10-Apr-1987	1 1-DICHLOROETHANE	<5	ug/L
SD-362	10-Apr-1987	1 1-DICHLOROETHENE	<5	ug/L
SD-362	10-Apr-1987	1 2 4-TRICHLOROBENZENE	<10	ug/L
SD-362	10-Apr-1987	1 2-DICHLOROBENZENE	<10	ug/L
SD-362	10-Apr-1987	1 2-DICHLOROETHANE	<5	ug/L
SD-362	10-Apr-1987	1 2-DICHLOROPROPANE	<5	ug/L
SD-362	10-Apr-1987	1 3-DICHLOROBENZENE	<10	ug/L
SD-362	10-Apr-1987	1 4-DICHLOROBENZENE	<10	ug/L
SD-362	10-Apr-1987	2 4 6-TRICHLOROPHENOL	<10	ug/L
SD-362	10-Apr-1987	2 4-DICHLOROPHENOL	<10	ug/L
SD-362	10-Apr-1987	2 4-DIMETHYLPHENOL	<10	ug/L
SD-362	10-Apr-1987	2 4-DINITROPHENOL	<10	ug/L
SD-362	10-Apr-1987	2 4-DINITROTOLUENE	<10	ug/L
SD-362	10-Apr-1987	2 6-DINITROTOLUENE	<10	ug/L
SD-362	10-Apr-1987	2-BUTANONE	12B	ug/L
SD-362	10-Apr-1987	2-CHLOROETHYLVINYL ETHER	<10	ug/L
SD-362	10-Apr-1987	2-CHLORONAPHTHALENE	<10	ug/L
SD-362	10-Apr-1987	2-CHLOROPHENOL	<10	ug/L
SD-362	10-Apr-1987	2-NITROPHENOL	<10	ug/L
SD-362	10-Apr-1987	3 3'-DICHLOROBENZIDINE	<20	ug/L
SD-362	10-Apr-1987	4 6-DINITRO-2-METHYLPHENOL	<50	ug/L
SD-362	10-Apr-1987	4-BROMOPHENYL-PHENYLETHER	<10	ug/L
SD-362	10-Apr-1987	4-CHLORO-3-METHYLPHENOL	<10	ug/L
SD-362	10-Apr-1987	4-CHLOROPHENYL-PHENYLETHER	<10	ug/L
SD-362	10-Apr-1987	4-NITROPHENOL	<50	ug/L
SD-362	10-Apr-1987	ACENAPHTHENE	<10	ug/L
SD-362	10-Apr-1987	ACENAPHTHYLENE	<10	ug/L
SD-362	10-Apr-1987	ALKALINITY	152	mg/L
SD-362	10-Apr-1987	ALPHA	126.4	pCi/L
SD-362	10-Apr-1987	ALUMINUM	<0.10	mg/L
SD-362	10-Apr-1987	AMMONIA	<0.2	mg/L
SD-362	10-Apr-1987	ANTHRACENE	<10	ug/L
SD-362	10-Apr-1987	ARSENIC	<0.005	mg/L
SD-362	10-Apr-1987	BARIUM	<0.10	mg/L
SD-362	10-Apr-1987	BENZENE	<5	ug/L
SD-362	10-Apr-1987	BENZIDINE	.<10	ug/L
SD-362	10-Apr-1987	BENZO(A)ANTHRACENE	<10	ug/L
SD-362	10-Apr-1987	BENZO(A)PYRENE	<10	ug/L
SD-362	10-Apr-1987	BENZO(B)FLUORANTHENE	<10	ug/L
SD-362	10-Apr-1987	BENZO(G H I)PERYLENE	<10	ug/L
SD-362	10-Apr-1987	BENZO(K)FLUORANTHENE	<10	ug/L
SD-362	10-Apr-1987	BERYLLIUM	<0.0010	mg/L
SD-362	10-Apr-1987	BETA	140.7	pCi/L
SD-362	10-Apr-1987	BIS(2-CHLOROETHOXY)METHANE	<10	ug/L
SD-362	10-Apr-1987	BIS(2-CHLOROETHYL)ETHER	<10	ug/L
SD-362	10-Apr-1987	BIS(2-CHLOROISOPROPYL)ETHER	<10	ug/L
SD-362	10-Apr-1987	BIS(2-ETHYLHEXYL)PHTHALATE	<10	ug/L

STORM DRAIN DATA FOR SD-362

LOCATION	DATE	TEST COMPOUND	RESULTS	UNITS
SD-362	10-Apr-1987	BORON	<0.0040	mg/L
SD-362	10-Apr-1987	BROMODICHLOROMETHANE	<5	ug/L
SD-362	10-Apr-1987	BROMOFORM	<5	ug/L
SD-362	10-Apr-1987	BROMOMETHANE	<10	ug/L
SD-362	10-Apr-1987	BUTYLBENZYLPHTHALATE	<10	ug/L
SD-362	10-Apr-1987	CADMIUM	<0.0030	mg/L
SD-362	10-Apr-1987	CALCIUM	41	mg/L
SD-362	10-Apr-1987	CARBON TETRACHLORIDE	<5	ug/L
SD-362	10-Apr-1987	CHEMICAL OXYGEN DEMAND (COD)	<5	mg/L
SD-362	10-Apr-1987	CHLORIDE	2.9	mg/L
SD-362	10-Apr-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1	mg/L
SD-362	10-Apr-1987	CHLOROBENZENE	<5	ug/L
SD-362	10-Apr-1987	CHLOROETHANE	<10	ug/L
SD-362	10-Apr-1987	CHLOROFORM	<5	ug/L
SD-362	10-Apr-1987	CHLOROMETHANE	<10	ug/L
SD-362	10-Apr-1987	CHROMIUM	<0.010	mg/L
SD-362	10-Apr-1987	CHRYSENE	<10	ug/L
SD-362	10-Apr-1987	CIS-1 3-DICHLOROPROPENE	<5	ug/L
SD-362	10-Apr-1987	COBALT	<0.10	mg/L
SD-362	10-Apr-1987	CONDUCTIVITY	372	umho/cm
SD-362	10-Apr-1987	COPPER	<0.0040	mg/L
SD-362	10-Apr-1987	CYANIDE	<0.002	mg/L
SD-362	10-Apr-1987	DI-N-BUTYLPHTHALATE	<10	ug/L
SD-362	10-Apr-1987	DI-N-OCTYLPHTHALATE	<10	ug/L
SD-362	10-Apr-1987	DIBENZ(A H)ANTHRACENE	<10	ug/L
SD-362	10-Apr-1987	DIBROMOCHLOROMETHANE	<5	ug/L
SD-362	10-Apr-1987	DIETHYLPHTHALATE	<10	ug/L
SD-362	10-Apr-1987	DIMETHYLPHTHALATE	<10	ug/L
SD-362	10-Apr-1987	DISSOLVED OXYGEN	8.1	ppm
SD-362	10-Apr-1987	ETHYLBENZENE	<5	ug/L
SD-362	10-Apr-1987	FLUORANTHENE	<10	ug/L
SD-362	10-Apr-1987	FLUORENE	<10	ug/L
SD-362	10-Apr-1987	FLUORIDE	1.1	mg/L
SD-362	10-Apr-1987	HARDNESS	180	mg/L
SD-362	10-Apr-1987	HEXACHLOROBENZENE	<10	ug/L
SD-362	10-Apr-1987	HEXACHLOROBUTADIENE	<10	ug/L
SD-362	10-Apr-1987	HEXACHLOROCYCLOPENTADIENE	<10	ug/L
SD-362	10-Apr-1987	HEXACHLOROETHANE	<10	ug/L
SD-362	10-Apr-1987	INDENO(1 2 3-CD)PYRENE	<10	ug/L
SD-362	10-Apr-1987	IRON	1.0	mg/L
SD-362	10-Apr-1987	ISOPHORONE	<10	ug/L
SD-362	10-Apr-1987	LEAD	<0.050	mg/L
SD-362	10-Apr-1987	LITHIUM	<0.0040	mg/L
SD-362	10-Apr-1987	MAGNESIUM	15	mg/L
SD-362	10-Apr-1987	MANGANESE	0.38	mg/L
SD-362	10-Apr-1987	MERCURY	<0.0002	mg/L
SD-362	10-Apr-1987	METHYLENE CHLORIDE	<5	ug/L
SD-362	10-Apr-1987	MOLYBDENUM	<0.010	mg/L
SD-362	10-Apr-1987	N-NITROSO-DI-N-PROPYLAMINE	<10	ug/L
SD-362	10-Apr-1987	N-NITROSODIMETHYLAMINE	<10	ug/L
SD-362	10-Apr-1987	N-NITROSODIPHENYLAMINE	<10	ug/L

STORM DRAIN DATA FOR SD-362

LOCATION	DATE	TEST COMPOUND	RESULTS	UNITS
SD-362	10-Apr-1987	NAPHTHALENE	<10	ug/L
SD-362	10-Apr-1987	NICKEL	<0.050	mg/L
SD-362	10-Apr-1987	NIOBIUM	<0.0070	mg/L
SD-362	10-Apr-1987	NITRATE	1.5	mg/L
SD-362	10-Apr-1987	NITROBENZENE	<10	ug/L
SD-362	10-Apr-1987	OIL & GREASE	<2	mg/L
SD-362	10-Apr-1987	PCB (AROCLOR-1016)	<0.5	ug/L
SD-362	10-Apr-1987	PCB (AROCLOR-1221)	<0.5	ug/L
SD-362	10-Apr-1987	PCB (AROCLOR-1232)	<0.5	ug/L
SD-362	10-Apr-1987	PCB (AROCLOR-1242)	<0.5	ug/L
SD-362	10-Apr-1987	PCB (AROCLOR-1248)	<0.5	ug/L
SD-362	10-Apr-1987	PCB (AROCLOR-1254)	<1	ug/L
SD-362	10-Apr-1987	PCB (AROCLOR-1260)	<1	ug/L
SD-362	10-Apr-1987	PENTACHLOROPHENOL	<50	ug/L
SD-362	10-Apr-1987	PH	8.1	
SD-362	10-Apr-1987	PHENANTHRENE	<10	ug/L
SD-362	10-Apr-1987	PHENOL	<10	ug/L
SD-362	10-Apr-1987	PHOSPHORUS	<0.20	mg/L
SD-362	10-Apr-1987	POTASSIUM	4.2	mg/L
SD-362	10-Apr-1987	PROMETON	2	ug/L
SD-362	10-Apr-1987	PYRENE	<10	ug/L
SD-362	10-Apr-1987	SELENIUM	<0.005	mg/L
SD-362	10-Apr-1987	SILICON	0.90	mg/L
SD-362	10-Apr-1987	SILVER	<0.010	mg/L
SD-362	10-Apr-1987	SODIUM	9.8	mg/L
SD-362	10-Apr-1987	STRONTIUM	0.041	mg/L
SD-362	10-Apr-1987	SULFATE	43	mg/L
SD-362	10-Apr-1987	TEMPERATURE	6.0	Deg. C
SD-362	10-Apr-1987	TETRACHLOROETHENE	<5	ug/L
SD-362	10-Apr-1987	THORIUM	<0.20	mg/L
SD-362	10-Apr-1987	TITANIUM	0.0051	mg/L
SD-362	10-Apr-1987	TOLUENE	<5	ug/L
SD-362	10-Apr-1987	TOTAL DISSOLVED SOLIDS	210	mg/L
SD-362	10-Apr-1987	TOTAL ORGANIC CARBON (TOC)	19	mg/L
SD-362	10-Apr-1987	TOTAL SUSPENDED SOLIDS	1	mg/L
SD-362	10-Apr-1987	TRANS-1 2-DICHLOROETHENE	<5	ug/L
SD-362	10-Apr-1987	TRANS-1 3-DICHLOROPROPENE	<5	ug/L
SD-362	10-Apr-1987	TRICHLOROETHENE	<5	ug/L
SD-362	10-Apr-1987	TURBIDITY	9	NTU
SD-362	10-Apr-1987	UNKNOWNS	17	ug/L
SD-362	10-Apr-1987	URANIUM	0.141	mg/L
SD-362	10-Apr-1987	VANADIUM	<0.50	mg/L
SD-362	10-Apr-1987	VINYL CHLORIDE	<10	ug/L
SD-362	10-Apr-1987	ZINC	0.022	mg/L
SD-362	10-Apr-1987	ZIRCONIUM	<0.0050	mg/L

B -Compound found in the blank

ChemRisk/Shonka Research Associates, Inc., Document Request Form

(This section to be completed by subcontractor requesting document)

TE BENNETT / K-25 ERDMC

Requestor / Document Center (is requested to provide the following document)

Date of request 9/5/95 Expected receipt of document ________

Document number ER025463 Date of document OCT 1988

Title and author (if document is unnumbered) K/HS-153

Name ADC Reviewer ________
Date Sent to ADC ________
Date(s) Cleared 7/21/88

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Date request received 9/1/95

Date submitted to ADC NA

Date submitted to HSA Coordinator 9/18/95

(This section to be completed by HSA Coordinator)

Date submitted to CICO NA

Date received from CICO NA

Date submitted to ChemRisk/Shonka and DOE 9/19/95

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K/HS-153

ORGDP

OAK RIDGE GASEOUS DIFFUSION PLANT

MARTIN MARIETTA

RCRA INVESTIGATION PLAN
K-1004-L VAULTS AREA
OAK RIDGE GASEOUS DIFFUSION PLANT
OAK RIDGE, TENNESSEE

OCTOBER 1988

OPERATED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

October 1988

K/HS-153

RCRA FACILITY INVESTIGATION PLAN
K-1004-L VAULTS AREA
OAK RIDGE GASEOUS DIFFUSION PLANT
OAK RIDGE, TENNESSEE

Prepared by the
Oak Ridge Gaseous Diffusion Plant
Oak Ridge, Tennessee 37831
Operated by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. Department of Energy
under contract DE-AC05-84OR21400

TABLE OF CONTENTS

1. INTRODUCTION

Within the confines of the Oak Ridge Gaseous Diffusion Plant (ORGDP) are hazardous waste treatment, storage, and disposal facilities; some are in operation while others are no longer in use. These solid waste management units (SWMUs) are subject to assessment by the U.S. Environmental Protection Agency (EPA), as required by the 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA). The RCRA Facility Investigation (RFI) Plans are scheduled to be submitted for all the SWMUs during calendar years 1987 and 1988. RCRA Facility Investigation Plan - General Document (K/HS-132) includes information applicable to all the ORGDP SWMUs and serves as a reference document for the site-specific RFI Plans. This plan is based upon requirements described in the draft document, RFI Guidance, Vols. I-IV, July 1987, EPA-530/SW-87-001.

This document is the RFI Plan for one of the SWMUs, the K-1004-L Vaults Area. Contained within this document are geographical, historica' operational, geological, and hydrological data specific to the K-1004-L Vaults Area. The potential for release of contamination through the various media to receptors is addressed. A sampling plan is proposed to further determine the extent (if any) of release of contamination to the surrounding environment. Included are health, safety, quality assurance (QA), and quality control (QC) procedures to be followed when implementing the sampling plan. QC procedures for remedial action occurring on the Oak Ridge Reservation (ORR) are presented in The Remedial Action Program QC Manual, and QA guidelines for ORGDP investigations are contained in The ORGDP RFI QA Plan.

2. OBJECTIVES OF RCRA FACILITY INVESTIGATION PLANNING

2.1 OBJECTIVES

The RFI Plan will identify actions necessary to determine the nature and extent of releases of hazardous contamination from the K-1004-L Vaults Area. The plan summarizes existing site information and addresses the potential for contamination of the soil, groundwater, surface water, and air.

2.2 EVALUATION CRITERIA

In order to prepare and implement a comprehensive sampling plan and to effectively evaluate analytical sampling results, evaluation criteria must first be established. Criteria for evaluating the extent of release of contaminants are based on existing state and federal regulatory guidance and best technical judgment.

The primary media of interest for the K-1004-L Vaults Area are soil and groundwater. Soil samples will be collected as a part of the RFI Plan and analyzed for the contaminants as described in Section 8 of this document. Under the ORGDP Groundwater Protection Program, four quarters of groundwater monitoring data will be collected and analyzed for the parameters listed in Table 2.1 of K/HS-132. The sampling methodology and analytical procedures are designed to characterize the contaminants of interest down to or below levels summarized in Table 2.2 of K/HS-132.

2.3 SCHEDULE FOR SPECIFIC RFI ACTIVITIES

The RFI activities that will be performed and the duration of each activity are shown in Table 2.1.

2.4 FEASIBLE ALTERNATIVES

Knowledge of feasible corrective measures has been used in preparing the RFI. Based on existing geologic, hydrologic, and contaminant source data, potential corrective measures for the K-1004-L Vaults Area have been identified and are shown in Table 2.2. These corrective measures will be re-evaluated after the RFI report is completed.

2.5 RISK ASSESSMENT

The environmental and public health risks associated with possible site contamination and each of the remedial action alternatives listed in Table 2.2 will be evaluated. This evaluation will consist of a characterization of contaminant sources, environmental setting, magnitude of release, pathways to human exposure, and characterization of risk Risk assessment data requirements have been incorporated in development of the site sampling plan.

Table 2.1. Duration of RFI activities for the K-1004-L Vaults Area

	Activities	Duration
1.	Engineering and construction of modifications to existing building space to serve as replacement for ETAC power electronics laboratory. Relocation of ETAC motor shop equipment to replacement facilities	40 weeks
2.	Characterization of storage vaults	12 weeks
3.	Site preparation and sample location	
	(a) Soil samples	2 weeks
	(b) Groundwater samples (includes well construction)	8 weeks
4.	Collection of samples	
	(a) Soil samples	6 weeks
	(b) Groundwater samples	52 weeks
5.	Analyses of Samples	
	(a) Soil samples	16 weeks
	(b) Groundwater samples[1]	66 weeks
6.	Compilation of data and data presentation	16 weeks
7.	Evaluation of results and recommendations	4 weeks
8.	Preparation of RFI report and submittal to EPA	8 weeks
9.	Additional sampling phases as needed	TBD

[1]Groundwater sample analysis will occur concurrently with groundwater sample collection.

Table 2.2. Potential corrective measures for the K-1004-L Vaults Area

General Response Action	Technologies
Monitoring	Surveillance monitoring and analysis
Removal of source	Remove radioactive materials and tanks. Excavate and treat/dispose of contaminated waste and soil
Containment from surface water	Construction of drainage channels, dikes to divert surface runoff and stormwater runoff around contaminated soils
	Cap contaminated area with clay, synthetic membranes, fabrics, etc.
Containment from groundwater	Subsurface collection drains - french drains, tile drains, pipe drains
	Vertical containment barriers - soil-bentonite slurry wall, cement-bentonite slurry wall, vibrating beam, grout curtains, steel sheet piling
	Groundwater diversion pumping - well points, deep wells, suction wells, ejector wells
Treatment of groundwater	Collect the groundwater and pump to a wastewater treatment plant for physical/chemical treatment or on-site treatment by aeration, filtration, carbon adsorption, or biological processes

3. DESCRIPTION OF CURRENT CONDITIONS

3.1 GEOGRAPHICAL INFORMATION

The K-1004-L Vaults Area is located within the ORGDP near the intersection of Avenue "D" and 5th Street in the immediate vicinity of what is now known as the K-1004-J building. A map of the area relative to the ORGDP is shown in Figure 3.1. The K-1004-L Vaults Area consists of the following components:

- a concrete pit which once contained a 750 gallon tank (hot pit)
- 5,500 gallon storage tank
- six vaults (storage wells) beneath the K-1004-J building

The hot pit was an underground 750-gallon stainless steel tank located on the southeast corner of the laboratory. The storage tank is an underground 5,500-gallon tank measuring 6 feet in diameter and 26 feet in length located due south of the entrance corridor to K-1004-J. The vaults were east of the original K-1004-J building (see Figure 3.2, shaded area), but are now below the concrete floor of building addition to the K-1004-J building. The vaults were constructed of 8-feet long 30-inch diameter reinforced concrete pipe placed in the ground on a 2-inch concrete pad and covered by a removable 4-inch concrete cap. Figure 3.2 is a schematic diagram of the K-1004-L Vaults Area components. Figure 3.3 is a cross-section of the vaults.

3.2 HISTORICAL INFORMATION

The original K-1004-J Laboratory was designed as a facility for research and development work on the recovery of uranium from the Hanford operations spent fuel solutions. This project began in the late 1940s and continued into the early to mid 1950s. At the close of the project, some of the equipment used in the uranium recovery was removed and the area decontaminated.

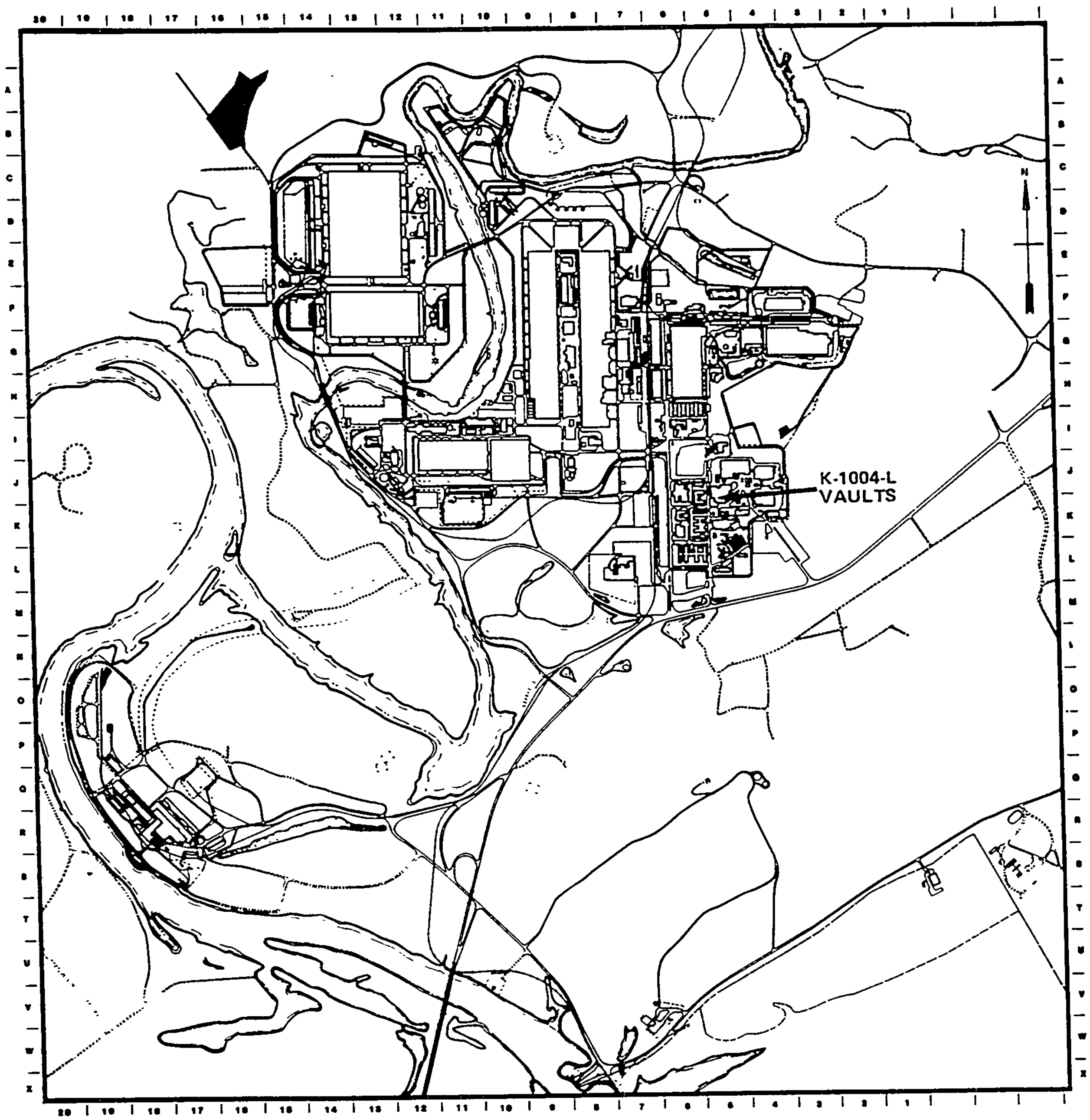


Fig. 3.1. ORGDP location of the K-1004-L Vaults

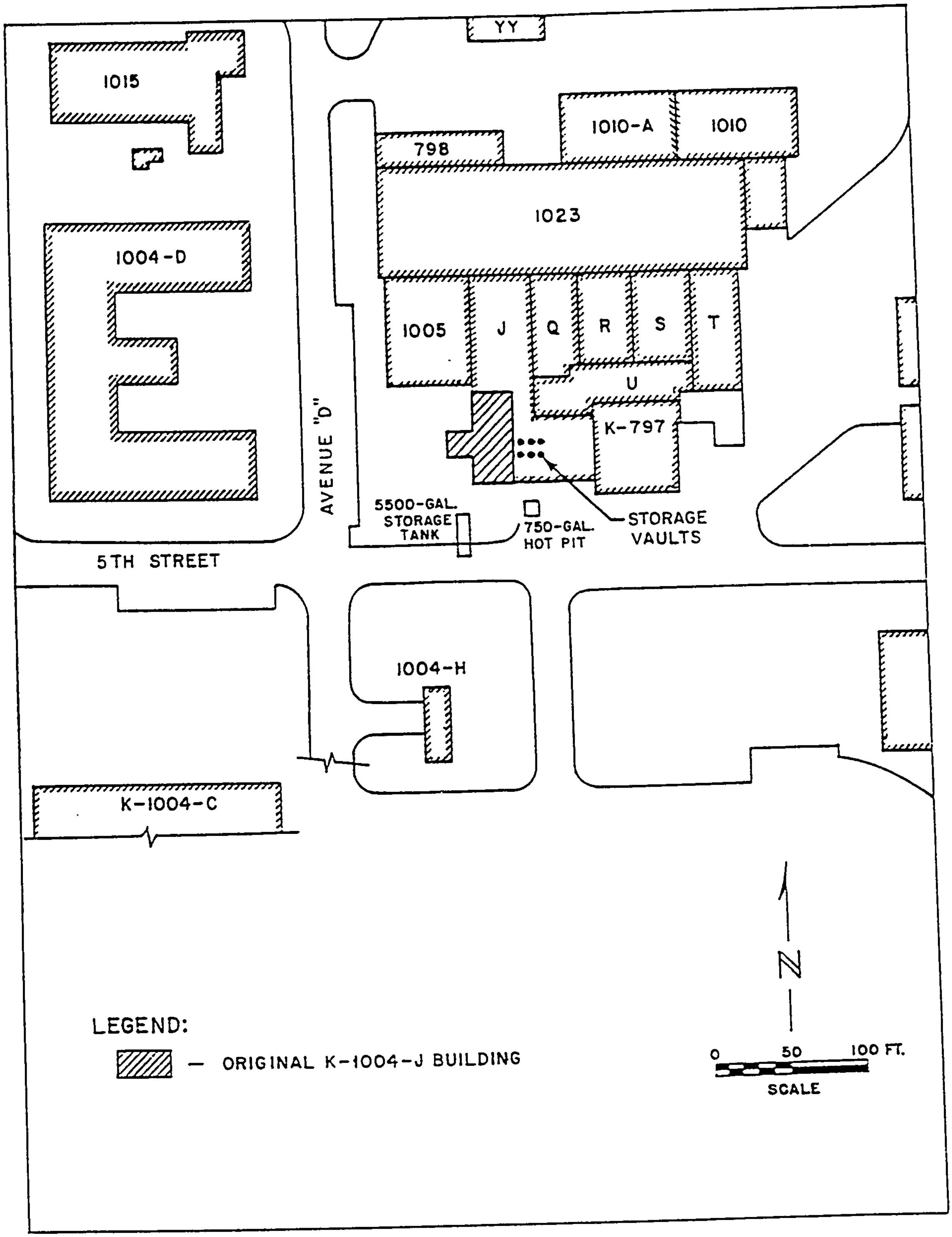


Fig. 3.2. Diagram of the K-1004-L vault area

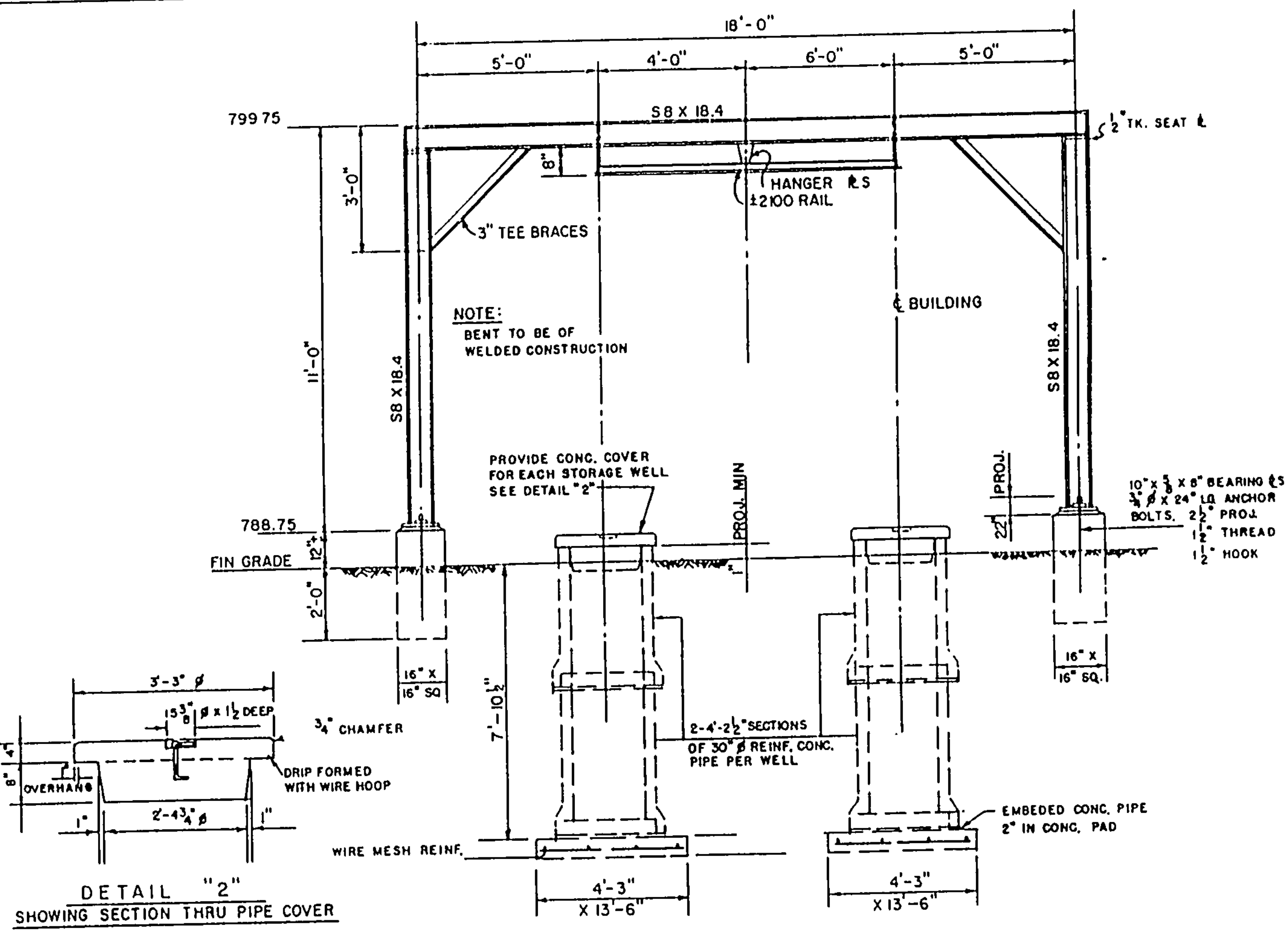


Fig. 3.3. Cross-section of the vaults (taken from D-AWS-7162)

The Uranium Recovery Project was followed by another research and development project aimed at improving the conversion of uranium trioxide to uranium hexafluoride, thus improving feed plant production efficiencies. The uranium oxide conversion project continued into the mid to late 1950s. Use of the original K-1004-J Laboratory for centrifuge development work began in November 1961. During 1962-1963, the Centrifuge Project personnel expanded the facility and poured a 4 to 6-inch concrete slab over the site of the vaults; the storage wells likely remained. Since there are no records detailing the vaults utilization or disposition, it is assumed that they still contain radioactive wastes. The building that covers the vaults currently houses the Enrichment Technology Application Center (ETAC) power electronics laboratory.

According to interviews, wastes from the 750-gallon tank were removed to Oak Ridge National Laboratory (ORNL) for disposal. The tank was removed and taken to the K-1064 Burn Area/Peninsula Storage. The tank was later moved to the White Wing disposal area near the intersection of state routes 58 and 95. The status of the tank's concrete containment pit is unknown.

Wastes from the 5,500-gallon storage tank were also removed to ORNL for disposal. The tank was flushed and likely decontaminated, welded closed, and left in place. In 1980, the tank was partially uncovered during extension of 5th Street; at this time, samples were collected from the tank and analyzed for radioactivity. The analyses detected no radioactivity. The tank was filled with sand, sealed, and covered with fill.

3.3 OPERATIONAL INFORMATION

The K-1004-J Laboratory had an elaborate drain system, as shown in Figure 3.4. The drain lines discharged to the hot pit at the southeast corner of the laboratory and to the storage tank at the southwest corner of laboratory (due south of the entrance corridor to K-1004-J). The highly radioactive drains from the laboratory discharged to the hot pit while lower level wastes discharged to the storage tank.

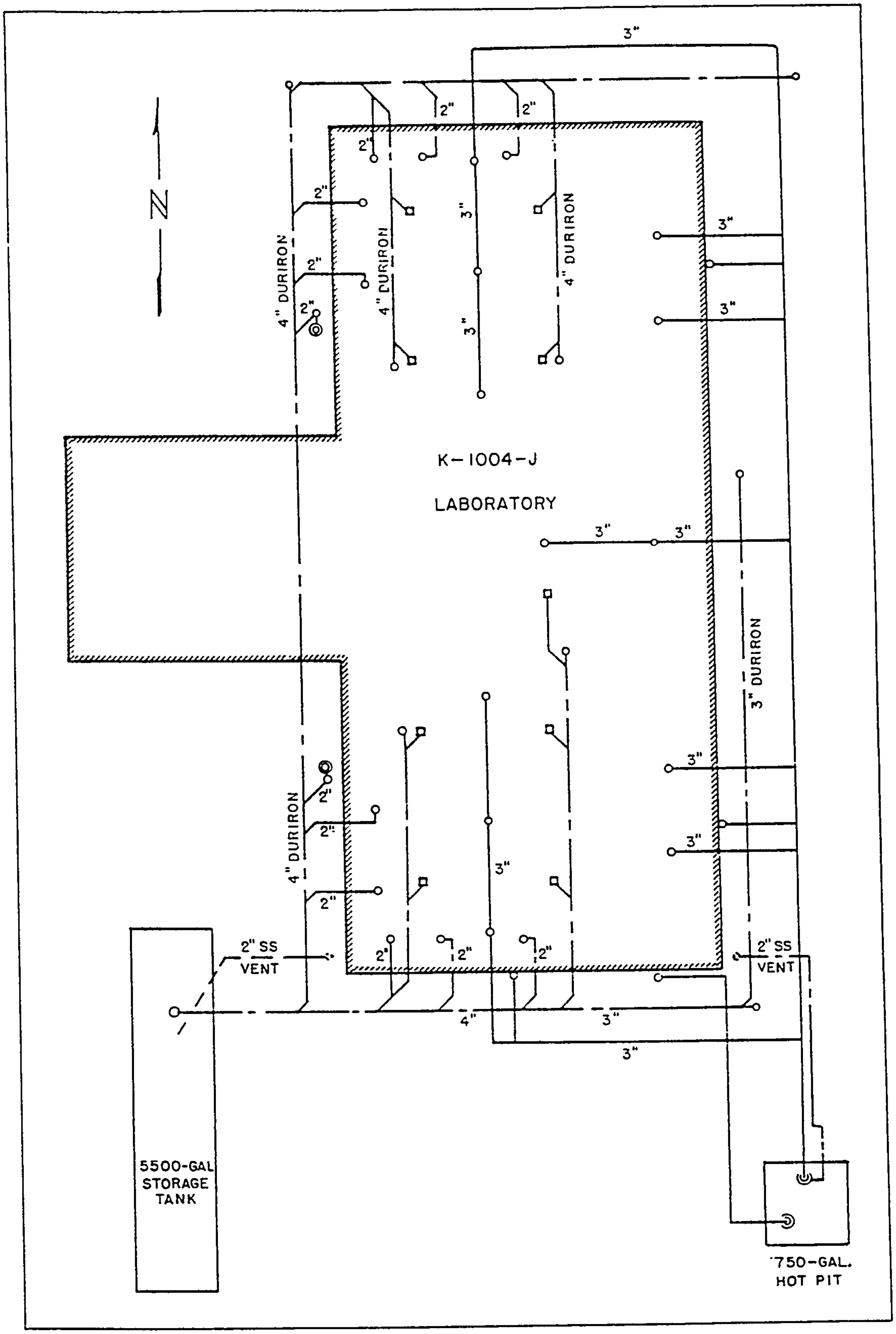


Fig. 3.4. Schematic of the process drain system for the K-1004-L vaults area

The vaults were used to store radioactive materials which were conveyed there from the laboratory in lead shielded containers by means of a hoist suspended from a monorail. The materials were deposited in the vaults and covered with sand.

The Uranium Recovery Project consisted of research and development work in the recovery of uranium from Hanford reactor spent fuel solutions. The Hanford solutions were the by-product of the stripping of plutonium from the reactor spent fuel. The solutions contained isotopes of uranium, transuranics, and uranium fission products. Radioactive elements such as neptunium, californium, traces of plutonium (alpha emitter), cesium (gamma emitter), and technetium (beta emitter) were present. The Uranium Oxide Project involved reacting UO_3 with H_2 to produce UO_2 and reacting UO_2 with HF to produce UF_4. The Centrifuge Process succeeded the Uranium Recovery Project.

4. CHARACTERIZATION OF THE CONTAMINANT SOURCE

Records of the quantities of chemicals discharged through the process lines are not available. No inventory of the contents of the storage wells has been found. However, the Hanford reactor spent fuel solutions contained the following radioactive elements:

- neptunium
- californium
- technetium
- plutonium
- cesium
- uranium

5. CHARACTERIZATION OF THE ENVIRONMENTAL SETTING

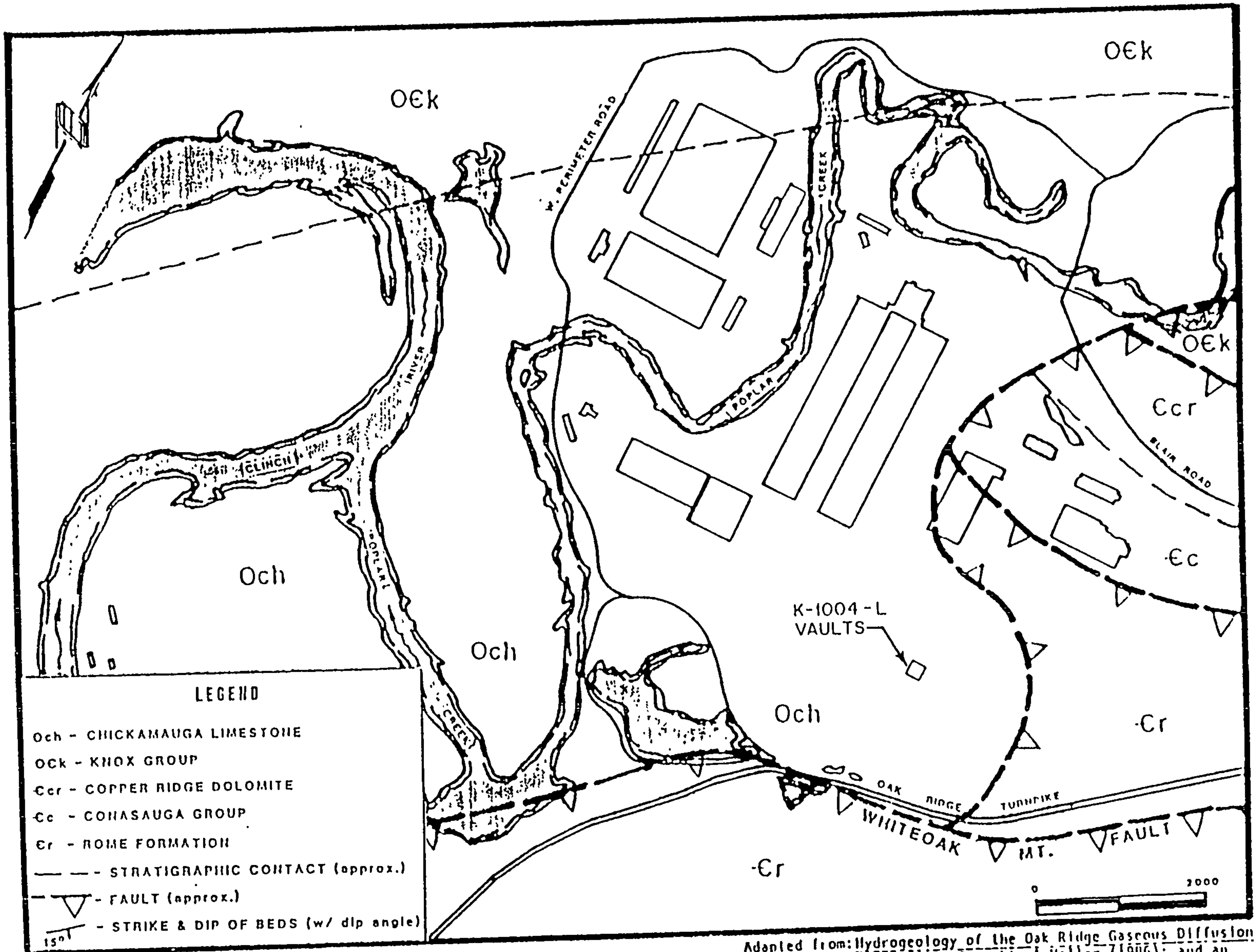
The K-1004-L Vaults Area and related installations are located in the southeastern part of the ORGDP site. The area is covered mostly with buildings and pavement so that local soil and bedrock conditions cannot be directly observed. There are no available geologic data specific to this SWMU, but subsurface conditions may be generally described from observations and well logs of nearby areas which are underlain by the same geologic formation.

5.1 HYDROGEOLOGY

The K-1004-L Vaults Area is underlain by the Chickamauga limestone which consists mainly of gray to blue-gray or greenish, very fine-grained (micritic) limestone with interbedded calcareous shale and shaley limestone. The limestone may be relatively "pure" or argillaceous (contains clay) and is generally medium to thinly bedded with bedding planes comprised of very thin, dark shaley partings. Some of the shaley or more argillaceous units may have a "nodular" fabric. Chert occurs at some horizons in the Chickamauga, either as zones of nodules or in thin, irregular layers. The calcareous shales are mostly gray to greenish and contain occasional thin beds of micritic limestone. There are no known bedrock outcrops in the subject area.

There are no available descriptions of the soils in the vicinity of the K-1004-L Vaults Area; however, drill logs from nearby geologically similar areas allow a very general characterization. Residuum derived from the Chickamauga limestone is typically yellow-brown or reddish to brown, silty clay which may contain scattered fragments of shale, chert, and weathered limestone. The thickness is variable up to about 30 feet.

The dominant geologic structural feature of the area is the Whiteoak Mountain fault which trends northeast-southwest about 1,000 feet south of the K-1004-L Vaults Area (Figure 5.1). This site is in the footwall of the fault which has thrust the Rome formation over the Chickamauga limestone and the bedrock here has been subjected to considerable deformation so that dips (inclination of beds) are likely to be highly



Adapted from: Hydrogeology of the Oak Ridge Gaseous Diffusion Plant Site, Geraghty & Miller (1986); and an unpublished map by R.H. Ketelle, ORNL.

Fig. 5.1. Geologic map of the ORGDP area

variable. The strike of the inclined strata will probably be northeast-southwest, approximately parallel to the strike of the fault. The deformation will have caused extensive fracturing and jointing in the bedrock, especially in the more competent lithologies (i.e., limestone, dolomite, etc.).

Groundwater storage and movement in the Chickamauga bedrock occurs in a system of interconnecting channels developed mainly within the carbonate units by solution-enlargement along joints, fractures, and bedding planes. Fractures in the more insoluble shales are relatively "tight", and water movement is restricted but the shaley units tend to channel groundwater flow in interbedded carbonates along bedding planes parallel to the strike. The direction of groundwater flow in bedrock beneath this site is probably southwest along the strike toward the K-1007-B Holding Pond (Figure 5.1).

There are no permeability data presently available for bedrock in the K-1004-L Vaults Area; however, tests of wells in similar areas of ORGDP indicate the Chickamauga limestone to have an average hydraulic conductivity of approximately 3.5×10^{-3} centimeters per second (cm/sec). This value is presumed to be representative of the Chickamauga beneath the subject site.

Groundwater flow direction in the unconsolidated zone should be to the southwest toward the K-1007-B Pond. No site-specific permeability data are available for the soils here, but tests on similar soils in the ORGDP area indicate a probable range in hydraulic conductivity of 10^{-5} to 10^{-6} cm/sec. Hydraulic gradients in both the bedrock and the unconsolidated zone should be very low with correspondingly low flow rates, and there is probably little interflow between the aquifer systems.

5.2 SURFACE WATER

Most surface runoff in the K-1004-L Vaults Area is diverted into a storm drain system (SD-100) that discharges to the K-1007-B Pond. The portions of this drainage system which formerly accepted laboratory wastes from the K-1004-J building are shown in Figure 5.2. The land surface around the K-1004-L Vaults Area is almost flat but does slope very gently

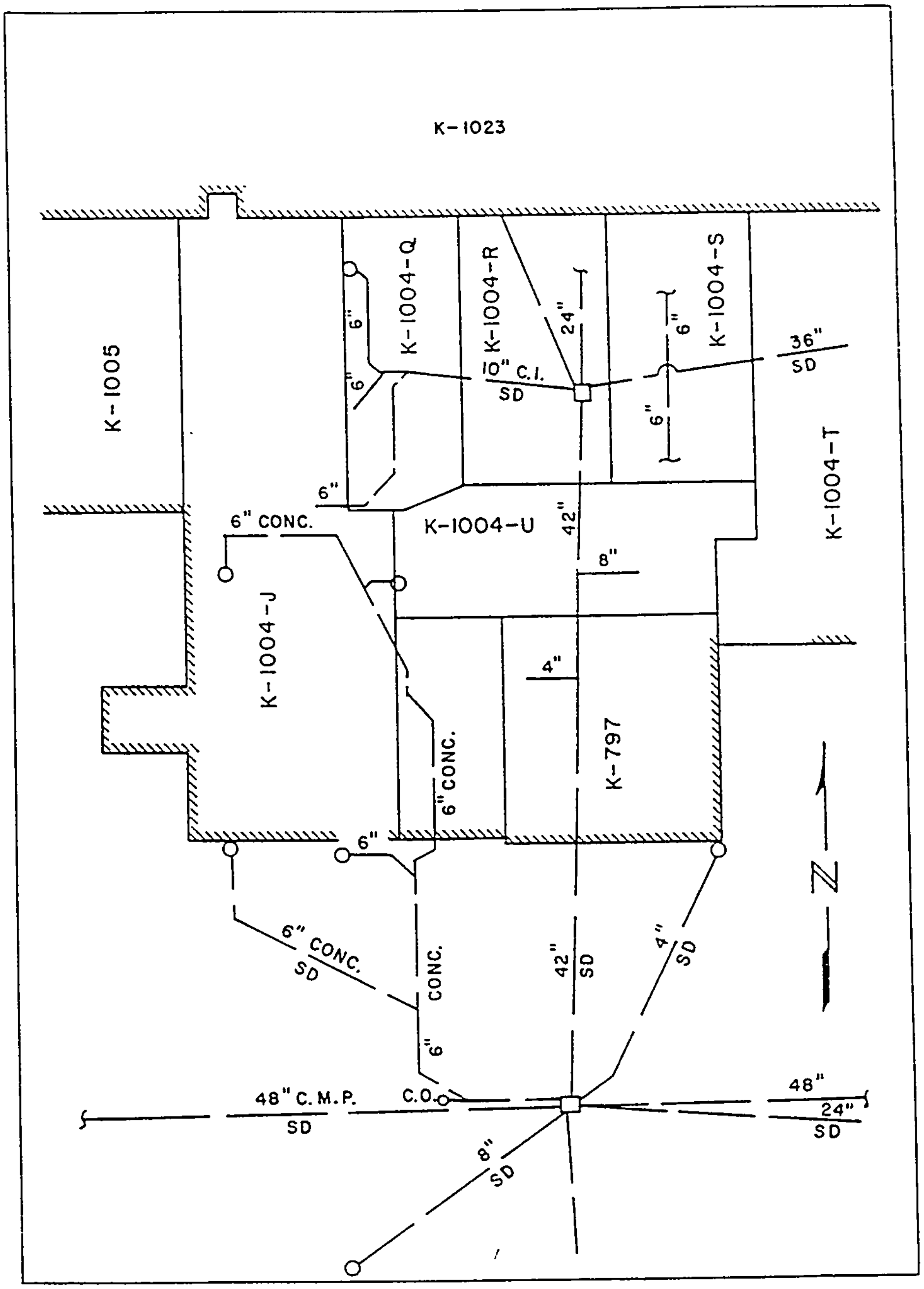


Fig. 5.2. Storm drain system for the K-1004-L vaults

to the southwest, and any runoff water not intercepted by the storm drain will also flow toward the K-1007-B Holding Pond. The pond is discharged into Poplar Creek under the authority of an NPDES permit. There are no springs, streams or other natural surface water features in the vicinity of the K-1004-L Vaults Area.

5.3 AIR

No site-specific air quality are available for this SWMU. Martin Marietta Energy Systems has an ongoing study of the air quality and meteorological conditions, and general data for the ORGDP are available in K/HS-132.

6. IDENTIFICATION OF POTENTIAL PATHWAYS AND RECEPTORS

Assessments of inactive hazardous waste disposal or storage sites are required to evaluate the sites' potential for health or safety risks to the environment, public, and personnel. Determination of such risks must be based on evaluations of both the potential pathways of contaminant migration from toxic releases and the possible receptors of the contamination. Information used in the evaluations of the pathways which might release contaminants from the K-1004-L Vaults Area has been obtained from (1) discussions with personnel with knowledge of K-1004-J laboratory operations and (2) past remedial actions taken at the site. K/HS-132 will serve as a general reference concerning the potential pathways and receptors for the ORGDP.

Disposal of liquid waste in the pit and tank and burial of containerized waste below ground in a vault suggests that groundwater and soil are potential migration pathways of concern. Soil sampling around the pit and tank and groundwater monitoring under the ORGDP Groundwate Protection Program are proposed to assess the nature and extent oı possible contamination. Air and surface water are not considered likely contaminant migration pathways due to the waste disposal methods.

6.1 POTENTIAL PATHWAYS OF MIGRATION

6.1.1 Groundwater

The possibility of pit or pipe leakage from the K-1004-J Lab Area indicates some potential for groundwater contamination. Site-specific hydrogeological data are not available for this area of the ORGDP; however, a groundwater monitoring well network is proposed. The nature and extent of possible groundwater contamination will be characterized by sample analyses from this well network under the ORGDP Groundwater Protection Program.

6.1.2 Soil

The possibility of pit or pipe leakage from the K-1004-J Lab area indicates some potential for soil contamination. A low hydraulic gradient coupled with low permeabilities could result in residual soil contamination. The nature and extent of potential soil contamination will be assessed by analysis of soil samples taken from the area immediately surrounding the pits.

6.2 POTENTIAL RECEPTORS

6.2.1 Human Populations

The security controls required by the Department of Energy (DOE) on entrance to ORGDP prevent public access to the K-1004-L Vault Area. Thus, the only public populations of interest are those which might come into contact with one of the exposure pathways beyond the boundaries of the site itself (i.e., through the reach of groundwater).

Of the 25 potable water wells within one mile of ORGDP, none of the wells are in proximity to the K-1004-J area and none are believed to occupy the same hydrogeological environment as the groundwater at the site. Further, of the ten public water supplies which withdraw from the Clinch-Tennessee River system, none are nearer than 15 miles to the Oak Ridge Reservation (ORR). While direct discharge of site groundwater presents the potential for contamination, distance and dilution effects make pollution of public water supplies of low probability. Finally, the effects of distance and dilution also make unlikely the possibility that contamination of groundwater would reach the waters used downstream in the Clinch-Tennessee River system for recreational and industrial use. The risk of contamination released from the site to the public will be assessed subsequent to the RFI.

6.2.2 Fauna and Flora

K/HS-132 discusses the rare, threatened, and endangered plant and animal species which are thought to inhabit the area. To date, there has been no report that any of these species in the vicinity of the K-1004-L

Vaults Area or surrounding area are directly threatened by any possible contamination present there. The risk of contamination released from the site to the local flora and fauna will be assessed subsequent to the RFI.

6.3 SUMMARY AND CONCLUSIONS

The nature of the materials disposed of in the pit, tank, and vaults, and the site hydrogeology indicate the potential for soil and groundwater contamination. Evaluation of the potential pathways of contaminant migration and possible receptors shows sufficient potential for environmental contamination and warrants an investigation of the site.

7. EXISTING MONITORING DATA

Data from SD 100-06 are presented in the appendix. The storm drain data were compiled from the report entitled ORGDP Storm Drain Characterization (W. J. Scheib, 1987).

8. SAMPLING PLAN

8.1 SAMPLING AND ANALYTICAL STRATEGY

The area of interest consists of three underground repositories. Two of these repositories are underground tanks which probably at one time contained radioactive waste solutions. The third repository is a series of underground vaults used for the storage of containerized radioactive materials. The underground pit and tank are located so as to be accessible by a drilling rig. The three repositories only contained radioactive material since radiochemical research was the only work performed within the K-1004-J Lab Area during the operational lifetime of the repositories. As such, samples collected as part of the Phase I investigation will be analyzed for gross alpha, beta, and gamma.

The vaults will be accessed to determine if radioactive materials are still present. Soil samples will be taken from the area around the pit and tank to determine the extent (if any) of soil contamination due to leakage from them. Groundwater samples, withdrawn from wells within the K-1004-J area as part of the ORGDP Groundwater Protection Program, wil also be utilized to characterize the site. No other pathways of migration (see Section 6) are seen as significant based on the identification of potential pathways and receptors.

8.2 SOURCE CHARACTERIZATION

Since the contents of the storage vaults are unknown, source characterization is necessary to determine potential hazards. Due to the uncertainties of the sampling, a worse case scenario has been assumed. The worst case is defined as the vaults containing radioactive material. The radioactive material may have leaked out of the lead containers and contaminated the soil. Procedures for sampling the vaults are described below:

- Replacement facilities for the Enrichment Technology Application Center (ETAC) power electronics laboratory shall be designed and constructed. The ETAC equipment shall be relocated.

- The exact location of each vault (Figure 8.1) in the building shall be determined. Warning signs or tags will be posted and a barricade will be erected which provides for absolute exclusion of unauthorized personnel with entrances locked or blocked. Ventilation in the area shall be isolated.

- A 4 foot by 4 foot opening will be sawed in the concrete floor above one of the vaults.

- While monitoring for radiation at hole, a lifting fixture will be attached to the concrete and the concrete removed. The hoist will be operated remotely.

- The crushed rock or concrete rubble beneath the floor will be removed. When the concrete cap to the vault has been exposed, the lifting fixture will be used to remove it while work personnel are equipped with supplied air breathing apparatus.

- After the cap is removed, the sand will be removed using a high efficiency vacuum remotely operated. The sand will be packaged and transported to an approved disposal facility.

- The lead shielded containers will be removed using remotely controlled equipment. The containers will be packaged in DOE/DOT/EPA approved containers and transported to an approved disposal facility (e.g., transuranic storage at solid waste storage area 5).

- The above procedure will be repeated for the remaining five vaults.

If the level of radiation is greater than 100 mR/hr but less than 1,250 mR/hr, work personnel will conduct the site characterization using lead shielding and supplied air apparatus. If the radiation readings are below 100 mR/hr, the site health and safety officer may choose to reduce personnel protection to Level C or Level D.

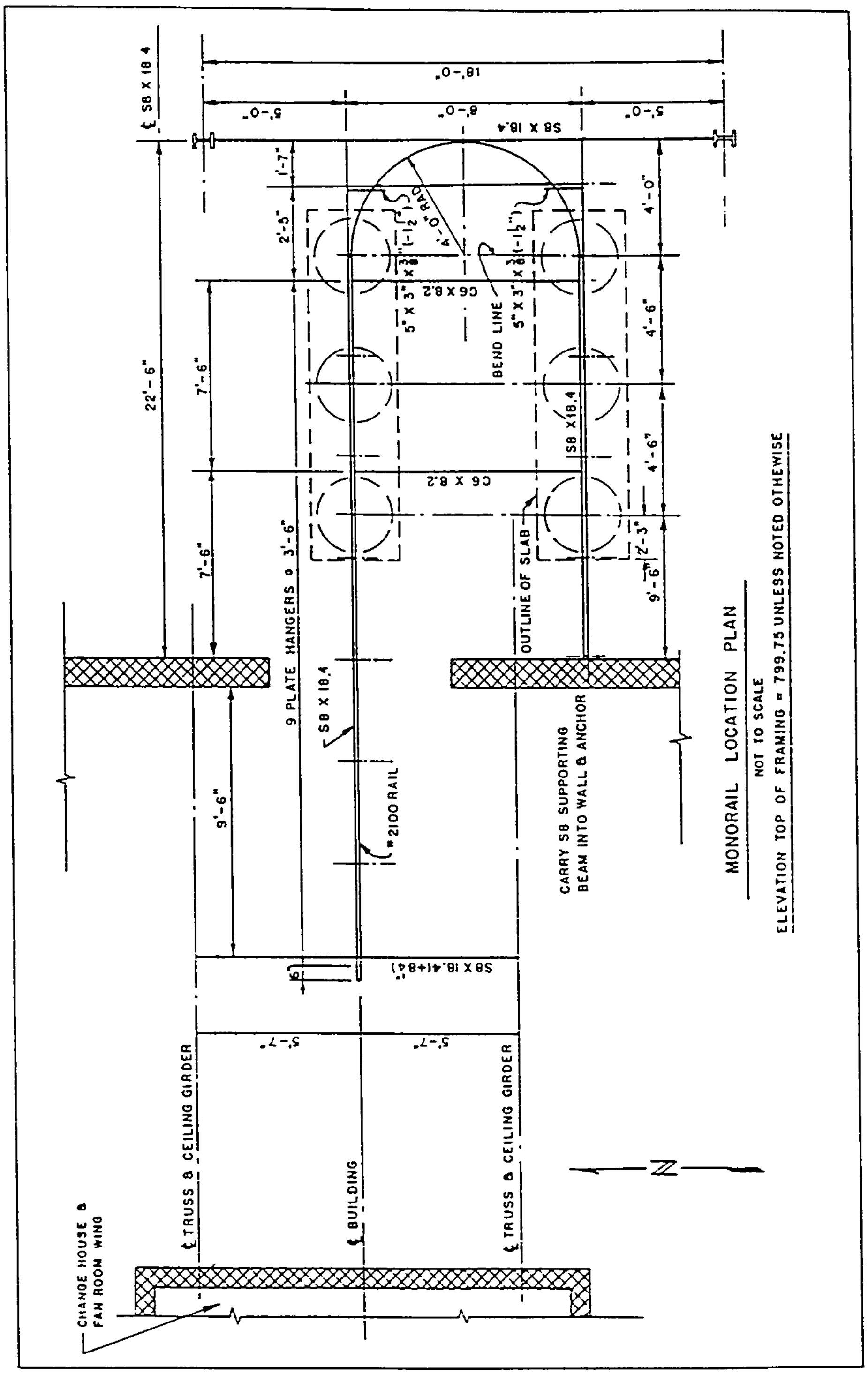


Fig. 8.1. Plan view of the vaults (taken from D-AWS-7162)

8.3 STATISTICAL SET-UP FOR SAMPLING

8.3.1 Soil Sampling

Sampling will occur in phases of soil sampling, chemical analysis, and statistical analysis of the resultant data. These phases will continue until there is sufficient information on the extent of contamination in the soil, and decisions can be made concerning appropriate remedial actions.

The first phase of soil sampling is designed to determine whether there have been leaks from the underground tanks. Five corings to bedrock will be taken from around the perimeter of each tank or pit. Two background corings will be taken as shown in Figure 8.2. From each drilling to bedrock, a soil sample will be taken: (a) from every distinct layer of soil, (b) from boundaries between soil layers, and (c) at regular intervals (Figure 8.1) of four feet of depth from the surface level. For thicker layers, soil from 2 consecutive two-foot split barrels will be composited with care not to composite across soil layer types or layer boundaries. These individual samples will be divided with a portion of each sample from the coring going into a single coring composite, and a portion of each sample individually saved in case better resolution on the composite or a backup analysis is needed (Figure 8.3).

8.3.2 Groundwater Monitoring

Three groundwater monitoring wells are designated to indicate if leaks from the K-1004-L Vaults Area (and associated tanks) have contaminated the uppermost aquifer. These wells are to be placed at the approximate locations shown in Figure 8.4, just south and southwest from the subject facility. The monitoring wells will be installed under the ORGDP Groundwater Protection Program.

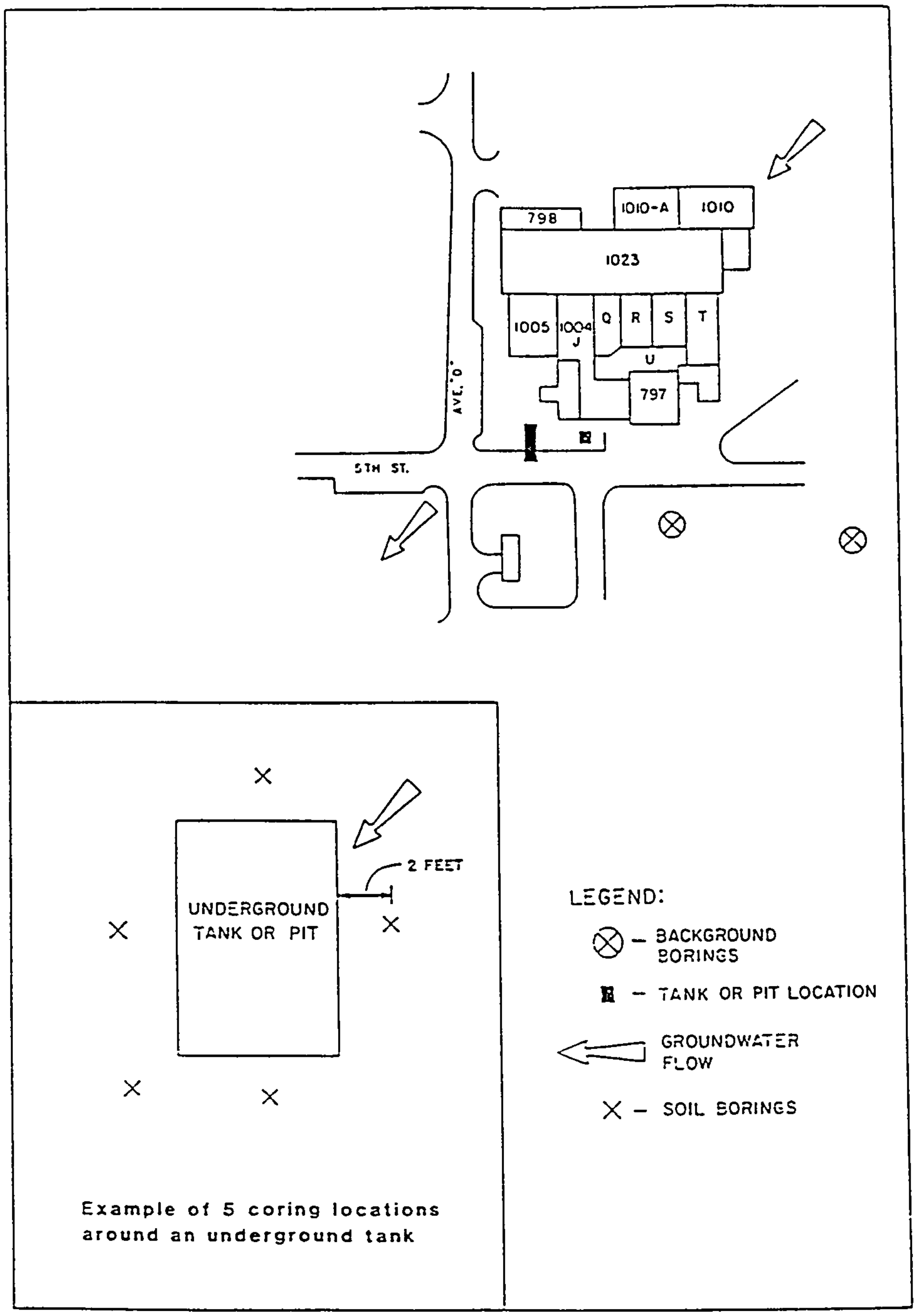


Fig. 8.2. Sampling locations around underground pit and tank

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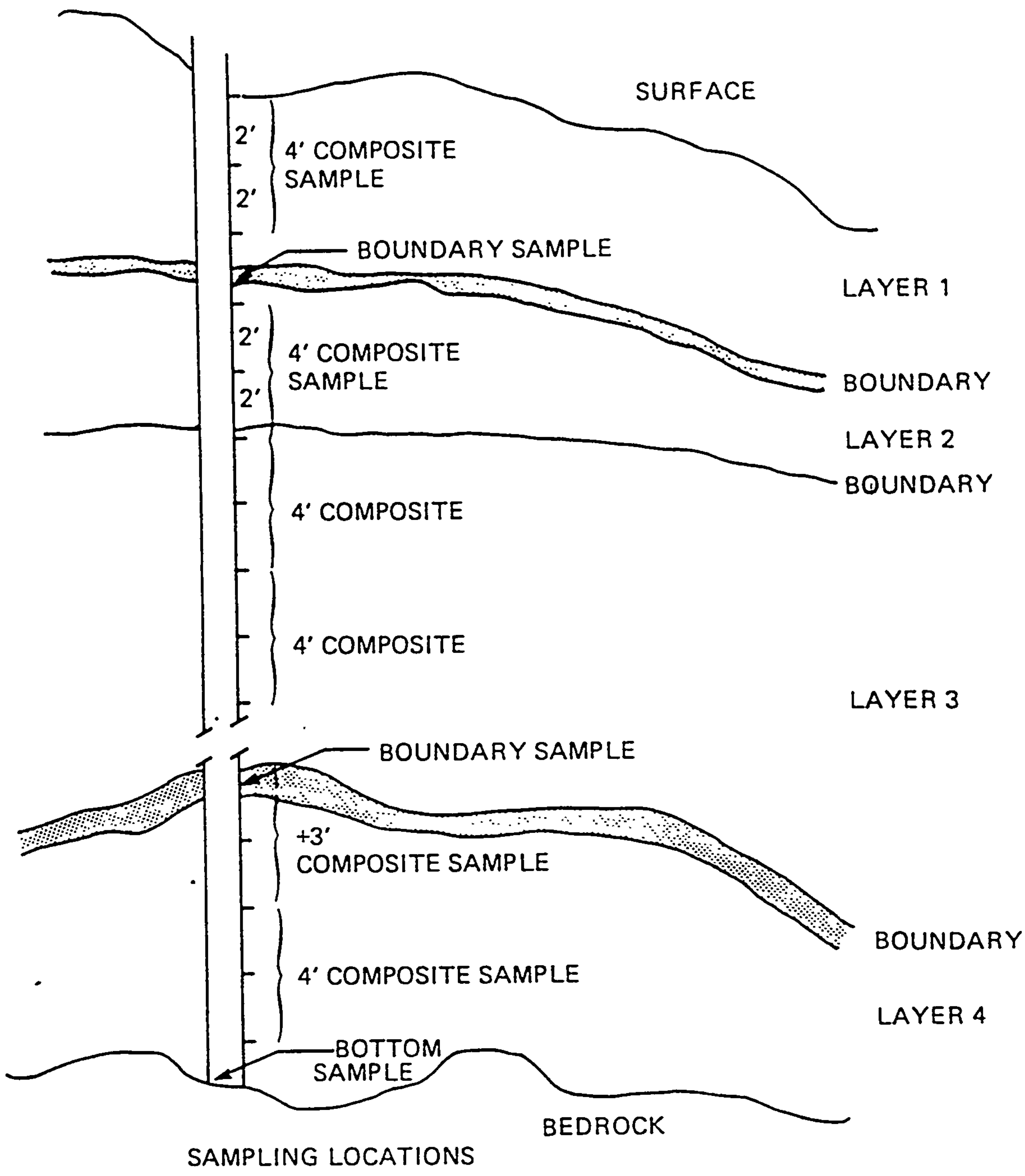

Fig. 8.3. Sampling within a core

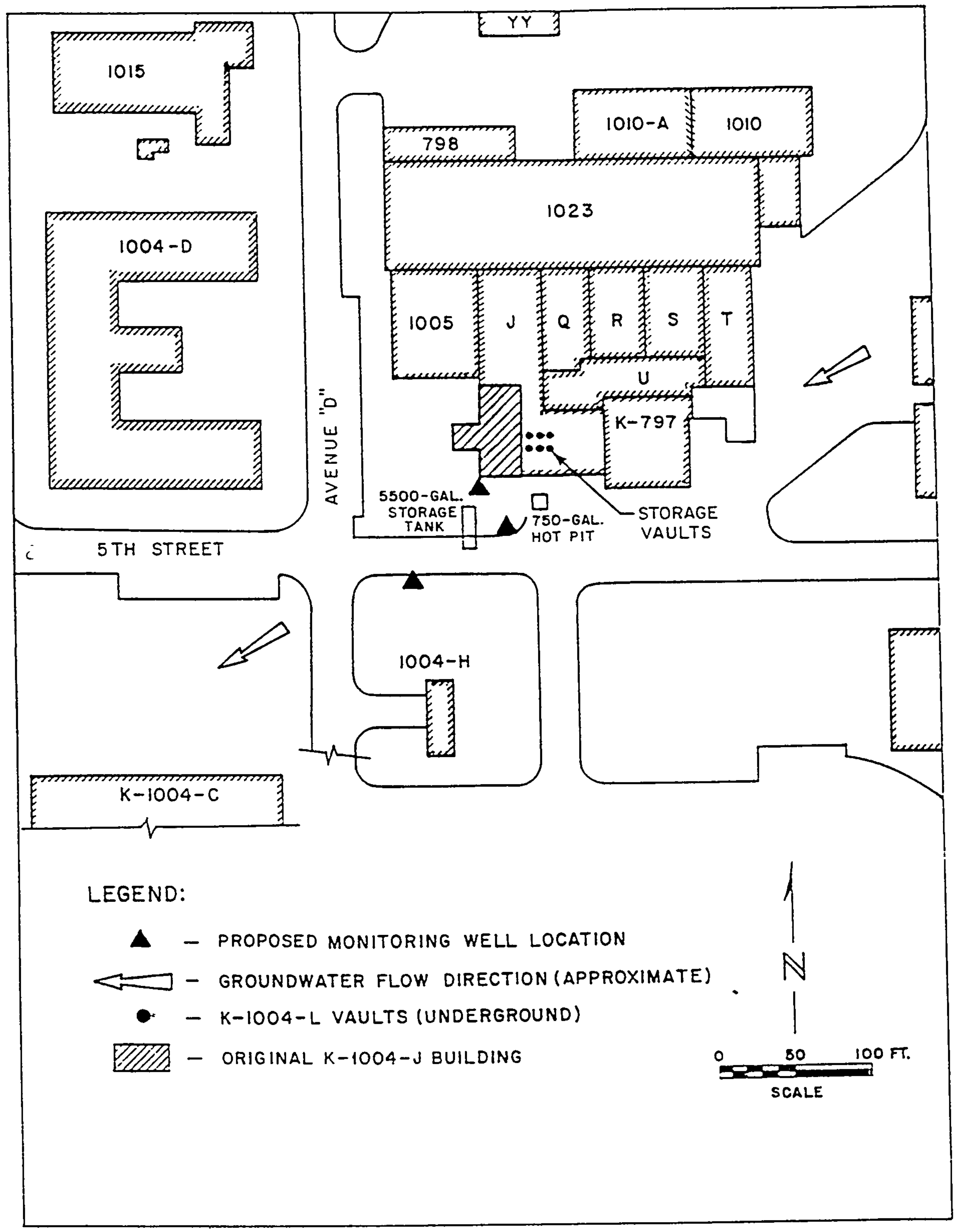

Fig. 8.4. Groundwater well locations

8.4 FIELD SAMPLING

8.4.1 Site Preparation

In order to accurately locate the drilling locations discussed in Section 8.2, arrangements will be made with Martin Marietta Energy Systems Engineering to have the site surveyed. Once surveying is complete, it will be necessary to also get an excavation permit through Energy Systems Engineering. Prior to any sampling, it will be necessary to install the groundwater wells discussed in Section 8.2.2. These wells should be constructed in accordance with the specifications contained in RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (EPA/OSWER-9950.1).

8.4.2 Equipment and Supplies

The drillers will provide all necessary drilling equipment (hollow core auger, split-barrel sampler, etc.). The following field sampling supplies will be required:

- Nonionic detergent, Micro (International Products Corp.)
- Deionized water
- Isopropyl alcohol
- Glass containers, pre-cleaned, with Teflon-lined lids, one quart capacity
- Logbook
- Chain-of-custody seals
- Chain-of-custody forms
- Sample labels
- Stainless steel trays
- Aluminum foil
- Stainless steel spatulas
- Remotely operated equipment

8.4.3 Soil Sampling Procedure

Collection of samples from this site will follow ASTM Method D-1586-84 Penetration Test Split-Barrel Sampling of Soils. The drilling will be performed by private drilling contractors. In order to obtain a sample that is undisturbed by the auger operation, a hollow core auger will be used to remove the soil above each segment to be sampled and the split-barrel sampler will be driven into the soil through the center of the auger.

A split-barrel sampler will be used to remove samples in 2-foot segments. Samples will be collected to auger refusal. At each 2-foot increment, the drilling crew will remove the split-barrel sampler from the drill rig and separate it to expose the sample. The sampling team will transfer the sample from the split-barrel sampler to containers for compositing. The soil from two consecutive coring segments will be combined in a foil-lined stainless steel pan, mixed, and transferred to a pre-cleaned one quart jar (sample should fill the jar).

Between samples, the equipment used for sample transfer will be cleaned with nonionic detergent and water and rinsed with deionized water and isopropyl alcohol. The split-barrel samplers will be detergent cleaned and rinsed with water by the drilling company.

From 10 percent of the core segments (to be determined in the field), duplicate samples will be submitted to the laboratory to fulfill QA/QC requirements set forth in Section 7.3, K/HS-132.

Sample containers will be labeled with the site identification, date, time, sample identification, and sampler's name. Sample date, site identification, time, sample identification, sampler's name, and coordinates of the sample will be recorded. In addition to the required entries, any other pertinent information and/or observations shall be recorded. The logbook used for these records will contain a copy of the map of the area and a copy of the sampling plan.

The sample containers shall be sealed and transported to the laboratory under chain-of-custody protocol as referenced in Section 7.4, K/HS-132.

8.4.4 Groundwater Sampling

Sampling of the monitoring wells described in Section 8.2.2 will be incorporated into the ORGDP Groundwater Protection Program and will therefore be subject to the established protocols of that program.

8.5 ANALYTICAL PROTOCOL

An analytical sampling protocol with the following salient features is proposed. The soil samples discussed are obtained as outlined in Section 8.3.

The presence of radioactive contamination is the only concern at this site. All soil samples obtained will be analyzed for gross alpha, beta, and gamma according to the procedures specified in Table 7.8 of K/HS-132. For any samples where the total radioactivity exceeds acceptable limits, a radionuclide characterization will be performed.

8.6 SAMPLE ANALYSIS

Soil analysis will follow the protocol outlined in Section 7.2.4 of the K/HS-132. The QA/QC requirements outlined in Section 7.3 of the K/HS-132 will be followed for all analyses.

9. DATA MANAGEMENT PROCEDURES

The results of the chemical analyses of the soil samples will be presented in a clear and logical format, so as to best illustrate any patterns in the data. These will include tabular, graphical, and other visual displays such as maps and contour plots, as appropriate to the data.

Statistical analyses will provide for treatment of duplicate laboratory analyses and results which are reported as less than detection limit, and for examination for statistical outliers. Where possible, values which are reported as less than detection limits will be handled according to RCRA Ground-Water Monitoring Enforcement Guidance Document, (EPA-OSWER-9950.1), which directs calculation through the use of Cohen's statistical methodology. This is found in "Tables for Maximum Likelihood Estimates from Single Truncated and Singly Censored Samples," Technometrics, Volume 3, pages 535-541, 1961. Otherwise, the detection limit will be used in the statistical analyses.

Average contaminant values for the potential release areas will be compared to their appropriate average background values and to pre-established limits using statistical t-tests. Statistical confidence bounds (upper, lower, or both) will be determined for the contaminants at a given sampling location and depth, where appropriate.

10. HEALTH AND SAFETY PROCEDURES

10.1 INTRODUCTION

Specific requirements and procedures to protect the health and safety of the investigating team, ORGDP site personnel, and the general public during the K-1004-L Vaults Area RFI are addressed in this section.

The K/HS-132 details the health, safety, environmental, security, plant protection, and emergency response organizations which are in place at the ORGDP line organizations to meet the requirements for health and safety during the RFIs. They provide the communications, response, and reporting for any plant emergency; on-site medical facilities with medical surveillance, treatment, monitoring, and periodic physical examinations; health physics and industrial hygiene surveillance hazard evaluation and control; operational safety accident prevention and control; and plant security and visitor control.

In addition, K/HS-132 identifies the organizational responsibilities for health and safety at the SWMU sites during the RFIs. The document also includes the methodology for establishing the work zones to each SWMU, the level of protection required in the exclusion zone, decontamination procedures, personnel exposure limits, and monitoring requirements.

10.2 KNOWN HAZARDS AND RISKS

The only substance of safety and health concern in the K-1004-L Vaults Area is radioactive waste.

10.3 LEVEL OF PROTECTION

The level of personnel protection and monitoring is designated below.

Level Designation			Monitoring Parameters	
A	______		Airborne Pollutants	______
B	______		Explosion Potential	______
C	X	(with lead shielding and supplied air apparatus)	Radiation	X
D	______			

10.4 DESIGNATION OF WORK AREA ZONES

The three zones (Exclusion, Contamination Reduction, and Support) will be established for the site in accordance with the methodology developed in Section 9 of the K/HS-132. The safety equipment required for the designated level of protection and the decontamination procedures are also covered in K/HS-132.

10.5 EXPOSURE LIMITS

The responsibility of limiting the exposure of the workers to nonhazardous levels of radiation resides with the Site Health and Safety Officer (SHSO). The instruments the SHSO used is described in Section 9 of the K/HS-132. The SHSO will monitor for radiation in the air with a radiation meter capable of measuring 0.1 mR/hr.

Additionally, personnel will be required to wear pocket dosimeters. If the level of radiation is greater than 100 mR/hr but less than 1,250 mR/hr, work personnel will conduct the site characterization using lead shielding and supplied air apparatus. If the radiation readings are below 100 mR/hr, the SHSO may choose to reduce personnel protection to Level C or Level D after consulting with the ORGDP Health Physics Department. All participants in the K-1004-L Vaults Area RFI sampling activities, including contractors, must be aware that excavation equipment, shoes, and other protective clothing could become contaminated with radioactive material Surveys shall be performed on all such items before and after each sampling operation. Each survey shall include monitoring all applicable personnel and equipment. Any equipment found to be contaminated above the guidelines for unrestricted release (alpha-5,000 dpm/100 cm^2 of surface, 1,000 dpm/100 cm^2 transferrable, and 0.1 mR/hr beta and gamma) shall be decontaminated.

APPENDIX A

STORM DRAIN DATA

STORM DRAIN DATA FOR SD-100-06

DATE	TEST COMPOUND	RESULT	UNITS
12-May-1987	1,1,1-Trichloroethane	<5	ug/L
18-May-1987	1,1,1-Trichloroethane	<5	ug/L
26-May-1987	1,1,1-Trichloroethane	<5	ug/L
3-Jun-1987	1,1,1-Trichloroethane	<5	ug/L
11-Jun-1987	1,1,1-Trichloroethane	<5	ug/L
18-Jun-1987	1,1,1-Trichloroethane	<5	ug/L
12-May-1987	1,1,2,2-Tetrachloroethane	<5	ug/L
18-May-1987	1,1,2,2-Tetrachloroethane	<5	ug/L
26-May-1987	1,1,2,2-Tetrachloroethane	<5	ug/L
3-Jun-1987	1,1,2,2-Tetrachloroethane	<5	ug/L
11-Jun-1987	1,1,2,2-Tetrachloroethane	<5	ug/L
18-Jun-1987	1,1,2,2-Tetrachloroethane	<5	ug/L
12-May-1987	1,1,2-Trichloroethane	<5	ug/L
18-May-1987	1,1,2-Trichloroethane	<5	ug/L
26-May-1987	1,1,2-Trichloroethane	<5	ug/L
3-Jun-1987	1,1,2-Trichloroethane	<5	ug/L
11-Jun-1987	1,1,2-Trichloroethane	<5	ug/L
18-Jun-1987	1,1,2-Trichloroethane	<5	ug/L
12-May-1987	1,1-Dichloroethane	<5	ug/L
18-May-1987	1,1-Dichloroethane	<5	ug/L
26-May-1987	1,1-Dichloroethane	<5	ug/L
3-Jun-1987	1,1-Dichloroethane	<5	ug/L
11-Jun-1987	1,1-Dichloroethane	<5	ug/L
18-Jun-1987	1,1-Dichloroethane	<5	ug/L
12-May-1987	1,1-Dichloroethene	<5	ug/L
18-May-1987	1,1-Dichloroethene	<5	ug/L
26-May-1987	1,1-Dichloroethene	<5	ug/L
3-Jun-1987	1,1-Dichloroethene	<5	ug/L
11-Jun-1987	1,1-Dichloroethene	<5	ug/L
18-Jun-1987	1,1-Dichloroethene	<5	ug/L
12-May-1987	1,2,4-Trichlorobenzene	<10	ug/L
26-May-1987	1,2,4-Trichlorobenzene	<5	ug/L
12-May-1987	1,2-Dichloroethane	<5	ug/L
18-May-1987	1,2-Dichloroethane	<5	ug/L
26-May-1987	1,2-Dichloroethane	<5	ug/L
3-Jun-1987	1,2-Dichloroethane	<5	ug/L
11-Jun-1987	1,2-Dichloroethane	<5	ug/L
18-Jun-1987	1,2-Dichloroethane	<5	ug/L
12-May-1987	1,2-Dichloropropane	<5	ug/L
18-May-1987	1,2-Dichloropropane	<5	ug/L
26-May-1987	1,2-Dichloropropane	<5	ug/L
3-Jun-1987	1,2-Dichloropropane	<5	ug/L
11-Jun-1987	1,2-Dichloropropane	<5	ug/L
18-Jun-1987	1,2-Dichloropropane	<5	ug/L
12-May-1987	1,3-Dichlorobenzene	<10	ug/L
26-May-1987	1,3-Dichlorobenzene	<5	ug/L
12-May-1987	1,4-Dichlorobenzene	<10	ug/L
26-May-1987	1,4-Dichlorobenzene	<5	ug/L
12-May-1987	2,4,6-Trichlorophenol	<10	ug/L

DATE	TEST COMPOUND	RESULT	UNITS
26-May-1987	2,4,6-Trichlorophenol	<5	ug/L
12-May-1987	2,4-Dichlorophenol	<10	ug/L
26-May-1987	2,4-Dichlorophenol	<5	ug/L
12-May-1987	2,4-Dimethylphenol	<10	ug/L
26-May-1987	2,4-Dimethylphenol	<5	ug/L
12-May-1987	2,4-Dinitrophenol	<10	ug/L
26-May-1987	2,4-Dinitrophenol	<5	ug/L
12-May-1987	2,4-Dinitrotoluene	<10	ug/L
26-May-1987	2,4-Dinitrotoluene	<5	ug/L
12-May-1987	2,6-Dinitrotoluene	<10	ug/L
26-May-1987	2,6-Dinitrotoluene	<5	ug/L
12-May-1987	2-Chloroethylvinyl ether	<10	ug/L
18-May-1987	2-Chloroethylvinyl ether	<10	ug/L
26-May-1987	2-Chloroethylvinyl ether	<10	ug/L
3-Jun-1987	2-Chloroethylvinyl ether	<10	ug/L
11-Jun-1987	2-Chloroethylvinyl ether	<10	ug/L
18-Jun-1987	2-Chloroethylvinyl ether	<10	ug/L
12-May-1987	2-Chloronaphthalene	<10	ug/L
26-May-1987	2-Chloronaphthalene	<5	ug/L
12-May-1987	2-Chlorophenol	<10	ug/L
26-May-1987	2-Chlorophenol	<5	ug/L
12-May-1987	2-Nitrophenol	<10	ug/L
26-May-1987	2-Nitrophenol	<5	ug/L
12-May-1987	3,3'-Dichlorobenzidine	<20	ug/L
26-May-1987	3,3'-Dichlorobenzidine	<10	ug/L
12-May-1987	4,6-Dinitro-2-methylphenol	<50	ug/L
26-May-1987	4,6-Dinitro-2-methylphenol	<25	ug/L
12-May-1987	4-Bromophenyl-phenylether	<10	ug/L
26-May-1987	4-Bromophenyl-phenylether	<5	ug/L
12-May-1987	4-Chloro-3-methylphenol	<10	ug/L
26-May-1987	4-Chloro-3-methylphenol	<5	ug/L
12-May-1987	4-Chlorophenyl-phenylether	<10	ug/L
26-May-1987	4-Chlorophenyl-phenylether	<5	ug/L
12-May-1987	4-Nitrophenol	<50	ug/L
26-May-1987	4-Nitrophenol	<25	ug/L
12-May-1987	Acenaphthene	<10	ug/L
26-May-1987	Acenaphthene	<5	ug/L
12-May-1987	Acenaphthylene	<10	ug/L
26-May-1987	Acenaphthylene	<5	ug/L
12-May-1987	Alkalinity	99	mg/L
18-May-1987	Alkalinity	102	mg/L
26-May-1987	Alkalinity	101	mg/L
3-Jun-1987	Alkalinity	105	mg/L
11-Jun-1987	Alkalinity	100	mg/L
18-Jun-1987	Alkalinity	99	mg/L
12-May-1987	Alpha	1	pCi/L
18-May-1987	Alpha	<2	pCi/L
26-May-1987	Alpha	<2	pCi/L
3-Jun-1987	Alpha	<2	pCi/L
11-Jun-1987	Alpha	<1	pCi/L
18-Jun-1987	Alpha	1.5	pCi/L
12-May-1987	Aluminum	<0.1	mg/L

DATE	TEST COMPOUND	RESULT	UNITS
18-May-1987	Aluminum	<0.1	mg/L
26-May-1987	Aluminum	<0.1	mg/L
3-Jun-1987	Aluminum	<0.1	mg/L
11-Jun-1987	Aluminum	<0.1	mg/L
18-Jun-1987	Aluminum	<0.1	mg/L
12-May-1987	Ammonia	<0.2	mg/L
18-May-1987	Ammonia	<0.2	mg/L
26-May-1987	Ammonia	<0.2	mg/L
3-Jun-1987	Ammonia	<0.2	mg/L
11-Jun-1987	Ammonia	<0.2	mg/L
18-Jun-1987	Ammonia	<0.2	mg/L
12-May-1987	Anthracene	10	ug/L
26-May-1987	Anthracene	<5	ug/L
12-May-1987	Arsenic	<0.005	mg/L
18-May-1987	Arsenic	<0.005	mg/L
26-May-1987	Arsenic	<0.005	mg/L
3-Jun-1987	Arsenic	<0.005	mg/L
11-Jun-1987	Arsenic	<0.005	mg/L
18-Jun-1987	Arsenic	<0.005	mg/L
12-May-1987	Barium	<0.1	mg/L
18-May-1987	Barium	<0.1	mg/L
26-May-1987	Barium	<0.1	mg/L
3-Jun-1987	Barium	<0.1	mg/L
11-Jun-1987	Barium	<0.1	mg/L
18-Jun-1987	Barium	<0.1	mg/L
12-May-1987	Benzene	<5	ug/L
18-May-1987	Benzene	<5	ug/L
26-May-1987	Benzene	<5	ug/L
3-Jun-1987	Benzene	<5	ug/L
11-Jun-1987	Benzene	<5	ug/L
18-Jun-1987	Benzene	<5	ug/L
12-May-1987	Benzidine	<10	ug/L
26-May-1987	Benzidine	<5	ug/L
12-May-1987	Benzo(a)anthracene	<10	ug/L
26-May-1987	Benzo(a)anthracene	<5	ug/L
12-May-1987	Benzo(a)pyrene	<10	ug/L
26-May-1987	Benzo(a)pyrene	<5	ug/L
12-May-1987	Benzo(b)fluoranthene	<10	ug/L
26-May-1987	Benzo(b)fluoranthene	<5	ug/L
12-May-1987	Benzo(g,h,i)perylene	<10	ug/L
26-May-1987	Benzo(g,h,i)perylene	<5	ug/L
12-May-1987	Benzo(k)fluoranthene	<10	ug/L
26-May-1987	Benzo(k)fluoranthene	<5	ug/L
12-May-1987	Beryllium	<0.001	mg/L
18-May-1987	Beryllium	<0.001	mg/L
26-May-1987	Beryllium	<0.001	mg/L
3-Jun-1987	Beryllium	<0.001	mg/L
11-Jun-1987	Beryllium	<0.001	mg/L
18-Jun-1987	Beryllium	<0.001	mg/L
12-May-1987	Beta	4	pCi/L
18-May-1987	Beta	<2	pCi/L
26-May-1987	Beta	<2	pCi/L

DATE	TEST COMPOUND	RESULT	UNITS
3-Jun-1987	Beta	4.4	pCi/L
11-Jun-1987	Beta	<2	pCi/L
18-Jun-1987	Beta	8.2	pCi/L
12-May-1987	Bis(2-Chloroethoxy)methane	<10	ug/L
26-May-1987	Bix(2-Chloroethoxy)methane	<5	ug/L
12-May-1987	Bis(2-Chloroethyl)ether	<10	ug/L
26-May-1987	Bis(2-Chloroethyl)ether	<5	ug/L
12-May-1987	Bis(2-Chloroisopropyl)ether	<10	ug/L
26-May-1987	Bis(2-Chloroisopropyl)ether	<5	ug/L
12-May-1987	Bis(2-Ethylhexyl)phthalate	<10	ug/L
26-May-1987	Bis(2-Ethylhexyl)phthalate	<5	ug/L
12-May-1987	Boron	<0.006	mg/L
18-May-1987	Boron	<0.013	mg/L
26-May-1987	Boron	<0.012	mg/L
3-Jun-1987	Boron	<0.016	mg/L
11-Jun-1987	Boron	<0.0071	mg/L
18-Jun-1987	Boron	<0.0088	mg/L
12-May-1987	Bromodichloromethane	19	ug/L
18-May-1987	Bromodichloromethane	15	ug/L
26-May-1987	Bromodichloromethane	6	ug/L
3-Jun-1987	Bromodichloromethane	5	ug/L
11-Jun-1987	Bromodichloromethane	5	ug/L
18-Jun-1987	Bromodichloromethane	5	ug/L
12-May-1987	Bromoform	5	ug/L
18-May-1987	Bromoform	5	ug/L
26-May-1987	Bromoform	<5	ug/L
3-Jun-1987	Bromoform	<5	ug/L
11-Jun-1987	Bromoform	<5	ug/L
18-Jun-1987	Bromoform	<5	ug/L
12-May-1987	Bromomethane	<10	ug/L
18-May-1987	Bromomethane	<10	ug/L
26-May-1987	Bromomethane	<10	ug/L
3-Jun-1987	Bromomethane	<10	ug/L
11-Jun-1987	Bromomethane	<10	ug/L
18-Jun-1987	Bromomethane	<10	ug/L
12-May-1987	Butylbenzylphthalate	<10	ug/L
26-May-1987	Butylbenzylphthalate	<5	ug/L
12-May-1987	Cadmium	<0.003	mg/L
18-May-1987	Cadmium	<0.003	mg/L
26-May-1987	Cadmium	<0.003	mg/L
3-Jun-1987	Cadmium	<0.003	mg/L
11-Jun-1987	Cadmium	<0.003	mg/L
18-Jun-1987	Cadmium	<0.003	mg/L
12-May-1987	Calcium	32	mg/L
18-May-1987	Calcium	31	mg/L
26-May-1987	Calcium	32	mg/L
3-Jun-1987	Calcium	34	mg/L
11-Jun-1987	Calcium	35	mg/L
18-Jun-1987	Calcium	36	mg/L
12-May-1987	Carbon Tetrachloride	<5	ug/L
18-May-1987	Carbon Tetrachloride	<5	ug/L
26-May-1987	Carbon Tetrachloride	<5	ug/L

DATE	TEST COMPOUND	RESULT	UNITS
3-Jun-1987	Carbon Tetrachloride	<5	ug/L
11-Jun-1987	Carbon Tetrachloride	<5	ug/L
18-Jun-1987	Carbon Tetrachloride	<5	ug/L
12-May-1987	Chemical Oxygen Demand (COD)	<5	mg/L
18-May-1987	Chemical Oxygen Demand (COD)	11	mg/L
26-May-1987	Chemical Oxygen Demand (COD)	<5	mg/L
3-Jun-1987	Chemical Oxygen Demand (COD)	<5	mg/L
11-Jun-1987	Chemical Oxygen Demand (COD)	<5	mg/L
18-Jun-1987	Chemical Oxygen Demand (COD)	<5	mg/L
12-May-1987	Chloride	9.9	mg/L
18-May-1987	Chloride	9	mg/L
26-May-1987	Chloride	8.3	mg/L
3-Jun-1987	Chloride	10.5	mg/L
11-Jun-1987	Chloride	11.1	mg/L
18-Jun-1987	Chloride	12	mg/L
12-May-1987	Chlorinated Hydrocarbons	180	ug/L
12-May-1987	Chlorine Total Residual Water	0.3	mg/L
18-May-1987	Chlorine Total Residual Water	0.6	mg/L
26-May-1987	Chlorine Total Residual Water	0.4	mg/L
3-Jun-1987	Chlorine Total Residual Water	0.7	mg/L
11-Jun-1987	Chlorine Total Residual Water	1.1	mg/L
18-Jun-1987	Chlorine Total Residual Water	0.4	mg/L
12-May-1987	Chlorobenzene	<5	ug/L
18-May-1987	Chlorobenzene	<5	ug/L
26-May-1987	Chlorobenzene	<5	ug/L
3-Jun-1987	Chlorobenzene	<5	ug/L
11-Jun-1987	Chlorobenzene	<5	ug/L
18-Jun-1987	Chlorobenzene	<5	ug/L
12-May-1987	Chloroethane	<10	ug/L
18-May-1987	Chloroethane	<10	ug/L
26-May-1987	Chloroethane	<10	ug/L
3-Jun-1987	Chloroethane	<10	ug/L
11-Jun-1987	Chloroethane	<10	ug/L
18-Jun-1987	Chloroethane	<10	ug/L
12-May-1987	Chloroform	31	ug/L
18-May-1987	Chloroform	29	ug/L
26-May-1987	Chloroform	33	ug/L
3-Jun-1987	Chloroform	36	ug/L
11-Jun-1987	Chloroform	46	ug/L
18-Jun-1987	Chloroform	42	ug/L
12-May-1987	Chloromethane	<10	ug/L
18-May-1987	Chloromethane	<10	ug/L
26-May-1987	Chloromethane	<10	ug/L
3-Jun-1987	Chloromethane	<10	ug/L
11-Jun-1987	Chloromethane	<10	ug/L
18-Jun-1987	Chloromethane	<10	ug/L
12-May-1987	Chromium	<0.01	ug/L
18-May-1987	Chromium	<0.01	ug/L
26-May-1987	Chromium	<0.01	ug/L
3-Jun-1987	Chromium	<0.01	ug/L
11-Jun-1987	Chromium	<0.01	ug/L
18-Jun-1987	Chromium	<0.01	ug/L

DATE	TEST COMPOUND	RESULT	UNITS
12-May-1987	Chrysene	<10	ug/L
26-May-1987	Chrysene	<5	ug/L
12-May-1987	Cis-1,3-Dichloropropene	<5	ug/L
18-May-1987	Cis-1,3-Dichloropropene	<5	ug/L
26-May-1987	Cis-1,3-Dichloropropene	<5	ug/L
3-Jun-1987	Cis-1,3-Dichloropropene	<5	ug/L
11-Jun-1987	Cis-1,3-Dichloropropene	<5	ug/L
18-Jun-1987	Cis-1,3-Dichloropropene	<5	ug/L
12-May-1987	Cobalt	<0.1	ug/L
18-May-1987	Cobalt	<0.1	ug/L
26-May-1987	Cobalt	<0.1	ug/L
3-Jun-1987	Cobalt	<0.1	ug/L
11-Jun-1987	Cobalt	<0.1	ug/L
18-Jun-1987	Cobalt	<0.1	ug/L
12-May-1987	Conductivity	284	umho/cm
18-May-1987	Conductivity	285	umho/cm
26-May-1987	Conductivity	294	umho/cm
3-Jun-1987	Conductivity	305	umho/cm
11-Jun-1987	Conductivity	312	umho/cm
18-Jun-1987	Conductivity	281	umho/cm
12-May-1987	Copper	<0.004	ug/L
18-May-1987	Copper	<0.004	ug/L
26-May-1987	Copper	<0.004	ug/L
3-Jun-1987	Copper	<0.004	ug/L
11-Jun-1987	Copper	<0.004	ug/L
18-Jun-1987	Copper	<0.004	ug/L
12-May-1987	Cyanide	<0.002	ug/L
18-May-1987	Cyanide	<0.002	ug/L
26-May-1987	Cyanide	<0.002	ug/L
3-Jun-1987	Cyanide	<0.002	ug/L
11-Jun-1987	Cyanide	<0.002	ug/L
18-Jun-1987	Cyanide	<0.002	ug/L
12-May-1987	Di-n-Butylphthalate	0.4	JB ug/L
26-May-1987	Di-n-Butylphthalate	<5	ug/L
12-May-1987	Di-n-Octylphthalate	<10	ug/L
26-May-1987	Di-n-Octylphthalate	<5	ug/L
12-May-1987	Dibenz(a,h)anthracene	<10	ug/L
26-May-1987	Dibenz(a,h)anthracene	<5	ug/L
12-May-1987	Dibromochloromethane	15	ug/L
18-May-1987	Dibromochloromethane	10	ug/L
26-May-1987	Dibromochloromethane	5	ug/L
3-Jun-1987	Dibromochloromethane	<5	ug/L
11-Jun-1987	Dibromochloromethane	<5	ug/L
18-Jun-1987	Dibromochloromethane	<5	ug/L
12-May-1987	Diethylphthalate	<10	ug/L
26-May-1987	Diethylphthalate	<5	ug/L
12-May-1987	Dimethylphthalate	<10	ug/L
26-May-1987	Dimethylphthalate	<5	ug/L
12-May-1987	Dissolved Oxygen	8.8	ppm
18-May-1987	Dissolved Oxygen	8.4	ppm
26-May-1987	Dissolved Oxygen	7.8	ppm
3-Jun-1987	Dissolved Oxygen.	7.5	ppm

DATE	TEST COMPOUND	RESULT	UNITS
11-Jun-1987	Dissolved Oxygen	8.8	ppm
18-Jun-1987	Dissolved Oxygen	9.2	ppm
12-May-1987	Ethylbenzene	<5	ug/L
18-May-1987	Ethylbenzene	<5	ug/L
26-May-1987	Ethylbenzene	<5	ug/L
3-Jun-1987	Ethylbenzene	<5	ug/L
11-Jun-1987	Ethylbenzene	<5	ug/L
18-Jun-1987	Ethylbenzene	<5	ug/L
12-May-1987	Fluoranthene	<10	ug/L
26-May-1987	Fluoranthene	<5	ug/L
12-May-1987	Fluorene	<10	ug/L
26-May-1987	Fluorene	<5	ug/L
12-May-1987	Fluoride	0.1	mg/L
18-May-1987	Fluoride	<0.1	mg/L
26-May-1987	Fluoride	<0.1	mg/L
3-Jun-1987	Fluoride	X	
11-Jun-1987	Fluoride	<0.1	mg/L
18-Jun-1987	Fluoride	<0.1	mg/L
12-May-1987	Hardness	127	mg/L
18-May-1987	Hardness	131	mg/L
26-May-1987	Hardness	126	mg/L
3-Jun-1987	Hardness	134	mg/L
11-Jun-1987	Hardness	130	mg/L
18-Jun-1987	Hardness	128	mg/L
12-May-1987	Hexachlorobenzene	<10	ug/L
26-May-1987	Hexachlorobenzene	<5	ug/L
12-May-1987	Hexachlorobutadiene	<10	ug/L
26-May-1987	Hexachlorobutadiene	<5	ug/L
12-May-1987	Hexachlorocyclopentadiene	<10	ug/L
26-May-1987	Hexachlorocyclopentadiene	<5	ug/L
12-May-1987	Hexachloroethane	<10	ug/L
26-May-1987	Hexachloroethane	<5	ug/L
12-May-1987	Indeno(1,2,3-cd)pyrene	<10	ug/L
26-May-1987	Indeno(1,2,3-cd)pyrene	<5	ug/L
12-May-1987	Iron	0.13	mg/L
18-May-1987	Iron	<0.05	mg/L
26-May-1987	Iron	<0.05	mg/L
3-Jun-1987	Iron	0.085	mg/L
11-Jun-1987	Iron	<0.05	mg/L
18-Jun-1987	Iron	0.33	mg/L
12-May-1987	Isophorone	<10	ug/L
26-May-1987	Isophorone	<5	ug/L
12-May-1987	Lead	<0.05	mg/L
18-May-1987	Lead	<0.05	mg/L
26-May-1987	Lead	<0.05	mg/L
3-Jun-1987	Lead	<0.05	mg/L
11-Jun-1987	Lead	<0.05	mg/L
18-Jun-1987	Lead	<0.05	mg/L
12-May-1987	Lithium	0.005	mg/L
18-May-1987	Lithium	0.0055	mg/L
26-May-1987	Lithium	0.0073	mg/L
3-Jun-1987	Lithium	<0.004	mg/L

DATE	TEST COMPOUND	RESULT	UNITS
11-Jun-1987	Lithium	<0.004	mg/L
18-Jun-1987	Lithium	0.0048	mg/L
12-May-1987	Magnesium	11	mg/L
18-May-1987	Magnesium	8.9	mg/L
26-May-1987	Magnesium	9.6	mg/L
3-Jun-1987	Magnesium	9.6	mg/L
11-Jun-1987	Magnesium	10	mg/L
18-Jun-1987	Magnesium	10	mg/L
12-May-1987	Manganese	0.013	mg/L
18-May-1987	Manganese	<0.01	mg/L
26-May-1987	Manganese	<0.01	mg/L
3-Jun-1987	Manganese	0.013	mg/L
11-Jun-1987	Manganese	<0.01	mg/L
18-Jun-1987	Manganese	<0.01	mg/L
12-May-1987	Mercury	<0.0002	mg/L
18-May-1987	Mercury	<0.0002	mg/L
26-May-1987	Mercury	<0.0002	mg/L
3-Jun-1987	Mercury	<0.0002	mg/L
11-Jun-1987	Mercury	<0.0002	mg/L
18-Jun-1987	Mercury	<0.0002	mg/L
12-May-1987	Methylene Chloride	<5	ug/L
18-May-1987	Methylene Chloride	<5	ug/L
26-May-1987	Methylene Chloride	5	ug/L
3-Jun-1987	Methylene Chloride	5	ug/L
11-Jun-1987	Methylene Chloride	<5	ug/L
18-Jun-1987	Methylene Chloride	<5	ug/L
12-May-1987	Molybdenum	<0.01	mg/L
18-May-1987	Molybdenum	<0.01	mg/L
26-May-1987	Molybdenum	0.012	mg/L
3-Jun-1987	Molybdenum	0.014	mg/L
11-Jun-1987	Molybdenum	<0.01	mg/L
18-Jun-1987	Molybdenum	<0.01	mg/L
12-May-1987	Ni-Nitroso-di-n-propylamine	<10	ug/L
26-May-1987	Ni-Nitroso-di-n-propylamine	<5	ug/L
12-May-1987	N-Nitrosodimethylamine	<10	ug/L
26-May-1987	N-Nitrosodimethylamine	<5	ug/L
12-May-1987	Naphthalene	<10	ug/L
26-May-1987	Naphthalene	<5	ug/L
12-May-1987	Nickel	<0.05	mg/L
18-May-1987	Nickel	<0.05	mg/L
26-May-1987	Nickel	<0.05	mg/L
3-Jun-1987	Nickel	<0.05	mg/L
11-Jun-1987	Nickel	<0.05	mg/L
18-Jun-1987	Nickel	<0.05	mg/L
12-May-1987	Niobium	<0.007	mg/L
18-May-1987	Niobium	<0.007	mg/L
26-May-1987	Niobium	<0.007	mg/L
3-Jun-1987	Niobium	<0.007	mg/L
11-Jun-1987	Niobium	<0.007	mg/L
18-Jun-1987	Niobium	<0.007	mg/L
12-May-1987	Nitrate	2.7	mg/L
18-May-1987	Nitrate	2.1	mg/L

DATE	TEST COMPOUND	RESULT	UNITS
26-May-1987	Nitrate	1.8	mg/L
3-Jun-1987	Nitrate	2.9	mg/L
11-Jun-1987	Nitrate	2.6	mg/L
18-Jun-1987	Nitrate	2.6	mg/L
12-May-1987	Nitrobenzene	<10	ug/L
26-May-1987	Nitrobenzene	<5	ug/L
12-May-1987	Oil & Grease	3	mg/L
18-May-1987	Oil & Grease	<2	mg/L
26-May-1987	Oil & Grease	<2	mg/L
3-Jun-1987	Oil & Grease	<2	mg/L
11-Jun-1987	Oil & Grease	<2	mg/L
18-Jun-1987	Oil & Grease	<2	mg/L
12-May-1987	PCB (AROCLOR-1016)	<0.5	ug/L
26-May-1987	PCB (AROCLOR-1016)	<0.5	ug/L
12-May-1987	PCB (AROCLOR-1221)	<0.5	ug/L
26-May-1987	PCB (AROCLOR-1221)	<0.5	ug/L
12-May-1987	PCB (AROCLOR-1232)	<0.5	ug/L
26-May-1987	PCB (AROCLOR-1232)	<0.5	ug/L
12-May-1987	PCB (AROCLOR-1242)	<0.5	ug/L
26-May-1987	PCB (AROCLOR-1242)	<0.5	ug/L
12-May-1987	PCB (AROCLOR-1248)	<0.5	ug/L
26-May-1987	PCB (AROCLOR-1248)	<0.5	ug/L
12-May-1987	PCB (AROCLOR-1254)	<1	ug/L
26-May-1987	PCB (AROCLOR-1254)	<1	ug/L
12-May-1987	PCB (AROCLOR-1260)	<1	ug/L
26-May-1987	PCB (AROCLOR-1260)	<1	ug/L
12-May-1987	Pentachlorophenol	<50	ug/L
26-May-1987	Pentachlorophenol	<25	ug/L
12-May-1987	pH	8.1	
18-May-1987	pH	8.2	
26-May-1987	pH	7.5	
3-Jun-1987	pH	8.3	
11-Jun-1987	pH	8.2	
18-Jun-1987	pH	8.5	
12-May-1987	Phenanthrene	<10	ug/L
26-May-1987	Phenanthrene	<5	ug/L
12-May-1987	Phenol	<10	ug/L
26-May-1987	Phenol	<5	ug/L
12-May-1987	Phosphorus	0.26	mg/L
18-May-1987	Phosphorus	0.31	mg/L
26-May-1987	Phosphorus	0.27	mg/L
3-Jun-1987	Phosphorus	0.39	mg/L
11-Jun-1987	Phosphorus	0.24	mg/L
18-Jun-1987	Phosphorus	0.27	mg/L
12-May-1987	Potassium	1.1	mg/L
18-May-1987	Potassium	0.66	mg/L
26-May-1987	Potassium	<0.6	mg/L
3-Jun-1987	Potassium	1.4	mg/L
11-Jun-1987	Potassium	0.89	mg/L
18-Jun-1987	Potassium	0.79	mg/L
12-May-1987	Pyrene	<10	ug/L
26-May-1987	Pyrene	<5	ug/L

DATE	TEST COMPOUND	RESULT	UNITS
12-May-1987	Selenium	<0.005	mg/L
18-May-1987	Selenium	<0.005	mg/L
26-May-1987	Selenium	<0.005	mg/L
3-Jun-1987	Selenium	<0.005	mg/L
11-Jun-1987	Selenium	<0.005	mg/L
18-Jun-1987	Selenium	<0.005	mg/L
12-May-1987	Silicon	1.7	mg/L
18-May-1987	Silicon	1.4	mg/L
26-May-1987	Silicon	1.3	mg/L
3-Jun-1987	Silicon	1.5	mg/L
11-Jun-1987	Silicon	1.4	mg/L
18-Jun-1987	Silicon	1.6	mg/L
12-May-1987	Silver	0.12	mg/L
18-May-1987	Silver	<0.01	mg/L
26-May-1987	Silver	<0.01	mg/L
3-Jun-1987	Silver	<0.01	mg/L
11-Jun-1987	Silver	<0.01	mg/L
18-Jun-1987	Silver	<0.01	mg/L
12-May-1987	Sodium	5.6	mg/L
18-May-1987	Sodium	5.6	mg/L
26-May-1987	Sodium	5.7	mg/L
3-Jun-1987	Sodium	5.4	mg/L
11-Jun-1987	Sodium	5.4	mg/L
18-Jun-1987	Sodium	5.4	mg/L
12-May-1987	Strontium	0.069	mg/L
18-May-1987	Strontium	0.066	mg/L
26-May-1987	Strontium	0.073	mg/L
3-Jun-1987	Strontium	0.070	mg/L
11-Jun-1987	Strontium	0.076	mg/L
18-Jun-1987	Strontium	0.075	mg/L
12-May-1987	Sulfate	24	mg/L
18-May-1987	Sulfate	26	mg/L
26-May-1987	Sulfate	28.4	mg/L
3-Jun-1987	Sulfate	26	mg/L
11-Jun-1987	Sulfate	27	mg/L
18-Jun-1987	Sulfate	26	mg/L
12-May-1987	Temperature	18	deg. C
18-May-1987	Temperature	22	deg. C
26-May-1987	Temperature	22	deg. C
3-Jun-1987	Temperature	22	deg. C
11-Jun-1987	Temperature	21	deg. C
18-Jun-1987	Temperature	22	deg. C
12-May-1987	Tetrachloroethene	<5	ug/L
18-May-1987	Tetrachloroethene	<5	ug/L
26-May-1987	Tetrachloroethene	<5	ug/L
3-Jun-1987	Tetrachloroethene	<5	ug/L
11-Jun-1987	Tetrachloroethene	<5	ug/L
18-Jun-1987	Tetrachloroethene	<5	ug/L
12-May-1987	Thorium	<0.2	mg/L
18-May-1987	Thorium	<0.2	mg/L
26-May-1987	Thorium	<0.2	mg/L
3-Jun-1987	Thorium	<0.2	mg/L

DATE	TEST COMPOUND	RESULT	UNITS
11-Jun-1987	Thorium	<0.2	mg/L
18-Jun-1987	Thorium	<0.2	mg/L
12-May-1987	Titanium	<0.003	mg/L
18-May-1987	Titanium	<0.003	mg/L
26-May-1987	Titanium	<0.003	mg/L
3-Jun-1987	Titanium	0.0064	mg/L
11-Jun-1987	Titanium	0.0041	mg/L
18-Jun-1987	Titanium	0.0037	mg/L
12-May-1987	Toluene	<5	ug/L
18-May-1987	Toluene	<5	ug/L
26-May-1987	Toluene	<5	ug/L
3-Jun-1987	Toluene	<5	ug/L
11-Jun-1987	Toluene	<5	ug/L
18-Jun-1987	Toluene	<5	ug/L
12-May-1987	Total Dissolved Solids	140	mg/L
18-May-1987	Total Dissolved Solids	138	mg/L
26-May-1987	Total Dissolved Solids	178	mg/L
3-Jun-1987	Total Dissolved Solids	178	mg/L
11-Jun-1987	Total Dissolved Solids	156	mg/L
18-Jun-1987	Total Dissolved Solids	194	mg/L
12-May-1987	Total Organic Carbon (TOC)	2.2	mg/L
18-May-1987	Total Organic Carbon (TOC)	2.6	mg/L
26-May-1987	Total Organic Carbon (TOC)	2	mg/L
3-Jun-1987	Total Organic Carbon (TOC)	2.2	mg/L
11-Jun-1987	Total Organic Carbon (TOC)	2.2	mg/L
18-Jun-1987	Total Organic Carbon (TOC)	2.4	mg/L
12-May-1987	Total Suspended Solids	3	mg/L
18-May-1987	Total Suspended Solids	2	mg/L
26-May-1987	Total Suspended Solids	<1	mg/L
3-Jun-1987	Total Suspended Solids	3	mg/L
11-Jun-1987	Total Suspended Solids	3	mg/L
18-Jun-1987	Total Suspended Solids	<4	mg/L
12-May-1987	Trans-1,2-Dichloroethene	<5	ug/L
18-May-1987	Trans-1,2-Dichloroethene	<5	ug/L
26-May-1987	Trans-1,2-Dichloroethene	<5	ug/L
3-Jun-1987	Trans-1,2-Dichloroethene	<5	ug/L
11-Jun-1987	Trans-1,2-Dichloroethene	<5	ug/L
18-Jun-1987	Trans-1,2-Dichloroethene	<5	ug/L
12-May-1987	Trans-1,3-Dichloropropene	<5	ug/L
18-May-1987	Trans-1,3-Dichloropropene	<5	ug/L
26-May-1987	Trans-1,3-Dichloropropene	<5	ug/L
3-Jun-1987	Trans-1,3-Dichloropropene	<5	ug/L
11-Jun-1987	Trans-1,3-Dichloropropene	<5	ug/L
18-Jun-1987	Trans-1,3-Dichloropropene	<5	ug/L
12-May-1987	Trichloroethene	<5	ug/L
18-May-1987	Trichloroethene	<5	ug/L
26-May-1987	Trichloroethene	10	ug/L
3-Jun-1987	Trichloroethene	5	ug/L
11-Jun-1987	Trichloroethene	<5	ug/L
18-Jun-1987	Trichloroethene	<5	ug/L
12-May-1987	Turbidity	2.3	NTU
18-May-1987	Turbidity	0.35	NTU

DATE	TEST COMPOUND	RESULT	UNITS
26-May-1987	Turbidity	0.25	NTU
3-Jun-1987	Turbidity	0.7	NTU
11-Jun-1987	Turbidity	0.3	NTU
18-Jun-1987	Turbidity	0.2	NTU
12-May-1987	Unknown Ketone	27	ug/L
12-May-1987	Unknowns	64	ug/L
12-May-1987	Uranium	0.003	mg/L
18-May-1987	Uranium	<0.001	mg/L
26-May-1987	Uranium	<0.001	mg/L
3-Jun-1987	Uranium	<0.001	mg/L
11-Jun-1987	Uranium	0.002	mg/L
18-Jun-1987	Uranium	0.002	mg/L
12-May-1987	Vanadium	<0.5	mg/L
18-May-1987	Vanadium	<0.5	mg/L
26-May-1987	Vanadium	<0.5	mg/L
3-Jun-1987	Vanadium	<0.5	mg/L
11-Jun-1987	Vanadium	<0.5	mg/L
18-Jun-1987	Vanadium	<0.5	mg/L
12-May-1987	Vinyl Chloride	<10	ug/L
18-May-1987	Vinyl Chloride	<10	ug/L
26-May-1987	Vinyl Chloride	<10	ug/L
3-Jun-1987	Vinyl Chloride	<10	ug/L
11-Jun-1987	Vinyl Chloride	<10	ug/L
18-Jun-1987	Vinyl Chloride	<10	ug/L
12-May-1987	Zinc	0.034	mg/L
18-May-1987	Zinc	0.024	mg/L
26-May-1987	Zinc	0.02	mg/L
3-Jun-1987	Zinc	0.031	mg/L
11-Jun-1987	Zinc	<0.02	mg/L
18-Jun-1987	Zinc	0.041	mg/L
12-May-1987	Zirconium	<0.005	mg/L
18-May-1987	Zirconium	<0.005	mg/L
26-May-1987	Zirconium	<0.005	mg/L
3-Jun-1987	Zirconium	<0.005	mg/L
11-Jun-1987	Zirconium	<0.005	mg/L
18-Jun-1987	Zirconium	<0.005	mg/L

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ChemRisk/Shonka Research Associates, Inc., Document Request Form

(This section to be completed by subcontractor requesting document)

TEBENNETT / K-25 ERDMC

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MARTIN MARIETTA

K/HS-147

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MARTIN MARIETTA ENERGY SYSTEMS, INC.

POST OFFICE BOX 2003
OAK RIDGE, TENNESSEE 37831 -7402

September 13, 1988

Mr. H. W. Hibbitts, Director
Environmental Protection Division
Department of Energy, Oak Ridge Operations
Post Office Box 2001
Oak Ridge, Tennessee 37831-8738

Dear Mr. Hibbitts:

<u>RCRA Facility Investigation Reports - Oak Ridge Gaseous Diffusion Plant</u>

Enclosed are eight copies of the RCRA Facility Investigation (RFI) Plan, K-1420 Waste Area Grouping, for the Oak Ridge Gaseous Diffusion Plant. This report is being submitted as required by the ORNL Part B Permit. To date, the General RFI Plan and nineteen site-specific RFI Plans have been issued to the Department of Energy.

If you have any questions concerning these documents, please contact J. L. Haymore at extension 4-9352.

Sincerely,

T. A. Bowers, Environmental Coordinator
Oak Ridge Gaseous Diffusion Plant

TAB:TBHale:shr

Enclosures

cc/enc: W. R. Golliher
T. B. Hale
J. L. Haymore
L. W. Long
T. P. A. Perry
H. D. Whitehead, Jr.
File - TAB - RC

K/HS-147

ORGDP

OAK RIDGE GASEOUS DIFFUSION PLANT

MARTIN MARIETTA

RCRA INVESTIGATION PLAN
K-1420 WASTE AREA GROUPING
OAK RIDGE GASEOUS DIFFUSION PLANT
OAK RIDGE, TENNESSEE

SEPTEMBER 1988

OPERATED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

SEPTEMBER 1988

K/HS-147

RCRA FACILITY INVESTIGATION PLAN
K-1420 WASTE AREA GROUPING
OAK RIDGE GASEOUS DIFFUSION PLANT
OAK RIDGE, TENNESSEE

Prepared by the
Oak Ridge Gaseous Diffusion Plant
Oak Ridge, Tennessee 37831
Operated by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U. S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

TABLE OF CONTENTS

1. INTRODUCTION

Within the confines of the Oak Ridge Gaseous Diffusion Plant (ORGDP) are hazardous waste treatment, storage, and disposal facilities; some are in operation while others are no longer in use. These solid waste management units (SWMUs) are subject to assessment by the U.S. Environmental Protection Agency (EPA), as required by the 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA). The RCRA Facility Investigation (RFI) Plans are scheduled to be submitted for all SWMUs during calendar years 1987 and 1988. RCRA Facility Investigation Plan - General Document (K/HS-132) includes information applicable to all the ORGDP SWMUs and serves as a reference document for the site-specific RFI Plans.

This document is the RFI Plan for one of the SWMUs, the K-1420 Waste Area Grouping (WAG). The K-1420 WAG includes the process lines from the K-1420 building, the K-1420 Oil Storage Yard, and the K-1421 Incinerator. The plan for the K-1420 WAG is based upon requirements described in the draft document, RFI Guidance, Vols. I-IV, July 1987, EPA-530/SW-87-001. Contained within this document are geographical, historical, operational, geological, and hydrological data specific to the K-1420 WAG. The potential for release of contamination through the various media to receptors is addressed. A sampling plan is proposed to further determine the extent (if any) of release of contamination to the surrounding environment. Included are health, safety, quality assurance, and quality control procedures to be followed when implementing the sampling plan. Procedures for managing and displaying data collected from the RFI are summarized.

2. OBJECTIVES OF RCRA FACILITY INVESTIGATION PLANNING

2.1 OBJECTIVES

The RFI Plan will identify actions necessary to determine the nature and extent of releases of hazardous and/or radioactive contamination from the K-1420 WAG. The plan summarizes existing site information and addresses the potential for contamination of soils, groundwater, surface water, and air pathways.

2.2 EVALUATION CRITERIA

To prepare and implement a comprehensive sampling plan and to effectively evaluate analytical sampling results, evaluation criteria must first be established. Criteria for evaluating the extent of release of contaminants are based on existing state and federal regulatory guidance and best technical judgement.

The primary media of interest for the K-1420 WAG are surface water, groundwater, and soils. Under the ORGDP Groundwater Protection Program, four quarters of groundwater monitoring data will be collected and analyzed for the parameters listed in Table 2.1 of the K/HS-132. Soil and surface water samples will be collected as part of the RFI Plan and analyzed for the contaminants described in Section 8 of this document. The sampling methodology and analytical procedures are designed to characterize the contaminants of interest down to or below levels summarized in Table 2.2 of K/HS-132.

2.3 SCHEDULE FOR SPECIFIC RFI ACTIVITIES

The RFI activities that will be performed and the duration of each activity are shown in Table 2.1.

2.4 FEASIBLE ALTERNATIVES

Knowledge of feasible corrective measures has been used in preparing the RFI. Based on existing geologic, hydrologic, and contaminant source data, potential corrective measures for the K-1420 WAG have been identified and are shown in Table 2.2. These corrective measures will be reevaluated after the RFI report is completed.

2.5 RISK ASSESSMENT

The environmental and public health risk associated with possible site contamination and each of the remedial action alternatives listed in Table 2.2 will be evaluated. This evaluation will consist of a characterization of contaminant sources, environmental setting, magnitude of release, pathways to human exposure, and characterization of risk. Risk assessment data requirements have been incorporated in development of the site sampling plan.

Table 2.1. Duration of RFI activities for the K-1420 Waste Area Grouping

Activities	Duration
1. Camera Survey	8 weeks
2. Site preparation and sample location	
(a) Soil Samples	4 weeks
(b) Surface Water Samples	2 weeks
(c) Groundwater Samples (includes well construction)	8 weeks
3. Collection of samples	
(a) Soil Samples	12 weeks
(b) Surface Water Samples	6 weeks
(c) Groundwater Samples	52 weeks
4. Analyses of Samples	
(a) Soil Samples	32 weeks
(b) Surface Water Samples	16 weeks
(c) Groundwater Samples[1]	66 weeks
5. Compilation of data and data presentation	24 weeks
6. Evaluation of results and recommendations	8 weeks
7. Preparation of RFI report and submittal to EPA	8 weeks
8. Additional sampling phases as needed	TBD

[1]Analyses of Groundwater samples will occur concurrently with groundwater sample collection.

Table 2.2. Potential corrective measures for the K-1420 Waste Area Grouping

General Response Action	Technologies
Monitoring	Surveillance monitoring and analysis
Removal of source	Excavate and treat/dispose of contaminated soil at an approved landfill or place in long term storage
Containment from surface water	Construct drainage channels, dikes to divert surface runoff and stormwater runoff around contaminated soils
	Cap contaminated area with clay, synthetic membranes, fabrics, etc.
Containment from groundwater	Subsurface collection drains - french drains, tile drains, pipe drains
	Vertical containment barriers - soil bentonite slurry wall, cement-bentonite slurry wall, vibrating beam, grout curtains, steel sheet piling
	Groundwater diversion pumping - well points, deep wells, suction wells, ejector wells
Treatment of groundwater	Collect the groundwater and pump to an existing wastewater treatment plant or treatment by physical/chemical processes, aeration, filtration, carbon adsorption, or biological processes at a new facility
Decommission incinerator	Demolish and dismantle the incinerator, decontaminate surface of the incinerator using a scabbler or high pressure water jet
Renovation of incinerator	Decontaminate incinerator and modify incinerator to comply with EPA regulations

3. DESCRIPTION OF CURRENT CONDITIONS

3.1 GEOGRAPHICAL INFORMATION

The K-1420 WAG is located within ORGDP between the Northeast Patrol Road and 15th Street. A map of the area is shown in Figure 3.1. The K-1420 WAG consists of three components:

- K-1420 Process Lines (between Building K-1420 and the K-1407-B Holding Pond)
- K-1420 Oil Storage Yard
- K-1421 Incinerator

The process lines are divided into two systems. Both are underground gravity systems with one on the south side of K-1420 which drains to the Central Collection Sump and then to the K-1407-A Neutralization Pit. The other system is on the north side of K-1420 which drains to the K-1407-B Holding Pond. Figure 3.2 shows a schematic of the underground process drains in the K-1420 area.

3.2 HISTORICAL INFORMATION

The K-1420 Chemical Operations building was constructed and began operation during 1953-54. The building initially contained the following facilities:

- Furnace stand for converter conditioning and recover
- Classified parts disassembly and cleaning
- Cascade and feed plant equipment cleaning and decontamination (includes compressors, converter parts, valves, piping, and UF_6 cylinders)
- Uranium recovery
- Alumina leaching (removal of uranium from the trapping media)
- Laboratory

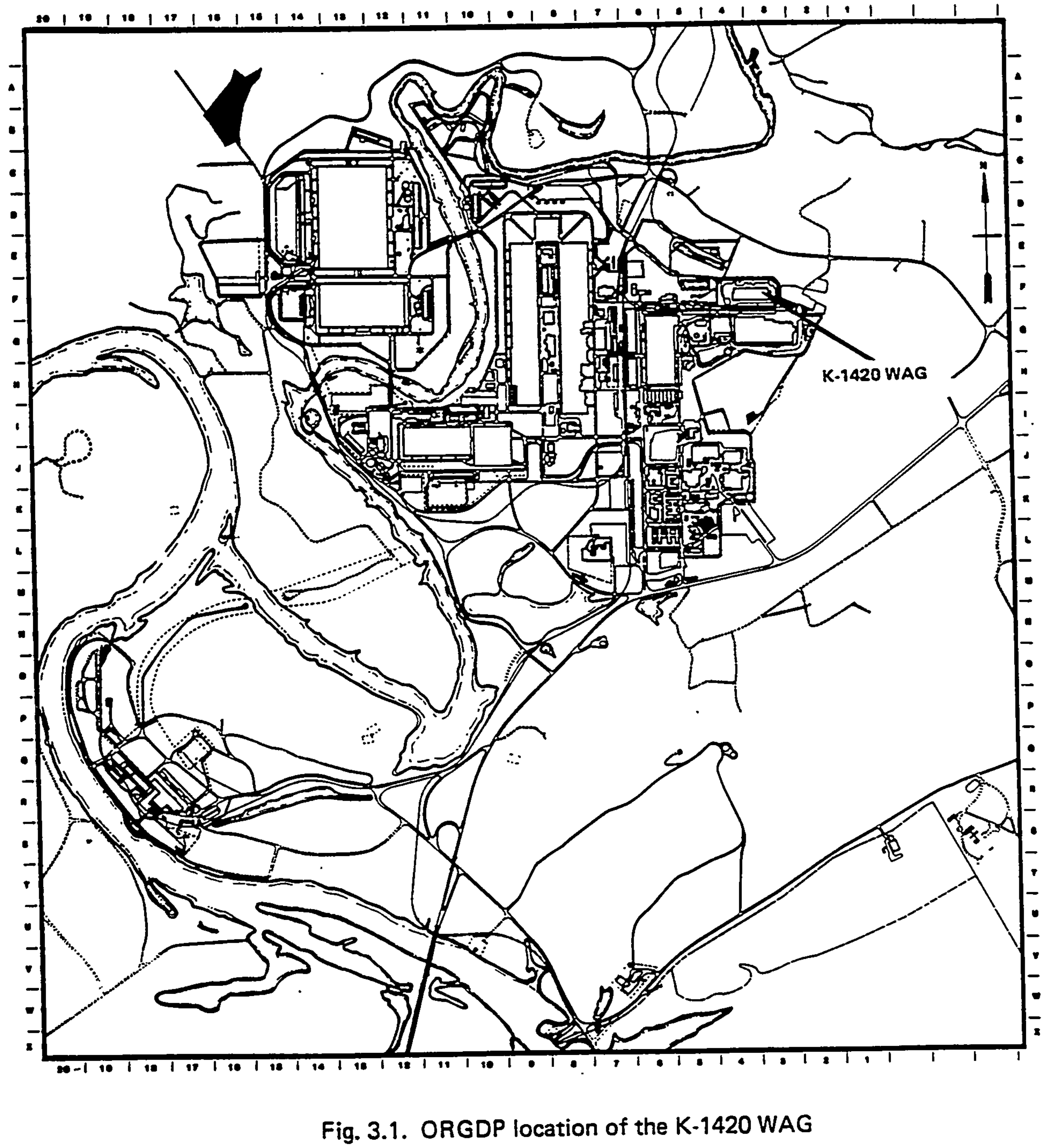


Fig. 3.1. ORGDP location of the K-1420 WAG

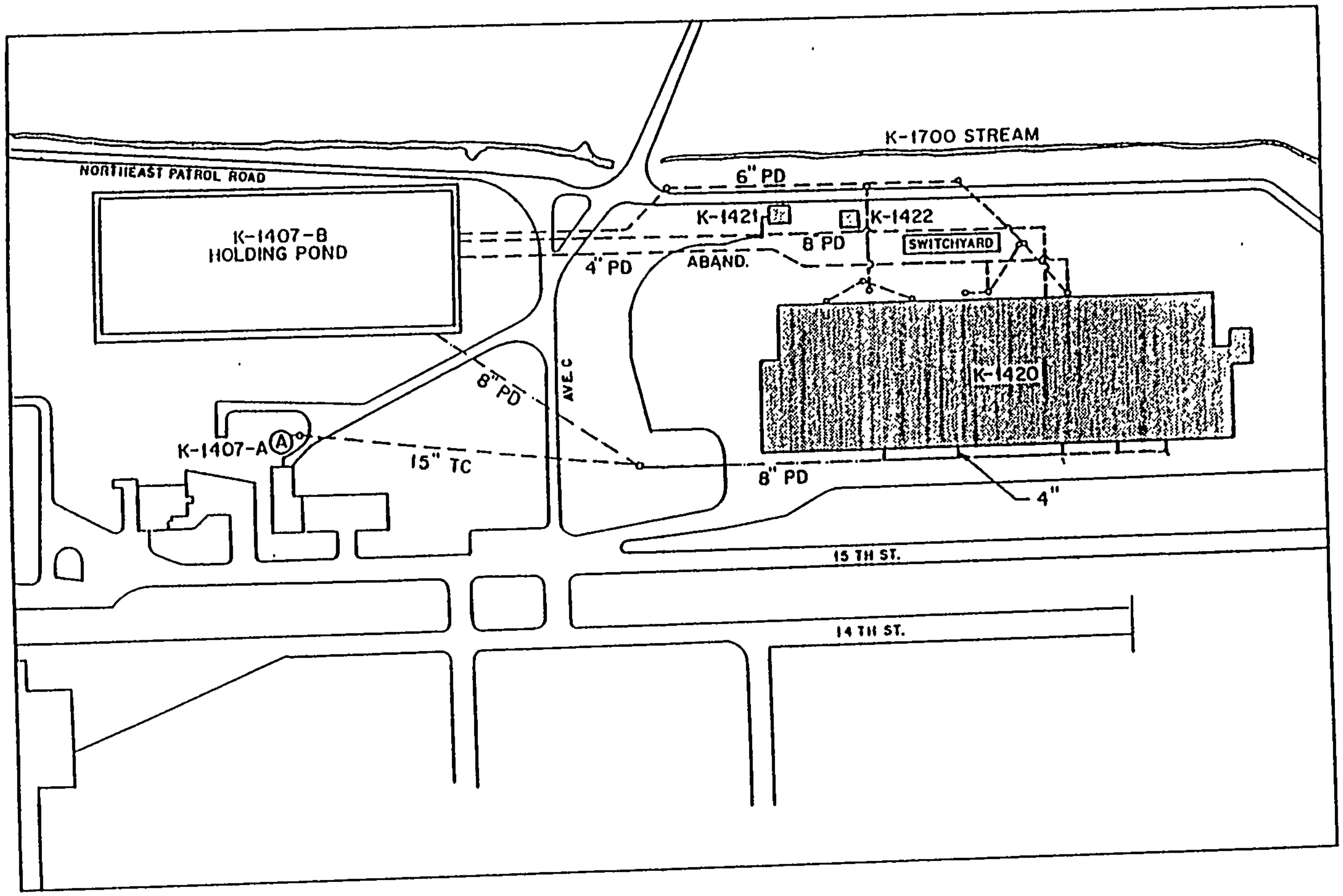


Fig. 3.2. Process drain lines for the K-1420 Waste Area Grouping Area

From the onset of K-1420 building operations, degreasing of parts occurred in a degreasing booth located on the south side of the building. To prepare uranium parts for plating, parts were degreased with trichloroethylene and freon 113. Spent degreasing solutions were discharged to the K-1407-B Holding Pond through the south process drain line if the solutions contained low concentrations of uranium.

From 1954 to 1960, a uranium oxide fluorination process was operated on the northwest side of the K-1420. Uranium oxide was converted to uranium fluoride in safe geometry fluorination reactors. Emissions (UO_2F_2 and HF) from the reactors were vented directly to a stack approximately 80 feet high on the northwest side of the building. Significant amounts of UO_2F_2 were emitted from the stack until a caustic scrubber was installed later.

Plating facilities were installed in the mid-1960s. Both electroplating and electroless plating processes were used.

A Millers Fluorinated Lubricating (MFL) oil reclamation project was started in early 1983. Uranium contaminated waste oil was treated with quinoline and was centrifuged. The resulting uranium bearing sludge was incinerated at the K-1421 Incinerator until the incinerator was shut down; the sludge is now stored. The oil centrate, with less than 200 ppm uranium, is currently sent to K-1435 storage to await incineration. If the concentration of uranium is greater than 200 ppm, the centrate is reprocessed or blended with low level uranium centrate for incineration.

The K-1421 annex was added to the east end of Building K-1420 in the early 1970s. The annex was used by maintenance to disassemble classified converter parts being removed from the cascade in the Cascade Improvement Program.

The K-1421 Incinerator was used from the beginning of K-1420 operations. The original incinerator, consisting of a brick pit and stack, was used to burn uranium contaminated paper gloves, shoes, and oil sludges. The incinerator was then replaced in the late 1960s with a unit containing a secondary burner and a higher stack. Operation continued until 1982 when the incinerator was modified to meet EPA standards. The new incinerator consisted of primary and secondary combustion chambers with state-of-the-art instrumentation and controls. The incinerator was shut down in 1986 when it did not comply with uranium emission standards.

In the 1970s, an oil burner was located east of the incinerator to burn uranium contaminated oils. Prior to the use of the burner, an oil combustion pan was used to burn uranium contaminated oil, oil sludges, gloves, shoes, paper, etc. The burner was removed from the K-1420 area when it ceased operation.

In 1987, an assessment was conducted on the underground lines and tank systems throughout ORGDP by Lee Wan & Associates. The K-1420 process lines were included in this survey. The results are summarized in the report titled "Final Assessment of ORGDP Tank Systems for Compliance with RCRA Regulations." As part of the assessment, leak tests on the process lines on the north and south sides of Building K-1420 were conducted and both lines were found to be leaking. PCB contamination was detected in an excavated section of one of the process drain lines. Table 3.1 shows a summary of the history of operations in the K-1420 WAG.

3.3 OPERATIONAL INFORMATION

Only equipment contaminated with low-level radioactive uranium was cleaned and decontaminated in K-1420. Diffusion cascade valves, compressors, converter parts, classified parts, pipes, valves, instruments, etc., were cleaned and decontaminated. The resulting uranium solutions were recovered. Equipment from the K-1131 Feed Plant, while operating on normal assay uranium, was also cleaned and decontaminated and the resulting solutions recovered in K-1420.

The processing of Hanford reactor returns introduced transuranics to the K-1131 Feed Plant, the ORGDP Diffusion Cascade, and the K-1420 Cleaning, Decontaminating, and Recovery operations. The transuranics from equipment cleaning at K-1420 were discharged through the process lines to the K-1407-A Neutralization Pit and K-1407-B Holding Pond.

Table 3.1. History of the K-1420 Chemical Operations Building

Date	Event
1953 - 54	Building constructed with the following operations supported by a small laboratory: • Converter conditioning and recovery • Classified parts disassembly and cleaning • Cascade and feed plant equipment cleaning and decontamination • Uranium recovery • Alumina leaching
	K-1421 Incinerator began operation
mid to late 1950s	Mercury recovery operations began (addressed in the K-1420 Mercury Room RFI Plan [K/HS-139])
	MFL oil reclaiming operations began
mid-1960s	Plating facilities installed
late 1960s	K-1421 Incinerator modified with secondary burner and higher stack
early 1970s	Converter bundle cleaning and barrier removal facility installed
	K-1420 Annex added to the east end of the building
1970s	Oil burner operated to burn uranium contaminated oils
1981	Converter bundle cleaning and barrier removal facility shut down
1982	New K-1421 Incinerator installed with state-of-the-art equipment
1983	MFL oil reclamation project started
1986	K-1421 Incinerator shut down
1987	Assessment conducted on the K-1420 process drain lines

A converter bundle cleaning and barrier removal facility was installed in the early 1970s to handle the converters being replaced in the Cascade Improvement Program (CIP). This facility was shut down with the completion of the CIP in 1981.

The MFL Oil Reclaiming Facility involved filtering the oil to remove any uranium. Cobaltous fluoride was then added to stabilize the filtered oil.

Disassembly facilities are located in the K-1420 Annex on the east end of the building. Classified parts which had been decontaminated in K-1420 were wet down for dust control for disassembly, cutting, and packaging. Valves were later decontaminated in this area. This process resulted in discharges of uranium and fluoride to the storm drain.

The Uranium Recovery Facility used aluminum nitrate to complex the fluoride in the recovery process and inhibit stainless steel attack by fluorides. In early operations the aluminum nitrate was purchased; later, it was produced using alumina and nitric acid.

The north and south process lines drain three areas of Building K-1420. The south drains handle the floor drains from "A" area (south side of the building) which includes the degreasing, stripping, rinsing, and plating areas. However, the floor pan drains from "A" area were routed to the north drain. The south drains previously flowed to the K-1407-A Neutralization Pit and then into the K-1407-B Holding Pond. The south drain now is diverted to the Central Neutralization Facility. The north drains flowed directly to the K-1407-B Holding Pond. The north drains handle the "B" (north side of the building) and "C" (center of building) area floor drains. These two areas included the Mercury Recovery and MFL Oil Reclamation Facilities. The north drain also handles the floor pan drains, the inside and outside drains from the K-1421 Incinerator, and the transfer station containment area drains. The original north drain lines were made of terra cotta but were replaced with stainless steel due to leakage.

The K-1420 roof drains, which could contain contaminants from the roof vents, discharge through storm drain No. 160 to the K-1700 Stream. Surface water flow from the K-1421 Incinerator area and the oil storage pad also discharge to K-1700 Stream (Mitchell Branch).

The oil storage pad is a 2,500 square foot asphalt area north of K-1420. Uranium contaminated oil (some oils contained PCBs) and uranium solutions were placed in safe-geometry dollies and stored in this area. Oil spills were known to occur at the storage pad area. Before the patrol road was covered with asphalt, surface water carried the oil spills and residues to K-1700 Stream. Later, most of the surface water flowed to a storm drain ditch running east and west along Patrol Road which eventually discharges to K-1700 Stream.

An oil-fired burner, made from a 10-inch pipe about 3 feet long, baffled with a series of cross bolts and a burner air supply, was operated to burn uranium contaminated oil in the 1970s. The oil burner was located east of the K-1421 Incinerator. Prior to the use of the oil burner, a safe-geometry stainless steel oil combustion pan, housed in an open transite shed, was used to burn uranium contaminated oil, oil sludges, gloves, shoes, and paper. The ash was collected and the uranium leached and processed through the K-1420 Uranium Recovery Facility.

4. CHARACTERIZATION OF THE CONTAMINANT SOURCE

Records on the quantities of chemicals processed in the K-1420 building and discharged through the process lines are not available. Chemicals which were possibly discharged to the K-1420 process lines are summarized below:

- uranium fluorides
- nitrate (Ca, Na, Al)
- technetium and other transuranics
- mercury
- nickel sulfate
- nickel sulfamate
- MFL oil
- tri-butyl phosphate
- caustic solutions (Na, K)
- acids (sulfuric, hydrochloric, nitric)
- fluorides (Ca, Al, Na, Co)
- quinoline (aromatic hydrocarbon)
- carbonates (Ca, Na)
- PCB contaminated oils
- di-butyl carbitol
- ammonium carbonate
- trichloroethylene
- Freon 113

Chemicals stored at the K-1420 oil storage area are oils contaminated with PCBs and uranium solutions.

Chemicals which were possibly discharged through the roof vents of K-1420 are summarized below:

- nitrogen (nitrous and nitric) oxides
- nickel carbonyl
- phosgene (from cleaning new cylinders)
- hydrogen fluoride
- uranium oxide fluoride

Chemicals/wastes burned in the K-1421 Incinerator are summarized below:

- uranium contaminated oil, oil sludges
- uranium contaminated gloves, shoes, paper

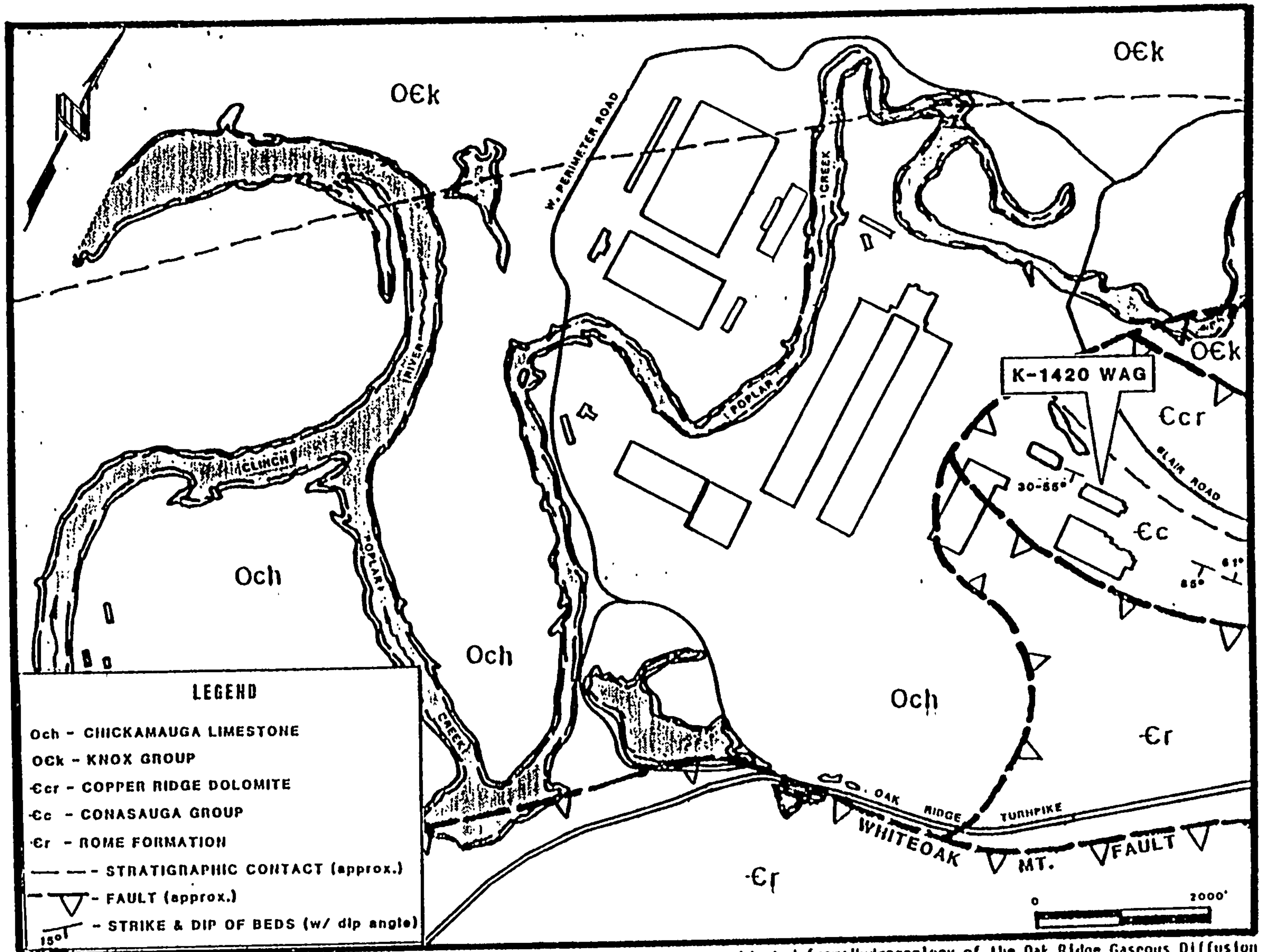
5. CHARACTERIZATION OF THE ENVIRONMENTAL SETTING

The K-1420 WAG is located near the eastern boundary of the ORGDP area within the K-1700 watershed known locally as Mitchell Branch. This stream flows to the west about 100 feet north from the WAG, and then to its confluence with Poplar Creek about 2,500 feet to the northwest. The land surface here originally sloped gently to the north, but the immediate vicinity of the K-1420 WAG has been cut and filled as necessary to produce a generally level surface for construction and operational convenience.

Drill hole data are not available for the K-1420 WAG; however, there are three bedrock monitoring wells, all about 1,000 feet from the WAG, and which penetrate the same geologic unit indicated to underlie this site. These wells are BRW-7 (K-1407-B) and BRW-8 (K-1070-B) to the west, and BRW-12 (K-1070-C/D) to the south (lithologic logs are included in Appendix A). Except for the limited evidence afforded by the drill hole logs, the geologic setting of this area is obscured by the structures and pavements of the ORGDP so that subsurface interpretations are generalized. The aerial geology of ORGDP is shown in Figure 5.1.

5.1 HYDROGEOLOGY

The K-1420 WAG is underlain by rocks of the upper Conasauga Group, which normally consist of massive limestone or limestone interbedded with shale grading stratigraphically downward (to the south) into calcareous shale. Some portions of the upper Conasauga may be dolomite or dolomitic limestone. Oolitic limestone, also very common in the Conasauga group, was observed in the aforesaid drill holes. The structural attitude of the bedrock strata beneath this site is not known; however, the strike is inferred to be approximately east-west which is confirmed by observations made by R. H. Ketelle of ORNL (unpublished geologic map); some of his measurements are shown on Figure 5.1. Dips of the beds are variable because of general deformation related to faulting.



Adapted from: Hydrogeology of the Oak Ridge Gaseous Diffusion Plant Site, Geraghty & Miller (1986); and an unpublished map by R.H. Ketelle, ORNL.

Fig. 5.1. Geologic map of the ORGDP area

The Conasauga strata, along with the Copper Ridge dolomite immediately to the north, have been thrust against and/or over the Chickamauga limestone by a branch of the White Oak Mountain fault (Figure 5.1). A "slice" of the main fault has thrust the Rome formation over the Conasauga just south of the K-1420 WAG. The fault related stresses have caused extensive fracturing in the bedrock strata.

Groundwater flow in the bedrock will occur mainly in the carbonate strata through a system of interconnecting, solution-enlarged fractures and bedding planes. Fracturing in the more insoluble shales generally remains very "tight" with lower flow rates. Shales interbedded with carbonates tend to contain groundwater and direct the groundwater flow parallel to the strike. Groundwater in the bedrock beneath the K-1420 WAG is probably flowing westward, although there may be some northward flow across bedding planes toward K-1700 Stream. The rate of groundwater movement beneath this WAG is not known; however, field permeability tests have been performed on bedrock wells BRW-7 and BRW-8 with hydraulic conductivities of 3.58×10^{-5} and 6.71×10^{-5} cm/s, respectively. The wells are presumed to represent approximate bedrock conditions beneath the K-1420 WAG.

There are no available descriptions of the unconsolidated zone but it should consist mainly of residual soil with soil and/or rock fill required for stability or leveling. Also, there are no permeability data available for the soils here, but wells UNW-1 (K-1407-B) and UNP-3 (K-1070-B) are in soils similar to those of the K-1420 WAG area and their average permeabilities of 10^{-4} cm/s and 10^{-5} cm/s, respectively, should approximate the limits of permeability of the soils beneath this WAG.

Lateral flow in the unconsolidated zone is probably toward the K-1700 Stream. Vertical (interaquifer) flow may occur here, but there are no available hydrogeologic data to determine this.

5.2 SURFACE WATER

Much of the K-1420 WAG is covered by pavement and buildings so that infiltration is assumed to be minimal. Surface runoff is mostly intercepted by storm drains which divert the water through oil containment structures before discharging into the K-1700 Stream. Figure 5.2 shows the storm sewer system for the K-1420 WAG. Any runoff which might originate outside the storm drain system should flow northward to the K-1700 Stream. Appendix B presents the storm drain data available for the K-1420 area.

5.3 AIR

Martin Marietta Energy Systems, Inc. has an ongoing study of the air quality and meteorological conditions of the ORGDP and two of the meteorological towers are located in the general area of the K-1420 WAG. A summary of the ORGDP data is available in K/HS-132.

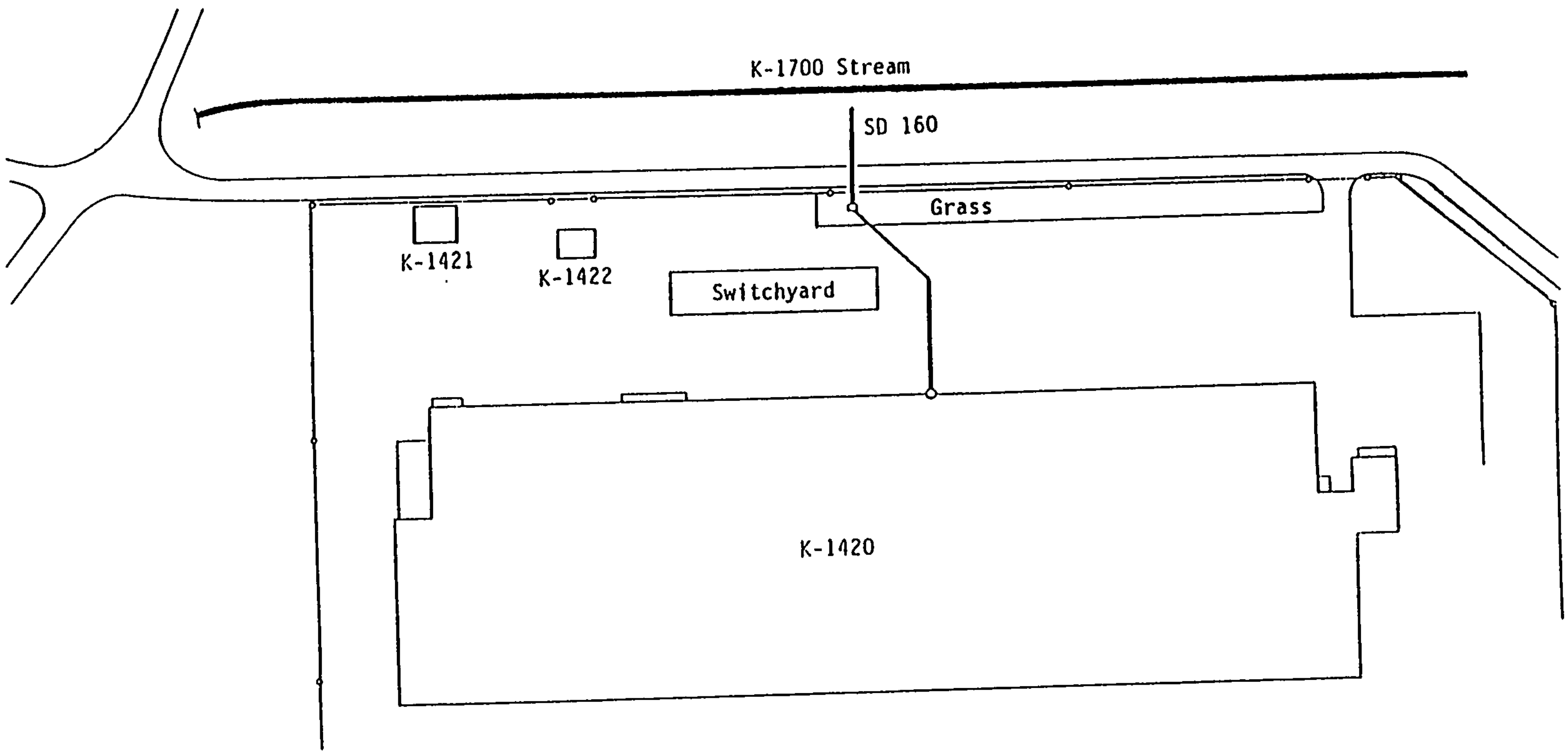


Fig. 5.2. Storm sewer system for the K-1420 Waste Area Grouping area

6. IDENTIFICATION OF POTENTIAL PATHWAYS AND RECEPTORS

Assessments of inactive hazardous waste disposal or storage sites are required to evaluate the site's potential for health or safety risks to the environment, public, or personnel. Determination of such risks must be based on evaluations of both the potential pathways of contaminant migration from toxic releases and the possible receptors of the contamination. Evaluation of the pathways which might release contaminants from the K-1420 WAG is based on (1) records of types of materials used in the operations at the K-1420 building, (2) records of types of materials stored at the K-1420 Oil Storage Yard, (3) results from a leak test of the K-1420 WAG process drain lines performed by Lee Wan & Associates (1987), and (4) interviews with persons having knowledge of the operational history of the components of the WAG. K/HS-132 will serve as a general reference of the components of the WAG and as a general reference concerning the potential pathways and receptors at ORGDP. The operational history of the K-1420 WAG presents the possibility of soil, groundwater, and surface water contamination. The grass and scrub vegetation at the site do not present likely exposure pathways. Air is not presently a potential pathway of migration. However, air emissions from previous operations of the K-1421 Incinerator could have contaminated areas remote from the K-1420 WAG.

6.1 POTENTIAL PATHWAYS OF MIGRATION

6.1.1 Soil

The nature of the materials discharged through the process drain lines, stored at the K-1420 Oil Storage Yard and emitted from the K-1421 Incinerator, makes soil contamination at the K-1420 WAG likely. It is probable that any metals released from the K-1420 WAG would be immobilized due to the clay composition of the soils in the area. Organics released from the K-1420 Oil Storage Yard might also be trapped in the soil for some period of time. In addition, there is some potential for radioactive contamination due to the nature of wastes discharged through the incinerator. A phased soil sampling approach is proposed to determine the nature, direction, and extent of any contaminant plume emanating from the components of the WAG; the sampling plan is described in Section 8 of this document.

6.1.2 Groundwater

The possibility of contaminant leakage from the components of the WAG indicates the potential for groundwater contamination. Limited hydrogeological data are available from three characterization wells near the K-1420 area; no groundwater monitoring data are available. Monitoring wells will be placed in the area and the assessment of the nature and extent of possible groundwater contamination will be carried out under the ORGDP Groundwater Protection Program.

6.1.3 Surface Water

Residual contamination on the roof of the K-1421 Incinerator and runoff from the oil storage yard and in the storm drain lines may be contaminating surface water in the vicinity of the WAG. Therefore, these locations will be sampled to assess the nature and extent of possible surface water contamination.

6.2 POTENTIAL RECEPTORS

6.2.1 Human Populations

The security controls required by the Department of Energy (DOE) on entrance to ORGDP prevent public access to the K-1420 WAG. Thus, the only public populations of interest are those which might come into contact with one of the exposure pathways beyond the boundaries of the site itself (i.e., through the reach of the surface water or the groundwater).

Of the 25 potable water wells within one mile of ORGDP, none of the wells are in proximity to any component of the WAG, and none are believed to occupy the same hydrogeological environment as the groundwater at the site. Further, of the ten public water supplies which withdraw from the

Clinch-Tennessee River system (into which the K-1700 Stream drains), none are nearer than 15 miles to the Oak Ridge Reservation (ORR). While direct discharge of surface runoff and site groundwater presents the potential for contaminant migration, distance, and dilution effects make pollution of public water supplies of low probability. Finally, the effects of distance and dilution also make unlikely the possibility that contamination of surface water and groundwater would reach the waters used downstream in the Clinch-Tennessee River system for recreational and industrial use.

6.2.2 Terrestrial Fauna and Flora

The K/HS-132 discusses the rare, threatened, and endangered plant and animal species which are thought to inhabit the area. To date, there has been no report that any of these species exist in the K-1420 WAG or are directly threatened by any possible contamination present there. The ecological viability of the K-1700 Stream is being evaluated under the ORGDP Biological Monitoring Program.

6.3 SUMMARY AND CONCLUSIONS

The nature of the materials used in the operations at the K-1420 building, stored at the Oil Storage Yard, and burned in the K-1421 Incinerator, combined with the site hydrogeology indicate the potential for soil, groundwater, and surface water contamination. Evaluation of the potential pathways of migration and possible receptors shows sufficient potential for environmental contamination and warrants an investigation of the site.

7. EXISTING MONITORING DATA

Data from storm drain No. 160 in the K-1420 area are presented in Appendix B. Storm drain No. 160 is located on the north side of Building K-1420 and drains to the K-1700 Stream. The storm drain data is compiled from the ORGDP Storm Water Characterization Program which is addressed in the report "ORGDP Storm Drain Characterization" (1987).

The stack emissions (i.e., off-gas) from the K-1421 Incinerator have been previously sampled and analyzed to quantify the emission rates for certain parameters, including total particulates, chlorides, fluorides, uranium, and technetium. The test results from sampling the K-1421 Incinerator stack are presented in Appendix C.

8. SAMPLING PLAN

8.1 SAMPLING AND ANALYTICAL STRATEGY

A knowledge of the types of operations performed within the K-1420 WAG serves as the basis for the preparation of this sampling plan. Soil corings and surface water samples will be taken as a part of this study. In addition, as a part of the ORGDP Groundwater Protection Program, samples are scheduled to be withdrawn from monitoring wells proposed for the K-1420 area. The RCRA groundwater data obtained from these wells will be utilized in this RFI to assist in the determination of any contamination.

As a result of operations carried out within the confines of the K-1420 WAG, the soil samples (oil storage and process piping) and surface water samples will be analyzed for heavy metals (including uranium and mercury), radioactivity, and organics. In addition, PCB contamination was detected in an excavated section of one of the process drain lines. Therefore, the soil and surface water samples will also be analyzed for PCB contamination. The soil samples collected for the K-1421 Incinerator will only be analyzed for radioactivity and heavy metals.

The process drain on the south side of Building K-1420 will be inspected using optical techniques (camera) to locate defects in the lines from which contaminants might have escaped. If defects are indicated, a second phase consisting of soil corings will be initiated to determine both the nature and extent of contamination (if any) resulting from the defect. Due to its small size of some of the north lines, the north lines will not be inspected by a camera. Therefore, soil samples will be collected along the north process line.

8.2 STATISTICAL SET-UP FOR SAMPLING

8.2.1 Soil Sampling for Oil Storage Pad and Process Piping

Sampling will occur in phases consisting of soil sampling, chemical analyses, and statistical analysis of the resultant data. Phases will continue until such time that conclusions can be drawn regarding the extent of contamination in the soil and decisions can be made concerning appropriate remedial actions.

The first phase of soil sampling is designed (1) to search along the process drain piping for any contaminants released into the soil through any defects in the piping (locations of defects are unknown), (2) to examine the soil immediately beneath the asphalt covered oil storage area, and (3) to identify variation sources and estimate their magnitude. This information will be used to guide the next phase of sampling, if needed.

Figures 8.1 and 8.2 show the soil sampling locations for the piping and oil storage area. There are 61 sampling locations. Ten locations monitor the oil storage only, 17 are oil storage and piping samples, and 34 are piping only samples. The sampling locations for the oil storage area will be located along a 25-foot grid. The piping will be sampled approximately every 25 feet, with the sampling points positioned to monitor more than one pipe wherever possible. Each location will be drilled to refusal and samples taken from the coring. Because of the presumed direction of general groundwater flow in the area, the corings will be located approximately 3-5 feet north of the pipe.

Exact coring coordinates will be determined from engineering drawings prior to drilling, surveyed as needed to avoid obstructions to the drilling rig, and documented. Table 8.1 gives the randomized drilling order.

8.2.1.1 Sampling from Oil Storage Corings

For the oil storage area corings, the first sample will be taken from the soil one foot beneath the asphalt and gravel bed. A sample will also be taken from: (1) each distinct soil layer, (2) boundaries between soil layers, and (3) regular intervals of four feet in depth in thicker soil layers. For thicker layers, soil from two successive two-foot split barrels will be composited, with care not to composite across soil layers or layer boundaries. Each sample will be divided with a portion saved in case a backup analysis is needed (Figure 8.3).

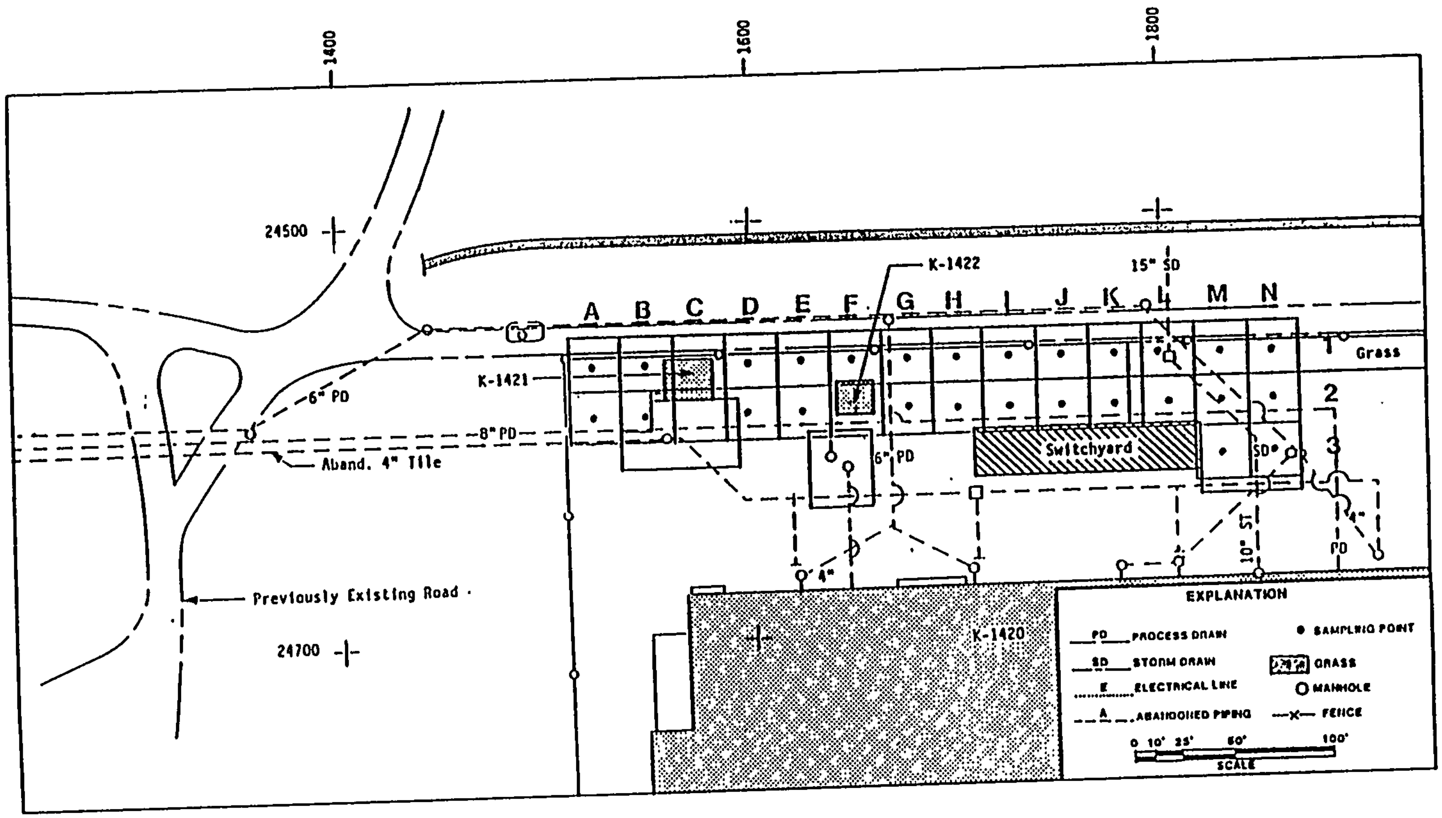


Fig. 8.1. K-1420 Waste Area Grouping soil coring locations for the oil storage area

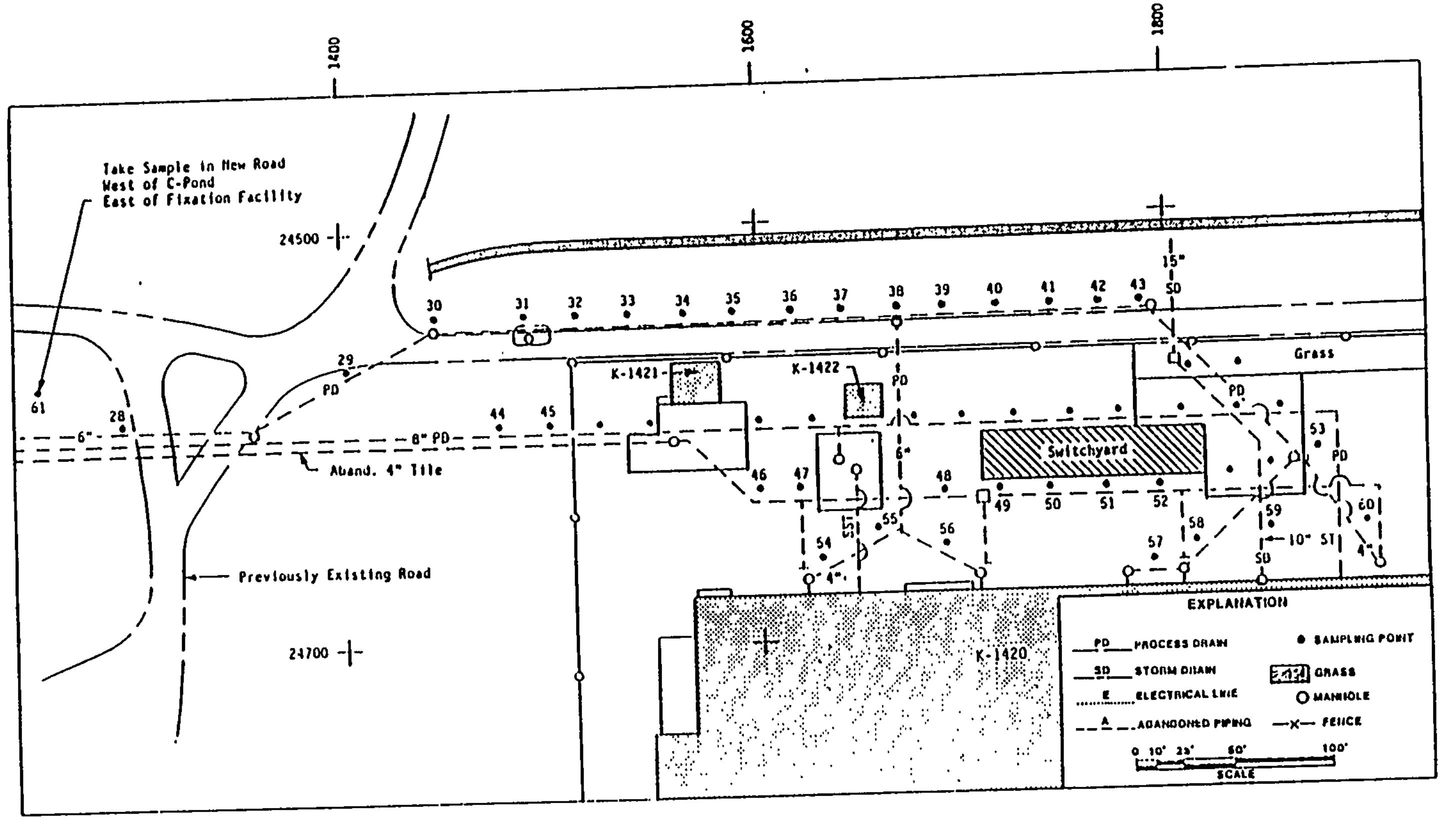


Fig. 8.2. K-1420 Waste Area Grouping soil coring locations for process piping

Table 8.1 Randomized drilling order for the K-1420 WAG

Drilling Order	ID No. from Fig. 8.1, 8.2	Coring Type
1	45	P
2	54	P
3	A-2	OP
4	51	P
5	58	P
6	42	P
7	L-1	OP
8	M-3	OP
9	52	P
10	I-1	O
11	N-3	OP
12	L-2	OP
13	28	P
14	49	P
15	41	P
16	48	P
17	47	P
18	39	P
19	J-2	OP
20	G-2	OP
21	M-2	OP
22	35	P
23	30	P
24	B-1	O
25	56	P
26	32	P
27	34	P
28	36	P
29	33	P
30	57	P
31	59	P
32	B-2	OP
33	55	P
34	G-1	OP
35	43	P
36	H-2	OP
37	60	P
38	D-1	O
39	K-1	O
40	F-1	O
41	31	P
42	N-1	O
43	50	P
44	44	P
45	M-1	OP
46	38	P

Table 8.1 (continued)

Drilling Order	ID No. from Fig. 8.1, 8.2	Coring Type
47	N-2	OP
48	29	P
49	A-1	O
50	D-2	OP
51	46	P
52	J-1	O
53	61	P
54	E-2	OP
55	40	P
56	K-2	OP
57	E-1	O
58	53	P
59	37	P
60	H-1	O
61	I-2	OP

Coring Type Symbols:

O - Oil Storage Only
P - Process Drain Pipes Only
OP - Oil Storage and Process Drain Pipes

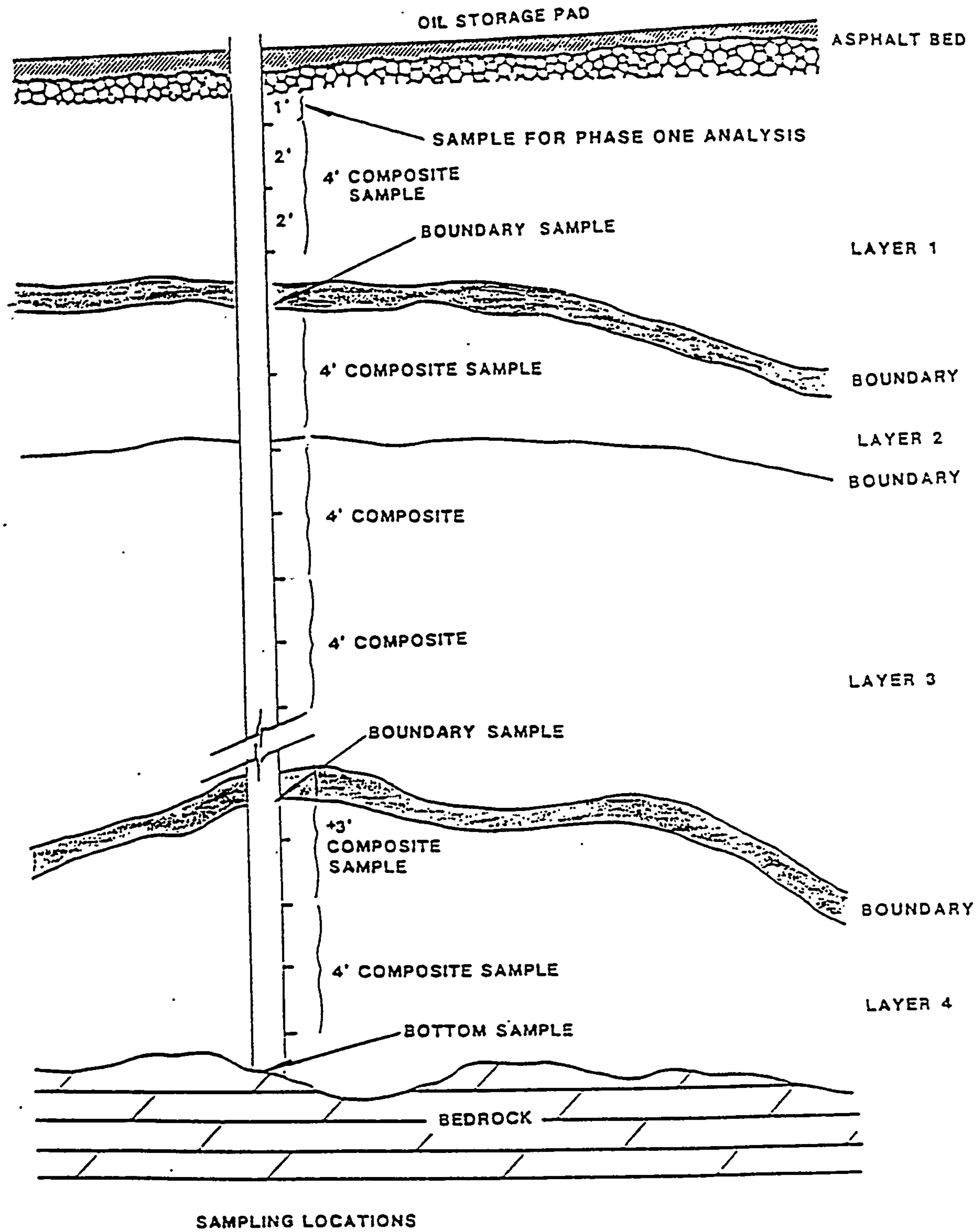


Fig. 8.3. K-1420 Waste Area Grouping oil storage only coring

8.2.1.2 Sampling from Process Piping Corings

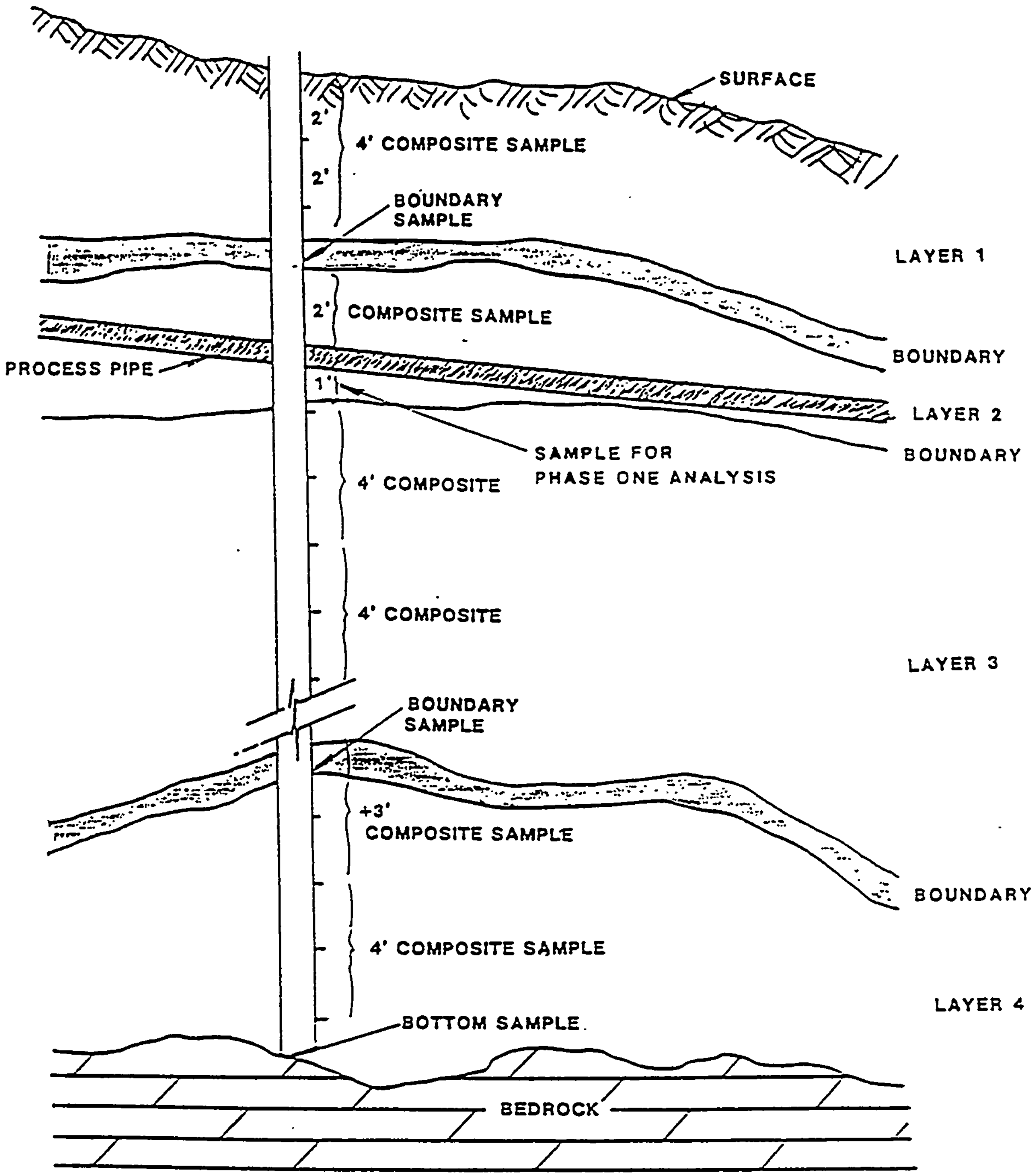
For the process piping corings, the first sample will be taken at the same level as the underground pipe, or the shallowest pipe, if the coring monitors more than one section of piping. From the soil below the level of the shallowest pipe, a sample will also be taken from: (1) each distinct soil layer, (2) boundaries between soil layers, and (3) regular intervals of four feet in depth in thicker soil layers. For thicker layers, soil from two adjacent two-foot split barrels will be composited, with care not to composite across soil layers or layer boundaries. Each sample will be divided with a portion saved in case a backup analysis is needed (Figure 8.4).

8.2.1.3 Sampling from Oil Storage and Piping Corings

The corings which are both storage and process piping corings will have samples taken one foot beneath the asphalt and at the level of the pipe. A sample will also be taken from: (1) each distinct soil layer, (2) boundaries between soil layers, and (3) regular intervals of four feet in depth in thicker soil layers. For thicker layers, soil from two adjacent two-foot split barrels will be composited, with care not to composite across soil layers or layer boundaries. Each sample will be divided with a portion saved in case a backup analysis is needed (Figure 8.5).

8.2.1.4 Phase Chemical Analysis of Soil Samples

The individual soil samples will be analyzed in phases. The first samples analyzed will be those from one foot beneath the oil storage asphalt and those from the level of the underground piping. There are 78 soil samples (61 plus 17 additional oil storage and piping) for phase one analysis. Additional samples will be analyzed as needed to define the extent of any contamination found in phase one samples.



SAMPLING LOCATIONS

Fig. 8.4. K-1420 Waste Area Grouping process drain piping only coring

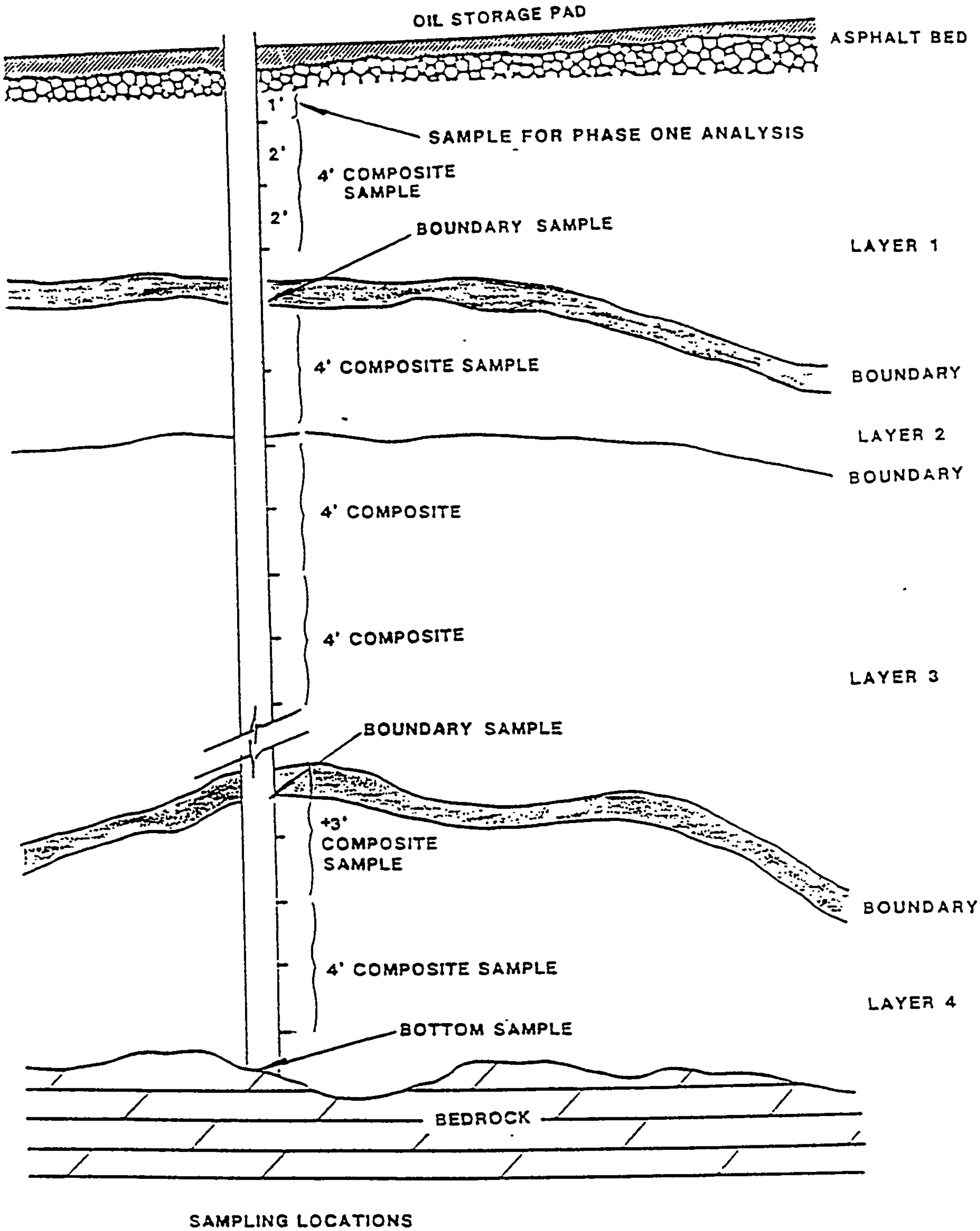


Fig. 8.5. K-1420 Waste Area Grouping oil storage and process piping coring

8.2.2 Soil Sampling for K-1421 Incinerator

The first phase of soil sampling is designed to survey in the direction of prevailing winds to reveal any spatial distribution of contaminants which may exist as result of past releases from the K-1421 Incinerator stack. This information will be used to guide the next phase of sampling, if needed.

Figure 8.6 shows a radial grid emanating from the K-1421 Incinerator. The spokes are located every 10 degrees about the prevailing wind direction (K/HS-132, p. 49) and the radii of the arcs are multiples of 500 feet. This grid scale allows sampling to extend to the top of the ridge northeast of the incinerator. Soil samples will be taken at the nodes of the grids. There are 36 sampling locations: arcs 1 through 4 crossed with spokes A through I. Each sample will be a surface sample to a depth of approximately six inches. Each sample will be analyzed for the constituents listed in Table 7.4 and 7.8 of K/HS-132.

8.2.3 Surface Water Sampling

The types of K-1420 WAG surface waters to be sampled are (1) storm drain water, (2) oil storage pad runoff, (3) K-1421 incinerator roof runoff, and (4) background rainwater. Duplicate grab samples will be taken at each sampling location during three events of heavy rain.

Figure 8.7 shows the sampling locations. Two storm drains flowing into the K-1700 Stream will be sampled at their effluent. Runoff from the oil storage pad will be sampled at the three locations indicated.

8.2.4 Groundwater Monitoring

Four monitoring wells are to be installed at the K-1420 WAG to determine if leaks or spills from this facility have contaminated the groundwater. One bedrock monitoring well (BRW) is to be placed near the west end of the WAG. Three shallow wells (UNW) will be located to monitor the unconsolidated zone along the north side. The locations of these wells are shown on Figure 8.7.

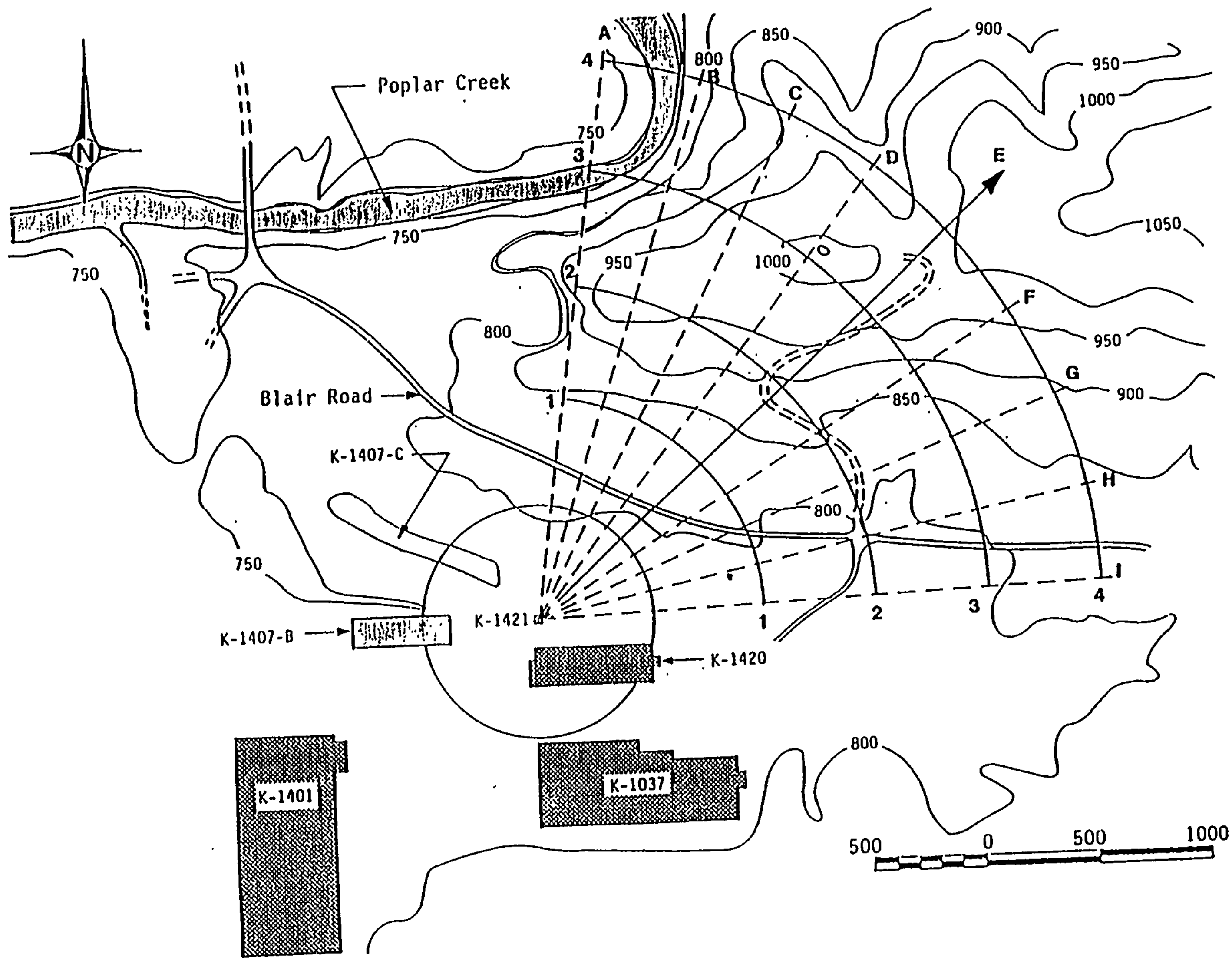


Fig. 8.6. Soil sampling for K-1421 incinerator releases

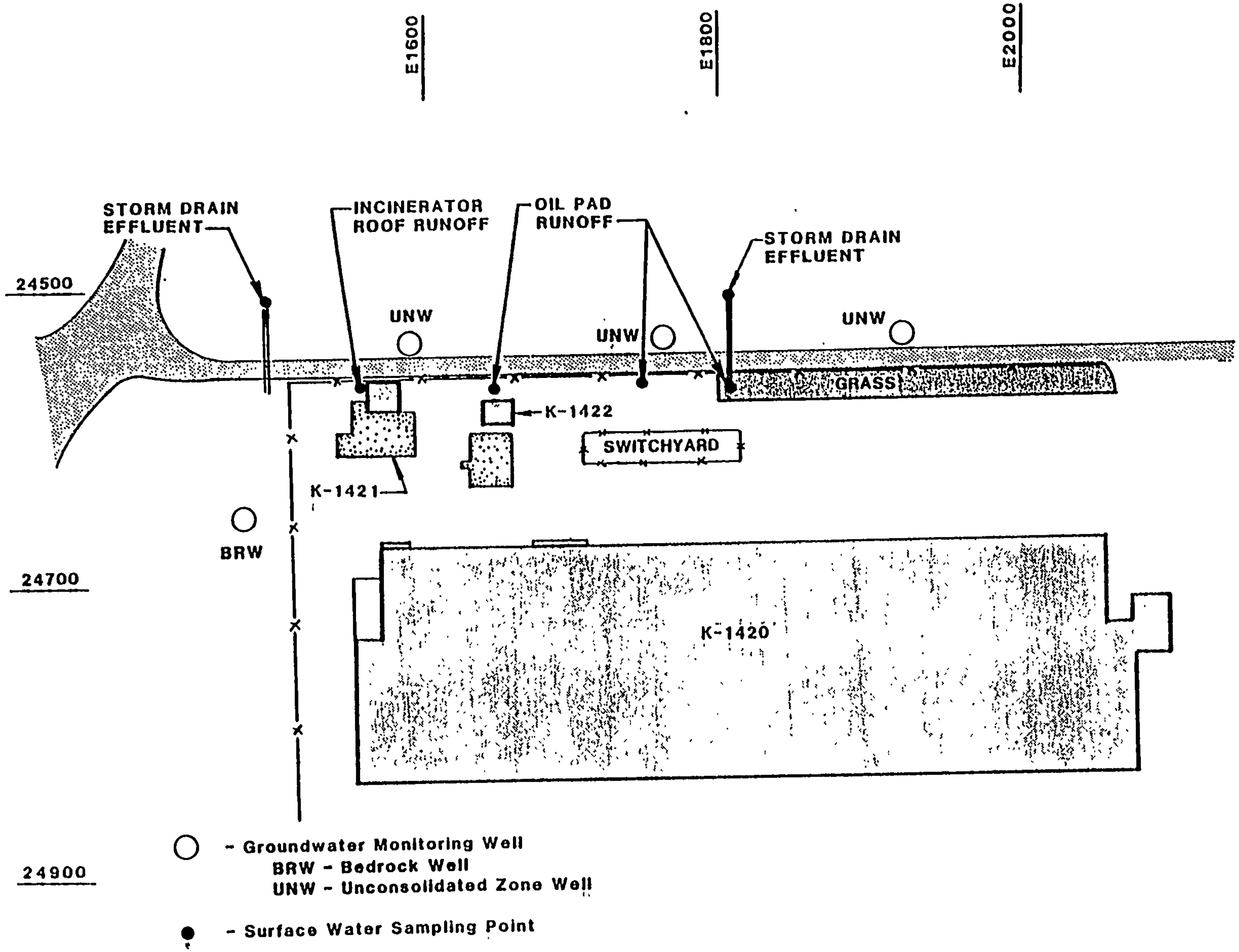


Fig. 8.7. K-1420 Waste Area Grouping surface water sampling and monitoring well locations

Monitoring wells may exist or be planned under the ORGDP Groundwater Protection Program which correspond to both the location and monitored zone with the wells designated by this plan. Only one well should be installed at any such location.

The wells will be installed in accordance with the applicable standards of "RCRA Groundwater Monitoring Technical Enforcement Guidance," EPA: OSWER-9950.1 (September 1986).

8.3 FIELD SAMPLING

8.3.1 Site Preparation

Due to the nature of the site and the density of underground utilities within the area, the precise location of soil corings will be determined by Martin Marietta Energy Systems Engineering. The field locations of the sampling points will be accurately located by surveying with considerations being made for equipment access. The area will be marked using appropriate permanent markers. Surveying will also be coordinated by Martin Marietta Energy Systems Engineering.

Just prior to drilling, the ORGDP Maintenance Department will be contacted to remove any asphalt above the previously identified sites for soil corings.

8.3.2 Equipment and Supplies

The drillers will provide all necessary drilling equipment (hollow core auger, split spoon sampler, etc.). The following field sampling supplies will be required:

- Nonionic detergent, Micro (International Products Corp.)
- Deionized water
- Isopropyl alcohol

- Glass containers, precleaned, with Teflon lined lids, one quart capacity
- Logbook
- Chain-of-custody seals
- Sample labels
- Chain-of-custody forms
- Stainless steel trays
- Aluminum foil
- VOA bottle
- Stainless steel spatulas
- Hand auger

8.3.3 Soil Sampling Procedure

Collection of samples from this site will follow ASTM Method D-1586-84 Penetration Test Split-Barrel Sampling of Soils. The drilling will be performed by private drilling contractors. A hollow core auger will be used to remove the soil above each segment to be sampled and the split-barrel sampler will be driven into the soil through the center of the auger. This technique will obtain a sample that is undisturbed by the auger operation. Using a split-barrel sampler, samples will be collected as prescribed in Section 8.2. Samples will be collected to refusal. At each two-foot increment, the split-barrel sampler will be removed from the drilling rig and separated to expose the sample. Between samples, the equipment used for sample transfer shall be cleaned with nonionic detergent and water and then rinsed with deionized water and isopropyl alcohol. The split-barrel samplers will be detergent cleaned and rinsed with water by the drilling company.

For samples designated for VOA analysis, the soil will be immediately transferred to a VOA bottle (sample should fill the bottle). The remaining soil from two adjacent corings will be combined in a foillined stainless steel pan, homogenized, and transferred to a precleaned one-quart jar (sample should fill the jar) per Section 8.2.

For surface samples, a hand auger is to be used. The sampling should be performed according to EPA 600/4-84-076 Method II-2. The auger should be detergent cleaned and rinsed with deionized water between sample collections.

From 10 percent of the soil samples (to be determined in the field), duplicate samples will be submitted to the laboratory to fulfill duplicate requirements as referenced in Section 7.3 of K/HS-132.

Sample containers will be labeled with the site identification, date, time, sample identification number, and the sampler's name. Sample date, site identification, time, sample identification number, sampler's name, and surveyed coordinates of the sample will be recorded in the logbook. In addition to the required entries, any other pertinent information and/or observations shall be recorded. The logbook used for these records will contain a copy of the map of the area and a copy of the sampling plan. The sample containers shall be sealed and transported to the laboratory under chain-of-custody protocol as referenced in Section 7.4 of K/HS-132.

After the sampling of each coring is complete, bored holes will be filled with a grout column, as described in Section 7.1.3 of K/HS-132, to prevent any contamination of the groundwater.

8.3.4 Surface and Runoff Water Samples

Grab samples of surface waters will be obtained from this site. Collection will follow EPA 600/4-84-076 Method III-1, which describes the use of a dipper for surface water sampling. A background sample will be collected utilizing a rainfall collector placed at the site. Locations and criteria for collection are described in Section 8.2. Preservation of the samples will be conducted in a manner consistent with those procedures prescribed in Methods for Chemical Analysis of Water and Waste (EPA-600/4-79-020). Table 8.2 is a brief description of the applicable preservation methods for the analytes of interest in this study.

Table 8.2. Recommendations for sampling and preservation

Analyte	Container	Preservative
Total Metals	Glass, Plastic	HNO_3 to pH<2
Radioactivity	Glass, Plastic	HNO_3 to pH<2
Extractable Organics	Glass	Cool, 4°C

Collection of duplicate samples, labeling, documentation, and sample transport will follow methods described in Section 8.3.3.

8.3.5 Process Line Camera Survey

The process line on the south side of Building K-1420 will be inspected using closed-circuit television systems specifically designed for sewer inspection. The operator shall be able to control the speed and travel of the camera while viewing the inspection on a television by remote control. Records will be collected on an inspection form and on video tape.

The inspection form will contain the following data for each manhole to manhole section that is inspected:

- the date of the inspection
- the location of the pipeline and upstream and downstream manholes
- the compass, direction of the viewing and the direction of the camera's travel;
- the pipe size, type, pipe joint length, and overall footage of the inspected sewer
- the occurrence and location of infiltration and exfiltration
- a description of defects observed (e.g., open joints, cracks, exposed soil) and their distance from the point at which the viewing began
- reference should be made to the videotape of the entire inspection.

The date of the inspection and location of the pipe will be recorded on the video tape.

8.4 ANALYTICAL PROTOCOL

Based on records detailing the types of waste disposed of at this site, it appears that migration of both organic as well as inorganic species is possible. All soil composites (oil storage and process piping) and water samples will be analyzed for PCBs and total inorganic elements (includes all regulated metals) listed in Table 7.4 of K/HS-132 as well as volatiles and semi-volatiles in Table 7.6 of K/HS-132. PCBs, volatiles, and semi-volatiles will be analyzed in accordance with procedures specified in Table 7.7 of K/HS-132. Additionally, the possibility of radionuclide contamination is present, and thus, it will be necessary to perform gross alpha, beta, and gamma analyses in accordance with procedures found in Table 7.8 of K/HS-132. The soil samples collected for the K-1421 Incinerator will be analyzed for the total inorganic elements listed in Table 7.4 of K/HS-132 as well as the radionuclide constituents listed in Table 7.8 of K/HS-132.

Further sample characterization will be necessary for those samples whose soil analyses indicate total elemental concentrations in excess of regulatory limits. The soil limits contained in Table 2.2 of K/HS-132 are the limits above which EP Toxicity extractions and analyses would be performed. These limits are arrived at by calculating the total inorganic specie content necessary to exceed EP Toxicity limits assuming the inorganic specie is 100 percent extractable.

An EP Toxicity type extraction and subsequent radionuclide analysis will also be necessary for those samples whose total radioactivity exceeds maximum acceptable levels. The establishment of these limits will be based on best technical judgement.

RCRA groundwater data will be obtained from proposed monitoring wells for the K-1420 WAG as part of the ORGDP Groundwater Protection Program. The data to be utilized for this study will be a subset of the parameter set shown in Table 2.1 of K/HS-132.

8.5 SAMPLE ANALYSIS

Soil analysis will follow standard EPA protocol as outlined in Test Methods for Evaluating Solid Waste: Physical/Chemical Methods (SW-846). Groundwater and surface water analyses will follow standard EPA protocol as outlined in Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020).

The Quality Assurance/Quality Control (QA/QC) requirements outlined in Section 7.3 of K/HS-132 shall be adhered to for all analyses.

9. DATA MANAGEMENT PROCEDURES

The results of the chemical analyses of the soil and surface water samples from the potential release areas will be presented in a clear and logical format so as to best illustrate any patterns in the data. These will include tabular, graphical, and other visual displays such as maps and contour plots described in Table 8.1 of K/HS-132, as appropriate to the data.

Statistical analyses will provide for treatment of duplicate laboratory analyses and results which are reported as less than detection limit and for examination for statistical outliers. Where possible, values which are recorded as less than detection limits will be handled according to "RCRA Groundwater Monitoring Enforcement Guidance Document," OSWER-9950.1, September 1986, which directs calculations through the use of Cohen's statistical methodology. This is found in "Tables for Maximum Likelihood Estimates from Single Truncated and Singly Censored Samples," (Technometrics, 3: 535-541, 1961). Otherwise, the detection limit will be used in the statistical analyses.

9.1 SOIL SAMPLES

For soil samples, average contaminant values for the potential release areas will be compared to preestablished limits using statistical t-tests. Statistical modeling methods such as least squares and kriging will be used to estimate response surfaces for use in developing concentration contours for the contaminants, where appropriate.

Statistical confidence bounds (upper, lower, or both) will be determined for the contaminants at a given sampling location and depth, where appropriate.

9.2 WATER SAMPLES

Average contaminant values for surface water and groundwater samples will be compared to background values and pre-established limits using statistical t-tests. Statistical confidence bounds (upper, lower, or both) will be determined for the contaminants at a given sampling location, where appropriate.

10. HEALTH AND SAFETY PROCEDURES

10.1 INTRODUCTION

Special requirements and procedures to protect the health and safety of the investigating team, ORGDP site personnel, and the general public during the RCRA Facility Investigations of the K-1420 WAG are addressed in this section.

The K/HS-132 details the health, safety, environmental, security, plant protection, and emergency response organizations which are in place at ORGDP line organizations to meet the requirements for health and safety during the RFIs. They provide the communications, response, and reporting for any plant emergency; on-site medical facilities with medical surveillance, treatment, monitoring, and periodic physical examinations; health physics and industrial hygiene surveillance hazard evaluation and control; operational safety accident prevention and control; and plant security and visitor control.

In addition, K/HS-132 identifies the organizational responsibilities for health and safety at the SWMU sites during RCRA Facility Investigations. K/HS-132 also includes the methodology for establishing the work zones of each SWMU, the level of protection required in the exclusion zone, decontamination procedures, personnel exposure limits, monitoring requirements, and respiratory protection requirements.

10.2 KNOWN HAZARDS AND RISKS

Substances of safety and health concern in the K-1420 WAG are tabulated below.

Substances of Safety and Health Concern

Waste Solvents and Degreasing Agents		Sludge	
Radioactive Wastes	X	Corrosive Liquids	X
Treated Industrial Wastes	X	Plating Wastes	X
Liquid Waste/Free Product Potential		Metal Wastes	
Asbestos		Cleaning Solutions	
PCB	X	Paint Wastes	
		Nonhazardous Wastes	
		Mercury	X

10.3 LEVEL OF PROTECTION

The level of personnel protection and monitoring is designated below.

Level Designation		Monitoring Parameters	
A		Airborne Pollutants	X
B		Explosion Potential	
C		Radiation	X
D	X		

10.4 DESIGNATION OF WORK AREA ZONES

The three zones (exclusion, contamination reduction, and support) will be established for the each drilling site in accordance with the methodology developed in Section 9 of K/HS-132. The safety equipment required for the designated level of protection and the decontamination procedures are also covered in K/HS-132.

10.5 EXPOSURE LIMITS

The level of personnel protection recommended for work activity in the exclusion zone of this SWMU is Level D.

In the exclusion zone, organic vapor levels will be monitored with instruments described in Section 9.4.9 of K/HS-132. If any of the following conditions occur, work will be stopped, the area will be evacuated, and the ORGDP Industrial Hygiene Department will be contacted to determine necessary actions to mitigate health and safety concerns:

- Organic vapor levels exceed background conditions for more than 1 minute.
- Unusual odors are detected.

The responsibility for limiting the exposure of the workers to non-hazardous levels of radiation resides with the Site Health and Safety Officer (SHSO) using instruments described in Section 9 of K/HS-132. The SHSO will monitor for radiation in the air with a radiation meter capable of measuring 0.1 mR/hr. If the contamination exceeds 2 mR/hr (ORGDP Health Physics action level), the SHSO shall order work to be stopped and all personnel shall be removed from the exclusion zone. The SHSO shall request that a health physicist assess the potential hazard of site conditions and determine if the sampling operations may continue.

All participants in the K-1420 WAG sampling activities, including contractors, must be aware that excavation equipment, shoes, and other protective clothing could become contaminated with radioactive material.

Surveys shall be performed on all such items before and after each sampling operation. Each survey shall include monitoring all applicable personnel and equipment. Any equipment found to be contaminated above the guidelines for unrestricted release (alpha-5,000 dpm/100 cm^2 of surface, 1,000 dpm/100 cm^2 transferrable, and 0.1 mR/hr beta and gamma) shall be decontaminated.

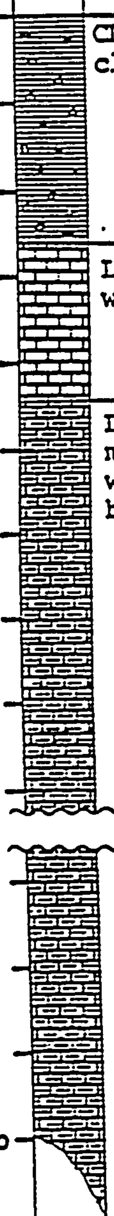
APPENDIX A

DRILL HOLE LOGS

GERAGHTY & MILLER, INC. Ground-Water Consultants	LITHOLOGIC LOG	BORING NO. BRW-7
		PROJECT Hydrogeologic Site Characterization, K-25 Plant

LOCATION	COORDINATES	SURFACE ELEVATION	TOTAL DEPTH
K-1407-B	Plant Grid S24509.81 E 910.07	754.31 feet msl	100 feet
GEOLOGIST	**SAMPLE INTERVAL**	**SAMPLE TYPE**	**DATE COMPLETED**
D. Hubert/D. Brice	5 feet	Drill Cuttings	02/04/86
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
A. Pippin	Alsay, Inc.	Air Rotary	Failing 1250
PURPOSE OF BORING	**GEOPHYSICAL CONTRACTOR**	**GEOPHYSICAL LOGS**	
Monitor Well	Century Geophysical	Natural Gamma, Density, Single Arm Caliper, Gamma-Gamma Compensated Density	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0		CLAY AND FILL MATERIAL: Fill material, plastic clay with rock fragments.	
10		LIMESTONE: Blue-gray, cherty, micritic, with secondary calcite.	
20		LIMESTONE AND SHALE: Limestone is blue-gray, micritic to slightly oolitic, (cherty in places), with some secondary calcite. Shale is gray, blue-gray and green-gray, calcareous in places.	
30			
40			
90			
100			

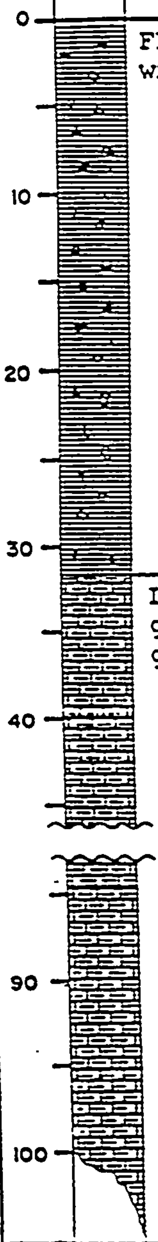


GERAGHTY & MILLER, INC.
Ground-Water Consultants

LITHOLOGIC LOG

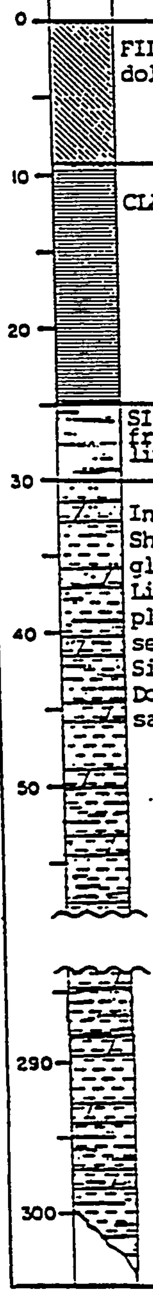
BORING NO. BRW-8		PROJECT Hydrogeologic Site Characterization, K-25 Plant	
LOCATION K-1070-B	COORDINATES S24663.84 Plant Grid E 477.00	SURFACE ELEVATION 778.65 feet msl	TOTAL DEPTH 100 feet
GEOLOGIST D. Hubert & G. Weiss	SAMPLE INTERVAL 5 feet	SAMPLE TYPE Drill Cuttings/Core	DATE COMPLETED 02/04/86
DRILLER J. Cason	DRILLING CONTRACTOR Alsay, Inc.	DRILLING METHOD Water Rotary	RIG TYPE Failing 1250
PURPOSE OF BORING Monitor Well	GEOPHYSICAL CONTRACTOR Century Geophysical	GEOPHYSICAL LOGS Natural Gamma, Density, Single Arm Caliper, Gamma-Gamma Compensated Density	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0–31		FILL MATERIAL: Orange brown, low plasticity clay with rock fragments, coal, brick and wood.	Slight loss of circulation at 30'.
31–100		LIMESTONE AND SHALE: Limestone is gray to dark gray, oolitic with secondary calcite. Shale is gray, green and maroon.	Slight loss of circulation at 51'.



GERAGHTY & MILLER, INC. Ground-Water Consultants	LITHOLOGIC LOG	BORING NO. BRW-12 PROJECT Phase II Monitor-well Installation, K-25 Plant	
LOCATION K-1070-C,D	COORDINATES (PLANT GRID) S25,658.31 E 1,477.35	SURFACE ELEVATION 817.34 ft msl	TOTAL DEPTH 300.0 ft
GEOLOGIST G. Weiss	SAMPLE INTERVAL 5 ft	SAMPLE TYPE Cuttings	DATE COMPLETED 02-05-87
DRILLER D. Wood	DRILLING CONTRACTOR Graves	DRILLING METHOD Air Rotary	RIG TYPE Dresser T-70-W
PURPOSE OF BORING Monitor Well	GEOPHYSICAL CONTRACTOR Geological Consulting	GEOPHYSICAL LOGS Natural Gamma, Density, S.P., Resistivity, Single Arm Caliper, Fluid Cond.	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0		FILL (100%), brown to red-brown clay and gray dolostone gravel.	
10		CLAY (100%), brown to red-brown.	
		SILT (100%), Dark gray, clayey in places. Contains fragments of weathered shale and traces of weathered limestone.	
30		Intercalated SHALE, SILTSTONE & DOLOSTONE Shale - dark to green-gray, silty in places, glauconitic in places. Lusterous sheen in places. Limestone - dark to green-gray, brown and white in places, micritic, sandy in places. Contains abundant secondary calcite. Siltstone - dark to green-gray, dense. Dolostone - dark to green gray, finely crystalline, sandy in places. Some secondary calcite.	Borehole producing water (<1 gpm) at 30 ft



APPENDIX B

STORM DRAIN DATA

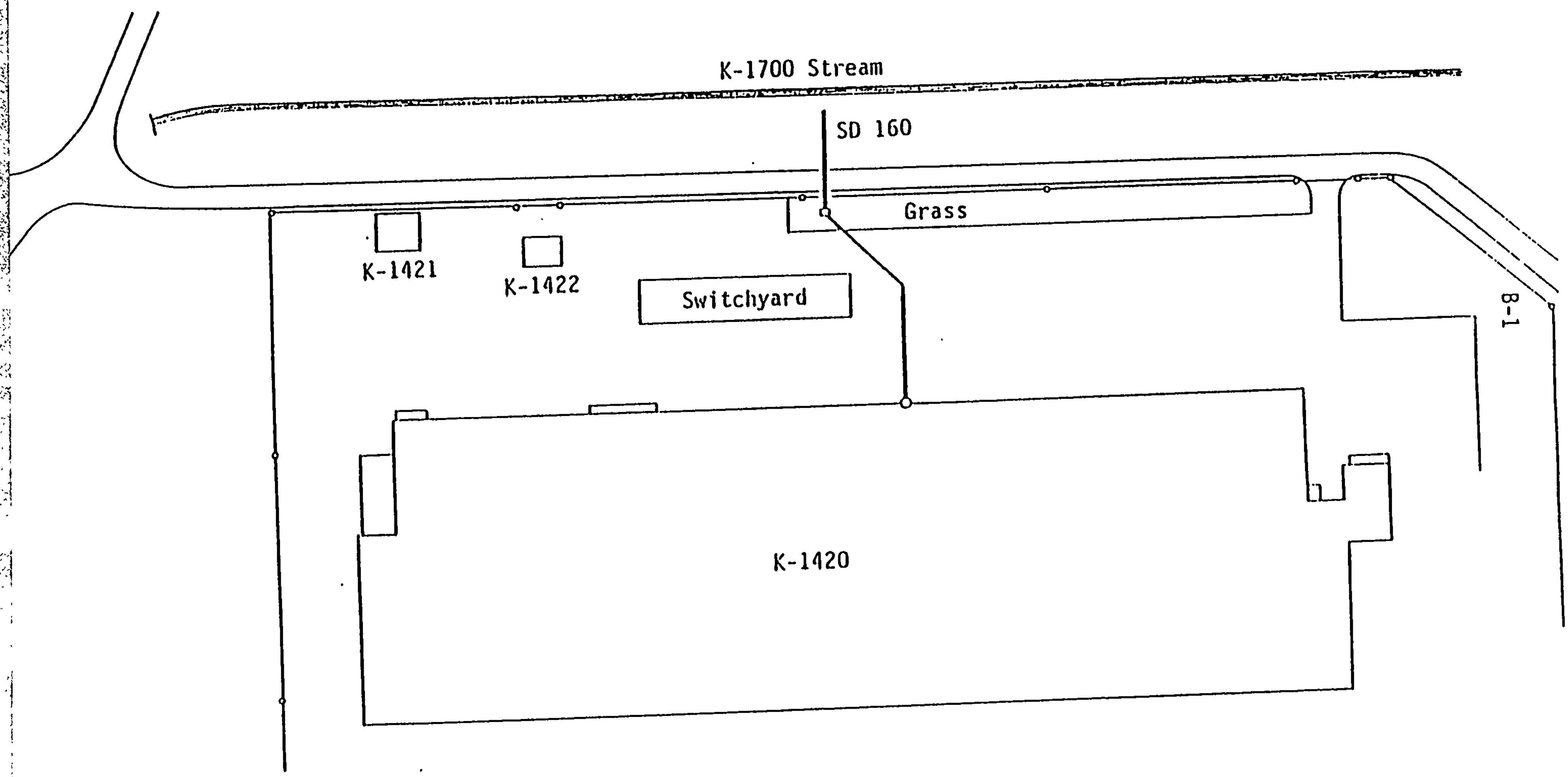


Fig. B.1. Location of Storm Drain #160

STORM DRAIN DATA FOR SD-160

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-160	3-Apr-1987	1,1,1-TRICHLOROETHANE	<5 ug/L
SD-160	3-Apr-1987	1,1,2,2-TETRACHLOROETHANE	<5 ug/L
SD-160	3-Apr-1987	1,1-DICHLOROETHANE	<5 ug/L
SD-160	3-Apr-1987	1,1-DICHLOROETHENE	<5 ug/L
SD-160	3-Apr-1987	1,2-DICHLOROETHANE	<5 ug/L
SD-160	3-Apr-1987	1,2-DICHLOROPROPANE	<5 ug/L
SD-160	3-Apr-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-160	3-Apr-1987	ALKALINITY	60 mg/L
SD-160	3-Apr-1987	ALPHA	252.2 pCi/L
SD-160	11-Mar-1987	ALUMINUM	<0.10 mg/L
SD-160	19-Mar-1987	ALUMINUM	0.22 mg/L
SD-160	25-Mar-1987	ALUMINUM	<0.10 mg/L
SD-160	30-Mar-1987	ALUMINUM	<0.10 mg/L
SD-160	3-Apr-1987	ALUMINUM	<0.10 mg/L
SD-160	14-Apr-1987	ALUMINUM	<0.10 mg/L
SD-160	17-June-1987	ALUMINUM	<0.10 mg/L
SD-160-F	11-Mar-1987	ALUMINUM	<0.10 mg/L
SD-160-F	19-Mar-1987	ALUMINUM	0.17 mg/L
SD-160-F	25-Mar-1987	ALUMINUM	<0.10 mg/L
SD-160-F	30-Mar-1987	ALUMINUM	<0.10 mg/L
SD-160-F	14-Apr-1987	ALUMINUM	<0.10 mg/L
SD-160-F	17-June-1987	ALUMINUM	<0.10 mg/L
SD-160	3-Apr-1987	AMMONIA	<0.2 mg/L
SD-160	3-Apr-1987	ARSENIC	<0.005 mg/L
SD-160	3-Apr-1987	BARIUM	<0.10 mg/L
SD-160	3-Apr-1987	BENZENE	<5 ug/L
SD-160	3-Apr-1987	BERYLLIUM	<0.0010 mg/L
SD-160	3-Apr-1987	BETA	206.0 pCi/L
SD-160	3-Apr-1987	BORON	0.0078 mg/L
SD-160	3-Apr-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-160	3-Apr-1987	BROMOFORM	<5 ug/L
SD-160	3-Apr-1987	BROMOMETHANE	<10 ug/L
SD-160	3-Apr-1987	CADMIUM	<0.0030 mg/L
SD-160	3-Apr-1987	CALCIUM	41 mg/L
SD-160	3-Apr-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-160	3-Apr-1987	CHEMICAL OXYGEN DEMAND (COD)	34 mg/L
SD-160	3-Apr-1987	CHLORIDE	201 mg/L
SD-160	3-Apr-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-160	3-Apr-1987	CHLOROBENZENE	<5 ug/L
SD-160	3-Apr-1987	CHLOROETHANE	<10 ug/L
SD-160	3-Apr-1987	CHLOROFORM	<5 ug/L
SD-160	3-Apr-1987	CHLOROMETHANE	<10 ug/L
SD-160	3-Apr-1987	CHROMIUM	<0.010 mg/L
SD-160	3-Apr-1987	CIS-1,3-DICHLOROPROPENE	<5 ug/L
SD-160	3-Apr-1987	COBALT	<0.10 mg/L
SD-160	3-Apr-1987	CONDUCTIVITY	877 umho/cm

STORM DRAIN DATA FOR SD-160

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-160	3-Apr-1987	COPPER	0.0069 mg/L
SD-160	3-Apr-1987	CYANIDE	0.002 mg/L
SD-160	3-Apr-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-160	3-Apr-1987	DISSOLVED OXYGEN	10.5 ppm
SD-160	3-Apr-1987	ETHYLBENZENE	<5 ug/L
SD-160	3-Apr-1987	FLUORIDE	0.4 mg/L
SD-160	3-Apr-1987	HARDNESS	134 mg/L
SD-160	3-Apr-1987	IRON	<0.050 mg/L
SD-160	3-Apr-1987	LEAD	<0.050 mg/L
SD-160	3-Apr-1987	LITHIUM	<0.0040 mg/L
SD-160	3-Apr-1987	MAGNESIUM	3.8 mg/L
SD-160	3-Apr-1987	MANGANESE	<0.010 mg/L
SD-160	3-Apr-1987	MERCURY	<0.0002 mg/L
SD-160	3-Apr-1987	METHYLENE CHLORIDE	<5 ug/L
SD-160	3-Apr-1987	MOLYBDENUM	<0.010 mg/L
SD-160	3-Apr-1987	NICKEL	<0.050 mg/L
SD-160	3-Apr-1987	NIOBIUM	<0.0070 mg/L
SD-160	3-Apr-1987	NITRATE	<0.5 mg/L
SD-160	3-Apr-1987	OIL & GREASE	<2 mg/L
SD-160	3-Apr-1987	pH	7.7
SD-160	3-Apr-1987	PHOSPHORUS	<0.20 mg/L
SD-160	3-Apr-1987	POTASSIUM	1.4 mg/L
SD-160	3-Apr-1987	SELENIUM	<0.005 mg/L
SD-160	3-Apr-1987	SILICON	0.62 mg/L
SD-160	3-Apr-1987	SILVER	<0.010 mg/L
SD-160	3-Apr-1987	SODIUM	93 mg/L
SD-160	3-Apr-1987	STRONTIUM	0.068 mg/L
SD-160	3-Apr-1987	SULFATE	9.6 mg/L
SD-160	11-Mar-1987	SUSPENDED SOLIDS	<1 mg/L
SD-160	19-Mar-1987	SUSPENDED SOLIDS	2 ug/g
SD-160	25-Mar-1987	SUSPENDED SOLIDS	3 ug/g
SD-160	30-Mar-1987	SUSPENDED SOILDS	4 ug/g
SD-160	3-Apr-1987	SUSPENDED SOLIDS	1 ug/L
SD-160	14-Apr-1987	SUSPENDED SOLIDS	3 ug/g
SD-160	17-June-1987	SUSPENDED SOLIDS	9 ug/g
SD-160	3-Apr-1987	TEMPERATURE	6.0 °C
SD-160	3-Apr-1987	TETRACHLOROETHENE	<5 ug/L
SD-160	3-Apr-1987	THORIUM	<0.20 mg/L
SD-160	3-Apr-1987	TITANIUM	<0.0030 mg/L
SD-160	3-Apr-1987	TOLUENE	<5 ug/L
SD-160	3-Apr-1987	TOTAL DISSOLVED SOLIDS	414 mg/L
SD-160	3-Apr-1987	TOTAL ORGANIC CARBON (TOC)	6 mg/L
SD-160	3-Apr-1987	TRANS-1 2-DICHLOROETHENE	<5 ug/L
SD-160	3-Apr-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-160	3-Apr-1987	TRICHLOROETHENE	<5 ug/L
SD-160	3-Apr-1987	TURBIDITY	3 NTU

STORM DRAIN DATA FOR SD-160

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-160	3-Apr-1987	URANIUM	0.243 mg/L
SD-160	3-Apr-1987	VANADIUM	<0.50 mg/L
SD-160	3-Apr-1987	VINYL CHLORIDE	<10 ug/L
SD-160	3-Apr-1987	ZINC	<0.020 mg/L
SD-160	3-Apr-1987	ZIRCONIUM	<0.0050 mg/L

F - Sample was filtered before testing

Average values for each compound in each storm drain can be found in:
ORGDP Storm Drain Characterization (K/HS-128), Part 2, September 1987.

APPENDIX C

K-1421 INCINERATOR SAMPLING RESULTS

TESTS RESULTS FROM SAMPLING THE K-1421 INCINERATOR STACK

Two tests were performed on the K-1421 Incinerator in 1985 and 1986. On June 11, 1985, the off-gas from the incinerator was sampled. The sampling technique from EPA Method 5 for total particulates was used except the impinger contents were changed to allow the determination of uranium, technetium, fluorine, and chlorine in addition to particulates. Table C.1 summarizes the results of the sampling.

The incinerator off-gas was sampled again on February 19, 1986. The off-gas was sampled for total particulates, uranium, technetium, plutonium, neptunium, and fluorides. The sampling was done in compliance with EPA Methods 1 through 5. Table C.2 summarizes the results of this sampling.

Table C.1. Test results from June 11, 1985 sampling

Cross-Section area of stack	1.767 SF
Composition of stack gas on a dry basis	
Carbon Dioxide	2.5%
Oxygen	15.3%
Nitrogen	82.2%
Molecular weight, dry basis	29.01
Off-gas temperature (at sample point)	954 deg F
Stack gas velocity	32.12 fps
Volumetric flow rates	3410 ACFM
Particulate emission rate	1.23 lb/hr
Uranium emission rate	0.0123 lb/hr
Technetium emission rate	1.84×10^{-6} lb/hr
Fluoride emission rate	0.00492 lb/hr
Chloride emission rate	0.104 lb/hr

Table C.2. Test results from February 19, 1986 sampling

Cross-Section area of stack	1.767 SF
Composition of stack gas on a dry basis	
Carbon Dioxide	2.5%
Oxygen	15.3%
Nitrogen	81.0%
Molecular weight, dry basis	29.2
Off-gas temperature (at sample point)	1104 deg F
Volumetric flowrate	363 SCFM
Particulate emission rate	0.485 lb/hr
Fluoride emission rate	none detected
Uranium emission rate	0.00108 lb/hr
Neptunium discharge rate	1590 pCi/hr
Plutonium discharge rate	none detected
Technetium discharge rate	21,500,000 pCi/hr
Thorium 228 discharge rate	3030 pCi/hr
Thorium 230 discharge rate	2850 pCi/hr
Thorium 234 discharge rate	3,890,000 pCi/hr

2351

K/HS-144

K-25

OAK RIDGE
K-25 SITE

MARTIN MARIETTA

RCRA FACILITY INVESTIGATION PLAN
K-1413 WASTE AREA GROUPING
OAK RIDGE GASEOUS DIFFUSION PLANT
OAK RIDGE, TENNESSEE

FEBRUARY 1988

MANAGED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

FEBRUARY 1988 K/HS-144

RCRA FACILITY INVESTIGATION PLAN
K-1413 WASTE AREA GROUPING
OAK RIDGE GASEOUS DIFFUSION PLANT
OAK RIDGE, TENNESSEE

Prepared by the
Oak Ridge Gaseous Diffusion Plant
Oak Ridge, Tennessee 37831
operated by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

TABLE OF CONTENTS

1. INTRODUCTION

Within the confines of the Oak Ridge Gaseous Diffusion Plant (ORGDP) are hazardous waste treatment, storage, and disposal facilities; some are in operation while others are no longer in use. These solid waste management units (SWMUs) are subject to assessment by the U.S. Environmental Protection Agency (EPA), as required by the 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA). The RCRA Facility Investigation (RFI) Plans are scheduled to be submitted for all the SWMUs during calendar years 1987 and 1988. The RFI Plan - General Document (K/HS-132) includes information applicable to all the ORGDP SWMUs and serves as a reference document for the site-specific RFI Plans.

This document is the site-specific RFI Plan for the K-1413 Waste Area Grouping (WAG). Contained within this document are geographical, historical, operational, geological, and hydrological data specific to the K-1413 site. The potential for release of contamination through the various media to receptors is addressed. A sampling plan is proposed to further determine the extent (if any) of release of contamination to the surrounding environment. Included are health, safety, quality assurance (QA), and quality control (QC) procedures to be followed when implementing the sampling plan. Procedures for managing and displaying data collected from the RFI are summarized.

2. OBJECTIVES OF RCRA FACILITY INVESTIGATION PLANNING

2.1 OBJECTIVES

This RFI Plan will identify actions necessary to determine the nature and extent (if any) of releases of hazardous and/or radioactive contamination from the K-1413 WAG. The plan summarizes existing site information and addresses the potential for contamination of soil, groundwater, surface water, and air.

2.2 EVALUATION CRITERIA

In order to prepare and implement a comprehensive sampling plan and to effectively evaluate analytical sampling results, evaluation criteria must first be established. Criteria for evaluating the extent of contaminant release are based on existing state and federal regulatory guidance and best technical judgment.

The primary media of interest for the K-1413 WAG are groundwater, soil, and surface water. The sampling methodology and analytical procedures are designed to characterize the contaminants of interest at or below the levels summarized in Table 2.2 of K/HS-132.

2.3 SCHEDULE FOR SPECIFIC RFI ACTIVITIES

A list of the sampling and analysis activities that will be performed for the K-1413 RFI and the duration of each activity is shown in Table 2.1.

Table 2.1. Duration of RFI activities for the K-1413 WAG

Activities	Duration
1. Leak tests of pits and associated process lines	8 weeks
2. Segmental leak tests of process lines (if needed)	12 weeks
3. Camera inspection of storm sewer lines using a closed-circuit television system	16 weeks
4. Collection of groundwater samples	52 weeks
5. Analysis of groundwater samples	66 weeks
6. Compilation of data and data presentation	8 weeks
7. Evaluation of results and recommendations	2 weeks
8. Preparation of RFI report and submittal to EPA	8 weeks
9. Soil sampling (if needed)	TBD
10. Additional sampling phases (if needed)	TBD

2.4 FEASIBLE ALTERNATIVES

Knowledge of feasible corrective measures has been used in preparing this RFI plan. Based on existing geologic, hydrologic, and contaminant source data, potential corrective measures for the K-1413 WAG have been identified and are shown in Table 2.2. These corrective measures will be reevaluated after the RFI report is completed.

2.5 RISK ASSESSMENT

The environmental and public health risks associated with possible site contamination and each of the remedial action alternatives listed in Table 2.2 will be evaluated. This evaluation will consist of a characterization of the contaminant source, the magnitude of release, the environmental setting, the pathways to human exposures, and a characterization of risks. Risk assessment began early in the RFI process and is useful for determining data requirements and site sampling plans.

Table 2.2 Potential corrective measures for the K-1413 WAG

General Response Action	Technologies
Monitoring	Surveillance monitoring and analysis
Removal of source	Excavate contaminated soil; treat or dispose of excavated material at an approved landfill or place in long term storage
Containment from surface water	Fill and cap pits and cap process lines - synthetic membrane, clay, asphalt, multimedia cap, concrete, or chemical sealants and stabilizers
Containment from groundwater	Utilize groundwater diversion pumps-well points, deep wells, suction wells, ejector wells
Treatment of groundwater	Collect the groundwater and transport to a wastewater treatment plant
In-situ treatment	Grout injection

3. DESCRIPTION OF CURRENT CONDITIONS

3.1 GEOGRAPHICAL INFORMATION

The K-1413 WAG is located due east of the K-25 building (Figure 3.1). The WAG includes the K-1413-C Neutralization Pit (Figure 3.2) to the south of Building K-1413, two smaller pits located to the north and east of Building K-1413, the lines from the pits to the K-1401 Acid Line via a pumping station, the process lines within the K-1413 building (Figures 3.3 and 3.4), and the storm drain lines in the vicinity of the K-1413 building (see Figure 5.2).

The south pit is open and has a capacity of approximately 21,000 gallons. This pit is equipped with an agitator and a sump pump and has a bin on top for the addition of lime. The two smaller pits are 4'x 4'x 4' in size and hold approximately 2,500 gallons each. They are connected to the K-1413 building and the pumping station by process drains (Figure 3.4). The north pit is equipped with a pump which allows circulation from the north pit to the south pit when a valve between the north pit and the pumping station is closed.

3.2 HISTORICAL INFORMATION

The K-1413 site was built and put into operation as a research and development facility in the early 1950s. Originally the K-1413 site consisted of only the K-1413 building and the east pit. In the late 1960s an annex was added to the K-1413 building and the north pit was constructed. In 1974-1975 the south pit was constructed to isolate the treatment and disposal of classified waste. A pumping station, located just north of the K-1413 building, was also built at this time, and

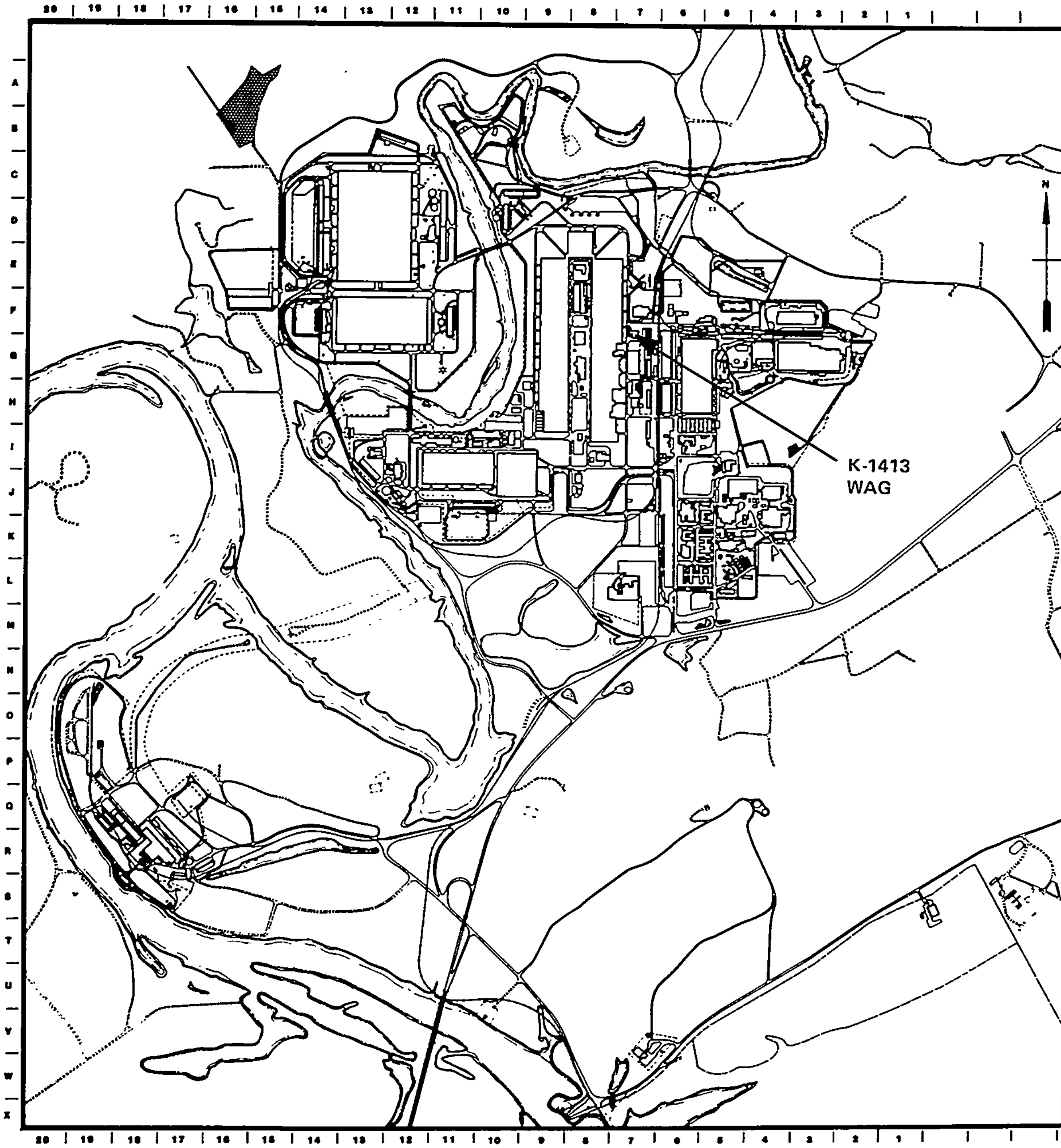


Fig. 3.1. ORGDP Location map of the K-1413 Waste Area Grouping
(The final figure will show the location of Poplar Creek and the K-25 building.)

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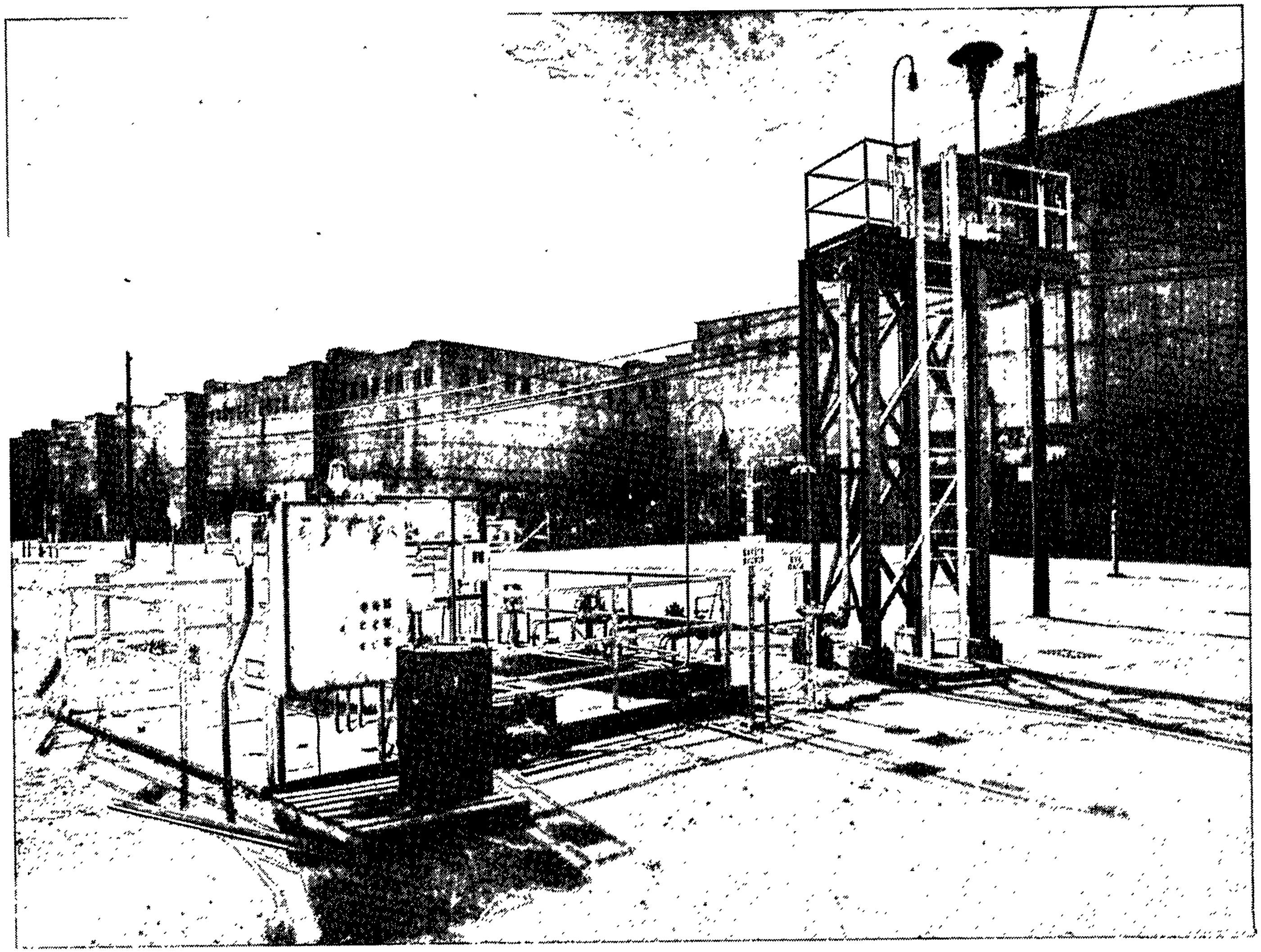

Fig. 3.2. K-1413-C Neutralization Pit

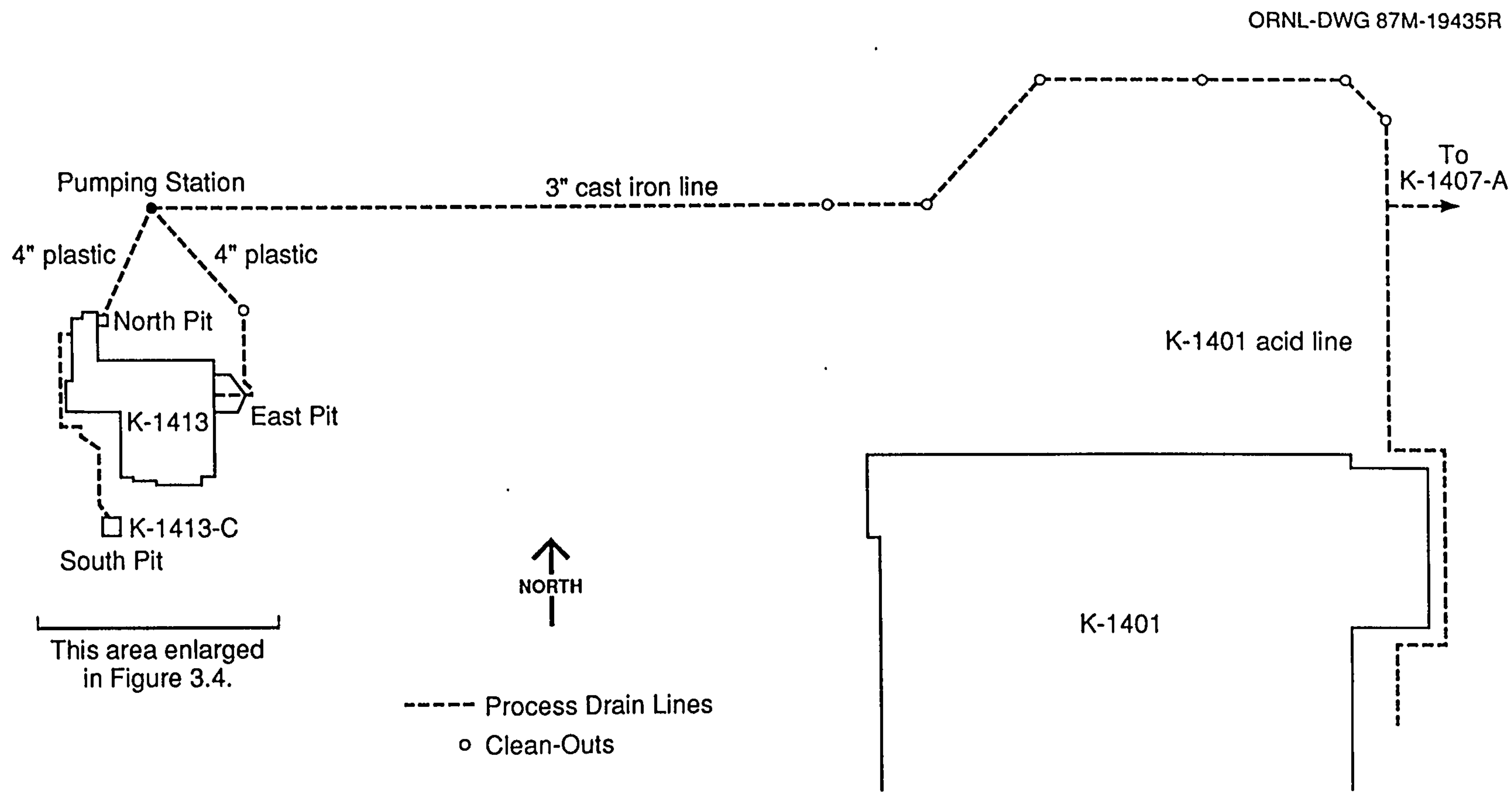

Fig. 3.3. The K-1413 Waste Area Grouping: Location of the pits and the process lines outside of the K-1413 building.

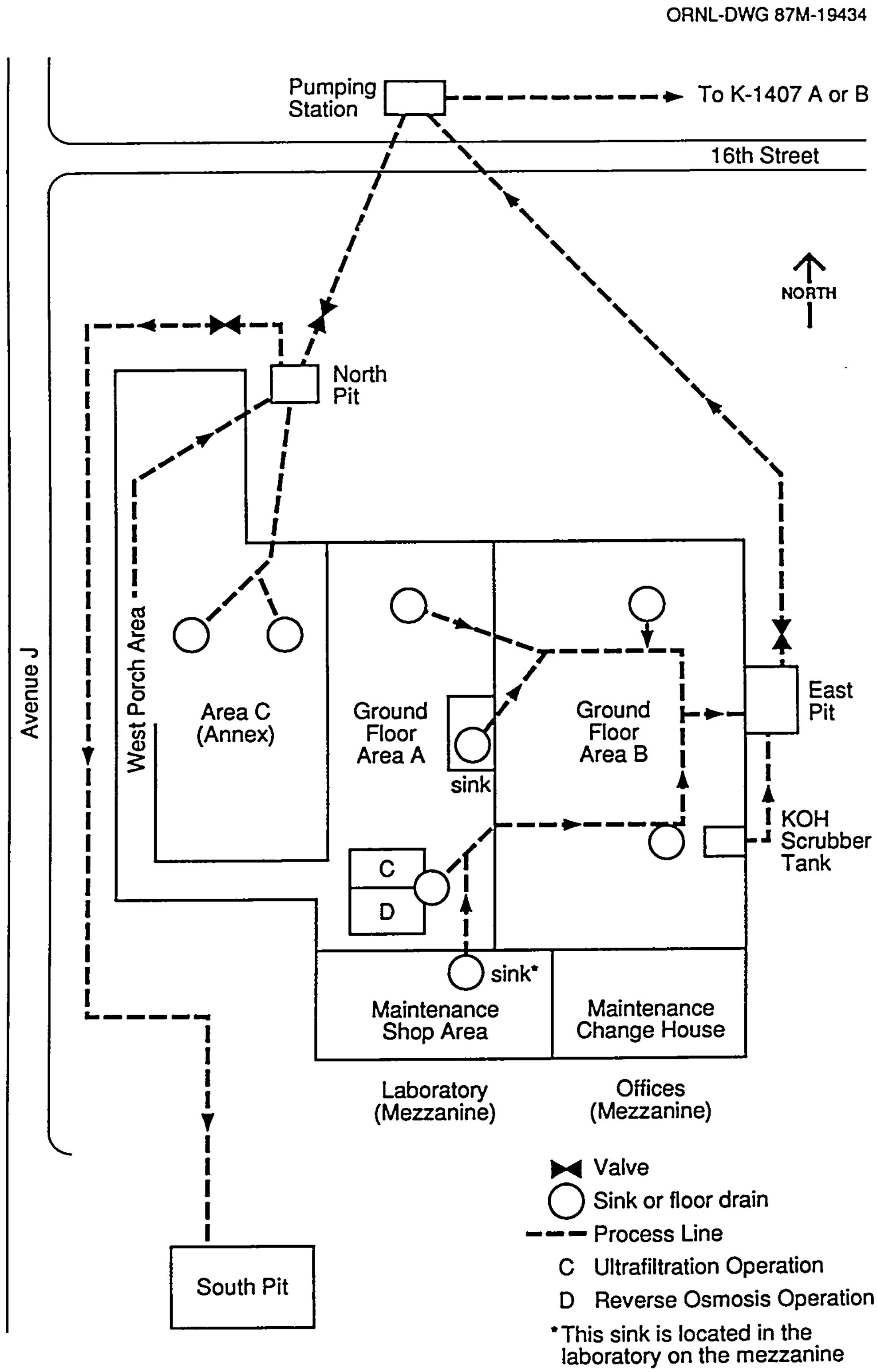

Fig. 3.4. K-1413 Facility
(schematic only — not to scale)

process drains connected this station to the north pit, the east pit, and to the K-1407-A/B neutralization and holding pond facility. The south pit was not connected to the K-1413 building; however, a process drain allowed the transfer of waste streams from the north pit to the south pit when a valve between the north pit and the pumping station was closed. This transfer was driven by a pump located at the north pit. The wastes were then pumped from the south pit into a tanker truck and transported to the K-1407-C disposal pond. Prior to 1974-1975 the waste streams from the north and east pits discharged by gravity flow into the storm sewer systems which are located on the east and west sides of the K-1413 building (see Figure 5.2).

The K-1413 facility was turned over to the K-25 Operations Divisions in 1981-1982. At this time, the north pit pump was deactivated, and the process drain between the north pit and the south pit was cut and capped. The south pit is, therefore, a closed system with waste solutions brought in by tanker trucks. The east pit remains in use.

3.3 OPERATIONAL INFORMATION

A variety of activities have been carried out in the K-1413 building since the facility was put into operation in the 1950s. An early K-1413 development project involved the fluorination of uranium metal chips to UF_6. The chips were immersed in perchloroethylene and shipped to the K-1413 facility in 55-gallon drums. Interviews revealed that spills of perchloroethylene occurred at the facility and UF_6 was accidently lost to the stack in at least one incident. Due to the dispersion of UF_6 away from the building and the rapid conversion of UF_6 to UO_2F_2, any uranium released during the incident would not have remained at significant levels within the K-1413 WAG area.

Wastes from the annex were discharged into the storm drains or later pumped to K-1407-A or K-1407-B from the north pit. This practice was discontinued and wastes were then transferred from the north pit to the south pit, pumped from the south pit into a tanker truck, and transported to the K-1407-C disposal pond in order to isolate the treatment and disposal of classified waste.

The fluoride volatility development program used depleted and slightly enriched uranium oxide in zirconium-clad fuel elements. The process included removal of the zirconium-clad material in a fluidized bed using hydrogen chloride. Other steps in this program included conversion of UO_3 to U_3O_8 using an oxygen/nitrogen mixture and fluorination of U_3O_8 to UF_6 using elemental fluorine. The UF_6 was cold-trapped and off gases produced in the various processes were passed through a filter and then scrubbed with sodium or potassium hydroxide solutions which would have been discharged to the east pit when spent.

Other development projects included:

- investigation of compressors for pumping fluorine and uranium hexafluoride
- reduction of UO_3 to UO_2 using hydrogen and vibrating trays
- conversion of UO_2 to UF_4 using HF
- tower fluorination of UO_2 or UF_4 to UF_6
- calcination of uranyl nitrate to U_3O_8
- hydration of normal assay UO_3 with solutions of NH_4OH for specific crystal formation
- separation of boron isotopes by extraction using anisole (an ether)
- trapping of fission products such as antimony, tantalum,

titanium, and ruthenium from UF_6 reactor returns (Hanford recovered spent fuels).

Chemicals used in other programs include sulfuric and hydrochloric acids, organic acids, nickel compounds, and sodium and calcium hydroxide. The K-1413 facility was also used as a pilot plant to demonstrate the separation technology of radioactive noble gases (e.g., krypton and xenon).

These development operations would have resulted in the discharge of sulfuric, hydrofluoric, nitric, and hydrochloric acids, and sodium and calcium hydroxides. Organic acids and other organics such as diethylene glycol and dibutyl ether, and metal fluorides including sodium, chromium, nickel, uranium and copper would also have been included in the waste stream. The major sources of these wastes were the laboratory on the mezzanine and the sink on the main floor in Area A, which drained to the east pit (see Figure 3.4). The cleaning of containers of tungsten and rhenium hexafluoride would have resulted in waste solutions (oxyfluorides, etc.) of these materials in the K-1413 laboratory.

In addition to the waste generated at the K-1413 building, the K-1413 neutralization pits were also used to treat classified waste streams from the K-1231 and K-1232 facilities. Wastewater transported by tankers from the Y-12 Plant has also been treated at the south pit during the operations history of the K-1413 facility. Records indicate that one shipment of Y-12 wastewater was treated at the south pit. Among other contaminants the wastewater contained 2.7 mg/l of mercury. Sodium sulfide was used at the south pit in the treatment of the wastewater, and the waste was transferred to the K-1232 facility for further treatment. Because follow-up samples of rainwater which collected in the south pit contained traces of mercury, the rainwater was collected and transferred to the K-1232 facility for treatment. Further follow-up samples showed no mercury contamination.

The east and north pits at the K-1413 site were originally separated into two halves by 4" thick baffles which came within 4"-6" of the bottom of the pits. Both halves of the pits were then filled with limestone gravel. The waste stream entered near the top of the pit and was forced by the baffle to percolate down through one half and back up the other half of the pit before it was discharged. Wastes generated in the laboratory on the mezzanine and in the ground floor areas A and B of the K-1413 building were treated in the east pit and wastes generated in area C were treated in the north pit, using this limestone neutralization process. The limestone was removed from the pits when the pumping station was installed.

Since 1973-1975, the east pit has received waste from a 20% KOH scrubber (see Figure 3.4). The wastes are transferred to the pit when the solution is depleted to 10% KOH. The waste solution includes hydroxides of tungsten, rhenium, and uranium as well as a high fluoride ion content. Presently, the north pit discharges rainwater which collects in a graded trenchway in the west porch area (see Figure 3.4). The north pit is not presently used for the treatment of waste because wet chemical operations are no longer conducted in the K-1413 building. The south pit is now considered a closed system and no longer provides pH adjustment for acidic waste.

4. CHARACTERIZATION OF THE CONTAMINANT SOURCE

The chemicals utilized in the various activities discussed in Section 3 are summarized below. Because records of all the chemicals used in this facility are not available, this is a partial list of possible contaminants. Records of the quantities and concentrations of the chemicals listed below are also not available.

- Uranium tetrafluoride
- Uranium oxide
- Antimony
- Titanium
- Fluorine
- NH_4OH
- Nickel
- Diethylene glycol
- Sulfuric, Hydrochloric, Nitric, and Organic Acids
- Tungsten, Rhenium, Uranium, Sodium, Calcium, and Potassium hydroxides
- Mercury
- Uranium hexafluoride
- Perchloroethylene
- Tantalum
- Zirconium
- Uranyl nitrate
- Anisole
- Ruthenium
- Dibutyl ether
- Nickel, Copper, Chromium, Hydrogen and Sodium fluorides
- Hydrogen chloride
- Tungsten and Rhenium hexafluorides

5. CHARACTERIZATION OF THE ENVIRONMENTAL SETTING

5.1 HYDROGEOLOGY

The lithologic log from bedrock well BRW-15 indicates that the K-1413 WAG is underlain by shale and limestone of the Chickamauga Group (Phase II-Detection Monitoring, ORGDP, Appendix D, Well Construction Diagram BRW-15, Geraghty and Miller, 1987). Figure 5.1 shows the locations of wells in the vicinity of the K-1413 WAG and Appendix A contains the currently available lithologic logs. The geologic structural setting is uncertain as this area is almost entirely covered by man-made structures and pavement, and bedrock may not be observed except by drilling or other indirect means. Faults are known to exist in the general area and it is presumed that the bedrock has been deformed, fractured, and jointed according to the proximity and intensity of the faulting activity.

Groundwater flow within the Chickamauga will occur primarily in the limestone units along joints, fractures, and bedding planes which have been solutionally enlarged. Limited flow may occur in the shales through "tight" fractures and joints, but the shales tend to inhibit flow across bedding planes and rather direct it parallel to strike within the carbonate layers. Permeability test data are not available for BRW-15; however, testing of other area wells in the Chickamauga limestone indicate the hydraulic conductivity to be on the order of 10^{-3} cm/sec.

The unconsolidated mantle at the K-1413 WAG consists of some relatively thin clay/gravel fill which overlies a moderately thick (25'to 55') soil zone. According to drill-hole logs, the upper 10 to 15 feet of this soil zone appears to be alluvium comprised of mostly clay with some sand and rock fragments. The lower soil horizon is yellow-brown to brown,

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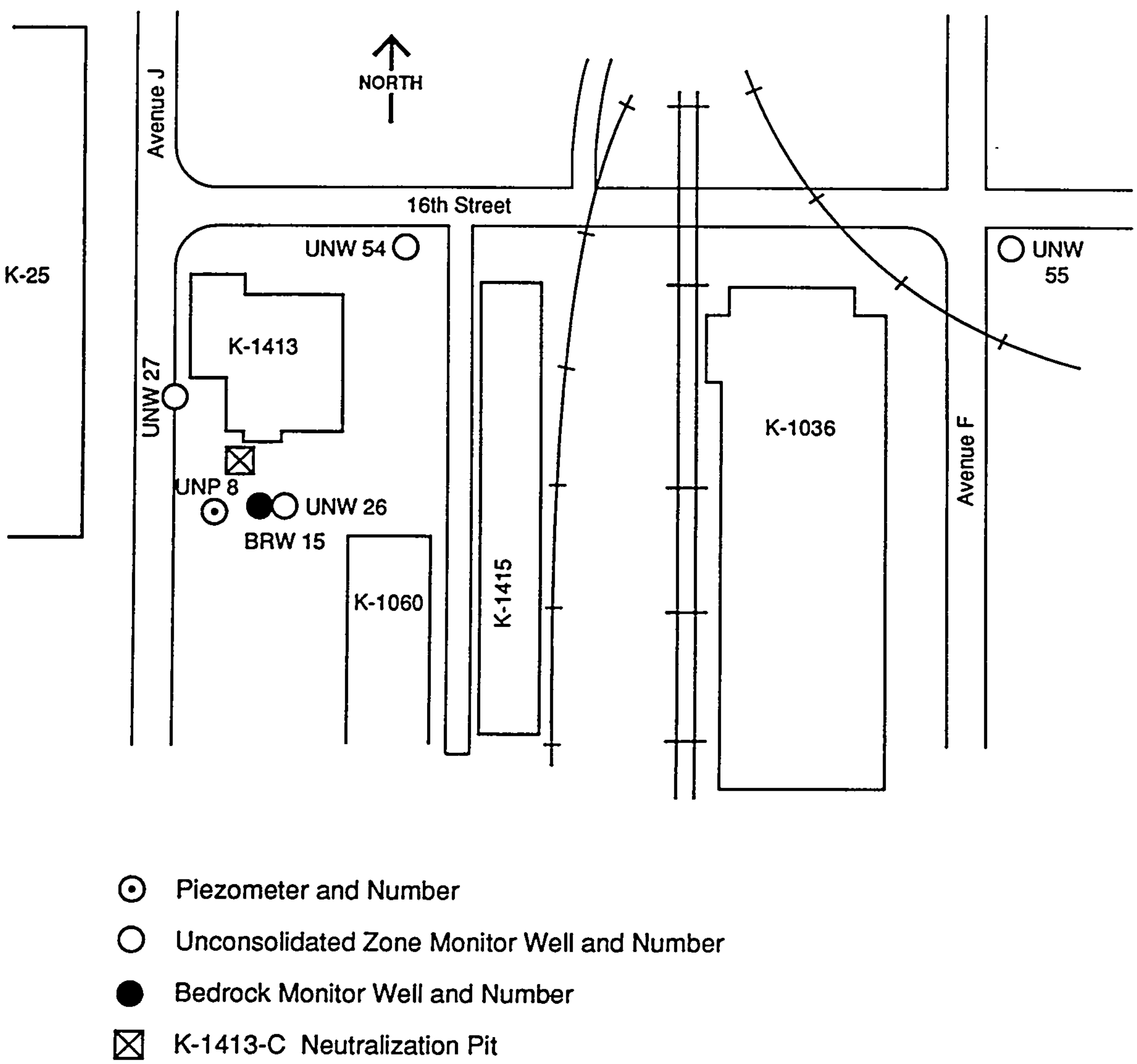


Fig. 5.1. K-1413 WAG Vicinity Map with Well Locations

silty, residual clay. Permeability testing of well UNP-8 indicates a hydraulic conductivity of approximately 8.5 x 10^{-5} cm/sec for the soil aquifer. In addition to UNP-8, five other wells, UNW-26, -27, -54, and-55, (see Figure 5.1), have been installed in the unconsolidated aquifer; however, permeability data from these wells are not yet available.

The water table in the K-1413 area, as measured on March 30, 1987, is approximately 15 to 17 feet below ground surface. Wells BRW-15 and UNW-26 are immediately adjacent to each other, and their water levels of 768.6 feet and 766.1 feet (MSL datum) respectively, indicate aquifer interflow with the bedrock aquifer apparently leaking upward into the soil aquifer at this location. Currently available data are insufficient to precisely determine the flow direction within either aquifer; although, the hydraulic gradient in the unconsolidated zone is presumed to be northward. The bedrock flow path cannot presently be estimated. Information from recently installed wells is forthcoming.

5.2 SURFACE WATER

The topography of the site has been extensively affected by construction and road-building activities. Much of the site is overlain by buildings, concrete, or asphalt. The flow of surface water is controlled by these man-made structures and surfaces. Surface water at the site is collected in storm drains and is then routed via the storm sewer system to the K-1700 stream (Figure 5.2). An effort is underway to characterize the quality and quantity of the stormwater discharging from ORGDP storm drains. The first in a series of reports on this effort has recently been published (ORGDP Storm Drain Characterization, W.J. Scheib, K/HS-128, Part 2) and data from the storm drains in the vicinity of the

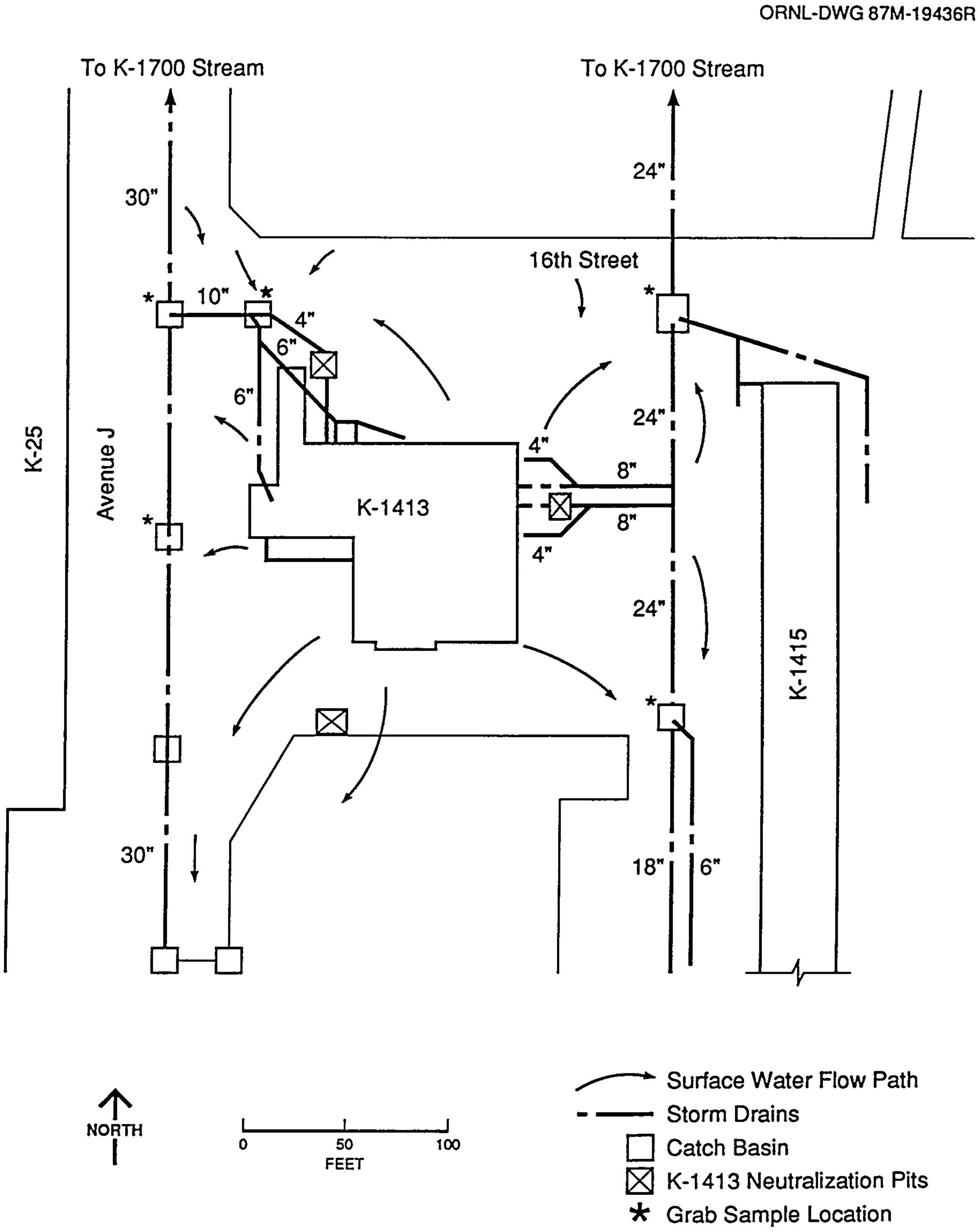


Fig. 5.2. K-1413 WAG Vicinity Map showing storm drain locations and surface water flow paths

K-1413 WAG are presented in Appendix B.

The K-1413 WAG is above the 100-year flood level as indicated in Figure 3.5 of K/HS-132.

5.3 AIR

No site-specific air quality or meterological data are available for this SWMU. However, Martin Marietta Energy Systems, Inc. has an ongoing study of the air quality and meteorological conditions of the ORGDP as a whole, and this study should be representative of the conditions at this SWMU. These general ORGDP data are available in K/HS-132.

6. IDENTIFICATION OF POTENTIAL PATHWAYS AND RECEPTORS

Assessments of inactive hazardous waste disposal or storage sites are required to evaluate the sites' potential for health or safety risks to the environment, public, or personnel. Determination of such risks must be based on evaluations of both the potential pathways of contaminant migration from toxic releases and the possible receptors of contamination. Information used in the evaluations of the pathways which might release contaminants from the K-1413 WAG is based on interviews with persons having knowledge of the operations carried on at the site. K/HS-132 will serve as a general reference concerning the potential pathways and receptors of the ORGDP.

Due to the location of the pits and lines and the nature of the solutions discharged, air and vegetation will not be evaluated as potential pathways of contamination. Any UF_6 lost via the stack during the early history of the K-1413 site would have been converted rapidly to UO_2F_2; therefore, it is unlikely that released uranium would have remained within the K-1413 WAG at detectable levels.

6.1 POTENTIAL PATHWAYS OF MIGRATION

6.1.1 Groundwater

The possibility of pit or pipe leakage from the components of the K-1413 WAG indicates some potential for groundwater contamination. Hydrogeological studies (Hydrogeology of the Oak Ridge Gaseous Diffusion Plant Site, K/SUB/85-22224/1, July 1986) of areas near the K-1413 facility indicate that the groundwater flows to the north and discharges to the K-1700 stream. There are four groundwater monitoring wells around the

K-1413 facility; however, site-specific hydrogeological data are presently unavailable. Permeability measurements taken in the bedrock near the K-1413 site were found to be normal for the Chickamauga Formation. One quarter of groundwater analysis data has been gathered under the ORGDP Groundwater Protection Program from BRW-15 and UNW-26; these data are presented in Appendix C. Assessment of the nature and extent of possible groundwater contamination will continue to be carried out under the ORGDP Groundwater Protection Program.

6.1.2 Soil

The practice of discharging wastes into the storm drain system during much of the history of this facility, and the possibility of leakage from these storm drains present the potential for soil contamination. In general, the soils at the ORGDP have low permeabilities (on the order of 10^{-5} to 10^{-4} cm/sec) and relatively high capacities for the exchange of metals and the filtering of particulates. This combination increases the possibility that soil contamination due to leakage would still be present. The storm sewer lines will be inspected for defects using a closed-circuit television system. The area surrounding any defect will become part of the Phase II soil sampling investigation.

6.1.3 Surface Water

Residual contamination in the storm sewer lines may be contaminating surface water flow in the storm sewer system. Grab samples will be taken from the catch basins in the vicinity of the K-1413 WAG (Figure 5.2), following two discrete storm events. The samples will be analyzed to assess the nature and extent of possible surface water contamination.

6.2 POTENTIAL RECEPTORS

6.2.1 Human Populations

The security controls required by the Department of Energy for entrance to the ORGDP prevent public access to the K-1413 WAG. Thus, the only public populations of interest are those which might come into contact with one of the exposure pathways beyond the boundaries of the site itself (i.e., through access to groundwater).

Of the 25 potable water wells within one mile of the ORGDP, none of the wells are in proximity to the K-1413 WAG, and none are believed to occupy the same hydrogeological environment as the groundwater at the site. Further, of the 10 public water supplies which withdraw from the Clinch-Tennessee River system (into which waters from the K-1700 stream eventually feed), none of these are nearer than 15 miles to the Oak Ridge Reservation making direct contamination from the K-1413 site unlikely. While the flow of site groundwater does represent the potential for contaminant migration, distance and dilution effects make pollution of public water supplies a low probability. Finally, the effects of distance and dilution also make unlikely the possibility that contamination of groundwater would reach the waters downstream in the Clinch-Tennessee River system for recreational and industrial use.

6.2.2 Terrestrial Fauna and Flora

K/HS-132 discusses the rare, threatened, and endangered plant and animal species which are thought to inhabit the area. To date, there has been no report that any of these species exist on the K-1413 site or are directly threatened by any possible contamination present there. Possible contaminant releases from the K-1413 site are not expected to affect the local flora and fauna.

6.3 SUMMARY AND CONCLUSIONS

The nature of the wastes treated at and discharged through the K-1413 neutralization pits, process lines, and storm drains indicates potential for contamination of the groundwater, surface water, and soil. Evaluation of the potential pathways of migration and possible receptors shows sufficient potential for environmental contamination and warrants an investigation of this site.

7. EXISTING MONITORING DATA

Storm drain data applicable to the K-1413 WAG vicinity are presented in Appendix B. Data from one quarter of groundwater monitoring under the ORGDP Groundwater Protection Program are presented in Appendix C.

8. SAMPLING PLAN

8.1 SAMPLING AND ANALYTICAL STRATEGY

The types of waste treated at the K-1413 facility and discharged into the process lines and storm drains have been covered in Sections 3 and 4. Programs are presently underway at the ORGDP to evaluate both the groundwater (ORGDP Groundwater Protection Program) and surface water runoff (ORGDP Storm Drain Characterization, W. J. Scheib, K/HS-128, Part 2) and these data will be evaluated in conjunction with this RFI. The nature of the K-1413 facility would require a prohibitive number of soil corings to be taken in order to ensure a high probability of detecting soil contamination resulting from component leaks. Thus, direct sampling and chemical analysis of soil samples will not be initially performed. Instead, a phased approach aimed at locating and characterizing distinct areas of soil contamination will be utilized.

8.2 SET-UP FOR SAMPLING

8.2.1 Phase I Investigations

A major portion of Phase I will consist of leak testing the various components of the K-1413 WAG in order to evaluate their integrity. The north, south, and east pits will be leak tested. The pits will be filled with water and the leakage rate measured over a 24-hour period. The leakage rate will be adjusted for evaporation and precipitation. If the pit(s) are found to leak, they will become part of the Phase II soil sampling investigation.

The process drain lines from the K-1413 building to the K-1401 process line will also be leak tested. The following sections shall be independently leak tested:

- the 4" drain lines from the K-1413 building to the north and east pits
- the drain line between the north and south pits
- the 4" plastic drain lines from the north and east pits to the manhole north of K-1413 (see Figure 5.2)
- the 3" cast-iron line from the manhole north of K-1413 to the manhole at the K-1401 process line.

Drain lines will be hydrostatically gravity tested. The lower end of each section will be plugged, and each section of pipe will be filled with water. A minimum 10-foot head of water on the invert of the pipe at the lower end is required. Measurement of the leakage rate will begin no sooner than 15 minutes after the pipe is completely filled with water. The maximum allowable leakage rate for each section of pipe is 0.1 gallon/hour.

The 3" cast-iron line will be hydrostatically pressure tested. The lower end of the line will be plugged, and the line will be filled with water. A standpipe will be attached on the upper end of the line and plugged. The line will be pressurized to 1.5 times the maximum operating pressure but not less that 50 psig. To pass the leak test, the line must maintain the initial pressure for a minimum of two hours. If the 3" cast-iron line between the pumping station and the K-1401 Acid Line is found to leak, sectional leak testing of the lines will be performed using the cleanouts located along the process line as sectional boundaries. The method involves plugging the pipe between cleanouts and hydrostatically testing the isolated section. A butterfly valve will be used as a stoppling tool to obtain the required isolation. Any area surrounding detected leaks will become part of the statistical set up for soil sampling in Phase II.

The results of each leak test will be recorded on a leak test form that includes the following information:

- the date of the leak test
- the location and identification of the pipeline
- the pipe size, type, and overall length of the section tested
- a description of the leak test and the leak test rate
- a description of any unusual occurrences and/or problems encountered.

The following storm sewer lines will be inspected using optical techniques (camera and mirror) to locate defects in the lines from which contaminants might have escaped:

- the storm drain lines from the north pit downgradient to the K-1700 stream
- the storm drain lines from the east pit downgradient to the K-1700 stream (see Figure 5.2).

Television inspection will be accomplished by using closed-circuit systems specifically designed for sewer inspection. The operator shall be able to remotely control the speed and travel of the camera while viewing the inspection on a television. For each sewer line inspected, records will be collected on an inspection form and on video tape.

The inspection form will contain the following data for each manhole to manhole section that is inspected:

- the date of the inspection
- the location of the pipeline and upstream and downstream manholes
- the compass direction of the viewing and the direction of the

camera's travel

- the pipe size, type, pipe joint length, and overall footage of the inspected sewer
- the occurrence and location of infiltration and exfiltration
- a description of defects observed (e.g., open joint, cracks, exposed soil) and their distance from the point at which the viewing began
- reference should be made to the videotape of the entire inspection.

The date and location of each pipeline inspected will be recorded on the video tape. Sewer lines too small for camera inspection will be inspected with portable mirrors. As with the process lines, any area surrounding a break in the storm sewer line will become part of the statistical set up for sampling in Phase II.

Surface water samples will be taken from the catch basins shown on Figure 5.2 following two discrete storm events. These samples will be analyzed to evaluate the storm sewer lines as pathways of contaminant migration.

8.2.2 Phase II Investigation

Phase II of this investigation will involve sampling and analyzing the soil surrounding the WAG components which were found to be defective in Phase I. An appropriate sampling plan will be statistically determined for areas surrounding the defects.

8.3 FIELD SAMPLING

The nature and the extent of the soil sampling required to characterize the K-1413 site will be determined after evaluation of the data obtained in Phase I. After the completion of Phase I, a supplement to this investigation plan will be issued detailing the results of the Phase I testing as well as the proposed soil sampling plan for Phase II if needed.

8.4 ANALYTICAL PROTOCOL

8.4.1 Phase I Investigation

Surface water samples will be analyzed for the regulated inorganic elements outlined in Table 7.4 of K/HS-132 and for the volatile and semi-volatile organic compounds listed in Table 7.6 of the same document.

Groundwater samples will be analyzed according to the protocol of the ORGDP Groundwater Protection Program.

8.4.2 Phase II Investigation

If line or pit defects are detected in Phase I, analysis for the following analytes should be performed on soil samples collected as part of the Phase II investigation:

- inorganic elements (Table 7.4, K/HS-132)
- volatile organics (Table 7.6, K/HS-132)
- semi-volatile organics (Table 7.6, K/HS-132)
- gross alpha, beta, and gamma.

8.5 SAMPLE ANALYSIS

Surface water and groundwater analysis will follow the standard EPA protocol as outlined in Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020).

The QA/AC requirements outlined in Section 7.3 of K/HS-132 will be adhered to for all analyses.

9. DATA MANAGEMENT PROCEDURES

In order to best illustrate any patterns in the data, the results of the chemical analyses of samples from the potential release areas will be presented in a clear and logical format. Tables, graphs, and other visual displays such as maps and contour plots (described in Table 8.1 of K/HS-132) will be used to present the data.

Statistical analyses will provide for treatment of duplicate laboratory analyses, results which are reported as less than detection limit, and for examination for statistical outliers. Where possible, values which are recorded as less than detection limits will be handled according to RCRA Ground-Water Monitoring Enforcement Guidance Document (OSWER-9950.1, September 1986) which directs calculation through the use of Cohen's statistical methodology. This is found in "Tables for Maximum Likelihood Estimates from Single Truncated and Singly Censored Samples" (Technometrics, 3: 535-541, 1961). Otherwise, the detection limit will be used in the statistical analyses.

For groundwater samples, average contaminant values will be compared to each other and to available limits using statistical t-tests.

10. HEALTH AND SAFETY PROCEDURES

10.1 INTRODUCTION

Special requirements and procedures to protect the health and safety of the investigating team, ORGDP site personnel, and the general public during the K-1413 WAG RFI are addressed in this section.

K/HS-132 details the health, safety, environmental, security, plant protection, and emergency response organizations which are in place at the ORGDP. These organizations provide the support to the ORGDP line organizations to meet the requirements for health and safety during the RFIs. They provide the communication, response, and reporting for any plant emergency; on-site medical facilities with medical surveillance, treatment, monitoring, and periodic physical examinations; health physics and industrial hygiene surveillance hazard evaluation and control; operational safety accident prevention and control; plant security and visitor control.

In addition, K/HS-132 identifies the organizational responsibilities for health and safety at the SWMUs during the RFIs. The document includes the methodology for establishing the work zones of each SWMU, the level of protection required in the exclusion zone, decontamination procedures, personnel exposure limits, monitoring requirements, and respiratory protection requirements.

10.2 KNOWN HAZARDS AND RISKS

Substances of safety and health concern in the K-1413 Waste Area Grouping are listed below.

Substance of Safety and Health Concern

Waste Solvents and Degreasing Agents	x	Sludge	
Radioactive Wastes	x	Corrosive Liquids	x
Treated Industrial Waste	x	Plating Wastes	
Liquid Waste/Free Product Potential	x	Metal Wastes	
Asbestos		Cleaning Solutions	x
PCB		Paint Wastes	
Mercury		Nonhazardous Wastes	

The plan for the K-1413 WAG SWMU is based upon requirements described in the draft document, RCRA Facility Investigation Guidance (Vol. I, Sect. 6, October 1986).

10.3 LEVEL OF PROTECTION

The level of personnel protection and monitoring for Phase I activities is designated below.

Level of Designation		Monitoring Parameters	
A		Airborne Pollutants	
B		Explosion Potential	
C		Radiation	
D	X		

10.4 EXPOSURE LIMITS

The personnel protection recommended for work activity in the exclusion zone of the K-1413 WAG SWMU is Level D. No monitoring will be performed during Phase I.

APPENDIX A

GERAGHTY & MILLER, INC.
Ground-Water Consultants

LITHOLOGIC LOG

BORING NO.	UNP-8
PROJECT	Hydrogeologic Site Characterization, K-25 Plant

LOCATION	COORDINATES	SURFACE ELEVATION	TOTAL DEPTH
K-1413	S25103.43 Plant Grid E 360.93	780.58 feet msl	39 feet
GEOLOGIST	**SAMPLE INTERVAL**	**SAMPLE TYPE**	**DATE COMPLETED**
D. Hubert	Continuous	Split Spoon	11/27/85
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
J. Cason	Alsay, Inc.	Hollow-Stem Auger	Diedrich D-50
PURPOSE OF BORING	**GEOPHYSICAL CONTRACTOR**	**GEOPHYSICAL LOGS**	
Piezometer	None	None	

DEPTH IN FEET	DESCRIPTION	COMMENTS
0 – 26	CLAY: Orange and brown, low plasticity, contains some rock fragments.	
26 – 39	SHALE: Maroon and yellow, weathered.	Wet from 29.5' to 30'. Auger refusal at 39'.

Depth scale: 0, 10, 20, 30, 40, 50, 60, 70

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
Ground-Water Consultants

LITHOLOGIC LOG

BORING NO.	UNW-26
PROJECT	Phase II Monitor-Well Installation, K-25 Plant

LOCATION	COORDINATES (PLANT GRID)	SURFACE ELEVATION	TOTAL DEPTH
K-1413	S25,093.91 W 326.28	781.40 ft msl	25.5 ft
GEOLOGIST	**SAMPLE INTERVAL**	**SAMPLE TYPE**	**DATE COMPLETED**
J.Walker	5 ft	Cuttings	01-09-87
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
R. Lenning	Middle Georgia	Hollow-stem Auger	Mobile B-53
PURPOSE OF BORING	**GEOPHYSICAL CONTRACTOR**	**GEOPHYSICAL LOGS**	
Monitor Well	None	None	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0		FILL (100%), clay with gravel.	
		CLAY (80%), soft, moist, plastic, reddish-orange to brown; Sand (10%), fine; Limestone Fragments (10%), micritic, gray.	
10			
		15'-25.5' Clay is brown with silt (10%).	
20			Clay is moist at 20 ft
			Refusal at 25.5 ft
30			
40			
50			
60			
70			

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
Ground-Water Consultants

LITHOLOGIC LOG

BORING NO. UNW-27	**PROJECT** Phase II Monitor-Well Installation, K-25 Plant		
LOCATION K-1413	**COORDINATES (PLANT GRID)** S25,012.29 W 411.77	**SURFACE ELEVATION** 780.00 ft msl	**TOTAL DEPTH** 55.0 ft
GEOLOGIST A.Motley	**SAMPLE INTERVAL** 5 ft	**SAMPLE TYPE** Cuttings	**DATE COMPLETED** 01-09-87
DRILLER R. Lenning	**DRILLING CONTRACTOR** Middle Georgia	**DRILLING METHOD** Hollow-stem Auger	**RIG TYPE** Mobile B-53
PURPOSE OF BORING Monitor Well	**GEOPHYSICAL CONTRACTOR** None	**GEOPHYSICAL LOGS** None	

DEPTH IN FEET	DESCRIPTION	COMMENTS
0	FILL (100%), dark brown soil and gravel.	
	CLAY (90%), moderately plastic, brown to orange-brown; Sand (10%) angular, brown.	
15	15'-55' Clay is yellowish-brown with silt (5%).	
35		Hit water at 35 ft
55		Refusal at 55 ft

Depth scale: 0, 10, 20, 30, 40, 50, 60, 70

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
Ground-Water Consultants

LITHOLOGIC LOG

BORING NO. BRW-15	PROJECT Phase II Monitor-Well Installation, K-25 Plant		
LOCATION K-1413	COORDINATES (PLANT GRID) S25,093.51 W 339.39	SURFACE ELEVATION 781.24 ft msl	TOTAL DEPTH 60.0 ft
GEOLOGIST G. Weiss	SAMPLE INTERVAL 5 ft	SAMPLE TYPE Cuttings	DATE COMPLETED 12-02-86
DRILLER D. Wood	DRILLING CONTRACTOR Graves	DRILLING METHOD Air Rotary	RIG TYPE Dresser T-70-W
PURPOSE OF BORING Monitor Well	GEOPHYSICAL CONTRACTOR None	GEOPHYSICAL LOGS None	

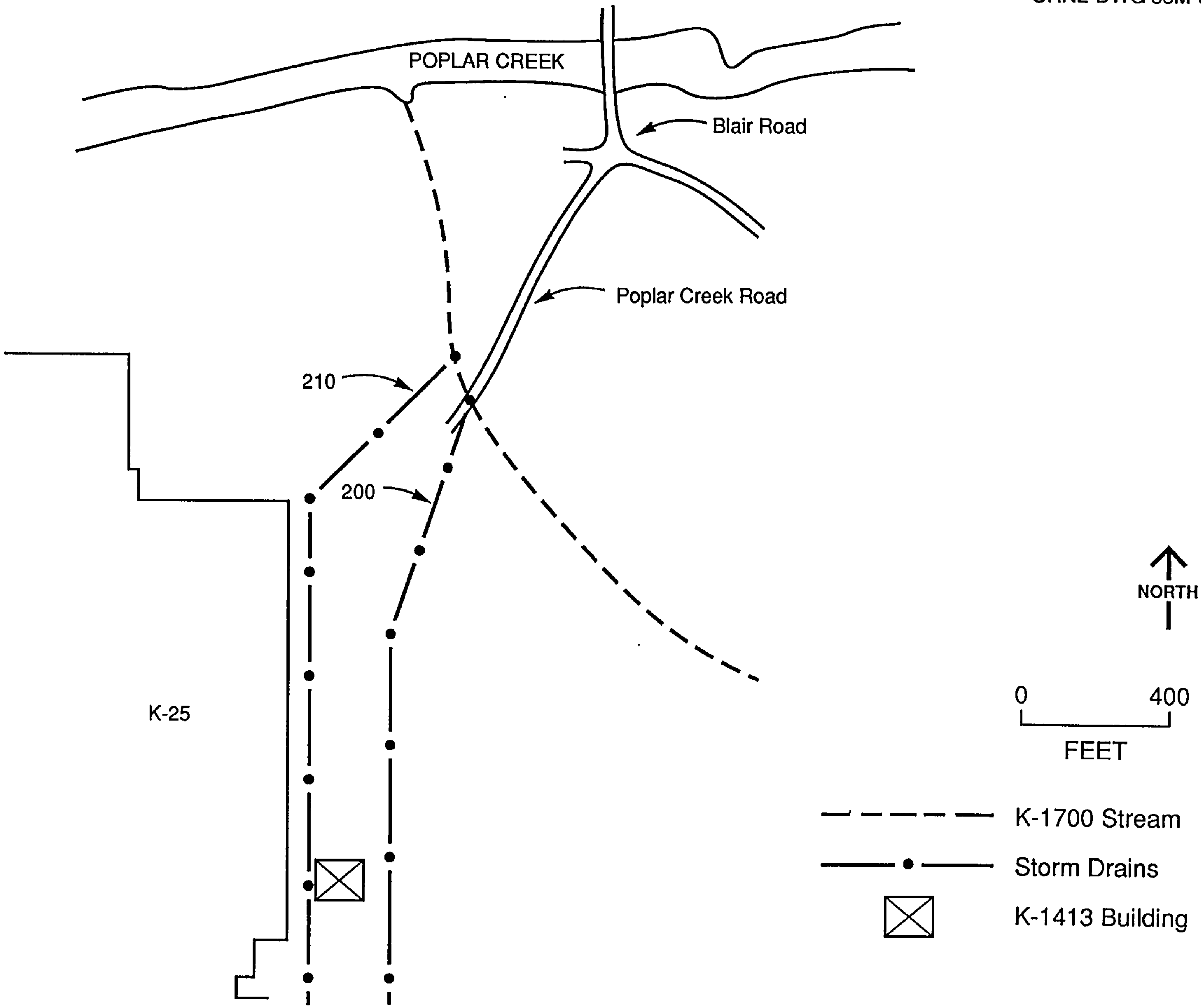
DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0–30		CLAY (100%), red, orange, brown, plastic, some scattered limestone gravel. 5'-12' Clay contains minor amounts of weathered limestone. 12'-30' Clay, brown, silty in places. Contains some weathered shale.	
30–39		SHALE (100%), brown, highly weathered, some brown plastic clay. 34'-37' Shale (75%), gray, green and brown, weathered in places; Limestone (25%), white to gray, oolitic.	Shale is wet at 34 ft
39–60		LIMESTONE (100%), dark gray to white, micritic, oolitic in places.	Borehole producing water (<1 gpm) from fractured interval 46 ft - 47 ft

Depth scale: 0, 10, 20, 30, 40, 50, 60, 70

SHEET 1 OF 1

APPENDIX B

ORNL-DWG 88M-6199



STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	3-Mar-1987	1 1 1-TRICHLOROETHANE	<5 ug/L
SD-210	9-Mar-1987	1 1 1-TRICHLOROETHANE	<5 ug/L
SD-210	18-Mar-1987	1 1 1-TRICHLOROETHANE	<5 ug/L
SD-210	26-Mar-1987	1 1 1-TRICHLOROETHANE	<5 ug/L
SD-210	1-Apr-1987	1 1 1-TRICHLOROETHANE	(U) <5 ug/L
SD-210	8-Apr-1987	1 1 1-TRICHLOROETHANE	<5 ug/L
SD-210-D	26-Mar-1987	1 1 1-TRICHLOROETHANE	<5 ug/L
SD-210	3-Mar-1987	1 1 2 2-TETRACHLOROETHANE	<5 ug/L
SD-210	9-Mar-1987	1 1 2 2-TETRACHLOROETHANE	<5 ug/L
SD-210	18-Mar-1987	1 1 2 2-TETRACHLOROETHANE	<5 ug/L
SD-210	26-Mar-1987	1 1 2 2-TETRACHLOROETHANE	<5 ug/L
SD-210	1-Apr-1987	1 1 2 2-TETRACHLOROETHANE	(U) <5 ug/L
SD-210	8-Apr-1987	1 1 2 2-TETRACHLOROETHANE	<5 ug/L
SD-210-D	26-Mar-1987	1 1 2 2-TETRACHLOROETHANE	<5 ug/L
SD-210	3-Mar-1987	1 1 2-TRICHLOROETHANE	<5 ug/L
SD-210	9-Mar-1987	1 1 2-TRICHLOROETHANE	<5 ug/L
SD-210	18-Mar-1987	1 1 2-TRICHLOROETHANE	<5 ug/L
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SD-210	9-Mar-1987	1 1-DICHLOROETHANE	<5 ug/L
SD-210	18-Mar-1987	1 1-DICHLOROETHANE	<5 ug/L
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SD-210	8-Apr-1987	1 1-DICHLOROETHANE	<5 ug/L
SD-210-D	26-Mar-1987	1 1-DICHLOROETHANE	<5 ug/L
SD-210	3-Mar-1987	1 1-DICHLOROETHENE	<5 ug/L
SD-210	9-Mar-1987	1 1-DICHLOROETHENE	<5 ug/L
SD-210	18-Mar-1987	1 1-DICHLOROETHENE	<5 ug/L
SD-210	26-Mar-1987	1 1-DICHLOROETHENE	<5 ug/L
SD-210	1-Apr-1987	1 1-DICHLOROETHENE	(U) <5 ug/L
SD-210	8-Apr-1987	1 1-DICHLOROETHENE	<5 ug/L
SD-210-D	26-Mar-1987	1 1-DICHLOROETHENE	<5 ug/L
SD-210	3-Mar-1987	1 2 4-TRICHLOROBENZENE	<10 ug/L
SD-210	9-Mar-1987	1 2 4-TRICHLOROBENZENE	<10 ug/L
SD-210	3-Mar-1987	1 2-DICHLOROBENZENE	<10 ug/L
SD-210	9-Mar-1987	1 2-DICHLOROBENZENE	<10 ug/L
SD-210	3-Mar-1987	1 2-DICHLOROETHANE	<5 ug/L
SD-210	9-Mar-1987	1 2-DICHLOROETHANE	<5 ug/L
SD-210	18-Mar-1987	1 2-DICHLOROETHANE	<5 ug/L
SD-210	26-Mar-1987	1 2-DICHLOROETHANE	<5 ug/L
SD-210	1-Apr-1987	1 2-DICHLOROETHANE	(U) <5 ug/L
SD-210	8-Apr-1987	1 2-DICHLOROETHANE	<5 ug/L
SD-210-D	26-Mar-1987	1 2-DICHLOROETHANE	<5 ug/L
SD-210	3-Mar-1987	1 2-DICHLOROPROPANE	<5 ug/L
SD-210	9-Mar-1987	1 2-DICHLOROPROPANE	<5 ug/L
SD-210	18-Mar-1987	1 2-DICHLOROPROPANE	<5 ug/L
SD-210	26-Mar-1987	1 2-DICHLOROPROPANE	<5 ug/L
SD-210	1-Apr-1987	1 2-DICHLOROPROPANE	(U) <5 ug/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	8-Apr-1987	1 2-DICHLOROPROPANE	<5 ug/L
SD-210-D	26-Mar-1987	1 2-DICHLOROPROPANE	<5 ug/L
SD-210	3-Mar-1987	1 3-DICHLOROBENZENE	<10 ug/L
SD-210	9-Mar-1987	1 3-DICHLOROBENZENE	<10 ug/L
SD-210	3-Mar-1987	1 4-DICHLOROBENZENE	<10 ug/L
SD-210	9-Mar-1987	1 4-DICHLOROBENZENE	<10 ug/L
SD-210	3-Mar-1987	2 4 6-TRICHLOROPHENOL	<10 ug/L
SD-210	9-Mar-1987	2 4 6-TRICHLOROPHENOL	<10 ug/L
SD-210	3-Mar-1987	2 4-DICHLOROPHENOL	<10 ug/L
SD-210	9-Mar-1987	2 4-DICHLOROPHENOL	<10 ug/L
SD-210	3-Mar-1987	2 4-DIMETHYLPHENOL	<10 ug/L
SD-210	9-Mar-1987	2 4-DIMETHYLPHENOL	<10 ug/L
SD-210	3-Mar-1987	2 4-DINITROPHENOL	<10 ug/L
SD-210	9-Mar-1987	2 4-DINITROPHENOL	<10 ug/L
SD-210	3-Mar-1987	2 4-DINITROTOLUENE	<10 ug/L
SD-210	9-Mar-1987	2 4-DINITROTOLUENE	<10 ug/L
SD-210	3-Mar-1987	2 6-DINITROTOLUENE	<10 ug/L
SD-210	9-Mar-1987	2 6-DINITROTOLUENE	<10 ug/L
SD-210	3-Mar-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-210	9-Mar-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-210	18-Mar-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-210	26-Mar-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-210	1-Apr-1987	2-CHLOROETHYLVINYL ETHER	(U) <5 ug/L
SD-210	8-Apr-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-210-D	26-Mar-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-210	3-Mar-1987	2-CHLORONAPHTHALENE	<10 ug/L
SD-210	9-Mar-1987	2-CHLORONAPHTHALENE	<10 ug/L
SD-210	3-Mar-1987	2-CHLOROPHENOL	<10 ug/L
SD-210	9-Mar-1987	2-CHLOROPHENOL	<10 ug/L
SD-210	3-Mar-1987	2-NITROPHENOL	<10 ug/L
SD-210	9-Mar-1987	2-NITROPHENOL	<10 ug/L
SD-210	3-Mar-1987	3 3'-DICHLOROBENZIDINE	<20 ug/L
SD-210	9-Mar-1987	3 3'-DICHLOROBENZIDINE	<20 ug/L
SD-210	3-Mar-1987	4 6-DINITRO-2-METHYLPHENOL	<50 ug/L
SD-210	9-Mar-1987	4 6-DINITRO-2-METHYLPHENOL	<50 ug/L
SD-210	3-Mar-1987	4-BROMOPHENYL-PHENYLETHER	<10 ug/L
SD-210	9-Mar-1987	4-BROMOPHENYL-PHENYLETHER	<10 ug/L
SD-210	3-Mar-1987	4-CHLORO-3-METHYLPHENOL	<10 ug/L
SD-210	9-Mar-1987	4-CHLORO-3-METHYLPHENOL	<10 ug/L
SD-210	3-Mar-1987	4-CHLOROPHENYL-PHENYLETHER	<10 ug/L
SD-210	9-Mar-1987	4-CHLOROPHENYL-PHENYLETHER	<10 ug/L
SD-210	3-Mar-1987	4-NITROPHENOL	<50 ug/L
SD-210	9-Mar-1987	4-NITROPHENOL	<50 ug/L
SD-210	3-Mar-1987	ACENAPHTHENE	<10 ug/L
SD-210	9-Mar-1987	ACENAPHTHENE	<10 ug/L
SD-210	3-Mar-1987	ACENAPHTHYLENE	<10 ug/L
SD-210	9-Mar-1987	ACENAPHTHYLENE	<10 ug/L
SD-210	9-Mar-1987	ALIPHATIC HYDROCARBON	14 ug/L
SD-210	3-Mar-1987	ALKALINITY	128 mg/L
SD-210	9-Mar-1987	ALKALINITY	49 mg/L
SD-210	18-Mar-1987	ALKALINITY	50 mg/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	26-Mar-1987	ALKALINITY	60 mg/L
SD-210	1-Apr-1987	ALKALINITY	57 mg/L
SD-210	8-Apr-1987	ALKALINITY	98 mg/L
SD-210-D	26-Mar-1987	ALKALINITY	74 mg/L
SD-210	3-Mar-1987	ALPHA	2 pCi/L
SD-210	9-Mar-1987	ALPHA	1 pCi/L
SD-210	18-Mar-1987	ALPHA	<2 pCi/L
SD-210	26-Mar-1987	ALPHA	<2 pCi/L
SD-210	1-Apr-1987	ALPHA	<2 pCi/L
SD-210	8-Apr-1987	ALPHA	4.1 pCi/L
SD-210-D	26-Mar-1987	ALPHA	<2 pCi/L
SD-210	3-Mar-1987	AMMONIA	<0.2 mg/L
SD-210	9-Mar-1987	AMMONIA	<0.2 mg/L
SD-210	18-Mar-1987	AMMONIA	<0.2 mg/L
SD-210	26-Mar-1987	AMMONIA	<0.2 mg/L
SD-210	1-Apr-1987	AMMONIA	<0.2 mg/L
SD-210	8-Apr-1987	AMMONIA	<0.2 mg/L
SD-210-D	26-Mar-1987	AMMONIA	<0.2 mg/L
SD-210	3-Mar-1987	ANTHRACENE	<10 ug/L
SD-210	9-Mar-1987	ANTHRACENE	<10 ug/L
SD-210	3-Mar-1987	ARSENIC	<0.005 mg/L
SD-210	9-Mar-1987	ARSENIC	<0.005 mg/L
SD-210	18-Mar-1987	ARSENIC	<0.005 mg/L
SD-210	26-Mar-1987	ARSENIC	<0.005 mg/L
SD-210	1-Apr-1987	ARSENIC	<0.005 mg/L
SD-210	8-Apr-1987	ARSENIC	<0.005 mg/L
SD-210-D	26-Mar-1987	ARSENIC	<0.005 mg/L
SD-210	3-Mar-1987	BARIUM	<0.10 mg/L
SD-210	9-Mar-1987	BARIUM	<0.10 mg/L
SD-210	18-Mar-1987	BARIUM	<0.10 mg/L
SD-210	26-Mar-1987	BARIUM	<0.10 mg/L
SD-210	1-Apr-1987	BARIUM	<0.10 mg/L
SD-210	8-Apr-1987	BARIUM	<0.10 mg/L
SD-210-D	26-Mar-1987	BARIUM	<0.10 mg/L
SD-210	3-Mar-1987	BENZENE	<5 ug/L
SD-210	9-Mar-1987	BENZENE	<5 ug/L
SD-210	18-Mar-1987	BENZENE	<5 ug/L
SD-210	26-Mar-1987	BENZENE	<5 ug/L
SD-210	1-Apr-1987	BENZENE	(U) <5 ug/L
SD-210	8-Apr-1987	BENZENE	<5 ug/L
SD-210-D	26-Mar-1987	BENZENE	<5 ug/L
SD-210	3-Mar-1987	BENZIDINE	<10 ug/L
SD-210	9-Mar-1987	BENZIDINE	<10 ug/L
SD-210	3-Mar-1987	BENZO(A)ANTHRACENE	<10 ug/L
SD-210	9-Mar-1987	BENZO(A)ANTHRACENE	<10 ug/L
SD-210	3-Mar-1987	BENZO(A)PYRENE	<10 ug/L
SD-210	9-Mar-1987	BENZO(A)PYRENE	<10 ug/L
SD-210	3-Mar-1987	BENZO(B)FLUORANTHENE	<10 ug/L
SD-210	9-Mar-1987	BENZO(B)FLUORANTHENE	<10 ug/L
SD-210	3-Mar-1987	BENZO(G H I)PERYLENE	<10 ug/L
SD-210	9-Mar-1987	BENZO(G H I)PERYLENE	<10 ug/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	3-Mar-1987	BENZO(K)FLUORANTHENE	<10 ug/L
SD-210	9-Mar-1987	BENZO(K)FLUORANTHENE	<10 ug/L
SD-210	3-Mar-1987	BERYLLIUM	<0.0010 mg/L
SD-210	9-Mar-1987	BERYLLIUM	<0.0010 mg/L
SD-210	18-Mar-1987	BERYLLIUM	<0.0010 mg/L
SD-210	26-Mar-1987	BERYLLIUM	<0.0010 mg/L
SD-210	1-Apr-1987	BERYLLIUM	<0.0010 mg/L
SD-210	8-Apr-1987	BERYLLIUM	<0.0010 mg/L
SD-210-D	26-Mar-1987	BERYLLIUM	<0.0010 mg/L
SD-210	3-Mar-1987	BETA	<2 pCi/L
SD-210	9-Mar-1987	BETA	<2 pCi/L
SD-210	18-Mar-1987	BETA	<2 pCi/L
SD-210	26-Mar-1987	BETA	<2 pCi/L
SD-210	1-Apr-1987	BETA	<2 pCi/L
SD-210	8-Apr-1987	BETA	4.9 pCi/L
SD-210-D	26-Mar-1987	BETA	<2 pCi/L
SD-210	3-Mar-1987	BIS(2-CHLOROETHOXY)METHANE	<10 ug/L
SD-210	9-Mar-1987	BIS(2-CHLOROETHOXY)METHANE	<10 ug/L
SD-210	3-Mar-1987	BIS(2-CHLOROETHYL)ETHER	<10 ug/L
SD-210	9-Mar-1987	BIS(2-CHLOROETHYL)ETHER	<10 ug/L
SD-210	3-Mar-1987	BIS(2-CHLOROISOPROPYL)ETHER	<10 ug/L
SD-210	9-Mar-1987	BIS(2-CHLOROISOPROPYL)ETHER	<10 ug/L
SD-210	3-Mar-1987	BIS(2-ETHYLHEXYL)PHTHALATE	15.B ug/L
SD-210	9-Mar-1987	BIS(2-ETHYLHEXYL)PHTHALATE	<10 ug/L
SD-210	3-Mar-1987	BORON	0.0080 mg/L
SD-210	9-Mar-1987	BORON	0.015 mg/L
SD-210	18-Mar-1987	BORON	<0.0040 mg/L
SD-210	26-Mar-1987	BORON	<0.0040 mg/L
SD-210	1-Apr-1987	BORON	<0.0040 mg/L
SD-210	8-Apr-1987	BORON	<0.0040 mg/L
SD-210-D	26-Mar-1987	BORON	0.012 mg/L
SD-210	3-Mar-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-210	9-Mar-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-210	18-Mar-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-210	26-Mar-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-210	1-Apr-1987	BROMODICHLOROMETHANE	(U) <5 ug/L
SD-210	8-Apr-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-210-D	26-Mar-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-210	3-Mar-1987	BROMOFORM	<5 ug/L
SD-210	9-Mar-1987	BROMOFORM	<5 ug/L
SD-210	18-Mar-1987	BROMOFORM	<5 ug/L
SD-210	26-Mar-1987	BROMOFORM	<5 ug/L
SD-210	1-Apr-1987	BROMOFORM	(U) <5 ug/L
SD-210	8-Apr-1987	BROMOFORM	<5 ug/L
SD-210-D	26-Mar-1987	BROMOFORM	<5 ug/L
SD-210	3-Mar-1987	BROMOMETHANE	<10 ug/L
SD-210	9-Mar-1987	BROMOMETHANE	<10 ug/L
SD-210	18-Mar-1987	BROMOMETHANE	<10 ug/L
SD-210	26-Mar-1987	BROMOMETHANE	<10 ug/L
SD-210	1-Apr-1987	BROMOMETHANE	(U) <5 ug/L
SD-210	8-Apr-1987	BROMOMETHANE	<10 ug/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210-D	26-Mar-1987	BROMOMETHANE	<10 ug/L
SD-210	3-Mar-1987	BUTYLBENZYLPHTHALATE	1.JB ug/L
SD-210	9-Mar-1987	BUTYLBENZYLPHTHALATE	<10 ug/L
SD-210	3-Mar-1987	CADMIUM	<0.0030 mg/L
SD-210	9-Mar-1987	CADMIUM	<0.0030 mg/L
SD-210	18-Mar-1987	CADMIUM	<0.0030 mg/L
SD-210	26-Mar-1987	CADMIUM	<0.0030 mg/L
SD-210	1-Apr-1987	CADMIUM	<0.0030 mg/L
SD-210	8-Apr-1987	CADMIUM	<0.0030 mg/L
SD-210-D	26-Mar-1987	CADMIUM	<0.0030 mg/L
SD-210	3-Mar-1987	CALCIUM	28 mg/L
SD-210	9-Mar-1987	CALCIUM	13 mg/L
SD-210	18-Mar-1987	CALCIUM	14 mg/L
SD-210	26-Mar-1987	CALCIUM	22 mg/L
SD-210	1-Apr-1987	CALCIUM	16 mg/L
SD-210	8-Apr-1987	CALCIUM	28 mg/L
SD-210-D	26-Mar-1987	CALCIUM	22 mg/L
SD-210	3-Mar-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-210	9-Mar-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-210	18-Mar-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-210	26-Mar-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-210	1-Apr-1987	CARBON TETRACHLORIDE	(U) <5 ug/L
SD-210	8-Apr-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-210-D	26-Mar-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-210	3-Mar-1987	CHEMICAL OXYGEN DEMAND (COD)	<5 mg/L
SD-210	9-Mar-1987	CHEMICAL OXYGEN DEMAND (COD)	<5 mg/L
SD-210	18-Mar-1987	CHEMICAL OXYGEN DEMAND (COD)	5 mg/L
SD-210	26-Mar-1987	CHEMICAL OXYGEN DEMAND (COD)	<5 mg/L
SD-210	1-Apr-1987	CHEMICAL OXYGEN DEMAND (COD)	5 mg/L
SD-210	8-Apr-1987	CHEMICAL OXYGEN DEMAND (COD)	<5 mg/L
SD-210-D	26-Mar-1987	CHEMICAL OXYGEN DEMAND (COD)	<5 mg/L
SD-210	3-Mar-1987	CHLORIDE	15.4 mg/L
SD-210	9-Mar-1987	CHLORIDE	6.3 mg/L
SD-210	18-Mar-1987	CHLORIDE	7.2 mg/L
SD-210	26-Mar-1987	CHLORIDE	9.6 mg/L
SD-210	1-Apr-1987	CHLORIDE	6.8 mg/L
SD-210	8-Apr-1987	CHLORIDE	14.5 mg/L
SD-210-D	26-Mar-1987	CHLORIDE	9.6 mg/L
SD-210	3-Mar-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-210	9-Mar-1987	CHLORINE TOTAL RESIDUAL WATER	0.1 mg/L
SD-210	18-Mar-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-210	26-Mar-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-210	1-Apr-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-210	8-Apr-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-210-D	26-Mar-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-210	3-Mar-1987	CHLOROBENZENE	<5 ug/L
SD-210	9-Mar-1987	CHLOROBENZENE	<5 ug/L
SD-210	18-Mar-1987	CHLOROBENZENE	<5 ug/L
SD-210	26-Mar-1987	CHLOROBENZENE	<5 ug/L
SD-210	1-Apr-1987	CHLOROBENZENE	(U) <5 ug/L
SD-210	8-Apr-1987	CHLOROBENZENE	<5 ug/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210-D	26-Mar-1987	CHLOROBENZENE	<5 ug/L
SD-210	3-Mar-1987	CHLOROETHANE	<10 ug/L
SD-210	9-Mar-1987	CHLOROETHANE	<10 ug/L
SD-210	18-Mar-1987	CHLOROETHANE	<10 ug/L
SD-210	26-Mar-1987	CHLOROETHANE	<10 ug/L
SD-210	1-Apr-1987	CHLOROETHANE	(U) <5 ug/L
SD-210	8-Apr-1987	CHLOROETHANE	<10 ug/L
SD-210-D	26-Mar-1987	CHLOROETHANE	<10 ug/L
SD-210	3-Mar-1987	CHLOROFORM	3 BJ ug/L
SD-210	9-Mar-1987	CHLOROFORM	<5 ug/L
SD-210	18-Mar-1987	CHLOROFORM	<5 ug/L
SD-210	26-Mar-1987	CHLOROFORM	<5 ug/L
SD-210	1-Apr-1987	CHLOROFORM	(U) <5 ug/L
SD-210	8-Apr-1987	CHLOROFORM	<5 ug/L
SD-210-D	26-Mar-1987	CHLOROFORM	<5 ug/L
SD-210	3-Mar-1987	CHLOROMETHANE	<10 ug/L
SD-210	9-Mar-1987	CHLOROMETHANE	<10 ug/L
SD-210	18-Mar-1987	CHLOROMETHANE	<10 ug/L
SD-210	26-Mar-1987	CHLOROMETHANE	<10 ug/L
SD-210	1-Apr-1987	CHLOROMETHANE	(U) <5 ug/L
SD-210	8-Apr-1987	CHLOROMETHANE	<10 ug/L
SD-210-D	26-Mar-1987	CHLOROMETHANE	<10 ug/L
SD-210	3-Mar-1987	CHROMIUM	<0.010 mg/L
SD-210	9-Mar-1987	CHROMIUM	<0.010 mg/L
SD-210	18-Mar-1987	CHROMIUM	<0.010 mg/L
SD-210	26-Mar-1987	CHROMIUM	<0.010 mg/L
SD-210	1-Apr-1987	CHROMIUM	<0.010 mg/L
SD-210	8-Apr-1987	CHROMIUM	<0.010 mg/L
SD-210-D	26-Mar-1987	CHROMIUM	<0.010 mg/L
SD-210	3-Mar-1987	CHRYSENE	<10 ug/L
SD-210	9-Mar-1987	CHRYSENE	<10 ug/L
SD-210	3-Mar-1987	CIS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	9-Mar-1987	CIS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	18-Mar-1987	CIS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	26-Mar-1987	CIS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	1-Apr-1987	CIS-1 3-DICHLOROPROPENE	(U) <5 ug/L
SD-210	8-Apr-1987	CIS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210-D	26-Mar-1987	CIS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	3-Mar-1987	COBALT	<0.10 mg/L
SD-210	9-Mar-1987	COBALT	<0.10 mg/L
SD-210	18-Mar-1987	COBALT	<0.10 mg/L
SD-210	26-Mar-1987	COBALT	<0.10 mg/L
SD-210	1-Apr-1987	COBALT	<0.10 mg/L
SD-210	8-Apr-1987	COBALT	<0.10 mg/L
SD-210-D	26-Mar-1987	COBALT	<0.10 mg/L
SD-210	3-Mar-1987	CONDUCTIVITY	253 umho/cm
SD-210	9-Mar-1987	CONDUCTIVITY	127 umho/cm
SD-210	18-Mar-1987	CONDUCTIVITY	121 umho/cm
SD-210	26-Mar-1987	CONDUCTIVITY	175 umho/cm
SD-210	1-Apr-1987	CONDUCTIVITY	125 umho/cm
SD-210	8-Apr-1987	CONDUCTIVITY	265 umho/cm

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210-D	26-Mar-1987	CONDUCTIVITY	174 umho/cm
SD-210	3-Mar-1987	COPPER	<0.0040 mg/L
SD-210	9-Mar-1987	COPPER	<0.0040 mg/L
SD-210	18-Mar-1987	COPPER	<0.0040 mg/L
SD-210	26-Mar-1987	COPPER	0.0084 mg/L
SD-210	1-Apr-1987	COPPER	0.0066 mg/L
SD-210	8-Apr-1987	COPPER	0.0064 mg/L
SD-210-D	26-Mar-1987	COPPER	0.011 mg/L
SD-210	3-Mar-1987	CYANIDE	0.004 mg/L
SD-210	9-Mar-1987	CYANIDE	0.002 mg/L
SD-210	18-Mar-1987	CYANIDE	0.002 mg/L
SD-210	26-Mar-1987	CYANIDE	<0.002 mg/L
SD-210	1-Apr-1987	CYANIDE	0.002 mg/L
SD-210	8-Apr-1987	CYANIDE	<0.002 mg/L
SD-210-D	26-Mar-1987	CYANIDE	0.002 mg/L
SD-210	3-Mar-1987	DI-N-BUTYLPHTHALATE	<10 ug/L
SD-210	9-Mar-1987	DI-N-BUTYLPHTHALATE	<10 ug/L
SD-210	3-Mar-1987	DI-N-OCTYLPHTHALATE	1.JB ug/L
SD-210	9-Mar-1987	DI-N-OCTYLPHTHALATE	1 JB ug/L
SD-210	3-Mar-1987	DIBENZ(A H)ANTHRACENE	<10 ug/L
SD-210	9-Mar-1987	DIBENZ(A H)ANTHRACENE	<10 ug/L
SD-210	3-Mar-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-210	9-Mar-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-210	18-Mar-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-210	26-Mar-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-210	1-Apr-1987	DIBROMOCHLOROMETHANE	(U) <5 ug/L
SD-210	8-Apr-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-210-D	26-Mar-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-210	3-Mar-1987	DIETHYLPHTHALATE	<10 ug/L
SD-210	9-Mar-1987	DIETHYLPHTHALATE	1 J ug/L
SD-210	3-Mar-1987	DIMETHYLPHTHALATE	<10 ug/L
SD-210	9-Mar-1987	DIMETHYLPHTHALATE	<10 ug/L
SD-210	3-Mar-1987	DISSOLVED OXYGEN	7.7 ppm
SD-210	9-Mar-1987	DISSOLVED OXYGEN	10.4 ppm
SD-210	18-Mar-1987	DISSOLVED OXYGEN	10.8 ppm
SD-210	26-Mar-1987	DISSOLVED OXYGEN	10.8 ppm
SD-210	1-Apr-1987	DISSOLVED OXYGEN	11.2 ppm
SD-210	8-Apr-1987	DISSOLVED OXYGEN	10.2 ppm
SD-210-D	26-Mar-1987	DISSOLVED OXYGEN	10.8 ppm
SD-210	3-Mar-1987	ETHYLBENZENE	<5 ug/L
SD-210	9-Mar-1987	ETHYLBENZENE	<5 ug/L
SD-210	18-Mar-1987	ETHYLBENZENE	<5 ug/L
SD-210	26-Mar-1987	ETHYLBENZENE	<5 ug/L
SD-210	1-Apr-1987	ETHYLBENZENE	(U) <5 ug/L
SD-210	8-Apr-1987	ETHYLBENZENE	<5 ug/L
SD-210-D	26-Mar-1987	ETHYLBENZENE	<5 ug/L
SD-210	3-Mar-1987	FLUORANTHENE	<10 ug/L
SD-210	9-Mar-1987	FLUORANTHENE	<10 ug/L
SD-210	3-Mar-1987	FLUORENE	<10 ug/L
SD-210	9-Mar-1987	FLUORENE	<10 ug/L
SD-210	3-Mar-1987	FLUORIDE	0.1 mg/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	9-Mar-1987	FLUORIDE	0.1 mg/L
SD-210	18-Mar-1987	FLUORIDE	<0.1 mg/L
SD-210	26-Mar-1987	FLUORIDE	0.1 mg/L
SD-210	1-Apr-1987	FLUORIDE	0.3 mg/L
SD-210	8-Apr-1987	FLUORIDE	0.2 mg/L
SD-210-D	26-Mar-1987	FLUORIDE	0.1 mg/L
SD-210	3-Mar-1987	HARDNESS	128 mg/L
SD-210	9-Mar-1987	HARDNESS	60 mg/L
SD-210	18-Mar-1987	HARDNESS	96 mg/L
SD-210	26-Mar-1987	HARDNESS	84 mg/L
SD-210	1-Apr-1987	HARDNESS	64 mg/L
SD-210	8-Apr-1987	HARDNESS	61 mg/L
SD-210-D	26-Mar-1987	HARDNESS	84 mg/L
SD-210	3-Mar-1987	HEXACHLOROBENZENE	<10 ug/L
SD-210	9-Mar-1987	HEXACHLOROBENZENE	<10 ug/L
SD-210	3-Mar-1987	HEXACHLOROBUTADIENE	<10 ug/L
SD-210	9-Mar-1987	HEXACHLOROBUTADIENE	<10 ug/L
SD-210	3-Mar-1987	HEXACHLOROCYCLOPENTADIENE	<10 ug/L
SD-210	9-Mar-1987	HEXACHLOROCYCLOPENTADIENE	<10 ug/L
SD-210	3-Mar-1987	HEXACHLOROETHANE	<10 ug/L
SD-210	9-Mar-1987	HEXACHLOROETHANE	<10 ug/L
SD-210	3-Mar-1987	INDENO(1 2 3-CD)PYRENE	<10 ug/L
SD-210	9-Mar-1987	INDENO(1 2 3-CD)PYRENE	<10 ug/L
SD-210	3-Mar-1987	IRON	0.15 mg/L
SD-210	9-Mar-1987	IRON	<0.050 mg/L
SD-210	18-Mar-1987	IRON	0.069 mg/L
SD-210	26-Mar-1987	IRON	0.12 mg/L
SD-210	1-Apr-1987	IRON	0.064 mg/L
SD-210	8-Apr-1987	IRON	0.11 mg/L
SD-210-D	26-Mar-1987	IRON	0.18 mg/L
SD-210	3-Mar-1987	ISOPHORONE	<10 ug/L
SD-210	9-Mar-1987	ISOPHORONE	<10 ug/L
SD-210	3-Mar-1987	LEAD	<0.050 mg/L
SD-210	9-Mar-1987	LEAD	<0.050 mg/L
SD-210	18-Mar-1987	LEAD	<0.050 mg/L
SD-210	26-Mar-1987	LEAD	<0.050 mg/L
SD-210	1-Apr-1987	LEAD	<0.050 mg/L
SD-210	8-Apr-1987	LEAD	<0.050 mg/L
SD-210-D	26-Mar-1987	LEAD	<0.050 mg/L
SD-210	3-Mar-1987	LITHIUM	<0.0040 mg/L
SD-210	9-Mar-1987	LITHIUM	<0.0040 mg/L
SD-210	18-Mar-1987	LITHIUM	<0.0040 mg/L
SD-210	26-Mar-1987	LITHIUM	<0.0040 mg/L
SD-210	1-Apr-1987	LITHIUM	<0.0040 mg/L
SD-210	8-Apr-1987	LITHIUM	<0.0040 mg/L
SD-210-D	26-Mar-1987	LITHIUM	<0.0040 mg/L
SD-210	3-Mar-1987	MAGNESIUM	8.6 mg/L
SD-210	9-Mar-1987	MAGNESIUM	3.1 mg/L
SD-210	18-Mar-1987	MAGNESIUM	3.7 mg/L
SD-210	26-Mar-1987	MAGNESIUM	6.6 mg/L
SD-210	1-Apr-1987	MAGNESIUM	4.8 mg/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	8-Apr-1987	MAGNESIUM	9.1 mg/L
SD-210-D	26-Mar-1987	MAGNESIUM	6.7 mg/L
SD-210	3-Mar-1987	MANGANESE	<0.010 mg/L
SD-210	9-Mar-1987	MANGANESE	<0.010 mg/L
SD-210	18-Mar-1987	MANGANESE	<0.010 mg/L
SD-210	26-Mar-1987	MANGANESE	<0.010 mg/L
SD-210	1-Apr-1987	MANGANESE	<0.010 mg/L
SD-210	8-Apr-1987	MANGANESE	<0.010 mg/L
SD-210-D	26-Mar-1987	MANGANESE	<0.010 mg/L
SD-210	3-Mar-1987	MERCURY	<0.0002 mg/L
SD-210	9-Mar-1987	MERCURY	<0.0002 mg/L
SD-210	18-Mar-1987	MERCURY	<0.0002 mg/L
SD-210	26-Mar-1987	MERCURY	<0.0002 mg/L
SD-210	1-Apr-1987	MERCURY	<0.0002 mg/L
SD-210	8-Apr-1987	MERCURY	<0.0002 mg/L
SD-210-D	26-Mar-1987	MERCURY	<0.0002 mg/L
SD-210	3-Mar-1987	METHYLENE CHLORIDE	<5 ug/L
SD-210	9-Mar-1987	METHYLENE CHLORIDE	5 ug/L
SD-210	18-Mar-1987	METHYLENE CHLORIDE	<5 ug/L
SD-210	26-Mar-1987	METHYLENE CHLORIDE	<5 ug/L
SD-210	1-Apr-1987	METHYLENE CHLORIDE	(U) <5 ug/L
SD-210	8-Apr-1987	METHYLENE CHLORIDE	11 ug/L
SD-210-D	26-Mar-1987	METHYLENE CHLORIDE	<5 ug/L
SD-210	3-Mar-1987	MOLYBDENUM	<0.010 mg/L
SD-210	9-Mar-1987	MOLYBDENUM	<0.010 mg/L
SD-210	18-Mar-1987	MOLYBDENUM	<0.010 mg/L
SD-210	26-Mar-1987	MOLYBDENUM	<0.010 mg/L
SD-210	1-Apr-1987	MOLYBDENUM	<0.010 mg/L
SD-210	8-Apr-1987	MOLYBDENUM	<0.010 mg/L
SD-210-D	26-Mar-1987	MOLYBDENUM	<0.010 mg/L
SD-210	3-Mar-1987	N-NITROSO-DI-N-PROPYLAMINE	<10 ug/L
SD-210	9-Mar-1987	N-NITROSO-DI-N-PROPYLAMINE	<10 ug/L
SD-210	3-Mar-1987	N-NITROSODIMETHYLAMINE	<10 ug/L
SD-210	9-Mar-1987	N-NITROSODIMETHYLAMINE	<10 ug/L
SD-210	3-Mar-1987	N-NITROSODIPHENYLAMINE	<10 ug/L
SD-210	9-Mar-1987	N-NITROSODIPHENYLAMINE	<10 ug/L
SD-210	3-Mar-1987	NAPHTHALENE	<10 ug/L
SD-210	9-Mar-1987	NAPHTHALENE	<10 ug/L
SD-210	3-Mar-1987	NICKEL	<0.050 mg/L
SD-210	9-Mar-1987	NICKEL	<0.050 mg/L
SD-210	18-Mar-1987	NICKEL	<0.050 mg/L
SD-210	26-Mar-1987	NICKEL	<0.050 mg/L
SD-210	1-Apr-1987	NICKEL	<0.050 mg/L
SD-210	8-Apr-1987	NICKEL	<0.050 mg/L
SD-210-D	26-Mar-1987	NICKEL	<0.050 mg/L
SD-210	3-Mar-1987	NIOBIUM	<0.0070 mg/L
SD-210	9-Mar-1987	NIOBIUM	<0.0070 mg/L
SD-210	18-Mar-1987	NIOBIUM	<0.0070 mg/L
SD-210	26-Mar-1987	NIOBIUM	<0.0070 mg/L
SD-210	1-Apr-1987	NIOBIUM	<0.0070 mg/L
SD-210	8-Apr-1987	NIOBIUM	<0.0070 mg/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210-D	26-Mar-1987	NIOBIUM	<0.0070 mg/L
SD-210	3-Mar-1987	NITRATE	0.20 mg/L
SD-210	9-Mar-1987	NITRATE	0.72 mg/L
SD-210	18-Mar-1987	NITRATE	<0.5 mg/L
SD-210	26-Mar-1987	NITRATE	0.9 mg/L
SD-210	1-Apr-1987	NITRATE	0.69 mg/L
SD-210	8-Apr-1987	NITRATE	0.94 mg/L
SD-210-D	26-Mar-1987	NITRATE	0.9 mg/L
SD-210	3-Mar-1987	NITROBENZENE	<10 ug/L
SD-210	9-Mar-1987	NITROBENZENE	<10 ug/L
SD-210	3-Mar-1987	OIL & GREASE	<2 mg/L
SD-210	9-Mar-1987	OIL & GREASE	<2 mg/L
SD-210	18-Mar-1987	OIL & GREASE	<2 mg/L
SD-210	26-Mar-1987	OIL & GREASE	<2 mg/L
SD-210	1-Apr-1987	OIL & GREASE	<2 mg/L
SD-210	8-Apr-1987	OIL & GREASE	<2 mg/L
SD-210-D	26-Mar-1987	OIL & GREASE	<2 mg/L
SD-210	3-Mar-1987	PCB (AROCLOR-1016)	<0.5 ug/L
SD-210	9-Mar-1987	PCB (AROCLOR-1016)	<1 ug/L
SD-210	3-Mar-1987	PCB (AROCLOR-1221)	<0.5 ug/L
SD-210	9-Mar-1987	PCB (AROCLOR-1221)	<1 ug/L
SD-210	3-Mar-1987	PCB (AROCLOR-1232)	<0.5 ug/L
SD-210	9-Mar-1987	PCB (AROCLOR-1232)	<1 ug/L
SD-210	3-Mar-1987	PCB (AROCLOR-1242)	<0.5 ug/L
SD-210	9-Mar-1987	PCB (AROCLOR-1242)	<1 ug/L
SD-210	3-Mar-1987	PCB (AROCLOR-1248)	<0.5 ug/L
SD-210	9-Mar-1987	PCB (AROCLOR-1248)	<1 ug/L
SD-210	3-Mar-1987	PCB (AROCLOR-1254)	<1 ug/L
SD-210	9-Mar-1987	PCB (AROCLOR-1254)	<1 ug/L
SD-210	3-Mar-1987	PCB (AROCLOR-1260)	<1 ug/L
SD-210	9-Mar-1987	PCB (AROCLOR-1260)	<1 ug/L
SD-210	3-Mar-1987	PENTACHLOROPHENOL	<50 ug/L
SD-210	9-Mar-1987	PENTACHLOROPHENOL	<50 ug/L
SD-210	3-Mar-1987	PH	7.7
SD-210	9-Mar-1987	PH	7.5
SD-210	18-Mar-1987	PH	7.4
SD-210	26-Mar-1987	PH	7.0
SD-210	1-Apr-1987	PH	7.9
SD-210	8-Apr-1987	PH	8.1
SD-210-D	26-Mar-1987	PH	7.7
SD-210	3-Mar-1987	PHENANTHRENE	<10 ug/L
SD-210	9-Mar-1987	PHENANTHRENE	<10 ug/L
SD-210	3-Mar-1987	PHENOL	<10 ug/L
SD-210	9-Mar-1987	PHENOL	<10 ug/L
SD-210	3-Mar-1987	PHOSPHORUS	<0.20 mg/L
SD-210	9-Mar-1987	PHOSPHORUS	<0.20 mg/L
SD-210	18-Mar-1987	PHOSPHORUS	<0.20 mg/L
SD-210	26-Mar-1987	PHOSPHORUS	<0.20 mg/L
SD-210	1-Apr-1987	PHOSPHORUS	<0.20 mg/L
SD-210	8-Apr-1987	PHOSPHORUS	<0.20 mg/L
SD-210-D	26-Mar-1987	PHOSPHORUS	<0.20 mg/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	3-Mar-1987	POTASSIUM	0.68 mg/L
SD-210	9-Mar-1987	POTASSIUM	<0.60 mg/L
SD-210	18-Mar-1987	POTASSIUM	<0.60 mg/L
SD-210	26-Mar-1987	POTASSIUM	<0.60 mg/L
SD-210	1-Apr-1987	POTASSIUM	<0.60 mg/L
SD-210	8-Apr-1987	POTASSIUM	<0.60 mg/L
SD-210-D	26-Mar-1987	POTASSIUM	<0.60 mg/L
SD-210	3-Mar-1987	PYRENE	<10 ug/L
SD-210	9-Mar-1987	PYRENE	<10 ug/L
SD-210	3-Mar-1987	SELENIUM	<0.005 mg/L
SD-210	9-Mar-1987	SELENIUM	<0.005 mg/L
SD-210	9-Mar-1987	SELENIUM	<0.005 mg/L
SD-210	18-Mar-1987	SELENIUM	<0.005 mg/L
SD-210	26-Mar-1987	SELENIUM	<0.005 mg/L
SD-210	1-Apr-1987	SELENIUM	<0.005 mg/L
SD-210	8-Apr-1987	SELENIUM	<0.005 mg/L
SD-210-D	26-Mar-1987	SELENIUM	<0.005 mg/L
SD-210	3-Mar-1987	SILICON	0.58 mg/L
SD-210	9-Mar-1987	SILICON	0.31 mg/L
SD-210	18-Mar-1987	SILICON	0.23 mg/L
SD-210	26-Mar-1987	SILICON	0.51 mg/L
SD-210	1-Apr-1987	SILICON	0.34 mg/L
SD-210	8-Apr-1987	SILICON	0.54 mg/L
SD-210-D	26-Mar-1987	SILICON	0.55 mg/L
SD-210	3-Mar-1987	SILVER	<0.010 mg/L
SD-210	9-Mar-1987	SILVER	<0.010 mg/L
SD-210	18-Mar-1987	SILVER	<0.010 mg/L
SD-210	26-Mar-1987	SILVER	<0.010 mg/L
SD-210	1-Apr-1987	SILVER	<0.010 mg/L
SD-210	8-Apr-1987	SILVER	<0.010 mg/L
SD-210-D	26-Mar-1987	SILVER	<0.010 mg/L
SD-210	3-Mar-1987	SODIUM	12 mg/L
SD-210	9-Mar-1987	SODIUM	3.0 mg/L
SD-210	18-Mar-1987	SODIUM	4.0 mg/L
SD-210	26-Mar-1987	SODIUM	6.8 mg/L
SD-210	1-Apr-1987	SODIUM	4.8 mg/L
SD-210	8-Apr-1987	SODIUM	8.6 mg/L
SD-210-D	26-Mar-1987	SODIUM	5.2 mg/L
SD-210	11-Mar-1987	SOLIDS SUSPENDED	5 mg/L
SD-210	3-Mar-1987	STRONTIUM	0.027 mg/L
SD-210	9-Mar-1987	STRONTIUM	0.014 mg/L
SD-210	18-Mar-1987	STRONTIUM	0.014 mg/L
SD-210	26-Mar-1987	STRONTIUM	0.020 mg/L
SD-210	1-Apr-1987	STRONTIUM	0.015 mg/L
SD-210	8-Apr-1987	STRONTIUM	0.021 mg/L
SD-210-D	26-Mar-1987	STRONTIUM	0.020 mg/L
SD-210	3-Mar-1987	SULFATE	16 mg/L
SD-210	9-Mar-1987	SULFATE	8.2 mg/L
SD-210	18-Mar-1987	SULFATE	7.3 mg/L
SD-210	26-Mar-1987	SULFATE	12 mg/L
SD-210	1-Apr-1987	SULFATE	8.6 mg/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	8-Apr-1987	SULFATE	16 mg/L
SD-210-D	26-Mar-1987	SULFATE	13 mg/L
SD-210	19-Mar-1987	SUSPENDED SOLIDS	12 ug/ML
SD-210	25-Mar-1987	SUSPENDED SOLIDS	1 ug/ML
SD-210	30-Mar-1987	SUSPENDED SOLIDS	15 ug/g
SD-210	14-Apr-1987	SUSPENDED SOLIDS	7 ug/g
SD-210	22-May-1987	SUSPENDED SOLIDS	<1 ug/g
SD-210	17-Jun-1987	SUSPENDED SOLIDS	5 ug/g
SD-210	3-Mar-1987	TEMPERATURE	7.0 Deg. C
SD-210	9-Mar-1987	TEMPERATURE	11.5 Deg. C
SD-210	18-Mar-1987	TEMPERATURE	10.0 Deg. C
SD-210	26-Mar-1987	TEMPERATURE	11.0 Deg. C
SD-210	1-Apr-1987	TEMPERATURE	7.0 Deg. C
SD-210	8-Apr-1987	TEMPERATURE	9.8 Deg. C
SD-210-D	26-Mar-1987	TEMPERATURE	11.0 Deg. C
SD-210	3-Mar-1987	TETRACHLOROETHENE	<5 ug/L
SD-210	9-Mar-1987	TETRACHLOROETHENE	<5 ug/L
SD-210	18-Mar-1987	TETRACHLOROETHENE	<5 ug/L
SD-210	26-Mar-1987	TETRACHLOROETHENE	<5 ug/L
SD-210	1-Apr-1987	TETRACHLOROETHENE	(U) <5 ug/L
SD-210	8-Apr-1987	TETRACHLOROETHENE	<5 ug/L
SD-210-D	26-Mar-1987	TETRACHLOROETHENE	<5 ug/L
SD-210	3-Mar-1987	THORIUM	<0.20 mg/L
SD-210	9-Mar-1987	THORIUM	<0.20 mg/L
SD-210	18-Mar-1987	THORIUM	<0.20 mg/L
SD-210	26-Mar-1987	THORIUM	<0.20 mg/L
SD-210	1-Apr-1987	THORIUM	<0.20 mg/L
SD-210	8-Apr-1987	THORIUM	<0.20 mg/L
SD-210-D	26-Mar-1987	THORIUM	<0.20 mg/L
SD-210	3-Mar-1987	TITANIUM	<0.0030 mg/L
SD-210	9-Mar-1987	TITANIUM	<0.0030 mg/L
SD-210	18-Mar-1987	TITANIUM	<0.0030 mg/L
SD-210	26-Mar-1987	TITANIUM	<0.0030 mg/L
SD-210	1-Apr-1987	TITANIUM	<0.0030 mg/L
SD-210	8-Apr-1987	TITANIUM	<0.0030 mg/L
SD-210-D	26-Mar-1987	TITANIUM	0.0044 mg/L
SD-210	3-Mar-1987	TOLUENE	1 BJ ug/L
SD-210	9-Mar-1987	TOLUENE	<5 ug/L
SD-210	18-Mar-1987	TOLUENE	<5 ug/L
SD-210	26-Mar-1987	TOLUENE	<5 ug/L
SD-210	1-Apr-1987	TOLUENE	(U) <5 ug/L
SD-210	8-Apr-1987	TOLUENE	<5 ug/L
SD-210-D	26-Mar-1987	TOLUENE	<5 ug/L
SD-210	3-Mar-1987	TOTAL DISSOLVED SOLIDS	158 mg/L
SD-210	9-Mar-1987	TOTAL DISSOLVED SOLIDS	88 mg/L
SD-210	18-Mar-1987	TOTAL DISSOLVED SOLIDS	14 mg/L
SD-210	26-Mar-1987	TOTAL DISSOLVED SOLIDS	136 mg/L
SD-210	1-Apr-1987	TOTAL DISSOLVED SOLIDS	86 mg/L
SD-210	8-Apr-1987	TOTAL DISSOLVED SOLIDS	136 mg/L
SD-210-D	26-Mar-1987	TOTAL DISSOLVED SOLIDS	142 mg/L
SD-210	3-Mar-1987	TOTAL ORGANIC CARBON (TOC)	13 mg/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	9-Mar-1987	TOTAL ORGANIC CARBON (TOC)	3 mg/L
SD-210	18-Mar-1987	TOTAL ORGANIC CARBON (TOC)	12 mg/L
SD-210	26-Mar-1987	TOTAL ORGANIC CARBON (TOC)	6 mg/L
SD-210	1-Apr-1987	TOTAL ORGANIC CARBON (TOC)	2 mg/L
SD-210	8-Apr-1987	TOTAL ORGANIC CARBON (TOC)	6 mg/L
SD-210-D	26-Mar-1987	TOTAL ORGANIC CARBON (TOC)	3 mg/L
SD-210	3-Mar-1987	TOTAL SUSPENDED SOLIDS	1 mg/L
SD-210	9-Mar-1987	TOTAL SUSPENDED SOLIDS	2 mg/L
SD-210	18-Mar-1987	TOTAL SUSPENDED SOLIDS	<1 mg/L
SD-210	26-Mar-1987	TOTAL SUSPENDED SOLIDS	4 mg/L
SD-210	1-Apr-1987	TOTAL SUSPENDED SOLIDS	<1 mg/L
SD-210	8-Apr-1987	TOTAL SUSPENDED SOLIDS	<1 mg/L
SD-210-D	26-Mar-1987	TOTAL SUSPENDED SOLIDS	5 mg/L
SD-210	3-Mar-1987	TRANS-1 2-DICHLOROETHENE	<5 ug/L
SD-210	9-Mar-1987	TRANS-1 2-DICHLOROETHENE	<5 ug/L
SD-210	18-Mar-1987	TRANS-1 2-DICHLOROETHENE	<5 ug/L
SD-210	26-Mar-1987	TRANS-1 2-DICHLOROETHENE	<5 ug/L
SD-210	1-Apr-1987	TRANS-1 2-DICHLOROETHENE	(U) <5 ug/L
SD-210	8-Apr-1987	TRANS-1 2-DICHLOROETHENE	<5 ug/L
SD-210-D	26-Mar-1987	TRANS-1 2-DICHLOROETHENE	<5 ug/L
SD-210	3-Mar-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	9-Mar-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	18-Mar-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	26-Mar-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	1-Apr-1987	TRANS-1 3-DICHLOROPROPENE	(U) <5 ug/L
SD-210	8-Apr-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210-D	26-Mar-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	3-Mar-1987	TRICHLOROETHENE	<5 ug/L
SD-210	9-Mar-1987	TRICHLOROETHENE	<5 ug/L
SD-210	18-Mar-1987	TRICHLOROETHENE	<5 ug/L
SD-210	26-Mar-1987	TRICHLOROETHENE	<5 ug/L
SD-210	1-Apr-1987	TRICHLOROETHENE	(U) <5 ug/L
SD-210	8-Apr-1987	TRICHLOROETHENE	<5 ug/L
SD-210-D	26-Mar-1987	TRICHLOROETHENE	<5 ug/L
SD-210	3-Mar-1987	TURBIDITY	2 NTU
SD-210	9-Mar-1987	TURBIDITY	1 NTU
SD-210	18-Mar-1987	TURBIDITY	1 NTU
SD-210	26-Mar-1987	TURBIDITY	1 NTU
SD-210	1-Apr-1987	TURBIDITY	3 NTU
SD-210	8-Apr-1987	TURBIDITY	1 NTU
SD-210-D	26-Mar-1987	TURBIDITY	1 NTU
SD-210	3-Mar-1987	URANIUM	0.005 mg/L
SD-210	9-Mar-1987	URANIUM	0.022 mg/L
SD-210	18-Mar-1987	URANIUM	0.004 mg/L
SD-210	26-Mar-1987	URANIUM	0.003 mg/L
SD-210	1-Apr-1987	URANIUM	0.004 mg/L
SD-210	8-Apr-1987	URANIUM	0.002 mg/L
SD-210-D	26-Mar-1987	URANIUM	0.004 mg/L
SD-210	3-Mar-1987	VANADIUM	<0.50 mg/L
SD-210	9-Mar-1987	VANADIUM	<0.50 mg/L
SD-210	18-Mar-1987	VANADIUM	<0.50 mg/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	26-Mar-1987	VANADIUM	<0.50 mg/L
SD-210	1-Apr-1987	VANADIUM	<0.50 mg/L
SD-210	8-Apr-1987	VANADIUM	<0.50 mg/L
SD-210-D	26-Mar-1987	VANADIUM	<0.50 mg/L
SD-210	3-Mar-1987	VINYL CHLORIDE	<10 ug/L
SD-210	9-Mar-1987	VINYL CHLORIDE	<10 ug/L
SD-210	18-Mar-1987	VINYL CHLORIDE	<10 ug/L
SD-210	26-Mar-1987	VINYL CHLORIDE	<10 ug/L
SD-210	1-Apr-1987	VINYL CHLORIDE	(U) <5 ug/L
SD-210	8-Apr-1987	VINYL CHLORIDE	<10 ug/L
SD-210-D	26-Mar-1987	VINYL CHLORIDE	<10 ug/L
SD-210	3-Mar-1987	ZINC	0.045 mg/L
SD-210	9-Mar-1987	ZINC	0.092 mg/L
SD-210	18-Mar-1987	ZINC	0.024 mg/L
SD-210	26-Mar-1987	ZINC	0.052 mg/L
SD-210	1-Apr-1987	ZINC	0.043 mg/L
SD-210	8-Apr-1987	ZINC	0.052 mg/L
SD-210-D	26-Mar-1987	ZINC	0.056 mg/L
SD-210	3-Mar-1987	ZIRCONIUM	<0.0050 mg/L
SD-210	9-Mar-1987	ZIRCONIUM	<0.0050 mg/L
SD-210	18-Mar-1987	ZIRCONIUM	<0.0050 mg/L
SD-210	26-Mar-1987	ZIRCONIUM	<0.0050 mg/L
SD-210	1-Apr-1987	ZIRCONIUM	<0.0050 mg/L
SD-210	8-Apr-1987	ZIRCONIUM	<0.0050 mg/L
SD-210-D	26-Mar-1987	ZIRCONIUM	<0.0050 mg/L

B - Analyte was found in the reagent blank as well as the sample.
C - Composite
D - Duplicate
J - Indicates an estimated value.
ND - Not Detected
U - Compound was analyzed for but not detected. The number is the attainable detection limit for the sample.

Source: W. J. Scheib
Average values for each compound in each storm drain can be found in: ORGDP Storm Drain Characterization (K/HS-128), Part 2, September 1987.

STORM DRAIN DATA FOR SD-200 *

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-200	9-Mar-1987	1 1 1-TRICHLOROETHANE	<5 ug/L
SD-200	14-Apr-1987	1 1 1-TRICHLOROETHANE	<5 ug/L
SD-200	9-Mar-1987	1 1 2 2-TETRACHLOROETHANE	<5 ug/L
SD-200	14-Apr-1987	1 1 2 2-TETRACHLOROETHANE	<5 ug/L
SD-200	9-Mar-1987	1 1 2-TRICHLOROETHANE	<5 ug/L
SD-200	14-Apr-1987	1 1 2-TRICHLOROETHANE	<5 ug/L
SD-200	9-Mar-1987	1 1-DICHLOROETHANE	<5 ug/L
SD-200	14-Apr-1987	1 1-DICHLOROETHANE	<5 ug/L
SD-200	9-Mar-1987	1 1-DICHLOROETHENE	<5 ug/L
SD-200	14-Apr-1987	1 1-DICHLOROETHENE	<5 ug/L
SD-200	9-Mar-1987	1 2 4-TRICHLOROBENZENE	<10 ug/L
SD-200	14-Apr-1987	1 2 4-TRICHLOROBENZENE	<10 ug/L
SD-200	9-Mar-1987	1 2-DICHLOROBENZENE	<10 ug/L
SD-200	14-Apr-1987	1 2-DICHLOROBENZENE	<10 ug/L
SD-200	9-Mar-1987	1 2-DICHLOROETHANE	<5 ug/L
SD-200	14-Apr-1987	1 2-DICHLOROETHANE	<5 ug/L
SD-200	9-Mar-1987	1 2-DICHLOROPROPANE	<5 ug/L
SD-200	14-Apr-1987	1 2-DICHLOROPROPANE	<5 ug/L
SD-200	9-Mar-1987	1 3-DICHLOROBENZENE	<10 ug/L
SD-200	14-Apr-1987	1 3-DICHLOROBENZENE	<10 ug/L
SD-200	9-Mar-1987	1 4-DICHLOROBENZENE	<10 ug/L
SD-200	14-Apr-1987	1 4-DICHLOROBENZENE	<10 ug/L
SD-200	9-Mar-1987	2 4 6-TRICHLOROPHENOL	<10 ug/L
SD-200	14-Apr-1987	2 4 6-TRICHLOROPHENOL	<10 ug/L
SD-200	9-Mar-1987	2 4-DICHLOROPHENOL	<10 ug/L
SD-200	14-Apr-1987	2 4-DICHLOROPHENOL	<10 ug/L
SD-200	9-Mar-1987	2 4-DIMETHYLPHENOL	<10 ug/L
SD-200	14-Apr-1987	2 4-DIMETHYLPHENOL	<10 ug/L
SD-200	9-Mar-1987	2 4-DINITROPHENOL	<10 ug/L
SD-200	14-Apr-1987	2 4-DINITROPHENOL	<10 ug/L
SD-200	9-Mar-1987	2 4-DINITROTOLUENE	<10 ug/L
SD-200	14-Apr-1987	2 4-DINITROTOLUENE	<10 ug/L
SD-200	9-Mar-1987	2 6-DINITROTOLUENE	<10 ug/L
SD-200	14-Apr-1987	2 6-DINITROTOLUENE	<10 ug/L
SD-200	9-Mar-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-200	14-Apr-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-200	9-Mar-1987	2-CHLORONAPHTHALENE	<10 ug/L
SD-200	14-Apr-1987	2-CHLORONAPHTHALENE	<10 ug/L
SD-200	9-Mar-1987	2-CHLOROPHENOL	<10 ug/L
SD-200	14-Apr-1987	2-CHLOROPHENOL	<10 ug/L
SD-200	9-Mar-1987	2-NITROPHENOL	<10 ug/L
SD-200	14-Apr-1987	2-NITROPHENOL	<10 ug/L
SD-200	9-Mar-1987	3 3'-DICHLOROBENZIDINE	<20 ug/L
SD-200	14-Apr-1987	3 3'-DICHLOROBENZIDINE	<20 ug/L
SD-200	9-Mar-1987	4 6-DINITRO-2-METHYLPHENOL	<50 ug/L
SD-200	14-Apr-1987	4 6-DINITRO-2-METHYLPHENOL	<50 ug/L
SD-200	9-Mar-1987	4-BROMOPHENYL-PHENYLETHER	<10 ug/L
SD-200	14-Apr-1987	4-BROMOPHENYL-PHENYLETHER	<10 ug/L
SD-200	9-Mar-1987	4-CHLORO-3-METHYLPHENOL	<10 ug/L
SD-200	14-Apr-1987	4-CHLORO-3-METHYLPHENOL	<10 ug/L
SD-200	9-Mar-1987	4-CHLOROPHENYL-PHENYLETHER	<10 ug/L

STORM DRAIN DATA FOR SD-200

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-200	14-Apr-1987	4-CHLOROPHENYL-PHENYLETHER	<10 ug/L
SD-200	9-Mar-1987	4-NITROPHENOL	<50 ug/L
SD-200	14-Apr-1987	4-NITROPHENOL	<50 ug/L
SD-200	9-Mar-1987	ACENAPHTHENE	<10 ug/L
SD-200	14-Apr-1987	ACENAPHTHENE	<10 ug/L
SD-200	9-Mar-1987	ACENAPHTHYLENE	<10 ug/L
SD-200	14-Apr-1987	ACENAPHTHYLENE	<10 ug/L
SD-200	9-Mar-1987	ALKALINITY	48 mg/L
SD-200	14-Apr-1987	ALKALINITY	74 mg/L
SD-200	9-Mar-1987	ALPHA	26 pCi/L
SD-200	14-Apr-1987	ALPHA	26.1 pCi/L
SD-200	9-Mar-1987	AMMONIA	<0.2 mg/L
SD-200	14-Apr-1987	AMMONIA	<0.2 mg/L
SD-200	9-Mar-1987	ANTHRACENE	<10 ug/L
SD-200	14-Apr-1987	ANTHRACENE	<10 ug/L
SD-200	9-Mar-1987	ARSENIC	<0.005 mg/L
SD-200	14-Apr-1987	ARSENIC	<0.005 mg/L
SD-200	9-Mar-1987	BARIUM	<0.10 mg/L
SD-200	14-Apr-1987	BARIUM	<0.10 mg/L
SD-200	9-Mar-1987	BENZENE	<5 ug/L
SD-200	14-Apr-1987	BENZENE	<5 ug/L
SD-200	9-Mar-1987	BENZIDINE	<10 ug/L
SD-200	14-Apr-1987	BENZIDINE	<10 ug/L
SD-200	9-Mar-1987	BENZO(A)ANTHRACENE	<10 ug/L
SD-200	14-Apr-1987	BENZO(A)ANTHRACENE	<10 ug/L
SD-200	9-Mar-1987	BENZO(A)PYRENE	<10 ug/L
SD-200	14-Apr-1987	BENZO(A)PYRENE	<10 ug/L
SD-200	9-Mar-1987	BENZO(B)FLUORANTHENE	<10 ug/L
SD-200	14-Apr-1987	BENZO(B)FLUORANTHENE	<10 ug/L
SD-200	9-Mar-1987	BENZO(G H I)PERYLENE	<10 ug/L
SD-200	14-Apr-1987	BENZO(G H I)PERYLENE	<10 ug/L
SD-200	9-Mar-1987	BENZO(K)FLUORANTHENE	<10 ug/L
SD-200	14-Apr-1987	BENZO(K)FLUORANTHENE	<10 ug/L
SD-200	9-Mar-1987	BERYLLIUM	<0.0010 mg/L
SD-200	14-Apr-1987	BERYLLIUM	<0.0010 mg/L
SD-200	9-Mar-1987	BETA	13 pCi/L
SD-200	14-Apr-1987	BETA	14.1 pCi/L
SD-200	9-Mar-1987	BIS(2-CHLOROETHOXY)METHANE	<10 ug/L
SD-200	14-Apr-1987	BIS(2-CHLOROETHOXY)METHANE	<10 ug/L
SD-200	9-Mar-1987	BIS(2-CHLOROETHYL)ETHER	<10 ug/L
SD-200	14-Apr-1987	BIS(2-CHLOROETHYL)ETHER	<10 ug/L
SD-200	9-Mar-1987	BIS(2-CHLOROISOPROPYL)ETHER	<10 ug/L
SD-200	14-Apr-1987	BIS(2-CHLOROISOPROPYL)ETHER	<10 ug/L
SD-200	9-Mar-1987	BIS(2-ETHYLHEXYL)PHTHALATE	<10 ug/L
SD-200	14-Apr-1987	BIS(2-ETHYLHEXYL)PHTHALATE	3 J ug/L
SD-200	9-Mar-1987	BORON	0.012 mg/L
SD-200	14-Apr-1987	BORON	0.046 mg/L
SD-200	9-Mar-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-200	14-Apr-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-200	9-Mar-1987	BROMOFORM	<5 ug/L
SD-200	14-Apr-1987	BROMOFORM	<5 ug/L

STORM DRAIN DATA FOR SD-200

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-200	9-Mar-1987	BROMOMETHANE	<10 ug/L
SD-200	14-Apr-1987	BROMOMETHANE	<10 ug/L
SD-200	9-Mar-1987	BUTYLBENZYLPHTHALATE	<10 ug/L
SD-200	14-Apr-1987	BUTYLBENZYLPHTHALATE	<10 ug/L
SD-200	9-Mar-1987	CADMIUM	<0.0030 mg/L
SD-200	14-Apr-1987	CADMIUM	<0.0030 mg/L
SD-200	9-Mar-1987	CALCIUM	12 mg/L
SD-200	14-Apr-1987	CALCIUM	28 mg/L
SD-200	9-Mar-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-200	14-Apr-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-200	9-Mar-1987	CHEMICAL OXYGEN DEMAND (COD)	<5 mg/L
SD-200	14-Apr-1987	CHEMICAL OXYGEN DEMAND (COD)	7 mg/L
SD-200	9-Mar-1987	CHLORIDE	2.3 mg/L
SD-200	14-Apr-1987	CHLORIDE	25 mg/L
SD-200	9-Mar-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-200	14-Apr-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-200	9-Mar-1987	CHLOROBENZENE	<5 ug/L
SD-200	14-Apr-1987	CHLOROBENZENE	<5 ug/L
SD-200	9-Mar-1987	CHLOROETHANE	<10 ug/L
SD-200	14-Apr-1987	CHLOROETHANE	<10 ug/L
SD-200	9-Mar-1987	CHLOROFORM	<5 ug/L
SD-200	14-Apr-1987	CHLOROFORM	<5 ug/L
SD-200	9-Mar-1987	CHLOROMETHANE	<10 ug/L
SD-200	14-Apr-1987	CHLOROMETHANE	<10 ug/L
SD-200	9-Mar-1987	CHROMIUM	<0.010 mg/L
SD-200	14-Apr-1987	CHROMIUM	<0.010 mg/L
SD-200	9-Mar-1987	CHRYSENE	<10 ug/L
SD-200	14-Apr-1987	CHRYSENE	<10 ug/L
SD-200	9-Mar-1987	CIS-1 3-DICHLOROPROPENE	<5 ug/L
SD-200	14-Apr-1987	CIS-1 3-DICHLOROPROPENE	<5 ug/L
SD-200	9-Mar-1987	COBALT	<0.10 mg/L
SD-200	14-Apr-1987	COBALT	<0.10 mg/L
SD-200	9-Mar-1987	CONDUCTIVITY	110 umho/cm
SD-200	14-Apr-1987	CONDUCTIVITY	429 umho/cm
SD-200	9-Mar-1987	COPPER	<0.0040 mg/L
SD-200	14-Apr-1987	COPPER	0.0099 mg/L
SD-200	9-Mar-1987	CYANIDE	<0.002 mg/L
SD-200	14-Apr-1987	CYANIDE	<0.002 mg/L
SD-200	9-Mar-1987	DI-N-BUTYLPHTHALATE	<10 ug/L
SD-200	14-Apr-1987	DI-N-BUTYLPHTHALATE	<10 ug/L
SD-200	9-Mar-1987	DI-N-OCTYLPHTHALATE	1 JB ug/L
SD-200	14-Apr-1987	DI-N-OCTYLPHTHALATE	<10 ug/L
SD-200	9-Mar-1987	DIBENZ(A H)ANTHRACENE	<10 ug/L
SD-200	14-Apr-1987	DIBENZ(A H)ANTHRACENE	<10 ug/L
SD-200	9-Mar-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-200	14-Apr-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-200	9-Mar-1987	DIETHYLPHTHALATE	<10 ug/L
SD-200	14-Apr-1987	DIETHYLPHTHALATE	<10 ug/L
SD-200	9-Mar-1987	DIMETHYLPHTHALATE	<10 ug/L
SD-200	14-Apr-1987	DIMETHYLPHTHALATE	<10 ug/L
SD-200	9-Mar-1987	DISSOLVED OXYGEN	10.3 ppm

STORM DRAIN DATA FOR SD-200

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-200	14-Apr-1987	DISSOLVED OXYGEN	10.7 ppm
SD-200	9-Mar-1987	ETHYLBENZENE	<5 ug/L
SD-200	14-Apr-1987	ETHYLBENZENE	<5 ug/L
SD-200	9-Mar-1987	FLUORANTHENE	<10 ug/L
SD-200	14-Apr-1987	FLUORANTHENE	<10 ug/L
SD-200	9-Mar-1987	FLUORENE	<10 ug/L
SD-200	14-Apr-1987	FLUORENE	<10 ug/L
SD-200	9-Mar-1987	FLUORIDE	0.1 mg/L
SD-200	14-Apr-1987	FLUORIDE	0.4 mg/L
SD-200	9-Mar-1987	HARDNESS	48 mg/L
SD-200	14-Apr-1987	HARDNESS	118 mg/L
SD-200	9-Mar-1987	HEXACHLOROBENZENE	<10 ug/L
SD-200	14-Apr-1987	HEXACHLOROBENZENE	<10 ug/L
SD-200	9-Mar-1987	HEXACHLOROBUTADIENE	<10 ug/L
SD-200	14-Apr-1987	HEXACHLOROBUTADIENE	<10 ug/L
SD-200	9-Mar-1987	HEXACHLOROCYCLOPENTADIENE	<10 ug/L
SD-200	14-Apr-1987	HEXACHLOROCYCLOPENTADIENE	<10 ug/L
SD-200	9-Mar-1987	HEXACHLOROETHANE	<10 ug/L
SD-200	14-Apr-1987	HEXACHLOROETHANE	<10 ug/L
SD-200	9-Mar-1987	INDENO(1 2 3-CD)PYRENE	<10 ug/L
SD-200	14-Apr-1987	INDENO(1 2 3-CD)PYRENE	<10 ug/L
SD-200	9-Mar-1987	IRON	<0.050 mg/L
SD-200	14-Apr-1987	IRON	0.14 mg/L
SD-200	9-Mar-1987	ISOPHORONE	<10 ug/L
SD-200	14-Apr-1987	ISOPHORONE	<10 ug/L
SD-200	9-Mar-1987	LEAD	<0.050 mg/L
SD-200	14-Apr-1987	LEAD	<0.050 mg/L
SD-200	9-Mar-1987	LITHIUM	<0.0040 mg/L
SD-200	14-Apr-1987	LITHIUM	<0.0040 mg/L
SD-200	9-Mar-1987	MAGNESIUM	1.8 mg/L
SD-200	14-Apr-1987	MAGNESIUM	4.8 mg/L
SD-200	9-Mar-1987	MANGANESE	<0.010 mg/L
SD-200	14-Apr-1987	MANGANESE	0.017 mg/L
SD-200	9-Mar-1987	MERCURY	<0.0002 mg/L
SD-200	14-Apr-1987	MERCURY	<0.0002 mg/L
SD-200	9-Mar-1987	METHYLENE CHLORIDE	5 ug/L
SD-200	14-Apr-1987	METHYLENE CHLORIDE	<5 ug/L
SD-200	9-Mar-1987	MOLYBDENUM	<0.010 mg/L
SD-200	14-Apr-1987	MOLYBDENUM	<0.010 mg/L
SD-200	9-Mar-1987	N-NITROSO-DI-N-PROPYLAMINE	<10 ug/L
SD-200	14-Apr-1987	N-NITROSO-DI-N-PROPYLAMINE	<10 ug/L
SD-200	9-Mar-1987	N-NITROSODIMETHYLAMINE	<10 ug/L
SD-200	14-Apr-1987	N-NITROSODIMETHYLAMINE	<10 ug/L
SD-200	9-Mar-1987	N-NITROSODIPHENYLAMINE	<10 ug/L
SD-200	14-Apr-1987	N-NITROSODIPHENYLAMINE	<10 ug/L
SD-200	9-Mar-1987	NAPHTHALENE	<10 ug/L
SD-200	14-Apr-1987	NAPHTHALENE	<10 ug/L
SD-200	9-Mar-1987	NICKEL	<0.050 mg/L
SD-200	14-Apr-1987	NICKEL	<0.050 mg/L
SD-200	9-Mar-1987	NIOBIUM	<0.0070 mg/L
SD-200	14-Apr-1987	NIOBIUM	<0.0070 mg/L

STORM DRAIN DATA FOR SD-200

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-200	9-Mar-1987	NITRATE	1.2 mg/L
SD-200	14-Apr-1987	NITRATE	6.3 mg/L
SD-200	9-Mar-1987	NITROBENZENE	<10 ug/L
SD-200	14-Apr-1987	NITROBENZENE	<10 ug/L
SD-200	9-Mar-1987	OIL & GREASE	<2 mg/L
SD-200	14-Apr-1987	OIL & GREASE	<2 mg/L
SD-200	9-Mar-1987	PCB (AROCLOR-1016)	<1 ug/L
SD-200	14-Apr-1987	PCB (AROCLOR-1016)	<0.5 ug/L
SD-200	9-Mar-1987	PCB (AROCLOR-1221)	<1 ug/L
SD-200	14-Apr-1987	PCB (AROCLOR-1221)	<0.5 ug/L
SD-200	9-Mar-1987	PCB (AROCLOR-1232)	<1 ug/L
SD-200	14-Apr-1987	PCB (AROCLOR-1232)	<0.5 ug/L
SD-200	9-Mar-1987	PCB (AROCLOR-1242)	<1 ug/L
SD-200	14-Apr-1987	PCB (AROCLOR-1242)	<0.5 ug/L
SD-200	9-Mar-1987	PCB (AROCLOR-1248)	<1 ug/L
SD-200	14-Apr-1987	PCB (AROCLOR-1248)	<0.5 ug/L
SD-200	9-Mar-1987	PCB (AROCLOR-1254)	<1 ug/L
SD-200	14-Apr-1987	PCB (AROCLOR-1254)	<1 ug/L
SD-200	9-Mar-1987	PCB (AROCLOR-1260)	<1 ug/L
SD-200	14-Apr-1987	PCB (AROCLOR-1260)	<1 ug/L
SD-200	9-Mar-1987	PENTACHLOROPHENOL	<50 ug/L
SD-200	14-Apr-1987	PENTACHLOROPHENOL	<50 ug/L
SD-200	9-Mar-1987	PH	7.6
SD-200	14-Apr-1987	PH	7.7
SD-200	9-Mar-1987	PHENANTHRENE	<10 ug/L
SD-200	14-Apr-1987	PHENANTHRENE	<10 ug/L
SD-200	9-Mar-1987	PHENOL	<10 ug/L
SD-200	14-Apr-1987	PHENOL	<10 ug/L
SD-200	9-Mar-1987	PHOSPHORUS	<0.20 mg/L
SD-200	14-Apr-1987	PHOSPHORUS	<0.20 mg/L
SD-200	9-Mar-1987	POTASSIUM	1.6 mg/L
SD-200	14-Apr-1987	POTASSIUM	6.5 mg/L
SD-200	9-Mar-1987	PYRENE	<10 ug/L
SD-200	14-Apr-1987	PYRENE	<10 ug/L
SD-200	9-Mar-1987	SELENIUM	<0.005 mg/L
SD-200	14-Apr-1987	SELENIUM	<0.005 mg/L
SD-200	9-Mar-1987	SILICON	0.49 mg/L
SD-200	14-Apr-1987	SILICON	1.1 mg/L
SD-200	9-Mar-1987	SILVER	<0.010 mg/L
SD-200	14-Apr-1987	SILVER	<0.010 mg/L
SD-200	9-Mar-1987	SODIUM	1.3 mg/L
SD-200	14-Apr-1987	SODIUM	8.4 mg/L
SD-200	11-Mar-1987	SOLIDS SUSPENDED	4 mg/L
SD-200	9-Mar-1987	STRONTIUM	0.027 mg/L
SD-200	14-Apr-1987	STRONTIUM	0.056 mg/L
SD-200	9-Mar-1987	SULFATE	7.5 mg/L
SD-200	14-Apr-1987	SULFATE	73 mg/L
SD-200	19-Mar-1987	SUSPENDED SOLIDS	10 ug/ML
SD-200	25-Mar-1987	SUSPENDED SOLIDS	3 ug/ML
SD-200	30-Mar-1987	SUSPENDED SOLIDS	3 ug/g
SD-200	14-Apr-1987	SUSPENDED SOLIDS	24 ug/g

STORM DRAIN DATA FOR SD-200

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-200	22-May-1987	SUSPENDED SOLIDS	1 ug/g
SD-200	17-Jun-1987	SUSPENDED SOLIDS	51 ug/g
SD-200	9-Mar-1987	TEMPERATURE	12.0 Deg. C
SD-200	14-Apr-1987	TEMPERATURE	15.0 Deg. C
SD-200	9-Mar-1987	TETRACHLOROETHENE	<5 ug/L
SD-200	14-Apr-1987	TETRACHLOROETHENE	<5 ug/L
SD-200	9-Mar-1987	THORIUM	<0.20 mg/L
SD-200	14-Apr-1987	THORIUM	<0.20 mg/L
SD-200	9-Mar-1987	TITANIUM	<0.0030 mg/L
SD-200	14-Apr-1987	TITANIUM	0.0039 mg/L
SD-200	9-Mar-1987	TOLUENE	<5 ug/L
SD-200	14-Apr-1987	TOLUENE	<5 ug/L
SD-200	9-Mar-1987	TOTAL DISSOLVED SOLIDS	70 mg/L
SD-200	14-Apr-1987	TOTAL DISSOLVED SOLIDS	188 mg/L
SD-200	9-Mar-1987	TOTAL ORGANIC CARBON (TOC)	26 mg/L
SD-200	14-Apr-1987	TOTAL ORGANIC CARBON (TOC)	11 mg/L
SD-200	9-Mar-1987	TOTAL SUSPENDED SOLIDS	2 mg/L
SD-200	14-Apr-1987	TOTAL SUSPENDED SOLIDS	3 mg/L
SD-200	9-Mar-1987	TRANS-1 2-DICHLOROETHENE	<5 ug/L
SD-200	14-Apr-1987	TRANS-1 2-DICHLOROETHENE	7 ug/L
SD-200	9-Mar-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-200	14-Apr-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-200	9-Mar-1987	TRICHLOROETHENE	<5 ug/L
SD-200	14-Apr-1987	TRICHLOROETHENE	21 ug/L
SD-200	9-Mar-1987	TURBIDITY	1 NTU
SD-200	14-Apr-1987	TURBIDITY	10 NTU
SD-200	9-Mar-1987	URANIUM	0.019 mg/L
SD-200	14-Apr-1987	URANIUM	0.021 mg/L
SD-200	9-Mar-1987	VANADIUM	<0.50 mg/L
SD-200	14-Apr-1987	VANADIUM	<0.50 mg/L
SD-200	9-Mar-1987	VINYL CHLORIDE	<10 ug/L
SD-200	14-Apr-1987	VINYL CHLORIDE	<10 ug/L
SD-200	9-Mar-1987	ZINC	0.024 mg/L
SD-200	14-Apr-1987	ZINC	0.040 mg/L
SD-200	9-Mar-1987	ZIRCONIUM	<0.0050 mg/L
SD-200	14-Apr-1987	ZIRCONIUM	<0.0050 mg/L

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*
B - Analyte was found in the reagent blank as well as the sample.
C - Composite
D - Duplicate
J - Indicates an estimated value.
ND - Not Detected
U - Compound was analyzed for but not detected. The number is the attainable detection limit for the sample.

Source: W. J. Scheib
Average values for each compound in each storm drain can be found in: ORGDP Storm Drain Characterization (K/HS-128), Part 2, September 1987.

APPENDIX C

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
** K-1413				
* UNW-26				
870610-077	K-1413	UNW-26	1,1,1-trichloroethane	<5 ug/L
870610-077	K-1413	UNW-26	1,1,2,2-tetrachloroethane	<5 ug/L
870610-077	K-1413	UNW-26	1,1,2-trichloroethane	<5 ug/L
870610-077	K-1413	UNW-26	1,1-dichloroethane	<5 ug/L
870610-077	K-1413	UNW-26	1,1-dichloroethene	<5 ug/L
870610-077	K-1413	UNW-26	1,2,4-trichlorobenzene	<5.0 ug/L
870610-077	K-1413	UNW-26	1,2-dichlorobenzene	<5.0 ug/L
870610-077	K-1413	UNW-26	1,2-dichloroethane	<5 ug/L
870610-077	K-1413	UNW-26	1,2-dichloropropane	<5 ug/L
870610-077	K-1413	UNW-26	1,3-dichlorobenzene	<5.0 ug/L
870610-077	K-1413	UNW-26	1,4-dichlorobenzene	<5.0 ug/L
870610-077	K-1413	UNW-26	2,4,5-T	<0.1 ug/L
870610-077	K-1413	UNW-26	2,4,5-TP (Silvex)	<0.1 ug/L
870610-077	K-1413	UNW-26	2,4,5-trichlorophenol	<25.0 ug/L
870610-077	K-1413	UNW-26	2,4,6-trichlorophenol	<5.0 ug/L
870610-077	K-1413	UNW-26	2,4-D	<1 ug/L
870610-077	K-1413	UNW-26	2,4-dichlorophenol	<5.0 ug/L
870610-077	K-1413	UNW-26	2,4-dimethylphenol	<5.0 ug/L
870610-077	K-1413	UNW-26	2,4-dinitrophenol	<25.0 ug/L
870610-077	K-1413	UNW-26	2,4-dinitrotoluene	<5.0 ug/L
870610-077	K-1413	UNW-26	2,6-dinitrotoluene	<5.0 ug/L
870610-077	K-1413	UNW-26	2-butanone	<10 ug/L
870610-077	K-1413	UNW-26	2-chloroethylvinyl ether	<10 ug/L
870610-077	K-1413	UNW-26	2-chloronaphthalene	<5.0 ug/L
870610-077	K-1413	UNW-26	2-chlorophenol	<5.0 ug/L
870610-077	K-1413	UNW-26	2-hexanone	<10 ug/L
870610-077	K-1413	UNW-26	2-methylnaphthalene	<5.0 ug/L
870610-077	K-1413	UNW-26	2-methylphenol	<5.0 ug/L
870610-077	K-1413	UNW-26	2-nitroaniline	<25.0 ug/L
870610-077	K-1413	UNW-26	2-nitrophenol	<5.0 ug/L
870610-077	K-1413	UNW-26	3,3'-dichlorobenzidine	<10.0 ug/L
870610-077	K-1413	UNW-26	3-nitroaniline	<25.0 ug/L
870610-077	K-1413	UNW-26	4,4'-DDD	<0.1 ug/L
870610-077	K-1413	UNW-26	4,4'-DDE	<0.1 ug/L
870610-077	K-1413	UNW-26	4,4'-DDT	<0.1 ug/L
870610-077	K-1413	UNW-26	4,6-dinitro-2-methylphenol	<25.0 ug/L
870610-077	K-1413	UNW-26	4-bromophenyl-phenylether	<5.0 ug/L
870610-077	K-1413	UNW-26	4-chloro-3-methylphenol	<5.0 ug/L
870610-077	K-1413	UNW-26	4-chloroaniline	<5.0 ug/L
870610-077	K-1413	UNW-26	4-chlorophenyl-phenylether	<5.0 ug/L
870610-077	K-1413	UNW-26	4-methyl-2-pentanone	<10 ug/L
870610-077	K-1413	UNW-26	4-methylphenol	<5.0 ug/L
870610-077	K-1413	UNW-26	4-nitroaniline	<25.0 ug/L
870610-077	K-1413	UNW-26	4-nitrophenol	<25.0 ug/L
870610-077	K-1413	UNW-26	Alpha Activity	21.0 pCi/L
870610-077	K-1413	UNW-26	Aluminum	19 mg/L

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870610-077	K-1413	UNW-26	Antimony	<0.050 mg/L
870610-077	K-1413	UNW-26	Arsenic	<0.005 mg/L
870610-077	K-1413	UNW-26	Barium	0.35 mg/L
870610-077	K-1413	UNW-26	Beryllium	0.0020 mg/L
870610-077	K-1413	UNW-26	Beta Activity	42.1 pCi/L
870610-077	K-1413	UNW-26	Boron	0.029 mg/L
870610-077	K-1413	UNW-26	Cadmium	<0.0030 mg/L
870610-077	K-1413	UNW-26	Calcium	15 mg/L
870610-077	K-1413	UNW-26	Chloride	23 mg/L
870610-077	K-1413	UNW-26	Chromium	0.095 mg/L
870610-077	K-1413	UNW-26	Cobalt	0.026 mg/L
870610-077	K-1413	UNW-26	Conductivity	190 umho/cm
870610-077	K-1413	UNW-26	Conductivity	223 umho/cm
870610-077	K-1413	UNW-26	Conductivity	223 umho/cm
870610-077	K-1413	UNW-26	Conductivity	220 umho/cm
870610-077	K-1413	UNW-26	Conductivity	218 umho/cm
870610-077	K-1413	UNW-26	Conductivity - Init	210 umho/cm
870610-077	K-1413	UNW-26	Copper	0.035 mg/L
870610-077	K-1413	UNW-26	Depth	16.5 feet
870610-077	K-1413	UNW-26	Dissolved Oxygen	2.5 ppm
870610-077	K-1413	UNW-26	Dissolved Oxygen - Init	1.8 ppm
870610-077	K-1413	UNW-26	Fluoride	<0.1 mg/L
870610-077	K-1413	UNW-26	Iron	19 mg/L
870610-077	K-1413	UNW-26	Lead	0.025 mg/L
870610-077	K-1413	UNW-26	Lithium	0.020 mg/L
870610-077	K-1413	UNW-26	Magnesium	11 mg/L
870610-077	K-1413	UNW-26	Manganese	2.1 mg/L
870610-077	K-1413	UNW-26	Mercury	<0.0002 mg/L
870610-077	K-1413	UNW-26	Molybdenum	0.012 mg/L
870610-077	K-1413	UNW-26	Nickel	0.095 mg/L
870610-077	K-1413	UNW-26	Niobium	<0.0070 mg/L
870610-077	K-1413	UNW-26	Nitrate-Nitrogen	0.79 mg/L
870610-077	K-1413	UNW-26	PCB (Aroclor-1016)	<0.5 ug/L
870610-077	K-1413	UNW-26	PCB (Aroclor-1221)	<0.5 ug/L
870610-077	K-1413	UNW-26	PCB (Aroclor-1232)	<0.5 ug/L
870610-077	K-1413	UNW-26	PCB (Aroclor-1242)	<0.5 ug/L
870610-077	K-1413	UNW-26	PCB (Aroclor-1248)	<0.5 ug/L
870610-077	K-1413	UNW-26	PCB (Aroclor-1254)	<1 ug/L
870610-077	K-1413	UNW-26	PCB (Aroclor-1260)	<1 ug/L
870610-077	K-1413	UNW-26	Phenols	0.003 mg/L
870610-077	K-1413	UNW-26	Phosphorus	0.35 mg/L
870610-077	K-1413	UNW-26	Potassium	7.3 mg/L
870610-077	K-1413	UNW-26	Redox	350 mv
870610-077	K-1413	UNW-26	Redox - Init	317 mv
870610-077	K-1413	UNW-26	Selenium	<0.005 mg/L
870610-077	K-1413	UNW-26	Silicon	26 mg/L
870610-077	K-1413	UNW-26	Silver	<0.0060 mg/L
870610-077	K-1413	UNW-26	Sodium	11 mg/L
870610-077	K-1413	UNW-26	Strontium	0.072 mg/L

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870610-077	K-1413	UNW-26	Sulfate	30 mg/L
870610-077	K-1413	UNW-26	TOX	19 ug/L
870610-077	K-1413	UNW-26	TOX	12 ug/L
870610-077	K-1413	UNW-26	TOX	15 ug/L
870610-077	K-1413	UNW-26	TOX	17 ug/L
870610-077	K-1413	UNW-26	Temperature	17.0 Deg C
870610-077	K-1413	UNW-26	Temperature - Init	17.5 Deg C
870610-077	K-1413	UNW-26	Thallium	<0.01 mg/L
870610-077	K-1413	UNW-26	Thorium	<0.20 mg/L
870610-077	K-1413	UNW-26	Titanium	0.22 mg/L
870610-077	K-1413	UNW-26	Total Coliform	NF col/100
870610-077	K-1413	UNW-26	Total Organic Carbon (TOC)	1.8 mg/L
870610-077	K-1413	UNW-26	Total Organic Carbon (TOC)	1.4 mg/L
870610-077	K-1413	UNW-26	Total Organic Carbon (TOC)	2.6 mg/L
870610-077	K-1413	UNW-26	Total Organic Carbon (TOC)	2.3 mg/L
870610-077	K-1413	UNW-26	Turbidity	>180 NTU
870610-077	K-1413	UNW-26	U-235	INSUFF U Wt.%
870610-077	K-1413	UNW-26	Uranium	<.001 mg/L
870610-077	K-1413	UNW-26	Vanadium	0.019 mg/L
870610-077	K-1413	UNW-26	Zinc	0.063 mg/L
870610-077	K-1413	UNW-26	Zirconium	<0.0050 mg/L
870610-077	K-1413	UNW-26	acenaphthene	<5.0 ug/L
870610-077	K-1413	UNW-26	acenaphthylene	<5.0 ug/L
870610-077	K-1413	UNW-26	acetone	10 B ug/L
870610-077	K-1413	UNW-26	aldrin	<0.05 ug/L
870610-077	K-1413	UNW-26	alpha-BHC	<0.05 ug/L
870610-077	K-1413	UNW-26	anthracene	<5.0 ug/L
870610-077	K-1413	UNW-26	benzene	<5 ug/L
870610-077	K-1413	UNW-26	benzo(a)anthracene	<5.0 ug/L
870610-077	K-1413	UNW-26	benzo(a)pyrene	<5.0 ug/L
870610-077	K-1413	UNW-26	benzo(b)fluoranthene	<5.0 ug/L
870610-077	K-1413	UNW-26	benzo(g,h,i)perylene	<5.0 ug/L
870610-077	K-1413	UNW-26	benzo(k)fluoranthene	<5.0 ug/L
870610-077	K-1413	UNW-26	benzoic acid	<25.0 ug/L
870610-077	K-1413	UNW-26	benzyl alcohol	<5.0 ug/L
870610-077	K-1413	UNW-26	beta-BHC	<0.05 ug/L
870610-077	K-1413	UNW-26	bis(2-chloroethoxy)methane	<5.0 ug/L
870610-077	K-1413	UNW-26	bis(2-chloroethyl)ether	<5.0 ug/L
870610-077	K-1413	UNW-26	bis(2-chloroisopropyl)ether	<5.0 ug/L
870610-077	K-1413	UNW-26	bis(2-ethylhexyl)phthalate	<5.0 ug/L
870610-077	K-1413	UNW-26	bromodichloromethane	<5 ug/L
870610-077	K-1413	UNW-26	bromoform	<5 ug/L
870610-077	K-1413	UNW-26	bromomethane	<10 ug/L
870610-077	K-1413	UNW-26	butylbenzylphthalate	<5.0 ug/L
870610-077	K-1413	UNW-26	carbon disulfide	<5 ug/L
870610-077	K-1413	UNW-26	carbon tetrachloride	<5 ug/L
870610-077	K-1413	UNW-26	chlorobenzene	<5 ug/L
870610-077	K-1413	UNW-26	chloroethane	<10 ug/L
870610-077	K-1413	UNW-26	chloroform	17 B ug/L

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870610-077	K-1413	UNW-26	chloromethane	<10 ug/L
870610-077	K-1413	UNW-26	chrysene	<5.0 ug/L
870610-077	K-1413	UNW-26	cis-1,3-dichloropropene	<5 ug/L
870610-077	K-1413	UNW-26	delta-BHC	<0.05 ug/L
870610-077	K-1413	UNW-26	di-n-butylphthalate	<5.0 ug/L
870610-077	K-1413	UNW-26	di-n-octylphthalate	<5.0 ug/L
870610-077	K-1413	UNW-26	dibenz(a,h)anthracene	<5.0 ug/L
870610-077	K-1413	UNW-26	dibenzofuran	<5.0 ug/L
870610-077	K-1413	UNW-26	dibromochloromethane	<5 ug/L
870610-077	K-1413	UNW-26	dieldrin	<0.1 ug/L
870610-077	K-1413	UNW-26	diethylphthalate	<5.0 ug/L
870610-077	K-1413	UNW-26	dimethylphthalate	<5.0 ug/L
870610-077	K-1413	UNW-26	endosulfan I	<0.05 ug/L
870610-077	K-1413	UNW-26	endosulfan II	<0.1 ug/L
870610-077	K-1413	UNW-26	endosulfan sulfate	<0.1 ug/L
870610-077	K-1413	UNW-26	endrin	<0.1 ug/L
870610-077	K-1413	UNW-26	endrin ketone	<0.1 ug/L
870610-077	K-1413	UNW-26	ethylbenzene	<5 ug/L
870610-077	K-1413	UNW-26	fluoranthene	<5.0 ug/L
870610-077	K-1413	UNW-26	fluorene	<5.0 ug/L
870610-077	K-1413	UNW-26	gamma-BHC (Lindane)	<0.05 ug/L
870610-077	K-1413	UNW-26	heptachlor	<0.05 ug/L
870610-077	K-1413	UNW-26	heptachlor epoxide	<0.05 ug/L
870610-077	K-1413	UNW-26	hexachlorobenzene	<5.0 ug/L
870610-077	K-1413	UNW-26	hexachlorobutadiene	<5.0 ug/L
870610-077	K-1413	UNW-26	hexachlorocyclopentadiene	<5.0 ug/L
870610-077	K-1413	UNW-26	hexachloroethane	<5.0 ug/L
870610-077	K-1413	UNW-26	indeno(1,2,3-cd)pyrene	<5.0 ug/L
870610-077	K-1413	UNW-26	isophorone	<5.0 ug/L
870610-077	K-1413	UNW-26	methoxychlor	<0.5 ug/L
870610-077	K-1413	UNW-26	methylene chloride	<5 ug/L
870610-077	K-1413	UNW-26	n-nitroso-di-n-propylamine	<5.0 ug/L
870610-077	K-1413	UNW-26	n-nitrosodiphenylamine	<5.0 ug/L
870610-077	K-1413	UNW-26	naphthalene	<5.0 ug/L
870610-077	K-1413	UNW-26	nitrobenzene	<5.0 ug/L
870610-077	K-1413	UNW-26	pH	5.1 -
870610-077	K-1413	UNW-26	pH	5.6 -
870610-077	K-1413	UNW-26	pH	5.5 -
870610-077	K-1413	UNW-26	pH	5.6 -
870610-077	K-1413	UNW-26	pH	5.8 -
870610-077	K-1413	UNW-26	pH - Init	4.5 -
870610-077	K-1413	UNW-26	pentachlorophenol	<25.0 ug/L
870610-077	K-1413	UNW-26	phenanthrene	<5.0 ug/L
870610-077	K-1413	UNW-26	phenol	<5.0 ug/L
870610-077	K-1413	UNW-26	pyrene	<5.0 ug/L
870610-077	K-1413	UNW-26	styrene	<5 ug/L
870610-077	K-1413	UNW-26	t. chlordane	<0.5 ug/L
870610-077	K-1413	UNW-26	tetrachloroethene	<5 ug/L
870610-077	K-1413	UNW-26	toluene	1 BJ ug/L

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870610-077	K-1413	UNW-26	total xylenes	<5 ug/L
870610-077	K-1413	UNW-26	toxaphene	<1 ug/L
870610-077	K-1413	UNW-26	trans-1,2-dichloroethene	1 J ug/L
870610-077	K-1413	UNW-26	trans-1,3-dichloropropene	<5 ug/L
870610-077	K-1413	UNW-26	trichloroethene	4 J ug/L
870610-077	K-1413	UNW-26	vinyl acetate	<10 ug/L
870610-077	K-1413	UNW-26	vinyl chloride	<10 ug/L
* UNW-26-F				
870610-078	K-1413	UNW-26-F	Aluminum	<0.020 mg/L
870610-078	K-1413	UNW-26-F	Antimony	<0.050 mg/L
870610-078	K-1413	UNW-26-F	Arsenic	<0.005 mg/L
870610-078	K-1413	UNW-26-F	Barium	0.15 mg/L
870610-078	K-1413	UNW-26-F	Beryllium	<0.0003 mg/L
870610-078	K-1413	UNW-26-F	Boron	0.023 mg/L
870610-078	K-1413	UNW-26-F	Cadmium	<0.0030 mg/L
870610-078	K-1413	UNW-26-F	Calcium	17 mg/L
870610-078	K-1413	UNW-26-F	Chromium	<0.010 mg/L
870610-078	K-1413	UNW-26-F	Cobalt	0.0060 mg/L
870610-078	K-1413	UNW-26-F	Copper	<0.0040 mg/L
870610-078	K-1413	UNW-26-F	Iron	0.078 mg/L
870610-078	K-1413	UNW-26-F	Lead	<0.004 mg/L
870610-078	K-1413	UNW-26-F	Lithium	<0.0040 mg/L
870610-078	K-1413	UNW-26-F	Magnesium	6.7 mg/L
870610-078	K-1413	UNW-26-F	Manganese	0.51 mg/L
870610-078	K-1413	UNW-26-F	Mercury	<0.0002 mg/L
870610-078	K-1413	UNW-26-F	Molybdenum	0.013 mg/L
870610-078	K-1413	UNW-26-F	Nickel	0.037 mg/L
870610-078	K-1413	UNW-26-F	Niobium	<0.0070 mg/L
870610-078	K-1413	UNW-26-F	Phosphorus	<0.20 mg/L
870610-078	K-1413	UNW-26-F	Potassium	4.4 mg/L
870610-078	K-1413	UNW-26-F	Selenium	<0.005 mg/L
870610-078	K-1413	UNW-26-F	Silicon	3.5 mg/L
870610-078	K-1413	UNW-26-F	Silver	<0.0060 mg/L
870610-078	K-1413	UNW-26-F	Sodium	11 mg/L
870610-078	K-1413	UNW-26-F	Strontium	0.069 mg/L
870610-078	K-1413	UNW-26-F	Thallium	<0.01 mg/L
870610-078	K-1413	UNW-26-F	Thorium	<0.20 mg/L
870610-078	K-1413	UNW-26-F	Titanium	0.0052 mg/L
870610-078	K-1413	UNW-26-F	Uranium	<.001 mg/L
870610-078	K-1413	UNW-26-F	Vanadium	<0.0050 mg/L
870610-078	K-1413	UNW-26-F	Zinc	0.0067 mg/L
870610-078	K-1413	UNW-26-F	Zirconium	<0.0050 mg/L
* BRW-15				
870723-034	K-1413	BRW-15	1,1,1-trichloroethane	<5 ug/L
870723-034	K-1413	BRW-15	1,1,2,2-tetrachloroethane	<5 ug/L
870723-034	K-1413	BRW-15	1,1,2-trichloroethane	<5 ug/L
870723-034	K-1413	BRW-15	1,1-dichloroethane	<5 ug/L

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870723-034	K-1413	BRW-15	1,1-dichloroethene	<5 ug/L
870723-034	K-1413	BRW-15	1,2,4-trichlorobenzene	<10 ug/L
870723-034	K-1413	BRW-15	1,2-dichlorobenzene	<10 ug/L
870723-034	K-1413	BRW-15	1,2-dichloroethane	<5 ug/L
870723-034	K-1413	BRW-15	1,2-dichloropropane	<5 ug/L
870723-034	K-1413	BRW-15	1,3-dichlorobenzene	<10 ug/L
870723-034	K-1413	BRW-15	1,4-dichlorobenzene	<10 ug/L
870723-034	K-1413	BRW-15	2,4,5-T	<0.1 ug/L
870723-034	K-1413	BRW-15	2,4,5-TP (Silvex)	<0.1 ug/L
870723-034	K-1413	BRW-15	2,4,5-trichlorophenol	<50 ug/L
870723-034	K-1413	BRW-15	2,4,6-trichlorophenol	<10 ug/L
870723-034	K-1413	BRW-15	2,4-D	<1 ug/L
870723-034	K-1413	BRW-15	2,4-dichlorophenol	<10 ug/L
870723-034	K-1413	BRW-15	2,4-dimethylphenol	<10 ug/L
870723-034	K-1413	BRW-15	2,4-dinitrophenol	<50 ug/L
870723-034	K-1413	BRW-15	2,4-dinitrotoluene	<10 ug/L
870723-034	K-1413	BRW-15	2,6-dinitrotoluene	<10 ug/L
870723-034	K-1413	BRW-15	2-butanone	13 B ug/L
870723-034	K-1413	BRW-15	2-chloroethylvinyl ether	<10 ug/L
870723-034	K-1413	BRW-15	2-chloronaphthalene	<10 ug/L
870723-034	K-1413	BRW-15	2-chlorophenol	<10 ug/L
870723-034	K-1413	BRW-15	2-hexanone	<10 ug/L
870723-034	K-1413	BRW-15	2-methylnaphthalene	<10 ug/L
870723-034	K-1413	BRW-15	2-methylphenol	<10 ug/L
870723-034	K-1413	BRW-15	2-nitroaniline	<50 ug/L
870723-034	K-1413	BRW-15	2-nitrophenol	<10 ug/L
870723-034	K-1413	BRW-15	3,3'-dichlorobenzidine	<20 ug/L
870723-034	K-1413	BRW-15	3-nitroaniline	<50 ug/L
870723-034	K-1413	BRW-15	4,4'-DDD	<0.1 ug/L
870723-034	K-1413	BRW-15	4,4'-DDE	<0.1 ug/L
870723-034	K-1413	BRW-15	4,4'-DDT	<0.1 ug/L
870723-034	K-1413	BRW-15	4,6-dinitro-2-methylphenol	<50 ug/L
870723-034	K-1413	BRW-15	4-bromophenyl-phenylether	<10 ug/L
870723-034	K-1413	BRW-15	4-chloro-3-methylphenol	<10 ug/L
870723-034	K-1413	BRW-15	4-chloroaniline	<10 ug/L
870723-034	K-1413	BRW-15	4-chlorophenyl-phenylether	<10 ug/L
870723-034	K-1413	BRW-15	4-methyl-2-pentanone	<10 ug/L
870723-034	K-1413	BRW-15	4-methylphenol	<10 ug/L
870723-034	K-1413	BRW-15	4-nitroaniline	<50 ug/L
870723-034	K-1413	BRW-15	4-nitrophenol	<50 ug/L
870723-034	K-1413	BRW-15	Alpha Activity	7.8 pCi/L
870723-034	K-1413	BRW-15	Aluminum	0.36 mg/L
870723-034	K-1413	BRW-15	Antimony	<0.050 mg/L
870723-034	K-1413	BRW-15	Arsenic	<0.005 mg/L
870723-034	K-1413	BRW-15	Barium	0.17 mg/L
870723-034	K-1413	BRW-15	Beryllium	0.0004 mg/L
870723-034	K-1413	BRW-15	Beta Activity	20.5 pCi/L
870723-034	K-1413	BRW-15	Boron	0.030 mg/L
870723-034	K-1413	BRW-15	Cadmium	<0.0030 mg/L

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870723-034	K-1413	BRW-15	Calcium	100 mg/L
870723-034	K-1413	BRW-15	Chloride	107 mg/L
870723-034	K-1413	BRW-15	Chromium	<0.010 mg/L
870723-034	K-1413	BRW-15	Cobalt	<0.0050 mg/L
870723-034	K-1413	BRW-15	Conductivity	590 umho/cm
870723-034	K-1413	BRW-15	Conductivity	679 umho/cm
870723-034	K-1413	BRW-15	Conductivity - Init	550 umho/cm
870723-034	K-1413	BRW-15	Copper	<0.0040 mg/L
870723-034	K-1413	BRW-15	Depth to water	16.4 feet
870723-034	K-1413	BRW-15	Dissolved Oxygen	5.0 ppm
870723-034	K-1413	BRW-15	Dissolved Oxygen - Init	2.3 ppm
870723-034	K-1413	BRW-15	Fluoride	<0.1 mg/L
870723-034	K-1413	BRW-15	Iron	0.47 mg/L
870723-034	K-1413	BRW-15	Lead	<0.004 mg/L
870723-034	K-1413	BRW-15	Lithium	0.015 mg/L
870723-034	K-1413	BRW-15	Magnesium	19 mg/L
870723-034	K-1413	BRW-15	Manganese	0.052 mg/L
870723-034	K-1413	BRW-15	Mercury	<0.0002 mg/L
870723-034	K-1413	BRW-15	Molybdenum	<0.010 mg/L
870723-034	K-1413	BRW-15	Nickel	0.014 mg/L
870723-034	K-1413	BRW-15	Niobium	0.012 mg/L
870723-034	K-1413	BRW-15	Nitrate-Nitrogen	0.13 mg/L
870723-034	K-1413	BRW-15	PCB (Aroclor-1016)	<0.5 ug/L
870723-034	K-1413	BRW-15	PCB (Aroclor-1221)	<0.5 ug/L
870723-034	K-1413	BRW-15	PCB (Aroclor-1232)	<0.5 ug/L
870723-034	K-1413	BRW-15	PCB (Aroclor-1242)	<0.5 ug/L
870723-034	K-1413	BRW-15	PCB (Aroclor-1248)	<0.5 ug/L
870723-034	K-1413	BRW-15	PCB (Aroclor-1254)	<1 ug/L
870723-034	K-1413	BRW-15	PCB (Aroclor-1260)	<1 ug/L
870723-034	K-1413	BRW-15	Phenols	0.003 mg/L
870723-034	K-1413	BRW-15	Phosphorus	<0.20 mg/L
870723-034	K-1413	BRW-15	Potassium	6.8 mg/L
870723-034	K-1413	BRW-15	Redox	181 mv
870723-034	K-1413	BRW-15	Redox - Init	215 mv
870723-034	K-1413	BRW-15	Selenium	<0.005 mg/L
870723-034	K-1413	BRW-15	Silicon	8.4 mg/L
870723-034	K-1413	BRW-15	Silver	<0.0060 mg/L
870723-034	K-1413	BRW-15	Sodium	9.1 mg/L
870723-034	K-1413	BRW-15	Strontium	0.25 mg/L
870723-034	K-1413	BRW-15	Sulfate	37 mg/L
870723-034	K-1413	BRW-15	TOX	13 ug/L
870723-034	K-1413	BRW-15	Temperature	22.0 Deg C
870723-034	K-1413	BRW-15	Temperature - Init	21.0 Deg C
870723-034	K-1413	BRW-15	Thallium	<0.01 mg/L
870723-034	K-1413	BRW-15	Thorium	<0.20 mg/L
870723-034	K-1413	BRW-15	Titanium	0.0094 mg/L
870723-034	K-1413	BRW-15	Total Coliform	0 col/100
870723-034	K-1413	BRW-15	Total Organic Carbon (TOC)	<1.0 mg/L
870723-034	K-1413	BRW-15	Turbidity	16 NTU

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870723-034	K-1413	BRW-15	U-235	0.85 Wt.%
870723-034	K-1413	BRW-15	Uranium	0.002 mg/L
870723-034	K-1413	BRW-15	Vanadium	<0.0050 mg/L
870723-034	K-1413	BRW-15	Zinc	0.0039 mg/L
870723-034	K-1413	BRW-15	Zirconium	<0.0050 mg/L
870723-034	K-1413	BRW-15	acenaphthene	<10 ug/L
870723-034	K-1413	BRW-15	acenaphthylene	<10 ug/L
870723-034	K-1413	BRW-15	acetone	<10 ug/L
870723-034	K-1413	BRW-15	aldrin	<0.05 ug/L
870723-034	K-1413	BRW-15	alpha-BHC	<0.05 ug/L
870723-034	K-1413	BRW-15	anthracene	<10 ug/L
870723-034	K-1413	BRW-15	benzene	<5 ug/L
870723-034	K-1413	BRW-15	benzo(a)anthracene	<10 ug/L
870723-034	K-1413	BRW-15	benzo(a)pyrene	<10 ug/L
870723-034	K-1413	BRW-15	benzo(b)fluoranthene	<10 ug/L
870723-034	K-1413	BRW-15	benzo(g,h,i)perylene	<10 ug/L
870723-034	K-1413	BRW-15	benzo(k)fluoranthene	<10 ug/L
870723-034	K-1413	BRW-15	benzoic acid	<50 ug/L
870723-034	K-1413	BRW-15	benzyl alcohol	<10 ug/L
870723-034	K-1413	BRW-15	beta-BHC	<0.05 ug/L
870723-034	K-1413	BRW-15	bis(2-chloroethoxy)methane	<10 ug/L
870723-034	K-1413	BRW-15	bis(2-chloroethyl)ether	<10 ug/L
870723-034	K-1413	BRW-15	bis(2-chloroisopropyl)ether	<10 ug/L
870723-034	K-1413	BRW-15	bis(2-ethylhexyl)phthalate	<10 ug/L
870723-034	K-1413	BRW-15	bromodichloromethane	<5 ug/L
870723-034	K-1413	BRW-15	bromoform	<5 ug/L
870723-034	K-1413	BRW-15	bromomethane	<10 ug/L
870723-034	K-1413	BRW-15	butylbenzylphthalate	<10 ug/L
870723-034	K-1413	BRW-15	carbon disulfide	<5 ug/L
870723-034	K-1413	BRW-15	carbon tetrachloride	<5 ug/L
870723-034	K-1413	BRW-15	chlorobenzene	<5 ug/L
870723-034	K-1413	BRW-15	chloroethane	<10 ug/L
870723-034	K-1413	BRW-15	chloroform	5 B ug/L
870723-034	K-1413	BRW-15	chloromethane	<10 ug/L
870723-034	K-1413	BRW-15	chrysene	<10 ug/L
870723-034	K-1413	BRW-15	cis-1,3-dichloropropene	<5 ug/L
870723-034	K-1413	BRW-15	delta-BHC	<0.05 ug/L
870723-034	K-1413	BRW-15	di-n-butylphthalate	<10 ug/L
870723-034	K-1413	BRW-15	di-n-octylphthalate	<10 ug/L
870723-034	K-1413	BRW-15	dibenz(a,h)anthracene	<10 ug/L
870723-034	K-1413	BRW-15	dibenzofuran	<10 ug/L
870723-034	K-1413	BRW-15	dibromochloromethane	<5 ug/L
870723-034	K-1413	BRW-15	dieldrin	<0.1 ug/L
870723-034	K-1413	BRW-15	diethylphthalate	<10 ug/L
870723-034	K-1413	BRW-15	dimethylphthalate	<10 ug/L
870723-034	K-1413	BRW-15	endosulfan I	<0.05 ug/L
870723-034	K-1413	BRW-15	endosulfan II	<0.1 ug/L
870723-034	K-1413	BRW-15	endosulfan sulfate	<0.1 ug/L
870723-034	K-1413	BRW-15	endrin	<0.1 ug/L

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870723-034	K-1413	BRW-15	endrin ketone	<0.1 ug/L
870723-034	K-1413	BRW-15	ethylbenzene	<5 ug/L
870723-034	K-1413	BRW-15	fluoranthene	<10 ug/L
870723-034	K-1413	BRW-15	fluorene	<10 ug/L
870723-034	K-1413	BRW-15	gamma-BHC (Lindane)	<0.05 ug/L
870723-034	K-1413	BRW-15	heptachlor	<0.05 ug/L
870723-034	K-1413	BRW-15	heptachlor epoxide	<0.05 ug/L
870723-034	K-1413	BRW-15	hexachlorobenzene	<10 ug/L
870723-034	K-1413	BRW-15	hexachlorobutadiene	<10 ug/L
870723-034	K-1413	BRW-15	hexachlorocyclopentadiene	<10 ug/L
870723-034	K-1413	BRW-15	hexachloroethane	<10 ug/L
870723-034	K-1413	BRW-15	indeno(1,2,3-cd)pyrene	<10 ug/L
870723-034	K-1413	BRW-15	isophorone	<10 ug/L
870723-034	K-1413	BRW-15	methoxychlor	<0.5 ug/L
870723-034	K-1413	BRW-15	methylene chloride	<5 ug/L
870723-034	K-1413	BRW-15	n-nitroso-di-n-propylamine	<10 ug/L
870723-034	K-1413	BRW-15	n-nitrosodiphenylamine	<10 ug/L
870723-034	K-1413	BRW-15	naphthalene	<10 ug/L
870723-034	K-1413	BRW-15	nitrobenzene	<10 ug/L
870723-034	K-1413	BRW-15	pH	8.2 -
870723-034	K-1413	BRW-15	pH	7.6 -
870723-034	K-1413	BRW-15	pH - Init	8.2 -
870723-034	K-1413	BRW-15	pentachlorophenol	<50 ug/L
870723-034	K-1413	BRW-15	phenanthrene	<10 ug/L
870723-034	K-1413	BRW-15	phenol	<10 ug/L
870723-034	K-1413	BRW-15	pyrene	<10 ug/L
870723-034	K-1413	BRW-15	styrene	<5 ug/L
870723-034	K-1413	BRW-15	t. chlordane	<0.5 ug/L
870723-034	K-1413	BRW-15	tetrachloroethene	<5 ug/L
870723-034	K-1413	BRW-15	toluene	3 BJ ug/L
870723-034	K-1413	BRW-15	total xylenes	<5 ug/L
870723-034	K-1413	BRW-15	toxaphene	<1 ug/L
870723-034	K-1413	BRW-15	trans-1,2-dichloroethene	<5 ug/L
870723-034	K-1413	BRW-15	trans-1,3-dichloropropene	<5 ug/L
870723-034	K-1413	BRW-15	trichloroethene	19 ug/L
870723-034	K-1413	BRW-15	vinyl acetate	<10 ug/L
870723-034	K-1413	BRW-15	vinyl chloride	<10 ug/L
* BRW-15-F				
870723-037	K-1413	BRW-15-F	Aluminum	0.052 mg/L
870723-037	K-1413	BRW-15-F	Antimony	<0.050 mg/L
870723-037	K-1413	BRW-15-F	Arsenic	<0.005 mg/L
870723-037	K-1413	BRW-15-F	Barium	0.14 mg/L
870723-037	K-1413	BRW-15-F	Beryllium	0.0004 mg/L
870723-037	K-1413	BRW-15-F	Boron	0.042 mg/L
870723-037	K-1413	BRW-15-F	Cadmium	<0.0030 mg/L
870723-037	K-1413	BRW-15-F	Calcium	99 mg/L
870723-037	K-1413	BRW-15-F	Chromium	<0.010 mg/L
870723-037	K-1413	BRW-15-F	Cobalt	<0.0050 mg/L

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870723-037	K-1413	BRW-15-F	Copper	<0.0040 mg/L
870723-037	K-1413	BRW-15-F	Iron	0.0098 mg/L
870723-037	K-1413	BRW-15-F	Lead	0.004 mg/L
870723-037	K-1413	BRW-15-F	Lithium	0.015 mg/L
870723-037	K-1413	BRW-15-F	Magnesium	19 mg/L
870723-037	K-1413	BRW-15-F	Manganese	0.038 mg/L
870723-037	K-1413	BRW-15-F	Mercury	<0.0002 mg/L
870723-037	K-1413	BRW-15-F	Molybdenum	<0.010 mg/L
870723-037	K-1413	BRW-15-F	Nickel	0.012 mg/L
870723-037	K-1413	BRW-15-F	Niobium	0.014 mg/L
870723-037	K-1413	BRW-15-F	Phosphorus	<0.20 mg/L
870723-037	K-1413	BRW-15-F	Potassium	6.5 mg/L
870723-037	K-1413	BRW-15-F	Selenium	<0.005 mg/L
870723-037	K-1413	BRW-15-F	Silicon	7.9 mg/L
870723-037	K-1413	BRW-15-F	Silver	<0.0060 mg/L
870723-037	K-1413	BRW-15-F	Sodium	9.6 mg/L
870723-037	K-1413	BRW-15-F	Strontium	0.25 mg/L
870723-037	K-1413	BRW-15-F	Thallium	<0.01 mg/L
870723-037	K-1413	BRW-15-F	Thorium	<0.20 mg/L
870723-037	K-1413	BRW-15-F	Titanium	<0.0030 mg/L
870723-037	K-1413	BRW-15-F	Uranium	0.002 mg/L
870723-037	K-1413	BRW-15-F	Vanadium	<0.0050 mg/L
870723-037	K-1413	BRW-15-F	Zinc	0.0016 mg/L
870723-037	K-1413	BRW-15-F	Zirconium	<0.0050 mg/L

B - Analyte was found in the reagent blank as well as the sample.
C - Composite
D - Duplicate
J - Indicates an estimated value.
ND - Not Detected
U - Compound was analyzed for but not detected. The number is the attainable detection limit for the sample.
NF - Compound was analyzed for but not found.
F - Sample was filtered before testing.

ChemRisk/Shonka Research Associates, Inc., Document Request Form

(This section to be completed by subcontractor requesting document)

TEBENNETT / K-25 ER DMC

Requestor — Document Center (is requested to provide the following document)

Date of request 9/5/95 Expected receipt of document ____

Document number ER025435 Date of document FEB 1988

Title and author (if document is unnumbered) K/HS-144

Name ADC Reviewer ____

Date Sent to ADC ____

Date(s) Cleared 1/5/88

(This section to be completed by Document Center)

Date request received 9/1/95

Date submitted to ADC NA

Date submitted to HSA Coordinator 9/18/95

(This section to be completed by HSA Coordinator)

Date submitted to CICO NA

Date received from CICO NA

Date submitted to ChemRisk/Shonka and DOE 9/19/95

(This section to be completed by ChemRisk/Shonka Research Associates, Inc.)

Date document received ____

Signature ____

K/HS-144

ORGDP

OAK RIDGE GASEOUS DIFFUSION PLANT

MARTIN MARIETTA

RCRA FACILITY INVESTIGATION PLAN
K-1413 WASTE AREA GROUPING
OAK RIDGE GASEOUS DIFFUSION PLANT
OAK RIDGE, TENNESSEE

FEBRUARY 1988

OPERATED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

FEBRUARY 1988 K/HS-144

RCRA FACILITY INVESTIGATION PLAN
K-1413 WASTE AREA GROUPING
OAK RIDGE GASEOUS DIFFUSION PLANT
OAK RIDGE, TENNESSEE

Prepared by the
Oak Ridge Gaseous Diffusion Plant
Oak Ridge, Tennessee 37831
operated by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

TABLE OF CONTENTS

1. INTRODUCTION

Within the confines of the Oak Ridge Gaseous Diffusion Plant (ORGDP) are hazardous waste treatment, storage, and disposal facilities; some are in operation while others are no longer in use. These solid waste management units (SWMUs) are subject to assessment by the U.S. Environmental Protection Agency (EPA), as required by the 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA). The RCRA Facility Investigation (RFI) Plans are scheduled to be submitted for all the SWMUs during calendar years 1987 and 1988. The RFI Plan - General Document (K/HS-132) includes information applicable to all the ORGDP SWMUs and serves as a reference document for the site-specific RFI Plans.

This document is the site-specific RFI Plan for the K-1413 Waste Area Grouping (WAG). Contained within this document are geographical, historical, operational, geological, and hydrological data specific to the K-1413 site. The potential for release of contamination through the various media to receptors is addressed. A sampling plan is proposed to further determine the extent (if any) of release of contamination to the surrounding environment. Included are health, safety, quality assurance (QA), and quality control (QC) procedures to be followed when implementing the sampling plan. Procedures for managing and displaying data collected from the RFI are summarized.

2. OBJECTIVES OF RCRA FACILITY INVESTIGATION PLANNING

2.1 OBJECTIVES

This RFI Plan will identify actions necessary to determine the nature and extent (if any) of releases of hazardous and/or radioactive contamination from the K-1413 WAG. The plan summarizes existing site information and addresses the potential for contamination of soil, groundwater, surface water, and air.

2.2 EVALUATION CRITERIA

In order to prepare and implement a comprehensive sampling plan and to effectively evaluate analytical sampling results, evaluation criteria must first be established. Criteria for evaluating the extent of contaminant release are based on existing state and federal regulatory guidance and best technical judgment.

The primary media of interest for the K-1413 WAG are groundwater, soil, and surface water. The sampling methodology and analytical procedures are designed to characterize the contaminants of interest at or below the levels summarized in Table 2.2 of K/HS-132.

2.3 SCHEDULE FOR SPECIFIC RFI ACTIVITIES

A list of the sampling and analysis activities that will be performed for the K-1413 RFI and the duration of each activity is shown in Table 2.1.

Table 2.1. Duration of RFI activities for the K-1413 WAG

Activities		Duration
1.	Leak tests of pits and associated process lines	8 weeks
2.	Segmental leak tests of process lines (if needed)	12 weeks
3.	Camera inspection of storm sewer lines using a closed-circuit television system	16 weeks
4.	Collection of groundwater samples	52 weeks
5.	Analysis of groundwater samples	66 weeks
6.	Compilation of data and data presentation	8 weeks
7.	Evaluation of results and recommendations	2 weeks
8.	Preparation of RFI report and submittal to EPA	8 weeks
9.	Soil sampling (if needed)	TBD
10.	Additional sampling phases (if needed)	TBD

2.4 FEASIBLE ALTERNATIVES

Knowledge of feasible corrective measures has been used in preparing this RFI plan. Based on existing geologic, hydrologic, and contaminant source data, potential corrective measures for the K-1413 WAG have been identified and are shown in Table 2.2. These corrective measures will be reevaluated after the RFI report is completed.

2.5 RISK ASSESSMENT

The environmental and public health risks associated with possible site contamination and each of the remedial action alternatives listed in Table 2.2 will be evaluated. This evaluation will consist of a characterization of the contaminant source, the magnitude of release, the environmental setting, the pathways to human exposures, and a characterization of risks. Risk assessment began early in the RFI process and is useful for determining data requirements and site sampling plans.

Table 2.2 Potential corrective measures for the K-1413 WAG

General Response Action	Technologies
Monitoring	Surveillance monitoring and analysis
Removal of source	Excavate contaminated soil; treat or dispose of excavated material at an approved landfill or place in long term storage
Containment from surface water	Fill and cap pits and cap process lines - synthetic membrane, clay, asphalt, multimedia cap, concrete, or chemical sealants and stabilizers
Containment from groundwater	Utilize groundwater diversion pumps-well points, deep wells, suction wells, ejector wells
Treatment of groundwater	Collect the groundwater and transport to a wastewater treatment plant
In-situ treatment	Grout injection

3. DESCRIPTION OF CURRENT CONDITIONS

3.1 GEOGRAPHICAL INFORMATION

The K-1413 WAG is located due east of the K-25 building (Figure 3.1). The WAG includes the K-1413-C Neutralization Pit (Figure 3.2) to the south of Building K-1413, two smaller pits located to the north and east of Building K-1413, the lines from the pits to the K-1401 Acid Line via a pumping station, the process lines within the K-1413 building (Figures 3.3 and 3.4), and the storm drain lines in the vicinity of the K-1413 building (see Figure 5.2).

The south pit is open and has a capacity of approximately 21,000 gallons. This pit is equipped with an agitator and a sump pump and has a bin on top for the addition of lime. The two smaller pits are 4'x 4'x 4' in size and hold approximately 2,500 gallons each. They are connected to the K-1413 building and the pumping station by process drains (Figure 3.4). The north pit is equipped with a pump which allows circulation from the north pit to the south pit when a valve between the north pit and the pumping station is closed.

3.2 HISTORICAL INFORMATION

The K-1413 site was built and put into operation as a research and development facility in the early 1950s. Originally the K-1413 site consisted of only the K-1413 building and the east pit. In the late 1960s an annex was added to the K-1413 building and the north pit was constructed. In 1974-1975 the south pit was constructed to isolate the treatment and disposal of classified waste. A pumping station, located just north of the K-1413 building, was also built at this time, and

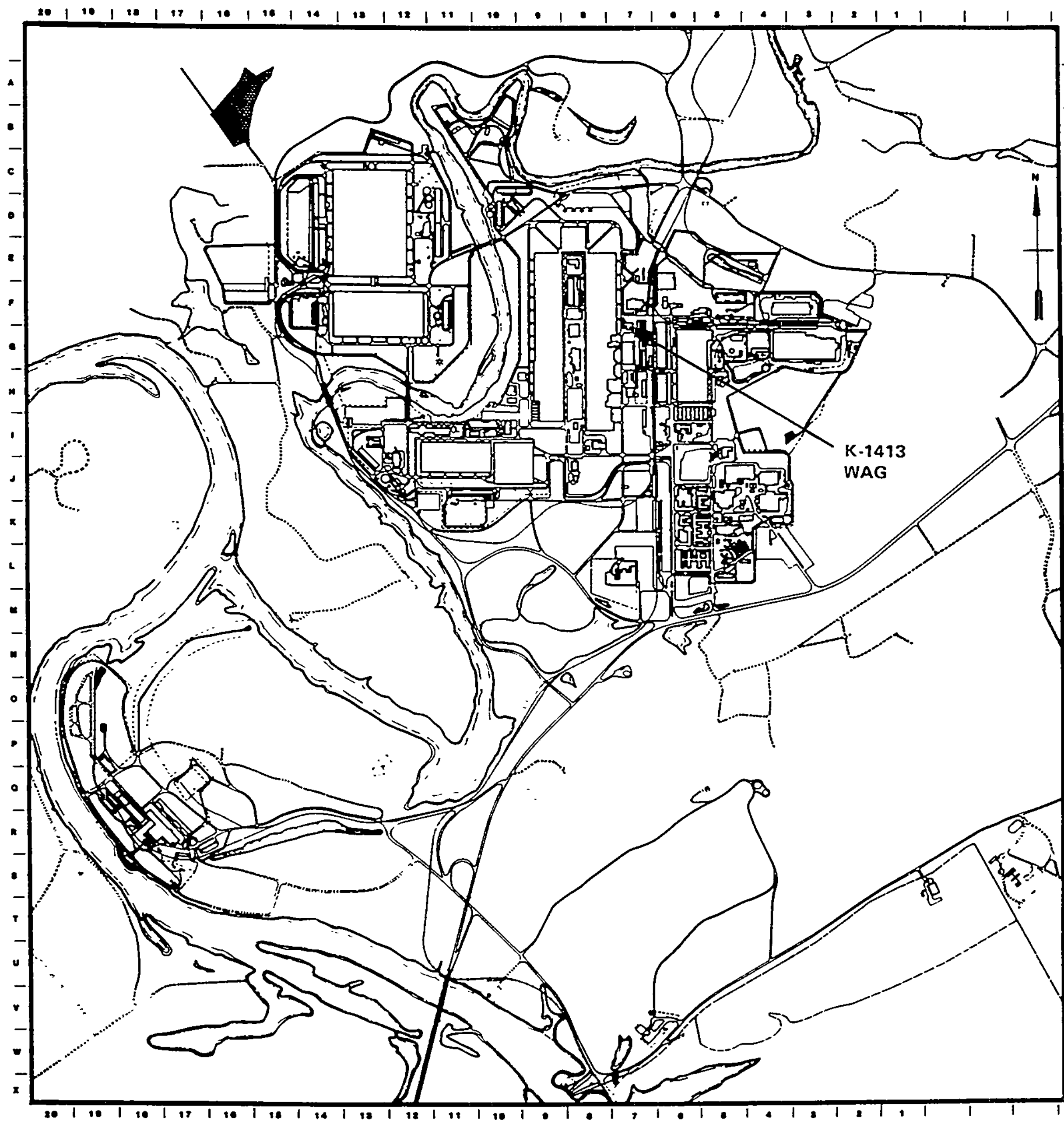

Fig. 3.1. ORGDP Location map of the K-1413 Waste Area Grouping
(The final figure will show the location of Poplar Creek and the K-25 building.)

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(U)

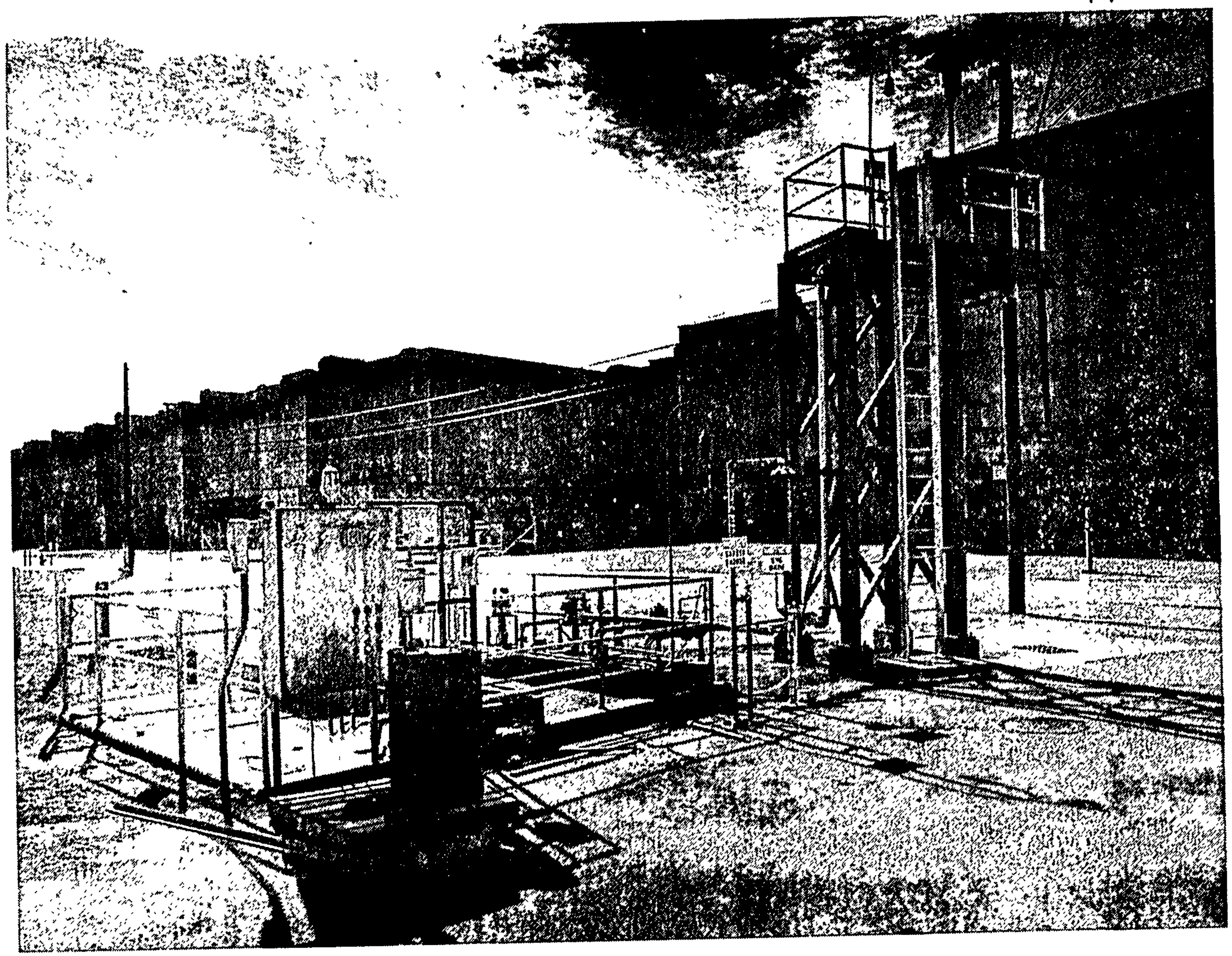

Fig. 3.2. K-1413-C Neutralization Pit

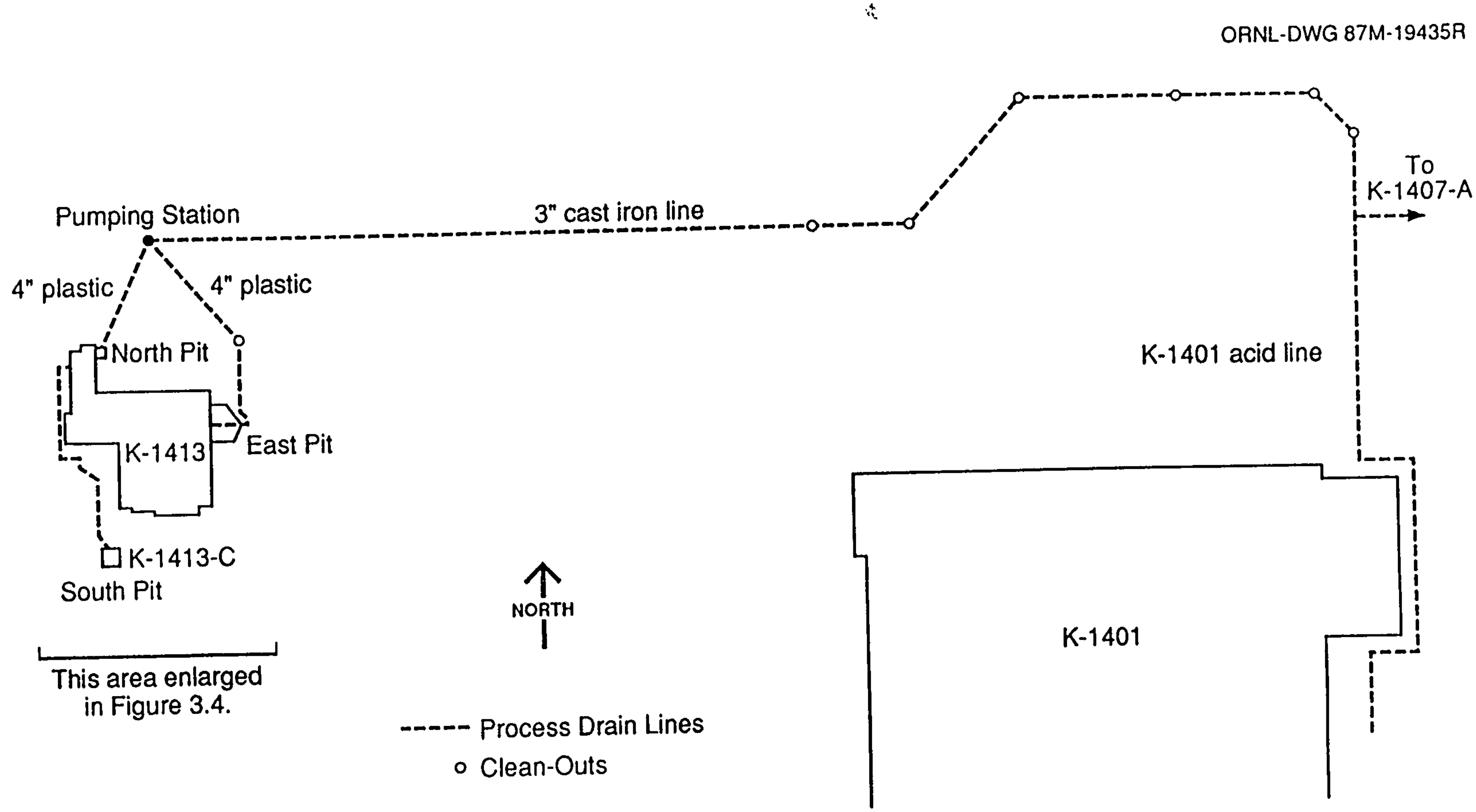

Fig. 3.3. The K-1413 Waste Area Grouping: Location of the pits and the process lines outside of the K-1413 building.

ORNL-DWG 87M-19434

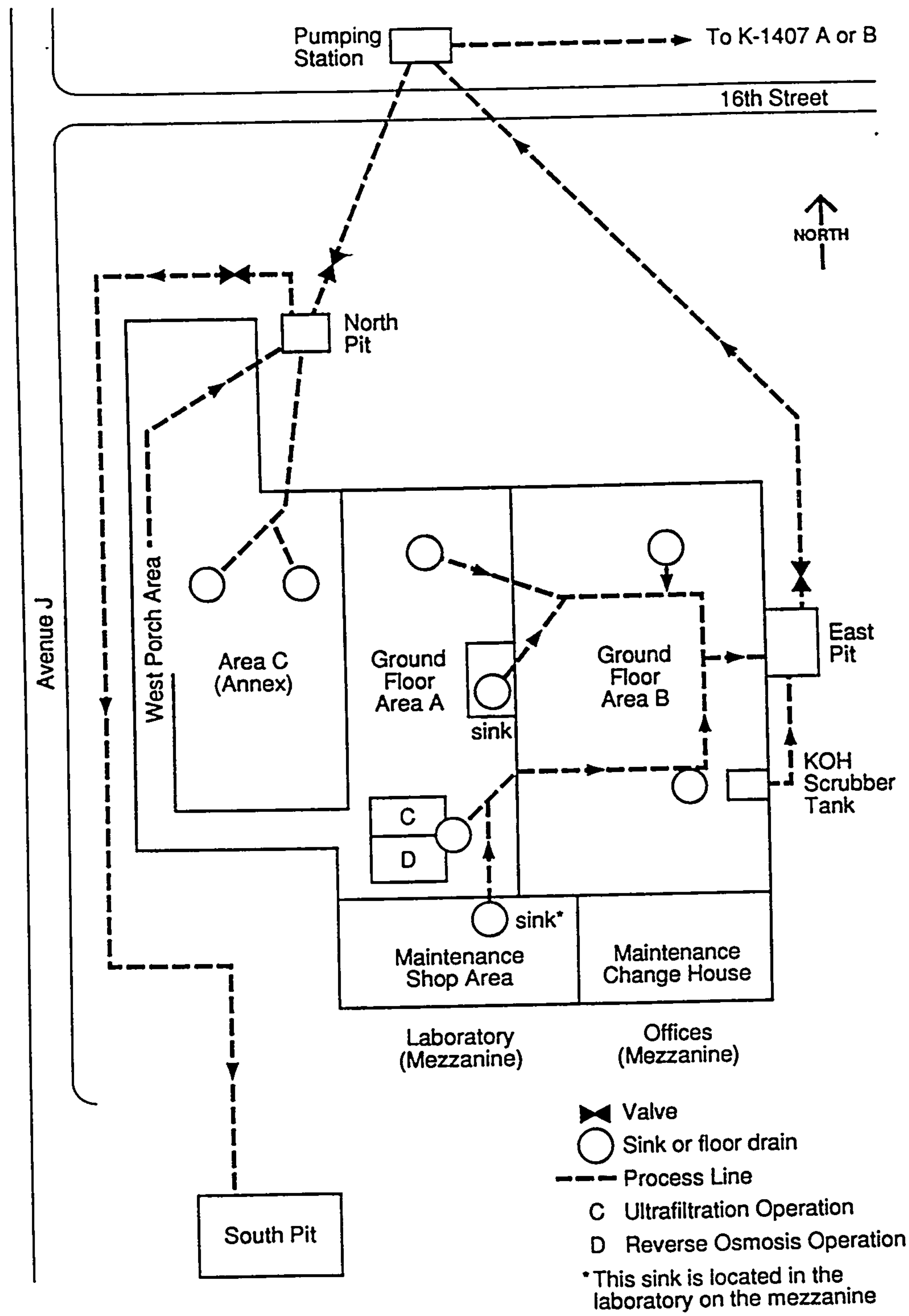

Fig. 3.4. K-1413 Facility
(schematic only — not to scale)

process drains connected this station to the north pit, the east pit, and to the K-1407-A/B neutralization and holding pond facility. The south pit was not connected to the K-1413 building; however, a process drain allowed the transfer of waste streams from the north pit to the south pit when a valve between the north pit and the pumping station was closed. This transfer was driven by a pump located at the north pit. The wastes were then pumped from the south pit into a tanker truck and transported to the K-1407-C disposal pond. Prior to 1974-1975 the waste streams from the north and east pits discharged by gravity flow into the storm sewer systems which are located on the east and west sides of the K-1413 building (see Figure 5.2).

The K-1413 facility was turned over to the K-25 Operations Divisions in 1981-1982. At this time, the north pit pump was deactivated, and the process drain between the north pit and the south pit was cut and capped. The south pit is, therefore, a closed system with waste solutions brought in by tanker trucks. The east pit remains in use.

3.3 OPERATIONAL INFORMATION

A variety of activities have been carried out in the K-1413 building since the facility was put into operation in the 1950s. An early K-1413 development project involved the fluorination of uranium metal chips to UF_6. The chips were immersed in perchloroethylene and shipped to the K-1413 facility in 55-gallon drums. Interviews revealed that spills of perchloroethylene occurred at the facility and UF_6 was accidently lost to the stack in at least one incident. Due to the dispersion of UF_6 away from the building and the rapid conversion of UF_6 to UO_2F_2, any uranium released during the incident would not have remained at significant levels within the K-1413 WAG area.

Wastes from the annex were discharged into the storm drains or later pumped to K-1407-A or K-1407-B from the north pit. This practice was discontinued and wastes were then transferred from the north pit to the south pit, pumped from the south pit into a tanker truck, and transported to the K-1407-C disposal pond in order to isolate the treatment and disposal of classified waste.

The fluoride volatility development program used depleted and slightly enriched uranium oxide in zirconium-clad fuel elements. The process included removal of the zirconium-clad material in a fluidized bed using hydrogen chloride. Other steps in this program included conversion of UO_3 to U_3O_8 using an oxygen/nitrogen mixture and fluorination of U_3O_8 to UF_6 using elemental fluorine. The UF_6 was cold-trapped and off gases produced in the various processes were passed through a filter and then scrubbed with sodium or potassium hydroxide solutions which would have been discharged to the east pit when spent.

Other development projects included:

- investigation of compressors for pumping fluorine and uranium hexafluoride
- reduction of UO_3 to UO_2 using hydrogen and vibrating trays
- conversion of UO_2 to UF_4 using HF
- tower fluorination of UO_2 or UF_4 to UF_6
- calcination of uranyl nitrate to U_3O_8
- hydration of normal assay UO_3 with solutions of NH_4OH for specific crystal formation
- separation of boron isotopes by extraction using anisole (an ether)
- trapping of fission products such as antimony, tantalum,

titanium, and ruthenium from UF_6 reactor returns (Hanford recovered spent fuels).

Chemicals used in other programs include sulfuric and hydrochloric acids, organic acids, nickel compounds, and sodium and calcium hydroxide. The K-1413 facility was also used as a pilot plant to demonstrate the separation technology of radioactive noble gases (e.g., krypton and xenon).

These development operations would have resulted in the discharge of sulfuric, hydrofluoric, nitric, and hydrochloric acids, and sodium and calcium hydroxides. Organic acids and other organics such as diethylene glycol and dibutyl ether, and metal fluorides including sodium, chromium, nickel, uranium and copper would also have been included in the waste stream. The major sources of these wastes were the laboratory on the mezzanine and the sink on the main floor in Area A, which drained to the east pit (see Figure 3.4). The cleaning of containers of tungsten and rhenium hexafluoride would have resulted in waste solutions (oxyfluorides, etc.) of these materials in the K-1413 laboratory.

In addition to the waste generated at the K-1413 building, the K-1413 neutralization pits were also used to treat classified waste streams from the K-1231 and K-1232 facilities. Wastewater transported by tankers from the Y-12 Plant has also been treated at the south pit during the operations history of the K-1413 facility. Records indicate that one shipment of Y-12 wastewater was treated at the south pit. Among other contaminants the wastewater contained 2.7 mg/l of mercury. Sodium sulfide was used at the south pit in the treatment of the wastewater, and the waste was transferred to the K-1232 facility for further treatment. Because follow-up samples of rainwater which collected in the south pit contained traces of mercury, the rainwater was collected and transferred to the K-1232 facility for treatment. Further follow-up samples showed no mercury contamination.

The east and north pits at the K-1413 site were originally separated into two halves by 4" thick baffles which came within 4"-6" of the bottom of the pits. Both halves of the pits were then filled with limestone gravel. The waste stream entered near the top of the pit and was forced by the baffle to percolate down through one half and back up the other half of the pit before it was discharged. Wastes generated in the laboratory on the mezzanine and in the ground floor areas A and B of the K-1413 building were treated in the east pit and wastes generated in area C were treated in the north pit, using this limestone neutralization process. The limestone was removed from the pits when the pumping station was installed.

Since 1973-1975, the east pit has received waste from a 20% KOH scrubber (see Figure 3.4). The wastes are transferred to the pit when the solution is depleted to 10% KOH. The waste solution includes hydroxides of tungsten, rhenium, and uranium as well as a high fluoride ion content. Presently, the north pit discharges rainwater which collects in a graded trenchway in the west porch area (see Figure 3.4). The north pit is not presently used for the treatment of waste because wet chemical operations are no longer conducted in the K-1413 building. The south pit is now considered a closed system and no longer provides pH adjustment for acidic waste.

4. CHARACTERIZATION OF THE CONTAMINANT SOURCE

The chemicals utilized in the various activities discussed in Section 3 are summarized below. Because records of all the chemicals used in this facility are not available, this is a partial list of possible contaminants. Records of the quantities and concentrations of the chemicals listed below are also not available.

- Uranium tetrafluoride
- Uranium oxide
- Antimony
- Titanium
- Fluorine
- NH_4OH
- Nickel
- Diethylene glycol
- Sulfuric, Hydrochloric, Nitric, and Organic Acids
- Tungsten, Rhenium, Uranium, Sodium, Calcium, and Potassium hydroxides
- Mercury
- Uranium hexafluoride
- Perchloroethylene
- Tantalum
- Zirconium
- Uranyl nitrate
- Anisole
- Ruthenium
- Dibutyl ether
- Nickel, Copper, Chromium, Hydrogen and Sodium fluorides
- Hydrogen chloride
- Tungsten and Rhenium hexafluorides

5. CHARACTERIZATION OF THE ENVIRONMENTAL SETTING

5.1 HYDROGEOLOGY

The lithologic log from bedrock well BRW-15 indicates that the K-1413 WAG is underlain by shale and limestone of the Chickamauga Group (Phase II-Detection Monitoring, ORGDP, Appendix D, Well Construction Diagram BRW-15, Geraghty and Miller, 1987). Figure 5.1 shows the locations of wells in the vicinity of the K-1413 WAG and Appendix A contains the currently available lithologic logs. The geologic structural setting is uncertain as this area is almost entirely covered by man-made structures and pavement, and bedrock may not be observed except by drilling or other indirect means. Faults are known to exist in the general area and it is presumed that the bedrock has been deformed, fractured, and jointed according to the proximity and intensity of the faulting activity.

Groundwater flow within the Chickamauga will occur primarily in the limestone units along joints, fractures, and bedding planes which have been solutionally enlarged. Limited flow may occur in the shales through "tight" fractures and joints, but the shales tend to inhibit flow across bedding planes and rather direct it parallel to strike within the carbonate layers. Permeability test data are not available for BRW-15; however, testing of other area wells in the Chickamauga limestone indicate the hydraulic conductivity to be on the order of 10^{-3} cm/sec.

The unconsolidated mantle at the K-1413 WAG consists of some relatively thin clay/gravel fill which overlies a moderately thick (25' to 55') soil zone. According to drill-hole logs, the upper 10 to 15 feet of this soil zone appears to be alluvium comprised of mostly clay with some sand and rock fragments. The lower soil horizon is yellow-brown to brown,

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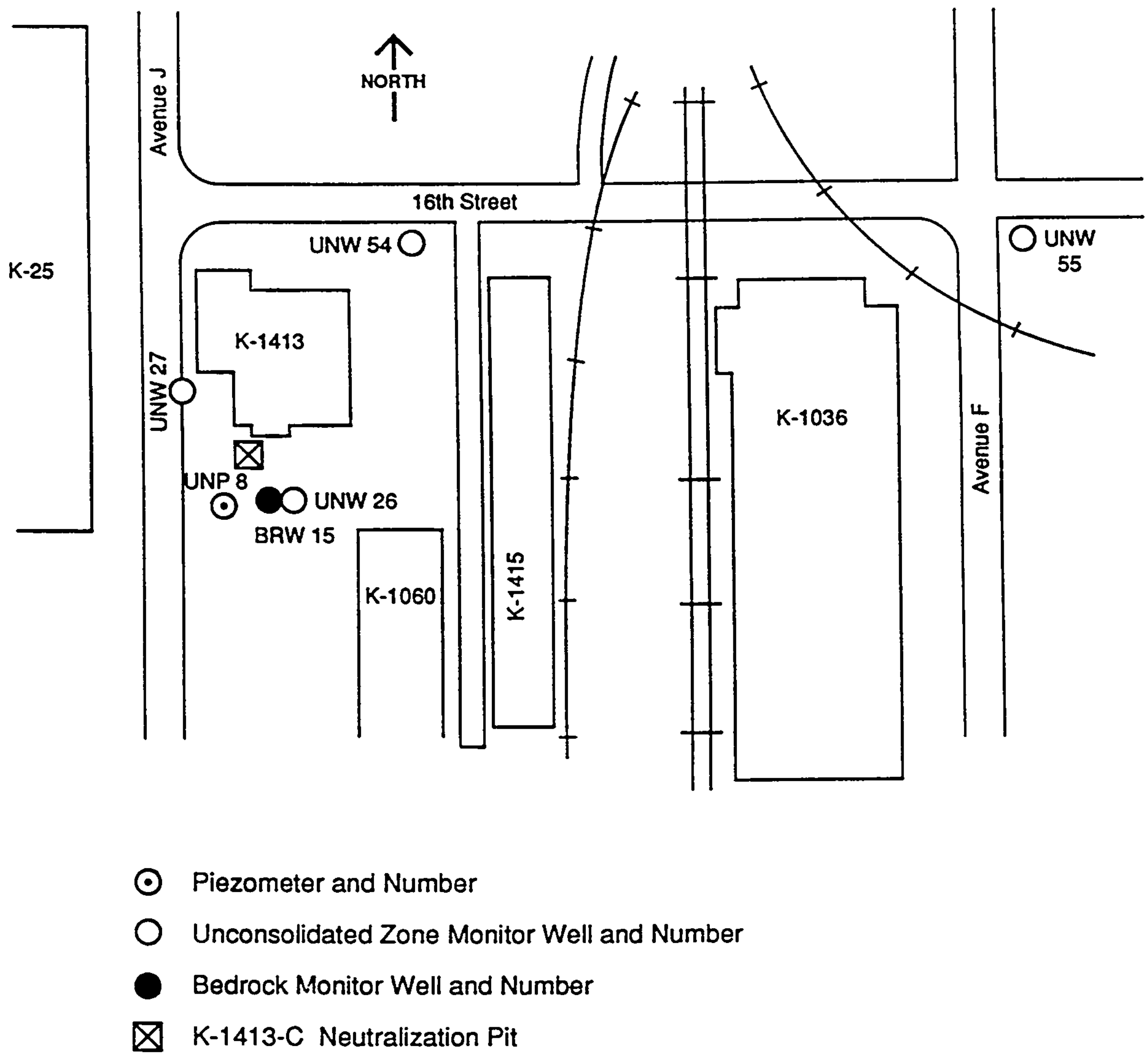

Fig. 5.1. K-1413 WAG Vicinity Map with Well Locations

silty, residual clay. Permeability testing of well UNP-8 indicates a hydraulic conductivity of approximately 8.5 x 10^{-5} cm/sec for the soil aquifer. In addition to UNP-8, five other wells, UNW-26, -27, -54, and-55, (see Figure 5.1), have been installed in the unconsolidated aquifer; however, permeability data from these wells are not yet available.

The water table in the K-1413 area, as measured on March 30, 1987, is approximately 15 to 17 feet below ground surface. Wells BRW-15 and UNW-26 are immediately adjacent to each other, and their water levels of 768.6 feet and 766.1 feet (MSL datum) respectively, indicate aquifer interflow with the bedrock aquifer apparently leaking upward into the soil aquifer at this location. Currently available data are insufficient to precisely determine the flow direction within either aquifer; although, the hydraulic gradient in the unconsolidated zone is presumed to be northward. The bedrock flow path cannot presently be estimated. Information from recently installed wells is forthcoming.

5.2 SURFACE WATER

The topography of the site has been extensively affected by construction and road-building activities. Much of the site is overlain by buildings, concrete, or asphalt. The flow of surface water is controlled by these man-made structures and surfaces. Surface water at the site is collected in storm drains and is then routed via the storm sewer system to the K-1700 stream (Figure 5.2). An effort is underway to characterize the quality and quantity of the stormwater discharging from ORGDP storm drains. The first in a series of reports on this effort has recently been published (ORGDP Storm Drain Characterization, W.J. Scheib, K/HS-128, Part 2) and data from the storm drains in the vicinity of the

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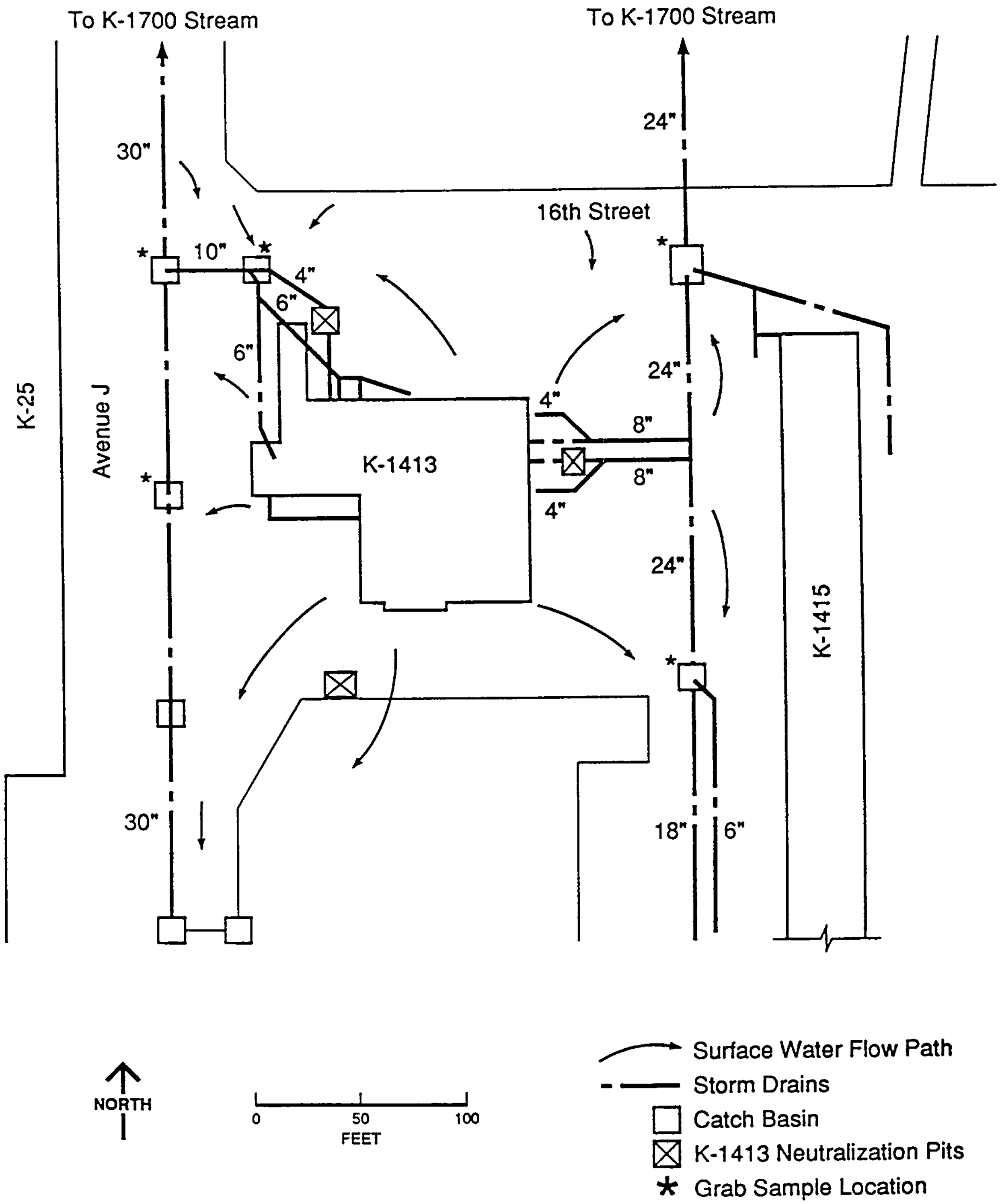


Fig. 5.2. K-1413 WAG Vicinity Map showing storm drain locations and surface water flow paths

K-1413 WAG are presented in Appendix B.

The K-1413 WAG is above the 100-year flood level as indicated in Figure 3.5 of K/HS-132.

5.3 AIR

No site-specific air quality or meterological data are available for this SWMU. However, Martin Marietta Energy Systems, Inc. has an ongoing study of the air quality and meteorological conditions of the ORGDP as a whole, and this study should be representative of the conditions at this SWMU. These general ORGDP data are available in K/HS-132.

6. IDENTIFICATION OF POTENTIAL PATHWAYS AND RECEPTORS

Assessments of inactive hazardous waste disposal or storage sites are required to evaluate the sites' potential for health or safety risks to the environment, public, or personnel. Determination of such risks must be based on evaluations of both the potential pathways of contaminant migration from toxic releases and the possible receptors of contamination. Information used in the evaluations of the pathways which might release contaminants from the K-1413 WAG is based on interviews with persons having knowledge of the operations carried on at the site. K/HS-132 will serve as a general reference concerning the potential pathways and receptors of the ORGDP.

Due to the location of the pits and lines and the nature of the solutions discharged, air and vegetation will not be evaluated as potential pathways of contamination. Any UF_6 lost via the stack during the early history of the K-1413 site would have been converted rapidly to UO_2F_2; therefore, it is unlikely that released uranium would have remained within the K-1413 WAG at detectable levels.

6.1 POTENTIAL PATHWAYS OF MIGRATION

6.1.1 Groundwater

The possibility of pit or pipe leakage from the components of the K-1413 WAG indicates some potential for groundwater contamination. Hydrogeological studies (Hydrogeology of the Oak Ridge Gaseous Diffusion Plant Site, K/SUB/85-22224/1, July 1986) of areas near the K-1413 facility indicate that the groundwater flows to the north and discharges to the K-1700 stream. There are four groundwater monitoring wells around the

K-1413 facility; however, site-specific hydrogeological data are presently unavailable. Permeability measurements taken in the bedrock near the K-1413 site were found to be normal for the Chickamauga Formation. One quarter of groundwater analysis data has been gathered under the ORGDP Groundwater Protection Program from BRW-15 and UNW-26; these data are presented in Appendix C. Assessment of the nature and extent of possible groundwater contamination will continue to be carried out under the ORGDP Groundwater Protection Program.

6.1.2 Soil

The practice of discharging wastes into the storm drain system during much of the history of this facility, and the possibility of leakage from these storm drains present the potential for soil contamination. In general, the soils at the ORGDP have low permeabilities (on the order of 10^{-5} to 10^{-4} cm/sec) and relatively high capacities for the exchange of metals and the filtering of particulates. This combination increases the possibility that soil contamination due to leakage would still be present. The storm sewer lines will be inspected for defects using a closed-circuit television system. The area surrounding any defect will become part of the Phase II soil sampling investigation.

6.1.3 Surface Water

Residual contamination in the storm sewer lines may be contaminating surface water flow in the storm sewer system. Grab samples will be taken from the catch basins in the vicinity of the K-1413 WAG (Figure 5.2), following two discrete storm events. The samples will be analyzed to assess the nature and extent of possible surface water contamination.

6.2 POTENTIAL RECEPTORS

6.2.1 Human Populations

The security controls required by the Department of Energy for entrance to the ORGDP prevent public access to the K-1413 WAG. Thus, the only public populations of interest are those which might come into contact with one of the exposure pathways beyond the boundaries of the site itself (i.e., through access to groundwater).

Of the 25 potable water wells within one mile of the ORGDP, none of the wells are in proximity to the K-1413 WAG, and none are believed to occupy the same hydrogeological environment as the groundwater at the site. Further, of the 10 public water supplies which withdraw from the Clinch-Tennessee River system (into which waters from the K-1700 stream eventually feed), none of these are nearer than 15 miles to the Oak Ridge Reservation making direct contamination from the K-1413 site unlikely. While the flow of site groundwater does represent the potential for contaminant migration, distance and dilution effects make pollution of public water supplies a low probability. Finally, the effects of distance and dilution also make unlikely the possibility that contamination of groundwater would reach the waters downstream in the Clinch-Tennessee River system for recreational and industrial use.

6.2.2 Terrestrial Fauna and Flora

K/HS-132 discusses the rare, threatened, and endangered plant and animal species which are thought to inhabit the area. To date, there has been no report that any of these species exist on the K-1413 site or are directly threatened by any possible contamination present there. Possible contaminant releases from the K-1413 site are not expected to affect the local flora and fauna.

6.3 SUMMARY AND CONCLUSIONS

The nature of the wastes treated at and discharged through the K-1413 neutralization pits, process lines, and storm drains indicates potential for contamination of the groundwater, surface water, and soil. Evaluation of the potential pathways of migration and possible receptors shows sufficient potential for environmental contamination and warrants an investigation of this site.

7. EXISTING MONITORING DATA

Storm drain data applicable to the K-1413 WAG vicinity are presented in Appendix B. Data from one quarter of groundwater monitoring under the ORGDP Groundwater Protection Program are presented in Appendix C.

8. SAMPLING PLAN

8.1 SAMPLING AND ANALYTICAL STRATEGY

The types of waste treated at the K-1413 facility and discharged into the process lines and storm drains have been covered in Sections 3 and 4. Programs are presently underway at the ORGDP to evaluate both the groundwater (ORGDP Groundwater Protection Program) and surface water runoff (ORGDP Storm Drain Characterization, W. J. Scheib, K/HS-128, Part 2) and these data will be evaluated in conjunction with this RFI. The nature of the K-1413 facility would require a prohibitive number of soil corings to be taken in order to ensure a high probability of detecting soil contamination resulting from component leaks. Thus, direct sampling and chemical analysis of soil samples will not be initially performed. Instead, a phased approach aimed at locating and characterizing distinct areas of soil contamination will be utilized.

8.2 SET-UP FOR SAMPLING

8.2.1 Phase I Investigations

A major portion of Phase I will consist of leak testing the various components of the K-1413 WAG in order to evaluate their integrity. The north, south, and east pits will be leak tested. The pits will be filled with water and the leakage rate measured over a 24-hour period. The leakage rate will be adjusted for evaporation and precipitation. If the pit(s) are found to leak, they will become part of the Phase II soil sampling investigation.

The process drain lines from the K-1413 building to the K-1401 process line will also be leak tested. The following sections shall be independently leak tested:

- the 4" drain lines from the K-1413 building to the north and east pits
- the drain line between the north and south pits
- the 4" plastic drain lines from the north and east pits to the manhole north of K-1413 (see Figure 5.2)
- the 3" cast-iron line from the manhole north of K-1413 to the manhole at the K-1401 process line.

Drain lines will be hydrostatically gravity tested. The lower end of each section will be plugged, and each section of pipe will be filled with water. A minimum 10-foot head of water on the invert of the pipe at the lower end is required. Measurement of the leakage rate will begin no sooner than 15 minutes after the pipe is completely filled with water. The maximum allowable leakage rate for each section of pipe is 0.1 gallon/hour.

The 3" cast-iron line will be hydrostatically pressure tested. The lower end of the line will be plugged, and the line will be filled with water. A standpipe will be attached on the upper end of the line and plugged. The line will be pressurized to 1.5 times the maximum operating pressure but not less that 50 psig. To pass the leak test, the line must maintain the initial pressure for a minimum of two hours. If the 3" cast-iron line between the pumping station and the K-1401 Acid Line is found to leak, sectional leak testing of the lines will be performed using the cleanouts located along the process line as sectional boundaries. The method involves plugging the pipe between cleanouts and hydrostatically testing the isolated section. A butterfly valve will be used as a stoppling tool to obtain the required isolation. Any area surrounding detected leaks will become part of the statistical set up for soil sampling in Phase II.

The results of each leak test will be recorded on a leak test form that includes the following information:

- the date of the leak test
- the location and identification of the pipeline
- the pipe size, type, and overall length of the section tested
- a description of the leak test and the leak test rate
- a description of any unusual occurrences and/or problems encountered.

The following storm sewer lines will be inspected using optical techniques (camera and mirror) to locate defects in the lines from which contaminants might have escaped:

- the storm drain lines from the north pit downgradient to the K-1700 stream
- the storm drain lines from the east pit downgradient to the K-1700 stream (see Figure 5.2).

Television inspection will be accomplished by using closed-circuit systems specifically designed for sewer inspection. The operator shall be able to remotely control the speed and travel of the camera while viewing the inspection on a television. For each sewer line inspected, records will be collected on an inspection form and on video tape.

The inspection form will contain the following data for each manhole to manhole section that is inspected:

- the date of the inspection
- the location of the pipeline and upstream and downstream manholes
- the compass direction of the viewing and the direction of the

camera's travel

- the pipe size, type, pipe joint length, and overall footage of the inspected sewer
- the occurrence and location of infiltration and exfiltration
- a description of defects observed (e.g., open joint, cracks, exposed soil) and their distance from the point at which the viewing began
- reference should be made to the videotape of the entire inspection.

The date and location of each pipeline inspected will be recorded on the video tape. Sewer lines too small for camera inspection will be inspected with portable mirrors. As with the process lines, any area surrounding a break in the storm sewer line will become part of the statistical set up for sampling in Phase II.

Surface water samples will be taken from the catch basins shown on Figure 5.2 following two discrete storm events. These samples will be analyzed to evaluate the storm sewer lines as pathways of contaminant migration.

8.2.2 <u>Phase II Investigation</u>

Phase II of this investigation will involve sampling and analyzing the soil surrounding the WAG components which were found to be defective in Phase I. An appropriate sampling plan will be statistically determined for areas surrounding the defects.

8.3 FIELD SAMPLING

The nature and the extent of the soil sampling required to characterize the K-1413 site will be determined after evaluation of the data obtained in Phase I. After the completion of Phase I, a supplement to this investigation plan will be issued detailing the results of the Phase I testing as well as the proposed soil sampling plan for Phase II if needed.

8.4 ANALYTICAL PROTOCOL

8.4.1 Phase I Investigation

Surface water samples will be analyzed for the regulated inorganic elements outlined in Table 7.4 of K/HS-132 and for the volatile and semi-volatile organic compounds listed in Table 7.6 of the same document.

Groundwater samples will be analyzed according to the protocol of the ORGDP Groundwater Protection Program.

8.4.2 Phase II Investigation

If line or pit defects are detected in Phase I, analysis for the following analytes should be performed on soil samples collected as part of the Phase II investigation:

- inorganic elements (Table 7.4, K/HS-132)
- volatile organics (Table 7.6, K/HS-132)
- semi-volatile organics (Table 7.6, K/HS-132)
- gross alpha, beta, and gamma.

8.5 SAMPLE ANALYSIS

Surface water and groundwater analysis will follow the standard EPA protocol as outlined in Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020).

The QA/AC requirements outlined in Section 7.3 of K/HS-132 will be adhered to for all analyses.

9. DATA MANAGEMENT PROCEDURES

In order to best illustrate any patterns in the data, the results of the chemical analyses of samples from the potential release areas will be presented in a clear and logical format. Tables, graphs, and other visual displays such as maps and contour plots (described in Table 8.1 of K/HS-132) will be used to present the data.

Statistical analyses will provide for treatment of duplicate laboratory analyses, results which are reported as less than detection limit, and for examination for statistical outliers. Where possible, values which are recorded as less than detection limits will be handled according to RCRA Ground-Water Monitoring Enforcement Guidance Document (OSWER-9950.1, September 1986) which directs calculation through the use of Cohen's statistical methodology. This is found in "Tables for Maximum Likelihood Estimates from Single Truncated and Singly Censored Samples" (Technometrics, 3: 535-541, 1961). Otherwise, the detection limit will be used in the statistical analyses.

For groundwater samples, average contaminant values will be compared to each other and to available limits using statistical t-tests.

10. HEALTH AND SAFETY PROCEDURES

10.1 INTRODUCTION

Special requirements and procedures to protect the health and safety of the investigating team, ORGDP site personnel, and the general public during the K-1413 WAG RFI are addressed in this section.

K/HS-132 details the health, safety, environmental, security, plant protection, and emergency response organizations which are in place at the ORGDP. These organizations provide the support to the ORGDP line organizations to meet the requirements for health and safety during the RFIs. They provide the communication, response, and reporting for any plant emergency; on-site medical facilities with medical surveillance, treatment, monitoring, and periodic physical examinations; health physics and industrial hygiene surveillance hazard evaluation and control; operational safety accident prevention and control; plant security and visitor control.

In addition, K/HS-132 identifies the organizational responsibilities for health and safety at the SWMUs during the RFIs. The document includes the methodology for establishing the work zones of each SWMU, the level of protection required in the exclusion zone, decontamination procedures, personnel exposure limits, monitoring requirements, and respiratory protection requirements.

10.2 KNOWN HAZARDS AND RISKS

Substances of safety and health concern in the K-1413 Waste Area Grouping are listed below.

Substance of Safety and Health Concern

Waste Solvents and Degreasing Agents	x	Sludge	
Radioactive Wastes	x	Corrosive Liquids	x
Treated Industrial Waste	x	Plating Wastes	
Liquid Waste/Free Product Potential	x	Metal Wastes	
Asbestos		Cleaning Solutions	x
PCB		Paint Wastes	
Mercury		Nonhazardous Wastes	

The plan for the K-1413 WAG SWMU is based upon requirements described in the draft document, RCRA Facility Investigation Guidance (Vol. I, Sect. 6, October 1986).

10.3 LEVEL OF PROTECTION

The level of personnel protection and monitoring for Phase I activities is designated below.

Level of Designation		Monitoring Parameters	
A		Airborne Pollutants	
B		Explosion Potential	
C		Radiation	
D	X		

10.4 EXPOSURE LIMITS

The personnel protection recommended for work activity in the exclusion zone of the K-1413 WAG SWMU is Level D. No monitoring will be performed during Phase I.

APPENDIX A

GERAGHTY & MILLER, INC.
Ground-Water Consultants

LITHOLOGIC LOG

BORING NO.	UNP-8
PROJECT	Hydrogeologic Site Characterization, K-25 Plant

…CATION	COORDINATES	SURFACE ELEVATION	TOTAL DEPTH
..-1413	S25103.43 Plant Grid E 360.93	780.58 feet msl	39 feet
GEOLOGIST	**SAMPLE INTERVAL**	**SAMPLE TYPE**	**DATE COMPLETED**
D. Hubert	Continuous	Split Spoon	11/27/85
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
J. Cason	Alsay, Inc.	Hollow-Stem Auger	Diedrich D-50
PURPOSE OF BORING	**GEOPHYSICAL CONTRACTOR**	**GEOPHYSICAL LOGS**	
Piezometer	None	None	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0		CLAY: Orange and brown, low plasticity, contains some rock fragments.	
10			
30		SHALE: Maroon and yellow, weathered.	Wet from 29.5' to 30'.
40			Auger refusal at 39'.
50			
60			
70			

SHEET 1 OF 1

GERAGHTY & MILLER, INC. Ground-Water Consultants

LITHOLOGIC LOG

BORING NO. UNW-26			
PROJECT Phase II Monitor-Well Installation, K-25 Plant			
LOCATION K-1413	COORDINATES (PLANT GRID) S25,093.91 W 326.28	SURFACE ELEVATION 781.40 ft msl	TOTAL DEPTH 25.5 ft
GEOLOGIST J.Walker	SAMPLE INTERVAL 5 ft	SAMPLE TYPE Cuttings	DATE COMPLETED 01-09-87
DRILLER R. Lenning	DRILLING CONTRACTOR Middle Georgia	DRILLING METHOD Hollow-stem Auger	RIG TYPE Mobile B-53
PURPOSE OF BORING Monitor Well	GEOPHYSICAL CONTRACTOR None	GEOPHYSICAL LOGS None	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0		FILL (100%), clay with gravel.	
		CLAY (80%), soft, moist, plastic, reddish-orange to brown; Sand (10%), fine; Limestone Fragments (10%), micritic, gray.	
10			
		15'-25.5' Clay is brown with silt (10%).	
20			Clay is moist at 20 ft
			Refusal at 25.5 ft
30			
40			
50			
60			
70			

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
Ground-Water Consultants

LITHOLOGIC LOG

BORING NO.	UNW-27
PROJECT	Phase II Monitor-Well Installation, K-25 Plant
LOCATION	K-1413
COORDINATES (PLANT GRID)	S25,012.29 W 411.77
SURFACE ELEVATION	780.00 ft msl
TOTAL DEPTH	55.0 ft
GEOLOGIST	A.Motley
SAMPLE INTERVAL	5 ft
SAMPLE TYPE	Cuttings
DATE COMPLETED	01-09-87
DRILLER	R. Lenning
DRILLING CONTRACTOR	Middle Georgia
DRILLING METHOD	Hollow-stem Auger
RIG TYPE	Mobile B-53
PURPOSE OF BORING	Monitor Well
GEOPHYSICAL CONTRACTOR	None
GEOPHYSICAL LOGS	None

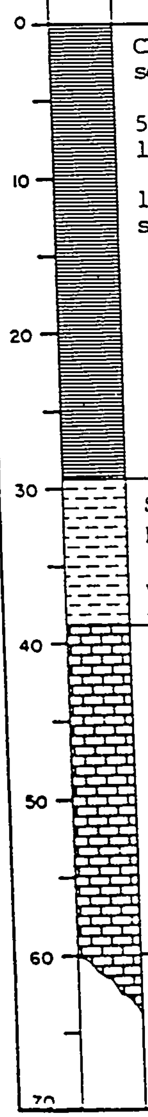
DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0		FILL (100%), dark brown soil and gravel.	
		CLAY (90%), moderately plastic, brown to orange-brown; Sand (10%) angular, brown.	
10			
		15'-55' Clay is yellowish-brown with silt (5%).	
20			
30			Hit water at 35 ft
40			
50			Refusal at 55 ft
60			
70			

SHEET 1 OF 1

GERAGHTY & MILLER, INC.
Ground-Water Consultants

LITHOLOGIC LOG

BORING NO. BRW-15	PROJECT Phase II Monitor-Well Installation, K-25 Plant		
LOCATION K-1413	COORDINATES (PLANT GRID) S25,093.51 W 339.39	SURFACE ELEVATION 781.24 ft msl	TOTAL DEPTH 60.0 ft
GEOLOGIST G. Weiss	SAMPLE INTERVAL 5 ft	SAMPLE TYPE Cuttings	DATE COMPLETED 12-02-86
DRILLER D. Wood	DRILLING CONTRACTOR Graves	DRILLING METHOD Air Rotary	RIG TYPE Dresser T-70-W
PURPOSE OF BORING Monitor Well	GEOPHYSICAL CONTRACTOR None	GEOPHYSICAL LOGS None	

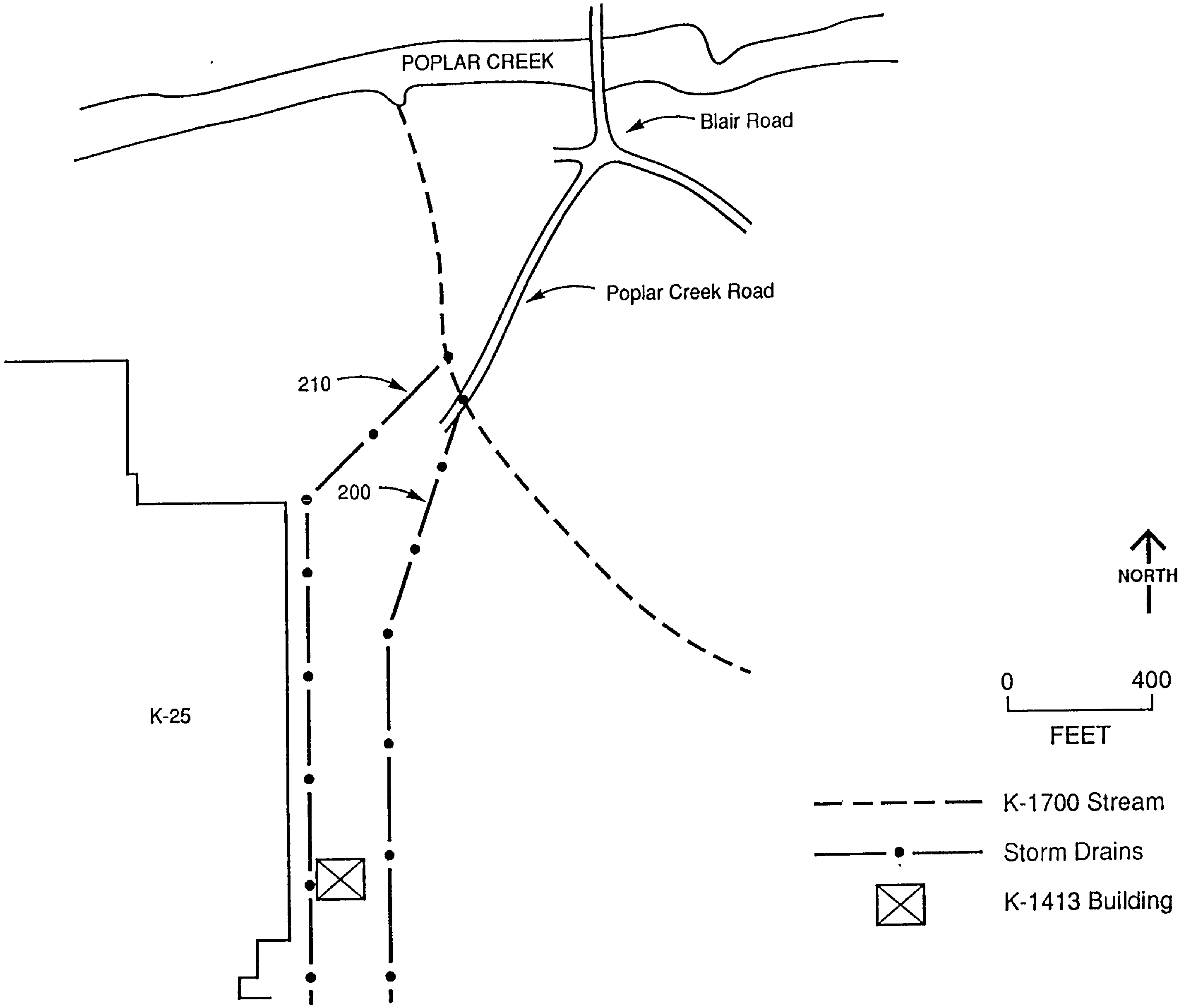


DEPTH IN FEET	DESCRIPTION	COMMENTS
0–30	CLAY (100%), red, orange, brown, plastic, some scattered limestone gravel. 5'-12' Clay contains minor amounts of weathered limestone. 12'-30' Clay, brown, silty in places. Contains some weathered shale.	
30–39	SHALE (100%), brown, highly weathered, some brown plastic clay. 34'-37' Shale (75%), gray, green and brown, weathered in places; Limestone (25%), white to gray, oolitic.	Shale is wet at 34 ft
39–60	LIMESTONE (100%), dark gray to white, micritic, oolitic in places.	Borehole producing water (<1 gpm) from fractured interval 46 ft - 47 ft

SHEET 1 OF 1

APPENDIX B

ORNL-DWG 88M-6199



STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND		RESULTS
SD-210	3-Mar-1987	1 1 1-TRICHLOROETHANE		<5 ug/L
SD-210	9-Mar-1987	1 1 1-TRICHLOROETHANE		<5 ug/L
SD-210	18-Mar-1987	1 1 1-TRICHLOROETHANE		<5 ug/L
SD-210	26-Mar-1987	1 1 1-TRICHLOROETHANE		<5 ug/L
SD-210	1-Apr-1987	1 1 1-TRICHLOROETHANE	(U)	<5 ug/L
SD-210	8-Apr-1987	1 1 1-TRICHLOROETHANE		<5 ug/L
SD-210-D	26-Mar-1987	1 1 1-TRICHLOROETHANE		<5 ug/L
SD-210	3-Mar-1987	1 1 2 2-TETRACHLOROETHANE		<5 ug/L
SD-210	9-Mar-1987	1 1 2 2-TETRACHLOROETHANE		<5 ug/L
SD-210	18-Mar-1987	1 1 2 2-TETRACHLOROETHANE		<5 ug/L
SD-210	26-Mar-1987	1 1 2 2-TETRACHLOROETHANE		<5 ug/L
SD-210	1-Apr-1987	1 1 2 2-TETRACHLOROETHANE	(U)	<5 ug/L
SD-210	8-Apr-1987	1 1 2 2-TETRACHLOROETHANE		<5 ug/L
SD-210-D	26-Mar-1987	1 1 2 2-TETRACHLOROETHANE		<5 ug/L
SD-210	3-Mar-1987	1 1 2-TRICHLOROETHANE		<5 ug/L
SD-210	9-Mar-1987	1 1 2-TRICHLOROETHANE		<5 ug/L
SD-210	18-Mar-1987	1 1 2-TRICHLOROETHANE		<5 ug/L
SD-210	26-Mar-1987	1 1 2-TRICHLOROETHANE		<5 ug/L
SD-210	1-Apr-1987	1 1 2-TRICHLOROETHANE	(U)	<5 ug/L
SD-210	8-Apr-1987	1 1 2-TRICHLOROETHANE		<5 ug/L
SD-210-D	26-Mar-1987	1 1 2-TRICHLOROETHANE		<5 ug/L
SD-210	3-Mar-1987	1 1-DICHLOROETHANE		<5 ug/L
SD-210	9-Mar-1987	1 1-DICHLOROETHANE		<5 ug/L
SD-210	18-Mar-1987	1 1-DICHLOROETHANE		<5 ug/L
SD-210	26-Mar-1987	1 1-DICHLOROETHANE		<5 ug/L
SD-210	1-Apr-1987	1 1-DICHLOROETHANE	(U)	<5 ug/L
SD-210	8-Apr-1987	1 1-DICHLOROETHANE		<5 ug/L
SD-210-D	26-Mar-1987	1 1-DICHLOROETHANE		<5 ug/L
SD-210	3-Mar-1987	1 1-DICHLOROETHENE		<5 ug/L
SD-210	9-Mar-1987	1 1-DICHLOROETHENE		<5 ug/L
SD-210	18-Mar-1987	1 1-DICHLOROETHENE		<5 ug/L
SD-210	26-Mar-1987	1 1-DICHLOROETHENE		<5 ug/L
SD-210	1-Apr-1987	1 1-DICHLOROETHENE	(U)	<5 ug/L
SD-210	8-Apr-1987	1 1-DICHLOROETHENE		<5 ug/L
SD-210-D	26-Mar-1987	1 1-DICHLOROETHENE		<5 ug/L
SD-210	3-Mar-1987	1 2 4-TRICHLOROBENZENE		<10 ug/L
SD-210	9-Mar-1987	1 2 4-TRICHLOROBENZENE		<10 ug/L
SD-210	3-Mar-1987	1 2-DICHLOROBENZENE		<10 ug/L
SD-210	9-Mar-1987	1 2-DICHLOROBENZENE		<10 ug/L
SD-210	3-Mar-1987	1 2-DICHLOROETHANE		<5 ug/L
SD-210	9-Mar-1987	1 2-DICHLOROETHANE		<5 ug/L
SD-210	18-Mar-1987	1 2-DICHLOROETHANE		<5 ug/L
SD-210	26-Mar-1987	1 2-DICHLOROETHANE		<5 ug/L
SD-210	1-Apr-1987	1 2-DICHLOROETHANE	(U)	<5 ug/L
SD-210	8-Apr-1987	1 2-DICHLOROETHANE		<5 ug/L
SD-210-D	26-Mar-1987	1 2-DICHLOROETHANE		<5 ug/L
SD-210	3-Mar-1987	1 2-DICHLOROPROPANE		<5 ug/L
SD-210	9-Mar-1987	1 2-DICHLOROPROPANE		<5 ug/L
SD-210	18-Mar-1987	1 2-DICHLOROPROPANE		<5 ug/L
SD-210	26-Mar-1987	1 2-DICHLOROPROPANE		<5 ug/L
SD-210	1-Apr-1987	1 2-DICHLOROPROPANE	(U)	<5 ug/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	8-Apr-1987	1 2-DICHLOROPROPANE	<5 ug/L
SD-210-D	26-Mar-1987	1 2-DICHLOROPROPANE	<5 ug/L
SD-210	3-Mar-1987	1 3-DICHLOROBENZENE	<10 ug/L
SD-210	9-Mar-1987	1 3-DICHLOROBENZENE	<10 ug/L
SD-210	3-Mar-1987	1 4-DICHLOROBENZENE	<10 ug/L
SD-210	9-Mar-1987	1 4-DICHLOROBENZENE	<10 ug/L
SD-210	3-Mar-1987	2 4 6-TRICHLOROPHENOL	<10 ug/L
SD-210	9-Mar-1987	2 4 6-TRICHLOROPHENOL	<10 ug/L
SD-210	3-Mar-1987	2 4-DICHLOROPHENOL	<10 ug/L
SD-210	9-Mar-1987	2 4-DICHLOROPHENOL	<10 ug/L
SD-210	3-Mar-1987	2 4-DIMETHYLPHENOL	<10 ug/L
SD-210	9-Mar-1987	2 4-DIMETHYLPHENOL	<10 ug/L
SD-210	3-Mar-1987	2 4-DINITROPHENOL	<10 ug/L
SD-210	9-Mar-1987	2 4-DINITROPHENOL	<10 ug/L
SD-210	3-Mar-1987	2 4-DINITROTOLUENE	<10 ug/L
SD-210	9-Mar-1987	2 4-DINITROTOLUENE	<10 ug/L
SD-210	3-Mar-1987	2 6-DINITROTOLUENE	<10 ug/L
SD-210	9-Mar-1987	2 6-DINITROTOLUENE	<10 ug/L
SD-210	3-Mar-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-210	9-Mar-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-210	18-Mar-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-210	26-Mar-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-210	1-Apr-1987	2-CHLOROETHYLVINYL ETHER	(U) <5 ug/L
SD-210	8-Apr-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-210-D	26-Mar-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-210	3-Mar-1987	2-CHLORONAPHTHALENE	<10 ug/L
SD-210	9-Mar-1987	2-CHLORONAPHTHALENE	<10 ug/L
SD-210	3-Mar-1987	2-CHLOROPHENOL	<10 ug/L
SD-210	9-Mar-1987	2-CHLOROPHENOL	<10 ug/L
SD-210	3-Mar-1987	2-NITROPHENOL	<10 ug/L
SD-210	9-Mar-1987	2-NITROPHENOL	<10 ug/L
SD-210	3-Mar-1987	3 3'-DICHLOROBENZIDINE	<20 ug/L
SD-210	9-Mar-1987	3 3'-DICHLOROBENZIDINE	<20 ug/L
SD-210	3-Mar-1987	4 6-DINITRO-2-METHYLPHENOL	<50 ug/L
SD-210	9-Mar-1987	4 6-DINITRO-2-METHYLPHENOL	<50 ug/L
SD-210	3-Mar-1987	4-BROMOPHENYL-PHENYLETHER	<10 ug/L
SD-210	9-Mar-1987	4-BROMOPHENYL-PHENYLETHER	<10 ug/L
SD-210	3-Mar-1987	4-CHLORO-3-METHYLPHENOL	<10 ug/L
SD-210	9-Mar-1987	4-CHLORO-3-METHYLPHENOL	<10 ug/L
SD-210	3-Mar-1987	4-CHLOROPHENYL-PHENYLETHER	<10 ug/L
SD-210	9-Mar-1987	4-CHLOROPHENYL-PHENYLETHER	<10 ug/L
SD-210	3-Mar-1987	4-NITROPHENOL	<50 ug/L
SD-210	9-Mar-1987	4-NITROPHENOL	<50 ug/L
SD-210	3-Mar-1987	ACENAPHTHENE	<10 ug/L
SD-210	9-Mar-1987	ACENAPHTHENE	<10 ug/L
SD-210	3-Mar-1987	ACENAPHTHYLENE	<10 ug/L
SD-210	9-Mar-1987	ACENAPHTHYLENE	<10 ug/L
SD-210	9-Mar-1987	ALIPHATIC HYDROCARBON	14 ug/L
SD-210	3-Mar-1987	ALKALINITY	128 mg/L
SD-210	9-Mar-1987	ALKALINITY	49 mg/L
SD-210	18-Mar-1987	ALKALINITY	50 mg/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	26-Mar-1987	ALKALINITY	60 mg/L
SD-210	1-Apr-1987	ALKALINITY	57 mg/L
SD-210	8-Apr-1987	ALKALINITY	98 mg/L
SD-210-D	26-Mar-1987	ALKALINITY	74 mg/L
SD-210	3-Mar-1987	ALPHA	2 pCi/L
SD-210	9-Mar-1987	ALPHA	1 pCi/L
SD-210	18-Mar-1987	ALPHA	<2 pCi/L
SD-210	26-Mar-1987	ALPHA	<2 pCi/L
SD-210	1-Apr-1987	ALPHA	<2 pCi/L
SD-210	8-Apr-1987	ALPHA	4.1 pCi/L
SD-210-D	26-Mar-1987	ALPHA	<2 pCi/L
SD-210	3-Mar-1987	AMMONIA	<0.2 mg/L
SD-210	9-Mar-1987	AMMONIA	<0.2 mg/L
SD-210	18-Mar-1987	AMMONIA	<0.2 mg/L
SD-210	26-Mar-1987	AMMONIA	<0.2 mg/L
SD-210	1-Apr-1987	AMMONIA	<0.2 mg/L
SD-210	8-Apr-1987	AMMONIA	<0.2 mg/L
SD-210-D	26-Mar-1987	AMMONIA	<0.2 mg/L
SD-210	3-Mar-1987	ANTHRACENE	<10 ug/L
SD-210	9-Mar-1987	ANTHRACENE	<10 ug/L
SD-210	3-Mar-1987	ARSENIC	<0.005 mg/L
SD-210	9-Mar-1987	ARSENIC	<0.005 mg/L
SD-210	18-Mar-1987	ARSENIC	<0.005 mg/L
SD-210	26-Mar-1987	ARSENIC	<0.005 mg/L
SD-210	1-Apr-1987	ARSENIC	<0.005 mg/L
SD-210	8-Apr-1987	ARSENIC	<0.005 mg/L
SD-210-D	26-Mar-1987	ARSENIC	<0.005 mg/L
SD-210	3-Mar-1987	BARIUM	<0.10 mg/L
SD-210	9-Mar-1987	BARIUM	<0.10 mg/L
SD-210	18-Mar-1987	BARIUM	<0.10 mg/L
SD-210	26-Mar-1987	BARIUM	<0.10 mg/L
SD-210	1-Apr-1987	BARIUM	<0.10 mg/L
SD-210	8-Apr-1987	BARIUM	<0.10 mg/L
SD-210-D	26-Mar-1987	BARIUM	<0.10 mg/L
SD-210	3-Mar-1987	BENZENE	<5 ug/L
SD-210	9-Mar-1987	BENZENE	<5 ug/L
SD-210	18-Mar-1987	BENZENE	<5 ug/L
SD-210	26-Mar-1987	BENZENE	<5 ug/L
SD-210	1-Apr-1987	BENZENE	(U) <5 ug/L
SD-210	8-Apr-1987	BENZENE	<5 ug/L
SD-210-D	26-Mar-1987	BENZENE	<5 ug/L
SD-210	3-Mar-1987	BENZIDINE	<10 ug/L
SD-210	9-Mar-1987	BENZIDINE	<10 ug/L
SD-210	3-Mar-1987	BENZO(A)ANTHRACENE	<10 ug/L
SD-210	9-Mar-1987	BENZO(A)ANTHRACENE	<10 ug/L
SD-210	3-Mar-1987	BENZO(A)PYRENE	<10 ug/L
SD-210	9-Mar-1987	BENZO(A)PYRENE	<10 ug/L
SD-210	3-Mar-1987	BENZO(B)FLUORANTHENE	<10 ug/L
SD-210	9-Mar-1987	BENZO(B)FLUORANTHENE	<10 ug/L
SD-210	3-Mar-1987	BENZO(G H I)PERYLENE	<10 ug/L
SD-210	9-Mar-1987	BENZO(G H I)PERYLENE	<10 ug/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	3-Mar-1987	BENZO(K)FLUORANTHENE	<10 ug/L
SD-210	9-Mar-1987	BENZO(K)FLUORANTHENE	<10 ug/L
SD-210	3-Mar-1987	BERYLLIUM	<0.0010 mg/L
SD-210	9-Mar-1987	BERYLLIUM	<0.0010 mg/L
SD-210	18-Mar-1987	BERYLLIUM	<0.0010 mg/L
SD-210	26-Mar-1987	BERYLLIUM	<0.0010 mg/L
SD-210	1-Apr-1987	BERYLLIUM	<0.0010 mg/L
SD-210	8-Apr-1987	BERYLLIUM	<0.0010 mg/L
SD-210-D	26-Mar-1987	BERYLLIUM	<0.0010 mg/L
SD-210	3-Mar-1987	BETA	<2 pCi/L
SD-210	9-Mar-1987	BETA	<2 pCi/L
SD-210	18-Mar-1987	BETA	<2 pCi/L
SD-210	26-Mar-1987	BETA	<2 pCi/L
SD-210	1-Apr-1987	BETA	<2 pCi/L
SD-210	8-Apr-1987	BETA	4.9 pCi/L
SD-210-D	26-Mar-1987	BETA	<2 pCi/L
SD-210	3-Mar-1987	BIS(2-CHLOROETHOXY)METHANE	<10 ug/L
SD-210	9-Mar-1987	BIS(2-CHLOROETHOXY)METHANE	<10 ug/L
SD-210	3-Mar-1987	BIS(2-CHLOROETHYL)ETHER	<10 ug/L
SD-210	9-Mar-1987	BIS(2-CHLOROETHYL)ETHER	<10 ug/L
SD-210	3-Mar-1987	BIS(2-CHLOROISOPROPYL)ETHER	<10 ug/L
SD-210	9-Mar-1987	BIS(2-CHLOROISOPROPYL)ETHER	<10 ug/L
SD-210	3-Mar-1987	BIS(2-ETHYLHEXYL)PHTHALATE	15.B ug/L
SD-210	9-Mar-1987	BIS(2-ETHYLHEXYL)PHTHALATE	<10 ug/L
SD-210	3-Mar-1987	BORON	0.0080 mg/L
SD-210	9-Mar-1987	BORON	0.015 mg/L
SD-210	18-Mar-1987	BORON	<0.0040 mg/L
SD-210	26-Mar-1987	BORON	<0.0040 mg/L
SD-210	1-Apr-1987	BORON	<0.0040 mg/L
SD-210	8-Apr-1987	BORON	<0.0040 mg/L
SD-210-D	26-Mar-1987	BORON	0.012 mg/L
SD-210	3-Mar-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-210	9-Mar-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-210	18-Mar-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-210	26-Mar-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-210	1-Apr-1987	BROMODICHLOROMETHANE	(U) <5 ug/L
SD-210	8-Apr-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-210-D	26-Mar-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-210	3-Mar-1987	BROMOFORM	<5 ug/L
SD-210	9-Mar-1987	BROMOFORM	<5 ug/L
SD-210	18-Mar-1987	BROMOFORM	<5 ug/L
SD-210	26-Mar-1987	BROMOFORM	<5 ug/L
SD-210	1-Apr-1987	BROMOFORM	(U) <5 ug/L
SD-210	8-Apr-1987	BROMOFORM	<5 ug/L
SD-210-D	26-Mar-1987	BROMOFORM	<5 ug/L
SD-210	3-Mar-1987	BROMOMETHANE	<10 ug/L
SD-210	9-Mar-1987	BROMOMETHANE	<10 ug/L
SD-210	18-Mar-1987	BROMOMETHANE	<10 ug/L
SD-210	26-Mar-1987	BROMOMETHANE	<10 ug/L
SD-210	1-Apr-1987	BROMOMETHANE	(U) <5 ug/L
SD-210	8-Apr-1987	BROMOMETHANE	<10 ug/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210-D	26-Mar-1987	BROMOMETHANE	<10 ug/L
SD-210	3-Mar-1987	BUTYLBENZYLPHTHALATE	1.JB ug/L
SD-210	9-Mar-1987	BUTYLBENZYLPHTHALATE	<10 ug/L
SD-210	3-Mar-1987	CADMIUM	<0.0030 mg/L
SD-210	9-Mar-1987	CADMIUM	<0.0030 mg/L
SD-210	18-Mar-1987	CADMIUM	<0.0030 mg/L
SD-210	26-Mar-1987	CADMIUM	<0.0030 mg/L
SD-210	1-Apr-1987	CADMIUM	<0.0030 mg/L
SD-210	8-Apr-1987	CADMIUM	<0.0030 mg/L
SD-210-D	26-Mar-1987	CADMIUM	<0.0030 mg/L
SD-210	3-Mar-1987	CALCIUM	28 mg/L
SD-210	9-Mar-1987	CALCIUM	13 mg/L
SD-210	18-Mar-1987	CALCIUM	14 mg/L
SD-210	26-Mar-1987	CALCIUM	22 mg/L
SD-210	1-Apr-1987	CALCIUM	16 mg/L
SD-210	8-Apr-1987	CALCIUM	28 mg/L
SD-210-D	26-Mar-1987	CALCIUM	22 mg/L
SD-210	3-Mar-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-210	9-Mar-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-210	18-Mar-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-210	26-Mar-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-210	1-Apr-1987	CARBON TETRACHLORIDE	(U) <5 ug/L
SD-210	8-Apr-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-210-D	26-Mar-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-210	3-Mar-1987	CHEMICAL OXYGEN DEMAND (COD)	<5 mg/L
SD-210	9-Mar-1987	CHEMICAL OXYGEN DEMAND (COD)	<5 mg/L
SD-210	18-Mar-1987	CHEMICAL OXYGEN DEMAND (COD)	5 mg/L
SD-210	26-Mar-1987	CHEMICAL OXYGEN DEMAND (COD)	<5 mg/L
SD-210	1-Apr-1987	CHEMICAL OXYGEN DEMAND (COD)	5 mg/L
SD-210	8-Apr-1987	CHEMICAL OXYGEN DEMAND (COD)	<5 mg/L
SD-210-D	26-Mar-1987	CHEMICAL OXYGEN DEMAND (COD)	<5 mg/L
SD-210	3-Mar-1987	CHLORIDE	15.4 mg/L
SD-210	9-Mar-1987	CHLORIDE	6.3 mg/L
SD-210	18-Mar-1987	CHLORIDE	7.2 mg/L
SD-210	26-Mar-1987	CHLORIDE	9.6 mg/L
SD-210	1-Apr-1987	CHLORIDE	6.8 mg/L
SD-210	8-Apr-1987	CHLORIDE	14.5 mg/L
SD-210-D	26-Mar-1987	CHLORIDE	9.6 mg/L
SD-210	3-Mar-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-210	9-Mar-1987	CHLORINE TOTAL RESIDUAL WATER	0.1 mg/L
SD-210	18-Mar-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-210	26-Mar-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-210	1-Apr-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-210	8-Apr-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-210-D	26-Mar-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-210	3-Mar-1987	CHLOROBENZENE	<5 ug/L
SD-210	9-Mar-1987	CHLOROBENZENE	<5 ug/L
SD-210	18-Mar-1987	CHLOROBENZENE	<5 ug/L
SD-210	26-Mar-1987	CHLOROBENZENE	<5 ug/L
SD-210	1-Apr-1987	CHLOROBENZENE	(U) <5 ug/L
SD-210	8-Apr-1987	CHLOROBENZENE	<5 ug/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210-D	26-Mar-1987	CHLOROBENZENE	<5 ug/L
SD-210	3-Mar-1987	CHLOROETHANE	<10 ug/L
SD-210	9-Mar-1987	CHLOROETHANE	<10 ug/L
SD-210	18-Mar-1987	CHLOROETHANE	<10 ug/L
SD-210	26-Mar-1987	CHLOROETHANE	<10 ug/L
SD-210	1-Apr-1987	CHLOROETHANE	(U) <5 ug/L
SD-210	8-Apr-1987	CHLOROETHANE	<10 ug/L
SD-210-D	26-Mar-1987	CHLOROETHANE	<10 ug/L
SD-210	3-Mar-1987	CHLOROFORM	3 BJ ug/L
SD-210	9-Mar-1987	CHLOROFORM	<5 ug/L
SD-210	18-Mar-1987	CHLOROFORM	<5 ug/L
SD-210	26-Mar-1987	CHLOROFORM	<5 ug/L
SD-210	1-Apr-1987	CHLOROFORM	(U) <5 ug/L
SD-210	8-Apr-1987	CHLOROFORM	<5 ug/L
SD-210-D	26-Mar-1987	CHLOROFORM	<5 ug/L
SD-210	3-Mar-1987	CHLOROMETHANE	<10 ug/L
SD-210	9-Mar-1987	CHLOROMETHANE	<10 ug/L
SD-210	18-Mar-1987	CHLOROMETHANE	<10 ug/L
SD-210	26-Mar-1987	CHLOROMETHANE	<10 ug/L
SD-210	1-Apr-1987	CHLOROMETHANE	(U) <5 ug/L
SD-210	8-Apr-1987	CHLOROMETHANE	<10 ug/L
SD-210-D	26-Mar-1987	CHLOROMETHANE	<10 ug/L
SD-210	3-Mar-1987	CHROMIUM	<0.010 mg/L
SD-210	9-Mar-1987	CHROMIUM	<0.010 mg/L
SD-210	18-Mar-1987	CHROMIUM	<0.010 mg/L
SD-210	26-Mar-1987	CHROMIUM	<0.010 mg/L
SD-210	1-Apr-1987	CHROMIUM	<0.010 mg/L
SD-210	8-Apr-1987	CHROMIUM	<0.010 mg/L
SD-210-D	26-Mar-1987	CHROMIUM	<0.010 mg/L
SD-210	3-Mar-1987	CHRYSENE	<10 ug/L
SD-210	9-Mar-1987	CHRYSENE	<10 ug/L
SD-210	3-Mar-1987	CIS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	9-Mar-1987	CIS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	18-Mar-1987	CIS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	26-Mar-1987	CIS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	1-Apr-1987	CIS-1 3-DICHLOROPROPENE	(U) <5 ug/L
SD-210	8-Apr-1987	CIS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210-D	26-Mar-1987	CIS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	3-Mar-1987	COBALT	<0.10 mg/L
SD-210	9-Mar-1987	COBALT	<0.10 mg/L
SD-210	18-Mar-1987	COBALT	<0.10 mg/L
SD-210	26-Mar-1987	COBALT	<0.10 mg/L
SD-210	1-Apr-1987	COBALT	<0.10 mg/L
SD-210	8-Apr-1987	COBALT	<0.10 mg/L
SD-210-D	26-Mar-1987	COBALT	<0.10 mg/L
SD-210	3-Mar-1987	CONDUCTIVITY	253 umho/cm
SD-210	9-Mar-1987	CONDUCTIVITY	127 umho/cm
SD-210	18-Mar-1987	CONDUCTIVITY	121 umho/cm
SD-210	26-Mar-1987	CONDUCTIVITY	175 umho/cm
SD-210	1-Apr-1987	CONDUCTIVITY	125 umho/cm
SD-210	8-Apr-1987	CONDUCTIVITY	265 umho/cm

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210-D	26-Mar-1987	CONDUCTIVITY	174 umho/cm
SD-210	3-Mar-1987	COPPER	<0.0040 mg/L
SD-210	9-Mar-1987	COPPER	<0.0040 mg/L
SD-210	18-Mar-1987	COPPER	<0.0040 mg/L
SD-210	26-Mar-1987	COPPER	0.0084 mg/L
SD-210	1-Apr-1987	COPPER	0.0066 mg/L
SD-210	8-Apr-1987	COPPER	0.0064 mg/L
SD-210-D	26-Mar-1987	COPPER	0.011 mg/L
SD-210	3-Mar-1987	CYANIDE	0.004 mg/L
SD-210	9-Mar-1987	CYANIDE	0.002 mg/L
SD-210	18-Mar-1987	CYANIDE	0.002 mg/L
SD-210	26-Mar-1987	CYANIDE	<0.002 mg/L
SD-210	1-Apr-1987	CYANIDE	0.002 mg/L
SD-210	8-Apr-1987	CYANIDE	<0.002 mg/L
SD-210-D	26-Mar-1987	CYANIDE	0.002 mg/L
SD-210	3-Mar-1987	DI-N-BUTYLPHTHALATE	<10 ug/L
SD-210	9-Mar-1987	DI-N-BUTYLPHTHALATE	<10 ug/L
SD-210	3-Mar-1987	DI-N-OCTYLPHTHALATE	1.JB ug/L
SD-210	9-Mar-1987	DI-N-OCTYLPHTHALATE	1 JB ug/L
SD-210	3-Mar-1987	DIBENZ(A H)ANTHRACENE	<10 ug/L
SD-210	9-Mar-1987	DIBENZ(A H)ANTHRACENE	<10 ug/L
SD-210	3-Mar-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-210	9-Mar-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-210	18-Mar-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-210	26-Mar-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-210	1-Apr-1987	DIBROMOCHLOROMETHANE	(U) <5 ug/L
SD-210	8-Apr-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-210-D	26-Mar-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-210	3-Mar-1987	DIETHYLPHTHALATE	<10 ug/L
SD-210	9-Mar-1987	DIETHYLPHTHALATE	1 J ug/L
SD-210	3-Mar-1987	DIMETHYLPHTHALATE	<10 ug/L
SD-210	9-Mar-1987	DIMETHYLPHTHALATE	<10 ug/L
SD-210	3-Mar-1987	DISSOLVED OXYGEN	7.7 ppm
SD-210	9-Mar-1987	DISSOLVED OXYGEN	10.4 ppm
SD-210	18-Mar-1987	DISSOLVED OXYGEN	10.8 ppm
SD-210	26-Mar-1987	DISSOLVED OXYGEN	10.8 ppm
SD-210	1-Apr-1987	DISSOLVED OXYGEN	11.2 ppm
SD-210	8-Apr-1987	DISSOLVED OXYGEN	10.2 ppm
SD-210-D	26-Mar-1987	DISSOLVED OXYGEN	10.8 ppm
SD-210	3-Mar-1987	ETHYLBENZENE	<5 ug/L
SD-210	9-Mar-1987	ETHYLBENZENE	<5 ug/L
SD-210	18-Mar-1987	ETHYLBENZENE	<5 ug/L
SD-210	26-Mar-1987	ETHYLBENZENE	<5 ug/L
SD-210	1-Apr-1987	ETHYLBENZENE	(U) <5 ug/L
SD-210	8-Apr-1987	ETHYLBENZENE	<5 ug/L
SD-210-D	26-Mar-1987	ETHYLBENZENE	<5 ug/L
SD-210	3-Mar-1987	FLUORANTHENE	<10 ug/L
SD-210	9-Mar-1987	FLUORANTHENE	<10 ug/L
SD-210	3-Mar-1987	FLUORENE	<10 ug/L
SD-210	9-Mar-1987	FLUORENE	<10 ug/L
SD-210	3-Mar-1987	FLUORIDE	0.1 mg/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	9-Mar-1987	FLUORIDE	0.1 mg/L
SD-210	18-Mar-1987	FLUORIDE	<0.1 mg/L
SD-210	26-Mar-1987	FLUORIDE	0.1 mg/L
SD-210	1-Apr-1987	FLUORIDE	0.3 mg/L
SD-210	8-Apr-1987	FLUORIDE	0.2 mg/L
SD-210-D	26-Mar-1987	FLUORIDE	0.1 mg/L
SD-210	3-Mar-1987	HARDNESS	128 mg/L
SD-210	9-Mar-1987	HARDNESS	60 mg/L
SD-210	18-Mar-1987	HARDNESS	96 mg/L
SD-210	26-Mar-1987	HARDNESS	84 mg/L
SD-210	1-Apr-1987	HARDNESS	64 mg/L
SD-210	8-Apr-1987	HARDNESS	61 mg/L
SD-210-D	26-Mar-1987	HARDNESS	84 mg/L
SD-210	3-Mar-1987	HEXACHLOROBENZENE	<10 ug/L
SD-210	9-Mar-1987	HEXACHLOROBENZENE	<10 ug/L
SD-210	3-Mar-1987	HEXACHLOROBUTADIENE	<10 ug/L
SD-210	9-Mar-1987	HEXACHLOROBUTADIENE	<10 ug/L
SD-210	3-Mar-1987	HEXACHLOROCYCLOPENTADIENE	<10 ug/L
SD-210	9-Mar-1987	HEXACHLOROCYCLOPENTADIENE	<10 ug/L
SD-210	3-Mar-1987	HEXACHLOROETHANE	<10 ug/L
SD-210	9-Mar-1987	HEXACHLOROETHANE	<10 ug/L
SD-210	3-Mar-1987	INDENO(1 2 3-CD)PYRENE	<10 ug/L
SD-210	9-Mar-1987	INDENO(1 2 3-CD)PYRENE	<10 ug/L
SD-210	3-Mar-1987	IRON	0.15 mg/L
SD-210	9-Mar-1987	IRON	<0.050 mg/L
SD-210	18-Mar-1987	IRON	0.069 mg/L
SD-210	26-Mar-1987	IRON	0.12 mg/L
SD-210	1-Apr-1987	IRON	0.064 mg/L
SD-210	8-Apr-1987	IRON	0.11 mg/L
SD-210-D	26-Mar-1987	IRON	0.18 mg/L
SD-210	3-Mar-1987	ISOPHORONE	<10 ug/L
SD-210	9-Mar-1987	ISOPHORONE	<10 ug/L
SD-210	3-Mar-1987	LEAD	<0.050 mg/L
SD-210	9-Mar-1987	LEAD	<0.050 mg/L
SD-210	18-Mar-1987	LEAD	<0.050 mg/L
SD-210	26-Mar-1987	LEAD	<0.050 mg/L
SD-210	1-Apr-1987	LEAD	<0.050 mg/L
SD-210	8-Apr-1987	LEAD	<0.050 mg/L
SD-210-D	26-Mar-1987	LEAD	<0.050 mg/L
SD-210	3-Mar-1987	LITHIUM	<0.0040 mg/L
SD-210	9-Mar-1987	LITHIUM	<0.0040 mg/L
SD-210	18-Mar-1987	LITHIUM	<0.0040 mg/L
SD-210	26-Mar-1987	LITHIUM	<0.0040 mg/L
SD-210	1-Apr-1987	LITHIUM	<0.0040 mg/L
SD-210	8-Apr-1987	LITHIUM	<0.0040 mg/L
SD-210-D	26-Mar-1987	LITHIUM	<0.0040 mg/L
SD-210	3-Mar-1987	MAGNESIUM	8.6 mg/L
SD-210	9-Mar-1987	MAGNESIUM	3.1 mg/L
SD-210	18-Mar-1987	MAGNESIUM	3.7 mg/L
SD-210	26-Mar-1987	MAGNESIUM	6.6 mg/L
SD-210	1-Apr-1987	MAGNESIUM	4.8 mg/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	8-Apr-1987	MAGNESIUM	9.1 mg/L
SD-210-D	26-Mar-1987	MAGNESIUM	6.7 mg/L
SD-210	3-Mar-1987	MANGANESE	<0.010 mg/L
SD-210	9-Mar-1987	MANGANESE	<0.010 mg/L
SD-210	18-Mar-1987	MANGANESE	<0.010 mg/L
SD-210	26-Mar-1987	MANGANESE	<0.010 mg/L
SD-210	1-Apr-1987	MANGANESE	<0.010 mg/L
SD-210	8-Apr-1987	MANGANESE	<0.010 mg/L
SD-210-D	26-Mar-1987	MANGANESE	<0.010 mg/L
SD-210	3-Mar-1987	MERCURY	<0.0002 mg/L
SD-210	9-Mar-1987	MERCURY	<0.0002 mg/L
SD-210	18-Mar-1987	MERCURY	<0.0002 mg/L
SD-210	26-Mar-1987	MERCURY	<0.0002 mg/L
SD-210	1-Apr-1987	MERCURY	<0.0002 mg/L
SD-210	8-Apr-1987	MERCURY	<0.0002 mg/L
SD-210-D	26-Mar-1987	MERCURY	<0.0002 mg/L
SD-210	3-Mar-1987	METHYLENE CHLORIDE	<5 ug/L
SD-210	9-Mar-1987	METHYLENE CHLORIDE	5 ug/L
SD-210	18-Mar-1987	METHYLENE CHLORIDE	<5 ug/L
SD-210	26-Mar-1987	METHYLENE CHLORIDE	<5 ug/L
SD-210	1-Apr-1987	METHYLENE CHLORIDE	(U) <5 ug/L
SD-210	8-Apr-1987	METHYLENE CHLORIDE	11 ug/L
SD-210-D	26-Mar-1987	METHYLENE CHLORIDE	<5 ug/L
SD-210	3-Mar-1987	MOLYBDENUM	<0.010 mg/L
SD-210	9-Mar-1987	MOLYBDENUM	<0.010 mg/L
SD-210	18-Mar-1987	MOLYBDENUM	<0.010 mg/L
SD-210	26-Mar-1987	MOLYBDENUM	<0.010 mg/L
SD-210	1-Apr-1987	MOLYBDENUM	<0.010 mg/L
SD-210	8-Apr-1987	MOLYBDENUM	<0.010 mg/L
SD-210-D	26-Mar-1987	MOLYBDENUM	<0.010 mg/L
SD-210	3-Mar-1987	N-NITROSO-DI-N-PROPYLAMINE	<10 ug/L
SD-210	9-Mar-1987	N-NITROSO-DI-N-PROPYLAMINE	<10 ug/L
SD-210	3-Mar-1987	N-NITROSODIMETHYLAMINE	<10 ug/L
SD-210	9-Mar-1987	N-NITROSODIMETHYLAMINE	<10 ug/L
SD-210	3-Mar-1987	N-NITROSODIPHENYLAMINE	<10 ug/L
SD-210	9-Mar-1987	N-NITROSODIPHENYLAMINE	<10 ug/L
SD-210	3-Mar-1987	NAPHTHALENE	<10 ug/L
SD-210	9-Mar-1987	NAPHTHALENE	<10 ug/L
SD-210	3-Mar-1987	NICKEL	<0.050 mg/L
SD-210	9-Mar-1987	NICKEL	<0.050 mg/L
SD-210	18-Mar-1987	NICKEL	<0.050 mg/L
SD-210	26-Mar-1987	NICKEL	<0.050 mg/L
SD-210	1-Apr-1987	NICKEL	<0.050 mg/L
SD-210	8-Apr-1987	NICKEL	<0.050 mg/L
SD-210-D	26-Mar-1987	NICKEL	<0.050 mg/L
SD-210	3-Mar-1987	NIOBIUM	<0.0070 mg/L
SD-210	9-Mar-1987	NIOBIUM	<0.0070 mg/L
SD-210	18-Mar-1987	NIOBIUM	<0.0070 mg/L
SD-210	26-Mar-1987	NIOBIUM	<0.0070 mg/L
SD-210	1-Apr-1987	NIOBIUM	<0.0070 mg/L
SD-210	8-Apr-1987	NIOBIUM	<0.0070 mg/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210-D	26-Mar-1987	NIOBIUM	<0.0070 mg/L
SD-210	3-Mar-1987	NITRATE	0.20 mg/L
SD-210	9-Mar-1987	NITRATE	0.72 mg/L
SD-210	18-Mar-1987	NITRATE	<0.5 mg/L
SD-210	26-Mar-1987	NITRATE	0.9 mg/L
SD-210	1-Apr-1987	NITRATE	0.69 mg/L
SD-210	8-Apr-1987	NITRATE	0.94 mg/L
SD-210-D	26-Mar-1987	NITRATE	0.9 mg/L
SD-210	3-Mar-1987	NITROBENZENE	<10 ug/L
SD-210	9-Mar-1987	NITROBENZENE	<10 ug/L
SD-210	3-Mar-1987	OIL & GREASE	<2 mg/L
SD-210	9-Mar-1987	OIL & GREASE	<2 mg/L
SD-210	18-Mar-1987	OIL & GREASE	<2 mg/L
SD-210	26-Mar-1987	OIL & GREASE	<2 mg/L
SD-210	1-Apr-1987	OIL & GREASE	<2 mg/L
SD-210	8-Apr-1987	OIL & GREASE	<2 mg/L
SD-210-D	26-Mar-1987	OIL & GREASE	<2 mg/L
SD-210	3-Mar-1987	PCB (AROCLOR-1016)	<0.5 ug/L
SD-210	9-Mar-1987	PCB (AROCLOR-1016)	<1 ug/L
SD-210	3-Mar-1987	PCB (AROCLOR-1221)	<0.5 ug/L
SD-210	9-Mar-1987	PCB (AROCLOR-1221)	<1 ug/L
SD-210	3-Mar-1987	PCB (AROCLOR-1232)	<0.5 ug/L
SD-210	9-Mar-1987	PCB (AROCLOR-1232)	<1 ug/L
SD-210	3-Mar-1987	PCB (AROCLOR-1242)	<0.5 ug/L
SD-210	9-Mar-1987	PCB (AROCLOR-1242)	<1 ug/L
SD-210	3-Mar-1987	PCB (AROCLOR-1248)	<0.5 ug/L
SD-210	9-Mar-1987	PCB (AROCLOR-1248)	<1 ug/L
SD-210	3-Mar-1987	PCB (AROCLOR-1254)	<1 ug/L
SD-210	9-Mar-1987	PCB (AROCLOR-1254)	<1 ug/L
SD-210	3-Mar-1987	PCB (AROCLOR-1260)	<1 ug/L
SD-210	9-Mar-1987	PCB (AROCLOR-1260)	<1 ug/L
SD-210	3-Mar-1987	PENTACHLOROPHENOL	<50 ug/L
SD-210	9-Mar-1987	PENTACHLOROPHENOL	<50 ug/L
SD-210	3-Mar-1987	PH	7.7
SD-210	9-Mar-1987	PH	7.5
SD-210	18-Mar-1987	PH	7.4
SD-210	26-Mar-1987	PH	7.0
SD-210	1-Apr-1987	PH	7.9
SD-210	8-Apr-1987	PH	8.1
SD-210-D	26-Mar-1987	PH	7.7
SD-210	3-Mar-1987	PHENANTHRENE	<10 ug/L
SD-210	9-Mar-1987	PHENANTHRENE	<10 ug/L
SD-210	3-Mar-1987	PHENOL	<10 ug/L
SD-210	9-Mar-1987	PHENOL	<10 ug/L
SD-210	3-Mar-1987	PHOSPHORUS	<0.20 mg/L
SD-210	9-Mar-1987	PHOSPHORUS	<0.20 mg/L
SD-210	18-Mar-1987	PHOSPHORUS	<0.20 mg/L
SD-210	26-Mar-1987	PHOSPHORUS	<0.20 mg/L
SD-210	1-Apr-1987	PHOSPHORUS	<0.20 mg/L
SD-210	8-Apr-1987	PHOSPHORUS	<0.20 mg/L
SD-210-D	26-Mar-1987	PHOSPHORUS	<0.20 mg/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	3-Mar-1987	POTASSIUM	0.68 mg/L
SD-210	9-Mar-1987	POTASSIUM	<0.60 mg/L
SD-210	18-Mar-1987	POTASSIUM	<0.60 mg/L
SD-210	26-Mar-1987	POTASSIUM	<0.60 mg/L
SD-210	1-Apr-1987	POTASSIUM	<0.60 mg/L
SD-210	8-Apr-1987	POTASSIUM	<0.60 mg/L
SD-210-D	26-Mar-1987	POTASSIUM	<0.60 mg/L
SD-210	3-Mar-1987	PYRENE	<10 ug/L
SD-210	9-Mar-1987	PYRENE	<10 ug/L
SD-210	3-Mar-1987	SELENIUM	<0.005 mg/L
SD-210	9-Mar-1987	SELENIUM	<0.005 mg/L
SD-210	9-Mar-1987	SELENIUM	<0.005 mg/L
SD-210	18-Mar-1987	SELENIUM	<0.005 mg/L
SD-210	26-Mar-1987	SELENIUM	<0.005 mg/L
SD-210	1-Apr-1987	SELENIUM	<0.005 mg/L
SD-210	8-Apr-1987	SELENIUM	<0.005 mg/L
SD-210-D	26-Mar-1987	SELENIUM	<0.005 mg/L
SD-210	3-Mar-1987	SILICON	0.58 mg/L
SD-210	9-Mar-1987	SILICON	0.31 mg/L
SD-210	18-Mar-1987	SILICON	0.23 mg/L
SD-210	26-Mar-1987	SILICON	0.51 mg/L
SD-210	1-Apr-1987	SILICON	0.34 mg/L
SD-210	8-Apr-1987	SILICON	0.54 mg/L
SD-210-D	26-Mar-1987	SILICON	0.55 mg/L
SD-210	3-Mar-1987	SILVER	<0.010 mg/L
SD-210	9-Mar-1987	SILVER	<0.010 mg/L
SD-210	18-Mar-1987	SILVER	<0.010 mg/L
SD-210	26-Mar-1987	SILVER	<0.010 mg/L
SD-210	1-Apr-1987	SILVER	<0.010 mg/L
SD-210	8-Apr-1987	SILVER	<0.010 mg/L
SD-210-D	26-Mar-1987	SILVER	<0.010 mg/L
SD-210	3-Mar-1987	SODIUM	12 mg/L
SD-210	9-Mar-1987	SODIUM	3.0 mg/L
SD-210	18-Mar-1987	SODIUM	4.0 mg/L
SD-210	26-Mar-1987	SODIUM	6.8 mg/L
SD-210	1-Apr-1987	SODIUM	4.8 mg/L
SD-210	8-Apr-1987	SODIUM	8.6 mg/L
SD-210-D	26-Mar-1987	SODIUM	5.2 mg/L
SD-210	11-Mar-1987	SOLIDS SUSPENDED	5 mg/L
SD-210	3-Mar-1987	STRONTIUM	0.027 mg/L
SD-210	9-Mar-1987	STRONTIUM	0.014 mg/L
SD-210	18-Mar-1987	STRONTIUM	0.014 mg/L
SD-210	26-Mar-1987	STRONTIUM	0.020 mg/L
SD-210	1-Apr-1987	STRONTIUM	0.015 mg/L
SD-210	8-Apr-1987	STRONTIUM	0.021 mg/L
SD-210-D	26-Mar-1987	STRONTIUM	0.020 mg/L
SD-210	3-Mar-1987	SULFATE	16 mg/L
SD-210	9-Mar-1987	SULFATE	8.2 mg/L
SD-210	18-Mar-1987	SULFATE	7.3 mg/L
SD-210	26-Mar-1987	SULFATE	12 mg/L
SD-210	1-Apr-1987	SULFATE	8.6 mg/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	8-Apr-1987	SULFATE	16 mg/L
SD-210-D	26-Mar-1987	SULFATE	13 mg/L
SD-210	19-Mar-1987	SUSPENDED SOLIDS	12 ug/ML
SD-210	25-Mar-1987	SUSPENDED SOLIDS	1 ug/ML
SD-210	30-Mar-1987	SUSPENDED SOLIDS	15 ug/g
SD-210	14-Apr-1987	SUSPENDED SOLIDS	7 ug/g
SD-210	22-May-1987	SUSPENDED SOLIDS	<1 ug/g
SD-210	17-Jun-1987	SUSPENDED SOLIDS	5 ug/g
SD-210	3-Mar-1987	TEMPERATURE	7.0 Deg. C
SD-210	9-Mar-1987	TEMPERATURE	11.5 Deg. C
SD-210	18-Mar-1987	TEMPERATURE	10.0 Deg. C
SD-210	26-Mar-1987	TEMPERATURE	11.0 Deg. C
SD-210	1-Apr-1987	TEMPERATURE	7.0 Deg. C
SD-210	8-Apr-1987	TEMPERATURE	9.8 Deg. C
SD-210-D	26-Mar-1987	TEMPERATURE	11.0 Deg. C
SD-210	3-Mar-1987	TETRACHLOROETHENE	<5 ug/L
SD-210	9-Mar-1987	TETRACHLOROETHENE	<5 ug/L
SD-210	18-Mar-1987	TETRACHLOROETHENE	<5 ug/L
SD-210	26-Mar-1987	TETRACHLOROETHENE	<5 ug/L
SD-210	1-Apr-1987	TETRACHLOROETHENE	(U) <5 ug/L
SD-210	8-Apr-1987	TETRACHLOROETHENE	<5 ug/L
SD-210-D	26-Mar-1987	TETRACHLOROETHENE	<5 ug/L
SD-210	3-Mar-1987	THORIUM	<0.20 mg/L
SD-210	9-Mar-1987	THORIUM	<0.20 mg/L
SD-210	18-Mar-1987	THORIUM	<0.20 mg/L
SD-210	26-Mar-1987	THORIUM	<0.20 mg/L
SD-210	1-Apr-1987	THORIUM	<0.20 mg/L
SD-210	8-Apr-1987	THORIUM	<0.20 mg/L
SD-210-D	26-Mar-1987	THORIUM	<0.20 mg/L
SD-210	3-Mar-1987	TITANIUM	<0.0030 mg/L
SD-210	9-Mar-1987	TITANIUM	<0.0030 mg/L
SD-210	18-Mar-1987	TITANIUM	<0.0030 mg/L
SD-210	26-Mar-1987	TITANIUM	<0.0030 mg/L
SD-210	1-Apr-1987	TITANIUM	<0.0030 mg/L
SD-210	8-Apr-1987	TITANIUM	<0.0030 mg/L
SD-210-D	26-Mar-1987	TITANIUM	0.0044 mg/L
SD-210	3-Mar-1987	TOLUENE	1 BJ ug/L
SD-210	9-Mar-1987	TOLUENE	<5 ug/L
SD-210	18-Mar-1987	TOLUENE	<5 ug/L
SD-210	26-Mar-1987	TOLUENE	<5 ug/L
SD-210	1-Apr-1987	TOLUENE	(U) <5 ug/L
SD-210	8-Apr-1987	TOLUENE	<5 ug/L
SD-210-D	26-Mar-1987	TOLUENE	<5 ug/L
SD-210	3-Mar-1987	TOTAL DISSOLVED SOLIDS	158 mg/L
SD-210	9-Mar-1987	TOTAL DISSOLVED SOLIDS	88 mg/L
SD-210	18-Mar-1987	TOTAL DISSOLVED SOLIDS	14 mg/L
SD-210	26-Mar-1987	TOTAL DISSOLVED SOLIDS	136 mg/L
SD-210	1-Apr-1987	TOTAL DISSOLVED SOLIDS	86 mg/L
SD-210	8-Apr-1987	TOTAL DISSOLVED SOLIDS	136 mg/L
SD-210-D	26-Mar-1987	TOTAL DISSOLVED SOLIDS	142 mg/L
SD-210	3-Mar-1987	TOTAL ORGANIC CARBON (TOC)	13 mg/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	9-Mar-1987	TOTAL ORGANIC CARBON (TOC)	3 mg/L
SD-210	18-Mar-1987	TOTAL ORGANIC CARBON (TOC)	12 mg/L
SD-210	26-Mar-1987	TOTAL ORGANIC CARBON (TOC)	6 mg/L
SD-210	1-Apr-1987	TOTAL ORGANIC CARBON (TOC)	2 mg/L
SD-210	8-Apr-1987	TOTAL ORGANIC CARBON (TOC)	6 mg/L
SD-210-D	26-Mar-1987	TOTAL ORGANIC CARBON (TOC)	3 mg/L
SD-210	3-Mar-1987	TOTAL SUSPENDED SOLIDS	1 mg/L
SD-210	9-Mar-1987	TOTAL SUSPENDED SOLIDS	2 mg/L
SD-210	18-Mar-1987	TOTAL SUSPENDED SOLIDS	<1 mg/L
SD-210	26-Mar-1987	TOTAL SUSPENDED SOLIDS	4 mg/L
SD-210	1-Apr-1987	TOTAL SUSPENDED SOLIDS	<1 mg/L
SD-210	8-Apr-1987	TOTAL SUSPENDED SOLIDS	<1 mg/L
SD-210-D	26-Mar-1987	TOTAL SUSPENDED SOLIDS	5 mg/L
SD-210	3-Mar-1987	TRANS-1 2-DICHLOROETHENE	<5 ug/L
SD-210	9-Mar-1987	TRANS-1 2-DICHLOROETHENE	<5 ug/L
SD-210	18-Mar-1987	TRANS-1 2-DICHLOROETHENE	<5 ug/L
SD-210	26-Mar-1987	TRANS-1 2-DICHLOROETHENE	<5 ug/L
SD-210	1-Apr-1987	TRANS-1 2-DICHLOROETHENE	(U) <5 ug/L
SD-210	8-Apr-1987	TRANS-1 2-DICHLOROETHENE	<5 ug/L
SD-210-D	26-Mar-1987	TRANS-1 2-DICHLOROETHENE	<5 ug/L
SD-210	3-Mar-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	9-Mar-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	18-Mar-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	26-Mar-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	1-Apr-1987	TRANS-1 3-DICHLOROPROPENE	(U) <5 ug/L
SD-210	8-Apr-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210-D	26-Mar-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-210	3-Mar-1987	TRICHLOROETHENE	<5 ug/L
SD-210	9-Mar-1987	TRICHLOROETHENE	<5 ug/L
SD-210	18-Mar-1987	TRICHLOROETHENE	<5 ug/L
SD-210	26-Mar-1987	TRICHLOROETHENE	<5 ug/L
SD-210	1-Apr-1987	TRICHLOROETHENE	(U) <5 ug/L
SD-210	8-Apr-1987	TRICHLOROETHENE	<5 ug/L
SD-210-D	26-Mar-1987	TRICHLOROETHENE	<5 ug/L
SD-210	3-Mar-1987	TURBIDITY	2 NTU
SD-210	9-Mar-1987	TURBIDITY	1 NTU
SD-210	18-Mar-1987	TURBIDITY	1 NTU
SD-210	26-Mar-1987	TURBIDITY	1 NTU
SD-210	1-Apr-1987	TURBIDITY	3 NTU
SD-210	8-Apr-1987	TURBIDITY	1 NTU
SD-210-D	26-Mar-1987	TURBIDITY	1 NTU
SD-210	3-Mar-1987	URANIUM	0.005 mg/L
SD-210	9-Mar-1987	URANIUM	0.022 mg/L
SD-210	18-Mar-1987	URANIUM	0.004 mg/L
SD-210	26-Mar-1987	URANIUM	0.003 mg/L
SD-210	1-Apr-1987	URANIUM	0.004 mg/L
SD-210	8-Apr-1987	URANIUM	0.002 mg/L
SD-210-D	26-Mar-1987	URANIUM	0.004 mg/L
SD-210	3-Mar-1987	VANADIUM	<0.50 mg/L
SD-210	9-Mar-1987	VANADIUM	<0.50 mg/L
SD-210	18-Mar-1987	VANADIUM	<0.50 mg/L

STORM DRAIN DATA FOR SD-210*

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-210	26-Mar-1987	VANADIUM	<0.50 mg/L
SD-210	1-Apr-1987	VANADIUM	<0.50 mg/L
SD-210	8-Apr-1987	VANADIUM	<0.50 mg/L
SD-210-D	26-Mar-1987	VANADIUM	<0.50 mg/L
SD-210	3-Mar-1987	VINYL CHLORIDE	<10 ug/L
SD-210	9-Mar-1987	VINYL CHLORIDE	<10 ug/L
SD-210	18-Mar-1987	VINYL CHLORIDE	<10 ug/L
SD-210	26-Mar-1987	VINYL CHLORIDE	<10 ug/L
SD-210	1-Apr-1987	VINYL CHLORIDE	(U) <5 ug/L
SD-210	8-Apr-1987	VINYL CHLORIDE	<10 ug/L
SD-210-D	26-Mar-1987	VINYL CHLORIDE	<10 ug/L
SD-210	3-Mar-1987	ZINC	0.045 mg/L
SD-210	9-Mar-1987	ZINC	0.092 mg/L
SD-210	18-Mar-1987	ZINC	0.024 mg/L
SD-210	26-Mar-1987	ZINC	0.052 mg/L
SD-210	1-Apr-1987	ZINC	0.043 mg/L
SD-210	8-Apr-1987	ZINC	0.052 mg/L
SD-210-D	26-Mar-1987	ZINC	0.056 mg/L
SD-210	3-Mar-1987	ZIRCONIUM	<0.0050 mg/L
SD-210	9-Mar-1987	ZIRCONIUM	<0.0050 mg/L
SD-210	18-Mar-1987	ZIRCONIUM	<0.0050 mg/L
SD-210	26-Mar-1987	ZIRCONIUM	<0.0050 mg/L
SD-210	1-Apr-1987	ZIRCONIUM	<0.0050 mg/L
SD-210	8-Apr-1987	ZIRCONIUM	<0.0050 mg/L
SD-210-D	26-Mar-1987	ZIRCONIUM	<0.0050 mg/L

B - Analyte was found in the reagent blank as well as the sample.
C - Composite
D - Duplicate
J - Indicates an estimated value.
ND - Not Detected
U - Compound was analyzed for but not detected. The number is the attainable detection limit for the sample.

Source: W. J. Scheib
Average values for each compound in each storm drain can be found in: <u>ORGDP Storm Drain Characterization</u> (K/HS-128), Part 2, September 1987.

STORM DRAIN DATA FOR SD-200 *

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-200	9-Mar-1987	1 1 1-TRICHLOROETHANE	<5 ug/L
SD-200	14-Apr-1987	1 1 1-TRICHLOROETHANE	<5 ug/L
SD-200	9-Mar-1987	1 1 2 2-TETRACHLOROETHANE	<5 ug/L
SD-200	14-Apr-1987	1 1 2 2-TETRACHLOROETHANE	<5 ug/L
SD-200	9-Mar-1987	1 1 2-TRICHLOROETHANE	<5 ug/L
SD-200	14-Apr-1987	1 1 2-TRICHLOROETHANE	<5 ug/L
SD-200	9-Mar-1987	1 1-DICHLOROETHANE	<5 ug/L
SD-200	14-Apr-1987	1 1-DICHLOROETHANE	<5 ug/L
SD-200	9-Mar-1987	1 1-DICHLOROETHENE	<5 ug/L
SD-200	14-Apr-1987	1 1-DICHLOROETHENE	<5 ug/L
SD-200	9-Mar-1987	1 2 4-TRICHLOROBENZENE	<10 ug/L
SD-200	14-Apr-1987	1 2 4-TRICHLOROBENZENE	<10 ug/L
SD-200	9-Mar-1987	1 2-DICHLOROBENZENE	<10 ug/L
SD-200	14-Apr-1987	1 2-DICHLOROBENZENE	<10 ug/L
SD-200	9-Mar-1987	1 2-DICHLOROETHANE	<5 ug/L
SD-200	14-Apr-1987	1 2-DICHLOROETHANE	<5 ug/L
SD-200	9-Mar-1987	1 2-DICHLOROPROPANE	<5 ug/L
SD-200	14-Apr-1987	1 2-DICHLOROPROPANE	<5 ug/L
SD-200	9-Mar-1987	1 3-DICHLOROBENZENE	<10 ug/L
SD-200	14-Apr-1987	1 3-DICHLOROBENZENE	<10 ug/L
SD-200	9-Mar-1987	1 4-DICHLOROBENZENE	<10 ug/L
SD-200	14-Apr-1987	1 4-DICHLOROBENZENE	<10 ug/L
SD-200	9-Mar-1987	2 4 6-TRICHLOROPHENOL	<10 ug/L
SD-200	14-Apr-1987	2 4 6-TRICHLOROPHENOL	<10 ug/L
SD-200	9-Mar-1987	2 4-DICHLOROPHENOL	<10 ug/L
SD-200	14-Apr-1987	2 4-DICHLOROPHENOL	<10 ug/L
SD-200	9-Mar-1987	2 4-DIMETHYLPHENOL	<10 ug/L
SD-200	14-Apr-1987	2 4-DIMETHYLPHENOL	<10 ug/L
SD-200	9-Mar-1987	2 4-DINITROPHENOL	<10 ug/L
SD-200	14-Apr-1987	2 4-DINITROPHENOL	<10 ug/L
SD-200	9-Mar-1987	2 4-DINITROTOLUENE	<10 ug/L
SD-200	14-Apr-1987	2 4-DINITROTOLUENE	<10 ug/L
SD-200	9-Mar-1987	2 6-DINITROTOLUENE	<10 ug/L
SD-200	14-Apr-1987	2 6-DINITROTOLUENE	<10 ug/L
SD-200	9-Mar-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-200	14-Apr-1987	2-CHLOROETHYLVINYL ETHER	<10 ug/L
SD-200	9-Mar-1987	2-CHLORONAPHTHALENE	<10 ug/L
SD-200	14-Apr-1987	2-CHLORONAPHTHALENE	<10 ug/L
SD-200	9-Mar-1987	2-CHLOROPHENOL	<10 ug/L
SD-200	14-Apr-1987	2-CHLOROPHENOL	<10 ug/L
SD-200	9-Mar-1987	2-NITROPHENOL	<10 ug/L
SD-200	14-Apr-1987	2-NITROPHENOL	<10 ug/L
SD-200	9-Mar-1987	3 3'-DICHLOROBENZIDINE	<20 ug/L
SD-200	14-Apr-1987	3 3'-DICHLOROBENZIDINE	<20 ug/L
SD-200	9-Mar-1987	4 6-DINITRO-2-METHYLPHENOL	<50 ug/L
SD-200	14-Apr-1987	4 6-DINITRO-2-METHYLPHENOL	<50 ug/L
SD-200	9-Mar-1987	4-BROMOPHENYL-PHENYLETHER	<10 ug/L
SD-200	14-Apr-1987	4-BROMOPHENYL-PHENYLETHER	<10 ug/L
SD-200	9-Mar-1987	4-CHLORO-3-METHYLPHENOL	<10 ug/L
SD-200	14-Apr-1987	4-CHLORO-3-METHYLPHENOL	<10 ug/L
SD-200	9-Mar-1987	4-CHLOROPHENYL-PHENYLETHER	<10 ug/L

STORM DRAIN DATA FOR SD-200

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-200	14-Apr-1987	4-CHLOROPHENYL-PHENYLETHER	<10 ug/L
SD-200	9-Mar-1987	4-NITROPHENOL	<50 ug/L
SD-200	14-Apr-1987	4-NITROPHENOL	<50 ug/L
SD-200	9-Mar-1987	ACENAPHTHENE	<10 ug/L
SD-200	14-Apr-1987	ACENAPHTHENE	<10 ug/L
SD-200	9-Mar-1987	ACENAPHTHYLENE	<10 ug/L
SD-200	14-Apr-1987	ACENAPHTHYLENE	<10 ug/L
SD-200	9-Mar-1987	ALKALINITY	48 mg/L
SD-200	14-Apr-1987	ALKALINITY	74 mg/L
SD-200	9-Mar-1987	ALPHA	26 pCi/L
SD-200	14-Apr-1987	ALPHA	26.1 pCi/L
SD-200	9-Mar-1987	AMMONIA	<0.2 mg/L
SD-200	14-Apr-1987	AMMONIA	<0.2 mg/L
SD-200	9-Mar-1987	ANTHRACENE	<10 ug/L
SD-200	14-Apr-1987	ANTHRACENE	<10 ug/L
SD-200	9-Mar-1987	ARSENIC	<0.005 mg/L
SD-200	14-Apr-1987	ARSENIC	<0.005 mg/L
SD-200	9-Mar-1987	BARIUM	<0.10 mg/L
SD-200	14-Apr-1987	BARIUM	<0.10 mg/L
SD-200	9-Mar-1987	BENZENE	<5 ug/L
SD-200	14-Apr-1987	BENZENE	<5 ug/L
SD-200	9-Mar-1987	BENZIDINE	<10 ug/L
SD-200	14-Apr-1987	BENZIDINE	<10 ug/L
SD-200	9-Mar-1987	BENZO(A)ANTHRACENE	<10 ug/L
SD-200	14-Apr-1987	BENZO(A)ANTHRACENE	<10 ug/L
SD-200	9-Mar-1987	BENZO(A)PYRENE	<10 ug/L
SD-200	14-Apr-1987	BENZO(A)PYRENE	<10 ug/L
SD-200	9-Mar-1987	BENZO(B)FLUORANTHENE	<10 ug/L
SD-200	14-Apr-1987	BENZO(B)FLUORANTHENE	<10 ug/L
SD-200	9-Mar-1987	BENZO(G H I)PERYLENE	<10 ug/L
SD-200	14-Apr-1987	BENZO(G H I)PERYLENE	<10 ug/L
SD-200	9-Mar-1987	BENZO(K)FLUORANTHENE	<10 ug/L
SD-200	14-Apr-1987	BENZO(K)FLUORANTHENE	<10 ug/L
SD-200	9-Mar-1987	BERYLLIUM	<0.0010 mg/L
SD-200	14-Apr-1987	BERYLLIUM	<0.0010 mg/L
SD-200	9-Mar-1987	BETA	13 pCi/L
SD-200	14-Apr-1987	BETA	14.1 pCi/L
SD-200	9-Mar-1987	BIS(2-CHLOROETHOXY)METHANE	<10 ug/L
SD-200	14-Apr-1987	BIS(2-CHLOROETHOXY)METHANE	<10 ug/L
SD-200	9-Mar-1987	BIS(2-CHLOROETHYL)ETHER	<10 ug/L
SD-200	14-Apr-1987	BIS(2-CHLOROETHYL)ETHER	<10 ug/L
SD-200	9-Mar-1987	BIS(2-CHLOROISOPROPYL)ETHER	<10 ug/L
SD-200	14-Apr-1987	BIS(2-CHLOROISOPROPYL)ETHER	<10 ug/L
SD-200	9-Mar-1987	BIS(2-ETHYLHEXYL)PHTHALATE	<10 ug/L
SD-200	14-Apr-1987	BIS(2-ETHYLHEXYL)PHTHALATE	3 J ug/L
SD-200	9-Mar-1987	BORON	0.012 mg/L
SD-200	14-Apr-1987	BORON	0.046 mg/L
SD-200	9-Mar-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-200	14-Apr-1987	BROMODICHLOROMETHANE	<5 ug/L
SD-200	9-Mar-1987	BROMOFORM	<5 ug/L
SD-200	14-Apr-1987	BROMOFORM	<5 ug/L

STORM DRAIN DATA FOR SD-200

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-200	9-Mar-1987	BROMOMETHANE	<10 ug/L
SD-200	14-Apr-1987	BROMOMETHANE	<10 ug/L
SD-200	9-Mar-1987	BUTYLBENZYLPHTHALATE	<10 ug/L
SD-200	14-Apr-1987	BUTYLBENZYLPHTHALATE	<10 ug/L
SD-200	9-Mar-1987	CADMIUM	<0.0030 mg/L
SD-200	14-Apr-1987	CADMIUM	<0.0030 mg/L
SD-200	9-Mar-1987	CALCIUM	12 mg/L
SD-200	14-Apr-1987	CALCIUM	28 mg/L
SD-200	9-Mar-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-200	14-Apr-1987	CARBON TETRACHLORIDE	<5 ug/L
SD-200	9-Mar-1987	CHEMICAL OXYGEN DEMAND (COD)	<5 mg/L
SD-200	14-Apr-1987	CHEMICAL OXYGEN DEMAND (COD)	7 mg/L
SD-200	9-Mar-1987	CHLORIDE	2.3 mg/L
SD-200	14-Apr-1987	CHLORIDE	25 mg/L
SD-200	9-Mar-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-200	14-Apr-1987	CHLORINE TOTAL RESIDUAL WATER	<0.1 mg/L
SD-200	9-Mar-1987	CHLOROBENZENE	<5 ug/L
SD-200	14-Apr-1987	CHLOROBENZENE	<5 ug/L
SD-200	9-Mar-1987	CHLOROETHANE	<10 ug/L
SD-200	14-Apr-1987	CHLOROETHANE	<10 ug/L
SD-200	9-Mar-1987	CHLOROFORM	<5 ug/L
SD-200	14-Apr-1987	CHLOROFORM	<5 ug/L
SD-200	9-Mar-1987	CHLOROMETHANE	<10 ug/L
SD-200	14-Apr-1987	CHLOROMETHANE	<10 ug/L
SD-200	9-Mar-1987	CHROMIUM	<0.010 mg/L
SD-200	14-Apr-1987	CHROMIUM	<0.010 mg/L
SD-200	9-Mar-1987	CHRYSENE	<10 ug/L
SD-200	14-Apr-1987	CHRYSENE	<10 ug/L
SD-200	9-Mar-1987	CIS-1 3-DICHLOROPROPENE	<5 ug/L
SD-200	14-Apr-1987	CIS-1 3-DICHLOROPROPENE	<5 ug/L
SD-200	9-Mar-1987	COBALT	<0.10 mg/L
SD-200	14-Apr-1987	COBALT	<0.10 mg/L
SD-200	9-Mar-1987	CONDUCTIVITY	110 umho/cm
SD-200	14-Apr-1987	CONDUCTIVITY	429 umho/cm
SD-200	9-Mar-1987	COPPER	<0.0040 mg/L
SD-200	14-Apr-1987	COPPER	0.0099 mg/L
SD-200	9-Mar-1987	CYANIDE	<0.002 mg/L
SD-200	14-Apr-1987	CYANIDE	<0.002 mg/L
SD-200	9-Mar-1987	DI-N-BUTYLPHTHALATE	<10 ug/L
SD-200	14-Apr-1987	DI-N-BUTYLPHTHALATE	<10 ug/L
SD-200	9-Mar-1987	DI-N-OCTYLPHTHALATE	1 JB ug/L
SD-200	14-Apr-1987	DI-N-OCTYLPHTHALATE	<10 ug/L
SD-200	9-Mar-1987	DIBENZ(A H)ANTHRACENE	<10 ug/L
SD-200	14-Apr-1987	DIBENZ(A H)ANTHRACENE	<10 ug/L
SD-200	9-Mar-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-200	14-Apr-1987	DIBROMOCHLOROMETHANE	<5 ug/L
SD-200	9-Mar-1987	DIETHYLPHTHALATE	<10 ug/L
SD-200	14-Apr-1987	DIETHYLPHTHALATE	<10 ug/L
SD-200	9-Mar-1987	DIMETHYLPHTHALATE	<10 ug/L
SD-200	14-Apr-1987	DIMETHYLPHTHALATE	<10 ug/L
SD-200	9-Mar-1987	DISSOLVED OXYGEN	10.3 ppm

STORM DRAIN DATA FOR SD-200

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-200	14-Apr-1987	DISSOLVED OXYGEN	10.7 ppm
SD-200	9-Mar-1987	ETHYLBENZENE	<5 ug/L
SD-200	14-Apr-1987	ETHYLBENZENE	<5 ug/L
SD-200	9-Mar-1987	FLUORANTHENE	<10 ug/L
SD-200	14-Apr-1987	FLUORANTHENE	<10 ug/L
SD-200	9-Mar-1987	FLUORENE	<10 ug/L
SD-200	14-Apr-1987	FLUORENE	<10 ug/L
SD-200	9-Mar-1987	FLUORIDE	0.1 mg/L
SD-200	14-Apr-1987	FLUORIDE	0.4 mg/L
SD-200	9-Mar-1987	HARDNESS	48 mg/L
SD-200	14-Apr-1987	HARDNESS	118 mg/L
SD-200	9-Mar-1987	HEXACHLOROBENZENE	<10 ug/L
SD-200	14-Apr-1987	HEXACHLOROBENZENE	<10 ug/L
SD-200	9-Mar-1987	HEXACHLOROBUTADIENE	<10 ug/L
SD-200	14-Apr-1987	HEXACHLOROBUTADIENE	<10 ug/L
SD-200	9-Mar-1987	HEXACHLOROCYCLOPENTADIENE	<10 ug/L
SD-200	14-Apr-1987	HEXACHLOROCYCLOPENTADIENE	<10 ug/L
SD-200	9-Mar-1987	HEXACHLOROETHANE	<10 ug/L
SD-200	14-Apr-1987	HEXACHLOROETHANE	<10 ug/L
SD-200	9-Mar-1987	INDENO(1 2 3-CD)PYRENE	<10 ug/L
SD-200	14-Apr-1987	INDENO(1 2 3-CD)PYRENE	<10 ug/L
SD-200	9-Mar-1987	IRON	<0.050 mg/L
SD-200	14-Apr-1987	IRON	0.14 mg/L
SD-200	9-Mar-1987	ISOPHORONE	<10 ug/L
SD-200	14-Apr-1987	ISOPHORONE	<10 ug/L
SD-200	9-Mar-1987	LEAD	<0.050 mg/L
SD-200	14-Apr-1987	LEAD	<0.050 mg/L
SD-200	9-Mar-1987	LITHIUM	<0.0040 mg/L
SD-200	14-Apr-1987	LITHIUM	<0.0040 mg/L
SD-200	9-Mar-1987	MAGNESIUM	1.8 mg/L
SD-200	14-Apr-1987	MAGNESIUM	4.8 mg/L
SD-200	9-Mar-1987	MANGANESE	<0.010 mg/L
SD-200	14-Apr-1987	MANGANESE	0.017 mg/L
SD-200	9-Mar-1987	MERCURY	<0.0002 mg/L
SD-200	14-Apr-1987	MERCURY	<0.0002 mg/L
SD-200	9-Mar-1987	METHYLENE CHLORIDE	5 ug/L
SD-200	14-Apr-1987	METHYLENE CHLORIDE	<5 ug/L
SD-200	9-Mar-1987	MOLYBDENUM	<0.010 mg/L
SD-200	14-Apr-1987	MOLYBDENUM	<0.010 mg/L
SD-200	9-Mar-1987	N-NITROSO-DI-N-PROPYLAMINE	<10 ug/L
SD-200	14-Apr-1987	N-NITROSO-DI-N-PROPYLAMINE	<10 ug/L
SD-200	9-Mar-1987	N-NITROSODIMETHYLAMINE	<10 ug/L
SD-200	14-Apr-1987	N-NITROSODIMETHYLAMINE	<10 ug/L
SD-200	9-Mar-1987	N-NITROSODIPHENYLAMINE	<10 ug/L
SD-200	14-Apr-1987	N-NITROSODIPHENYLAMINE	<10 ug/L
SD-200	9-Mar-1987	NAPHTHALENE	<10 ug/L
SD-200	14-Apr-1987	NAPHTHALENE	<10 ug/L
SD-200	9-Mar-1987	NICKEL	<0.050 mg/L
SD-200	14-Apr-1987	NICKEL	<0.050 mg/L
SD-200	9-Mar-1987	NIOBIUM	<0.0070 mg/L
SD-200	14-Apr-1987	NIOBIUM	<0.0070 mg/L

STORM DRAIN DATA FOR SD-200

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-200	9-Mar-1987	NITRATE	1.2 mg/L
SD-200	14-Apr-1987	NITRATE	6.3 mg/L
SD-200	9-Mar-1987	NITROBENZENE	<10 ug/L
SD-200	14-Apr-1987	NITROBENZENE	<10 ug/L
SD-200	9-Mar-1987	OIL & GREASE	<2 mg/L
SD-200	14-Apr-1987	OIL & GREASE	<2 mg/L
SD-200	9-Mar-1987	PCB (AROCLOR-1016)	<1 ug/L
SD-200	14-Apr-1987	PCB (AROCLOR-1016)	<0.5 ug/L
SD-200	9-Mar-1987	PCB (AROCLOR-1221)	<1 ug/L
SD-200	14-Apr-1987	PCB (AROCLOR-1221)	<0.5 ug/L
SD-200	9-Mar-1987	PCB (AROCLOR-1232)	<1 ug/L
SD-200	14-Apr-1987	PCB (AROCLOR-1232)	<0.5 ug/L
SD-200	9-Mar-1987	PCB (AROCLOR-1242)	<1 ug/L
SD-200	14-Apr-1987	PCB (AROCLOR-1242)	<0.5 ug/L
SD-200	9-Mar-1987	PCB (AROCLOR-1248)	<1 ug/L
SD-200	14-Apr-1987	PCB (AROCLOR-1248)	<0.5 ug/L
SD-200	9-Mar-1987	PCB (AROCLOR-1254)	<1 ug/L
SD-200	14-Apr-1987	PCB (AROCLOR-1254)	<1 ug/L
SD-200	9-Mar-1987	PCB (AROCLOR-1260)	<1 ug/L
SD-200	14-Apr-1987	PCB (AROCLOR-1260)	<1 ug/L
SD-200	9-Mar-1987	PENTACHLOROPHENOL	<50 ug/L
SD-200	14-Apr-1987	PENTACHLOROPHENOL	<50 ug/L
SD-200	9-Mar-1987	PH	7.6
SD-200	14-Apr-1987	PH	7.7
SD-200	9-Mar-1987	PHENANTHRENE	<10 ug/L
SD-200	14-Apr-1987	PHENANTHRENE.	<10 ug/L
SD-200	9-Mar-1987	PHENOL	<10 ug/L
SD-200	14-Apr-1987	PHENOL	<10 ug/L
SD-200	9-Mar-1987	PHOSPHORUS	<0.20 mg/L
SD-200	14-Apr-1987	PHOSPHORUS	<0.20 mg/L
SD-200	9-Mar-1987	POTASSIUM	1.6 mg/L
SD-200	14-Apr-1987	POTASSIUM	6.5 mg/L
SD-200	9-Mar-1987	PYRENE	<10 ug/L
SD-200	14-Apr-1987	PYRENE	<10 ug/L
SD-200	9-Mar-1987	SELENIUM	<0.005 mg/L
SD-200	14-Apr-1987	SELENIUM	<0.005 mg/L
SD-200	9-Mar-1987	SILICON	0.49 mg/L
SD-200	14-Apr-1987	SILICON	1.1 mg/L
SD-200	9-Mar-1987	SILVER	<0.010 mg/L
SD-200	14-Apr-1987	SILVER	<0.010 mg/L
SD-200	9-Mar-1987	SODIUM	1.3 mg/L
SD-200	14-Apr-1987	SODIUM	8.4 mg/L
SD-200	11-Mar-1987	SOLIDS SUSPENDED	4 mg/L
SD-200	9-Mar-1987	STRONTIUM	0.027 mg/L
SD-200	14-Apr-1987	STRONTIUM	0.056 mg/L
SD-200	9-Mar-1987	SULFATE	7.5 mg/L
SD-200	14-Apr-1987	SULFATE	73 mg/L
SD-200	19-Mar-1987	SUSPENDED SOLIDS	10 ug/ML
SD-200	25-Mar-1987	SUSPENDED SOLIDS	3 ug/ML
SD-200	30-Mar-1987	SUSPENDED SOLIDS	3 ug/g
SD-200	14-Apr-1987	SUSPENDED SOLIDS	24 ug/g

STORM DRAIN DATA FOR SD-200

LOCATION	DATE	TEST COMPOUND	RESULTS
SD-200	22-May-1987	SUSPENDED SOLIDS	1 ug/g
SD-200	17-Jun-1987	SUSPENDED SOLIDS	51 ug/g
SD-200	9-Mar-1987	TEMPERATURE	12.0 Deg. C
SD-200	14-Apr-1987	TEMPERATURE	15.0 Deg. C
SD-200	9-Mar-1987	TETRACHLOROETHENE	<5 ug/L
SD-200	14-Apr-1987	TETRACHLOROETHENE	<5 ug/L
SD-200	9-Mar-1987	THORIUM	<0.20 mg/L
SD-200	14-Apr-1987	THORIUM	<0.20 mg/L
SD-200	9-Mar-1987	TITANIUM	<0.0030 mg/L
SD-200	14-Apr-1987	TITANIUM	0.0039 mg/L
SD-200	9-Mar-1987	TOLUENE	<5 ug/L
SD-200	14-Apr-1987	TOLUENE	<5 ug/L
SD-200	9-Mar-1987	TOTAL DISSOLVED SOLIDS	70 mg/L
SD-200	14-Apr-1987	TOTAL DISSOLVED SOLIDS	188 mg/L
SD-200	9-Mar-1987	TOTAL ORGANIC CARBON (TOC)	26 mg/L
SD-200	14-Apr-1987	TOTAL ORGANIC CARBON (TOC)	11 mg/L
SD-200	9-Mar-1987	TOTAL SUSPENDED SOLIDS	2 mg/L
SD-200	14-Apr-1987	TOTAL SUSPENDED SOLIDS	3 mg/L
SD-200	9-Mar-1987	TRANS-1 2-DICHLOROETHENE	<5 ug/L
SD-200	14-Apr-1987	TRANS-1 2-DICHLOROETHENE	7 ug/L
SD-200	9-Mar-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-200	14-Apr-1987	TRANS-1 3-DICHLOROPROPENE	<5 ug/L
SD-200	9-Mar-1987	TRICHLOROETHENE	<5 ug/L
SD-200	14-Apr-1987	TRICHLOROETHENE	21 ug/L
SD-200	9-Mar-1987	TURBIDITY	1 NTU
SD-200	14-Apr-1987	TURBIDITY	10 NTU
SD-200	9-Mar-1987	URANIUM	0.019 mg/L
SD-200	14-Apr-1987	URANIUM	0.021 mg/L
SD-200	9-Mar-1987	VANADIUM	<0.50 mg/L
SD-200	14-Apr-1987	VANADIUM	<0.50 mg/L
SD-200	9-Mar-1987	VINYL CHLORIDE	<10 ug/L
SD-200	14-Apr-1987	VINYL CHLORIDE	<10 ug/L
SD-200	9-Mar-1987	ZINC	0.024 mg/L
SD-200	14-Apr-1987	ZINC	0.040 mg/L
SD-200	9-Mar-1987	ZIRCONIUM	<0.0050 mg/L
SD-200	14-Apr-1987	ZIRCONIUM	<0.0050 mg/L

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*
B - Analyte was found in the reagent blank as well as the sample.
C - Composite
D - Duplicate
J - Indicates an estimated value.
ND - Not Detected
U - Compound was analyzed for but not detected. The number is the attainable detection limit for the sample.

Source: W. J. Scheib
Average values for each compound in each storm drain can be found in: <u>ORGDP Storm Drain Characterization</u> (K/HS-128), Part 2, September 1987.

APPENDIX C

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
** K-1413				
* UNW-26				
870610-077	K-1413	UNW-26	1,1,1-trichloroethane	<5 ug/L
870610-077	K-1413	UNW-26	1,1,2,2-tetrachloroethane	<5 ug/L
870610-077	K-1413	UNW-26	1,1,2-trichloroethane	<5 ug/L
870610-077	K-1413	UNW-26	1,1-dichloroethane	<5 ug/L
870610-077	K-1413	UNW-26	1,1-dichloroethene	<5 ug/L
870610-077	K-1413	UNW-26	1,2,4-trichlorobenzene	<5.0 ug/L
870610-077	K-1413	UNW-26	1,2-dichlorobenzene	<5.0 ug/L
870610-077	K-1413	UNW-26	1,2-dichloroethane	<5 ug/L
870610-077	K-1413	UNW-26	1,2-dichloropropane	<5 ug/L
870610-077	K-1413	UNW-26	1,3-dichlorobenzene	<5.0 ug/L
870610-077	K-1413	UNW-26	1,4-dichlorobenzene	<5.0 ug/L
870610-077	K-1413	UNW-26	2,4,5-T	<0.1 ug/L
870610-077	K-1413	UNW-26	2,4,5-TP (Silvex)	<0.1 ug/L
870610-077	K-1413	UNW-26	2,4,5-trichlorophenol	<25.0 ug/L
870610-077	K-1413	UNW-26	2,4,6-trichlorophenol	<5.0 ug/L
870610-077	K-1413	UNW-26	2,4-D	<1 ug/
870610-077	K-1413	UNW-26	2,4-dichlorophenol	<5.0 ug/.
870610-077	K-1413	UNW-26	2,4-dimethylphenol	<5.0 ug/L
870610-077	K-1413	UNW-26	2,4-dinitrophenol	<25.0 ug/L
870610-077	K-1413	UNW-26	2,4-dinitrotoluene	<5.0 ug/L
870610-077	K-1413	UNW-26	2,6-dinitrotoluene	<5.0 ug/L
870610-077	K-1413	UNW-26	2-butanone	<10 ug/L
870610-077	K-1413	UNW-26	2-chloroethylvinyl ether	<10 ug/L
870610-077	K-1413	UNW-26	2-chloronaphthalene	<5.0 ug/L
870610-077	K-1413	UNW-26	2-chlorophenol	<5.0 ug/L
870610-077	K-1413	UNW-26	2-hexanone	<10 ug/L
870610-077	K-1413	UNW-26	2-methylnaphthalene	<5.0 ug/L
870610-077	K-1413	UNW-26	2-methylphenol	<5.0 ug/L
870610-077	K-1413	UNW-26	2-nitroaniline	<25.0 ug/L
870610-077	K-1413	UNW-26	2-nitrophenol	<5.0 ug/L
870610-077	K-1413	UNW-26	3,3'-dichlorobenzidine	<10.0 ug/L
870610-077	K-1413	UNW-26	3-nitroaniline	<25.0 ug/L
870610-077	K-1413	UNW-26	4,4'-DDD	<0.1 ug/L
870610-077	K-1413	UNW-26	4,4'-DDE	<0.1 ug/L
870610-077	K-1413	UNW-26	4,4'-DDT	<0.1 ug/L
870610-077	K-1413	UNW-26	4,6-dinitro-2-methylphenol	<25.0 ug/L
870610-077	K-1413	UNW-26	4-bromophenyl-phenylether	<5.0 ug/L
870610-077	K-1413	UNW-26	4-chloro-3-methylphenol	<5.0 ug/L
870610-077	K-1413	UNW-26	4-chloroaniline	<5.0 ug/L
870610-077	K-1413	UNW-26	4-chlorophenyl-phenylether	<5.0 ug/L
870610-077	K-1413	UNW-26	4-methyl-2-pentanone	<10 ug/
870610-077	K-1413	UNW-26	4-methylphenol	<5.0 ug
870610-077	K-1413	UNW-26	4-nitroaniline	<25.0 ug/
870610-077	K-1413	UNW-26	4-nitrophenol	<25.0 ug/L
870610-077	K-1413	UNW-26	Alpha Activity	21.0 pCi/L
870610-077	K-1413	UNW-26	Aluminum	19 mg/L

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870610-077	K-1413	UNW-26	Antimony	<0.050 mg/L
870610-077	K-1413	UNW-26	Arsenic	<0.005 mg/L
870610-077	K-1413	UNW-26	Barium	0.35 mg/L
870610-077	K-1413	UNW-26	Beryllium	0.0020 mg/L
870610-077	K-1413	UNW-26	Beta Activity	42.1 pCi/L
870610-077	K-1413	UNW-26	Boron	0.029 mg/L
870610-077	K-1413	UNW-26	Cadmium	<0.0030 mg/L
870610-077	K-1413	UNW-26	Calcium	15 mg/L
870610-077	K-1413	UNW-26	Chloride	23 mg/L
870610-077	K-1413	UNW-26	Chromium	0.095 mg/L
870610-077	K-1413	UNW-26	Cobalt	0.026 mg/L
870610-077	K-1413	UNW-26	Conductivity	190 umho/cm
870610-077	K-1413	UNW-26	Conductivity	223 umho/cm
870610-077	K-1413	UNW-26	Conductivity	223 umho/cm
870610-077	K-1413	UNW-26	Conductivity	220 umho/cm
870610-077	K-1413	UNW-26	Conductivity	218 umho/cm
870610-077	K-1413	UNW-26	Conductivity - Init	210 umho/cm
870610-077	K-1413	UNW-26	Copper	0.035 mg/L
870610-077	K-1413	UNW-26	Depth	16.5 feet
870610-077	K-1413	UNW-26	Dissolved Oxygen	2.5 ppm
870610-077	K-1413	UNW-26	Dissolved Oxygen - Init	1.8 ppm
870610-077	K-1413	UNW-26	Fluoride	<0.1 mg/L
870610-077	K-1413	UNW-26	Iron	19 mg/L
870610-077	K-1413	UNW-26	Lead	0.025 mg/L
870610-077	K-1413	UNW-26	Lithium	0.020 mg/L
870610-077	K-1413	UNW-26	Magnesium	11 mg/L
870610-077	K-1413	UNW-26	Manganese	2.1 mg/L
870610-077	K-1413	UNW-26	Mercury	<0.0002 mg/L
870610-077	K-1413	UNW-26	Molybdenum	0.012 mg/L
870610-077	K-1413	UNW-26	Nickel	0.095 mg/L
870610-077	K-1413	UNW-26	Niobium	<0.0070 mg/L
870610-077	K-1413	UNW-26	Nitrate-Nitrogen	0.79 mg/L
870610-077	K-1413	UNW-26	PCB (Aroclor-1016)	<0.5 ug/L
870610-077	K-1413	UNW-26	PCB (Aroclor-1221)	<0.5 ug/L
870610-077	K-1413	UNW-26	PCB (Aroclor-1232)	<0.5 ug/L
870610-077	K-1413	UNW-26	PCB (Aroclor-1242)	<0.5 ug/L
870610-077	K-1413	UNW-26	PCB (Aroclor-1248)	<0.5 ug/L
870610-077	K-1413	UNW-26	PCB (Aroclor-1254)	<1 ug/L
870610-077	K-1413	UNW-26	PCB (Aroclor-1260)	<1 ug/L
870610-077	K-1413	UNW-26	Phenols	0.003 mg/L
870610-077	K-1413	UNW-26	Phosphorus	0.35 mg/L
870610-077	K-1413	UNW-26	Potassium	7.3 mg/L
870610-077	K-1413	UNW-26	Redox	350 mv
870610-077	K-1413	UNW-26	Redox - Init	317 mv
870610-077	K-1413	UNW-26	Selenium	<0.005 mg/L
870610-077	K-1413	UNW-26	Silicon	26 mg/L
870610-077	K-1413	UNW-26	Silver	<0.0060 mg/L
870610-077	K-1413	UNW-26	Sodium	11 mg/L
870610-077	K-1413	UNW-26	Strontium	0.072 mg/L

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870610-077	K-1413	UNW-26	Sulfate	30 mg/L
870610-077	K-1413	UNW-26	TOX	19 ug/L
870610-077	K-1413	UNW-26	TOX	12 ug/L
870610-077	K-1413	UNW-26	TOX	15 ug/L
870610-077	K-1413	UNW-26	TOX	17 ug/L
870610-077	K-1413	UNW-26	Temperature	17.0 Deg C
870610-077	K-1413	UNW-26	Temperature - Init	17.5 Deg C
870610-077	K-1413	UNW-26	Thallium	<0.01 mg/L
870610-077	K-1413	UNW-26	Thorium	<0.20 mg/L
870610-077	K-1413	UNW-26	Titanium	0.22 mg/L
870610-077	K-1413	UNW-26	Total Coliform	NF col/100
870610-077	K-1413	UNW-26	Total Organic Carbon (TOC)	1.8 mg/L
870610-077	K-1413	UNW-26	Total Organic Carbon (TOC)	1.4 mg/L
870610-077	K-1413	UNW-26	Total Organic Carbon (TOC)	2.6 mg/L
870610-077	K-1413	UNW-26	Total Organic Carbon (TOC)	2.3 mg/L
870610-077	K-1413	UNW-26	Turbidity	>180 NTU
870610-077	K-1413	UNW-26	U-235	INSUFF U Wt.%
870610-077	K-1413	UNW-26	Uranium	<.001 mg/L
870610-077	K-1413	UNW-26	Vanadium	0.019 mg/
870610-077	K-1413	UNW-26	Zinc	0.063 mg/L
870610-077	K-1413	UNW-26	Zirconium	<0.0050 mg/L
870610-077	K-1413	UNW-26	acenaphthene	<5.0 ug/L
870610-077	K-1413	UNW-26	acenaphthylene	<5.0 ug/L
870610-077	K-1413	UNW-26	acetone	10 B ug/L
870610-077	K-1413	UNW-26	aldrin	<0.05 ug/L
870610-077	K-1413	UNW-26	alpha-BHC	<0.05 ug/L
870610-077	K-1413	UNW-26	anthracene	<5.0 ug/L
870610-077	K-1413	UNW-26	benzene	<5 ug/L
870610-077	K-1413	UNW-26	benzo(a)anthracene	<5.0 ug/L
870610-077	K-1413	UNW-26	benzo(a)pyrene	<5.0 ug/L
870610-077	K-1413	UNW-26	benzo(b)fluoranthene	<5.0 ug/L
870610-077	K-1413	UNW-26	benzo(g,h,i)perylene	<5.0 ug/L
870610-077	K-1413	UNW-26	benzo(k)fluoranthene	<5.0 ug/L
870610-077	K-1413	UNW-26	benzoic acid	<25.0 ug/L
870610-077	K-1413	UNW-26	benzyl alcohol	<5.0 ug/L
870610-077	K-1413	UNW-26	beta-BHC	<0.05 ug/L
870610-077	K-1413	UNW-26	bis(2-chloroethoxy)methane	<5.0 ug/L
870610-077	K-1413	UNW-26	bis(2-chloroethyl)ether	<5.0 ug/L
870610-077	K-1413	UNW-26	bis(2-chloroisopropyl)ether	<5.0 ug/L
870610-077	K-1413	UNW-26	bis(2-ethylhexyl)phthalate	<5.0 ug/L
870610-077	K-1413	UNW-26	bromodichloromethane	<5 ug/L
870610-077	K-1413	UNW-26	bromoform	<5 ug/L
870610-077	K-1413	UNW-26	bromomethane	<10 ug/L
870610-077	K-1413	UNW-26	butylbenzylphthalate	<5.0 ug
870610-077	K-1413	UNW-26	carbon disulfide	<5 ug,
870610-077	K-1413	UNW-26	carbon tetrachloride	<5 ug/L
870610-077	K-1413	UNW-26	chlorobenzene	<5 ug/L
870610-077	K-1413	UNW-26	chloroethane	<10 ug/L
870610-077	K-1413	UNW-26	chloroform	17 B ug/L

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870610-077	K-1413	UNW-26	chloromethane	<10 ug/L
870610-077	K-1413	UNW-26	chrysene	<5.0 ug/L
870610-077	K-1413	UNW-26	cis-1,3-dichloropropene	<5 ug/L
870610-077	K-1413	UNW-26	delta-BHC	<0.05 ug/L
870610-077	K-1413	UNW-26	di-n-butylphthalate	<5.0 ug/L
870610-077	K-1413	UNW-26	di-n-octylphthalate	<5.0 ug/L
870610-077	K-1413	UNW-26	dibenz(a,h)anthracene	<5.0 ug/L
870610-077	K-1413	UNW-26	dibenzofuran	<5.0 ug/L
870610-077	K-1413	UNW-26	dibromochloromethane	<5 ug/L
870610-077	K-1413	UNW-26	dieldrin	<0.1 ug/L
870610-077	K-1413	UNW-26	diethylphthalate	<5.0 ug/L
870610-077	K-1413	UNW-26	dimethylphthalate	<5.0 ug/L
870610-077	K-1413	UNW-26	endosulfan I	<0.05 ug/L
870610-077	K-1413	UNW-26	endosulfan II	<0.1 ug/L
870610-077	K-1413	UNW-26	endosulfan sulfate	<0.1 ug/L
870610-077	K-1413	UNW-26	endrin	<0.1 ug/L
870610-077	K-1413	UNW-26	endrin ketone	<0.1 ug/L
870610-077	K-1413	UNW-26	ethylbenzene	<5 ug/L
870610-077	K-1413	UNW-26	fluoranthene	<5.0 ug/L
870610-077	K-1413	UNW-26	fluorene	<5.0 ug/L
870610-077	K-1413	UNW-26	gamma-BHC (Lindane)	<0.05 ug/L
870610-077	K-1413	UNW-26	heptachlor	<0.05 ug/L
870610-077	K-1413	UNW-26	heptachlor epoxide	<0.05 ug/L
870610-077	K-1413	UNW-26	hexachlorobenzene	<5.0 ug/L
870610-077	K-1413	UNW-26	hexachlorobutadiene	<5.0 ug/L
870610-077	K-1413	UNW-26	hexachlorocyclopentadiene	<5.0 ug/L
870610-077	K-1413	UNW-26	hexachloroethane	<5.0 ug/L
870610-077	K-1413	UNW-26	indeno(1,2,3-cd)pyrene	<5.0 ug/L
870610-077	K-1413	UNW-26	isophorone	<5.0 ug/L
870610-077	K-1413	UNW-26	methoxychlor	<0.5 ug/L
870610-077	K-1413	UNW-26	methylene chloride	<5 ug/L
870610-077	K-1413	UNW-26	n-nitroso-di-n-propylamine	<5.0 ug/L
870610-077	K-1413	UNW-26	n-nitrosodiphenylamine	<5.0 ug/L
870610-077	K-1413	UNW-26	naphthalene	<5.0 ug/L
870610-077	K-1413	UNW-26	nitrobenzene	<5.0 ug/L
870610-077	K-1413	UNW-26	pH	5.1 -
870610-077	K-1413	UNW-26	pH	5.6 -
870610-077	K-1413	UNW-26	pH	5.5 -
870610-077	K-1413	UNW-26	pH	5.6 -
870610-077	K-1413	UNW-26	pH	5.8 -
870610-077	K-1413	UNW-26	pH - Init	4.5 -
870610-077	K-1413	UNW-26	pentachlorophenol	<25.0 ug/L
870610-077	K-1413	UNW-26	phenanthrene	<5.0 ug/L
870610-077	K-1413	UNW-26	phenol	<5.0 ug/L
870610-077	K-1413	UNW-26	pyrene	<5.0 ug/L
870610-077	K-1413	UNW-26	styrene	<5 ug/L
870610-077	K-1413	UNW-26	t. chlordane	<0.5 ug/L
870610-077	K-1413	UNW-26	tetrachloroethene	<5 ug/L
870610-077	K-1413	UNW-26	toluene	1 BJ ug/L

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870610-077	K-1413	UNW-26	total xylenes	<5 ug/L
870610-077	K-1413	UNW-26	toxaphene	<1 ug/L
870610-077	K-1413	UNW-26	trans-1,2-dichloroethene	1 J ug/L
870610-077	K-1413	UNW-26	trans-1,3-dichloropropene	<5 ug/L
870610-077	K-1413	UNW-26	trichloroethene	4 J ug/L
870610-077	K-1413	UNW-26	vinyl acetate	<10 ug/L
870610-077	K-1413	UNW-26	vinyl chloride	<10 ug/L
* UNW-26-F				
870610-078	K-1413	UNW-26-F	Aluminum	<0.020 mg/L
870610-078	K-1413	UNW-26-F	Antimony	<0.050 mg/L
870610-078	K-1413	UNW-26-F	Arsenic	<0.005 mg/L
870610-078	K-1413	UNW-26-F	Barium	0.15 mg/L
870610-078	K-1413	UNW-26-F	Beryllium	<0.0003 mg/L
870610-078	K-1413	UNW-26-F	Boron	0.023 mg/L
870610-078	K-1413	UNW-26-F	Cadmium	<0.0030 mg/L
870610-078	K-1413	UNW-26-F	Calcium	17 mg/L
870610-078	K-1413	UNW-26-F	Chromium	<0.010 mg/L
870610-078	K-1413	UNW-26-F	Cobalt	0.0060 mg/
870610-078	K-1413	UNW-26-F	Copper	<0.0040 mg/L
870610-078	K-1413	UNW-26-F	Iron	0.078 mg/L
870610-078	K-1413	UNW-26-F	Lead	<0.004 mg/L
870610-078	K-1413	UNW-26-F	Lithium	<0.0040 mg/L
870610-078	K-1413	UNW-26-F	Magnesium	6.7 mg/L
870610-078	K-1413	UNW-26-F	Manganese	0.51 mg/L
870610-078	K-1413	UNW-26-F	Mercury	<0.0002 mg/L
870610-078	K-1413	UNW-26-F	Molybdenum	0.013 mg/L
870610-078	K-1413	UNW-26-F	Nickel	0.037 mg/L
870610-078	K-1413	UNW-26-F	Niobium	<0.0070 mg/L
870610-078	K-1413	UNW-26-F	Phosphorus	<0.20 mg/L
870610-078	K-1413	UNW-26-F	Potassium	4.4 mg/L
870610-078	K-1413	UNW-26-F	Selenium	<0.005 mg/L
870610-078	K-1413	UNW-26-F	Silicon	3.5 mg/L
870610-078	K-1413	UNW-26-F	Silver	<0.0060 mg/L
870610-078	K-1413	UNW-26-F	Sodium	11 mg/L
870610-078	K-1413	UNW-26-F	Strontium	0.069 mg/L
870610-078	K-1413	UNW-26-F	Thallium	<0.01 mg/L
870610-078	K-1413	UNW-26-F	Thorium	<0.20 mg/L
870610-078	K-1413	UNW-26-F	Titanium	0.0052 mg/L
870610-078	K-1413	UNW-26-F	Uranium	<.001 mg/L
870610-078	K-1413	UNW-26-F	Vanadium	<0.0050 mg/L
870610-078	K-1413	UNW-26-F	Zinc	0.0067 mg/L
870610-078	K-1413	UNW-26-F	Zirconium	<0.0050 mg/L
* BRW-15				
870723-034	K-1413	BRW-15	1,1,1-trichloroethane	<5 ug/L
870723-034	K-1413	BRW-15	1,1,2,2-tetrachloroethane	<5 ug/L
870723-034	K-1413	BRW-15	1,1,2-trichloroethane	<5 ug/L
870723-034	K-1413	BRW-15	1,1-dichloroethane	<5 ug/L

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870723-034	K-1413	BRW-15	1,1-dichloroethene	<5 ug/L
870723-034	K-1413	BRW-15	1,2,4-trichlorobenzene	<10 ug/L
870723-034	K-1413	BRW-15	1,2-dichlorobenzene	<10 ug/L
870723-034	K-1413	BRW-15	1,2-dichloroethane	<5 ug/L
870723-034	K-1413	BRW-15	1,2-dichloropropane	<5 ug/L
870723-034	K-1413	BRW-15	1,3-dichlorobenzene	<10 ug/L
870723-034	K-1413	BRW-15	1,4-dichlorobenzene	<10 ug/L
870723-034	K-1413	BRW-15	2,4,5-T	<0.1 ug/L
870723-034	K-1413	BRW-15	2,4,5-TP (Silvex)	<0.1 ug/L
870723-034	K-1413	BRW-15	2,4,5-trichlorophenol	<50 ug/L
870723-034	K-1413	BRW-15	2,4,6-trichlorophenol	<10 ug/L
870723-034	K-1413	BRW-15	2,4-D	<1 ug/L
870723-034	K-1413	BRW-15	2,4-dichlorophenol	<10 ug/L
870723-034	K-1413	BRW-15	2,4-dimethylphenol	<10 ug/L
870723-034	K-1413	BRW-15	2,4-dinitrophenol	<50 ug/L
870723-034	K-1413	BRW-15	2,4-dinitrotoluene	<10 ug/L
870723-034	K-1413	BRW-15	2,6-dinitrotoluene	<10 ug/L
870723-034	K-1413	BRW-15	2-butanone	13 B ug/L
870723-034	K-1413	BRW-15	2-chloroethylvinyl ether	<10 ug/L
870723-034	K-1413	BRW-15	2-chloronaphthalene	<10 ug/L
870723-034	K-1413	BRW-15	2-chlorophenol	<10 ug/L
870723-034	K-1413	BRW-15	2-hexanone	<10 ug/L
870723-034	K-1413	BRW-15	2-methylnaphthalene	<10 ug/L
870723-034	K-1413	BRW-15	2-methylphenol	<10 ug/L
870723-034	K-1413	BRW-15	2-nitroaniline	<50 ug/L
870723-034	K-1413	BRW-15	2-nitrophenol	<10 ug/L
870723-034	K-1413	BRW-15	3,3'-dichlorobenzidine	<20 ug/L
870723-034	K-1413	BRW-15	3-nitroaniline	<50 ug/L
870723-034	K-1413	BRW-15	4,4'-DDD	<0.1 ug/L
870723-034	K-1413	BRW-15	4,4'-DDE	<0.1 ug/L
870723-034	K-1413	BRW-15	4,4'-DDT	<0.1 ug/L
870723-034	K-1413	BRW-15	4,6-dinitro-2-methylphenol	<50 ug/L
870723-034	K-1413	BRW-15	4-bromophenyl-phenylether	<10 ug/L
870723-034	K-1413	BRW-15	4-chloro-3-methylphenol	<10 ug/L
870723-034	K-1413	BRW-15	4-chloroaniline	<10 ug/L
870723-034	K-1413	BRW-15	4-chlorophenyl-phenylether	<10 ug/L
870723-034	K-1413	BRW-15	4-methyl-2-pentanone	<10 ug/L
870723-034	K-1413	BRW-15	4-methylphenol	<10 ug/L
870723-034	K-1413	BRW-15	4-nitroaniline	<50 ug/L
870723-034	K-1413	BRW-15	4-nitrophenol	<50 ug/L
870723-034	K-1413	BRW-15	Alpha Activity	7.8 pCi/L
870723-034	K-1413	BRW-15	Aluminum	0.36 mg/L
870723-034	K-1413	BRW-15	Antimony	<0.050 mg/L
870723-034	K-1413	BRW-15	Arsenic	<0.005 mg/L
870723-034	K-1413	BRW-15	Barium	0.17 mg/L
870723-034	K-1413	BRW-15	Beryllium	0.0004 mg/L
870723-034	K-1413	BRW-15	Beta Activity	20.5 pCi/L
870723-034	K-1413	BRW-15	Boron	0.030 mg/L
870723-034	K-1413	BRW-15	Cadmium	<0.0030 mg/L

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870723-034	K-1413	BRW-15	Calcium	100 mg/L
870723-034	K-1413	BRW-15	Chloride	107 mg/L
870723-034	K-1413	BRW-15	Chromium	<0.010 mg/L
870723-034	K-1413	BRW-15	Cobalt	<0.0050 mg/L
870723-034	K-1413	BRW-15	Conductivity	590 umho/cm
870723-034	K-1413	BRW-15	Conductivity	679 umho/cm
870723-034	K-1413	BRW-15	Conductivity - Init	550 umho/cm
870723-034	K-1413	BRW-15	Copper	<0.0040 mg/L
870723-034	K-1413	BRW-15	Depth to water	16.4 feet
870723-034	K-1413	BRW-15	Dissolved Oxygen	5.0 ppm
870723-034	K-1413	BRW-15	Dissolved Oxygen - Init	2.3 ppm
870723-034	K-1413	BRW-15	Fluoride	<0.1 mg/L
870723-034	K-1413	BRW-15	Iron	0.47 mg/L
870723-034	K-1413	BRW-15	Lead	<0.004 mg/L
870723-034	K-1413	BRW-15	Lithium	0.015 mg/L
870723-034	K-1413	BRW-15	Magnesium	19 mg/L
870723-034	K-1413	BRW-15	Manganese	0.052 mg/L
870723-034	K-1413	BRW-15	Mercury	<0.0002 mg/L
870723-034	K-1413	BRW-15	Molybdenum	<0.010 mg/
870723-034	K-1413	BRW-15	Nickel	0.014 mg,
870723-034	K-1413	BRW-15	Niobium	0.012 mg/L
870723-034	K-1413	BRW-15	Nitrate-Nitrogen	0.13 mg/L
870723-034	K-1413	BRW-15	PCB (Aroclor-1016)	<0.5 ug/L
870723-034	K-1413	BRW-15	PCB (Aroclor-1221)	<0.5 ug/L
870723-034	K-1413	BRW-15	PCB (Aroclor-1232)	<0.5 ug/L
870723-034	K-1413	BRW-15	PCB (Aroclor-1242)	<0.5 ug/L
870723-034	K-1413	BRW-15	PCB (Aroclor-1248)	<0.5 ug/L
870723-034	K-1413	BRW-15	PCB (Aroclor-1254)	<1 ug/L
870723-034	K-1413	BRW-15	PCB (Aroclor-1260)	<1 ug/L
870723-034	K-1413	BRW-15	Phenols	0.003 mg/L
870723-034	K-1413	BRW-15	Phosphorus	<0.20 mg/L
870723-034	K-1413	BRW-15	Potassium	6.8 mg/L
870723-034	K-1413	BRW-15	Redox	181 mv
870723-034	K-1413	BRW-15	Redox - Init	215 mv
870723-034	K-1413	BRW-15	Selenium	<0.005 mg/L
870723-034	K-1413	BRW-15	Silicon	8.4 mg/L
870723-034	K-1413	BRW-15	Silver	<0.0060 mg/L
870723-034	K-1413	BRW-15	Sodium	9.1 mg/L
870723-034	K-1413	BRW-15	Strontium	0.25 mg/L
870723-034	K-1413	BRW-15	Sulfate	37 mg/L
870723-034	K-1413	BRW-15	TOX	13 ug/L
870723-034	K-1413	BRW-15	Temperature	22.0 Deg C
870723-034	K-1413	BRW-15	Temperature - Init	21.0 Deg C
870723-034	K-1413	BRW-15	Thallium	<0.01 mg/
870723-034	K-1413	BRW-15	Thorium	<0.20 mg
870723-034	K-1413	BRW-15	Titanium	0.0094 mg/L
870723-034	K-1413	BRW-15	Total Coliform	0 col/10
870723-034	K-1413	BRW-15	Total Organic Carbon (TOC)	<1.0 mg/L
870723-034	K-1413	BRW-15	Turbidity	16 NTU

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870723-034	K-1413	BRW-15	U-235	0.85 Wt.%
870723-034	K-1413	BRW-15	Uranium	0.002 mg/L
870723-034	K-1413	BRW-15	Vanadium	<0.0050 mg/L
870723-034	K-1413	BRW-15	Zinc	0.0039 mg/L
870723-034	K-1413	BRW-15	Zirconium	<0.0050 mg/L
870723-034	K-1413	BRW-15	acenaphthene	<10 ug/L
870723-034	K-1413	BRW-15	acenaphthylene	<10 ug/L
870723-034	K-1413	BRW-15	acetone	<10 ug/L
870723-034	K-1413	BRW-15	aldrin	<0.05 ug/L
870723-034	K-1413	BRW-15	alpha-BHC	<0.05 ug/L
870723-034	K-1413	BRW-15	anthracene	<10 ug/L
870723-034	K-1413	BRW-15	benzene	<5 ug/L
870723-034	K-1413	BRW-15	benzo(a)anthracene	<10 ug/L
870723-034	K-1413	BRW-15	benzo(a)pyrene	<10 ug/L
870723-034	K-1413	BRW-15	benzo(b)fluoranthene	<10 ug/L
870723-034	K-1413	BRW-15	benzo(g,h,i)perylene	<10 ug/L
870723-034	K-1413	BRW-15	benzo(k)fluoranthene	<10 ug/L
870723-034	K-1413	BRW-15	benzoic acid	<50 ug/L
870723-034	K-1413	BRW-15	benzyl alcohol	<10 ug/L
870723-034	K-1413	BRW-15	beta-BHC	<0.05 ug/L
870723-034	K-1413	BRW-15	bis(2-chloroethoxy)methane	<10 ug/L
870723-034	K-1413	BRW-15	bis(2-chloroethyl)ether	<10 ug/L
870723-034	K-1413	BRW-15	bis(2-chloroisopropyl)ether	<10 ug/L
870723-034	K-1413	BRW-15	bis(2-ethylhexyl)phthalate	<10 ug/L
870723-034	K-1413	BRW-15	bromodichloromethane	<5 ug/L
870723-034	K-1413	BRW-15	bromoform	<5 ug/L
870723-034	K-1413	BRW-15	bromomethane	<10 ug/L
870723-034	K-1413	BRW-15	butylbenzylphthalate	<10 ug/L
870723-034	K-1413	BRW-15	carbon disulfide	<5 ug/L
870723-034	K-1413	BRW-15	carbon tetrachloride	<5 ug/L
870723-034	K-1413	BRW-15	chlorobenzene	<5 ug/L
870723-034	K-1413	BRW-15	chloroethane	<10 ug/L
870723-034	K-1413	BRW-15	chloroform	5 B ug/L
870723-034	K-1413	BRW-15	chloromethane	<10 ug/L
870723-034	K-1413	BRW-15	chrysene	<10 ug/L
870723-034	K-1413	BRW-15	cis-1,3-dichloropropene	<5 ug/L
870723-034	K-1413	BRW-15	delta-BHC	<0.05 ug/L
870723-034	K-1413	BRW-15	di-n-butylphthalate	<10 ug/L
870723-034	K-1413	BRW-15	di-n-octylphthalate	<10 ug/L
870723-034	K-1413	BRW-15	dibenz(a,h)anthracene	<10 ug/L
870723-034	K-1413	BRW-15	dibenzofuran	<10 ug/L
870723-034	K-1413	BRW-15	dibromochloromethane	<5 ug/L
870723-034	K-1413	BRW-15	dieldrin	<0.1 ug/L
870723-034	K-1413	BRW-15	diethylphthalate	<10 ug/L
870723-034	K-1413	BRW-15	dimethylphthalate	<10 ug/L
870723-034	K-1413	BRW-15	endosulfan I	<0.05 ug/L
870723-034	K-1413	BRW-15	endosulfan II	<0.1 ug/L
870723-034	K-1413	BRW-15	endosulfan sulfate	<0.1 ug/L
870723-034	K-1413	BRW-15	endrin	<0.1 ug/L

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870723-034	K-1413	BRW-15	endrin ketone	<0.1 ug/L
870723-034	K-1413	BRW-15	ethylbenzene	<5 ug/L
870723-034	K-1413	BRW-15	fluoranthene	<10 ug/L
870723-034	K-1413	BRW-15	fluorene	<10 ug/L
870723-034	K-1413	BRW-15	gamma-BHC (Lindane)	<0.05 ug/L
870723-034	K-1413	BRW-15	heptachlor	<0.05 ug/L
870723-034	K-1413	BRW-15	heptachlor epoxide	<0.05 ug/L
870723-034	K-1413	BRW-15	hexachlorobenzene	<10 ug/L
870723-034	K-1413	BRW-15	hexachlorobutadiene	<10 ug/L
870723-034	K-1413	BRW-15	hexachlorocyclopentadiene	<10 ug/L
870723-034	K-1413	BRW-15	hexachloroethane	<10 ug/L
870723-034	K-1413	BRW-15	indeno(1,2,3-cd)pyrene	<10 ug/L
870723-034	K-1413	BRW-15	isophorone	<10 ug/L
870723-034	K-1413	BRW-15	methoxychlor	<0.5 ug/L
870723-034	K-1413	BRW-15	methylene chloride	<5 ug/L
870723-034	K-1413	BRW-15	n-nitroso-di-n-propylamine	<10 ug/L
870723-034	K-1413	BRW-15	n-nitrosodiphenylamine	<10 ug/L
870723-034	K-1413	BRW-15	naphthalene	<10 ug/L
870723-034	K-1413	BRW-15	nitrobenzene	<10 ug/
870723-034	K-1413	BRW-15	pH	8.2 -
870723-034	K-1413	BRW-15	pH	7.6 -
870723-034	K-1413	BRW-15	pH - Init	8.2 -
870723-034	K-1413	BRW-15	pentachlorophenol	<50 ug/L
870723-034	K-1413	BRW-15	phenanthrene	<10 ug/L
870723-034	K-1413	BRW-15	phenol	<10 ug/L
870723-034	K-1413	BRW-15	pyrene	<10 ug/L
870723-034	K-1413	BRW-15	styrene	<5 ug/L
870723-034	K-1413	BRW-15	t. chlordane	<0.5 ug/L
870723-034	K-1413	BRW-15	tetrachloroethene	<5 ug/L
870723-034	K-1413	BRW-15	toluene	3 BJ ug/L
870723-034	K-1413	BRW-15	total xylenes	<5 ug/L
870723-034	K-1413	BRW-15	toxaphene	<1 ug/L
870723-034	K-1413	BRW-15	trans-1,2-dichloroethene	<5 ug/L
870723-034	K-1413	BRW-15	trans-1,3-dichloropropene	<5 ug/L
870723-034	K-1413	BRW-15	trichloroethene	19 ug/L
870723-034	K-1413	BRW-15	vinyl acetate	<10 ug/L
870723-034	K-1413	BRW-15	vinyl chloride	<10 ug/L

* BRW-15-F

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870723-037	K-1413	BRW-15-F	Aluminum	0.052 mg/L
870723-037	K-1413	BRW-15-F	Antimony	<0.050 mg/L
870723-037	K-1413	BRW-15-F	Arsenic	<0.005 mg/L
870723-037	K-1413	BRW-15-F	Barium	0.14 mg/L
870723-037	K-1413	BRW-15-F	Beryllium	0.0004 mg/
870723-037	K-1413	BRW-15-F	Boron	0.042 mg
870723-037	K-1413	BRW-15-F	Cadmium	<0.0030 mg/L
870723-037	K-1413	BRW-15-F	Calcium	99 mg/L
8[illegible]23-037	K-1413	BRW-15-F	Chromium	<0.010 mg/L
23-037	K-1413	BRW-15-F	Cobalt	<0.0050 mg/L

ORGDP GROUNDWATER DATA
K-1413 SITE

LAB NUMBER	SITE	WELL ID	PARAMETER	RESULT
870723-037	K-1413	BRW-15-F	Copper	<0.0040 mg/L
870723-037	K-1413	BRW-15-F	Iron	0.0098 mg/L
870723-037	K-1413	BRW-15-F	Lead	0.004 mg/L
870723-037	K-1413	BRW-15-F	Lithium	0.015 mg/L
870723-037	K-1413	BRW-15-F	Magnesium	19 mg/L
870723-037	K-1413	BRW-15-F	Manganese	0.038 mg/L
870723-037	K-1413	BRW-15-F	Mercury	<0.0002 mg/L
870723-037	K-1413	BRW-15-F	Molybdenum	<0.010 mg/L
870723-037	K-1413	BRW-15-F	Nickel	0.012 mg/L
870723-037	K-1413	BRW-15-F	Niobium	0.014 mg/L
870723-037	K-1413	BRW-15-F	Phosphorus	<0.20 mg/L
870723-037	K-1413	BRW-15-F	Potassium	6.5 mg/L
870723-037	K-1413	BRW-15-F	Selenium	<0.005 mg/L
870723-037	K-1413	BRW-15-F	Silicon	7.9 mg/L
870723-037	K-1413	BRW-15-F	Silver	<0.0060 mg/L
870723-037	K-1413	BRW-15-F	Sodium	9.6 mg/L
870723-037	K-1413	BRW-15-F	Strontium	0.25 mg/L
870723-037	K-1413	BRW-15-F	Thallium	<0.01 mg/L
870723-037	K-1413	BRW-15-F	Thorium	<0.20 mg/L
870723-037	K-1413	BRW-15-F	Titanium	<0.0030 mg/L
870723-037	K-1413	BRW-15-F	Uranium	0.002 mg/L
870723-037	K-1413	BRW-15-F	Vanadium	<0.0050 mg/L
870723-037	K-1413	BRW-15-F	Zinc	0.0016 mg/L
870723-037	K-1413	BRW-15-F	Zirconium	<0.0050 mg/L

B - Analyte was found in the reagent blank as well as the sample.
C - Composite
D - Duplicate
J - Indicates an estimated value.
ND - Not Detected
U - Compound was analyzed for but not detected. The number is the attainable detection limit for the sample.
NF - Compound was analyzed for but not found.
F - Sample was filtered before testing.

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ChemRisk/Shonka Research Associates, Inc., Document Request Form

(This section to be completed by subcontractor requesting document)

TE BENNETT / K-25 ER DMC
Requestor / Document Center (is requested to provide the following document)

Date of request 9/5/95 Expected receipt of document ______

Document number ER025436 Date of document MARCH 1988

Title and author (if document is unnumbered) K/HS-142

Name ADC Reviewer ______
Date Sent to ADC ______
Date(s) Cleared 11/9/87

(This section to be completed by Document Center)

Date request received 9/1/95

Date submitted to ADC NA

Date submitted to HSA Coordinator 9/18/95

(This section to be completed by HSA Coordinator)

Date submitted to CICO NA

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K/HS-142

ORGDP

OAK RIDGE GASEOUS DIFFUSION PLANT

MARTIN MARIETTA

RCRA FACILITY INVESTIGATION PLAN
K-1401 ACID LINE
OAK RIDGE GASEOUS DIFFUSION PLANT
OAK RIDGE, TENNESSEE

MARCH 1988

OPERATED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

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Prepared by the
Oak Ridge Gaseous Diffusion Plant
Oak Ridge, Tennessee 37831
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MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U. S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

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1. INTRODUCTION

Within the confines of the Oak Ridge Gaseous Diffusion Plant (ORGDP) are hazardous waste treatment, storage, and disposal facilities; some are in operation while others are no longer in use. These solid waste management units (SWMUs) are subject to assessment by the U. S. Environmental Protection Agency (EPA), as required by the 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA). The RCRA Facility Investigation (RFI) Plans are scheduled to be submitted for all SWMUs during calendar years 1987 and 1988. RCRA Facility Investigation Plan - General Document (K/HS-132) includes information applicable to all the ORGDP SWMUs and serves as a reference document for the site-specific RFI Plans.

This document is the site-specific RFI Plan for one of the SWMUs, the K-1401 acid line. This document contains geographical, historical, operational, geological, and hydrological data specific to the K-1401 acid line. The potential for release of contamination through the vario media to receptors is addressed in Section 6. Section 8 proposes a sampling plan to further determine the extent (if any) of contamination to the surrounding environment. Health, safety, quality assurance, and quality control procedures to be followed when implementing the sampling plan are also included in Section 8. Section 9 summarizes procedures for managing and presenting data collected from the RFI.

2. OBJECTIVES OF RCRA FACILITY INVESTIGATION PLANNING

2.1 OBJECTIVES

The RFI Plan identifies actions necessary to determine the nature and extent of release of hazardous contamination from the K-1401 acid line. The plan summarizes existing site information and addresses the potential for contamination of soil, groundwater, surface water, and air pathways.

2.2 EVALUATION CRITERIA

To prepare and implement a comprehensive sampling plan and to effectively evaluate analytical sampling results, evaluation criteria must first be established. Criteria for evaluating the extent of release of contaminants are based on existing state and federal regulatory guidance and best technical judgement.

The primary media of interest for the K-1401 acid line are groundwater and soil. Under the ORGDP Groundwater Protection Program, four quarters of groundwater monitoring data will be collected covering the parameters referred to in Table 2.1 of K/HS-132. Soil samples will be collected as part of the RFI and analyzed for the contaminants described in Section 8 of this document. The sampling methodology and analytical procedures are designed to characterize the contaminants of interest at or below levels summarized in Table 2.2 of K/HS-132.

2.3 SCHEDULE FOR SPECIFIC RFI ACTIVITIES

A list of soil sampling and analysis activities that will be performed for the K-1401 acid line and the duration of each activity is shown in Table 2.1 of this document.

2.4 FEASIBLE ALTERNATIVES

Knowledge of feasible corrective measures has been used in preparing the RFI Plan. Based on existing geologic, hydrologic, and contaminant

Table 2.1. Duration of RFI activities for the K-1401 Acid Line

Activities	Duration
1. Site Preparation and Sample Location	
(a) Soil Samples	5 weeks
(b) Groundwater Samples (includes well construction)	Complete
2. Collection of Samples	
(a) Soil Samples	6 weeks
(b) Groundwater Samples	52 weeks
3. Analysis of Samples	
(a) Soil Samples	16 weeks
(b) Groundwater Samples	66 weeks
4. Compilation of Data and Data Presentation	15 weeks
5. Evaluation of Results and Recommendations	2 weeks
6. Preparation of RFI Report and Submittal to EPA	8 weeks
7. Additional Sampling Phases as Needed	TBD

Table 2.2. Potential corrective measures

General Response Action	Technologies
Monitoring	Surveillance monitoring and analysis
Removal of source	Excavate and treat/dispose the contaminated soils
Containment from surface water	Cap site/surface diversion structures
Containment from groundwater	Subsurface collection drains - french drains tile drains, pipe drains, slurry walls
	Vertical containment barriers - soil bentonite slurry wall, cement-bentonite slurry wall, vibrating beam, grout curtains, steel sheet piling
	Horizontal containment barriers (bottom sealing) - block displacement, grout injection
	Groundwater diversion pumping - well points, deep well, suction wells, ejector wells
Treatment of groundwater	Collect the groundwater and pump to a wastewater treatment plant

source data, potential corrective measures for the K-1401 acid line have been identified and are shown in Table 2.2. Corrective measures will be reevaluated after the RFI report is completed.

2.5 RISK ASSESSMENT

The public health risk associated with each of the remedial action alternatives listed in Table 2.2 will be evaluated. This evaluation will consist of a characterization of contaminant sources, environmental setting, magnitude of release, pathways to human exposures, and characterization of risks. Risk assessment began early in the RFI process and will be used to determine data requirements and site sampling plans.

3. DESCRIPTION OF CURRENT CONDITIONS

3.1 GEOGRAPHICAL INFORMATION

The K-1401 acid line is located within ORGDP on the east side of Building K-1401 between Avenue D and Avenue F. The 10-inch acid line is constructed of vitrified clay pipe, is approximately 1500 feet in length, and runs from the southeast end of the building toward the K-1407-A neutralization pit. A location map of the site is shown in Figure 3.1. The K-1401 acid line RFI Plan addresses the following components:

(1) acid, alkali, and degreaser tanks with respective process drain lines inside Building K-1401;

(2) a process drain line beginning at the southeast end of Building K-1401 and extending to the K-1407-A neutralization pit;

(3) five sumps located between the east side of the K-1401 building and the acid line that collect condensate from K-1401 fan systems; and

(4) a process drain line running from Building K-1301 to its intersection with the K-1401 acid line.

3.2 HISTORICAL INFORMATION

Various cleaning solutions were discharged through the K-1401 maintenance facility acid line. The acid line leaked and was partially replaced in 1975. The process drain line was used primarily to transfer organic and inorganic degreasing liquids to the K-1407-A neutralization pit or the K-1407-B holding pond. The bell joints in the process line were packed with lead, rope, and tar and sealed with concrete. The pipe ran through a limestone-filled trench with diatomaceous earth packed around the pipe. Subsequent leaks occurred due to the acid making its way

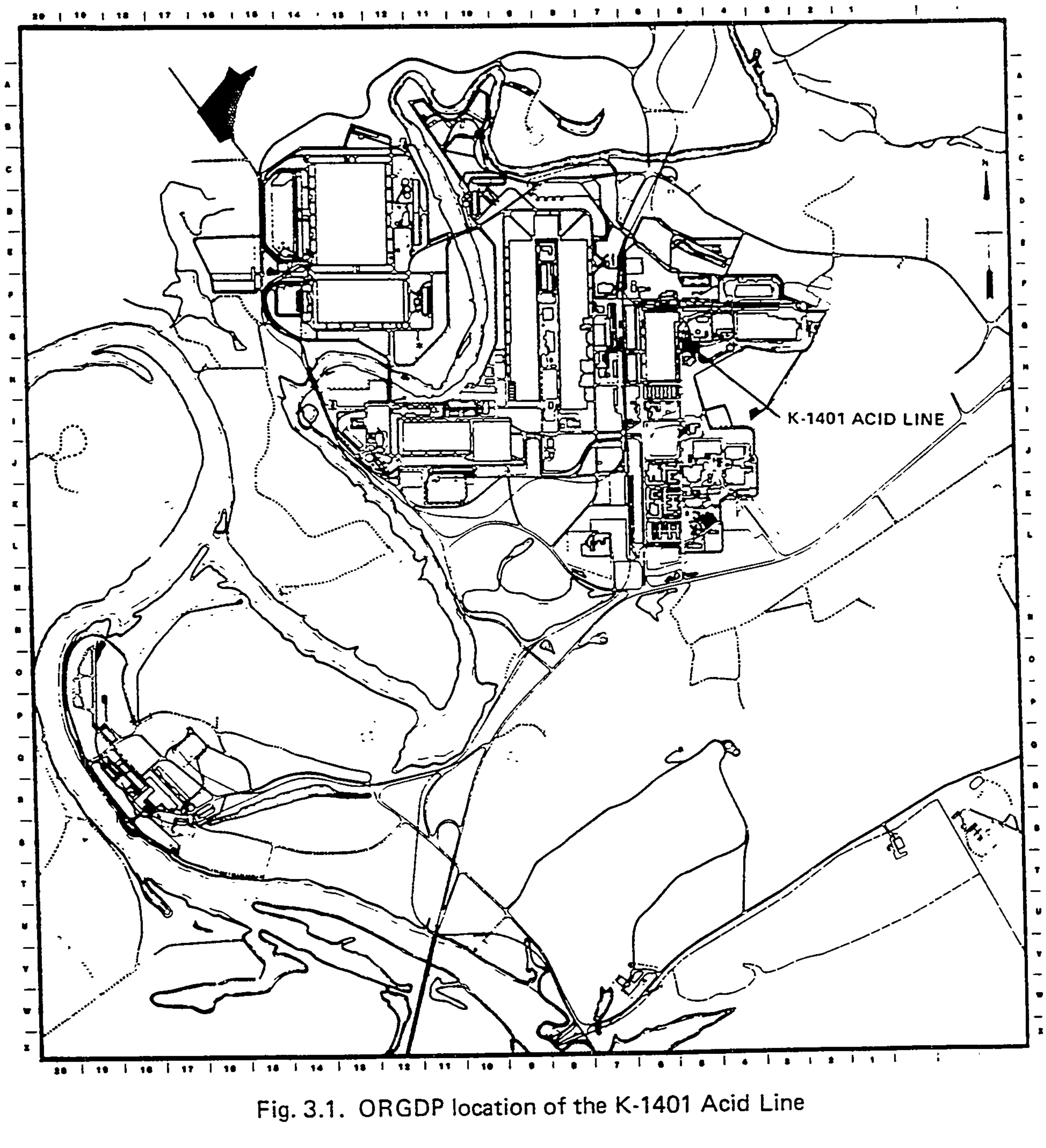


Fig. 3.1. ORGDP location of the K-1401 Acid Line

through the joints and corroding the limestone. The K-1401 drain line was slip-lined in 1982 with a 10-inch polyethylene sleeve from the K-1401 building to the manhole west of the K-1407-A neutralization pit and ranges from 4 to 15 feet below grade. The line was leak tested in 1987 and was found to leak. The acid line has been placed out of service until the pipe can be replaced. There is a possibility that the degreasing operations in Building K-1401 will remain shut down and the acid line abandoned.

Prior to 1977, K-1301 housed a nitrogen production facility which discharged spent caustic solutions directly to the K-1407-B holding pond. In 1977, the process drain lines were repiped to flow to the K-1407-A neutralization pit, and all nonprocess drain lines in K-1301 were tied either to the sanitary or storm sewers. The K-1301 facility was shut down in 1978-1979.

3.3 OPERATIONAL INFORMATION

Cleaning operations performed in Building K-1401 included the use of degreasers, caustics, and acids. Degreasing was performed using carbon tetrachloride, trichloroethylene, and trichloroethane. The motor coils from the cascade were degreased in Building K-1401, and the sludges were discharged through the acid line. New piping and equipment (i.e., pumps, coolers, and hardware) that would be exposed to uranium hexafluoride in Buildings K-25, K-27, K-29, K-31, and K-33 at ORGDP, as well as from the Paducah Gaseous Diffusion Plant, were cleaned in K-1401. Instruments and containers from the K-1420 mercury recovery room were cleaned in the building, resulting in the possibility of small amounts of mercury being discharged to the acid line.

Some of the cleaners used in the operations were caustics, detergents, troxide, and soap-oakite. Acids discharged through the line include hydrochloric, sulfuric, chromic, sulfamic, and Diversey (a slight acidic cleaner). Organics used included methyl ethyl ketone, aromatic hydrocarbons, small quantities of acetone, and freons. Additionally, the line was used to transfer paint shop paints, epoxies, and cutting oils.

Appropriately lined tanks contained within a concrete pit are located inside the northeast section of the building. The tanks are not considered to be a contaminated source for this RFI due to this double containment, and any leakage that may occur would be confined to the pit.

The fan sump area inside the building is used to collect condensation of fumes and vapors, liquids from spills, steam condensate, or any other liquid substance that may be utilized in the area. The collected liquids drain from the sump areas to a transfer station where they are pumped up and into the acid drain line to the K-1407-A neutralization facility.

The air distillation units of the K-1301 nitrogen facility required carbon dioxide free air for nitrogen production and caustic scrubbers were used to wash the air supply. The caustic used in the operation was flake sodium hydroxide. Any sodium hydroxide that may have leaked through the process line would no longer be present in the soil or groundwater due to natural neutralization and dilution. The K-1301 process line is not considered to be a source of contamination; sampling will not be performed.

4. CHARACTERIZATION OF THE CONTAMINANT SOURCE

Detailed records on the quantities and materials that flowed through the process drain line at this site are not available. A summary of the possible contaminants from the discussion in Section 3 is listed below:

- carbon tetrachloride
- trichloroethane
- trichloroethylene
- hydrochloric acid
- acetone
- freon
- paint shop waste
- mercury
- sulfuric acid
- chromic acid
- sulfamic acid
- Diversey
- methyl ethyl ketone
- aromatic hydrocarbons
- epoxies
- cutting oils

5. CHARACTERIZATION OF THE ENVIRONMENTAL SETTING

The K-1401 Acid Line is located along the east side of the K-1401 machine shop and drains north to a manhole into which process drains from Building K-1301 and K-1413 also drain. The K-1413 process drain will be addressed in another RFI Plan. The K-1301 drain line is included in this RFI Plan; therefore, the environmental characterization of the area around K-1301 is also required. The K-1401/K-1301 area is almost entirely covered by buildings and pavement so that geologic conditions cannot be observed except by drill penetrations or other indirect exploratory means.

The most recent geologic mapping of the area is by R.H. Ketelle of ORNL (unpublished) who has expanded upon and reinterpreted the work of Geraghty and Miller (Hydrogeology of the Oak Ridge Gaseous Diffusion Plant Site, July 1986). Figure 5.1 is a geologic map of the ORGDP area which, although general in scope, is based on the maps of both Ketelle and Geraghty and Miller, Inc., and it is supported by data from recently installed wells.

5.1 HYDROGEOLOGY

The K-1401/K-1301 area is underlain by two major geologic units. Most of the area, including K-1301 and the north part of the K-1401 Building, is underlain by the Conasauga Group, which typically consists of massive limestone interbedded with shale in the upper part and grading stratigraphically downward (to the south) into calcareous shale and thinner interbedded limestone. Three bedrock wells in nearby areas indicate lithologies typical of the Conasauga Group; these are BRW-7 (K-1407-B) and BRW-8 (K-1070-B) and BRW-12 (K-1070-C/D). The oolitic limestones described in the well logs, located in the Appendix are characteristic of the Conasauga.

The Rome formation underlies the south part of the K-1401 area. The Rome is a heterogeneous unit of interbedded sandstone, siltstone and shale with variegated coloration including gray, green, maroon, and brown. Much of the formation is thin-bedded although some massive sandstone beds occur as do minor carbonate layers. The Rome lithology is not well documented in

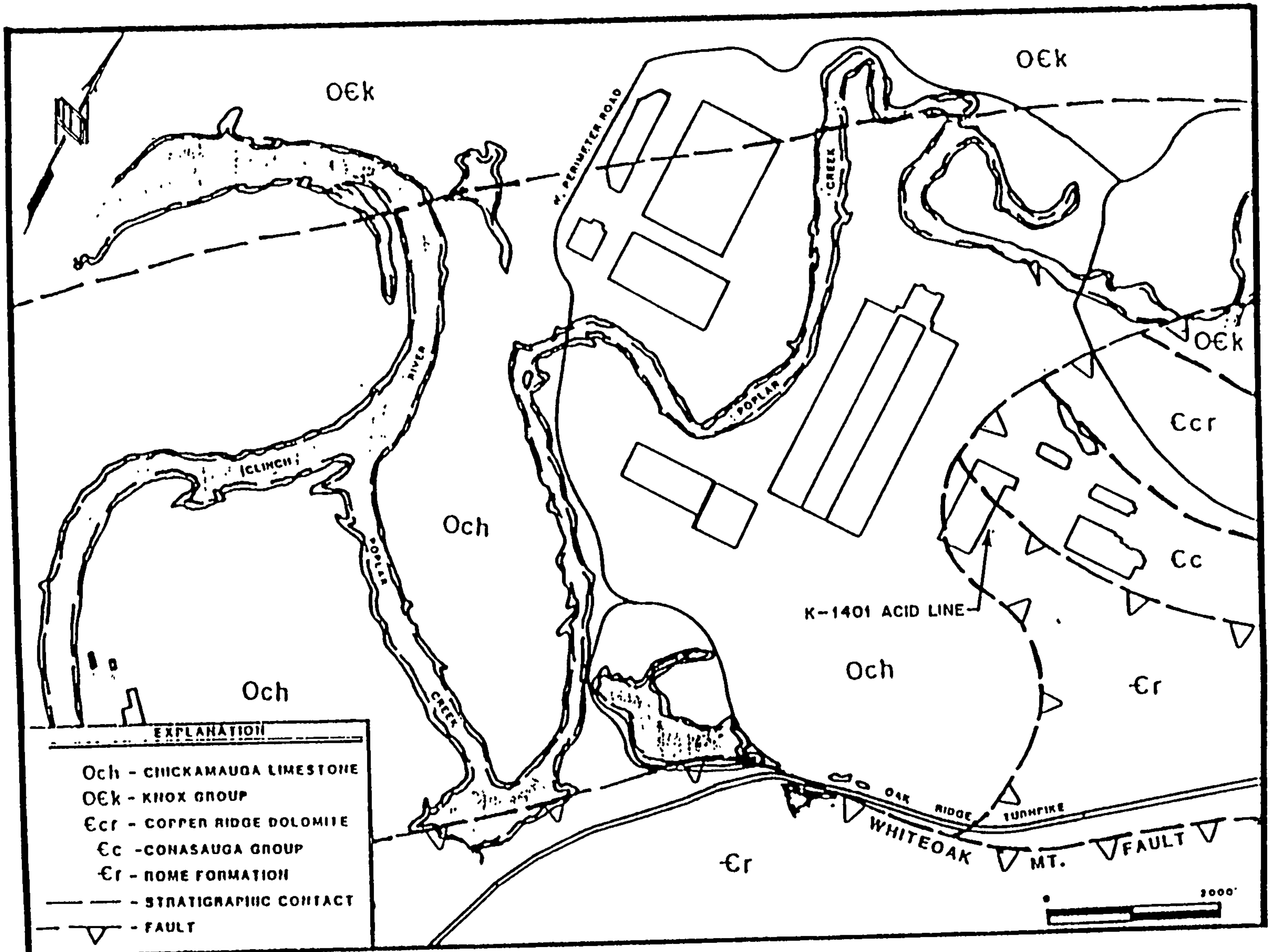


Fig. 5.1. Geologic map of the ORGDP Area. (Adapted from: *"Hydrogeology of the Oak Ridge Gaseous Diffusion Plant Site,"* Geraghty & Miller (1986), and an unpublished geologic map by R. H. Ketelle, Oak Ridge National Laboratory)

the subject area except in well BRW-11, just southeast from K-1401, where it is described as dark gray to maroon siltstone.

The Rome formation appears to be faulted against the Conasauga in the K-1401/K-1301 area (Figure 5.1), but the exact structural relationship is not known.

Both bedrock units at this site have been thrust over the Chickamauga limestone by a north and northeastward trending branch of the Whiteoak Mountain fault. The trace of the branch fault is indicated to lie just west of the K-1401/K-1301 area. The geologic structure is apparently more complex than can be practicably mapped with present data. Minor faults and structural anomalies may exist but should be of no significance to the environmental stability of the area. A "possible fault" recorded in the log of BRW-11 is an indication of such an anomaly.

Groundwater flow in the bedrock beneath K-1401/K-1301 will occur mainly in the carbonate units through solutionally enlarged joints and fractures, while flow rates within the shales and siltstones will generally be very low. Bedrock aquifer flow from this area is probably westward, along strike, to the fault zone and thence southwestward with the strike of the Chickamauga strata to Poplar Creek. Some flow may also follow the fault zone in a southward direction.

Field permeability tests have been performed on bedrock wells BRW-7 and -8 with indicated permeabilities of 3.58×10^{-5} and 6.71×10^{-5}, respectively. These permeabilities are relatively low for a fractured carbonate aquifer; however, the interbedded shale which is almost ubiquitous to the Conasauga limestone units will effectively restrict water movements across the bedding planes.

The unconsolidated zone in the K-1401/K-1301 area consists of both natural soils and various fill materials used during construction. The natural soils observed in five shallow piezometer and monitoring well installations (UNP-1, -2, and -3, and UNW -24 and -25) are silty, residual clays from a geologic settings similar to that of the subject area. The soils in UNP-1, -2, and -3 have permeabilities ranging from 5.77×10^{-7} to 1.66×10^{-5} (re: Geraghty and Miller, 1986), and these values are estimated to be representative of the soils of this area. Due to the flat topography in the K-1401/K-1301 vicinity, it is expected that the unconsolidated zone hydraulic gradient will be low, which in combination with the low permeabilities should result in low average flow velocities. From regional data, it is believed that groundwater in the unconsolidated zone (upper aquifer) is flowing northward through this area toward the K-1700 watershed (Figure 5.2). Four shallow aquifer characterization wells have been installed in the K-1401/K-1301 area, but data are not yet available. These wells are shown on Figure 5.2 as UNW-51, -52, -53, and -55.

Little is known about interaquifer flow between the unconsolidated zone and the bedrock system in the area. Where the bedrock aquifer is fractured limestone, there is potential for a significant interflow relationship according to the relative piezometric heads and the degree of interconnection.

5.2 SURFACE WATER

The majority of the site is covered by buildings and asphalt or concrete pavement. Due to the "cap" and the isolation of the pipe which is buried at least four feet below the surface, surface water is not considered a pathway of contamination. Surface waters resulting from storm events are routed to the nearest catch basin into a storm drain system which flows northward and discharges into the K-1700 stream just to the east of the K-1407-B Pond (Figure 5.3).

5.3 AIR

No site-specific air quality or meteorological data is available for the SWMU. However, Martin Marietta Energy Systems (MMES) has an ongoing study of the air quality and meteorological conditions of ORGDP as a whole and this study should be representative of the conditions at this SWMU. This general ORGDP data is available in the RFI Plan - General Document (K/HS-132).

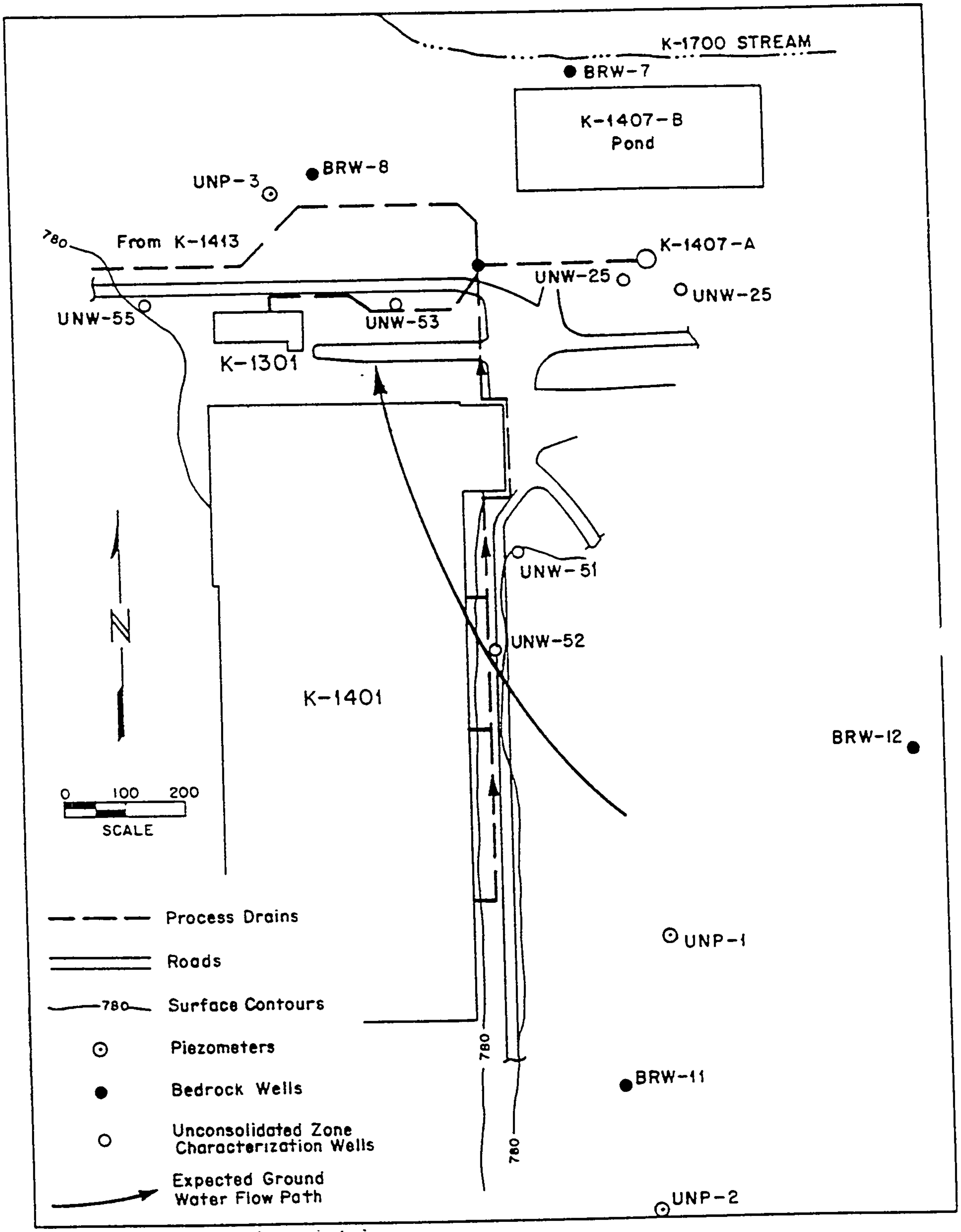


Fig. 5.2. Monitoring well locations in the K-1401/K-1301 vicinity

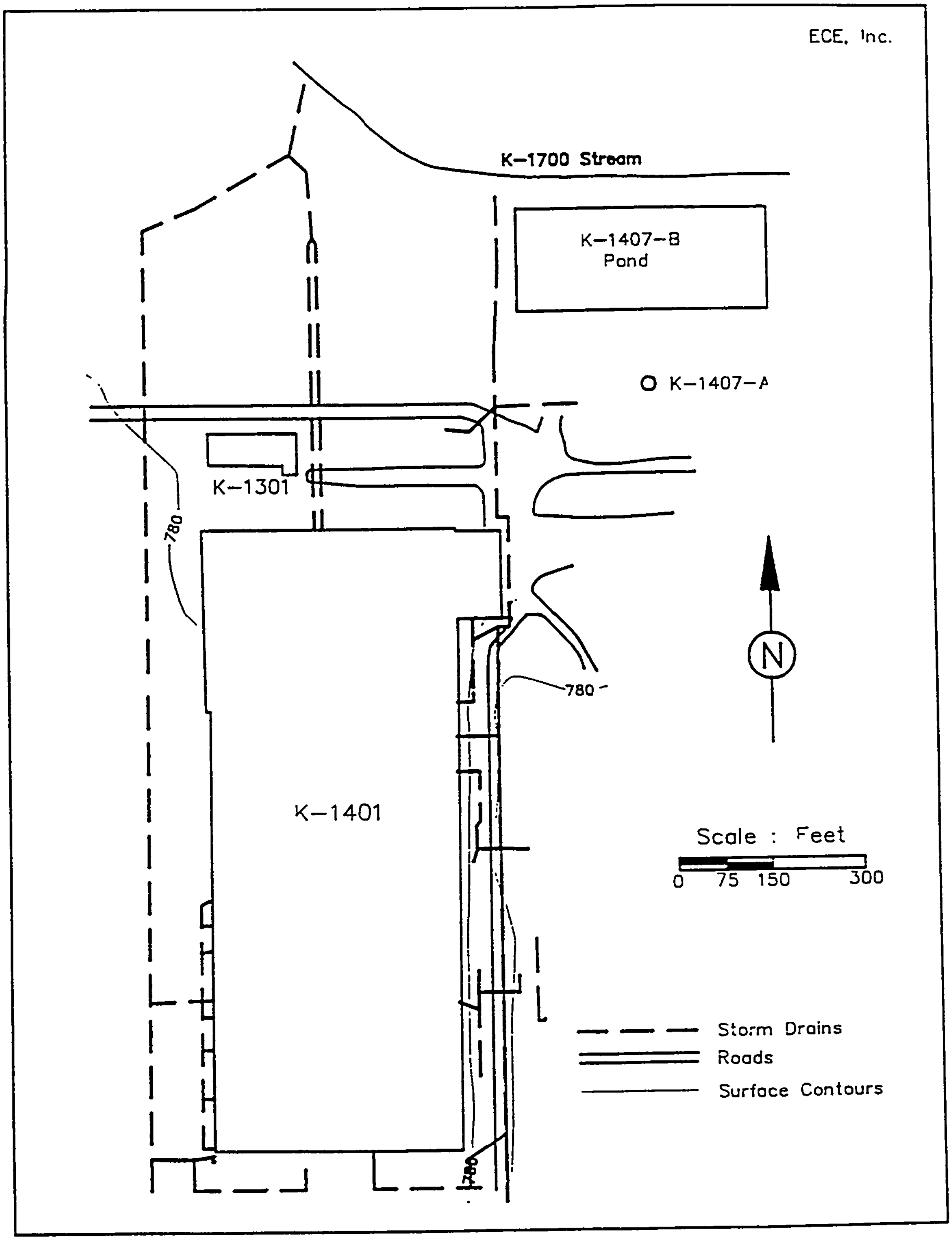


Fig. 5.3. Storm drain system for the K-1401 area

6. IDENTIFICATION OF POTENTIAL PATHWAYS AND RECEPTORS

Assessments of inactive hazardous waste disposal or storage sites are required to evaluate the site's potential for health or safety risks to personnel, public, or environment. Determination of such risks must be based on evaluations of both the potential pathways of toxic release and the possible receptors of the contamination. Evaluations of the pathways which might release contaminants from the K-1401 acid line and possible receptors of the contamination are based on (1) records of processes carried out in the adjacent K-1401 facility and (2) interviews with persons having knowledge of the solutions discharged through the line. K/HS-132 will serve as a general reference concerning the potential pathways and receptors for ORGDP.

Records of leak tests performed in 1978 indicated at least 17 breaks in the pipe and one faulty joint; the pipe was slip-lined in 1982 to correct leakage problems. Leak tests performed on the line in 1987 continue to indicate the presence of line leakage. Due to the location of the line and the nature of the constituents involved, surface water and air will not be considered as pathways of contaminant migration.

6.1 POTENTIAL PATHWAYS OF MIGRATION

6.1.1. Soils

The area of the K-1401 acid line exhibits the typical ORGDP cover of unconsolidated material composed of weathered residuum and manmade fill which are underlain by bedrock. In general, the soils comprising the surficial materials at ORGDP present low permeabilities and relatively high capacities for the immobilization or exchange of metals and the filtering of particulates due to the silty clay composition of ORGDP soils. This composition makes it probable that some organics or any metal contamination in the soil would still be present. Soil samples will be collected to determine the character and extent of any contamination present.

6.1.2 Groundwater

Site-specific hydrogeologic data are presently unavailable. However, pipe leakage of the process discharges indicate some potential for groundwater contamination. Inferred groundwater flow paths indicate that groundwater moves across the site from the southeast toward the northwest, eventually discharging in the K-1700 stream. Assessment of the nature and extent of possible groundwater contamination will be carried out under the ORGDP Groundwater Protection Program.

6.2 POTENTIAL RECEPTORS

6.2.1 Human Populations

The security controls exercised by the Department of Energy (DOE) prevent public access to the K-1401 acid line area. The only public populations of concern are those which might come into contact with one of the exposure pathways beyond the boundaries of the site itself; for example, through the reach of groundwater. Of the 25 potable water wells within one mile of ORGDP, none of the wells are in proximity to the acid line, and none are believed to occupy the same hydrogeologic domain as the groundwaters at the site. Further, of the ten public water supplies which withdraw from the Clinch-Tennessee River system (into which the K-1700 stream eventually feeds), none of these are nearer than 15 miles to the Oak Ridge Reservation, making direct contamination from the K-1401 acid line unlikely. While discharge of site groundwater represents the potential for contaminant migration, distance and dilution effects make pollution of public water supplies of low probability. Finally, the effects of distance and dilution also make unlikely the possibility that groundwater contamination would reach the waters used downstream in the Clinch-Tennessee River system for recreational and industrial use.

6.2.2 Terrestrial Fauna and Flora

K/HS-132 discusses the rare, threatened, and endangered plant and animal species which are thought to inhabit the area. To date, there has been no report that any of these species exist in the area of the K-1401 acid line or are directly threatened by any possible contamination. Contaminants released from the K-1401 acid line will not adversely affect the local flora and fauna.

6.3 SUMMARY AND CONCLUSIONS

The nature of the solutions discharged and the site hydrogeology indicate the potential for soil and groundwater contamination exists. Evaluation of the potential pathways of contaminant migration and possible receptors shows sufficient potential for environmental contamination and warrants an investigation of the site.

7. EXISTING MONITORING DATA

Four characterization wells have been drilled around Building K-1401, but no data have been collected. Two wells are located on the north side of the building, one well is located at the east side, and the other is across the road from K-1401 (see Figure 5.2).

8. SAMPLING PLAN

8.1 SAMPLING AND ANALYTICAL STRATEGY

A knowledge of the types of waste disposed through the K-1401 acid line and historical line leakage data will serve as the basis for preparing this sampling plan. The types of samples to be taken as a part of this study will be soil corings.

Both inorganic (acid and caustic solutions) and organic (paint shop wastes and degreaser solutions) wastes were removed from the K-1401 facility through the K-1401 acid line. The majority of the wastes were the product of a metal cleaning operation and would be expected to contain at least trace heavy metal contamination. Analysis for an inorganic plume will rely on the presence of these trace heavy metals since the main constituent of the inorganic wastes, namely mineral acid, would have migrated away from the acid lines or have been neutralized immediately upon leakage. Since analysis for mineral acid content of the soil surrounding the pipeline would be inadequate for characterizing tt contamination emanating from the pipeline, analysis for metals will be performed. The metals are more likely to be retained by the soil and will provide a more useful parameter for evaluating the extent of contamination. The organic waste disposed of via the K-1401 acid line was volatile in nature. Since a degreasing operation was performed, the volatile waste could contain significant amounts of semivolatile contamination, and thus, an extractable organic analysis (BNA), as well as a volatile organics analysis (VOA), will be performed on all soil corings in an attempt to characterize any contaminant plume emanating from the acid line.

The K-1301 process line will not be sampled as part of this RFI Plan because it does not present an environmental hazard. Any caustic solution that may have leaked from the pipe would have been naturally neutralized or diluted by the site geology.

8.2 STATISTICAL SET UP FOR SAMPLING

8.2.1 Soil Sampling

Monitoring will occur in phases that will consist of soil sampling, chemical analyses, and statistical analysis of the resultant data. Phases will continue until conclusions can be drawn regarding the extent of contamination in the soil and decisions can be made about appropriate remedial actions. The first phase of soil sampling the K-1401 acid line is designed (1) to examine locations along the pipeline where 17 breaks and one faulty joint were found in a 1972 study; (2) to search sections of the pipeline for contaminants emanating from any previously undetected defects in the pipeline and leaks from the fan sumps; and (3) to identify variation sources and estimate their magnitude. This information will be used to guide the next phase of sampling, if needed. Figure 8.1 shows (a) the pipeline, (b) the locations of three background corings, (c) the locations of the 18 previously discovered defects, (d) the placement of 14 soil corings to examine for possible releases from these defects, and (e) the locations of 18 soil corings to search for contamination plumes in "defect-free" sections of the pipeline, approximately 50-foot spacing between corings. Each coring will be to refusal.

Table 8.1 gives the coordinates of the known pipe defects, the distance between adjacent defects, the coordinates of coring locations, and the distance between adjacent corings. Table 8.2 provides a randomized order for coring. The sampling point types include a defect, monitor, or search point. A defect point is the sampling in locations of known defects. A monitor point is the sampling along the acid line to monitor any leakage that may have occurred from the defect. The search point is the sampling along the acid line to locate any other leakage or contamination. Allowing for general groundwater flow, the corings are located approximately 3-to-5 feet downgradient of the pipe. Exact locations will be field sighted and documented as needed to avoid obstructions to the drilling rig.

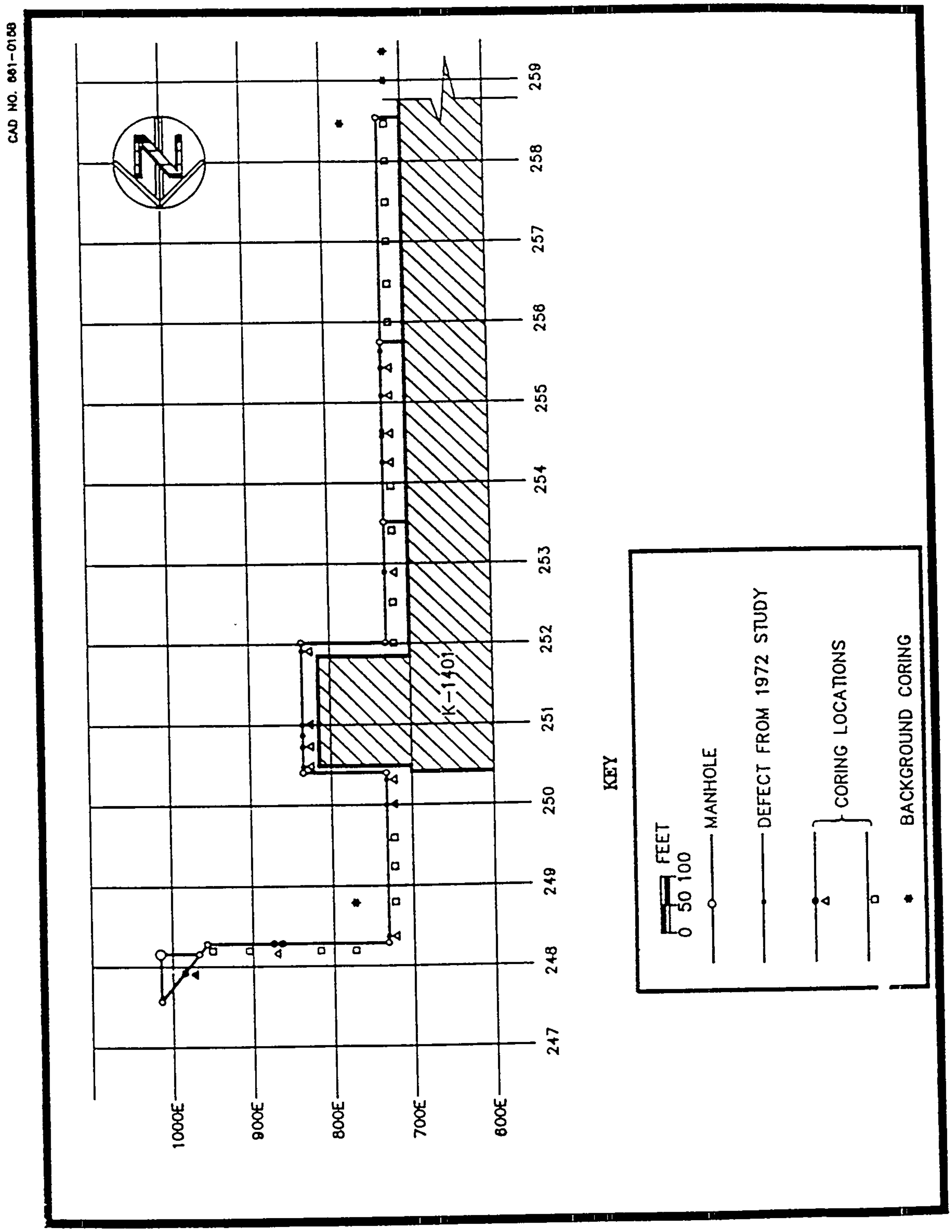


Fig. 8.1. Phase I soil sampling locations

Table 8.1 Locations of defects and sampling points

Sample ID	Type	----Coordinates---- (East)	(+	)	Distance Between Samples (ft)	Distance Between Defects (ft)
	Defect	985.5	247	94.0		
1	MONITOR	980.0	247	90.0		
2	SEARCH	960.0	248	18.0	34.41	
3	SEARCH	910.0	248	18.0	50.00	
	Defect	871.0	248	22.0		117.874
	Defect	866.0	248	22.0		5.000
4	MONITOR	865.0	248	18.0	45.00	
5	SEARCH	820.0	248	18.0	45.00	
6	SEARCH	770.0	248	18.0	50.00	
	Defect	738.0	248	27.5		128.118
7	MONITOR	732.0	248	23.0	38.33	
8	SEARCH	732.0	248	72.0	49.00	
9	SEARCH	732.0	249	22.0	50.00	
10	SEARCH	732.0	249	72.0	50.00	
	Defect	738.0	249	99.0		171.500
11	MONITOR	732.0	249	95.0	23.00	
	Defect	738.0	250	30.5		31.500
12	MONITOR	732.0	250	26.0	31.00	
	Defect	778.0	250	43.5		42.440
13	MONITOR	775.0	250	40.0	45.22	
	Defect	778.4	250	71.5		28.000
14	MONITOR	775.0	250	69.0	29.00	
	Defect	778.4	251	3.5		14.000
	Defect	778.4	250	89.5		18.000
15	MONITOR	775.0	251	0.0	31.00	
16	SEARCH	775.0	251	50.0	50.00	
	Defect	778.4	251	93.5		90.000
17	MONITOR	775.0	251	90.0	40.00	
18	SEARCH	732.0	252	0.0	44.15	
19	SEARCH	732.0	252	50.0	50.00	
	Defect	738.0	252	93.5		107.852
20	MONITOR	732.0	252	90.0	40.00	
21	SEARCH	732.0	252	40.0	50.00	
22	SEARCH	732.0	252	90.0	50.00	
	Defect	738.0	254	40.0		146.500
23	MONITOR	732.0	254	37.0	47.00	
	Defect	738.0	254	71.0		31.000
	Defect	738.0	254	77.0		6.000
24	MONITOR	732.0	254	71.0	34.00	
	Defect	738.0	255	10.5		33.500
25	MONITOR	732.0	255	8.0	37.00	
	Defect	738.0	255	50.0		39.500
	Defect	738.0	255	64.0		14.000

Table 8.1 Locations of defects and sampling points (continued)

Sample ID	Type	----Coordinates---- (East)	(+)		Distance Between Samples (ft)	Distance Between Samples (ft)
26	MONITOR	732.0	255	50.0	42.00	
27	SEARCH	732.0	256	0.0	50.00	
28	SEARCH	732.0	256	50.0	50.00	
29	SEARCH	732.0	257	0.0	50.00	
30	SEARCH	732.0	257	50.0	50.00	
31	SEARCH	732.0	258	0.0	50.00	
32	SEARCH	732.0	258	40.0	40.00	
33	BACKGRD	732.0	259	0.0		
34	BACKGRD	732.0	259	50.0		
35	BACKGRD	775.0	248	75.0		

Table 8.2 Randomized coring order

Coring Order	Sample ID	Sample Type	- - - Coordinates (East)	(+	) - - -
1	22	SEARCH	732	253	90
2	29	SEARCH	732	257	0
3	35	BACKGRD	775	248	75
4	8	SEARCH	732	248	72
5	25	MONITOR	732	255	8
6	17	MONITOR	775	251	90
7	15	MONITOR	775	251	0
8	30	SEARCH	732	257	50
9	13	MONITOR	775	250	40
10	32	SEARCH	732	258	40
11	31	SEARCH	732	258	0
12	3	SEARCH	910	248	18
13	20	MONITOR	732	252	90
14	5	SEARCH	820	248	19
15	11	MONITOR	732	249	95
16	33	BACKGRD	732	259	0
17	19	SEARCH	732	252	50
18	34	BACKGRD	732	259	50
19	26	MONITOR	732	255	50
20	27	SEARCH	732	256	0
21	14	MONITOR	775	250	69
22	28	SEARCH	732	256	50
23	9	SEARCH	732	249	22
24	16	SEARCH	775	251	50
25	6	SEARCH	770	248	18
26	24	MONITOR	732	254	71
27	23	MONITOR	732	254	37
28	2	SEARCH	960	248	18
29	12	MONITOR	732	250	26
30	7	MONITOR	732	248	23
31	18	SEARCH	732	252	0
32	10	SEARCH	732	249	72
33	4	MONITOR	865	248	18
34	21	SEARCH	732	253	40
35	1	MONITOR	980	247	90

For each coring to refusal, a soil sample will be taken from each distinct soil layer at the pipe level and below, at boundaries between soil layers, and at regular intervals of four feet of depth in thicker soil layers (Figure 8.2). For thicker layers, soil from two adjacent two-foot split barrels will be composited, with care not to composite across soil layers or layer boundaries. Each sample will be divided with a portion archived in case a backup analysis is needed.

8.2.1.1 Probability of Hitting a Plume

The length of the contaminant plume along the line will be defined to be the maximum distance between two corings to refusal along the line, such that all in-between corings to refusal pass through the plume (Figure 8.3). This length would be denoted as 'L' and the distance between two "search" corings along the same line be 'K', where 'L' is less than 'K'. Then, the probability of a coring hitting the plume is 'L/K'. Since the Phase I search spacing between corings is approximately 50 feet, a plume of 45-50 feet will be found with a probability of at least .90, and all plumes greater than 50 feet are certain to be found. However, the probability of searching and hitting all plumes with lengths of 45-50 feet (when there are more than one) emanatly from unknown leakage points is low.

8.2.1.2 Phase II Soil Sampling

To overcome the inefficiencies of "random searching" methods, Phase II sampling provides for a search spacing of no longer than 25 feet in selected sections of the piping, if on the basis of Phase I results there is reason to believe that additional defects have occurred in what was "defect-free" sections of piping. Phase II sampling will also call for corings which can map the multi-directional extent of any plumes discovered by Phase I sampling.

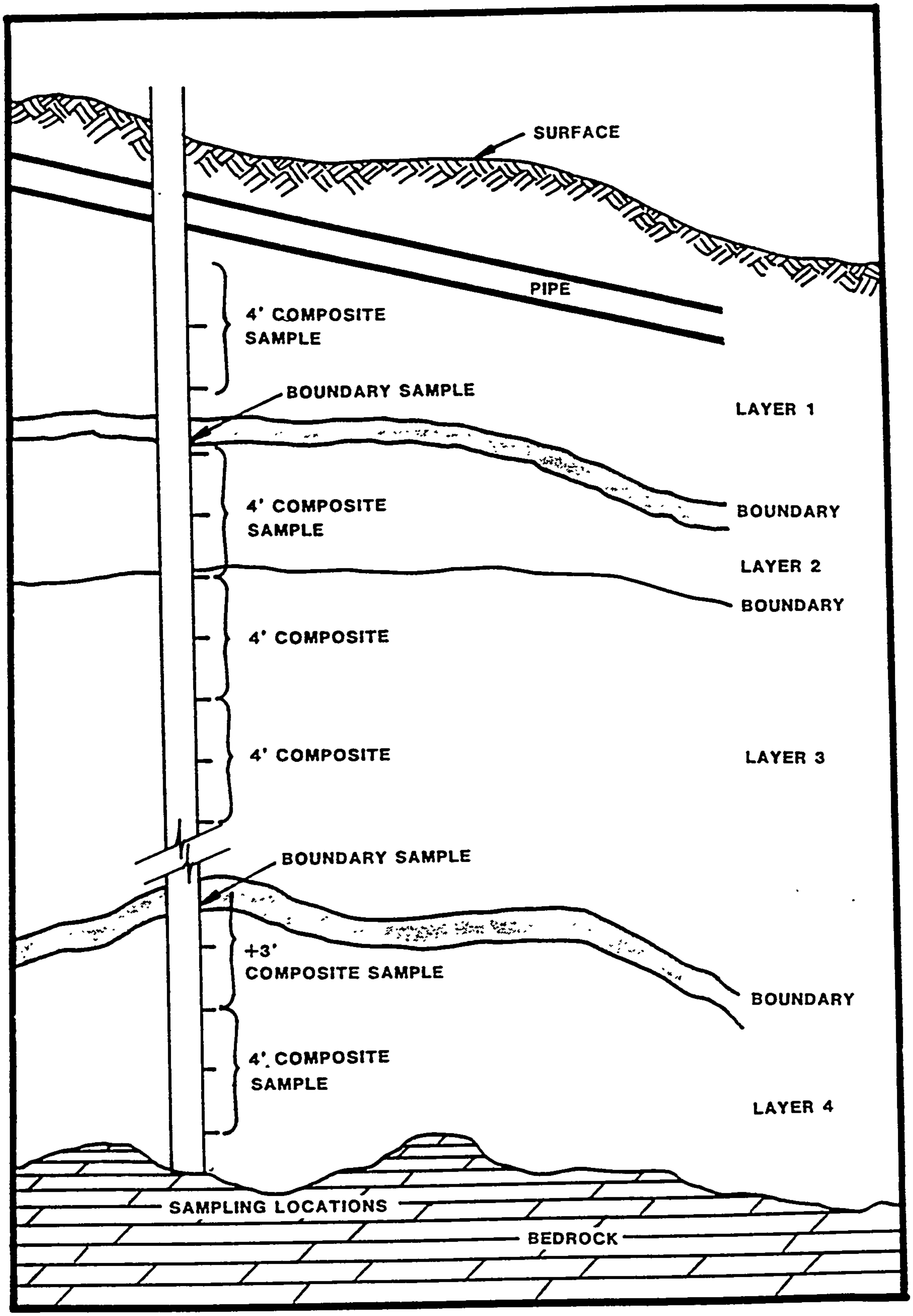


Fig. 8.2. Sampling to bedrock

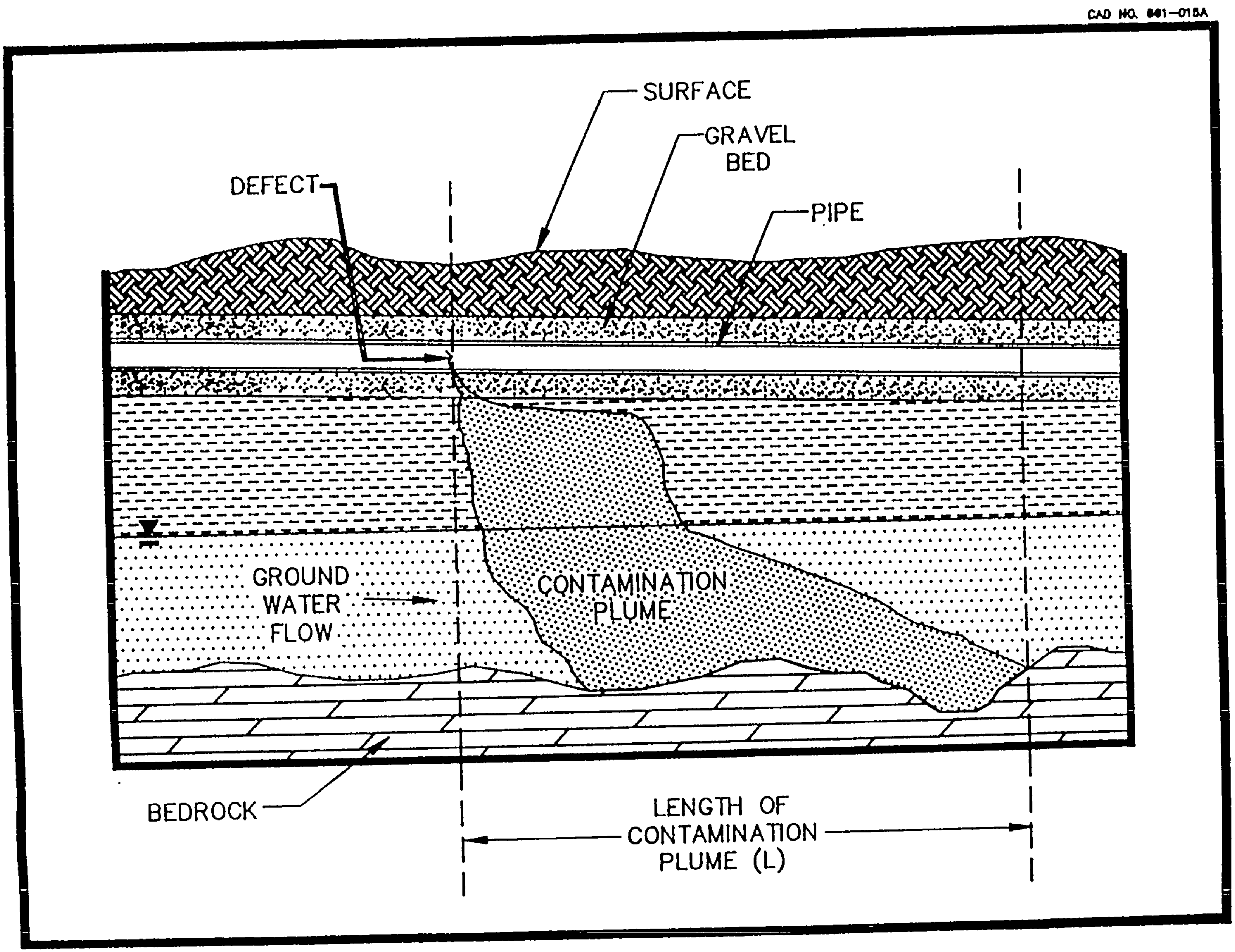


Fig. 8.3. Probability of hitting a plume

8.3 FIELD SAMPLING

8.3.1 Site Preparation

To accurately locate the drilling locations within the K-1401 area, arrangements will be made through Energy Systems Engineering to have the site surveyed. The accessible sampling locations shown in this report will be marked. A detailed map of the area will be drawn indicating the sampling points and their coordinates. After Phase I is complete, a sampling plan will be submitted defining the Phase II sampling.

Energy Systems Engineering shall be consulted concerning the location of each sampling point to verify that no utility obstruction occurs.

8.3.2 Equipment and Supplies

The drillers will provide all necessary drilling equipment (hollow core auger, split-barrel sampler, etc.). The following field sampling supplies will be required:

- Nonionic detergent, Micro (International Products Corporation)
- Deionized water
- Isopropyl alcohol
- VOA bottles
- Glass containers, precleaned, with Teflon-lined lids, one quart capacity
- Logbook
- Chain of custody seals
- Sample labels
- Chain of custody forms
- Stainless steel trays
- Aluminum foil
- Stainless-steel spatulas

8.3.3 Soil Sampling Procedure

Collection of samples from this site will follow the American Society for Testing and Materials (ASTM) Method D-1586-84 Penetration Test Split-Barrel Sampling of Soils. The drilling will be performed by private drilling contractors. A hollow core auger will be used to remove the soil above each segment to be sampled and the split-barrel sampler will be driven into the soil through the center of the auger. This technique will obtain a sample that is undisturbed by the auger operation.

Using a split-barrel sampler of two-foot length, samples will be removed from each position in two-foot segments. Samples will be collected to refusal. At each two-foot increment, the drilling crew will remove the split-barrel sampler from the drilling rig and separate the barrel to expose the sample.

The equipment used for sample transfer shall be cleaned with nonionic detergent and water and rinsed with deionized water and isopropyl alcohol between samples. The split-barrel samplers will be cleaned with detergen and rinsed with water by the drilling company.

For segments designated for VOA analysis, the soil will be immediately transferred to a VOA bottle (sample should fill the bottle). The remaining soil from two adjacent coring segments (see Figure 8.2) will be combined in a foil-lined stainless steel pan, homogenized, and transferred to a precleaned one quart jar (sample should fill the jar).

From 10% of the core segments (to be determined in the field), duplicate samples will be submitted to the laboratory to fulfill duplicate requirements discussed in Section 7.3 of K/HS-132.

Sample containers will be labeled with the site identification number, date, time, sample identification number, and the sampler's name. Sample date, site identification number, time, sample identification number, sampler's name, and surveyed coordinates of the sample will be recorded in the logbook. In addition to the required entries, any other pertinent information and/or observations shall be recorded. The logbook used for these records will contain a map of the areas and a copy of the sampling plan. The sample containers shall be sealed and transported to the laboratory under chain of custody protocol as referenced in Section 7.4 of K/HS-132. After the sampling of each coring is complete, bored holes will be filled with a grout column if located within the aquifer, as described in Section 7.1.3 K/HS-132. Otherwise, the bored holes will be backfilled with cuttings.

8.4 ANALYTICAL PROTOCOL

Analytical sampling with the following salient features is proposed. The corings are to be composites of two 2-foot segments yielding a sample every 4 feet. The composites will be analyzed for the regulated inorganic elements outlined in Table 7.4 of K/HS-132. The EP toxicity extractions will be performed on those samples with an inorganic species content sufficient to exceed EP toxicity limits if the inorganic specie were 100% extractable.

All samples will be analyzed for both the volatile and semi-volatile organic compounds listed in Table 7.6 of K/HS-132.

8.5 SAMPLE ANALYSIS

After reception by the analytical laboratory, samples will be archived and, if so designated, scheduled for the analyses discussed in Section 8.4.

Soil sample analyses will follow standard EPA protocol as outlined in Test Methods for Evaluating Solid Waste (SW-846, 3rd Edition).

The Quality Assurance (QA) Quality Control (QC) requirements outlined in Section 7.3 of K/HS-132 shall be adhered to for all analyses.

9. DATA MANAGEMENT PROCEDURES

To best illustrate any patterns in the data, the results of the chemical analyses of the soil samples from the potential release areas will be presented in a clear and logical format. These will include tabular, graphical, and other visual displays, such as maps and contour plots described in Table 9.1 of "RCRA Facility Investigation Guidance, Volume I," as appropriate to the data.

Tabular data will include, as a minimum, the following:

- Unique sample code
- Sampling location and type
- Sampling depth
- Sampling composition information
- Sampling date and order
- Laboratory analysis identification number
- Property measured
- Results of analysis
- Detection limits
- Reporting units
- Sampling time

Statistical analyses will provide for treatment of duplicate laboratory analyses, results which are reported as less than detection limit, and for examination for any statistical outliers that result from the analyses. Where possible, values which are recorded as less than detection limits will be handled according to "RCRA Groundwater Monitoring Enforcement Guidance Document" (OSWER-9950.1, September, 1986), which directs calculation through the use of Cohen's statistical methodology. This is found in "Tables for Maximum Likelihood Estimates from Single Truncated and Singly Censored Samples" (Technometrics, 3: 535-541, 1961). Otherwise, the detection limit will be used in the statistical analyses.

Average contaminant values for the potential release areas will be compared to their appropriate average background values and to pre-established limits using statistical t-tests. Statistical modeling methods such as least squares and kriging will be used to estimate response surfaces for use in developing concentration contours for the contaminants, where appropriate. Statistical confidence bounds (upper, lower, or both) will be determined for the contaminants at a given sampling location and depth, where appropriate.

10. HEALTH AND SAFETY PROCEDURES

10.1 INTRODUCTION

Special requirements and procedures to protect the health and safety of the investigating team, ORGDP site personnel, and the general public during the RCRA Facility Investigations of the K-1401 acid line are addressed in this section.

K/HS-132 details the health, safety, environmental, security, plant protection, and emergency response organizations which are in place at ORGDP. These organizations provide the support at the ORGDP line organizations to meet the requirements for health and safety during the RFIs. They provide the communications response and reporting for any plant emergency; on-site medical facilities with medical surveillance, treatment, monitoring, and periodic physical examinations; health physics and industrial hygiene surveillance hazard evaluation and control; operational safety accident prevention and control; plant security and visitor control.

In addition, the general document identifies the organizational responsibilities for health and safety at the SWMU sites during RFIs. The document includes the methodology for establishing the work zones of each SWMU, the level of protection required in the exclusion zone, decontamination procedures, personnel exposure limits, monitoring requirements, and respiratory protection requirements.

10.2 KNOWN HAZARDS AND RISKS

Substances of safety and health concern in the K-1401 Acid Line are tabulated below.

Substances of Safety and Health Concern

Waste Solvents and Degreasing Agents	x	Sludge	x
Radioactive Wastes	x	Corrosive Liquids	x
		Plating Wastes	x

Treated Industrial Waste	____	Metal Wastes	____
Liquid Waste/Free Product Potential	____	Cleaning Solutions	x
Asbestos	____	Paint Wastes	x
PCB	____	Nonhazardous Wastes	x
Mercury	x		

The plan for the K-1401 Acid Line SWMU is based upon requirements described in Volume I, Section 6, of the draft document, "RCRA Facility Investigation Guidance" (October, 1986). The operational information of the K-1401 Acid Line establishes the personnel protection as Level D for this SWMU.

10.3 LEVEL OF PROTECTION

The level of personnel protection and monitoring for sediment and surface water sampling is designated below.

Level Designation		Monitoring Parameters	
A	____	Airborne Pollutants	x
B	____	Explosion Potential	____
C	____	Radiation	x
D	x		

10.4 DESIGNATION OF WORK AREA ZONES

The three zones (exclusion, contamination reduction, and support) will be established for the work activity area in accordance with the methodology developed in Section 9 of K/HS-132. The safety equipment required for the designated level of protection and the decontamination procedures are also covered in K/HS-132.

10.5 EXPOSURE LIMITS

The personnel protection recommended for work activity in the exclusion zone of this SWMU is Level D.

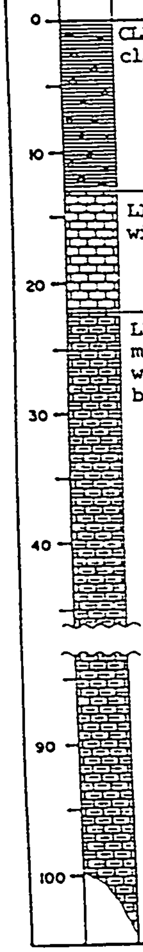
Employee exposure to airborne pollutants throughout the course of the investigation will be monitored through the use of air monitoring equipment. If organic vapor levels exceed background conditions for more than one minute or unusual odors are detected, work will be stopped, the area will be evacuated, and the ORGDP Industrial Hygiene Department will be contacted to determine necessary actions to mitigate health and safety concerns.

The responsibility for limiting the exposure of the workers to nonhazardous levels of radiation resides in the site health and safety officer (SHSO) using instruments described in Section 9 of K/HS-132. The SHSO will monitor for radiation in the air with a radiation meter capable of measuring 0.1 mR/hr. Should the reading exceed 0.1 mR/hr, the SHSO will order work to be stopped and the crew removed from the exclusion zone. The SHSO will request the presence of a health physicist on the site who will assess the potential hazard of the conditions and determine whether work should continue.

APPENDIX

GERAGHTY & MILLER, INC. Ground-Water Consultants	LITHOLOGIC LOG	BORING NO. BRW-7
		PROJECT Hydrogeologic Site Characterization, K-25 Plant

LOCATION	COORDINATES	SURFACE ELEVATION	TOTAL DEPTH
K-1407-B	Plant Grid S24509.81 E 910.07	754.31 feet msl	100 feet
GEOLOGIST	**SAMPLE INTERVAL**	**SAMPLE TYPE**	**DATE COMPLETED**
D. Hubert/D. Brice	5 feet	Drill Cuttings	02/04/86
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
A. Pippin	Alsay, Inc.	Air Rotary	Failing 1250
PURPOSE OF BORING	**GEOPHYSICAL CONTRACTOR**	**GEOPHYSICAL LOGS**	
Monitor Well	Century Geophysical	Natural Gamma, Density, Single Arm Caliper, Gamma-Gamma Compensated Density	

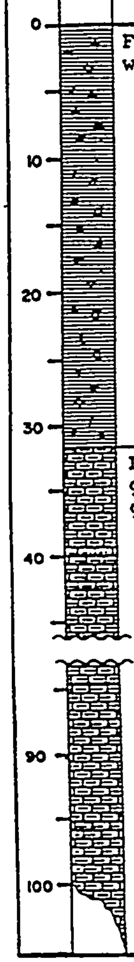


DEPTH IN FEET	DESCRIPTION	COMMENTS
0–~13	CLAY AND FILL MATERIAL: Fill material, plastic clay with rock fragments.	
~13–~22	LIMESTONE: Blue-gray, cherty, micritic, with secondary calcite.	
~22–100	LIMESTONE AND SHALE: Limestone is blue-gray, micritic to slightly oolitic, (cherty in places), with some secondary calcite. Shale is gray, blue-gray and green-gray, calcareous in places.	

GERAGHTY & MILLER, INC.
Ground-Water Consultants

LITHOLOGIC LOG

BORING NO. BRW-8	PROJECT Hydrogeologic Site Characterization, K-25 Plant		
LOCATION K-1070-B	COORDINATES Plant Grid S24663.84 E 477.00	SURFACE ELEVATION 778.65 feet msl	TOTAL DEPTH 100 feet
GEOLOGIST D. Hubert & G. Weiss	SAMPLE INTERVAL 5 feet	SAMPLE TYPE Drill Cuttings/Core	DATE COMPLETED 02/04/86
DRILLER J. Cason	DRILLING CONTRACTOR Alsay, Inc.	DRILLING METHOD Water Rotary	RIG TYPE Failing 1250
PURPOSE OF BORING Monitor Well	GEOPHYSICAL CONTRACTOR Century Geophysical	GEOPHYSICAL LOGS Natural Gamma, Density, Single Arm Caliper, Gamma-Gamma Compensated Density	



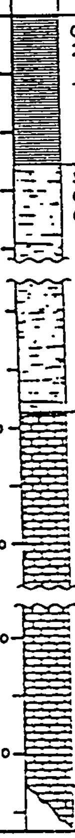
DEPTH IN FEET	DESCRIPTION	COMMENTS
0–30	FILL MATERIAL: Orange brown, low plasticity clay with rock fragments, coal, brick and wood.	
30–100	LIMESTONE AND SHALE: Limestone is gray to dark gray, oolitic with secondary calcite. Shale is gray, green and maroon.	Slight loss of circulation at 30'. Slight loss of circulation at 51'.

GERAGHTY & MILLER, INC.
Ground-Water Consultants

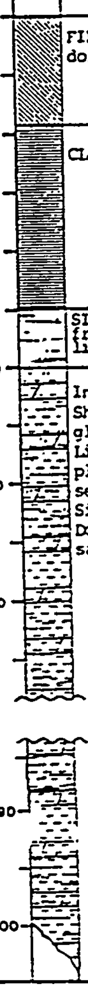
LITHOLOGIC LOG

BORING NO. BRW-11		PROJECT Phase II Monitor-Well Installation, K-25 Plant	
LOCATION K-1070-C,D	COORDINATES (PLANT GRID) S26,178.46 E 969.26	SURFACE ELEVATION 626.36 ft msl	TOTAL DEPTH 183.0 ft
GEOLOGIST G. Weiss	SAMPLE INTERVAL 5 ft	SAMPLE TYPE Cuttings	DATE COMPLETED 01-31-87
DRILLER D. Wood	DRILLING CONTRACTOR Graves	DRILLING METHOD Air Rotary	RIG TYPE Dresser T-70-W
PURPOSE OF BORING Monitor Well	GEOPHYSICAL CONTRACTOR Geological Consulting	GEOPHYSICAL LOGS Natural Gamma, Density, S.P., Resistivity, Single Arm Caliper, Fluid Cond.	

DEPTH IN FEET	DESCRIPTION	COMMENTS
0	CLAY (100%), brown, some limestone fragments. 2'-7' Red, very firm. 7'-13' Tan, very silty and sandy.	
10	SILTSTONE (100%), dark gray, maroon in places. Contains very fine-grained sand in places. Glauconitic in places.	
20 / 120	Possible Fault	
130	LIMESTONE (100%), white to light brown, lime-green in places, micritic, some secondary calcite.	
140 / 170	170'-183' Limestone (75%); Shale (25%), green and red-brown, glauconitic in places.	Borehole producing water (<1 gpm) from 155 ft to 165 ft
180		



GERAGHTY & MILLER, INC. Ground-Water Consultants	LITHOLOGIC LOG	BORING NO BRW-12	
		PROJECT Phase II Monitor-well Installation, K-25 Plant	
LOCATION K-1070-C,D	COORDINATES (PLANT GRID) S25,658.31 E 1,477.35	SURFACE ELEVATION 817.34 ft msl	TOTAL DEPTH 300.0 ft
GEOLOGIST G. Weiss	SAMPLE INTERVAL 5 ft	SAMPLE TYPE Cuttings	DATE COMPLETED 02-05-87
DRILLER D. Wood	DRILLING CONTRACTOR Graves	DRILLING METHOD Air Rotary	RIG TYPE Dresser T-70-W
PURPOSE OF BORING Monitor Well	GEOPHYSICAL CONTRACTOR Geological Consulting	GEOPHYSICAL LOGS Natural Gamma, Density, S.P., Resistivity, Single Arm Caliper, Fluid Cond.	



DEPTH IN FEET	DESCRIPTION	COMMENTS
0	FILL (100%), brown to red-brown clay and gray dolostone gravel.	
10	CLAY (100%), brown to red-brown.	
20		
	SILT (100%), Dark gray, clayey in places. Contains fragments of weathered shale and traces of weathered limestone.	
30	Intercalated SHALE, SILTSTONE & DOLOSTONE Shale - dark to green-gray, silty in places, glauconitic in places. Lusterous sheen in places. Limestone - dark to green-gray, brown and white in places, micritic, sandy in places. Contains abundant secondary calcite. Siltstone - dark to green-gray, dense. Dolostone - dark to green gray, finely crystalline, sandy in places. Some secondary calcite.	Borehole producing water (<1 gpm) at 30 ft
40		
50		
290		
300		

2351

ChemRisk/Shonka Research Associates, Inc., Document Request Form

(This section to be completed by subcontractor requesting document)

TEBENNETT / K-25 ER DMC

Requestor — Document Center (is requested to provide the following document)

Date of request 9/5/95 Expected receipt of document ____________

Document number ER004634 Date of document SEPT 1987

Title and author (if document is unnumbered) K/HS-138

Name ADC Reviewer ____________

Date Sent to ADC ____________

Date(s) Cleared 9/17/87

(This section to be completed by Document Center)

Date request received 9/1/95

Date submitted to ADC NA

Date submitted to HSA Coordinator 9/18/95

(This section to be completed by HSA Coordinator)

Date submitted to CICO NA

Date received from CICO NA

Date submitted to ChemRisk/Shonka and DOE 9/19/95

(This section to be completed by ChemRisk/Shonka Research Associates, Inc.)

Date document received ____________

Signature ____________

K/HS-138

ORGDP

OAK RIDGE GASEOUS DIFFUSION PLANT

MARTIN MARIETTA

RCRA FACILITY INVESTIGATION PLAN K-1410 NEUTRALIZATION PIT OAK RIDGE GASEOUS DIFFUSION PLANT OAK RIDGE, TENNESSEE

SEPTEMBER 1987

OPERATED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

101100

SEPTEMBER 1987 K/HS-138

RCRA FACILITY INVESTIGATION PLAN
K-1410 NEUTRALIZATION PIT
OAK RIDGE GASEOUS DIFFUSION PLANT
OAK RIDGE, TENNESSEE

Prepared by the
Oak Ridge Gaseous Diffusion Plant
Oak Ridge, Tennessee 37831
operated by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U. S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

TABLE OF CONTENTS

1. INTRODUCTION

Within the confines of the Oak Ridge Gaseous Diffusion Plant (ORGDP) are hazardous waste treatment, storage, and disposal facilities; some are in operation while others have been closed. These solid waste management units (SWMUs) are subject to assessment by the U.S. Environmental Protection Agency (EPA), as required by the 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA). The RCRA Facility Investigation (RFI) Plans are scheduled to be submitted for all the SWMUs during calendar years 1987 and 1988. RCRA Facility Investigation Plan - General Document (K/HS-132) includes information applicable to all the ORGDP SWMUs and serves as a reference document for the site specific RFI Plans.

This document is the site specific RFI Plan for one of the SWMUs, the K-1410 Neutralization Pit. Contained within this document are geographical, historical, operational, geological, and hydrological data specific to the K-1410 Neutralization Pit. The potential for release of contamination through the various medias to receptors is addressed. A sampling plan is proposed to further determine the extent, if any, of release of contamination to the surrounding environment. Included are health, safety, quality assurance, and quality control procedures to be followed when implementing the sampling plan. Procedures for managing and displaying data collected from the RFI are summarized.

2. OBJECTIVES OF RCRA FACILITY INVESTIGATION PLANNING

2.1 OBJECTIVES

The RFI Plan will identify actions necessary to determine the nature and extent of releases of hazardous contamination from the K-1410 Neutralization Pit. The plan summarizes existing site information and addresses the extent of potential contamination through soils, groundwater, surface water, and air pathways.

2.2 EVALUATION CRITERIA

In order to prepare and implement a comprehensive sampling plan and to effectively evaluate analytical sampling results, evaluation criteria must first be established. Criteria for evaluating the extent of release of contaminants are based on existing state and federal regulatory guidelines and best technical judgment.

The primary medias of interest for the K-1410 Neutralization Pit are surface water, groundwater, and soils. Under the ORGDP Groundwater Protection Program, four quarters of groundwater monitoring data will be collected covering the parameters listed in the RFI Plan - General Document (K/HS-132) in Table 2.1. Soil and surface water samples will be collected as a part of the RFI Plan and analyzed for the contaminants described in Section 8 of this document. The sampling methodology and analytical procedures are designed to characterize the contaminants of interest at or below levels summarized in the RFI Plan - General Document (K/HS-132) in Table 2.2.

2.3 SCHEDULE FOR SPECIFIC RFI ACTIVITIES

A list of RFI activities for the soil sampling and analyses that will be performed and the duration of each activity are shown in Table 2.1.

2.4 FEASIBLE ALTERNATIVES

Knowledge of feasible corrective measures has been used in preparing the RFI Plan. Based on existing geologic, hydrologic, and contaminant source data, potential corrective measures for the K-1410 Neutralization Pit have been identified and are shown in Table 2.2. These corrective measures will be reevaluated after the RFI report is completed.

2.5. RISK ASSESSMENT

The public health risk associated with each of the remedial action alternatives listed in Table 2.2 will be evaluated. This evaluation will consist of a characterization of contaminant sources, environmental setting, magnitude of release, pathways to human exposures, and characterization of risks. Risk assessment began early in the RFI process and is useful for determining data requirements and site sampling plans.

Table 2.1 Schedule of RFI activities for K-1410 Neutralization Pit

	Activities	Duration
1.	Sample location and collection	
	(a) Soil Sampling	6 weeks
	(b) Groundwater Sampling (Includes Well Construction	60 weeks
	(c) Surface Water Sampling	8 weeks
2.	Analyses of samples	
	(a) Soil Samples	16 weeks
	(b) Groundwater Samples	66 weeks
	(c) Surface Water Samples	16 weeks
3.	Compilation of data and data presentation	8 weeks
4.	Evaluation of results and recommendations	2 weeks
5.	Preparation of RFI report and submittal to EPA	8 weeks
6.	Additional sampling phases as needed	TBD

Table 2.2. Potential corrective measures

General Response Action	Technologies
Monitoring	Surveillance monitoring and analysis
Removal of Source	Excavate the contaminated soils and materials Treat and/or dispose of excavated materials
Containment from surface water	Cap site/surface diversion structures
Containment from groundwater	Subsurface collection drains-french drains, tile drains, pipe drains
Treatment of groundwater	Collect the groundwater in the existing retrofitted pit and haul to treatment facility

3. DESCRIPTION OF CURRENT CONDITIONS

3.1 GEOGRAPHICAL INFORMATION

The K-1410 Neutralization Pit is located across Poplar Road from the K-1410 Plating Facility; approximately 600 feet west of the K-25 building and adjacent to Poplar Creek. The K-1410 Neutralization Pit area consists of five separate components:

(1) the pipe leading from the K-1410 building to the concrete pit;

(2) the pipe leading from the concrete pit to the limestone pit;

(3) concrete neutralization pit;

(4) limestone pit, and;

(5) the weir from the limestone pit to the creek.

The limestone pit is located outside a security fence that surrounds ORGDP. A location map is shown in Figure 3.1. The security fence provides a locked gate for access to the pit area from inside the plant; otherwise, the area can be accessed by boat via Poplar Creek.

3.2 HISTORICAL INFORMATION

In 1945, the K-1410 building was used for the storage of clean trapping material (alumina, carbon, sodium fluoride). An area of the K-1410 building was also used for dumping spent traps and refilling them with clean trapping material. Most of the spent material containing low level radioactive uranium was

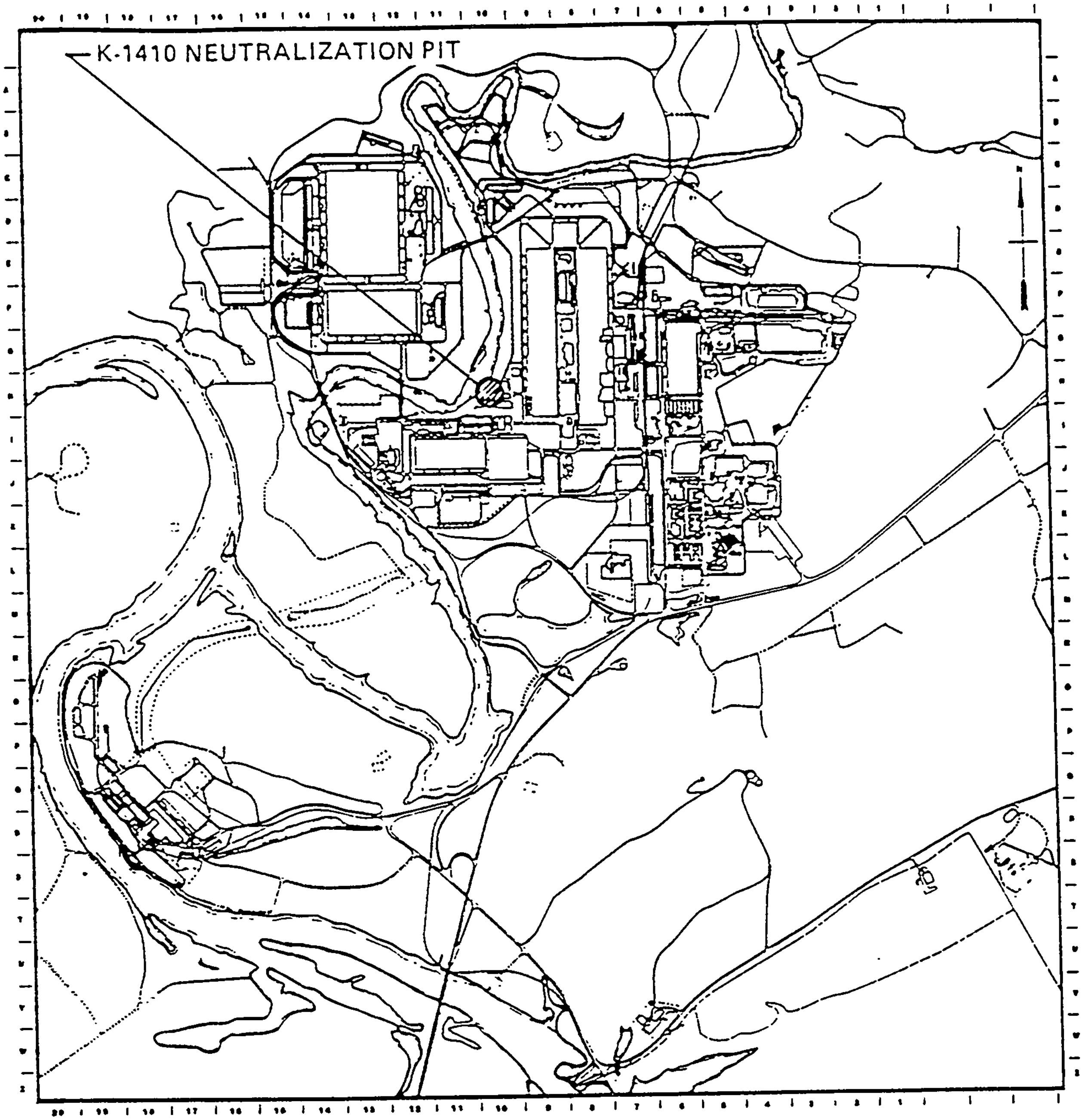


Fig. 3.1. K-1410 Neutralization Pit - ORGDP Location

stored in the K-25 building vaults for subsequent recovery. A uranium decontamination and cleaning facility was operated in the K-1410 building from the late 1940s until the K-1420 Chemical Operations Facility was built and placed into operation in the mid 1950s. The decontamination and cleaning solutions from Building K-1410 were transported to K-131 for recovery if economic recovery criteria were met; otherwise, the solutions were discharged into Poplar Creek. During this time period, the discharge pipe ran underground until it exited from the bank of the creek; the discharge pipe was then supported to spill its contents into the creek or onto the bank near the water's edge. Discharge pipes were elevated above the ground or water surface with the effluent spilling into the stream or onto the bank. An interim period existed from the time the K-1420 building was completed (1953-1954), and the K-1410 building began plating operations in 1963. During this interim period the K-1410 facility continued servicing cascade chemical tanks and vacuum pumps and cleaning and decontaminating equipment parts.

In 1963, the K-1410 plating facility and neutralization pit were in operation. The K-1410 facility was modified as an electroplating facility. The modifications included the excavation of a pit on the bank of Poplar Creek and filled with limestone. This pit was to handle neutralization of the discharges from the plating operations. An underground pipeline from the K-1410 facility, at the side of the bank above the pit, was installed to discharge the plating effluents. Rip-rap lined the bank from the pit to Poplar Creek. Effluents overflowed from the pit down the rip-rap into Poplar Creek.

In order to meet requirements imposed by the EPA, a new neutralization facility was constructed and placed in operation in 1975. The facility consisted of a 15,800 gallon concrete pit with feed and mechanical mixing equipment and monitoring instruments. The concrete pit was located upgradient of the original limestone pit with the effluent from the concrete pit discharging into the original pipeline and exiting at the limestone pit. The neutralized discharge into Poplar Creek was permitted under the National Pollutant Discharge Elimination Program (NPDES) regulations. Figure 3.2 is a sketch of the locations of the two neutralization pits and the associated piping.

In 1979, the needs of the ORGDP improvement and upgrading program (CIP-CUP) had been met, and the K-1410 Plating Facility and Neutralization Pit were shut down. The K-1410 building, the neutralization pit, and the original limestone pit are now abandoned facilities.

3.3 OPERATIONAL INFORMATION

The original limestone pit and the K-1410 Neutralization Pit was used to neutralize corrosive solutions generated in the K-1410 Plating Facility. Chemicals used in the K-1410 plating operations included alkaline cleaners (various trade names);

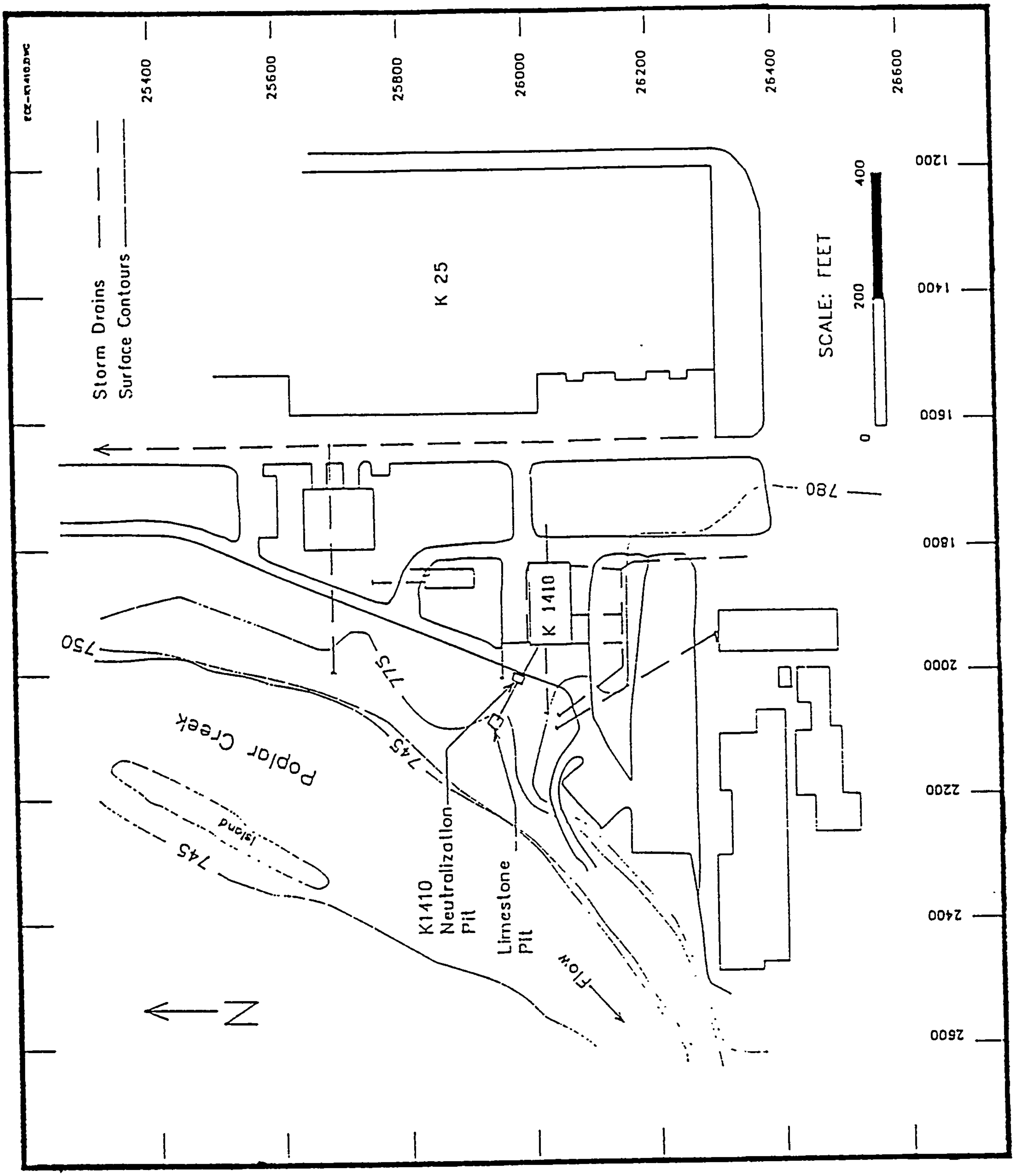


Fig. 3.2. Surface Contours and Storm Drains for the K-1410 Neutralization and Limestone Pits

hydrochloric, boric, and sulfuric acids; nickel sulfamate; and lime.

Degreasing operations were carried out in the K-1410 building during 1946 through 1963 using a commercial degreasing unit which included a recovery still. The degreaser was required to cleanup pumps that used MFL oil as a lubricant. Initially, carbon tetrachloride may have been used as the degreasing agent; however, trichloroethylene later became the degreasing agent. There is no evidence that the degreasing agents were discharged into the neutralization pit after use. The bulk of the degreasing operations with organic degreasers was handled in K-1401 after K-1410 became an electroplating facility. From 1963 until 1979, degreasing was conducted in the K-1410 building using inorganic degreasing agents such as detergents and special formulated alkali and acid dips that contained trace amounts of organic degreasers.

4. CHARACTERIZATION OF THE CONTAMINANT SOURCE

Detailed records of the quantities and types of materials treated at this site are not available.

5. CHARACTERIZATION OF THE ENVIRONMENTAL SETTING

The K-1410 Neutralization Pit is located on the east bank of Poplar Creek (Figure 3.2). While no site specific information is available for this area, groundwater and surface water flows may be inferred from regional data obtained in the plant-wide Groundwater Protection Program currently underway and from another SWMU (K-1232) located south of this site, also on the east bank of Poplar Creek.

5.1 HYDROGEOLOGY

This entire site is underlain by Chickamauga Limestone and the unconsolidated residuum primarily consists of the weathered bedrock and man-made fill. Extrapolating from data gathered from the K-1232 area, an estimated depth of the residuum is approximately 30 ft. A site characterization well is scheduled for installation at this site for the end of FY-87. The installation of this characterization well will provide information for the eventual siting of the actual monitoring wells around the limestone and concrete pit and their process lines. While there are no site-specific data presently available, a facility-wide study of ORGDP hydrogeology (P.P. Kuhlmeier, W.C. Sinclair, and J.C. Haymore, July 1986.) indicates that the groundwater table in the vicinity of K-1410 is relatively flat to the east of the site and then dips down to Poplar Creek with a very steep gradient. The groundwater should flow directly from the neutralization pit area perpendicular into Poplar Creek. Slug test results from the K-1232 area indicate that the stiff clays produced by weathering of the bedrock have very low hydraulic conductivities of 10^{-6} cm/s. The low conductivities result in low velocities in the flood plain. As the groundwater nears Poplar Creek and dips rapidly toward the creek, groundwater velocities would tend to increase.

5.2 SURFACE WATER

The surface water from the site flows to a small grass-lined swale (the area also drains the area west of the K-25 building) and quickly flows down the steep bank to Poplar Creek.

5.3 AIR

No site specific air quality or meteorological data is available for this SWMU. However, Martin Marietta Energy Systems (MMES) has an ongoing study of the air quality and meteorological conditions of ORGDP as a whole and this study should be representative of the conditions at the SWMU. This general ORGDP data is available in the RFI Plan - General Document (K/HS-132).

6.0 IDENTIFICATION OF POTENTIAL PATHWAYS AND RECEPTORS

Assessments of inactive hazardous waste disposal or storage sites are required to evaluate the site's potential for health or safety risks to personnel, public, or environment. Determination of such risks must be based on evaluations of both the potential pathways of toxic release and the possible receptors of the contamination. Evaluations of the pathways which might release contaminants from the K-1410 Neutralization Pit area and possible receptors of the contamination are based on (1) interviews with persons having knowledge of the process waters treated at the site, and (2) records of plating processes carried out in the adjacent K-1410 facility. RFI Plan - General Document (K/HS-132) will serve as a reference concerning the potential pathways and receptors for the ORGDP.

The operational history of the K-1410 Neutralization Pit presents a possibility of contamination of soils, groundwater, and surface water due to pipe or pit leakage or deposition of contaminants due to pit overflow. The grass and scrub vegetation present at the site are not exposure pathways and thus will not be considered. Further, while the aquatic life in Poplar Creek presents a small possibility of exposure via fishing along the Clinch River (into which Poplar Creek flows), that pathway will be covered in a separate RFI for the Poplar Creek and Clinch River watersheds.

6.1 POTENTIAL PATHWAYS OF MIGRATION

6.1.1 Soils

The area of the K-1410 Neutralization Pit exhibits the typical ORGDP cover of unconsolidated material composed of weathered residuum and man-made fill which are underlain by bedrock. In general, the soils comprising the surficial materials at ORGDP present low permeabilities (on the order of 10^{-5} to 10^{-4} cm/sec) and relatively high capacities for the immobilization or exchange of metals and the filtering of particulates. This composition makes it possible that soil contamination due to pit or pipe leakage would still be present. In addition, overflow from the orginal limestone pit could have resulted in contamination of surface soils around the pit and down the embankment to Poplar Creek. Soil sampling will be carried out to determine the character and extent of any contamination present in the soils due to either leakage or overflow.

6.1.2 Groundwater

Site-specific hydrogeological data are presently unavailable. However, the possibility of pit or pipe leakage of the nickel-plating solution discharge indicates some potential for groundwater contamination. Based on the hydrogeological studies by P. D. Kuhlmeier, et al. (July, 1986) of areas near the K-1410 Neutralization Pit, contamination in the groundwater would be suspected to follow steep gradients toward Poplar Creek the ultimate line of groundwater discharge. Assessment of the nature and extent of possible groundwater contamination will be carried out under the ORGDP Groundwater Protection Program.

6.1.3 Surface Water

Site topography suggests that surface waters at the site would drain from the upgradient southeastern corner of the area, down the steep embankment, and into Poplar Creek. The environmental persistence and toxicity of the principal contaminants of concern, nickel and other metals, makes fouling of surface water run-off a possibility, although the likelihood of such contamination is mitigated by the vegetative cover in the area. Contamination of the waters of Poplar Creek is also a possibility, but the character and extent of contamination will be investigated under a separate plan.

Surface water samples will be taken on the banks of Poplar Creek below the limestone pit after periods of rainfall. Grab samples will also be taken from the water standing in the concrete pit. Surface water samples will be analyzed principally for metal and radioactive contamination in Phase I.

6.1.4 Air

Since the wastes treated at the site are not volatiles and vegetative cover prevents soil particulates from becoming airborne, atmospheric tranport is not considered a possible pathway of migration.

6.2 POTENTIAL RECEPTORS

6.2.1 Human Populations

The institutional controls exercised by ORGDP on the entrance to the plant prevent public access to the K-1410 Neutralization Pit area. The only public populations of interest, are those which might come into contact with one of the exposure pathways beyond the boundaries of the site itself, i.e., through the reach of the surface water or groundwater.

Of the 25 potable water wells within one mile of ORGDP, none of the wells are in proximity to the neutralization pit area, and none are believed to occupy the same hydrogeological plane as the groundwaters at the site. Furthermore, of the ten public water supplies which withdraw from the Clinch-Tennesseee River system (into which Poplar Creek feeds), none of these are closer than 15 miles to the Oak Ridge Reservation, making direct contamination from the K-1410 site unlikely. While direct discharge of surface runoff and site groundwater do represent the potential for contamination, distance and dilution effects make pollution of public water supplies a low probability. Finally, the effects of distance and dilution make the possibility unlikely that contamination of surface water and groundwater would reach the waters used downstream in the Clinch-Tennessee system for recreational and industrial use.

6.2.2 Terrestrial Fauna and Flora

The RFI Plan - General Document (K/HS-132) discusses the rare, threatened, and endangered plant and animal species which are thought to inhabit the area. To date, there has been no report that any of these species exist on the K-1410 site or are directly threatened by any possible contamination present there.

6.3 SUMMARY AND CONCLUSIONS

The nature of the process waters treated and discharged through the neutralization pit and the site hydrogeology indicate the potential for soil, groundwater, and surface water contamination. Evaluation of the potential pathways of migration and possible receptors shows sufficient potential for environmental contamination and warrants an investigation of the site.

7. EXISTING MONITORING DATA

The overflow from the K-1410 Neutralization Pit is discharged into Poplar Creek through an NPDES discharge point (Permit No. TN 0002950 Discharge Point 002). The effluent was monitored from 1975 to 1979 when the facility was shut down. Table 7.1 is a summary analyses of the effluent discharged to Poplar Creek (averaged from 1976 to 1979). Based on the NPDES permit, grab samples were taken from the discharge point on a monthly basis. The monthly grab samples indicated no detectable cyanide and a 2.25 ppm daily average of oil and grease (24 ppm-daily maximum). Nickel was monitored, but no limitations on discharge were established. The pH was maintained between 6-9. The NPDES discharge data for 1976 to 1979 is located in Appendix A. Based on the available source and monitoring data, additional monitoring of surface water is necessary. Groundwater will be monitored as part of the ORGDP Groundwater Protection Program.

	Daily Average	Minimum Value Observed or Expected During Discharge Activity	Maximum Value Observed or Expected During Discharge Activity	Freq. of Analysis	No. of Analyses	Sample Type
Flow (gal/day)	3772.5	0	14,400	Cont.	N/A	N/A
pH	7.54	5.8	9.3	Cont.	N/A	N/A
Temp (winter) F	110	110	110	1/30	48	G
Temp (summer) F	-	-	-	1/30	48	G
Cyanide (ppm)	0.0028	0.0005	0.01	1/30	48	G
Nickel (ppm)	122.28	0.005	4,000	1/30	48	G
Oil & Grease (ppm)	2.25	0.45	24	1/30	48	G

TABLE 7.1 NPDES Effluent Data From the K-1410 Neutralization Pit Averaged Between 1976 - 1979

8. SAMPLING PLAN

8.1 SAMPLING AND ANALYTICAL STRATEGY

Since no prior characterization or environmental monitoring has been performed at the K-1410 Neutralization Pit, historical information describing the operation of the facility serves as the basis for preparation of the sampling plan. The types of samples to be taken as part of this study will be soil samples and surface water samples. The K-1410 area is presently under evaluation to determine the extent of groundwater monitoring required. Groundwater characterization wells will be installed as a part of the ORGDP Groundwater Protection Program. The groundwater monitoring well network will be based on piezometric data obtained from these characterization wells. When monitoring wells are installed at this site, the groundwater data obtained from these wells will be utilized in the site characterization. No other pathways will be sampled.

There is no evidence that organic materials were ever discharged at the site. Samples collected for characterization of this area will initially be analyzed for the inorganic elements and radioactivity. Soil samples will be collected to determine whether leakage from the piping or the neutralization pit has entered the environment. The limestone pit will be sampled to determine whether it is a source of hazardous materials. Surface water samples will be collected to determine whether hazardous material is present and if any is leaching from the bank below the limestone pit into Poplar Creek.

8.2 STATISTICAL SET-UP FOR SAMPLING

8.2.1 Leak Test

The underground vitrified clay pipe (VCP) to and from the concrete neutralization pit will be leak tested. The section of piping upgradient from the concrete pit will be tested independently of the section downgradient from the pit. The lower end of each section will be plugged, and each section of the pipe will be filled with water. A minimum 10-foot head of water on the invert of the pipe at the lower end is required. Measurement of the leakage rate will begin no earlier than 15 minutes after the pipe is completely filled with water. The maximum allowable leak rate for each section of pipe is 0.1 gal/hr based on the proposed 40 CFR 280.41.

8.2.2 Soil Sampling

The K-1410 Neutralization Pit site is divided into three areas for the purpose of soil sampling: concrete pit, limestone pit and hillside, and the underground pipe lines (Figure 8.1). Within each area release monitoring will occur in phases, with each phase consisting of soil sampling, chemical analyses, and statistical analysis of resultant data. Additional phases will be conducted to determine the extent of any release and decisions made of appropriate remedial action. The first phase of sampling

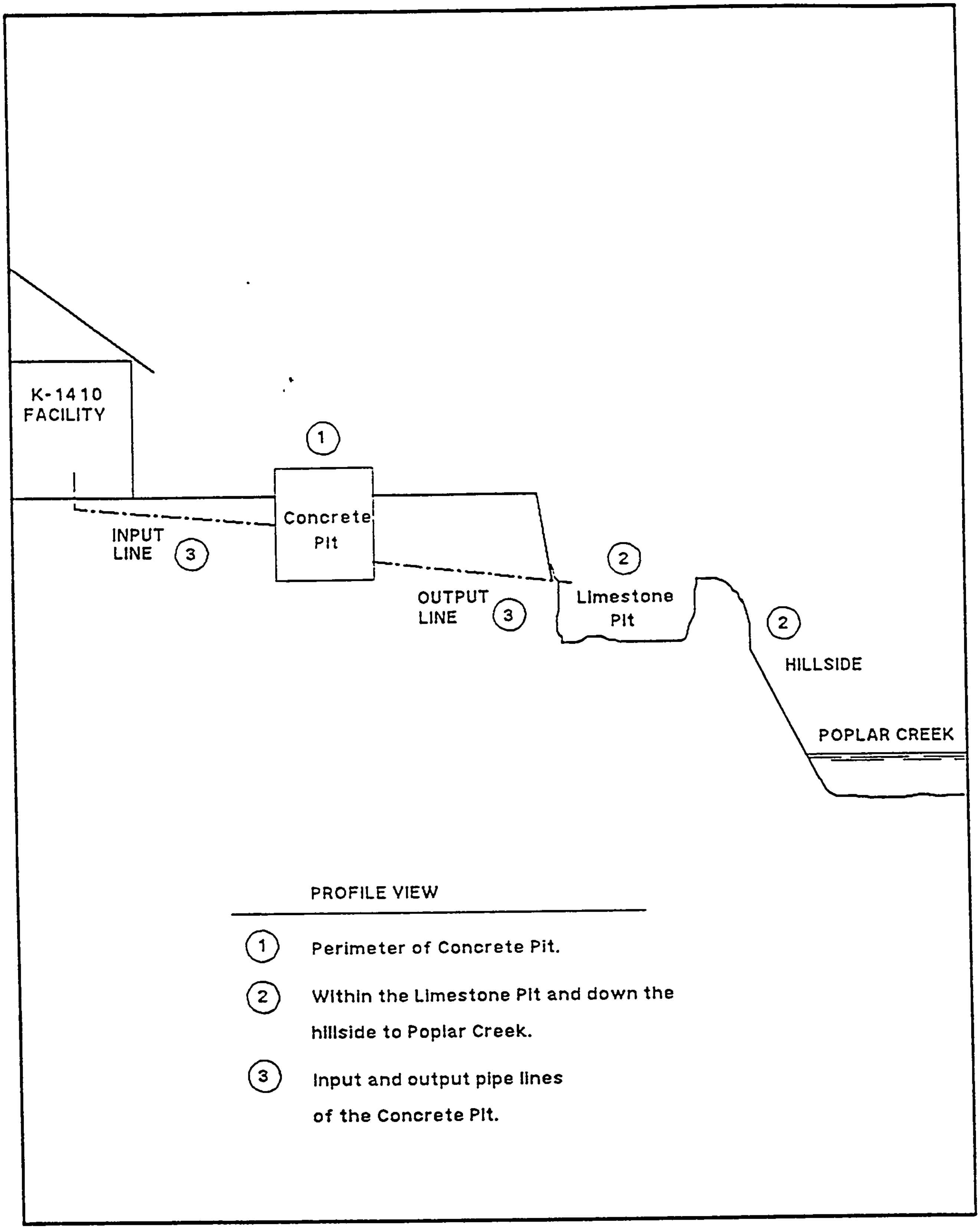


Fig. 8.1. Three Soil Sampling Areas of K-1410 Neutralization Pit Site

is designed to provide initial estimates of contaminant levels in the potential release area and in background. Also, the general direction of contaminant movement will be indicated and the variation sources identified and magnitude estimated. This information will be used to direct the next phase of monitoring, if needed.

8.2.2.1 Concrete Pit Area

Figure 8.2 shows the sampling locations of 11 corings to bedrock around the perimeter of the concrete pit. From each drilling, a soil sample will be taken: (1) from every distinct layer of soil which might be affected by a release, (2) from boundaries between soil layers, and (3) at regular four-foot intervals in thick homogeneous layers. For thicker layers, soil from two adjacent two-foot split barrels will be composited, taking precaution not to composite across soil layer types or layer boundaries. Samples will be taken to refusal (Figure 8.3). These individual samples will be divided with a portion of each sample saved in case a backup analysis is needed. In order to minimize the number of analytical tests performed prior to reaching a conclusion, chemical analyses on the samples from the 11 corings will be conducted in phases (Table 8.1). Samples from the four coring locations indicated with a star in Figure 8.2, will be analyzed first. The circles denote the seven locations where samples will be analyzed, based on the results of Phase I sampling.

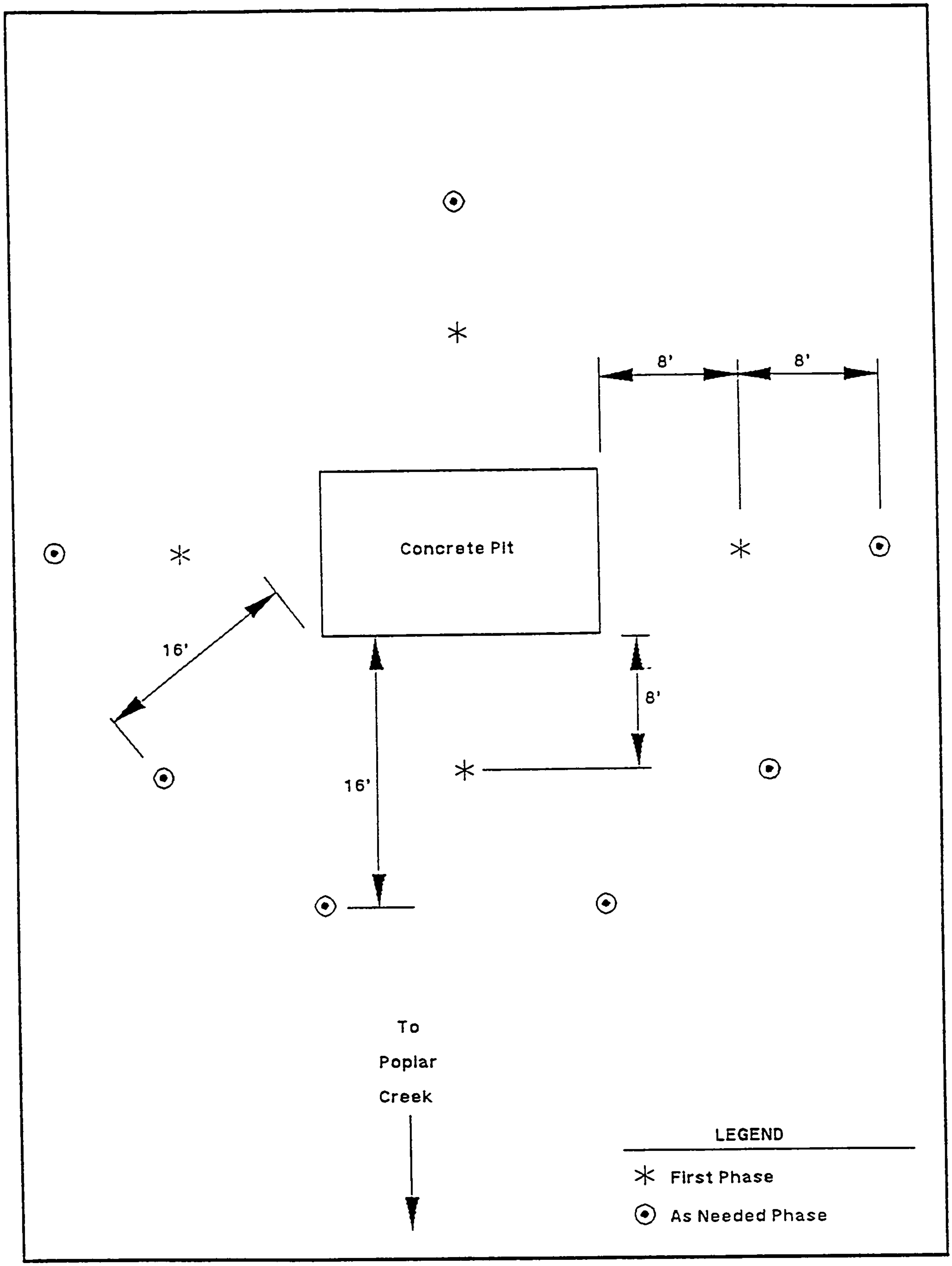


Fig. 8.2. Soil Sampling Locations for the Concrete Pit

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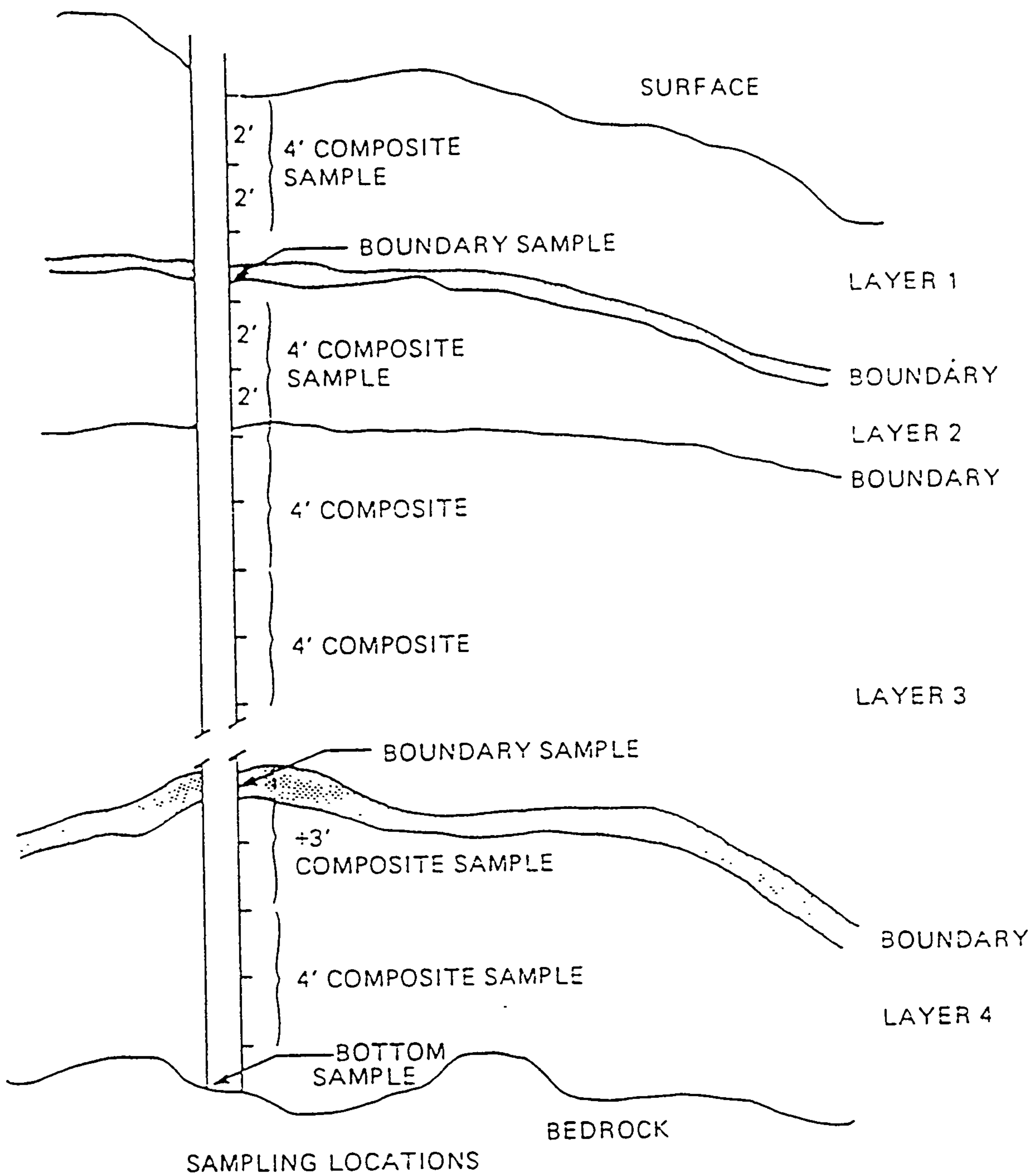

Fig. 8.3. Sampling to Bedrock

Table 8.1 Phased analysis order strategy for soil samples around the concrete pit and underground pipelines of the K-1410 Neutralization Pit Area

1. Sample locations around concrete pit (Figure 8.2):

8 feet from Concrete Pit	*
16 feet from Concrete Pit	O

Sample depths within corings:

0-8 feet	a
8-20 feet	b
20 feet-bedrock	c

<u>Phased analysis order of concrete pit soil sample groups</u>

Order	Group
1	*b
2	*c
3	*a
4	Ob
5	Oc
6	Oa

2. Phased analysis order of soil samples from along the underground pipelines (Figure 8.5):

Order	Group
1	Samples from pipeline to 10 ft. below pipeline
2	Samples from greater than 10 ft below pipeline to refusal
3	Samples from above pipeline

8.2.2.2 Limestone Pit and Hillside Area

Figure 8.4 shows the soil sampling locations from the limestone pit and down the hillside to Poplar Creek. From the single location within the limestone pit, a hole will be dug as deep as possible and samples taken: (1) from every distinct layer of soil which might be affected by a release, (2) from boundaries between soil layers, and (3) at regular intervals of two feet deep in thick homogeneous layers. A sample will be taken at surface level; a minimum of four samples will be taken. These individual samples will be divided and a portion of each sample will be retained in case a backup analysis is needed. Precaution will be taken during the hand digging so the samples in the hole will not be cross contaminated.

The hillside adjacent to the limestone pit will have surface soil samples analyzed from 10 randomly selected grid locations as indicated in Figure 8.4. Each of the ten samples analyzed will be the composite of four six-inch deep samples from within a five foot square. The hillside will be surveyed and the grid system laid out prior to the random selection of sampling locations.

8.2.2.3 Underground Pipelines

Should the pipeline leak above the maximum leak rate as addressed in Section 8.2.1, soil corings to bedrock will be taken along the inlet and outlet lines of the concrete pit at 25 foot intervals (Figure 8.5). From each drilling to bedrock, a soil sample will be taken: (1) from every distinct layer of soil,

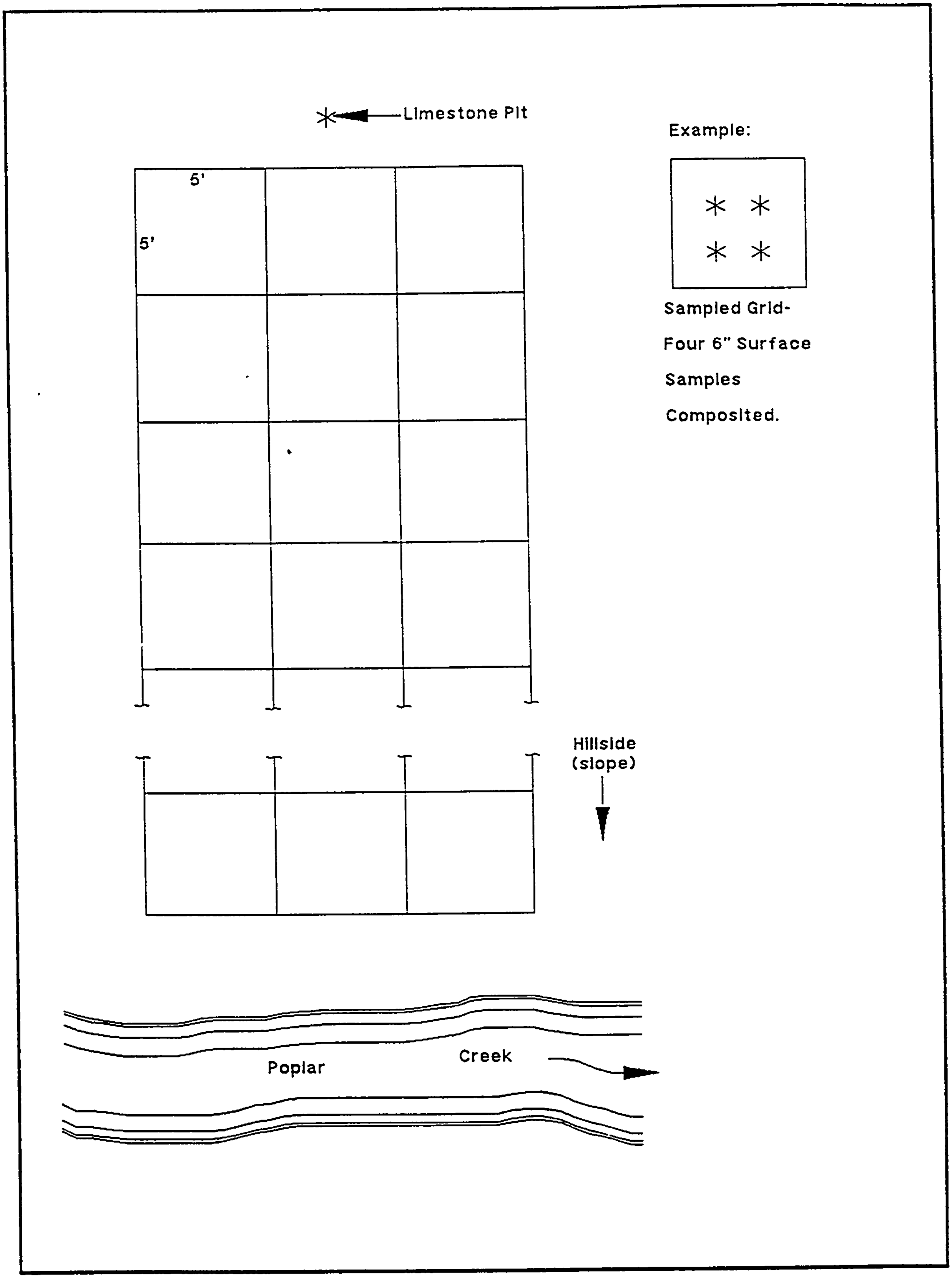

Fig. 8.4. Soil Sampling Locations for the Limestone Pit and Hillside Area

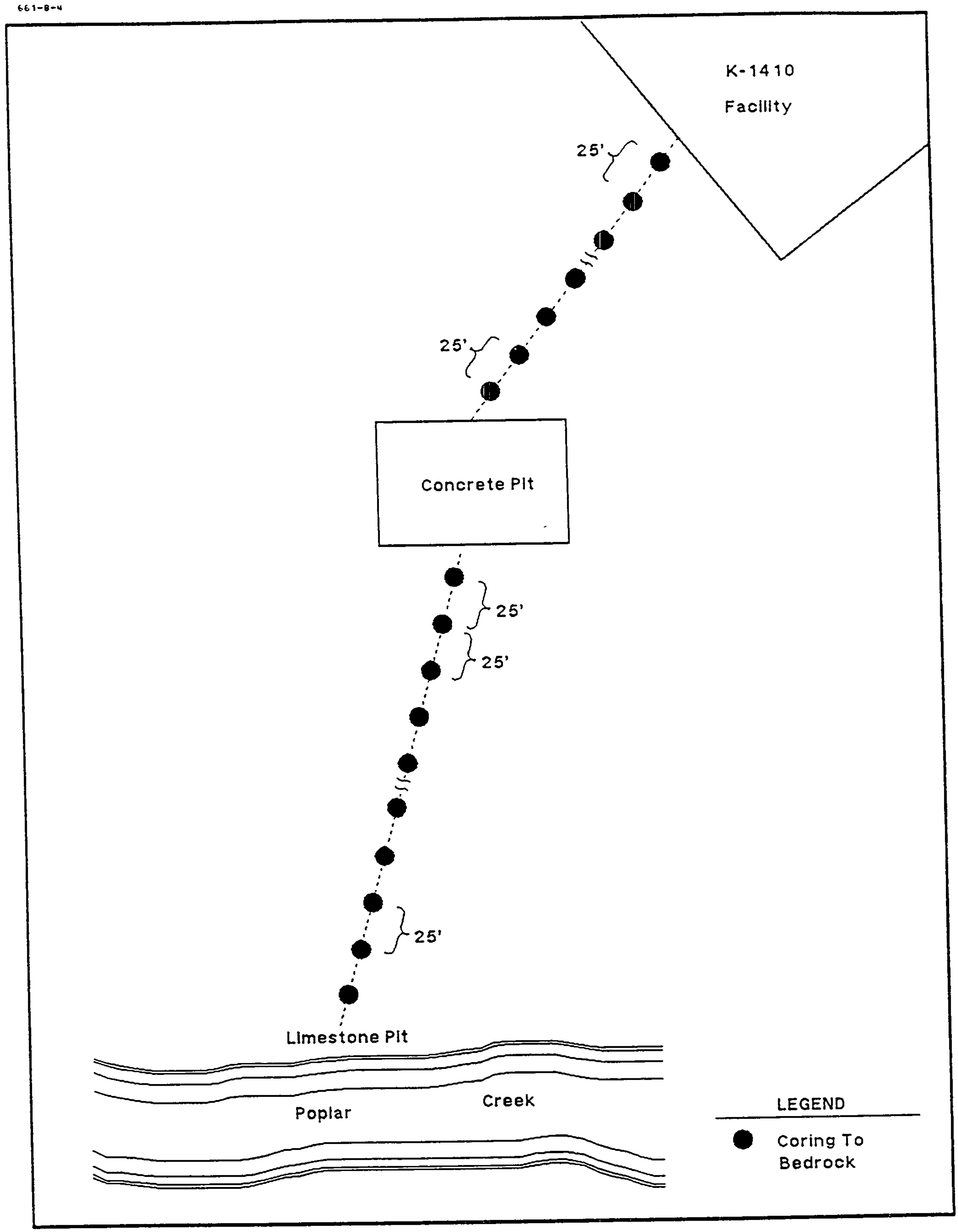

Fig. 8.5. Soil Sampling Locations for the Underground Pipes of K-1410

starting at the bottom of the pipe, which might be affected by a release, (2) from boundaries between soil layers, and (3) at regular intervals of four feet of depth in thick homogeneous layers. For thicker layers, soil from two adjacent two-foot split barrels will be composited, with care not to composite across soil layer types or layer boundaries. Samples will be taken to refusal (Figure 8.3). These individual samples will be divided with a portion of each sample retained in case a backup analysis is needed. Analysis will be conducted in phases, as given in Table 8.1.

8.2.2.4 Background Sampling

Figure 8.6 shows the general location of three background corings to bedrock. Samples will be taken and composited according to the discussion in 8.2.1.1 and Figure 8.3. All samples will be analyzed.

For Quality Assurance and Quality Control (QA and QC) purposes, approximately ten percent of the samples will be sampled and analyzed in duplicate.

8.2.3 Surface Water Sampling

Surface water sampling will occur at two locations at the K-1410 site: (1) two grab samples will be taken of the water located in the concrete pit and (2) rainfall runoff will be sampled from the bottom of the limestone pit hillside just above Poplar Creek during three periods of heavy rain.

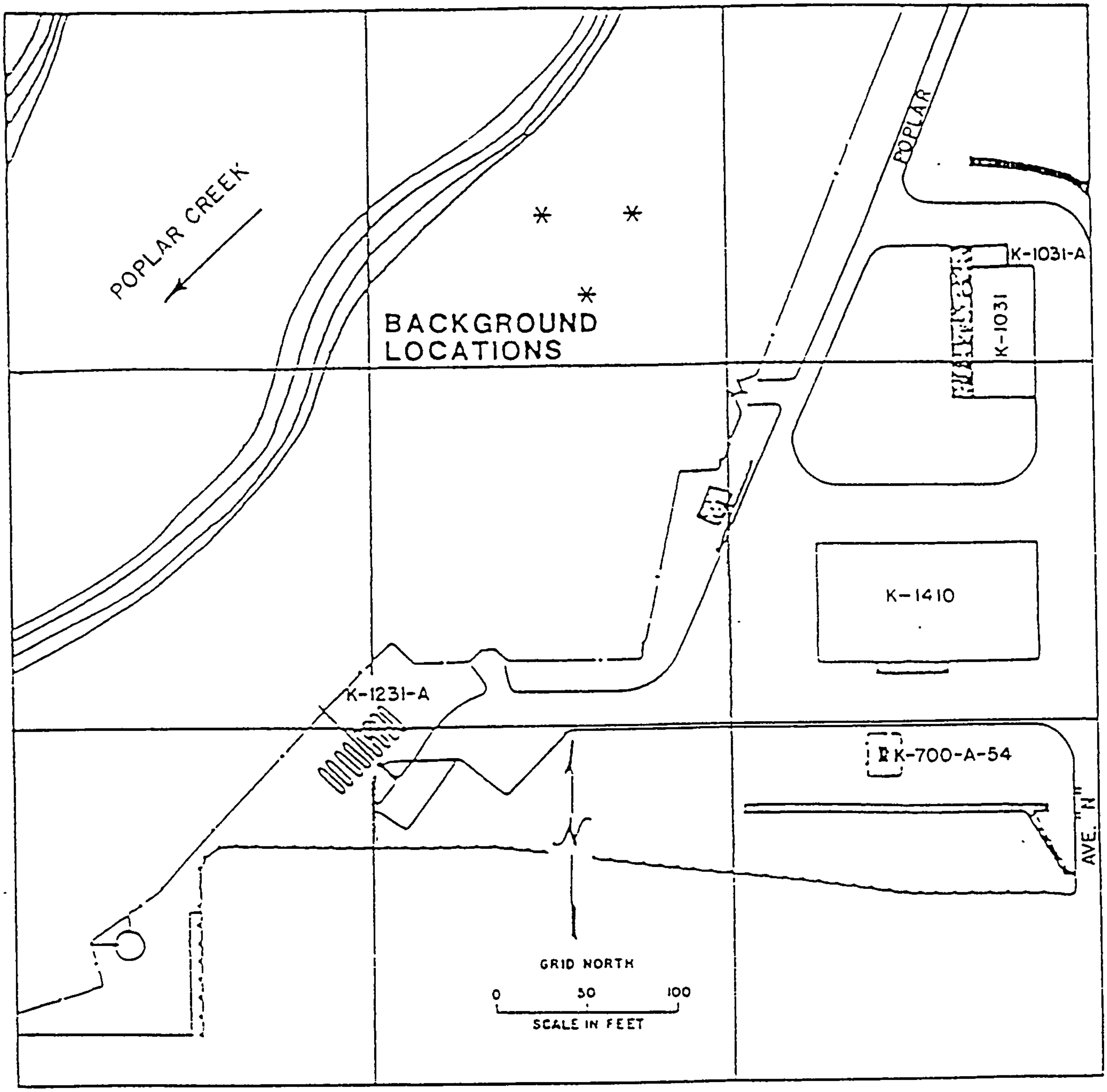

Fig. 8.6. Background Sampling Locations

8.3 FIELD SAMPLING

8.3.1. Site Preparation

The required usage of a drilling rig and the proximity of overhead electrical lines will require special arrangements with Plant Operations to eliminate the possibility of the drilling rig contacting live overhead electrical lines.

Additionally, to make expeditious use of the driller's time, the preselected drilling sites (see Figures 8.2 and 8.5) should be located and staked out prior to the arrival of the drilling rig. If any corings are located in an area covered with asphalt or cement, arrangements should be made for removal of the cement/asphalt layer prior to sampling.

8.3.2 Equipment and Supplies

The drillers will provide all necessary drilling equipment (hollow core auger, split-barrel sampler, etc.). The following field sampling supplies will be required:

- o Nonionic detergent, Micro (International Products Corp.)
- o Deionized water
- o Isopropyl alcohol
- o Glass containers, pre-cleaned, with teflon lined lids, one quart capacity
- o Logbook
- o Chain of custody seals
- o Sample labels
- o Chain of custody forms

- o Stainless steel trays
- o Aluminum foil
- o Stainless steel spatulas
- o Hand auger
- o Shovel

8.3.3 Soil Sampling Procedure

Collection of samples from this site will follow ASTM Method D 1586-84 Penetration Test Split-Barrel Sampling of Soils. The drilling will be performed by private drilling contractors. In this method, a hollow core auger will be used to remove the soil above each segment to be sampled and the split-barrel sampler will be driven into the soil through the center of the auger. This technique will obtain a sample that is undisturbed by the auger operation. Using a split-barrel sampler of two-foot length, samples will be removed from each position in two-foot segments. Samples will be collected to refusal. At each two-foot increment, the split-barrel sampler will be removed from the drilling rig (to be performed by the drilling crew) and separated to expose the sample. Two of the samples will be composited as described in Section 8.2.

Between samples, the equipment used for sample transfer shall be cleaned with nonionic detergent and water and rinsed with deionized water and isopropyl alcohol. The split-barrel samplers will be detergent cleaned and rinsed with water by the drilling company.

After sampling of each coring is complete, drilled holes will be filled with a grout column (see Section 7.1.3 of RFI Plan-General Document - (K/HS-132) to prevent any contamination of the groundwater. For surface samples, a hand auger is to be used. The sampling should be performed according to EPA 600/4-84-076 Method II-2. The auger should be detergent cleaned and rinsed with deionized water between sample collections.

From ten percent of the core segments, duplicate samples will be submitted to the laboratory to fulfill duplicate requirements per RFI Plan - General Document (K/HS-132), Section 7.3.

Sample containers will be labelled with the site identification, date, time, sample identification, and sampler's name. Sample date, site identification, time, sample identification, sampler's name, and coordinates of sample will be recorded in the logbook. In addition to the required entries, any other pertinent information and/or observations shall be recorded. The logbook used for these records will contain a copy of the map of the area and a copy of the sampling plan.

The sample containers shall be sealed and transported to the laboratory under chain of custody protocol as referenced in RFI Plan - General Document (K/HS-132) in Section 7.4.

8.4 ANALYTICAL PROTOCOL

An analytical sampling protocol with the following salient features is proposed. The coring sections discussed are obtained as outlined in Section 8.3.

There appears to be a definite possibility for inorganic and radioactive waste migration. Samples/composites will be analyzed for both radioactivity (gross alpha, beta, and gamma) and the inorganic elements listed in the RFI Plan - General Document (K/HS-132), Table 7.4 (includes all regulated metals and uranium). EP Toxicity extractions will only be performed on those samples whose total regulated inorganic species content exceeds the EP Toxicity limits. Radionuclide analysis will only be conducted on those samples whose gross alpha, beta, or gamma exceeds accepted levels.

Groundwater characterization/monitoring wells are to be installed at the site. Once installed, data from these wells, obtained as part of the ORGDP Groundwater Protection Program, will be used to furthur define the site.

8.5 SAMPLE ANALYSIS

After reception by the analytical laboratory, samples will be archived and, if so designated, will be scheduled for the analyses outlined in Figure 8.7.

Surface water and groundwater analysis will follow standard EPA protocol as outlined in Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020). Soil sample analyses will follow standard EPA protocol as outlined in Test Methods for Evaluating Solid Waste (SW-846, 3rd Edition).

The QA/QC requirements outlined in the RFI Plan - General

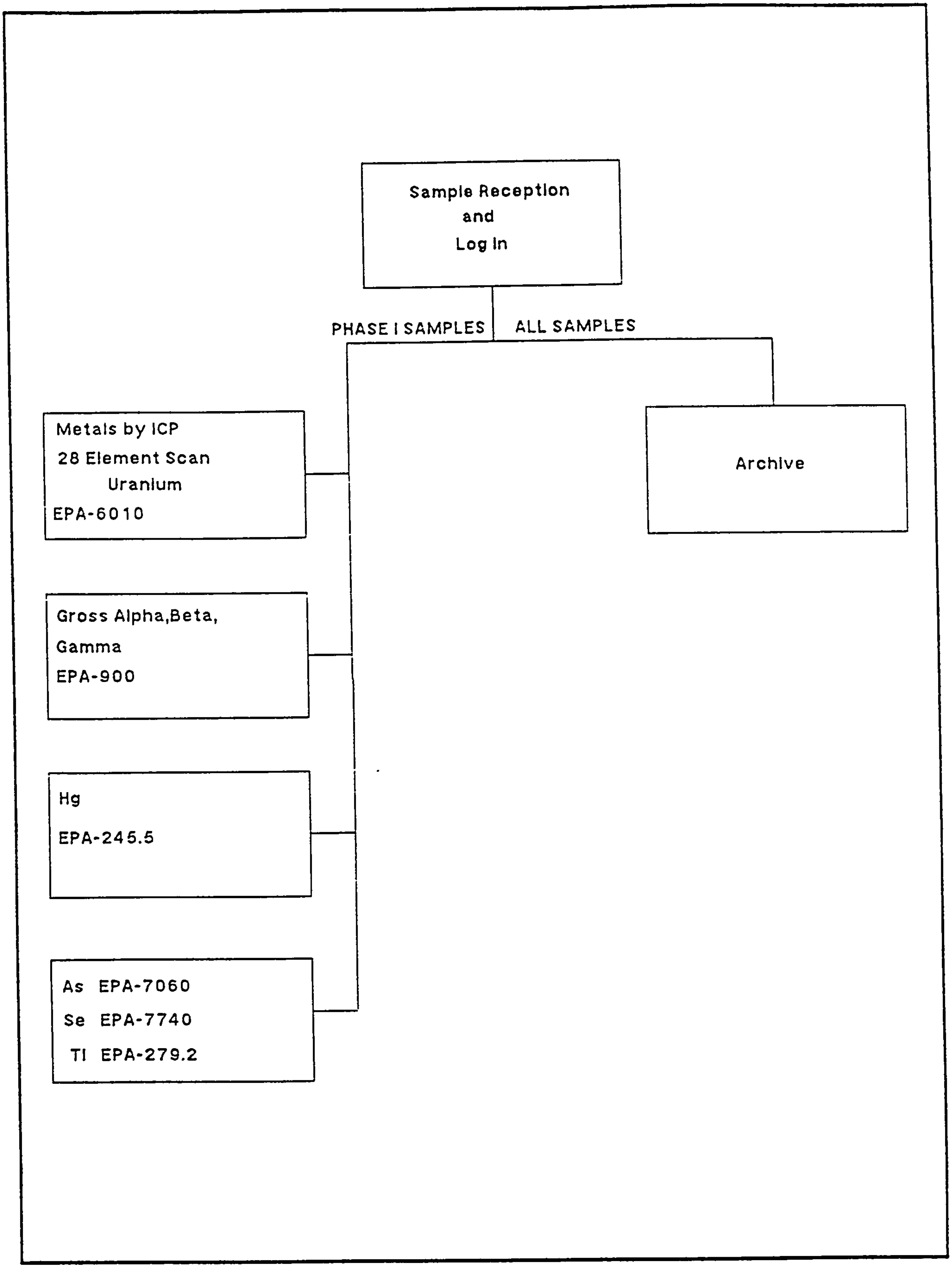

Fig. 8.7. Sample Analysis Procedures

Document (K/HS-132) in Section 7.3 shall be adhered to for all analyses.

9. DATA MANAGEMENT PROCEDURES

In order to clearly illustrate any patterns in the data, the results of the chemical analyses of samples from the potential release areas will be presented through tables, graphs, and other visual displays such as maps and contour plots so as to best illustrate any patterns in the data. (See RFI Plan - General Document (K/HS-132), Table 8.1.

Statistical analyses will provide for treatment of duplicate laboratory analyses, results which are reported as less than detection limit, and examination for statistical outlines. Specifically, values which are recorded as less than detection limits will be handled according to "RCRA Groundwater Monitoring Enforcement Guidance Document," OSWER-9950.1, September 1986, which directs calculation through the use of Cohen's statistical methodology. This is found in "Tables for Maximum Likelihood Estimates from Single Truncated and Singly Censored Samples," Technometrics, Volume 3, pages 535-541, 1961.

For soil samples, average contaminant values for the source characterization will be compared to available limits using statistical 't' tests. Statistical modeling methods such as least squares and kriging will be used to estimate response surfaces for use in developing concentration contours for the contaminants, where appropriate. Statistical confidence bounds (upper, lower, or both) will be determined for the contaminants at a given location, where appropriate.

For surface waters, average contaminant values will be compared to each other and to available limits using statistical 't' tests.

10. HEALTH AND SAFETY PROCEDURES

10.1 INTRODUCTION

Special requirements and procedures to protect the health and safety of the investigating team, ORGDP site personnel, and the general public during the RCRA Facility Investigations of the K-1410 Neutralization Pit are addressed in this section.

The RFI Plan - General Document (K/HS-132) details the health, safety, environmental, security, plant protection, and emergency response organizations which are in place at ORGDP. These organizations provide the support to ORGDP line organizations to meet the requirements for health and safety during the RFIs. They provide the communications, response, and reporting for any plant emergency; on-site medical facilities with medical surveillance, treatment, monitoring, and periodic physical examinations; health physics and industrial hygiene surveillance hazard evaluation and control; operational safety accident prevention and control; and, plant security and visitor control.

In addition, the general document identifies the organizational responsibilities for health and safety at the SWMU sites during RCRA Facility Investigations. The document includes the methodology for establishing the work zones of each SWMU, the level of protection required in the exclusion zone, decontamination procedures, personnel exposure limits, monitoring requirements, and respiratory protection.

10.2 KNOWN HAZARDS AND RISKS

Substances of safety and health concern in the K-1410 Neutralization Pit are tabulated below.

Substances of Safety and Health Concern

Waste Solvents and Degreasing Agents		Sludge	
		Corrosive Liquids	
Radioactive Wastes	x	Plating Wastes	x
Treated Industrial Waste	x	Metal Wastes	
Liquid Waste Product Potential		Cleaning Solutions	
		Paint Wastes	
Asbestos			
PCB		Nonhazardous Wastes	x
Mercury			

The plan for the K-1410 Neutralization Pit SWMU is based upon requirements described in Volume I, Section 6, of the draft document, "RCRA Facility Investigation Guidance," dated October 1986. The operational information of the K-1410 Neutralization Pit establishes the personnel protection as Level D for this SWMU.

10.3 LEVEL OF PROTECTION

The level of personnel protection and monitoring for sediment and surface water sampling is designated below.

Level Designation		Monitoring Parameters	
A		Airborne Pollutants	x
B		Explosion Potential	
C		Radiation	x
D	x		

10.4 DESIGNATION OF WORK AREA ZONES

The three zones (Exclusion, Contamination Reduction, and Support) will be established for the work activity area in accordance with the methodology developed in the RFI Plan-General Document (K/HS-132) in Section 9. As work activity requires, the exclusion zone will move to encompass areas around the concrete neutralization pit, the effluent line to the limestone pit, and the free discharge from the limestone pit down the bank into Poplar Creek. The safety equipment required for the designated level of protection and the decontamination procedures are also covered in K/HS-132.

10.5 EXPOSURE LIMITS

The personnel protection recommended for work activity in the exclusion zone of the K-1410 Neutralization Pit SWMU is Level D. Personnel will be required to wear inner and outer chemical resistant gloves during work activity.

Employee exposure to airborne pollutants (i.e., dust containing metallic particulates) throughout the course of the investigation will be monitored through the use of air monitoring equipment. If pollutants or unusual odors are detected, work will be stopped, the area will be evacuated, and the ORGDP Industrial Hygiene Department will be contacted to determine necessary actions to mitigate health and safety concerns.

The responsibility for limiting the exposure of the workers to nonhazardous levels of radiation resides in the Site Health and Safety Officer (SHSO) using instruments described in the RFI Plan - General Document (K/HS-132) in Section 9. The SHSO will monitor for radiation in the air and adjacent to sample drillings and/or diggings with a radiation meter capable of measuring 0.1 mR/hr. Should the reading exceed 0.1 mR/hr, the SHSO will order work to be stopped and the crew removed from the exclusion zone. The SHSO will request the presence of a health physicist on site who will assess the potential hazard of the conditions and determine whether or not work should continue.

APPENDIX A

	Daily Average	Minimum Value Observed or Expected During Discharge Activity	Maximum Value Observed or Expected During Discharge Activity	Freq. of Analysis	No. of Analyses	Sample Type
Flow (gal/day)	7,770	720	14,400	Cont.	N/A	N/A
pH	7.86	6.7	9.3	Cont.	N/A	N/A
Temp (winter) F	110	110	110	1/30	12	G
Temp (summer) F	-	-	-	1/30	12	G
Cyanide (ppm)	0.0042	0.002	0.01	1/30	12	G
Nickel (ppm)	7.8	0.005	42.3	1/30	12	G
Oil & Grease (ppm)	2.9	1	24	1/30	12	G

TABLE A.1 NPDES Effluent Data From the K-1410 Neutralization Pit During 1976

	Daily Average	Minimum Value Observed or Expected During Discharge Activity	Maximum Value Observed or Expected During Discharge Activity	Freq. of Analysis	No. of Analyses	Sample Type
Flow (gal/day)	4,530	720	14,400	Cont.	N/A	N/A
pH	7.39	5.8	8.4	Cont.	N/A	N/A
Temp (winter) F	110	110	110	1/30	12	G
Temp (summer) F	-	-	-	1/30	12	G
Cyanide (ppm)	0.004	0.001	0.01	1/30	12	G
Nickel (ppm)	13.35	0.13	48	1/30	12	G
Oil & Grease (ppm)	1.75	1	10	1/30	12	G

TABLE A.2 NDPES Effluent Data From the K-1410 Neutralization Pit During 1977

	Daily Average	Minimum Value Observed or Expected During Discharge Activity	Maximum Value Observed or Expected During Discharge Activity	Freq. of Analysis	No. of Analyses	Sample Type
Flow (gal/day)	1,710	0	7,200	Cont.	N/A	N/A
pH	7.49	6.8	8.1	Cont.	N/A	N/A
Temp (winter) F	-	-	-	1/30	12	G
Temp (summer) F	-	-	-	1/30	12	G
Cyanide (ppm)	0.0011	0.0005	0.002	1/30	12	G
Nickel (ppm)	431.5	0.9	4,000	1/30	12	G
Oil & Grease (ppm)	2.88	1	19	1/30	12	G

TABLE A.3 NPDES Effluent Data From the K-1410 Neutralization Pit During 1978

	Daily Average	Minimum Value Observed or Expected During Discharge Activity	Maximum Value Observed or Expected During Discharge Activity	Freq. of Analysis	No. of Analyses	Sample Type
Flow (gal/day)	1,080	720	1,440	Cont.	N/A	N/A
pH	7.43	6.9	7.9	Cont.	N/A	N/A
Temp (winter) F	-	-	-	1/30	12	G
Temp (summer) F	-	-	-	1/30	12	G
Cyanide (ppm)	0.002	0.002	0.002	1/30	12	G
Nickel (ppm)	36.45	0.35	266.9	1/30	12	G
Oil & Grease (ppm)	1.47	0.45	5.5	1/30	12	G

TABLE A.4 NPDES Effluent Data From the K-1410 Neutralization Pit During 1979

2351

ChemRisk/Shonka Research Associates, Inc., Document Request Form

(This section to be completed by subcontractor requesting document)

TEBENNETT / K-25 ER DMC
Requestor / Document Center (is requested to provide the following document)

Date of request 9/5/95 Expected receipt of document ______

Document number ER028393 Date of document MAY 1989

Title and author (if document is unnumbered)
K/HS-138 Rev 1

Name ADC Reviewer ______
Date Sent to ADC ______
Date(s) Cleared 4/5/89

(This section to be completed by Document Center)

Date request received 9/1/95

Date submitted to ADC NA

Date submitted to HSA Coordinator 9/18/95

(This section to be completed by HSA Coordinator)

Date submitted to CICO NA

Date received from CICO NA

Date submitted to ChemRisk/Shonka and DOE 9/19/95

(This section to be completed by ChemRisk/Shonka Research Associates, Inc.)

Date document received ______

Signature ______

M' 'N MARIETTA ENERGY SYSTEMS, INC.
POST OFFICE BOX 2003
OAK RIDGE, TENNESSEE 37831 -7134

April 3, 1989

Dr. Ronald O. Hultgren, Director
Enriching Operations Division
Department of Energy, Oak Ridge Operations
Post Office Box 2001
Oak Ridge, Tennessee 37831-8651

Dear Dr. Hultgren:

Revision to Draft RCRA Facility Investigation (RFI) Plans

Enclosed are two copies each of seven draft Oak Ridge Gaseous Diffusion Plant RCRA Facility Investigation (RFI) Plans. This submittal meets the commitments established in the February 28, 1989, letter to you entitled "Request for K/HS-133 RFI Plan Revision Extension." These reports should be forwarded to the Department of Energy, Headquarters, for their review. If there are any comments or questions, we need to have them resolved by April 24, 1989, for incorporation into the May 1989 submittal of the final reports.

Included in this transmittal are the following draft reports:

RCRA Facility Investigation Plan, General Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-132, Revision 1;

RCRA Facility Investigation Plan, K-1070-A Contaminated Burial Ground, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-133, Revision 1;

RCRA Facility Investigation Plan, K-1064 Burn Area/ Peninsula Storage, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-134, Revision 1;

RCRA Facility Investigation Plan, K-901-A Holding Pond, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-136, Revision 1;

RCRA Facility Investigation Plan, K-1410 Neutralization Pit, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-138, Revision 1;

RCRA Facility Investigation Plan, K-1070-C/D Classified Burial Ground, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee, K/HS-140, Revision 1; and

RCRA Facility Investigation Plan, K-1503 Neutralization Pit, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee. K/HS-143, Revision 1.

If you have any questions or need additional information, please contact J. L. Haymore at extension 4-9352.

Sincerely,

for W. R. Golliher, Manager
Oak Ridge Gaseous Diffusion Plant

WRG:JLHaymore:rbf

cc/enc: T. A. Bowers - RC
C. S. Gist, DOE (4)
R. A. Jump, DOE
J. L. Haymore
J. O. Moore, DOE

cc: T. B. Hale
C. L. Stair
H. D. Whitehead, Jr.
File - WRG

Department of Energy
Oak Ridge Operations
P.O. Box 2001
Oak Ridge, Tennessee 37831 — 8740

May 11, 1989

Mr. Tom Tiesler, Director
Division of Solid Waste Management
Tennessee Department of Health and Environment
4th Floor, Customs House, 701 Broadway
Nashville, Tennessee 37219-5403

Dear Mr. Tiesler:

REVISED RCRA FACILITY INVESTIGATION PLANS - OAK RIDGE GASEOUS DIFFUSION PLANT (ORGDP)

Enclosed for your review are two copies each of the following documents:

- K/HS-132, Rev. 1: RCRA Facility Investigation Plan: General Document/Oak Ridge Gaseous Diffusion Plant; Oak Ridge, Tennessee
- K/HS-133, Rev. 1: RCRA Facility Investigation Plan: K-1070-A Contaminated Burial Ground/Oak Ridge Gaseous Diffusion Plant; Oak Ridge, Tennessee
- K/HS-134, Rev. 1: RCRA Facility Investigation Plan: K-1064 Burn Area/Peninsula Storage/Oak Ridge Gaseous Diffusion Plant; Oak Ridge, Tennessee
- K/HS-136, Rev. 1: RCRA Facility Investigation Plan: K-901-A Holding Pond/Oak Ridge Gaseous Diffusion Plant; Oak Ridge, Tennessee
- K/HS-138, Rev. 1: RCRA Facility Investigation Plan: K-1410 Neutralization Pit/Oak Ridge Gaseous Diffusion Plant; Oak Ridge, Tennessee
- K/HS-140, Rev. 1: RCRA Facility Investigation Plan: K-1070-C/D Classified Burial Ground/Oak Ridge Gaseous Diffusion Plant; Oak Ridge, Tennessee
- K/HS-143, Rev. 1: RCRA Facility Investigation Plan: K-1503 Neutralization Pit/Oak Ridge Gaseous Diffusion Plant; Oak Ridge, Tennessee

File Name: [illegible]

File No.: [illegible]

Date Filed: [illegible]

- o K/HS-231, Rev. 1: ORGDP Remedial Action Program Quality Assurance Plan/Oak Ridge Gaseous Diffusion Plant; Oak Ridge, Tennessee

- o K/HS-232, Rev. 1: ORGDP Remedial Action Program Data Management Plan/Oak Ridge Gaseous Diffusion Plant; Oak Ridge, Tennessee

- o K/HS-259: ORGDP Remedial Action Project Plan/Oak Ridge Gaseous Diffusion Plant; Oak Ridge, Tennessee

These revisions have incorporated the comments made by the Environmental Protection Agency Region IV (EPA-IV) and the Tennessee Department of Health and Environment (TDHE), and are submitted in accordance to agreements reached in the January 30, 1989, meeting attended by representatives from Martin Marietta Energy Systems, Inc., the Department of Energy, TDHE, and EPA-IV.

If you have any questions or require additional information, please contact Clayton Gist of our Environmental Remediation Branch at (615) 576-6821.

Sincerely,

Ronald O. Hultgren

Ronald O. Hultgren, Director
Enriching Operations Division

SE-312:Gist

Enclosures:
As stated

cc w/enclosures:
E. C. Leming, TDHE

cc w/o enclosures:
D. Hopkins, EPA-IV
J. Haymore, K-1020, ORGDP
C. Stair, K-1001, ORGDP

K/HS-138
Revision 1

ORGDP

OAK RIDGE GASEOUS DIFFUSION PLANT

MARTIN MARIETTA

RCRA FACILITY INVESTIGATION PLAN
K-1410 NEUTRALIZATION PIT
OAK RIDGE GASEOUS DIFFUSION PLANT
OAK RIDGE, TENNESSEE

MAY 1989

OPERATED BY
MARTIN MARIETTA ENERGY SYSTEMS, INC.
FOR THE UNITED STATES
DEPARTMENT OF ENERGY

MAY 1989

K/HS-138
Rev. 1

RCRA FACILITY INVESTIGATION PLAN
K-1410 NEUTRALIZATION PIT (UNIT NO. R011)
OAK RIDGE GASEOUS DIFFUSION PLANT
OAK RIDGE, TENNESSEE

Prepared by the
Oak Ridge Gaseous Diffusion Plant
Oak Ridge, Tennessee 37831
operated by
MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the
U. S. DEPARTMENT OF ENERGY
under contract DE-AC05-84OR21400

TABLE OF CONTENTS

1. INTRODUCTION

Within the confines of the Oak Ridge Gaseous Diffusion Plant (ORGDP) are hazardous waste treatment, storage, and disposal facilities; some are in operation while others are no longer in use. Most of these solid waste management units (SWMUs) are subject to assessment in accordance with the terms of Paragraph II.A.2 of the Resource Conservation and Recovery Act (RCRA) 1984 Hazardous and Solid Waste Amendments (Permit Number HSWA TN 001) and the Tennessee Department of Health and Environment (TDHE) RCRA Permit (Number TN1 890 090 003) for Building 7652 at the Oak Ridge National Laboratory (ORNL). These ORGDP units are referred to as RCRA 3004(u) units because Section 3004(u) of RCRA addresses corrective actions for continuing releases from SWMUs. Other sites fall under the jurisdiction of the mandates of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). However, at this time there are no regulatory drivers at the ORGDP for remedial investigation or remediation of CERCLA units. These requirements will be incorporated into the anticipated Interagency Agreement (IAG) between the Environmental Protection Agency (EPA), the TDHE, and the U. S. Department of Energy (DOE). This agreement is expected to be in effect prior to the listing of the Oak Ridge Reservation (ORR) on the National Priorities List (NPL) of CERCLA.

Since both 3004(u) and CERCLA sites will be covered in the IAG, both types are included in the ORGDP Remedial Action Program. All activities will be addressed using the RCRA Facility Investigation (RFI) approach as described in the EPA document, RCRA Facility Investigation Guidance,[1] OSWER Directive 9502.00-6C, December 1987. The RCRA Facility Investigation (RFI) Plans for those units outlined in the ORNL RCRA Permit were submitted during calendar years 1987 and 1988.

This document is the site-specific RFI plan for the K-1410 Neutralization Pit, a RCRA 3004(u) unit, providing information for field studies involving data collection for remedial decisions under CERCLA, the Superfund Amendments and Reauthorization Act (SARA), and the National Contingency Plan (40 CFR 300). Contained within this site-specific document are geographical, historical, operational, geological, and hydrological data specific to the K-1410 Neutralization Pit. The potential for releases of contamination through the various media to receptors is addressed. A sampling plan is proposed to further determine the nature and extent (if any) of contaminant release to the surrounding environment.

The RCRA Facility Investigation Plan - General Document,[2] K/HS-132, includes information applicable to all the ORGDP SWMUs and serves as a reference document for the site-specific RFI plans. Included are health and safety procedures to be followed when implementing the sampling plan. Quality control (QC) procedures for remedial actions occurring on the ORR are presented in the Environmental Surveillance Procedures QC Program,[3] Martin Marietta Energy Systems, Inc., ESH/Sub/87-21706(1), and quality assurance (QA) guidelines for ORGDP investigations are presented in the ORGDP Remedial Action Program QA Plan,[4] K/HS-231. Procedures for managing and displaying data collected from this RFI are summarized, in accordance with the ORGDP Remedial Action Program Data Management Plan,[5] K/HS-232. Groundwater monitoring procedures are implemented in accordance with the Groundwater Protection Program Management Plan,[6] K/HS-258.

2. OBJECTIVES OF RCRA FACILITY INVESTIGATION PLANNING

2.1 OBJECTIVES

This RFI plan will identify actions necessary to determine the nature and extent (if any) of releases of hazardous contamination from the K-1410 Neutralization Pit. The plan summarizes existing site information and addresses the potential for contamination of soil, groundwater, surface water, and air.

2.2 EVALUATION CRITERIA

In order to prepare and implement a comprehensive sampling plan and to effectively evaluate analytical sampling results, evaluation criteria must first be established. Criteria for evaluating the extent of release of contaminants are based on existing state and federal regulatory guidelines and best technical judgment.

The primary media of interest for the K-1410 Neutralization Pit are surface water, groundwater, and soil. Under the ORGDP Groundwater Protection Program, groundwater data will be collected covering the parameters of interest listed in the General Document in Table 2.1. Soil and surface water samples will be collected as a part of the RFI plan and analyzed for the contaminants described in Section 8 of this document.

2.3 SCHEDULE FOR SPECIFIC RFI ACTIVITIES

A Gantt chart representing the RFI sampling and analysis activities that will be performed and the duration of each activity is shown in Figure 2.1.

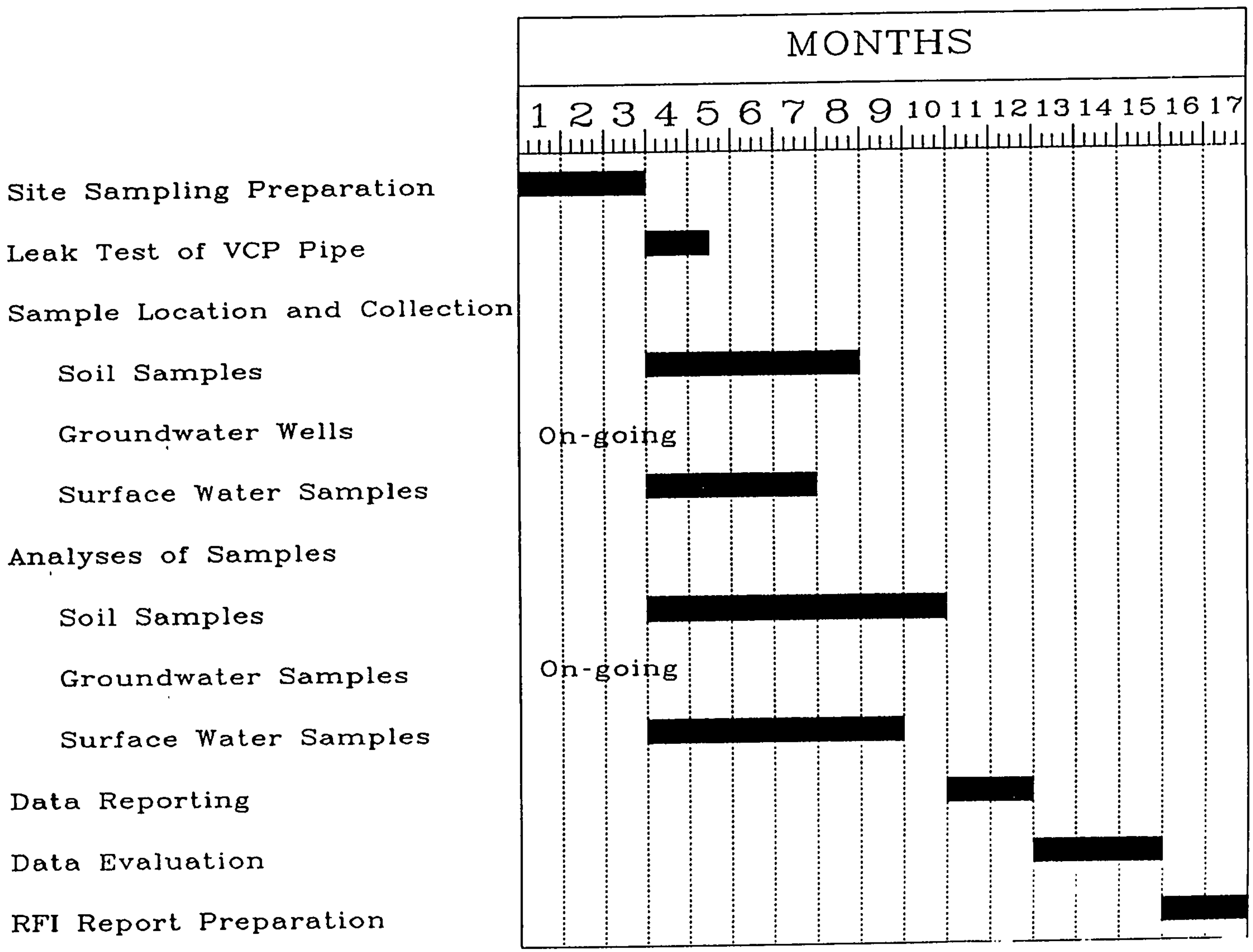

Fig. 2.1. RFI sampling and analysis activities and their durations for the K-1410 Neutralization Pit

2.4 FEASIBLE ALTERNATIVES

Knowledge of feasible corrective measures has been used in preparing this RFI plan. Potential corrective measures for the K-1410 Neutralization Pit have been identified based on existing geologic, hydrologic, and contaminant source data, and are listed in Table 2.1. This table is an indication of the types of corrective actions and may not include all available options at the time of remediation. In addition, site remediation may necessitate the use of one or more of the available options. These corrective measures will be re-evaluated following the RFI report.

2.5 RISK ASSESSMENT

The environmental and public health risks associated with possible site contamination and the remedial action alternatives listed in Table 2.1 will be evaluated. This evaluation will consist of a characterization of contaminant sources, the environmental setting, the magnitude of release, pathways to human exposures, and characterization of risks as addressed in Section 2 of the General Document. Environmental transport models may be used to assess changes in contaminant concentrations over time and distance. The site sampling plan has been designed to provide the data necessary for performing a risk assessment.

Table 2.1. Potential corrective measures

General Response Action	Technologies
Monitoring	Surveillance monitoring and analysis
Removal of Source	Excavate the contaminated soils and materials Treat and/or dispose of excavated materials
Containment from surface water	Cap site/surface diversion structures
Containment from groundwater	Subsurface collection drains-french drains, tile drains, pipe drains
Treatment of groundwater	Collect the groundwater in the existing retrofitted pit and haul to treatment facility

3. DESCRIPTION OF CURRENT CONDITIONS

3.1 GEOGRAPHICAL INFORMATION

The K-1410 Neutralization Pit is located across Poplar Road from the K-1410 Plating Facility, approximately 600 ft west of the K-25 building, adjacent to Poplar Creek. The scope of the K-1410 RFI includes five components:

(1) the pipe leading from the K-1410 building to the concrete pit;

(2) the pipe leading from the concrete pit to the limestone pit;

(3) the concrete neutralization pit;

(4) the limestone pit; and,

(5) the bank from the limestone pit to the creek.

The limestone pit is located outside the security fence that surrounds the ORGDP. A location map is shown in Figure 3.1. A locked gate in the security fence provides access to the limestone pit area from inside the plant; the only other access to the area is by boat via Poplar Creek.

3.2 HISTORICAL INFORMATION

The K-1410 building was constructed in 1945 as a storage area for clean trapping material (alumina, carbon, sodium fluoride). In addition, part of the building was used for dumping and refilling spent traps. Most of the spent material contained low-level radioactive uranium and, therefore, was stored in the vaults at the K-25 building for subsequent recovery. A uranium decontamination and cleaning facility was operated in the K-1410 building from the late 1940s until the K-1420 Chemical Operations Facility was built and placed in operation in the mid-1950s. The decontamination and cleaning solutions from the K-1410 building were transported to K 131 for recovery if economic recovery criteria were met; otherwise, the solutions were discharged to Poplar Creek. During this time, the discharge pipe ran underground until it exited from the bank of the

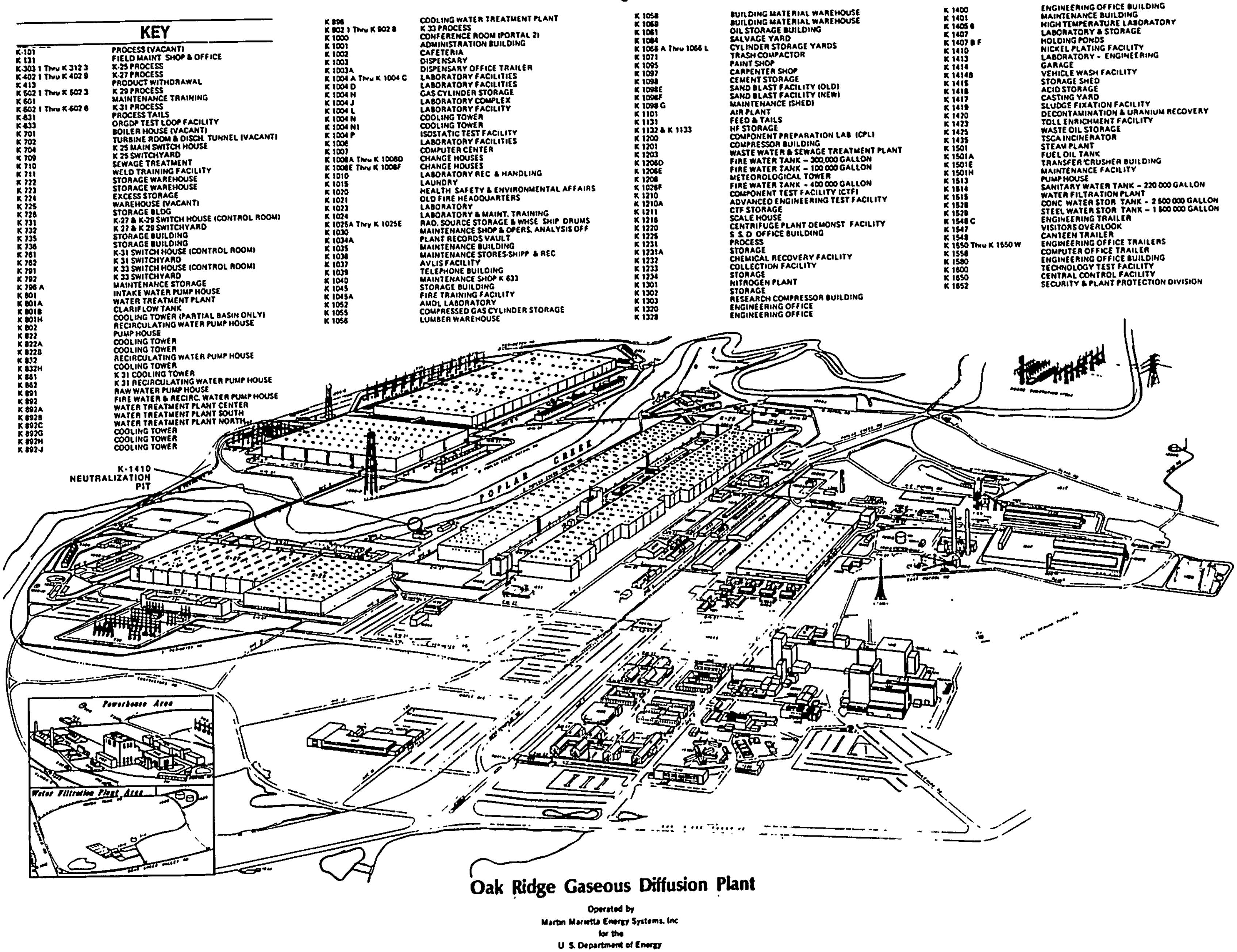

Fig. 3.1. ORGDP location map for the K-1410 neutralization pit

creek; discharge from the pipe spilled into the creek or onto the bank near the water's edge. After the K-1420 Chemical Operations Facility was placed in operation in 1955, the K-1410 building was used for servicing chemical tanks, for cleaning and decontaminating equipment, and for degreasing pumps that used Miller's Fluorinated Lubricant (MFL).

In 1963, the K-1410 facility was modified for use as an electroplating area. A limestone-filled pit was installed on the bank of Poplar Creek and was used to neutralize discharges from the plating operations. An underground pipeline from the K-1410 facility was installed at the side of the bank above the pit to discharge the plating effluents. Rip-rap lined the bank between the pit and Poplar Creek, and effluents overflowing from the pit ran down the rip-rap into the creek.

In order to meet requirements imposed by the U. S. Environmental Protection Agency (EPA), a new lime neutralization facility was constructed and placed in operation in 1975. This facility consisted of a 15,800 gallon concrete pit with feed and mechanical mixing equipment and monitoring instruments. The concrete pit was located upgradient of the original limestone pit; the effluent from the concrete pit discharged into the original pipeline and exited at the limestone pit. The neutralized discharge flowing into Poplar Creek was permitted under National Pollutant Discharge Elimination Program (NPDES) regulations. Figure 3.2 is a diagram of the locations of the two neutralization pits and associated piping.

In 1979 the K-1410 Plating Facility and Neutralization Pit were shut down. The K-1410 building, the neutralization pit, and the original limestone pit are now abandoned. The K-1410 building is addressed in the RFI Plan - K-1410 Building[7] (K/HS-155).

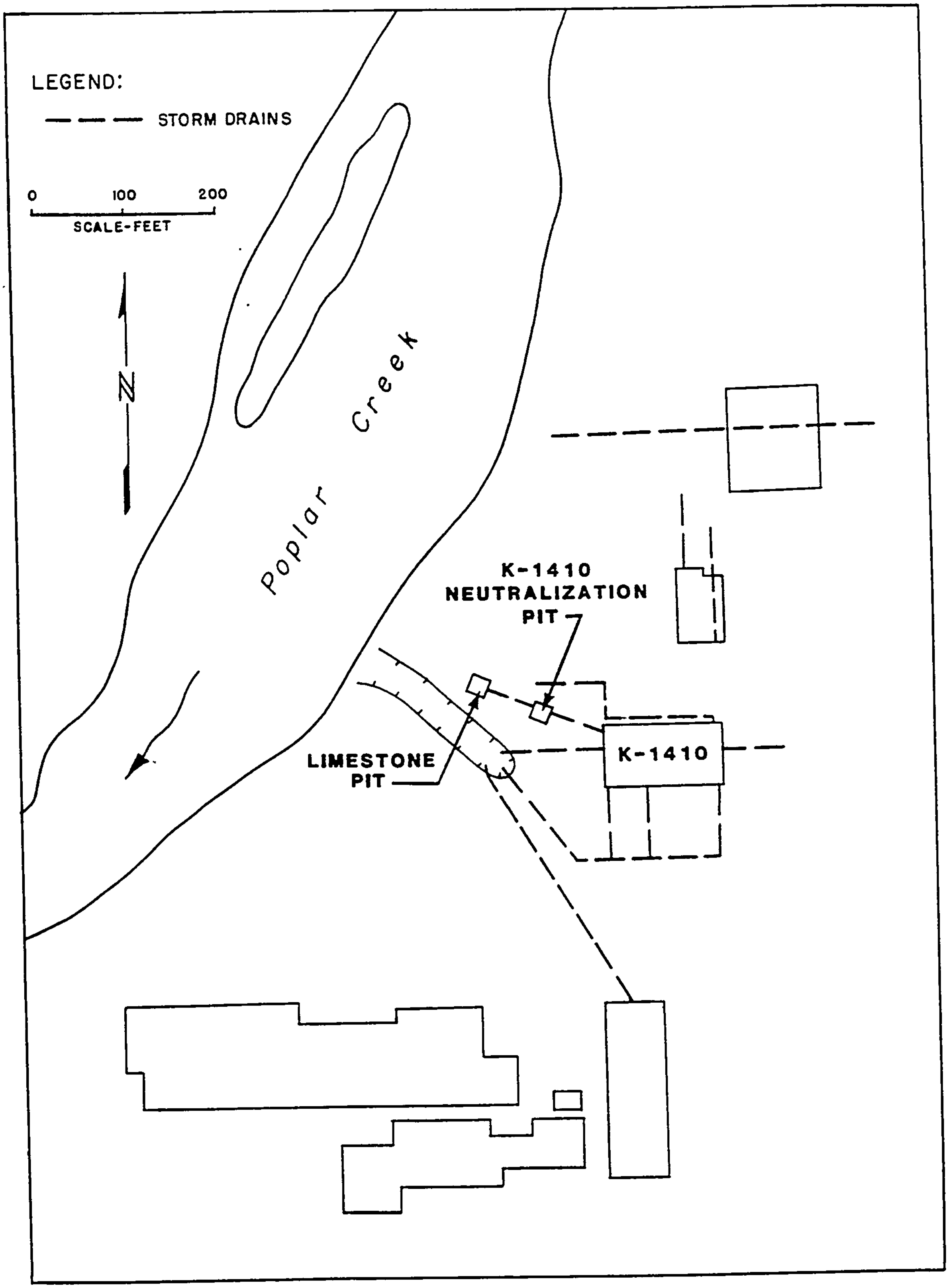

Fig. 3.2. Diagram of Neutralization Pits and associated drain lines

3.3 OPERATIONAL INFORMATION

The original limestone pit and the K-1410 Neutralization Pit were used to neutralize corrosive solutions generated in the K-1410 Plating Facility. Chemicals used in the K-1410 plating operations included alkaline cleaners (various trade names); hydrochloric, boric, and sulfuric acids; nickel sulfamate; and lime (for neutralization of acid solutions).

Degreasing operations were carried out in the K-1410 building from 1946 to 1963 using a commercial degreasing unit which included a recovery still. The degreaser was required to clean pumps that used MFL as a lubricating material. Initially, carbon tetrachloride may have been used as the degreasing agent; trichloroethylene was later used. There is no evidence that the degreasing agents were discharged into the neutralization pit after use. The bulk of the organic degreasing operations was handled in K-1401 after K-1410 became an electroplating facility. From 1963 until 1979, degreasing was conducted in the K-1410 building using inorganic degreasing agents such as detergents and special formulated alkali and acid dips.

4. CHARACTERIZATION OF THE CONTAMINANT SOURCE

Detailed records of the quantities and types of materials treated at this site are not available. Physical and chemical characteristics (i.e., density, vapor pressure, pH, etc.) for contaminants found above the action limits in Table 2.2 of the General Document will be included in the RFI report.

5. CHARACTERIZATION OF THE ENVIRONMENTAL SETTING

The K-1410 Neutralization Pit is located about 65 ft northwest of the K-1410 building on the west side of the K-25 building. The facility is situated on the east bank of Poplar Creek approximately 35 ft (in elevation) above the full pool level of the Poplar Creek embayment of Watts Bar Reservoir. The adjacent eastern land surface is almost flat, sloping very gently westward; however, near the K-1410 Neutralization Pit the slope steepens abruptly toward the creek.

Only one monitoring well, UNW-60, has been installed in the vicinity of the K-1410 pit. This is a groundwater characterization well intended to provide data for the unconsolidated (soil) zone. However, several wells have been installed near K-1232, approximately 800 ft to the southwest and along strike from the K-1410 area. The hydrogeologic characteristics of the K-1232 area are presumed to be similar to those in the proximity of the K-1410 pit; therefore, the K-1232 monitoring wells will be referred to as applicable. The lithologic logs of referenced wells are included in Appendix B, and well construction diagrams are presented in Hydrogeology of the Oak Ridge Gaseous Diffusion Plant,[8] Appendix B, Geraghty and Miller, 1988. The locations of monitoring wells in the K-1410 vicinity are shown in Figure 5.1.

The general geology of the ORGDP area is shown in Figure 5.2 and has been compiled from three major sources: (1) Hydrogeology of the Oak Ridge Gaseous Diffusion Plant,[8] Geraghty and Miller, 1988, (2) recent, unpublished work by R.H. Ketelle,[9] Oak Ridge National Laboratory, and (3) Geologic Map of the Oak Ridge Area, Tennessee,[10] by W.M. McMaster, U.S. Geological Survey, 1958. The following geologic descriptions and discussions of hydrogeology are based on all of these sources and the well ɔgs (Appendix B). Specific data (e.g., permeabilities) are referenced as applicable.

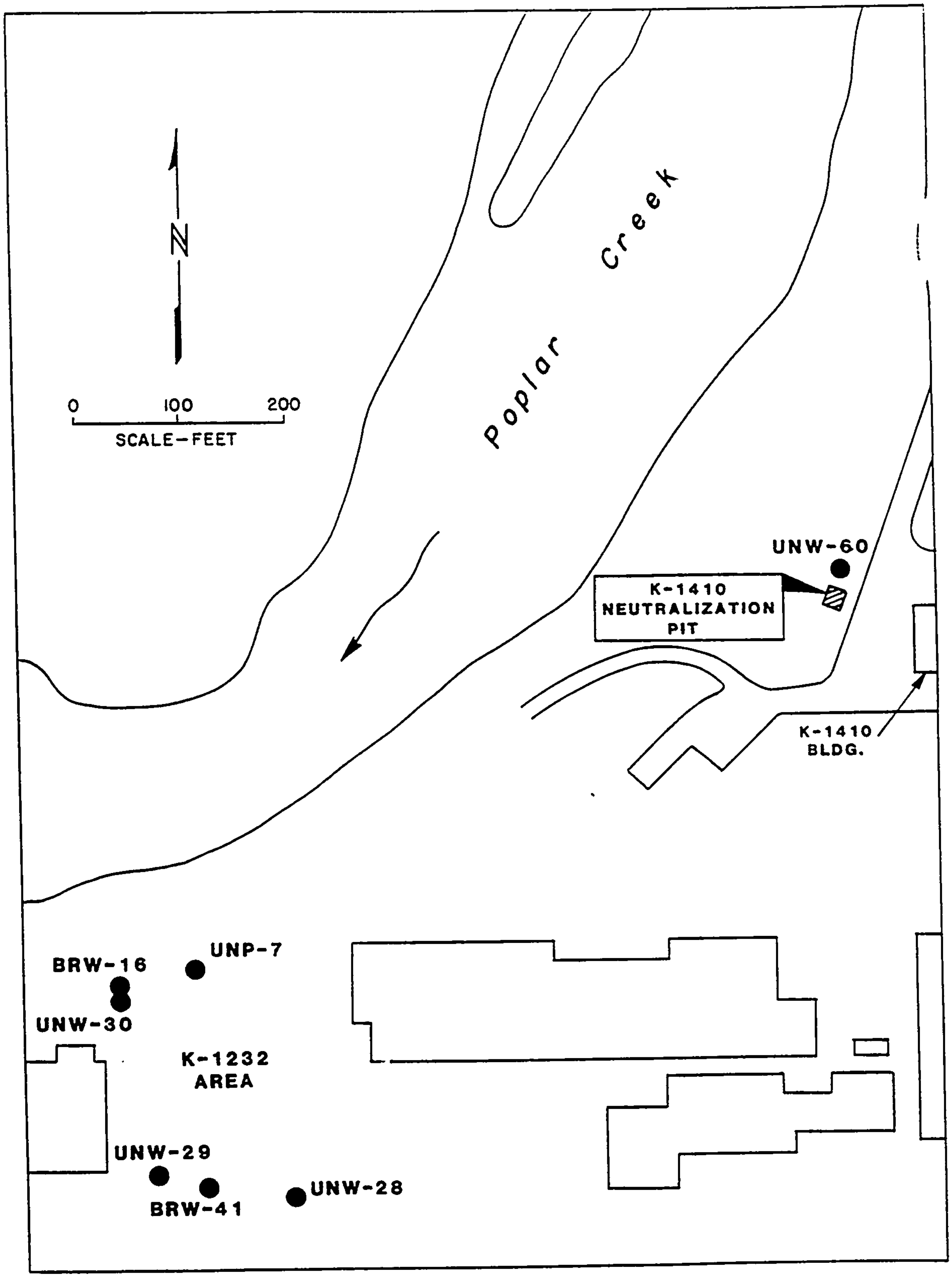

Fig. 5.1. Monitoring wells near the K-1410 Neutralization Pit

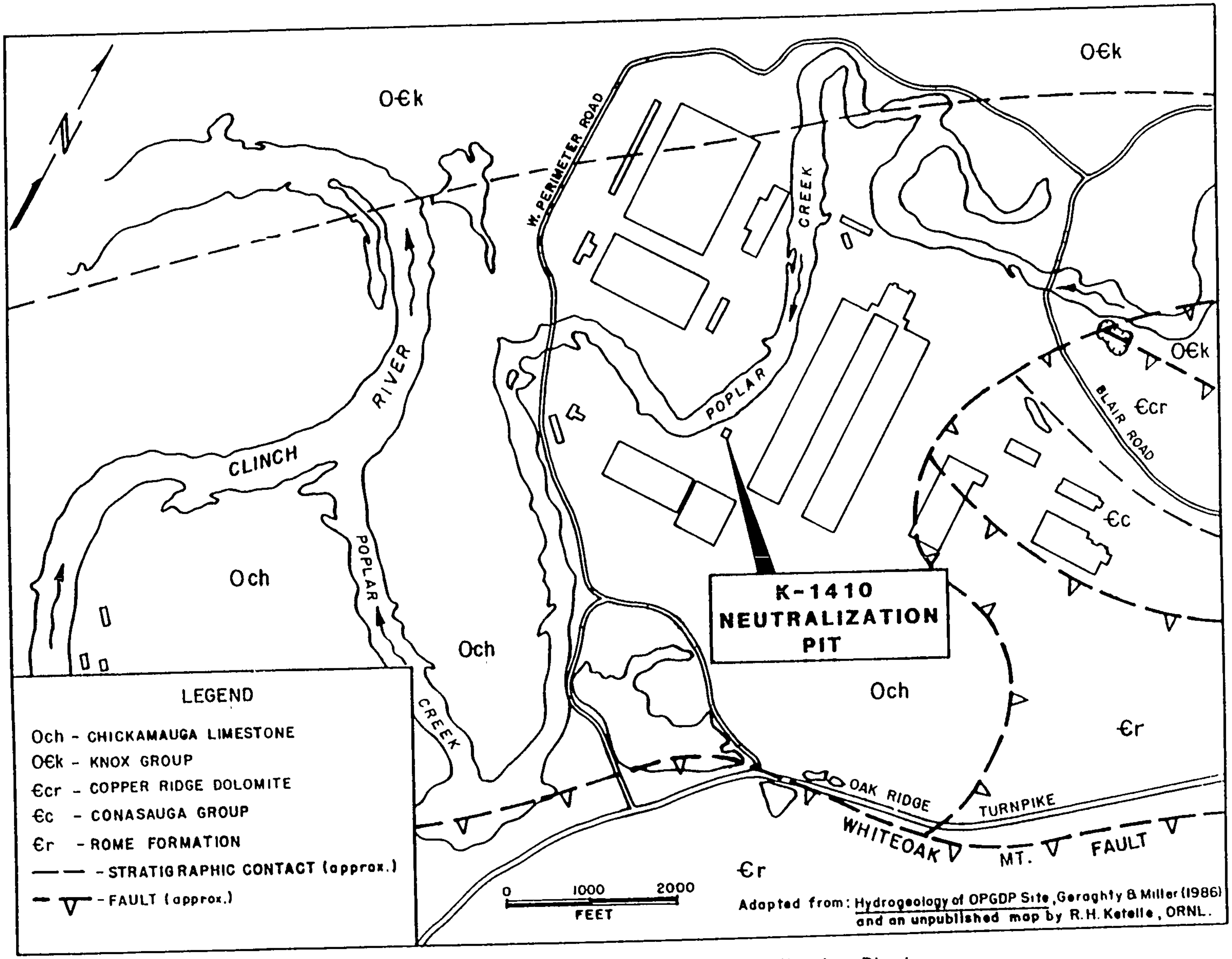

Fig. 5.2. Areal geology of the K-1410 Neutralization Pit site

5.1 HYDROGEOLOGY

The K-1410 Neutralization Pit area is underlain by Chickamauga limestone. The Chickamauga in the ORGDP area consists mainly of gray to blue-gray or greenish, very fine-grained (micritic) limestone with interbedded calcareous shale and shaley limestone. The limestone may be relatively "pure" or argillaceous (contains clay), and is mostly medium to thinly bedded. Bedding planes in the limestone units are generally composed of thin, dark shaley partings. Some of the shaley or more argillaceous limestones may have a "nodular" fabric. Chert occurs at some horizons in the Chickamauga, either as zones of nodules or in thin, irregular layers. The calcareous shales are mostly gray to greenish and contain occasional thin beds of micritic limestone.

The dominant geologic structural feature of the area is the Whiteoak Mountain fault, the trace of which extends across the southeast side of the ORGDP (see Figure 5.2) about 3,500 ft from the K-1410 site. The rocks of this area have been subject to varying degrees of folding, and the strata beneath K-1410 generally dip to the southeast; however, Ketelle (unpublished) has measured considerably variable dips in outcrops along Poplar Creek immediately to the west. The dip variation is indicative of localized flexures and possibly minor faulting. The structural deformation has caused extensive fracturing in the more competent units which is evidenced by the "secondary calcite" (fracture filling) noted in the lithologic logs of BRW-16 and BRW-41 (Appendix B).

The unconsolidated zone in the K-1410 area is typified in the lithologic log of UNW-60 (Appendix B) as light to dark brown, silty clay with some limestone fragments. The upper soil horizons may be of alluvial origin overlying a more clayey residuum directly over bedrock, although extensive soil studies have not been performed. The depth to bedrock is variable and will typically range from 15 to 30 ft. Some areas may be overlain with fill materials consisting mainly of soil and/or gravel.

Groundwater storage and movement in the Chickamauga bedrock occur in a system of interconnecting, solution-enlarged channels developed mainly within the carbonate units along fractures, joints, and bedding planes. Fractures in the more insoluble shales are relatively "tight," and water movement within these rocks is very limited; however, the more shaley units may tend to contain groundwater flow within the interbedded carbonates, resulting in preferential flow along bedding planes parallel to strike. The direction of groundwater flow in the bedrock beneath K-1410 is probably west or southwest, generally along strike, toward Poplar Creek.

There are no permeability data presently available for bedrock in the K-1410 area, but tests of wells in other areas of the ORGDP indicate the Chickamauga limestone to have an average hydraulic conductivity of approximately 10^{-3} cm/s. This value is presumed to be representative of the Chickamauga beneath K-1410. There are no available data on groundwater levels beneath the K-1410 pit area; however, groundwater flow in the unconsolidated zone should be westward toward Poplar Creek. The water table is approximately parallel to the local topography, with the hydraulic gradient likely to be very low to the east of K-1410 and gradually becoming very steep approaching the creek. No site-specific permeability data are available for the soils here, but testing of well UNP-7 at K-1232 indicates an average hydraulic conductivity in the range of 10^{-5} to 10^{-6} cm/se which should apply to the unconsolidated zone of the K-1410 area as well. The fill materials here should have no significant effect on the groundwater recharge or storage potential.

The hydraulic gradient in the area of the K-1410 Neutralization Pit may be periodically affected by the fluctuating water levels in the Watts Bar Reservoir which extends into Poplar Creek. Very local reversals of hydraulic gradient may occur in areas adjacent to Poplar Creek. However, the reservoir fluctuations normally take place very slowly, and the effect on local water table conditions is not expected to be significant or extensive.

Interaquifer flow may occur in the K-1410 area. UNW-60, which is very near to the neutralization pit (Figure 5.1), is a dry well, an indication that the soil zone may be discharging to bedrock. Also, water-level data for wells at K-1232 (RFI Plan for the K-1232 Treatment Facility,[11] K/HS-145) infer a downward flow (i.e., the soil aquifer leaking into the bedrock system), and hydrogeologic conditions there appear to be very similar to those in the K-1410 area. No sinks, bedrock outcrops, or other features which could enhance groundwater recharge were observed near the subject site. General information on the subsurface geology and hydrogeology at ORGDP can be found in Section 4.2 of the General Document.

5.2 SURFACE WATER

There are no natural surface water features (other than Poplar Creek) in the immediate vicinity of the K-1410 Neutralization Pit. Surface runoff in the area east of the pit is diverted into storm drains which then direct the flow to Poplar Creek. Surface runoff in the immediate area of the pit flows naturally down the slopes westward and into Poplar Creek. Figure 3.2 shows the storm drain system in the K-1410 area. General information on surface water in the ORGDP area is contained in Section 4.3 of the General Document.

The K-1410 Neutralization Pit is above the 100-year flood level as determined by the U.S. Tennessee Valley Authority. Therefore, if Poplar Creek were to flood, the K-1410 area should not be affected. A flood map of the ORGDP area is presented in Figure 3.5 of the General Document.

5.3 AIR

No site specific air quality data are available for this SWMU. Martin Marietta Energy Systems, Inc., has an ongoing study of the meteorological conditions, and general data for ORGDP are available in Section 4.4 of the General Document. Also, recent air quality data from the ORGDP monitoring system are available in The Environmental Surveillance of the U.S. Department of Energy Oak Ridge Reservation and Surrounding Environs During 1987,[12] Volume 1, ES/ESH-4/V1.

6. IDENTIFICATION OF POTENTIAL PATHWAYS AND RECEPTORS

Assessment of an inactive hazardous waste disposal or storage site is required to evaluate the site's potential for health or safety risks to personnel, the public, and the environment. Determination of such risks must be based on evaluations of both the potential pathways of toxic release and the possible receptors of the contamination. Evaluations of the pathways which might release contaminants from the K-1410 Neutralization Pit and possible receptors of the contamination are based on (1) interviews with persons having knowledge of the process water treated at the site, and (2) records of plating processes carried out in the adjacent K-1410 Facility. Section 5.0 of the General Document will serve as a reference concerning the potential pathways and receptors for the ORGDP.

The operational history of the K-1410 Neutralization Pit presents the potential for contamination of soil, groundwater, and surface water from pipe or pit leakage or deposition of contaminants from overflow of the limestone pit. The grass and scrub vegetation present at the site are not considered exposure pathways and thus will not be evaluated. Further, the nature of the contaminants and the operational history of the K-1410 facility make the migration of contaminants via subsurface gas unlikely; this pathway will therefore not be addressed.

6.1 POTENTIAL PATHWAYS OF MIGRATION

6.1.1 Soil

The K-1410 Neutralization Pit area is unconsolidated material (weathered residuum and fill) underlain by bedrock. In general, the soils comprising the surficial materials at the ORGDP have low permeabilities (approximately 10^{-7} to 10^{-4} cm/s) and relatively high capacities for the immobilization or exchange of metals and the filtering of particulates. Thus, the physical properties of these soils increase the contaminant retention time or immobilize the contaminants altogether. Therefore, contamination due to pit or pipe leakage or overflow may still be present. For these reasons, soil sampling will be conducted to determine the nature and extent (if any) of any contamination present in the soils.

6.1.2 Groundwater

There is the potential for contaminant migration from pit or pipe leakage of nickel-plating solutions to contaminate groundwater in the K-1410 area. Site-specific hydrogeological data are presently unavailable. However, based on the hydrogeologic studies by P. D. Kuhlmeier, et al. (July, 1986), contaminated groundwater would most likely follow the steep gradients toward Poplar Creek where it would then be discharged. Assessment of the nature and extent (if any) of possible groundwater contamination will be carried out according to the ORGDP Groundwater Protection Program Management Plan[5].

6.1.3 Surface Water

Surface water drainage at K-1410 would run off from the southeastern corner of the area, down the embankment, and into Poplar Creek based on an evaluation of site topography. The environmental persistence and toxicity of the principal contaminants of concern (i.e., nickel and other metals) makes fouling of surface water runoff a possibility, although the likelihood of such contamination is mitigated by the vegetative cover in the area. Also, there is the potential for contamination of the waters of Poplar Creek, but the nature and extent (if any) of such contamination will be investigated under the off-site RFI for the Clinch River and Poplar Creek watersheds.

In order to assess the nature and extent (if any) of surface water contamination at K-1410, surface water samples will be taken on the banks of Poplar Creek below the limestone pit after periods of rainfall. Also, grab samples will be taken from the water standing in the concrete pit. All surface water samples will be analyzed for metals, organics, and radioactive contamination as part of the Phase I contaminant characterization.

6.1.4 Air

Since the wastes treated at the site are not volatiles and vegetative cover prevents soil particulates from becoming airborne, atmospheric transport is not considered a pathway of migration.

6.1.5 Vegetation

The plants and grasses that cover the K-1410 area have a shallow root system and, therefore, biological uptake of contamination via plant roots is not expected to occur in this area. Thus, vegetation is not considered a pathway of contaminant migration at the K-1410 site.

6.1.6 Subsurface Gas

The nature of the potential contaminants at the K-1410 site and the operational history of the site do not present the possibility for the formation of subsurface gas. Therefore, subsurface gas is not considered a pathway of contaminant migration at this site.

6.2 POTENTIAL RECEPTORS

6.2.1 Human Populations

Due to the security requirements regulating access to the ORGDP, the only public populations of interest as potential receptors are those which might come into contact with one of the exposure pathways beyond the boundaries of the site itself, i.e., through the reach of the surface water or groundwater.

Of the 25 potable water wells within one mile of ORGDP, none are in proximity to the neutralization pit area, and none occupy the same hydrogeological environment as the groundwaters at the site, as discussed in Section 5.2 of the General Document.

Of the ten public water supplies which withdraw from the Clinch-Tennessee River system (into which Poplar Creek feeds), none are closer than eight river miles to the ORR, making direct contamination from the K-1410 site unlikely. While direct discharge of surface runoff and site groundwater do represent the potential for contamination, distance and dilution effects make pollution of public water supplies a low probability. Finally, the effects of distance and dilution also reduce the likelihood that contamination of surface water and groundwater discharge would adversely impact the waters used downstream in the Clinch-Tennessee system for recreational and industrial use.

6.2.2 Fauna and Flora

Section 5.3 of the General Document discusses the ecology of the area around the ORGDP and the plant and animal species which are thought to inhabit the area. To date, there has been no report that any of these species exist on the K-1410 site or are directly threatened by any possible contamination present there. However, there is the potential for human exposure via ingestion of aquatic life in the Clinch River as a result of contaminant migration from Poplar Creek. This possibility will be addressed in the off-site RFI for the Clinch River and Poplar Creek watersheds and, therefore, will not be evaluated as part of this investigation.

6.3 SUMMARY AND CONCLUSIONS

The nature of the process waters treated and discharged through the neutralization pit and the site hydrogeology indicate the potential for soil, groundwater, and surface water contamination. Evaluation of the potential pathways of migration and possible receptors shows sufficient potential for environmental contamination and warrants an investigation of the site.

7. EXISTING MONITORING DATA

The overflow from the K-1410 Neutralization Pit is discharged into Poplar Creek through an NPDES discharge point (Permit No. TN 0002950,[13] Discharge Point 002). The effluent was monitored from 1975 until 1979 when the facility was shut down. Table 7.1 is a summary analyses of the effluent discharged to Poplar Creek (averaged from 1976 to 1979). Based on the NPDES permit, grab samples were taken from the discharge point on a monthly basis. The monthly grab samples indicated no detectable cyanide and a 2.25 ppm daily average of oil and grease (24 ppm-daily maximum). Cyanide and nickel were monitored as routine parameters, but no limitations on discharge were established for these compounds. The pH was to be maintained between 6-9; periodic excursions of pH above or below the 6-9 range specified by the permit were the only noncompliances documented for the site. The NPDES discharge data for 1976 to 1979 is located in Appendix A. Additional monitoring of surface water is necessary based on an evaluation of the available source and monitoring data. Groundwater will be monitored in accordance with the specifications set forth in the ORGDP Groundwater Protection Program Management Plan, K/HS-258.

Table 7.1 NPDES effluent data from the K-1410 Neutralization Pit Averaged Between 1976-1979

	Daily Average	Minimum Value Observed or Expected During Discharge Activity	Maximum Value Observed or Expected During Discharge Activity	Freq. of Analysis	No. of Analyses	Sample Type
Flow (gal/day)	3772.5	0	14,400	Cont.	N/A	N/A
pH	7.54	5.8	9.3	Cont.	N/A	N/A
Temp (winter) F	110	110	110	1/30	48	G
Temp (summer) F	-	-	-	1/30	48	G
Cyanide (ppm)	0.0028	0.0005	0.01	1/30	48	G
Nickel (ppm)	122.28	0.005	4,000	1/30	48	G
Oil & Grease (ppm)	2.25	0.45	24	1/30	48	G

8. SAMPLING PLAN

8.1 SAMPLING AND ANALYTICAL STRATEGY

The objectives of the RFI Investigation of the K-1410 Neutralization Pit Area are (1) to determine whether the pit and associated piping leak or have leaked and if so whether any contamination has entered the environment as a result of the leak(s), (2) to determine if the limestone pit is presently a source of contamination, and (3) to better define the "contaminants of concern". For the Phase I portion of the investigation, the source characterization data contained in Section 4.0 will used to limit the investigation to only those broad class(es) of contaminants that were found to have passed through the neutralization pit and hence could be expected to be released into the K-1410 Neutralization Pit Area. The information contained therein reveals the possibility for organic, metal and radiochemical contaminant release. All samples collected as a part of this study will, therefore, be analyzed for organics, metals and radioactivity (gross alpha, beta, and gamma).

Section 6.0 discusses the possible pathways of migration away from the site for any contaminant released from the site. For the K-1410 Neutralization Pit, the principal migration pathway is via soil contamination and the resulting contamination of the groundwater. However, due to the presence of the open limestone pit, surface water is also seen as a potential pathway for contaminant migration. Thus the Phase I investigation of this site will consist of the collection of soil, surface water, and groundwater data and their evaluation for the contaminants discussed above. The Phase I soil borings will be collected from the perimeter of the concrete pit and at intervals along the lines associated with the pits. The data obtained from these corings will be used to determine the approximate location of leaks and the identity of leaked hazardous substances (if any). Additionally, the division of each boring into individual 4 ft segments, with each undergoing analysis, will permit a crude estimate to be made of the vertical extent of contamination. Soil samples will also be taken from the area which comprised the limestone pit and from the creek bank area below the limestone pit NPDES discharge point (abandoned). These samples will be utilized to determine the presence and the nature of contamination in this area. Surface water samples will be taken downstream of the abandoned NPDES point to evaluate contaminant transport via surface waters.

Based on the K-1410 Neutralization Pit Area Phase I findings, a determination of the need for a Phase II investigation will be made. If it is determined that a Phase II investigation is warranted then a K-1410 Neutralization Pit Area Phase II sampling plan will be drafted and submitted. Included in this Phase II plan would be the determination of contaminate specific environmental properties (eg. soil attenuation capacity) for any contaminant identified in Phase I as a "contaminants of concern"; as well as the collection of additional samples. The decision as to the necessity of, the type, and the location of additional samples will be based on conclusions resulting from the Phase I investigation.

8.2 STATISTICAL SETUP FOR SAMPLING

8.2.1 Leak Test

The underground vitrified clay pipe (VCP) that leads to and from the concrete neutralization pit will be leak tested. The section of piping upgradient of the concrete pit will be tested independently of the section downgradient of the pit. The lower end of each section will be plugged, and each section of the pipe will be filled with water. A minimum 10-ft head of water on the invert of the pipe at the lower end is required. Measurement of the leakage rate will begin no earlier than 15 minutes after the pipe is completely filled with water. The maximum allowable leak rate for each section of pipe is 0.1 gal/h based on the proposed 40 CFR 280.41.

8.2.2 Soil Sampling

The K-1410 Neutralizatic :a Pit site is divided into three areas for the purpose of soil sampling: (1) concrete pit, (2) limestone pit and hillside, and (3) the underground pipe lines (Figure 8.1). Within each area, release monitoring will occur in phases, with each phase consisting of soil sampling, chemical analyses, and statistical analysis of resultant data. Additional phases will be conducted to determine the nature and extent (if any) of contaminant release and decisions will be made concerning appropriate remedial action. Phase I sampling is designed to provide initial

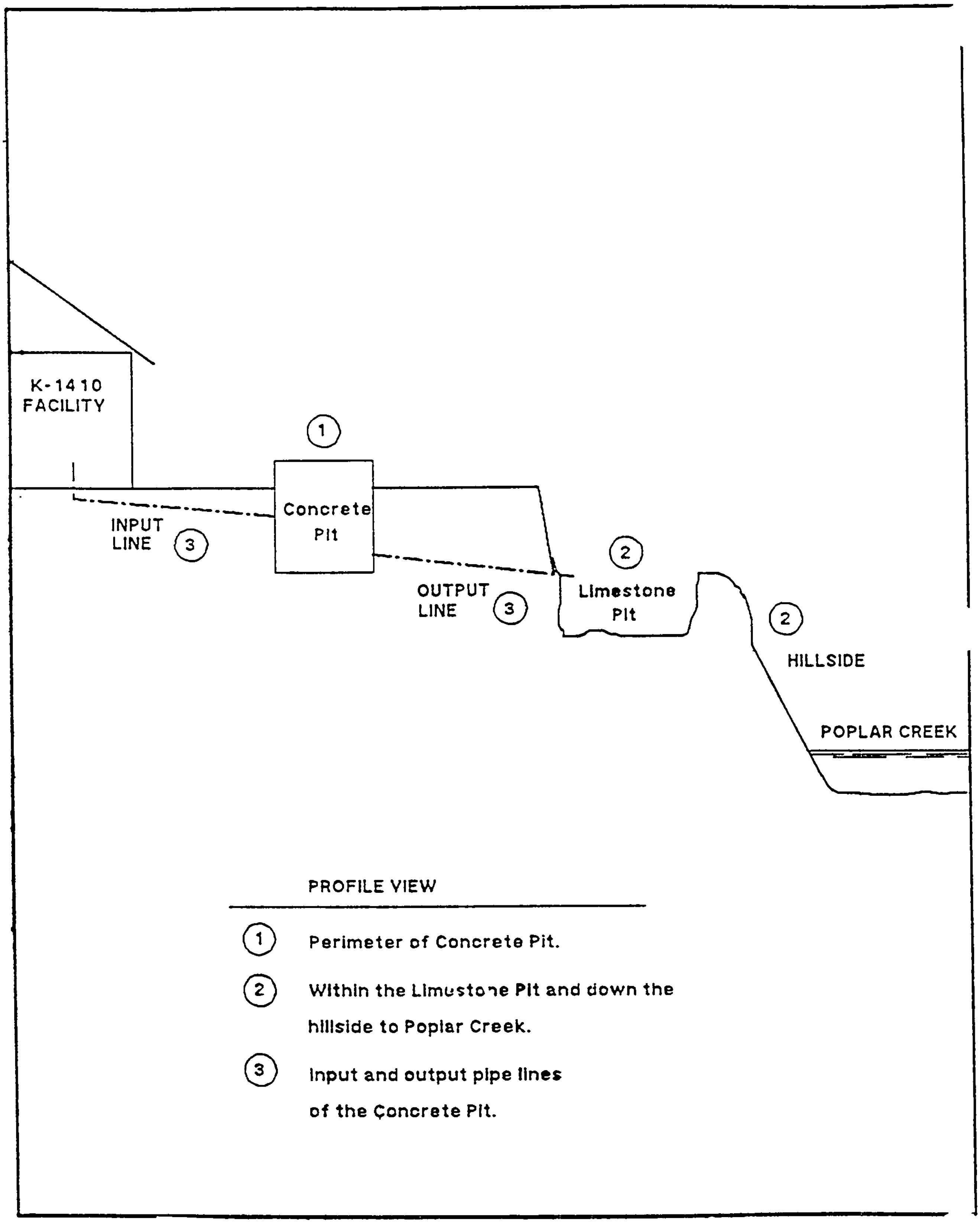

Fig. 8.1. Three soil sampling areas of K-1410 Neutralization Pit site

estimates of contaminant concentration levels in the potential release area and background concentrations. Also, the general direction of contaminant movement will be indicated, the variation sources identified, and the magnitude estimated. This information will be used to direct the next phase of monitoring, if needed.

8.2.2.1 Concrete Pit Area

Figure 8.2 shows the sampling locations of 11 corings to bedrock around the perimeter of the concrete pit. From each drilling, a soil sample will be taken: (1) from every distinct layer of soil which might be affected by a release, (2) from boundaries between soil layers, and (3) at regular 4-ft intervals in thick homogeneous layers. For thicker layers, soil from two adjacent 2-ft split barrels will be composited, taking precautions not to composite across soil layer types or layer boundaries. Samples will be taken to refusal (Figure 8.3). These individual samples will be divided with a portion of each sample saved in case a backup analysis is needed. In order to minimize the number of analytical tests performed prior to reaching a conclusion, chemical analyses on the samples from the 11 corings will be conducted in phases (Table 8.1). Samples from the four coring locations indicated with a star in Figure 8.2 will be analyzed first. The circles denote the seven locations where samples will be analyzed based on the results of Phase I sampling.

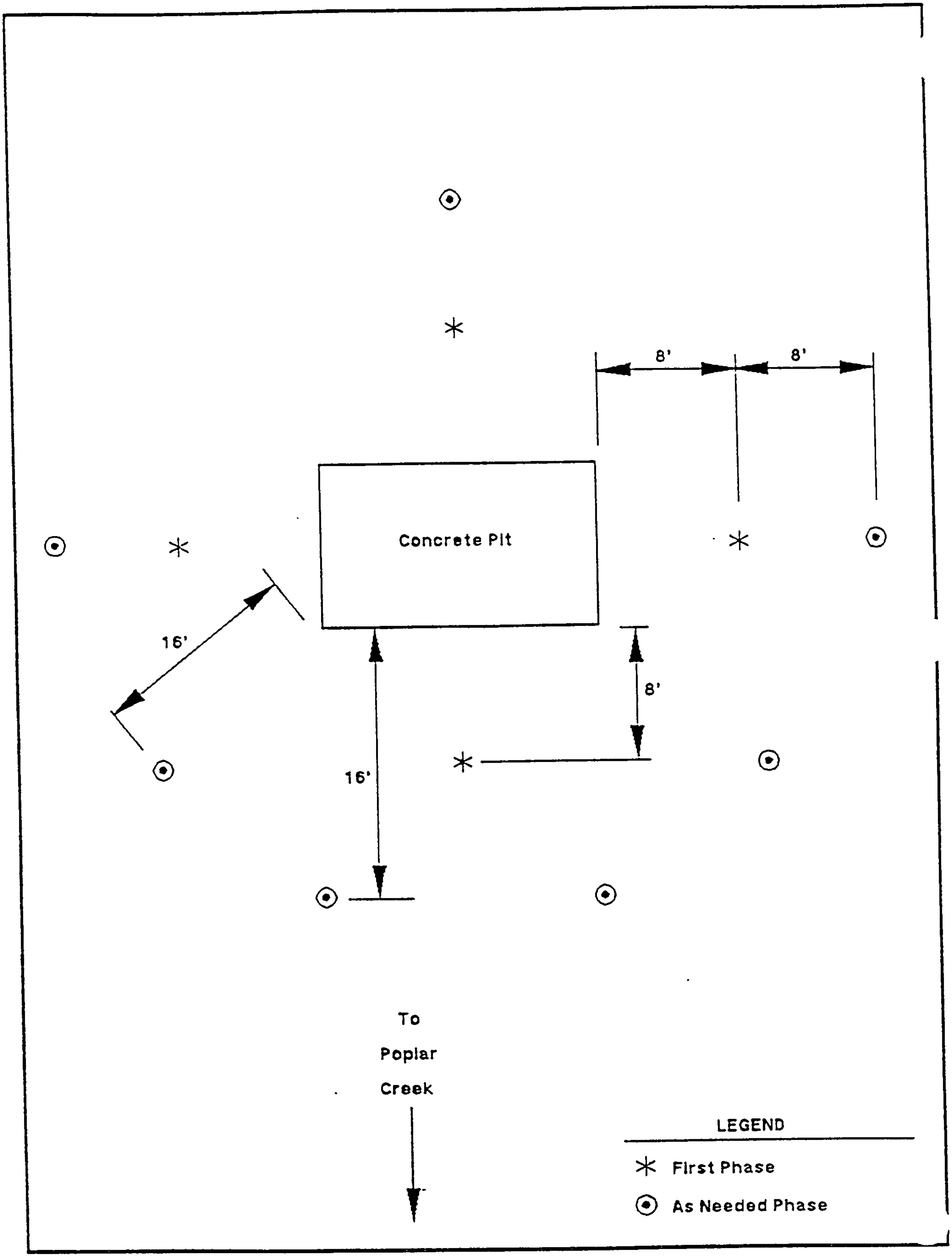

Fig. 8.2. Soil sampling locations for the Concrete Pit

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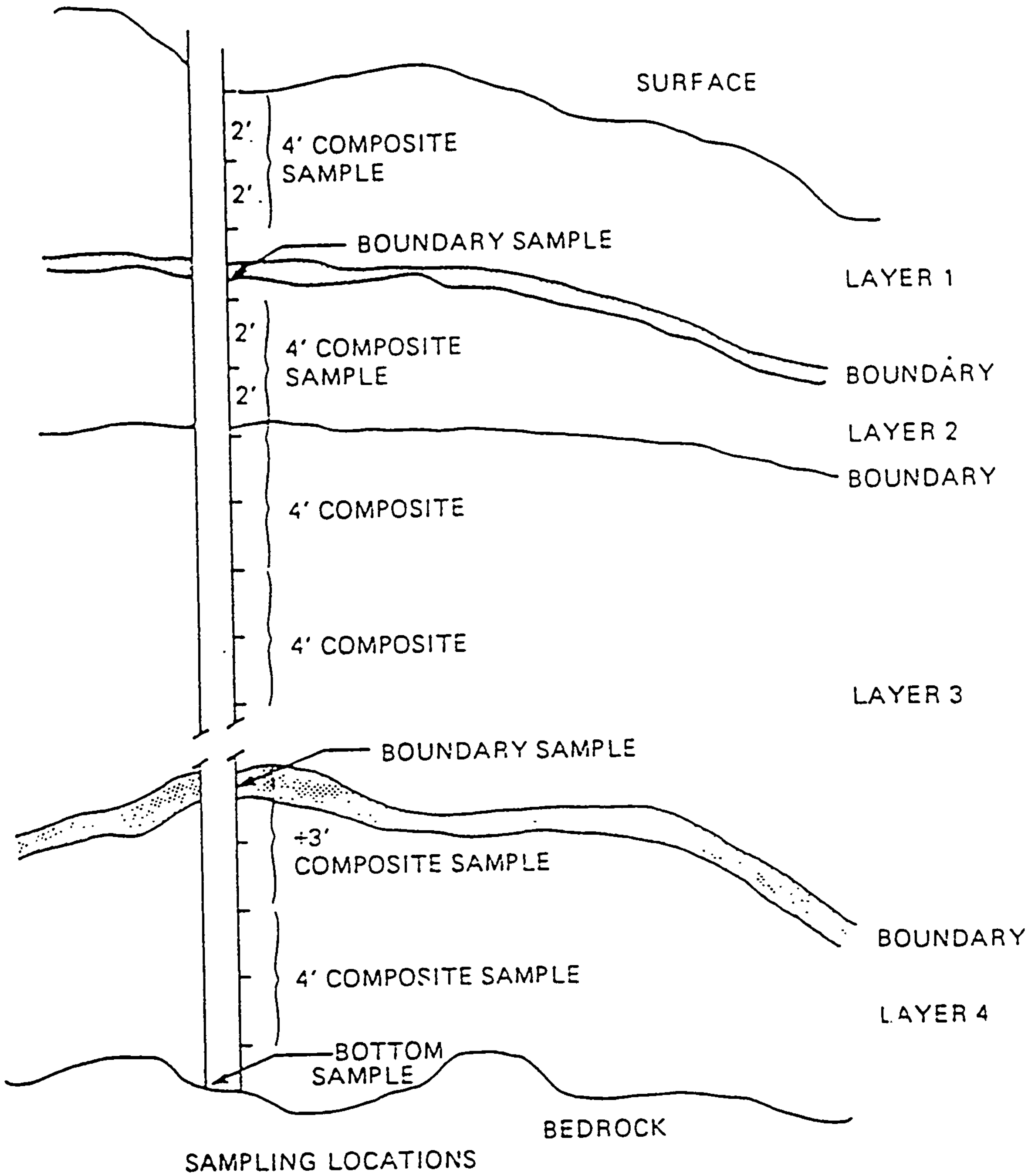


Fig. 8.3. Sampling to bedrock

Table 8.1 Phased analysis order strategy for soil samples around the concrete pit and underground pipelines of the K-1410 Neutralization Pit Area.

1. Sample locations around concrete pit (Figure 8.2):

8 feet from Concrete Pit	*
16 feet from Concrete Pit	o

Sample depths within corings:

0-8 feet	a
8-20 feet	b
20 feet - bedrock	c

Phased analysis order of concrete pit soil sample groups

Order	Group
1	*b
2	*c
3	*a
4	ob
5	oc
6	oa

2. Phased analysis order of soil samples from along the underground pipelines (Figure 8.5):

Order	Group
1	Samples from pipeline to 10 feet below pipeline.
2	Samples from greater than 10 feet below pipeline to refusal
3	Samples from above pipeline

8.2.2.2 Limestone Pit and Hillside Area

Figure 8.4 shows the soil sampling locations from the limestone pit and down the hillside to Poplar Creek. From the single location within the limestone pit a hole will be dug as deep as possible and samples taken: (1) from every distinct layer of soil which might be affected by a release, (2) from boundaries between soil layers, and (3) at regular intervals of 2-ft deep in thick homogeneous layers. A sample will be taken at surface level; a minimum of four samples will be taken. These individual samples will be divided and a portion of each sample will be retained in case a backup analysis is needed. Precaution will be taken during the hand digging so the samples in the hole will not be cross-contaminated.

The hillside adjacent to the limestone pit will have surface soil samples analyzed from ten randomly selected grid locations as indicated in Figure 8.4. Each of the ten samples analyzed will be the composite of four 6-in.-deep samples from within a 5-ft square. The hillside will be surveyed and the grid system laid out prior to the random selection of sampling locations.

8.2.2.3 Underground Pipelines

Should the pipeline leak above the maximum leak rate as addressed in Section 8.2.1, soil corings to bedrock will be taken along the inlet and outlet lines of the concrete pit at 25-ft intervals (Figure 8.5). From each drilling to bedrock, a soil sample will be taken: (1) from every distinct layer of soil, starting at the bottom of the pipe, which might be affected by a release, (2) from boundaries between soil layers, and (3) at regular intervals of 4-ft of depth in thick homogeneous layers. For thicker layers, soil from two adjacent 2-ft split barrels will be composited, with care not to composite across soil layer types or layer boundaries. Samples will be taken to refusal (Figure 8.3). These individual samples will be divided with a portion of each sample retained in case a backup analysis is needed. Analysis will be conducted in phases, as given in Table 8.1.

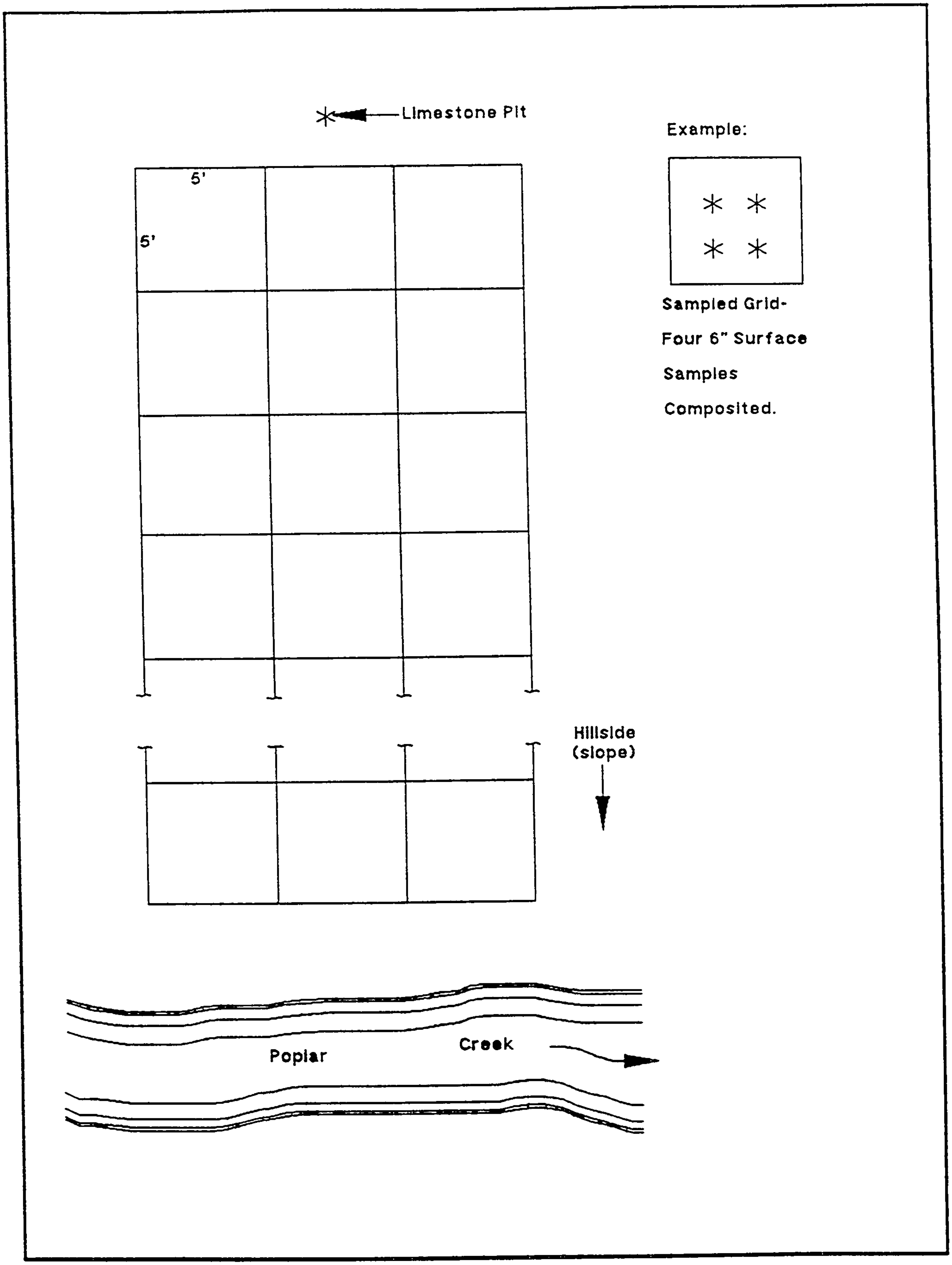


Fig. 8.4. Soil sampling location for the Limestone Pit and Hillside area

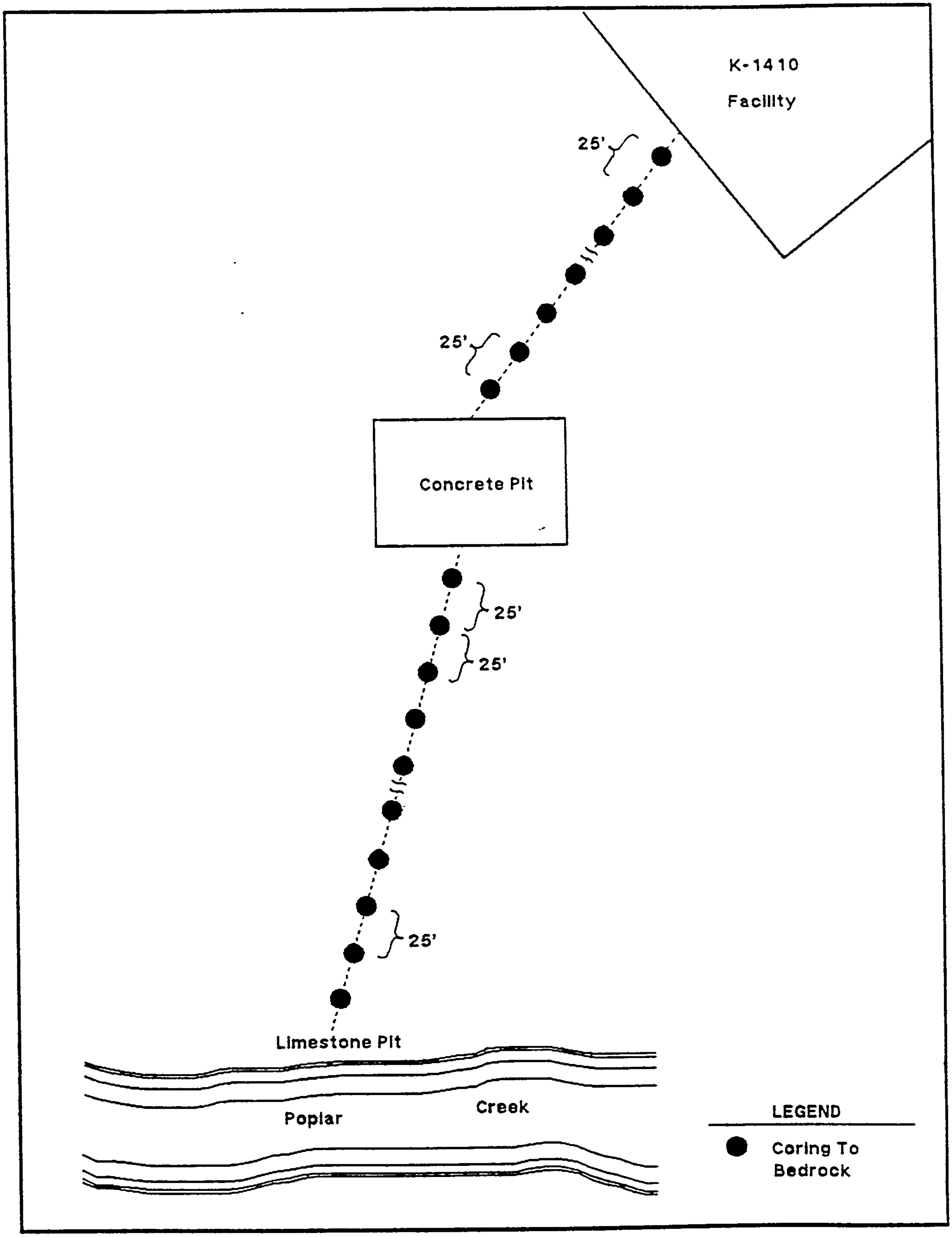


Fig. 8.5. Soil sampling locations for the underground pipes of K-1410

8.2.2.4 Background Sampling

Figure 8.6 shows the general location of three background corings to bedrock. Samples will be taken and composited according to the discussion in 8.2.1.1 and Figure 8.3. All samples will be analyzed.

For QA and QC purposes, approximately 10 percent of the samples will be sampled and analyzed in duplicate.

8.2.3 Surface Water

Surface water sampling will occur at two locations at the K-1410 site: (1) two grab samples will be taken of the water located in the concrete pit, and (2) rainfall runoff will be sampled from the bottom of the limestone pit just above Poplar Creek during three periods of rain.

8.3 FIELD SAMPLING

8.3.1 Site Preparation

In order to accurately locate the drilling sites within the K-1070-A area, arrangements will be made through Martin Marietta Engineering to have the actual sampling points (as described in Section 8.2) surveyed and marked. Any overhead or underground utilities that could possibly interfere with the required drilling will be identified, located, and the sampling points will be adjusted so as to avoid contact with any of the utilities. In addition to marking the sampling points, a detailed map, indicating the sampling points and their exact coordinates will need to be prepared.

8.3.2 Equipment and Supplies

The drillers will provide all necessary drilling equipment (hollow core auger, stainless steel split-barrel sampler, grout supplies for filling boreholes after sampling, etc.). The following field sampling supplies will be required:

- nonionic detergent, Micro (International Products Corp.)
- distilled water
- volatile organic analysis (VOA) bottles-precleaned
- glass containers, pre-cleaned, with teflon lined lids, one quart capacity

- polyethylene containers, pre-cleaned, one liter capacity
- logbook, bound
- chain of custody seals
- sample labels
- chain-of-custody forms
- stainless steel trays
- aluminum foil
- stainless steel spatulas
- hand Auger
- shovel
- cap assembly for soil gas analysis
- Teflon tubing-0.25" O.D.
- VOST tubes-pre-conditioned

The above listed equipment is to be supplied by the sampling team. Additionally, it will necessary to have some supplies delivered to the site by Energy Systems. These supplies would include 55-gallon drums (refer to the ORGDP Remedial Action QA Plan,[3] Section 13.3 for drum specifications) for collection of decontamination/washing solutions as well as the excess soil generated during drilling.

8.3.3 Soil Sampling Procedure

Collection of samples from locations along the pipelines and around the perimeter of the concrete pit will follow the protocol discussed in Sections 8.2.2.3 and 8.2.2.1 respectively and will be obtained utilizing ASTM Method D-1586-84 Penetration Test Split-Barrel Sampling of Soils.[14] This soil sampling procedure is detailed in the ESH/Sub/87/27106/1 Method ESP 303-4. The drilling will be performed by a private drilling contractor. In order to obtain a sample that is undisturbed by the auger operation, a hollow core auger will be used to remove the soil above the pipeline level, the split-barrel sampler will then be driven into the soil through the center of the auger thus obtaining an undisturbed core sample below the penetration of the deepest auger flight.

A stainless steel split-barrel sampler will be used to remove samples in 2-ft segments. Once two 2-ft segments have been obtained, the split-barrel samplers will be opened. The two 2-ft segments will then be transferred to an aluminum foil lined stainless steel pan, homogenized, and transferred to precleaned 1-quart jars (ESH/Sub/87/27106/1 Method ESP 308-1). The location of background corings are shown in Figure 8.6. For this site, background samples will be generated following the protocol outlined above. All corings are to be continuous until refusal. Background corings are to be sampled in a manner identical to the pipeline corings including the collection of soil gas samples as described in the following paragraph.

Upon completion of a borehole (pipeline or background), drilling equipment will be removed in preparation for soil gas sampling. A borehole cap will be constructed as per ESH/Sub/87/27106/1 Method ESP 303-7. Attached to the cap will be teflon tubing of sufficient length to reach the bottom of the borehole. Connected to the free end of the teflon tubing will be a Tenax GC - Tenax GC/charcoal volatile organic sample train (VOST, SW-846 Section 1.2.2.13). After installation of the soil gas sampling device the borehole must remain undisturbed for 24 hrs. to allow for equilibration. After equilibration, sampling (according to ESH/Sub/87/27106/1 Method ESP 303-7 Section VII.D.2) will be performed for 40 min at a sampling (flow) rate of 0.5 liter/min. After retrieval of the VOST tube, the tubes will be capped and stored in ice water until analysis.

After soil gas sampling of each coring is complete, the borehole is to be backfilled with a grout column s described in the General Document, Section 7.1.3. This will prevent any surface water infiltration into the groundwater.

Soil samples will be taken from the limestone pit and the adjacent bank. Their collection will follow the protocol outlined in Section 8.2.2.2. Actual sampling will be performed using a hand auger (ESH/Sub/87/27106/1 Method number ESP-303-2). Compositing of the hillside samples will follow the guidelines outlined in ESH/Sub/87/27106/1 Method number ESP-308-1. A sediment

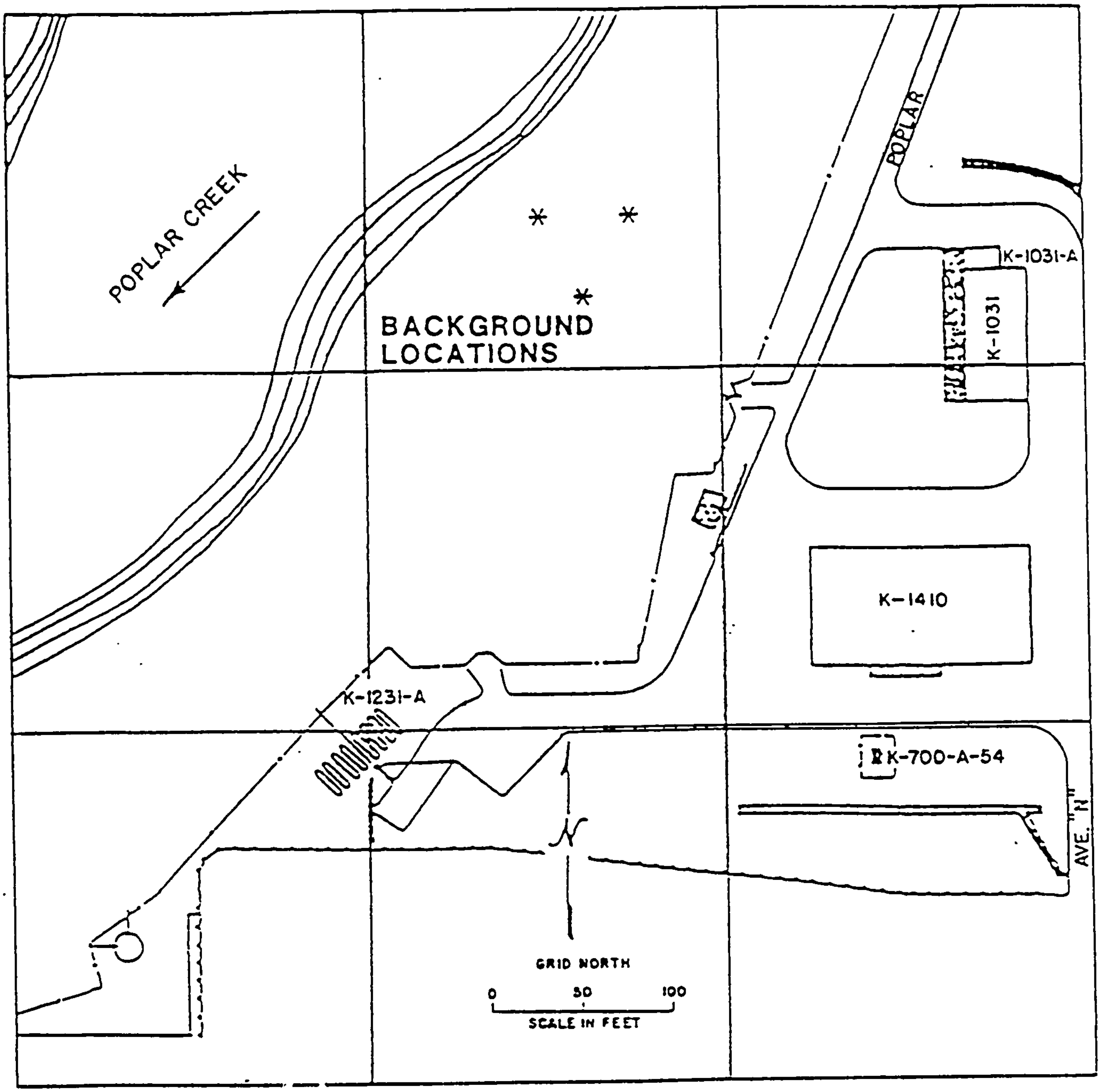


Fig. 8.6. Background sampling locations

sample will also be collected from the concrete pit. Collection will be performed using a spade or scoop (ESH/Sub/87/27106/1 Method number ESP-303-1).

8.3.4 Surface Water Sampling

The locations and criteria for collection of surface water grab samples are described in Section 8.2.3. Four liters of sample (1-one liter polyethylene bottle, 3-one quart jars) and a VOA sample will be collected during each sampling at each sampling point. The samples contained in the polyethylene bottles are intended for both metal and radiochemical analyses and thus will be acidified to a pH<2 with HNO_3. The samples collected in the glass jars and the VOA bottles are intended for organic analysis and need only be cooled to <4°C.

8.3.5 Equipment Decontamination and Waste Management

Between samples, the equipment used for sampling and sample transfer will be cleaned with the nonionic detergent and water, rinsed with water, followed by an isopropanol rinse and then a final rinse with distilled water. All the solutions generated during this cleaning process will be collected in 55 gallon drums for later disposal. The 55 gallon drums of waste generated as a result of the sampling will be labelled in such a manner as to allow a correlation between drum contents and the specific sampling site. Additional general requirements for decontamination and waste management are outlined in ESH/Sub/87/27106/1 Methods ESP 901 and ESP 1000 respectively.

For QA purposes, an equipment rinsate (1-one liter polyethylene and 1-one quart glass bottle) will be collected at least once a day, preserved according to ESH/Sub/87/27106/1 Method Number ESP-701 and submitted to the analytical laboratory for organics (semi-volatile only) metals and radiochemical (gross alpha, beta, and gamma) analyses. The final distilled water equipment rinse discussed above will serve as the source of this rinsate. These equipment rinsates will verify the adequacy of the decontamination procedure. Along with equipment rinsate, a sample of water (1-one liter polyethylene bottle and 1-one quart glass bottle) used in decontamination will be submitted at least daily. Also, field duplicates (splits) amounting to 10% of the samples taken should be routinely submitted as part of the sampling protocol.

8.3.6 Sample Labelling and Chain of Custody

Sample containers will be labelled in accordance with ESH/Sub/87/27106/1 Method ESP-500. Each sample (container) will be assigned a unique Sample Identification Number (SIN). The format of this SIN is described in the ORGDP Remedial Action QA Plan,[3] Section 8.4. The sample containers will be sealed and transported to the laboratory under chain of custody protocol, a description of which is contained in ESH/Sub/87/27106/1 as Method ESP-500. The sampling date, site identification, time, sample identification number, sampler's name, and the surveyed coordinates of the sample will be recorded in the logbook. In addition to the required entries, any other pertinent information and/or observations (e.g., weather, unusual occurrences, etc.) shall be recorded. The logbook will be kept in a manner consistent with ESH/Sub/87/27106/1 Methods ESP 400 and ESP 500. The logbook, this sampling plan, and a map of the site must be available on site if sampling activities are being conducted.

8.4 ANALYTICAL PROTOCOL

All of the soil samples received by the analytical laboratory as part of this investigation will be analyzed for TOTAL metals and radioactivity (gross alpha, beta, and gamma). In addition to metals and radiochemical analysis, a semi-volatile organic analysis will be performed on soil samples taken from the limestone pit and the hillside areas. Additionally, a "pipeline borehole composite" will be made by mixing equal quantities of each borehole segment (pipeline samples only) sample. These composites will also be analyzed for their semi-volatile organic content. After compositing and subsampling are complete the remaining sample will be archived. Surface water samples will be ana yze l for organics (volatile and semi-volatile), : ıetals, and radic:activity. The equipment rinsates received will be analyzed for semi-volatile organics, metals and radioactivity. Finally, VOST tubes will be analyzed for the volatile organics adsorbed as a result of borehole sampling.

If sample analysis indicates soil TOTAL contaminate metal level(s) to be such that accepted regulatory levels (e.g. leachate concentration from EP-TOX or TCLP) for a worst case situation (e.g. 100% extractability of the metals for EP-TOX or TCLP) would be exceeded, then the regulatory test would be performed on a sub-sample of the archived sample and the results documented as part of the sample package.

Groundwater was listed as a migratory pathway for contamination in Section 6 and thus will need to be examined as part of this investigation. The field work directly associated with the K-1410 Neutralization Pit Area, however, will not involve the sampling of any groundwater wells. Instead, the requisite wells will be installed and their actual sampling will then follow the protocol outlined in the ORGDP Groundwater Protection Plan.[5] The data generated from these wells will become part of the ORGDP Groundwater Database which will be accessed during the data analysis phase of this RFI investigation.

8.5 SAMPLE ANALYSIS

Throughout the K-1410 Neutralization Pit Area Sampling Plan generic terms are used to describe the analyses to be performed (e.g. metals, radiochemical activity), the following describes the specific parameters for which analyses will be conducted. In addition, the procedures of choice will be referenced.

Metals analysis as used in the above discussion should include but is not limited to analysis for the metals listed in Table 8.2. Also included in Table 8.2 is the recommended analytical procedure(s).

The soil analysis procedure for gross alpha, beta, and gamma is outlined in Section 7 of the General Document. The water analysis procedure of choice is EPA-900.0.

The volatile organic analyses and VOST tube analyses discussed in the bulk of this document refers to the anal sis for all the parameters contained in the V latiles section of Table 7.6 of the General Document. The analysis method of choice is EPA-8240. VOST tube analyses will require a modification of the sample inlet system, the modification is detailed in SW-846 Method 3720.

The semi-volatile analysis discussed refers to the analysis for the parameters listed in the semi-volatiles section of Table 7.6 of the General Document. The analysis method of choice is EPA-8270.

The analytical procedures cited are for reference purposes only, the QA/QC requirements for this investigation are outlined in the ORGDP Remedial Action QA Plan[3] and the General Document. These requirements are minimum requirements and take precedence over those contained in the cited methods.

Table 8.2. Metallic elements of interest at K-1410 Neutralization Pit Area

Element	Analytical Procedure
Arsenic	EPA-6010
Cadmium	EPA-6010
Cobalt	EPA-6010
Copper	EPA-6010
Iron	EPA-6010
Lead	EPA-6010
Manganese	EPA-6010
Mercury	EPA-245.1
Nickel	EPA-6010
Selenium	EPA-6010
Silver	EPA-6010
Uranium	EPA-6010
Zinc	EPA-6010

9. DATA MANAGEMENT PROCEDURES

In order to clearly illustrate any patterns in the data, the results of the chemical analyses of samples from the potential release areas will be presented through tables, graphs, and other visual displays such as maps and contour plots so as to best illustrate any patterns in the data (see the General Document, Table 8.1). Statistical analyses will provide for treatment of duplicate laboratory analyses, results which are reported as less than detection limit, and examination for statistical outlines.

Average contaminant values for the release area will be compared to average background values and to preestablished limits. Statistical modeling methods, such as least squares and kriging, will be used to estimate response surfaces for use in developing concentration contours for the contaminants. Statistical confidence bounds (upper, lower, or both) will be determined for the contaminants at a given sampling location and depth where appropriate.

The specific type of statistical analysis depends on the variability of the data. Analysis of the data will be performed according to sound statistical practice by qualified statisticians and will be documented. Data validation, management, and corrective actions are addressed in the ORGDP Data Management Plan[4] (K/HS-232). Detection limits will be reported using an arithmetic bound calculated using 0 as the detection limit and an arithmetic bound calculated using the actual detection limit. EPA public domain kriging software will be used in modeling to develop concentration contours over the area.

10. HEALTH AND SAFETY PROCEDURES

10.1 INTRODUCTION

Special requirements and procedures to protect the health and safety of the investigating team, ORGDP site personnel, and the general public during the RCRA Facility Investigations of the K-1410 Neutralization Pit are addressed in this section.

Section 9.0 of the General Document details the health, safety, environmental, security, plant protection, and emergency response organizations which are in place at ORGDP. These organizations provide support to ORGDP line organizations to meet requirements for health and safety during the RFIs. They provide the communications, response, and reporting for any plant emergency; on-site medical facilities with medical surveillance, treatment, monitoring, and periodic physical examinations; health physics and industrial hygiene surveillance hazard evaluation and control; operational safety accident prevention and control; and plant security and visitor control.

In addition, the general document identifies the organizational responsibilities for health and safety at the SWMU sites during RCRA Facility Investigations. The document includes the methodology for establishing the work zones of each SWMU, the level of protection required in the exclusion zone, decontamination procedures, personnel exposure limits, monitoring requirements, and respiratory protection. The plan for the K-1410 Neutralization Pit SWMU is based upon requirements described in Volume I, Section 6, of the draft document, RCRA Facility Investigation Guidance, dated October 1986. The operational information of the K-1410 Neutralization Pit establishes the personnel protection as Level D for this SWMU.

10.2 LEVEL OF PROTECTION

The level of personnel protection and monitoring for sediment and surface water sampling is designated below.

Level Designation	Monitoring Parameters	
A ____	Airborne Pollutants	x
B ____	Explosion Potential	
C ____	Radiation	x
D x		

10.3 DESIGNATION OF WORK AREA ZONES

The three zones (Exclusion, Contamination Reduction, and Support) will be established for the work activity area in accordance with the methodology developed in Section 9.0 of the General Document. As work activity requires, the exclusion zone will move to encompass areas around the concrete neutralization pit, the effluent line to the limestone pit, and the free discharge from the limestone pit down the bank into Poplar Creek. The safety equipment required for the designated level of protection and the decontamination procedures are also covered in the General Document.

10.4 EXPOSURE LIMITS

The personnel protection recommended for work activity in the exclusion zone of the K-1410 Neutralization Pit SWMU is Level D. Personnel will be required to wear inner and outer chemical resistant gloves during work activity.

Employee exposure to airborne pollutants (i.e., dust containing metallic particulates) throughout the course of the investigation will be monitored through the use of air monitoring equipment. If pollutants or unusual odors are detected, work will be stopped, the area will be evacuated, and the ORGDP Industrial Hygiene Department will be contacted to determine necessary actions to mitigate health and safety concerns.

The responsibility for limiting the exposure of the workers to nonhazardous levels of radiation resides in the Site Health and Safety Officer (SHSO) using instruments described in Section 9.0 of the General Document. The SHSO will monitor for radiation in the air and adjacent to sample drillings and/or diggings with a radiation meter capable of measuring 0.1 mR/h. Should the reading exceed 0.1 mR/h, the SHSO will order work to be stopped and the crew removed from the exclusion zone. The SHSO will request the presence of a health physicist on site who will assess the potential hazard of the conditions and determine whether or not work should continue.

Sampling personnel must be aware that equipment used for soil sampling could become contaminated with radioactive material. Personal safety shoes and other protective equipment could become contaminated. Surveys should be performed on such equipment in the soil sampling areas before and after each operation. Each survey should include monitoring all applicable personnel and equipment. Equipment that is found to be contaminated above the guidelines for unrestricted release (alpha: 5,000 dpm/100 cm^2, 1,000 dpm/cm^2 transferrable; beta and gamma: 0.1 mR/h) will be decontaminated. Should the reading exceed an action level of 2 mR/h (set by ORGDP Health Physics as an action point), the SHSO will order work to be stopped, and the crew will be removed from the exclusion zone. The SHSO, who has ultimate control of the site, will also request a health physicist to assess the potential hazard of the conditions and determine whether or not work should continue.

REFERENCES

1. RFI Guidance, Volumes I - IV, EPA-530/SW-87-001, OSWER 9502.00-6C, U.S. Environmental Protection Agency, December 1987.

2. RFI Plan - General Document, Oak Ridge Gaseous Diffusion Plant, Oak Ridge, Tennessee. K/HS-132, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, March 1987.

3. Environmental Surveillance Procedures Quality Control Program, ESH/SUB/87-21706/1, Kimbrough, Long, and McMahon; Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn., September 1988.

4. ORGDP Remedial Action Program Quality Assurance Plan, K/HS-231, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, December 1988.

5. ORGDP Remedial Action Program Data Management Plan, K/HS-232, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, December 1988.

6. ORGDP Groundwater Protection Program Management Plan, K/HS-258, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, 1988.

7. RFI Plan - K-1410 Building, K/HS-155, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, December 1988.

8. Hydrogeology of the Oak Ridge Gaseous Diffusion Plant, K/Sub/85-2224/9, Geraghty and Miller, Inc., July 1986.

9. ORGDP Geologic Map, ORNL-DWG-86/9769, R.H. Ketelle, to be published at the Oak Ridge National Laboratory.

10. Geologic Map of the Oak Ridge Area, Tennessee, W.M. McMaster, U.S. Geologic Service, 1958.

11. RFI Plan - K-1232 Treatment Facility, K/HS-145, Martin Marietta Energy Systems, Inc., Oak Ridge Gaseous Diffusion Plant, March 1988.

12. The Environmental Surveillance of the U.S. Department of Energy Oak Ridge Reservation and Surrounding Environs During 1987, Volume 1, ES/ESH-4/V1, J.G. Rogers et al.; Martin Marietta Energy Systems, Inc., April 1988.

13. "Final Permit Modification NPDES Permit No. TN0002950, Oak Ridge Gaseous Diffusion Plant", B. R. Barrett, U.S. Environmental Protection Agency, Atlanta, Georgia, letter to W. F. Manning, U.S. Department of Energy, Oak Ridge, Tennessee, September 11, 1986.

14. Standard Method for Penetration Test and Split-Barrel Sampling of Soils, D-1586-84, American Society for Testing and Materials, November 1984.

APPENDIX A

	Daily Average	Minimum Value Observed or Expected During Discharge Activity	Maximum Value Observed or Expected During Discharge Activity	Freq. of Analysis	No. of Analyses	Sample Type
Flow (gal/day)	7,770	720	14,400	Cont.	N/A	N/A
pH	7.86	6.7	9.3	Cont.	N/A	N/A
Temp (winter) F	110	110	110	1/30	12	G
Temp (summer) F	-	-	-	1/30	12	G
Cyanide (ppm)	0.0042	0.002	0.01	1/30	12	G
Nickel (ppm)	7.8	0.005	42.3	1/30	12	G
Oil & Grease (ppm)	2.9	1	24	1/30	12	G

TABLE A.1 NPDES Effluent Data From the K-1410 Neutralization Pit During 1976

	Daily Average	Minimum Value Observed or Expected During Discharge Activity	Maximum Value Observed or Expected During Discharge Activity	Freq. of Analysis	No. of Analyses	Sample Type
Flow (gal/day)	4,530	720	14,400	Cont.	N/A	N/A
pH	7.39	5.8	8.4	Cont.	N/A	N/A
Temp (winter) F	110	110	110	1/30	12	G
Temp (summer) F	-	-	-	1/30	12	G
Cyanide (ppm)	0.004	0.001	0.01	1/30	12	G
Nickel (ppm)	13.35	0.13	48	1/30	12	G
Oil & Grease (ppm)	1.75	1	10	1/30	12	G

TABLE A.2 NDPES Effluent Data From the K-1410 Neutralization Pit During 1977

	Daily Average	Minimum Value Observed or Expected During Discharge Activity	Maximum Value Observed or Expected During Discharge Activity	Freq. of Analysis	No. of Analyses	Sample Type
Flow (gal/day)	1,710	0	7,200	Cont.	N/A	N/A
pH	7.49	6.8	8.1	Cont.	N/A	N/A
Temp (winter) F	-	-	-	1/30	12	G
Temp (summer) F	-	-	-	1/30	12	G
Cyanide (ppm)	0.0011	0.0005	0.002	1/30	12	G
Nickel (ppm)	431.5	0.9	4,000	1/30	12	G
Oil & Grease (ppm)	2.88	1	19	1/30	12	G

TABLE A.3 NPDES Effluent Data From the K-1410 Neutralization Pit During 1978

	Daily Average	Minimum Value Observed or Expected During Discharge Activity	Maximum Value Observed or Expected During Discharge Activity	Freq. of Analysis	No. of Analyses	Sample Type
Flow (gal/day)	1,080	720	1,440	Cont.	N/A	N/A
pH	7.43	6.9	7.9	Cont.	N/A	N/A
Temp (winter) F	-	-	-	1/30	12	G
Temp (summer) F	-	-	-	1/30	12	G
Cyanide (ppm)	0.002	0.002	0.002	1/30	12	G
Nickel (ppm)	36.45	0.35	266.9	1/30	12	G
Oil & Grease (ppm)	1.47	0.45	5.5	1/30	12	G

TABLE A.4 NPDES Effluent Data From the K-1410 Neutralization Pit During 1979

APPENDIX B

GERAGHTY & MILLER, INC. *Ground-Water Consultants*

LITHOLOGIC LOG

BORING NO. UNW-60			
PROJECT ORGDP Monitor-We: Installation Program - Phase I Ext			
LOCATION K-25 Plant, K-1410	K-25 PLANT COORDINATES SOUTH 25,928.81 WEST 2,001.54	SURFACE ELEVATION 778.78 ft msl	TOTAL DEPTH 21.4 ft
GEOLOGIST G. Weiss	SAMPLE INTERVAL 5 feet	SAMPLE TYPE Cuttings	DATE WELL COMPLETED 07-06-87
DRILLER B. Manis	DRILLING CONTRACTOR Mannis Drilling	DRILLING METHOD Hollow-Stem Auger	RIG TYPE Mobile B-80
PURPOSE OF BORING Characterization Well	GEOPHYSICAL CONTRACTOR None	GEOPHYSICAL LOGS None	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0		CLAY (100%), slightly silty in places, dark brown, contains some rootlets.	Clay moist at 5 ft
		18.0' - 21.4' Light brown, contains some gray, dismicritic limestone fragments.	Refusal at 21.4 ft
10, 20, 30, 40, 50, 60, 70, 80, 90			

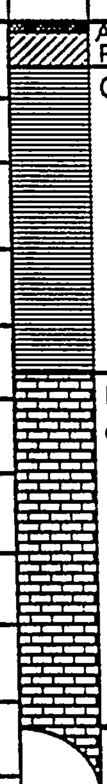
SHEET 1 OF 1

GERAGHTY & MILLER, INC.
Ground-Water Consultants

LITHOLOGIC LOG

BORING NO.	BRW-16
PROJECT	ORGDP Monitor-W Installation Program - Phase

LOCATION	K-25 PLANT COORDINATES	SURFACE ELEVATION	TOTAL DEPTH
K-25 Plant, K-1232	SOUTH 26,357.73 WEST 2,724.15	771.92 ft msl	47.0 ft
GEOLOGIST	**SAMPLE INTERVAL**	**SAMPLE TYPE**	**DATE WELL COMPLETED**
G. Weiss	5 feet	Cuttings	11-26-86
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
D. Wood	Graves Drilling	Air Rotary	Dresser T-70-W
PURPOSE OF BORING	**GEOPHYSICAL CONTRACTOR**	**GEOPHYSICAL LOGS**	
Monitor Well	None	None	



DEPTH IN FEET	DESCRIPTION	COMMENTS
0	ASPHALT.	
	FILL (100%), limestone gravel.	
	CLAY (100%), orange-red, plastic, some weathered limestone.	
	LIMESTONE (100%), gray to white, micritic, abundant secondary calcite.	Borehole produced water (~30 gpm) at 38 ft

Depth scale: 0, 10, 20, 30, 40, 50, 60, 70, 80, 90

SHEET 1 OF 1

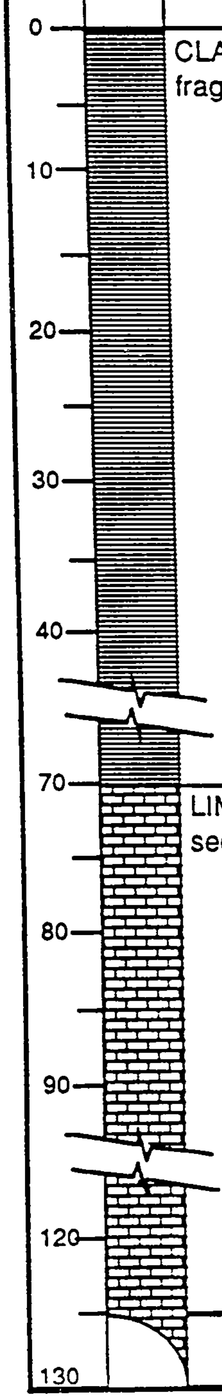
GERAGHTY & MILLER, INC.
Ground-Water Consultants

LITHOLOGIC LOG

BORING NO.	BRW-41
PROJECT	ORGDP Monitor-We Installation Program - Phase

LOCATION	K-25 PLANT COORDINATES	SURFACE ELEVATION	TOTAL DEPTH
K-25 Plant, K-1232	Not Available	Not Available	105.0 ft
GEOLOGIST	**SAMPLE INTERVAL**	**SAMPLE TYPE**	**DATE WELL COMPLETED**
G. Weiss	5 feet	Cuttings	09-02-87
DRILLER	**DRILLING CONTRACTOR**	**DRILLING METHOD**	**RIG TYPE**
S. Baker	Middle Georgia	Air Rotary	Ingersoll-Rand T4W
PURPOSE OF BORING	**GEOPHYSICAL CONTRACTOR**	**GEOPHYSICAL LOGS**	
Monitor Well	None	None	

DEPTH IN FEET	GRAPHIC LOG	DESCRIPTION	COMMENTS
0		CLAY (100%), silty in places, red, contains weathered chert fragments, moist to wet in places.	
70		LIMESTONE (100%), micritic, light to dark gray, traces of secondary calcite, weathered in places.	Borehole produced water (~5 gpm) at 86 ft



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