

Stratford Army Engine Plant
Restoration Advisory Board (RAB)
Meeting January 6, 2000

The Stratford Army Engine Plant (SAEP) which is proceeding with closure action under provisions of the Base Realignment and Closure Act (BRAC) of 1995 will hold a Restoration Advisory Board (RAB) on January 6, 2000 at 7p.m. in Room 22, Stratford Army Engine Plant. The meeting is open to the public. Parking is in the West Lot and entry through the main guard station.

Stratford Army Engine Plant
Restoration Advisory Board (RAB)
Meeting January 6, 2000

AGENDA

1. Welcome, opening remarks, introductions, announcements, old business.
2. Discussion and Update on Environmental Investigations
 - A) RI/FS update by URSGWC
 - B) OU02 Groundwater Investigation by FW/HLA
Includes discussion on air quality
 - C) OU01 Causeway Investigation by FW/HLA
 - D) GIS Status by FW/HLA
 - E) GWM by USACE New England District
3. Open forum, next meeting, adjourn.

For additional information call the SAEP BRAC office (John Burleson) at 385-4316 or Margarita Hartley Moore, RAB Community Co-Chairperson at Redacted - Privacy Act.

16/00 RAB Sign-In

Michael McBill URSGWC

Bob Wolff URSGWC

Redacted - Privacy Act - RESIDENT -

Redacted - Privacy Act

STAN Silverstein RAB

JIM OTTO RAB

Rod Pendleton HLA

Nelson Walter HLA

Stu Pearson HLA

Karen Arnold HLA

Dorothy Brossid HLA

RICK NORRIS LRA SAEP

Ken Feathers CT DEP

Michelle Brock COE - New England

PHILIP KATZ LRA & RAB

AARON HOCHMAN TEAM STRATFORD

FRED BERGER TEAM STRATFORD

MICHAEL SUSCA TEAM STRATFORD / TRC ENVIRONMENTAL

Meghan Cassidy U.S. EPA

MAINE O'KEEFE STRATFORD HEAVY DEPT

Janet Carlucci RAB

Fred Hyatt BTC SAEP

Redacted - Privacy Act Visitor - RESIDENT

JEFFREY FRYE COE NY DISTRICT

Marcia Stewart RAB

Jay BORKLAND FW

Debbie Galle Secretary

John Bulson

**STRATFORD ARMY ENGINE PLANT
RESTORATION ADVISORY BOARD (RAB)**

MEETING MINUTES

January 6, 2000

The SAEP Restoration Advisory Board conducted a Regular Meeting on Thursday, January 6, 2000 at 7:00 p.m. in Room 22 of the Stratford Army Engine Plant, 550 Main St., Stratford CT, pursuant to notice duly given.

Call to Order: The meeting was called to order at 7:03 p.m.

Presiding: John Burleson, Community Co-Chairman

In Attendance: M. McGill, B. Wolff, S. Silverstein, J. Otto, R. Pendleton, N. Walter, S. Pearson, K. Arnold, D. Bossio, R. Norris, K. Feathers, M. Brock, P. Katz, M. Cassidy, E. O'Keefe, J. Carlucci, F. Hyatt, Redacted - Privacy Act J. Frye, M. Stewart, J. Borkland, A. Hochman, F. Berger, M. Susca, Redacted - Privacy Act

Members Absent: L. Perlmutter, J. Terceno, F. Gerarden, A. deMello, M. Hartley-Moore

1. Welcome, Opening Remarks, Introductions, Announcements, Old Business: J. Burleson welcomed and introduced those new to the RAB meeting. He also noted that Item 2(e) will be omitted from the agenda for this meeting.
2. Update and Discussion on Environmental Investigations:
 - a) RI/FS Update by URSGWC: B. Wolff and M. McGill presented the following discussion items:
 - Aquifer Testing
 - Groundwater Sampling
 - Human Health Baseline Risk Assessment
 - Remaining Activities
 - b) OUO2 Groundwater Investigation by FW/HLA (Including discussion on air quality): N. Walter, S. Pearson and R. Pendleton presented the following discussion items:
 - OU2 Pilot Tests (objectives, summary of results, proposed extension)
 - OU2 Indoor Air Maintenance (results, risk assessment, future activities)
 - c) Causeway & Dike NCRA (field investigation, results on causeway contamination)

- d) Geographic Information System (chemical data gathered into one place and evaluated, with considerations for buildings, past use, square footage, make-up of property). Data will show basemap, utilities, samples, GW comparisons to CT standards.
3. Open forum, next meeting, adjournment:
- a) Next regular meeting will be 3/2/00;
 - b) Data presentation session to be scheduled (all day format) sometime in April;
 - c) RAB meeting scheduled to be reconsidered (possibly to a monthly schedule vs. bi-monthly).
 - d) Adjournment: There being no further business, the meeting adjourned at 9:25 p.m.

Respectfully submitted,



Debbie Gallo, Recording Secretary

Update of On-going Activities Remedial Investigation Stratford Army Engine Plant Stratford, Connecticut

Presented to
Base Realignment Closure Team and
The Restoration Advisory Board
January 6, 2000

Discussion Items

- I. Aquifer Testing
- II. Groundwater Sampling
- III. Human Health Risk Assessment
- IV. Remaining Activities

URS Greiner Woodward Clyde

Summary of Aquifer Testing

- A total of 34 monitoring wells were tested during study
- Rising head slug tests were performed in order to determine hydraulic conductivity
- Hvorslev (1951) solution for unconfined aquifers was utilized for data analysis
- Hydraulic conductivities ranged from 0.000315 to 0.165 ft/min

URS Greiner Woodward Clyde

Summary of Slug Test Results

Well ID	Date	Time	Flow Rate (gpm)	Initial Head (ft)	Final Head (ft)	Hydraulic Conductivity (ft/min)
W-10	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-11	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-12	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-13	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-14	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-15	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-16	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-17	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-18	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-19	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-20	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-21	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-22	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-23	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-24	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-25	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-26	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-27	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-28	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-29	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-30	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-31	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-32	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-33	11/02/99	10:00	1.00	1.00	0.99	0.000315
W-34	11/02/99	10:00	1.00	1.00	0.99	0.000315

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Summary of Direct Push Groundwater Sampling

- Nine direct push borings were advanced: one location on-site and eight locations off-site
- Groundwater samples were collected at ten foot vertical intervals beginning at 20 below ground surface (bgs) to 60 feet bgs
- Groundwater samples analyzed for volatile organic compounds using an on-site mobile laboratory

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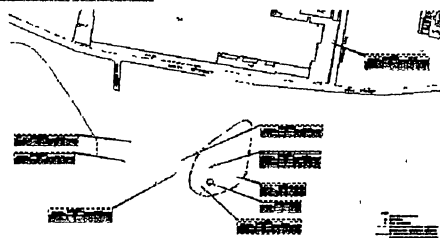
Summary of Direct Push Groundwater Sample Results

Volatile Organics

- Tetrachloroethene, Trichloroethene and 1,1 Dichloroethene exceedances
- PCE, TCE, and 1,1-DCE exceedances concentrated in 20 to 40 foot below surface vertical interval
- No exceedances detected below 40 feet

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Direct Push Groundwater Sampling Locations And Results



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Summary of Preliminary Monitoring Well Sample Results

- Second round monitoring well groundwater results are similar to first round results
- Preliminary results indicated the causeway monitoring wells had no exceedances of CTDEP RSRs for VOCs, BNs, and Metals
- Preliminary results indicated the monitoring wells along Access Road had no exceedances of CTDEP RSRs for VOCs, BNs, and Metals

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Human Health Baseline Risk Assessment

Purpose

Evaluate the potential human health risks associated with a no-action alternative.

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Human Health Baseline Risk Assessment

KEY STEPS

- Identify the PCOCs
- Identify human populations exposed to the PCOCs
- Develop exposure assumptions
- Estimate cancer/noncancer risks

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Human Health Baseline Risk Assessment

SAEP AREAS OF CONCERN

- Intertidal Flats
- Causeway
- Marine Basin
- Main Site (outside the fence line)

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Human Health Baseline Risk Assessment

PCOCs Selection Process

- Chemicals not detected are excluded
- Chemicals detected at low frequency (<5%) are excluded
- Chemicals present at background concentrations were **not** excluded

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Human Health Baseline Risk Assessment

PCOCs Selection Process

- Chemicals that are essential nutrients are excluded when present at low levels (i.e., levels that are likely to produce beneficial rather than toxic effects).
- Comparison to Health-Based Screening Values (Chemicals below the screening value were excluded as PCOCs).

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Human Health Baseline Risk Assessment

PCOCs Selection Process

- PCOCs identified for surface soil, total soil, sediment, groundwater, surface water and biota.
- PCOCs in air are limited to those PCOCs identified in other media.

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Human Health Baseline Risk Assessment

Receptor Populations

- Construction workers
- Commercial fisherman
- Recreational Receptor (adult)
- Recreational Receptor (child)

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Human Health Baseline Risk Assessment

Potential Exposure Pathways

- Source of Chemicals and release mechanism
- Transport Medium (air, groundwater)
- Point of potential receptor contact (exposure point)
- Route of exposure (inhalation, ingestion, dermal contact)

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Human Health Baseline Risk Assessment

Evaluation of Exposure Assumptions



- Estimate the chronic daily intake using a series of exposure parameters

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Future Activities

- Validation of 2nd Round of Groundwater Sampling Data/GIS Format
- Preparation of Remedial Investigation Draft Report

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Project Status Updates

STRATFORD ARMY ENGINE PLANT

Harding Lawson Associates
and Foster Wheeler
January 6, 2000

Foster Wheeler/HLA Projects at SAEP

- **OU 2 - Groundwater Non-Time Critical Removal Action**
 - Pre-Design Investigation Report
 - Pilot Tests
 - EE/CA
 - Indoor Air Monitoring
- **Causeway and Dike Non-Time Critical Removal Action**
 - Pre-Design Investigation Report
 - EE/CA

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HLA Projects at SAEP

- **Community Relations Support**
- **BRAC Cleanup Plan**
- **Geographic Information System**

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OU2 Pre-Design Investigation Report

- Draft to be issued in late January 2000
- Following review of Draft, comments will be incorporated, and Draft Final version incorporated into Draft Remedial Investigation Report (March 1999)

verse

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OU 2 - Pilot Tests

- Evaluation of remedial technology for hot spot contamination near chrome plating area
- Conducted in-situ Hexavalent Chromium and Trichloroethene from November 30 through December 11
- Review Objectives
- Review System Setup/Installation

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OU 2 - Pilot Tests

- Review Results
- Discuss need for additional testing in January

verse

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OU 2 - Pilot Test Objectives

■ Hexavalent Chromium (Cr⁶⁺) Area

- In-situ reduction of Cr⁶⁺ to Cr³⁺ by addition of ferrous sulfate
- Mass reduction of source area
- Attempt to achieve CT RSR (SWPC) of less than 0.11 mg/L Cr⁶⁺

■ Trichloroethene (TCE) Area

- In-situ oxidation of TCE to end products (CO₂, Cl₂, H₂O) by potassium permanganate
- Mass reduction of source area
- Attempt to achieve CT RSR (SWPC) of less than 2.34 mg/LTCE

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Pilot Test - Summary of Results

- Reduction of Cr⁶⁺ and TCE in groundwater demonstrated
- Effective treatment achieved in some but not all piezometers
- Time required to treat the pilot test area is longer than predicted
- Heterogeneous aquifer properties may be affecting the treatment time
- No data available yet on rebound effects

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OU 2 - Pilot Test - Proposed Extension

- Results indicate treatment is working but not complete
- Resume system operation for up to 14 days in January
- Increase chemical dose
- Shut down if evidence of treatment achieved in all treated areas for 3-5 consecutive days
- Results will be incorporated into the EE/CA

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OU2 - Indoor Air Monitoring

- Four rounds conducted to date
- First two rounds in Building B-2
- Third and fourth rounds in various other occupied spaces within facility

WSP-02

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OU2 - Indoor Air Monitoring

- Results:
 - Exceedance of RSR indoor air criteria detected in both indoor air and some background results (collected outdoors)
 - Exceedances detected for TCE, 1,1-DCE, vinyl chloride at levels of up to 50 times RSR criteria in Building B-2 (Rounds 1 and 2)

WSP-02

Harding Lawson Associates

OU2 - Indoor Air Monitoring

- Results (cont.):
 - Exceedances of RSR criteria for 1,1-DCE and vinyl chloride found in rounds 3 and 4 sampling
 - Exceedances of RSR criteria found in most locations sampled in round 3 (exceedances in B-2, B-8, B-12, B-48, B-86)
 - Round 4 results indicate exceedances in B-2, B-12, B-86
 - No exceedances found in either sampling event in upper floors of B-1

WSP-02

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OU2 - Indoor Air Monitoring

■ Risk Assessment

- Screening level risk assessment completed (Rounds 1-3) to assess risks to current workers in buildings
- Risk calculations showed that under current usage, short term exposure (5 years or less) would not cause unacceptable risk to workers

10/99

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OU2 - Indoor Air Monitoring

■ Future Actions:

- Monthly sampling program initiated after Round 3 results received - additional 6 months sampling planned (December 1999 to May 2000)
- During December 1999 meeting with Connecticut Department of Health, DOH concurred with approach for risk assessment and future sampling
- Additional risk assessment to evaluate results planned at end of 6 months of sampling, or sooner if results warrant re-evaluation

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IPM plans to change air flows in B-12 to try to reduce indoor air concs.

Causeway and Dike NCRA

- The Causeway and Dike Non-Time Critical Removal Action (NCRA) contract was issued to Foster Wheeler (Boston, MA) and HLA in late June 1999
- The objectives of the Causeway and Dike NCRA are:
 - Perform field investigations to characterize physical and chemical subsurface conditions on the Causeway and Dike
 - Summarize the results of the field investigations in a Pre-Design Investigation Report
 - Document the decision process for selection of a potential removal process in an EE/CA and a Removal Action Memorandum (RAM)

10/99

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Causeway and Dike Field Investigation

- Geophysical surveys of both areas to assist in characterizing subsurface conditions to evaluate whether to drill or test pit, and to assist in placement of explorations
- Seismic survey performed concurrently with Causeway and Dike investigation
- 15 soil borings and 10 test pits on the Causeway to assess potential subsurface soil contamination; collected 48 samples for chemical analysis

verso

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Causeway and Dike Field Investigation (cont.)

- Installation of 4 monitoring wells at 2 locations on Causeway
- CTDEP collected 8 soil samples for radiological analysis from 7 locations on the Causeway
- Allied Signal collected 4 samples for radiological analysis from 4 locations on the Causeway
- 18 soil borings and 5 hand auger borings on the Dike to assess potential subsurface soil contamination; collected 41 samples for chemical analysis

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Causeway Results

- Fill material on Causeway up to 12 feet thick and comprised of well-graded clean sands to oil-stained sands, wood, metal, cobbles, concrete rubble, etc.; bedrock dips to the north and west (100 to 110 ft)
- Contaminants in Causeway soils exceed CTDEP RSRs and include chlorinated VOCs, fuel-related compounds, PCBs and inorganics
- Asbestos does not exist above trace levels (<1%) in Causeway soils

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Causeway Results (cont.)

- Radiologically elevated soils on present in small, isolated locations on Causeway
- Preliminary Round 2 RI groundwater sampling results indicate groundwater beneath Causeway is not contaminated above CTDEP SWPC RSR

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Dike Results

- Dike material is clean sand and gravel with cobbles
- Asbestos does not exist above trace levels (<1%) in Dike soils
- PCBs detected in one boring (DB-99-08) on Dike

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Dike Results (cont.)

- VOC, SVOC, and inorganic concentrations exceed DEC and PMC RSR criteria at 3 hand auger locations on the Dike (HA-99-03, HA-99-07, and HA-99-08)
- With the exception of these sample locations, the soils comprising the remainder of the Dike do not contain chemical concentrations greater than CTDEP RSRs

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Causeway and Dike EE/CA

■ **Purpose and Scope:**

- Identify removal action objectives
- Evaluate removal action alternatives
- Select a proposed remedy

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Causeway and Dike EE/CA

■ **Proposed Alternatives**

- Capping with hydraulic barrier
- Capping with composite cover system
- Excavation and off-site disposal
- No action alternative

HR02

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*Fill cover only (dependence
VOC, SVOC
leachability
- would need to
analyze for
SPLP/ICLP)*

Causeway and Dike EE/CA

■ **Schedule**

- Submit Draft EE/CA for regulatory agency review (February 2000)
- Submit Final EE/CA for Public Comment Period (March 2000)
- Submit Removal Action Memorandum (April 2000)

HR02

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Community Relations Support

- 3rd Newsletter issued December 1999
- 4th Newsletter scheduled for issue in April 2000

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BRAC Cleanup Plan

- Draft Version 2 of BRAC Cleanup Plan issued in Fall of 1999
- Awaiting regulatory agency comments to finalize Version 2

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Geographic Information System (GIS)

- **Current Status**
 - Historical aerial photos and utilities incorporated into ArcView system
 - Database updated to contain: 1) RI soil, Round 1 groundwater, surface water, and sediment data; 2) OU2 groundwater and soil gas data; 3) Causeway data
 - Prototype ArcView system queries against CTDEP RSRs have been developed

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Geographic Information System (GIS)

■ Demonstration

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Geographic Information System (GIS)

■ Coming Attractions:

- New geologic cross-sections (OU2), groundwater contour, and depth to bedrock maps
- Building information (# floors, square feet, etc.)
- Sediment, surface water, and soil gas queries against CTDEP RSRs
- Contour maps of chemical data (user-specified depth intervals)

version

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Geographic Information System (GIS)

■ Coming Attractions (continued):

- Calculation of volumes of an area (user-defined depth interval)
- Presentation proposed for full-scale public demonstration in April 2000

version

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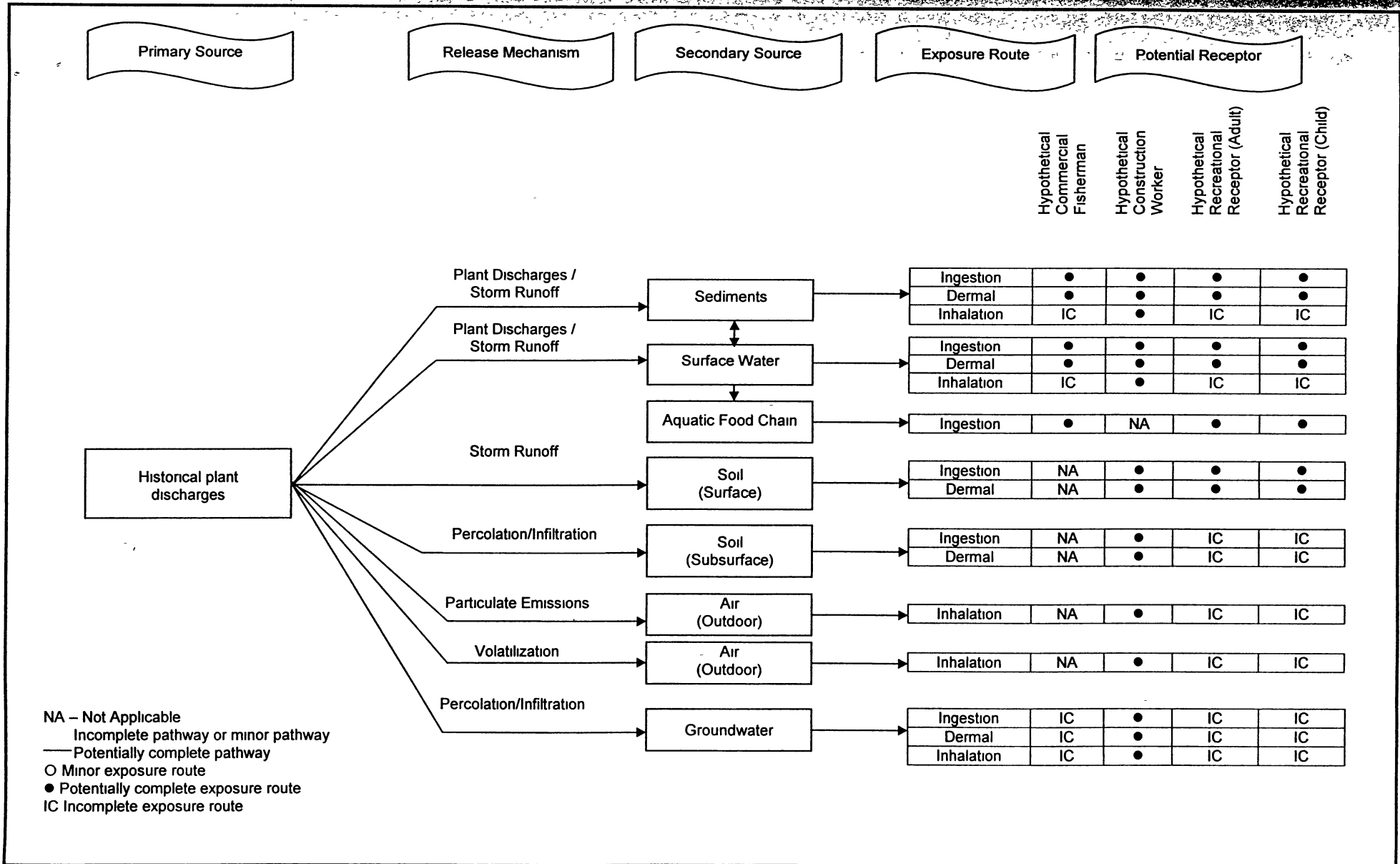


FIGURE 3-1
SITE CONCEPTUAL EXPOSURE MODEL – STRATFORD ARMY ENGINE PLANT
STRATFORD, CONNECTICUT

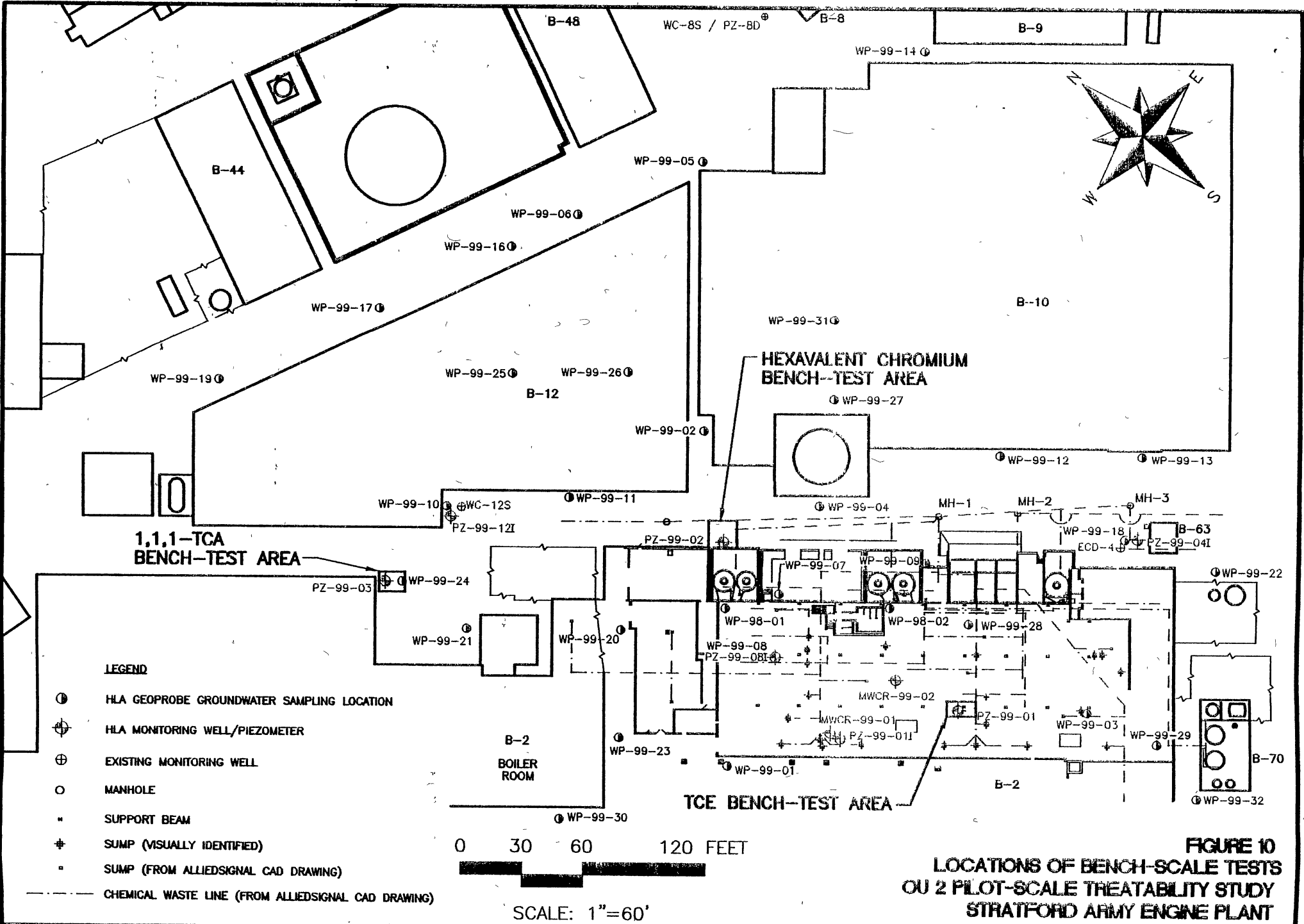
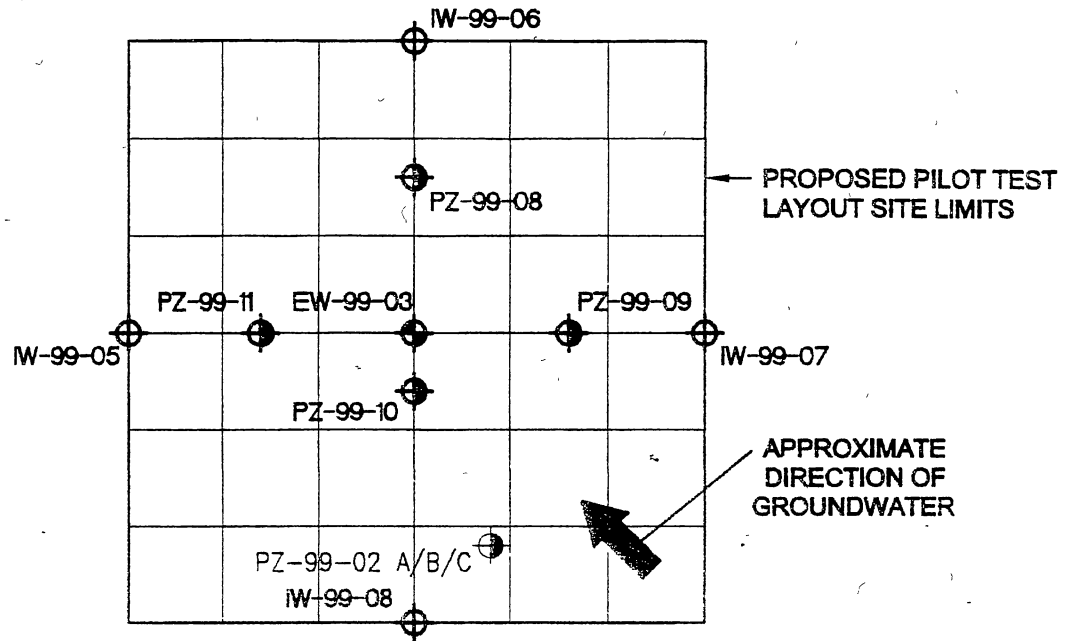
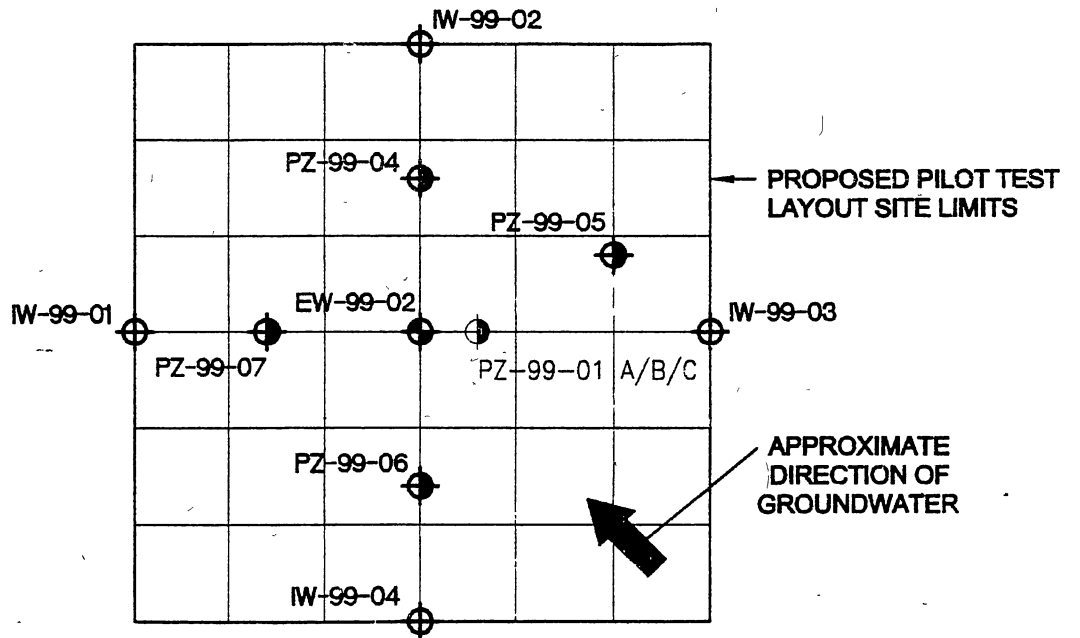
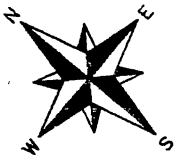


FIGURE 10
LOCATIONS OF BENCH-SCALE TESTS
OU 2 PILOT-SCALE TREATABILITY STUDY
STRATFORD ARMY ENGINE PLANT



HEXAVALENT CHROMIUM TEST AREA



TCE TEST AREA

LEGEND

- PZ-99-06 ● PROPOSED PIEZOMETER
- IW-99-03 ⊕ PROPOSED INJECTION WELL
- EW-99-03 ● PROPOSED EXTRACTION WELL
- PZ-99-01 ● EXISTING PIEZOMETER

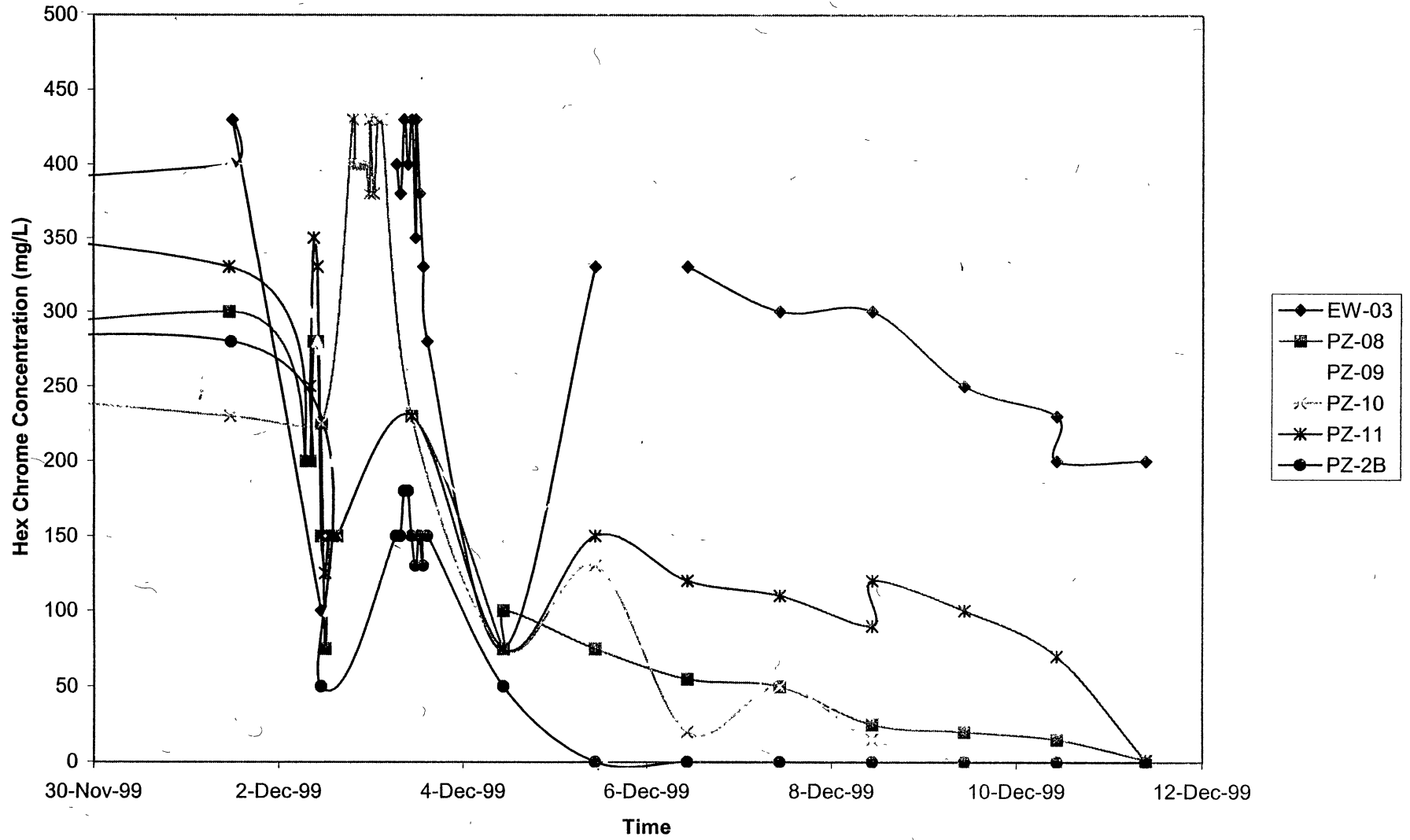
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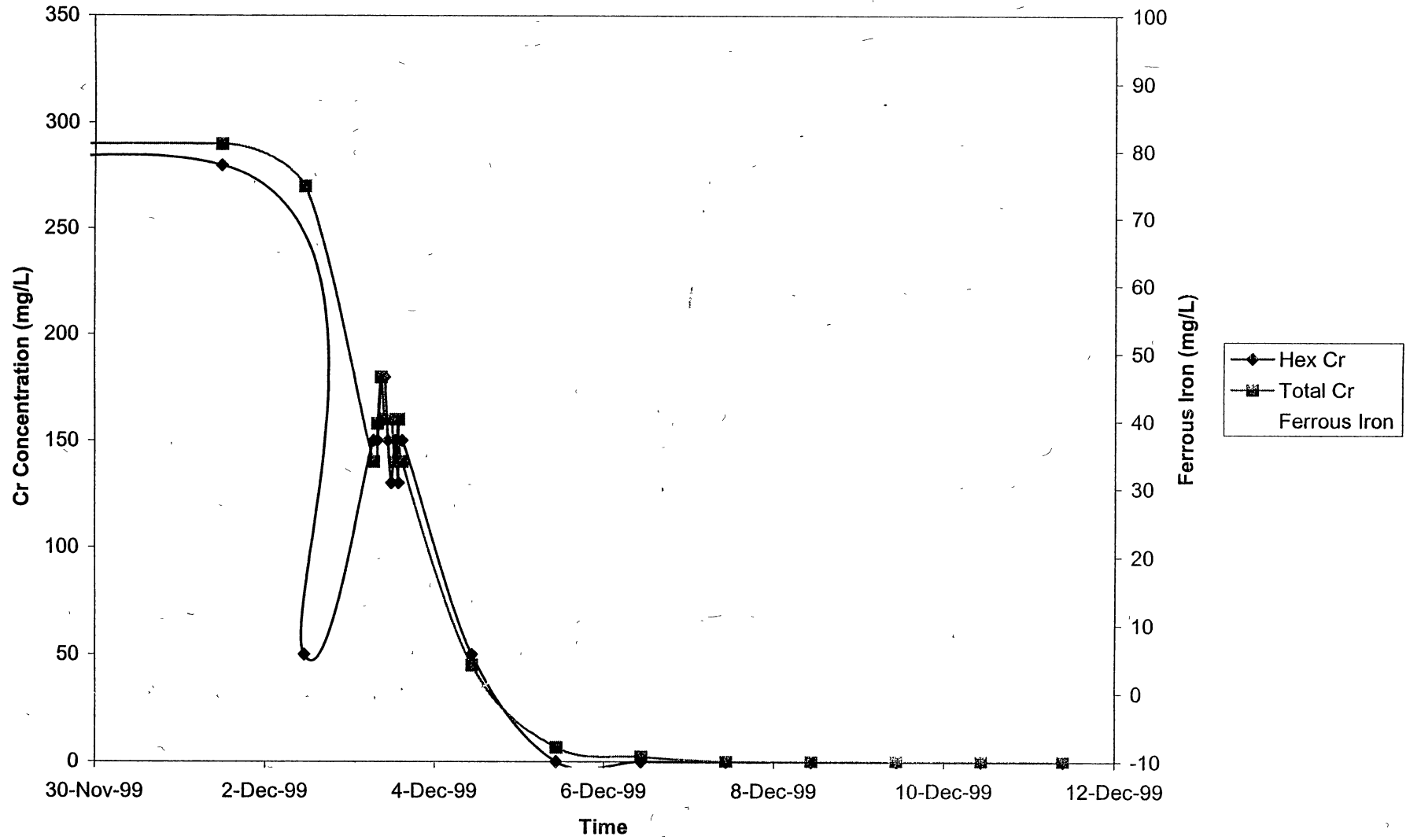
SCALE: 1"=10'

FIGURE 12
CHROMIUM PLATING FACILITY
PROPOSED PILOT TEST LAYOUTS
OU2 PILOT-SCALE TREATABILITY STUDY
STRATFORD ARMY ENGINE PLANT

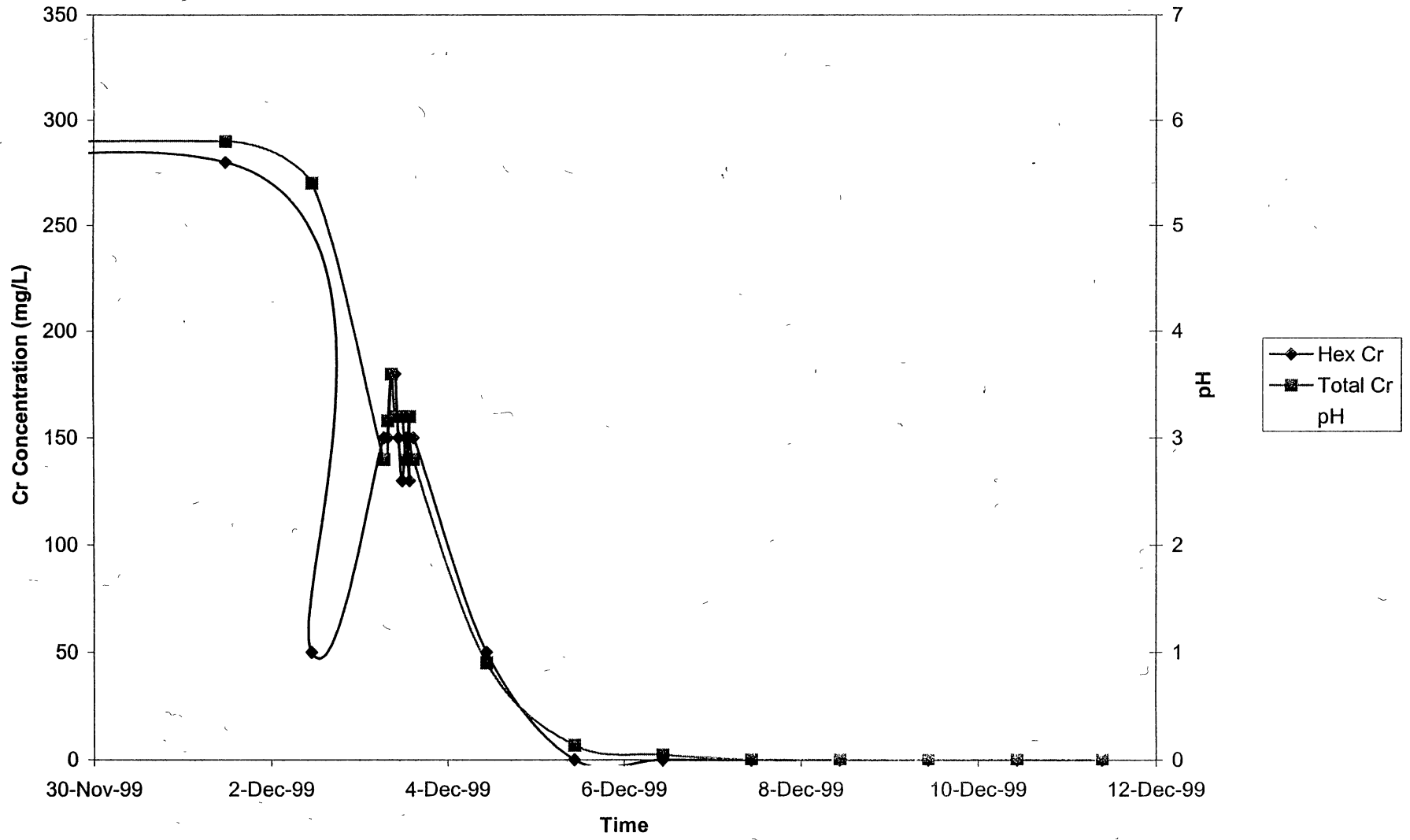
Hexavalent Chrome Area



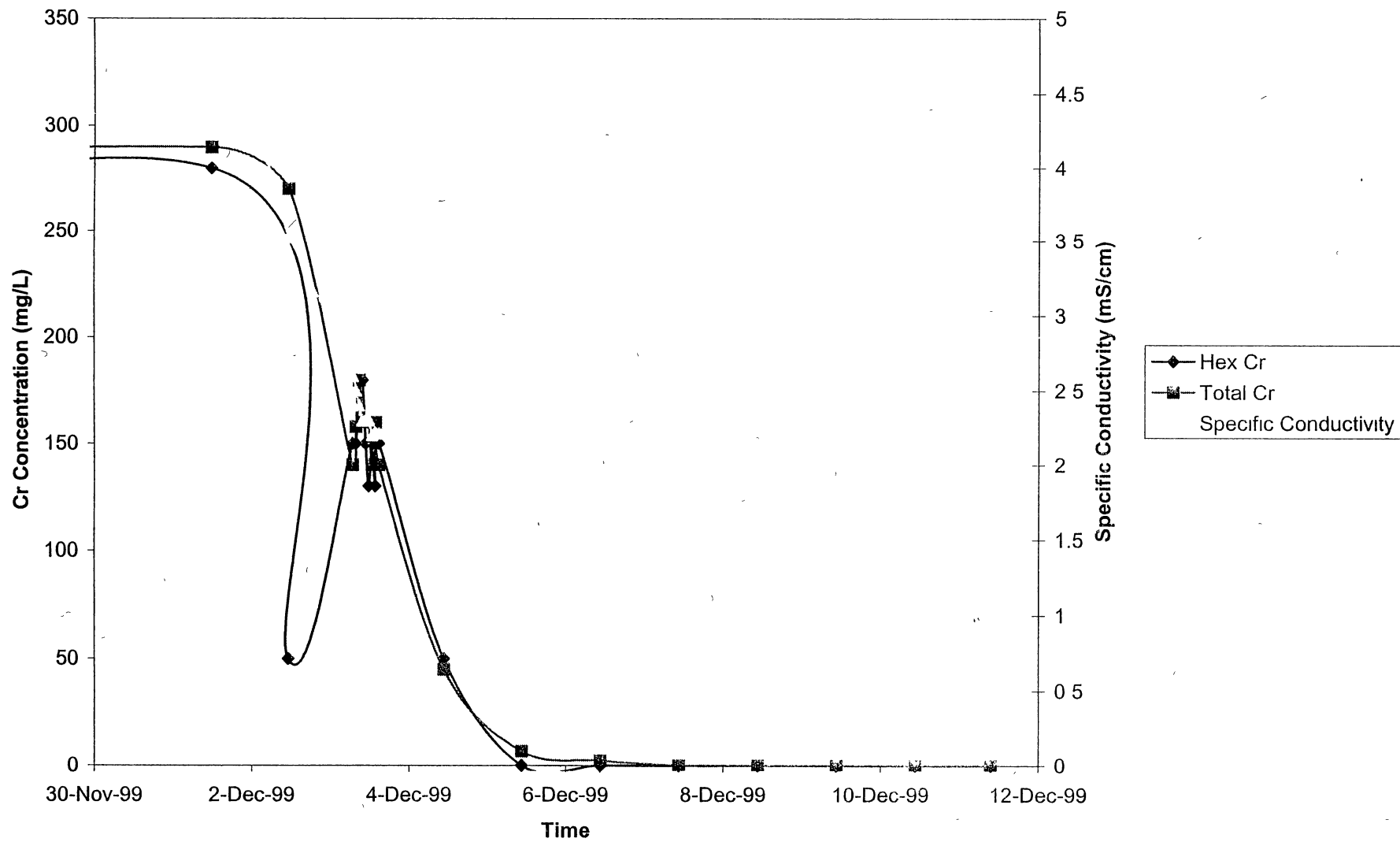
PZ-2B



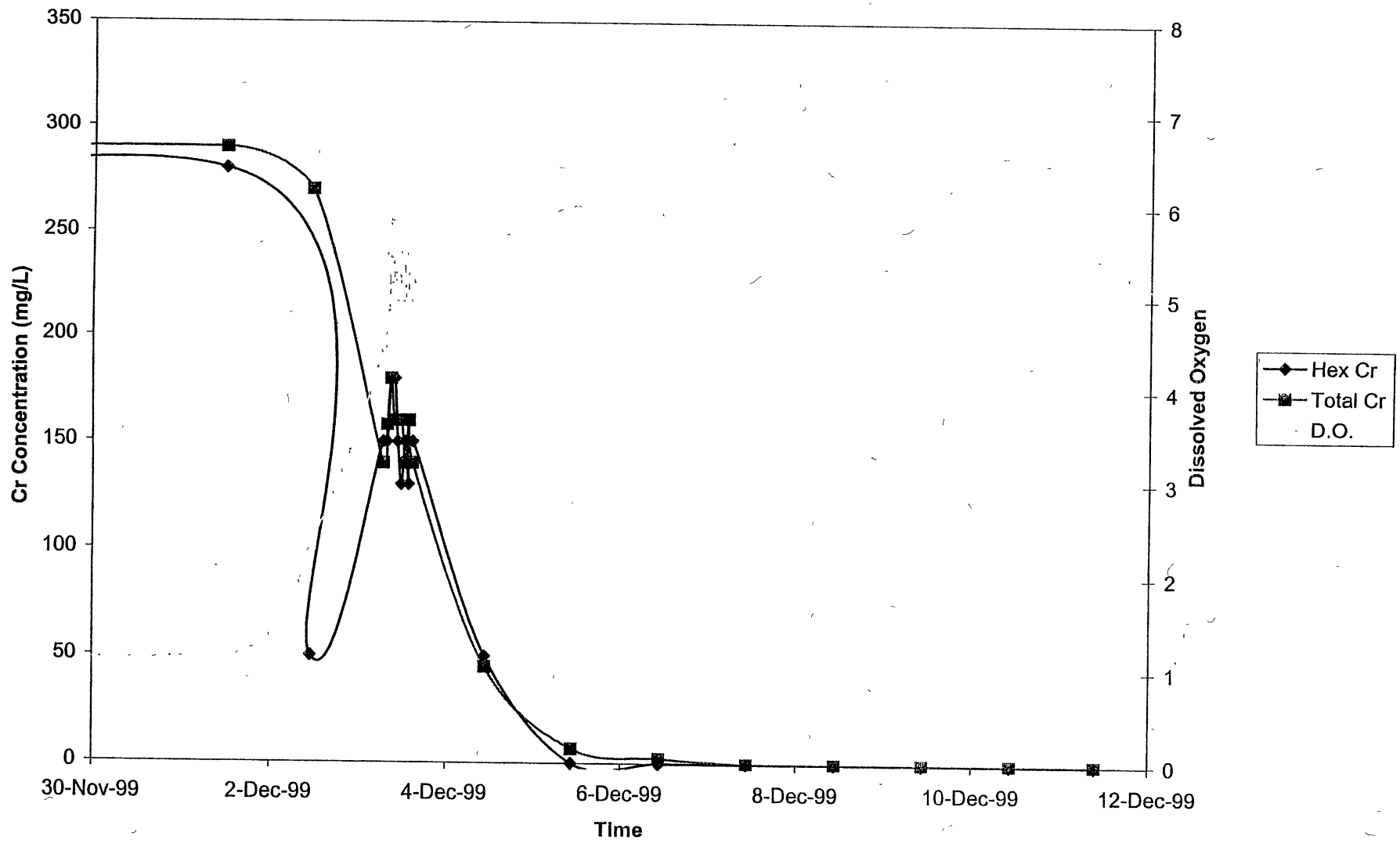
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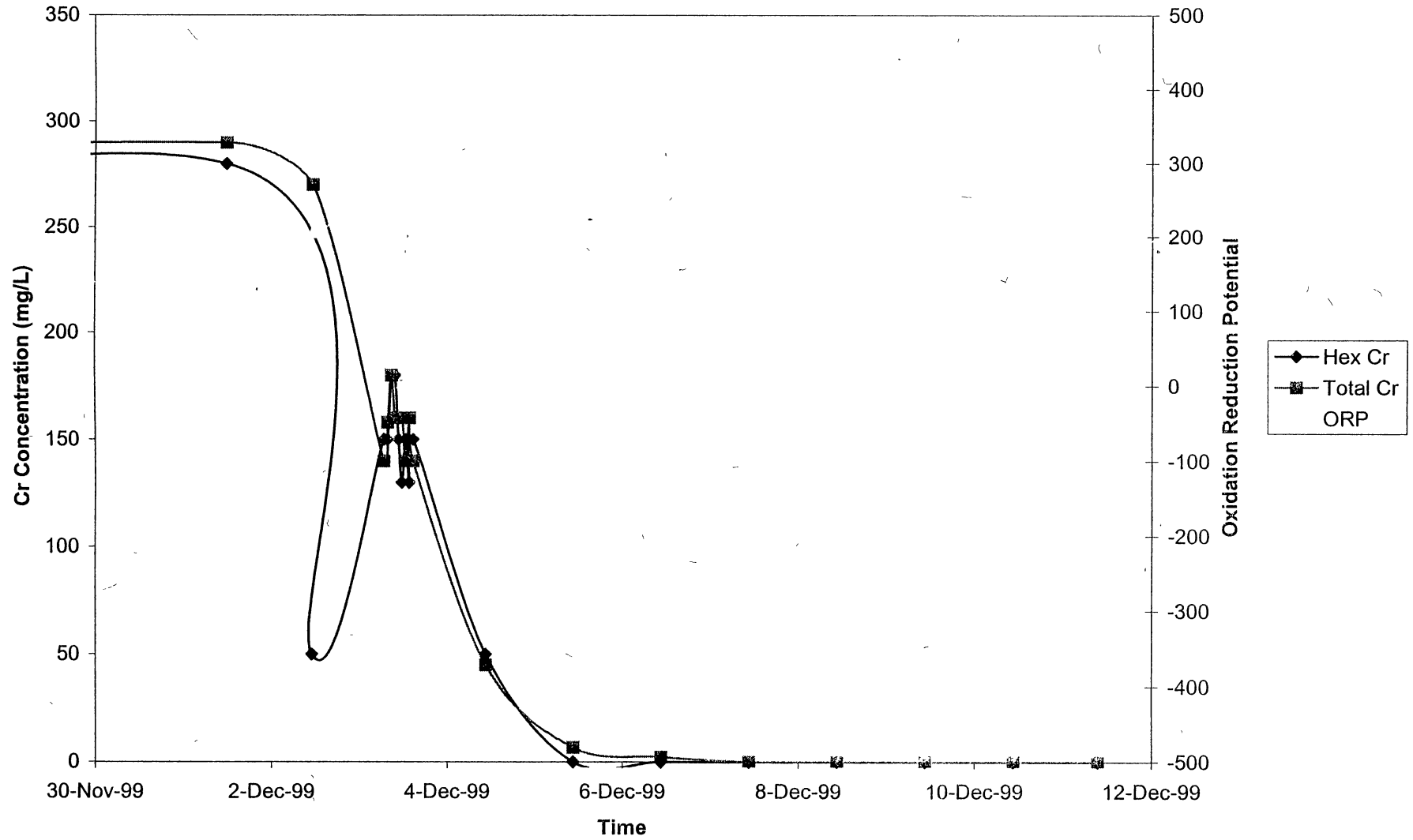
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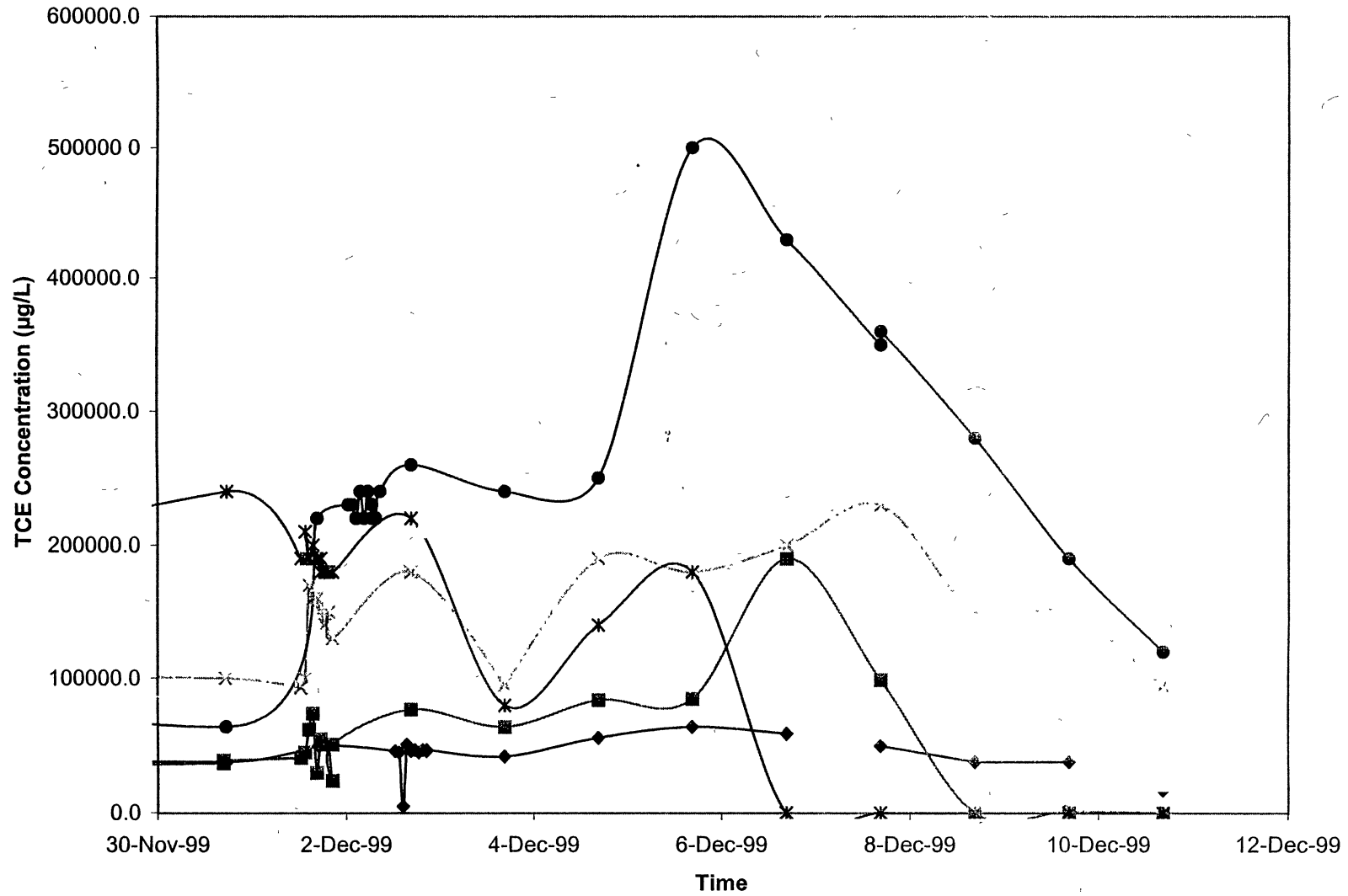
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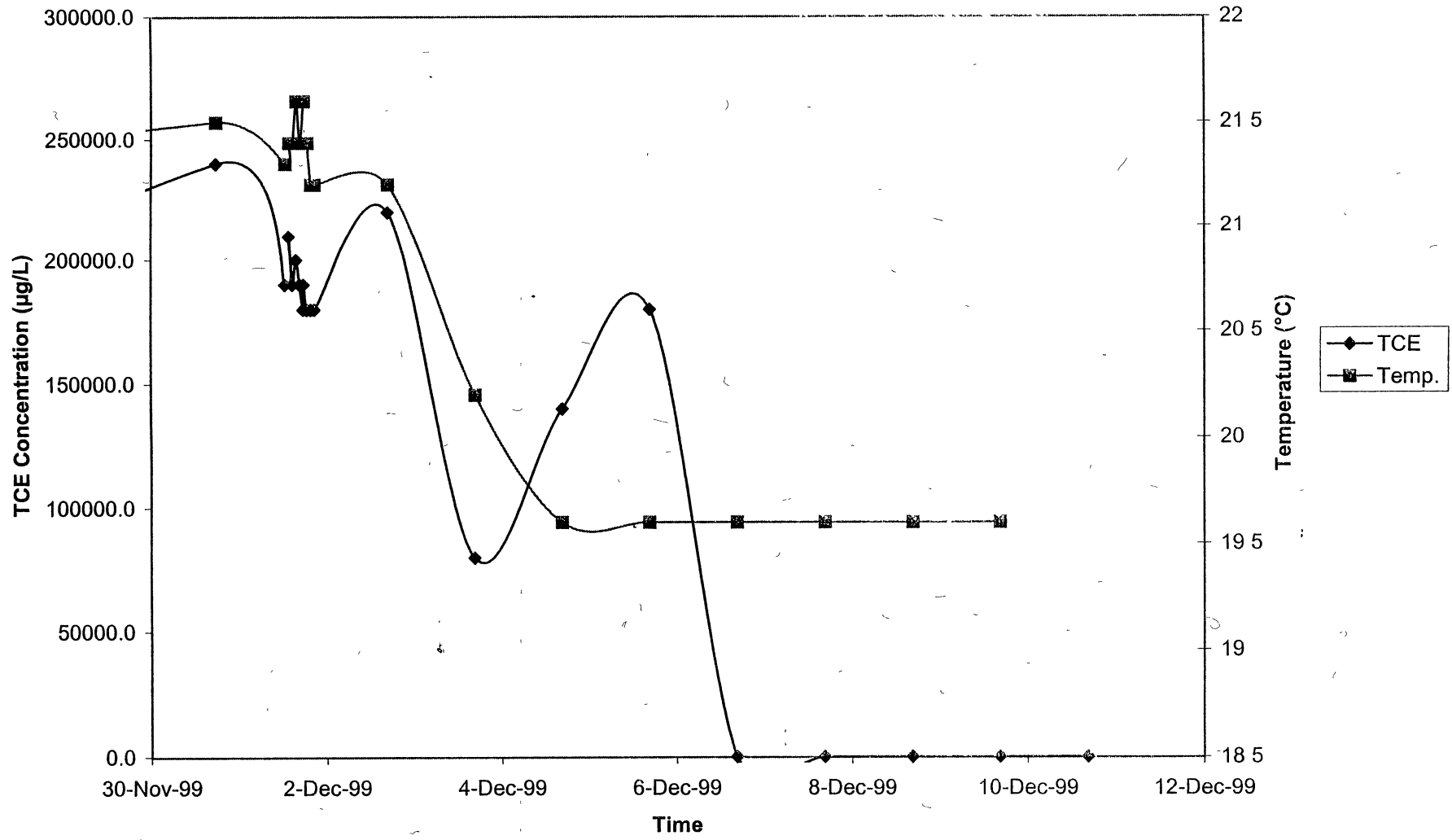
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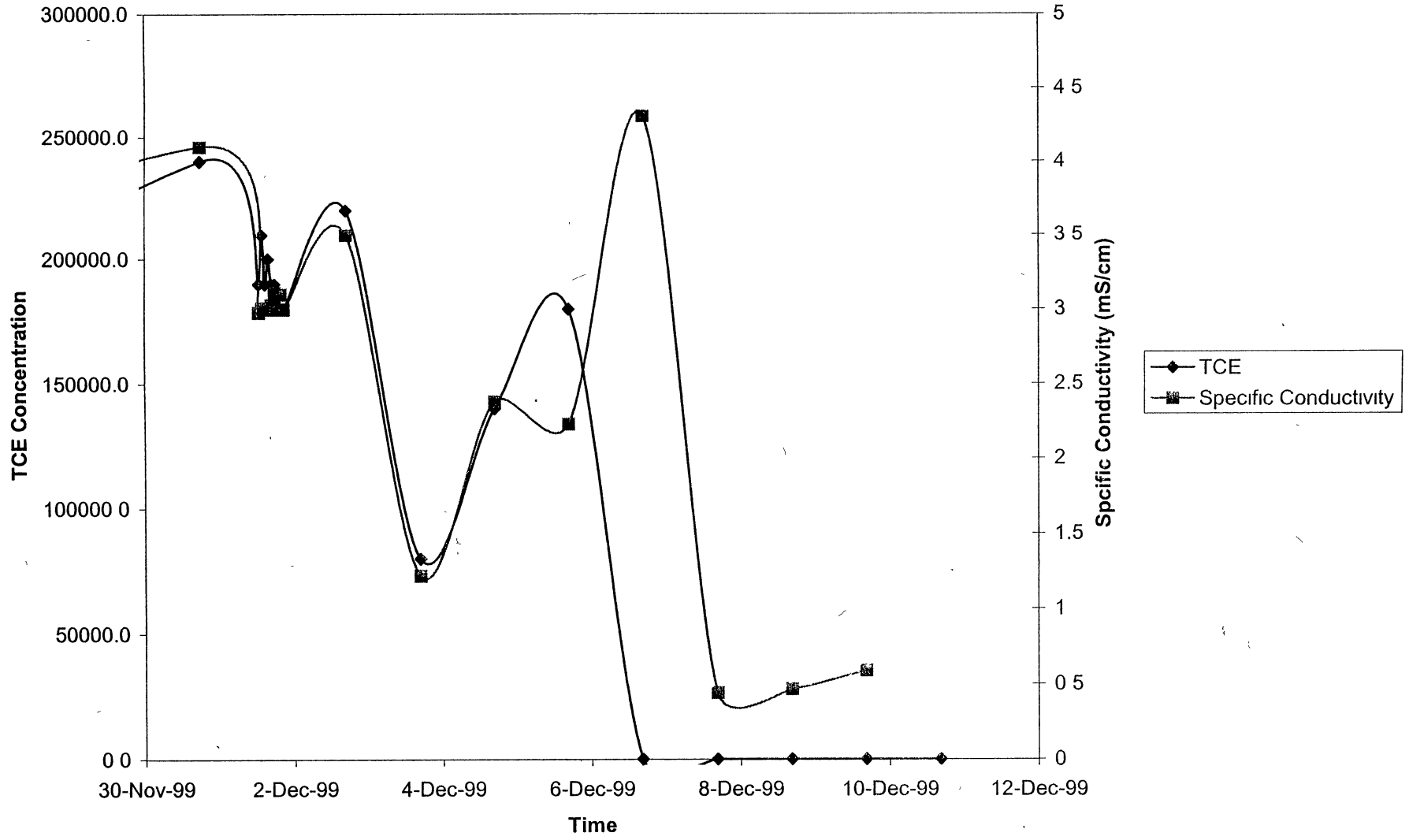
TCE Area



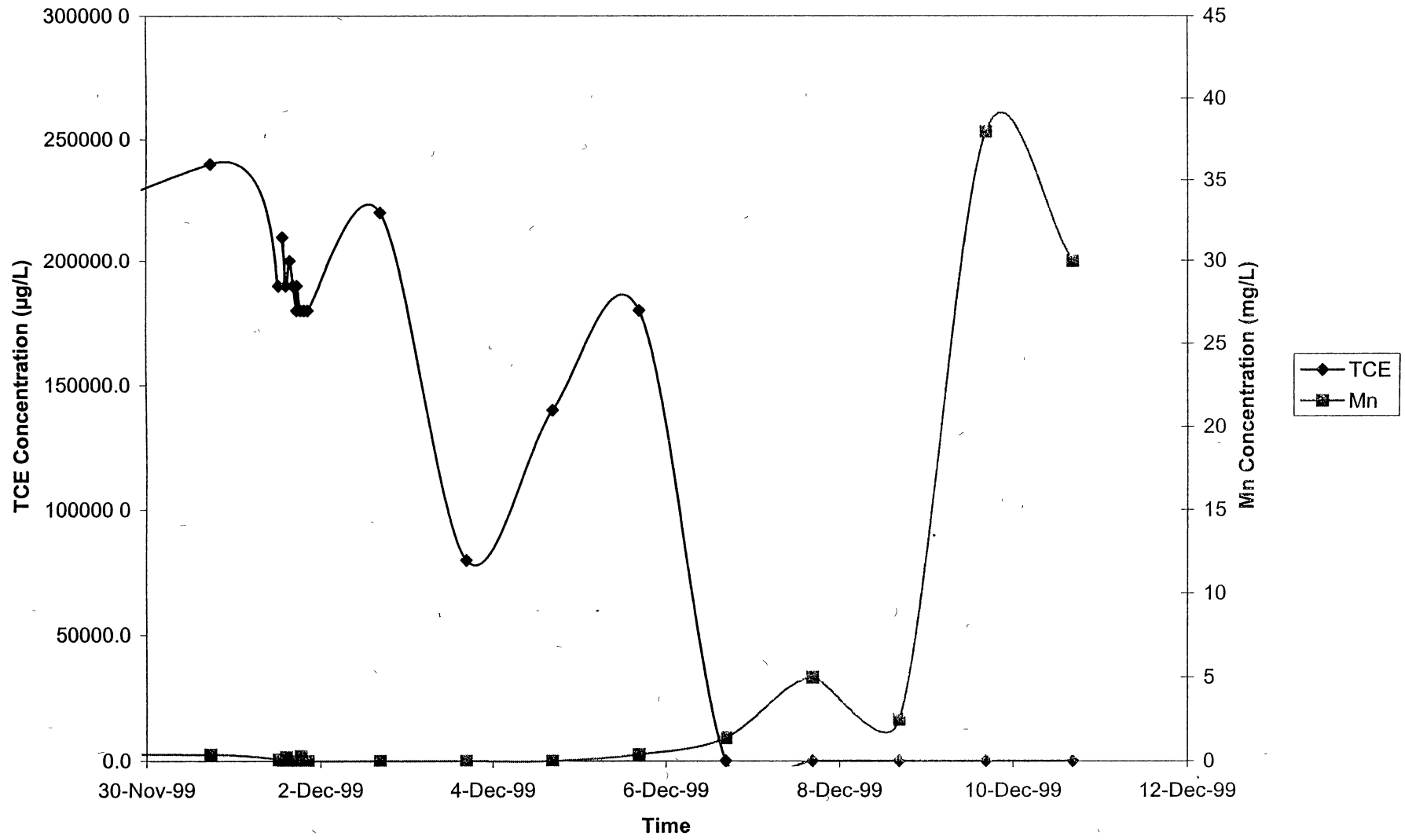
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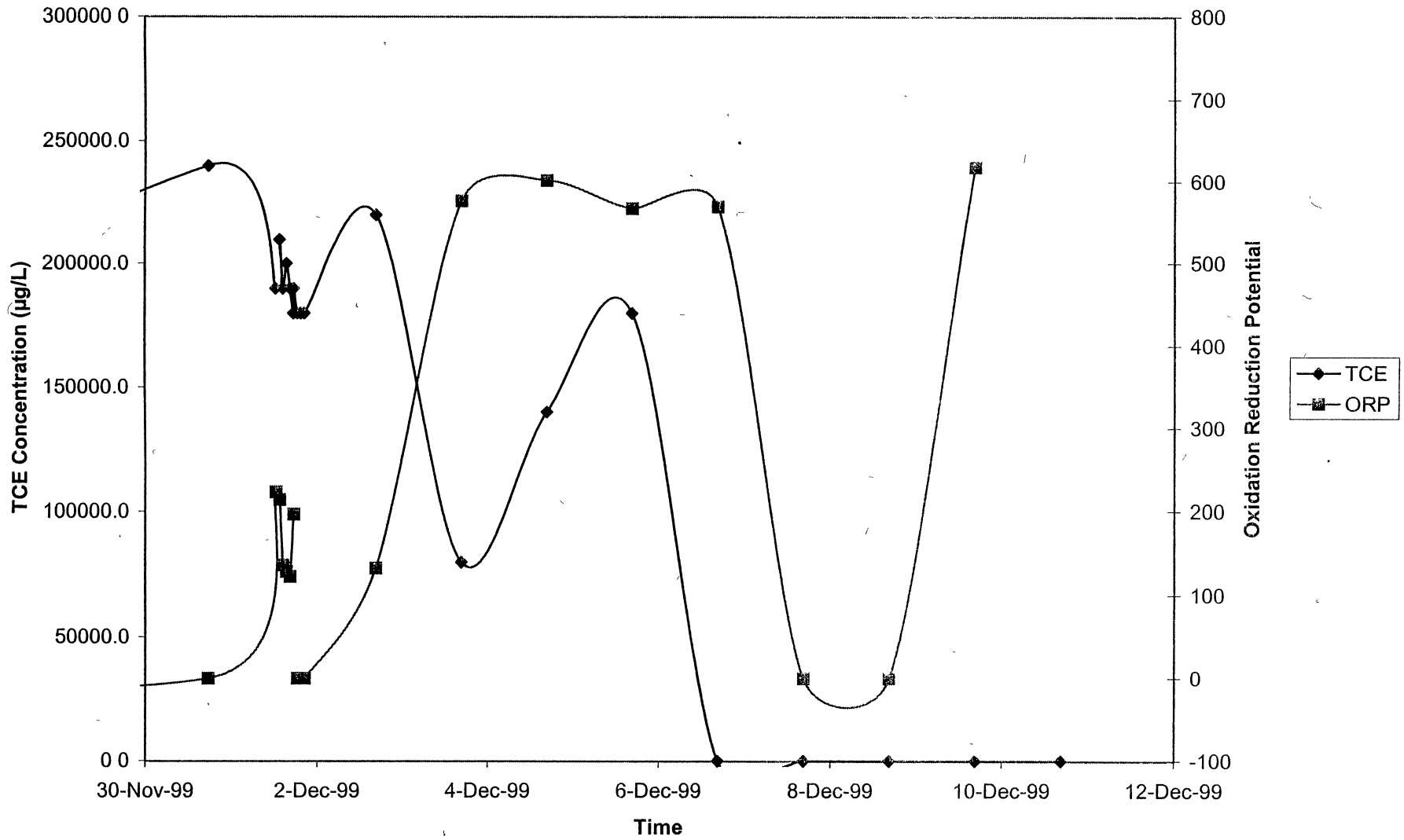
PZ-07



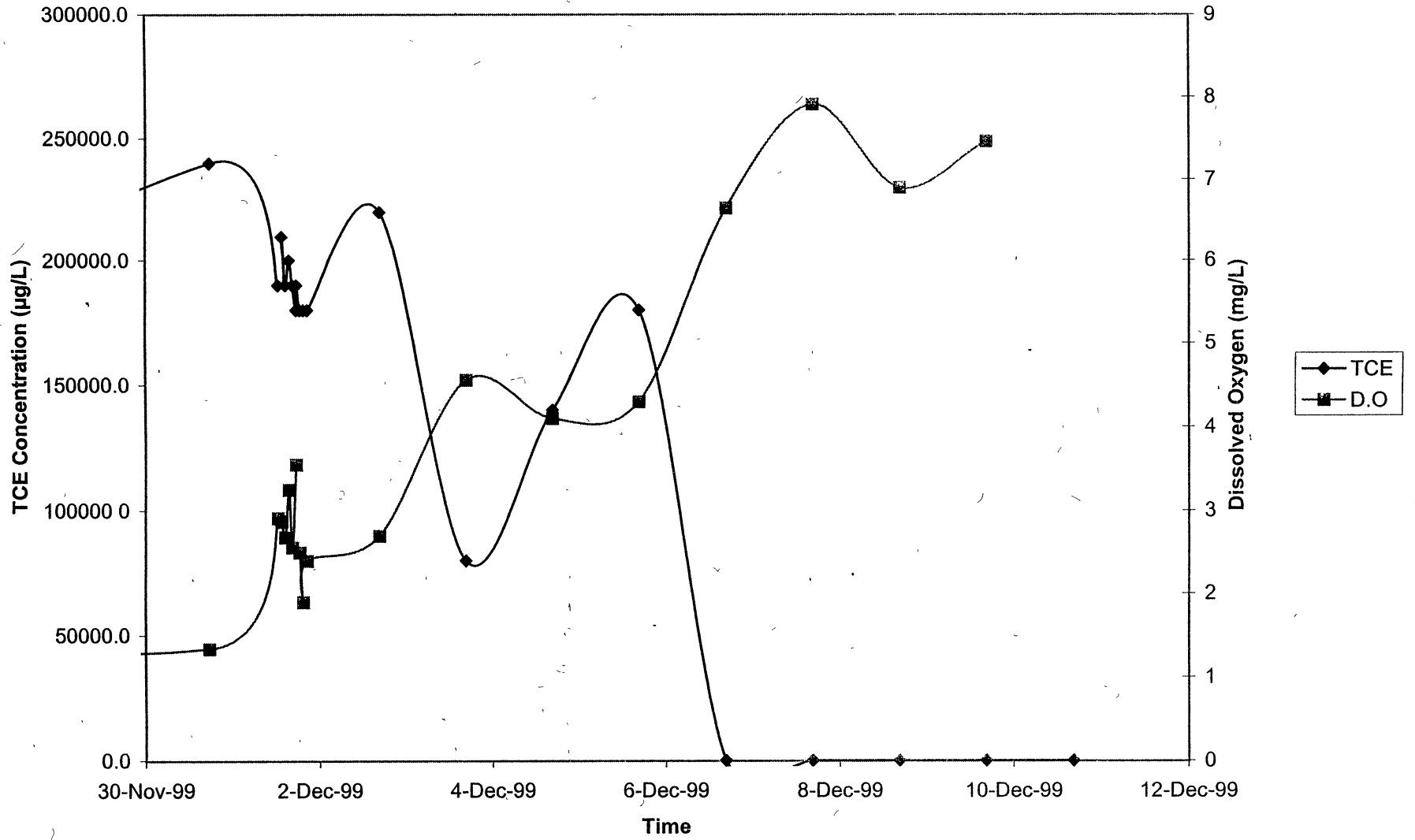
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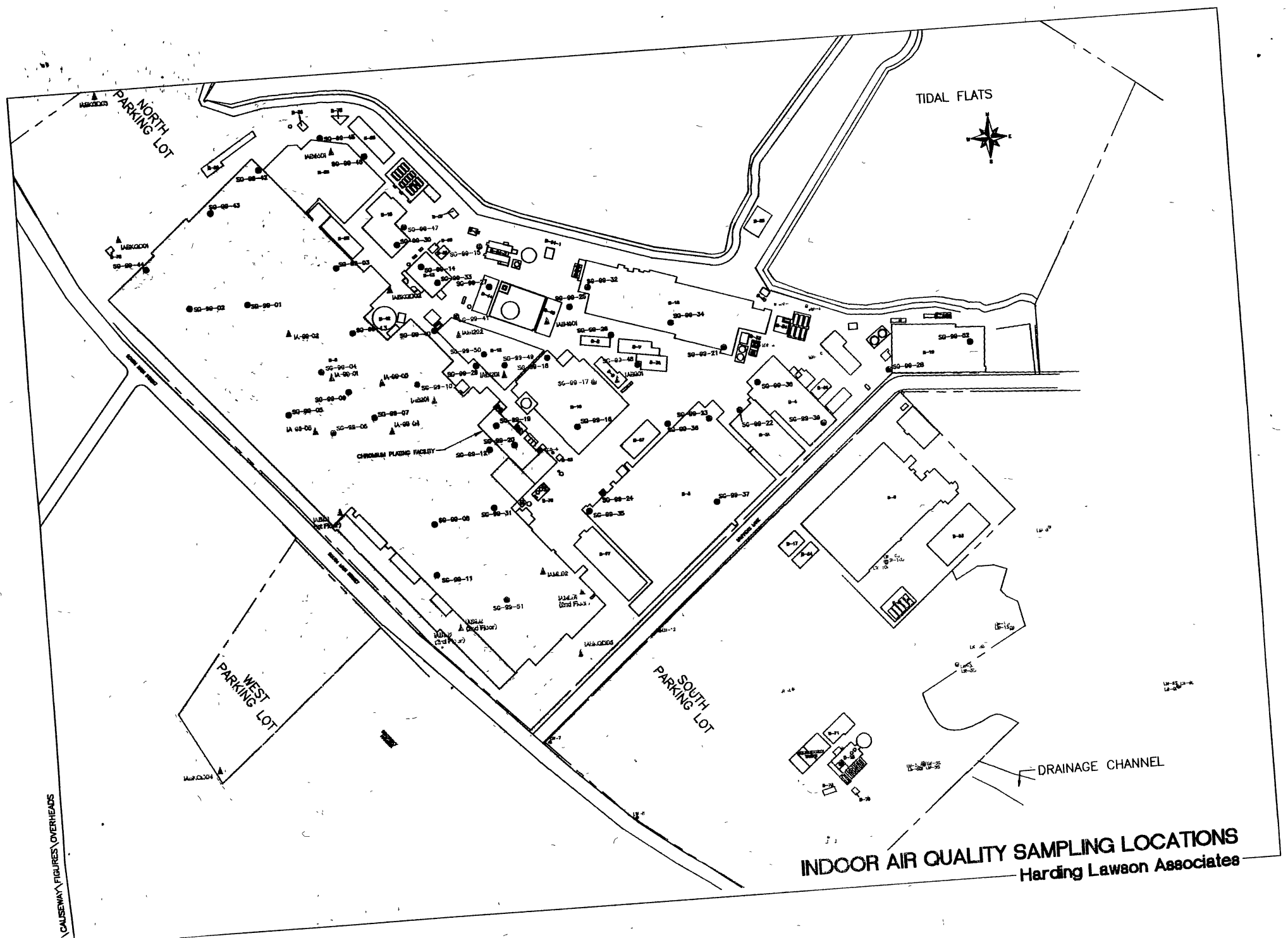


PZ-07



PZ-07





CAUSEWAY FIGURES OVERHEADS

INDOOR AIR QUALITY SAMPLING LOCATIONS
 Harding Lawson Associates

ROUND 1
INDOOR AIR QUALITY SAMPLING ANALYTICAL RESULTS
STRATFORD ARMY ENGINE PLANT

SITE ID: IA-99-01		IA-99-01	IA-99-02	IA-99-03	IA-99-04	IA-99-05	
SAMPLE ID: GL0054		0090	92062	802	0071	93208	
DATE SAMPLED: 9/2/99		9/2/99	9/2/99	9/2/99	9/2/99	9/2/99	
		DUPLICATE					
Compound	RSR*	ppbv	ppbv	ppbv	ppbv	ppbv	
Vinyl chloride	0.019	0.016	0.99	0.024 U	0.025	0.025 U	0.036
1,1-Dichloroethen	0.02	0.18	0.23	0.15	0.72	0.18	0.14
1,1,1-Trichloroeth	266	0.25	1.0	1.1	1.8	1.1	1.0
Trichloroethene	0.92	7.8	8.1	8.2	8.2	11.0	10.0
Tetrachloroethene	1.61	0.25	0.31	0.31 U	0.91	1.10	0.46 U

SITE ID: IABKGD01		IABKGD02
SAMPLE ID: 9707-B		12442
DATE SAMPLED: 9/2/99		9/2/99
Compound	RSR*	ppbv
Vinyl chloride	0.019	0.15 U
1,1-Dichloroethen	0.02	0.19 U
1,1,1-Trichloroeth	266	2.1 U
Trichloroethene	0.92	4.3
Tetrachloroethene	1.61	1.90 U

Shaded values indicate exceedance of RSR

RSR = CTDEP Remediation Standard
 Regulation (RSR) for Industrial/Commercial

U - Not Detected at a concentration
 above the detection limit

ROUND 2
INDOOR AIR QUALITY SAMPLING ANALYTICAL RESULTS
STRATFORD ARMY ENGINE PLANT

SITE ID: IA-99-01		IA-99-02	IA-99-03	IA-99-04	IA-99-05	IA-99-05	
SAMPLE ID: GL0054		92062	802	0071	93208	0090	
DATE SAMPLED: 9/21/99		9/21/99	9/21/99	9/21/99	9/21/99	9/21/99	
Compound	RSR*	ppbv	ppbv	ppbv	ppbv	ppbv	
Vinyl chloride	0.019	0.043	0.023	0.048	0.063	0.063	0.066
1,1-Dichloroethen	0.02	0.32	0.24	0.29	0.30	0.26	0.63
1,1,1-Trichloroeth	266	2.10	1.8	2.1	2.5	2.0	2.4
Trichloroethene	0.92	1.8	1.7	1.8	2.0	1.7	2.0
Tetrachloroethene	1.61	0.33	0.22	0.36	0.41	0.35	0.43

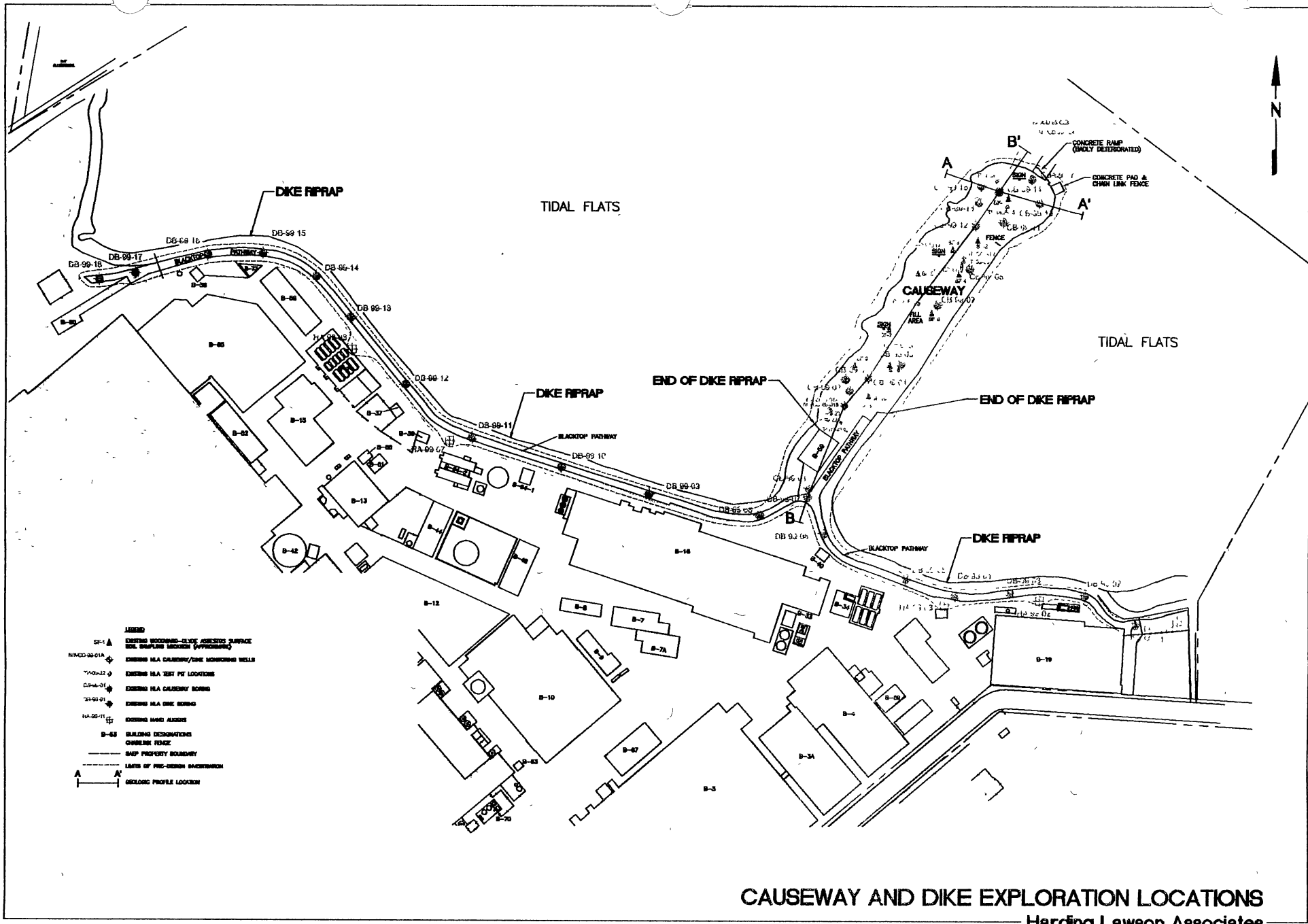
SITE ID: IABKGD03		IABKGD02
SAMPLE ID: 9707-B		12442
DATE SAMPLED: 9/21/99		9/21/99
Compound	RSR*	ppbv
Vinyl chloride	0.019	0.018
1,1-Dichloroethen	0.02	0.01 U
1,1,1-Trichloroeth	266	0.14
Trichloroethene	0.92	0.29
Tetrachloroethene	1.61	0.33

Shaded values indicate exceedance of RSR

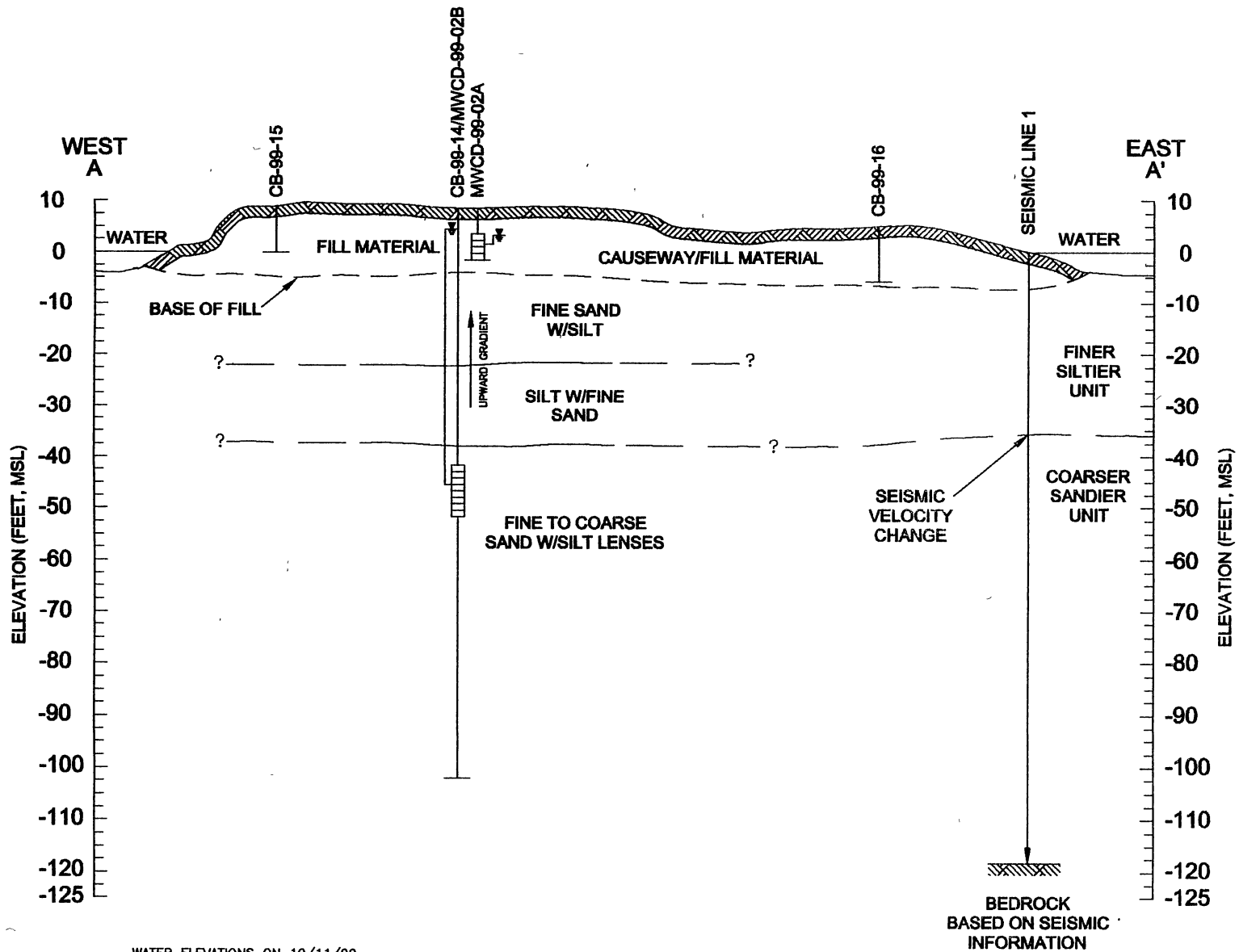
RSR = CTDEP Remediation Standard
 Regulation (RSR) for Industrial/Commercial

U - Not Detected at a concentration
 above the detection limit

C:\Causeway\Figures\Overheads



CAUSEWAY AND DIKE EXPLORATION LOCATIONS
 Harding Lawson Associates



WATER ELEVATIONS ON 10/11/99

LOCATION	WATER DEPTH BELOW RISER	RISER ELEVATION	WATER ELEVATION
MWCD-99-02A	8.92'	10.47'	3.55'
MWCD-99-02B	5.00'	10.33'	5.33'

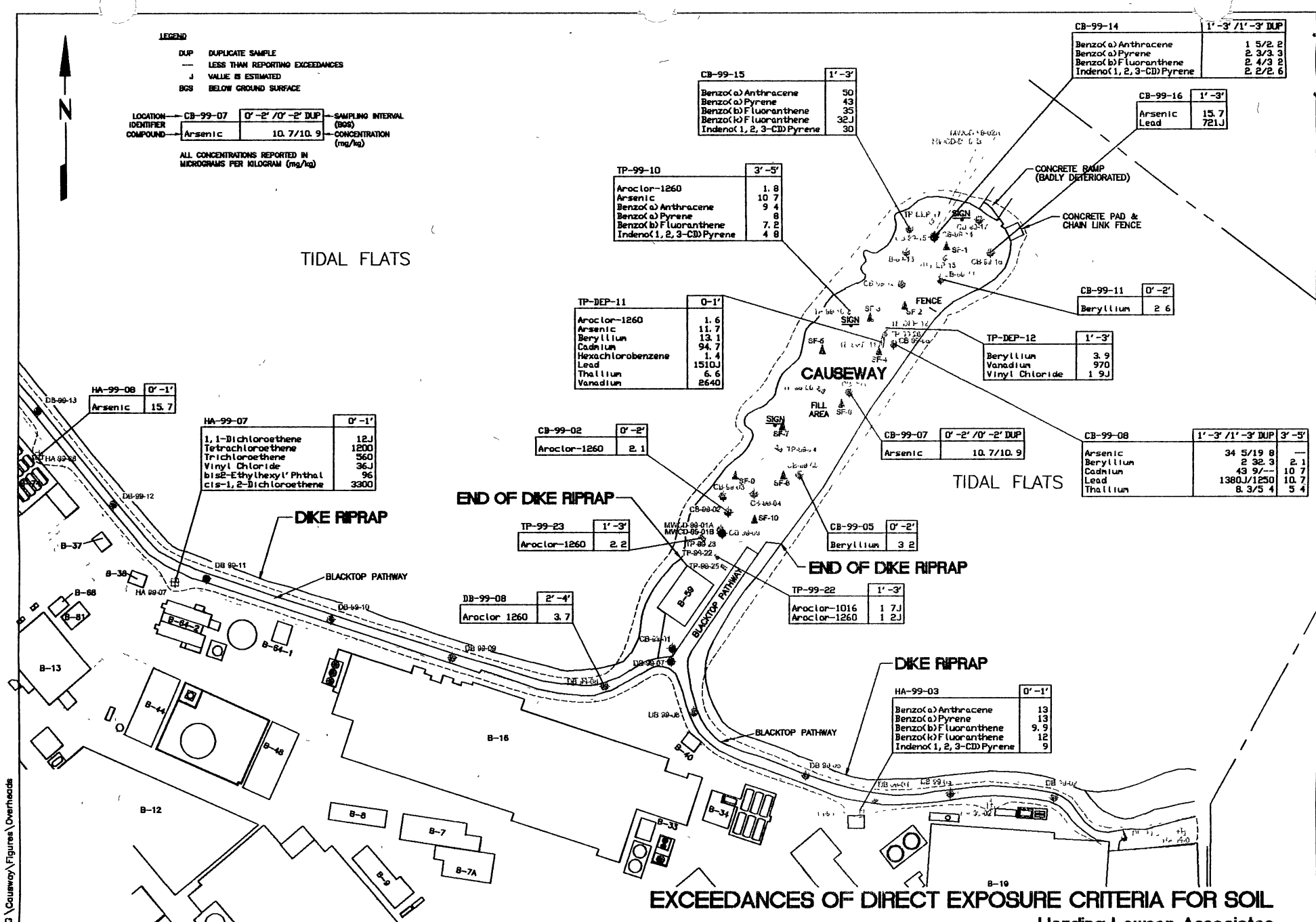
INTERPRETIVE GEOLOGIC PROFILE CROSS-SECTION A-A'
Harding Lawson Associates

LEGEND

- DUP DUPLICATE SAMPLE
- LESS THAN REPORTING EXCEEDANCES
- J VALUE IS ESTIMATED
- BGS BELOW GROUND SURFACE

LOCATION IDENTIFIER	CB-99-07	0'-2' / 0'-2' DUP	SAMPLING INTERVAL (BGS)
COMPOUND	Arsenic	10.7/10.9	CONCENTRATION (mg/kg)

ALL CONCENTRATIONS REPORTED IN MICROGRAMS PER KILOGRAM (mg/kg)



CB-99-15	1'-3'
Benzo(a) Anthracene	50
Benzo(a) Pyrene	43
Benzo(b) Fluoranthene	35
Benzo(k) Fluoranthene	32.1
Indeno(1,2,3-CD) Pyrene	30

CB-99-14	1'-3' / 1'-3' DUP
Benzo(a) Anthracene	1 5/2 2
Benzo(a) Pyrene	2 3/3 3
Benzo(b) Fluoranthene	2 4/3 2
Indeno(1,2,3-CD) Pyrene	2 2/2 6

CB-99-16	1'-3'
Arsenic	15.7
Lead	721J

TP-99-10	3'-5'
Aroclor-1260	1.8
Arsenic	10.7
Benzo(a) Anthracene	9.4
Benzo(a) Pyrene	8
Benzo(b) Fluoranthene	7.2
Indeno(1,2,3-CD) Pyrene	4.8

TP-DEP-11	0'-1'
Aroclor-1260	1.6
Arsenic	11.7
Beryllium	13.1
Cadmium	94.7
Hexachlorobenzene	1.4
Lead	1510J
Thallium	6.6
Vanadium	2640

CB-99-11	0'-2'
Beryllium	2.6

TP-DEP-12	1'-3'
Beryllium	3.9
Vanadium	970
Vinyl Chloride	1.9J

HA-99-08	0'-1'
Arsenic	15.7

HA-99-07	0'-1'
1,1-Dichloroethene	12J
Tetrachloroethene	1200
Trichloroethene	560
Vinyl Chloride	96
bis(2-Ethylhexyl) Phthalate	96
cis-1,2-Dichloroethene	3300

CB-99-02	0'-2'
Aroclor-1260	2.1

CB-99-07	0'-2' / 0'-2' DUP
Arsenic	10.7/10.9

CB-99-08	1'-3' / 1'-3' DUP	3'-5'
Arsenic	34 5/19 8	---
Beryllium	2 32.3	2.1
Cadmium	43 9/--	10.7
Lead	1380J/1250	10.7
Thallium	8 3/5 4	5.4

TP-99-23	1'-3'
Aroclor-1260	2.2

CB-99-05	0'-2'
Beryllium	3.2

DB-99-08	2'-4'
Aroclor 1260	3.7

TP-99-22	1'-3'
Aroclor-1016	1.7J
Aroclor-1260	1.2J

HA-99-03	0'-1'
Benzo(a) Anthracene	13
Benzo(a) Pyrene	13
Benzo(b) Fluoranthene	9.9
Benzo(k) Fluoranthene	12
Indeno(1,2,3-CD) Pyrene	9

EXCEEDANCES OF DIRECT EXPOSURE CRITERIA FOR SOIL
Harding Lawson Associates

LEGEND

- DUP DUPLICATE SAMPLE
- LESS THAN REPORTING EXCEEDANCES
- J VALUE IS ESTIMATED
- BGS BELOW GROUND SURFACE

LOCATION IDENTIFIER	CB-99-07	0'-2' / 0'-2' DUP	SAMPLING INTERVAL (BGS)
COMPOUND	Arsenic	10.7 / 10.9	CONCENTRATION (mg/kg)

ALL CONCENTRATIONS REPORTED IN MICROGRAMS PER KILOGRAM (mg/kg) EXCEPT FOR VANADIUM WHICH IS REPORTED IN MICROGRAMS PER LITER (mg/L)

TIDAL FLATS

TIDAL FLATS

HA-99-07	0'-1'
1,1,1-Trichloroethane	340
1,1-Dichloroethane	120J
1,1-Dichloroethene	12J
2-Methylnaphthalene	25
Benzene	3.8J
Tetrachloroethene	1200
Toluene	180J
Trichloroethene	360
Vinyl Chloride	35J
Xylene (total)	85J
bis(2-Ethylhexyl)Phthalate	9.6
cis-1,2-Dichloroethene	3300

CB-99-03	2'-4' / 2'-4' DUP	4'-6'
2-Methylnaphthalene	—	45
Methylene Chloride	1J/3	3J
Vanadium	—	5.92

CB-99-02	5'-7'	5'-7'
Methylene Chloride	2.6J	81
Tetrachloroethene	2.4J	4.3J
cis-1,2-Dichloroethene	—	100

CB-99-04	0'-2'	5'-7'
Tetrachloroethene	—	2.7J
Trichloroethene	3.4J	1.2J
Vinyl Chloride	—	24
cis-1,2-Dichloroethene	—	120

TP-99-06	6'-8'
Trichloroethene	1.2J

TP-99-10	3'-5'
Benzo(a)Anthracene	9.4
Benzo(a)Pyrene	8
Benzo(b)Fluoranthene	7.2
Benzo(k)Fluoranthene	7.2
Carbazole	1.6
Chrysene	9.2
Indeno(1,2,3-CD)Pyrene	4.8
Tetrachloroethene	2.1J
Trichloroethene	2.3J

CB-99-13	7'-9' / 7'-9' DUP
Tetrachloroethene	37/28

CB-99-15	1'-3'	7'-9'
Acenaphthene	—	190
Anthracene	—	520J
Benzo(a)Anthracene	50	1200J
Benzo(a)Pyrene	43	880J
Benzo(b)Fluoranthene	35	940J
Benzo(k)Fluoranthene	32J	880J
Carbazole	6.9	310
Chrysene	46	1,200
Dibenzofuran	6.9	130
Fluoranthene	120	2700
Fluorene	—	250J
Indeno(1,2,3-CD)Pyrene	30	350
Naphthalene	—	97J
Phenanthrene	100	2400
Pyrene	93	1800J

CB-99-14	1'-3' / 1'-3' DUP
Benzo(a)Anthracene	1.5/2.2
Benzo(a)Pyrene	2.3/3.3
Benzo(b)Fluoranthene	2.4/3.2
Benzo(k)Fluoranthene	1.4/2.9
Chrysene	1.6/2.4
Indeno(1,2,3-CD)Pyrene	2.2/2.6

CB-99-12	8'-10'
Benzo(a)Anthracene	22J
Benzo(a)Pyrene	19J
Benzo(b)Fluoranthene	18J
Chrysene	20
Dibenz(a,b)Anthracene	8.1
Fluoranthene	58
Phenanthrene	60
Pyrene	46

TP-DEP-12	1'-3'
Trichloroethene	4J
Vanadium	1.07
Vinyl Chloride	1.9J

CB-99-08	1'-3' / 1'-3' DUP
1,1,2,2-Tetrachloroethane	—/—
1,1,2-Trichloroethane	—/—
1,1-Dichloroethane	—/—
Tetrachloroethene	2.9
1,2-Dichloroethane	—/—
1,2-Dichloropropane	—/—
Benzene	—/—
Bromoform	—/—
Carbon Tetrachloride	—/—
Chloroform	—/—
Dibromochloromethane	—/—
Methylene Chloride	—/—
Tetrachloroethene	—/—
Trichloroethene	—/—
Vinyl Chloride	—/—
cis-1,3-Dichloropropene	—/—
trans-1,3-Dichloropropene	—/—

CB-99-09	10'-12'
Benzo(a)Anthracene	1.2J
Benzo(a)Pyrene	1J
Benzo(b)Fluoranthene	1J
Chrysene	1.3

CB-99-01	0'-2'	9'-11'
Methylene Chloride	1.4	1.9
Trichloroethene	—	3J

HA-99-03	0'-1'
Benzo(a)Anthracene	13
Benzo(a)Pyrene	13
Benzo(b)Fluoranthene	9.9
Benzo(k)Fluoranthene	12
Carbazole	4.2
Chrysene	14
Indeno(1,2,3-CD)Pyrene	9

EXCEEDANCES OF GB POLLUTANT MOBILITY CRITERIA
Harding Lawson Associates

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