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NSY PORTSMOUTH
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MINUTES OF MEETING

SUBJECT: Technical Review Committee (TRC) Meeting
Portsmouth Naval Shipyard (PNS)
RCRA Facility Investigation/Corrective Measures Program

PURPOSE: The TRC meeting was called by the Navy to review the framework of the off-shore ecological risk assessment and the 35% design plans for the ICM at the DRMO (SWMU # 6).

LOCATION: Portsmouth Naval Shipyard
Kittery, Maine

DATE: November 17, 1992

PREPARED BY: Stephen F. Urschel
Manager, Geosciences
McLaren/Hart Environmental Engineering Corporation
28 Madison Avenue Extension
Albany, New York 12203-5326
(518) 869-6192

November 20, 1992

ATTENDEES:

Community/Public Representatives

None

University of New Hampshire

Dr. Fred Short
Dr. Francis Hall, Retired

USEPA Region I

Ernest Waterman, Project Manager
Patti Lynne Tyler, Ecological Risk Assessor

US Navy- PNS

CDR Carmine Pellosie, Director Medical Services, Navy Clinic
Jim Tayon, Environmental Affairs
Ken Plaisted, Environmental Affairs
Mike Pedersen, Environmental Affairs
Cdr. Dave Carll. Asst. Facility and Maintenance Officer
Len Sargent, Code 106.3
Ralph Hickson, Code 121.8
Jesse Rodgers, DRMO Property Disposal Officer
George Gray, Code 914

NCCOSC

Bob Johnston, Project Coordinator

US Navy- Northern Division, Philadelphia

Debbie Carlson, Remedial Project Manager
Mark Leipert, RTM
Paul Briegel, Design Manager

McLaren/Hart Environmental Engineering Corporation

Stephen Urschel, Project Manager, Albany, NY
Vince Lucianni, Project Design Engineer, Lester, PA

NUS

Karen Roof, Halliburton NUS

New Hampshire Fish & Game

John Nelson, Chief Marine Fisheries

Maine DEP

Troy Smith, Geologist

Maine DMR

Brad Sterl, Biologist

National Oceanic Atmospheric Administration (NOAA)

John Lindsay, Coastal Resource Coordinator
Mary Colligan, NMFS
Ken Finklestein

US Fish & Wildlife

Cyndi Perry, Biologist

BACKGROUND

The subject TRC meeting was held in the Museum at the Portsmouth Naval Shipyard, Kittery, Maine to update committee members on the off-shore ecological risk assessment and the 35% design plans for the DRMO.

DISCUSSION AND SUMMARY

The meeting was opened at approximately 10:30 a.m. by Deborah Carlson who introduced the topics of discussion and the presentation schedule. Deborah then turned the floor over to Bob Johnston.

Bob Johnston opened his presentation by discussing the framework of the Off-Shore Ecological Risk Assessment. Bob spoke for approximately 30 minutes at which time the floor was opened to questions.

Stephen Urschel, Project Manager for McLaren/Hart then introduced the next speaker, Vince Lucianni, Project Design Engineer with McLaren/Hart. Vince provided the audience with a booklet and presented the 35% design plans for an Interim Corrective Measure (ICM) cap for the DRMO. Stephen Urschel then followed Vince with a brief discussion of the possibility of the need for long-term corrective measures at the DRMO. He emphasized the importance of the connection of the Corrective Measure Study (CMS) which is about to begin and the on-going ecological risk assessment of the estuary. The floor was again opened for questions. The meeting adjourned at approximately 12:30 p.m.

PRESENTATION OVERVIEW: OFF-SHORE ECOLOGICAL RISK ASSESSMENT

Bob Johnston began the off-shore discussion by presenting slides showing sample collection procedures, the research vessel and instruments used in the study, and photographs of the sampling locations. He indicated that the off-shore Ecological Risk Assessment was broken into two phases of work. Phase I is on-going and is 90% complete. Phase II has just begun and is 10% complete. Preliminary results from Phase I show some evidence of ecological stress in the estuary and very low concentrations of contaminants in seafood. Comparisons were made of contaminant concentrations (both organics and heavy metals) in mussel tissue from Portsmouth Harbor to similar samples collected in other harbors in New England and the mid-atlantic states.

Bob then presented overheads showing the relations between Phase I and Phase II and discussing the final product expected from the overall study, an outline of how the off-shore study meets all requirements in the RCRA permit, and the revised schedule.

He indicated that the study would produce a new and improved exposure/effects database, models for assessing ecological impacts for the estuary, a sediment distribution map and a well defined monitoring program to be used in the future.

The revised schedule showed the preliminary Phase I draft report of findings would be submitted by December, 1992. The final draft would be submitted in March and the Phase II preliminary draft is expected to be submitted in the Fall of 1993.

QUESTIONS: OFF-SHORE

Questions were presented and answered after the presentation. A brief summary of the questions and responses follows.

- Jim Tayon asked Bob Johnston to clarify the evidence for ecological stress regarding polycheate worms in Clark's Island Employment (CIE).

  Response - Bob indicated that there was a reduction in organism diversity and an increase in the concentration of worms in some samples collected within CIE. Reason for this was unknown, but additional studies and evaluations during Phase II will investigate a possible link with sediment contaminant concentrations at these sampling points.

- Ken Finkelstein (NOAA) questioned why the Federal Drug Administration (FDA) standards were used for comparison with contamination found in lobster meat and hipatopancreas samples.

  Ken indicated that such a comparison was misleading in the context in which it was presented in that the FDA standards are not intended for ecological risk assessment and are poorly suited for human health risk assessment. Their purpose is simply to set a standard for the purpose of interstate shipments of seafood.

  Response - Bob Johnston indicated that Ken's concerns were valid and that he simply wished to provide some measuring stick for the purposes of public presentation of the analytical findings.

- A member of the audience questioned the means of comparison to be performed on sample results from varying geological settings; namely, sampling locations with varying sediment grain size.

  Response - Bob indicated that data comparisons must be made on many levels and care must be taken to evaluate cause and effects. He indicated that contaminants may change composition and toxicity after being released to the estuary and may not resemble the source contaminants.

- Ernest Waterman (USEPA) indicated that the discussions thus far have focused on comparisons between Portsmouth Harbor and other harbors in the U.S. While he indicated that this information is useful, he expressed the need for the study to address:

  - Types and concentrations of contaminants in sediment, surface water and biota
  - Risk to public health
  - Risk to organisms
  - Risk represented by Portsmouth Naval Shipyard (PNS)

  Ernie indicated that the study should particularly now *focus* on the relationship between contaminants which are known to have been, or are being released from the PNS and the impacts on the ecology of the estuary.

- A member of the audience questioned how the investigations look at muscle growth in terms of stress

  Response - Bob indicated that as standard operating procedures, caged mussels were placed in different areas of the estuary for a 28-day period. Studies have shown that is a reasonable amount of time for the muscles to equilibrate in terms of growth and contamination. The cages were retrieved and the mussels were measured in terms of tissue burden, growth and analysis called "scope for growth" which means that it had to work harder to grow which relates to stress.

- Jim Tayon asked what areas have higher concentration of worms in the sediment.

  Response - Bob Johnston indicated that there were 3 sampling areas which showed high density worms with concentration of approximately 20,000 per square meter and mostly dominated by the polycheate worm.

  There were also 3 areas within CIE which showed very high density of worms - 80,000 - 100,000/square meter.

  Bob also said that during Phase II, the plan is to go back and resample to verify the sampling method.

- Patti Lynne Tyler asked about the amphipod toxicity testing and found it interesting that toxicity was found in a reference station. She asked if there were there any problems with the testing and interference of grains of sediment.

  Response - Bob indicated there was a difference in textural analysis in the sediments but the amphipod toxicity testing is independent of grain size. He stated that once the review of chemistry data is completed, the investigations will be able to determine if there is a connection between contaminants associated with grain size.

- John Lindsey asked if all muddy depositional areas show stations of high density worms throughout the estuary or only in the 3 areas indicated.

  Response - Bob Johnston answered that all stations in CIE were found to have muddy sediment. Two of the stations showed high density of worms, while the others were within the range normally expected.

PRESENTATION OVERVIEW: DRMO INTERIM CORRECTIVE MEASURE (ICM)

Vince Lucianni, project design engineer for McLaren/Hart presented his evaluation of nine (9) capping options for the DRMO. Vince indicated that the primary objectives of the interim corrective measure for the DRMO were to minimize human and environmental exposure to the contaminants in soils, primary lead. Human exposure results from direct contact with the soils and from inhalation of dust. Environmental exposure results from surface water runoff carrying soil particles to the river and dust. Secondary considerations for the ICM included minimizing infiltration of rain water, maintaining existing operations, promoting aesthetics, cost, future permanent corrective measures which may be required, and RCRA performance standards for capping.

Vince presented maps of the DRMO, including a "Site Plan", a "Grading Plan" showing the material balance for a 12" thick cap consideration, cross-sectional details and soil boring information.

He presented his arguments for selecting capping option #6 which consists of a synthetic liner composed ¼-inch bentonite clay sandwiched between geotextile material and covered by 12 inches of gravel and lime rock powder.

QUESTIONS DRMO ICM

- CDR Carll, APWO, asked what design parameters are required for permeability and does option #1, of crushed stone only, meet that permeability requirement.

  Response - Vince identified that the permeability requirement of 10^{-7} is for a clay liner. However, for an interim corrective measure, there are no specified parameters for permeability, and therefore, both options would be acceptable. The preferred option would go one step further and meet the permeability factor of 10^{-7} which is an anticipated requirement as a final corrective measure.

- Cdr. Carll asked the approximate cost of each option.

  Response - Vince indicated the options studied ranged in price from a low of $272,000 to a high of $642,000. Option #1 which was discussed in previous question is estimated at $281,000 and the selection option is estimated at $335,000.

- A member of the audience questioned the need for, and use of, curbs which were depicted in the site plans.

  Response - Vince indicated that the curbs were included in the design to reduce or eliminate sheet wash (runoff) from cascading over the unprotected bank along the Piscataqua River and possibly causing increased bank erosion.

- A member of the audience questioned whether the existing storm water inlets could be used in the new design and eliminate introducing a new discharge point.

  Response - Vince indicated that their use was considered but that in the final analysis the regrading that was required to maintain material balance precluded their use.

- Troy Smith, MEDEP, identified concerns on the geotextile liner with respect to the heavy equipment and the freeze/thaw cycle. Troy Smith also requested that the final design include information on the bearing capacity versus expected loads on the substrate liner.

  Response - Vince indicated this GCL liner and design will withstand the operations and conditions at the DRMO. The design of layer of fabric below and above the geotextile clay liner will protect the GCL From crushed stone being driven into it. Investigation on the proposed GCL also shows it is less susceptible to freeze/thaw than ordinary compacted clay because of the liner design which consists of bentonite clay sandwiched between two fabrics.

- All information to support the geotextile clay liner will be provided in the 100% design submittal.

- Ernest Waterman (USEPA) indicated that the 100% design document should include provisions for applicable health and safety plan, erosion control plan and a dust suppression plan.

- Mike Pederson asked if the design has estimated the amount of time the DRMO will be out of operation during construction.

  Response - Design of the interim cap is being coordinated with the DRMO operation manager. The 100% design package will specify the construction period and a phasing plan, if required.

- Ernest Waterman (USEPA) indicated that the EPA was satisfied with any of the nine options proposed with regard to mitigating direct human exposure to the contaminated soils. He said he was less concerned with infiltration of surface water but felt that such design considerations were worth pursuing.

Deborah Carlson then opened the floor to general questions and discussions.

The next TRC meeting was scheduled for January 12, 1993, at 10:30 a.m. at the Portsmouth Naval Shipyard in Kittery, Maine.

The meeting was adjourned at 12:30 p.m.

FRAMEWORK FOR OFFSHORE ECOLOGICAL RISK ASSESSMENT

STATUS REPORT FOR
Technical Review Committee
Portsmouth Naval Shipyard

November 17, 1992

Presented By:

Robert K. Johnston,
Naval Command Control and Ocean Surveillance Center
c/o USEPA Environmental Research Laboratory
Narragansett, RI

Introduction
An Estuarine Ecological Risk Assessment for the Piscataqua and Great Bay Estuary, NH (Paper Presented at Society of Environmental Toxicology and Chemistry Annual Meeting)
RCRA Permit Requirements Addressed by Offshore Study
Updated Schedule of Tasks and Products

AN ESTUARINE ECOLOGICAL RISK ASSESSMENT FOR THE PISCATAQUA AND GREAT BAY ESTUARY, NH

Robert K. Johnston, NCCOSC RDT&E DIV
Wayne R. Munns, Jr., SAIC ERLN
Fred Short, UNH Jackson Estuarine Lab
Skip Nelson, USEPA ERLN

Estuarine Ecological Risk Assessment

- Introduction
- Why Conduct Ecological Risk Assessment?
- Ecological Risk Framework
- Endpoint Selection
- Status and Progress
- Some Preliminary Results
- Conclusion

PARTICIPANTS

NAVAL COMMAND CONTROL AND OCEAN SURVEILLANCE CENTER, SAN DIEGO, CA

US EPA ENVIRONMENTAL RESEARCH LABORATORY, NARRAGANSETT, RI

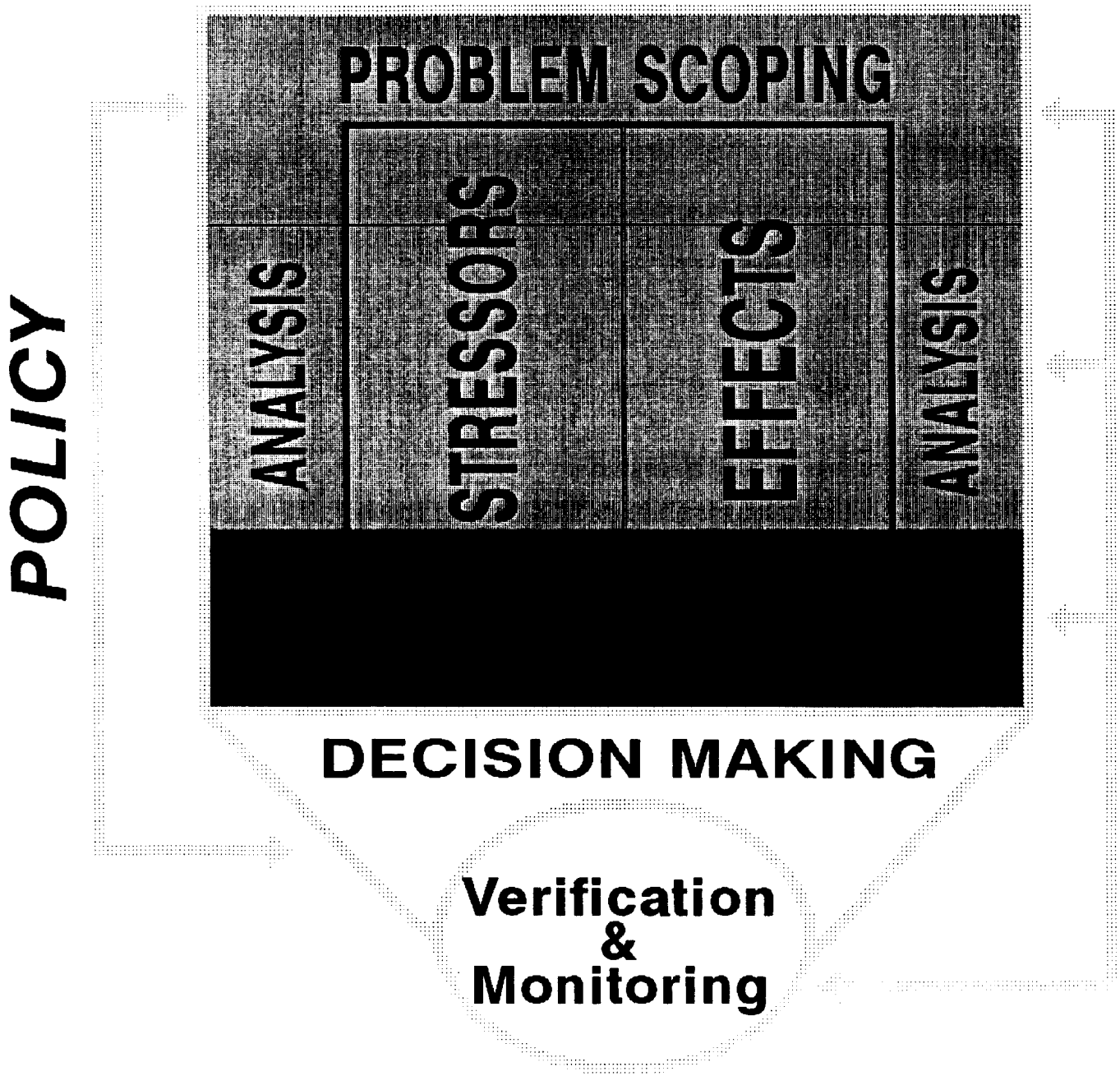
UNIVERSITY OF NEW HAMPSHIRE
JACKSON ESTUARINE LABORATORY
OCEAN ENGINEERING PROGRAM

Woods Hole Oceanographic Institution
URI Graduate School of Oceanography
Normandeau Associates
MacLaren/Hart
Ceimic Corporation

Why Conduct Ecological Risk Assessment?

- Meet Current and Future Regulatory Requirements
- Emphasis on Both Ecological and Human Health Considerations
- Focus on Important Parameters of the Ecosystem
- Satisfy Public Concern

ECOLOGICAL RISK FRAMEWORK



STRESSORS

PNSY SWMUs
Landfill
Discharges
Tanks
Disposal Areas

OTHER
NPDES Permits
Nonpoint Sources
Superfund Sites
Eutrophication

POLICY

EPA Permit
Facility Inves.
Public Health &
Envir. Risk Eval.
Media Protection
Corrective Action

NAVY
Proactive
Public Concerns

EFFECTS

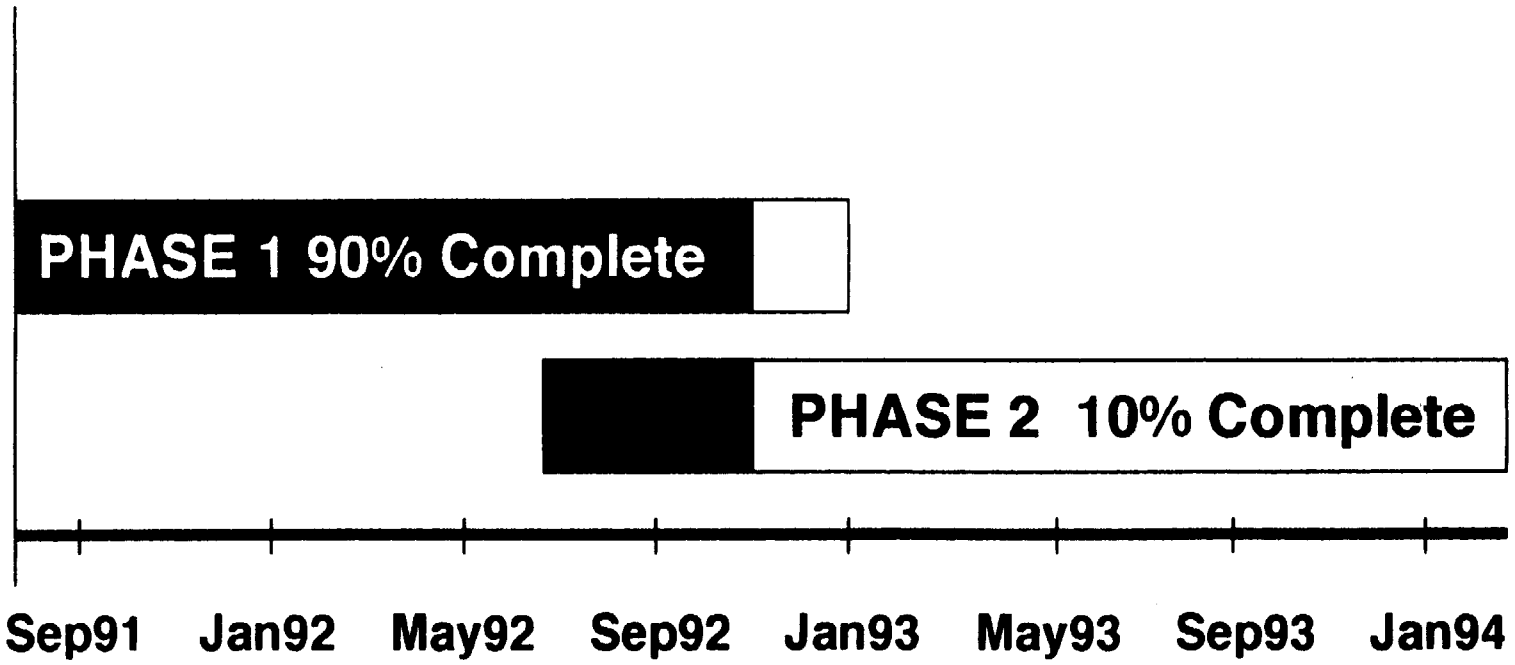
Water Quality
Sediment Quality
Biota
Toxicity
Bioaccumulation
Benthic Comm.
Natural Resource
Lobster
Flounder
Trophic Transfer
Ecosystem Health

ENDPOINT SELECTION

STATUS AND PROGRESS

PHASE 1: Is there Evidence that Shipyard Contaminants are Impacting the Estuary RIGHT NOW?

PHASE 2: Verify and Evaluate Any Evidence of PAST Releases and Predict Any FUTURE Impact.

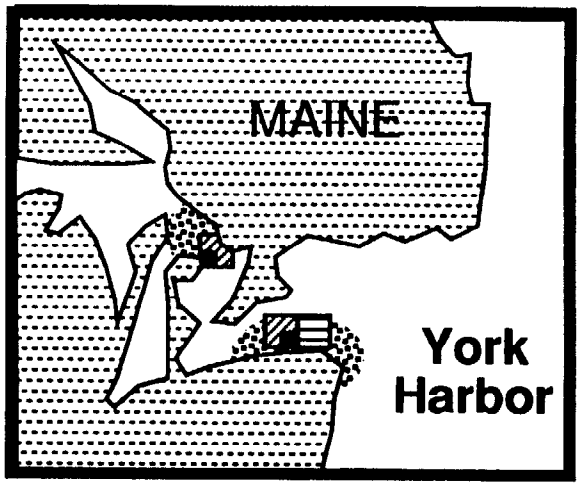


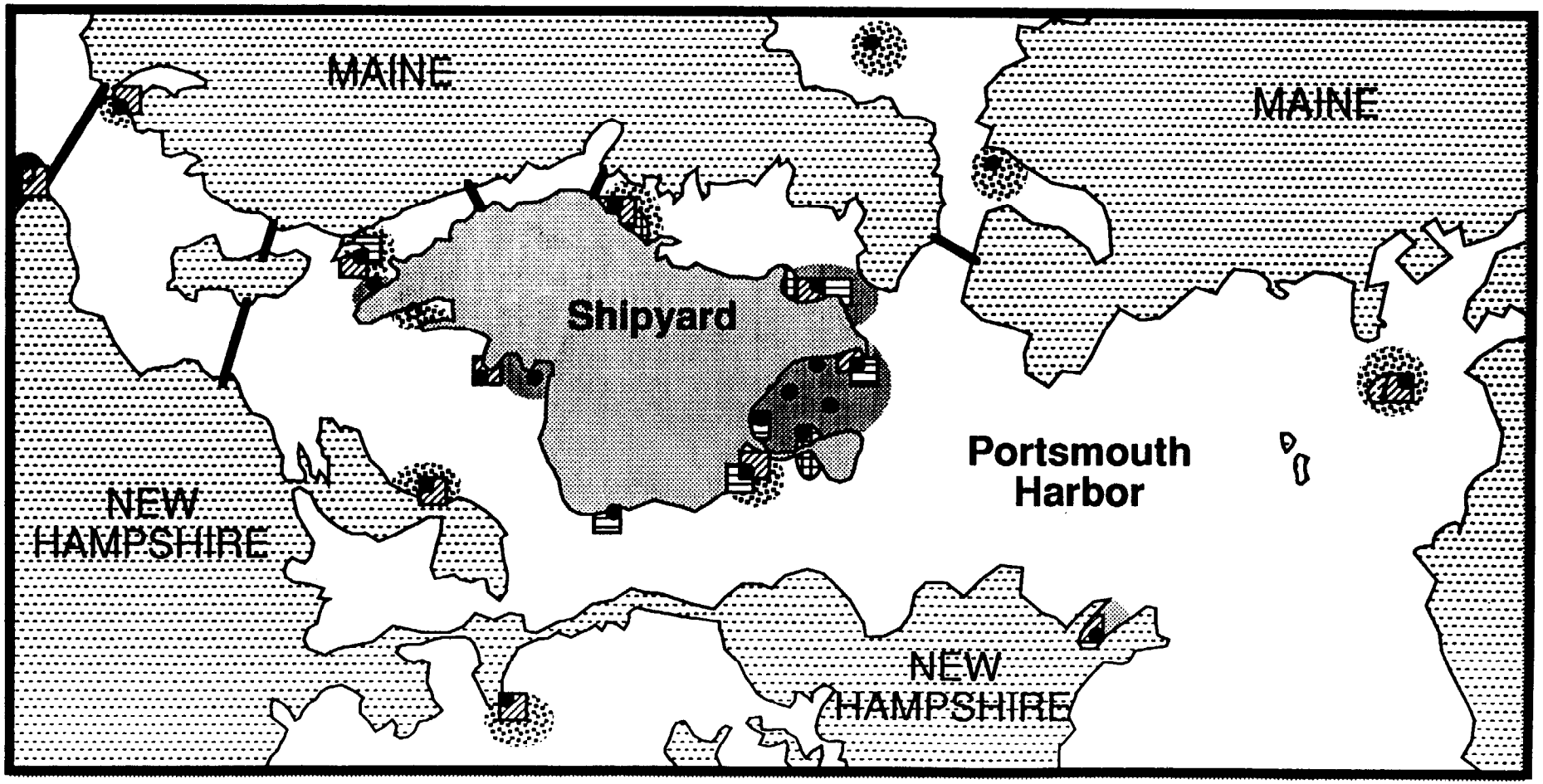
SOME PRELIMINARY RESULTS

- Important Ecological Resources Identified
- Some Areas Indicated Ecological Stress
- Contamination Levels are Relatively Low
- Seafood Contains Only Low Amounts of Contaminants

HABITAT TYPES

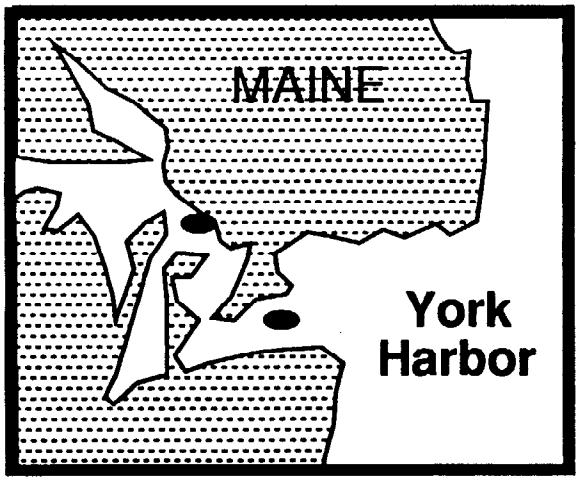
- Station Location - Mussel Bed
- Eelgrass Bed
- Fucoid Algae
- Salt Marsh
- Muddy Sand
- Muddy Silt

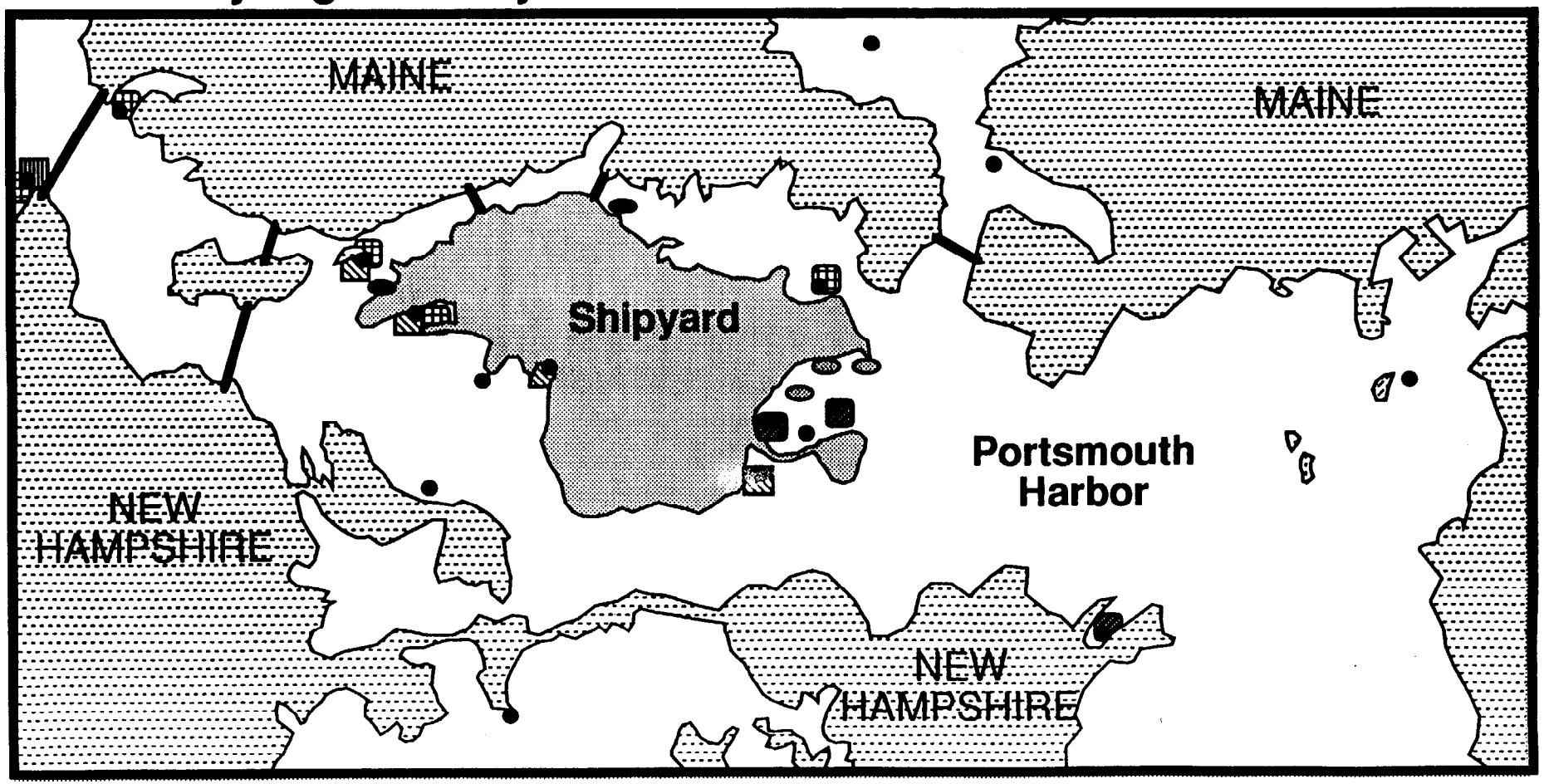




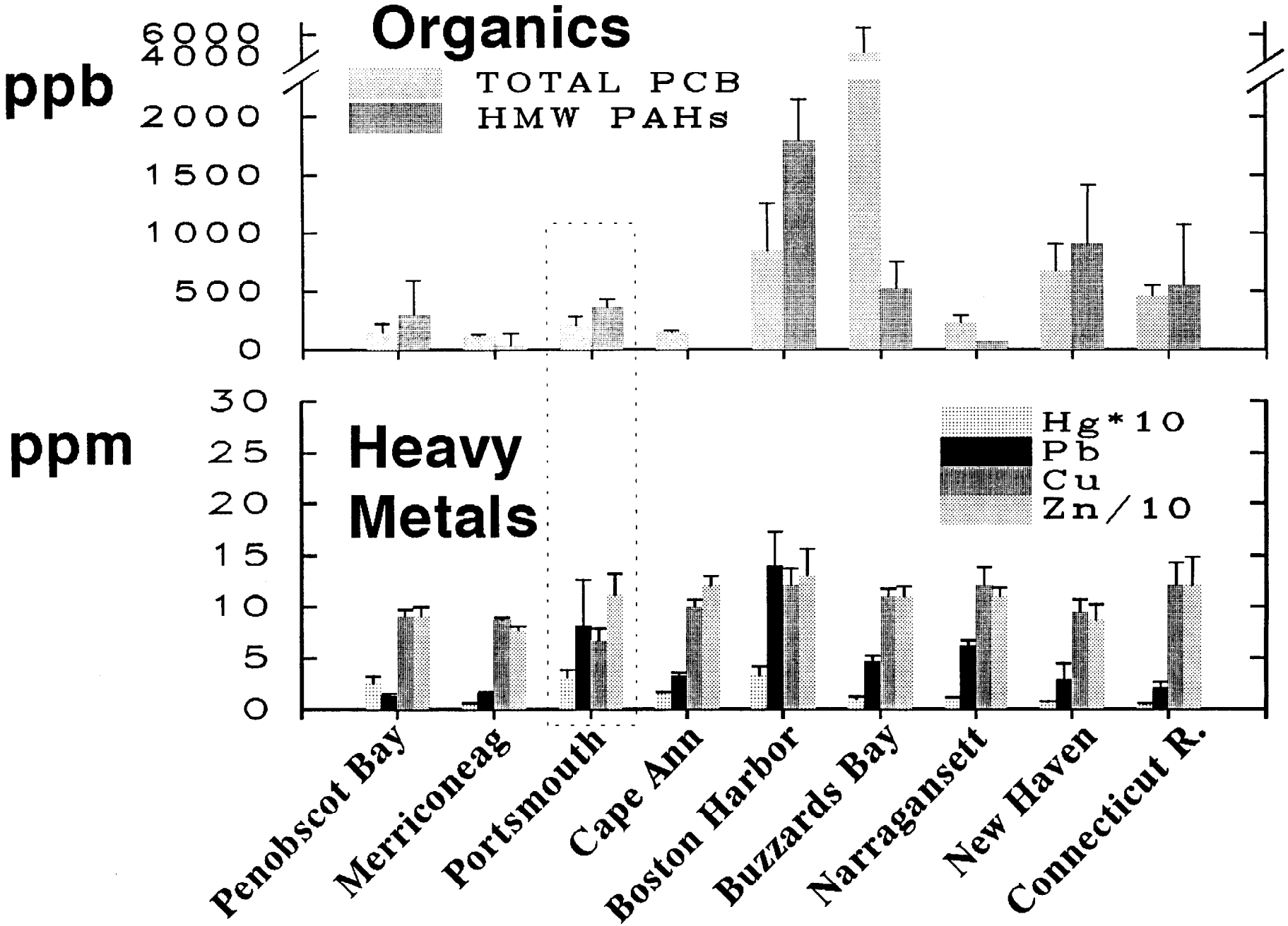
INDICATIONS OF ECOLOGICAL STRESS

- Toxicity to Amphipods
- Toxicity to Sea Urchin Sex Cells
- High Microbial Contamination
- Stress on Mussel Growth
- High Density of Worms
- Very High Density of Worms

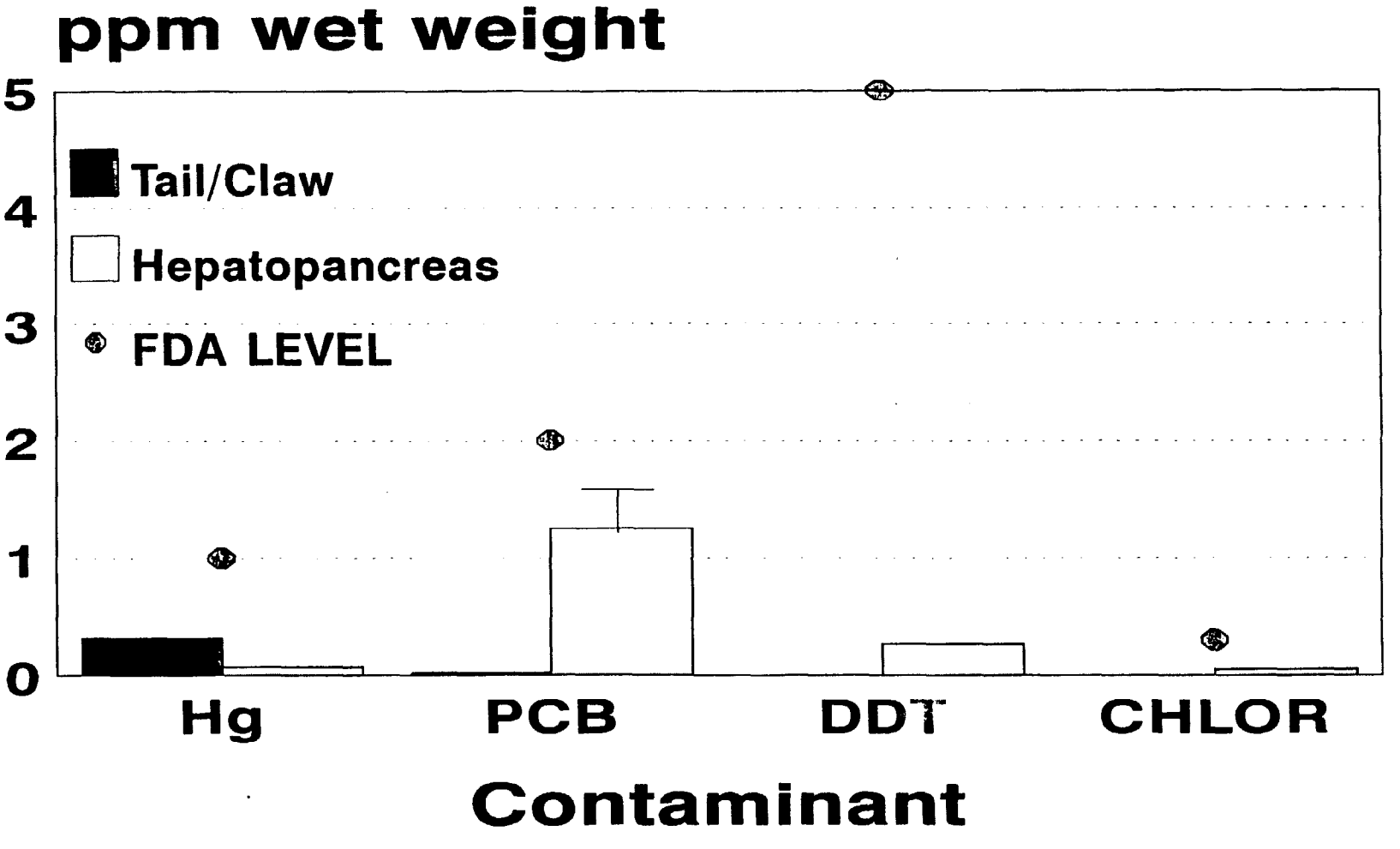




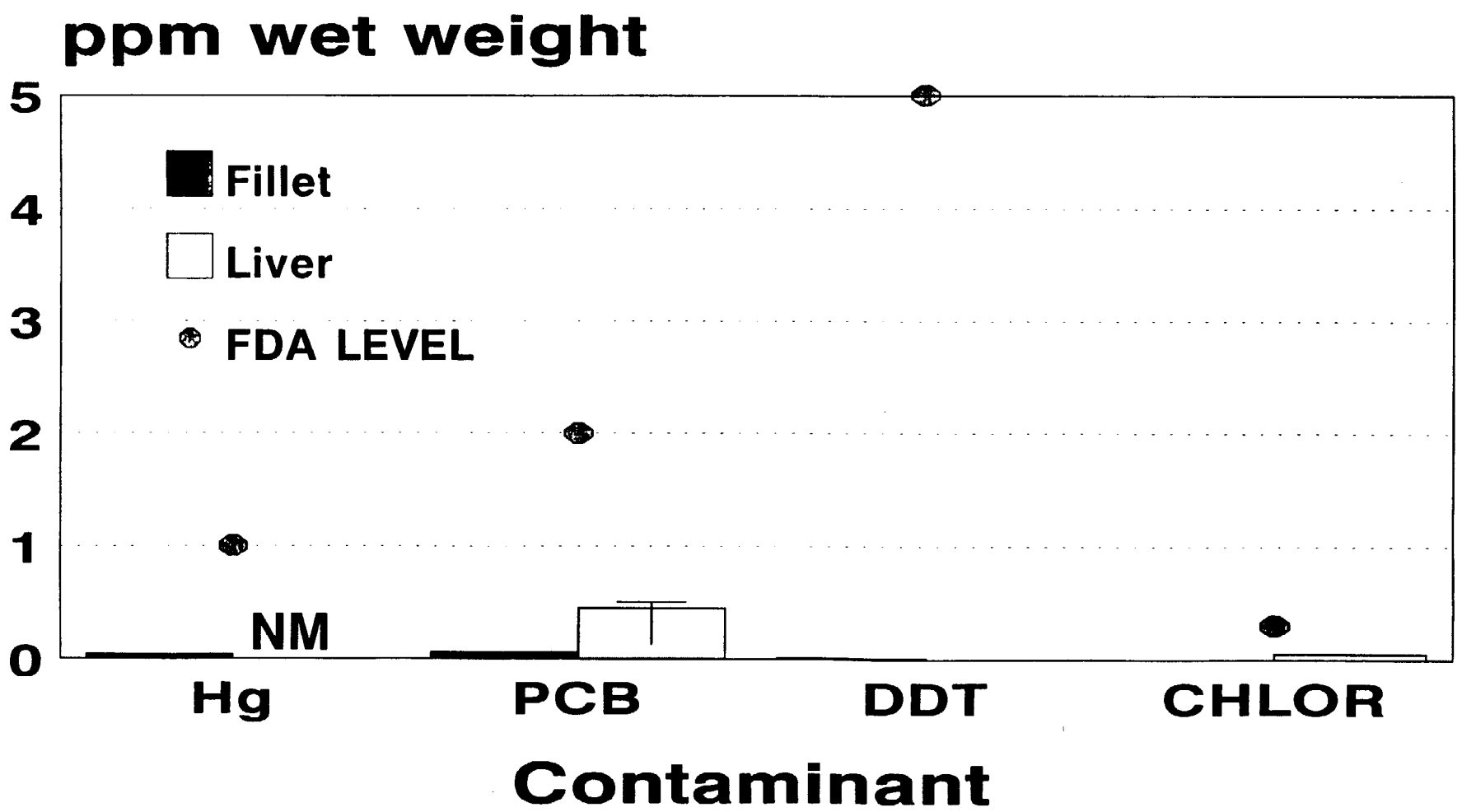
Mussel Watch Tissue Burdens



SEAFOOD
Lobster Tissue



SEAFOOD
Flounder Tissue



SUMMARY

ONSHORE STUDY PROVIDES INFORMATION ON:

- Source Strength and Types of Contaminants
- Routes of Release and Migration
- Rates of Loading into the System
- Exposure to Inhabitants of the Island (Human and Nonhuman)

SUMMARY

OFFSHORE STUDY PROVIDES INFORMATION ON:

- Fate of Contaminants Released
- Effect of Contaminants Present
- Potential Accumulation in Food Chain
- Overall Impact on Ecology of Estuary

CONCLUSION

TOGETHER THE

ONSHORE AND OFFSHORE STUDIES

PROVIDE THE TECHNICAL DATA AND INFORMATION TO MAKE INFORMED DECISIONS

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                                 FY92 FY92 FY93 FY93 FY93 FY93
Task                              3rd  4th  1st  2nd  3rd  4th   TOTALS
-----------------------------------------------------------------------
1.a Exposure/Response                          D-P-*-IP----P------P------F

1.b Marsh/Benthic Ecology                 S-P----P---IP----P---C

1.c Bioaccumulation                       S-P----P-*--P----P---C

2.a Sedimentology                 S----P--* P----P---IP----P------C

2.b Dispersion Dynamics           S----P--* P----P---IP----P------C

2.c Markers                                 S----P---IP----P------C

3. Long Term Monitoring           Z----P----P----P---IP----P------P-----Z

4. Risk Synthesis                                S----P----P------P-----F
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NOTES:
- S = Task Start
- P = Progress Report
- I = Interim Report
- C = Task Completion
- F = Final Report
- Z = Task Continuation
- * = Decision Point/Decision Paper (Critical Path)
- D = Delay: Task 1.a has been delayed due to inability to transfer funds to ERLN. Time line represents best estimate for completion.

ESTUARINE ECOLOGICAL RISK ASSESSMENT AT
NAVAL SHIPYARD PORTSMOUTH, MAINE
UPDATED SCHEDULE OF TASKS AND PRODUCTS
REV: October 26, 1992

DELIVERABLE	DATE	COMP
1. **Phase I: Work/Quality Assurance Project Plan**	NOV 91	*
2. **Health and Safety Plan**	2 MAR 92	*
3. **Data Management Plan**	2 MAR 92	*
4. **Historical Overview**		
a. **Interim**	DEC 91	*
b. **Final (Published by NOAA Coastal Program)**	OCT 92	*
5. **Interim Phase I Status Report**	12 MAR 92	*
6. **Preliminary Phase I Report**	23 NOV 92	
a. Technical Data Summaries (by Task)	15 JUN 92	*
b. Chemistry data report (recieved Ceimic data 16 OCT 92)	23 NOV 92	
c. Data Dump	DEC 92	
7. **Phase I Final Report**		
a. Draft Final Report (120 days after Preliminary Report)	MAR 93	
b. Final Report	MAY 93	
8. **Phase II Work Plan**		
a. Phase II Straw Man	MAR 92	*
b. Phase II Initial Cost Estimate	MAR 92	*
c. Phase II Scope of Work	MAY 92	*
d. Plan of Action and Milestones (POAM)	MAY 92	*
e. Updated POAM	OCT 92	
f. QA/QC Work Plan	JAN 93	
9. **Initiation of Phase II Field Work**	JUL 92	
10. **Phase II Reports**		
a. Interim Status Report	MAR 93	
b. Preliminary Report	SEP 93	
c. Draft Final Report	JAN 93	
11. **Progress Reports (Quarterly)** Jul/Oct/Jan/Apr		
12. **Peer Reviewed Publication**	SEP 93	

ECHNICAL REVIEW
OMMITTEE MEETING
OVEMBER 17, 1992

ENVIRONMENTAL AFFAIRS

UTH NAVAL SHIPYARD

INTERIM CORRECTIVE ACTION
PORTSMOUTH NAVAL SHIPYARD
KITTERY, MAINE
CAPPING ALTERNATIVES EVALUATION FOR THE DRMO

Prepared by:

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NOVEMBER 17, 1992

CAPPING ALTERNATIVES EVALUATION OUTLINE

INTRODUCTION

CAP FUNCTIONS

INTERIM CAPPING ALTERNATIVES

EVALUATION OF CAPPING ALTERNATIVES

Advantages

Disadvantages

SELECTION OF CAPPING CONCEPT/RECOMMENDED DESIGN CONCEPT

DESIGN DEVELOPMENT

INTRODUCTION

Background - Concentrated levels of metals, particularly lead, were found to be elevated in both shallow and deep soil samples at the DRMO. Immediate environmental concerns identified as soil erosion and runoff of surface soils into the Piscataqua River.

Objectives - Evaluate several alternatives for capping and controlling surface water at the DRMO as an interim corrective measure. Cap must be consistent with RCRA performance standards for capping.

CAP FUNCTIONS

Prevent or Minimize Infiltration

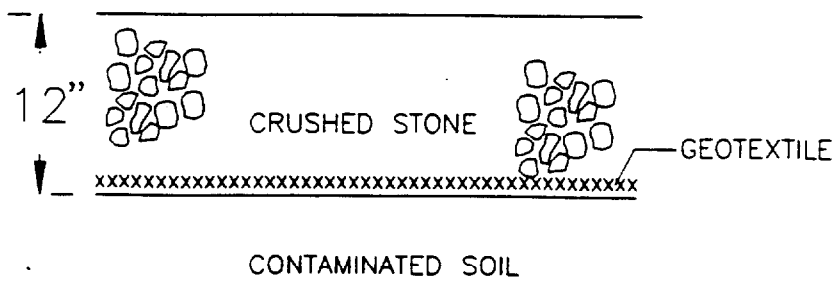
Prevent Surface Erosion and Control Surface Water Runoff

Promote Aesthetics

Promote Site Reclamation

INTERIM CAPPING ALTERNATIVES

OPTION 1 -	Semi-Permeable Crushed Stone Cap
OPTION 2 -	Impermeable Clay Cap
OPTION 3 -	Geosynthetic Cap
OPTION 4 -	Geocomposite Clay Liner (GCL) Cap
OPTION 5 -	Crushed Stone and Clay Cap Combined
OPTION 6 -	Crushed Stone and GCL Combined
OPTION 7 -	Full Asphalt Cap
OPTION 8 -	Full Concrete Cap
OPTION 9 -	Partial Asphalt Cap and Concrete Cap Combined



SEMI–PERMEABLE CRUSHED STONE CAP

OPTION 1

EVALUATION OF CAPPING ALTERNATIVES

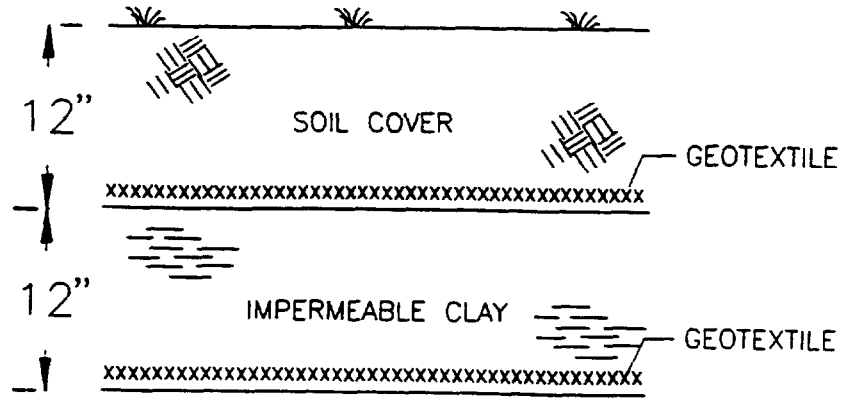
OPTION 1 - Semi-Permeable Crushed Stone Cap

ADVANTAGES -

- Constructability
- Availability of materials
- Consistent with yard operations
- Durable
- Low permeability
- Semi-permanent
- Erosion resistant

DISADVANTAGES -

- Minimizes infiltration, but does not prevent it



IMPERMABLE CLAY CAP

OPTION 2

EVALUATION OF CAPPING ALTERNATIVES

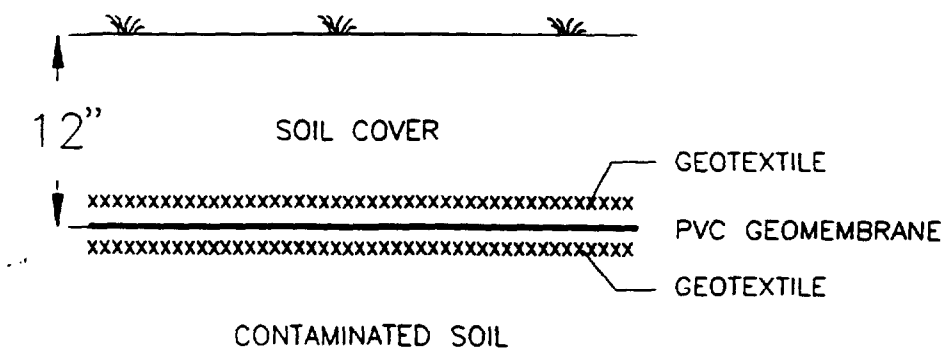
OPTION 2 - Impermeable Clay Cap

ADVANTAGES -

- Virtually impermeable

DISADVANTAGES -

- Does not possess surface durability for continued operations in the yard



GEOSYNTHETIC CAP

OPTION 3

EVALUATION OF CAPPING ALTERNATIVES

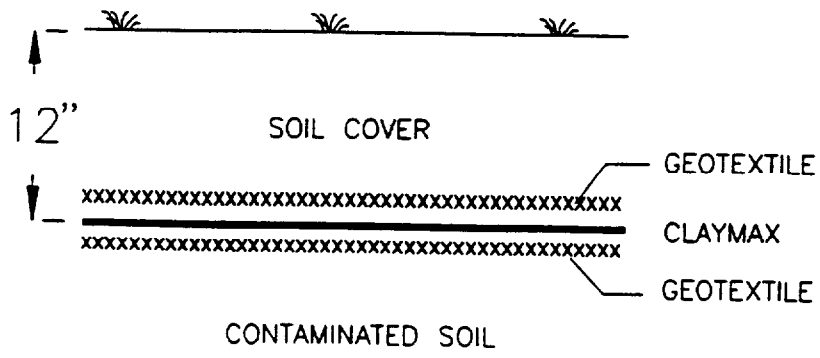
OPTION 3 - Geosynthetic Cap

ADVANTAGES -

- Impermeable
- Easy to install
- Surface water and soil erosion control

DISADVANTAGES -

- Does not provide needed structural stability



CLAYMAX CAP

OPTION 4

EVALUATION OF CAPPING ALTERNATIVES

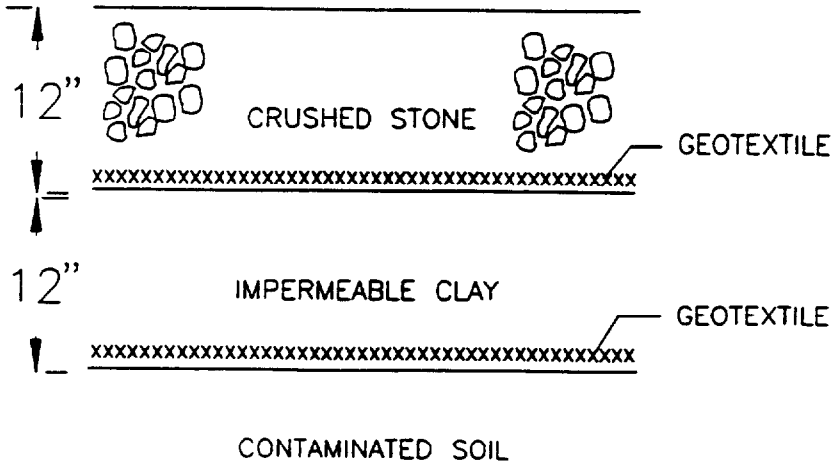
OPTION 4 - Geocomposite Clay Liner (GCL) Cap

ADVANTAGES -

- Impermeable
- Easy to install
- Surface water and erosion control
- Self-healing

DISADVANTAGES -

- Does not provide needed structural stability



CRUSHED STONE AND CLAY CAP

OPTION 5

EVALUATION OF CAPPING ALTERNATIVES

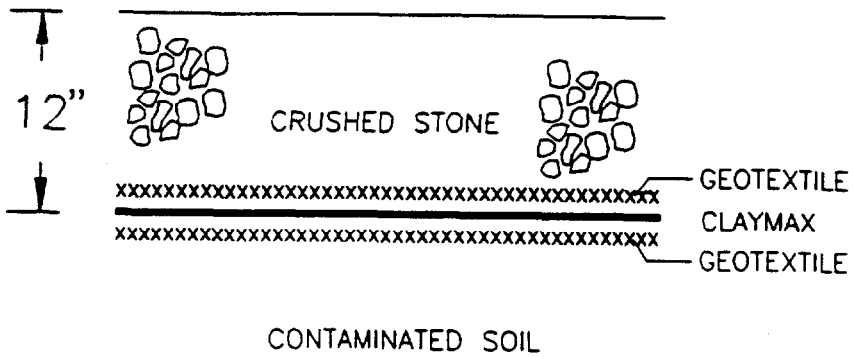
OPTION 5 - Crushed Stone and Clay Cap Combined

ADVANTAGES -

- Durable
- Virtually impermeable

DISADVANTAGES -

- Extensive grading required for 24 inch cap



CRUSHED STONE AND CLAYMAX

OPTION 6

EVALUATION OF CAPPING ALTERNATIVES

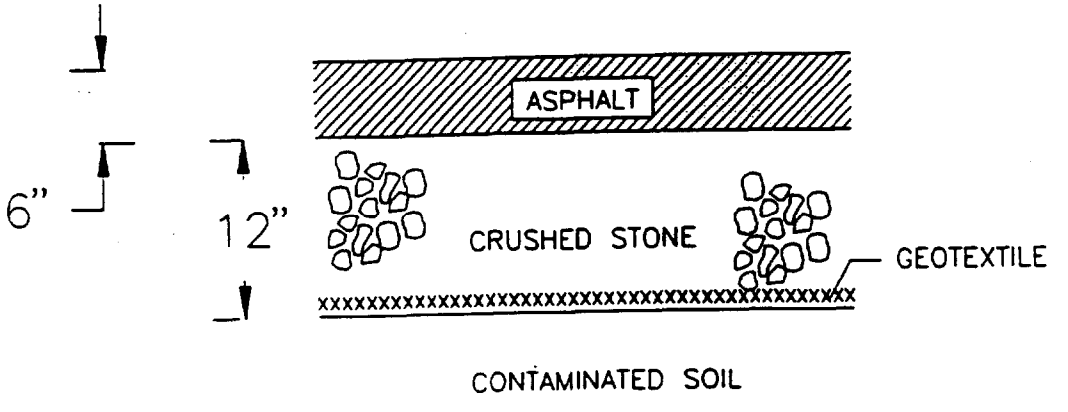
OPTION 6 - Crushed Stone and GCL Combined

ADVANTAGES -

- Durable
- Impermeable
- Greater flexibility of grading due to 12 inch cap
- Self-healing properties of GCL

DISADVANTAGES -

- No significant technical disadvantages



ASPHALT CAP

OPTION 7

EVALUATION OF CAPPING ALTERNATIVES

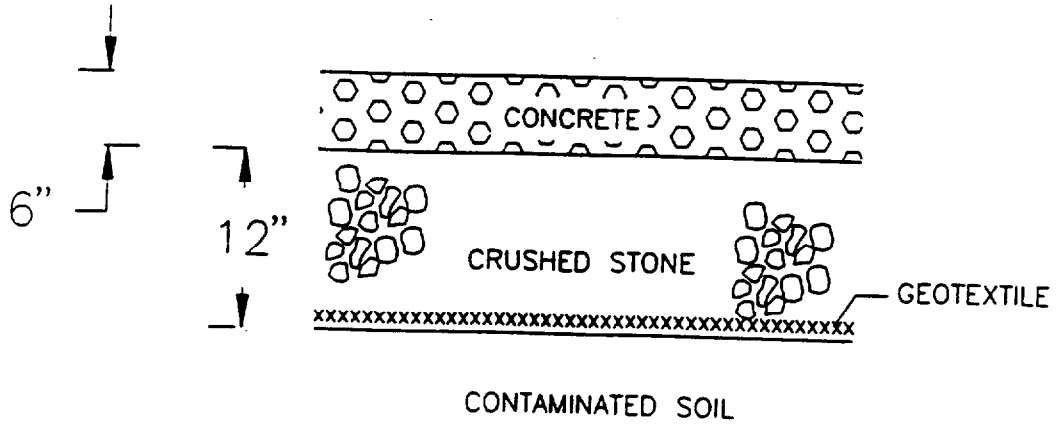
OPTION 7 - Full Asphalt Cap

ADVANTAGES -

- Impermeable to infiltration
- Surface water runoff and soil erosion control
- Structural stability for most anticipated loads
- Aesthetics
- Low maintenance

DISADVANTAGES -

- Damage from cleats of on-site crane
- Vulnerable to cracking during cold weather installation



CONCRETE CAP

OPTION 8

EVALUATION OF CAPPING ALTERNATIVES

OPTION 8 - Full Concrete Cap

ADVANTAGES -

- Impermeable to infiltration
- Surface water runoff and soil erosion control
- Structural stability to support both crane and truck traffic

DISADVANTAGES -

- Susceptible to cracking and leaking at joints
- Substantial site preparation and grading to ensure stable substrate

EVALUATION OF CAPPING ALTERNATIVES

OPTION 9 - Partial Asphalt Cap and Concrete Cap Combined

ADVANTAGES -

- **Structural stability to support crane**

DISADVANTAGES -

- **Asphalt susceptible to cracking during cold weather**
- **Concrete susceptible to cracking and leaking at joints**
- **Concrete requires substantial site preparation and grading to ensure stable substrate**

SELECTION OF CAPPING CONCEPT/RECOMMENDED DESIGN CONCEPT

OPTION 6 - Crushed Stone and GCL Combined

- The cap meets all RCRA cap performance requirements. This is a desirable feature given that this interim corrective measure may become the, or part of the, final corrective measure for this site.

- The recommended cap can be easily excavated should EPA require some other final remedial corrective measure other than capping. Also, the recommended cap can be upgraded should EPA require or if the operations of the yard demand. For example, should EPA require a more " permanent" type surface, the crushed stone could always be paved at a later date. Or, if during yard operations, it is noted that a particular area gets heavy activity which causes damage to the surface of the cap, this area could be repaired with crushed stone as part of routine maintenance, or, if the Navy desires, these heavy trafficked areas could be paved on an as identified basis.

- The asphalt and concrete paving options are permanent options which would be costly to remove should EPA require sub-cap intrusive activities as part of the final corrective measures at this site. As discussed above, should EPA not require such activities, but the Navy require a more durable surface of the cap because of its operations in the yard, the resurfacing could be done at a later date.

SITE PLAN

- Topographic Survey performed by Civil Consultants September, 1992
- Delineation of Capping Area
- Delineation of Asphalt Paving Area
- Curbing Location

DESIGN DEVELOPMENT

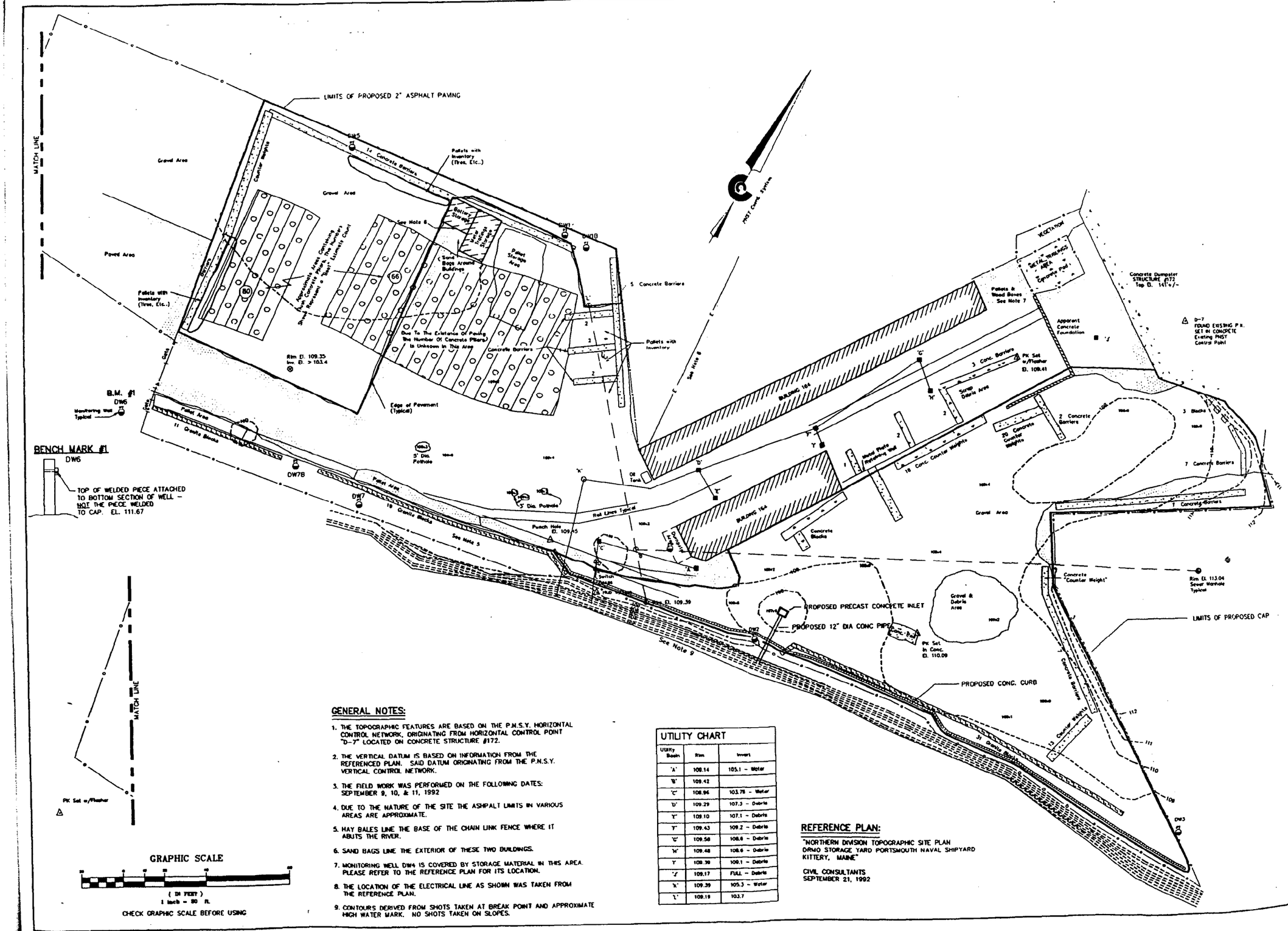
Preliminary Design Drawings

Site Plan

Grading Plan

Sections and Details

Boring Logs



GENERAL NOTES:

1. THE TOPOGRAPHIC FEATURES ARE BASED ON THE P.N.S.Y. HORIZONTAL CONTROL NETWORK, ORIGINATING FROM HORIZONTAL CONTROL POINT "D-7" LOCATED ON CONCRETE STRUCTURE #172.
2. THE VERTICAL DATUM IS BASED ON INFORMATION FROM THE REFERENCED PLAN. SAID DATUM ORIGINATING FROM THE P.N.S.Y. VERTICAL CONTROL NETWORK.
3. THE FIELD WORK WAS PERFORMED ON THE FOLLOWING DATES: SEPTEMBER 9, 10, & 11, 1992
4. DUE TO THE NATURE OF THE SITE THE ASHPALT LIMITS IN VARIOUS AREAS ARE APPROXIMATE.
5. HAY BALES LINE THE BASE OF THE CHAIN LINK FENCE WHERE IT ABUTS THE RIVER.
6. SAND BAGS LINE THE EXTERIOR OF THESE TWO BUILDINGS.
7. MONITORING WELL DW4 IS COVERED BY STORAGE MATERIAL IN THIS AREA. PLEASE REFER TO THE REFERENCE PLAN FOR ITS LOCATION.
8. THE LOCATION OF THE ELECTRICAL LINE AS SHOWN WAS TAKEN FROM THE REFERENCE PLAN.
9. CONTOURS DERIVED FROM SHOTS TAKEN AT BREAK POINT AND APPROXIMATE HIGH WATER MARK. NO SHOTS TAKEN ON SLOPES.

UTILITY CHART

Utility Basin	Rim	Invert
'A'	108.14	105.1 - Water
'B'	109.42	
'C'	108.96	103.78 - Water
'D'	109.29	107.3 - Debris
'E'	109.10	107.1 - Debris
'F'	109.43	109.2 - Debris
'G'	109.58	108.8 - Debris
'H'	109.48	108.6 - Debris
'I'	108.39	109.1 - Debris
'J'	109.17	FULL - Debris
'K'	109.39	105.3 - Water
'L'	109.19	103.7

REFERENCE PLAN:

"NORTHERN DIVISION TOPOGRAPHIC SITE PLAN
DRMO STORAGE YARD PORTSMOUTH NAVAL SHIPYARD
KITTERY, MAINE"

CIVIL CONSULTANTS
SEPTEMBER 21, 1992

MCLAUGHLIN/HAIRT LESTER, PA

DESIGN
SURV.
SUBMITTED BY:
DATE
PROJ MGR
OIC
FPC
OFFICER IN CHARGE
DATE

PREP BY DATE APPRVD

REV. DESCRIPTION

NAVAL FACILITIES ENGINEERING COMMAND

PORTSMOUTH, NH

INTERIM CORRECTIVE MEASURES, DRMO
SITE PLAN

DEPARTMENT OF THE NAVY

PORTSMOUTH NAVAL SHIPYARD

NORFOLK FOR COMMANDER, NAVFAC

DATE

APPROVED

SEAL AREA

SAT NO

DATE

CODE I.D. NO.

SCALE:

SPEC. NO. 04 -

CONSTRUCT. CONTR. NO.

NAVFAC DRAWING NO.

SHEET

SIZE D

DWG. SAT NO

GRADING PLAN

- **Material balance so that there is no removal of on-site materials**
- **Proposed stormwater inlet at low point discharging directly to Piscataqua River**

MATCH LINE

Gravel Area

Paved Area

Pallets with Inventory (Tires, Etc.)

Approximate area Containing Some Concrete Piers. The Number Shown Represent a "Best" Estimate Count

Sand Bags Around Buildings

Pallet Storage Area

Due To The Existence Of Paving The Number Of Concrete Piers? Is Unknown In This Area

Concrete Barriers

5 Concrete Barriers

Pallets with Inventory

Rim El. 109.35
Inv. El. > 103.4

Edge of Pavement (Typical)

B.M. #1
DW6
Monitoring Well Typical

BENCH MARK #1
DW6
TOP OF WELDED PIECE ATTACHED TO BOTTOM SECTION OF WELL - NOT THE PIECE WELDED TO CAP. EL. 111.67

Pallet Area
11 Granite Blocks
DW7B
DW7
Pallet Area
19 Granite Blocks
5' Dia. Pothole
5' Dia. Pothole
Oil Tank
Roll Lines Typical
Punch Hole El. 109.45
Switch Boxes
Hub w/Tack
Rim El. 109.59
BUILDING 164
BUILDING 165
Metal Pipe Retaining Wall
Concrete Blocks
Gravel Area
Concrete "Counter Weight"
Rim El. 113.04 Sewer Manhole Typical
Concrete Barriers
31 Granite Blocks
13 Counter Weights
Concrete Barriers
Pallets & Wood Boxes
Apparent Concrete Foundation
Concrete Dumpster STRUCTURE #172 Top El. 111.4+/-
D-7 FOUND EXISTING P.K. SET IN CONCRETE Existing PNSY Control Point
Scrap Debris Area
2 Concrete Barriers
3 Blocks
Concrete Barriers
PNSY Coord System
Site Plan
PK Set w/Flasher

MATCH LINE

GRAPHIC SCALE
(IN FEET)
1 inch = 20 ft.
CHECK GRAPHIC SCALE BEFORE USING

SEE SHEET 1 of FOR GENERAL NOTES AND UTILITY CHART

LEGEND
EXISTING CONTOUR
EXISTING SPOT ELEVATION
PROPOSED CONTOUR

REV.	DESCRIPTION	PREP BY	DATE	APPRVD

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
PORTSMOUTH, NH
PORTSMOUTH NAVAL SHIPYARD
NORFOLK, VA
NORFOLK DIVISION
SEAL AREA

INTERIM CORRECTIVE MEASURES, DRMO
GRADING PLAN

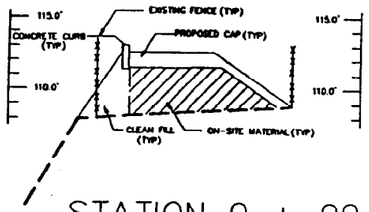
APPROVED
DATE
NORFOLK FOR COMMANDER, NAVFAC

DESIGN: McLAREN/HART LESTER, PA
DR: CHK: CHK FOR:
SUPV:
SUBMITTED BY: TITLE: DATE:
TITLE SURVEY
NORFOLK DIV
DR: PC:
FPC: DIR:
OFFICER IN CHARGE
DATE

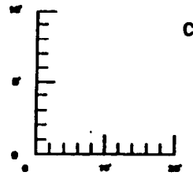
SAT TO DATE
CODE I.D. NO.
SCALE: 1"=20'
SPEC. NO. 04 -
CONSTRUCT. CONTR. NO.
NAVFAC DRAWING NO
SHEET OF
SIZE: D
EFS SH. NO

SECTIONS AND DETAILS

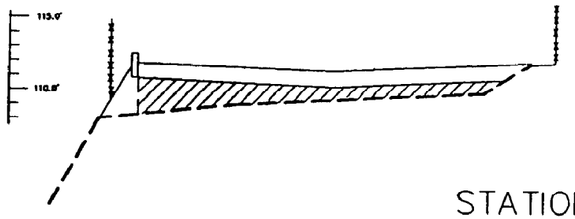
- Cross-sections at 50 foot stationing showing areas of excavation and fill
- Capping Detail
- Pre-cast Stormwater Inlet Detail
- Storm Sewer Piping Details
- Asphalt Paving Detail
- Fencing Detail
- Curbing Detail

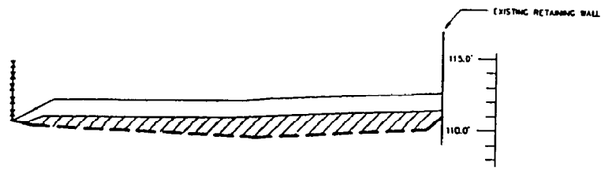


STATION 0 + 00

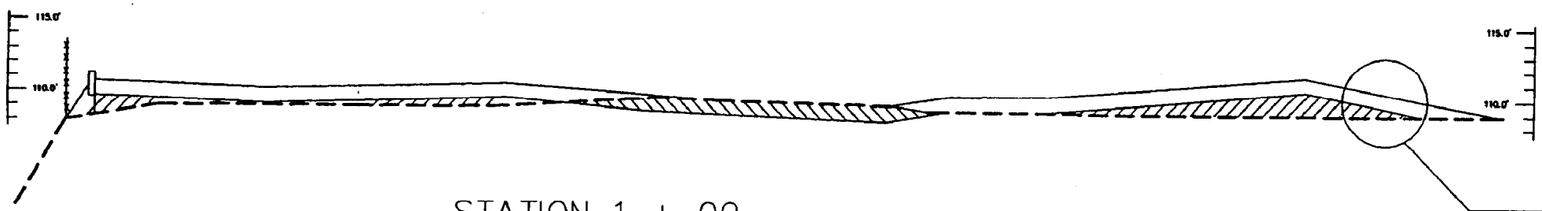


CROSS-SECTION SCALE:
HORIZ: 1" = 10'
VERT: 1" = 5'



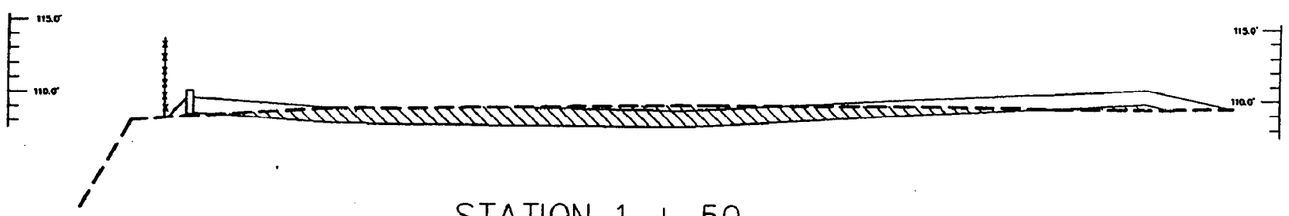


STATION 0 + 50

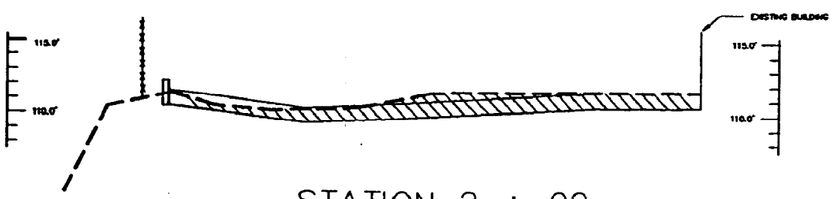


STATION 1 + 00

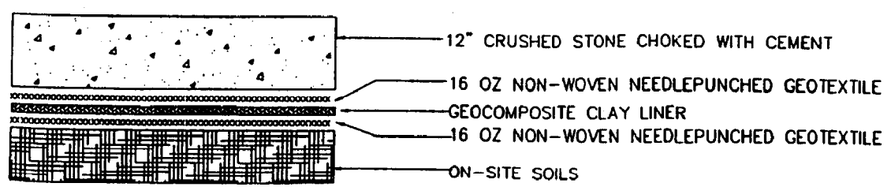
DETAIL A
(TYP)



STATION 1 + 50



STATION 2 + 00



DETAIL A – CAP DETAIL
(NOT TO SCALE)

REV.	DESCRIPTION	PREP BY	DATE	APPRVD

MCLAREN/HART LESTER, PA

DESIGN: DR: CK: ENG:
SUPV: TRNG ENGINEER
SUBMITTED BY: TITLE
NORTHDIV DIR: PWC
OFFICER IN CHARGE
CONCUR

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
PORTSMOUTH NAVAL SHIPYARD
PORTSMOUTH, NH

INTERIM CORRECTIVE MEASURES, DRMO
SECTIONS AND DETAILS

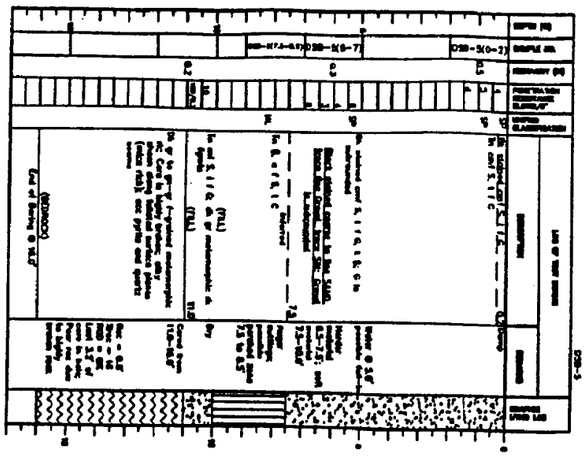
APPROVED
DATE
NORTHDIV FOR COMMANDER, NAVFAC

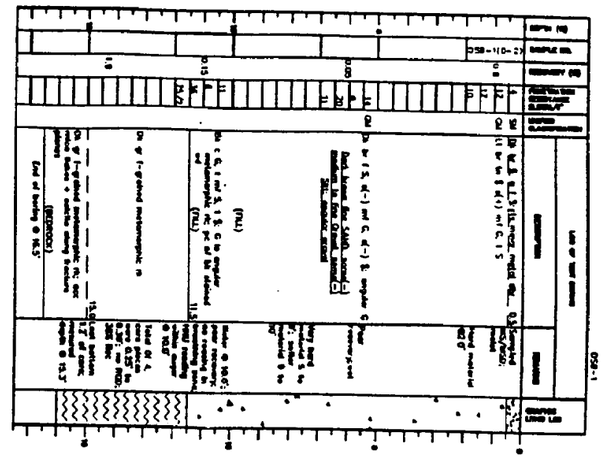
SEAL AREA

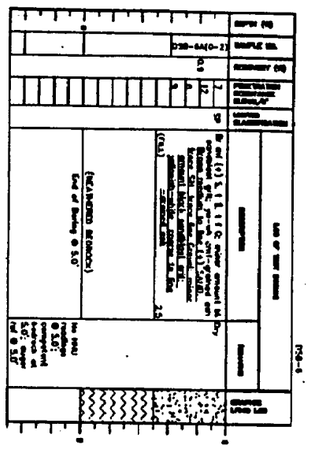
SAT TO SAVE
CODE I.D. NO.
SCALE:
SPEC. NO. 84 –
CONSTRN. CONTR. NO.
NAVFAC DRAWING NO.
SHEET OF
SIZE: DWG. SYL NO.

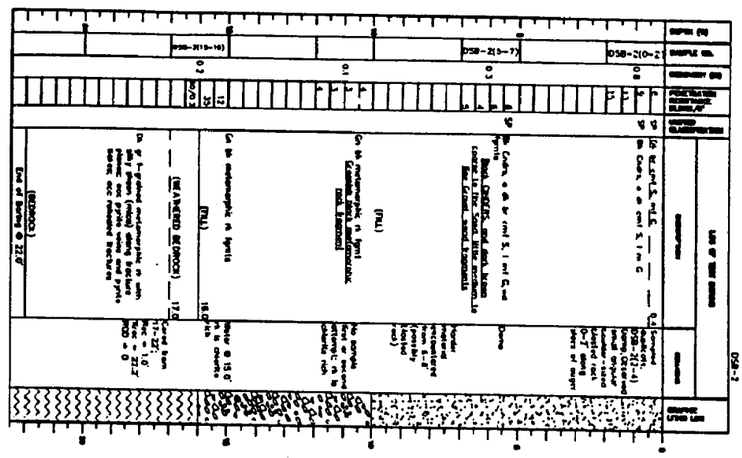
BORING LOGS

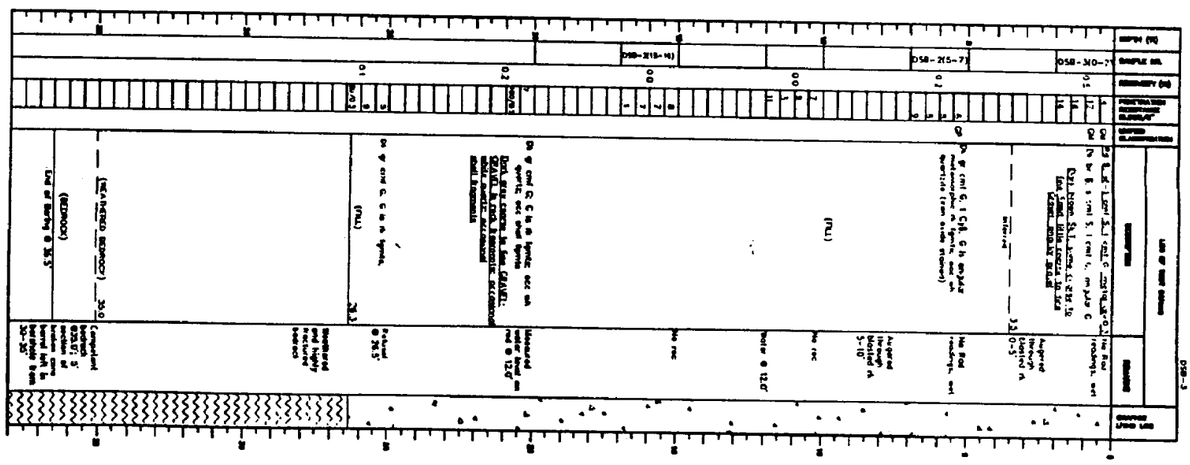
- **McLaren/Hart Soil Borings - November, 1989**

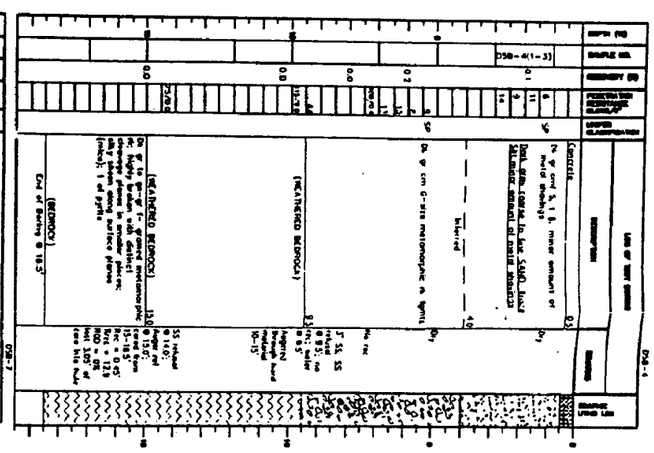


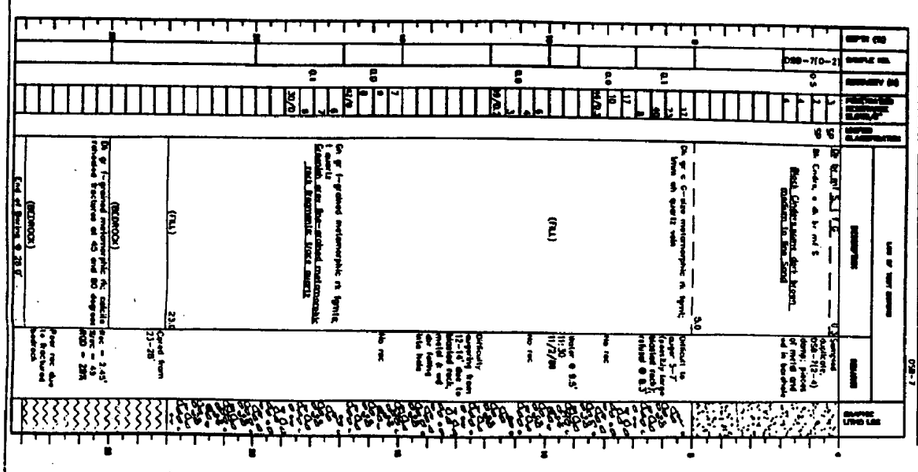












DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND

PORTSMOUTH NAVAL SHIPYARD — PORTSMOUTH, NH

INTERIM CORRECTIVE MEASURES, DRMO

BORING LOGS

APPROVED — DATE — NORTHDIV FOR COMMANDER, NAVFAC

REV.	DESCRIPTION	PREP BY	DATE	APPRVD

MCLAREN HART LESTER, PA

DSGN — DR — CHK

SUBMITTED BY:

NORTHDIV

OFFICER IN CHARGE

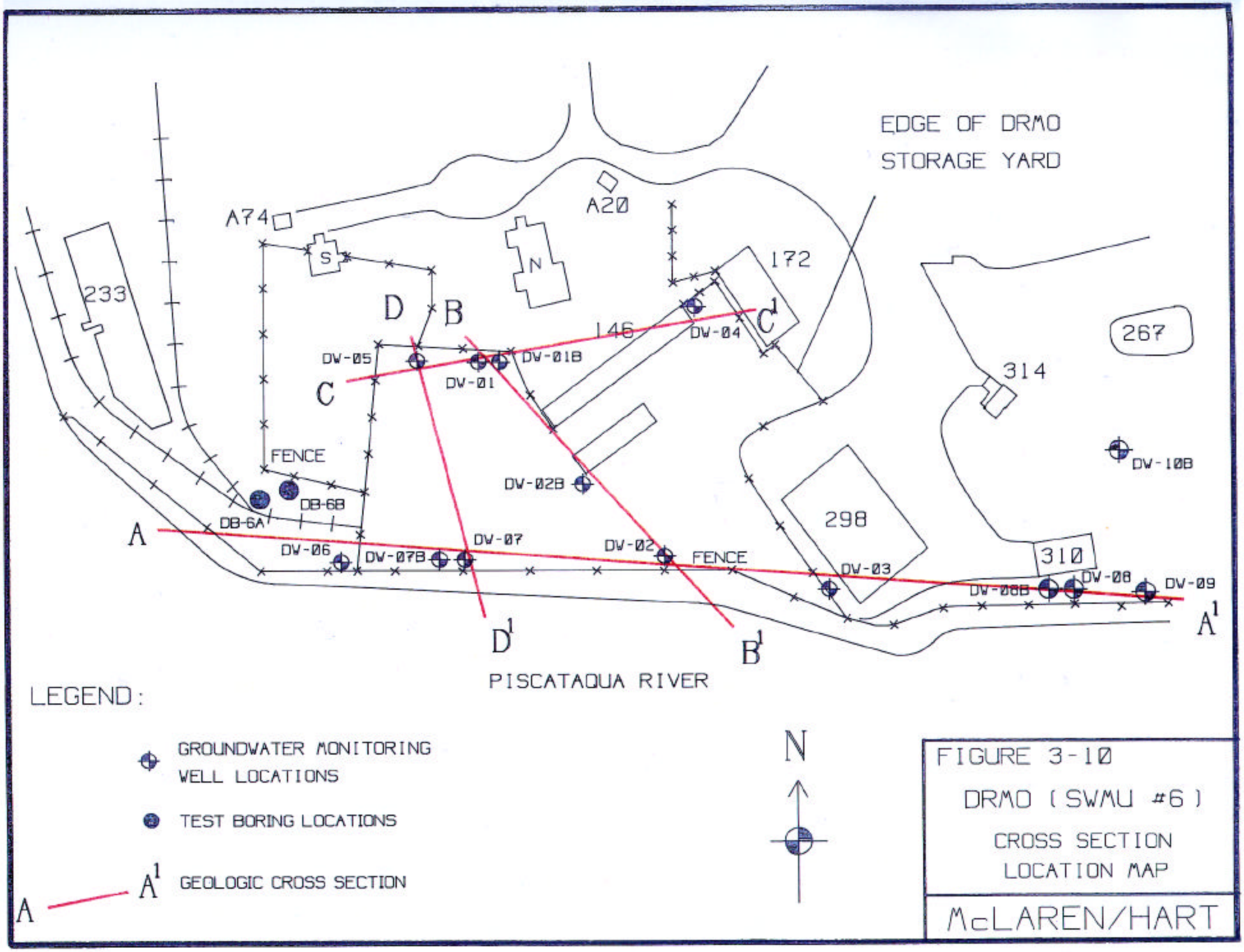
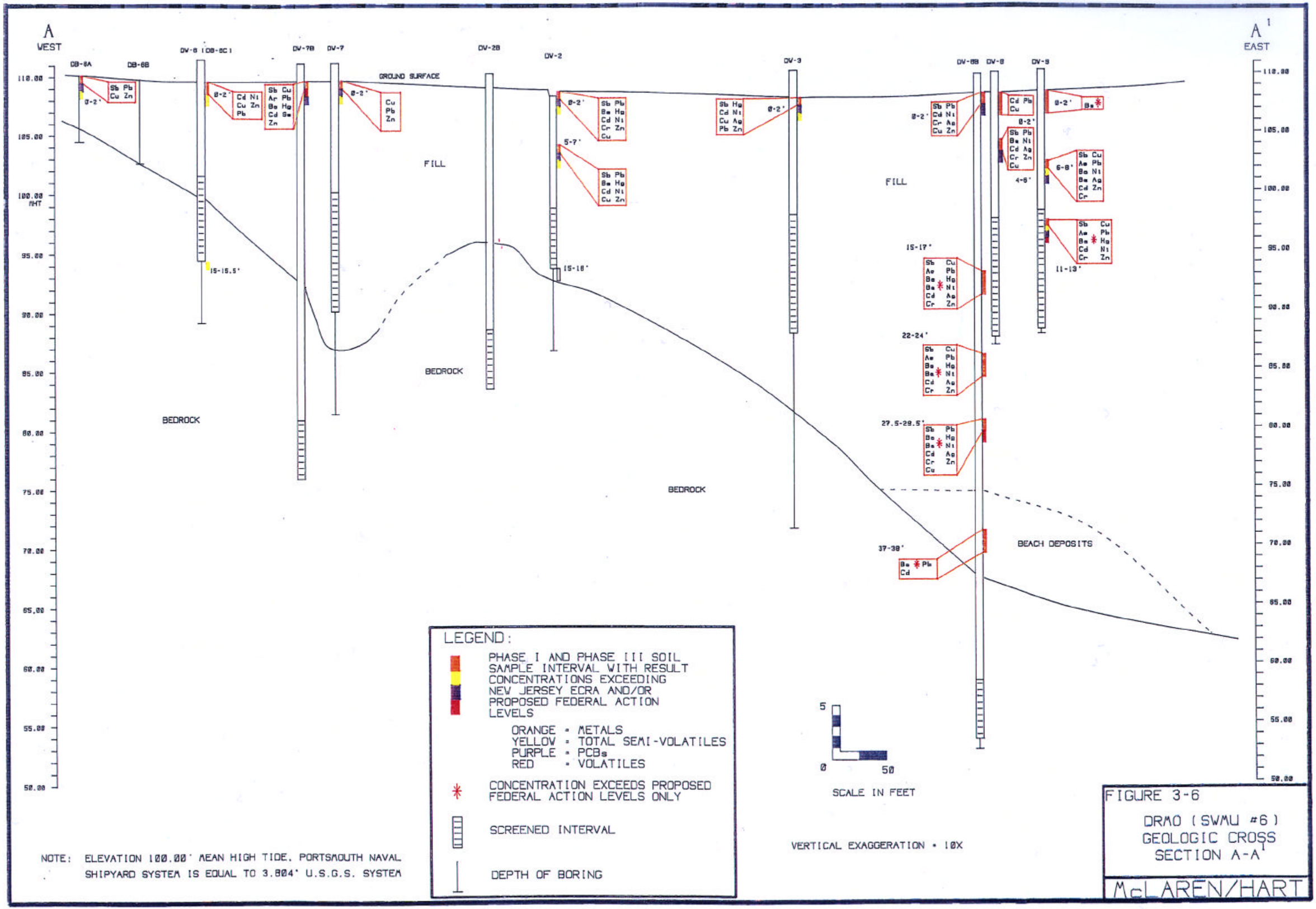


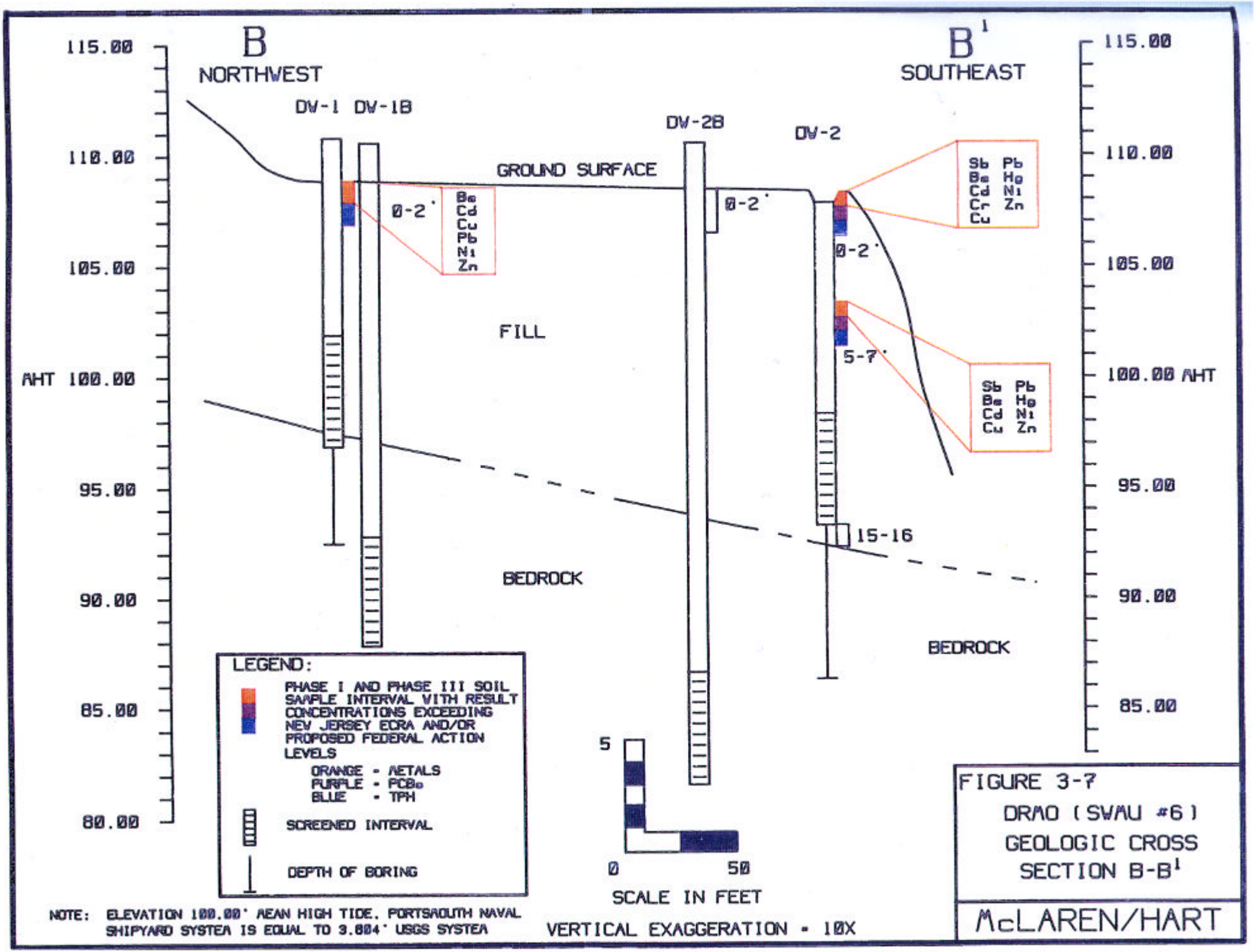
FIGURE 3-10

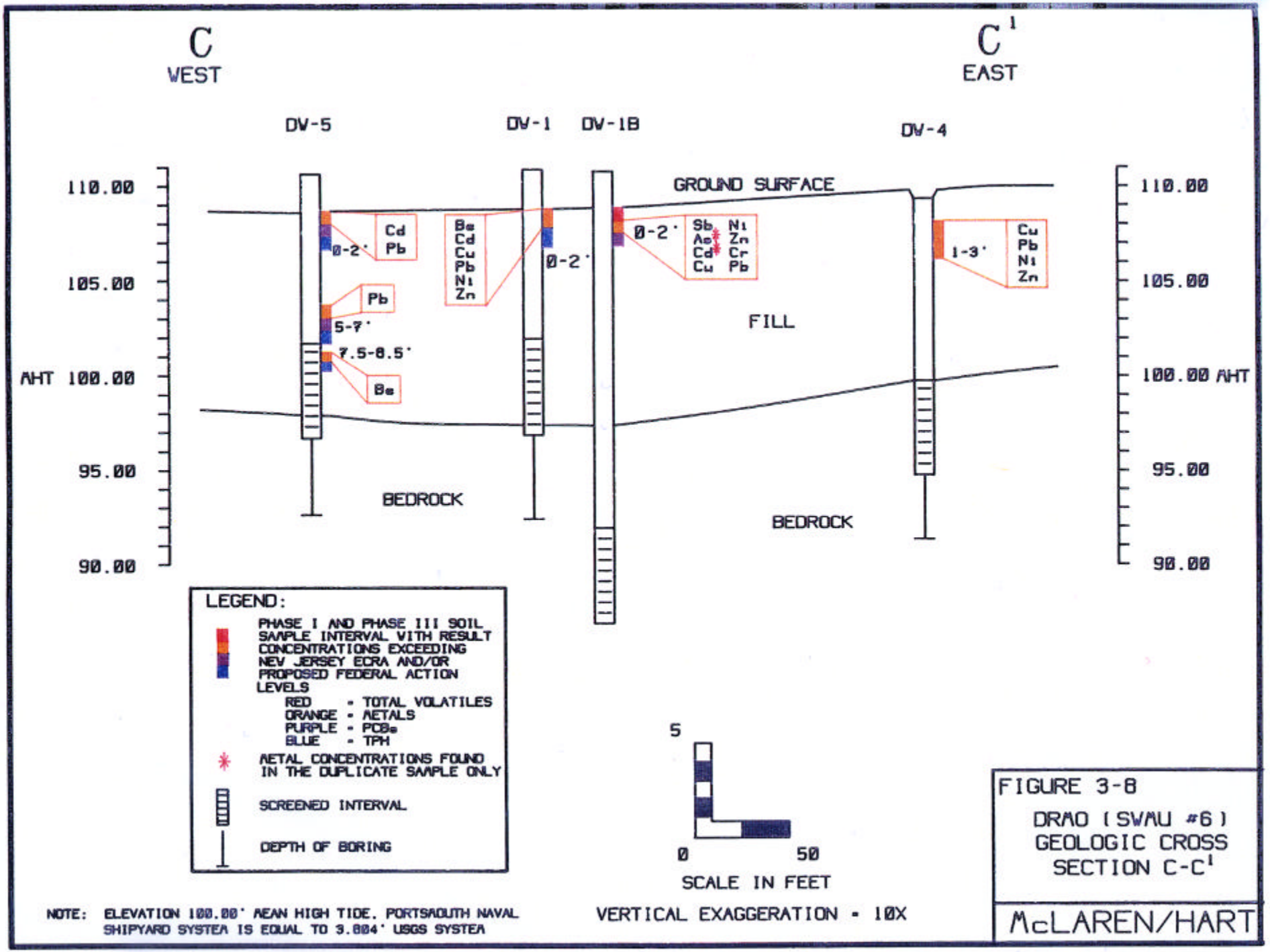
DRMO (SWMU #6)

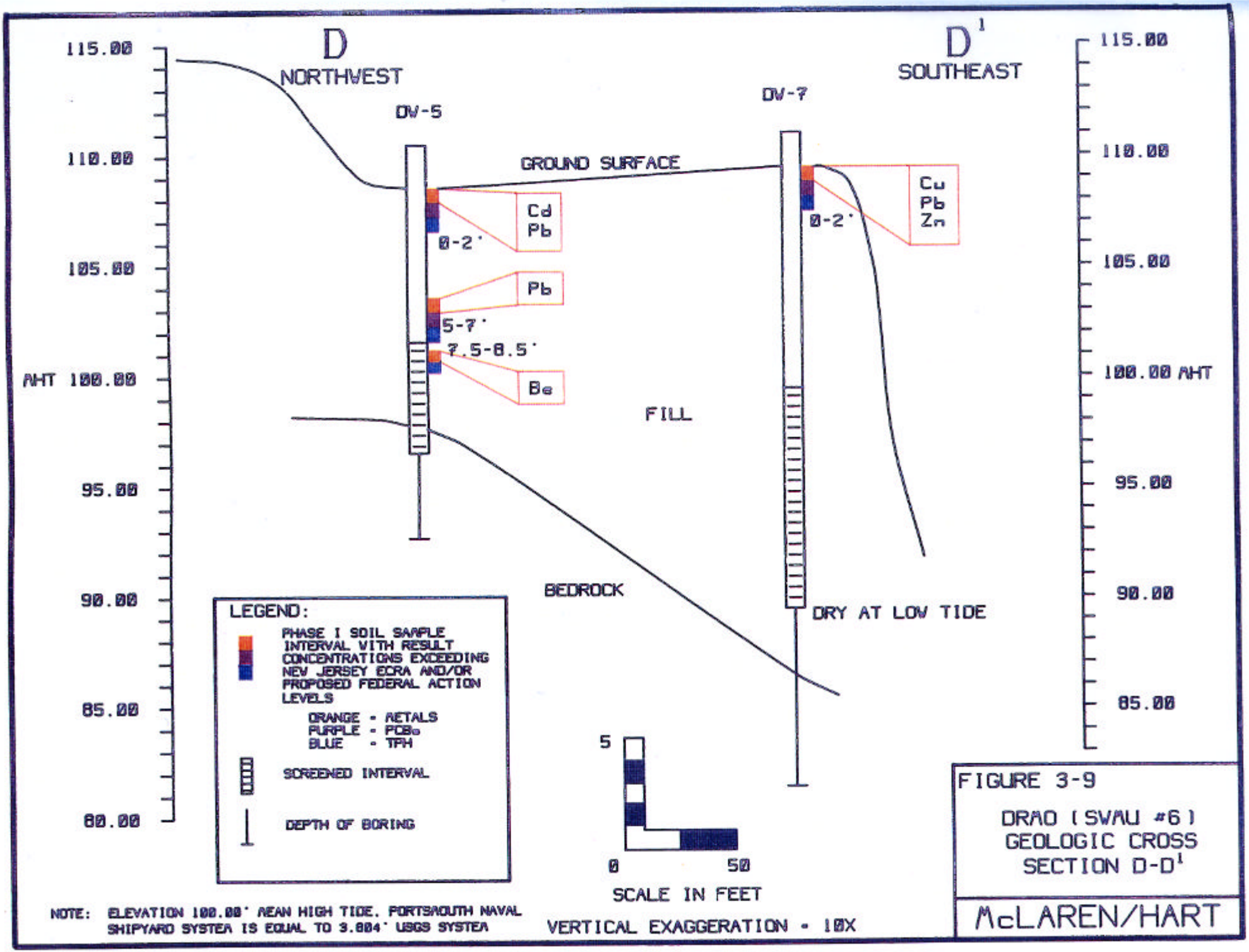
CROSS SECTION
LOCATION MAP

McLAREN/HART


A
WEST
A'
EAST
DB-6A
DB-6B
DV-6 (DB-6C)
DV-7B
DV-7
DV-2B
DV-2
DV-3
DV-8B
DV-8
DV-9
GROUND SURFACE
FILL
BEDROCK
BEACH DEPOSITS
110.00
105.00
100.00
NHT
95.00
90.00
85.00
80.00
75.00
70.00
65.00
60.00
55.00
50.00
0-2'
Sb Pb Cu Zn
Cd Ni Cu Zn Pb
Sb Cu Ar Pb Ba Hg Cd Se Zn
Cu Pb Zn
Sb Pb Ba Hg Cd Ni Cr Zn Cu
5-7'
Sb Pb Ba Hg Cd Ni Cu Zn
Sb Hg Cd Ni Cu Ag Pb Zn
Sb Pb Cd Ni Cr Ag Cu Zn
Cd Pb Cu
Sb Pb Ba Ni Cd Ag Cr Zn Cu
4-6'
Ba *
6-8'
Sb Cu Ag Pb Ba Ni Ba Ag Cd Zn Cr
11-13'
Sb Cu Ag Pb Ba * Hg Cd Ni Cr Zn
15-15.5'
15-18'
15-17'
Sb Cu Ag Pb Ba Hg Ba * Ni Cd Ag Cr Zn
22-24'
Sb Cu Ag Pb Ba Hg Ba * Ni Cd Ag Cr Zn
27.5-29.5'
Sb Pb Ba Hg Ba * Ni Cd Ag Cr Zn Cu
37-38'
Ba * Pb Cd
5
0
50
SCALE IN FEET
VERTICAL EXAGGERATION = 10X
LEGEND:
PHASE I AND PHASE III SOIL SAMPLE INTERVAL WITH RESULT CONCENTRATIONS EXCEEDING NEW JERSEY ECRA AND/OR PROPOSED FEDERAL ACTION LEVELS
ORANGE = METALS
YELLOW = TOTAL SEMI-VOLATILES
PURPLE = PCBs
RED = VOLATILES
* CONCENTRATION EXCEEDS PROPOSED FEDERAL ACTION LEVELS ONLY
SCREENED INTERVAL
DEPTH OF BORING
NOTE: ELEVATION 100.00' MEAN HIGH TIDE, PORTSMOUTH NAVAL SHIPYARD SYSTEM IS EQUAL TO 3.804' U.S.G.S. SYSTEM
FIGURE 3-6
DRMO (SWMU #6)
GEOLOGIC CROSS SECTION A-A'
McLAREN/HART


B
NORTHWEST
B'
SOUTHEAST
115.00
110.00
105.00
AHT 100.00
95.00
90.00
85.00
80.00
DW-1
DW-1B
DW-2B
DW-2
GROUND SURFACE
0-2'
Be
Cd
Cu
Pb
Ni
Zn
FILL
5-7'
15-16
BEDROCK
Sb
Pb
Be
Hg
Cd
Ni
Cu
Zn
LEGEND:
PHASE I AND PHASE III SOIL SAMPLE INTERVAL WITH RESULT CONCENTRATIONS EXCEEDING NEW JERSEY ECRA AND/OR PROPOSED FEDERAL ACTION LEVELS
ORANGE - METALS
PURPLE - PCBs
BLUE - TPH
SCREENED INTERVAL
DEPTH OF BORING
5
0
50
SCALE IN FEET
VERTICAL EXAGGERATION - 10X
NOTE: ELEVATION 100.00' MEAN HIGH TIDE, PORTSMOUTH NAVAL SHIPYARD SYSTEM IS EQUAL TO 3.804' USGS SYSTEM
FIGURE 3-7
DRMO (SWMU #6)
GEOLOGIC CROSS SECTION B-B'
McLAREN/HART


C
WEST
C'
EAST
DV-5
DV-1
DV-1B
DV-4
GROUND SURFACE
110.00
105.00
AHT 100.00
95.00
90.00
0-2'
Cd
Pb
Pb
5-7'
7.5-8.5'
Be
Be
Cd
Cu
Pb
Ni
Zn
0-2'
0-2'
Sb
As
Cd
Cu
Ni
Zn
Cr
Pb
1-3'
Cu
Pb
Ni
Zn
FILL
BEDROCK
BEDROCK
LEGEND:
PHASE I AND PHASE III SOIL SAMPLE INTERVAL WITH RESULT CONCENTRATIONS EXCEEDING NEW JERSEY ECRA AND/OR PROPOSED FEDERAL ACTION LEVELS
RED - TOTAL VOLATILES
ORANGE - METALS
PURPLE - PCBs
BLUE - TPH
METAL CONCENTRATIONS FOUND IN THE DUPLICATE SAMPLE ONLY
SCREENED INTERVAL
DEPTH OF BORING
5
0
50
SCALE IN FEET
VERTICAL EXAGGERATION - 10X
NOTE: ELEVATION 100.00' MEAN HIGH TIDE, PORTSMOUTH NAVAL SHIPYARD SYSTEM IS EQUAL TO 3.804' USGS SYSTEM
FIGURE 3-8
DRMO (SWMU #6)
GEOLOGIC CROSS
SECTION C-C'
McLAREN/HART


D
NORTHWEST
D'
SOUTHEAST
115.00
110.00
105.00
MHT 100.00
95.00
90.00
85.00
80.00
DW-5
DW-7
GROUND SURFACE
Cd
Pb
0-2'
Pb
5-7'
7.5-8.5'
Be
Cu
Pb
Zn
0-2'
FILL
BEDROCK
DRY AT LOW TIDE
LEGEND:
PHASE I SOIL SAMPLE INTERVAL WITH RESULT CONCENTRATIONS EXCEEDING NEW JERSEY ECRA AND/OR PROPOSED FEDERAL ACTION LEVELS
ORANGE - METALS
PURPLE - PCBs
BLUE - TPH
SCREENED INTERVAL
DEPTH OF BORING
5
0
50
SCALE IN FEET
VERTICAL EXAGGERATION - 10X
NOTE: ELEVATION 100.00' MEAN HIGH TIDE, PORTSMOUTH NAVAL SHIPYARD SYSTEM IS EQUAL TO 3.004' USGS SYSTEM
FIGURE 3-9
DRMO (SWMU #6)
GEOLOGIC CROSS
SECTION D-D'
McLAREN/HART

DRMO SOILS (148,600 yd^3)

VOLATILES	Average of Exceedances (mg/kg)	No. of Exceedances	Total No. of Samples Collected +	Concentration Range of Exceedances (mg/kg)	Proposed Federal Action Level (mg/kg)	N.J. ECRA Guidance Value (ppm)
Total Volatiles	4,233	5	52	1,800 - 8,714	NA	1,000

+ = Includes Duplicate Samples
NA = Not Applicable

DRMO SOILS (148,600 yd^3)

SEMI-VOLATILES*	Average of Exceedances (µg/kg)	No. of Exceedances	Total No. of Samples Collected +	Concentration Range of Exceedances (µg/kg)	Proposed Federal Action Level (µg/kg)	N.J. ECRA Guidance Value (ppb)
Bis(2-ethylhexyl)phthalate	110,000	1	52	110,000	50,000	NA
Total Base Neutrals	127,006	6	85	10,258 - 216,180	NA	10,000

* = Semi-Volatile constituents were chosen based on known carcinogenic effects (Table 4-2 of PHERE)
\+ = Includes Duplicate Samples
NA = Not Applicable

DRMO SOILS (148,600 yd^3)

INORGANICS*	Average of Exceedances (mg/kg)	No. of Exceedances	Total No. of Samples Collected +	Concentration Range of Exceedances (mg/kg)	Proposed Federal Action Level (mg/kg)	N.J. ECRA Guidance Value (ppm)
Arsenic	30.46	24	86	20.0 - 83.8	80	20
Beryllium	1.49	71	86	0.22 - 2.1	0.2	1
Cadmium	11.7	31	86	3.2 - 52.7	40	3
Chromium	186	18	86	102 - 527	400	100
Copper**	2,837	39	86	179 - 23,300	NA	170
Lead	13,943	55	86	257 - 255,000	NA	250
Nickel	839	27	86	107 - 4,970	2000	100
Zinc**	2,054	38	86	360 - 13,700	NA	350

* = Inorganic constituents were chosen based on known carcinogenic effects (Table 4-2 of PHERE)
** = Not a known carcinogen
\+ = Includes Duplicate Samples
NA = Not Applicable

DRMO SOILS (148,600 yd^3)

PESTICIDE/PCBs*	Average of Exceedances (µg/kg)	No. of Exceedances	Total No. of Samples Collected +	Concentration Range of Exceedances (µg/kg)	Proposed Federal Action Level (µg/kg)	N.J. ECRA Guidance Value (ppb)
4-4' DDE	2,500	1	66	2,500	2,000	NA
4-4' DDT	3,000	1	66	3,000	2,000	NA
Aldrin	110	1	66	110	40	NA
Dieldrin	217	3	66	170 - 280	40	NA
PCBs	10,937	22	86	690 - 58,900	90.0	1,000.0

* = Pesticide/PCB constituents were chosen based on known carcinogenic effects (Table 4-2 of PHERE)
\+ = Includes Duplicate Samples
NA = Not Applicable

DRMO SOILS (148,600 yd^3)

PETROLEUM HYDROCARBONS	Average of Exceedances (mg/kg)	No. of Exceedances	Total No. of Samples Collected +	Concentration Range of Exceedances (mg/kg)	Proposed Federal Action Level (mg/kg)	N.J. ECRA Guidance Value (ppm)
TPH	954.4	34	86	110 - 7,500	NA	100

+ = Includes Duplicate Samples
NA = Not Applicable