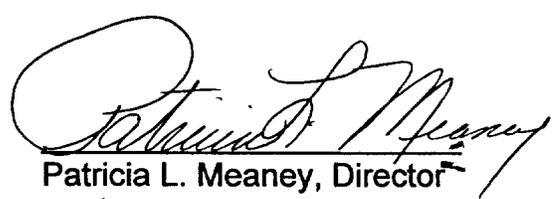


PSC Resources
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PSC Resources Superfund Site

Palmer, Massachusetts

Five-Year Review Report



Patricia L. Meaney, Director

Office of Site Remediation and Restoration

9/8/00
Date

PSC Resources Superfund Site

Palmer, Massachusetts

Final First Five-Year Review Report

I. Introduction

EPA New England Region has conducted a first five-year review of the remedial actions implemented at the PSC Resources Superfund Site in Palmer, Massachusetts. This review was conducted from March 2000 through August 2000. This report documents the results of the review. The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify deficiencies found during the review, if any, and identify recommendations to address them.

This review is required by statute. EPA must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA 121(c), as amended, states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

The NCP part 300.430(f)(4)(ii) of the Code of Federal Regulations (CFR) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

This is the first five-year review for the PSC Resources Site. The triggering action for this review is the initiation of the remedial action on September 12, 1995. Due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unrestricted use and unlimited exposure, a five-year review is required.

II Site Chronology

DATE	EVENT
1978	Massachusetts Department of Environmental Quality Engineering (DEQE)(now Mass Department of Environmental Protection or DEP), initiates actions against facility owners resulting in closing of facility.
1982 - 1984	Removal Activities - removing drums, liquids and sludge from tanks.
9/83	Final listing on EPA National Priorities List.
1986	Additional removal activities - Demolition and removal of remaining storage tanks and waste material contained in tanks.
1/92	Remedial Investigation/Feasibility Study (RI/FS) made available to public.
3/92	Proposed Plan identifying EPA's preferred remedy, presented to public. Start of public comment period.
9/15/92	Record of Decision (ROD) choosing the remedy is signed.
2/95	Consent Decree finalizing settlement for Responsible Party performance of remedy, entered by Federal Court.
9/11/95	Start of on-site construction for building/structures demolition and decontamination (1 st phase of site Remedial Action and date which triggers 5-year review). Completed 7/30/96.
11/26/96	Explanation of Significant Differences (ESD) issued by EPA, primarily changing a component of the remedy from "in-situ" to "ex-situ".
5/5/97	Start of on-site construction for stabilization remedy (2 nd phase of site Remedial Action).
8/28/98	Construction Completion.
9/8/98	Start of Operation and Maintenance.

III Background

The PSC Resources Site is an approximately four acre facility located on Water Street adjacent to and upgradient of the Quaboag River in Palmer, Massachusetts. Palmer is a community of approximately 12,000 residents, located in Hampden County. In addition to the property parcel, the Site includes the adjacent wetlands, wooded area and the immediately adjacent portion of the river. The Site is located within the 100-year flood zone of the Quaboag River. The Site is bordered by Water Street, wetlands and woodlands, by the Quaboag River, and by a soccer field. Residential and commercial properties are located across Water Street from the Site.

The historic land use of the Site has entailed some petroleum or solvent related industry since at least 1900. From at least 1974 until operations ceased in 1978 activities at the Site included waste oil and solvent recovery and disposal. In the course of these operations, spills occurred causing contamination of soils, sediments and groundwater. Contamination at the Site was discovered in the course of several property inspections conducted by the DEQE which documented; improper maintenance as well as waste oil and hazardous materials spills. Hazardous substances which have been released at the site in the following media include:

Soil

PCBs
PAHs
1,1-Dichloroethane
Cis-1,2-Dichloroethylene
Trans-1,2-Dichloroethylene
1,1,1-Trichloroethane
Trichloroethylene
Tetrachloroethylene
Benzene
Lead

Lagoon Sediment

Bis(2-ethylhexyl)phthalate
PAHs
1,1-Dichloroethane
1,1,1-Trichloroethane
Trichloroethylene
Tetrachloroethylene
Methylene Chloride
Benzene
Acetone
Lead

Wetland Sediment

PCBs
PAHs
Arsenic
Lead
Zinc

Groundwater

Bis(2-ethylhexyl)phthalate
Vinyl Chloride
1,1-Dichloroethane
Cis-1,2-Dichloroethylene
Trans-1,2-Dichloroethylene
1,1,1-Trichloroethane
Methylene Chloride
Trichloroethylene
Tetrachloroethylene
Benzene
2-Butanone (MEK)
Acetone
Lead

From 1978 to 1984, as a result of enforcement efforts by the Commonwealth of Massachusetts, approximately 1.5 million gallons of waste material were removed from the Site during a number of separate events. In 1986, interim measures were taken to; establish complete fencing of the Site, demolish and dispose of 19 storage tanks,

dispose of the oil and water contained in the tanks, and dispose of sludge generated during the cleaning of tanks.

The Site itself is currently fenced and the treated, stabilized soils and sediments are contained within the fenced area under an impermeable cap. As mentioned above, the current land use for the surrounding area is residential, commercial (both are across the street from the Site) and recreational (the adjacent soccer field). Although there have been a number of zoning changes over the years, it is anticipated that a mix of land uses similar to that described will continue into the future. In establishing cleanup requirements for the Site, EPA considered the theoretical possibility of residential development at the Site.

IV Remedial Actions

A. Remedy Selection

The Record of Decision (ROD) for the PSC Resources site was signed on September 15, 1992. Remedial Action Objectives (RAOs) were developed as a result of data collected during the Remedial Investigation to aid in the development and screening of remedial alternatives to be considered for the Record of Decision. The RAOs for PSC Resources were:

Source Control Response Objectives

- Minimize the migration of contaminants from the property soils and lagoon sediment that could degrade ground water quality;
- Reduce risks to human health by preventing direct contact with, and ingestion of, contaminants in the property soils, wetland sediments, and lagoon sediments; and potential ingestion of contaminated ground water;
- Reduce risks to the environment by preventing direct contact with, and ingestion of, contaminants in the wetland sediments;
- Minimize the migration of contaminants (i.e., from property soils, lagoon sediments, and wetland sediments) that could result in surface water concentrations in excess of Ambient Water Quality Criteria.

Management of Migration Response Objectives

- Eliminate or minimize the threat posed to human health and the environment by preventing exposure to ground water contaminants;

- Prevent further migration of ground water contamination beyond its current extent; and
- Restore contaminated ground water to Federal and State applicable or relevant and appropriate requirements (ARARs), including drinking water standards, and to a level that is protective of human health and the environment within a reasonable period of time.

The major components of the source control remedy selected in the ROD include:

1. Decontamination, demolition, and off-site disposal of property structures; Treatment and discharge of lagoon surface water;
2. Consolidation of contaminated property soils with lagoon and wetland sediments on site property;
3. In-situ mixing and stabilization of property soils/sediments with treatment agents to bind contaminants into a stable matrix;
4. Construction of a permeable cap over stabilized property soils and sediments, and grading and planting of the cap's surface;
5. Restoration of wetlands;
6. Implementation of institutional controls on groundwater use and land development; and
7. Long-term monitoring of groundwater, wetland sediments, and Quaboag River water and sediments.

The major components of the management of migration remedy selected in the ROD include:

1. Use of natural attenuation to achieve groundwater cleanup levels;
2. Groundwater monitoring of existing wells on the PSC Resources, Inc. property and of monitoring wells adjacent to the property;
3. Sediment sampling of portions of the wetland and the Quaboag River, where groundwater discharges to the wetland and the Quaboag River;
4. Surface water sampling in areas adjacent to the wetland and in the Quaboag River; and
5. Five-year site reviews to assess site conditions, contaminant distributions, and any associated site hazards.

An Explanation of Significant Differences (ESD) was issued on November 26, 1996. The primary changes documented in the ESD were:

- Ex-situ stabilization instead of in-situ; and
- Construction of a low-permeability cap instead of a permeable cap.

- The change to ex-situ stabilization led to the necessity of designating a Corrective Action Management Unit (CAMU) at the Site concurrent with the ESD. This designation allowed the handling and temporary storage of contaminated soils and sediments which was necessary using ex-situ stabilization.

B. Remedy Implementation

In a Consent Decree (CD) signed with EPA on September 18, 1994, the Performing Settling Defendants (PSDs) agreed to perform the remedial design/remedial action (RD/RA). The RD was conducted in conformance with the ROD as modified by the ESD. The RD was approved by EPA on March 5, 1997.

The Remedial Action (RA) took place in two phases. The first phase entailed the decontamination, demolition and off-site disposal of property structures. The activities for this phase were initiated on September 12, 1995 and were completed on December 28, 1995. The major components of this phase of the RA were:

- Decontamination of the buildings and structures on the property;
- Removal, treatment, and discharge to the Quaboag River of water from the basement of one building and water collected from decontamination.
- Collection and analyses of composite samples of buildings and structures.
- Demolition and off-site disposal of property buildings and structures and off-site disposal of miscellaneous debris from the property;
- Removal and off-site disposal of two underground storage tanks and one manhole and their contents; and
- Restoration of demolition areas to match existing grade.

The second phase entailed all other remedial activities. Component numbers 2 through 7 of the Source Control Remedy as listed in Section A., constituted the primary activities performed as the second phase of the RA. The activities for the second phase of the RA were formally initiated on March 11, 1997 when the PSDs awarded the RA contract. The contractor conducted remedial activities as planned and EPA and the State conducted a pre-final inspection on November 19, 1997. During this period, 1,606 cubic yards of lagoon sediment, 1,187 cubic yards of wetland sediment and 8,004 cubic yards of soil were treated, stabilized and placed under the impermeable cap. In addition, a fence and surface water drainage structures were built. At this time,

the preparation for the wetland restoration (grading and backfilling of clean sediment material) and the planting of new, replacement wetland species was accomplished. The pre-final inspection concluded that construction had been completed in accordance with the remedial design plans and specifications and did not result in the development of a punch list. The ***Final Remedial Construction Source Control Close-out Report***, submitted by the PSDs has been approved by EPA and MADEP.

The site achieved construction completion status when the Preliminary Close Out Report was signed on August 28, 1998.

EPA and the state have determined that all RA construction activities, including the implementation of institutional controls, were performed according to specifications. The Interim RA Report documenting the completion of Remedial Action, was issued on March 8, 1999. It is expected that cleanup levels for all groundwater contaminants will have been reached within approximately 10 years. After groundwater cleanup levels have been met, EPA will issue a Final RA Report.

C. Operation and Maintenance

The PSDs are conducting long term monitoring and maintenance activities according to the operation and maintenance (O&M) plan which was approved by EPA September 8, 1998. The primary activities associated with O&M include:

- Visual inspection of the cap with regard to vegetative cover, settlement, stability, and any need for corrective action. In addition, the cap is scheduled to be mowed semi-annually.
- Inspection of the drainage swale for blockage, erosion and instability, and any need for corrective action.
- Inspection of the condition of groundwater monitoring wells.
- Environmental monitoring. Quarterly monitoring of groundwater, wetland surface water and sediment, and Quaboag River surface water and sediment.
- Engineered Wetlands inspection and assessment: Inspections are conducted primarily for the purposes of assessing both weed control needs and the survival of plantings. Assessments are performed specifically to determine if the Engineered wetlands are meeting the performance standards regarding the survival and density of desired wetland species.

The primary cleanup of the PSC Resources Site took place during the construction phase of the Remedial Action (i.e. the stabilization of contaminated soil and sediments). The other remaining component of cleanup is the natural attenuation of groundwater, as the source of groundwater contamination in soil and sediment has been removed. Therefore, as indicated in the planned elements above, the primary O&M activities have been geared towards inspections and maintenance.

A currently evolving issue exists with regard to the engineered wetlands. The total area of engineered wetlands at the PSC site is 0.7 acres. This area encompasses wetland habitats which were replanted with appropriate wetland plant species following the removal of contaminated sediments during the RA. As mentioned above there are performance standards with regard to density of desired plant species and minimizing weeds and other undesirable species. The Performing Settling Defendants are obligated to meet these standards. During the course of the O&M period, there have been repeated access issues involving the property abutting the southern border of the PSC Resources property. During the RA, contaminated sediments were removed from this property, clean sediment was backfilled, and wetland plants were planted. Since completion of the RA the owner of this property has prevented PSD contractors from performing maintenance (weeding and replanting, as necessary) in an area which is highly at risk from invasive species. The area affected by this issue is 0.32 acres. EPA, MADEP and the Performing Settling Defendants are working together to determine if there is additional wetland acreage at the site which may be amenable to restoration or enhancement. If an appropriate area is found, it may be substituted for the 0.32 acre area which is not accessible for maintenance.

V. Five-Year Review Process

The PSC Resources five-year review was led by Don McElroy of EPA, Remedial Project Manager for the PSC Resources site. Harish Panchal of MADEP assisted in the review as the representative for the support agency.

This five-year review consisted of a review of relevant documents (see Attachment 1), review of applicable groundwater cleanup standards and consultation with risk assessment personnel. The completed report is available at the information repository.

VI. Five-Year Review Findings

As discussed previously, the active work for the PSC Resources Site Remedial Action has been completed with the exception of the groundwater component. Groundwater is being remediated via natural attenuation following removal of contamination sources in soil and sediments. There are really no ongoing operations at the Site.

The primary focus of this section is a review of ARARs, assumptions utilized in the risk assessment, a review of monitoring data obtained during the Operation and Maintenance (O&M) period and the results of the site inspection.

A. ARARs

As the remedial work has been completed, most ARARs cited in the ROD, do not have current relevancy. ARARs which do retain relevancy at this time and which have been evaluated include: the Safe Drinking Water Act (SDWA)(40 CFR 141.11-141.16) from which were derived many of the groundwater cleanup levels - Maximum Contaminant Levels (MCLs), and MCL Goals (MCLGs); ARARs related to wetland protection, and ARARs related to post-closure monitoring.

There have been no changes in these ARARs affecting the protectiveness of the PSC Remedy.

B. Risk Assessment Assumptions

The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures(older child trespasser, adult trespasser) and potential future exposures (young and older child future resident, future adult resident and future adult worker). These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk based cleanup levels. No change to these assumptions or the cleanup levels developed from them, is warranted.

C. Monitoring Data

Groundwater monitoring has been conducted at the PSC Resources Site since the late 1980's. In general, most contaminants were detected at their highest levels early in the Removal/Remedial history of the Site (1989-1990). This high level followed by a drop in contaminant level may well have been the result of removal activities eliminating significant source material.

Since the completion of construction in 1997, 5 of the 13 contaminants for which groundwater cleanup levels have been established have exceeded their respective cleanup value in 1 or more sampling event. The other 8 contaminants have not exceeded cleanup levels during this period. While not absolute or fully consistent, in general contaminant concentrations have trended downwards over time. Recent monitoring results for the 5 contaminants which have exceeded cleanup values since the completion of construction are shown on Table 1. The monitoring record indicates that the groundwater attenuation process conceptualized in the ROD is proceeding essentially as expected.

As noted in Table 1, Well 103c was not sampled in March, 2000. Well 103c, which is downgradient of the site and has exhibited elevated levels of benzene, could not be sampled because during the sampling event, the area of the well was flooded. In the future, if it is not possible to obtain a sample during a scheduled monitoring event, provisions have been made to return to the site at a later date to obtain the sample and ensure that the monitoring record is complete.

D. Site Inspection

Inspections at the site were conducted in January and May of 2000. No significant issues have been identified at any time regarding the cap, the drainage structures or the fence. The primary issues identified have to do with trespassing and its effect on plantings within restored wetlands. As noted, a joint effort between the Governments and the Performing Settling Defendants, is being made to potentially change some of the wetland areas which are subject to restoration. In addition, the use of additional fencing is being considered within the site property boundaries to inhibit trespassing and better protect restored wetland plantings.

E. Institutional Controls

Institutional controls are in place for the PSC Resources property as well as for the adjacent Town-owned property, the only properties on or near the Site requiring institutional controls. These institutional controls are established through the Access and Institutional Controls Agreement between the Performing Settling Defendants and the Town of Palmer (Appendix J of the Consent Decree), dated October 20, 1994, and recorded on June 19, 1997 in the Hampden County Registry of Deeds at Book 9901, pages 118 through 136. Paragraph 7 of Appendix J identifies the institutional controls which are in place, including prohibitions on the use or disturbance of ground water until cleanup levels are achieved, and prohibitions on excavation activities, disturbance of the cap, and any other activities or actions which might interfere with the implemented remedy.

VII. Protectiveness Statement

The remedy for the PSC Resources Site was implemented as required in the ROD and as modified by the ESD. The assumptions used at the time of remedy selection are valid and no changes to cleanup levels are warranted. Verification sampling determined that soil and sediment with contamination above cleanup levels had been excavated. Analytical testing showed that the treatment process was effective on the contaminated material (soil and sediment) and that all performance criteria were achieved. Groundwater monitoring shows that natural attenuation is progressing towards achieving cleanup levels. The threats posed by exposure to contaminated soil and sediment at the PSC Resources have been addressed.

Institutional controls have been put in place to ensure that contaminated groundwater is not used and that no actions take place which interfere with the implemented remedy. The remedial action at PSC Resources will be protective when the groundwater cleanup levels are achieved as expected.

VIII. Conclusions

As noted there really no "operations" at the PSC Resources Site. The ongoing activities relate to maintenance and monitoring.

The maintenance of restored wetlands, is an ongoing issue which while not affecting the protectiveness of the remedy, does involve significant effort. As discussed previously, EPA, MADEP and the Performing Settling Defendants are working together to successfully conclude this effort.

Inspection and maintenance of the fence cap and drainage systems has been straightforward and has necessitated minimal follow-up thus far.

Quarterly environmental monitoring, which includes groundwater, surface water and sediment sampling, will continue to be a long term activity until at least attainment of groundwater cleanup levels. It is expected that the contingency provisions made following the March, 2000 monitoring event (section **VI.C. Monitoring Data**) will prevent further gaps in the monitoring record.

IX. Next Review

Five-year reviews are conducted every five years at sites where contaminant levels remain at concentrations that prevent unlimited, unrestricted use of the Site. The next five-year review for the PSC Resources Superfund Site should be conducted by 2005.

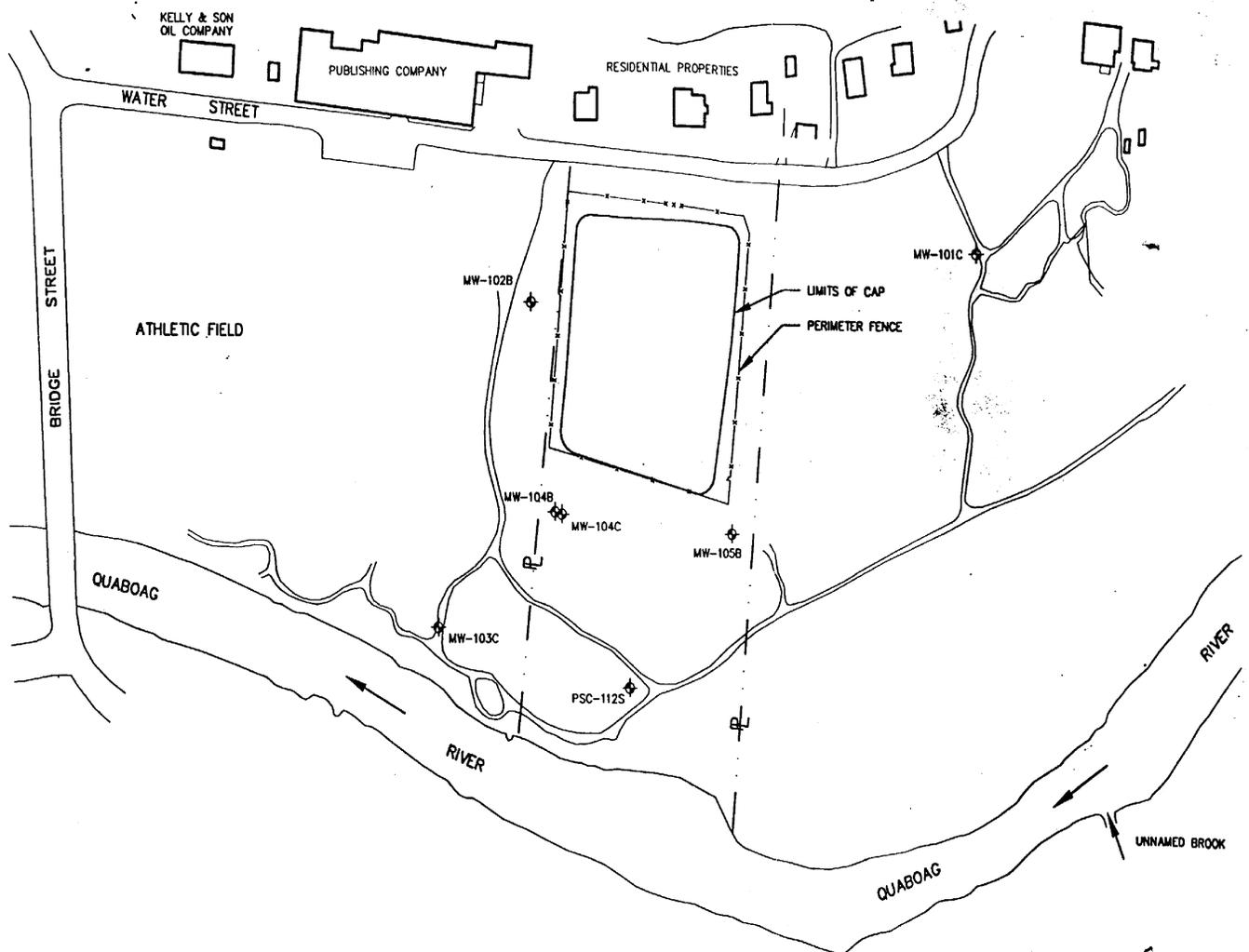
Attachment 1

Documents Reviewed for the 5-year Review

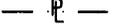
1. HMM Associates, Inc. PSC Resources Site, Remedial Investigation
January, 1992
2. HMM Associates, Inc. PSC Resources Site, Feasibility Study
January, 1992
3. Environmental Protection Agency. PSC Resources Site, Record of
Decision. September 15, 1992
4. Environmental Protection Agency. PSC Resources Site, Explanation of
Significant Differences. November 26, 1996
5. O'Brien & Gere Engineers, Inc. Final Remedial Construction Source
Control Close-Out Report. June 1998.
6. O'Brien & Gere Engineers, Inc. Operation and Maintenance Plan,
Environmental Monitoring Work Plan, and Project Operations Plan.
June 1998.
7. Environmental Protection Agency. PSC Resources Site, Preliminary
Close-Out Report (PCOR). August 28, 1998.
8. Environmental Protection Agency. PSC Resources Site, Remedial Action
Report. March 9, 1999.

Table 1											
Recent Groundwater Monitoring Results											
Contamination	Cleanup #	Concentration	Date	Concentration	Date	Concentration	Date	Concentration	Date	Concentration	Date
Well #	(ppb)										
Benzene	5	110*	3/99	130*	6/99	310(est)*	9/99	120*	12/99	58*	3/00
104b-a											
Benzene	5	2300*	3/99	4900*	6/99	530*	9/99	190*	12/99	39*	3/00
104c											
Benzene	5	100*	3/99	130*	6/99	130*	9/99	100*	12/99	Not Sampled	
103c											
Trichloroethene	5	15(est)*	3/99	5.5*	6/99	ND	9/99	0.29(est)	12/99	0.014(est)	3/00
105b											
Vinyl chloride	2	13*	3/99	5.2*	6/99	ND	9/99	ND	12/99	5.9(est)*	3/00
105b											
cis-1,2-Dichloroethene	70	ND	3/99	78*	6/99	7.4(est)	9/99	5.8	12/99	0.88	3/00
104c											
Lead	0.015	0.005(est)	3/99	0.004(est)	6/99	0.017*	9/99	ND	12/99	0.003(est)	3/00
104c											
ND = Not Detected			(EST)=ESTIMATED VALUE			*EXCEEDS CLEANUP LEVEL					

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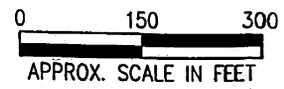


LEGEND

-  MW-104B
MONITORING WELL LOCATION TO BE SAMPLED
-  — x —
APPROX. FENCELINE LOCATION
-  — P —
PSC RESOURCES PROPERTY BOUNDARY

PSC RESOURCES
SUPERFUND SITE
PALMER, MASSACHUSETTS

**GROUND WATER SAMPLING
LOCATIONS**

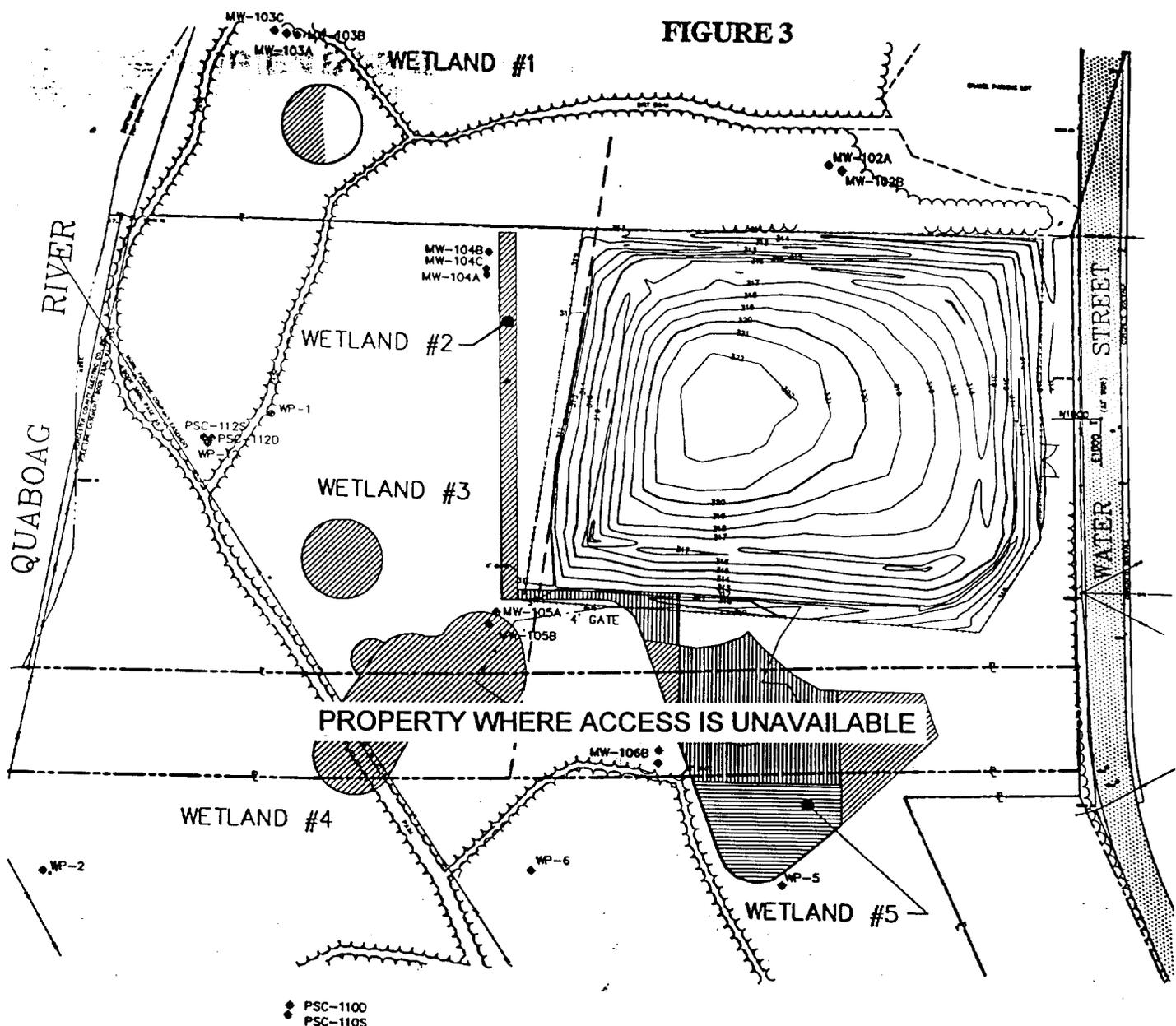


NOTE: THIS DRAWING WAS PREPARED BASED UPON INFORMATION WITHIN THE "GROSS" REMEDIAL INVESTIGATION VOLUME 1 OF IV, SECTIONS 1 THROUGH 3, DATED JANUARY, 1992, PREPARED BY EMM ASSOCIATES, INC.

FILE NO. 5819.003-072



FIGURE 3

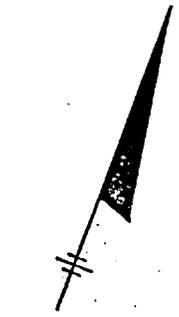
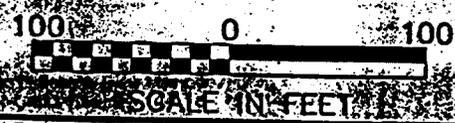


- LEGEND**
- OVERHEAD WIRES
 - PROPERTY LINE
 - EDGE OF WOODS
 - TOP OF BANK, BOTTOM OF BANK
 - - - APPROX. LIMITS OF FLOODWAY BOUNDARY
 - - - PROPERTY OWNED BY ROBERT HAFNER
- WETLAND TYPES**
- EMERGENT
 - SCRUB/SHRUB
 - FORESTED
- UTILITY POLE
 - GUY WIRE
 - SANITARY MANHOLE
 - GATE IN FENCE
 - DRAINAGE MANHOLE

FIGURE NOTES:
 1. FIGURE ADAPTED FROM "FINAL SITE PLAN"
 AS-BUILT DRAWING SHEET C-4 FILE NUMBER
 5819.003-045.

**PSC RESOURCES SUPERFUND SITE
 PALMER, MASSACHUSETTS**

SITE PLAN



5819.005-008
 NOVEMBER 1999



11/20/99