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Five-Year Review Report

Third Five-Year Review Report
for
Yaworski Lagoon Superfund Site
Town of Canterbury
Windham County, Connecticut

September 2008

PREPARED BY:

United States Environmental Protection Agency
Region I
Boston, Massachusetts

Approved by: Date:

for James T. Owens, III, Director
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U.S. Environmental Protection Agency – New England

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LIST OF ACRONYMS AND ABBREVIATIONS

ACRONYM	DEFINITION
ACL	Alternate Concentration Limit
ARARs	Applicable or Relevant and Appropriate Requirements
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability
CFR	Code of Federal Regulations
CT DEP	Connecticut Department of Environmental Protection
ELUR	Connecticut Environmental Land Use Restriction
EPA	United States Environmental Protection Agency
ER-L	Effects Range-Low, a sediment benchmark
ER-M	Effects Range-Medium, a sediment benchmark
LTRA	Long-Term Remedial Action
MCLs	Maximum Contaminant Levels
M&E	EPA contractor Metcalf & Eddy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
O&M	Operation & Maintenance
OU	Operable Unit
PAHs	Polycyclic Aromatic Hydrocarbons
PCL	Protective Concentration Limit
ppb	parts per billion
PRP	Potentially Responsible Party
RA	Remedial Action
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RD/RA	Remedial Design/Remedial Action
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RSRs	Connecticut Remediation Standard Regulations
SARA	Superfund Amendments and Reauthorization Act of 1986
TOC	Total Organic Carbon
VOCs	Volatile Organic Compounds
WasteLAN	The Regional database related to the Comprehensive Environmental Response, Compensation, and Liability Information System

EXECUTIVE SUMMARY

The remedy selected to address contamination at the Yaworski Lagoon Superfund Site, located in the Town of Canterbury, Windham County, Connecticut, as outlined in the September 29, 1988 Record of Decision, includes:

- construction of a permanent, multi-layer cap over the lagoon, including reinforcement of the earthen dike surrounding the lagoon;
- establishing Alternate Concentration Limits (ACLs) as the groundwater protection standard for the site;
- restriction of groundwater use both within the meander bend of the river and on three properties located across the river from the site; and
- compliance monitoring of groundwater, surface water, and sediment for 30 years.

The site achieved construction completion when the Preliminary Close Out Report was signed on September 20, 2000. On September 28, 2001, EPA determined that the remedy was Operational and Functional, and documented this in an Interim Remedial Action (RA) Report.

The remedy at the Yaworski Lagoon Superfund Site currently protects human health and the environment in the short-term because: 1) there is no current exposure to contaminated groundwater originating from the site, 2) based on evaluation of surface water and sediment data collected as part of compliance monitoring, threats to human health and ecological receptors from site-related contamination are not significant, and 3) the Connecticut Department of Environmental Protection (CT DEP) continues to perform operation and maintenance (O&M) on the lagoon cap and past inspections reveal the cap to be an effective barrier to exposure to contaminated waste by human and ecological receptors. In order for the remedy to be protective in the long-term, follow-up actions are required.

The public is protected from on-site contaminants because the fence and the lagoon cap impede direct access to the lagoon and the wastes contained within the lagoon. Control of the area around the site is generally restricted by locked gates, and the entrances are posted with no trespassing signs. There is no longer any public activity at the landfill property located next to the lagoon.

EPA performs ongoing evaluation of all results from compliance monitoring of groundwater, surface water and sediment. EPA reviewed recent ACL and MCL exceedances in groundwater and none of the current exceedances have warranted further action beyond evaluation. These exceedances do not represent a risk to human health since there is no current exposure to contaminated groundwater. EPA will conduct a screening level human health risk review of the ACL values, as well as recent ACL exceedances, to determine whether the ACL values require updating and/or whether added investigation of surface water and sediment is needed.

EPA reviewed levels of polycyclic aromatic hydrocarbons (PAHs) in sediment and concluded that these levels are unlikely to pose a significant risk to human health from potential incidental ingestion of and dermal contact with PAHs. EPA has also preliminarily concluded that the source of PAHs in sediment is from a location upstream of the lagoon and the nearby landfill. EPA continues to evaluate PAH exceedances in sediment, and will also conduct an ecological review of all ACL values and ACL exceedances to determine if more sampling is required in surface water or sediment. Review of previous surface water data will be included in this review. After completing the ecological evaluation and review, EPA, in conjunction with CT DEP, will make a final decision about future sediment and surface water sampling.

Institutional controls are required to prevent groundwater pumping from drawing contamination into uncontaminated areas, and to prevent exposure to contaminants in groundwater. Institutional controls have not yet been implemented on three off-site properties that are not owned by Potentially Responsible Parties (PRPs), but the agencies have initiated surveys and other work required to finalize easements to implement restrictions on all three properties.

With respect to land use and groundwater use restrictions within the meander bend of the river, the Yaworskis had previously agreed to these restrictions pursuant to the 1990 Consent Decree (CD). EPA, the U.S. Department of Justice, and the State of Connecticut are currently evaluating how to finalize an easement on this property pursuant to the September 2000 CD.

The Yaworskis and all three landowners across the river from the lagoon are periodically notified of the need for groundwater use restrictions, and to date, they have all cooperated with the agencies in the need to restrict all use of groundwater. None of the landowners have installed wells of any kind in the groundwater use restriction zones. Because there are no structures or drinking water wells located within or immediately downgradient of contaminated groundwater from the site or the groundwater use restriction zones, there is no risk to human health via ingestion of groundwater or potential vapor intrusion.

While the public is currently protected, formal groundwater use restrictions must be implemented in order to provide long term protection.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site name: Yaworski Lagoon Superfund Site

EPA ID: CTD009774969

Region: 1	**State:** CT	**City/County:** Canterbury/Windham

SITE STATUS

NPL Status: X Final Deleted Other (specify)

Remediation Status (choose all that apply): Under Construction X Operating Complete

Multiple Operable Units (OUs)? Yes X No	**Construction completion date:** 9/20/2000

Has site been put into reuse? Yes X No

REVIEW STATUS

Lead Agency: X EPA State Tribe Other Federal Agency

Author name: Anni Loughlin

Author title: Remedial Project Manager	**Author affiliation:** U.S. Environmental Protection Agency

Review Period: March 11, 2008 to August 28, 2008

Date(s) of inspection: August 25, 2008

Type of Review: X Post-SARA Pre-SARA NPL-Removal Only
Non-NPL Remedial Action Site NPL State/Tribe-lead
Regional Discretion

Review number: 1 (first) 2 (second) X 3 (third) Other:

Triggering Action:
Actual RA Onsite Construction at OU #_____ Actual RA Start at OU#_____
Construction Completion X Previous Five-Year Review Report
Other (specify) Signing of ROD

Triggering action date (from WasteLAN): 9/30/2003

Due date (five years after triggering action date): 9/30/2008

Five-Year Review Summary Form, continued

Issues: ACL exceedances continue at various point-of-compliance wells at the lagoon, and further evaluation is required for ACL values.
Institutional controls have not been implemented on non-PRP properties.
Institutional controls have not been implemented on PRP-owned property.
Further evaluation required for PAH exceedances in sediment, as well as for overall surface water and sediment sampling programs.

Recommendations and Follow-up Actions: Screening level human health risk and ecological reviews of ACL values and ACL exceedances to determine if any potential changes to surface water and sediment monitoring are required. For institutional controls on properties owned by non-PRP landowners, perform and finalize surveys, finalize and record easements, and make final payments to landowners. For institutional controls on PRP-owned property, finalize investigations and decisions regarding title insurance requirements and access, and finalize and record easement. Continue evaluation of PAHs in sediment, to be followed by final determination on continued monitoring. ACL evaluation may also result in modifications to the surface water and sediment monitoring programs.

Protectiveness Statement: The remedy at the Yaworski Lagoon Superfund Site currently protects human health and the environment in the short-term because: 1) there is no current exposure to contaminated groundwater originating from the site, 2) based on evaluation of surface water and sediment data collected as part of compliance monitoring, threats to human health and ecological receptors from site-related contamination are not significant, and 3) CT DEP continues to perform O&M on the lagoon cap and past inspections reveal the cap to be an effective barrier to exposure to contaminated waste by human and ecological receptors.

The public is protected from on-site contaminants because the fence and the lagoon cap prevent direct access to the lagoon and the wastes contained within the lagoon, and control of the area around the site is generally restricted. EPA reviewed recent ACL and MCL exceedances in groundwater and none of the current exceedances have warranted further action beyond evaluation. These exceedances do not represent a risk to human health since there is no current exposure to contaminated groundwater. EPA will conduct a screening level human health risk review of the ACL values, as well as recent ACL exceedances, to determine whether the ACL values require updating and/or whether added investigation of surface water and sediment is needed.

EPA determined levels of PAHs in sediment are unlikely to pose a significant risk to human health from potential incidental ingestion of and dermal contact with PAHs. EPA has also preliminarily concluded that the source of PAHs in sediment is from a location upstream of the lagoon and the nearby landfill. EPA continues to evaluate PAH exceedances in sediment, and will also conduct an ecological review of all ACL values and ACL exceedances to determine if more sampling is required in surface water or sediment. Review of previous surface water data will be included in this review. After completing the ecological evaluation and review, EPA, in conjunction with CT DEP, will make a final decision about future sediment and surface water sampling.

While the public is currently protected, institutional controls must be implemented in order to provide long term protection. Groundwater use restrictions are required on three off-site properties to prevent groundwater pumping from drawing contamination into uncontaminated areas, and to prevent exposure to contaminants in groundwater. The agencies anticipate conducting surveys and other

work required for final easements to implement restrictions on all three properties. With respect to land use and groundwater use restrictions within the meander bend of the river, the Yaworskis had previously agreed to these restrictions pursuant to the 1990 CD. The agencies are currently evaluating how to finalize an easement on this property pursuant to the September 2000 CD.

The Yaworskis and all three off-site landowners are periodically notified of the need for groundwater use restrictions, and to date, they have all cooperated with the agencies in the need to restrict all use of groundwater. None of the landowners have installed wells of any kind in the groundwater use restriction zones. Because there are no structures or drinking water wells located within or immediately downgradient of contaminated groundwater from the site, there is no risk to human health via ingestion of groundwater or potential vapor intrusion.

1.0 INTRODUCTION

The purpose of this five-year review is to determine whether the remedy for the Yaworski Lagoon Superfund Site is protective of human health and the environment. The methods, findings and conclusions of this review are documented in this Five-Year Review Report. In addition, this report identifies any issues found during the preparation of this five-year review along with recommendations to address such issues.

The United States Environmental Protection Agency (EPA) must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA Section 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. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.*

The agency interpreted this requirement further in 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.*

EPA Region I conducted a five-year review of the remedial actions implemented at the Yaworski Lagoon Superfund Site in the Town of Canterbury, Windham County, Connecticut. This review was conducted from March 11, 2008 through August 28, 2008. This report documents the results of the review.

This is the third five-year review for the Yaworski Lagoon Superfund Site. The triggering action for this review is the date of the second five-year review, as shown in EPA's WasteLAN database: September 30, 2003. This review is required by statute as the Record of Decision (ROD) was signed after October 17, 1986, the effective date of the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the remedial action will leave hazardous substances, pollutants, or contaminants on site above levels that allow for unlimited use and unrestricted exposure. The Connecticut Department of Environmental Protection (CT DEP) and EPA's Office of Emergency and Remedial Response reviewed and provided comments on this document (see Attachment 7).

2.0 SITE CHRONOLOGY

The chronology of the site, including all significant site events and dates is included in Table 1.

Table 1: Chronology of Site Events	
Event	**Date**
Industrial waste disposal on site	1950 to 1973
CT DEP orders environmental assessment of site.	1976 to 1980
Site covered with paper, rags, and rubble.	1982
Proposal to National Priorities List (NPL).	December 30, 1982
Final Listing on NPL.	September 8, 1983
Initial Remedial Investigation/Feasibility Study	1986
Supplemental Remedial Investigation/Feasibility Study	1987 to 1988
Record of Decision (ROD) signed.	September 29, 1988
Consent Decree (CD) entered.	February 26, 1990
Potentially Responsible Parties (PRPs) submit lagoon closure plan and Alternate Concentration Limit (ACL) Demonstration Report; EPA disapproves ACL Demonstration Report and requires installation of additional monitoring wells.	May 1990
EPA approves PRP lagoon closure plan.	May 3, 1990
PRPs award contract for lagoon closure.	June 5, 1990
PRPs conduct initial groundwater sampling round for ACL Demonstration.	March 1991
PRP construction documentation report for lagoon cap and dike.	March 1991
EPA approves PRP Post-Closure Work Plan for the lagoon cap and dike.	April 8, 1991
EPA/CT DEP final inspection of lagoon cap and dike.	November 25, 1991
EPA approves PRP's final Remedial Construction Report for lagoon cap and dike.	March 31, 1992
PRPs conduct second round of groundwater monitoring for ACL development; results indicate benzene Maximum Contaminant Level (MCL) exceedance across the river in the intermediate N well ("Ni").	October 1992
EPA confirms benzene MCL exceedance across the river; requires PRPs to implement a Corrective Action Program.	February 1993
PRPs submit revised ACL Demonstration Plan.	March 1993
PRPs begin quarterly compliance monitoring of groundwater, surface water and sediment.	March 1993
PRPs submit Corrective Action Work Plan.	June 1993
EPA disapproves PRP Corrective Action Work Plan.	August 1993
PRPs submit revised Corrective Action Work Plan; EPA disapproves.	September 1993
PRPs submit additional revised Corrective Action Work Plan.	October 1993

Pervel Industries, Inc. (lead PRP responsible for all work under the 2/26/1990 CD) notifies EPA that it is financially unable to perform any remaining work at the site.	October 27, 1993
PRPs agree to finalize Corrective Action Work Plan; EPA submits comments.	September 1995
EPA executes a Stipulation and Order with the site owner/operators ("the Yaworskis"), under which they agree to perform certain activities, including finalizing the Corrective Action Work Plan.	October 20, 1995
Yaworskis' contractor submits significantly revised Corrective Action Work Plan.	March 1996
Two of three off-site landowners accept EPA offers for access and institutional controls.	June 1996
EPA submits comments on revised Corrective Action Work Plan.	July 1996
U.S. enters de minimis-type Consent Agreement with five low-volume generators resolving their liabilities under the 2/26/1990 CD.	July 18, 1996
Yaworskis notify EPA that they are financially unable to perform any remaining work at the site.	October 1996
U.S. files a complaint against Pervel Industries, Inc. and its parent company, the Bemis Company.	December 2, 1996
EPA assumes all responsibility to perform further response actions at the site, with the exception of operation and maintenance (O&M) activities on the lagoon cap which are to be performed by the State of Connecticut. EPA contractor Metcalf & Eddy (M&E) begins compliance monitoring activities.	December 1996
The Connecticut Department of Environmental Protection (CT DEP) begins O&M activities for lagoon cap and dike.	March 1997
EPA finalizes Corrective Action Work Plan; M&E begins on-site field activities to investigate the nature and extent of the benzene exceedance at well Ni.	June 1998
First five-year review; EPA certifies that the remedy remains protective of human health and the environment.	September 29, 1998
EPA increases offers to three off-site landowners for access and institutional controls based on revised appraisals; two of three landowners accept.	January 1999
U.S. files a complaint against the Yaworskis.	April 7, 1999
EPA human health and ecological risk screening evaluations for surface water and sediment data.	December 1999
EPA approves the final Pre-Design Engineering Report on the benzene exceedance at well Ni; monitored natural attenuation is selected as the corrective action measure.	December 1999
EPA approves the Final ACL Demonstration Report,	December 30, 1999

formalizing the methodology by which ACLs will be set.	
U.S. enters Consent Decree with Pervel Industries, Inc. and the Bemis Company formalizing settlement resulting in a final cash-out figure of $3,000,000.	August 11, 2000
EPA/CT DEP final site-wide inspection for construction completion determination.	August 23, 2000
EPA approves 279 final ACLs for point of compliance wells.	September 18, 2000
EPA approves Preliminary Close-Out Report documenting completion of Remedial Action (RA) construction; start of one-year Operational & Functional period.	September 20, 2000
U.S. enters Consent Decree with the Yaworskis formalizing settlement resulting in a final cash-out figure of $1,425,000.	September 25, 2000
EPA approves Interim RA Report documenting that all necessary RA is complete and the start of the Long-Term Remedial Action (LTRA) phase.	September 28, 2001
Second five-year review; EPA certifies that the remedy remains protective of human health and the environment.	September 30, 2003
EPA implements modifications to sediment sampling program based on ecological risk evaluation and trend analysis of concentrations of polycyclic aromatic hydrocarbons (PAHs).	October 2004
EPA implements additional modifications to sediment and surface water sampling program based on PAH detections.	September 2006
EPA, CT DEP and Army Corps of Engineers (ACOE) met with off-site landowners to initiate new appraisals and survey maps for access and groundwater use restrictions.	November 13, 2007
Public notice regarding start of Third Five-Year Review published in the *Norwich Bulletin*.	June 27, 2008
EPA and CT DEP conduct site inspection.	August 25, 2008

3.0 BACKGROUND

Physical Characteristics.

The Yaworski Lagoon Superfund Site is located on approximately five acres of land between Route 169 and Packer Road in Town of Canterbury, Windham County, Connecticut. The site is bordered by the Quinebaug River on the north, west, and south, and by Packer Road to the east.

The lagoon is located within a meander loop on the floodplain of the Quinebaug River. The site is a dewatered and backfilled lagoon, and measures approximately 700 feet by 300 feet. Open fields that were once used for the production of silage corn are to the east

and south of the lagoon. Approximately 2000 feet southeast of the lagoon is a municipal solid waste landfill. Wetland and wet areas are located along the riverbank south of the lagoon.

Groundwater flow from the site discharges to Quinebaug River, primarily to the south, downgradient of the lagoon. The nearest residents are located across the Quinebaug River, to the north, west, and south. Residential homes are also located along Packer Road to the east.

Figures provided in Attachment 1 and Attachment 2 to this report, show the general location of the site and a more detailed map of the area.

Land and Resource Use.

The lagoon was operated from 1950 to 1973, and is currently inactive. The parcel is privately owned by the Yaworski family. (No reuse is currently planned for the site, or any land use that might interfere with the remedy, due to the waste-in-place remedy and planned institutional controls prohibiting future use of groundwater.)

The abutting parcel to the east is also owned by the Yaworskis. A municipal solid waste landfill, the Packer Road (Yaworski) Landfill (EPA ID Number CTD981204431), is located on this parcel, but is not part of the Superfund site. The landfill accepted solid waste until early 1995 at which time it stopped accepting waste. The landfill is regulated under state authority. CT DEP maintains the area as necessary and will ultimately authorize closure activities for the landfill. A transfer station is located on this parcel, but is currently unused.

The current land use for other surrounding areas is mainly residential. The Quinebaug River is used for recreational purposes, such as canoeing. The landfill abuts the river both upgradient and downgradient of the lagoon.

Residential homes near the site obtain their drinking water from private residential wells. Residential homes along Packer Road are not impacted by the lagoon. No residential wells located downgradient of the site have been impacted by contaminants emanating from the lagoon.

History of Contamination.

From 1950 to 1973, industrial wastes including solvents, paints, textile dyes, acids, resins, and various other debris was dumped into the lagoon. Flammable waste was periodically burned at the site until 1965 when the Connecticut Department of Health ordered a halt to on-site burning of waste. The combined efforts of local residents, and state and local officials led to the end of all dumping at the site in 1973.

In 1976, the Connecticut Department of Environmental Protection (CT DEP) directed the site owner, James Yaworski, Sr., to assess the environmental hazard posed by the site.

Mr. Yaworski was required to install monitoring wells adjacent to the lagoon, which detected contaminated groundwater. In 1980, CT DEP ordered Mr. Yaworski to employ a professional engineering firm to conduct an environmental study of the property. The firm concluded that most of the contaminants had migrated from the abandoned lagoon and recommended capping the area. In response to an order by CT DEP in 1982, Mr. Yaworski covered the site with paper, rags, rubble and soil.

Initial Response.

After a fire occurred at the site in 1982, EPA decided that additional information was needed about the site to better assess the potential threat to human health and the environment. EPA proposed the site to the National Priorities List (NPL) on December 30, 1982 (47 FR 58476) and added it to the final list on September 8, 1983 (48 FR 40658).

The initial Remedial Investigation (RI), completed in April 1986, concluded that several areas needed further study before a cleanup decision could be made. A Supplemental RI and Feasibility Study were completed in 1987 and 1988. The lagoon was found to contain approximately 65,000 cubic yards of highly contaminated sludge, a mixture of water, dirt, volatile organic compounds (VOCs), semi-VOCs, and heavy metals. Organic compounds included 2-butanone, toluene, total xylenes, and bis(2-ethylhexyl)phthalate. Heavy metals included arsenic, chromium, lead and mercury. Further, the sludge was covered by an additional 60,000 cubic yards of contaminated debris, consisting of dirt, rags, trash, and construction materials, and saturated with contaminated water perched above the sludge.

On September 29, 1988, the Regional Administrator signed a Record of Decision (ROD), for which the State of Connecticut concurred. An initial Consent Decree (CD) was entered in the United States District Court, District of Connecticut on February 26, 1990.

No activities were conducted using removal authority at this site.

Basis for Taking Action.

The ROD concluded that potential threats to human health and the environment could primarily occur via physical contact with wastes, exposure to contaminated soils, sediments and groundwater, and discharge of contaminants to surface water, sediments, and the nearby wetland.

The ROD stated that dermal contact with contaminated leachate and sediments would pose an incremental lifetime cancer risk, and although contaminated groundwater was not being consumed at the time, ingestion of groundwater would result in risks that exceed EPA's cancer risks target and exceed acceptable reference doses for exposure to non-carcinogens. Concentrations of heavy metals in the wetland due to leachate flow from the lagoon and erosion of contaminated sediments also exceeded chronic and acute Ambient Water Quality Criteria and ecotoxicity criteria.

4.0 REMEDIAL ACTIONS

Remedy Selection.

Remedial action objectives for the site included the following:

- minimize exposure to contaminated groundwater;
- ensure that contamination from the lagoon does not adversely impact the Quinebaug River;
- protect environmental receptors in the wetlands;
- minimize exposure to contaminated leachate seeps; and
- attain Applicable or Relevant and Appropriate Requirements (ARARs).

As outlined in the September 29, 1988 ROD, the selected remedy for the site included:

- construction of a permanent, multi-layer cap over the lagoon, including reinforcement of the earthen dike surrounding the lagoon;
- establishing ACLs as the groundwater protection standard for the site;
- restriction of groundwater use both within the meander bend of the river and on three properties located across the river from the site; and
- compliance monitoring of groundwater, surface water, and sediment for 30 years.

An ACL establishes a numerical limit on the amount of contamination that can exist in groundwater at the point of compliance (POC) without endangering human health and the environment where receptors are potentially exposed. In the event ACLs are exceeded, or if certain other conditions are not met, the ROD provides for the development of a corrective action contingency plan, to include the installation and operation of a groundwater extraction and treatment system or other necessary action required. The other conditions that must be maintained, and restored if necessary, are outlined in the ROD and the CD as follows:

1. ACLs shall not be exceeded at the POC monitoring wells located immediately adjacent to the lagoon, well clusters "B," "C," and "G" (see Attachment 2).
2. At the point of exposure (the Quinebaug River), the concentration of hazardous constituents shall not pose a risk to human health and the environment.
3. The Quinebaug River shall be maintained as a hydraulic barrier to contaminated groundwater (that is, preventing contamination from crossing to the opposite side of the river). This condition is measured by ensuring Maximum Contaminant Levels (MCLs) are not exceeded across the river from the lagoon.
4. The Quinebaug River shall not be adversely impacted by the discharge of contaminants into it.

These conditions, as outlined in the ROD and CD, relate only to site-related contamination, and not to contaminants that are generated from a source other than the Yaworski Lagoon Superfund Site.

Remedy Implementation and Operation and Maintenance.

Note: due to the unusual situations that required a change from PRP-lead to Fund-lead performance of work, a section has been added to this report documenting enforcement history.

EPA approved the Potentially Responsible Parties' (PRPs) lagoon closure plan on May 3, 1990. The PRPs awarded the contract on June 5, 1990 and construction began shortly thereafter on the lagoon cap and dike. Most construction was completed by late 1990. The PRPs submitted a construction documentation report in March 1991 outlining remaining items: establish a vegetative cover, repair erosion and re-grade an area on the lagoon surface, fill holes beneath the chain link fence, and fill several small depressions at the base of the gabion wall. EPA and the State conducted a final inspection on November 25, 1991, and EPA approved the final Remedial Construction Report for the lagoon cap and dike on March 31, 1992.

EPA approved the Post Closure Work Plan for the lagoon cap on April 8, 1991. Monthly inspections and ongoing maintenance were performed by PRP contractors and employees from 1992 through December of 1996. In December 1996, the site changed from PRP-lead to Fund-lead (see "Enforcement History"), and as part of that decision, it was determined that the cap portion of the remedy was essentially in the Operation and Maintenance (O&M) phase. CT DEP agreed to take over 100% of this work, and has been performing all maintenance activities since March 1997, including regular inspections of the cap and fence, mowing the site approximately twice per year or as needed, tree and brush removal, repairs to the fence and cap, and re-seeding as needed. EPA and CT DEP conducted a final site-wide inspection on August 23, 2000 and confirmed that there was no need for additional work or construction for the lagoon cap beyond these ongoing O&M activities.

The second portion of the remedy consists of establishing ACLs as the groundwater protection standard and monitoring groundwater, surface water, and sediment for 30 years. EPA disapproved the PRP's first ACL Demonstration Report submitted in May 1990. Lack of adequate groundwater characterization required the installation of additional monitoring wells in 1990 and 1991. An initial groundwater sampling round was conducted in March 1991 to determine which compounds would be included on the ACL list. During discussions with the PRPs, EPA decided that another round of groundwater data was necessary to update site conditions, and the PRPs collected another round of data in October 1992. EPA contractors provided split sampling for each round.

After multiple submittals and extensive discussions, EPA, CT DEP and the PRPs finalized the methodology by which ACLs would be set at the site for a specific set of compounds. It was determined that two years of monitoring data would be collected, and the PRPs would conduct a statistical analysis to determine the appropriate ACLs.

Data collected during October 1992, however, indicated an MCL exceedance for benzene across the river from the lagoon at the intermediate well at monitoring well cluster N (well "Ni"). The Consent Decree condition requiring the Quinebaug River act as a hydraulic barrier to contaminated groundwater flow was not being met, as evidenced by the MCL exceedance across the river. EPA technical and legal staff evaluated the benzene MCL exceedance along with all other site conditions and determined that the levels did not pose an imminent threat, and did not warrant a change in the remedy outlined in the 1988 ROD. The potential exposure to the benzene exceedance exists through ingestion of groundwater only, and there are no known drinking water wells immediately downgradient of the benzene exceedance. (Benzene has never been detected in the shallow well at monitoring well cluster N.) EPA determined in February 1993 that MCLs on the other side of the river were indeed being exceeded for benzene and that the river was not being maintained as a hydraulic barrier. As a result, the PRPs began implementing a Corrective Action Program as outlined in the 1988 ROD and 1990 Consent Decree.

Soon after the PRPs began implementing a Corrective Action program, they submitted a revised ACL Demonstration Plan (March 1993), and began quarterly compliance monitoring to start collecting data to set ACLs, and to ensure protection of human health and the environment. The PRPs conducted human health and ecological risk assessments as part of the ACL determination, and these assessments generated Protective Concentration Limits (PCLs) for surface water, sediments, and pore water. Surface water and sediment are sampled at five locations in the river, including points upgradient, adjacent, and downgradient of the site. Pore water is sampled at four well points located in the river. Exceedances of PCLs for any specific contaminant at any one location trigger an evaluation of this contaminant in the surrounding area to determine if the contaminants are site-related. (To date, although there have been individual PCL exceedances in all media, EPA evaluations determined in all cases that remedial action was not warranted.)

In early 1993, pursuant to the Corrective Action Work Plan, the PRPs submitted work plans for Pre-Design activities to confirm that the benzene exceedance was site-related, investigate the nature and extent of the exceedance, and determine what measures, if any, were necessary to prevent plume migration beyond well Ni and restore groundwater across the river to below MCLs. None of the PRP work plans were finalized due to numerous changes in the status of the PRPs (see "Enforcement History"). While the PRPs also updated the ACL Demonstration Report in 1995 and 1996, the report was not finalized before all PRPs defaulted from the site.

Quarterly monitoring confirmed that the benzene continued to be exceeded at well Ni at levels ranging from 8 parts per billion (ppb) to 23 ppb. The MCL for benzene is 5 ppb. In December of 1996, EPA and the State of Connecticut took over all work at the site; EPA's contractor Metcalf & Eddy (M&E) began performing all site-wide compliance monitoring at that time, and the State of Connecticut took over all operation and maintenance work on the lagoon cap.

In 1998, M&E began working on Pre-Design activities as part of the Corrective Action Program. Field investigations, consisting largely of the collection and analysis of groundwater samples from temporary small diameter wells at 41 locations, were completed in September 1998. Additional hydraulic conductivity testing and supplementary groundwater sampling and analysis of monitoring wells were also conducted, as well as groundwater modeling. The data strongly suggests that there are two volatile organic compound plumes, one from the lagoon and the other from the Packer Road Landfill which is not part of the Superfund site. The relative proportions of various compounds differ between the two plumes, and data also indicates that the plumes are separate and distinct in the area investigated. Although both plumes appear to have migrated beneath the river, data suggest that the extent of both plumes is currently only a short distance beyond the river. CT DEP continues to be alerted of the presence of the plume that appears to be emanating from the State-regulated Landfill. This five-year review report does not evaluate the landfill plume; the remedy for the Yaworski Lagoon Superfund site is not designed to address exceedances from other sources.

To address the benzene exceedance, the Corrective Action study evaluated several remedial alternatives, including in-situ oxygen enhancement, in-well air stripping, containment walls, pump-and-treat technologies, and monitored natural attenuation, among others, as methods to reduce benzene concentrations in groundwater to or below the MCL of 5 ppb. A preliminary evaluation of natural attenuation of the lagoon VOC plume indicated that biodegradation is most likely playing a significant role in natural attenuation processes at the site, and that current subsurface conditions are favorable to continued attenuation. The time frame for benzene concentrations to decrease to the MCL at the impacted well was estimated at approximately 8 to 10 years based on the conditions at the time of the report.

Given the above, monitored natural attenuation was selected as the best corrective action to address the benzene exceedance. EPA determined that an engineered remedy to reduce benzene concentrations in the area of well Ni is unwarranted for several reasons:

- the expected decrease in contamination by natural attenuation in approximately 8 to 10 years;
- the limited migration of the plume beyond the currently impacted well;
- the absence of drinking water wells in the vicinity of the plume;
- the apparent stability of site conditions based on over 8 years of monitoring results;
- the technical difficulty of implementing alternative engineered measures for limited expected success;
- no other contaminants have been detected across the river above the MCL; and
- the planned restriction on groundwater use in the area to prevent off-site pumping from further affecting movement of the contaminants.

Installation of additional monitoring wells was not required. If there is a statistically significant increase in concentrations at well clusters across the river from the site, additional monitoring wells will be considered for installation downgradient of the

affected wells. Based on all historical monitoring data, however, this is not expected to occur.

EPA, in conjunction with CT DEP, approved the final Pre-Design Engineering Report on December 30, 1999. The groundwater monitoring program was modified as of calendar year 2000 to include measurements to determine changes in the configuration of the lagoon plume, and ongoing evaluation of the effectiveness of natural attenuation. EPA issued a fact sheet in April 2000 explaining its choice of natural attenuation as the corrective action measure to address the benzene exceedance. This is consistent with the 1988 ROD which provides for additional contingency remedies as necessary (including groundwater pump and treat) if conditions arise.

In 1999, EPA also conducted human health and ecological risk screening evaluations based on surface water and sediment data collected from the Quinebaug River since 1993. EPA found that contact with river water and sediments poses an insignificant health risk to humans. The screening level ecological risk assessment concludes that there are now fewer site-related contaminants that could be contributing towards any potential risk (to date, none of the levels found have warranted remedial action).

On December 30, 1999, as a result of the Pre-Design work and risk screening evaluations, EPA was able to approve the Final ACL Demonstration Report, formalizing the methodology by which ACLs will be set. M&E conducted statistical analysis with data collected during the fall 1992 monitoring round, as well as data collected since March 1993 in the first 28 quarters of compliance monitoring. An ACL was established for three POC well clusters, each having a shallow, intermediate, and deep well, for 31 different contaminants, totaling 279 individual ACLs. (See Attachment 3.) Each ACL establishes a numerical limit on the amount of contamination that can exist in groundwater at the point of compliance (POC wells adjacent to the lagoon) without endangering human health and the environment where receptors are potentially exposed. Receptors at this site can be exposed where contamination emanating from the lagoon reaches the Quinebaug River (measured by PCLs in surface water, sediment, and pore water).

The bulk of the 279 total ACLs were statistically calculated using available POC well detections. In some cases, contaminants at a particular location were not detected or detected at levels lower than the established MCL. In such cases, the ACL was set at the MCL; this is an extremely conservative measure, however, and future exceedances of these particular ACLs will require careful review to determine whether the contaminant is expected to reach the river at levels above the PCLs. In other cases, contaminants at a particular location were not detected, or detected at levels lower than the current method quantitation/detection limit. When this happened for contaminants with no established MCL, the ACL was set at five times the current method quantitation/detection limit.

Five times the current method quantitation/detection limit was selected as a reasonable buffer level above the current detection limit to minimize false positive exceedances without being excessively high (i.e., none of the ACL values calculated in this way

exceed PCLs set for pore water at the river). A factor of five is generally used by EPA when assessing blank contamination during data validation (any positive sample value within five times of the concentration of a blank contaminant is considered suspect due to the potential variability of the reported results).

EPA approved the final ACLs on September 18, 2000. Approval of ACLs effectively constituted the completion of Remedial Action (RA) construction at this site, and the start of a one year Operational & Functional period. EPA approved a Preliminary Close-Out Report for this site on September 20, 2000, formalizing the completion of all construction activities.

The groundwater monitoring program was tailored in calendar year 2000 to include ensuring that ACLs are not exceeded at these POC well locations. The groundwater monitoring schedule was also modified to include measurements to determine changes in the configuration of the lagoon plume, and ongoing evaluation of the effectiveness of natural attenuation to address the benzene exceedance at well Ni. Further, the groundwater monitoring schedule was reduced from quarterly to three times a year (generally in the months of April, July, and October).

The second five-year review report of September 2003 noted that benzene exceedances had generally decreased since calendar year 2000, ranging from 5.6 ppb to 11 ppb (from a previous high of 23 ppb). Since 2003, benzene levels have decreased even further, and recently become somewhat sporadic. The last detection of a benzene MCL exceedance occurred in April 2006 with a detection of 5.6 ppb. Since then, benzene at well Ni has been detected below the MCL of 5 ppb or not detected.

As of calendar year 2000, the monitoring program for surface water and sediments was also tailored to monitor for fewer specific compounds identified in the screening level ecological risk assessment that could be contributing towards any potential risk. Of particular concern at the time were widespread detections of polycyclic aromatic hydrocarbons (PAHs) in sediment during more recent sampling rounds. PAHs had been detected at all sampling locations, including upgradient locations, and it was unclear if the contamination was related to the Superfund site. Sediment sampling was limited to an annual event for a limited number of compounds, including PAHs and certain inorganics. Since 2000, detections of PAHs and metals in sediment were compared to PCLs, as well as commonly used sediment benchmarks of Effects Range-Low (ER-L) and Effects Range-Medium (ER-M) values to aid with ongoing ecological review of sediment results. Surface water sampling was reduced to once every five years for certain inorganics only.

The last component of the remedy is institutional controls. Groundwater use will be prohibited within 100 feet outside of the river to the north, west and south, and production wells greater than 50 gallons per minute are prohibited within 1500 feet downgradient of the site. These restrictions affect three properties across the river from the lagoon owned by non-PRP landowners. Although monitoring wells were installed on the three properties neighboring the site, and compliance monitoring has taken place

since March 1993, the landowners and PRPs did not reach a formal agreement for access and groundwater use restrictions. EPA ultimately arranged for the U.S. Army Corps of Engineers to perform appraisals on all three properties; these appraisals were finalized in June 1996, and later revised in January 1999. At that time, two of the three landowners accepted the appraised values, and EPA received approval from Headquarters to directly pay the landowners for access and groundwater use restrictions.

EPA and the State of Connecticut subsequently drafted formal easements for the properties pursuant to Connecticut's Environmental Land Use Restrictions regulations, however, CT DEP required changes to the survey maps of the properties provided with the appraisals in order for the maps to comply with the regulations. EPA re-retained the U.S. Army Corps of Engineers and the agencies collectively determined that new survey maps and appraisals of the properties were required.

Restrictions prohibiting any groundwater use are also required on the property within the meander bend of the river, as well as restriction of any use of the property that would interfere with or adversely affect or impact the protectiveness of the remedy. The site owner/operators ("the Yaworskis") had previously agreed to these restrictions pursuant to the February 26, 1990 CD. As part of the September 25, 2000 settlement with the Yaworskis, the Consent Decree requires the Yaworskis to additionally execute and record in the deed an easement granting the right to enforce the land and water use restrictions.

Enforcement History.

EPA entered into an initial 1990 Consent Decree with 11 Settling Defendants: Pervel Industries, Inc. ("Pervel"), generator of over 90% of the waste disposed in the lagoon; three settling parties that can collectively be referred to as the Yaworskis, owner/operators of the lagoon; five small generators, who collectively disposed of less than 3% of the waste in the lagoon; and two companies which are now bankrupt or defunct. The Consent Decree designated Pervel as responsible for performance of all work, and provided that the remaining parties would be liable for the work should Pervel become unable to perform.

Pervel's consultant, ENSR Consulting and Engineering ("ENSR"), began performing most of the requirements, including developing ACLs and all corrective action requirements. Pervel also financed construction of the lagoon cap in 1990 to 1991. The Yaworskis' consultant, Fuss & O'Neill, Inc., began performing the required compliance monitoring and related work in March 1993.

In late October 1993, after ENSR had submitted a number of draft Work Plans for Pre-Design activities related to the benzene exceedance, Pervel notified EPA that it was financially unable to perform the remaining work at the site and ENSR subsequently ceased ongoing site work. In accordance with the Consent Decree, EPA notified the remaining parties (the five small generators and the Yaworskis) that Pervel was unable to perform and that they were responsible for performing the remainder of the work at the site.

Subsequently, EPA and the five low volume generators entered into an agreement resolving their liabilities under the 1990 CD for the remaining work at the site, for payment of a sum certain. That agreement, memorialized in a de minimis-type Consent Agreement, was entered in court in July 1996, and resulted in a financial settlement of $310,903, plus interest, which was placed in a site-specific Special Account.

The Yaworskis' contractor continued to conduct quarterly compliance monitoring after Pervel ceased site work. EPA negotiated an agreement with the Yaworskis, finalized September 1995 and filed in court October 1995, in which the Yaworskis agreed to finalize the ACL Demonstration Report and calculate final ACLs, conduct Pre-Design investigations, and continue quarterly compliance monitoring until Pre-Design investigations were complete. Through a side agreement among the PRPs, ENSR submitted revisions to the ACL Demonstration Plan in 1995 and 1996. The Yaworskis' contractor developed a work plan for Pre-Design investigations in 1996, but this work plan was never finalized; in October of 1996, the Yaworskis notified EPA that they could no longer continue financing any cleanup activities at the site and all PRP site work ended.

EPA formally notified the Yaworskis and the other Settling Defendants in December 1996 of Fund takeover of all site work, except for Operations and Maintenance of the lagoon cap, which the State of Connecticut agreed to perform.

On December 2, 1996, the United States filed a complaint against Pervel and its parent company, the Bemis Company ("Bemis"). After protracted litigation, the parties entered into mediation and achieved a settlement resulting in a final cash-out figure of three million dollars ($3,000,000), to be placed in a site-specific Special Account to be used, as necessary, for future response action at or near the site. The Consent Decree formalizing this settlement was entered in court on August 11, 2000.

On April 7, 1999, the United States filed a complaint against the owners/operators of the site ("the Yaworskis"). In October 1999, the United States entered into mediation with a judge of the Connecticut Superior Court and various parties regarding (a) the U.S. lawsuit regarding the Superfund site, (b) litigation brought by the State of Connecticut relating to the Yaworski Lagoon Superfund Site and the adjacent Yaworski-owned and Connecticut-regulated Packer Road Landfill, (c) a suit brought by a citizen's group, Peoples Rights in a Clean Environment ("PRICE"), relating to the State-regulated landfill, and (d) back taxes owed to Connecticut, and other remaining obligations of the Yaworskis. The U.S., Connecticut, PRICE, the Yaworskis, and various Yaworski-related entities achieved global settlement of all suits through mediation. The United States' ability-to-pay-based settlement with the Yaworskis and Yaworski-related entities in the amount of $1,425,000 will also be placed in a site-specific Special Account to be used for future response action at or near the site. The Consent Decree formalizing this settlement was entered in court on September 25, 2000. The settlement amount received by the State of Connecticut will, along with other funds provided by the State, allow the State to take the lead on implementing clean-up of the nearby solid waste landfill.

5.0 PROGRESS SINCE LAST FIVE-YEAR REVIEW

In the second five-year review, dated September 30, 2003, EPA certified that the remedy selected for this site remains protective of human health and the environment.

The second five-year review noted that ACLs were set and recommended re-evaluation every five years. Since the approval of the ACLs, there have been ACL exceedances at various POC wells. (See Attachment 4 for a summary table of all ACL, MCL and PCL exceedances for all sampling rounds from 2003 through 2007. Note: Attachment 4 does not include exceedances of secondary MCLs, which are guidelines relating to aesthetic conditions, such as taste, color, and odor.) For this five-year review, EPA reviewed recent ACL and MCL exceedances in groundwater. These exceedances do not represent a risk to human health since there is no current exposure to contaminated groundwater. EPA will conduct a screening level human health risk review of the ACL values, as well as recent ACL exceedances, to determine whether the ACL values require updating and/or whether added investigation of surface water and sediment is needed.

Three site-related compounds have exceeded MCLs in wells across the river in the last five years: trichloroethene, bis(2-ethylhexyl)phthalate, and benzene. The MCL exceedances of trichloroethene and bis(2-ethylhexyl)phthalate were not repeated in subsequent sampling rounds, so no further evaluation is warranted.

As noted previously, the second five-year review report indicated that benzene exceedances at well Ni had generally decreased since calendar year 2000. Since 2003, benzene levels have decreased even further, and recently become somewhat sporadic. The last detection of a benzene MCL exceedance occurred in April 2006 with a detection of 5.6 ppb. Since then, benzene at well Ni has been detected below the MCL of 5 ppb or not detected.

There are ongoing MCL exceedances at well cluster K which EPA believes are not related to the Yaworski Lagoon site. EPA added well cluster K to its compliance monitoring program in 1998 to supplement investigations for the benzene exceedance at well Ni. Since June/July 1998, EPA has detected trichloroethene at well Ki in every sampling round in generally increasing concentrations. Since the second five-year review, exceedances of trichloroethene continued at well Ki and also manifested in well Kd. Levels appear to be incrementally increasing at both Ki and Kd, reaching maximum detected concentrations at well Ki up to 300 ppb, and at well Kd up to 33 ppb.

Beginning in 2003 and continuing through the 2007 sampling events, cis-1,2-dichloroethene was also detected over the MCL (70 ppb) at well Ki, reaching 90 ppb in October 1997. At well Ki, vinyl chloride was sporadically detected above the MCL of 2 ppb, with the last detection at the MCL occurring in July 2005.

The exceedances indicate that the river is not acting as a hydraulic barrier at the K well cluster, however, the data strongly suggests that there are two volatile organic compound plumes, one from the lagoon and the other from the Packer Road Landfill which is not

part of the Superfund site. The relative proportions of various compounds differ between the two plumes, and data also indicates that the plumes are separate and distinct in the area investigated. Both plumes appear to have migrated beneath the river. Data collected in 1998 suggested that the extent of both plumes was only a short distance beyond the river. Since 1998, however, the level of chlorinated compounds has increased at wells Ki and Kd. EPA has no wells downgradient of the K well cluster. CT DEP continues to be alerted of the presence of the plume that appears to be emanating from the State-regulated Landfill.

Surface water sampling currently continues on a five year schedule for metals only. The last surface water sampling event of October 2004 incorporated certain changes based on the ecological review of the site. Filtered grab samples were collected at five locations, one sample each at three transects (sampling locations) near the lagoon, as well as one sample across from the northern toe of the landfill and one sample upstream of the landfill. All samples were analyzed for metals only. The results indicated estimated detections of mercury ranging up to 0.16 ppb, which exceed the PCL of 0.0204 ppb. Mercury was not identified in the previous ecological review as one of the contaminants of potential concern in surface water. None of the mercury exceedances approached the historical high for mercury in surface water. There have never been any ACL exceedances for mercury, and mercury was infrequently detected in point of compliance wells between 2003 and 2007. No changes to the surface water sampling program are currently recommended, although EPA anticipates reviewing the program again before the next scheduled event in the fall of 2009.

With regard to sediment, as noted previously, based on a 1999 human health risk screening evaluations of surface water and sediment data collected from the Quinebaug River since 1993, EPA found that contact with river water and sediments poses an insignificant health risk to humans. Since that time, sampling at points of exposure (surface water and sediments) has not been required for the purposes of evaluating risk to human health. For this five-year review, EPA reviewed October 2004 and November 2006 sediment results for PAHs, and compared the results to the risk analysis for PAHs in sediments presented in a January 2000 memo to determine if current levels of PAHs pose a significant risk to human health. The review concluded that, although the levels of PAHs in sediments have risen, these levels are unlikely to pose a significant risk to human health from potential incidental ingestion of and dermal contact with PAHs.

The second five-year review did recommend further evaluation of PAHs in sediment for ecological risk, and noted that ongoing evaluation of PAHs would be supplemented with analysis of 2002 and 2003 sediment data. Based on subsequent ecological risk reviews of the site and all available sediment data, in October 2004, EPA incorporated further changes to the sediment sampling plan in order to evaluate the source of PAHs and inorganics in sediment. These changes included compositing samples for three of five sediment transects, as well as collecting three additional sediment samples adjacent to, upstream, and downstream of the northern toe of the Packer Road Landfill (all three of these additional samples were located upstream of the lagoon). EPA's ecological risk assessor worked with EPA's contractor during sample collection to find appropriate

depositional areas from which to collect these samples. Total organic carbon (TOC) samples were also collected to help assess the PAH levels.

After reviewing the October 2004 data, EPA preliminarily concluded that the Yaworski Lagoon Superfund Site and the Packer Road Landfill were not the source of PAHs in river sediment, based in part on PAH detection at upstream locations. There were no concentrations observed at or over the ER-L benchmarks for inorganics.

At the time, EPA determined that sediment sampling should continue, but only once every two years unless data indicates the need for increased frequency. Additional modifications to the sediment sampling program were implemented in advance of the November 2006 sediment sampling round, including changes to transect locations and the compositing of sediment samples at each of four transect locations. A new transect location was established approximately 1,200 feet upstream from the Packer Road Landfill to measure background levels of PAHs not associated with past or current releases from either the landfill or the lagoon. Sediment samples were analyzed for PAHs and TOC only.

Results of sediment sampling from November 2006 showed PAHs over their ER-L benchmarks at three of four sampling locations, one of which was upstream of both the lagoon and the landfill. In addition, there were two observations of contaminants over their ER-M benchmarks, both at the upstream sampling location. There were no PCL exceedances at any location.

The upstream sediment sample locations were added because EPA suspected that the PAHs may not originate from the lagoon or the landfill. PAHs are not generally known to readily migrate in groundwater, and historical groundwater monitoring data indicate only sporadic detections of one or two PAHs at very low concentrations. There is no evidence of a clear surface run-off or groundwater transport mechanism for PAHs to travel from the lagoon to the river.

EPA recently reviewed the results from all sediment sampling rounds, including the November 2006 data, and plotted TOC-normalized total PAHs at each location against TOC. This evaluation suggests that the PAHs in sediment are strongly correlated with TOC concentration (r2=0.86) and that the temporal variations in PAHs are driven more by their association with TOC rather than by any known source. The data did not point to a clear upstream/downstream pattern in PAH distribution. The evidence strongly suggests that the lagoon is not a likely source of PAHs in river sediment, and that the PAHs are from a source (or sources) upstream of both the lagoon and the landfill.

Based on this review, EPA has decided not to conduct the fall 2008 sediment sampling round for PAHs and TOC. Rather, in the next several months, EPA will perform statistical analyses of the PAH and TOC sediment data to confirm the PAH/TOC association. EPA will also conduct an ecological review of ACL values and all ACL exceedances from 2003-2007 to determine if more sampling of these (or other) parameters is required in surface water or sediment. Review of previous surface water

data will be included in this review. After completing the ecological evaluation and review, EPA, in conjunction with CT DEP, will make a final decision about future sediment and surface water sampling.

EPA will continue to evaluate all groundwater, surface water, and sediment monitoring data and overall site conditions, and report exceedances and evaluation of these exceedances to CT DEP. EPA will coordinate with CT DEP on any final determinations or further changes to the monitoring program.

Another component of the remedy is the lagoon cap. CT DEP has performed all maintenance activities for the lagoon cap since March 1997, including inspections of the cap and fence, tree and brush removal, repairs to the fence and cap, and re-seeding. These activities all currently occur on an as-needed basis. The lagoon cap is also mowed approximately twice per year or as needed.

In 1999, EPA established settlement monuments and survey points on the cap to monitor for cap settlement and possible movement of soil at the northwest corner of the lagoon cap where there is a bow/tilt in the gabion wall. Lagoon settlement monitoring was performed twice in 2000, and approximately once a year thereafter through 2004. Preliminary conclusions at that time were that horizontal movement was minor and there was no evidence to suggest any connection with the bow/tilt in the gabion wall. The rate of cap settlement was relatively low and appeared to be consistent with the history of the lagoon and typical consolidation. Based on the lack of significant cap settlement or movement, in 2005, EPA discontinued lagoon settlement activities and asked CT DEP to alert EPA to any future observed cap movement or settlement. To date, no such movement or settlement has been observed.

EPA and CT DEP conducted a site inspection on August 25, 2008. The lagoon cap and surrounding gabion wall appeared to be in very good condition. No deficiencies were observed. Minor ongoing maintenance requirements were noted (eventual need for mowing and repairs for minor erosion areas). The agencies did not observe anyone in the lagoon or landfill area during the visit. (See Attachment 5 for the "Five-Year Review Site Inspection Checklist.")

The last component of the remedy is institutional controls, which includes implementation of groundwater use restrictions at three properties across the river from the site owned by non-PRP landowners. Because the original CD intended for the PRPs to make arrangements for access and use restrictions, the switch from PRP-lead to Fund-lead activity on the site has been problematic. Fund-lead implementation of this portion of the remedy by EPA and the State of Connecticut has required compliance with a Connecticut's Environmental Land Use Restrictions regulations, involving steps that were not foreseen in the original ROD and CD. EPA and the State of Connecticut had to obtain subordination agreements from banks holding mortgages on the properties in question. EPA and the State of Connecticut subsequently drafted formal easements for the properties pursuant to Connecticut's Environmental Land Use Restrictions regulations, however, CT DEP required changes to the survey maps of the properties

provided with the appraisals. As previously noted, EPA has re-retained the U.S. Army Corps of Engineers and the agencies collectively determined that new survey maps and appraisals of the properties were required. The agencies visited with all three landowners on their respective properties in November 2007 to restart this process.

One of the landowners had previously indicated unwillingness to implement the groundwater use restrictions. In March 2008, EPA met with certain of the landowners, including the recalcitrant landowner, to discuss and resolve a number of outstanding issues. EPA and the State of Connecticut subsequently provided feedback to the landowner regarding the outstanding concerns, and at this time, it appears that all parties are in agreement on how to proceed with implementing the restrictions.

At the time of this report, most of the work to provide appraisal information is complete. The agencies anticipate conducting surveys of the properties in October 2008, after on-site crops are harvested and vegetation begins to clear.

With respect to land use and groundwater use restrictions within the meander bend of the river, the site owner/operators ("the Yaworskis") had previously agreed to these restrictions pursuant to the February 26, 1990 CD. As part of the September 25, 2000 settlement with the Yaworskis, the Consent Decree requires the Yaworskis to additionally execute and record in the deed an easement granting the right to enforce the land and water use restrictions. EPA, the U.S. Department of Justice, and the State of Connecticut are currently evaluating how to finalize this easement. Requirements for title insurance and the need to create an access path across two separate parcels of land are complicating this effort.

At this time, the Yaworskis and all three landowners are periodically notified of the need for groundwater use restrictions, and to date, they have all cooperated with the agencies in the need to restrict all use of groundwater. The Yaworskis are aware of the land use restrictions on their property and are currently not using the land for any purpose inconsistent with the remedy or these restrictions. None of the landowners have installed wells of any kind in the groundwater use restriction zones. Because there are no structures or drinking water wells located within or immediately downgradient of contaminated groundwater from the site or the groundwater use restriction zones, there is no risk to human health via ingestion of groundwater or potential vapor intrusion.

6.0 FIVE-YEAR REVIEW PROCESS

This five-year review was conducted in accordance with EPA's guidance document, "Comprehensive Five-Year Review Guidance," EPA 540-R-01-007, dated June 2001. Tasks completed as part of this five-year review include review of pertinent site-related documents, an inspection of the site, discussions with CT DEP, and a review of the current status of regulatory or other relevant standards.

Document Review.

Site-related documents reviewed as part of this effort are listed in Attachment 6. Additionally, this review included review of all recent post-closure monitoring reports and data.

Community Involvement/Interviews.

This is the site's third five-year review. A public notice announcing the start of the third five-year review was published in the *Norwich Bulletin* on June 27, 2008. (EPA received only one call as a result of the public notice, and the caller's interests related to a proposed nearby biomass plant and not to the Yaworski Lagoon site.) Community involvement activities were conducted on a limited basis only, given the age of the site and the level of citizen interest in recent years. Individual citizen interviews were not conducted.

Community interest in the past was mainly limited to citizens that lived in the immediate area, most along Packer Road, and many of these citizens formed a group, Peoples Rights in a Clean Environment ("PRICE"). PRICE was active at the site throughout the 1990's, although the bulk of their complaints were related to impacts on local residents from the nearby municipal solid waste landfill.

In October 1999, the United States entered into mediation with a judge of the Connecticut Superior Court and various parties regarding (a) the U.S. lawsuit regarding the Superfund site, (b) litigation brought by the State of Connecticut relating to the Yaworski Lagoon Superfund site and the adjacent Yaworski-owned and Connecticut-regulated Packer Road Landfill, (c) a suit brought by the citizen's group PRICE relating to the State-regulated landfill, and (d) back taxes owed to Connecticut, and other remaining obligations of the Yaworskis. The U.S., Connecticut, PRICE, the Yaworskis, and various Yaworski-related entities achieved global settlement of all suits through mediation. As part of the landfill-related settlement, many of the members of PRICE were bought out by the Yaworskis and moved away from the area.

Since the settlements took place, and because the area around the site is largely rural, there has been virtually no interest in the Superfund site by local residents. The Yaworskis have resold many of the houses along Packer Road. EPA and CT DEP have received an extremely limited number of calls in recent years, many of which are from citizens interested in buying houses in the area. The proposed construction of a biomass plant on the nearby Gallup's Quarry Superfund Site in Plainfield has generated some additional interest in the area, particularly with regard to the potential installation of a cooling water intake pipe downstream of the Yaworski Lagoon Superfund Site. Based on discussions to date, it appears that the location of any such intake pipe will have no impact on the Superfund site.

The public information repository is located at the Canterbury Public Library and continues to be supplemented with key documents. EPA will issue a press release to local papers regarding the third five-year review, and the completed report for this site will be sent to the information repository.

Data Reviewed.

The PRPs monitored groundwater, surface water, and sediment on a regular basis since 1993 as part of the long-term compliance monitoring plan. With the default of all PRPs in 1996, EPA took over the compliance monitoring and its contractor continues to perform monitoring three times a year. A much larger group of constituents are analyzed annually to identify whether additional constituents should be added to the regular sampling program. As previously outlined, in calendar year 2000, the monitoring program was tailored to include monitoring for ACL exceedances, monitoring of natural attenuation of the benzene exceedance across the river, and specific compounds in sediment. Since then, EPA implemented modifications to the sediment and surface water sampling plans.

All activities undertaken by EPA's contractor were reviewed and approved by EPA quality assurance staff and found to comply with all EPA and State requirements. All Quality Assurance Project Plans utilized at the site by PRP contractors incorporate QA/QC procedures and protocol. All Quality Assurance Project Plans utilized at the site by EPA contractors were reviewed and approved by the project manager and EPA QA staff.

EPA, in conjunction with CT DEP, has evaluated all site-wide exceedances. A summary of exceedances since the last five-year review is provided in Attachment 4. EPA and CT DEP continue to evaluate ongoing ACL exceedances at point-of-compliance wells. These exceedances are somewhat sporadic in nature. Monitored natural attenuation was selected as the corrective action measure for the ongoing benzene exceedance across the river, and this remedy appears to be working as predicted based on the generally decreasing detections of benzene at well Ni. The last MCL exceedance at well Ni occurred in July 2005. EPA has preliminarily concluded that PAH exceedances in sediment are likely not caused by the Superfund site or the nearby State-regulated Packer Road Landfill.

EPA will conduct a screening level human health risk review of the ACL values, as well as recent ACL exceedances, to determine whether the ACL values require updating and/or whether added investigation of surface water and sediment is needed. EPA continues to evaluate the PAH exceedances in sediment and will also conduct an ecological review of all ACL exceedances from 2003-2007 to determine if more sampling of these (or other) parameters is required in surface water or sediment. Review of previous surface water data will be included in this review. After completing the human health and ecological evaluation and review, EPA, in conjunction with CT DEP, will make final decisions about future sediment and surface water sampling.

Site Inspection.

EPA staff, EPA's contractor, and CT DEP staff performed oversight of all construction activities and design of all monitoring programs. EPA and CT DEP conducted a final inspection of the lagoon cap and dike construction on November 25, 1991, and EPA

approved the final Remedial Construction Report for the lagoon cap and dike on March 31, 1992.

EPA and CT DEP conducted a final site-wide inspection on August 23, 2000 and confirmed that there was no need for additional work or construction for the lagoon cap beyond ongoing operation and maintenance activities. No punch list items remained at that time. EPA and CT DEP certified on September 24, 2001 that the remedy was operational & functional, with no additional work required beyond ongoing operation and maintenance activities for the lagoon cap, and ongoing site-wide compliance monitoring. This marked the beginning of the site-wide Long Term Remedial Action (LTRA) phase.

EPA and CT DEP conducted a site inspection most recently on August 25, 2008 and found the lagoon cap, vegetative cover, gabion wall, and the condition of fence gates and locks to all be in good condition. No deficiencies were observed. Minor ongoing maintenance requirements were noted (eventual need for mowing and repairs for minor erosion areas). The agencies did not observe anyone in the lagoon or landfill area during the visit. The site inspection checklist is provided as Attachment 5.

CT DEP will continue to perform post-construction O&M activities for the lagoon cap, including inspections, mowing the vegetative cover, and conducting repairs as necessary to ensure ongoing integrity of the lagoon cap.

EPA's contractor will continue to perform site-wide compliance monitoring activities throughout the LTRA period. EPA and CT DEP will evaluate all monitoring results, and make ongoing determinations of the need for remedial action for future exceedances, if any. It is expected that LTRA will be completed in September 2011, at which time CT DEP will be responsible for all O&M activities site-wide.

Groundwater use restrictions are required both on site and in certain areas off site. EPA, the U.S. Department of Justice, and the State of Connecticut are currently evaluating how to finalize an easement for the Yaworski property within the meander bend of the Quinebaug River. EPA is working with the State of Connecticut and the U.S. Army Corps of Engineers to implement easements for the three off-site properties pursuant to Connecticut's Environmental Land Use Restrictions regulations. All three landowners are periodically notified of the need for groundwater use restrictions, and to date, they have all cooperated with the agencies in the need to restrict all use of groundwater.

7.0 TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?

No, the remedy as outlined in the ROD is currently not operating as designed. The 1988 Rod outlined the following specific objectives for the remedial response:

- minimize exposure to contaminated groundwater;

- ensure that contamination from the lagoon does not adversely impact the Quinebaug River;
- protect environmental receptors in the wetlands;
- minimize exposure to contaminated leachate seeps; and
- attain Applicable or Relevant and Appropriate Requirements (ARARs).

As required by the 1988 ROD, a permanent, multi-layer cap was constructed over the lagoon, in conjunction with reinforcement of the surrounding dike and installation of a fence around the lagoon. The lagoon cap and fencing are performing as intended and continue to be maintained and repaired as necessary. A settlement monitoring program did not identify any problems caused by settlement or lateral movement. No problems with the cap have been identified that fall outside of the range of normal maintenance. The lagoon cap has minimized the ongoing discharge of contaminated groundwater to surface water and sediment, and has eliminated runoff to the wetland area and potential direct exposure to contaminated debris and groundwater.

Alternate Concentration Limits (ACLs) were established as the groundwater protection standard for the site, in conjunction with a compliance monitoring program to sample groundwater, surface water and sediment. Protective Concentration Limits (PCLs) were set in the river where receptors could be potentially exposed. Monitoring for Maximum Contaminant Levels (MCLs) continues across the river from the site as a measurement to ensure that the river is maintained as a hydraulic barrier.

Data from 2003-2007 indicates ACL exceedances at various POC wells, although these exceedances are somewhat sporadic. EPA has determined that the ACL exceedances do not represent a risk to human health since there is no current exposure to contaminated groundwater.

MCL exceedances for benzene at well Ni across the river triggered the Corrective Action Program contingency in the ROD. After Pre-Design investigations, monitored natural attenuation was selected as the most appropriate remedy. Levels of benzene at well Ni appear to be decreasing as anticipated. The last detection at or above the MCL occurred in July 2005. Although there are MCL exceedances at well cluster K, EPA believes these exceedances are not site-related, originating instead from the State-regulated Packer Road Landfill. Additionally, there is no current exposure to groundwater in the vicinity of well cluster N.

EPA continues to evaluate PAH exceedances in sediment, although PAH detection in at upstream sediment sampling locations indicate the Yaworski Lagoon Superfund Site and the Packer Road Landfill are not the source of PAHs in river sediment. Further, EPA's review of October 2004 and November 2006 sediment results for PAHs concluded that levels of PAHs in sediment are unlikely to pose a significant risk to human health from potential incidental ingestion and dermal contact. EPA continues to evaluate the PAH exceedances in sediment, and will conduct an ecological review of all ACL exceedances in groundwater, and expects to make final decisions about future sediment and surface water sampling after completing these activities.

No other exceedances have warranted further evaluation. EPA continues to evaluate sampling results and overall site conditions, and reports exceedances and evaluation of these exceedances to CT DEP.

The last component of the remedy is institutional controls, which have not yet been implemented as required. Prior to Fund takeover, the PRPs were unable to negotiate agreements for groundwater restrictions with the off-site landowners. EPA/State acquisition of institutional controls has been problematic and time-consuming.

Groundwater use will be prohibited within 100 feet outside of the river to the north, west and south, and production wells greater than 50 gallons per minute are prohibited within 1500 feet downgradient of the site. These restrictions affect three properties across the river from the site owned by non-PRP landowners. EPA re-retained the U.S. Army Corps of Engineers and the agencies collectively determined that new survey maps and appraisals of the properties were required. The agencies visited with all three landowners on their respective properties in November 2007 to restart this process. EPA also met with certain of the landowners in March 2008 to discuss and resolve a number of outstanding issues. Although one landowner previously refused to implement groundwater use restrictions, it appears that the agencies have resolved the outstanding issues and that all parties are in agreement on proceeding with the restrictions.

At the time of this report, most of the work to provide appraisal information is complete. The agencies anticipate conducting surveys of the properties in October 2008, after on-site crops are harvested and vegetation begins to clear. None of the landowners have installed wells of any kind in the groundwater use restriction zones.

With respect to land use and groundwater use restrictions within the meander bend of the river, the site owner/operators ("the Yaworskis") had previously agreed to these restrictions pursuant to the February 26, 1990 CD. As part of the September 25, 2000 settlement with the Yaworskis, the Consent Decree requires the Yaworskis to additionally execute and record in the deed an easement granting the right to enforce the land and water use restrictions. EPA, the U.S. Department of Justice, and the State of Connecticut are currently evaluating how to finalize this easement. Requirements for title insurance and the need to create an access path across two separate parcels of land are complicating this effort. The Yaworskis are aware of the need for land and groundwater use restrictions and the land is currently not used for any purpose inconsistent with the remedy and these restrictions.

Cost of System Operation/O&M.

The 1988 ROD estimated the total cost of the remedy at $2,976,000, including total capital costs of $2,259,300 and a total O&M present worth of $716,600. The PRPs were not initially required to report on their expenditures pursuant to the 1990 CD.

During the period from February 1990 to October 1993, Pervel Industries, Inc. was the lead PRP performing the work. The CD capped oversight at $225,000 until RD/RA construction was completed, and the PRPs reached that cap with payments made in August 1992. When Pervel notified EPA in October 1993 that it was unable to continue performing work, their parent company, the Bemis Company, provided EPA with copies of invoices and checks proving that they had expended the full amount of a $4,000,000 financial guarantee. This amount included lagoon cap construction costs, and costs to develop all required work plans, including the ACL Demonstration Plan. This amount did not include the costs of quarterly monitoring and lagoon cap O&M since March 1993, which was paid for by the Yaworskis.

The Yaworskis continued to pay for quarterly monitoring and lagoon cap O&M after October 1993, until they also ceased performing/financing work in October of 1996. While the Yaworskis' exact costs during this period are unknown, their contractor had previously provided certain 1994 invoices to EPA which indicate that the lagoon cap O&M cost between $3000 - $4000 per year, and the cost of monitoring and all associated laboratory work, data validation, and reporting, totaled almost $400,000 per year.

The site has been Fund-lead since December 1996. The total cost for the EPA contractor's performance of the Pre-Design Investigation related to the benzene exceedance is approximately $631,000. The total budget for the EPA contractor's performance of compliance monitoring from March 1997 through the July 2001 monitoring event, as well as development of ACLs, is $2.65 million. Since October 2001, the total cost for the EPA contractor's performance has consistently totaled, on average, approximately $600,000 per year. These costs include the costs to perform compliance monitoring, including all associated laboratory work, data validation, and reporting, as well as all administrative costs required to open, manage, and close new work assignments/task orders under changing contract mechanisms. EPA's contractor will continue performing the compliance monitoring through June 2011.

EPA's direct and indirect costs are not included in these estimates. These costs also do not include O&M of the lagoon cap, for which the State took over all responsibilities at the time the site went Fund-lead.

While it is not possible to calculate the exact difference between actual project cost and the ROD estimate, actual costs are significantly higher. This is largely attributable to the eventual default of all PRPs, requiring a highly unusual and unplanned switch from PRP-lead to Fund-lead during Remedial Design/Remedial Action. Prior to the Fund takeover, project costs had already exceeded ROD estimates mainly due to the contentious disagreements between the agencies and the PRPs regarding the methodology by which to set ACLs, followed by the unexpected exceedance of benzene across the river and the subsequent need to implement the Corrective Action program.

EPA received three separate settlement payments (as outlined in "Enforcement History") to resolve all outstanding liabilities for all remaining PRPs. Payments of $310,903 from five low-volume generators, $3,000,000 to settle U.S. v. Bemis/Pervel, and $1,425,000 to

settle U.S. v. Yaworski, Inc., et. al., and interest for all three payments were placed in a Site-Specific Special Account. Interest continues to accrue, and EPA is drawing off of these funds to pay for ongoing compliance monitoring.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of remedy selection still valid?

Yes, the exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of remedy selection are still valid. Detail on each of these areas is presented below.

Changes in Standards. The 1988 ROD, page 41, identifies the following laws, regulations and guidance as applicable to the proposed remedial alternative. Changes in standards since the 1988 ROD do not appear to affect the protectiveness of the remedy.

- Resource Conservation and Recovery Act (RCRA), Closure Regulations and Location Regulations, Part 264. The cap was designed in accordance with applicable RCRA requirements, including design to prevent washout by a 100-year flood. EPA approved the cap in March 1992, and CT DEP continues to perform all O&M requirements.

- Connecticut Hazardous Waste Management Regulations, and Connecticut Hazardous Waste Facility Siting Rules, promulgated pursuant to Connecticut General Statutes. The cap and dike were designed and constructed to meet these regulations and rules.

- Executive Order 11990 (Wetlands) and 11988 (Floodplains) and guidance outlined under 40 CFR Part 6, Appendix A. The cap and dike were constructed in such a manner to minimize adverse impacts to the floodplain and destruction, loss, or degradation of nearby wetlands. While there was some inherent impact to the floodplain during cap construction, the 1988 ROD noted that no practicable alternative existed.

- RCRA Groundwater Protection Standards, 40 CFR, Part 264, Subpart F. Setting ACLs as the groundwater protection standard for the site meets these regulations.

- Federal Ambient Water Quality Criteria; and Connecticut Water Quality Standards and Classifications, promulgated pursuant to Connecticut General Statutes. These state and federal standards are used to monitor the effectiveness of the remedy. In addition, at points of exposure, where groundwater discharges to surface water, risk-based Protective Concentration Limits have been established using state and federal water quality criteria to ensure that the remedy is properly functioning and that no additional action is warranted to prevent impact to human health and the environment. The lagoon cap and ACLs minimize contaminated groundwater discharge and impacts to surface water to the maximum extent practicable.

- Safe Drinking Water Act regulations establishing MCLs, and Connecticut Standards for Quality of Public Drinking Water, promulgated pursuant to Connecticut General Statutes. New ARARs promulgated since the 1988 ROD include Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals (MCLGs). Alternate

Concentration Limits required the establishment of a groundwater protection standard for each contaminant to be set based on detections at the point of compliance that will not result in an exceedance at the points of exposure of site specific limits that are protective of human health and the environment. Protective Concentration Limits (PCLs) at the points of exposure were set based on the more conservative of human health or ecological risk-based numbers. Across the river, MCLs are set as a measure for whether the Quinebaug River continues to be maintained as a hydraulic barrier to the flow of contaminated groundwater; MCLs are not used to measure health-based risks. There are no drinking water wells immediately downgradient of contaminated groundwater. Changes to MCLs have been incorporated into the monitoring program.

- EPA Risk Reference Doses; Carcinogen Group Potency Factors; and Federal Interim Sediment Criteria Values. These ARARs were all to be considered during development of ACLs. ACLs and the associated PCLs were developed using up-to-date health-based criteria and ecological benchmarks. PCLs and all monitoring data continue to be reviewed on an ongoing basis. Site-wide human health and ecological risk screenings occurred in calendar year 2000. EPA conducted a human health risk review of available data in 2008, including a review of the potential risk from exposure to PAHs in sediment. EPA will conduct a screening level human health risk review of the ACL values, as well as recent ACL exceedances, to determine whether the ACL values require updating and/or whether added investigation of surface water and sediment is needed. Ecological risk screening and review specific to PAHs in sediment occurred in 2004, 2006 and recently in 2008; modifications to the sediment sampling program were implemented after each review. EPA anticipates further ecological review of PAHs in sediment as well as the ACL groundwater data to determine if more sampling of these (or other) parameters is required in surface water or sediment. Review of previous surface water data will be included in this review.

- Connecticut Public Health Code, promulgated pursuant to Connecticut General Statutes. This law provided the Connecticut Department of Public Health with permit authority over potable water wells. The 1988 ROD intended for this law to allow Connecticut to apply enforceable controls to restrict groundwater within one mile of the site. It was later determined that this law did not restrict groundwater use in all of the required areas, therefore requiring easements on affected properties to implement these controls.

- Clean Water Act, Section 404, 33 USC section 1344, and 40 CFR part 230; and Connecticut Inland Wetland and Water Courses Regulations, promulgated pursuant to Connecticut General Statutes. These laws and regulations limit and/or prohibit activities that adversely affect a wetland if a practicable alternative exists. The cap and dike were designed and constructed in accordance with these regulations.

- National Ambient Air Quality Standards, promulgated pursuant to the Clean Air Act. Past construction activities were conducted to minimize future emissions from the site; no waste materials were excavated during construction. There are no activities currently being conducted that trigger requirements under the Clean Air Act.

• Worker safety regulations, 29 CFR, Part 1910, promulgated pursuant to the Occupational Safety and Health Act. All past construction activities were conducted to comply with these regulations. All ongoing activities, including compliance monitoring, require compliance with an approved Health and Safety Plan. EPA contractors are required to review this plan prior to accessing the site.

• RCRA Post-Closure Regulations, 40 CFR Part 264.117 - 264.120, and 264.310, and Part 264, Subpart F. All post-closure plans for cap maintenance, compliance monitoring, and reporting include provisions required by these regulations.

• RCRA Corrective Action Regulations, 40 CFR, part 264.100. All corrective action work plans incorporated these regulations as necessary.

• Connecticut Remediation Standard Regulations (RSRs), Regulations of Connecticut State Agencies (R.C.S.A.) Sections 22a-133k1 to 3, and Connecticut Environmental Land Use Restriction (ELUR) Regulations, R.C.S.A. Section 22a-133-q-1 adopted pursuant to Sections 22a-133k, and 22a-133q of the Connecticut General Statutes. These regulations were adopted on January 30, 1996, thus they were not ARARs at the time of the1988 ROD. The RSRs provide specific numeric cleanup criteria for a wide variety of contaminants in soil, ground water, and soil vapor. The selected remedy was not required to achieve cleanup standards in surface water. In certain cases when pollutants will be left in place in soil or ground water at concentrations that exceed the RSR criteria, an environmental land use restriction may be put in place. An ELUR is a binding agreement between a property owner and the State that the property owner records on the municipal land records. The purpose of an ELUR is to minimize the risk of human exposure to pollutants and hazards to the environment by preventing specific uses or activities at a property or a portion of a property. EPA is working with the State to record environmental land restrictions on the Yaworski property and for three off- site properties. These ELURs will prohibit the installation of drinking water wells on these parcels and ensure that the ground water is not used for drinking or other domestic purposes.

Changes in Exposure Pathways. No new human health or ecological exposure pathways or receptors have been identified. There are no changes in land use or the anticipated land use on or near the site. No new contaminants or contaminant sources have been identified since the completion of the Pre-Design investigations for the benzene exceedance in 1998. One possible exception is PAH exceedances in sediment, which appear to be from a source (or sources) upstream of both the Superfund site and the nearby State-regulated landfill. EPA continues to evaluate the PAH exceedances in sediment, and will be conducting an ecological and human health risk review of all ACL values and ACL exceedances in groundwater.

Changes in Toxicity and Other Contaminant Characteristics; Changes in Risk Assessment Methods. The 1988 ROD stated that dermal contact with contaminated leachate and sediments would pose an incremental lifetime cancer risk, and although contaminated

groundwater was not being consumed at the time, ingestion of groundwater would result in risks that exceed EPA's cancer risks target and exceed acceptable reference doses for exposure to non-carcinogens. Concentrations of heavy metals in the wetland due to leachate flow from the lagoon and erosion of contaminated sediments also exceeded chronic and acute Ambient Water Quality Criteria and ecotoxicity criteria.

The document review did not provide information regarding the previous cancer slope factors (CSFs) used in the Remedial Investigation/Feasibility Study (RI/FS) and the ROD to calculate risk, however, CSFs have generally decreased. Development of PCLs included human health and ecological risk assessments to address risks to site-specific receptors, and subsequent human health and ecological risk screenings and reviews were performed on more recent monitoring data. Further, all of the risks identified in the ROD as outlined above have been addressed at this time, and most of the exposure scenarios associated with site contaminants and remedial action objectives remain the same as those identified at the time of the ROD. While ACL exceedances and the benzene exceedance in groundwater across the river were not anticipated at the time of the ROD, there is no current route of exposure to contaminated groundwater. EPA conducted a human health risk review of available data in 2008, including a review of the potential risk from exposure to PAHs in sediment. The review concluded that the levels are unlikely to pose a significant risk to human health. EPA continues to evaluate the PAH exceedances in sediment, which appear to be from a source (or sources) upstream of both the lagoon and the nearby landfill.

EPA will conduct a screening level human health risk review of the ACL values, as well as recent ACL exceedances, to determine whether the ACL values require updating and/or whether added investigation of surface water and sediment is needed. EPA will also conduct an ecological review of all ACL exceedances from 2003-2007 to determine if more sampling of these (or other) parameters is required in surface water or sediment. Review of previous surface water data will be included in this review.

Expected Progress Towards Meeting RAOs. The remedy is progressing as expected, with the exception of the need to implement monitored natural attenuation for the benzene exceedance across the river. The remedy implemented for this specific exceedance is also progressing as expected. The agencies will continue to evaluate PAH exceedances in sediment, which do not appear to be site-related. EPA will conduct a human health and an ecological risk review of ACL values and ACL exceedances as previously outlined.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No, no new information has come to light that could call into question the protectiveness of the remedy.

The 1988 ROD and the 1990 CD require groundwater use restrictions on three off-site properties as previously outlined. Further, the September 2000 CD with the Yaworski

entities requires land use and groundwater use restrictions within the meander bend of the Quinebaug River. These requirements will prevent groundwater pumping or extraction from drawing contaminated groundwater into uncontaminated areas. An easement on the property within the meander bend will also serve to notify potential future buyers that hazardous wastes are landfilled on site, and that post closure use must never be allowed to disturb the lagoon cap or interfere with the remedy in any way.

Initially, the ROD contemplated that Connecticut Public Health Code would prevent groundwater use off site, however, it was later determined that this law did not restrict groundwater use in all of the required areas. This requirement was then assigned to various PRPs, all of whom were unable to successfully negotiate agreements with the three off-site landowners. When the site changed from PRP-lead to Fund-lead, EPA began working with the State of Connecticut on acquisition of institutional controls, which is extremely complex and time-consuming, given that the ROD did not anticipate the agencies performing this component of the remedy.

As previously outlined, EPA has re-retained the U.S. Army Corps of Engineers and the agencies collectively determined that new survey maps and appraisals were required for the three properties across the river from the lagoon. The agencies visited with all three landowners on their respective properties in November 2007 to restart this process. The agencies appear to have resolved certain outstanding issues, and at this time, it appears that all parties are in agreement on how to proceed with implementing the restrictions.

At the time of this report, most of the work to provide appraisal information is complete. The agencies anticipate conducting surveys of the properties in October 2008, after on-site crops are harvested and vegetation begins to clear.

With respect to land use and groundwater use restrictions within the meander bend of the river, the site owner/operators ("the Yaworskis") had previously agreed to these restrictions pursuant to the 1990 CD. The September 2000 CD requires the Yaworskis to additionally execute and record in the deed an easement granting the right to enforce the land and water use restrictions. EPA, the U.S. Department of Justice, and the State of Connecticut are currently evaluating how to finalize this easement.

At this time, the Yaworskis and all three landowners are periodically notified of the need for groundwater use restrictions, and to date, they have all cooperated with the agencies in the need to restrict all use of groundwater. The Yaworskis are aware of the land use restrictions on their property and are currently not using the land for any purpose inconsistent with the remedy or these restrictions. None of the landowners have installed wells of any kind in the groundwater use restriction zones. Because there are no structures or drinking water wells located within or immediately downgradient of contaminated groundwater from the site or the groundwater use restriction zones, there is no risk to human health via ingestion of groundwater or potential vapor intrusion.

While the public is currently protected, formal groundwater use restrictions must be implemented in order to provide long term protection.

No other new information has come to light which would call into questions the effectiveness of the remedy. No new human or ecological receptors have been identified at this time. No evidence of damage due to natural disasters was noted during the site inspection.

Technical Assessment Summary.

The remedy, as outlined in the ROD, is not currently operating as designed, but is meeting all remedial action objectives in the short term. Institutional controls to prevent groundwater migration and exposure to contaminants in groundwater must be implemented in order to provide for long term protection.

The lagoon cap is being maintained and has minimized the ongoing discharge of contaminated groundwater to surface water. EPA continues to conduct monitoring of groundwater, surface water, and sediment, including monitoring ACLs at the point of compliance, PCLs at the point of exposure, and monitored natural attenuation of the benzene exceedance across the river. EPA takes all necessary measures to evaluate all exceedances as necessary. As outlined, EPA is currently evaluating PAH exceedances in sediment and ongoing ACL exceedances.

8.0 ISSUES

Based on the activities conducted during this Five-Year Review, the issues identified in Table 2 have been noted.

Table 2

Issues	Affects Current Protectiveness	Affects Future Protectiveness
ACL exceedances continue at various point-of-compliance wells, and further evaluation required for ACL values.	N	Y
Institutional controls not yet implemented on three non-PRP properties.	N	Y
Institutional controls not implemented on PRP property.	N	Y
Further evaluation required for PAH exceedances in sediment, as well as for overall surface water and sediment sampling programs.	N	Y

9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

In response to the issues noted above, it is recommended that the actions listed in Table 3 be taken:

Table 3						
Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness	
					Current	Future
ACL exceedances and review of ACL values.	Screening level human health risk and ecological reviews of ACL values and ACL exceedances for potential modification to surface water and sediment sampling.	EPA & CT DEP	N/A	Complete reviews and implement any monitoring changes by 9/30/2009.	N	Y
Institutional controls for three non-PRP properties.	Perform survey and develop survey maps. Finalize and record easements, make payments to landowners.	EPA, CT DEP, & Army Corps of Engineers	N/A	9/30/2009	N	Y
Institutional controls for PRP property.	Finalize investigations and decisions regarding title insurance requirements and access; finalize and record easement.	Yaworskis	EPA, CT DEP, U.S. Dept. of Justice	9/30/2010	N	Y
Further evaluation required for PAH exceedance in sediment, as well as for overall surface water and sediment sampling programs.	Statistical analysis of sediment PAH/TOC results, to be followed by determination regarding continued monitoring. ACL evaluation may also result in potential modification to surface water and sediment sampling programs.	EPA, in conjunction with CT DEP	N/A	Complete evaluation and implement any monitoring changes by 9/30/2009.	N	Y

10.0 PROTECTIVENESS STATEMENTS

The remedy at the Yaworski Lagoon Superfund Site currently protects human health and the environment in the short-term because: 1) there is no current exposure to contaminated groundwater originating from the site, 2) based on evaluation of surface water and sediment data collected as part of compliance monitoring, threats to human health and ecological receptors from site-related contamination are not significant, and 3) CT DEP continues to perform O&M on the lagoon cap and past inspections reveal the

cap to be an effective barrier to exposure to contaminated waste by human and ecological receptors.

The public is protected from on-site contaminants because the fence and the lagoon cap impede direct access to the lagoon and the wastes contained within the lagoon. Control of the area around the site is generally restricted by locked gates, and the entrances are posted with no trespassing signs. There is no longer any public access to the nearby landfill.

EPA performs ongoing evaluation of all results from compliance monitoring of groundwater, surface water and sediment. EPA reviewed recent ACL and MCL exceedances in groundwater and none of the current exceedances have warranted further action beyond evaluation. These exceedances do not represent a risk to human health since there is no current exposure to contaminated groundwater. EPA will conduct a screening level human health risk review of the ACL values, as well as recent ACL exceedances, to determine whether the ACL values require updating and/or whether added investigation of surface water and sediment is needed.

EPA reviewed levels of PAHs in sediment and concluded that these levels are unlikely to pose a significant risk to human health from potential incidental ingestion of and dermal contact with PAHs. EPA has also preliminarily concluded that the source of PAHs in sediment is from a location upstream of the lagoon and the nearby landfill. EPA continues to evaluate PAH exceedances in sediment, and will also conduct an ecological review of all ACL values and ACL exceedances to determine if more sampling is required in surface water or sediment. Review of previous surface water data will be included in this review. After completing the ecological evaluation and review, EPA, in conjunction with CT DEP, will make a final decision about future sediment and surface water sampling.

Institutional controls are required to prevent groundwater pumping from drawing contamination into uncontaminated areas, and to prevent exposure to contaminants in groundwater. Institutional controls have not yet been implemented on three off-site non-PRP properties, but the agencies have initiated surveys and other work required to finalize easements to implement restrictions on all three properties.

With respect to land use and groundwater use restrictions within the meander bend of the river, the Yaworskis had previously agreed to these restrictions pursuant to the 1990 CD. EPA, the U.S. Department of Justice, and the State of Connecticut are currently evaluating how to finalize an easement on this property pursuant to the September 2000 CD.

The Yaworskis and all three landowners of property located across the river from the lagoon are periodically notified of the need for groundwater use restrictions, and to date, they have all cooperated with the agencies in the need to restrict all use of groundwater. Because there are no structures or drinking water wells located within or immediately downgradient of contaminated groundwater from the site or the groundwater use

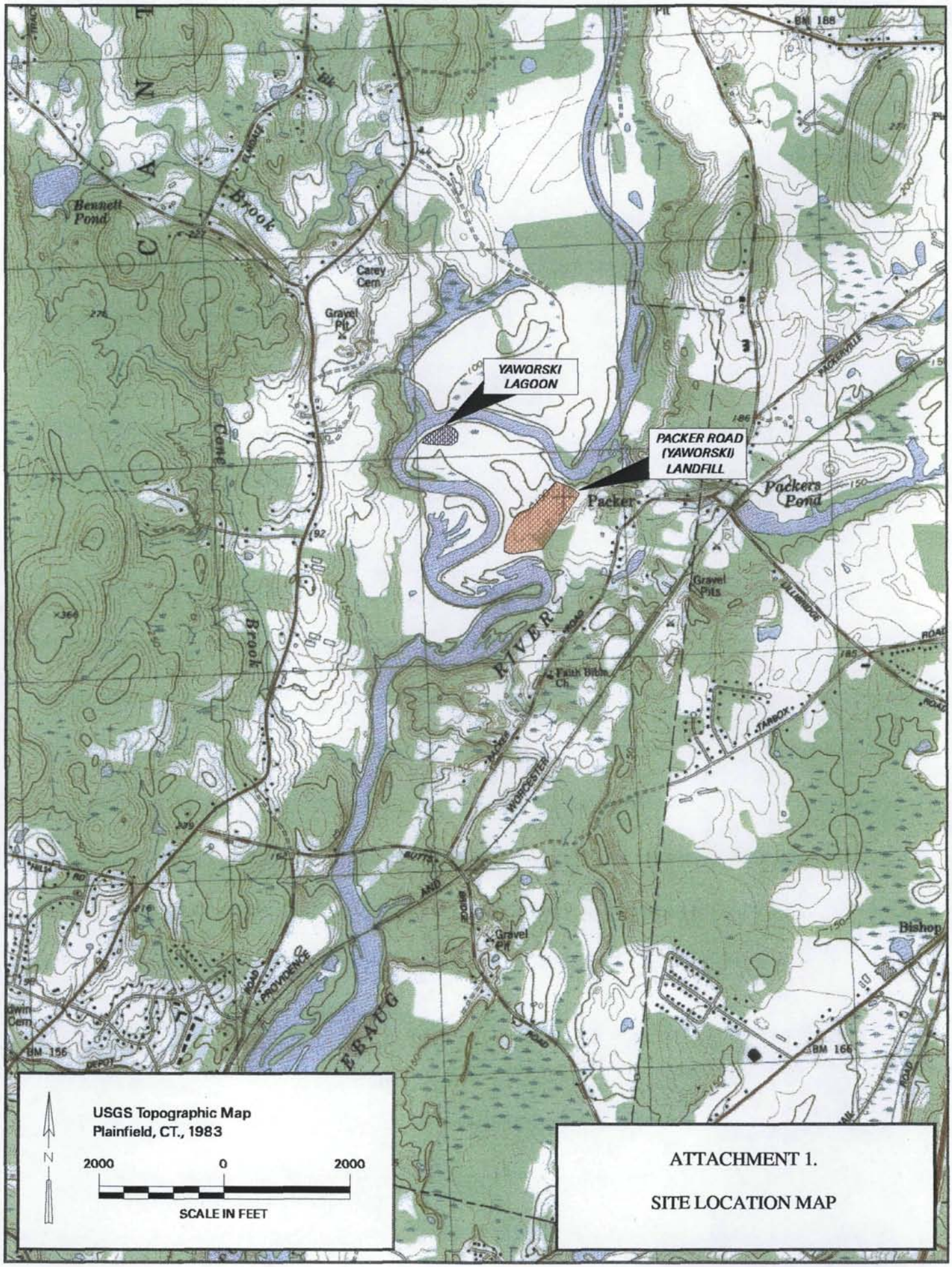
restriction zones, there is no risk to human health via ingestion of groundwater or potential vapor intrusion.

While the public is currently protected, formal groundwater use restrictions must be implemented in order to provide long term protection.

11.0 NEXT REVIEW

The due date for this third five-year review of the Yaworski Lagoon Superfund Site is September 30, 2008. Therefore, the next five-year review should be completed by September 30, 2013.

ATTACHMENT 1
SITE LOCATION MAP

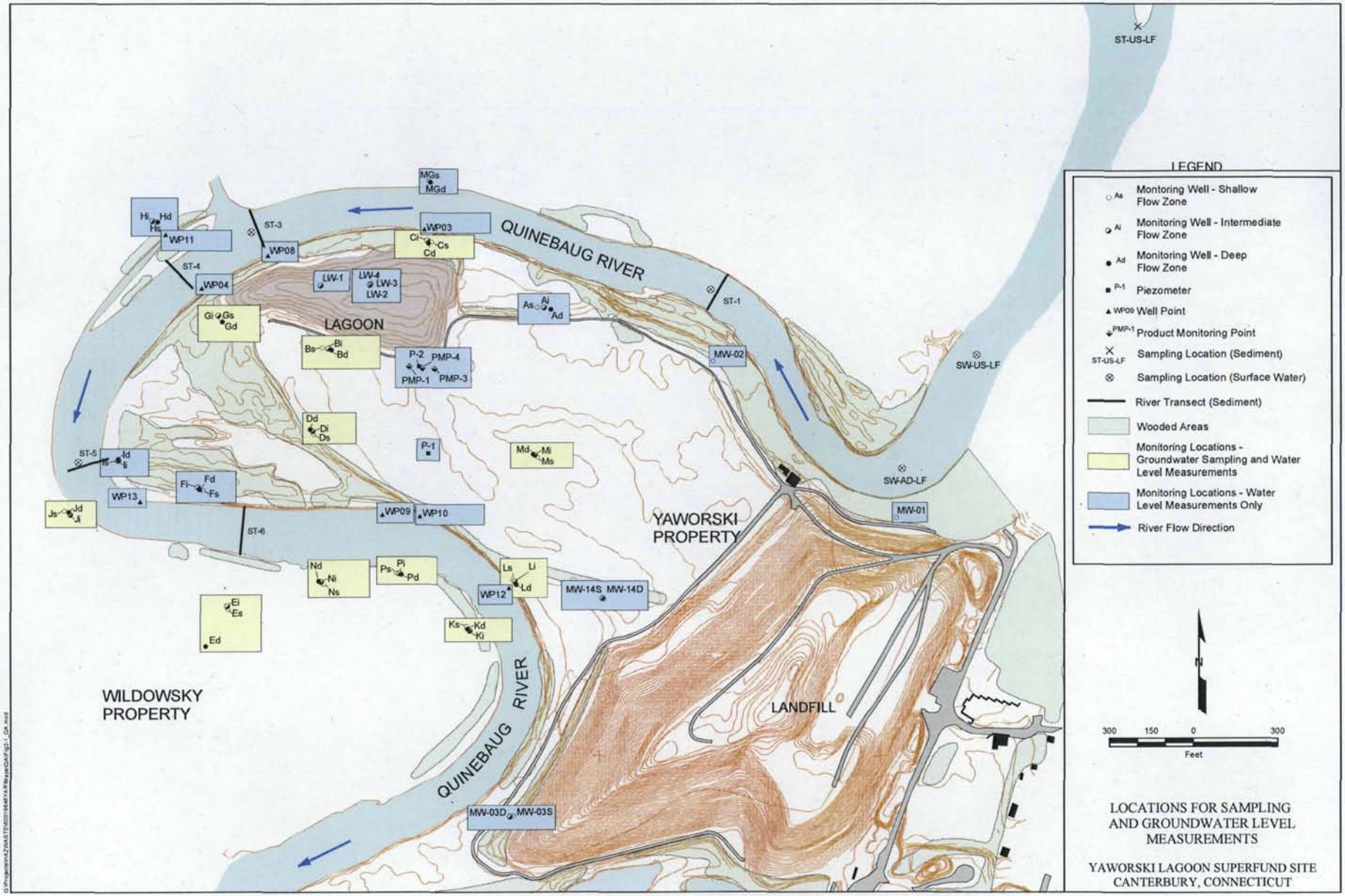


ATTACHMENT 1.

SITE LOCATION MAP

/u6/yaworski/topo_2k

ATTACHMENT 2
SAMPLING LOCATIONS



LOCATIONS FOR SAMPLING AND GROUNDWATER LEVEL MEASUREMENTS

YAWORSKI LAGOON SUPERFUND SITE
CANTERBURY, CONNECTICUT

ATTACHMENT 3
ALTERNATE CONCENTRATION LIMITS
SUMMARY TABLE

Table 1

Alternate Concentration Limits - Summary Table

Compound/Analyte	EPA MCLs (ug/L)	Groundwater PCLs (ug/L) [1]		Established ACLs (ug/L)								
		Human Health	Ecological	Bs	Bi	Bd	Cs	Ci	Cd	Gs	Gi	Gd
1,1-dichloroethane	not available	189,000	43,100	140	50	50	99	50	50	2,050	50	50
1,4-dioxane	not available	14,000	1,000,000	500	4,900	5,500	50,000	500	500	4,600	500	500
2,4-dimethylphenol	not available	4,490	775	50	120	78	84	50	50	50	50	50
2-butanone	not available	3,060,000	169,000	97	6,400	180	180,000	50	50	7,200	65	50
4-methyl-2-pentanone	not available	51,000	46,000	250	2,400	270	9,300	50	50	1,450	50	50
benzene	5	91.20	530	50	100	290	180	50	50	50	50	50
chloroethane	not available	2,030,000	43,100	2,600	130	110	1,600	50	50	4,900	50	50
ethylbenzene	700	9,350	1,400	850	7,760	1,900	8,000	700	700	13,300	700	700
styrene	100	12,200	2,510	100	260	230	214	100	100	100	100	100
tetrahydrofuran	not available	281,000	216,000	330	31,200	75,100	99,900	250	250	21,500	1,920	250
toluene	1,000	9,350	1,270	1,300	1,000	1,000	3,400	1,000	1,000	1,250	1,000	1,000
xylene (total)	10,000	105,000	10,000	10,000	13,100	21,400	31,400	10,000	10,000	67,700	10,000	10,000
4-methylphenol	not available	21,000	200	50	90	50	120	50	50	97	50	50
bis(2-ethylhexyl)phthalate	6	120	1,800	50	50	50	50	71	50	50	50	79
naphthalene	not available	2,440	not available	50	68	50	53	50	50	50	50	50
phenol	not available	606,000	34,100	50	52	50	50	50	50	220	50	50
acetonitrile	not available	22,100	185,000	250	13,000	250	50,000	250	250	2,500	250	250
acetophenone	not available	258,000	10,300	50	69	50	50	50	50	50	50	50
N,N-dimethylformamide	not available	1,620,000	1,200,000	250	203,000	1,550,000	383,000	8,500	250	210,000	3,900	250
beta-BHC	not available	2.06	1.80	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
arsenic	50	317	not available	50	1140	226	114	50	50	220	50	50
barium	2,000	236,000	5,000	2,000	2,000	3,660	2,000	2,000	2,000	2,000	2,000	2,000
cadmium	5	5,260	not available	5	14.9	16	12.2	5	5	5	6.1	33.2
chromium	100	4,210	not available	100	100	100	100	100	100	100	100	100
cobalt	not available	7,570,000	1,000	69.3	390	379	38.1	2.5	2.5	44.9	2.5	21.5
copper	1,300	not available	not available	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300	1,300
lead	15	not available	not available	15	32.5	28.5	52.2	15	15	15	15	15
mercury	2	1,260	not available	5.9	2	2	2	2	2	2	2	2
nickel	not available	842,000	not available	12.8	86.7	91.6	117	2,590	10.7	149	16.6	9.9
vanadium	not available	118,000	600	4.3	11	13.6	136	15.8	2.5	11.7	8.9	28.3
zinc	not available	1,680,000	not available	73.5	141	253	156	243	105	115	75.5	218
2,3,7,8-TCDD TE	.03 ng/L	.000264 ng/L	200 ng/L	NC	NC	NC	NC	NC	NC	NC	NC	NC

Note 1 - Groundwater PCLs were obtained from Tables 5-21 and 6-28 in ENSR's ACL Demonstration Report, March 1993 with revisions through November 1996.

NC - Not calculated due to insufficient data.

MCL - Maximum Contaminant Level

ACL - Alternate Concentration Level

METCALF & EDDY, "Final Statistical Derivation of Alternate Concentration Limits (ACLs)", July 2000

ATTACHMENT 4
EXCEEDANCES OF ACLs, PCLs, and MCLs (2003-2007)

GROUNDWATERACL/MCL/PCL EXCEEDANCES FOR THE APRIL 2003 (38TH) CMR THROUGH OCTOBER 2007 (52ND) CMR

				Reported Concentration (µg/L)														
Sampling Location	Analyte	Exceedance Type	ACL/MCL/PCL (µg/L)[1]	38th CMR	39th CMR	40th CMR	41st CMR	42nd CMR	43rd CMR	44th CMR	45th CMR	46th CMR	47th CMR	48th CMR	49th CMR	50th CMR	51st CMR	52nd CMR
Bs	Chromium	ACL	100	NE	NE	210/210*	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
	Nickel	ACL	12.8	NE	NE	160/150*	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Bi	1,4-Dioxane	ACL	4,900	NE	NE	NE	NE	NE	NE	5,000 J	[illegible] J	NE	5,100 J	NE	NE	NE	5,700 J	NE
	2,4-Dimethylphenol	ACL	120	NE	190	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
	2-Butanone	ACL	6,400	NE	NE	NE	NE	NE	NE	NE	[illegible] J	NE	16,000 J	NE	NE	NE	NE	NE
	4-Methyl-2-pentanone	ACL	2,400	NE	NE	NE	NE	5,400 J	[illegible] J	4,100 J	4,900 J	NE	6,300 J	NE	NE	NE	NE	NE
	4-Methylphenol[2]	ACL	90	NE	NE	NE	NE	110 J	120	140	140	NE	130	NE	NE	93	NE	NE
	Chloroethane	ACL	130	NE	NE	150 J	NE	240 J	150 J	260 J	210 J	NE	280 J	190 J	170 J	200	NE	150 J
	N,N-dimethyl formamide	ACL	203,000	NE	NE	NE	NE	NE	NE	NE	NE	NE	240,000	NE	NE	NE	NE	NE
	Phenol	ACL	52	NE	NE	NE	NE	NE	NE	NE	NE	NE	61	NE	NE	NE	NE	NE
	Tetrahydrofuran	ACL	31,200	NE	NE	33,000 J	NE	44,000 J	58,000 J	63,000 J	110,000 J	NE	59,000 J	NE	49,000 J	57,000	87,000 J	65,000 J
	Toluene	ACL	1,000	NE	NE	NE	NE	1,200 J	NE	NE	1,400 J	NE	2,300	NE	NE	NE	NE	NE
	Xylenes	ACL	13,100	NE	NE	NE	NE	[illegible]	NE	NE	NE	NE	17,000 J	NE	NE	NE	14,000 J	NE
Bd	Xylenes	ACL	21,400	NE	NE	NE	NE	22,000 J	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Cs	2,4-Dimethylphenol	ACL	84	NE	160	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
	Chloroethane	ACL	1,600	2,100	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
	Phenol	ACL	50	NE	NE	NE	NE	NE	NE	[illegible]	NE	NE	NE	NE	NE	NE	NE	NE
Ci	Cobalt	ACL	2.5	NE	NE	NE	NE	NE	NE	NE	NE	NE	3.3	NE	NE	NE	NE	NE
Gs	2,4-Dimethylphenol	ACL	50	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	[illegible]	NE	NE	NE	NE
	Chloroethane	ACL	4,900	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	[illegible]	NE	NE	NE	NE
Gi	Nickel	ACL	16.6	NE	NE	NE	NE	NE	NE	NE	NE	32	NE	NE	NE	NE	NE	NE
Ks	Trichloroethene	MCL and CT MCL	5	NE	NE	NE	NE	NE	NE	NE	NE	5.6	NE	NE	NE	NE	NE	NE
Ki	cis-1,2-Dichloroethene	MCL and CT MCL	70	70	NE	70	NE	71	NE	NE	76 J	72	NE	[illegible]	97/100*	NE	79	90
	Methylene chloride	MCL and CT MCL	5	NE	NE	NE	6 J	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
	Trichloroethene	MCL and CT MCL	5	290/290*	250	280	290/290*	290	280	300	280 J	280/290*	260/260*	290	190/190*	300 J/280*	NE	270
	Vinyl chloride	MCL and CT MCL	2	2/2*	NE	NE	2	NE	NE	NE	[illegible]	NE	NE	NE	NE	NE	NE	NE
Kd	Trichloroethene	MCL and CT MCL	5	16	16	18	14	20	19	7	19 J	24	24	31	28	25	32	33
Ni	Benzene	MCL and CT MCL	5	11 J/10 J*	NE	NE	7/7*	NE	8 J/8 J*	6/6*	7 J/7 J*	NE	5.6 J/5.2 J*	NE	NE	NE	NE	NE
	Trichloroethene	MCL and CT MCL	5	NE	NE	NE	NE	NE	NE	NE	NE	11 J	NE	NE	NE	NE	NE	NE
Nd	Bis(2-ethylhexyl)phthalate	MCL and CT MCL	6	6.3 B	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Hs	Bis(2-ethylhexyl)phthalate	MCL and CT MCL	6	NS	NE	NS	NS	14	NS	NS	NE	NS	NS	NE	NS	NS	NE	NS
WP08	Lead	PCL	15	43	NS	NE	NE	NS	NE	NE	NS	NE	NE	NS	NS	NS	17.6	NS

Footnotes:

1 - Action levels and the list of evaluated compounds and analytes are from Table 8-1 of ENSR's *ACL Demonstration Report* (dated 3/93 with revisions per ENSR's letter to EPA, *Response to Comments and Revisions of the ACL Demonstration Report*, dated 11/13/96). Federal Maximum Contaminant Levels (MCLs) are from U.S. EPA Office of Water's *Drinking Water Standards and Health Advisories* (Summer 2000 and subsequent revisions). Connecticut MCLs are from Electronic Law Libraries for Connecticut Environmental, Section B102, *Standards for Quality of Public Drinking Water* (1998 and subsequent revisions).

2 - The reported concentration for 4-methylphenol may also include 3-methylphenol, which co-elutes during chromatography

* - The second number is the field duplicate result

☼ - Laboratory qualification that indicates the relative percent difference (RPD) between the sample result and the matrix duplicate exceeded the acceptance limit

ACL - Alternate Concentration Limits

B - Found in associated method blank

J - Value is approximate due to limitations identified in the data validation review

MCL - Maximum Concentration Limits

NE - No Exceedance

NS - Not Sampled

PCL - Protective Concentration Limits

TABLE 3. SEDIMENT PCL/ER-L EXCEEDANCES FOR THE OCTOBER 2003 (40th) CMR

Sampling Location	Analyte	Exceedance Type	PCL/ER-L[1] (ug/kg)	Reported Concentration (ug/kg)
ST-4-A	Benzo(a)anthracene	ER-L	261	360 J
	Benzo(a)pyrene	ER-L	430	450 J
	Chrysene	ER-L	384	430 J
	Dibenzo(a,h)anthracene	RE-L	63.4	96 J
	Fluoranthene	ER-L	600	6,400
	Phenanthrene	ER-L	240	310 J
	Pyrene	ER-L	665	780
	PAH, Total HMW[3]	ER-L	1,700	3,800
ST-7-A	Benzo(a)anthracene	ER-L	261	350 J
	Chrysene	ER-L	384	450 J
	Fluoranthene	ER-L	600	660 J
	Lead	PCL	35,000	36,700
	Phenanthrene	ER-L	240	340 J
	Pyrene	ER-L	665	730 J
	PAH, Total HMW[3]	ER-L	1,700	2,580
ST-7-B	Benzo(a)anthracene	ER-L	261	390 J
	Benzo(a)pyrene	ER-L	430	430 J
	Chrysene	ER-L	384	490 J
	Fluoranthene	ER-L	600	760
	Phenanthrene	ER-L	240	390 J
	Pyrene	ER-L	665	810
	PAH, Total HMW[3]	ER-L	1,700	2,880
ST-7-C	Anthracene	ER-L	85.3	180 J
	Benzo(a)anthracene	ER-L	261	610 J
	Benzo(a)pyrene	ER-L	430	700 J
	Chrysene	ER-L	384	730 J
	Dibenzo(a,h)anthracene	ER-L	63.4	170 J
	Fluoranthene	ER-L	600	1,100
	Phenanthrene	ER-L	240	650 J
	Pyrene	ER-L	665	1,300
	PAH, Total LMW[2]	ER-L	552	830
	PAH, Total HMW[3]	ER-L	1,700	4,610
	PAH, Total[4]	ER-L	4,022	5,440

1 - Effects Range-Low (ER-L) and Effects Range-Median (ER-M) levels are from *Toxicological Benchmarks for Screening Contaminants of Concern for Effects on Sediment-Associated Biota: 1997 Revision*, Table 1

2 - The ER-L for PAH, Total (LMW) is compared to the sum of acenaphthene, acenaphthylene, anthracene, fluorene, 2-methylnaphthalene, naphthalene, and phenanthrene

3 - The ER-L for PAH, Total (HMW) is compared to the sum of benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, and pyrene

4 - The ER-L for PAH, Total is compared to the sum of the LMW PAHs and HMW PAHs

J - Value is approximate due to limitations identified in the data validation review

HMW - High molecular weight
LMW - Low molecular weight
PAH - Polycyclic aromatic hydrocarbon

TABLE 3. SEDIMENT ER-L EXCEEDANCES FOR THE OCTOBER 2004 (43rd) CMR

Sampling Location	Analyte	Exceedance Type	ER-L[1] (ug/kg)	Reported Concentration (ug/kg)
SD-US-LF	Benzo(a)anthracene	ER-L	261	370 J
	Benzo(a)pyrene	ER-L	430	480 J
	Chrysene	ER-L	384	470 J
	Fluoranthene	ER-L	600	740 J
	Phenanthrene	ER-L	240	400 J
	Pyrene	ER-L	665	930
	PAH, Total HMW[2]	ER-L	1,700	2,990
SD-AD-LF	Fluoranthene	ER-L	600	610
	Phenanthrene	ER-L	240	340 J
	Pyrene	ER-L	665	680
	PAH, Total HMW[2]	ER-L	1,700	2,240
ST-5	Benzo(a)anthracene	ER-L	261	370 J
	Benzo(a)pyrene	ER-L	430	470 J
	Chrysene	ER-L	384	460 J
	Fluoranthene	ER-L	600	830
	Phenanthrene	ER-L	240	540 J
	Pyrene	ER-L	665	1,000
	PAH, Total HMW[2]	ER-L	1,700	3,130
ST-7	Phenanthrene	ER-L	240	310 J
	PAH, Total HMW[2]	ER-L	1,700	1,950

1 - Effects Range-Low (ER-L) levels are from *Toxicological Benchmarks for Screening Contaminants of Concern for Effects on Sediment-Associated Biota: 1997 Revision*, Table 1

2 - The ER-L for PAH, Total (HMW) is compared to the sum of benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, and pyrene

J - Value is approximate due to limitations identified in the data validation review

HMW - High molecular weight

PAH - Polycyclic aromatic hydrocarbon

TABLE 3. SEDIMENT ER-L EXCEEDANCES FOR THE NOVEMBER 2006 (49th) CMR

Sampling Location	Analyte	Exceedance Type	ER-L/ER-M [1] (µg/kg)	Reported Concentration (µg/kg)
ST-US-LF	Acenaphthene	ER-L	16	71 J
	Acenaphthylene	ER-L	44	57 J
	Anthracene	ER-L	85.3	420
	Benzo(a)anthracene	ER-L	261	1,100
	Benzo(a)pyrene	ER-L	430	1,200
	Chrysene	ER-L	384	1,300
	Dibenzo(a,h)anthracene	ER-L and ER-M	63.4/260	270
	Fluoranthene	ER-L	600	2,200
	Fluorene	ER-L	19	180 J
	Phenanthrene	ER-L and ER-M	240/1,500	1,600
	Pyrene	ER-L	665	2,400
	PAH, Total LMW[2]	ER-L	552	2,328
	PAH, Total HMW[3]	ER-L	1,700	8,470
	PAH, Total[4]	ER-L	4,022	10,798
ST-4	Anthracene	ER-L	85.3	97 J
	Benzo(a)anthracene	ER-L	261	550
	Benzo(a)pyrene	ER-L	430	650
	Chrysene	ER-L	384	660
	Dibenzo(a,h)anthracene	ER-L	63.4	160 J
	Fluoranthene	ER-L	600	890
	Phenanthrene	ER-L	240	510
	Pyrene	ER-L	665	1,000
	PAH, Total LMW[2]	ER-L	552	607
	PAH, Total HMW[3]	ER-L	1,700	3,910
	PAH, Total[4]	ER-L	4,022	4,517
ST-6	Anthracene	ER-L	85.3	190 J/160 J*
	Benzo(a)anthracene	ER-L	261	1,100/820*
	Benzo(a)pyrene	ER-L	430	1,200/880*
	Chrysene	ER-L	384	1,200/900*
	Dibenzo(a,h)anthracene	ER-L	63.4	240 J/200 J*
	Fluoranthene	ER-L	600	1,300/1,000*
	Phenanthrene	ER-L	240	540/420*
	Pyrene	ER-L	665	1,900/1,500
	PAH, Total LMW[2]	ER-L	552	730/580*
	PAH, Total HMW[3]	ER-L	1,700	6,940/5,300*
	PAH, Total[4]	ER-L	4,022	7,670/5,880*

NOTES:

[1] - Effects Range-Low (ER-L) and Effects Range-Median (ER-M) levels are from *Toxicological Benchmarks for Screening Contaminants of Concern for Effects on Sediment-Associated Biota: 1997 Revision*, Table 1

[2] - The ER-L for PAH, Total (LMW) is compared to the sum of acenaphthene, acenaphthylene, anthracene, fluorene, 2-methylnaphthalene, naphthalene, and phenanthrene

[3] - The ER-L for PAH, Total (HMW) is compared to the sum of benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenzo(a,h)anthracene, fluoranthene, and pyrene

[4] - The ER-L for PAH, Total is compared to the sum of the LMW PAHs and HMW PAHs

J - detected below quantitation limits

* - The second number is the field duplicate result

HMW - High molecular weight

LMW - Low molecular weight

PAH - Polycyclic aromatic hydrocarbon

TABLE 4. SURFACE WATER PCL EXCEEDANCES FOR THE OCTOBER 2004 (43rd) CMR

Sampling Location	Analyte	Exceedance Type	PCL[1] (ug/L)	Reported Concentration (ug/L)
T-1	Mercury	PCL	0.0204	0.11 J/0.16 J*
T-3	Mercury	PCL	0.0204	0.078 J
T-5	Mercury	PCL	0.0204	0.14 J

* - The second number is the field duplicate result

1- Protective Concentration Limits (PCLs) are from the revised Table 8-1 of ENSR's ACL Demonstration Report (most recent update of 11/13/96).

J - Value is approximate due to limitations identified in the data validation review

ATTACHMENT 5
FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

I. SITE INFORMATION	
Site name: YANKOSKI LAGOON SFSITE	**Date of inspection:** 8/25/2008, 1:00-3:00 pm.
Location and Region: CANTERBURY, CT / REG. 1	**EPA ID:** CTD009774969
Agency, office, or company leading the five-year review: EPA	**Weather/temperature:** SUNNY / HAZY, ~85°

Remedy Includes: (Check all that apply)

- ☒ Landfill cover/containment (lagoon)
- ☒ Access controls
- ☒ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☒ Other Alternate Concentration Limits (ACLs) + compliance monitoring
- ☒ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: ☐ Inspection team roster attached ☒ Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** _____ _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Report attached.

* SITE INSPECTION CONDUCTED WITH MARK LEWIS, PROJECT MANAGER FOR CT DEP.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply) N/A

1. **O&M Documents**
   - ☐ O&M manual ☐ Readily available ☐ Up to date ☒ N/A
   - ☒ As-built drawings ☒ Readily available ☐ Up to date ☐ N/A
   - ☐ Maintenance logs ☐ Readily available ☐ Up to date ☐ N/A

   Remarks

2. **Site-Specific Health and Safety Plan** ☒ Readily available ☒ Up to date ☐ N/A
   - ☐ Contingency plan/emergency response plan ☐ Readily available ☐ Up to date ☐ N/A

   Remarks METCALF + EDDY. H+S PLAN INCLUDES PROVISIONS FOR EMERGENCIES.

3. **O&M and OSHA Training Records** ☐ Readily available ☐ Up to date ☒ N/A

   Remarks

4. **Permits and Service Agreements**
   - ☐ Air discharge permit ☐ Readily available ☐ Up to date ☒ N/A
   - ☐ Effluent discharge ☐ Readily available ☐ Up to date ☒ N/A
   - ☐ Waste disposal, POTW ☐ Readily available ☐ Up to date ☒ N/A
   - ☐ Other permits ☐ Readily available ☐ Up to date ☒ N/A

   Remarks ALL OFF-SITE DISPOSAL OF WASTE IS IN COMPLIANCE W/EPA REQUIREMENTS, MANIFESTS AVAILABLE.

5. **Gas Generation Records** ☐ Readily available ☐ Up to date ☒ N/A

   Remarks

6. **Settlement Monument Records** ☒ Readily available ☐ Up to date ☐ N/A

   Remarks EPA/METCALF + EDDY LASOOD SETTLEMENT MONITORING 2000-2004, DISCONTINUED AS OF 2005.

7. **Groundwater Monitoring Records** ☒ Readily available ☒ Up to date ☐ N/A

   Remarks METCALF + EDDY.

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date ☒ N/A

   Remarks

9. **Discharge Compliance Records**
   - ☐ Air ☐ Readily available ☐ Up to date ☒ N/A
   - ☐ Water (effluent) ☐ Readily available ☐ Up to date ☒ N/A

   Remarks

10. **Daily Access/Security Logs** ☐ Readily available ☐ Up to date ☒ N/A

    Remarks

NO ON-SITE RECORDS. ALL RECORDS INDICATED HERE @ EPA AND REVIEWED PRIOR TO INSPECTION

IV. O&M COSTS (COSTS ADDRESSED IN REPORT)

1. **O&M Organization**
   - ☐ State in-house
   - ☐ PRP in-house
   - ☐ Federal Facility in-house
   - ☐ Contractor for State
   - ☐ Contractor for PRP
   - ☐ Contractor for Federal Facility
   - ☐ Other _____

2. **O&M Cost Records**
   - ☐ Readily available ☐ Up to date
   - ☐ Funding mechanism/agreement in place
   - Original O&M cost estimate _____ ☐ Breakdown attached

   Total annual cost by year for review period if available

   From _____ To _____ _____ ☐ Breakdown attached
   Date Date Total cost

   From _____ To _____ _____ ☐ Breakdown attached
   Date Date Total cost

   From _____ To _____ _____ ☐ Breakdown attached
   Date Date Total cost

   From _____ To _____ _____ ☐ Breakdown attached
   Date Date Total cost

   From _____ To _____ _____ ☐ Breakdown attached
   Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**
   Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☒ Gates secured ☐ N/A
   Remarks FENCE/GATES AROUND LAGOON IN GOOD SHAPE + SECURE.

B. Other Access Restrictions

1. **Signs and other security measures** ☐ Location shown on site map ☐ N/A
   Remarks ONE ENTRANCE GATE LOCKED/SECURE. GATE TO OVERALL LANDFILL AREA DIRECTLY ACROSS FROM OFFICE AT 133 PACKER ROAD WAS OPEN, BUT EXTENSIVELY POSTED WITH NO TRESPASSING SIGNS AND INSTRUCTIONS TO SIGN IN AT 133 PACKER RD. OFFICE.

NO ONE OBSERVED AT/AROUND LANDFILL/LAGOON AREAS.

C. Institutional Controls (ICs) (ICs ADDRESSED IN REPORT. N/A, BUT SEE NOTE BELOW)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☐ No ☐ N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☐ No ☐ N/A

Type of monitoring (*e.g.*, self-reporting, drive by) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No ☐ N/A
Reports are verified by the lead agency ☐ Yes ☐ No ☐ N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No ☐ N/A
Violations have been reported ☐ Yes ☐ No ☐ N/A
Other problems or suggestions: ☐ Report attached
ICs NOT YET FULLY IMPLEMENTED ON SITE.
NO OBSERVATIONS TO INDICATE PRP LANDOWNER IS VIOLATING REQUIRED LAND + GROUNDWATER USE RESTRICTIONS.

2. **Adequacy** ☐ ICs are adequate ☐ ICs are inadequate ☐ N/A
Remarks _____

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map ☒ No vandalism evident
Remarks NO SIGNS OF TRESPASS.

2. **Land use changes on site** ☐ N/A
Remarks NO.

3. **Land use changes off site** ☐ N/A
Remarks NOT OBSERVED.

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map ☒ Roads adequate ☐ N/A
Remarks CT DEP HAS BEEN NOTIFIED OF ROUGH ROADS LEADING TO CERTAIN ON-SITE MONITORING WELLS. ROADS ARE STILL PASSABLE.

B. Other Site Conditions

Remarks EAST OF LAGOON, IN FIELD BETWEEN LAGOON + LANDFILL, OBSERVED PILE COVERED WITH LARGE WHITE PLASTIC SHEETING, EDGES SECURED WITH TIRES. APPEARS TO BE MANURE/SOIL STORED UNDERNEATH. OK.
LOCATION SHOWN ON SITE MAP.

VII. LANDFILL COVERS ☒ Applicable ☐ N/A (LAGOON CAP)

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☒ Settlement not evident
Areal extent____ Depth____
Remarks____

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident
Lengths____ Widths____ Depths____
Remarks____

3. **Erosion** ☒ Location shown on site map ☐ Erosion not evident
Areal extent____ Depth____
Remarks VERY MINOR IN TWO LOCATIONS ALONG GABION WALL @ N.E. CORNER. ONE AREA ~1-2' AREAL EXTENT, UP TO 8" DEEP. SECOND AREA ~1' AREAL EXTENT, UP TO 6" DEEP.

4. **Holes** ☒ Location shown on site map ☐ Holes not evident
Areal extent____ Depth____
Remarks 8" DEEP GROOVED AREA APPEARS TO CONTAIN SEVERAL SMALL ANIMAL BURROWS.

5. **Vegetative Cover** ☐ Grass ☒ Cover properly established ☒ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram)
Remarks____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
Remarks RIP RAP IN GOOD SHAPE, MINOR VEGETATIVE GROWTH THROUGH RIP RAP DOES NOT APPEAR TO COMPROMISE INTEGRITY.

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
Areal extent____ Height____
Remarks____

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent_____
☐ Ponding ☐ Location shown on site map Areal extent_____
☐ Seeps ☐ Location shown on site map Areal extent_____
☐ Soft subgrade ☐ Location shown on site map Areal extent_____
Remarks_____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☒ No evidence of slope instability
Areal extent_____
Remarks_____

B. Benches ☐ Applicable ☒ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks_____

C. Letdown Channels ☐ Applicable ☒ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_____ Areal extent_____
Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent_____ Depth_____
Remarks_____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ ☐ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations ☒ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☒ N/A
Remarks_____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
☒ Properly secured/locked ☐ Functioning ☒ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☒ N/A
Remarks_____

5. **Settlement Monuments** ☒ Located ☐ Routinely surveyed ☐ N/A
Remarks DID NOT SEEK TO LOCATE ALL MONUMENTS.

E. Gas Collection and Treatment ☐ Applicable ☒ N/A

1. **Gas Treatment Facilities**
   ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____

2. **Gas Collection Wells, Manifolds and Piping**
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   ☐ Good condition ☐ Needs Maintenance ☐ N/A
   Remarks_____

F. Cover Drainage Layer ☐ Applicable ☒ N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks_____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks_____

G. Detention/Sedimentation Ponds ☐ Applicable ☒ N/A

1. **Siltation** Areal extent_____ Depth_____ ☐ N/A
   ☐ Siltation not evident
   Remarks_____

2. **Erosion** Areal extent_____ Depth_____
   ☐ Erosion not evident
   Remarks_____

3. **Outlet Works** ☐ Functioning ☐ N/A
   Remarks_____

4. **Dam** ☐ Functioning ☐ N/A
   Remarks_____

H. Retaining Walls ☒ Applicable ☐ N/A GABION WALLS.

1. **Deformations** ☐ Location shown on site map ☒ Deformation not evident
Horizontal displacement_____ Vertical displacement_____
Rotational displacement_____
Remarks WALKED LENGTH OF LAGOON. ALL GABION WALLS IN VERY GOOD SHAPE. SMALL TREE DOWN ACROSS RIPRAP @ WEST END. NO APPARENT DAMAGE.

2. **Degradation** ☐ Location shown on site map ☒ Degradation not evident
Remarks_____

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☒ N/A

1. **Siltation** ☐ Location shown on site map ☐ Siltation not evident
Areal extent_____ Depth_____
Remarks_____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
☐ Vegetation does not impede flow
Areal extent_____ Type_____
Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent_____ Depth_____
Remarks_____

4. **Discharge Structure** ☐ Functioning ☐ N/A
Remarks_____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent_____ Depth_____
Remarks_____

2. **Performance Monitoring** Type of monitoring_____
☐ Performance not monitored
Frequency_____ ☐ Evidence of breaching
Head differential_____
Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☐ Applicable ☑ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☐ Applicable ☐ N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   ☐ Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A
   Remarks_____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____

3. **Spare Parts and Equipment**
   ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks_____

B. Surface Water Collection Structures, Pumps, and Pipelines ☐ Applicable ☐ N/A

1. **Collection Structures, Pumps, and Electrical**
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____

3. **Spare Parts and Equipment**
   ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided
   Remarks_____

C. Treatment System ☐ Applicable ☒ N/A

1. **Treatment Train** (Check components that apply)
   ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
   ☐ Air stripping ☐ Carbon adsorbers
   ☐ Filters_____
   ☐ Additive (*e.g.*, chelation agent, flocculent)_____
   ☐ Others_____
   ☐ Good condition ☐ Needs Maintenance
   ☐ Sampling ports properly marked and functional
   ☐ Sampling/maintenance log displayed and up to date
   ☐ Equipment properly identified
   ☐ Quantity of groundwater treated annually_____
   ☐ Quantity of surface water treated annually_____
   Remarks_____

2. **Electrical Enclosures and Panels** (properly rated and functional)
   ☐ N/A ☐ Good condition ☐ Needs Maintenance
   Remarks_____

3. **Tanks, Vaults, Storage Vessels**
   ☐ N/A ☐ Good condition ☐ Proper secondary containment ☐ Needs Maintenance
   Remarks_____

4. **Discharge Structure and Appurtenances**
   ☐ N/A ☐ Good condition ☐ Needs Maintenance
   Remarks_____

5. **Treatment Building(s)**
   ☐ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair
   ☐ Chemicals and equipment properly stored
   Remarks_____

6. **Monitoring Wells** (pump and treatment remedy)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks_____

D. Monitoring Data

1. Monitoring Data
   ☐ Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
   ☐ Groundwater plume is effectively contained ☐ Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs Maintenance ☐ N/A
Remarks

X. OTHER REMEDIES

N/A

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

LAGOON CAP + SURROUNDING GABION WALLS APPEAR TO BE IN VERY GOOD CONDITION. MINOR ITEMS ONLY REQUIRE FOLLOW-UP:

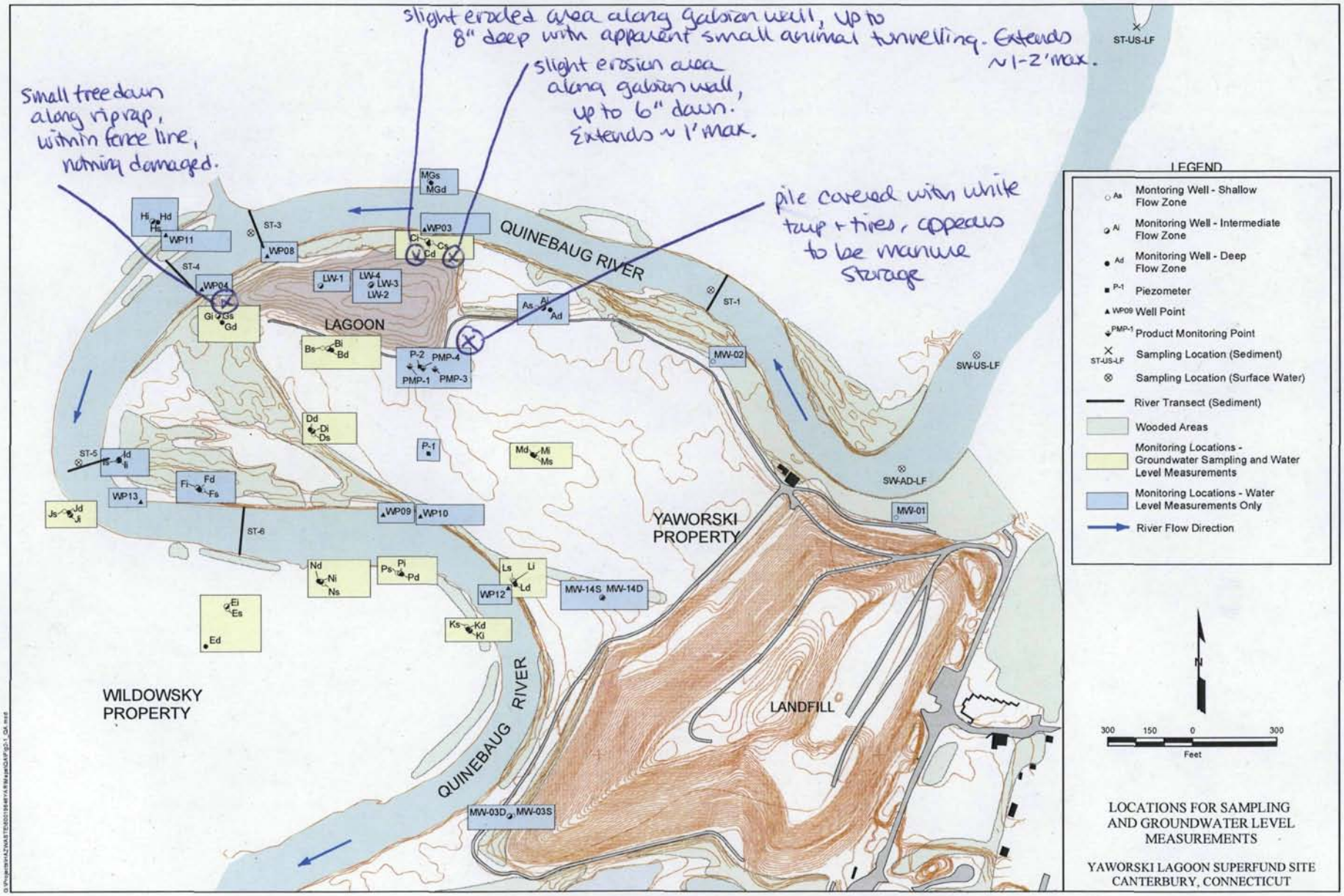
- IF POSSIBLE, MOW SITE BEFORE END OF YEAR. (APPEARS CAP WAS MOWED ONCE ALREADY (SPRING?))
- TWO VERY MINOR EROSION AREAS ALONG TOP OF GABION WALL IN NORTHEAST AREA REQUIRE EVENTUAL REPAIR. NOT URGENT.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

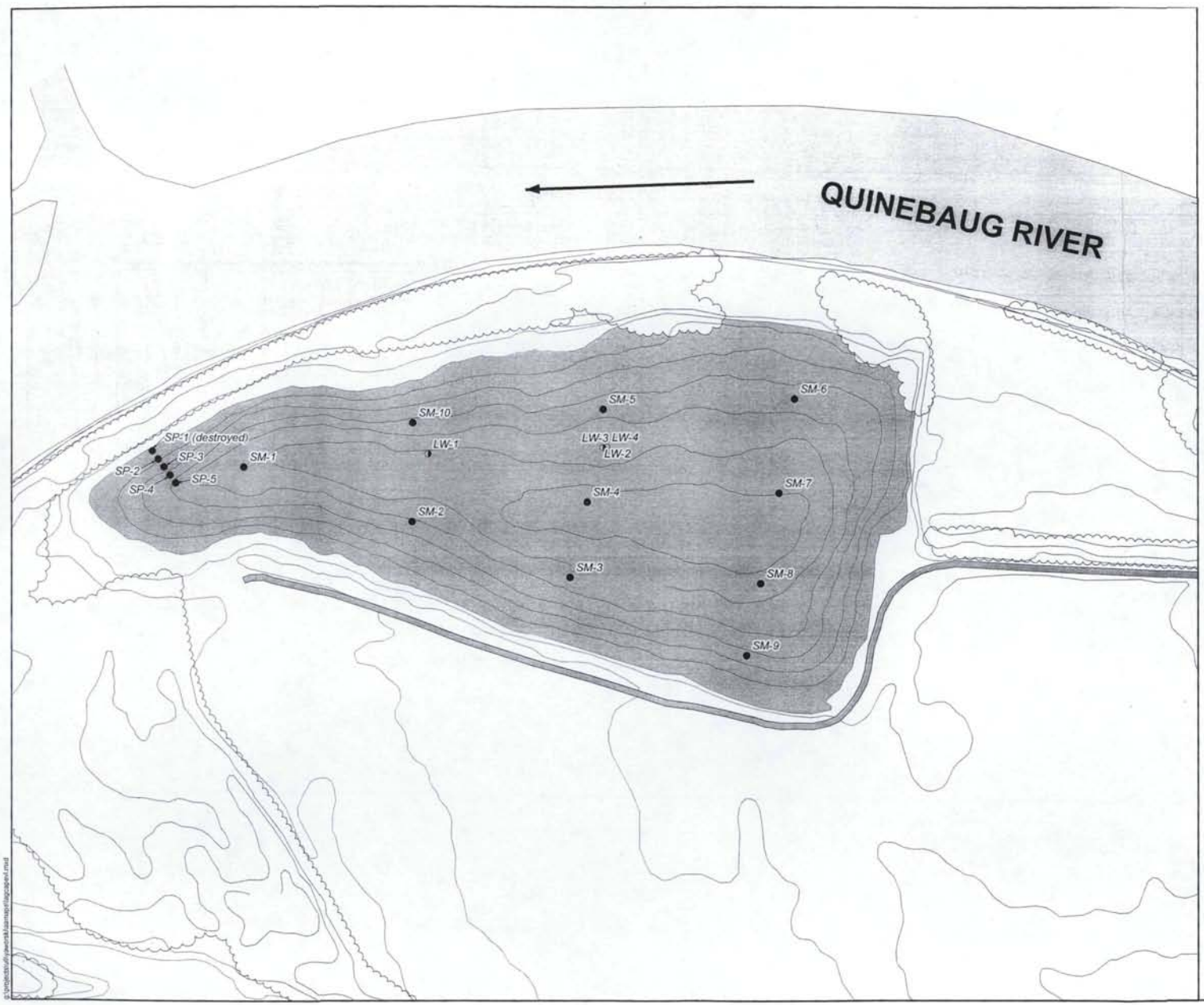
NO ISSUES.

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future. NONE.
D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. N/A.



LOCATIONS FOR SAMPLING AND GROUNDWATER LEVEL MEASUREMENTS

YAWORSKI LAGOON SUPERFUND SITE
CANTERBURY, CONNECTICUT



LEGEND

- Montoring Well - Shallow Flow Zone
- Monitoring Well - Intermediate Flow Zone
- SM-1 Settlement Monument
- SP-1 Survey Point
- Wooded Areas
- Capped Lagoon

N

50 25 0 50 100 150 200
Scale in Feet

FIGURE 1. LOCATIONS OF SETTLEMENT MONUMENTS AND SURVEY POINTS

YAWORSKI LAGOON SUPERFUND SITE
CANTERBURY, CONNECTICUT

ATTACHMENT 6
LIST OF DOCUMENTS REVIEWED

Record of Decision
Yaworski Lagoon Site, Canterbury Township, Connecticut
September 29, 1988

Consent Decree, Civil Action Nos. N-89-615(JAC) and H-89-870 (JAC)
Yaworski Lagoon Superfund Site
February 26, 1990

Construction Documentation Report, Lagoon Closure, Volumes I and II.
GZA GeoEnvironmental, Inc. (on behalf of Pervel Industries, Inc.)
March 1991

Remedial Design/Remedial Action Work Plan, Volumes I and II
(includes Post Closure Plan and Corrective Action Plan)
ENSR Consulting and Engineering (on behalf of Pervel Industries, Inc.)
March 1991

Final Remedial Construction Report Approval
EPA
March 31, 1992

Split Sampling Report for the October, 1992 Sampling Round
Metcalf & Eddy
February 1993

Stipulation and Order
October 20, 1995

Consent Agreement to Resolve Claims for Enforcement of 1990 Consent Decree,
Civil Action Nos. N-89-615(JAC) and H-89-870 (JAC)
Yaworski Lagoon Superfund Site
July 18, 1996

Five-Year Review Report, Type 1a
September 29, 1998

Timing of Remedial Design, Remedial Action, Long-Term RA and O&M
EPA Memo
August 12, 1999

Final Pre-Design Engineering Report
Metcalf & Eddy
December 1999

Final Alternate Concentration Limit (ACL) Demonstration Report, Volumes I and II
ENSR Consulting and Engineering
(on behalf of Pervel Industries, Inc. and the Bemis Company).
March 1993, updated by revisions of November 1995 and November 1996, approved December 1999

Yaworski Human Health Risk Screening Evaluation for Surface Water and Sediments, Based on First 20 Quarterly Monitoring Reports
EPA Memo
January 6, 2000

Sampling and Analysis Plan for Compliance Monitoring and Monitored Natural Attenuation Sampling
Metcalf & Eddy
June 2000

Final Statistical Derivation of Alternate Concentration Limits (ACLs)
Metcalf & Eddy
July 2000

Consent Decree, Civil Action No. 3:99cv626 (PCD)
U.S. v. Yaworski, Inc., et. al.
Yaworski Lagoon Superfund Site
August 2, 2000

Consent Decree, Civil Action No. 3:96-CV-2420 (AVC)
U.S. v. Bemis Company, Inc. and Pervel Industries, Inc.
Yaworski Lagoon Superfund Site
August 11, 2000

Preliminary Close Out Report
Yaworski Lagoon Superfund Site
September 20, 2000

Interim Remedial Action Report
Yaworski Lagoon Superfund Site
September 28, 2001

Second Five-Year Review
Yaworski Lagoon Superfund Site
September 30, 2003

Trend analysis of polycyclic aromatic hydrocarbon (PAH) concentrations in sediments from the Quinebaug River, Yaworski Lagoon Superfund Site, Canterbury Township, CT
ESAT – Region I, Lockheed Martin Information Technologies
August 17, 2004

Lagoon Settlement Monitoring Technical Memorandum
Metcalf & Eddy
January 31, 2005

Simplified Long-Term Monitoring Program for the Quinebaug River, Yaworski Lagoon Superfund Site, Canterbury Township, CT
ESAT – Region I, Lockheed Martin Information Technologies
January 17, 2006

Review of Long-Term Monitoring Data for Sediment Samples Collected from the Quinebaug River between 1999 and 2006 at the Yaworski Lagoon Superfund Site
ESAT – Region I, TechLaw, Inc.
August 22, 2008

Post-Closure Monitoring Reports and Exceedance Reports
for Compliance Monitoring Rounds 2003-2007
Metcalf & Eddy

ATTACHMENT 7
CT DEP COMMENT LETTER, DATED SEPTEMBER 5, 2008

STATE OF CONNECTICUT
DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF WATER PROTECTION AND LAND REUSE
REMEDIATION DIVISION

September 5, 2008

Via U.S. Mail and e-mail

Ms. Anni Loughlin
US Environmental Protection Agency
1 Congress St., Suite 1100 (HBT)
Boston, MA 02114-2023

RE: State Comments Regarding Draft Third Five Year Review Report for Yaworski Lagoon Superfund Site, Canterbury, CT

Dear Ms. Loughlin:

The Remediation Division of the Bureau of Water Protection and Land Reuse has received and reviewed the draft report entitled "Five-Year Review Report, Third Five-Year Review Report for Yaworski Lagoon Superfund Site, Town of Canterbury, Windham County, Connecticut", dated September 2008 (the "Report".) The U.S. Environmental Protection Agency (EPA) prepared the Report. The Report describes the effort undertaken by EPA to determine whether the remedy selected by EPA for the site in 1988 remains protective of human health and the environment.

General Comments

Overall Conclusion of Report

The Report concludes that the remedy remains protective of human health and the environment in the short term but institutional controls preventing use of groundwater on the site and portions of three downgradient properties must be put into place to ensure that the remedy remains protective in the long term. The Report notes that EPA and DEP are working with the owners of these properties to put the institutional controls in place.

DEP concurs with the conclusions of the Report. DEP intends to continue to work with EPA and the land owners to record environmental land use restrictions to prevent the use of groundwater from the site and the three

downgradient properties. DEP appreciates the long- standing cooperative relationship between EPA and DEP in working to ensure that the selected remedy remains permanently protective of human health and the environment.

DEP's Future O & M Responsibilities

The Report notes that DEP is currently responsible for physical operation and maintenance (O & M) of the cap, including cutting the grass, repairing erosion damage, etc. The report also states that EPA's contractor (Metcalf & Eddy, Inc.) will continue to perform compliance monitoring at the site through the end of the long term remedial action (LTRA) period. After that point, which is estimated to be in September 2011, the State will be responsible for all O & M activities.

DEP would like to discuss with EPA the appropriate scope of monitoring for which it will be responsible as part of O & M. DEP recognizes its responsibility for O & M at the site under CERCLA, and that it will be responsible for ongoing monitoring as part of O & M. DEP's current expenditures for O & M at the Yaworski Lagoon site are minimal beyond the salaries of State Parks personnel who cut the grass and perform other needed maintenance work. The addition of monitoring will be a considerable expense for DEP. DEP currently includes in its budget a line item for O & M at Fund- lead NPL sites. DEP is currently preparing its budget requests for fiscal years 2010 and 2011, and wishes to estimate how much additional funding will be needed cover the cost of monitoring.

DEP also wishes to determine whether O & M will include any other actions beyond those DEP is already performing and the added monitoring. DEP feels that this discussion should be initiated in the near future, but discussion on this issue can begin after the current Five Year Review is finalized. As discussed in more detail below, DEP acknowledges that EPA currently plans to conduct a review to determine whether sediment sampling is warranted in the future.

Discontinuation of Sediment Sampling

The Report notes that polynuclear aromatic hydrocarbons (PAHs) have been found in Quinebaug River sediment both adjacent to the river and at upgradient locations. The report concludes that the PAHs appear to originate from an unknown source upgradient of the Yaworski Lagoon site and the adjacent Yaworski landfill. The Report concludes that the PAHs do not warrant further action beyond monitoring, and that states that EPA will continue to evaluate the PAHs detected in sediment. The Report also states that EPA will, in conjunction

with DEP, make a final decision about the need for future sediment and surface water sampling after completing an ecological evaluation of all exceedances of alternate concentration limits. DEP agrees with this approach and appreciates EPA's willingness to include DEP in any decision regarding future sediment and surface water sampling.

EPA recently notified DEP in an e- mail from you to me dated September 2, 2008 that it does not intend to sample sediment during the fall 2008 sampling round. Over the next several months, EPA will perform additional statistical analysis of existing data. EPA's e- mail also states that EPA will conduct the ecological study referred to in the preceding paragraph. DEP notified EPA of its concurrence with this approach in an e- mail from me to you also dated September 2, 2008.

Specific Comments

DEP offers the following minor editorial comments and suggestions. Suggested additions to the text are shown in *italic font.*

Page 5, last ¶ History of Contamination

The first sentence of the first paragraph of this section should say "...debris *was* dumped..." rather than..."debris *were* dumped..."

Page 9, 4th ¶ Remedy Implementation and Operation and Maintenance

Please revise the second sentence to indicate that "the State of Connecticut took over all *operations and maintenance* work...."

Page 14, last ¶ Enforcement History

Please revise the last sentence of the paragraph to read "The settlement amount received by the State of Connecticut will, *along with other funds provided by the State,* allow the State..."

Page 23, last ¶ Technical Assessment- Question A

The second sentence states that the land use restrictions will affect the three property owners living across the river from the lagoon. DEP is unsure whether all three property owners actually live on the properties in question. If any of the property owners live elsewhere, EPA may wish to revise this sentence to reflect

property owners live elsewhere, EPA may wish to revise this sentence to reflect that fact.

Page 32, 2nd ¶ Section 10

DEP suggests revising the second sentence to read "....the entrances are posted *with* no trespassing *signs*."

Page 32, last ¶ Section 10

DEP suggests revising the first sentence of this paragraph to read "....all three landowners *of property on the west side of the Quinebaug River* are periodically notified..."

Please contact me at (860) 424-3768 if you have any questions.

Sincerely,

Mark R. Lewis

Mark R. Lewis
Environmental Analyst 3
Remediation Division
Bureau of Water Protection and Land Reuse