



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION I  
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BOSTON, MASSACHUSETTS 02109-3912

September 10, 2010

Mr. Russ G. Downey  
Senior Manager, Remediation Projects  
Pfizer Global Engineering  
Pfizer Inc.  
100 Route 206 North  
Peapack, NJ 07977

Re: RCRA Corrective Action at Pfizer (formerly Pharmacia & Upjohn) North Haven,  
Connecticut, CTD001168533: Final Decision and Response to Comments on  
Proposed Site-Wide Remedy

Dear Mr. Downey:

This letter transmits a final decision, made by the U.S. Environmental Protection Agency (EPA) and the Connecticut Department of Environmental Protection (CT DEP) on Pfizer's site-wide remedy proposal. The initial proposal was detailed in a Statement of Basis, in which EPA and the CTDEP requested public comment on the proposed site-wide remedy. The attached "Remedy Decision and Response to Comments" document finalizes the remedy as it was initially proposed and responds to comments received during a June 20 through August 4, 2010 public comment period which includes the August 4, 2010 public meeting held on the proposed remedy.

EPA and Pfizer will be entering into a new administrative order pursuant to Section 3008(h) of the Resource Conservation and Recovery Act that, once issued, will cover the design, construction, operation, maintenance and monitoring of the final remedy. Congratulations on reaching this milestone and thank you for all of your efforts to achieve this important RCRA Corrective Action goal. Please do not hesitate to contact me at 617/918-1360 if you have any questions.

Sincerely,

A handwritten signature in blue ink, appearing to read "R. O'Meara", is positioned above the printed name.

Robert A. O'Meara  
RCRA Facility Manager

Enclosure:

cc: Mr. Michael J. Freda, Town of North Haven First Selectman  
Mr. David J. Monz, Chairman Pharmacia Upjohn Citizens' Advisory Panel  
Mr. Martin Mador, Director and Past President Quinnipiac River Watershed Association  
Ms. Mary Mushinsky, Executive Director Quinnipiac River Watershed Association  
Mr. Steve Fontana, Connecticut State Representative and North Haven Third Selectman  
Ms. Nancy Alderman, President, Environment and Human Health, Inc.  
Ms. Letitia McPhedran  
Ms. Mary White  
Ms. Betsey Reid  
Mr. Thomas Roberts, Member Pharmacia Upjohn Citizens' Advisory Panel  
Mr. Rico Gattilia, Member Pharmacia Upjohn Citizens' Advisory Panel  
Mr. Wesley T. Hale

**FINAL DECISION AND RESPONSE TO COMMENTS**

**FOR**

**PHARMACIA & UPJOHN COMPANY LLC SITE  
NORTH HAVEN, CONNECTICUT**

**USEPA ID NO. CTD001168533**



**SEPTEMBER 9, 2010**

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## 1.0 INTRODUCTION

The United States Environmental Protection Agency (USEPA<sup>1</sup>) Region I, in coordination with the Connecticut Department of Environmental Protection (CTDEP), presents this Final Decision and Response to Comments regarding the Pharmacia & Upjohn Company LLC (Pharmacia & Upjohn) facility located at 41 Stiles Lane in North Haven, Connecticut (Site) (see Figure 1) to identify the selected final remedy for the Site, present concerns and issues raised during the public comment period (June 20, 2010 through August 4, 2010), and respond to those comments. All of the comments received were carefully reviewed during the final selection of the remedy, and have been addressed in this Response to Comments. No additional alternatives were raised that were not considered in the Corrective Measures Study (CMS), and the proposed remedy as summarized in the Statement of Basis was not altered as a result of public comments.

## 2.0 SELECTED REMEDY AND MEDIA PROTECTION STANDARDS

USEPA, with concurrence from CTDEP, is selecting Site-wide Corrective Measures Alternative 4, as described in the CMS and summarized below, as the final remedy for the Site. USEPA is also establishing media protection standards (MPS) to be used during remedy implementation. The following sections describe the major components of the selected remedy and describe the MPS selected by USEPA for use during design and implementation of the selected remedial components.

### 2.1 DESCRIPTION OF REMEDY

The selected remedy for the Site will provide long-term protection of human health and the environment and will return the Site to productive use. The selected remedy combines aggressive treatment of chemical mass during remedial construction along with long-term containment and treatment to eliminate future exposures to contaminated media. The selected remedy is referred to as Corrective Measure Alternative 4 and is fully described in section 7.4 of the CMS. A summary of the major components of the selected remedy is provided below and shown on Figure 2.

- Construction of a hydraulic control system for shallow groundwater (hydrogeologic Unit 1) consisting of a perimeter sub-grade low-permeability vertical barrier (hydraulic barrier wall) and a groundwater extraction and treatment system that will intercept and treat contaminated groundwater, preventing impacts to the Quinnipiac River and abutting properties. Collected groundwater will be treated on-site prior to discharge to the Quinnipiac River in accordance with a CTDEP National Pollutant Discharge Elimination System (NPDES) permit;
- Construction, regular sampling and evaluation of data from monitoring wells and piezometers both inside and outside the hydraulic barrier wall to verify long-term performance of the Unit 1 hydraulic control system;
- Monitoring of deep groundwater (in hydrogeologic Units 3 and 4 below the Unit 2 semi-confining layer) to assess continued compliance with CTDEP remediation criteria (MPS). This component of the remedy includes further investigation of well SEC-7D and implementation of focused remedial measures, if determined appropriate by USEPA;

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<sup>1</sup> A glossary has been added to the end of this document to assist the reader with acronyms and certain terms.

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- Treatment and elimination of the most highly contaminated area on the Site using in-situ thermal remediation (ISTR) of dense non-aqueous phase liquids (DNAPL), including operation of appropriate air pollution controls in accordance with both USEPA and CTDEP requirements;
- Construction of protective barrier covers over the 17-acre west side of the Site to allow safe commercial/light industrial redevelopment of this portion of the Site. The type of cover systems used in the west side will be determined during detailed design based on the specific type of redevelopment chosen;
- Stabilization and installation of low-permeability cover systems for both the North and South Piles and the Former Aeration Lagoon in the east side of the Site to safely contain contaminated materials, prevent future contact with the materials, reduce infiltration into these areas, and minimize groundwater impacts from these areas;
- Construction of protective barrier cover systems over the remaining portions of the east side of the Site to contain and prevent future contact with contaminated materials and to allow it to be safely used by maintenance workers and visitors;
- Minimize the importation of fill materials by beneficially re-using on-site soil, sediment, and debris generated from the construction of the remedy. To facilitate management of soil, sediment, and debris and to expedite the implementation of the corrective measures, the entire Site and adjacent tidal wetland areas shall be considered a single area of contamination (AOC), consistent with the preamble to the National Contingency Plan (55 FR 8758-8760, March 8, 1990) and USEPA AOC guidance;
- On-site management of PCB-impacted materials below protective barrier cover systems and low permeability cover systems under a Toxic Substances Control Act Risk-Based Disposal Approval (40 CFR 761.61(c));
- Enhancement of the east side ecological habitat, including creation of higher value uplands and wetlands habitat. Walking trails for interpretative environmental education will be constructed for guided viewing of the enhanced east side habitats, which will be maintained as an ecological preserve;
- Focused remediation of Quinnipiac River tidal flat sediment in two areas and in a small stretch of South Creek, which would remove the highest concentrations of key contaminants in sediments and minimize disturbance to ecological habitat;
- Placement of institutional controls, including CTDEP Environmental Land Use Restrictions (ELURs) along with deed restrictions, to prohibit residential development and other residential uses (e.g., schools, hospitals, day care centers), restrict groundwater use, and prevent demolition or disturbance of engineered controls and other remedial components constructed on Site;
- Long-term operation, monitoring, and maintenance (OM&M) of the Site to maintain the integrity of the engineered controls, verify that the intended function of the remedial components is and continues to be achieved over the long term, and to provide continued protection of human health and the environment.

A detailed evaluation of five Site-wide Alternatives was completed with respect to the nine criteria stipulated in the Resource Conservation and Recovery Act (RCRA) 3008(h) Order<sup>2</sup>, which include the following three performance standards:

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<sup>2</sup> The RCRA Orders also covered the Lake A Property (USEPA ID# CTD000635896) located at 410 Sackett Point Road in North Haven, which was once a part of the Upjohn property. The Lake A Property has been successfully remediated under the Connecticut Transfer Act and has met the corrective action requirements for milestones CA400 (Remedy Decision) and CA550 (Remedy Construction Complete), as stated in the letter from CTDEP dated March 5, 2010. As such, the requirements of the RCRA 3008(h) Order have been satisfied for the Lake A Property and it will not be included in future RCRA Orders to implement the selected remedy for the Site.

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- overall protectiveness of human health and the environment;
- attainment of media protection standards; and
- control of source releases;

and, the following six balancing criteria:

- compliance with waste management standards;
- long-term reliability and effectiveness;
- reduction of toxicity, mobility, and/or volume through treatment;
- implementability;
- short-term effectiveness (including carbon footprint); and
- cost effectiveness.

The selected remedy was developed through a comprehensive understanding of the environmental conditions that exist at the Site, the risks associated with those conditions, and the regulatory standards that must be met. CMS Alternative 4 was selected from the five potential Corrective Measure Alternatives as the most effective alternative for meeting the nine criteria established by the RCRA 3008(h) Order and the results of the human health and ecological risk assessments. Specifically, Alternative 4 satisfies all three performance standards and provides the best balance among the alternatives with respect to the six balancing criteria.

## 2.2 SELECTION OF MPS

The MPS selected for the soil and waste water treatment residuals (WWTR), groundwater, and sediment media at the Site are the same as the preliminary MPS (PMPS) presented in the CMS. As required by CTDEP, these MPS will be reviewed and revised, as appropriate, considering the promulgated CTDEP Remediation Standard Regulations (RSRs) and approved criteria for additional polluting substances (APS) in effect at the time of remedy implementation.

## 3.0 PUBLIC PARTICIPATION ACTIVITIES

USEPA and CTDEP conducted a combined 45-day public comment period on the proposed remedy for the Site between June 20, 2010 and August 4, 2010, concluding with a public informational meeting on August 4, 2010 at the North Haven High School. No requests for a public hearing were received during the 45-day public comment period.

The public comment period for the proposed remedy was formally announced by public notices placed in the New Haven Register on June 19, 2010 and June 20, 2010 (see Attachment 1). The public informational meeting was also publicized by articles in the New Haven Register on July 21, 2010 and in the North Haven Courier on July 29, 2010. During the public comment period, copies of the Statement of Basis and CMS were placed in the North Haven Public Library, 17 Elm Street, North Haven, CT 06473. An electronic copy of the complete Administrative Record for the Site was also made available for public review at the North Haven Public Library.

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The public informational meeting was attended by approximately 23 members of the public as well as representatives from USEPA, CTDEP, the Town of North Haven, and Pfizer. Members of the public in attendance included five members of the Citizens Advisory Panel (CAP), members of the Quinnipiac River Watershed Association (QRWA) and local citizens. The meeting was broadcast live on North Haven TV2 (NHTV) as is the town practice for all government meetings.

### 4.0 PUBLIC COMMENTS AND THE AGENCY'S RESPONSE

Neither USEPA nor CTDEP received written comments prior to the public meeting. Nine members of the public made verbal statements and asked questions during the public meeting. Four commenters, including the QRWA, the CAP, and two residents, supported their verbal statements with written comments, which have been inserted in the Administrative Record along with a transcript of the meeting. All of the comments received were carefully reviewed by USEPA during the final selection of the remedy, and are summarized and responded to below. While some commenters had questions about specific aspects of the remedy and/or provided suggestions to be considered for the design and implementation of the remedy (as discussed in Sections 4.2 and 4.3 below), there were no objections to the proposed remedy for the Site.

### 4.1 COMMENTS SUPPORTING SELECTED REMEDY

Several commenters indicated their support of Site-Wide Corrective Measure Alternative No. 4 as recommended in the CMS and as proposed by USEPA in the Statement of Basis. These commenters agreed that Alternative No. 4 was appropriate for the Site and was protective of human health and the environment. Multiple commenters expressed their appreciation for the transparency of the public outreach provided by Pfizer, USEPA, and CTDEP during the remedy selection process. Commenters also expressed their appreciation of how well the federal, state, and Town of North Haven governments and Pfizer worked together to find a solution for the Site and hoped that this cooperative relationship would continue in the future. In addition, several commenters expressed their strong preference for capping contaminated materials at the Site, as required by the selected remedy (Alternative No. 4), and were opposed to moving and transporting contaminated materials off-site, which could cause unnecessary odor and vapor exposures to workers and the community.

Specifically, comments in support of the remedial selection process and the selected remedy were made by the following individuals:

- Mr. Mike Freda, North Haven First Selectman, on behalf of the Town of North Haven
- Mr. Dave Monz, Chairman, on behalf of the CAP
- Mr. Marty Mador, Director and Past President of the QRWA with concurrence from the Rivers Alliance of Connecticut
- Ms. Mary Mushinsky, Executive Director of the QRWA
- Ms. Nancy Alderman, President of the Environment and Human Health, Inc., and board member for the Quinnipiac River Fund

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- Mr. Wesley Hale, Hamden resident
- Ms. Mary White, North Haven resident

## Response to Comments Supporting the Selected Remedy:

USEPA appreciates the active participation in the public comment process and thanks everyone who provided comments on the proposed remedy. The remedy selection process for this Site has had a positive outcome, not only due to the cooperative partnership between USEPA, CTDEP, the Town of North Haven, and Pfizer, but also due to the participation of an informed community. We anticipate that this cooperative relationship will continue through the design and implementation of the selected remedy.

## 4.2 WRITTEN COMMENTS MADE BY ORGANIZATIONS

The QRWA, with concurrence from the Rivers Alliance of Connecticut, submitted thirteen specific comments and questions. Each of the specific QRWA written comments are provided below followed by USEPA's formal response.

### **QRWA Comment No. 1:**

***The remediation plan calls for the creation of structures and engineering facilities. This effort will succeed only if resources are allocated to the ongoing operations, monitoring and maintenance, which will be necessary during the lifetime of the remediation efforts. We wish to emphasize this concern at the outset.***

### Response to QRWA Comment No. 1:

Federal and state laws under which Pfizer will implement the corrective measures require Pfizer to provide financial assurance to demonstrate that adequate funds will be available to perform the remedy, maintain the Site, and ensure the integrity of the remedy over the long term. Specifically, Pfizer is performing corrective action at this Site under an order issued pursuant to section 3008(h) of RCRA. This section of RCRA authorizes USEPA to require financial assurance for all corrective action cleanups. The current order under which Pfizer has been performing requires financial assurance, and as that order is updated to cover remedy design and implementation, so will the financial assurance provisions be updated to require Pfizer to demonstrate that adequate funds will be available to cover implementation of the selected remedy. In addition, the order is legally binding on Pfizer's successors and assigns. Should Pfizer be sold to another entity at some point in the future, the obligation to remediate the Site as well as the obligation to provide financial assurance for that remediation will transfer to the new owner, as it did when Pfizer bought the Pharmacia and Upjohn Company, which was legally obligated under the existing 3008(h) Order to investigate and remediate the Site and to provide financial assurance for the cleanup.

It should be noted that financial assurance is based on detailed cost estimates for the remedy and any ongoing operation and maintenance costs anticipated in order to ensure the integrity of the remedy in the future. Financial assurance mechanisms must be updated annually to reflect any changes in conditions that may increase the costs associated with the cleanup, and those updates must be submitted to the USEPA and the CTDEP to ensure that adequate resources remain available.

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### QRWA Comment No. 2:

*We are concerned about the timing of the dredging of tidal flats 1 and 2 and the south creek. We have been involved in efforts to encourage the return of anadromous fish for spawning upstream. The dam on the river at Hanover Pond in Meriden now has a fish ladder. There will be one in the near future at Wallace Dam in Wallingford. Pending that new facility, we annually use 16' seine nets to capture shad, alewife and herring and carry them above the dam. This year, we transferred over 5,000 fish.*

*As some contaminants will inevitably be released from the sediments to the water column during the dredging operations, we ask that the dredging operations not take place during the adult spring migration upriver (late April to early June) and the run of the fry to the sea downstream. We look to DEP's expertise to identify these target periods, as well as the spawning times of other resident species.*

### Response to QRWA Comment No. 2:

USEPA will consider the potential impacts of sediment remediation on anadromous fish, along with non-migratory species, when reviewing the detailed designs and the proposed schedule for the sediment removal component of the remedy. USEPA will require that the sediment removal minimizes impacts to anadromous fish either by scheduling the work outside the migratory periods, or by requiring incorporation of measures to isolate the work area and to minimize the release of suspended sediments to the water column.

It should be noted that the sediment removal activities are focused on tidal flats in coves isolated from the main river channel flow. A physical structure such as a cofferdam will be installed, as appropriate, to further isolate the tidal flats, allow surface water to be removed from the surface of the sediments and thus allow the sediments to be excavated "in the dry," minimizing release of sediments to the main river channel flow.

### QRWA Comment No. 3:

*Cleansing of brownfields and placing the land back into productive use is an important public policy goal. The west side of the property will be remediated and prepared for low impact re-use. We approve of this, as recycling old sites is a wise use of land. As the plan provides, Environmental Land Use Restrictions must be placed on the property. These restrictions must be recorded on the town land records.*

### Response to QRWA Comment No. 3:

The selected remedy relies on the use of an Environmental Land Use Restriction (ELUR) under Connecticut General Statutes (CGS) § 22a-133n to 22a-133s to prohibit residential uses of the Site as well as to protect the integrity of engineered controls. Specifically, CGS § 22a-133o requires ELURs to be recorded on the town land records for the restrictions to be effective. In addition, the updated RCRA 3008(h) Order will also require that any ELUR be recorded on the town land records.

### QRWA Comment No. 4:

*The site is an extraordinary and unique venue on the edge of the river. Plans call for public access to the property. We appreciate the company's willingness to include such access. Coupled with the habitat restoration, we expect the site to become a highly valued and visited destination. We are concerned, however, that access will be available only on request, and only if the key holder can be found. We ask that unlocked access to the public portions of the site be made freely available as soon as the remediation process has rendered it safe for the public to visit. Trails, river side outlooks, birding and wildlife study, and other recreation should be provided, but should not interfere with efforts to restore wildlife and habitat.*

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Response to QRWA Comment No. 4:

As described in the CMS and the Statement of Basis, the proposed remedy will include the enhancement of the ecological habitat on the east side of property, including the creation of higher value uplands and wetland habitat. This portion of the property will be designated as an ecological preserve. As the primary caretaker of the Site, Pfizer's first priority will be to protect and maintain the integrity of the remedy. In addition, as an ecological preserve, the habitat itself must also be protected. To accomplish this, the land must be protected from motorized vehicles, off-trail access, and other potentially destructive activities. It is currently anticipated that public access will be provided on a scheduled basis for group tours, environmental education and passive recreational uses. Working with community-based groups as key stakeholders, it may be possible to expand public access over time; however, no commitment can be made at this phase of the process.

**QRWA Comment No. 5:**

*Plans are underway in three municipalities to create an extensive linear trail along the Quinnipiac River. The trail design places the trail in the western portion of the site. We strongly urge that the plan provide for this trail, and that it be connected with onsite nature trails.*

Response to QRWA Comment No. 5:

USEPA understands that Pfizer has been working with the North Haven Trail Association and other community-based stakeholder groups throughout the CMS process. The selected remedy calls for the creation of interpretive walking trails and habitat viewing areas within a newly designated ecological preserve. USEPA believes that the on-Site trails that are part of the selected remedy provide the appropriate degree of access to the Site at this juncture. USEPA understands that Pfizer will continue to work with the North Haven Trail Association in the design phase to better understand the Quinnipiac River Linear Trail plan and to determine if limited access connections are feasible.

**QRWA Comment No. 6:**

*We have for years tried to find canoe and kayak launch sites for the public along the river. It has been a difficult project. There are several places at the site which could serve as launch sites in all tidal conditions. We ask that the plans include a designation for such a launch, with road access provided from the site entrance to the river for car top access.*

Response to QRWA Comment No. 6:

As previously stated, Pfizer's first priority will be to implement, maintain and protect the remedy for this Site. While the selected remedy includes the enhancement of the ecological habitat on the east side of property and the creation of interpretive walking trails for public access on a scheduled basis, no provisions have been made at this time to provide river access via a boat launch. (See Response to QRWA Comment No. 4).

**QRWA Comment No. 7:**

*The plans call for extensive habitat restoration, including creation of grasslands, historically present on the sand plain of the lower Quinnipiac. While such restoration can be difficult and at times problematic, we applaud their inclusion in the plans, and feel that such work will add significantly to the environmental value of the site.*

Response to QRWA Comment No. 7:

USEPA acknowledges the comment in support of the selected remedy. USEPA agrees that habitat restoration is a beneficial re-use appropriate for the lower Quinnipiac River corridor. The proposed ecological enhancement was developed through a thorough understanding of the Site's location within the Quinnipiac River ecosystem and input from the QRWA, the North Haven Land Trust, the

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North Haven Trail Association and other stakeholders. The exact balance and type of wetland, grassland, and other upland habitat will be determined during detailed design subject to USEPA's review and approval and in collaboration with the Town of North Haven as appropriate.

### **QRWA Comment No. 8:**

***Alternative 4 calls for minimal transport offsite of contaminated soil. We find this appropriate because the planned remediation will either neutralize the toxic material or sequester it from human contact, wildlife contact, and discharge to the river. Transport of large quantities of soil can be expensive. It merely moves the toxic material to another location, and can create opportunities for mobilization of the toxic material and release to the environment.***

### Response to QRWA Comment No. 8:

USEPA acknowledges the comment in support of the selected remedy. USEPA agrees that installing protective covers to isolate and contain impacted soils would be protective of human health and the environment while minimizing the risk of short-term exposures to workers and local communities during remedial implementation.

### **QRWA Comment No. 9:**

***We are very concerned that financial resources be secured to cover the complete cost of the selected remediation strategy. Well-made plans, best intentions and good faith are a great starting point, but reserving the financial resources to complete the job is a necessity. While we wish the company all the best, we are uncomfortable with this effort tied to the corporate fortunes of Pfizer. The history of environmental remediation, including other sites on the Quinnipiac, is replete with stories of excellent plans never carried to completion. We call for creation of an escrow account, insurance policy, letter of credit, corporate guarantee, or surety bond to make sure the funds are there for the many years it will take to complete the job.***

### Response to QRWA Comment No. 9:

As stated in the response to Comment 1, the law requires and the RCRA 3008(h) Order will stipulate that financial assurance be put in place to cover the cost of implementing and maintaining the remedy. Both USEPA and CTDEP accept several forms of financial assurance, as outlined in the regulations at 40 CFR § 265.145 (adopted by CTDEP at RCSA § 22a-449(c)-105(a)), including trust funds, surety bonds, letters of credit, insurance, and self-insurance by means of a financial test and corporate guarantee. We understand QRWA's comment that "an escrow account, insurance policy, letter of credit, corporate guarantee, or surety bond" be created to ensure funds are available to complete the remedy. USEPA will ensure that these funds are provided consistent with the financial assurance mechanisms available under applicable law.

### **QRWA Comment No. 10:**

***Species of concern are mentioned in the plan. In recent years, the osprey population along the river has been growing substantially, helped by pesticide bans and QRWA's nest platform construction. Bald eagles have also been sighted on a regular basis. These two species must be added to the list. They cannot thrive without an uncontaminated food source.***

### Response to QRWA Comment No. 10:

The intent of the ecological risk assessment process is to evaluate a representative list of ecological receptors with varied feeding habitats and home range size as surrogate species for the wildlife species that could inhabit or visit the Site. It is not the intent of the ecological risk assessment process to evaluate every species that may be present at a Site. The ecological risk assessment conducted for the Site evaluated herbivore, omnivore, and carnivore (including piscivores that eat

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mostly fish) receptors that have both small home ranges (would feed mostly or entirely at the Site) and large home ranges (would feed only occasionally at the Site). Both terrestrial and estuarine species were evaluated, and it has been determined by U.S. Fish and Wildlife Services and CTDEP that there are no threatened and endangered species at the Site. USEPA reviewed and approved the representative surrogate receptor species that were evaluated in the ecological risk assessment.

Specifically, the ecological risk assessment for the Site used a kingfisher as the surrogate receptor species to represent piscivorous birds, including osprey and eagles. Kingfishers have a relatively small home range and a relatively high feeding rate (per unit body mass), and are therefore considered to be a conservative risk surrogate for these other species. That is, osprey and bald eagle would be expected to have a lower risk of exposure to Site contaminants than kingfisher. Since the risk assessment did not indicate an unacceptable risk to kingfisher, there would be no unacceptable risk to osprey or bald eagle. The sediment removal, soil covers, and ecological enhancements that will be completed as part of the selected remedy will only increase the level of protection afforded to the osprey and bald eagle. Therefore, the osprey and bald eagle will continue to be protected from potentially adverse ecological exposures in the future.

### **QRWA Comment No. 11:**

***We want to ensure that monitoring of progress to ensure its completion will be incorporated in the plan. Monitoring records should be made available to the public on a periodic basis, either through a website, the town of North Haven, or the DEP.***

### Response to QRWA Comment No. 11:

USEPA currently requires the submission of quarterly reports detailing activities performed at the Site. USEPA will continue to require periodic progress reports during remedy design and construction as a means of monitoring the progress towards completion of the remedy. These reports will be available upon request from USEPA through the Freedom of Information Act (FOIA). Copies will also be submitted to the CTDEP and will be available to the public in CTDEP's file room. In addition, USEPA will require Pfizer to continue public outreach efforts and to periodically update the public about the progress of the remedial design and construction. The specific methods to inform the public of the progress and schedule of remedy implementation will be described in the Community Relations Plan, which will be prepared by Pfizer during the remedy design stage. This plan will be reviewed and approved by USEPA prior to remedy implementation.

### **QRWA Comment No. 12:**

***We are concerned that the site be protected from extensive flooding. Flooding in many areas has become more extensive and frequent than obsolete FEMA maps would predict. This trend will intensify as global warming changes our climate, sea level, and precipitation patterns<sup>3</sup>. The plans incorporate rainwater handling from serious storm events. As a significant flood could inundate the site with devastating consequences for the remediation efforts, the possibility of such an event must also be incorporated in the plans.***

### Response to QRWA Comment No. 12:

USEPA recognizes the QRWA's concern about a significant flood event damaging selected remedial components. Federal regulations for remediation waste sites require that:

For remediation waste management sites subject to regulation under subparts I through O and subpart X of this part, the owner/operator must design, construct, operate, and maintain a unit within a 100-year floodplain to prevent washout of any hazardous waste by a 100-year flood, unless the owner/operator can meet the demonstration of § 264.18(b) (40 CFR 264.1(j)(7));

<sup>3</sup> See The Impacts of Climate Change on Connecticut Agriculture, Infrastructure, Natural Resources and Public Health, CT DEP, April 2010, available from <http://ctclimatechange.com/>

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Pfizer's proposal to use a 500-year flood event as the baseline for design and construction measures to prevent washout of Site materials goes beyond the requirements of federal and state regulations and is acceptable to USEPA. USEPA will request that Pfizer consider potential predicted increases in sea level when designing flood protection measures for the Site. In addition, USEPA will require that on-site stormwater management facilities meet all federal, state, and local stormwater management requirements.

### **QRWA Comment No. 13:**

*Finally, we are concerned about planning for the eventuality that the company may deem further operation of the groundwater treatment plan unnecessary, as the concentration of contaminants steadily declines. While this may be covered under the site's NPDES discharge permit, we want to ensure that such a future determination will be handled appropriately.*

### Response to QRWA Comment No. 13:

USEPA anticipates that the operation of the groundwater extraction and treatment system will need to continue for the foreseeable future. The eventual determination of whether operation of the groundwater extraction and treatment system (or parts of the system) can be discontinued will be made based on the results of the long-term groundwater monitoring that will be performed under USEPA and/or CTDEP oversight and as required by a permit to discharge the treated water. At a minimum, constituent concentrations in groundwater would need to have declined to below applicable surface water protection levels in effect at that time. Pfizer would then be required to make a formal proposal to USEPA and/or CTDEP and obtain approval from USEPA and/or CTDEP to modify the permit or discontinue the operation (or parts of the operation) of the extraction system and groundwater treatment plant.

## 4.3 WRITTEN AND VERBAL COMMENTS MADE BY INDIVIDUALS

In addition to the written comments submitted by the QRWA discussed above, USEPA received verbal and written comments from individual members of the community during the August 4, 2010 public meeting. The following summarizes the written and verbal comments received from the community. Comments or questions on similar topics have been grouped to facilitate responses.

### 4.3.1 Comments Concerning Financial Assurance and Long-Term Commitment to Remedy Implementation and Maintenance

#### **Individuals Comment No. 1:**

*In addition to QRWA Comment Nos. 1 and 9, two members of the public asked questions regarding financial assurance for the remedy over the long-term. Specifically, commenters asked how a successor to Pfizer, should it be acquired by another company, would be held responsible for financing the remedy and where funding would come from to maintain the remedy in the long-term, even 100 or 200 years from now.*

#### Response to Individual Comment No. 1:

Financial assurance requirements are explained in responses to QRWA comment Nos. 1 and 9. In addition, RCRA financial assurance regulations require that financial assurance for post-closure care, or that period after the remedy is implemented, must be in place for thirty years (40 CFR § 265.117(a)(1)). USEPA may extend the time that financial assurance is required as appropriate to ensure the integrity of the remedy (40 CFR § 265.117(a)(2)). It is anticipated that at some point in the future, regulatory oversight will be transferred to the CTDEP via the use of a Stewardship Permit. Under the regulations the CTDEP has adopted, it also has the authority to extend the number of years for which financial assurance is required, and the Stewardship Permit would remain in place until such time as the CTDEP has determined that regulatory oversight is no longer deemed necessary to ensure the integrity of the remedy and to provide protection of human health and the environment.

# FINAL DECISION AND RESPONSE TO COMMENTS DOCUMENT

## 4.3.2 Comments Concerning Future Land Use Restrictions

### Individuals Comment No. 2:

***In addition to QRWA Comment No. 3, another commenter asked who would hold the deed restriction to be placed on the land records for the Site, how those restrictions would be enforced, whether residential use restrictions referred only to housing, and how would USEPA prevent other sensitive uses such as daycare centers.***

### Response to Individuals Comment No. 2:

Environmental land use restrictions are addressed in QRWA Comment No. 3. With regard to the issue of "residential use," the CTDEP's regulations define "residential activity" to mean "any activity related to a (A) residence or dwelling, including but not limited to a house, apartment, or condominium, or (B) school, hospital, day care center, playground, or outdoor recreational area." (RCSA § 22a-133k-1(a)(53)). The updated RCRA 3008(h) Order will also define permissible "residential uses" that are consistent with this definition. Because USEPA's selected remedy includes reuse of the east side for the development of interpretive trails, the order will specify that limited outdoor recreational use will be permitted under specific conditions to ensure the health and safety of visitors using the trails.

With regard to who holds the ELUR and how it is enforced, when an ELUR is agreed and recorded, it gives the CTDEP an enforceable interest in the property similar to a lien, and it is superior to all other interests in the land. Any subsequent owner of the property would be on notice of the restrictions because they would be recorded on the land records. In addition, Pfizer or any other person seeking to develop the property would first have to obtain permits and approvals from the Town of North Haven. Before any permits and approvals can be issued, the Town of North Haven would check the land records to determine if any use restrictions or other conditions prevent the proposed activity from taking place at the Site.

CTDEP has the authority in perpetuity to enforce the restrictions and conditions as set forth in the ELUR. Only CTDEP has the authority to release the ELUR, and it can do so only in the event that either the Site will be further remediated to meet CTDEP's Remediation Standard Regulations for residential activities or a new ELUR is recorded.

## 4.3.3 Comments Concerning the In-Situ Thermal Remediation (ISTR) Component of the Remedy

### Individuals Comment No. 3:

***Commenters requested an explanation of how thermal desorption works, including providing examples of where it has been used successfully at this point, and for clarification of the potential air emissions from the thermal desorption process and what benefit does it provide over capping the materials in place.***

### Response to Individuals Comment No.3:

In-situ thermal remediation (ISTR) is a technology that simultaneously applies heat to soils by thermal conduction to vaporize DNAPL chemicals and a vacuum to extract the chemical vapors from the subsurface using a piping system. The area to be treated is sealed and the vapors produced are captured in the subsurface (i.e., are not allowed to be released above the ground) by the installation of a thermal blanket/vapor barrier and by the vacuum created below the ground. Depending on the target treatment temperature selected during design, the area to be treated may be further contained by installation of a sheet-pile wall or other subsurface vertical barrier to prevent infiltration of groundwater from outside the thermal treatment area. Collected vapors will be treated in an enclosed above-ground treatment process before they are emitted to the air. The treated vapors will be emitted to the atmosphere in accordance with regulatory limits set by the USEPA and CTDEP. Monitoring will be performed to verify that unacceptable levels of vapors are not escaping at the

## FINAL DECISION AND RESPONSE TO COMMENTS DOCUMENT

surface of the treated area and that treated vapor emissions are within regulatory limits. A detailed description of the ISTR process is presented in Sections 7.4.1.3 and 9.9.3 of the CMS.

Some representative examples of successful full scale ISTR projects (location and contaminants treated) are:

- Former Naval Facility Centerville Beach, Ferndale, CA – PCBs
- National Grid, North Adams, MA – DNAPL, semivolatile organic compounds (SVOCs) including polynuclear aromatic hydrocarbons (PAH), and residual coal tar
- Terminal One Site, Richmond, CA – chlorinated volatile organic compounds (VOCs)
- Southern California Edison, Alhambra, CA – SVOCs including PAH, pentachlorophenol, dioxins and furans

The compounds successfully treated at these sites are analogous to the VOCs, SVOCs and PCBs present at the Site. In addition, as presented in Appendix U of the CMS, the vendor for this ISTR system, TerraTherm, has successfully demonstrated that the thermal desorption technology is effective to address Site contaminants on a bench-scale; therefore, USEPA has selected this technology to address the DNAPL area.

### 4.3.4 Comments Concerning When Site Redevelopment / Re-Use Would Occur

#### **Individuals Comment No. 4:**

***Commenters asked whether the former manufacturing area will be available for use once ISTR is completed and how long after the site-wide remedies are constructed would the site be ready for redevelopment.***

Response to Individuals Comment No. 4:

The exact date that the west side will be available for development and the specific type of development are not completely known at this time and depend on many factors, including local economic conditions, types of proposed facilities, and other factors. The remedial design process will start as soon as USEPA issues this final remedy decision. Remedial design and construction is expected to require approximately seven years. The current schedule shows that the ecological preserve would be completed sometime in 2018, and the 17 acres on the west side of the Site would be made available for redevelopment at about the same time.

### 4.3.5 Comments Concerning Longevity of Remedial Systems

#### **Individuals Comment No. 5:**

***Several commenters asked for clarification concerning the expected lifespan of the protective caps and hydraulic barrier wall, what length of time the protective caps were anticipated to last (e.g., one commenter asked whether the covers would last for 200 years), and commenters requested example of where such cover systems have been in use in the United States the longest to prove that they can last for hundreds of years.***

Response to Individuals Comment No. 5:

There are two parts to these comments, the cover systems and hydraulic barrier wall, which are addressed separately below.

Regarding the cover systems, the selected remedy will incorporate either a soil cover system to prevent direct contact with impacted soils, or a low permeability soil and geosynthetic cover system to also minimize stormwater infiltration into the subsurface. For soil cover systems, the main concern regarding long-term function is erodibility of the soil that could result in unintended exposure to the underlying impacted materials. The soil covers included in the selected remedy for the Site will be

## FINAL DECISION AND RESPONSE TO COMMENTS DOCUMENT

placed on areas having gentle slopes. Erosion by stormwater runoff will not be a significant issue in these areas as the slopes are too shallow to produce enough flow velocity to create excessive erosive forces.

Soil covers will consist of natural geologic materials that have existed for many centuries and that will continue to exist for many centuries. The soil covers will be constructed on top of a geosynthetic demarcation barrier (such as a geotextile layer) placed on top of the contaminated soils to further protect against future soil exposure and assist with operation, monitoring, and maintenance (OM&M). Finally, the soil cover will be vegetated which will also assist in preventing erosion that could occur over time due to large storm events and changes in grade as a result of differential settlement. In addition, the soil cover systems will be routinely inspected (at least annually) and maintained. Should erosion problems develop in the future, they will be identified and repaired by adding more soil and re-vegetating the affected area. With proper inspection and maintenance, the soil cover systems will achieve their intended function for centuries. As part of the long-term maintenance of the Site, Pfizer will be required to prepare a soil erosion control plan and a long-term operation, monitoring, and maintenance plan for the Site to help ensure the long-term integrity and function of the protective soil covers. USEPA and CTDEP will review, approve, and oversee implementation of these plans.

Low permeability soil and geosynthetic cover systems, which are included in the remedy for the slopes and crown of the North and South Piles and the Former Aeration Lagoon, consist of a geomembrane such as high density polyethylene (HDPE) or similar type of synthetic liner placed on top of a cushion soil and geotextile layer above contaminated soil. A protective vegetated soil layer is then placed over the geosynthetic membrane. The protective vegetated soil layer would function and be maintained as described above for the soil cover system. Geomembranes such as HDPE are used extensively for both bottom liners and covers for hazardous, radioactive, industrial, and municipal solid waste landfills and containment facilities throughout the United States and elsewhere in the world. They are widely used for containment of both liquid and soil waste because they are stable, are not susceptible to biodegradation, and are very resistant to a large variety of chemicals.

HDPE geomembranes began to be widely used in waste containment in the early 1980's and have been studied extensively given their ubiquitous use. As such, they are the geosynthetic cover system of choice. Because geosynthetic covers have only been in widespread use for about 30 years, studies to predict their long-term durability involve accelerating the aging of these materials using techniques developed in the polymeric sciences that apply high temperatures to samples which are immersed in chemical solutions in the laboratory. The increased temperature and chemical exposures artificially accelerates the aging process to simulate hundreds of years of exposure. A number of long-term studies conducted over many years in the 1990s have indicated that these materials will survive in the environment for several hundred years<sup>4</sup> without significant deterioration. While no available man-made material can be guaranteed to last forever, the geomembranes used in today's waste containment systems are among the most durable of synthetic materials and represent state-of-the-art containment materials.

The USEPA will review Pfizer's design of the soil and geosynthetic cover systems to ensure that the design incorporates an appropriate type of geomembrane into the soil/geosynthetic cover system to provide long-term durability to the maximum extent practical. As with soil cover systems, the long-term OM&M plan will also provide procedures for routine inspection, maintenance, and repair, if necessary, of the low permeability soil and geosynthetic cover systems.

For hydraulic barrier walls, the concern is chemical compatibility of the materials used to construct the wall (such as bentonite typically used in a slurry wall) with the surrounding soils and groundwater. Bentonite is a naturally occurring clay mineral that has a very low permeability to water. This natural geologic material has existed for many centuries and, if placed in a chemically compatible environment, is expected to exist and maintain its low permeability characteristics for many more centuries. It is used extensively in water-proofing structures, sealing of groundwater wells, soil liners for water and waste containment, and in drilling muds.

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<sup>4</sup> See GRI White Paper #6. Geomembrane Lifetime Prediction: Unexposed and Exposed Conditions, Robert M. Koerner et al., Geosynthetic Institute, June, 2005.

## FINAL DECISION AND RESPONSE TO COMMENTS DOCUMENT

The main concern with the long-term durability of a bentonite-based slurry wall is an increase in the permeability of the material over time. Because of the unique chemical structure of the bentonite mineral which makes it relatively impervious to water, it is possible for chemical constituents (mainly metals) in the groundwater to affect its permeability through a process of cation exchange. In order to account for potential changes in permeability of the bentonite over time, bench-scale chemical compatibility tests will be conducted using actual Site groundwater to monitor changes in permeability over time. Since the hydraulic barrier wall may be exposed to brackish water in the Quinnipiac River, compatibility testing would also consider these conditions. Several mix designs (percent of bentonite, soil, and other additives) can be tested to determine the optimal mix that meets the permeability requirement over the long-term. For especially difficult conditions, other materials such as attapulgite (another naturally occurring material) or polymeric additives can be used in the mix to resist chemical changes over time. The USEPA may require long-term bench-scale compatibility testing as part of the design of the hydraulic barrier wall for the site to ensure that a mix design is selected to provide a long-term performance.

It should also be pointed out that the primary remedial component to minimize off-site groundwater migration is the use of pumping wells to control the gradient (i.e., level) of groundwater. Pumping groundwater from a series of extraction wells located inside the hydraulic barrier wall will maintain groundwater levels inside the wall at a lower elevation than the groundwater levels outside the wall which will prevent flow off the site. The hydraulic barrier wall, therefore, is not the primary means of controlling off-site migration of contamination in the groundwater, but rather is a supplement to the extraction system to minimize the amount of groundwater needing to be pumped. In addition, long-term monitoring of the hydraulic controls and effectiveness of the hydraulic barrier wall will be performed through the measurement of the groundwater levels in piezometers (wells) located on both sides of the wall. Changes in water levels as a result of long-term impacts to the permeability of the wall (if any) can be detected and adjustments to the extraction system can be made to control gradients and ensure proper containment.

### 4.3.6 Comments Supporting Capping of Contaminated Materials

#### **Individuals Comment No. 6:**

***In addition to QRWA Comment No. 8, several commenters expressed approval of minimizing movement of and capping contaminated soils on site, based on concerns that the removing the soil posed the potential for odors and exposures to contaminants.***

#### Response to Individuals Comment No. 6:

As previously stated, USEPA acknowledges the public support for the selected remedy. Due to our long involvement with the Site, USEPA is aware of local objections to past odors emanating from the operating Upjohn facility. USEPA is also aware of concerns from the CAP regarding the potential odor generation during remediation. As a result, USEPA considered alternatives that would minimize the potential for odor generation during remediation. Alternative 4 requires fewer intrusive activities and does not require the movement of highly contaminated materials (i.e., DNAPL-impacted soil/fill). Also, see Response to QWRA Comment No. 8.

### 4.3.7 Comments Concerning Duration of Groundwater Treatment

#### **Individuals Comment No. 7:**

***A commenter asked for clarification about future decisions to continue treating groundwater from the Site, asking if there is there a possibility that both will always be needed.***

#### Response to Individuals Comment No. 7:

USEPA anticipates that groundwater extraction and treatment will continue for the foreseeable future. While there is the possibility that groundwater treatment will always be needed, the smaller mass loading to groundwater from the reduction of the DNAPL source area through ISTR and the decrease

## FINAL DECISION AND RESPONSE TO COMMENTS DOCUMENT

in infiltration from the low permeability protective covers on the North and South Piles coupled with the natural attenuation of chemicals will eventually allow the extraction and treatment of groundwater to be reduced or potentially stopped. As described in the response to QRWA Comment #13, should the groundwater monitoring results show an appropriate improvement, USEPA in conjunction with CTDEP may determine that groundwater treatment can be reduced or eliminated.

### 4.3.8 Comments Concerning Flood Protection

#### **Individuals Comment No. 8:**

***A commenter reiterated the QRWA's question about suitable flood protection, (see QRWA Comment No. 12) stating that the combination of the tide and the Quinnipiac is a major problem that needs to be addressed.***

#### Response to Individuals Comment No. 8:

As discussed previously in the response to QRWA Comment No. 12, Pfizer's proposal to design and construct flood control measures to prevent washout of Site materials from a 500-year flood event goes beyond the requirements of federal and state regulations and is acceptable to USEPA. In addition, USEPA will request that Pfizer consider potential predicted increases in sea level when designing flood protection measures for the Site.

### 4.3.9 Comment Concerning Screening of Remedial Alternatives

#### **Individuals Comment No. 9:**

***A commenter observed that Table 5 in the Statement of Basis, entitled Summary of Alternative Evaluation does not address long term effectiveness, which could potentially change the outcome of the evaluation for Alternative 5. The commenter wondered if this was a "deliberate omission."***

#### Response to Individuals Comment No. 9:

Long-term reliability and effectiveness is the second balancing criteria included in Table 5 of the Statement of Basis. Alternatives 3, 4 and 5 fulfilled the long-term effectiveness criteria (shown by a green symbol in the table) along with the performance standards of overall protectiveness of human health and the environment, attainment of media protection standards, and control of source releases. As these Alternatives all met the criteria to provide long-term reliability and effectiveness, USEPA used the remaining balancing criteria, particularly short term impacts, to decide which remedy would be the most appropriate for the Site. Because Alternative 4 avoids that large scale removal and transport off-site of contaminated soils, and the risks of potential odors, traffic, and worker exposures associated with excavation proposed in Alternative 5, Alternative 4 is much more effective in the short-term. This was not an omission, but rather a choice in favor of a remedy that satisfies the balancing criteria.

### 4.3.10 Comments on Public Participation

#### **Individuals Comment No. 10:**

***While several commenters expressed their satisfaction with the remedy selection and public participation process, one commenter was surprised when first learning of the August 4 meeting in the article published in the North Haven Courier on July 29th. The resident stated that this left not much time to absorb the documents online at the North Haven Library. In addition, it was not possible to print, nor take comments using the computer. The commenter requested that the documents be maintained in the Library and further requested information on how to access the Response to Comments.***

# FINAL DECISION AND RESPONSE TO COMMENTS DOCUMENT

## Response to Individuals Comment No. 10:

The public comment period for the proposed remedy was formally announced by public notices placed in the New Haven Register on June 19, 2010 and June 20, 2010, consistent with USEPA public notice policies and CTDEP public notice requirements. In addition, the public informational meeting was publicized by articles in the New Haven Register on July 21, 2010 and by the North Haven Courier on July 29, 2010. USEPA appreciates the commenter's efforts to quickly become familiar with the material at the North Haven Memorial Library and the constructive comments provided.

The Statement of Basis will remain available for download from the Site's informational website [www.upjohnnorthhaven.com](http://www.upjohnnorthhaven.com) and this Final Decision and Response to Comments will be posted there as well. This website will be periodically updated with the progress of the remedial construction as part of the public outreach activities that Pfizer will be required to conduct. For members of the public that do not have access to a computer, internet access is available at the North Haven Memorial Library. These and other documents concerning the Site are also available through a FOIA request made to the USEPA and will also be available in CTDEP's file room.

## Individuals Comment No. 11:

***In addition to QRWA Comment No. 11, residents expressed questions about how they would be informed of progress during remedy construction. A CAP member requested meetings at least once a year "to get an update on what's going on and to keep the Town and the agencies abreast of what's going on"***

## Response to Individuals Comment No. 11:

USEPA will be requiring that Pfizer prepare a Community Relations Plan as part of the design workplan submittals to inform the community of key activities during remedial design and construction. USEPA expects that Pfizer will continue to meet with interested community members and local stakeholders such as the North Haven Land Trust and the CAP, as it did throughout the development of the CMS and the selection of the final remedy. USEPA will require that Pfizer assist USEPA in making information available concerning completed and upcoming remedial activities. The technical documents concerning remedial design and construction will be available upon request from USEPA and CTDEP. In addition, Pfizer will maintain the [www.upjohnnorthhaven.com](http://www.upjohnnorthhaven.com) website as a means of providing information to the public.

## 5.0 FUTURE ACTIONS

Following this final remedy selection, USEPA and Pfizer will enter into an updated RCRA Section 3008(h) Order on Consent to complete the design and construction of the selected remedy and to implement OM&M procedures to ensure that the final remedy performs as intended in the future. The order will include requirements for long-term financial assurance from Pharmacia & Upjohn or its successors to insure not only that funds will be available for construction of the remedy, but also for long-term OM&M. The order will also incorporate requirements for the design of the specific remedial components, detail the process for USEPA review and approval of the design documents, define the schedule for progress reports and monitoring reports to be submitted to USEPA, and include a plan for continued community communication and involvement. These reports will become part of the Administrative Record for the Site and will be available for public review.

Following construction of the remedy and USEPA's confirmation inspection, Pfizer will be required to submit construction completion reports to USEPA for review and approval. After USEPA approves the

## FINAL DECISION AND RESPONSE TO COMMENTS DOCUMENT

construction of the remedy, Pfizer will perform long-term OM&M to maintain the effectiveness of the remedy in accordance with the OM&M Plan that will be reviewed and approved by USEPA as part of the design submittals. Long-term groundwater monitoring will be conducted to assess and ensure the continued performance of the groundwater perimeter hydraulic control system. Operation of the groundwater treatment facility will be conducted under a NPDES permit to protect adjacent surface waters. Inspection, maintenance, and repairs to the protective barrier and low-permeability cover systems and other remedial components will be performed as necessary.

Upon the completion of remedial construction, the RCRA 3008(h) Order may be replaced by another mechanism that obligates Pfizer to perform long-term OM&M such as a CTDEP Stewardship permit. Institutional controls, including ELURs, will be implemented and monitored to ensure that residential and potable water uses are prohibited and future re-use activities do not disturb or interfere with the integrity and protectiveness of the constructed remedial components.

### 6.0 DECLARATION

Based on the administrative record compiled for this corrective action, USEPA has determined that the selected remedy for the Pharmacia & Upjohn Company LLC facility (USEPA ID# CTD001168533) is appropriate and will be protective of human health and the environment.



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Mr. Robert O'Meara  
RCRA Facility Manager  
United States Environmental Protection Agency  
Region 1

Date 9/10/2010

# FINAL DECISION AND RESPONSE TO COMMENTS DOCUMENT

## 7.0 GLOSSARY

- Administrative Record** – Collection of documents (reports, correspondence, etc.) that form the basis for the remedy selection
- Citizens Advisory Panel (CAP)** – Group of North Haven residents assembled by the Office of the First Selectman to track, comment on, and act as a conduit for information regarding the environmental investigation and remediation of the Site.
- Connecticut General Statutes (CGS)** – Codification of the laws and public acts of the State of Connecticut
- Corrective Measures Study (CMS)** – Report that evaluates alternatives for cleanup of RCRA corrective action sites. Golder Associates Inc., February 2010. Final Revised Corrective Measures Study, Pharmacia & Upjohn Company LLC Site and Lake A LLC Site, North Haven, Connecticut.
- Dense Non-Aqueous Phase Liquid (DNAPL)** – Liquid that is heavier than water and remains in a separate phase and does not entirely dissolve in water.
- Environmental Land Use Restrictions (ELUR)** – Easement granted to the Commissioner of the CTDEP by the property owner and is recorded 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. An ELUR is a tool which permits the remedial goals for a property to be dependent on the exposure risk associated with its use
- GB Groundwater** – Groundwater defined by CTDEP as being within a historically highly urbanized area or an area of intense industrial activity and where public water supply service is available. Such ground water is presumed not be suitable for human consumption without treatment due to waste discharges, spills or leaks of chemicals or land use impacts.
- Groundwater Treatment Facility (GWTF)** – Existing treatment facility at the Site that removes contaminants from extracted groundwater prior to discharge to the Quinnipiac River in accordance with a CTDEP NPDES permit.
- In-situ Thermal Remediation (ISTR)** – In-situ remediation technology that simultaneously applies heat and vacuum to remove contaminants from subsurface soil/WWTR located above and/or below the water table, without the need for excavation. Contaminants removed from soil/WWTR are treated in an above ground vapor treatment system.
- Media Protection Standard (MPS)** – numerical matrix, pathway and chemical specific remediation criteria protective of human health and the environment that will be used during remedy implementation.
- National Pollutant Discharge Elimination System (NPDES) Permit** – Permit issued from CTDEP that allows and requires monitoring of the discharge of treated groundwater extracted from the Site to the Quinnipiac River.
- Operation, Monitoring and Maintenance (OM&M)** – Continuing activities to operate installed corrective measures, monitor the continued effectiveness of the corrective measures, including groundwater monitoring, and the maintenance and repair, as needed, of the remedy components.
- Polycyclic Aromatic Hydrocarbons (PAH)** – subset of semivolatile organic compounds with two or more fused aromatic rings. Examples of PAH are naphthalene and benzo(a)pyrene.
- Polychlorinated Biphenyls (PCBs)** – Class of organic compounds with 1 to 10 chlorine atoms attached to biphenyl, which is a molecule composed of two benzene rings. PCBs were widely used for many applications, especially as dielectric fluids in transformers, capacitors, and coolants. Remediation of sites contaminated with PCBs may be regulated by TSCA.

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**Preliminary Media Protection Standards (PMPS)** – numerical matrix, pathway and chemical specific remediation criteria protective of human health and the environment that were used to evaluate remedial technologies and alternatives during the CMS.

**Quinnipiac River Watershed Association (QRWA)** - non-profit, 501(c)(3) organization, with a mission to work with the citizenry to address the many environmental issues of the densely populated Quinnipiac River watershed.

**Remediation Standard Regulations (RSRs)** – CTDEP regulations governing the requirements for remediation of contaminated sites.

**Resource Conservation and Recovery Act (RCRA)** – This law regulates the management and disposal of hazardous wastes. RCRA, in Section 3008(h), also authorizes the federal government to respond directly to releases of hazardous waste which may be a threat, or potential threat, to public health or the environment.

**Regulations of Connecticut State Agencies (RCSA)** – Codification of regulations for Connecticut State Agencies, such as the CTDEP.

**Risk Assessment** – Formal process to evaluate the hazards to human health and the environment presented by environmental conditions at the Site.

**Semivolatile Organic Compounds (SVOCs)** – Class of organic chemicals with moderate vapor pressures. Examples include 1,2-dichlorobenzene, benzidine, and 2-chloroaniline,

**Statement of Basis** – Document presenting the proposed remedy for a facility to the public. The Statement of Basis provides a brief summary of the facility conditions, potential risks, and alternatives studies in the detailed analysis phase of the CMS. USEPA, February 2010. Statement of Basis, Pharmacia & Upjohn Company LLC Site and Lake A LLC Site, North Haven, Connecticut.

**Toxic Substances Control Act (TSCA)** – This law provides USEPA with authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures. The TSCA includes specific requirements concerning the production, importation, use, and disposal of several chemicals including polychlorinated biphenyls (PCBs). The TSCA PCB regulations are found at 40 CFR Part 761.

**Unit 1** – Uppermost geologic feature underlying the Site. Unit 1 consists of a historic fill and shallow sand layer, which contains extractable groundwater.

**Unit 2** – Geologic feature underlying the Site. Unit 2 consists of a silt/clay layer with low permeability that is highly resistant to groundwater flow and hydraulically separates Unit 1 from Units 3 and 4.

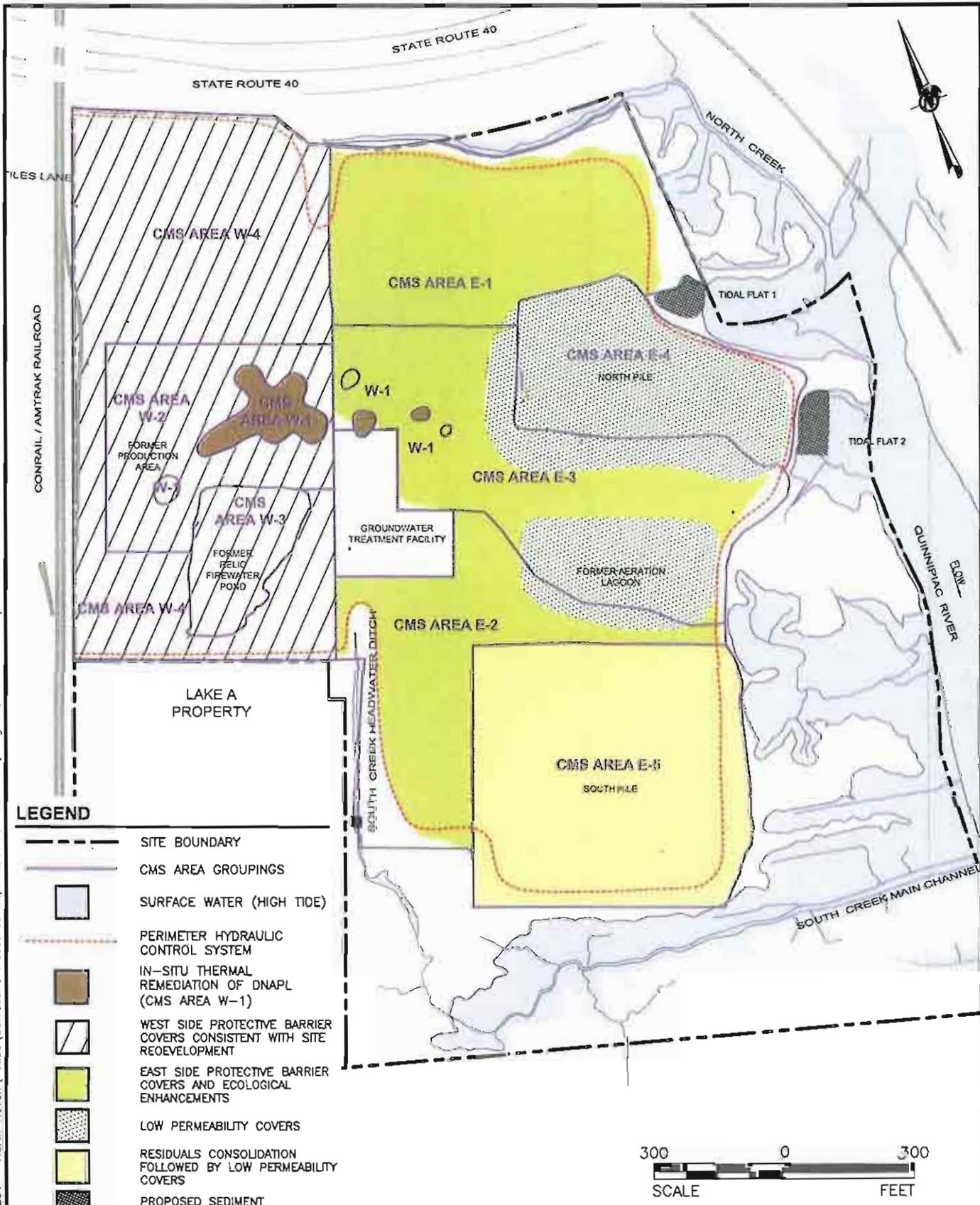
**Units 3 & 4** – Lower geologic features containing extractable groundwater. Unit 3 is a lower sand layer, and Unit 4 is bedrock.

**Volatile Organic Compounds (VOCs)** – Organic chemicals with a high vapor pressure. Examples include benzene, chlorobenzene, and toluene.

**Waste Water Treatment Residuals (WWTR)** – Sludge-like material generated from the treatment of chemical manufacturing process wastewaters. In general, WWTR consists of spent powdered activated carbon and biological solids from the previous aerated biological treatment processes and acid neutralization sludges from the addition of lime and other chemicals to acidic wastewaters.



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**LEGEND**

- SITE BOUNDARY
- CMS AREA GROUPINGS
- SURFACE WATER (HIGH TIDE)
- PERIMETER HYDRAULIC CONTROL SYSTEM
- IN-SITU THERMAL REMEDIATION OF DNAPL (CMS AREA W-1)
- WEST SIDE PROTECTIVE BARRIER COVERS CONSISTENT WITH SITE REDEVELOPMENT
- EAST SIDE PROTECTIVE BARRIER COVERS AND ECOLOGICAL ENHANCEMENTS
- LOW PERMEABILITY COVERS
- RESIDUALS CONSOLIDATION FOLLOWED BY LOW PERMEABILITY COVERS
- PROPOSED SEDIMENT REMEDIATION AREA



**CONCEPTUAL DIAGRAM OF  
SELECTED CORRECTIVE MEASURES**

PHARMACIA & UPJOHN COMPANY LLC SITE

**FIGURE 2**



**ATTACHMENT 1**  
**AFFIDAVIT OF PUBLICATION**  
**NEW HAVEN REGISTER**

# AFFIDAVIT OF PUBLICATION

## New Haven Register

JUL 8 2010

STATE OF CONNECTICUT

County of New Haven

I, J. Quinn of New Haven

Connecticut, being duly sworn, do depose and say that I am Sales Rep

of the New Haven Register, and that on the following date June 20, 2010 to wit: 2010

there was published in the regular daily edition of the said newspaper an advertisement.

**PUBLIC NOTICE**

**Corrective Measures Study (CMS) and Proposed Remedy for the Phosphate & Urea Company LLC Property, 41 Sites Lane, North Haven, CT.**

The United States Environmental Protection Agency (EPA) and the Connecticut Department of Environmental Protection (DEP) are providing this notice of a Proposed Remedial Action (PRA) for the Phosphate & Urea Company LLC Property, 41 Sites Lane, North Haven, CT. The PRA is based on the results of a Corrective Measures Study (CMS) conducted by EPA and DEP in 2008. The CMS identified several areas of concern, including elevated concentrations of lead, copper, and zinc in the soil and groundwater, and the presence of petroleum hydrocarbons in the soil. The PRA proposes remedial actions to address these concerns, including soil removal, groundwater monitoring, and installation of a groundwater treatment system. The PRA also includes a schedule for implementation and a timeline for completion. The PRA is available for public review and comment at the following address: EPA Region 01, 1200 Massachusetts Avenue, Boston, MA 02118. Comments should be submitted to the EPA Regional Administrator, Robert O'Connell, at the following address: EPA Region 01, 1200 Massachusetts Avenue, Boston, MA 02118. Comments should be submitted by July 15, 2010.

axed were clipped from each of the above-named issues of said newspaper.

30th day of June, 2010 before me.

Mary Fealner Notary Public  
My Commission Expires 10/31/2012

**North Haven High School**  
101 Elm Street  
North Haven, CT 06460

**U.S. Environmental Protection Agency, Region 1**  
1200 Massachusetts Avenue  
Boston, MA 02118

**North Haven Municipal Library**  
115 Elm Street  
North Haven, CT 06460  
Phone: 203-839-0400

**Public Library No. 10**  
Newlyington, CT 06460  
Phone: 203-839-0400  
Sundays: 10:00 AM to 5:00 PM

**Gene Elymborg**  
State of Connecticut, Department of Environmental Protection  
Bureau of Water Management and Land Policy  
1200 Elm Street, Room 1000  
Hartford, CT 06103  
Phone: 860-426-3200

If comments received within the public notice period will be considered in the final decision regarding approval or denial of the proposed remedial action.