

**DECLARATION FOR THE  
EXPLANATION OF SIGNIFICANT DIFFERENCES  
HATHEWAY AND PATTERSON SUPERFUND SITE  
MANSFIELD/FOXBOROUGH, MASSACHUSETTS  
AUGUST 2011**

**Site Name and Location**

The Hatheway and Patterson Superfund Site is located in Mansfield and Foxborough, Massachusetts.

**Lead Agency**

United States Environmental Protection Agency

**Support Agency**

Massachusetts Department of Environmental Protection

**Statement of Purpose**

This decision document sets forth the basis for the determination to issue the attached Explanation of Significant Differences (ESD) for the Hatheway and Patterson Superfund Site. The U.S. Environmental Protection Agency (EPA) developed this decision document after consulting with the Massachusetts Department of Environmental Protection (MassDEP), and MassDEP's letter of concurrence is provided as Attachment A to this ESD.

**Statutory Basis for Issuance of the ESD**

Pursuant to Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9617(c), and the rule at 40 C.F.R. § 300.435(c)(2)(i), if EPA determines that the remedial action being undertaken at a site differs significantly from the Record of Decision (ROD) for that site, EPA shall publish an explanation of the significant differences and the reasons such changes are being made. According to 40 C.F.R. § 300.435(c)(2)(i), and EPA guidance (Office of Solid Waste and Emergency Response (OSWER) Directive 9200.1-23-P, July 1999), an Explanation of Significant Differences, rather than a ROD amendment, is appropriate where the adjustments being made to the ROD are significant but do not fundamentally alter the remedy with respect to scope, performance, or cost. EPA has determined that the adjustments to the ROD provided in this ESD are significant but do not fundamentally alter the overall remedy for the Hatheway and Patterson Superfund Site with respect to scope, performance, or cost. Therefore, this ESD is being properly issued.

In accordance with Section 117(d) of CERCLA, 42 U.S.C. § 9617(d), and the rules at 40 C.F.R. §§ 300.435(c)(2)(i)(A) and 300.825(a)(2), this ESD will be available for public review at the EPA Records Center in Boston, Massachusetts and the public information repository located at the Mansfield, Massachusetts public library.

## **Background**

The Hatheway and Patterson Superfund Site is located in Mansfield, Bristol County, Massachusetts, and Foxborough, Norfolk County, Massachusetts. The Site is divided into four quadrants, demarcated by a railroad right of way and the Rumford River. See Figure 1. Prior to the 1950's, the property was reportedly used for various activities, including railroad operations, coal storage, bulk chemical transfer, and storage of electric/utility poles and railroad ties. From 1952 to 1993, Hatheway and Patterson operated a wood treatment facility at the Site which included the preservation of wood sheeting, planking, timber, piling, poles and other wood products. In 2002, EPA placed the Site on the National Priorities List due to soil and groundwater contamination.

In 2005, EPA issued a ROD that set forth the selected remedy at the Hatheway and Patterson Superfund Site. Impacted soil would be excavated to the depth of the water table. The remedy called for soils contaminated with arsenic and pentachlorophenol to be excavated and consolidated on-site under a low-permeability cover, after being stabilized if necessary. Soil contaminated with dioxin and free product (Light Non-Aqueous Phase Liquid or "LNAPL") were to be disposed of at a licensed off-site facility. Institutional controls would prohibit the use of Site groundwater and restrict land uses in a manner that ensures the protectiveness of the remedy as described in the ROD. Institutional controls would also ensure the integrity of the on-site low-permeability cover and other remedial components. Long term monitoring of groundwater, surface water, sediment, as well as fish tissue analysis of specimens caught in the Rumford River would be performed. The results would be analyzed in Five Year Reviews of the remedy.

New information and circumstances arose after the signature of the ROD that led to the need for this ESD. These include changes in the anticipated future use of part of the Site, the shipment of nearly all Site soils to an off-site landfill, and the need to clarify the extent of institutional controls at the Site.

## **Overview of the ESD**

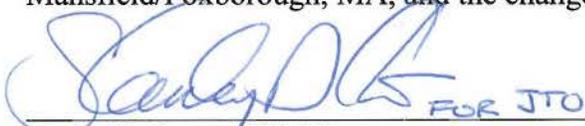
This ESD has three major purposes:

- A. To document changes made to the remedy on the Foxborough, MA parcel, including changes to the anticipated future land use, design of the consolidation area, and the tax foreclosure and rezoning of the property by the Town;

- B. To document the shipment of certain pentachlorophenol (PCP) and arsenic contaminated soils to an off-site facility, rather than the on-site consolidation specified in the ROD;
- C. To clarify the extent of institutional controls to be placed on portions of the Site.

**Declaration**

For the foregoing reasons and as explained herein, by my signature below, I approve the issuance of an Explanation of Significant Differences for the Hatheway and Patterson Superfund Site in Mansfield/Foxborough, MA, and the changes stated therein.



James T. Owens, III, Director  
Office of Site Remediation and Restoration  
U.S. Environmental Protection Agency – New England

8/29/11  
Date

**EXPLANATION OF SIGNIFICANT DIFFERENCES  
HATHEWAY and PATTERSON SUPERFUND SITE  
MANSFIELD/FOXBOROUGH, MASSACHUSETTS  
August 2011**

**Site Name:** Hatheway and Patterson Superfund Site

**Site Location:** Mansfield/Foxborough, Massachusetts

**Lead Agency:** United States Environmental Protection Agency (EPA)

**Support Agency:** Massachusetts Department of Environmental Protection (MassDEP)

**I. INTRODUCTION**

This Explanation of Significant Differences (ESD) is being issued for the Hatheway and Patterson Superfund Site to address differences between the remedial action undertaken there and the remedy that was set forth in the Record of Decision (ROD) for the Site on September 30, 2005. EPA is required to publish this ESD by Section 117(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. § 9617(c), and the rule at 40 C.F.R. § 300.435(c)(2)(i).

This ESD has three major purposes:

- A. To document changes made to the remedy on the Foxborough, MA parcel, including changes to the anticipated future land use, design of the consolidation area, and the tax foreclosure and rezoning of the property by the Town;
- B. To document the shipment of certain pentachlorophenol (PCP) and arsenic contaminated soils to an off-site facility, rather than the on-site consolidation specified in the ROD;
- C. To clarify the extent of institutional controls to be placed on portions of the Site.

The basis for these decisions is outlined below.

First, EPA changed the anticipated future use of the Foxborough, MA parcel of the Site. The cleanup selected in the 2005 ROD for the 1.77 acre portion of the Site in Foxborough, MA was based on future residential use of the parcel. This anticipated future use was based on the residential zoning of the property in 2005. After the ROD was issued, the Town of Foxborough took ownership of the parcel through tax foreclosure and changed the zoning of this parcel to "Limited Industrial." The Town notified EPA of its intention to use the parcel as a parking facility for the nearby MBTA commuter rail station. Based on the change in zoning and

intended reuse of the parcel, EPA and MassDEP determined that the 1.77 acre portion of the Site in Foxborough should be remediated to a Reasonably Anticipated Future Use (RAFU) of commercial/open space and changed the cleanup level accordingly. EPA also determined that a consolidation area for soils in Foxborough contaminated with arsenic could be built on the Site property in Foxborough. The consolidation area was designed with an asphalt cover in order to facilitate reuse as a parking facility.

Second, EPA decided to dispose of the remainder of the PCP/arsenic contaminated soils excavated from the lots in the Mansfield portion of the Site at an off-site facility. The remedy chosen in the ROD called for on-site consolidation of pentachlorophenol (PCP) and arsenic (As) contaminated soils. EPA reevaluated both options using criteria required under CERCLA to compare different remedial options. The criteria included overall protection, long term effectiveness and permanence, community support and cost. EPA found off-site disposal was a preferable alternative because it provided advantages versus the on-site consolidation specified in the ROD.

Lastly, EPA is clarifying the extent of institutional controls to be placed on the Site properties as called for in the ROD. EPA is clarifying that restrictions on future soil excavation, in the form of institutional controls, will be needed in the northeast quadrant of the Site: 1) below the depth of the vertical extent of excavation reached during the remedial action; and 2) at depths of two feet and below in a strip of land bordering the northeast quadrant and County Street to a distance about 5 feet laterally within the fence line. Institutional controls will also be necessary to protect the cover placed over the consolidated soils in the 1.7 acre parcel of the Site in Foxborough. Risks from soil exposures within the area of the existing railroad right of way were evaluated during design and remedial action as specified by the ROD; institutional controls or other legal and administrative measures were deemed not to be necessary. As part of the Five Year Review process for the Site, risk from the railroad right of way will be reevaluated. In addition, institutional controls to eliminate on-site exposures to groundwater and to prevent residential use will be necessary on all four quadrants of the Site property.

In accordance with CERCLA §117(d), 42 U.S.C. § 9617(d), and the rules at 40 C.F.R. §§ 300.435(c)(2)(i)(A) and 300.825(a)(2), this ESD and its supporting documents will be made available for public inspection and will be added to the Administrative Record for the Site. The Administrative Record is available for public review at the EPA Region 1 Records Center in Boston, Massachusetts, and the repository located near the Site, at the addresses listed below:

EPA Region 1 Records Center  
5 Post Office Square, 1<sup>st</sup> Floor  
Boston, Massachusetts 02109  
By appointment only: 617-918-1440

Public Information Repository  
Mansfield Public Library  
255 Hope Street  
Mansfield, MA 02048  
508-261-7380

## II. SITE HISTORY, CONTAMINATION, AND THE SELECTED REMEDY

The Hatheway and Patterson Superfund Site is located in Mansfield, Bristol County, Massachusetts, and Foxborough, Norfolk County, Massachusetts. Approximately 36 acres of the Site are located in the Town of Mansfield. The remaining 1.77 acres are located in the Town of Foxborough. The Site is bisected by the Rumford River, which runs north to south, and by a railroad right-of-way, which runs east to west, dividing the Site into four quadrants. The northeast (NE) and northwest (NW) quadrants are north of the railroad tracks operated by CSX, while the southeast (SE) and southwest (SW) quadrants are the area south of the railroad tracks. See Figure 1.

Prior to the 1950's, the property was reportedly used for various activities, including railroad operations, coal storage, bulk chemical transfer, and storage of electric/utility poles and railroad ties. Beginning in 1952, wood treatment operations by Hatheway and Patterson began. Operations at the Site included the preservation of wood sheeting, planking, timber, piling, poles and other wood products. The company filed for bankruptcy in 1993, leading to a subsequent removal action by EPA in 1993-5 to address the imminent hazard posed by abandoned chemicals and waste at the Hatheway and Patterson facility.

During the Remedial Investigation/Feasibility Study (RI/FS), elevated arsenic levels were found in soil adjacent to the Site boundary with County Street. As a result, an additional removal action was performed in 2003 to remove contaminated soil. Excavation in some areas bordering County Street stopped at two feet due to concerns that further excavation would undermine the stability of County Street, the adjoining road. In these areas, if arsenic contamination remained below two feet, the soil was covered with a filter fabric and brought to grade with clean fill.

In 2005, EPA issued a ROD that set forth the selected remedy at the Hatheway and Patterson Superfund Site. The remedy addresses current and future risks due to direct contact and incidental ingestion of soil and risks to future users of groundwater. Impacted soil would be excavated to the depth of the water table. The remedy called for soils contaminated with arsenic and pentachlorophenol to be excavated and consolidated on-site under a low-permeability cover, after being stabilized if necessary. Soil contaminated with dioxin and free product (Light Non-Aqueous Phase Liquid or "LNAPL") were to be disposed of at a licensed off-site facility. Groundwater risks were to be addressed through the use of institutional controls and monitoring. Institutional controls would prohibit the use of Site groundwater and restrict land uses in a manner that ensures the protectiveness of the remedy as described in the ROD. Institutional controls would also ensure the integrity of the on-site low-permeability cover and other remedial

components. Long term monitoring of groundwater, surface water, sediment, as well as fish tissue analysis of specimens caught in the Rumford River would be performed. The results would be analyzed in Five Year reviews of the remedy.

The remedy was based on an anticipated future use scenario of commercial/open space for the 36-acre Mansfield portion of the Site. A residential future use scenario was anticipated for the smaller 1.77 acre portion of the Site in Foxborough because of residential zoning in place for the property at the time of ROD signature. The remedy is based on an assumption that groundwater at the Site is not available for drinking water by future users of the Site, and therefore, no active cleanup measures were planned for groundwater under the Site.

The Remedial Action was conducted in 2009-10 and substantially completed in 2010. Details of the construction project can be found in the Remedial Action Report being prepared in conjunction with this ESD.

### **III. BASIS FOR THIS ESD**

#### **A. Foxborough Parcel/Consolidation Area**

At the time the ROD was written in 2005, it was unknown where the consolidation area for arsenic and pentachlorophenol contaminated soils would be located; this was a decision left intentionally until the Remedial Design was completed. The ROD states “location of the consolidated and covered material will be determined during design, but will be located in an area that is consistent with future use assumptions.” Also at the time the ROD was written, zoning in the Foxborough parcel was residential and EPA used this as the basis for selecting a cleanup level for arsenic that would allow for residential reuse of the property.

Subsequent to the ROD signature, the Town of Foxborough foreclosed on the approximately 1.7 acres of the Site located within the Town with the intent of redeveloping the parcel as a parking lot to service the nearby MBTA commuter rail station. In connection with this plan, at the May 12, 2008 Town Meeting, the Town voted to adopt a change in zoning of the lot from R-40 Residential and Agricultural District to Limited Industrial (LI) district. EPA decided to place a consolidation area called for by the ROD in the Foxborough parcel based on this new information. The consolidation area would contain arsenic contaminated soil found on the Foxborough parcel. A low-permeability asphalt surface would cover the consolidation area to facilitate its reuse as a parking lot. Finally, the Town of Foxborough agreed to put in place an institutional control to prevent exposure to the contamination left in place beneath the cover in the consolidation area.

Although the consolidation area would cover most of the 1.77 acre Foxborough parcel, there were several small areas that would not be included under the cover. For these areas, EPA used the cleanup level consistent with the new anticipated future use of commercial/open space. EPA determined that the appropriate cleanup level for arsenic on this portion of the Site would be 16

ppm.<sup>1</sup> The 16 ppm cleanup level is the same level that was being used in the rest of the Site in Mansfield that was zoned open space/commercial.

Please see Attachment C for a memorandum from EPA's risk assessor documenting the protectiveness of this cleanup level in the Foxborough portion of the Site.

## **B. Shipment Off-site of Remaining Arsenic and Pentachlorophenol (PCP) Contaminated Soils**

Once the decision was made to consolidate contaminated soil in Foxborough, EPA determined that the remainder of pentachlorophenol and arsenic contaminated soils could be disposed of at an off-site facility at a similar cost to building an additional on-site consolidation area. Because there was not sufficient space within the Foxborough consolidation area described above for pentachlorophenol and arsenic contaminated soils from the Mansfield portion of the Site, a second consolidation area would have been required.

EPA had evaluated both options in the 2005 ROD. The Record of Decision selected alternative RA-S4 which called for disposal of arsenic and pentachlorophenol contaminated soils in an on-site disposal area. However, subsequent to ROD signature, the relative cost of off-site disposal (RA-S5) decreased significantly. This made alternative RA-S5 (off-site disposal) preferable when compared to on-site consolidation specified in the ROD.

The comparative analysis performed for the 2005 ROD indicated that alternative (RA-S5), off-site disposal:

- Provides the highest degree of overall protection. Because RA-S5 removes the greatest amount of materials from the Site that pose an unacceptable risk through excavation and off-site disposal, it provides the highest degree of overall protection.
- Would be slightly more effective and provide the highest level of permanence. Because the greatest volume of soil contamination is taken off-site for disposal in RA-S5, this alternative is slightly more effective in the long term and provides the highest level of permanence.
- Would present the most risk to nearby residents located along the trucking route due to the increased amount of shipping and handling near the site.
- Would be the most expensive by far at 20.9 million, about double the cost of the selected remedy, RA-S4.
- Was most accepted by the community based on comments received on the proposed plan from the community members concerned about the long-term nature of the on-site consolidation option in Mansfield.

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<sup>1</sup> There is no cleanup level for PCP in the Foxborough parcel because this area of the Site did not contain PCP or other contaminants at levels that exceeded the calculated preliminary remediation goals.

With costs for both options similar, other criteria weighed in favor of off-site disposal: it was preferred by the community and it offered the greatest overall protection, and long term effectiveness and permanence. The disadvantages, including a small increase in risk to residents due to the transport of the soils (which was mitigated through careful coordination with local officials and residents) was outweighed by the ability to complete the work more quickly at a cost similar to that of the selected remedy.

Therefore, based on technical, cost, state acceptance, and schedule considerations, EPA decided to ship the remaining material to an off-site landfill along with the remaining LNAPL/dioxin soils shipped from the NE and NW quadrants.

### **C. Institutional Controls**

EPA is clarifying the extent of institutional controls to be placed at the Site. Institutional controls will be needed restricting soil excavation or disturbance in several areas of the Site. The extent of the soil institutional controls is shown in Figures 2 and 3 of this ESD. Extraction of groundwater and residential use will be restricted within the four quadrants of the Site. Institutional controls were determined not to be necessary in the railroad right of way based on a risk evaluation. EPA will revisit the risk of exposure in the railroad right of way as part of the Five Year Review process for the Site.

#### County Street

During construction of the remedy, a small number of soil samples exceeded cleanup standards near the Site's boundary at County Street. These samples were adjacent to the area in which filter fabric was placed on top of remaining contaminated soils at a depth of approximately two feet during the 2003 removal action because of concern about the stability of the roadway.

The removal of additional material in this area would have undermined the soil and the marker layer placed during the 2003 removal action. In order to avoid instability of the street and to avoid the removal of trees, and the marker area placed during 2003 along County Street, EPA decided not to excavate additional soil in this area. Because some soil with contamination above cleanup levels was left in place, EPA is requiring institutional controls in this area. See Figure 2. The institutional controls will prevent digging or other disturbance of soil below two feet below ground surface in the area to ensure the remedy remains protective of human health and the environment.

#### Water Table

The Record of Decision called for excavation of soil to a depth corresponding to that of the water table, approximately six feet below ground elevation in the NE quadrant. The final elevations in the NE quadrant were based on this information. Institutional controls will therefore be required

below that depth in the NE quadrant. See Figure 2. Institutional controls will prevent exposure to contaminated soil by construction workers or other potential receptors who might encounter it during a future excavation.

#### Consolidation Area

In addition, institutional controls are needed to protect the integrity of the asphalt cover in the Foxborough portion of the Site, as required by the ROD. See Figure 3. Institutional controls will prevent exposure to arsenic contaminated soil which was consolidated on the Foxborough parcel.

### **IV. DESCRIPTION OF SIGNIFICANT DIFFERENCES**

#### **Introduction:**

The section of the 2005 Record of Decision describing the selected remedy stated in part that:

*“Soils containing pentachlorophenol (PCP), semi-volatile organic compounds (SVOCs), and arsenic above the cleanup levels in Table L-1 will be excavated, tested for leachability using appropriate test methods and, if they fail leachability criteria, a stabilization/solidification agent(s) will be utilized. If treatment is needed, a pug mill will likely be used to mix and treat the soils.*

*The stabilized/solidified soils, along with demolition debris will then be consolidated on-site under a low-permeability cover...the location of the consolidated and covered material will be determined during design, but will be located in an area that is consistent with future use assumptions and is not within a wetland area.”*

The institutional controls section describing the selected remedy stated:

*“...Institutional controls will prohibit the use of Site groundwater and restrict land uses in a manner that ensures the protectiveness of the remedy as described in this ROD, and ensures the integrity of the on-site low-permeability cover and other remedial components. There will be a provision that prevents land use activities which would interfere with the integrity of the low-permeability cover or are inconsistent with the land use assumptions used as the basis for the soil cleanup levels. Residential uses of the Mansfield portion of the Site and other uses incompatible with the remedy will be prohibited...”*

#### **A. Foxborough Parcel/Consolidation Area**

The remedy in the ROD called for the consolidation of PCP and arsenic contaminated soil on-site, but did not specify the location of the consolidation area(s). After the Town of Foxborough

changed the zoning of a portion of the Site located within the Town, EPA decided to place the consolidation area called for in the ROD in the Foxborough parcel. The consolidation area in Foxborough is discussed in this section, with the disposition of the remaining PCP and arsenic contaminated soil in the Mansfield section of the Site discussed in Sections III. and IV.B. of this ESD.

In general conformance with the Construction Specifications (TRC, 2008), the Foxborough parcel was restored consistent with reuse as a parking lot, with a paved surface of bituminous asphalt. The area was graded to promote surface drainage to three catch basins, a Cultec Stormfilter 400, and ultimately the Rumford River. The western edge of the property, approximately 30 feet wide, was covered with loam and seeded and a row of spruce trees was planted. This area was remediated using the commercial/industrial cleanup levels developed for the rest of the Site (for arsenic) in accordance with the memo outlining the protectiveness of the cleanup level for this area. See Attachment C, McDonough, 2010.

### **B. Shipment Off-site of Remaining Arsenic and Pentachlorophenol (PCP) Contaminated Soils**

The Record of Decision called for soil containing pentachlorophenol (PCP), semi-volatile organic compounds (SVOCs), and arsenic to be excavated, tested for leachability and, if necessary treated with stabilization/solidification agent(s). The soil was then to be consolidated on-site under a low-permeability cover. Testing of PCP and arsenic impacted soils as prescribed by the ROD was performed and led to a determination that this soil did not require stabilization/solidification.

Once the decision was made to consolidate some of the contaminated soil in Foxborough, EPA determined that the remainder of pentachlorophenol and arsenic contaminated soil could be disposed of at an off-site facility at a similar cost to using onsite consolidation. For the reasons outlined in Section III.B. of the ESD, EPA shipped this contaminated soil off-site for disposal in 2010.

### **C. Institutional Controls**

Based on the remedy implemented at the Site, institutional controls will be needed to fulfill the RODs requirement to “restrict land uses in a manner that ensures the protectiveness of the remedy.” The institutional controls will prevent residential use of the Site and restrict the extraction of groundwater from beneath the Site. The institutional controls will also restrict the excavation of soils or disturbance of the remedy in the following areas at the Site:

- a strip of land bordering the NE quadrant and County Street to a distance about 5 feet laterally within the fence line (below approximately two feet);
- areas where excavation stopped at the water table in the NE quadrant (below approximately six feet); and

- to protect the integrity of the cover placed over the consolidated soil in the 1.7 acre parcel of the Site in Foxborough, MA.

See Figures 2 and 3 for the approximate extent of institutional controls to be placed on excavated areas. EPA will evaluate the risk of exposure in the railroad right of way as part of the Five Year Review process to ensure the determination that institutional controls are not necessary in that area remains valid.

#### Change in Expected Outcomes

The main change in the expected outcomes listed in the 2005 ROD is that the Foxborough section of the Site was cleaned up to a commercial standard instead of a residential standard because of the change in the anticipated future use of the property. In addition, nearly all of the contaminated soil was taken off-site for disposal. Finally, the extent of institutional controls for the Site has been clarified. All other expected outcomes remain unchanged.

#### **V. Support Agency Comments**

MassDEP participated with EPA in developing the changes to the selected remedy described herein and concurs with these changes as provided in Attachment A.

#### **VI. Statutory Determinations**

The remedy as adjusted herein remains protective of human health and the environment and satisfies the requirements in Section 121 of CERCLA. The changes made in this ESD have not changed the remedial action objectives for the Site. Rather, the modifications and clarifications to the remedy described herein will allow the remedy to continue to perform in the most cost-effective manner practicable while meeting all of the statutory requirements of CERCLA.

#### **VII. Public Participation Compliance**

In accordance with Section 117(d) of CERCLA, 42 U.S.C. § 9617(d) and Section 300.825(a) of the National Contingency Plan (NCP), 40 C.F.R. § 300.825(a) this ESD will become part of the Site's Administrative Record that is available for public review at the locations identified in the introduction to this document.

As required by NCP section 300.435(c)(2)(i)(B), 40 C.F.R. § 300.435(c)(2)(i)(B), EPA will publish a notice of availability and a brief description of this ESD in a major local newspaper of general circulation following the signing of this ESD.

## REFERENCES

United States Environmental Protection Agency Record of Decision: Hatheway and Patterson Superfund Site, September 30, 2005.

### EPA Guidance:

U.S. Environmental Protection Agency (USEPA). 1990. *National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan)*. Code of Federal Regulations, Title 40, Part 300, Federal Register, Volume 55, Number 46, pp. 8866 et. seq. March 9, 1990.

U.S. Environmental Protection Agency (USEPA). 1999. *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Documents*. Office of Solid Waste and Emergency Response, Washington D.C. Directive 9200.1-23.P. July 1999.

### **ATTACHMENT A**

MassDEP Concurrence Letter

### **ATTACHMENT B**

Figures

### **ATTACHMENT C**

Memo from Margaret McDonough to David Lederer regarding cleanup levels in the Foxborough portion of the Site

ATTACHMENT A: MassDEP CONCURRENCE LETTER



Commonwealth of Massachusetts  
Executive Office of Energy & Environmental Affairs

## Department of Environmental Protection

One Winter Street Boston, MA 02108 • 617-292-5500

DEVAL L. PATRICK  
Governor

TIMOTHY P. MURRAY  
Lieutenant Governor

RICHARD K. SULLIVAN JR.  
Secretary

KENNETH L. KIMMELL  
Commissioner

August 3, 2011

Mr. Robert Cianciarulo  
Office of Site Remediation and Restoration  
U.S. Environmental Protection Agency, Region 1  
5 Post Office Square  
Suite 100  
Mail code OSRR 7-4  
Boston, MA 02109-3912

Re: State Concurrence  
Explanation of Significant Differences - Hatheway and Patterson Superfund Site  
Mansfield and Foxborough, Massachusetts

Dear Mr. Cianciarulo:

The Department of Environmental Protection (MassDEP) has reviewed the Explanation of Significant Differences (ESD) submitted by the U.S. Environmental Protection Agency (EPA) for the Hatheway and Patterson Superfund Site (Site). For the reasons described below, the Department concurs with the remedy for the Site described in the ESD.

In the 2005, EPA issued a Record of Decision (ROD) that set forth the selected remedy at the Site. Impacted soil would be excavated to the depth of the water table. The remedy called for soils contaminated with arsenic and pentachlorophenol (PCP) to be excavated and addressed through treatment by stabilization and on-site consolidation under an impermeable cap. Soil contaminated with dioxin and free product (light non-aqueous phase liquids or "LNAPL") were to be disposed of at a licensed off-site facility. Institutional controls would prohibit the use of Site groundwater and restrict land uses in a manner that ensures the protectiveness of the remedy as described in the ROD. Institutional controls would also ensure the integrity of the on-site low permeability cover and other remedial components. Long term monitoring of the groundwater, surface water, sediment, as well as fish tissue analysis of specimens caught in the Rumford River would be performed. The results would be analyzed in Five Year Reviews of the Site.

New information and circumstances arose after the signature of the ROD and lead to this ESD. This ESD has three major purposes: 1) to document changes made to the remedy on the Foxborough parcel, including changes to the anticipated future land use, design of the consolidation area, and the tax foreclosure and rezoning of the property by the Town; 2) to

document the shipment of certain pentachlorophenol and arsenic contaminated soils to an off-site facility rather than the on-site consolidation specified in the ROD; and 3) to clarify the extent of institutional controls to be placed on the Site.

First, EPA changed the anticipated future use of the Foxborough parcel of the Site. The cleanup selected in the 2005 ROD for the 1.77 acre portion of the Site in Foxborough was based on future residential use of the parcel. This anticipated future use was based on the residential zoning of the property in 2005. After the ROD was issued, the Town of Foxborough took ownership of the parcel through tax foreclosure and changed the zoning of this parcel to "Limited Industrial". The Town notified EPA of its intention to use the parcel as a parking facility for the nearby MBTA commuter rail station. Based on the change in zoning and intended reuse of the parcel, EPA and MassDEP determined that the 1.77 acre portion of the Site in Foxborough should be remediated to a Reasonably Anticipated Future Use of commercial/open space and changed the cleanup level accordingly. EPA also determined that a consolidation area for soils in Foxborough contaminated with arsenic could be built on the Site property in Foxborough. The consolidation area was designed with an asphalt cover in order to facilitate reuse as a parking facility.

Second, the remedy chosen in the ROD called for on-site consolidation of PCP and arsenic contaminated soils. However EPA decided to dispose of the remainder of the PCP/arsenic contaminated soils excavated from the Mansfield portion of the Site at an off-site facility due to lower disposal costs at the time of construction. EPA determined that off-site disposal was a preferable alternative because it provided advantages versus constructing and maintaining the on-site consolidation specified in the ROD.

Lastly, this ESD is clarifying the extent of institutional controls to be placed on the Site as called for in the ROD. The ESD clarifies that restrictions on future soil excavation, in the form of institutional controls, will be needed in the northeast quadrant of the site. Institutional controls will also be necessary to protect the cover placed over the consolidated soils in the 1.77 acre parcel of the Site in Foxborough. Risks from soil exposures within the area of the existing railroad right of way were evaluated during design and remedial action as specified in the ROD; institutional controls were deemed not necessary. As part of the Five Year Review process for the Site, risks from the railroad right of way will be reevaluated. In addition, institutional controls to eliminate on site exposures to groundwater and prevent residential use will be necessary on all four quadrants of the Site.

The changes described in the ESD to the selected remedy document a comprehensive approach for this site that addresses all current and potential future risks caused by soil and groundwater contamination. Therefore, MassDEP agrees with the conclusions in the ESD concurs with the EPA's constructed remedy.

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8/3/11  
ESD Concurrence  
Hatheway and Patterson

If you have any questions regarding this letter, please contact Mr. Garry Waldeck, Project Manager at (617) 348-4017.

Very truly yours,

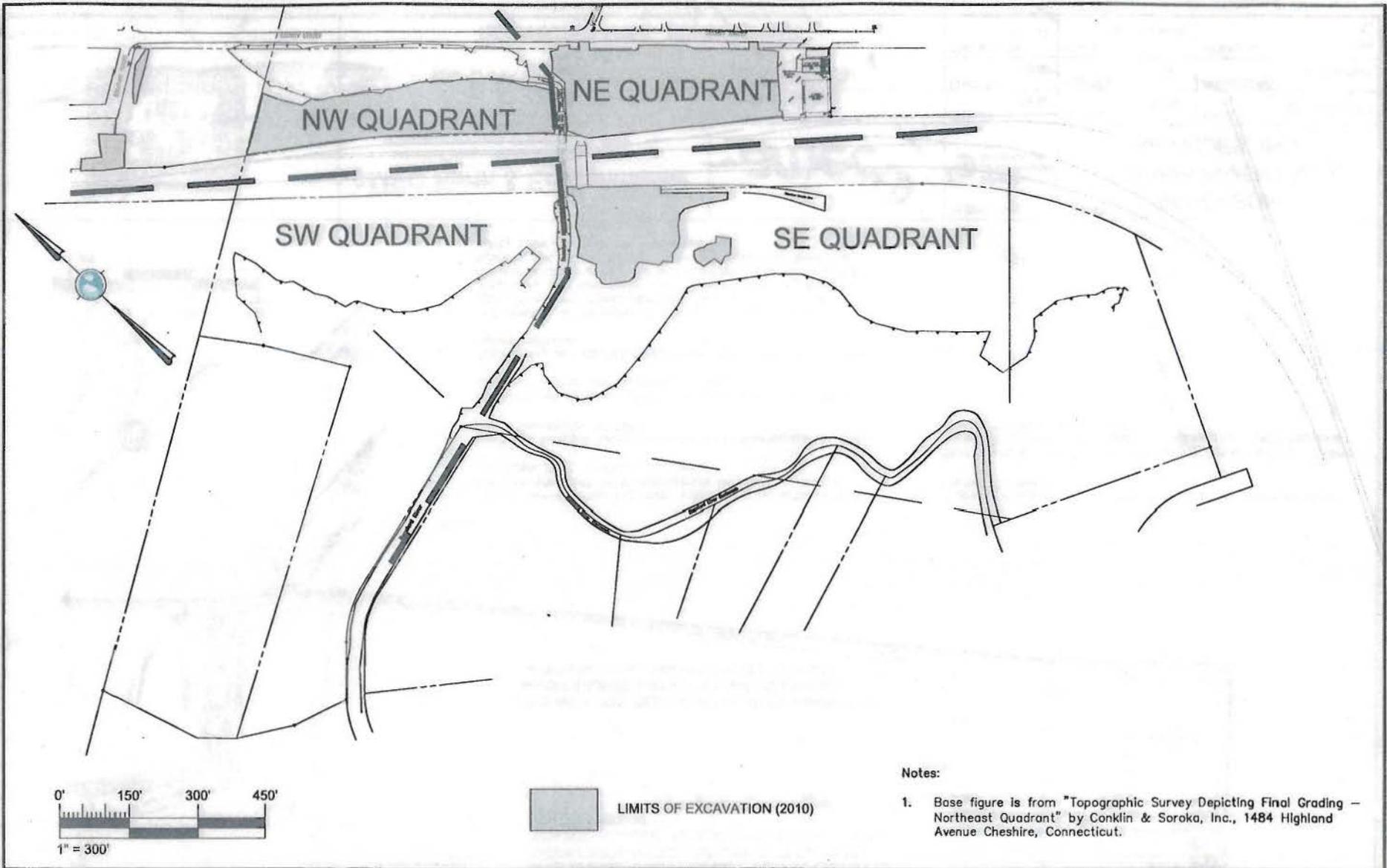
A handwritten signature in black ink, appearing to read "Paul Locke", written over a large, loopy flourish.

Mr. Paul Locke  
Acting Assistant Commissioner  
Department of Environmental Protection

Copies to:

File RTN 4-0571  
Jay Naparstek, MADEP Boston  
Dave Lederer, USEPA

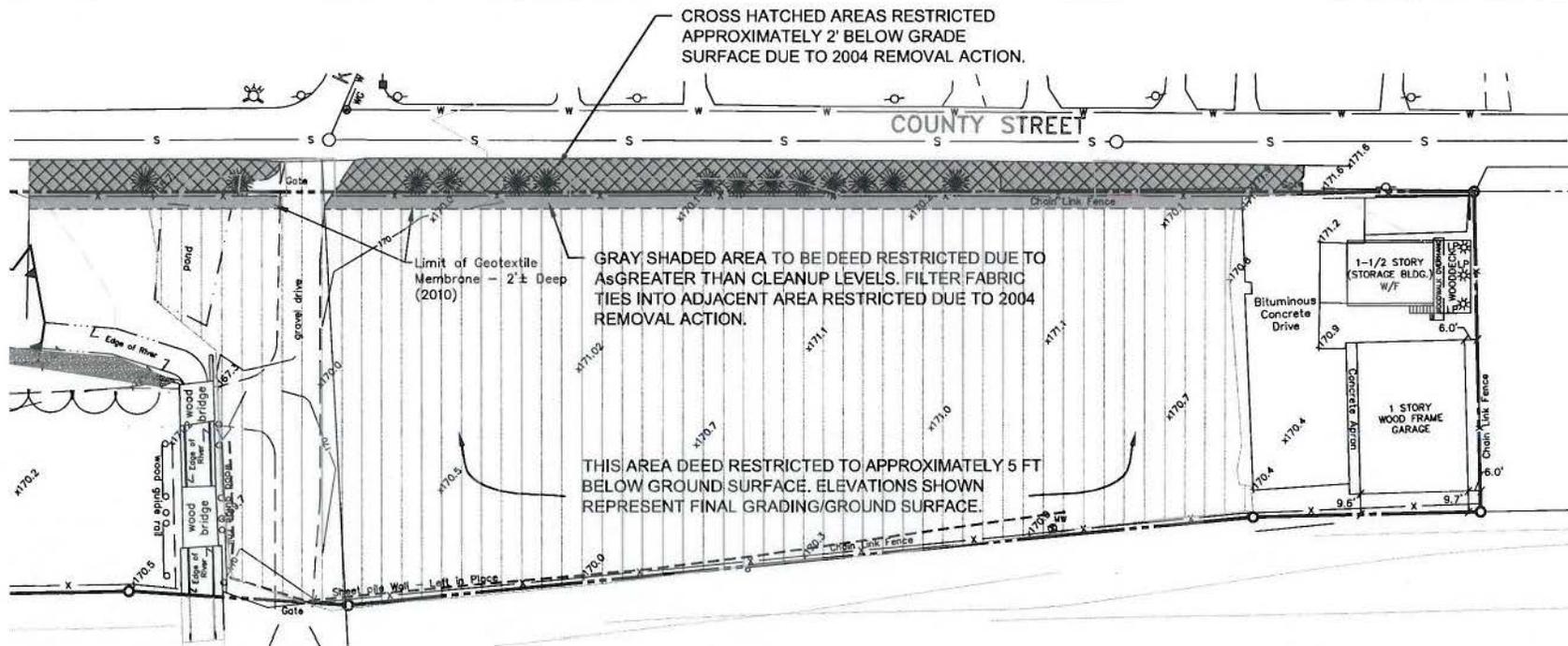
ATTACHMENT B: FIGURES



**Notes:**

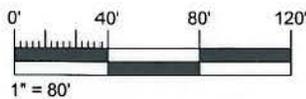
1. Base figure is from "Topographic Survey Depicting Final Grading - Northeast Quadrant" by Conklin & Soroka, Inc., 1484 Highland Avenue Cheshire, Connecticut.

	<b>AMEC Earth &amp; Environmental</b> 502 WEST GERMANTOWN PIKE, SUITE 850 PLYMOUTH MEETING, PENNSYLVANIA 19402		CLIENT LOGO 	CLIENT <b>SEVENSON ENVIRONMENTAL SERVICES, INC.</b>		
	PROJECT <b>HATHEWAY PATTERSON</b> <b>35 COUNTY ROAD MANSFIELD, MASSACHUSETTS</b>		DWN BY: AEW	DATUM: NAD83	DATE: 10 JUNE 2011	
	TITLE <b>EXPLANATION OF SIGNIFICANT DIFFERENCES</b> <b>FIGURE 1</b> <b>SITE LAYOUT</b>		CHK'D BY: HWC	REV. NO.: 0	PROJECT NO: 774840002	
		PROJECTION: MSPCS	SCALE: AS SHOWN	FIGURE No. <b>1</b>		



Notes:

1. This survey and map has been prepared in accordance with the Commonwealth of Massachusetts Regulations, Section 250 (CMR 250), Section 6.02 part 5.
2. North as depicted hereon is based upon Massachusetts State Plane Coordinates of 1983.
3. Elevations as depicted hereon are based upon the National Geodetic Vertical Datum (NGVD of 1988).
4. Topography as depicted hereon was derived from conventional survey methods.
5. The location of underground utilities depicted hereon are approximate and based upon the field location of visible structures and compilation from available mapping from the respective utility companies and municipal agencies. Dig Safe System, Inc. should be contacted at 1-888-DIG-SAFE for utility mark out prior to any excavation.
6. Property is subject to a lease in favor of the Massachusetts Electric Company.
7. Base figure is from "Topographic Survey Depicting Final Grading - Northeast Quadrant" by Conklin & Soroka, Inc., 1484 Highland Avenue Cheshire, Connecticut.



**AMEC Earth & Environmental**

502 WEST GERMANTOWN PIKE, SUITE 850  
PLYMOUTH MEETING, PENNSYLVANIA 19462

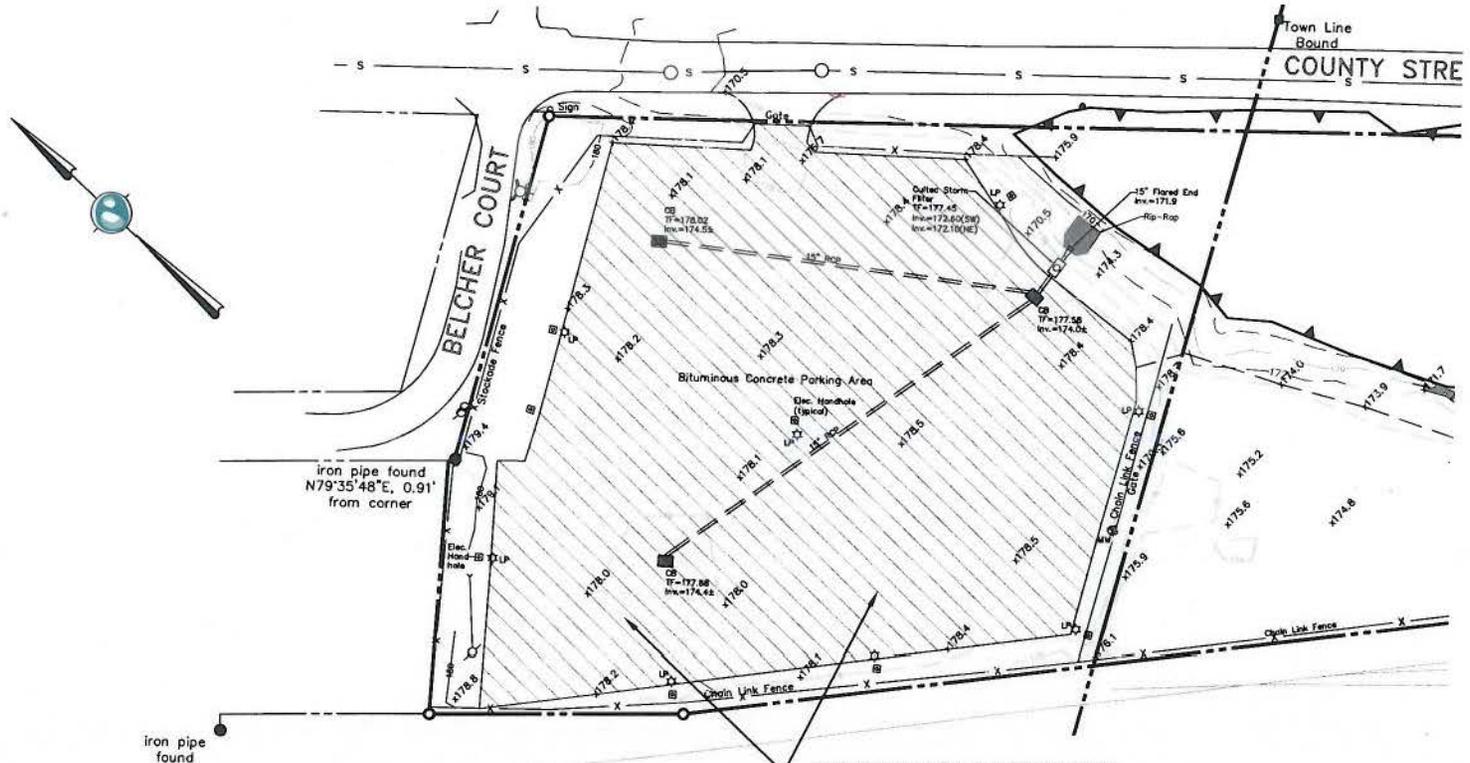


**SEVENSON ENVIRONMENTAL SERVICES, INC.**

PROJECT HATHEWAY PATTERSON  
35 COUNTY ROAD MANSFIELD, MASSACHUSETTS

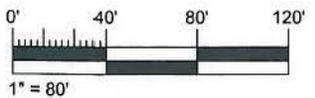
TITLE EXPLANATION OF SIGNIFICANT DIFFERENCES  
FIGURE 2  
RESTRICTED AREA - NE QUADRANT

CLIENT LOGO	CLIENT	
DWN BY: AEW	DATUM: NAD83	DATE: 10 JUNE 2011
CHK'D BY: HWC	REV. NO.: 0	PROJECT NO: 774840002
PROJECTION: MSPCS	SCALE: AS SHOWN	FIGURE No. <b>2</b>



Notes:

1. This survey and map has been prepared in accordance with the Commonwealth of Massachusetts Regulations, Section 250 (CMR 250), Section 6.02 part 5.
2. North as depicted hereon is based upon Massachusetts State Plane Coordinates of 1983.
3. Elevations as depicted hereon are based upon the National Geodetic Vertical Datum (NGVD of 1988).
4. Topography as depicted hereon was derived from conventional survey methods.
5. The location of underground utilities depicted hereon are approximate and based upon the field location of visible structures and compilation from available mapping from the respective utility companies and municipal agencies. Dig Safe System, Inc. should be contacted at 1-888-DIG-SAFE for utility mark out prior to any excavation
6. Property is subject to a lease in favor of the Massachusetts Electric Company.
7. Base figure is from "Topographic Survey Depicting Final Grading - Northeast Quadrant" by Conklin & Soroka, Inc., 1484 Highland Avenue Cheshire, Connecticut.



**AMEC Earth & Environmental**  
 502 WEST GERMANTOWN PIKE, SUITE 850  
 PLYMOUTH MEETING, PENNSYLVANIA 19462



**SEVENSON ENVIRONMENTAL SERVICES, INC.**

PROJECT HATHEWAY PATTERSON  
 35 COUNTY ROAD MANSFIELD, MASSACHUSETTS  
 TITLE EXPLANATION OF SIGNIFICANT DIFFERENCES  
 FIGURE 3  
 RESTRICTED AREA - NW QUADRANT

DWN BY: AEW	DATUM: NAD83	DATE: 10 JUNE 2011
CHK'D BY: HWC	REV. NO.: 0	PROJECT NO: 774840002
PROJECTION: MSPCS	SCALE: AS SHOWN	FIGURE No. <b>3</b>

ATTACHMENT C: Memo from Margaret McDonough to David Lederer regarding Cleanup Levels in the Foxborough Portion of the Site

## MEMO

Subject: Future Use of Foxboro Portion of the Hatheway and Patterson Superfund Site  
To: Dave Lederer, RPM  
From: Margaret McDonough, Risk Assessor  
Date: July 22, 2010

The purpose of this memo is to confirm that 16 mg/kg arsenic in soil is protective for:

- the future use of the 1.77 acre portion of the Hatheway and Patterson "Process Area" that is located in the Town of Foxborough as a parking lot, and
- current adjoining residential property

The 1.77 acre portion of the approximately 12-acre area included in the Baseline Risk Assessment as the "Process Area" is located in Foxborough. The remainder of the area is located in Mansfield. The portion in Foxborough is currently unused and is believed to have been used in the past for wood storage only. At the time of the ROD, the Town of Foxborough indicated that it had not determined the future use of the area, and, therefore, EPA assumed unlimited (residential) use and set a cleanup level for arsenic accordingly. Subsequently, in July, 2007, the Town of Foxborough provided documentation that the intended future use is a parking area, and acknowledged their understanding of the need for institutional controls. Under this land use, there will be a small portion of land adjoining the western boundary of the site that will be left unpaved. I have calculated risks associated with exposure to 16 mg/kg arsenic in soil for a town worker or older child trespasser who may be exposed to soil in the unpaved area. The exposure assumptions are the same as used in the baseline risk assessment for these two receptors. The estimated risks are presented in Table 1 below.

Also, regarding the neighboring residential parcel, I have also calculated the risk associate with residential exposure assuming exposure occurs to both a young child and an adult consistent with the baseline risk assessment. Potential risks to a resident are presented in Table 1.

Pentachlorophenol (PCP) and dioxin were not detected at levels of concern in this 1.77 acre parcel. The maximum concentrations of PCP and dioxin were 0.28 mg/kg and 0.20 ug/kg, respectively.

Although the arsenic cleanup level is site-specific, it is worth noting that in its publication: "Technical Update: Background Levels of Polycyclic Aromatic Hydrocarbons and Metals in Soil", May 2002, Massachusetts DEP identifies the 90<sup>th</sup> percentile concentration of natural arsenic in soil as 20 ppm.

The calculated risks are within EPA's acceptable risk range of  $10^{-4}$  to  $10^{-6}$  for Superfund cleanups.

**Table 1<sup>1</sup>**  
**Risk at Cleanup Level of 16 mg/kg Arsenic in Soil**

<b>Potentially Exposed Individuals</b>	<b>Cancer Risk</b>	<b>Hazard Index</b>
Town Worker	2E-06	3E-02
Older Child Trespasser	2E-06	3E-02
Resident	2E-05	3E-01

<sup>1</sup>Attachments 1-3 provide the equations and parameter values used.

**Attachments**

# Site-specific

## Worker Equation Inputs for Soil

Variable	Value
Target cancer risk (TR) - unitless	1.0E-6
Target hazard quotient (THQ) - unitless	1
Averaging time (AT) - days	365
Exposure frequency (EF) - days	52
Exposure duration (ED) - years	25
Life Time (LT)	70
Exposure Time (ET)	8
Adult body weight ( $BW_w$ ) - kg	70
Worker soil ingestion rate ( $IR_w$ ) - mg/day	100
Exposed skin surface ( $SA_w$ ) - $cm^2/day$	3300
Soil-to-skin adherence factor ( $AF_w$ ) - $mg/cm^2$	0.2

# Site-specific

## Worker Risk-Based Screening Levels for Soil

ca=Cancer, nc=Noncancer, ca\* (Where nc SL < 100 x ca SL),

ca\*\* (Where nc SL < 10 x ca SL),

max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat

Chemical	CAS Number	Ingestion SF (mg/kg-day) <sup>-1</sup>	SFO Ref	Inhalation Unit Risk (ug/m <sup>3</sup> ) <sup>-1</sup>	IUR Ref	Chronic RfD (mg/kg-day)	RfD Ref	Chronic RfC (mg/m <sup>3</sup> )	RfC Ref	GIABS	ABS	Volatilization Factor (m <sup>3</sup> /kg)	Soil Saturation Concentration (mg/kg)
Arsenic, Inorganic	7440-38-2	1.50E+00	I	4.30E-03	I	3.00E-04	I	1.50E-05	C	1	0.03	-	-

Chemical	Particulate Emission Factor (m <sup>3</sup> /kg)	Ingestion SL TR=1.0E-6 (mg/kg)	Dermal SL TR=1.0E-6 (mg/kg)	Inhalation SL TR=1.0E-6 (mg/kg)	Carcinogenic SL TR=1.0E-6 (mg/kg)	Ingestion SL HQ=1 (mg/kg)	Dermal SL HQ=1 (mg/kg)	Inhalation SL HQ=1 (mg/kg)	Noncarcinogenic SL HI=1 (mg/kg)	Screening Level (mg/kg)
Arsenic, Inorganic	1.36E+09	9.17E+00	4.63E+01	1.86E+04	7.65E+00	1.47E+03	7.44E+03	4.29E+05	1.23E+03	7.65E+00 ca

# Site-specific

## Worker Equation Inputs for Ambient Air

Variable	Value
Target cancer risk (TR) - unitless	1.0E-6
Target hazard quotient (THQ) - unitless	1
Averaging time (AT) - days	365
Exposure frequency (EF) - days	250
Exposure duration (ED) - years	25
Life Time (LT)	70
Exposure time (ET) - hours	8

Output generated 20JUL2010:10:25:37

## Site-specific

### Worker Risk-Based Screening Levels for Ambient Air

ca=Cancer, nc=Noncancer, ca\* (Where nc SL < 100 x ca SL),

ca\*\* (Where nc SL < 10 x ca SL),

max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat

Chemical	CAS Number	Inhalation Unit Risk (ug/m <sup>3</sup> ) <sup>-1</sup>	IUR Ref	Chronic RfC (mg/m <sup>3</sup> )	RfC Ref	Carcinogenic SL TR=1.0E-6 (ug/m <sup>3</sup> )	Noncarcinogenic SL HI=1 (ug/m <sup>3</sup> )	Screening Level (ug/m <sup>3</sup> )
Arsenic, Inorganic	7440-38-2	4.30E-03	I	1.50E-05	C	2.85E-03	6.57E-02	2.85E-03 ca*

# Site-specific

## Worker Equation Inputs for Soil

Variable	Value
Target cancer risk (TR) - unitless	1.0E-6
Target hazard quotient (THQ) - unitless	1
Averaging time (AT) - days	365
Exposure frequency (EF) - days	78
Exposure duration (ED) - years	10
Life Time (LT)	70
Exposure Time (ET)	8
Adult body weight (BW <sub>w</sub> ) - kg	40
Worker soil ingestion rate (IR <sub>w</sub> ) - mg/day	100
Exposed skin surface (SA <sub>w</sub> ) - cm <sup>2</sup> /day	3300
Soil-to-skin adherence factor (AF <sub>w</sub> ) - mg/cm <sup>2</sup>	0.2

Output generated 20JUL2010:10:07:55

# Site-specific

## Worker Risk-Based Screening Levels for Soil

ca=Cancer, nc=Noncancer, ca\* (Where nc SL < 100 x ca SL),

ca\*\* (Where nc SL < 10 x ca SL),

max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat

Chemical	CAS Number	Ingestion SF (mg/kg-day) <sup>-1</sup>	SFO Ref	Inhalation Unit Risk (ug/m <sup>3</sup> ) <sup>-1</sup>	IUR Ref	Chronic RfD (mg/kg-day)	RfD Ref	Chronic RfC (mg/m <sup>3</sup> )	RfC Ref	GIABS	ABS	Volatilization Factor (m <sup>3</sup> /kg)	Soil Saturation Concentration (mg/kg)
Arsenic, Inorganic	7440-38-2	1.5E+00	U	4.3E-03	U	3.0E-04	U	1.5E-05	U	1	0.03	-	-

Chemical	Particulate Emission Factor (m <sup>3</sup> /kg)	Ingestion SL TR=1.0E-6 (mg/kg)	Dermal SL TR=1.0E-6 (mg/kg)	Inhalation SL TR=1.0E-6 (mg/kg)	Carcinogenic SL TR=1.0E-6 (mg/kg)	Ingestion SL HQ=1 (mg/kg)	Dermal SL HQ=1 (mg/kg)	Inhalation SL HQ=1 (mg/kg)	Noncarcinogenic SL HI=1 (mg/kg)	Screening Level (mg/kg)
Arsenic, Inorganic	1.36E+09	8.74E+00	4.41E+01	3.11E+04	7.29E+00	5.62E+02	2.84E+03	2.86E+05	4.68E+02	7.29E+00 ca*

## Site-specific

### Worker Equation inputs for Ambient Air

Variable	Value
Target cancer risk (TR) - unitless	1.0E-6
Target hazard quotient (THQ) - unitless	1
Averaging time (AT) - days	365
Exposure frequency (EF) - days	250
Exposure duration (ED) - years	25
Life Time (LT)	70
Exposure time (ET) - hours	8

## Site-specific

### Worker Risk-Based Screening Levels for Ambient Air

ca=Cancer, nc=Noncancer, ca\* (Where nc SL < 100 x ca SL),

ca\*\* (Where nc SL < 10 x ca SL),

max=SL exceeds ceiling limit (see User's Guide), ssi=SL exceeds csat

Chemical	CAS Number	Inhalation Unit Risk (ug/m <sup>3</sup> ) <sup>-1</sup>	IUR Ref	Chronic RfC (mg/m <sup>3</sup> )	RfC Ref	Carcinogenic SL TR=1.0E-6 (ug/m <sup>3</sup> )	Noncarcinogenic SL HI=1 (ug/m <sup>3</sup> )	Screening Level (ug/m <sup>3</sup> )
Arsenic, Inorganic	7440-38-2	4.3E-03	U	1.5E-05	U	2.85E-03	6.57E-02	2.85E-03 ca*

## Site-specific

### Resident Equation Inputs for Soil

Variable	Value
Target cancer risk (TR) - unitless	1.0E-6
Target hazard quotient (THQ) - unitless	1
Averaging time (AT) - days	365
Exposure frequency (EF) - days	150
Exposure duration (ED) - years	30
Mutagenic exposure duration (ED <sub>0-2</sub> ) - years	2
Mutagenic exposure duration (ED <sub>2-6</sub> ) - years	4
Mutagenic exposure duration (ED <sub>6-16</sub> ) - years	10
Mutagenic exposure duration (ED <sub>16-30</sub> ) - years	14
Life Time (LT)	70
Exposure Time (ET)	24
Body weight - adult (BW <sub>a</sub> ) - kg	70
Body weight - children 1-6 yr (BW <sub>c</sub> ) - kg	15
Exposure duration - child (ED <sub>c</sub> ) - years	6
Soil ingestion - adult (IRS <sub>a</sub> ) - mg/day	100
Soil ingestion - child (IRS <sub>c</sub> ) - mg/day	200
Exposed skin surface - adult (SA <sub>a</sub> ) - cm <sup>2</sup> /day	5700
Exposed skin surface - child (SA <sub>c</sub> ) - cm <sup>2</sup> /day	2800
Soil-to-skin adherence factor - adult (AF <sub>a</sub> ) - mg/cm <sup>2</sup>	0.07
Soil-to-skin adherence factor - child (AF <sub>c</sub> ) - mg/cm <sup>2</sup>	0.2
Ingestion Factor (IFS <sub>adi</sub> ) - mg-year/kg-day	114.28571429
Dermal Factor (DFS <sub>adi</sub> ) - mg-year/kg-day	360.8
Mutagenic Ingestion Factor (IFSM <sub>adi</sub> ) - mg-year/kg-day	489.52380952
Mutagenic Dermal Factor (DFSM <sub>adi</sub> ) - mg-year/kg-day	1445.4666667

# Site-specific

## Resident Risk-Based Screening Levels for Soil

ca=Cancer, nc=Noncancer, ca\* (Where nc SL < 100 x ca SL),

ca\*\* (Where nc SL < 10 x ca SL),

max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat

Chemical	CAS Number	Ingestion SF (mg/kg-day) <sup>-1</sup>	SFO Ref	Inhalation Unit Risk (ug/m <sup>3</sup> ) <sup>-1</sup>	IUR Ref	Chronic RfD (mg/kg-day)	RfD Ref	Chronic RfC (mg/m <sup>3</sup> )	RfC Ref	GIABS	ABS	Volatilization Factor (m <sup>3</sup> /kg)	Soil Saturation Concentration (mg/kg)
Arsenic, Inorganic	7440-38-2	1.5E+00	U	4.3E-03	U	3.0E-04	U	1.5E-05	U	1	0.03	-	-

Chemical	Particulate Emission Factor (m <sup>3</sup> /kg)	Ingestion SL (mg/kg) TR=1.0E-6	Dermal SL (mg/kg) TR=1.0E-6	Inhalation SL (mg/kg) TR=1.0E-6	Carcinogenic SL (mg/kg) TR=1.0E-6	Ingestion SL (mg/kg) HQ=1	Dermal SL (mg/kg) HQ=1	Inhalation SL (mg/kg) HQ=1	Noncarcinogenic SL (mg/kg) HI=1	Screening Level (mg/kg)
Arsenic, Inorganic	1.36E+09	9.94E-01	1.05E+01	1.79E+03	9.07E-01	5.48E+01	6.52E+02	4.96E+04	5.05E+01	9.07E-01 ca*

## Site-specific

### Resident Equation Inputs for Ambient Air

Variable	Value
Target cancer risk (TR) - unitless	1.0E-6
Target hazard quotient (THQ) - unitless	1
Averaging time (AT) - days	365
Exposure time (ET) - hours/day	24
Exposure frequency (EF) - days	350
Exposure duration (ED) - years	30
Mutagenic Exposure duration (ED <sub>0-2</sub> ) - years	2
Mutagenic Exposure duration (ED <sub>2-6</sub> ) - years	4
Mutagenic Exposure duration (ED <sub>6-16</sub> ) - years	10
Mutagenic Exposure duration (ED <sub>16-30</sub> ) - years	14
Life Time (LT)	70

## Site-specific

### Resident Risk-Based Screening Levels for Ambient Air

ca=Cancer, nc=Noncancer, ca\* (Where nc SL < 100 x ca SL),

ca\*\* (Where nc SL < 10 x ca SL),

max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat

Chemical	CAS Number	Inhalation Unit Risk (ug/m <sup>3</sup> ) <sup>-1</sup>	IUR	Chronic RfC Ref (mg/m <sup>3</sup> )	RfC Ref	Carcinogenic SL TR=1.0E-6 (ug/m <sup>3</sup> )	Noncarcinogenic SL HI=1 (ug/m <sup>3</sup> )	Screening Level (ug/m <sup>3</sup> )
Arsenic, Inorganic	7440-38-2	4.3E-03	U	1.5E-05	U	5.66E-04	1.56E-02	5.66E-04 ca*

# Site-specific

## Resident Equation Inputs for Tap Water

Variable	Value
Target cancer risk (TR) - unitless	1.0E-6
Target hazard quotient (THQ) - unitless	1
Averaging time (AT) - days	365
Exposure frequency (EF) - days	350
Exposure duration (ED) - years	30
Mutagenic Exposure duration (ED <sub>0-2</sub> ) - years	2
Mutagenic Exposure duration (ED <sub>2-6</sub> ) - years	4
Mutagenic Exposure duration (ED <sub>6-16</sub> ) - years	10
Mutagenic Exposure duration (ED <sub>16-30</sub> ) - years	14
Life Time (LT)	70
Exposure Time (ET) hours/day	24
Body Weight - adult (BW <sub>a</sub> ) - kg	70
Body Weight - children 1-6 yr (BW <sub>c</sub> ) - kg	15
Exposure duration - child (ED <sub>c</sub> ) - years	6
Water Ingestion - adult (IRW <sub>a</sub> ) - L/day	2
Water Ingestion - child (IRW <sub>c</sub> ) - L/day	1
Volatilization factor of Andelman (K) - L/m <sup>3</sup>	0.5
Ingestion Factor - L-year/kg-day	1.0857142857
Mutagenic Ingestion Factor - L-year/kg-day	3.3904761905

# Site-specific

## Resident Risk-Based Screening Levels for Tap Water

ca=Cancer, nc=Noncancer, ca\* (Where nc SL < 100 x ca SL),

ca\*\* (Where nc SL < 10 x ca SL),

max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat

Chemical	CAS Number	Ingestion SF (mg/kg-day) <sup>-1</sup>	SFO Ref	Inhalation Unit Risk (ug/m <sup>3</sup> ) <sup>-1</sup>	IUR Ref	Chronic RfD (mg/kg-day)	RfD Ref	Chronic RfC (mg/m <sup>3</sup> )	RfC Ref	MCL ug/L
Arsenic, Inorganic	7440-38-2	1.5E+00	U	4.3E-03	U	3.0E-04	U	1.5E-05	U	1.0E+01

Chemical	Ingestion SL TR=1.0E-6 (ug/L)	Inhalation SL TR=1.0E-6 (ug/L)	Carcinogenic SL TR=1.0E-6 (ug/L)	Ingestion SL HQ=1 (ug/L)	Inhalation SL HQ=1 (ug/L)	Noncarcinogenic SL HI=1 (ug/L)	Screening Level (ug/L)
Arsenic, Inorganic	4.48E-02	-	4.48E-02	1.10E+01	-	1.10E+01	4.48E-02 ca