



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
ONE CONGRESS STREET, SUITE 1100
BOSTON, MA 02114-2023

MEMORANDUM


DATE: April 29, 2002

SUBJ: Request for a Removal Action III
Fisherville Mill Site
Grafton, Massachusetts - Action Memorandum

FROM: Janis K. Tsang, P.E., On-Scene Coordinator
Site Evaluation and Response Section I

A handwritten signature in black ink, appearing to read "Janis K. Tsang", is written over the "FROM" line.

THRU: David McIntyre, Chief
Site Evaluation and Response Section I

TO:  Patricia L. Meaney, Director
Office of Site Remediation and Restoration

A handwritten signature in black ink, appearing to read "Patricia L. Meaney", is written over the "TO" line.

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of the proposed removal action described herein for the Fisherville Mill Site, ("Site") in Grafton, Massachusetts. Hazardous substances/pollutants/contaminants present in the groundwater at the Site, if not addressed by implementing the response actions selected in this Action Memorandum, will continue to pose a threat to human health and the environment.

II. SITE CONDITIONS AND BACKGROUND

SITE ID #: 017B

CERCLIS ID #: MASFN0102999

Category of Removal: Time-critical

A. SITE DESCRIPTION

1. Background

The Fisherville Mill Site was used from 1882 until 1986 by different industries including textile (cotton spinning and weaving) manufacturing; manufacturing of steel racks, machine parts, stamps and lawn furniture, and also for warehouse storage.

The Site is contaminated with petroleum, chlorinated volatile organic compounds, asbestos, and heavy metals and had been undergoing a state-lead cleanup. The Massachusetts Department of Environmental Protection (MA DEP) had installed a groundwater treatment system at the Site to

remediate the petroleum and trichloroethylene (TCE) contaminated groundwater.

In August 1999, there was a major multiple-alarm fire at the Fisherville Mill building which destroyed the entire complex including MA DEP's treatment system. EPA conducted an approximately \$554,000 emergency response action to address all off-site properties that had been impacted by the asbestos-containing fire debris.

From June 12, 2000 to November 22, 2000, EPA, MA DEP and Central Massachusetts Development Economic Authority (CMEDA) jointly performed a second removal action at the Site to address the surface contamination resulting from the destruction by fire of the facility. EPA contractors loaded, and MA DEP/CMEDA contractors transported and disposed of, approximately 3,400 tons of asbestos-containing material (ACM) to offsite disposal facilities. An estimated 300 tons of asbestos debris removed from the former boiler room area were transported to an offsite disposal facility funded by MA DEP. Approximately 3,226 tons of ash and building debris, 111 gallons of PCB-contaminated oil, three PCB-contaminated transformer carcasses, and four non-PCB transformers were transported off site for disposal funded by EPA. MA DEP funded offsite disposal of 94 gallons of mineral oil.

On January 22, 2001, South Grafton Water District (SGWD) notified MA DEP that samples collected from SGWD Well #3 and MW-32 (center of peninsula) in November 2000 detected TCE at concentrations of 0.7 and 1.5 ug/l (part-per-billion (ppb)) respectively. TCE was not detected in Well #3 during previous or subsequent monthly sampling. SGWD uses Well #3 on an as-needed basis during the dry summer and fall months. SGWD operated Well #3 from September 28 to November 14, 2000. Post November 2000 sampling results showed TCE concentration in MW-32 decreased gradually. These data suggested that under pumping conditions, the chlorinated VOC plume may have been shifted to the southwest toward well #3. MA DEP did not have sufficient data to fully define the chlorinated VOC source area, the migration pathway between the site and Well #3, or the need for a barrier between the site and the SGWD wells, or to install a temporary treatment system to treat the source area and plume.

On March 1, 2001, MA DEP, SGWD and CMEDA met and agreed that additional wells were needed in order to evaluate the situation. Due to the fact that there were no resources available to fund the additional well installation and groundwater assessment in a timely fashion, on April 18, 2001, MA DEP submitted a written request to EPA to assist with the installation of new wells, the groundwater assessment, and implementation of a time-critical removal action, if warranted.

2. Removal Site Evaluation

From May 2001 to December 2001, EPA conducted the following groundwater investigations:

- EPA installed a number of transducer data loggers in miscellaneous well locations which automatically measure water/pressure and groundwater temperature at set time intervals for a period of several months to establish background water level data.
- EPA installed a total of 13 monitoring wells: 5 by the South Grafton Water District Pump

Station #3; 4 on the peninsula south of Route 122A; and 4 in the former mill building site. Split spoon samples at various depth were collected from 6 wells for VOC screening analysis. All well locations were recorded with a Global Positioning System (GPS), then surveyed and documented.

- In order to determine the hydrologic environments that could induce the migration of the groundwater VOC contaminant plume from the former mill site toward SGWD Well #3 located downgradient from the site, the drawdown effect of increased pumping at SGWD #3 was investigated. Drawdown pumping conditions were evaluated by operating the SGWD Well #3 under two different usage rates: (i) pumping for 4 hours per day for 5 days; and (ii) 8 hours per day for 5 days. The 4-hour and 8-hour pumping tests were conducted in a period of low rainfall to simulate late summer/early fall pumping conditions when SGWD Well #3 would most likely be utilized. During the 4- and 8-hour pumping tests, SGWD Well #3 was pumped at approximately 450 gallons per minute (gpm). Manual water level measurements were collected from selected monitoring well locations during the pump tests to monitor the changes in water levels.
- Thirty-five (35) monitoring wells were sampled and analyzed for VOCs, nitrate/nitrite, sulfate, and dissolved iron and manganese.

The results of the hydrogeologic investigations showed the following:

- 76 subsurface soil samples collected during the monitoring well installation from May 29 to June 7, 2001 showed the following:

SAMPLING LOCATION	CONTAMINANT	CONCENTRATION
At the surface (0-2 feet)	cis 1,2-dichloroethylene (DCE)	800 ppb
	TCE	33,000 ppb
	tetrachloroethylene (PCE)	1,100 ppb
On top of bedrock [31 - 32 feet below ground surface (bgs)]	TCE	1,400 ppb
	PCE	130 ppb

- The analytical results confirm 1997 studies conducted by Handex that suggested a concentrated VOC source may be present just above the bedrock surface [possible dense non-aqueous phase liquid (DNAPL)] at the western end of the former mill building. The former loading dock area and a drywell located just north of the northwest corner of the former mill foundation are believed to be the predominate sources of the VOC groundwater plume migrating south toward the peninsula. The TCE detected in the shallow soil samples (0 to 2 ft and 2 to 4 ft) from a boring beneath the concrete foundation floor (estimated 2 - 4 inches thick) is assumed to be from the same source

- The results of the August 2001 groundwater sampling events indicated the presence of 12 VOCs:

1,1,1-trichlorethane (TCA),	methylene chloride,
1,1-DCE,	PCE,
1,1-dichloroethane (DCA),	trans 1,2-DCE,
acetone,	TCE,
chloroform,	vinyl chloride,
methyl tert butyl ether (MTBE), and	cis 1,2-DCE.

The analytical results of the comprehensive monitoring well sampling support previous Handex investigations at the site that indicated the VOC plume originates near the western end of the former mill building and moves south-southeast where it discharges to the Blackstone River along the eastern edge of the peninsula. Although it appears that the main body of the plume discharges to the Blackstone River, prolonged pumping of SGWD Well #3 under dry conditions can alter the plume migration pattern such that low concentrations of VOCs can be pulled westward, towards the Blackstone Canal and SGWD Well #3.

On October 19, 2001, representatives from State Senator Glodis' Office, MA DEP, CMEDA, SGWD, EPA and WESTON held a meeting at MADEP Central Regional Office to discuss the hydrogeologic data collected to date and three possible contaminant pathways from the former mill site toward the SGWD #3 Well. The three possible contaminant pathways discussed were: (i) contaminants transport from southeast to northwest; (ii) transport through fractured bedrock; and, (iii) transport above screened intervals in sentinel wells adjacent to SGWD Well #3.

Pathway iii is likely the contaminant pathway due to the drawdown from pumping SGWD Well #3 resulting in a reversal in the vertical gradient west of Blackstone Canal toward SG-7D and SGWD Well #3. It appears that under prolonged pumping/usage of SGWD Well #3, a reversal of vertical hydraulic gradients is likely in the vicinity of the Blackstone Canal. Such a reversal of gradient would allow impacted surface water in the canal and shallow groundwater to move towards SGWD Well #3. In addition, the lowering of groundwater levels beneath the canal could allow groundwater from the southern end of the peninsula to move past the canal and ultimately into SGWD Well #3.

On December 7, 2001, MA DEP, CMEDA, SGWD, Town of Grafton, WESTON and EPA held a second meeting at MADEP Central Regional Office to review the results from the MADEP October 2001 sampling and discuss methods, approaches and/or treatment technologies for treating source area or contaminant plumes or both. Sources of funding and technical expertise were discussed. Analytical results from MA DEP indicated a detection of 1.7 ppb of TCE in SG-6, located on the west side of the canal. All parties agreed that given existing conditions and

current utilization of Well #3 by SGWD, that a treatability study for the application/injection of an oxidation agent (potassium permanganate) in the source area was critical for the site. Subsequently, the OSC decided to perform the bench scale chemical oxidation test in light of CMEDA's funding uncertainty and the urgency of the situation; especially in the upcoming dry summer months.

Based on all of the above, the OSC determined that a removal action is warranted to eliminate the drinking water threat posed by the VOC contamination source areas on the Site.

3. Physical Location and Site Characteristics

The Site is located at 60 Main Street (Route 122A) in Grafton, Massachusetts at latitude 42°10' 40" north and longitude 71°41' 25" west. The approximately 16.2-acre site is bounded to the North by Fisherville Pond, to the East by the Blackstone River, to the South by Route 122A, and to the West by private residences. SGWD utilizes two overburden water supply wells, approximately 1000 feet to the south, on the other side of the Blackstone River (designated as an American Heritage River) to supply domestic water for area residences. The surrounding area is a mix of residential, commercial and industrial properties.

The August 1999 fire destroyed a large 330,000-square-foot mill building leaving a stone foundation and a full concrete-floored basement. Other features such as a former guard house, an office building, a two-bay maintenance garage, a former warehouse, a former storage platform, a former electric transformer building remain on-site after the fire. Miscellaneous debris piles, some of which contain asbestos scattered throughout the Site outside the main mill foundation.

The topography of the site is relatively flat and generally slopes to the south toward the confluence of the Blackstone Canal and Blackstone River. Groundwater seeps along the the canal north and east of the SGWD Well #3 were noted during site activities. The groundwater seeps were observed to maintain a low flow of surface water in the canal south of Main Street (Route 122A) throughout the dryer late summer months.

Recent changes in groundwater hydrology have occurred in the vicinity of the site caused by the fire at the former mill building and the subsequent destruction of the pump and treat system installed by MADEP and by the degradation of the dam system along the Blackstone River. These changes may have allowed the contaminant plume originating from the former mill site to migrate toward SGWD Well #3 in response to pumping. The SGWD Well #3 is under increased risk during late summer/early fall when groundwater levels are at their seasonal low and the well is used to supplement the public water supply.

The findings of the 2001 EPA investigation which is consistent with the 1997 studies by Handex noted the following:

- Overburden deposits of primarily coarse sand and gravel with a dense sand, silt, and cobble layer was encountered near the bedrock interface in the vicinity of the foundation of the former mill building north of Main Street (Route 122A).

- Overburden deposits of primarily fine sand and silt with fine gravel was located on the peninsula south of Main Street (Route 122A).
- A narrow peat layer (approximately 2-6 inches) was observed in borings north and south of Main Street.

The estimated bedrock contours show that bedrock generally slopes to the southeast toward the Blackstone River, with a bowl-shaped depression evident sloping toward the center of the peninsula at the location of bedrock monitoring well MW-31R. Depth to bedrock was recorded to be approximately 60 ft bgs at MW-31R. Historical water quality results have indicated that VOCs in bedrock wells within the foundation of the former mill building had rapidly migrated to bedrock well MW-31R. However, little bedrock elevation data exists for the southern area of the peninsula.

The Upper Blackstone Waste Water Treatment Plant (UBWWTP) has a permitted discharge into the Blackstone River approximately four miles upstream of the Fisherville Mill property in Millbury, Massachusetts. The discharge data from the UBWWTP for August 2001 was superimposed on water level data from selected monitoring wells and the Blackstone River surface water measurement location SW-3A. The data shown for August 2001, indicates an approximate seven hour time lag exists between discharge at the treatment plant and increase in water levels in the Blackstone River near Fisherville Mill.

4. Release or Threatened Release into the Environment of a Hazardous Substance or Pollutant or Contaminant

The groundwater at the Site is predominantly contaminated with TCE. According to the MA DEP groundwater analytical data, other contaminants including tetrachloroethene (PCE), cis 1,2-dichloroethene (cis 1,2-DCE), trans 1,2-dichloroethene (trans 1,2-DCE), 1,1,1-trichloroethane (TCA), 1,2-dichloroethene (1,2-DCE), 1,1-dichloroethane (1,1-DCA) and vinyl chloride were also detected in the groundwater.

These compounds are hazardous substances/pollutants/contaminants as defined by Section 101(14) of CERCLA.

5. NPL Status

The Site is not currently listed on the National Priorities List (NPL). It has neither received a Hazard Ranking System rating nor is it being evaluated by the Agency for Toxic Substances and Disease Registry (ATSDR).

B. OTHER ACTIONS TO DATE

1. Previous Actions Conducted by State and Local Officials

Since 1977, MA DEP has conducted numerous inspections of the Site and has issued orders to previous property owner to address several environmental issues at the Site, including: a discharge of number 6 fuel oil from former underground storage tanks (USTs) located on the western side of the building to the Blackstone Canal and the Blackstone River; and the presence of volatile organic compounds (VOCs - primarily TCE) into the groundwater. Several studies conducted at the site confirmed the presence of VOCs in subsurface soils and groundwater on site. In October 1996, the MA DEP installed a groundwater recovery and treatment system which consisted of an air stripper and an activated carbon unit to address the groundwater contamination. This groundwater recovery and treatment system was later on destroyed in the August 1999 multiple-alarm fire.

C. STATE ROLES

EPA and MA DEP are working closely together as partners in addressing the site. MA DEP has already spent over \$1,000,000 to investigate and address the contaminated groundwater. In the June 2000 Removal Action, MA DEP funded the transportation and disposal of an estimated total of 300 tons of asbestos debris removed from the former boiler room area and offsite disposal of 94 gallons of mineral oil. In addition to the monthly groundwater sampling, MA DEP provided assistance to EPA in planning and conducting the groundwater investigations and acted a liaison between SGWD, local conservation commission and other state authorities.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

A. THREATS TO PUBLIC HEALTH OR WELFARE

Hazardous substances/pollutants/contaminants at this Site, as defined by Section 101(14) of CERCLA, include TCE, PCE, TCA, 1,2-DCE, 1,1-DCA, and vinyl chloride. Pathways of exposure to the above hazardous substances/pollutants/contaminants are inhalation, ingestion, absorption and direct contact.

TCE is a known carcinogen. Exposure to TCE can cause nausea, somnolence, tremors, vomiting, irritation to eyes, dermatitis and cardiac arrhythmias. TCA is a known carcinogen. Exposure to TCA can cause irritation to nose and eyes and damages to liver, kidney and central nervous system. Exposure to 1,2-DCE can cause irritation to eyes and respiratory system and damage to central nervous system. Exposure to 1,1-DCA can cause depression, damages to central nervous system, liver and kidney. 1,1-DCA is also a skin irritant. Vinyl chloride is a known carcinogen. Exposure to vinyl chloride can cause damages to liver, central nervous system, blood, respiratory system and lymphatic system.

The migration of the TCE and other VOCs plume threatens the drinking water supply from the

Town's two down gradient wells and poses a potential public health threat because people could be exposed to the contamination via direct contact with contaminated water during recreational activities and via ingestion of contaminated drinking water should the drinking water supply well be contaminated.

According to the South Grafton Water District, the SGWD has shut down one of the two drinking water wells and is reducing use of the second well due to the potential threat posed by the plume of contamination moving from the Site. However, in the dry summer months, the SGWD would normally have to run both wells in order to meet the District's overall water demand, since the District's other drinking water sources have limited capacity to meet the District's peak water needs. SGWD operated Well #3 from September 28 to November 14, 2000. In November 2000, SGWD detected 0.7 ppb TCE in municipal well #3.

B. THREATS TO THE ENVIRONMENT

As stated previously, the source of the TCE contamination is located in the building foundation area (predominantly on the northwest portion of the Site) and could continue to be released to the environment (the River) due to weather conditions.

Hazardous substances/pollutants/contaminants found in the groundwater onsite could continue to migrate toward the Blackstone River and the drinking water wells, posing a serious environmental and public health threat.

IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances/pollutants/contaminants from this Site, if not addressed by implementing the response actions selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. PROPOSED ACTIONS

1. Proposed action description

Proposed actions include, but are not limited to, the following:

- Conducting treatability study and field study to evaluate treatment technologies including, but not limited to, chemical oxidation for treating TCE and other chlorinated VOCs. The method selected will eliminate the VOC/DNAPL source and subsequently eliminate the threat to public drinking water supply posed by contaminated groundwater plume.
- Coordinating a meeting with MA DEP, CMEDA, the Town, WESTON and ERRS

contractor to discuss the removal logistics and removal work plan.

- Implementing interim water treatment including, but not limited to, installing portable dam(s) at various locations along the Blackstone Canal, monitoring the hydrologic conditions and/or installing temporary well head treatment.
- Conducting topographical (land and aerial) survey to establish base line reference (e.g., elevation) for removal planning, if necessary.
- Conducting field survey/evaluation and/or literature research for rock contour plan, if necessary.
- Conducting additional sampling including, but not limited to conducting soil gas survey to further delineate the nature and the extent-of-contamination on-site and installation of additional monitoring wells. Off-site activities may include sediment and water sampling in the Blackstone River, Fisherville Pond and Blackstone Canal.
- Developing engineer-designed treatment plan utilizing the treatment technology evaluated in the above to treat the source areas and/or control the contaminant plume.
- Implementing the treatment plan in accordance with the engineered design and specifications. EPA, MA DEP and SGWD agreed that the objective of the treatment is to reduce the TCE contaminant level by approximately two orders of magnitude within a twelve-month period. If the results of the selected treatment does not accomplish the above-mentioned objective within the 12 months, EPA will review other options including reviewing whether the project should remain within the scope of the Removal Program.
- Conducting groundwater monitoring while implementing the treatment plan.
- Perform applicable air monitoring.
- Perform applicable environmental sampling and monitoring including soil and/or water testing during the removal.
- Perform land survey and document the Site conditions with as-built drawings.

The OSC will coordinate with MA DEP, CMEDA, the town of Grafton, United State Army Corps of Engineers (USACE) and EPA Environmental Response Team (EPA/ERT) throughout the removal.

2. Community Relations

Upon the approval of the Action Memorandum, the OSC will coordinate with the EPA Public Relations Office to prepare and implement the following community relations activities depending upon Agency's resources and/or community preferences:

- publish a press release;
- conduct a public meeting; and,
- publish removal newsletters.

The OSC will also be available by appointment to meet with citizens and news reporters or by phone to answer their questions regarding the removal action.

2. Description of alternative technologies

The OSC is currently evaluating the feasibility of chemical oxidation technology. When applicable, the OSC will review other alternative technologies to determine the most cost-effective and environmentally beneficial method to treat the hazardous substances depending on the waste volume and waste characteristics.

3. Applicable or relevant and appropriate requirements (ARARs)

The OSC will identify the federal ARARs. MA DEP and CMEDA will identify the state and local ARARs. The OSC will identify and comply with the applicable health and safety regulations under Occupation Safety and Health Act (OSHA).

4. Project Schedule

The OSC estimates that this removal action will take approximately twelve months to complete. Removal coordination activities will be commenced upon the approval of this action memorandum.

B. PROPOSED COSTS

EXTRAMURAL COSTS:

Regional Allowance Costs:

<i>ERRS</i>	\$ 1,300,000
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Other Extramural Costs Not Funded from the Regional Allowance:

<i>START</i>	\$ 300,000
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<i>USACE</i>	\$ 10,000
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<i>EPA/ERT</i>	\$ 40,000
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Subtotal, Extramural Cost:	\$1,650,000
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20% Extramural Project Contingency:	\$ 330,000
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TOTAL REMOVAL PROJECT CEILING:	\$ 1,980,000
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VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Delayed action will increase public health risks to adjacent occupants as well as environmental risks to the Blackstone River. The situation is currently unstable. Any further delays in this action will add to the likelihood of a release through a number of circumstances, i.e., weather conditions.

VII. OUTSTANDING POLICY ISSUES

None

VIII. ENFORCEMENT

The total estimated EPA costs for the removal would be:

$$(\$1,980,000 + \$80,000) + (27.02\% \times \$2,060,000) = \$2,616,600$$

The total EPA costs for this removal action based on full-cost accounting practices that will be eligible for cost recovery are estimated to be \$2,616,600¹.

THE ENFORCEMENT ADDENDUM ATTACHED HERETO FOR INTERNAL DISTRIBUTION ONLY.

¹ Direct Costs include direct extramural costs and direct intramural costs. Indirect costs are calculated based on an estimated indirect cost rate expressed as a percentage of site-specific direct costs, consistent with the full cost accounting methodology effective October 2, 2000. These estimates do not include pre-judgement interest, do not take into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of a removal action. The estimates are for illustrative purposes only and their use is not intended to create any rights for responsible parties. Neither the lack of a total cost estimate nor deviation of actual total costs from this estimate will affect the United States' right to cost recovery.

IX. RECOMMENDATION

This decision document represents the selected removal action for the Fisherville Mill Site in Grafton, MA. It was developed in accordance with CERCLA, as amended, and is consistent with the National Contingency Plan (NCP). This decision is based on the administrative record file for the Site.

Conditions at the Fisherville Mill Site meet the NCP Section 300.415(b)(2) criteria for a removal action in that there are:

"Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants" [300.415(b)(2)(i)];

"Actual or potential contamination of drinking water supplies or sensitive ecosystems" [300.415(b)(2)(ii)];

"Weather conditions that may cause hazardous substances/pollutants/contaminants or pollutants or contaminants to migrate or be released" [300.415(b)(2)(v)];

"The availability of other appropriate federal or state response mechanisms to respond to the release" [300.415(b)(2)(vii)]; and,

"Other situations or factors that may pose threats to public health or welfare or the environment" [300.415(b)(2)(viii)].

Therefore, I recommend approval of this removal action. The total estimated removal action project ceiling is \$1,980,000, of which \$1,300,000 comes from the Regional removal allowance.

Approved: Bill Hagens Date May 6, 2002

Disapproved: _____ Date _____