2015 FIVE-YEAR REVIEW REPORT FOR CANNONS ENGINNERING BRIDGEWATER SUPERFUND SITE (CEC) PLYMOUTH COUNTY BRIDGEWATER, MASSACHUSETTS

Prepared by

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09/22/15
Date

LIST OF ACRONYMS

ACEC	Area of Critical Environmental Concern
ARAR	Applicable or Relevant and Appropriate Requirement
COC	Contaminant of Concern
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
DEQE	Department of Environmental Quality Engineering
EPA	Environmental Protection Agency
ESD	Explanation of Significant Differences
FEMA	Federal Emergency Management Agency
FS	Feasibility Study
LTMP	Long-Term Monitoring Program
MassDEP	Massachusetts Department of Environmental Protection
MASSGIS	Massachusetts Geographical Information System
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MCP	Massachusetts Contingency Plan
mg/kg	milligrams per kilogram
MMCL	Massachusetts maximum contaminant level
MSR	Management System Review
MOM	Management of Migration
MTBE	Methyl-tert butyl ether
NOAA	National Oceanic and Atmospheric Administration
NPL	National Priorities List
OSWER	Office of Solid Waste and Emergency Response
PAH	Polycyclic aromatic hydrocarbons
PCB	Polychlorinated biphenyl
PCE	Tetrachloroethene
Plan	Long-Term Monitoring Plan
PPA	Prospective Purchaser Agreement
ppb	parts per billion
ppm	parts per million
PRP	potentially responsible party
RPM	Remedial Project Manager
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
RP	Responsible Party
SARA	Superfund Amendments and Reauthorization Act

SC	Source Control
Site	Cannons Engineering Bridgewater Superfund Site (CEC)
SVOC	Semi-volatile organic compounds
TCE	Trichloroethene
µg/L	micrograms per liter
VOC	Volatile Organic Compound

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EXECUTIVE SUMMARY

This is the fifth Five-Year Review (FYR) for the Cannons Engineering Bridgewater Superfund Site (CEC) located in Bridgewater, Plymouth County, Massachusetts. The purpose of this FYR is to review information to determine if the remedy is and will continue to be protective of human health and the environment. This FYR focuses on the management of migration (groundwater) and source (soil) operable units. The triggering action for this statutory FYR was the signing of the previous FYR on September 22, 2010.

The Cannons Engineering Bridgewater Superfund site ("CEC") facility is a 7-acre site located on First Street in a small industrial park in the western part of the Town of Bridgewater, Massachusetts. The Site is comprised of three parcels of land; Lots 3A, 4, and 4A. Prior to development of the industrial park in 1969, the site consisted of a wooded lowland bordered to the north, south, and east by rural agricultural land. Current land use around the site consists of industrial development in the immediate vicinity to the north and east, and a wooded lowland to the south and west, and agricultural and residential development in the outlying areas.

The CEC Bridgewater site is located in the southeastern portion of the Town River watershed which has an estimated area of 56 square miles and feeds water supply wells for the towns of Bridgewater, West Bridgewater, and Raynham. Hockomock Swamp occupies a large portion of the watershed. Lake Nippenicket is the largest surface waterbody located within 1 mile of the Site. The nearest drinking water well, operated by the Town of Raynham, is located 1.3 miles west of the Site on the shore of Lake Nippenicket.

The CEC facility is one of the four separate but related sites which form the Cannons Site Group. The others are Cannons Plymouth Harbor located in Plymouth, Massachusetts; Tinkham's Garage in Londonderry, New Hampshire; and Gilson Road in Nashua, New Hampshire. All four sites are being handled under one enforcement effort.
CEC first purchased the parcel of land at the Site in November, 1974. The property was developed by them to handle, store, and incinerate chemical wastes. These activities occurred frequently at the Site between 1974 until 1980 when operations at the Site ceased after the MassDEP (then called the Department of Environmental Quality Engineering) revoked CEC's Waste License, citing document falsification and other waste reporting violations.
Prior to remedial activities contaminants included volatile organic compounds (VOCs); polychlorinated biphenyls (PCBs) polycyclic aromatic hydrocarbons (PAHs) pesticides and metals such as iron selenium, manganese, lead and silver.

Over 700 drums and approximately 155,000 gallons of liquid waste and sludge in bulk storage were left behind on-site by CEC. Between 1980 and 1982, MassDEP and EPA conducted Site inspections, performed sampling and analyses and confirmed the presence of chemical contamination at the Site. Several tanks and drums were also observed to be leaking. In order to alleviate the problem of leaking contamination and wastes left on-site, the MassDEP performed a removal action. In October 1982, MADEP's contractor, Jet Line Services, Inc., removed approximately 155,000 gallons of sludge and liquid wastes that were stored in tanks and approximately 711 drums from the Site. A subsequent removal was conducted by the group of Potentially Responsible Parties (the "PRP Group") in June1988. The PRP Group removed the bulk contents of an underground tank, a septic tank, 3 tanker trailers and small (5 gallon or less) containers from laboratory and storage areas at the Site.

In December of 1982, the Site was proposed for inclusion on the NPL, (49 FR 40320) and the site was made final to the NPL on September 8, 1983, (51 FR 21054). To view a chronology of major site activities and for detailed information about the remedies implemented, see Appendix

A. See Appendix B, to view a Site figure.

The property was redeveloped in November of 1996, when Osterman Propane, Inc., relocated its propane storage and distribution operations to the Site.

An Explanation of Significant Differences (ESD) was signed on May 15, 2013. An ESD was required in order to modify the original clean up goals because the Commonwealth of Massachusetts had reclassified groundwater underneath the site; it is no longer classified as a current or future drinking water supply. The ESD documents that the site groundwater no longer needs to meet Maximum Contaminant Level (MCLs). See Appendix C for a copy of the 2013 ESD which includes the Groundwater Use and Value Determination that MassDEP conducted for the site in 2012.

Subsequently in 2013, EPA conducted a cumulative human health and ecological risk assessment which determined that the residual levels of contaminants in groundwater are within EPA's acceptable risk range of 1 x 10-4 to 1 x 10-6 and a Hazard Quotient = <1, for all appropriate exposure pathways including vapor intrusion.

Due to the fact that there are no longer any unacceptable human health or ecological risks, a Final Closeout Report (FCOR) was signed on June 13, 2013. The FCOR documents that EPA has completed all response actions for the Source Control and Management of Migration operable unit at the site. As such, the site was delisted from the NPL on September 24, 2013.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Cannons Engineering Bridgewater Superfund site (CEC)		
EPA ID: **MAD079510780**		
Region: 1	**State:** MA	**City/County:** Bridgewater/Plymouth

SITE STATUS	
NPL Status: Deleted	
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes

REVIEW STATUS
Lead agency: EPA
Author name Derrick Golden –Remedial Project Manager
Author affiliation: USEPA – New England Region 1
Review period: 1/5/2015 - 9/22/2015
Date of site inspection: 8/13/2015
Type of review: Statutory
Review number: 5
Triggering action date: 9/22/2010
Due date *(five years after triggering action date)*: 9/22/2015

Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:
Management of Migration (MOM) and Source Control (SC)

Issues and Recommendations Identified in the Five-Year Review:

OU(s): Click here to enter text.	Issue Category: No Issue			
	Issue: N/A			
	Recommendation: N/A			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
N/A	N/A	N/A	N/A	N/A

Protectiveness Statement(s)

Operable Unit: Management of Migration (MOM)	*Protectiveness Determination:* Protective

Protectiveness Statement:
The remedy at the MOM operable unit is protective of human health and the environment because construction is complete, institutional controls in the form of a deed restriction are in place and groundwater meets risk based cleanup goals, as documented by the Final Closeout Report dated 2013.

Operable Unit: Source Control	*Protectiveness Determination:* Protective

Protectiveness Statement:
The remedy at the SC operable unit is protective of human health and the environment because construction is complete, institutional controls in the form of a deed restriction are in place and soil meets cleanup goals, as documented by the Interim Close Out Report dated 1991.

Sitewide Protectiveness Statement

Protectiveness Determination:
Protective

Protectiveness Statement:
Because the remedial actions for the MOM and SC operable units are protective, the site is protective of human health and the environment.

I. INTRODUCTION

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP). CERCLA 121 states:

> *"If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."*

EPA interpreted this requirement further in the NCP; 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which states:

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

EPA conducted a FYR on the remedy implemented at the Cannons Engineering Bridgewater Superfund site ("CEC") in Bridgewater, Plymouth County, Massachusetts. EPA is the lead agency for developing and implementing the remedy for the Site. The Massachusetts Department of Environmental Protection (MassDEP), is the support agency representing the State of Massachusetts, has reviewed this Five Year Review and provided input to EPA during the FYR process.

This is the fifth FYR for the Cannons Engineering Bridgewater Superfund Site. The triggering action for this statutory review is the previous FYR that was signed on September 22, 2010. The FYR is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure. The Site consists of both a source and a management of migration Operable Unit, all of which are addressed in this FYR.

II. PROGRESS SINCE THE LAST REVIEW

The fourth FYR was signed on September 22, 2010, and found that the remedies for source control and groundwater were protective of human health and the environment.

Table 1: Protectiveness Determinations/Statements from the 2010 FYR

OU #	Protectiveness Determination	Protectiveness Statement
Source (SC)	Protective	The Source Control remedy was documented by EPA as complete in 1991, and judged protective by EPA in the first three five-year reviews. No new information was encountered during this (fourth) five-year review to indicate that the protectiveness of this remedy has changed.
Management of Migration (MOM)	Will be Protective	The groundwater remedy (management of migration) for the Cannons Engineering Bridgewater Site is expected to be protective of human health and the environment upon completion, and in the interim, exposure pathways that could result in unacceptable risks are being controlled through institutional controls.
Sitewide	Protective	The remedies for the management of migration (groundwater) and for the source control (soil) are protective of human health and the environment. Also, institutional controls (deed restrictions) which restrict residential use, remain in place.

Table 2: Status of Recommendations from the 2010 FYR

OU #	Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Party	Original Milestone Date	Current Status	Completion Date (if applicable)
Management of Migration	No sampling has been conducted for 1,4-dioxane, as 1,4-dioxane was not a well-known chemical at the time the monitoring plan was established	Collect groundwater and surface water samples for 1,4-dioxane in the Year 20 annual event and use the data in a risk analysis to be completed prior to site closure	PRP	EPA/State	9/29/2010	Completed	9/21/2010
Management of Migration	Groundwater concentrations in 7 of the Site monitoring wells exceeded the MCL for arsenic in the Year 19 data	An additional round of groundwater sampling, prior to the next Five Year Review (2015), for metals is recommended. If arsenic continues to exceed the MCL, further monitoring may be required	PRP	EPA/State	9/29/2010	Considered But Not Implemented	N/A
Management of Migration and Source Control	Several Town officials indicated that they were unfamiliar with the history of the Site and were not aware of the deed restriction requirements	Send Town officials copy of the 2010 Five Year Review	EPA	EPA	10/30/2010	Completed	9/29/2010

Recommendation 1

- Recommendation 1 was completed during the year twenty groundwater sampling event, which was conducted by the responsible party on 9/21/2010 and 9/22/2010. The cumulative risk assessment performed by EPA in 2013 determined that the residual levels of contaminants in groundwater are within EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6} and a Hazard Quotient = <1, for all appropriate exposure pathways.

Recommendation 2

- In 2012, the Commonwealth of Massachusetts prepared a new Groundwater Use and Value Determination, finding that groundwater directly beneath and in the vicinity of the Site was not considered a current or potential drinking water source. As a result, MCLs are no longer considered applicable or relevant and appropriate requirements (ARARs) that must be achieved by the remedy. Furthermore, EPA also conducted a site specific cumulative human health risk assessment in order to support the NPL delisting in 2013. The results of the risk assessment determined that there were no unacceptable risks to either human health and or the environment from the residual levels of contaminants present in groundwater for all exposure routes (including the vapor intrusion pathway) during the year 20 sampling event. Because MCLs are no longer the appropriate cleanup goals, and because there is no unacceptable risk, recommendation 2 was not implemented. To view the 2013 EPA Risk Assessment Memo documenting no unacceptable risks, see Appendix D.

Recommendation 3

- In September 2010, EPA sent a cover letter along with the 2010 Final Five Year review to the town the town of Bridgewater as a reminder that this is a former Superfund site and there is still Institutional Controls/Deed Restriction requirements for the Site.

Remedy Implementation Activities

Table 3: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater and excavation below the level of groundwater	No	Yes	Lots 3A, and 4	Restrict residential use of property, prevent withdrawal of groundwater and prevent excavation of soil below the level of groundwater	*Declaration of Restrictions*, dated 9/26/1991

A copy of the 1991 deed restrictions is included in Appendix E.

As documented in the second five-year review, there was a violation of the deed restrictions during the redevelopment of the Lot 3A parcel. In the spring of 1998, Omnipoint installed a communications tower (monopole) on Lot 3A that while completed with the proper Bridgewater permits and approvals, did not comply with the requirements of the deed restrictions. During construction of the tower, soil was excavated below the water table. Groundwater in the excavation pit was pumped out and discharged onto the property. Neither the property owner nor the communications company sought prior approval from EPA or the MassDEP to install the tower. Subsequently on November 24, 1999, EPA issued a Notice of Violation to the property owner and lessee. Also, on November 24, 1999, EPA sent a letter to the Town of Bridgewater to remind the town officials about the requirements of the deed restrictions.

System Operation/Operation and Maintenance Activities

There is no active treatment nor groundwater sampling being conducted at the site. EPA signed the Final Closeout Report (FCOR) for the Site on June 13, 2013, because the cleanup levels established in the ROD and 2013 ESD were achieved. The site was delisted from the NPL in September 2013.

III. FIVE-YEAR REVIEW PROCESS

Administrative Components

The PRP was notified of the initiation of the five-year review on 1/5/2015, via the press release. The Cannons Engineering Bridgewater Superfund site (CEC) Five-Year Review was led by

Derrick Golden of the U.S. EPA, Remedial Project Manager for the Site. In addition, Rudy Brown from EPA was the Community Involvement Coordinator (CIC) and Rick Sugatt from EPA provided risk assessment support. Jay Naparstek, of the MassDEP, assisted in the review as the representative for the support agency.

This FYR review, which began on 2/3/2015, consisted of the following components:

- Community Involvement;
- Document Review;
- Data Review;
- Site Inspection; and
- Five-Year Review Report Development and Review.

Community Notification and Involvement

Activities to involve the community in the five-year review process were initiated with a meeting on February 3, 2015, between the Remedial Project Manager, the Community Involvement Coordinator, the EPA risk assessor and the EPA attorney for the Site. Per Region 1 policy, a region wide press release announcing all upcoming five year reviews in New England was sent to all regional newspapers. The press release was sent on January 5, 2015 and is included as Appendix F. The results of the review and the report will be made available at the Site information repository located at the Bridgewater Public Library in Bridgewater, MA, as well as the EPA Records Center located in Boston, MA.

Document Review

This five-year review consisted of a review of relevant documents including monitoring data which are included as part of the Administrative Record and Deletion Docket for the site. Applicable groundwater, soil and sediment cleanup standards, as listed in the March 31, 1998, Record of Decision (ROD) and as modified by the May 15, 2013, ESD, were also reviewed.

Data Review

As of 2010, the last year of the long term sampling requirements, all contaminants of concern met MCLs, with the exception of arsenic, in several onsite monitoring well locations. However, on October 23, 2012, MassDEP conducted a new groundwater use and value determination specifically for the Cannons Engineering Bridgewater site. As a result of this re-evaluation, it was determined that drinking water standards (MCLs) are no longer applicable or appropriate for groundwater cleanup goals because the ingestion of site groundwater is not an exposure pathway. See EPA's Explanation of Significant Differences (ESD) dated May 2013, for additional details and to view a copy of the MassDEP groundwater use and value determination.

In March of 2013, EPA's risk assessor conducted a cumulative evaluation of risks to human health, based on a standard recreational exposure scenario. This evaluation considered all residual groundwater contaminants and used the last three years of groundwater sampling data from 2008, 2009 and 2010 in the risk calculations. The results of this cumulative risk assessment

determined that the human health risks are within EPA's acceptable risk range of 1 x 10^{-4} to 1 x 10^{-6} and a Hazard Quotient = <1. EPA also evaluated ecological risk that could occur due to exposure of aquatic organisms to on-site levels of arsenic and 1, 4-dioxane in groundwater. The maximum on-site concentrations of arsenic and 1, 4-dioxane were found to be lower than National Recommended Water Quality for arsenic and aquatic toxicity benchmarks for 1, 4-dioxane. Therefore, it was concluded that site groundwater would not have any unacceptable ecological risk even if groundwater emerged undiluted into surface water in the wetlands downgradient and to the west of the Site. For specific details about these risk assessments, see the risk assessment memo, included as Attachment 1 to the May 2013 ESD.

In August of 2015, the EPA risk assessor updated the 2013 risk evaluation of residual contaminant levels with updated toxicity factors, exposure scenarios, etc., for the contaminants of concern in groundwater and soil. The purpose of this review was to determine if the remedies still remain protective of human health and the environment. The results of this re-evaluation determined that risk associated with the levels of site related contaminants continue to be within EPA's acceptable and protective risk range of 1 x 10^{-4} to 1 x 10^{-6} and a Hazard Quotient (HQ) = <1. The 2015 evaluation included a re-evaluation of dioxin in the environment, specifically dioxins in soils now covered by asphalt pavement, and compared the dioxin levels in these soils to new toxicity values established in 2012. This re-evaluation found that the potential health risk if these soils were to be exposed would be acceptable (below preliminary remedial goals) for residential use, as well as commercial/industrial use. In addition, there was no unacceptable risk to aquatic organisms in surface water in the wetlands downgradient of the site, and there was no unacceptable risk to human health based on recreational use of the wetlands. Therefore the remedies implemented at the Site are still protective of both human health and environment. See Appendix G to view a copy of the No Unacceptable Risks Memo, dated August 2015.

Site Inspection

The inspection of the Site was conducted on August, 13, 2015, by Derrick Golden, U.S. EPA. The purpose of the inspection was to assess the protectiveness of the remedy.

The site is still currently occupied by Osterman Propane, a propane storage and distribution company on one of the site's parcels. Also, a cellular communication tower is still located on the second parcel on the Site.

Interviews

During the FYR process, interviews were conducted with various parties impacted by the Site, including the town of Bridgewater, MassDEP and the Manager of Osterman Propane (current propane distribution business located on the site). The purpose of the interviews was to document any perceived problems or successes with the remedy that has been implemented to date. Interviews were conducted on in August of 2015. The interview summary sheets are included in Appendix H.

The following people were interviewed for this FYR:

- Jay Naparstek – MassDEP
- John Sharland - Town of Bridgewater – Board of Health
- Stuart Briggs – Manager for Osterman Propane

IV. TECHNICAL ASSESSMENT

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

Yes. The review of site related documents and data indicates that the remedies are functioning as intended by the 1998 ROD, as modified by the 2013 ESD:

Remedial Action Performance

- The Source Control remedy (soil) was completed and the appropriate clean up levels were achieved and documented in the Interim Close-Out Report, dated 1991.
- In September of 2010, the last round (20 of 20 years) of the Long Term groundwater and sediment monitoring was conducted.
- The 2012 MassDEP Groundwater Use and Value Determination that drinking water standards (MCLs) are no longer applicable or appropriate as groundwater underneath the site is no longer classified as a current or future drinking water supply. Therefore ingestion of site groundwater is not an exposure pathway.
- The 2013 ESD modified the 1988 ROD, eliminating the requirement to reach MCLs.
- The 2013 Human Heath and Ecological Risk evaluation determined that the residual levels of contaminants in groundwater are within EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6} and a Hazard Quotient = <1, for all appropriate exposure pathways, including vapor intrusion.
- In 2013 a Final Close-Out Report was completed to document that EPA has completed all response actions and for the MOM and SC remedies.
- The site was delisted from the NPL in September 2013.

System Operations/O&M

- There is no monitoring being conducted. There is no active treatment system or operation and maintenance activities.

Opportunities for Optimization

- There is no need for optimization because the remedial actions were completed and the site was delisted from the NPL in 2013.

Early Indicators of Potential Issues

- There have not been any indicators of potential issues (such as non-compliance with institutional controls) since the previous 2010 FYR.

Implementation of Institutional Controls and Other Measures

- Institutional controls were recorded in 1991 and still remain in place to prevent unacceptable exposure, e.g., to prevent residential development on the Site and to prevent the withdrawal of groundwater.

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

Yes. Some of the exposure assumptions and toxicity data used at the time of the remedy selection have changed; however, because the remedy relied on preventing direct contact with Site waste and groundwater using institutional controls, the remedy remains protective of human health and the environment. The RAOs used at the time of the remedy selection are still valid.

Environmental Protection Agency Reference Doses and Carcinogenic Potency Factors

EPA toxicity values, including reference doses (RfDs) and cancer slope factors (CSFs), are routinely re-evaluated and updated. Currently, the primary source of toxicity values is EPA's IRIS database. Carcinogen Assessment Group Potency Factors have been replaced with CSFs. Reference concentrations (RfCs) and inhalation unit risk factors (URFs) are now available for evaluation of risks via the inhalation pathway. These toxicity values are used in the calculations of risk and the development of site-specific and more generic risk-based screening values or clean-up goals. Although some changes have occurred to toxicity values since selection of the remedy, they do not affect the protectiveness of the remedy. See changes in toxicity discussion below. Because the source control remedy relies on institutional controls to prevent exposures by contaminants through direct contact with soils, groundwater, or inhalation of indoor air, these changes do not impact the protectiveness of the remedy.

TSCA PCB Spill Cleanup Policy

The Toxic Substances Control Act (TSCA) PCB Spill Cleanup Policy (40 CFR 761. 120-135) remains in effect, and does not impact the protectiveness of the remedy.

Guidance on Remedial Actions at Superfund Sites with PCB Contamination

This document (EPA/540/G-90/007, August 1990) remains in effect, and does not impact the protectiveness of the remedy.

EPA Regional Screening Levels (RSLs)

The RSLs are updated twice per year. The most up-to-date tables are available at http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/. The RSLs were not listed previously as ARARs or TBCs. Because the remedies relied on stabilization and treatment of soil to protective levels and because the long term groundwater monitoring was completed in 2010, there is no exposure to site related contaminants by direct contact with soil, groundwater, or inhalation of indoor air. Therefore this added TBC does not impact the protectiveness of the remedies.

EPA Vapor Intrusion Screening Levels (VISLs)

The VISLs are updated periodically. The most up-to-date tables are available at http://www.epa.gov/oswer/vaporintrusion/guidance.html#Item6. The VISLs were not listed previously as ARARs or TBCs. Because the remedies relied on stabilization and treatment of soil to protective levels; and because the long term groundwater monitoring was completed in 2010, there is no exposure to contaminants by inhalation of indoor air. Therefore the VISLs do not impact the protectiveness of the remedy.

Changes in Exposure Pathways

New guidance has been issued regarding human health exposure assumptions used in the evaluations of human health risk.

- 2014 OSWER Directive on the Update of Standard Default Exposure Factors

  In 2014, EPA finalized a Directive to update standard default exposure factors and frequently asked questions associated with these updates. http://www.epa.gov/oswer/vaporintrusion/guidance.html#EO12866OSWERVI Many of these exposure factors differ from those used in the risk assessment(s) supporting the ROD(s) and ESD. These changes in general would result in a slight decrease of the risk estimates for most chemicals. (Reference: USEPA. 2014. Human Health Evaluation Manual, Supplemental Guidance: Update of Standard Default Exposure Factors. OSWER Directive 9200.1-120. February 6, 2014.)

The changes in exposure pathway assumptions do not affect protectiveness because the source control remedy prevents any direct contact with soil, groundwater, and vapor intrusion into on-site buildings. Therefore, these changes to exposure factors do not impact the protectiveness of the remedy.

Changes in Toxicity and Other Contaminant Characteristics

There were several changes to toxicity values since the 2010, Five Year Review, notably;

New IRIS toxicity values since 2010:

- **2010 1,4-dioxane** non-cancer toxicity value and 2013 cancer toxicity values -

  In 2010 and 2013, EPA finalized the toxicity assessment for 1,4-dioxane. The new values indicate that 1,4-dioxane is more toxic from both cancer and non-cancer health effects. These toxicity changes would result in increased non-cancer hazard and cancer risk from exposure to 1,4-dioxane.

- **2010 cis-1,2-DCE** non-cancer toxicity values -

  In January 2010, EPA revised the non-cancer toxicity value for cis-1,2-DCE and determined that there are currently no available cancer value and no inhalation values. It is now not possible to quantify cancer risk and inhalation risk from exposure to cis-1,2-DCE.

- **2010 Pentachlorophenol** cancer and non-cancer toxicity values -

  On September 30, 2010, EPA finalized the toxicity assessment for pentachlorophenol (PCP). The new values indicate that PCP is more toxic from both cancer and non-cancer health effects. These toxicity changes would result in increased non-cancer hazard and cancer risk from exposure to PCP.

- **2011 TCE** cancer and non-cancer toxicity values -

  On September 28, 2011, EPA finalized the December 2009 revised toxicity values for TCE. The new values indicate that TCE is more toxic from both cancer and non-cancer health effects. These toxicity changes would result in increased non-cancer hazard and cancer risk from exposure to TCE.

- **2011 Methylene Chloride** cancer and non-cancer toxicity values -

  On November 18, 2011, EPA finalized the toxicity assessment for methylene chloride. The new values indicate that methylene chloride is more toxic from non-cancer health effects but less toxic from cancer health effects. These toxicity changes would result in an increased non-cancer hazard and a decreased cancer risk from exposure to methylene chloride.

- **2012 PCE cancer and non-cancer toxicity values -**

  On February 10, 2012, EPA finalized the cancer and non-cancer toxicity values for

PCE. These new values indicate that PCE is now more toxic from cancer health effects but less toxic from non-cancer hazard effects. Although cancer risks and non-cancer hazards from these contaminants may change due to the changes in toxicity values. These toxicity changes would result in an increased cancer risk and a decreased non-cancer hazard from exposure to PCE.

- **2012 Dioxin non-cancer toxicity value -**

  On February 17, 2012, EPA finalized the non-cancer toxicity assessment for 2,3,7,8-TCDD, indicating that non-cancer health effects from exposure to dioxin can now be quantified. EPA's dioxin reassessment has been developed and undergone review for many years, with the participation of scientific experts in EPA and other federal agencies, as well as scientific experts in the private sector and academia. The Agency followed current guidelines and incorporated the latest data and physiological/biochemical research into the reassessment. With the release of the final human health non-cancer dioxin reassessment, EPA also published an oral non-cancer toxicity value, or reference dose (RfD), of 7x10-10 mg/kg-day for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) in EPA's Integrated Risk Information System (IRIS). The dioxin cancer reassessment will follow thereafter. The dioxin RfD was approved for immediate use at Superfund sites to ensure protection of human health. Non-cancer hazard from exposure to dioxin can now be quantified for the site.

However, because the remedy relies on systems to prevent exposures by contaminants by direct contact with soils, groundwater, or inhalation of indoor air, these toxicity value changes do not impact the protectiveness of the remedy.

Changes in Risk Assessment Methods

Changes have occurred to methods used to evaluate vapor intrusion exposures, methods used to evaluate exposures to asbestos, methods used to evaluate arsenic, and methods used to evaluate mutagenic carcinogens, including polycyclic aromatic hydrocarbons (PAHs).

EPA has introduced the following new risk assessment method potentially applicable to this site:

- 2012 OSWER Directive on Recommendations for Default Value for Relative Bioavailability of Arsenic in Soil

Expected Progress towards Meeting RAOs

A cumulative human health and ecological risk assessment was conducted in 2013, which determined that the residual levels of contaminants in groundwater are within EPA's acceptable risk range of 1×10^{-4} to 1×10^{-6} and a Hazard Quotient = <1, for all appropriate exposure pathways, including vapor intrusion. The site was delisted from the NPL in September 2013.

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

No other information has come to light which could affect the protectiveness of the remedy.

The previous FYR concluded that there were no ecological risks for ecological receptors because the only remaining groundwater contaminants (arsenic and 1, 4-dioxane) that exceeded MCLs or other groundwater standards occurred at concentrations below National Recommended Water Quality Criteria (for arsenic) or aquatic benchmarks (for 1, 4-dioxane). Therefore, these site contaminants would not have unacceptable effects on aquatic organisms if the groundwater emerged undiluted into surface water in wetlands downgradient from the site.

There are no newly identified contaminants or sources. There are no unanticipated byproducts not previously addressed by the decision documents.

Technical Assessment Summary

Some of the exposure assumptions, toxicity data, and risk assessment methods and cleanup levels of the remedy selection have changed; however, because the remedy relied on institutional controls to prevent direct contact with contamination in soil and groundwater and vapor intrusion into on-site buildings, the remedy remains protective of human health and the environment. Land use has not changed since the ROD and ESD were signed and there is no change in exposure pathways. No other information has come to light which could affect the protectiveness of the remedy.

V. ISSUES/RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 4: Issues and Recommendations/Follow-up Actions

OU #	Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
						Current	Future
Management of Migration	None	Not Applicable	Not Applicable	Not Applicable	Not Applicable	No	No
Source	None	Not Applicable	Not Applicable	Not Applicable	Not Applicable	No	No

There are no issues that affect the current or future protectiveness of the remedies. In addition, the following recommendation is made to ensure the continued effectiveness of the remedies does not affect current or future protectiveness;

- Ensure that the deed restrictions remain in place and are not violated

VI. PROTECTIVENESS STATEMENT

Protectiveness Statement(s)		
Operable Unit: Management of Migration (MOM)	*Protectiveness Determination:* Protective	*Addendum Due Date (if applicable):* Click here to enter a date.
Protectiveness Statement: The remedy at the MOM operable unit is protective of human health and the environment because construction is complete, institutional controls in the form of a deed restriction are in place and groundwater meets risk based cleanup goals, as documented by the Final Closeout Report dated June 2013.		

Protectiveness Statement(s)		
Operable Unit: Source Control (SC)	*Protectiveness Determination:* Protective	*Addendum Due Date (if applicable):* Click here to enter a date.
Protectiveness Statement: The remedy at the SC operable unit is protective of human health and the environment because construction is complete, institutional controls in the form of a deed restriction are in place and soil meets cleanup goals, as documented by the Interim Close Out Report dated 1991.		

Sitewide Protectiveness Statement	
Protectiveness Determination: Protective	*Addendum Due Date (if applicable):* Click here to enter a date.
Protectiveness Statement: Because the remedial actions for the MOM and SC operable units are protective, the site is protective of human health and the environment.	

VII. NEXT REVIEW

The next five-year review report for the Cannons Engineering Bridgewater Superfund site is required five years from the completion date of this review; September 22, 2020.

APPENDIX A

SITE CHRONOLOGY AND ADDITIONAL SITE INFORMATION

Event	Date
Cannons Engineering Corp. begins operations at the Bridgewater site.	1974
Cannons operates as a hazardous waste storage, transport, and incineration facility under state license from the Massachusetts Department of Environmental Quality Engineering (DEQE) [now known as the MassDEP].	1974 - 1980
License revoked by DEQE; operations cease.	1980
Site inspections and investigations conducted by DEQE and EPA.	1980 - 1982
State-contracted removal action performed. Sludge and liquid wastes from on-site tanks and drums were removed to prevent potential release of contaminants into the environment.	10/1982
Site placed on the NPL.	9/1983
Bridgewater Industrial Park is the owner of record for Lot 3A.	1984
Lot 4 "taken" by the Town of Bridgewater.	3/1985
EPA notifies approximately 600 parties of their potential liability with respect to the Site. The PRPs form a steering committee. Negotiations result in development of two settlement agreements. The EPA proposes a de minimis settlement to resolve the liability of several hundred parties who contributed small amounts of waste to the Bridgewater facility. The second agreement is reached with 22 PRPs to conduct an emergency removal action at the Site.	1986
EPA releases a Wetlands Assessment that estimates the probability and magnitude of potential adverse environmental effects from exposure to contaminants associated with the Site.	4/1987
EPA releases a Remedial Investigation, and an Endangerment Assessment that estimates the potential impact to human health from exposure to contaminants associated with the Site.	5/1987
Feasibility Study completed.	1/1988

CHRONOLOGY OF SITE EVENTS (continued)

Event	Date
EPA issues ROD.	3/31/1988
PRPs commence the remedial action specified in the ROD under an EPA Administrative Order of Consent.	1988
EPA approves a Pre-Design Study report, which documents the full extent of contamination at the Site. The Settling Parties' contractor conducts a groundwater contaminant leaching modeling study and completes a report.	2/1989 and 6/1989
Consent Decree entered.	8/14/1989
Source control remedial action undertaken by the Settling, or Responsible Parties, with oversight by the EPA and the state.	11/1989 – 12/1990
The RP's contractor completes the MOM Remedial Design Report.	1/1990
RPs install new groundwater monitoring wells.	9/1990-11/1990
Management of migration component of the selected remedy implemented. This involved restricted use of groundwater at the Site and implementing a long term monitoring program.	1991
RPs commence the first quarterly round of a 20-year long-term monitoring phase of the MOM remedial action. The LTMP includes collection of groundwater, surface water, and sediment samples.	6/1991
Institutional controls (deed restrictions) imposed for Lot 4 and Lot 3A. EPA completes Superfund Site Interim Close-Out report.	9/1991
RP contractor completes Source Control Remedial Action Report.	10/1991
Long-Term Ground Water Monitoring Plan (Plan) describing the water quality monitoring program to be implemented at the Site is submitted to EPA by the RPs.	6/1992
Additional monitoring wells installed (MW-18 triplet).	10/1994
EPA completes First Five-Year Review.	6/1995
The Long-Term Ground Water Monitoring Plan is amended to reflect changes in monitoring frequency and addition of the MW-18 triplet.	3/1996

CHRONOLOGY OF SITE EVENTS (continued)

Event	Date
A portion of the town-owned land (Lot 4A) is redeveloped for use by a propane distributor.	1996 - 1997
Lot 4A sold to Osterman Propane, Inc. Lot 3A sold to Z & P, LLC.	1997
Uses and activities permitted under the Declaration of Restrictions for Lot 4A are expanded to include propane gas business uses and activities as well as groundwater monitoring uses and activities.	10/1997
Lot 3A leased. Omnipoint erects a monopole telecommunications relay tower. In so-doing, the Declaration of Restriction established as specified in the ROD is violated.	1998
Irwin Engineers, Inc. (Osterman's contractor) supervises installation of monitoring wells downgradient of septic leaching field on Lot 4A for the property owner.	11/1998
EPA provides a written notice of violation of the deed restriction for Lot 3A to the property owner, lessee, and Town of Bridgewater.	1999
EPA completes the Second Five-Year Review.	9/2000
The Long-Term Ground Water Monitoring Plan is amended a second time to incorporate EPA's low-flow groundwater sampling procedure.	2001
American Tower (Unisite) purchases communications monopole on Lot 3A.	6/2002
Lot 3A sold to Unison Site Management, Frederick, Maryland. American Tower continues to lease property.	11/2003
EPA completes the Third Five-Year Review.	9/2005
The Long-Term Groundwater Monitoring Program is amended to include metals in the Year 19 sampling event and to modify the SVOC analytical method.	8/2009
EPA completes the Fourth Five-Year Review.	9/2010
MassDEP conducts groundwater use and value determination	10/2012
EPA issues ESD	5/2013
EPA issues FCOR	6/2013
EPA delists the site from the NPL	9/2013
EPA signs the fifth FYR	9/2015

I. BACKGROUND

Physical Characteristics

The Site is located on First Street, in a small industrial park in Bridgewater, Plymouth County, Massachusetts. The industrial park is located off of Elm Street, in the area west of Elm Street and east of Massachusetts Route 24 (Figure 3-1). Geographic coordinates of the property, as measured from First Street, are approximately 41°58'16.41'' north latitude and 71°1'30.44'' west longitude. The Site is bordered by commercial/industrial operations to the north, wetlands and a drainage canal to the south, First Street to the east, and Route 24 (Amvets Memorial Highway) to the west.

The Site appears on Bridgewater Tax Assessor's Map No. 71 and is comprised of three parcels of land covering approximately 7 acres: Parcel 75 (Lot 4A, 42 First Street), Parcel 53 (Lot 4, 50 First Street), and Parcel 52 (Lot 3, 32 First Street). Parcel 75 (Lot 4A) is currently owned by Osterman Propane, Inc. It was purchased from the Town of Bridgewater on January 24, 1997. Parcel 53 (Lot 4) is town-owned land and was acquired by the Town of Bridgewater March 2, 1985. According to tax records, Osterman Propane currently leases a portion of Parcel 53 for the storage of machinery. Parcel 52 (Lot 3) is currently leased by Unison Site Management, Frederick, Maryland. Previous owners of this lot include Z&P LLC, Beverly, Massachusetts
(1997) and the Bridgewater Industrial Park (1984). Note that while town records identify this parcel as Lot 3, all site-related information refers to the parcel as Lot 3A. This report will therefore refer to the parcel as Lot 3A.

The current physical layout of the Site is depicted on Figure 3-2. The topography of the Site is relatively flat with an upland area in the northeast and north-central portion of the property. The southern and western portions of the Site consist of wetland areas (Wet Area 1 and Wet Area 2) and a drainage canal. The land surface generally slopes to the south and southwest. The Cannons Engineering Corp. operations occurred in the upland area. A grassy drainage swale runs along the southern portion of the upland area. Access to the northeast portion of the Site, along First Street, is unrestricted. Fencing restricts access from the north, south, and west sides of the property; however, a portion of the fence along the southern edge of the Site has partially collapsed.

In the late 1990s, the town sold approximately 2 acres of the Site (Lot 4A) to Osterman Propane, Inc. (Osterman), a privately owned propane storage and distribution dealer. Osterman established operations and regraded and redeveloped Lot 4A for industrial/commercial purposes. A single-story office building with a slab foundation at grade, building utilities, a septic tank and leach field for sanitary wastewater discharge, a paved driveway, two monitoring wells (IMW-1 and IMW-2) downgradient of the septic system/leach field, and a new site fence have been constructed in the northern and northeastern portion of Lot 4A. The west-northwest portion of the upland area is paved and includes a warehouse, two 30,000 gallon above-ground propane tanks on a concrete pad, and small propane gas tanks. Since the last five year review, Osterman has paved a portion of the parking area that was previously gravel.

Lot 4, west and south of the Osterman property, is town land that consists of both wetland and non-wetland areas. Lot 3A borders the southern portion of Lot 4. This lot consists of a pond, wetland areas, portions of a drainage canal, and a telecommunications relay tower. A culvert beneath First Street channels surface water flow westward in the drainage canal.

In 1997, Lot 3A was purchased by Z&P, LLC. In the spring of 1998, Unisite/Omnipoint constructed the telecommunications relay tower on Lot 3A in the southeast portion of the Site. Access to the tower is controlled by a chain-link fence and a locked gate. A gravel driveway leads to the tower which is situated on a concrete slab foundation. A degraded silt fence, hay bales, and seven monitoring wells surround the tower's foundation. Wet Area 1 and wooded lowlands are located immediately northwest and west of the tower, respectively. Two soil berms, bisected by a narrow channel, separate these features.

Hydrology

The Site is located in the southeastern portion of the Town River watershed. Surface water runoff from the Site drains to the south and southwest towards Wet Area 1 and Wet Area 2. Wet Area 1 discharges into the drainage canal via another channel between Wet Area 2 and the wooded lowland (Figure 3-2). The drainage canal flows west and empties into Hockomock Swamp. Hockomock Swamp, a vast wet and wooded wetland area, occupies a large portion of this watershed. Wetlands and floodplains of the Hockomock Swamp are hydrologically connected to an underlying system of regional aquifers. The towns of Bridgewater, West Bridgewater, and Raynham obtain their water supplies from wells in the Town River watershed. The nearest water supply well is located approximately 1.3 miles west of the Site on the southwest shore of Lake Nippenicket (Figure 3-1). Lake Nippenicket is the largest surface water body within 1-mile of the site and is included in the Hockomock Swamp Area of Critical Environmental Concern (ACEC).

The geology and the hydrogeology of the Site have been determined from previous investigations. Based on boring logs in published reports, surficial deposits consist of fill, peat, sand, sandy silt, and clayey silt. These units range in thickness from 1 to 10 feet (EPA, 1988). The fill unit is present at the surface across the upland area and in portions of Wet Area 1. The peat deposit is present at the surface in the wetland areas. The sandy silt deposit was encountered in the upland area as well as Wet Area 1 and reportedly consists of stratified silt, fine sand, and clay (EPA, 1988). A permeable sand and gravel layer underlies the sandy silt unit and is present across the Site. Some cobbles and boulders were encountered while drilling through this unit. The clayey silt unit was found below the permeable sand unit in contact with the bedrock. This unit was generally encountered in the wetland areas. Weathered and fractured sandstone and conglomerate units of the Rhode Island formation were encountered below the surficial deposits (EPA, 1988).

The MOM component of the ROD requires long-term monitoring (20 years) of contaminants in groundwater. Currently, 24 groundwater wells comprise the monitoring well network at upgradient and downgradient locations across the Site. These wells are primarily screened in the unconsolidated sand and sandy silt units and the weathered bedrock. At seven locations, wells are clustered in couplets or triplets to define any vertical hydraulic gradient and allow comparisons between the unconsolidated and consolidated units. The Remedial Investigation (1987) data indicated that groundwater in both the unconsolidated materials and the fractured bedrock flows to the south and southwest. Groundwater elevations measured in September 2009 (Year 19 of the LTMP) were similar to those from previous sampling events and confirm that the groundwater flow direction is primarily to the south/southwest toward the unnamed drainage canal. Similar flow directions have been reported in previous reports.

Land and Resource Use

The Site is located in the Bridgewater Industrial Park and is bordered to the east by First Street. Two commercial/industrial operations, J.P. Plastics and Insulation Technology, Inc. are located further east across First Street. Wetlands and a drainage canal are south of the Site. Additional wetlands and Route

24 (Amvets Memorial Highway) are west of the Site. North of the Site at 60 First Street is a commercial operation, Graziano Concrete. The area around the Site, and west of Route 24, remains zoned as I-A, i.e. Industrial-A.

The businesses in the Bridgewater Industrial Park are supplied with municipal water for drinking water purposes. There are no public or private drinking water supply wells within the Park. The nearest public municipal water supply well is located approximately 1.3 miles west of the Site on the southwest shore of Lake Nippenicket. Graziano Concrete, the commercial operation which borders the Site to the north (upgradient), uses groundwater from a bedrock supply well for its concrete operation. This well supply, which is not used for drinking water, had been sampled in the past and the results were non-detect for Site related contaminants. According to town officials, the nearest registered private domestic well is located at 444 Elm Street, approximately 1 mile north (upgradient) of the Site.

According to the Massachusetts Geographic Information System (MASSGIS), the Site is located within the boundaries of an ACEC, namely the Hockomock Swamp and its associated wetlands and floodplain areas. The Swamp receives water from the drainage canal that flows south of the Site. The Hockomock Swamp is the largest vegetated freshwater wetland area in Massachusetts. It covers an area of approximately 17,000 acres across six municipalities. Wetlands and surface water bodies within this ACEC are connected hydrologically to an underlying system of aquifers. However, the Site is not within a Sole Source or Potentially Productive Aquifer Zone. A MassDEP Wellhead Protection Zone (Zone II) is approximately 0.5 miles southwest of the Site. Potentially productive medium and high yield aquifers are located within approximately 0.3 to 0.5 miles east of the Site, respectively.

The Site is not within an area of Protected Open Space. The nearest permanently Protected Open Space areas are in the Hockomock Swamp Wildlife Management Area, approximately 0.25 miles west of the Site; another is located approximately 2000-feet north/northeast of the Site. According to the 2008 Priority and Estimated Habitat map produced by the Natural Heritage & Endangered Species Program, there are no threatened, endangered, or special concern species on the Site. The nearest Priority and Estimated Habitat is located approximately 0.25 miles to the west of the Site. The Program's database for the Town of Bridgewater documents (Data Accessed May 2010) the existence of nine species of special concern, five threatened species, and three endangered species within the town boundary.

According to Federal Emergency Management Agency (FEMA) maps, the upland and redeveloped portions of the Site are not in a Flood Hazard Zone. A Special Flood Hazard Area Zone A is mapped along the east side of Route 24, in the Wet Area 2 portion of the Site. Zone A is described as an area inundated by 100-year floods where no base flood elevation has been determined.

The Site includes several wetland areas and portions of a drainage canal. According to a MASS GIS wetland map for properties on First Street, Bridgewater, Massachusetts, wetlands on site include varieties of swamp marsh meadow or fen and wooded swamp deciduous species. Both the fen and wooded swamp deciduous wetland species have been mapped on portions of Parcel 53 (Lot 4, town land) and Parcel 52 (Lot 3A).

History of Contamination

In 1974, Cannons Engineering Corporation developed the Site on First Street to transport, store, and incinerate hazardous wastes. On-site structures included 21 storage tanks, 3 buildings, an office/warehouse, and an incinerator. The operation was licensed in 1979 to store used motor oils and emulsions, solvents, lacquers, organic and inorganic chemicals, plating waste, clay and filter media containing chemicals, plating sludge solids, and pesticides (EPA, 2005). The facility had a license to operate from 1974 until 1980, when alleged waste mishandling and reporting violations prompted the Massachusetts Executive Office of Environmental Affairs to revoke their license. The facility was placed in receivership when its owners were found to be guilty of illegal storage and disposal.

Operations ceased at the Site in 1980, leaving behind approximately 700 drums and 155,000 gallons of hazardous liquid waste and sludge in bulk storage (EPA, 2005). Analytical data obtained during investigations in the 1980s identified the presence of chemical contamination at the Site. Prior to removal and remediation activities, the on-site soils, sediments, buildings, groundwater, and surface waters were contaminated to varying degrees with one or more of the following: VOCs; PCBs; PAHs; pesticides; and metals, such as iron, selenium, manganese, lead, and silver (EPA, 2005).

Initial Response

In 1982, the State removed 155,000 gallons of sludge and liquid wastes and approximately 700 drums and incinerated the materials off site (EPA, 2005). The Site was listed on the NPL in September 1983. The EPA commenced a Remedial Investigation (RI) to assess the extent of contamination present in the air, soils, sediment, surface water, and groundwater. In addition, an Endangerment Assessment and a Wetlands Assessment were prepared to estimate the impacts to human health and the environment, respectively, from exposure to contaminants associated with the Site. The RI and the Assessments were completed in 1987. The information and data obtained during the RI and the Assessments were used to develop a Feasibility Study (FS) which screened several alternatives for remediation. The FS was completed in 1988. Based on the information contained in the RI/FS, the EPA issued a ROD in 1988 requiring remediation of the Site through Source Control to address soil and sediment contamination, and Management of Migration to monitor contamination in the groundwater at the Site.

Basis for Taking Action

Prior to remediation activities, the on-site air contained trace amounts of VOCs, including benzene and methylene chloride. Groundwater beneath the Site contained VOCs including toluene, as well as heavy metals. Soil and sediments contained PAHs, PCBs, dioxin, and pesticides in addition to VOCs and heavy metals (EPA, 2005). The organic contaminants were primarily detected in the surface soils, with low concentrations found in subsurface soils. In addition, low levels of PCBs were found in surface soils but were not found in subsurface soils (ELI, 1999). The surface water was contaminated with heavy metals including high levels of iron, selenium, lead, manganese, and silver. Direct contact with and accidental ingestion of contaminated material posed a potential public health threat (EPA, 2005). Inhaling VOCs and contaminated fugitive dust were also potential health threats. Sensitive environmental areas located near the Site include wetland areas to the south and Lake Nippenicket to the west.

Remedy Selection

The Source Control remedy included: fencing the area to restrict unauthorized access to contaminated soils; treating soil contaminated with VOCs on site by heating it using thermal desorption to remove contaminants; excavating and transporting soils containing PCBs in excess of 9 parts per million (ppm) for off-site incineration; installing a groundwater monitoring system; decontaminating and removing buildings and associated structures; sampling and treating other soils as necessary; and restoration of wetlands disturbed during site cleanup. Institutional controls were included as part of the remedy to prevent the use of on-site groundwater for all water use purposes and to protect human health. The institutional controls were also included to alert future property owners to potential site-related risks.

As part of the remedial design process, the RP's contractor completed a groundwater contaminant leaching modeling study for the contaminants of concern. The results were compared to the federal MCLs and maximum contaminant level goals (MCLGs). The response objectives for soils in the source areas were then established to prevent the migration of contaminants of concern beyond the site perimeter at levels above the MCLs and MCLGs (EPA, 2000). On-site thermal aeration (also known as thermal desorption) was then used to treat VOC-contaminated upland area and wet area soils to these protective cleanup levels.

The response objectives identified to mitigate threats to public health are as follows:

- Prevent direct contact with contaminated soils throughout the site
- Prevent ingestion of contaminated soils, standing water in the wet area
- Prevent ingestion of contaminated groundwater
- Prevent exposure to contaminants in the buildings, aboveground and underground tanks, and associated structures

The response objectives identified to mitigate threats to the environment are as follows:

- Prevent the exposure of wildlife to contaminated soil, sediments, and standing water in the wet area
- Prevent future wetlands contamination from surface water runoff and discharge of contaminated groundwater into the wetlands

The MOM portion of the remedy specified in the ROD includes restricting the use of groundwater at the Site by the use of a deed restriction/institutional controls, installing additional monitoring wells, and implementing a long term groundwater quality monitoring program to observe the presence, distribution, and migration of contaminants, if any. The ROD (EPA, 1988) stated that removal and treatment of contaminated soils would eliminate sources of further groundwater contamination and that low levels of residual groundwater contamination were expected to naturally attenuate over a 20-year period to meet drinking water standards (MCLs). This approach was selected since "groundwater contamination at the site does not pose a significant risk to human health or the environment because analysis of the groundwater conditions indicates that no contaminants migrate past the site boundaries at levels above drinking water standards (MCLs) or any other criteria which are designed to be protective of human health or the environment" (EPA, 1988).

An ESD was required in order to modify the original clean up goals because the Commonwealth of Massachusetts had reclassified groundwater underneath the site; it is no longer classified as a current or future drinking water supply. The 2013 ESD documents that the site groundwater no longer needs to meet Maximum Contaminant Level (MCLs). See Appendix C for a copy of the 2013 ESD which includes the Groundwater Use and Value Determination that MassDEP conducted for the site in 2012.

Remedy Implementation

In 1988, the EPA and the PRPs removed and disposed of numerous hazardous materials abandoned at the Site. A fence surrounding the Site was erected in 1989 (EPA, 2005).

In 1990, in accordance with the ROD and the Consent Decree and under EPA and State oversight, cleanup activities were undertaken by the RPs. The building and tanks on the Site were decontaminated and removed and the soils under the structures and in other areas of the Site were characterized. Contaminated soils requiring treatment to remove the threat to human health and the environment were remediated by either thermal desorption or incineration. Four hundred tons of PCB-contaminated soil were incinerated off site; 11,330 tons of soils containing VOCs were treated on site; 1,200 tons of steel and 1,300 tons of concrete were shipped off-site for recycling; 360 cubic yards of hazardous debris were sent to a federally-approved disposal facility; and 480 cubic yards of non-hazardous debris were shipped to a demolition materials landfill (EPA, 1991).

Confirmatory sampling indicated that the ROD soil cleanup objectives (removal of PCBs in soil to below 9 ppm and removal of VOCs and SVOCs in soil below design excavation levels) were achieved and the soil remedy as specified in the ROD was successfully implemented. These results are documented in the Preliminary Closeout Report, (EPA, 1991). Metals were not identified in the ROD as a contaminant of concern in soils.

The upland and on-site wetland areas impacted by the excavation of contaminated soils were restored. The fill materials used during the restoration process were tested and found free of contamination prior to placement on site (EPA, 2000). The site restoration activities were completed by the end of 1990 (EPA, 1991).

The final remedial action activities were completed in 1991. The testing of debris from the demolished on-site thermal treatment unit for dioxin and its subsequent removal was completed in 1991. The thermal aeration process equipment was shipped off site to an EPA-regulated disposal facility. Following the removal of all stored hazardous wastes from the site in July 1991, final grading, seeding, and other minor site activities were completed (EPA, 1991).

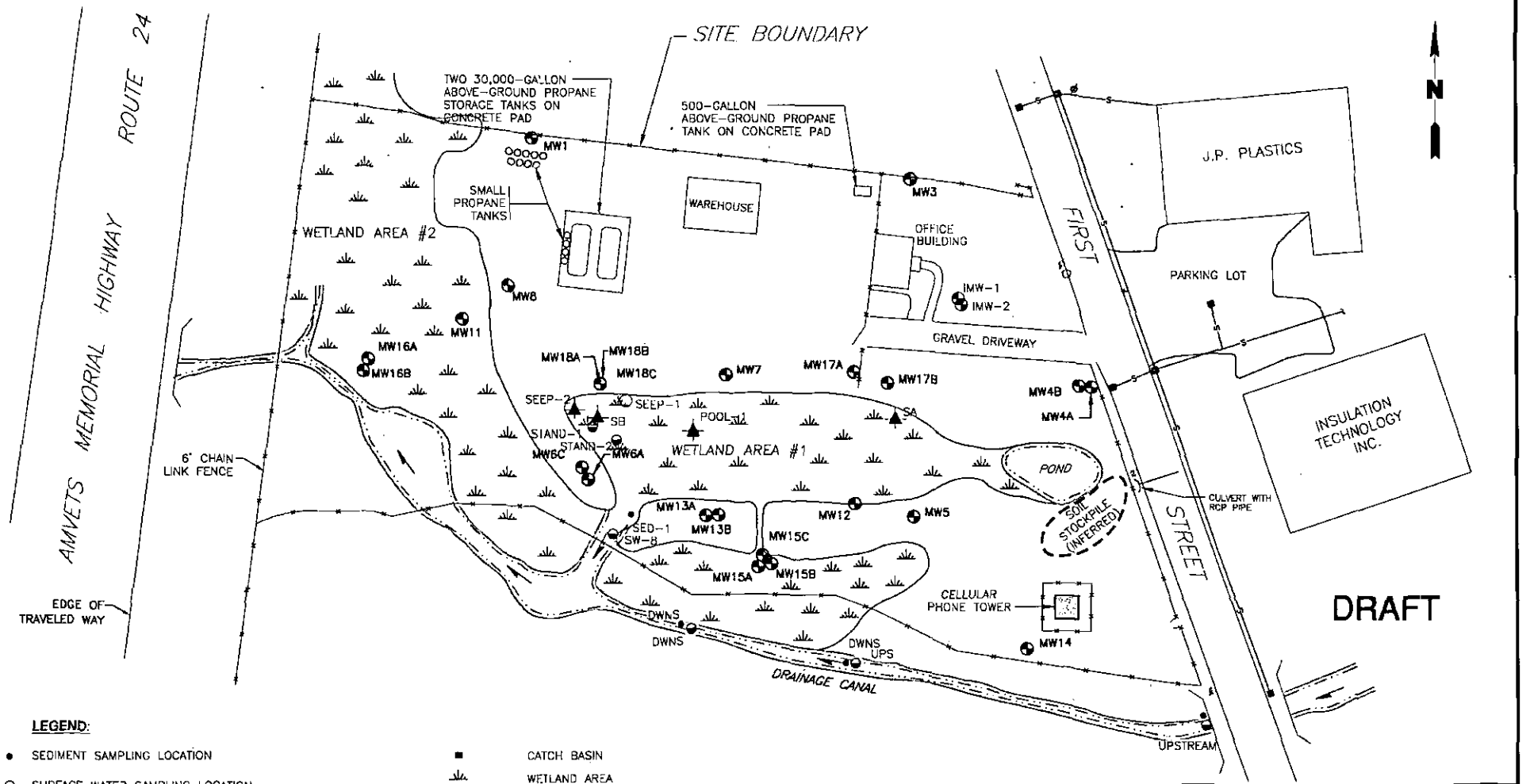
The MOM remedy consists of a long-term monitoring program including routine annual groundwater sampling and periodic sediment and surface water sampling. Long-term groundwater monitoring began in 1991 with an expected duration of 15 to 20 years. The monitoring program has been implemented by the RP contractors, GEI Consultants (1991 – 2002) and Roux Associates (2003 – 2010), under oversight provided by both EPA and MassDEP. The program was conducted in accordance with the revised Long-Term Ground Water Monitoring Plan (GEI, 1992). The last round (year 20 of 20) of the required long term sediment, seep and groundwater sampling was completed in September 2010.

System Operation/Operation and Maintenance

There is no treatment system or operation and maintenance activities currently being conducted at the site.

APPENDIX B

SITE FIGURE



LEGEND:

- SEDIMENT SAMPLING LOCATION
- SURFACE WATER SAMPLING LOCATION
- MONITORING WELL (SHALLOW)
- MONITORING WELL (BEDROCK)
- POOLED WATER SAMPLING LOCATION
- MONITORING WELL INSTALLED BY IRWIN ENGINEERS, INC.
- GROUNDWATER SEEP SAMPLING LOCATION
- CATCH BASIN
- WETLAND AREA
- FLOW DIRECTION
- STORM SEWER
- FENCE
- DRAINAGE CANAL
- POLE
- HYDRANT

80' 0 80'

MAP RESOURCE:

GEI CONSULTANTS, INC., DRAWING ENTITLED, "YEAR ELEVEN GROUNDWATER MONITORING PROGRAM CANNONS ENGINEERING SUPERFUND SITE BRIDGEWATER, MASSACHUSETTS SITE PLAN". FIGURE 1, FEBRUARY 2003.

Title:

SITE MAP

CANNONS BRIDGEWATER
BRIDGEWATER, MASSACHUSETTS

Prepared For:
CANNONS ENGINEERING PRP COMMITTEE

ROUX ASSOCIATES, INC.
Environmental Consulting & Management

Compiled by: LC	Date: 12/15/10	FIGURE
Prepared by: CRS	Scale: AS SHOWN	1
Project Mgr: IP	Office: MA	
File No: CSG70211502	Project: 111702M	

N:\PROJECTS\CANNONS 111\Bridgewater CSG02A\115\CSG70211502.cwg

APPENDIX C

2013 ESD

EXPLANATION OF SIGNIFICANT DIFFERENCES (ESD)

THE CANNONS ENGINEERING BRIDGEWATER SUPERFUND SITE (CEC)

MANAGEMENT OF MIGRATION OPERABLE UNIT

BRIDGEWATER, MASSACHUSETTS

MAY 2013

U.S. ENVIRONMENTAL PROTECTION AGENCY
NEW ENGLAND - REGION 1
5 POST OFFICE SQUARE
BOSTON, MA 02109-3912

I. INTRODUCTION

A. SITE NAME & LOCATION

Site Name: Cannons Engineering Bridgewater Superfund Site

Site Location: Bridgewater, Massachusetts, Plymouth County

Cannons Engineering Bridgewater Superfund Site

B. LEAD & SUPPORT AGENCIES

Lead Agency: United States Environmental Protection Agency (EPA)

- *Contact: Derrick Golden, EPA Remedial Project Manager, (617) 918-1448*

Support Agency: Massachusetts Department of Environmental Protection (MassDEP)

- *Contact: Jay Naparstek, MassDEP Deputy Division Director, (617) 292 - 5697*

C. LEGAL AUTHORITY FOR ESD

This Explanation of Significant Differences ("ESD") is being issued for the Cannons Engineering Bridgewater Superfund site ("Site") to document a change in a component of the remedy as originally set forth in the March 31, 1988

Record of Decision ("ROD") for the management of migration operable unit at the Site.

310 CMR 40.0932, establishes groundwater classification for the purposes of determining remediation requirements for groundwater at waste disposal sites within the Commonwealth of Massachusetts.

In October of 2012, MassDEP indicated that the groundwater classification used to develop the 1988 ROD was no longer appropriate and identified the current classification of groundwater beneath and near the site. Therefore this ESD revises the groundwater cleanup levels which must now be t achieved at the Site. This reclassification is further discussed in section,I.D., below.

The United States Environmental Protection Agency ("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).

Under Section 117(c) of CERCLA, 42 U.S.C. § 9617(c), the rule at 40 C.F.R. 300.435(c)(2)(i), and EPA guidance (Office of Solid Waste and Emergency Response [OSWER] Directive 9200.1-23P), if the EPA determines that differences in the remedial action significantly change but do not fundamentally alter the remedy selected in the ROD, with respect to scope, performance, or cost, the EPA shall publish an ESD between the remedial action being undertaken and the remedial action set forth in the ROD, and the reasons such changes are being made. 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 Cannons Engineering Bridgewater Superfund with respect to scope, performance, or cost. Therefore, this ESD is being properly issued.

D. SUMMARY OF CIRCUMSTANCES NECESSITATING THIS ESD

The remedy for the Site as selected in the 1988 ROD included both Source Control and Management of Migration ("MOM") components. The cleanup was divided into two operable units, as described in further detail in Section II.B., of this document.

The MOM portion of the remedy included an extensive groundwater monitoring program to assure that groundwater contamination above the Maximum Contaminant Levels (MCLs) did not migrate off-site, and to assure that on-site contaminant levels naturally attenuated to levels below drinking water standards.

The MOM groundwater remedy was selected in 1988, before the 1993 revisions to the Massachusetts Contingency Pan (MCP). In 1993 MassDEP revised its cleanup regulations, the MCP. Included in these revisions to the MCP was the establishment of a new groundwater classification written specifically for

addressing remediation at waste sites.

The MCP has now established the following three groundwater categories for aquifers located within the Commonwealth of Massachusetts.

- GW-1 – Applies to groundwater that is either a current drinking water resource (e.g., within a Zone 2 of a public water supply) or a potential future source of drinking water. Standards for GW-1 are intended to address the potential use of groundwater as a drinking water source.

- GW- 2 – Applies to groundwater that is considered both shallow and where there is currently a structure built on the land above the groundwater. Standards for GW-2 are intended to address the potential migration of volatile oil or hazardous material from groundwater into the indoor air.

- GW-3 - Applies to all groundwater in the Commonwealth. Standards for GW-3 are intended to address the adverse ecological effects that could result from discharge of oil or hazardous material to surface water.

On October 23, 2012, MassDEP conducted a new groundwater use & value determination specifically for the Cannons Engineering Bridgewater Superfund site. This evaluation determined that the groundwater at the Site is actually located within GW-2 and GW-3 groundwater classification areas. The Site is no longer considered to be within a GW-1 area. As a result of this reclassification, drinking water standards such as MCLs are no longer applicable or appropriate for groundwater cleanup goals. See attachment 1 for a copy of the groundwater value and use determination performed by MassDEP.

In accordance with EPA Region I's 1996 Final Ground Water Use and Value Determination Guidance, MADEP recommended a "medium use and value" determination for the groundwater at the Site in October 2012.

This recommendation is based on the non-drinking water status of the groundwater beneath and in the immediate vicinity of the site, the presence of current and potential drinking water source in nearby areas off-site, the presence of sensitive ecological resources in the immediate vicinity of the site, and the location of the site within a State designated Area of Critical Environmental Concern (ACEC). For further details, see the MassDEP groundwater value and use determination, attachment 1.

As a result of MADEP's "medium use and value" determination and the fact that the groundwater beneath the site has a non-drinking water status, EPA considers that there is no reasonable likelihood that the groundwater will be used for drinking water purposes, and therefore there is no ingestion exposure pathway which would lead to unacceptable risk.

The last three years of annual groundwater data are contained in the following reports:

- Year 20 Groundwater Monitoring Report, dated 2/10/2011
- Year 19 Groundwater Monitoring Report, dated 1/6/2010
- Year 18 Groundwater Monitoring Report, dated 3/23/2009

E. AVAILABILITY OF DOCUMENTS

This ESD and all supporting documentation shall become part of the Administrative Record for the Site. The ESD, supporting documentation for the ESD, and the Administrative Record are available to the public at the following locations and may be reviewed at the times listed:

U.S. Environmental Protection Agency
Records Center
5 Post Office Square, Suite 100
Boston, MA 02109
617-918-1440
Monday-Friday: 9:00 am - 5:00 pm
Saturday and Sunday - Closed

Bridgewater Public Library
15 South Street
Bridgewater, MA 02324
508-697-3331
Monday-Wednesday: 9:00 am – 8:00 pm
Thursday: 10:00 am – 5:00 pm
Friday: 10:00 am – 2:00 pm
Saturday: 10:00 am – 2:00 pm
Sunday: Closed

II. SUMMARY OF SITE HISTORY, CONTAMINATION AND SELECTED REMEDY

A. SITE HISTORY, CONTAMINATION AND SITE RISKS

The Cannons Engineering Bridgewater Superfund site ("CEC") facility is a 7-acre site located in a small industrial park in the western part of the Town of Bridgewater, Massachusetts. Prior to 1969, the industrial park consisted of a wooded lowland bordered to the north, south, and east by rural agricultural land. Current land use around the site consists of industrial development in the immediate vicinity to the north and east, and a wooded lowland to the south and west, and agricultural and residential development in the outlying areas.

The CEC Bridgewater site is located in the southeastern portion of the Town River watershed which has an estimated area of 56 square miles and feeds water supply wells for the towns of Bridgewater, West Bridgewater, and Raynham. Hockomock Swamp occupies a large portion of the watershed. Lake Nippenicket is the largest surface waterbody located within 1 mile of the Site. The nearest

drinking water well, operated by the Town of Raynham, is located 1.3 miles west of the Site on the shore of Lake Nippenicket.

The CEC facility is one of the four separate but related sites which form the Cannons Site Group. The others are Cannons Plymouth Harbor located in Plymouth, Massachusetts; Tinkham's Garage in Londonderry, New Hampshire; and Gilson Road in Nashua, New Hampshire. All four sites are being handled under one enforcement effort.

CEC first purchased the parcel of land at the Site in November, 1974. The property was developed by them to handle, store, and incinerate chemical wastes. These activities occurred frequently at the Site between 1974 and November, 1980 when operations at the Site ceased after the MassDEP (then called the Department of Environmental Quality Engineering) revoked CEC's Waste License, citing document falsification and other waste reporting violations.

Over 700 drums and approximately 155,000 gallons of liquid waste and sludge in bulk storage were left behind on-site by CEC. Between 1980 and 1982, MassDEP and EPA conducted Site inspections, performed sampling and analyses and confirmed the presence of chemical contamination at the Site. Several tanks and drums were also observed to be leaking. In order to alleviate the problem of leaking contamination and wastes left on-site, the MassDEP performed a removal action. In October 1982, MADEP's contractor, Jet Line Services, Inc., removed approximately 155,000 gallons of sludge and liquid wastes that were stored in tanks and approximately 711 drums from the Site. A subsequent removal was conducted by the a group of Potentially Responsible Parties (the "PRP Group") in June1988. The PRP Group removed the bulk contents of an underground tank, a septic tank, 3 tanker trailers and small (5 gallon or less) containers from laboratory and storage areas at the Site.

B. SUMMARY OF THE MOM REMEDY

The ROD for the CEC Site was signed by EPA on March 31, 1988. The ROD separated the cleanup plan for the Site into two Operable units; Management of Migration (MOM) for groundwater and Source Control for soils. This ESD only pertains to the MOM portion of the remedy.

1. Management of Migration

The MOM portion of the remedy included a twenty year groundwater monitoring program to assure that contamination above the Maximum Contaminant Levels (MCLs) did not migrate off-site, and to also assure that contaminant levels on-site naturally attenuated. The 1988 ROD estimated that groundwater cleanup target levels, based on the ingestion of on-site groundwater, would be achieved within 15 to 20 years.

The last year of groundwater sampling, the year 20 groundwater sampling event, was completed in September of 2012. Except for arsenic, all contaminants of concern currently met MCLs. However because the groundwater at the site in no longer considered a drinking water aquifer, the requirement to reach MCLs is no longer applicable nor relevant.

The management of migration remedy also required that institutional controls be placed on the property to restrict the use of groundwater at the Site. The institutional controls were recorded with the Registry of Deeds in September of 1991 and remain in place.

III. BASIS FOR THE DOCUMENT

This ESD is being issued to explain a modification to the selected cleanup levels as set forth in the March 31, 1988, ROD for the Site. The modification described in this ESD, reflects the current MCP groundwater classification for waste sites in the Commonwealth. The current groundwater classification prompts a change in the Site-related cleanup levels. The proposed modifications to the MOM remedy described in this ESD will still be protective of both human health and the environment.

The EPA Risk Assessment Information System was used to recalculate the risks of arsenic and 1, 4-dioxane for a standard recreational receptor. The cancer risk for a receptor exposed to arsenic from childhood through adulthood for a total of 30 years was 5×10^{-6}, which is within EPA's acceptable human health risk range of 1×10^{-6} to 1×10^{-4}.

With regards to 1, 4-dioxane, the cancer risk for a receptor exposure from childhood through adulthood for a total of 30 years was 4×10^{-8}, which is well below EPA's acceptable risk range of 1×10^{-6} to 1×10^{-4}.

Lastly, an evaluation of ecological risk due to exposure of aquatic organisms to arsenic and 1, 4-dioxane in Site groundwater that may emerge into surface water in the wetlands to the west of the Site, indicates that there is no actionable risk even if there were no dilution of the maximum concentrations of arsenic and 1, 4-dioxane on the Site,

IV. DESCRIPTION OF SIGNIFICANT DIFFERENCES

The proposed modifications to the remedy are summarized below.

Original Remedy for the Management of Migration Operable Unit

The original remedy for the MOM Operable Unit is described in detail in Section II.B.1 of this document.

Modified Remedy

The purpose of this ESD is to modify only the MOM portion of the remedy by accepting the recent groundwater reclassification, and consequently modifying the cleanup levels for the Site.

In order to determine the appropriate groundwater classification and groundwater cleanup levels, in October of 2012, MassDEP completed a new groundwater use and value determination specific to the Cannons Engineering site. This evaluation determined that groundwater beneath the Site is actually located within a GW-2 and GW-3 groundwater classification area. There is no ingestion of groundwater; therefore,

MCLs, which are appropriate for a GW-1 aquifer, are no longer applicable or appropriate to groundwater at the Site.

Roux Associates, Inc., consultant to the PRPs, indicated in a memorandum to EPA (Roux Associates, Inc., 2010) that the GW-1 area south of the Site is not receiving contaminated groundwater from the Site. This opinion was supported both by the hydrology at the Site and distance from the Site. The Site is located about 0.4 miles from the boundary of a Zone II. This Zone II boundary is in a hydraulically cross-gradient location relative to the Site, and therefore, groundwater at the Site is flowing away from the Zone II and ultimately discharging into the freshwater wetlands in the western part of the Site and beyond to the west. Groundwater has been demonstrated to flow in this direction for over 20 years based on groundwater monitoring at the Site.

The year 20, 19 & 18 annual groundwater monitoring reports from the last three years of annual groundwater sampling, demonstrates that all remaining contaminants of concern at the Site are protective of EPA's human health and ecological risk values. Furthermore, though the "Method I" standards outlined in the Massachusetts Contingency Plan (MCP) are not considered Applicable or Relevant and Appropriate requirements (ARARs) under CERCLA, it is important to note that groundwater also currently meets the GW-2 and GW-3 standards under the MCP.

Annual groundwater monitoring reports showing data collected in the 18th, 19th, and 20th year of monitoring provides the data which supports that the concentrations of all contaminants of concerns currently meet the MCP GW-2 and GW-3 standards.

In addition, the contaminant levels in these three years of monitoring do not exceed EPA's range for unacceptable risks to human health and the environment. See attachment 2 for EPA's determination of protectiveness for both human health and the environment.

Summary of Costs

There are no additional costs associated with this 2013 ESD.

V. SUPPORTING AGENCY COMMENTS

The State of Massachusetts (MassDEP) has participated with the EPA in reviewing the modifications to the groundwater classification and cleanup levels described herein, and concur with this ESD. See attachment 3 for the concurrence letter from the MassDEP.

VI. STATUTORY DETERMINATIONS

EPA believes that the modified remedy as stated in this ESD remains protective of human health and the environment, complies with all Federal and State requirements that are applicable or relevant and appropriate to this remedial action, meets the remedial action objectives specified in the 1988 ROD, and is cost-effective.

VII. PUBLIC PARTICIPATION COMPLIANCE

In accordance with Section 117(d) of CERCLA and Section 300.825(a) of the NCP, the ESD and supporting documentation shall become part of the Administrative Record for the Site. This ESD and the Administrative Record are available for public review at the locations and times listed in Section I(E) above. A public notice, which summarizes the modification to the remedy as set forth in the ESD shall be published in a local newspaper of general circulation following the signing of this ESD.

VIII. DECLARATION

For the foregoing reasons, by my signature below, I approve the issuance of this 2013 Explanation of Significant Differences for the Cannons Engineering Superfund Site located in Bridgewater, Massachusetts and the changes and conclusions stated therein.

Mary Baranski for

James T. Owens III, Director
Office of Site Remediation and Restoration
USEPA New England – Region 1
5 Post Office Square, Suite 100
Boston, MA 02109-3912

05/15/13
Date

Attachment 1 –MassDEP Groundwater Use and Value Determination

Attachment 2 – Copy of March 2013 EPA memorandum

Attachment 3 – MassDEP Concurrence Letter

Attachment 1 – MassDEP Groundwater Use and Value Determination

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

October 23, 2012

Derrick Golden, Remedial Project Manager
US EPA Region 1
Mail Code OSRR07-4
5 Post Office Square, Suite 100
Boston, MA 02109-3912

Subject: Cannons Engineering Corporation Superfund Site, Bridgewater, Massachusetts
Groundwater Use and Value Determination

Dear Derrick:

Attached please find the Groundwater Use and Value Determination prepared by the Department (MassDEP) for the Cannons Engineering Corporation Superfund Site located in Bridgewater, MA. This Use and Value Determination was developed by Mass, pursuant to MOA between EPA and MassDEP and consistent with EPA's Groundwater Use and Value Determination Guidance.

In determining the use and value of the groundwater in the vicinity of the Cannons Bridgewater Site, we referred to the aquifer classification contained in the Massachusetts Contingency Plan (MCP). The classification in the MCP gives consideration to all of the factors in the Use and Value Guidance.

Enclosed with the Use and Value Determination is the GIS 21E Resource map (0.5 and 1 mile radii) used to develop the Use and Value Determination. This maps provides a variety of information, including the USGS yield classification, the locations of public water supplies and zones of protection, and areas of sensitive ecological resources.

If you have any questions regarding this letter, please feel free to contact me at 292-5697.

Very truly yours,

Jay Naparstek
Deputy Division Director

GROUNDWATER USE AND VALUE DETERMINATION
Cannons Engineering Superfund Site, Bridgewater, MA
October, 2012

Pursuant to the Memorandum of Agreement (MOA) between the EPA and MassDEP concerning Ground Water Use and Value Determinations, and consistent with EPA's 1996 Final Ground Water Use and Value Determination Guidance, the Department has developed a Use and Value Determination of the groundwater beneath and in the vicinity of the Cannons Engineering Superfund site located in Bridgewater, MA (the "Site"). The purpose of the Use and Value Determination is to identify whether the local area groundwater is of high, medium, or low use and value. These are designations contained in EPA's guidance. In the development of this Determination, as agreed to in the MOA, the Department has applied the criteria for groundwater classification promulgated in the Massachusetts Contingency Plan (MCP). The classification contained in the MCP considers criteria similar to those recommended in EPA's Use and Value Guidance.

The Departments recommendation for the groundwater at the Cannons Engineering Bridgewater site is medium use and value. This recommendation is based on the non-drinking water status of the groundwater beneath and in the immediate vicinity of the site, the presence of current and potential drinking water source areas off-site but within the study area, the presence of sensitive ecological resources in the immediate vicinity of the site, and the location of the site within a State designated Area of Critical Environmental Concern (ACEC). This recommendation is explained in more detail below.

For the purposes of this Determination, the groundwater under evaluation is defined as that underlying the Site and the surrounding area extending in a two mile radius from the central portion of the Site.

The Cannons Engineering site in Bridgewater occupies approximately 6 acres of land between Route 24 and First Street. Operations at the site that included the transportation, storage, and incineration of hazardous wastes resulted in contamination of on-site soils, sediments, buildings, groundwater, and surface waters. Contaminants of concern included volatile organic compounds (VOC), polychlorinated biphenyls (PCB), polycyclic aromatic hydrocarbons (PAH), pesticides, and metals. Groundwater beneath the site contained VOCs including toluene, as well as heavy metals.

The completed source control portion of the cleanup had several components, including on-site thermal desorption of upland area and wet area soils that were contaminated with VOCs, and off-site incineration of PCBs contaminated soils in excess of 9 parts per million (ppm).

The management of migration portion of the clean up included restricting the use of groundwater at the site by the use of a deed restriction/institutional controls, installing additional monitoring wells, and implementing a long term groundwater quality monitoring program to observe the presence, distribution and migration of contaminants. The Record of Decision anticipated that removal and treatment of contaminated soils would eliminate sources of further groundwater

contamination and that the residual low levels of contamination found in the groundwater would meet drinking water standards through monitored natural attenuation over 20 years.

Long-term groundwater monitoring began in 1991. Annual sampling was required to be conducted for at least twenty years to demonstrate and ensure that monitored natural attenuation was occurring. The 20th annual sampling event was completed in September 2010. Analytical results indicate that all VOCs have met their respective MCLs. However, the 2009 analytical data for inorganics showed that 7 out of 24 groundwater samples exceeded the MCL for arsenic. The arsenic exceedences are isolated and appear to be confined to within the site boundaries. It is suggested by the parties conducting the cleanup that the arsenic exceedences are indicative of a reducing environment associated with the chlorinated organics contamination. They anticipate that the arsenic will become adsorbed to aquifer matrix materials and/or precipitate out of solution as the aquifer gradually returns to a more oxidized state now that VOC concentrations have been significantly reduced. EPA's 2010 Five Year Review recommended an additional round of groundwater sampling for arsenic be conducted prior to the next Five Year Review (2015).

The land use surrounding the Site is mostly light industrial with some residential areas. The nearest residence is located 1/8 of a mile from the site. The closest municipal drinking water well is located in Raynham, approximately 1 mile southwest of the site. The Bridgewater municipal Town wells are located 2.6 miles east of the site. Sensitive ecological areas are located near the site and include wetland areas to the east and west of the site, and Lake Nippenicket to the west. The site is within a Massachusetts designated Area of Critical Environmental Concern, the Hockomock Swamp ACEC.

The aquifer immediately beneath the Site is classified as a low yield aquifer by the United States Geological Survey. This groundwater is not considered to be a Current or Potential Drinking Water Source Area (MCP Category GW-1) and is category GW-3 under the MCP. Drinking water standards do not apply at GW-3 areas. However, there are both Current and Potential Drinking Water Source Areas within the study area. Approximately ¼ mile to the east of the site is a medium yield aquifer as defined by the USGS. This is a category GW-1, Potential Drinking Water Source Area. Approximately 1/3 mile to the southwest is another medium yield aquifer, and the edge of a delineated Zone II for a series of Raynham municipal wells. 1.3 miles to the east is the edge of a delineated Zone II for a series of Bridgewater municipal wells that are located approximately 2.6 miles east of the Site. These areas are category GW-1 groundwaters and considered to be Current or Potential Drinking Water Source Areas. State and federal drinking water standards apply to these areas. Any groundwater migrating from the site should meet or exceed State and federal drinking water standards (MCLs/GW-1) if and when it reaches any of these areas.

In summary, groundwater directly beneath and in the immediate vicinity of the site is category GW-3 and GW-2 and not considered a source of drinking water. Drinking water standards are not directly applicable in these areas. However, some groundwater areas outside the site boundary and the immediate vicinity of the site, but within the study area, are category GW-1 and should be evaluated as drinking water source areas. Drinking water standards do apply in these locations. Finally, there are sensitive environmental receptors within the study area.

Decisions on final remedy and protectiveness should include evaluation of the impacts to these areas. Definitions of the various groundwater categories in the MCP are summarized as follows:

GW-1 The groundwater is located within an area that is currently used for drinking water or is considered to be a location that has the potential to be developed for public water supply. State and federal drinking water standards are directly applicable to these areas.

GW-2 This designation addresses areas where there is a potential for migration of vapors from groundwater to occupied structures. The classification applies to locations where groundwater has an average annual depth of 15 feet or less and where there is an occupied building or structure within a 30 foot surface radius of that groundwater. In these cases, evaluation of risk should include indoor air exposures through contaminant vapor intrusion.

GW-3 This designation considers the impacts and risks associated with the discharge of groundwater to surface water and therefore applies to all groundwater in the Commonwealth, regardless of any other category it may also fall within. Evaluation of risk should include human health and environmental exposure resulting from discharge of contaminated groundwater to surface water bodies.

Considering these classifications, evaluation of the groundwater risks remedy performance at the Cannons Bridgewater site should include, but is not limited to, the following:

Human Health:

a) vapor seepage into buildings,
b) migration of contaminants to GW-1 areas off-site,
c) use of the water in industrial processes,
d) excavation into groundwater (i.e., worker exposure),
e) potential exposures resulting from discharge to surface water (e.g. wading, recreation, fishing).

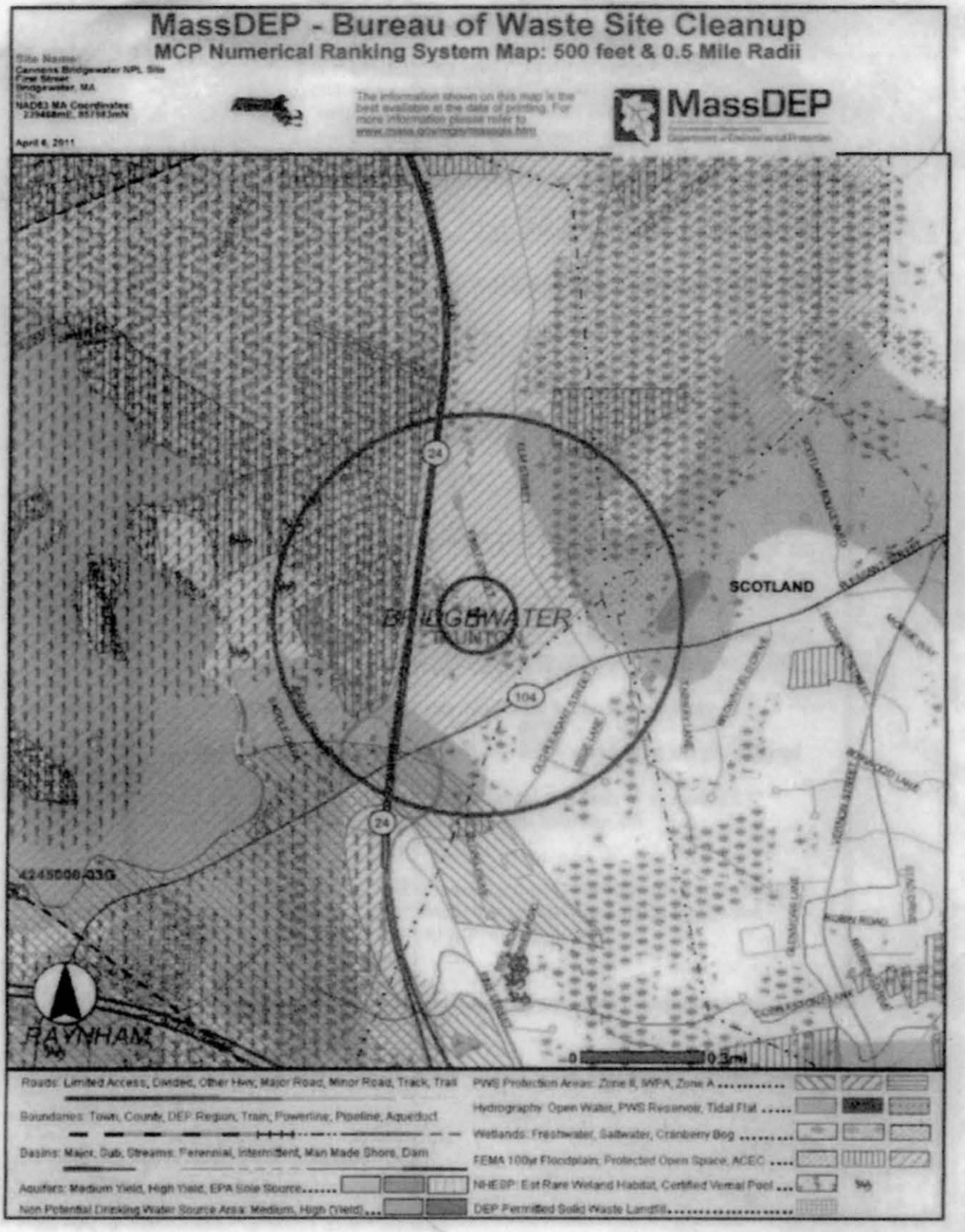
Ecological:

a) ecological risks posed by discharge of groundwater to nearby wetlands and Lake Nippenicket.

In light of the use and value factors contained in EPA's guidance and similar criteria established in the MCP that were examined in this determination, the Department recommends a medium use and value for the Site groundwater.

USE AND VALUE FACTORS	CANNONS ENGINEERING CORP. SITE SITE-SPECIFIC DETERMINATION
1.) Quantity	• Low Yield on and in immediate vicinity of site; • Areas of medium and high yield off-site but within 1/3 mile
2.) Quality	• Groundwater not impacted by the site is of good quality to the best of our knowledge. Municipal wells are located approximately 1 mile southwest of the site; Delineated Zone II's are located southeast and west of the site.
3.) Current Public Water Supply Wells	• Municipal wells and Wellhead Protection Areas are located within Study Area
4.) Current Private Drinking Water Supply Wells	• No known private wells within Study Area
5.) Likelihood and Identification of Future Drinking Water Use	• Groundwater directly beneath and in the immediate vicinity of the site is notbelieved to be suitable for public water supply development • Aquifer to the SE is already in use for public water supply; aquifer to the west has potenrial for water supply development; No known current plans for this. • Study area consists of agricultural, residential, and industrial development • Approximately 800 people live within a 1 mile radius of site
6.) Other Current or Reasonable Expected Ground Water Use in Review Area	• Unkown
7.) Ecological Value	• Shallow groundwater discharge to drainage canals and nearby wetlands to the south and west • Deeper groundwater discharge to southern portion of Hockomock Swamp • Potential receptors of contaminated groundwater are aquatic and terrestrial biota inhabiting the wetlands (discharge area for shallow water) • Endangered species habitat exists on-site

8.) Public Opinion	•



Attachment 2 – Copy of March 2013 EPA risk memorandum

MEMORANDUM

To: Derrick Golden
From: Richard Sugatt
Date: March 21, 2013
Subject: Residual risk evaluation for Cannons Engineering Superfund Site, Bridgewater, MA

The purpose of this memorandum is to evaluate the potential for human health and ecological risk due to residual contaminants in groundwater at the Cannons Engineering Superfund Site in Bridgewater, MA. As documented below, it is concluded that there is no actionable human health or environmental risk due to residual contaminants in groundwater at the Site.

On October 23, 2012 Mass DEP conducted a new groundwater use and value determination specifically for the Cannons Engineering Bridgewater Superfund Site, and this evaluation determined that groundwater at the Site is actually located within GW-2 and GW-3 groundwater classification areas. The Site is no longer considered to be within a GW-1 area. As a result of this reclassification, drinking water standards such as MCLs are no longer applicable or appropriate for groundwater cleanup goals.

As shown on Table 1, the latest available groundwater data (2009, 2010) indicate that arsenic and 1, 4-dioxane are the only two groundwater contaminants that exceeded human health standards or guidance. Arsenic at a maximum concentration of 40 ug/L exceeded the MCL and Massachusetts MCL, both 10 ug/L. 1, 4-dioxane at a maximum concentration of 4.9 ug/L exceeded the Massachusetts Drinking Water Guideline of 3 ug/L. Since the GW-1, MCL, MMCL, and Massachusetts Drinking Water Guideline are not applicable or appropriate, and use of groundwater at the Site for drinking water is not reasonably foreseeable, there is no current or future completed human health exposure pathway to groundwater, and therefore, no human health risk.

Although GW-2 and GW-3 standards are not considered applicable or relevant and appropriate requirements (ARARs) under the Superfund Program, I have reviewed site-related data against these state standards as another basis of comparison. Table 1 demonstrates that the maximum concentrations of all detected chemicals do not exceed these standards. GW-2 standards are designed to be protective against vapor intrusion of volatile organic chemicals (VOCs) from groundwater into buildings. The absence of GW-2 exceedances supports the conclusion that vapor intrusion is not of concern. This conclusion is also supported by the conclusion in the most recent Five Year Review Report (EPA, 2010) that there was no complete vapor intrusion pathway based on Site conditions, as well as conservative Johnson & Ettinger modeling
Similarly, the absence of GW-3 exceedances supports the conclusion that ecological impacts to surface water are unlikely when Site groundwater reaches surface water. All groundwater in Massachusetts is classified as GW-3, and the GW-3 standards are designed to be protective of aquatic organisms after 10-fold dilution of groundwater as it emerges into surface water.

Roux Associates, Inc., consultant to the PRPs, indicated in a memorandum to EPA (Roux Associates, Inc., 2010) that the GW-1 area south of the Site is not receiving contaminated groundwater from the Site. This opinion was supported both by the hydrology at the Site and distance from the Site. The Site is located about 0.4 miles from the boundary of a Zone II. This Zone II boundary is in a hydraulically cross-gradient location relative to the Site, and therefore, groundwater at the Site is flowing away from the Zone II and ultimately discharging into the freshwater wetlands in the western part of the Site and beyond to the west. Groundwater has been demonstrated to flow in this direction for over 20 years based on groundwater monitoring at the Site.

To address the potential concern that groundwater at the Site migrating to the off-Site wetlands may pose a human health risk, this memorandum evaluates the human health risk to off-Site recreators as described below:

Although unlikely, it might possible that people who explore the off-Site wetlands to the west of the Site may contact surface water comprised in part of groundwater from the Site. The risk calculator at the Risk Assessment Information System (http://rais.ornl.gov/cgi-bin/prg/RISK_search?select=chem) was used to calculate the risks of arsenic and 1, 4-dioxane for a standard recreational receptor, using the undiluted maximum concentration of 40 ug/L arsenic and 4.9 ug/L of 1, 4-dioxane in Site groundwater.

Standard exposure assumptions for dermal contact and incidental ingestion of surface water for recreational adults and children included ingestion of 0.05 L/day, exposure time of 1 hour/day, exposure frequency of 45 days/year, exposure duration of 30 years, over a lifetime of 70 years. As shown in the attached printout for 40 ug/L arsenic, the non-cancer Hazard Quotient for both adults and children was less than 1, indicating that non-carcinogenic effects are unlikely. As shown in the attached printout for arsenic, the cancer risk for a receptor exposed from childhood through adulthood for a total of 30 years was 5×10^{-6}, which is within EPA's acceptable risk range of 1×10^{-6} to 1×10^{-4}.

As shown in the attached printout for 4.9 ug/L of 1, 4-dioxane, the non-cancer Hazard Quotient for both adults and children was less than 1, indicating that non-carcinogenic effects are unlikely. As shown in the attached printout for 1, 4-dioxane, the cancer risk for a receptor exposure from childhood through adulthood for a total of 30 years was 4×10^{-8}, which is well below EPA's acceptable risk range of 1×10^{-6} to 1×10^{-4}.

To address the potential concern that arsenic in groundwater at the Site migrating to the off-Site wetlands may pose an ecological risk, it is sufficient conclude there is no potential ecological risk because the National Recommended Water Quality Criteria for protection of aquatic life for chronic exposure is 150 ug/L as the Criteria Continuous Concentration (CCC). This indicates no risk to aquatic life because the maximum concentration of 40 ug/L in groundwater at the Site is lower than the CCC.

Similarly for 1, 4-dioxane, the available aquatic information indicates that aquatic toxicity is low and does not occur at concentrations below 145 mg/L. The 1995 OPPT Chemical Fact Sheet for 1, 4-dioxane (EPA, 1995) (http://www.epa.gov/chemfact/dioxa-sd.txt) cites reports describing acute and chronic toxicity of 1,4-dioxane to *Pimephales promelas* (fathead minnows). Acute effects occurred at 10,000 mg/L but not at 6000 mg/L, which was the highest no observed adverse effect level (NOAEL). A 32-day embryo-larval test identified a Maximum Allowable Toxicant Concentration (MATC) >145 mg/L, which means that no chronic effects occurred at 145 mg/L. Additional acute toxicity studies indicated that the 96-hour LC50 value for *Lepomis macrochirus* (bluegill) was 10,000 ppm (10,000 mg/L) in fresh water, and the 96-hour LC50 value for the fish *Menidia beryllina* in synthetic seawater was 6,777 ppm (6777 mg/L). These toxicity data are sufficient to conclude that the maximum concentration of 1, 4-dioxane in Site groundwater (4.9 ug/L) is much lower than the levels that are toxic to aquatic organisms.

Summary and Conclusions

Although the maximum concentration of arsenic and 1, 4-dioxane in Site groundwater exceeded human health standards or guidelines, it is concluded there are no human health risks due to ingestion of on-Site groundwater because there is no reasonably foreseeable use of this groundwater for drinking water purposes, as shown by the MassDEP reclassification of groundwater at the Site from GW-1 to GW-2 and GW-3. There are no on-Site human health risks due to vapor intrusion because it was concluded in the most recent Five Year Review report that there is no completed vapor intrusion exposure pathway. According to available data, Site groundwater moves to the west rather than to the south towards the nearest GW-1 area, therefore, there is no risk due to use of off-site drinking water. An evaluation of human health risk due to contact with arsenic and 1, 4-dioxane in Site groundwater that may emerge into surface water in the wetlands to the west of the Site indicates that there is no actionable risk even if there were no dilution of the maximum concentrations of arsenic and 1, 4-dioxane on the Site. An evaluation of ecological risk due to exposure of aquatic organisms to arsenic and 1, 4-dioxane in Site groundwater that may emerge into surface water in the wetlands to the west of the Site indicates that there is no actionable risk even if there were no dilution of the maximum concentrations of arsenic and 1, 4-dioxane on the Site. It is concluded that there is no actionable human health or environmental risk due to residual contaminants in Site groundwater.

References

Roux Associates, Inc. May 21, 2010. Memorandum to Derrick Golden from Ian Phillips, LSP, Roux Associates, Inc.

U.S. EPA. 2010. Five-Year Review Report Fourth Five-Year Review Report for Cannons Engineering Bridgewater Superfund Site, Town of Bridgewater Plymouth County, Massachusetts. September 2010.

U.S. EPA. 1995. OPPT Chemical Fact Sheet 1, 4-Dioxane Fact Sheet: Support Document (CAS No. 123-9-1). February, 1995. EPA 749-F-95-010a.

Recreator Equation Inputs for Surface Water

Variable	Value
TR (target cancer risk) unitless	1.0E-6
ED_{rec} (exposure duration - recreator) years	30
THQ (target hazard quotient) unitless	1
LT (lifetime - recreator) yr	70
EF_{recw} (exposure frequency) d/yr	45
ET_{rec} (exposure time) hours/day	1
Apparent thickness of stratum corneum (cm)	0.001
BW_a (body weight - adult) kg	70
SA_{rec} (skin surface area - adult) cm^2	18000
IRW_{rec} (water intake rate - adult) L/day	0.05
$ET_{recw\text{-}adj}$ (age-adjusted exposure time) hour/event	1
$ET_{recw\text{-}madj}$ (mutagenic age-adjusted exposure time) hour/event	1
$IFW_{rec\text{-}adj}$ (age-adjusted water intake rate) L/kg	1.67
$IFWM_{rec\text{-}adj}$ (mutagenic age-adjusted water intake rate) L/kg	6.214
$DFW_{rec\text{-}adj}$ (age-adjusted dermal factor) cm^2-event/kg	396514
$DFWM_{rec\text{-}adj}$ (mutagenic age-adjusted dermal factor) cm^2-event/kg	1142743
$BW_{0\text{-}2}$ (body weight) kg	15
$BW_{2\text{-}6}$ (body weight) kg	15
$BW_{6\text{-}16}$ (body weight) kg	70
$BW_{16\text{-}30}$ (body weight) kg	70
$ED_{0\text{-}2}$ (exposure duration) year	2
$ED_{2\text{-}6}$ (exposure duration) year	4
$ED_{6\text{-}16}$ (exposure duration) year	10
$ED_{16\text{-}30}$ (exposure duration) year	14
$EF_{0\text{-}2}$ (exposure frequency) day/year	45
$EF_{2\text{-}6}$ (exposure frequency) day/year	45
$EF_{6\text{-}16}$ (exposure frequency) day/year	45
$EF_{16\text{-}30}$ (exposure frequency) day/year	45
$ET_{recw0\text{-}2}$ (exposure time) hour/event	1

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Recreator Equation Inputs for Surface Water

Variable	Value
$ET_{recw2-6}$ (exposure time) hour/event	1
$ET_{recw6-16}$ (exposure time) hour/event	1
$ET_{recw16-30}$ (exposure time) hour/event	1
EV_{0-2} (events) events/day	1
EV_{2-6} (events) events/day	1
EV_{6-16} (events) events/day	1
EV_{16-30} (events) events/day	1
IRW_{0-2} (water intake rate) L/hour	0.05
IRW_{2-6} (water intake rate) L/hour	0.05
IRW_{6-16} (water intake rate) L/hour	0.05
IRW_{16-30} (water intake rate) L/hour	0.05
SA_{0-2} (skin surface area) cm^2	6600
SA_{2-6} (skin surface area) cm^2	6600
SA_{6-16} (skin surface area) cm^2	18000
SA_{16-30} (skin surface area) cm^2	18000
ED_{recwa} (exposure duration - adult) year	24
EF_{recwa} (adult exposure frequency) day/year	45
ET_{recwa} (adult exposure time) hour/event	1
EV_{recwa} (adult) events/day	1
BW_{recwa} (body weight - adult) kg	70
SA_{recwa} (skin surface area - adult) cm^2	18000
IRW_{recwa} (water intake rate - adult) L/hr	0.05

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Recreator RISK for Surface Water

Chemical	Chronic RfD (mg/kg-day)	RfD Reference	Ingestion SF $(mg/kg\text{-}day)^{-1}$	SFO Reference	RAGSe GIABS (unitless)	K_p	FA	EPD	Concentration (mg/L)	Concentration (ug/L)	Child Ingestion Noncarcinogenic CDI
Arsenic, Inorganic	3.00E-04	IRIS	1.50E+00	IRIS	1	0.001	1	1	0.04	40	1.64E-05
Total Risk/HI											

Child Dermal Noncarcinogenic CDI	Adult Ingestion Noncarcinogenic CDI	Adult Dermal Noncarcinogenic CDI	Adjusted Ingestion Noncarcinogenic CDI	Adjusted Dermal Noncarcinogenic CDI	Ingestion Carcinogenic CDI	Dermal Carcinogenic CDI	Child Ingestion HQ	Child Dermal HQ
2.17E-06	3.52E-06	1.27E-06	6.10E-06	1.45E-06	2.61E-06	6.21E-07	5.48E-02	7.23E-03
							5.48E-02	*7.23E-03*

Child Total HI	Adult Ingestion HQ	Adult Dermal HQ	Adult Total HI	Adjusted Ingestion HQ	Adjusted Dermal HQ	Adjusted Total HI	Ingestion Risk	Dermal Risk	Total Risk
6.20E-02	1.17E-02	4.23E-03	1.60E-02	2.03E-02	4.83E-03	2.52E-02	3.92E-06	9.31E-07	4.85E-06
6.20E-02	*1.17E-02*	*4.23E-03*	*1.60E-02*	*2.03E-02*	*4.83E-03*	*2.52E-02*	*3.92E-06*	*9.31E-07*	*4.85E-06*

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Recreator Equation Inputs for Surface Water

Variable	Value
TR (target cancer risk) unitless	1.0E-6
ED_{rec} (exposure duration - recreator) years	30
THQ (target hazard quotient) unitless	1
LT (lifetime - recreator) yr	70
EF_{rec-w} (exposure frequency) d/yr	45
ET_{rec} (exposure time) hours/day	1
Apparent thickness of stratum corneum (cm)	0.001
BW_a (body weight - adult) kg	70
SA_{rec} (skin surface area - adult) cm^2	18000
IRW_{rec} (water intake rate - adult) L/day	0.05
$ET_{recw-adj}$ (age-adjusted exposure time) hour/event	1
$ET_{recw-madj}$ (mutagenic age-adjusted exposure time) hour/event	1
$IFW_{rec-adj}$ (age-adjusted water intake rate) L/kg	1.67
$IFWM_{rec-adj}$ (mutagenic age-adjusted water intake rate) L/kg	6.214
$DFW_{rec-adj}$ (age-adjusted dermal factor) cm^2-event/kg	396514
$DFWM_{rec-adj}$ (mutagenic age-adjusted dermal factor) cm^2-event/kg	1142743
BW_{0-2} (body weight) kg	15
BW_{2-6} (body weight) kg	15
BW_{6-16} (body weight) kg	70
BW_{16-30} (body weight) kg	70
ED_{0-2} (exposure duration) year	2
ED_{2-6} (exposure duration) year	4
ED_{6-16} (exposure duration) year	10
ED_{16-30} (exposure duration) year	14
EF_{0-2} (exposure frequency) day/year	45
EF_{2-6} (exposure frequency) day/year	45
EF_{6-16} (exposure frequency) day/year	45
EF_{16-30} (exposure frequency) day/year	45
$ET_{recw0-2}$ (exposure time) hour/event	1

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Recreator Equation Inputs for Surface Water

Variable	Value
$ET_{recw2-6}$ (exposure time) hour/event	1
$ET_{recw6-16}$ (exposure time) hour/event	1
$ET_{recw16-30}$ (exposure time) hour/event	1
EV_{0-2} (events) events/day	1
EV_{2-6} (events) events/day	1
EV_{6-16} (events) events/day	1
EV_{16-30} (events) events/day	1
IRW_{0-2} (water intake rate) L/hour	0.05
IRW_{2-6} (water intake rate) L/hour	0.05
IRW_{6-16} (water intake rate) L/hour	0.05
IRW_{16-30} (water intake rate) L/hour	0.05
SA_{0-2} (skin surface area) cm^2	6600
SA_{2-6} (skin surface area) cm^2	6600
SA_{6-16} (skin surface area) cm^2	18000
SA_{16-30} (skin surface area) cm^2	18000
ED_{recwa} (exposure duration - adult) year	24
EF_{recwa} (adult exposure frequency) day/year	45
ET_{recwa} (adult exposure time) hour/event	1
EV_{recwa} (adult) events/day	1
BW_{recwa} (body weight - adult) kg	70
SA_{recwa} (skin surface area - adult) cm^2	18000
IRW_{recwa} (water intake rate - adult) L/hr	0.05

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Recreator RISK for Surface Water

Chemical	Chronic RfD (mg/kg-day)	RfD Reference	Ingestion SF $(mg/kg\text{-}day)^{-1}$	SFO Reference	RAGSe GIABS (unitless)	K_p	FA	EPD	Concentration (mg/L)	Concentration (ug/L)	Child Ingestion Noncarcinogenic CDI
Dioxane, 1,4-	3.00E-02	IRIS	1.00E-01	IRIS	1	0.000332	1	1	0.0049	4.9	2.01E-06
Total Risk/HI											

Child Dermal Noncarcinogenic CDI	Adult Ingestion Noncarcinogenic CDI	Adult Dermal Noncarcinogenic CDI	Adjusted Ingestion Noncarcinogenic CDI	Adjusted Dermal Noncarcinogenic CDI	Ingestion Carcinogenic CDI	Dermal Carcinogenic CDI	Child Ingestion HQ	Child Dermal HQ
1.46E-07	4.32E-07	8.53E-08	7.47E-07	9.75E-08	3.20E-07	4.18E-08	6.71E-05	4.87E-06
							6.71E-05	*4.87E-06*

Child Total HI	Adult Ingestion HQ	Adult Dermal HQ	Adult Total HI	Adjusted Ingestion HQ	Adjusted Dermal HQ	Adjusted Total HI	Ingestion Risk	Dermal Risk	Total Risk
7.20E-05	1.44E-05	2.84E-06	1.72E-05	2.49E-05	3.25E-06	2.82E-05	3.20E-08	4.18E-09	3.62E-08
7.20E-05	*1.44E-05*	*2.84E-06*	*1.72E-05*	*2.49E-05*	*3.25E-06*	*2.82E-05*	*3.20E-08*	*4.18E-09*	*3.62E-08*

Table 1. Comparison of Maximum Concentrations in Groundwater at Cannons Engineering Bridgewater Superfund Site with Regulatory Standards

Chemical	2010			2009			GW-1 (ug/l)	GW-2 (ug/L)	GW-3 (ug/l)	MCL (ug/l)	MMCL (ug/l)	MORSG (ug/l)
	Maximum Concentration (ug/l)	No. of Detections	Well with Maximum Concentration	Maximum Concentration (ug/l)	No. of Detections	Well with Maximum Concentration						
Acetone	9.4	9	MW4B	9.4	10	MW4B	na	na	na	na	na	6300
Benzene	0.21	4	MW17B	0.27	5	MW17A	5	2000	10000	5	5	na
2-Butanone	2.2	1	MW4B	2.2	1	MW4B	4000	50000	50000	na	na	4000
Chloroacetonitrile	nd	nd	nd	8.5	1	MW17B	na	na	na	na	na	na
Chlorobenzene	11	9	MW17B	15	9	MW17A	100	200	1000	100	100	na
Chloroform	0.049	1	MW16A	0.049	1	MW16A	70	50	20000	80	na	70
Chloromethane	0.59	18	MW6C	0.59	17	MW6C	na	na	na	na	na	na
1,2-Dichlorobenzene	0.76	2	MW17B	1.1	3	MW17A	600	2000	2000	600	600	na
1,4-Dichlorobenzene	nd	nd	nd	0.24	1	MW17A	5	200	8000	75	5	na
1,1-Dichloroethane	0.61	12	MW11	0.61	11	MW11	70	1000	20000	na	na	70
1,2-Dichloroethane	1.3	6	MW15C,MW12	1.3	6	MW15C, MW12	5	5	20000	5	5	na
cis-1,2-Dichloroethene	3.8	14	MW18C	4.1	14	MW18C	70	100	50000	70	70	na
trans-1,2-Dichloroethene	0.1	1	MW18C	0.1	1	MW18C	100	90	50000	100	100	na
Diethyl Ether	nd	nd	nd	0.33	3	MW13B	na	na	na	na	na	na
Methyl-t-Butyl Ether	6.1	18	MW16B	6.1	17	MW16B	70	50000	50000	na	na	70
Nitrobenzene	nd	nd	nd	7.9	1	MW17B	na	na	na	na	na	na
Preprionitrile	nd	nd	nd	3.1	1	MW17B	na	na	na	na	na	na
Tetrachloroethene	2.5	10	MW1	2.5	10	MW1	5	50	30000	5	5	na
1,2,4-Trichlorobenzene	0.048	1	MW11	0.048	1	MW11	70	2000	50000	70	70	na
Trichloroethene	1.2	14	MW17B	1.6	14	MW17A	5	30	5000	5	5	na
Vinyl Chloride	1.9	8	MW18C	1.9	8	MW18C	2	2	50000	2	2	na
Xylene	0.53	1	MW11	0.56	1	MW11	10000	9000	5000	10000	10000	na
1,4-Dioxane	4.9	3	MW18C	na	na	na	3	6000	50000	na	na	3
Aluminum	na	na	na	280	2	MW4B	na	na	na	na	na	na
Arsenic	na	na	na	40	12	MW18C	10	na	900	10	10	na
Barium	na	na	na	360	24	MW1	2000	na	50000	2000	2000	na
Cadmium	na	na	na	3.6	11	MW1	5	na	4	5	5	na
Copper	na	na	na	7.9	3	MW1	na	na	na	1300	1300	na
Iron	na	na	na	43000	17	MW13B	na	na	na	na	na	na
Lead	na	na	na	2.7	2	MW1	15	na	10	15	15	na
Manganese	na	na	na	7800	23	MW4A	na	na	na	na	na	na
Zinc	na	na	na	78	4	MW1	5000	na	900	na	na	na

na = not available or not analyzed

nd = not detected

MCL = Maximum Contaminant Level

MMCL = Massachusetts Maximum Contaminant Level

MORSG = Massachusetts Drinking Water Guideline

Attachment 3 – 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

May 2, 2013

Derrick S. Golden
Remedial Project Manager
US Environmental Protection Agency Region 1
5 Post Office Square
Boston, MA 02109-3912

Dear Derrick,

EPA has proposed an Explanation of Significant Differences (ESD) for the Cannons Engineering Bridgewater Superfund site to document a change in a component of the remedy contained in the 1988 Record of Decision (ROD) for the management of migration operable unit. MassDEP has reviewed the final draft of the ESD and concurs with the proposed revisions.

The purpose of the ESD is to revise the groundwater cleanup criteria contained in the ROD to reflect the current criteria contained in the Massachusetts Contingency Plan (MCP). The 1988 ROD reflected the groundwater cleanup criteria that existed prior to the 1993 revisions to the MCP which established a new groundwater classification intended to address remediation at waste disposal sites. MassDEP outlined the criteria that currently apply at the Cannons Bridgewater site in a recently completed Groundwater Use and Value Determination.

Thank you for the opportunity to review the ESD. We look forward to continuing our work with you on the Cannons Bridgewater site. Please feel free to contact me if you have any questions regarding this matter.

Very truly yours

Jay Naparstek
Deputy Division Director
Bureau of Waste Site Cleanup

APPENDIX D

2013 EPA RISK ASSESSMENT MEMO

DOCUMENTING NO UNACCEPTABLE RISKS

MEMORANDUM

To: Derrick Golden
From: Richard Sugatt
Date: March 21, 2013
Subject: Residual risk evaluation for Cannons Engineering Superfund Site, Bridgewater, MA

The purpose of this memorandum is to evaluate the potential for human health and ecological risk due to residual contaminants in groundwater at the Cannons Engineering Superfund Site in Bridgewater, MA. As documented below, it is concluded that there is no actionable human health or environmental risk due to residual contaminants in groundwater at the Site.

On October 23, 2012 Mass DEP conducted a new groundwater use and value determination specifically for the Cannons Engineering Bridgewater Superfund Site, and this evaluation determined that groundwater at the Site is actually located within GW-2 and GW-3 groundwater classification areas. The Site is no longer considered to be within a GW-1 area. As a result of this reclassification, drinking water standards such as MCLs are no longer applicable or appropriate for groundwater cleanup goals.

As shown on Table 1, the latest available groundwater data (2009, 2010) indicate that arsenic and 1, 4-dioxane are the only two groundwater contaminants that exceeded human health standards or guidance. Arsenic at a maximum concentration of 40 ug/L exceeded the MCL and Massachusetts MCL, both 10 ug/L. 1, 4-dioxane at a maximum concentration of 4.9 ug/L exceeded the Massachusetts Drinking Water Guideline of 3 ug/L. Since the GW-1, MCL, MMCL, and Massachusetts Drinking Water Guideline are not applicable or appropriate, and use of groundwater at the Site for drinking water is not reasonably foreseeable, there is no current or future completed human health exposure pathway to groundwater, and therefore, no human health risk.

Although GW-2 and GW-3 standards are not considered applicable or relevant and appropriate requirements (ARARs) under the Superfund Program, I have reviewed site-related data against these state standards as another basis of comparison. Table 1 demonstrates that the maximum concentrations of all detected chemicals do not exceed these standards. GW-2 standards are designed to be protective against vapor intrusion of volatile organic chemicals (VOCs) from groundwater into buildings. The absence of GW-2 exceedances supports the conclusion that vapor intrusion is not of concern. This conclusion is also supported by the conclusion in the most recent Five Year Review Report (EPA, 2010) that there was no complete vapor intrusion pathway based on Site conditions, as well as conservative Johnson & Ettinger modeling
Similarly, the absence of GW-3 exceedances supports the conclusion that ecological impacts to surface water are unlikely when Site groundwater reaches surface water. All groundwater in Massachusetts is classified as GW-3, and the GW-3 standards are designed to be protective of aquatic organisms after 10-fold dilution of groundwater as it emerges into surface water.

Roux Associates, Inc., consultant to the PRPs, indicated in a memorandum to EPA (Roux Associates, Inc., 2010) that the GW-1 area south of the Site is not receiving contaminated groundwater from the Site. This opinion was supported both by the hydrology at the Site and distance from the Site. The Site is located about 0.4 miles from the boundary of a Zone II. This Zone II boundary is in a hydraulically cross-gradient location relative to the Site, and therefore, groundwater at the Site is flowing away from the Zone II and ultimately discharging into the freshwater wetlands in the western part of the Site and beyond to the west. Groundwater has been demonstrated to flow in this direction for over 20 years based on groundwater monitoring at the Site.

To address the potential concern that groundwater at the Site migrating to the off-Site wetlands may pose a human health risk, this memorandum evaluates the human health risk to off-Site recreators as described below:

Although unlikely, it might possible that people who explore the off-Site wetlands to the west of the Site may contact surface water comprised in part of groundwater from the Site. The risk calculator at the Risk Assessment Information System (http://rais.ornl.gov/cgi-bin/prg/RISK_search?select=chem) was used to calculate the risks of arsenic and 1, 4-dioxane for a standard recreational receptor, using the undiluted maximum concentration of 40 ug/L arsenic and 4.9 ug/L of 1, 4-dioxane in Site groundwater.

Standard exposure assumptions for dermal contact and incidental ingestion of surface water for recreational adults and children included ingestion of 0.05 L/day, exposure time of 1 hour/day, exposure frequency of 45 days/year, exposure duration of 30 years, over a lifetime of 70 years. As shown in the attached printout for 40 ug/L arsenic, the non-cancer Hazard Quotient for both adults and children was less than 1, indicating that non-carcinogenic effects are unlikely. As shown in the attached printout for arsenic, the cancer risk for a receptor exposed from childhood through adulthood for a total of 30 years was 5×10^{-6}, which is within EPA's acceptable risk range of 1×10^{-6} to 1×10^{-4}.

As shown in the attached printout for 4.9 ug/L of 1, 4-dioxane, the non-cancer Hazard Quotient for both adults and children was less than 1, indicating that non-carcinogenic effects are unlikely. As shown in the attached printout for 1, 4-dioxane, the cancer risk for a receptor exposure from childhood through adulthood for a total of 30 years was 4×10^{-8}, which is well below EPA's acceptable risk range of 1×10^{-6} to 1×10^{-4}.

To address the potential concern that arsenic in groundwater at the Site migrating to the off-Site wetlands may pose an ecological risk, it is sufficient conclude there is no potential ecological risk because the National Recommended Water Quality Criteria for protection of aquatic life for chronic exposure is 150 ug/L as the Criteria Continuous Concentration (CCC). This indicates no risk to aquatic life because the maximum concentration of 40 ug/L in groundwater at the Site is lower than the CCC.

Similarly for 1, 4-dioxane, the available aquatic information indicates that aquatic toxicity is low and does not occur at concentrations below 145 mg/L. The 1995 OPPT Chemical Fact Sheet for 1, 4-dioxane (EPA, 1995) (http://www.epa.gov/chemfact/dioxa-sd.txt) cites reports describing acute and chronic toxicity of 1,4-dioxane to *Pimephales promelas* (fathead minnows). Acute effects occurred at 10,000 mg/L but not at 6000 mg/L, which was the highest no observed adverse effect level (NOAEL). A 32-day embryo-larval test identified a Maximum Allowable Toxicant Concentration (MATC) >145 mg/L, which means that no chronic effects occurred at 145 mg/L. Additional acute toxicity studies indicated that the 96-hour LC50 value for *Lepomis macrochirus* (bluegill) was 10,000 ppm (10,000 mg/L) in fresh water, and the 96-hour LC50 value for the fish *Menidia beryllina* in synthetic seawater was 6,777 ppm (6777 mg/L). These toxicity data are sufficient to conclude that the maximum concentration of 1, 4-dioxane in Site groundwater (4.9 ug/L) is much lower than the levels that are toxic to aquatic organisms.

Summary and Conclusions

Although the maximum concentration of arsenic and 1, 4-dioxane in Site groundwater exceeded human health standards or guidelines, it is concluded there are no human health risks due to ingestion of on-Site groundwater because there is no reasonably foreseeable use of this groundwater for drinking water purposes, as shown by the MassDEP reclassification of groundwater at the Site from GW-1 to GW-2 and GW-3. There are no on-Site human health risks due to vapor intrusion because it was concluded in the most recent Five Year Review report that there is no completed vapor intrusion exposure pathway. According to available data, Site groundwater moves to the west rather than to the south towards the nearest GW-1 area, therefore, there is no risk due to use of off-site drinking water. An evaluation of human health risk due to contact with arsenic and 1, 4-dioxane in Site groundwater that may emerge into surface water in the wetlands to the west of the Site indicates that there is no actionable risk even if there were no dilution of the maximum concentrations of arsenic and 1, 4-dioxane on the Site. An evaluation of ecological risk due to exposure of aquatic organisms to arsenic and 1, 4-dioxane in Site groundwater that may emerge into surface water in the wetlands to the west of the Site indicates that there is no actionable risk even if there were no dilution of the maximum concentrations of arsenic and 1, 4-dioxane on the Site. It is concluded that there is no actionable human health or environmental risk due to residual contaminants in Site groundwater.

References

Roux Associates, Inc. May 21, 2010. Memorandum to Derrick Golden from Ian Phillips, LSP, Roux Associates, Inc.

U.S. EPA. 2010. Five-Year Review Report Fourth Five-Year Review Report for Cannons Engineering Bridgewater Superfund Site, Town of Bridgewater Plymouth County, Massachusetts. September 2010.

U.S. EPA. 1995. OPPT Chemical Fact Sheet 1, 4-Dioxane Fact Sheet: Support Document (CAS No. 123-9-1). February, 1995. EPA 749-F-95-010a.

Recreator Equation Inputs for Surface Water

Variable	Value
TR (target cancer risk) unitless	1.0E-6
ED_{rec} (exposure duration - recreator) years	30
THQ (target hazard quotient) unitless	1
LT (lifetime - recreator) yr	70
EF_{rec-w} (exposure frequency) d/yr	45
ET_{rec} (exposure time) hours/day	1
Apparent thickness of stratum corneum (cm)	0.001
BW_a (body weight - adult) kg	70
SA_{rec} (skin surface area - adult) cm^2	18000
IRW_{rec} (water intake rate - adult) L/day	0.05
$ET_{recw-adj}$ (age-adjusted exposure time) hour/event	1
$ET_{recw-madj}$ (mutagenic age-adjusted exposure time) hour/event	1
$IFW_{rec-adj}$ (age-adjusted water intake rate) L/kg	1.67
$IFWM_{rec-adj}$ (mutagenic age-adjusted water intake rate) L/kg	6.214
$DFW_{rec-adj}$ (age-adjusted dermal factor) cm^2-event/kg	396514
$DFWM_{rec-adj}$ (mutagenic age-adjusted dermal factor) cm^2-event/kg	1142743
BW_{0-2} (body weight) kg	15
BW_{2-6} (body weight) kg	15
BW_{6-16} (body weight) kg	70
BW_{16-30} (body weight) kg	70
ED_{0-2} (exposure duration) year	2
ED_{2-6} (exposure duration) year	4
ED_{6-16} (exposure duration) year	10
ED_{16-30} (exposure duration) year	14
EF_{0-2} (exposure frequency) day/year	45
EF_{2-6} (exposure frequency) day/year	45
EF_{6-16} (exposure frequency) day/year	45
EF_{16-30} (exposure frequency) day/year	45
$ET_{recw0-2}$ (exposure time) hour/event	1

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Recreator Equation Inputs for Surface Water

Variable	Value
$ET_{recw2-6}$ (exposure time) hour/event	1
$ET_{recw6-16}$ (exposure time) hour/event	1
$ET_{recw16-30}$ (exposure time) hour/event	1
EV_{0-2} (events) events/day	1
EV_{2-6} (events) events/day	1
EV_{6-16} (events) events/day	1
EV_{16-30} (events) events/day	1
IRW_{0-2} (water intake rate) L/hour	0.05
IRW_{2-6} (water intake rate) L/hour	0.05
IRW_{6-16} (water intake rate) L/hour	0.05
IRW_{16-30} (water intake rate) L/hour	0.05
SA_{0-2} (skin surface area) cm^2	6600
SA_{2-6} (skin surface area) cm^2	6600
SA_{6-16} (skin surface area) cm^2	18000
SA_{16-30} (skin surface area) cm^2	18000
ED_{recwa} (exposure duration - adult) year	24
EF_{recwa} (adult exposure frequency) day/year	45
ET_{recwa} (adult exposure time) hour/event	1
EV_{recwa} (adult) events/day	1
BW_{recwa} (body weight - adult) kg	70
SA_{recwa} (skin surface area - adult) cm^2	18000
IRW_{recwa} (water intake rate - adult) L/hr	0.05

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Recreator RISK for Surface Water

Chemical	Chronic RfD (mg/kg-day)	RfD Reference	Ingestion SF $(mg/kg\text{-}day)^{-1}$	SFO Reference	RAGSe GIABS (unitless)	K_p	FA	EPD	Concentration (mg/L)	Concentration (ug/L)	Child Ingestion Noncarcinogenic CDI
Arsenic, Inorganic	3.00E-04	IRIS	1.50E+00	IRIS	1	0.001	1	1	0.04	40	1.64E-05
*Total Risk/HI	-		-		-	-	-	-	-	-	-

Child Dermal Noncarcinogenic CDI	Adult Ingestion Noncarcinogenic CDI	Adult Dermal Noncarcinogenic CDI	Adjusted Ingestion Noncarcinogenic CDI	Adjusted Dermal Noncarcinogenic CDI	Ingestion Carcinogenic CDI	Dermal Carcinogenic CDI	Child Ingestion HQ	Child Dermal HQ
2.17E-06	3.52E-06	1.27E-06	6.10E-06	1.45E-06	2.61E-06	6.21E-07	5.48E-02	7.23E-03
-	-	-	-	-	-	-	*5.48E-02*	*7.23E-03*

Child Total HI	Adult Ingestion HQ	Adult Dermal HQ	Adult Total HI	Adjusted Ingestion HQ	Adjusted Dermal HQ	Adjusted Total HI	Ingestion Risk	Dermal Risk	Total Risk
6.20E-02	1.17E-02	4.23E-03	1.60E-02	2.03E-02	4.83E-03	2.52E-02	3.92E-06	9.31E-07	4.85E-06
6.20E-02	*1.17E-02*	*4.23E-03*	*1.60E-02*	*2.03E-02*	*4.83E-03*	*2.52E-02*	*3.92E-06*	*9.31E-07*	*4.85E-06*

Output generated 18MAR2013:14:16:25

Recreator Equation Inputs for Surface Water

Variable	Value
TR (target cancer risk) unitless	1.0E-6
ED_{rec} (exposure duration - recreator) years	30
THQ (target hazard quotient) unitless	1
LT (lifetime - recreator) yr	70
EF_{recw} (exposure frequency) d/yr	45
ET_{rec} (exposure time) hours/day	1
Apparent thickness of stratum corneum (cm)	0.001
BW_a (body weight - adult) kg	70
SA_{rec} (skin surface area - adult) cm^2	18000
IRW_{rec} (water intake rate - adult) L/day	0.05
$ET_{recw-adj}$ (age-adjusted exposure time) hour/event	1
$ET_{recw-madj}$ (mutagenic age-adjusted exposure time) hour/event	1
$IFW_{rec-adj}$ (age-adjusted water intake rate) L/kg	1.67
$IFWM_{rec-adj}$ (mutagenic age-adjusted water intake rate) L/kg	6.214
$DFW_{rec-adj}$ (age-adjusted dermal factor) cm^2-event/kg	396514
$DFWM_{rec-adj}$ (mutagenic age-adjusted dermal factor) cm^2-event/kg	1142743
BW_{0-2} (body weight) kg	15
BW_{2-6} (body weight) kg	15
BW_{6-16} (body weight) kg	70
BW_{16-30} (body weight) kg	70
ED_{0-2} (exposure duration) year	2
ED_{2-6} (exposure duration) year	4
ED_{6-16} (exposure duration) year	10
ED_{16-30} (exposure duration) year	14
EF_{0-2} (exposure frequency) day/year	45
EF_{2-6} (exposure frequency) day/year	45
EF_{6-16} (exposure frequency) day/year	45
EF_{16-30} (exposure frequency) day/year	45
$ET_{recw0-2}$ (exposure time) hour/event	1

Output generated 21MAR2013:11:48:58

Recreator Equation Inputs for Surface Water

Variable	Value
$ET_{recw2-6}$ (exposure time) hour/event	1
$ET_{recw6-16}$ (exposure time) hour/event	1
$ET_{recw16-30}$ (exposure time) hour/event	1
EV_{0-2} (events) events/day	1
EV_{2-6} (events) events/day	1
EV_{6-16} (events) events/day	1
EV_{16-30} (events) events/day	1
IRW_{0-2} (water intake rate) L/hour	0.05
IRW_{2-6} (water intake rate) L/hour	0.05
IRW_{6-16} (water intake rate) L/hour	0.05
IRW_{16-30} (water intake rate) L/hour	0.05
SA_{0-2} (skin surface area) cm^2	6600
SA_{2-6} (skin surface area) cm^2	6600
SA_{6-16} (skin surface area) cm^2	18000
SA_{16-30} (skin surface area) cm^2	18000
ED_{recwa} (exposure duration - adult) year	24
EF_{recwa} (adult exposure frequency) day/year	45
ET_{recwa} (adult exposure time) hour/event	1
EV_{recwa} (adult) events/day	1
BW_{recwa} (body weight - adult) kg	70
SA_{recwa} (skin surface area - adult) cm^2	18000
IRW_{recwa} (water intake rate - adult) L/hr	0.05

Output generated 21MAR2013:11:48:58

Recreator RISK for Surface Water

Chemical	Chronic RfD (mg/kg-day)	RfD Reference	Ingestion SF $(mg/kg\text{-}day)^{-1}$	SFO Reference	RAGSe GIABS (unitless)	K_p	FA	EPD	Concentration (mg/L)	Concentration (ug/L)	Child Ingestion Noncarcinogenic CDI
Dioxane, 1,4-	3.00E-02	IRIS	1.00E-01	IRIS	1	0.000332	1	1	0.0049	4.9	2.01E-06
*Total Risk/HI	-		-		-	-	-	-	-	-	-

Child Dermal Noncarcinogenic CDI	Adult Ingestion Noncarcinogenic CDI	Adult Dermal Noncarcinogenic CDI	Adjusted Ingestion Noncarcinogenic CDI	Adjusted Dermal Noncarcinogenic CDI	Ingestion Carcinogenic CDI	Dermal Carcinogenic CDI	Child Ingestion HQ	Child Dermal HQ
1.46E-07	4.32E-07	8.53E-08	7.47E-07	9.75E-08	3.20E-07	4.18E-08	6.71E-05	4.87E-06
-	-	-	-	-	-	-	*6.71E-05*	*4.87E-06*

Child Total HI	Adult Ingestion HQ	Adult Dermal HQ	Adult Total HI	Adjusted Ingestion HQ	Adjusted Dermal HQ	Adjusted Total HI	Ingestion Risk	Dermal Risk	Total Risk
7.20E-05	1.44E-05	2.84E-06	1.72E-05	2.49E-05	3.25E-06	2.82E-05	3.20E-08	4.18E-09	3.62E-08
7.20E-05	*1.44E-05*	*2.84E-06*	*1.72E-05*	*2.49E-05*	*3.25E-06*	*2.82E-05*	*3.20E-08*	*4.18E-09*	*3.62E-08*

Output generated 21MAR2013:11:48:58

Table 1. Comparison of Maximum Concentrations in Groundwater at Cannons Engineering Bridgewater Superfund Site with Regulatory Standards

Chemical	2010			2009			GW-1 (ug/l)	GW-2 (ug/L)	GW-3 (ug/l)	MCL (ug/l)	MMCL (ug/l)	MORSG (ug/l)
	Maximum Concentration (ug/l)	No. of Detections	Well with Maximum Concentration	Maximum Concentration (ug/l)	No. of Detections	Well with Maximum Concentration						
Acetone	9.4	9	MW4B	9.4	10	MW4B	na	na	na	na	na	6300
Benzene	0.21	4	MW17B	0.27	5	MW17A	5	2000	10000	5	5	na
2-Butanone	2.2	1	MW4B	2.2	1	MW4B	4000	50000	50000	na	na	4000
Chloroacetonitrile	nd	nd	nd	8.5	1	MW17B	na	na	na	na	na	na
Chlorobenzene	11	9	MW17B	15	9	MW17A	100	200	1000	100	100	na
Chloroform	0.049	1	MW16A	0.049	1	MW16A	70	50	20000	80	na	70
Chloromethane	0.59	18	MW6C	0.59	17	MW6C	na	na	na	na	na	na
1,2-Dichlorobenzene	0.76	2	MW17B	1.1	3	MW17A	600	2000	2000	600	600	na
1,4-Dichlorobenzene	nd	nd	nd	0.24	1	MW17A	5	200	8000	75	5	na
1,1-Dichloroethane	0.61	12	MW11	0.61	11	MW11	70	1000	20000	na	na	70
1,2-Dichloroethane	1.3	6	MW15C,MW12	1.3	6	MW15C, MW12	5	5	20000	5	5	na
cis-1,2-Dichloroethene	3.8	14	MW18C	4.1	14	MW18C	70	100	50000	70	70	na
trans-1,2-Dichloroethene	0.1	1	MW18C	0.1	1	MW18C	100	90	50000	100	100	na
Diethyl Ether	nd	nd	nd	0.33	3	MW13B	na	na	na	na	na	na
Methyl-t-Butyl Ether	6.1	18	MW16B	6.1	17	MW16B	70	50000	50000	na	na	70
Nitrobenzene	nd	nd	nd	7.9	1	MW17B	na	na	na	na	na	na
Proprionitrile	nd	nd	nd	3.1	1	MW17B	na	na	na	na	na	na
Tetrachloroethene	2.5	10	MW1	2.5	10	MW1	5	50	30000	5	5	na
1,2,4-Trichlorobenzene	0.048	1	MW11	0.048	1	MW11	70	2000	50000	70	70	na
Trichloroethene	1.2	14	MW17B	1.6	14	MW17A	5	30	5000	5	5	na
Vinyl Chloride	1.9	8	MW18C	1.9	8	MW18C	2	2	50000	2	2	na
Xylene	0.53	1	MW11	0.56	1	MW11	10000	9000	5000	10000	10000	na
1,4-Dioxane	4.9	3	MW18C	na	na	na	3	6000	50000	na	na	3
Aluminum	na	na	na	280	2	MW4B	na	na	na	na	na	na
Arsenic	na	na	na	40	12	MW18C	10	na	900	10	10	na
Barium	na	na	na	360	24	MW1	2000	na	50000	2000	2000	na
Cadmium	na	na	na	3.6	11	MW1	5	na	4	5	5	na
Copper	na	na	na	7.9	3	MW1	na	na	na	1300	1300	na
Iron	na	na	na	43000	17	MW13B	na	na	na	na	na	na
Lead	na	na	na	2.7	2	MW1	15	na	10	15	15	na
Manganese	na	na	na	7800	23	MW4A	na	na	na	na	na	na
Zinc	na	na	na	78	4	MW1	5000	na	900	na	na	na

na = not available, or not analyzed

nd = not detected

MCL = Maximum Contaminant Level

MMCL = Massachusetts Maximum Contaminant Level

MORSG = Massachusetts Drinking Water Guideline

APPENDIX E

1991 INSTITUTIONAL CONTROLS/DEED RESTRICTIONS

BK10498PG281

Received & Recorded
PLYMOUTH COUNTY
REGISTRY OF DEEDS
26 SEP 1991 09:48AM
JOHN D.RIORDAN
REGISTER

DECLARATION OF RESTRICTIONS

Whereas, the Town of Bridgewater owns a certain parcel of land situated on the northwesterly side of proposed subdivision street called First Street, and shown as Lot 4 (the "Premises") on plan entitled "Bridgewater Industrial Park, a Subdivision of Land in Bridgewater, Mass., owned by Benson Realty Trust, Bridgewater, Mass., Scale 1" = 40', dated June 2, 1970, C.A. Pickering Associates, Inc., Consulting Engineers," recorded with Plymouth County Registry of Deeds in Plan Book 15, Page 400;

Whereas, former uses on the Premises included handling, storing and incinerating chemical wastes which contaminated the soil and groundwater;

Whereas, the Premises is located within the Cannons Engineering Corporation Superfund Site (the "Site") in Bridgewater, Massachusetts, which was listed on the National Priority List of hazardous substances sites pursuant to Section 105 of Comprehensive Environmental Response, Compensation, and

Zucker
Environmental Protection Agency
one Cong Federal Bldg., RCT
Boston, MA 02203-2211

Liability Act ("CERCLA"), 42 U.S.C. § 9605, on September 8, 1983;

Whereas, the United States Environmental Protection Agency ("USEPA"), in consultation with the Massachusetts Department of Environmental Protection ("MADEP"), has selected and overseen the implementation of remedial action for the Site pursuant to CERCLA; and

Whereas, the USEPA, in consultation with the MADEP, has determined that removal and treatment of the contaminated soils located above groundwater level will remove or limit the source of contamination to the groundwater and that the effects of natural attenuation are expected to reduce contaminants in the groundwater to cleanup target levels (e.g., Benzene, 5 ppb; Trichloroethylene, 5 ppb; and Vinyl Chloride, 2 ppb) in fifteen (15) to twenty (20) years;

NOW, THEREFORE, in order to protect the health, safety and welfare of the inhabitants of the Town of Bridgewater, the Town of Bridgewater hereby grants the following restrictions to the USEPA, its successors and assigns, and the MADEP, its successors and assigns, which inure to their benefit;

(1) The Premises are hereby restricted to the following uses:

(a) The Premises are restricted to the following municipal or town uses, until the USEPA and MADEP provide

certification to be recorded in the Registry of Deeds that other municipal and town uses are permissible: municipal office buildings, municipal storage facilities, and municipal fire stations. The term "municipal and town uses" as used in this subparagraph means uses of the Premises directly by the Town of Bridgewater, and not by any lessee of the Town of Bridgewater or any subsequent owner or lessee of the Premises.

(b) In addition to the restricted uses provided in subparagraph (1)(a) hereof, the Premises are further restricted to the uses by private parties listed in the current Town of Bridgewater Protective Zoning By-Laws, in Table 6.3(D) [Office and Laboratory Uses], (E) [Retail Business and Consumer Service Establishments], (F) [Automotive Service and Open Air Drive-In Retail Service], and (G) [Industrial, Wholesale and Transportation Uses], until the USEPA and MADEP provide certification to be recorded in the Registry of Deeds that other uses are permissible (a list of these uses is provided in Attachment A to this Declaration of Restrictions). Notwithstanding the provisions set forth in the preceding sentence, the uses listed in Table 6.3(F)(7) of the current Town of Bridgewater Protective Zoning By-Laws shall not be permitted at the Premises.

(2) Except as authorized by the USEPA and MADEP pursuant to

the remedial action selected for the Site which includes longterm groundwater monitoring, groundwater shall not be drawn from any point on the Premises, nor shall it serve as a drinking water supply or be used for any other purpose, nor shall groundwater wells be installed at the Premises, until the USEPA and MADEP provide certification to be recorded at the Registry of Deeds, which certificate describes what uses of the groundwater are permissible;

(3) No excavation below the level of the groundwater may be undertaken on the Premises without advance written approval from the USEPA or the MADEP;

(4) These restrictions shall run with the land;

(5) These restrictions hereby imposed are in gross and are not for the benefit of the appurtenant to any particular land but are for the benefit of and enforceable by the USEPA, its successors and assigns, and MADEP, its successors and assigns;

(6) These restrictions shall be enforceable by the United States and the Commonwealth of Massachusetts, pursuant to the provisions of G.L. c. 184, § 32, or otherwise, or by either one acting singly. Notwithstanding that these restrictions shall be enforceable pursuant to G.L. c. 184, § 32, these restrictions shall also be enforceable by the United States and the Commonwealth of Massachusetts, pursuant to the provisions of

G.L. c. 184, § 26, et seq., or otherwise, or by either one acting singly. A notice of restrictions, in compliance with law, shall be recorded before the expiration of thirty (30) years from the date of this deed and shall name the person or persons appearing of record who own the Premises at the time of recording; and in the case of any such recording, a subsequent notice of restriction shall be recorded within twenty (20) years after the recording of any prior notice of restriction until the period of these restrictions has elapsed. Failure to record the notice of restrictions in accordance with this Paragraph shall not affect the enforceability of these restrictions pursuant to the provisions of G.L. c. 184, § 32. Any grantee hereby covenants for itself, its successors and assigns, to timely execute, and record such documents and take such action, including the surrender of certificate of title, if any, for notation thereon, as shall be necessary to cause such notice of restriction to be effective and enforceable under the then applicable G.L. c. 184, § 26, et seq. Any grantee further covenants for itself, its successors and assigns, to include the restrictions and protective covenants herein set out, in each lease and sublease of the premises or any portion thereof.

No documentary stamps are affixed hereto as none are required by law as this conveyance is made without monetary

consideration.

Executed as a sealed instrument this 16 day of Sept. 1991.

TOWN OF BRIDGEWATER

By _____

COMMONWEALTH OF MASSACHUSETTS

Plymouth, ss. Sept. 16, 1991

On this 16 day of Sept., 1991, before me appeared the above named Carolyn Morwick, John Colford and Peter C. Riordan, to me personally known, who, being by me duly sworn, did say that they constitute the Board of Selectmen of the Town of Bridgewater, and that said instrument was signed on behalf of the Town of Bridgewater, and said Carolyn Morwick, John Colford and Peter C. Riordan acknowledged said instrument to be the free act and deed of the Town of Bridgewater. Witness my hand and official seal.

_____
Notary Public
My commission expires: 7/16/95

NOTARY PUBLIC COMMONWEALTH OF MASSACHUSETTS MY COMMISSION EXPIRES JULY 16, 1995 ARLYN D. COHEN

Pursuant to vote of Special Town Meeting, Town of Bridgewater, held September 16, 1991.

CERTIFICATE OF APPROVAL BY THE SECRETARY

The Secretary of the Executive Office of Environmental Affairs, Commonwealth of Massachusetts, hereby certifies that she approves the foregoing restrictions under G.L. c. 184, § 32.

_____
Secretary, Executive Office of
Environmental Affairs,
Commonwealth of Massachusetts

ATTACHMENT A

The Premises are restricted to the following uses by private parties:

Table 6.3(D). Office and Laboratory Uses.[1]

1. Business, financial, professional or governmental offices but no retail business, no manufacturing and no processing.

2. Offices and clinics for medical, psychiatric, or other health services for the examination or treatment of persons as outpatient, including only laboratories that are part of such office or clinic.

3. Laboratory or research facility.

4. Radio or television studio.

5. Radio or television transmission facility but not studio.

Table 6.3(E). Retail Business and Consumer Service Establishments.

1. Store serving local retail business needs of residents of vicinity including but not limited to new bakery, grocery, meat market, fruit store, hardware or paint store, florist, news and/or tobacco store, drug store, book store, magazine and periodical store, novelty store, stores providing electronic displays of pictures or movies whether coin operated or otherwise, film store, video tape stores, provided gross floor area of such establishment is under 4,000 sq. ft. and further provided all display, storage and sales of materials are conducted within a building and provided there be no manufacturing or assembly on the premises. In addition, said activity shall not include the conveyance of any material involving subject matter as defined in Sec. 31 of C. 272 MGL, as amended.

2. Store for retail sale of merchandise provided all display storage and sale of materials are conducted within a

---

[1] All references to Table 6.3 throughout this Attachment A refer to Table 6.3 of the Town of Bridgewater Protective Zoning By-Laws, as in effect at the time of the execution of this Declaration of Restrictions.

building and provided there be no manufacturing or assembly on the premises. In addition, said activity shall not include the conveyance of any material involving subject matter as defined in Sec. 31 of C. 272 MGL, as amended.

3. Eating places servicing food and beverages, no dancing or live entertainment permitted.

4. Eating places serving food and beverages.

5. Space for manufacture, assembly, or packaging of consumer goods provided that at least 50% of the merchandise is sold at retail on the premises and that all display, sales and storage is conducted within a building; and further provided that not more than 25% of floor area is devoted to manufacturing, assembly or packaging of consumer goods and that not more than 5 persons are employed at any one time for the manufacturing, assembly or packaging of such goods.

6. Service business servicing local needs, such as barber shops, beauty shops, shoe repair, self-service laundry, or dry cleaning or pick-up agency.

7. Hand laundry, dry cleaning, or tailoring or other similar uses provided personnel is limited to not more than ten (10) persons at any one time on the premises.

8. Mortuary, undertaking or funeral establishments.

9. Veterinary establishment, or similar establishment provided that animals are kept wholly indoors.

10. Store for retail sale of merchandise such as but not limited to lumber yards and building supply yards wherein merchandise is stored in the open, provided that all merchandise so stored is screened from ground level view from any abutting street or abutting property where such materials are stored.

Table 6.3(F). Automotive Service and Open Air Drive-In Retail Service.

1. Gasoline service station.

2. Sale or rental of automobiles, boats and other motor vehicles and accessory storage conducted entirely within an enclosed sound-insulated structure to protect the neighborhood from inappropriate noise and other disturbing effects such as but not limited to flashing, fumes, gases, smoke and vapors.

3. Sale or rental of automobiles, boats and other motor vehicles and accessory storage conducted partly or wholly on open

lots.

4. Automobile repair shops, provided all work is carried out within the building.

5. Car washing establishment.

6. Sales places for flowers, garden supplies, agricultural products partly or wholly outdoors, including commercial greenhouses.

7. (not permitted)

8. Place for exhibition, lettering, or sale of gravestones.

Table 6.3(G). Industrial, Wholesale and Transportation Uses.

1. Laundries and dry cleaning plants.

2. Printing, binding, publishing and related arts and trades.

3. Bottling of beverages.

4. Plumbing, electrical or carpentry shop or other similar service or repair establishments.

5. Place for manufacturing, assembling or packaging of goods, provided that all resulting cinders, dust, flashing, fumes, gases, odors, refuse matter, smoke and vapor be effectively confined to the premises or be disposed of in manner that does not create a nuisance or hazard to safety or health.

6. Wholesale business and storage in a roofed structure.

7. Trucking terminals.

8. Freight terminals.

9. Extractive Industries.

10. Contractor yards.

Town of Bridgewater

Town Clerk
Ronald R. Adams
(508)697-0921

September 17, 1991

Attorney Melvyn D. Cohen
Town Counsel
111 Torrey Street
Brockton, MA. 02401

Dear Attorney Cohen:

At the Special Town Meeting held on Monday, September 16, 1991, the following article was voted.

ARTICLE 1. That the Town authorize the Board of Selectmen to enter into a Declaration of Restrictions with the United States Environmental Protection Agency and the Massachusetts Department of Environmental Protection limiting the use of land and to run with the land on a certain parcel of land owned by the Town of Bridgewater on First Street, and shown as Lot 4 on a Plan entitled, "Bridgewater Industrial Park, a Subdivision of Land in Bridgewater, Mass., owned by Benson Realty Trust, Bridgewater, Mass., Scale 1"=40', dated June 2, 1970, C.A.Pickering Associates, Inc., Consulting Engineers, "recorded with Plymouth County Registry of Deeds, in Plan Book 15, Page 400, (said premises being located within the Cannons Engineering Corporation Superfund Site), said ...on of Restrictions to be recorded in the Plymouth ...egistry of Deeds.

VOTED.

RONALD R. ADAMS
TOWN CLERK

END OF INSTRUMENT

BK10498PG291

Received & Recorded
PLYMOUTH COUNTY
REGISTRY OF DEEDS
26 SEP 1991 09:48AM
JOHN D. PIORDAN
REGISTER

DECLARATION OF RESTRICTIONS

Whereas, Bridgewater Industrial Park, Inc., a corporation duly organized and existing under the laws of Massachusetts, with a usual place of business at 727 Atlantic Avenue, Room 300, Boston, Massachusetts 02111, owns a certain parcel of land situated on First Street, and shown as Lot 3A (the "Premises") on plan entitled "Bridgewater Industrial Park Revised Subdivision of Land in Bridgewater, Mass. owned by Benson Realty Trust dated October 13, 1973 by C.A. Pickering Associates Inc.," recorded with the Plymouth County Registry of Deeds in Plan Book 17, Page 988;

Whereas, a portion of the Premises is located within the Cannons Engineering Corporation Superfund Site (the "Site") in Bridgewater, Massachusetts, which was listed on the National Priority List of hazardous substances sites pursuant to Section 105 of the Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA"), 42 U.S.C. § 9605, on September 8, 1983;

Whereas, the United States Environmental Protection Agency ("USEPA"), in consultation with the Massachusetts Department of Environmental Protection ("MADEP"), has selected and overseen the implementation of remedial action for the Site pursuant to CERCLA; and

Whereas, the USEPA, in consultation with the MADEP, has determined that removal and treatment of contaminated soils at the Site will remove or limit the source of contamination to the groundwater at the Site and that the effects of natural attenuation are expected to reduce contaminants in the groundwater to cleanup target levels in fifteen (15) to twenty (20) years;

NOW, THEREFORE, in order to protect the health, safety and welfare of the inhabitants of the Town of Bridgewater, Bridgewater Industrial Park, Inc. hereby grants the following restrictions to the USEPA, its successors and assigns, and the MADEP, its successors and assigns, which inure to their benefit:

(1) The Premises are hereby restricted to the uses listed in the Town of Bridgewater Protective Zoning By-Laws, in effect at the time of the execution of this Declaration of Restrictions, in Table 6.3(D) [Office and Laboratory Uses], (E) [Retail Business and Consumer Service Establishments], (F) [Automotive Service and Open Air Drive-In Retail Service], and (G)

[Industrial, Wholesale and Transportation Uses], until the USEPA and MADEP provide certification to be recorded in the Registry of Deeds that other uses are permissible (a list of these uses is provided in Attachment A to this Declaration of Restrictions). Notwithstanding the provisions set forth in the preceding sentence, the uses listed in Table 6.3(F)(7) of the current Town of Bridgewater Protective Zoning By-Laws shall not be permitted at the Premises.

(2) Except as authorized by the USEPA and MADEP pursuant to the remedial action selected for the Site which includes longterm groundwater monitoring, groundwater shall not be drawn from any point on the Premises, nor shall it serve as a drinking water supply or be used for any other purpose, nor shall groundwater wells be installed on the Premises, until the USEPA and MADEP provide certification to be recorded at the Registry of Deeds, which certificate describes what uses of the groundwater are permissible;

(3) No excavation below the level of the groundwater may be undertaken on the Premises without advance written approval from the USEPA or the MADEP;

(4) These restrictions shall run with the land;

(5) These restrictions hereby imposed are in gross and are not for the benefit of the appurtenant to any particular land but are for the benefit of and enforceable by the USEPA, its successors and assigns, and MADEP, its successors and assigns;

(6) These restrictions shall be enforceable by the United States and the Commonwealth of Massachusetts, pursuant to the provisions of G.L. c. 184, § 32, or otherwise, or by either one acting singly. Notwithstanding that these restrictions shall be enforceable pursuant to G.L. c. 184, § 32, these restrictions shall also be enforceable by the United States and the Commonwealth of Massachusetts, pursuant to the provisions of G.L. c. 184, § 26, et seq., or otherwise, or by either one acting singly. A notice of restrictions, in compliance with law, shall be recorded before the expiration of thirty (30) years from the date of this deed and shall name the person or persons appearing of record who own the Premises at the time of recording; and in the case of any such recording, a subsequent notice of restriction shall be recorded within twenty (20) years after the recording of any prior notice of restriction until the period of these restrictions has elapsed. Failure to record the notice of restrictions in accordance with this Paragraph shall not effect the enforceability of these restrictions pursuant to the provisions of G.L. c. 184, § 32. Any grantee hereby covenants for itself, its successors and assigns, to timely execute, and record such documents and take such action, including the surrender of certificate of title, if any, for notation thereon,

as shall be necessary to cause such notice of restriction to be effective and enforceable under the then applicable G.L. c. 184, § 26, et seq. Any grantee further covenants for itself, its successors and assigns, to include the restrictions and protective covenants herein set out, in each lease and sublease of the Premises or any portion thereof.

No documentary stamps are affixed hereto as none are required by law as this conveyance is made without monetary consideration.

Executed as a sealed instrument this 23rd day of Sept, 1991.

By Saul L Ziner
Saul L. Ziner
President
Bridgewater Industrial Park, Inc.

COMMONWEALTH OF MASSACHUSETTS

Plymouth, ss. 9th, 1991

On this 9th day of Sept, 1991, before me appeared Saul L. Ziner, to me personally known, who, being by me duly sworn, did say that he is the President of Bridgewater Industrial Park, Inc., and that said instrument was signed on behalf of Bridgewater Industrial Park, Inc., and said Saul L. Ziner acknowledged said instrument to be the free act and deed of Bridgewater Industrial Park, Inc. Witness my hand and official seal.

Notary Public
My commission expires: 2/27/95

CERTIFICATE OF APPROVAL BY THE SECRETARY

The Secretary of the Executive Office of Environmental Affairs, Commonwealth of Massachusetts, hereby certifies that she approves the foregoing restrictions under G.L. c. 184, § 32.

Secretary, Executive Office of
Environmental Affairs,
Commonwealth of Massachusetts

ATTACHMENT A

The Premises are restricted to the following uses:

Table 6.3(D). Office and Laboratory Uses.[1]

1. Business, financial, professional or governmental offices but no retail business, no manufacturing and no processing.

2. Offices and clinics for medical, psychiatric, or other health services for the examination or treatment of persons as outpatient, including only laboratories that are part of such office or clinic.

3. Laboratory or research facility.

4. Radio or television studio.

5. Radio or television transmission facility but not studio.

Table 6.3(E). Retail Business and Consumer Service Establishments.

1. Store serving local retail business needs of residents of vicinity including but not limited to new bakery, grocery, meat market, fruit store, hardware or paint store, florist, news and/or tobacco store, drug store, book store, magazine and periodical store, novelty store, stores providing electronic displays of pictures or movies whether coin operated or otherwise, film store, video tape stores, provided gross floor area of such establishment is under 4,000 sq. ft. and further provided all display, storage and sales of materials are conducted within a building and provided there be no manufacturing or assembly on the premises. In addition, said activity shall not include the conveyance of any material involving subject matter as defined in Sec. 31 of C. 272 MGL, as amended.

2. Store for retail sale of merchandise, provided all display storage and sale of materials are conducted within a

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[1] All references to Table 6.3 throughout this Attachment A refer to Table 6.3 of the Town of Bridgewater Protective Zoning By-Laws, as in effect at the time of the execution of this Declaration of Restrictions.

building and provided there be no manufacturing or assembly on the premises. In addition, said activity shall not include the conveyance of any material involving subject matter as defined in Sec. 31 of C. 272 MGL, as amended.

3. Eating places servicing food and beverages, no dancing or live entertainment permitted.

4. Eating places serving food and beverages.

5. Space for manufacture, assembly, or packaging of consumer goods provided that at least 50% of the merchandise is sold at retail on the premises and that all display, sales and storage is conducted within a building; and further provided that not more than 25% of floor area is devoted to manufacturing, assembly or packaging of consumer goods and that not more than 5 persons are employed at any one time for the manufacturing, assembly or packaging of such goods.

6. Service business servicing local needs, such as barber shops, beauty shops, shoe repair, self-service laundry, or dry cleaning or pick-up agency.

7. Hand laundry, dry cleaning, or tailoring or other similar uses provided personnel is limited to not more than ten (10) persons at any one time on the premises.

8. Mortuary, undertaking or funeral establishments.

9. Veterinary establishment, or similar establishment provided that animals are kept wholly indoors.

10. Store for retail sale of merchandise such as but not limited to lumber yards and building supply yards wherein merchandise is stored in the open, provided that all merchandise so stored is screened from ground level view from any abutting street or abutting property where such materials are stored.

Table 6.3(F). Automotive Service and Open Air Drive-In Retail Service.

1. Gasoline service station.

2. Sale or rental of automobiles, boats and other motor vehicles and accessory storage conducted entirely within an enclosed sound-insulated structure to protect the neighborhood from inappropriate noise and other disturbing effects such as but not limited to flashing, fumes, gases, smoke and vapors.

3. Sale or rental of automobiles, boats and other motor vehicles and accessory storage conducted partly or wholly on open

lots.

4. Automobile repair shops, provided all work is carried out within the building.

5. Car washing establishment.

6. Sales places for flowers, garden supplies, agricultural products partly or wholly outdoors, including commercial greenhouses.

7. (not permitted)

8. Place for exhibition, lettering, or sale of gravestones.

Table 6.3(G). Industrial, Wholesale and Transportation Uses.

1. Laundries and dry cleaning plants.

2. Printing, binding, publishing and related arts and trades.

3. Bottling of beverages.

4. Plumbing, electrical or carpentry shop or other similar service or repair establishments.

5. Place for manufacturing, assembling or packaging of goods, provided that all resulting cinders, dust, flashing, fumes, gases, odors, refuse matter, smoke and vapor be effectively confined to the premises or be disposed of in manner that does not create a nuisance or hazard to safety or health.

6. Wholesale business and storage in a roofed structure.

7. Trucking terminals.

8. Freight terminals.

9. Extractive Industries.

10. Contractor yards.

END OF INSTRUMENT

BK15550PG108

106406
Received & Recorded
PLYMOUTH COUNTY
REGISTRY OF DEEDS
10 OCT 1997 09:55AM
JOHN D.RIORDAN
REGISTER
Bk 15550 Pg 108

CERTIFICATION OF ADDITIONAL USES
UNDER DECLARATION OF RESTRICTIONS

WHEREAS, Osterman Propane, Inc., a Connecticut corporation having a principal place of business at 997 Church Street, Northbridge, Massachusetts ("Osterman") has purchased a certain parcel of land as described on Attachment A hereto (the "Premises");

WHEREAS, the Premises, as well as certain adjacent property, is subject to a certain Declaration of Restrictions dated September 16, 1991, recorded with said Registry of Deeds, in Book 10498, Page 281 (the "Declaration");

WHEREAS, the Declaration was established in order to protect the health, safety and welfare of the inhabitants of the Town of Bridgewater and for other purposes, in connection with a remedial action performed at the Premises, selected and overseen by the United States Environmental Protection Agency, a duly constituted agency established under the laws of the United States and having a principal regional office at One Congress Street, Boston, Massachusetts 02203 ("USEPA"), in consultation with the Massachusetts Department of Environmental Protection, a duly constituted agency established under the laws of the Commonwealth of Massachusetts and having a principal office at One Winter Street, Boston, Massachusetts 02108 ("MADEP");

WHEREAS, Osterman desires to conduct a propane gas business at the Premises, including the storing, transporting, distributing, and selling of propane gas and related equipment and appliances (the "Propane Gas Business");

WHEREAS, Osterman desires to install groundwater monitoring wells at the Premises, and to draw groundwater from such wells for the purpose of conducting groundwater monitoring ("Groundwater Monitoring");

WHEREAS, the installation of groundwater monitoring wells at the Premises will require excavation below the level of the groundwater;

WHEREAS, paragraph 1(b) of the Declaration limits the uses and activities permitted on the Premises by private parties; paragraph 2 of the Declaration limits the uses of the groundwater at the Premises to those authorized pursuant to the remedial action selected for the Cannons Engineering Corporation Superfund Site; and paragraph 3 of the Declaration prohibits excavation at the Premises below the level of the groundwater;

WHEREAS, USEPA and MADEP are grantees of certain rights under the Declaration, including in paragraph 1(b) the right to provide certification that other uses of the Premises by private parties are permissible and in paragraph 2 the right to provide certification that other uses of the groundwater at the Premises are permissible, such certifications to be recorded in said Registry of Deeds;

WHEREAS, paragraph 3 of the Declaration provides that excavation at the Premises below the level of the groundwater is permissible only with prior written approval by USEPA and MADEP;

WHEREAS, Osterman has requested pursuant to paragraphs 1(b) and 2 of the Declaration that USEPA and MADEP provide

certifications for the Propane Gas Business uses and activities, and for the Groundwater Monitoring uses and activities; and

WHEREAS, USEPA and MADEP have considered the proposed Propane Gas Business and Groundwater Monitoring uses and activities and have determined that such uses and activities are not inconsistent with the remedial action performed at the Premises, provided that the provisions of the Declaration are otherwise complied with.

NOW THEREFORE, the USEPA and MADEP hereby certify, pursuant to paragraph 1(b) of the Declaration, that the list of uses by private parties to which the Premises are restricted, set forth therein, does and shall hereby include the storing, transporting, distributing, and selling of propane gas and related equipment and appliances.

The USEPA and MADEP hereby further certify, pursuant to paragraph 2 of the Declaration, that the installation of groundwater wells at the Premises and the drawing of groundwater from such wells for the purpose of conducting groundwater monitoring is a permissible use of the Premises and the groundwater at the Premises, and approves, pursuant to paragraph 3 of the Declaration, any associated excavation below the level of the groundwater; provided that a plan for such excavation, installation of groundwater wells, and groundwater monitoring is first submitted to and approved in writing by the USEPA and MADEP.

All other provisions of the Declaration, including, without

limitation, the restrictions pertaining to the use of groundwater, excavation below the level of groundwater, and all other uses and activities at the Premises, shall continue in full force and effect, and are not altered by this certification.

This certification is solely a determination of uses and activities permitted under the Declaration and shall have no effect on the applicability of (1) any zoning ordinances of the Town of Bridgewater to the proposed Propane Gas Business uses and activities, or (2) any requirements of federal, State or local laws, regulations or other ordinances applicable to the proposed Propane Gas Business or Groundwater Monitoring uses and activities.

This certification shall be effective upon recording at the Plymouth County Registry of Deeds.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

By: _____, 7/7/97
John P. DeVillars Date
Regional Administrator, Region I

In accordance with M.G.L. c. 21E, § 6, as amended, the Commissioner of the Massachusetts Department of Environmental Protection hereby approves this certification.

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION

By: _____, 6/23/97
David B. Struhs Date
Commissioner

COMMONWEALTH OF MASSACHUSETTS

Suffolk, SS. 7/22, 1997

Then personally appeared the above-named John P. DeVillars, as Regional Administrator, Region I of the United States Environmental Protection Agency, and acknowledged the foregoing instrument to be his free act and deed, before me:

WANDA L RIVERA
Notary Public
My Comm. Expires Oct. 9, 2003

Wanda L. Rivera
Notary Public
My Commission Expires:

COMMONWEALTH OF MASSACHUSETTS

Suffolk, SS. 6/23, 1997

Then personally appeared the above-named David B. Struhs, as Commissioner of the Massachusetts Department of Environmental Protection, and acknowledged the foregoing instrument to be his free act and deed, before me:

Elizabeth B Kimball
Notary Public
My Commission Expires:

ELIZABETH B. KIMBALL
Notary Public
My Commission Expires May 3, 2002

5-3-2002

ATTACHMENT A

That certain parcel of land located in the Town of Bridgewater, County of Plymouth, Massachusetts, being shown as "Lot 4A" on a plan of land entitled "Land Acquisition Plan Town of Bridgewater, Plymouth County", dated May 13, 1996, prepared by Joseph J. Tauper and recorded with the Plymouth County Registry of Deeds, Plan Book 39, Page 236, being bounded and described according to said Plan as follows:

NORTHEASTERLY by First Street, 200 feet;

SOUTHWESTERLY by Parcel A shown on said Plan, 522.17 feet;

NORTHWESTERLY by Parcel A shown on said Plan, 180.81 feet; and

NORTHEASTERLY by land shown on said Plan as "N./F. Marie, Trustee of Mackenzie Realty Trust", 436.68 feet;

Containing according to said Plan, 1.99 acres of land.

Being a portion of the premises taken by the Town of Bridgewater as evidenced by a certain Final Decree dated December 28, 1983 (Land Court Case No. 65470) recorded with said Deeds in Book 5585, Page 85.

END OF INSTRUMENT

APPENDIX F

PRESS RELEASE ANNOUNCING START OF 2015 FIVE YEAR REVIEW

Golden, Derrick

Subject: FW: EPA Will Review 24 Hazardous Site Cleanups during 2015

From: Emily Bender [mailto:Bender.Emily@epa.gov]
Sent: Monday, January 05, 2015 11:07 AM
To: Cianciarulo, Robert
Subject: EPA Will Review 24 Hazardous Site Cleanups during 2015

News Release

U.S. Environmental Protection Agency
New England Regional Office
January 5, 2015

Contact: Emily Bender, 617-918-1037

EPA Will Review 24 Hazardous Site Cleanups during 2015

Boston, Mass.– EPA will review site clean ups and remedies at 20 Superfund Sites and oversee reviews at 4 Federal Facilities across New England this year by doing scheduled Five-Year Reviews at each site.

EPA conducts evaluations every five years on previously-completed clean up and remediation work performed at Superfund sites and Federal Facilities listed on the "National Priorities List" (aka Superfund sites) to determine whether the implemented remedies at the sites continue to be protective of human health and the environment. Further, five year review evaluations identify any deficiencies to the previous work and, if called for, recommend action(s) necessary to address them.

The Superfund Sites where EPA will begin Five Year Reviews in FY' 2015 (October 1, 2014 through September 30, 2015) are below. Please note, the Web link provided after each site provides detailed information on the site status and past assessment and cleanup activity. The web link also provides contact information for the EPA Project Manager and Community Involvement Coordinator at each site. Community members and local officials are invited to contact EPA with any comments or current concerns about a Superfund Site or about the conclusions of the previous Five Year Review.

The Superfund Sites at which EPA is performing Five Year Reviews over the following several months include the following sites.

Connecticut
Durham Meadows, Durham
http://www.epa.gov/region1/superfund/sites/durham

Old Southington Landfill, Southington
http://www.epa.gov/region1/superfund/sites/oldsouthington

Raymark Industries, Stratford
http://www.epa.gov/region1/superfund/sites/raymark

Solvents Recovery Services of New England, Southington
http://www.epa.gov/region1/superfund/sites/srs

Maine

Brunswick Naval Air Station (Federal Facility), Brunswick
http://www.epa.gov/region1/superfund/sites/brunswick

Callahan Mining Corp., Brooksville
http://www.epa.gov/region1/superfund/sites/callahan

Eastland Woolen Mill, Corinna
http://www.epa.gov/region1/superfund/sites/eastland

Loring Air Force Base (Federal Facility), Limestone
http://www.epa.gov/region1/superfund/sites/loring

Pinette's Salvage Yard, Washburn
http://www.epa.gov/region1/superfund/sites/pinette

Saco Municipal Landfill, Saco
http://www.epa.gov/region1/superfund/sites/sacolandfill

Massachusetts

Atlas Tack Corp., Fairhaven
http://www.epa.gov/region1/superfund/sites/atlas

Cannon Engineering Corp., Bridgewater
http://www.epa.gov/region1/superfund/sites/cannon

Charles-George Reclamation Trust Landfill, Tyngsborough
http://www.epa.gov/region1/superfund/sites/charlesgeorge

Fort Devens (Federal Facility), Ayer, Harvard, Lancaster & Shirley
http://www.epa.gov/region1/superfund/sites/devens

Groveland Wells No. 1 & 2 Site, Groveland
http://www.epa.gov/region1/superfund/sites/groveland

Materials Technology Laboratory (US ARMY, Federal Facility), Watertown
http://www.epa.gov/region1/superfund/sites/amtl

New Bedford Harbor, New Bedford
www.epa.gov/nbh

PSC Resources, Palmer
http://www.epa.gov/region1/superfund/sites/psc

New Hampshire

Somersworth Sanitary Landfill, Somersworth
http://www.epa.gov/region1/superfund/sites/somersworth

South Municipal Water Supply Well (Five Year Review Addendum), Peterborough
http://www.epa.gov/region1/superfund/sites/southmuni

Troy Mills Landfill, Troy
http://www.epa.gov/region1/superfund/sites/troymills

Rhode Island

Stamina Mills Inc., North Smithfield
http://www.epa.gov/region1/superfund/sites/stamina

West Kingston Town Dump/URI Disposal Area, South Kingstown
http://www.epa.gov/region1/superfund/sites/wkingston

Vermont

Burgess Brothers Landfill, Woodford and Bennington
http://www.epa.gov/region1/superfund/sites/burgess

Learn More about the Latest EPA News & Events in New England (http://www.epa.gov/region1/newsevents/index.html)

Follow EPA New England on Twitter (http://twitter.com/epanewengland)

Connect with EPA New England on Facebook (https://www.facebook.com/EPARegion1)

APPENDIX G

2015 NO UNACCEPTABLE RISKS MEMO FROM EPA RISK ASSESSOR

MEMORANDUM

To: Derrick Golden
From: Richard Sugatt
Date: August 10, 2015
RE: Absence of Risk issues for Cannons Engineering Superfund Site

The purpose of this memorandum is to document for the 2015 Five Year Review report that there are no remaining human health or ecological risk issues at the Cannons Engineering Bridgewater Superfund Site.

After the previous Five Year Review report, Massachusetts DEP conducted a new groundwater use and value determination for the Site area dated October 23, 2012. The state concluded that the groundwater was not suitable for potable use. Therefore, EPA determined in an ESD dated May 2013 that drinking water standards were no longer applicable or appropriate. EPA's risk assessor in March, 2013 conducted a human health risk assessment for recreational surface water risk associated with groundwater that may emerge into downgradient surface water. Drinking water risk was not further evaluated because the groundwater use and value determination and institutional controls eliminated the possibility of a future completed drinking water exposure pathway. In addition, the risk assessment evaluated ecological risk for groundwater that may emerge into downgradient surface water.

The risk assessment demonstrated that the only two chemicals that exceeded drinking water standards/criteria, arsenic and 1, 4-dioxane, would not have risk above EPA human health risk limits for recreational receptors or EPA National Recommended Water Quality Criteria or other benchmarks for aquatic organisms. These results were documented in a technical memorandum dated March 21, 2013 attached to a Final Closeout Report, which was signed on June 13, 2013. The Site was delisted from the NPL on September 24, 2013.

The risk assessment memorandum was reviewed to evaluate whether the conclusions would change based on any changes in toxicity factors and exposure assumptions that have occurred since 2013. The chemical concentration data for groundwater from the risk assessment is presented in Table 1, where the maximum concentrations were compared with current Massachusetts GW-3 standards and recreational EPA Regional Screening Levels (RSLs) for surface water, if they were available. Massachusetts GW-3 standards are considered to be protective of aquatic organisms under the assumption that groundwater is diluted by a factor of 10 in surface water. The recreational RSL for surface water only was calculated on the EPA RSL calculator http://www.epa.gov/region9/superfund/prg/. A copy of the calculator output containing the exposure assumptions, chemical toxicity values, and calculated RSLs is attached.

As shown in Table 1, the maximum concentrations of groundwater data from the last sampling rounds (2009, 2010) were lower than GW-3 standards, suggesting that undiluted groundwater would not have effects on aquatic organisms in downgradient surface water. The maximum groundwater concentrations were also lower than the recreational surface water RSL for all chemicals except vinyl chloride and arsenic. Since the RSLs for these two carcinogens were based on a cancer risk of 1×10^{-6}, the cancer risk associated with the maximum groundwater concentration was calculated by dividing the maximum groundwater concentration by the RSL and then multiplying by 1×10^{-6}. As shown in Table 1, these cancer risk values were 1.2×10^{-5} for vinyl chloride and 4.3×10^{-6} for arsenic, both of which are within EPA's acceptable risk range of 1×10^{-6} to 1×10^{-4}, even without dilution of groundwater into

surface water. These results indicate that groundwater at the Site does not have an unacceptable potential downgradient risk to surface water for recreational receptors and aquatic organisms.

The only other potential risk issue that may be affected by changes in toxicity factors since the 2010 Five Year Review report is related to six samples of refractory brick in pre-remedial soils that were analyzed for dioxins in the original Remedial Investigation. These soils are now covered by asphalt. As shown in the attached table from the October 1991 "Remedial Action Report Cannons Bridgewater Superfund Site", the concentrations of dioxins (expressed as toxicity equivalents (TEQ) relative to the most potent dioxin (2, 3, 7, 8-tetrachlorodibenzodioxin, or 2,3,7,8-TCDD) ranged from 0.002 ug/kg to 0.065 ug TEQ/kg. TEQ was quantifiable in all six samples and averaged 0.03 ug TEQ/kg.

On February 17, 2012, EPA finalized the non-cancer toxicity assessment for 2,3,7,8-TCDD, indicating that non-cancer health effects from exposure to dioxin can now be quantified. EPA's dioxin reassessment has been developed and undergone review for many years, with the participation of scientific experts in EPA and other federal agencies, as well as scientific experts in the private sector and academia. The Agency followed current guidelines and incorporated the latest data and physiological/biochemical research into the reassessment. With the release of the final human health non-cancer dioxin reassessment, EPA also published an oral non-cancer toxicity value, or reference dose (RfD), of $7x10^{-10}$ mg/kg-day for 2,3,7,8-TCDD in EPA's Integrated Risk Information System (IRIS). The dioxin cancer reassessment will follow thereafter, although the cancer oral slope value from California EPA ($1.3 \times 10^{+5}$ per mg/kg-day) is recommended in the interim. The dioxin RfD was approved for immediate use at Superfund sites to ensure protection of human health. Non-cancer hazard from exposure to dioxin can now be quantified for the site.

Using the new oral RfD results in a Preliminary Remedial Goal (PRG) of 0.05 ug TEQ/kg for residential soil and 0.664 ug TEQ/kg for commercial/industrial soil. Using the California EPA cancer slope factor, these PRG concentrations would have cancer risk of 1×10^{-5} for residential soil and 3×10^{-5} for commercial/industrial soil, both within EPA's acceptable risk range (1×10^{-6} to 1×10^{-4}). The average concentration measured at the site, 0.03 ug TEQ/kg, is lower than the residential PRG of 0.05 ug TEQ/kg, indicating that the potential risk if these soils were to be exposed would be acceptable for residential use, as well as commercial/industrial use.

Table 1. Comparison of Maximum Concentrations in Groundwater at Cannons Engineering Bridgewater Superfund Site with GW-3 Groundwater Standards and Recreational RSL

Chemical	2009		2010		GW-3 (ug/l)	Recreational Surface Water	
	Maximum Concentration (ug/l)	No. of Detections	Maximum Concentration (ug/l)	No. of Detections		RSL (ug/L)	Cancer Risk
Acetone	9.4	10	9.4	9	50000	2000000	
Benzene	0.27	5	0.21	4	10000	49	
2-Butanone	2.2	1	2.2	1	50000	1230000	
Chloroacetonitrile	8.5	1	ND	ND	NA	NA	
Chlorobenzene	15	9	11	9	1000	6350	
Chloroform	0.049	1	0.049	1	20000	135	
Chloromethane	0.59	17	0.59	18	NA	NA	
1,2-Dichlorobenzene	1.1	3	0.76	2	2000	15500	
1,4-Dichlorobenzene	0.24	1	ND	ND	8000	124	
1,1-Dichloroethane	0.61	11	0.61	12	20000	802	
1,2-Dichloroethane	1.3	6	1.3	6	20000	70	
cis-1,2-Dichloroethene	4.1	14	3.8	14	50000	1420	
trans-1,2-Dichloroethene	0.1	1	0.1	1	50000	14200	
Diethyl Ether	0.33	3	ND	nd	NA	NA	
Methyl-t-Butyl Ether	6.1	17	6.1	18	50000	5290	
Nitrobenzene	7.9	1	ND	ND	NA	2060	
Proprionitrile	3.1	1	ND	ND	NA	NA	
Tetrachloroethene	2.5	10	2.5	10	30000	380	
1,2,4-Trichlorobenzene	0.048	1	0.048	1	50000	12	
Trichloroethene	1.6	14	1.2	14	5000	38	
Vinyl Chloride	1.9	8	1.9	8	50000	**0.159**	1.2E-05
Xylene	0.56	1	0.53	1	5000	38600	
1,4-Dioxane	NA	NA	4.9	3	50000	154	
Aluminum	280	2	NA	NA	NA	2160000	
Arsenic	40	12	NA	NA	900	**9.4**	4.3E-06
Barium	360	24	NA	NA	50000	172000	
Cadmium	3.6	11	NA	NA	4	343	
Copper	7.9	3	NA	NA	NA	86300	
Iron	43000	17	NA	NA	NA	1510000	
Lead	2.7	2	NA	NA	10	NA	
Manganese	7800	23	NA	NA	NA	13900	
Zinc	78	4	NA	NA	900	678000	

NA = not available, or not analyzed

ND = not detected

GW-3 = Massachusetts GW-3 standared (all groundwater in state)

RSL = EPA Regional Screening Level for recreational receptor (lower of 1E-06 cancer risk or HQ =1)

Numbers in bold exceed recreational RSL for surface water

Cancer risk = (maximum concentration/RSL) x 1E-06

Specific

...ator Equation Inputs for Surface Water

Variable	Value
TR (target cancer risk) unitless	1.0E-6
ED_{recw} (exposure duration - recreator) year	26
ED_{recwa} (exposure duration - adult) year	20
ED_{recwc} (exposure duration - child) year	6
ED_{0-2} (mutagenic exposure duration) year	2
ED_{2-6} (mutagenic exposure duration) year	4
ED_{6-16} (mutagenic exposure duration) year	10
ED_{16-30} (mutagenic exposure duration) year	10
THQ (target hazard quotient) unitless	1
LT (lifetime - recreator) year	70
EF (exposure frequency) day/year	45
EF_{recwa} (adult exposure frequency) day/year	45
EF_{recwc} (child exposure frequency) day/year	45
EF_{0-2} (mutagenic exposure frequency) day/year	45
EF_{2-6} (mutagenic exposure frequency) day/year	45
EF_{6-16} (mutagenic exposure frequency) day/year	45
EF_{16-30} (mutagenic exposure frequency) day/year	45
$ET_{recw-adj}$ (age-adjusted exposure time) hour/event	1
$ET_{recw-madj}$ (mutagenic age-adjusted exposure time) hour/event	1
ET_{recwa} (adult exposure time) hour/event	1
ET_{recwc} (child exposure time) hour/event	1
$ET_{recw0-2}$ (mutagenic exposure time) hour/event	1
$ET_{recw2-6}$ (mutagenic exposure time) hour/event	1
$ET_{recw6-16}$ (mutagenic exposure time) hour/event	1
$ET_{recw16-30}$ (mutagenic exposure time) hour/event	1
EV_{recwa} (adult) events/day	1
EV_{recwc} (child) events/day	1
EV_{0-2} (mutagenic) events/day	1
EV_{2-6} (mutagenic) events/day	1
EV_{6-16} (mutagenic) events/day	1
EV_{16-30} (mutagenic) events/day	1
BW_{recwc} (body weight - child) kg	15
BW_{recwa} (body weight - adult) kg	80
BW_{0-2} (mutagenic body weight) kg	15

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Site-specific

Recreator Equation Inputs for Surface Water

Variable	Value
BW_{2-6} (mutagenic body weight) kg	15
BW_{6-16} (mutagenic body weight) kg	80
BW_{16-30} (mutagenic body weight) kg	80
SA_{recwc} (skin surface area - child) cm^2	6378
SA_{recwa} (skin surface area - adult) cm^2	20900
SA_{0-2} (skin surface area - mutagenic) cm^2	6378
SA_{2-6} (skin surface area - mutagenic) cm^2	6378
SA_{6-16} (skin surface area - mutagenic) cm^2	20900
SA_{16-30} (skin surface area - mutagenic) cm^2	20900
SA_{0-2} (mutagenic skin surface area) cm^2	6378
SA_{2-6} (mutagenic skin surface area) cm^2	6378
SA_{6-16} (mutagenic skin surface area) cm^2	20900
SA_{16-30} (mutagenic skin surface area) cm^2	20900
$IFW_{rec-adj}$ (age-adjusted water intake rate) L/kg	1.463
$IFWM_{rec-adj}$ (mutagenic age-adjusted water intake rate) L/kg	5.925
$DFW_{rec-adj}$ (age-adjusted dermal factor) cm^2-event/kg	349929
$DFWM_{rec-adj}$ (mutagenic age-adjusted dermal factor) cm^2-event/kg	1082538
IRW_{recwa} (water intake rate - adult) L/hr	0.05
IRW_{recwc} (water intake rate - child) L/hr	0.05
IRW_{0-2} (mutagenic water intake rate) L/hr	0.05
IRW_{2-6} (mutagenic water intake rate) L/hr	0.05
IRW_{6-16} (mutagenic water intake rate) L/hr	0.05
IRW_{16-30} (mutagenic water intake rate) L/hr	0.05
l_{sc} (apparent thickness of stratum corneum) cm	0.001

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pecific

creening Levels (RSL) for Surface Water

nc=Noncancer, ca* (Where nc SL < 100 x ca SL),
(Where nc SL < 10 x ca SL), max=SL exceeds ceiling limit (see User's Guide), sat=SL exceeds csat,
Smax=Soil SL exceeds ceiling limit and has been substituted with the max value (see User's Guide),
Ssat=Soil inhalation SL exceeds csat and has been substituted with the csat

Chemical	CAS Number	Mutagen?	VOC?	Chemical Type	Ingestion SF $(mg/kg\text{-}day)^{-1}$	SFO Ref	Chronic RfD (mg/kg-day)	Chronic RfD Ref	Chronic RfC (mg/m^3)	Chronic RfC Ref	RAGSe GIABS (unitless)
Acetone	67-64-1	No	Yes	Organics	-		9.00E-01	I	3.09E+01	A	1
Aluminum	7429-90-5	No	No	Inorganics	-		1.00E+00	P	5.00E-03	P	1
Arsenic, Inorganic	7440-38-2	No	No	Inorganics	1.50E+00	I	3.00E-04	I	1.50E-05	C	1
Barium	7440-39-3	No	No	Inorganics	-		2.00E-01	I	5.00E-04	H	0.07
Benzene	71-43-2	No	Yes	Organics	5.50E-02	I	4.00E-03	I	3.00E-02	I	1
Cadmium (Water)	7440-43-9	No	No	Inorganics	-		5.00E-04	I	1.00E-05	A	0.05
Chlorobenzene	108-90-7	No	Yes	Organics	-		2.00E-02	I	5.00E-02	P	1
Chloroform	67-66-3	No	Yes	Organics	3.10E-02	C	1.00E-02	I	9.77E-02	A	1
Chloromethane	74-87-3	No	Yes	Organics	-		-		9.00E-02	I	1
Copper	7440-50-8	No	No	Inorganics	-		4.00E-02	H	-		1
Dichlorobenzene, 1,2-	95-50-1	No	Yes	Organics	-		9.00E-02	I	2.00E-01	H	1
Dichlorobenzene, 1,4-	106-46-7	No	Yes	Organics	5.40E-03	C	7.00E-02	A	8.00E-01	I	1
Dichloroethane, 1,1-	75-34-3	No	Yes	Organics	5.70E-03	C	2.00E-01	P	-		1
Dichloroethane, 1,2-	107-06-2	No	Yes	Organics	9.10E-02	I	6.00E-03	S	7.00E-03	P	1
Dichloroethylene, 1,2-cis-	156-59-2	No	Yes	Organics	-		2.00E-03	I	-		1
Dichloroethylene, 1,2-trans-	156-60-5	No	Yes	Organics	-		2.00E-02	I	-		1
Dioxane, 1,4-	123-91-1	No	Yes	Organics	1.00E-01	I	3.00E-02	I	3.00E-02	I	1
Iron	7439-89-6	No	No	Inorganics	-		7.00E-01	P	-		1
Lead and Compounds	7439-92-1	No	No	Inorganics	-		-		-		1
Manganese (Non-diet)	7439-96-5	No	No	Inorganics	-		2.40E-02	S	5.00E-05	I	0.04
Methyl Ethyl Ketone (2-Butanone)	78-93-3	No	Yes	Organics	-		6.00E-01	I	5.00E+00	I	1
Methyl tert-Butyl Ether (MTBE)	1634-04-4	No	Yes	Organics	1.80E-03	C	-		3.00E+00	I	1
Nitrobenzene	98-95-3	No	Yes	Organics	-		2.00E-03	I	9.00E-03	I	1
Tetrachloroethylene	127-18-4	No	Yes	Organics	2.10E-03	I	6.00E-03	I	4.00E-02	I	1
Trichlorobenzene, 1,2,4-	120-82-1	No	Yes	Organics	2.90E-02	P	1.00E-02	I	2.00E-03	P	1
Trichloroethylene	79-01-6	Yes	Yes	Organics	4.60E-02	I	5.00E-04	I	2.00E-03	I	1
Vinyl Chloride	75-01-4	Yes	Yes	Organics	7.20E-01	I	3.00E-03	I	1.00E-01	I	1
Xylenes	1330-20-7	No	Yes	Organics	-		2.00E-01	I	1.00E-01	I	1
Zinc and Compounds	7440-66-6	No	No	Inorganics	-		3.00E-01	I	-		1

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Site-specific

Recreator Screening Levels (RSL) for Surface 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,
Smax=Soil SL exceeds ceiling limit and has been substituted with the max value (see User's Guide),
Ssat=Soil inhalation SL exceeds csat and has been substituted with the csat

Chemical	K_p (cm/hr)	MW	FA	In EPD?	DAeventc	DAeventnc	DAeventna	Ingestion SL TR=1.0E-6 (µg/L)	Dermal SL TR=1.0E-6 (µg/L)	Carcinogenic SL TR=1.0E-6 (µg/L)
Acetone	0.000512	58.08	1	Yes	-	17.168391	27.942584	-	-	-
Aluminum	0.001	26.982	1	Yes	-	19.07599	31.047315	-	-	-
Arsenic, Inorganic	0.001	74.922	1	Yes	0.0000487	0.0057228	0.0093142	1.16E+01	4.87E+01	9.40E+00
Barium	0.001	137.33	1	Yes	-	0.2670639	0.4346624	-	-	-
Benzene	0.0149	78.11	1	Yes	0.0013275	0.076304	0.1241893	3.18E+02	5.72E+01	4.85E+01
Cadmium (Water)	0.001	112.41	1	Yes	-	0.0004769	0.0007762	-	-	-
Chlorobenzene	0.0282	112.56	1	Yes	-	0.3815198	0.6209463	-	-	-
Chloroform	0.00683	119.38	1	Yes	0.0023553	0.1907599	0.3104732	5.63E+02	1.78E+02	1.35E+02
Chloromethane	0.00328	50.49	1	Yes	-	-	-	-	-	-
Copper	0.001	63.55	1	Yes	-	0.7630396	1.2418926	-	-	-
Dichlorobenzene, 1,2-	0.0446	147	1	Yes	-	1.7168391	2.7942584	-	-	-
Dichlorobenzene, 1,4-	0.0453	147	1	Yes	0.0135213	1.3353193	2.1733121	3.23E+03	1.29E+02	1.24E+02
Dichloroethane, 1,1-	0.00675	98.96	1	Yes	0.0128096	3.8151981	6.2094631	3.06E+03	1.09E+03	8.02E+02
Dichloroethane, 1,2-	0.0042	98.96	1	Yes	0.0008024	0.1144559	0.1862839	1.92E+02	1.09E+02	6.96E+01
Dichloroethylene, 1,2-cis-	0.011	96.94	1	Yes	-	0.038152	0.0620946	-	-	-
Dichloroethylene, 1,2-trans-	0.011	96.94	1	Yes	-	0.3815198	0.6209463	-	-	-
Dioxane, 1,4-	0.000332	88.11	1	Yes	0.0007301	0.5722797	0.9314195	1.75E+02	1.33E+03	1.54E+02
Iron	0.001	55.85	1	Yes	-	13.353193	21.733121	-	-	-
Lead and Compounds	0.0001	207.2	1	Yes	-	-	-	-	-	-
Manganese (Non-diet)	0.001	54.94	1	Yes	-	0.018313	0.0298054	-	-	-
Methyl Ethyl Ketone (2-Butanone)	0.000962	72.11	1	Yes	-	11.445594	18.628389	-	-	-
Methyl tert-Butyl Ether (MTBE)	0.00211	88.15	1	Yes	0.0405638	-	-	9.70E+03	1.16E+04	5.29E+03
Nitrobenzene	0.00541	123.11	1	Yes	-	0.038152	0.0620946	-	-	-
Tetrachloroethylene	0.0334	165.83	1	Yes	0.034769	0.1144559	0.1862839	8.32E+03	3.99E+02	3.80E+02
Trichlorobenzene, 1,2,4-	0.0705	181.45	1	Yes	0.0025178	0.1907599	0.3104732	6.02E+02	1.24E+01	1.21E+01
Trichloroethylene	0.0116	131.39	1	Yes	0.0011108	0.009538	0.0155237	2.34E+02	4.58E+01	3.83E+01
Vinyl Chloride	0.00838	62.5	1	Yes	3.1645E-6	0.057228	0.0931419	4.10E-01	2.59E-01	1.59E-01
Xylenes	0.05	106.17	1	Yes	-	3.8151981	6.2094631	-	-	-
Zinc and Compounds	0.0006	65.38	1	Yes	-	5.7227971	9.3141946	-	-	-

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Site-specific

Recreator Screening Levels (RSL) for Surface 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,
Smax=Soil SL exceeds ceiling limit and has been substituted with the max value (see User's Guide),
Ssat=Soil inhalation SL exceeds csat and has been substituted with the csat

Chemical	Ingestion SL (Child) HQ=1 (µg/L)	Dermal SL (Child) HQ=1 (µg/L)	Noncarcinogenic SL (Child) HQ=1 µ(g/L)	Ingestion SL (Adult) HQ=1 (µg/L)	Dermal SL (Adult) HQ=1 (µg/L)	Noncarcinogenic SL (Adult) HQ=1 (µg/L)	Screening Level (µg/L)
Acetone	2.19E+06	2.32E+07	2.00E+06	1.17E+07	3.78E+07	8.92E+06	2.00E+06 nc
Aluminum	2.43E+06	1.91E+07	2.16E+06	1.30E+07	3.10E+07	9.15E+06	2.16E+06 nc
Arsenic, Inorganic	7.30E+02	5.72E+03	6.47E+02	3.89E+03	9.31E+03	2.75E+03	9.40E+00 ca*
Barium	4.87E+05	2.67E+05	1.72E+05	2.60E+06	4.35E+05	3.72E+05	1.72E+05 nc
Benzene	9.73E+03	3.29E+03	2.46E+03	5.19E+04	5.35E+03	4.85E+03	4.85E+01 ca*
Cadmium (Water)	1.22E+03	4.77E+02	3.43E+02	6.49E+03	7.76E+02	6.93E+02	3.43E+02 nc
Chlorobenzene	4.87E+04	7.31E+03	6.35E+03	2.60E+05	1.19E+04	1.14E+04	6.35E+03 nc
Chloroform	2.43E+04	1.44E+04	9.06E+03	1.30E+05	2.35E+04	1.99E+04	1.35E+02 ca*
Chloromethane	-	-	-	-	-	-	
Copper	9.73E+04	7.63E+05	8.63E+04	5.19E+05	1.24E+06	3.66E+05	8.63E+04 nc
Dichlorobenzene, 1,2-	2.19E+05	1.66E+04	1.55E+04	1.17E+06	2.71E+04	2.65E+04	1.55E+04 nc
Dichlorobenzene, 1,4-	1.70E+05	1.27E+04	1.19E+04	9.08E+05	2.07E+04	2.03E+04	1.24E+02 ca*
Dichloroethane, 1,1-	4.87E+05	3.23E+05	1.94E+05	2.60E+06	5.26E+05	4.38E+05	8.02E+02 ca
Dichloroethane, 1,2-	1.46E+04	1.56E+04	7.54E+03	7.79E+04	2.53E+04	1.91E+04	6.96E+01 ca
Dichloroethylene, 1,2-cis-	4.87E+03	2.01E+03	1.42E+03	2.60E+04	3.27E+03	2.91E+03	1.42E+03 nc
Dichloroethylene, 1,2-trans-	4.87E+04	2.01E+04	1.42E+04	2.60E+05	3.27E+04	2.91E+04	1.42E+04 nc
Dioxane, 1,4-	7.30E+04	1.04E+06	6.82E+04	3.89E+05	1.70E+06	3.17E+05	1.54E+02 ca
Iron	1.70E+06	1.34E+07	1.51E+06	9.08E+06	2.17E+07	6.41E+06	1.51E+06 nc
Lead and Compounds	-	-	-	-	-	-	
Manganese (Non-diet)	5.84E+04	1.83E+04	1.39E+04	3.11E+05	2.98E+04	2.72E+04	1.39E+04 nc
Methyl Ethyl Ketone (2-Butanone)	1.46E+06	7.77E+06	1.23E+06	7.79E+06	1.26E+07	4.82E+06	1.23E+06 nc
Methyl tert-Butyl Ether (MTBE)	-	-	-	-	-	-	5.29E+03 ca
Nitrobenzene	4.87E+03	3.56E+03	2.06E+03	2.60E+04	5.79E+03	4.73E+03	2.06E+03 nc
Tetrachloroethylene	1.46E+04	1.31E+03	1.20E+03	7.79E+04	2.14E+03	2.08E+03	3.80E+02 ca**
Trichlorobenzene, 1,2,4-	2.43E+04	9.37E+02	9.02E+02	1.30E+05	1.53E+03	1.51E+03	1.21E+01 ca*
Trichloroethylene	1.22E+03	3.93E+02	2.97E+02	6.49E+03	6.40E+02	5.83E+02	3.83E+01 ca**
Vinyl Chloride	7.30E+03	4.68E+03	2.85E+03	3.89E+04	7.62E+03	6.38E+03	1.59E-01 ca
Xylenes	4.87E+05	4.19E+04	3.86E+04	2.60E+06	6.82E+04	6.65E+04	3.86E+04 nc
Zinc and Compounds	7.30E+05	9.54E+06	6.78E+05	3.89E+06	1.55E+07	3.11E+06	6.78E+05 nc

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October 1991 89-132

REMEDIAL ACTION REPORT
CANNONS BRIDGEWATER SUPERFUND SITE

VOLUME 1 - TEXT, TABLES, FIGURES

CanonieEnvironmental

TABLE 66
REFRACTORY BRICK SAMPLES
SUMMARY OF RESULTS

All results in ug/Kg

SAMPLE NUMBER:	6112A-1		6112A-2		6112A-3		6112A-4		6112A-5		6112A-6	
MATRIX:	Brick		Brick		Brick		Brick		Ash		Ash/Brick	
TCDD/TCDF CONGENER												
2,3,7,8-TCDD	0.002		0.001	U	0.003	U	0.002		0.004		0.007	
1,2,3,7,8-PeCDD	0.003	U	0.002	U	0.014	U	0.013	U	0.016		0.006	
1,2,3,4,7,8-HxCDD	0.007	U	0.005	U	0.008	U	0.011	U	0.010	J	0.013	J
1,2,3,6,7,8-HxCDD	0.007	U	0.004	U	0.007	U	0.010	U	0.023	J	0.039	J
1,2,3,7,8,9-HxCDD	0.007	U	0.004	U	0.008	U	0.010	U	0.026	J	0.028	J
1,2,3,4,6,7,8-HpCDD	0.040		0.027		0.058		0.046		0.222		0.292	
OCDD	0.071	J	0.133	J	0.153		0.162	J	0.766	J	0.926	J
2,3,7,8-TCDF	0.003	*U	0.001	*U	0.040		0.058		0.031	*U	0.049	
1,2,3,7,8-PeCDF	0.003		0.001		0.032		0.049		0.047		0.084	
2,3,4,7,8-PeCDF	0.004		0.002		0.044		0.068		0.038		0.063	
1,2,3,4,7,8-HxCDF	0.003		0.003		0.025		0.039		0.088		0.181	
1,2,3,6,7,8-HxCDF	0.002	U	0.002		0.017		0.028		0.031		0.053	
2,3,4,6,7,8-HxCDF	0.003	U	0.003		0.018		0.033		0.028		0.035	
1,2,3,7,8,9-HxCDF	0.002	U	0.001	U	0.004		0.007		0.010		0.012	
1,2,3,4,6,7,8-HpCDF	0.013		0.021		0.027		0.037		0.095		0.262	
1,2,3,4,7,8,9-HpCDF	0.007	U	0.002	U	0.003	U	0.003	U	0.018		0.024	
OCDF	0.008		0.013		0.007	*U	0.006		0.005	U	0.151	
TOTAL TCDD	0.134		0.061		0.217		0.233		0.083		0.151	
TOTAL PeCDD	0.101		0.049		0.217		0.284		0.171		0.252	
TOTAL HxCDD	0.098		0.049		0.310		0.355		0.262		0.393	
TOTAL HpCDD	0.072		0.051		0.124		0.132		0.393		0.523	
TOTAL TCDF	0.036		0.031		0.848		1.12		0.333		0.493	
TOTAL PeCDF	0.028		0.021		0.403		0.558		0.262		0.453	
TOTAL HxCDF	0.012		0.049		0.143		0.213		0.232		0.413	
TOTAL HpCDF	0.013		0.032		0.027		0.060		0.151		0.382	
Toxicity Equivalency	0.004		0.002		0.013		0.026		0.043		0.065	
Dilution Factor	1		1		1		1		1		1	
Percent Moisture	3.03		2.33		3.30		1.37		0.81		0.65	
Date of Receipt	3/21/91		3/21/91		3/21/91		3/21/91		3/21/91		3/21/91	
Sample Extraction Date	4/2/91		4/2/91		4/2/91		4/2/91		4/2/91		4/2/91	
Analysis Date	4/10/91		4/10/91		4/10/91		4/10/91		4/10/91		4/10/91	

Qualifier Key

U : Undetected at the corresponding minimum detection limit. J : Estimated value.

(*U : estimated maximum possible concentration). *All results are reported on a dry weight basis.*

TCDD= tetrachlorodibenzo-p-dioxin; TCDF= tetrachlorodibenzofuran; Pe= penta- ; Hx= hexa- ; Hp= hepta- ; O= octa-

Samples were analyzed by the "Modified Version of EPA 12/90 CLP SOW for Analysis of Polychlorinated Dibenzo-p-dioxins (PCDD) and Polychlorinated Dibenzofurans (PCDF)."

APPENDIX H

INTERVIEWS

INTERVIEW RECORD

Site Name: Cannons Engineering Bridgewater Superfund Site	**EPA ID No.:** MAD079510780
Subject: Third Five-Year Review (2015)	**Time:** **Date:**
Type: ☐ Telephone ☐ Visit ☐ Other **Location of Visit:**	☐ Incoming ☐ Outgoing

Contact Made By:

Name: Rudy Brown	**Title:** Community Involvement Coordinator	**Organization:** EPA New England

Individual Contacted:

Name: Stuart Briggs	**Title:** Manager	**Organization:** Osterman Propane
Telephone No: 800-698-3131 **Fax No:** 508-697-3175 **E-Mail Address:** sbriggs@ostermangas.com	**Street Address:** 42 First Street **City, State, Zip:** Bridgewater, MA 02324	

Summary Of Conversation

Q1: What is your overall impression of the project and site?
A1: The work is done. It is completely clean safe property.

Q2: Are you aware of any issues the five-year review should focus on?
A2: No. Nothing, no issues have been brought to us.

Q3: Whom should Nobis Engineering, Inc. speak to in the community to solicit local input?
A3: Perhaps the town health official. (He was contacted and had no issues raised to him,)

Q4: Do you feel that information related to the site is readily available?
A4: Yes. All the information is posted and available.

Q5: Have there been any changes in the operation of Municipal Well Station 1 since 2010? Are there any plans to increase the pumping rate of Well Station 1?
A5: No.

Q6: Are you aware of any pending or future water needs or any change in water usage in the area (i.e. drilling of new municipal water supply wells)?
A6: No. Town may review some of the old wells.

Q7: Do you know whether there have there been any changes in the Site or downgradient property in the last 5 years, or whether changes are planned?
A7: One new building may have been constructed.

Q8: Are you aware of any changes in the state drinking water quality standards or requirements since 2010 that would change the Site groundwater cleanup requirements?
A8: No. He indicated that he was not aware of any changes.

INTERVIEW RECORD

Site Name: Cannons Engineering Bridgewater Superfund Site		**EPA ID No.:** MAD079510780
Subject: Fifth Five-Year Review (2015)		**Time: 3:30 pm** **Date: 8/10/15**
Type: ☐ Telephone ☐ Visit ☒ Other **Location of Visit:**		☐ Incoming ☐ Outgoing

Contact Made By:

Name: Rudy Brown	**Title:** Community Involvement Coordinator	**Organization:** EPA New England

Individual Contacted:

Name: Jay Naparstek	**Title:** Deputy Division Director	**Organization:** Massachusetts Department of Environmental Protection
Telephone No: 617-556-1156 **Fax No:** 617-292-5530 **E-Mail Address:** jay.naparstek@state.ma.us		**Street Address:** One Winter Street **City, State, Zip:** Boston, MA 02108

Summary Of Conversation

Q1: What is your overall impression of the project and site?
A1: The remedial decisions made for the site seem to remain protective.

Q2: Are you aware of any issues the five-year review should focus on?
A2: No

Q3: With pump and treat operations discontinued; do you believe that the remedy still protective of downgradient water supply wells?
A3: To the best of my knowledge based on the data that has been produced.

Q4: Are you aware of any changes in the state ARARs, groundwater quality standards, etc., since 2010?
A4: Our GW-1 standard for 1, 4-dioxane has been lowered to 0.3 ug/l.

Q5: Have groundwater treatment facility restart criteria been established by MassDEP and US EPA?
A5: Not that I am aware of.

Q6: Are you aware of any changes in the Site or surrounding property in the last 5 years, or whether any changes are planned?
A6: No

Q7: Do you have any comments, suggestions, or recommendations regarding the project?
A7: Nothing in addition to what is already being done.

Golden, Derrick

From: Brown, Rudy
Sent: Thursday, August 06, 2015 9:41 AM
To: Golden, Derrick
Subject: FW: FW: Cannons Bridgewater - the 2015 FYR of the site is being prepared.

Derrick, see below.

From: JRSharland@aol.com [mailto:JRSharland@aol.com]
Sent: Wednesday, August 05, 2015 3:47 PM
To: Brown, Rudy
Cc: ebadger@bridgewaterma.org
Subject: Re: FW: Cannons Bridgewater - the 2015 FYR of the site is being prepared.

Rudy - it is time to close the books on this one. There is no longer any need to spend taxpayers dollars on this. The monitoring wells, if any are still in service, should be abandoned and capped.

My credentials:

1. I am a chemical engineer (UMass, Amherst, 1970) and spent my entire 40 year career involved with hazardous chemicals.

2. I was a member of the Bridgewater Board of Health from 1980 to 1989 and prior to that, I assisted the Bridgewater Health Agent (Nancy Oliveira now Nancy Koska) with a local assessment of why Cannon's Engineering smelled so bad. (Neighborhood complaints from Elm Street, Bridgewater). We (the Bridgewater Board of Health) were putting together an action plan to shut Cannon's Engineering down for nuisance and violation of original permits when the State of Massachusetts came in and did it, just as much for manifest violations and illegal dumping in a warehouse next to a river in either Lawrence or Lowell, MA, (I forget which city) as for the expanded and illegal burning of chlorinated reactor bottoms etc versus their permit to burn waste oil.

It's been 30 years or more since the "burn the dirt" clean up and monitoring wells. I have not closely checked monitoring well results of late, but I believe they are essentially negative as to any migration of the chlorinated chemicals et al from the site to any nearby aquifer or well site or home.

Time to pack up the tents and go home. You have bigger fish to fry.

I am available for a telephone call if you wish.

John Sharland. P.E.
86 Fox Hill Drive
Bridgewater, MA
508-942-4507

P.S. After a 25 year hiatus, I am back on the Bridgewater Board of Health, this time by appointment and not by election.

In a message dated 8/5/2015 2:20:35 P.M. Eastern Daylight Time, EBADGER@bridgewaterma.org writes:

FYI. I spoke with Rudy this afternoon. I know you were involved with the initial planning. I explained there has not been any action on or with this since I have been here. If you could give any feedback that I cannot please feel free to do so.

Thank you,

Eric J. Badger

Health Agent

Bridgewater Board of Health

508-697-0903

From: Brown, Rudy [mailto:Brown.Rudy@epa.gov]
Sent: Tuesday, August 04, 2015 2:30 PM
To: Badger, Eric
Subject: Cannons Bridgewater - the 2015 FYR of the site is being prepared.

Eric,

As we discussed on the phone, EPA is conducting a Five Year Review of the Cannons Engineering Bridgewater Superfund Site. During the last Five Year Review Doug Sime was interviewed; I earlier shared information with you which is pertinent for the upcoming FYR at Cannons Bridgewater:

- 2010 Five Year Review - the PDF contains all tables and figures
- 2013 Final Close-out Report – document that the cleanup levels reached
- 2013 Explanation of Significant Differences (ESD)

I also attached an Interview Record form and I am again attaching the interview form. Please review the questions on the form. I would like to discuss these questions with you, If you are pressed for time and would rather respond through and e-mail, that is also fine. I realize that you may have had little or no interaction regarding the site, but I wanted to again check in with the town.

I can be reach by phone at 617-918-1031 or by e-mail at brown.rudy@epa.gov

The following is a link to the EPA website which also provides additional information and the above reports.

http://yosemite.epa.gov/r1/npl_pad.nsf/701b6886f189ceae85256bd20014e93d/6760e6ca572c82908525690d00449680!OpenDocument

Derrick Golden is the Remedial Project Manager. His contact information is below. I am the Community Involvement Coordinator. My e-mail is brown.rudy@epa.gov and my phone number is 617-918-1031. Again, Derrick's contact information is below.

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