FIVE-YEAR REVIEW REPORT FOR KEARSARGE METALLURGICAL CORPORATION SUPERFUND SITE CARROLL COUNTY, NEW HAMPSHIRE

Prepared by

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9/5/13
Date

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES AND PHOTOS

LIST OF ABBREVIATIONS

AGQS	Ambient Groundwater Quality Standards
ARAR	Applicable or Relevant and Appropriate Requirement
AUR	Activity and Use Restriction
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CVFD	Conway Village Fire District
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
EW	Extraction well
FS	Feasibility Study
GPTS	Groundwater Pump-and-Treat System
HI	Hazard Index
ICL	Interim Cleanup Level
KMC	Kearsarge Metallurgical Corporation
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MNA	Monitored Natural Attenuation
MW	Monitoring Well
NCP	National Contingency Plan
NHBSWM	New Hampshire Bureau of Solid Waste Management (precursor to NHDES).
NHDES	New Hampshire Department of Environmental Services
NPL	National Priorities List
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Administration
OU	Operable Unit
ppb or µg/L or µg/kg	Parts per billion or micrograms per liter (or kilogram)
ppm or mg/L or mg/kg	Parts per million or milligrams per liter (or kilogram)
RA	Remedial Action
RAO	Remedial Action Objective
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study

ROD	Record of Decision
SDWA	Safe Drinking Water Act
TCA	Trichloroethane
VOC	Volatile Organic Compound
1,1-DCA	1,1-Dichloroethane
1,1-DCE	1,1-Dichloroethene
1,2-DCA	1,2-Dichloroethane
1,1,1-TCA	1,1,1-Trichloroethane
1990 ROD	1990 EPA Record of Decision
1998 ESD	1998 Explanation of Significant Differences, EPA Region 1, September 1998.
2003 ESD	2003 Explanation of Significant Differences, EPA Region 1, September 2003.
2010 ESD	2010 Explanation of Significant Differences, EPA Region 1, September 2003.
2012 AROD	2012 Amended Record of Decision

EXECUTIVE SUMMARY

The United States Environmental Protection Agency (EPA) is required to conduct five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This is the fourth five-year review for the Kearsarge Metallurgical Corporation (KMC) Superfund Site (the Site). This review is a policy review because more than five years is required for the remedy to achieve a cleanup allowing for unlimited use and unrestricted exposure. The action that triggered the Five Year Review cycle was completion of Operable Unit (OU) 2 construction, the ground water remediation system for the selected management of migration remedy, on September 24, 1993.

The 1990 Record of Decision (1990 ROD) selected source control (OU 1) and management of migration (OU 2) to address Site contaminants.[1] As part of OU 1, EPA removed and disposed of 13,620 tons of waste pile material, 41.85 tons of crushed drums, a solvent-contaminated septic tank and 12 yards of contaminated septic soils. For OU 2, EPA designed and built a 40 gallon-per-minute groundwater pump-and-treatment system (GPTS) on the Site which became operational and functional on May 9, 1994. After the State of New Hampshire had operated the GPTS for eight years, EPA issued an Explanation of Significant Differences in 2003 (2003 ESD). To address remaining groundwater contamination, the 2003 ESD selected the excavation of contaminated soils in an area where groundwater was proving recalcitrant to recovery.

To implement the 2003 ESD, approximately 5,670 tons of soils contaminated with chlorinated solvents were excavated and removed from the eastern half of the Site from October to December 2003. The excavation was backfilled with gravel and an extraction trench was installed. The extraction trench was designed and operated to collect contaminated groundwater that may have been attached to the aquifer soils bordering the excavation. The extraction trench operated until December 2005 when NHDES, with EPA concurrence, discontinued pumping to assess the ambient conditions in the aquifer.

The decision to discontinue the GPTS after 11 years of operation was based on the excavation of 5,670 tons of contaminated aquifer soils, a 99% reduction in contamination from Site discovery, and exceedingly low recovery rates. During the last year of operation less than one-pound of contaminants was recovered at a cost of over $200,000. After seven years of monitoring and analysis, EPA found that the data indicated that although some of the VOCs still exceed the clean up goals, the area of contamination was small, the contaminant plume was stable, contaminant concentrations were declining, and monitored natural attenuation (MNA) would meet cleanup goals in a similar timeframe as the original OU2 remedy.[2] In 2012 EPA issued a Amended Record of Decision (2012 AROD) changing the groundwater remedy from the GPTS to monitored natural attenuation.[3]

[1] *Record of Decision, Kearsarge Metallurgical Corporation*, U.S. Environmental Protection Agency, September 1990.
[2] *Focused Feasibility Study, Kearsarge Metallurgical Corporation*, U.S. Environmental Protection Agency, January 2012.
[3] *Record of Decision Amendment, Kearsarge Metallurgical Corporation*, U.S. Environmental Protection Agency, September 2012.

Cleanup levels have been modified during the implementation of the remedy. A 1998 Explanation of Significant Differences (1998 ESD) clarified the soil cleanup level for chromium and described minor changes in the disposal of the OU1 components. In addition to the soil excavation, the 2003 ESD also revised the groundwater cleanup goal for 1,1-dichloroethane (DCA). The 2010 Explanation of Significant Differences (2010 ESD) established institutional controls to prevent the use of groundwater at the Site.

The eastern contaminant plume discharges to a drainage culvert that drains directly to Pequawket Pond. The remedial actions of the GPTS and the 2003 source excavation reduced the level of contamination such that any discharges would not exceed surface water quality standards for the pond.

Because the 2012 AROD selected MNA as a remedy, a provision to implement a contingent remedy was also developed in the event that concentrations of contaminants began to increase and migrate off-site. In May of 2013 biannual sampling indicated that those criteria were exceeded in two on-site monitoring wells at the center of the contaminant plume. Monitoring has indicated that although the concentrations are increasing, sentinel wells at the plume boundaries show either no increase or are decreasing in concentration. A confounding factor with respect to these two monitoring wells is the influence of Pequawket Pond, which has widely varying water levels, on water levels and contaminant concentrations in both wells. EPA and NHDES have begun to evaluate the means to address the increased concentrations of contaminants in these two wells.

Based on the information provided in this Five Year Review, EPA has determined that the remedial actions taken are protective of human health and the environment in the short-term because there are no completed exposure pathways. However, to be protective in the long-term, a number of follow-up actions are necessary: continue monitoring of Institutional Controls, continue monitoring groundwater, evaluate the interaction of the surface water in Pequawket Pond and the Site groundwater, and assess the need to implement a contingent remedy to reduce concentrations of volatile organic contaminants in Site groundwater.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name: Kearsarge Metallurgical Corporation Superfund Site		
EPA ID: NHD062002001		
Region: 1	**State:** NH	**City/County:** Conway/Carroll
SITE STATUS		
NPL status: Final		
Multiple OUs? Yes.	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: State		
Author name: Darryl Luce		
Author affiliation: United States Environmental Protection Agency		
Review period: March 2013 to September 2013		
Date of site inspection: March 12, 2013		
Type of review: Policy		
Review number: 4		
Triggering action date: 09/26/2008		
Due date (five years after triggering action date): 09/26/2013		

Five-Year Review Summary Form (continued)

Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:

OU1.

Issues and Recommendations Identified in the Five Year Review:

OU: 2	**Issue Category:** Remedy Performance.			
	Issue: Overburden groundwater remains contaminated above cleanup levels.			
	Recommendation: Continue monitoring Site groundwater, surface water, and institutional controls. Continue to evaluate the effectiveness of monitored natural attenuation as a remedy.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	December 2015

OU: 2	**Issue Category:** Remedy Performance.			
	Issue: Contingent remedy criteria established in the 2012 Amended ROD have been violated indicating the need to implement a contingent groundwater remedy.			
	Recommendation: Assess the interaction of the drainage culvert and Pequawket Pond with on-site groundwater to determine contaminant and hydraulic behavior before implementing a contingent remedy.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	December 2015

Protectiveness Statement

Protectiveness Determination:
Short-term Protective

Protectiveness Statement: The remedial actions taken are protective of human health and the environment in the short-term because there are no completed exposure pathways. However, to be protective in the long-term, a number of follow-up actions are necessary: continue monitoring of Institutional Controls, continue monitoring groundwater, evaluate the interaction of the surface water in Pequawket Pond and the Site groundwater, and assess the need to implement a contingent remedy to reduce concentrations of volatile organic contaminants in Site groundwater.

Five-Year Review Report

I. Introduction

The purpose of a Five-Year Review is to determine whether a remedy at a Superfund site is protective of human health and the environment. The methods, findings, and conclusions of a review are documented in a Five-Year Review report. In addition, Five-Year Review reports identify issues, if any, and recommend action(s) necessary to address them.

The U.S. Environmental Protection Agency (EPA), Region I prepared this Five-Year Review pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA Section 121(c) as amended states:

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

The Agency interpreted this requirement further in the National Contingency Plan (NCP); 40 CFR §300.430(f)(4)(ii) states:

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

EPA Region I conducted this Five-Year Review of the remedial actions implemented at the Kearsarge Metallurgical Corporation Superfund Site (the "Site") in Conway, Carroll County, New Hampshire. Figure 1 shows the Site and surrounding area. Figure 2 shows details of the Site. This review was conducted for the entire Site from March 2013 through September 2013. This report documents the results of the review.

This is the fourth Five-Year Review Report for the Site. The trigger for the initial five year review was the completion of the management of migration remedy, marked by the start-up of the ground water extraction and treatment operation on September 24, 1993. The trigger for this policy review was EPA's signature date of the preceding Five Year Review Report, dated September 26, 2008. Because hazardous substances, pollutants, or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure and the cleanup will take more than five years, it is EPA policy to conduct Five-Year reviews. Specifically, following implementation and operation of the ground water remedy, ground water remains contaminated above Interim Cleanup Levels (ICLs).

Figure 1: Site Location Map.
The topographic map shows the location of the Site relative to the State and surrounding features. The datum is from 1981.

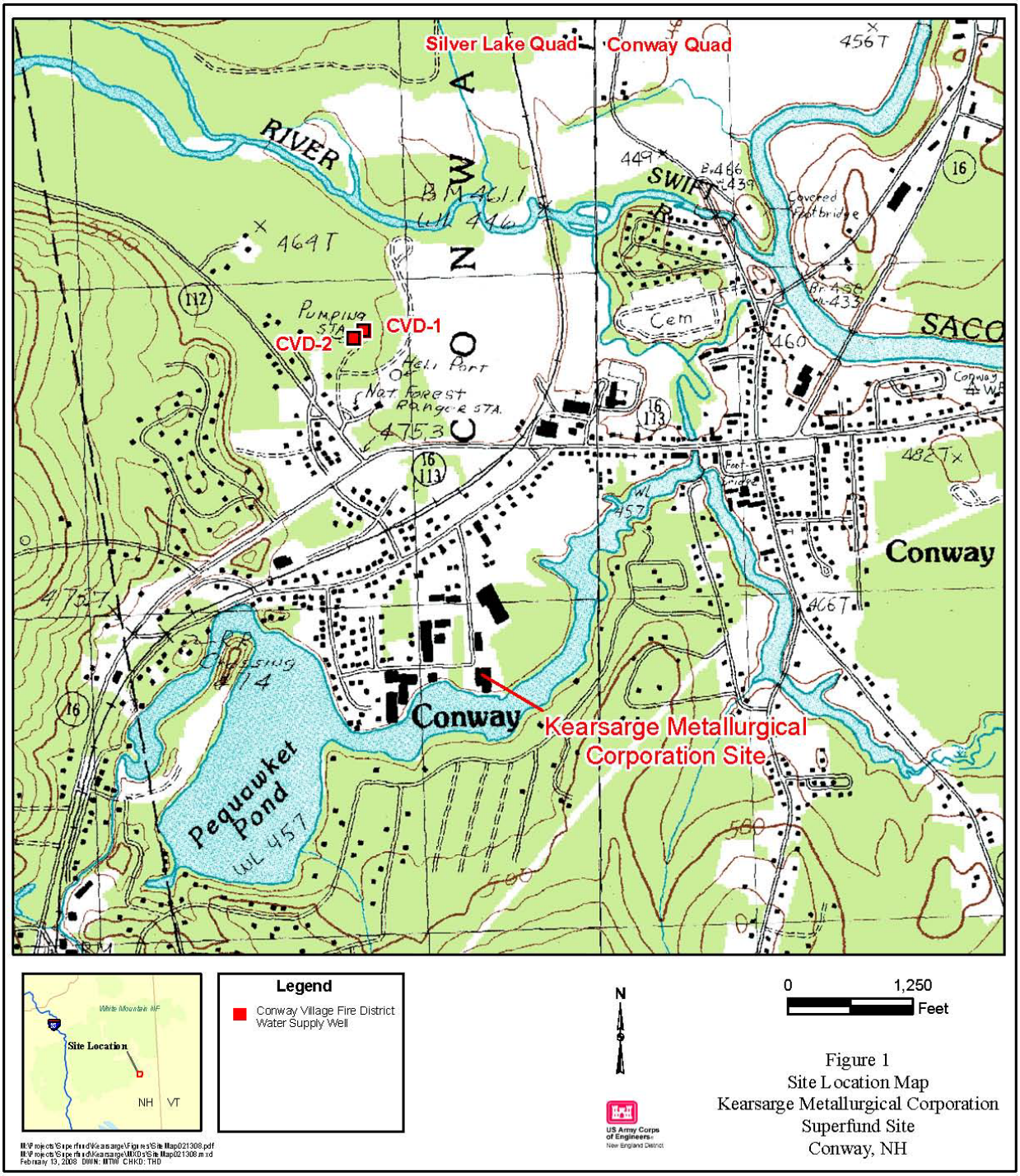


Figure 2: Site Features.

II. Site Chronology

Table 1 summarizes the events at the Site. More detailed chronologies are available in the RI/FS as well as the 1990 ROD and the 2012 AROD.

Table 1. Chronology of Site Events.

Date	Event
Pre-1964	Future location of the Site is operated as a sawmill.
1964 – 1982	Operation of Site as Kearsarge Metallurgical Corporation (KMC) manufacturing stainless steel castings.
1970s	Discharge of acids, chlorinated solvents, caustics, and flammable liquids to ground surface (waste piles) and septic system.
1979	New Hampshire Water Supply and Pollution Control Commission notifies KMC that discharges to ground/septic system are illegal.
September 1981	EPA and New Hampshire Bureau of Solid Waste Management (NHBSWM) issue verbal order to re-containerize corroded drums in the waste piles.
December 1981	NHBSWM issues Letter of Deficiency to KMC.
1982	Indian Head Bank takes possession of KMC Lot 8 (now Lot 140). Site is abandoned.
June 1982	Containerized wastes removed from the Site in response to verbal order from EPA and NHBSWM.
October 1982	NHBSWM issues a Notice of Violation and Order of Abatement to KMC.
December 1982	NHBSWM begins hydrologic investigation of Site.
May 1983	EPA and NHBSWM order KMC to remove waste piles from the Site.
September 21, 1984	KMC Site added to the NPL.
July 1985	Consent Order – State of New Hampshire vs. KMC, orders KMC to perform Remedial Investigation/Feasibility Study (RI/FS).
July 1985	Commencement of RI/FS activities by GEI, KMC's contractor.
1987	After producing four draft documents, the insurance carriers for KMC cease funding the RI/FS.
1988	Through a cooperative agreement with EPA, NHDES selects Camp, Dresser and McKee, Inc. (CDM), to complete the RI/FS.
June 1990	CDM completes the RI/FS. EPA releases the RI/FS and Proposed Plan to the public.
September 1990	Action Memorandum issued by EPA requiring removal of seven drums of uncharacterized materials from the Site.
September 28, 1990	ROD signed by EPA to perform Source Control and construct a groundwater pump-and-treat system (GPTS).
August 1992	Explanation of Significant Differences (ESD) is issued by EPA to describe minor changes and clarifications to the 1990 ROD.
September 1992	Source Control Completed. EPA removed and disposed of 13,620 tons of waste pile material, 41.85 tons of crushed drums, a solvent-contaminated septic tank and 12 yards of contaminated septic soils

Table 1. Chronology of Site Events.

Date	Event
September 1992 to 1993	GPTS was designed, built, and began operation, pumping and treating 40 gallons of contaminated groundwater per minute.
May 9, 1994	EPA determines that the GPTS was functioning properly and performing as designed (operational and functional).
May 9, 1994 – May 31, 2004	Long-term response action (LTRA), the period of operation funded by EPA to pump-and-treat groundwater.
August 1, 1994	Cooperative Agreement between the EPA and NHDES documenting the takeover by NHDES of the LTRA.
July 1998	First SARA Five-Year Review completed.
October 1999	An active soil gas survey conducted by EPA.
October 2000	GPTS was modified by installing a groundwater recovery trench and extraction well EW-13A.
January 2001	Extraction trench installed and groundwater recovery begins through well EW-13A.
January 2001	Capture zone analysis performed for Conway Village Fire District Wells No. 1 and No.2.
April 2002	Passive soil gas survey completed by Weston, Inc., for NHDES.
August 2002	Vertical profiling study completed by Weston, Inc., for NHDES.
December 2002	Geoprobe coring investigations completed and a report of the results issued.
March 2003	EPA and NHDES met with Conway's town engineer to discuss Site remediation and obtain Town's feedback on excavation of saturated soils.
July 2003	EPA and NHDES attended Town of Conway selectmen's meeting to review future excavation activities, give overview of Site status, and respond to questions.
September 2003	ESD providing for additional source material excavation and modification of the cleanup level for 1,1-DCA from 4 µg/ℓ to 3,650 µg/ℓ.
September 30, 2003	Second Five-Year Review completed by EPA Region I.
October through December 2003	Approximately 5,670 tons of soils contaminated with chlorinated solvents were excavated and removed from the Site as part of additional source material excavation.
February 2004	New extraction well EW-13B installed in excavation area and pumping begun.
February 2004	Discontinued pumping from the Hobbs Street Extraction Wells (EW-01, EW-02, EW-03) due to attainment of cleanup goals in that area.
May 31, 2004	Ten years of LTRA completed. NHDES assumes full responsibility for O&M.
June 2004	Source Removal Action Completion Report completed for NHDES by Weston Solutions, Inc.
September 2004	Kearsarge Metallurgical Corporation Reuse Assessment completed.

Table 1. Chronology of Site Events.

Date	Event
Early December 2005	GPTS turned off as agreed to by EPA and NHDES to allow stabilization phase to begin.
March 29, 2007	Preliminary Draft Post-Source Removal Data Evaluation Report completed by Weston Solutions, Inc.
September 26, 2008	Third Five-Year review issued by EPA. This Five-Year Review deferred on protectiveness of the remedy for OU2.
December 2009	EPA issues a 2009 report that evaluated the remaining groundwater contamination at the Site using the Monitoring and Remediation Optimization System (MAROS) software.
April 19, 2010	EPA issues an Explanation of Significant Differences to require Institutional Controls for the Site.
June 15, 2010	EPA issues an Addendum to the 2008 Five-Year Review that found the remedy protective in the short-term after institutional controls were established but not in the long-term until an MNA evaluation was performed.
August 30, 2011	Institutional Control (Activity and Use Restriction) recorded by Carroll County Register of Deeds.
September 18, 2012	EPA issues an Amended Record of Decision to change the groundwater remedy from pump-and-treat to monitored natural attenuation.
August 27, 2012	Town of Conway takes ownership of property in preparation to sell it for re-use.
December 2012	Town removes portions of the old KMC building.
March 29, 2013	Institutional Control (activity and use restriction) amended to address the potential future risk of vapor intrusion.

III. Background

The Site is located in an industrial park, on the southeast side of Hobbs Street (formerly Mill Street), on the western edge of Conway, New Hampshire 03818 (43° 58’21”N and 71° 07’43”W). The Site and area surrounding the Site is served by public water and sewer provided by the Conway Village Fire District (CVFD). The closest water supply wells, CVD-1 and CVD-2, lie nearly 1 mile to the north of the Site as shown on Figure 1. The Site property, monitoring wells and other features are shown on Figure 2.

A. Physical Characteristics

Physical Setting and Site Conditions

The 9.4 acre Site consists of two lots, lot 140 and 139, shown on Town of Conway Tax Map 277. Both lots have been abandoned by their owners. Lot 139, formerly owned by OCR, Inc., consists of 5.4 acres of wetland bisected by a storm drain pipe that discharges street drainage into Pequawket Pond. Lot 140 covers 4 acres west of lot 139. The eastern half of lot 140 is wetland but the land rises, most likely fill material, approximately four feet in the vicinity of Hobbs Street. Two buildings are on lot 140: a portion of the original KMC building lies on the southern

part of the lot and a 4,000 ft^2 groundwater treatment plant built by EPA in 1993 lies on the northern part of the lot. The entire, original KMC building is shown on Figure 2. The eastern-most, dilapidated portions of the building were removed in December 2012 by the Town and what remains, the former western wing, is a sheet metal building covering approximately 2000 ft^2.

The Town of Conway is attempting to sell the two buildings for industrial or commercial reuse. The groundwater treatment plant was part of the Groundwater Pump-and Treat System (GPTS). A network of wells extracted contaminated groundwater from both the east and west sides of Hobbs Street and directed it to the groundwater treatment plant. The extraction wells were properly abandoned and the connections from the well field to the groundwater treatment plant were severed in June 2012. The treatment plant was decommissioned and all equipment removed.

The topography of the area is flat and the grounds surrounding the KMC building are overgrown with native vegetation. The eastern portion of the Site is a wet meadow containing asters and sedges that is transitioning to a wooded wetland comprised of poplars. The poplars, once they reach one to two-inch caliper, are trimmed by local beavers to approximately one foot in height to produce extremely sharp stakes that are concealed by tall grasses – the most dangerous element of the Site. The surface water drainage culvert bisects the Site and conveys storm water runoff from Hobbs Street and a parking lot to the north of the Site into Pequawket Pond which lies on the southern border of the Site.

Surrounding Properties, Condition and Use

Several light manufacturing uses surround the Site. To the north is Yield House, a furniture maker, and Tuckerman's, a micro-brewer of fine ales. To the west are several buildings belonging to the White Mountain Puzzle Company as well as several other abandoned buildings. Pequawket Pond forms the southern boundary of the Site. To the east is vacant land that consists of a forested wetland of birch and poplar. Several isolated homes lie on the opposite bank of Pequawket Pond, approximately 400 feet across the water and a larger number of smaller homes lie 800-feet west of the KMC property, just outside the industrial park.

Surface Water Hydrology

The 64-acre Pequawket Pond forms the southern boundary of the Site. The pond level is controlled by New Hampshire Water Resources Board via a dam east of the Site along Route 16. Pequawket Pond discharges northward to the Swift River, a tributary of the Saco River. The water level in Pequawket Pond has an average elevation of 456 ft National Geodetic Vertical Datum (NGVD) and seasonal fluctuations of approximately 5 feet due to management. The entire Site and portions of adjacent properties are within the 100-year floodplain of the pond. The area on the north bank of the pond, which includes the Site, is mostly level and any precipitation is directed to storm drains that discharge directly to the pond. The surface topography near the Site varies from 465 ft NGVD where the buildings are, to 460 ft NGVD in the wetlands.

Geology and Hydrogeology

Near Hobbs Street and in the area of the present and former buildings there is a 4 to 5 foot layer of anthropogenic silt. Progressing eastward from Hobbs Street and the buildings, the topography drops approximately 4 feet to a wet meadow. This area is underlain by 8 to 15 feet of permeable sands that are inter-bedded with lenses of low-permeability silts, the Upper Sand interval. The low-permeability silts within the Upper Sand create a perched water table that has allowed a wet meadow to form. Within a few feet of the surface, the permeable sands are unsaturated and the actual water table, which typically mirrors the surface water elevation in Pequawket Pond, may vary from 3 to 7 feet below the surface.

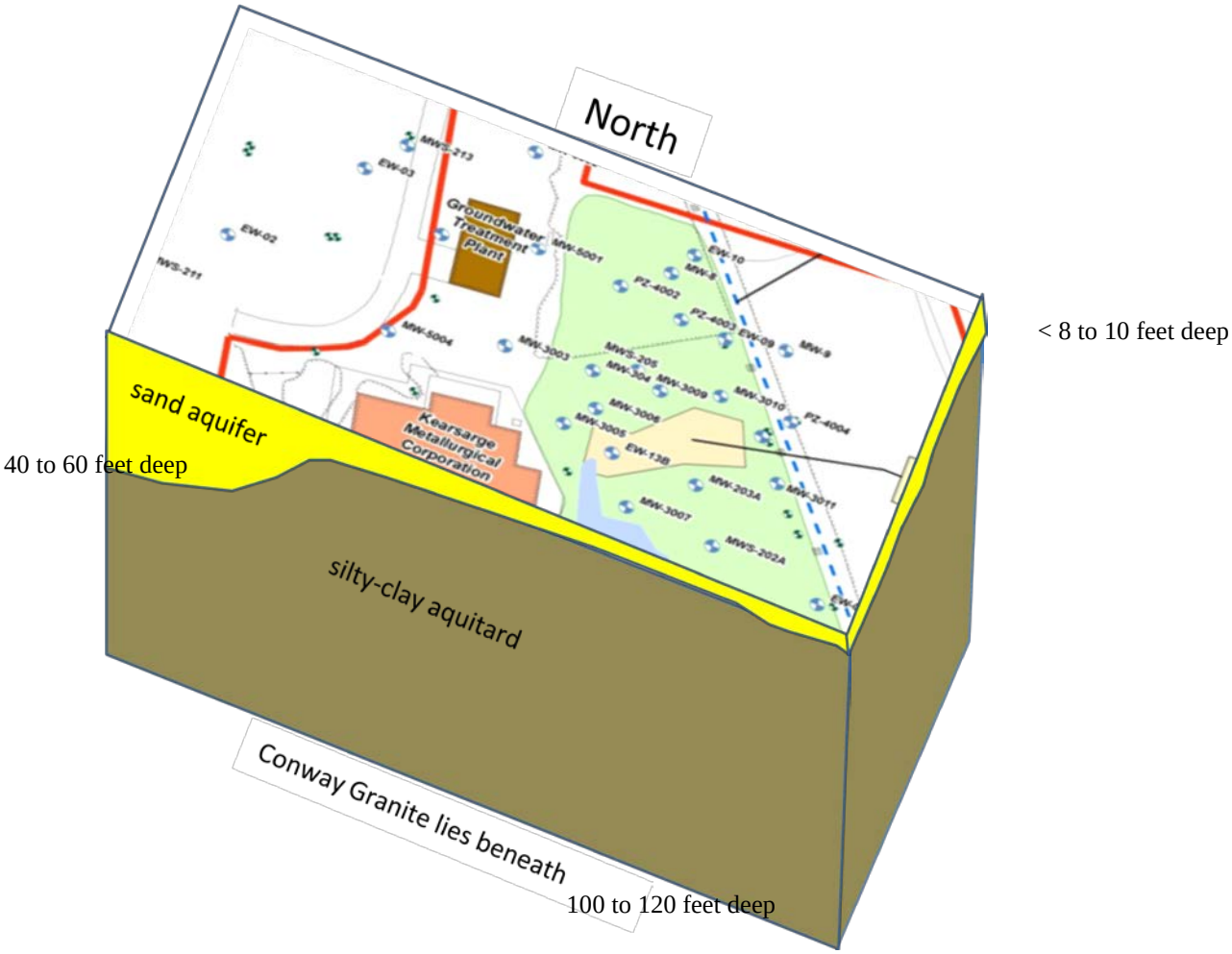
The drainage culvert along the eastern edge of the Site extends and accelerates the influence of Pequawket Pond on Site groundwater levels in the Upper Sand aquifer. This culvert has a gravel base and open-bottomed manholes along its length. The culvert rapidly transmits the level of the pond along its length and has proven to be an effective barrier to contaminant migration east of the culvert. In autumn and during late summer (in dry years), the water level in the pond may be lowered by as much as 3 to 4 feet and then restored in the spring, 5 months later. This pattern of recharge in a thin aquifer (the saturated, flowing interval can vary from 5 to 12 feet) can profoundly alter concentrations and contaminant flows. The Upper Sand thickens to the west, past Hobbs Street, to as much as 40 feet thick.

Beneath the Upper Sand is a thick, low-permeability silty-clay. Westward, towards Hobbs Street, the top surface of the Silty-Clay moves 40 to 60 feet downward leaving a thick lens of the Upper Sand as described above. The Silty-Clay is an 80 to 100 foot thick layer of glaciolacustrine silt, sand, and clay that overlies the bedrock and has been demonstrated to effectively isolate the contamination from the Site.

Photo 1 – Material from the Silty-Clay underlying the Site. This sample was recovered east of the old KMC building at a depth of 12-feet by Weston Solutions, Inc., during the November 2002 geoprobe investigation.

The bedrock beneath the Site is the Conway Granite, the top of which varies from a low of 318 ft NGVD to a high of 364 ft NGVD, and is approximately 100 to 120 ft below ground surface (bgs). The bedrock has two major fracture orientations trending north-south and east-west. Figure 3 shows a general schematic of Site geology.

Figure 3. A block diagram shows a schematic of the underlying geology at the Site. The drainage culvert is the dashed blue line on the right side of the plan view. The plan view is taken from Figure 2.



B. Resource Use

Groundwater and surface water are the area's primary resources. Surface waters provide recreation in the area and groundwater is the source for potable water. Pequawket Pond is a quiet lake ringed with homes and used for boating and fishing. In the near vicinity of the Site, there are no groundwater uses as the area is supplied with municipal water from the Conway Village Fire District (CVFD).

The CVFD operates two water supply wells, CVD-1 and CVD-2. Both wells are located approximately 3,000 ft northwest of the Site in the floodplain of the Swift River. These wells are capable of yielding more than 1 million gallons per day but, based on NH Geological Survey and NHDES data between 1994 and 2006, the combined yield ranged from 0.32 to 0.71 million gallons/day. These wells are screened in an alluvial aquifer consisting of coarse sand deposits. Modeling based on pump tests, analytical data, and field measurements have found that these

wells will not be affected by the remaining contamination at the Site.[4] Figure 1 shows locations of the water supply wells and the Site.

C. History of Contamination

KMC manufactured stainless steel valves and materials through high-quality castings using the lost-wax process. The lost-wax process produced waste casting sands and solvents. These solvents and casting sands were disposed in a wooded wetland just east of the old KMC building shown on Figure 2 in the area labeled "1992 Source Removal Area now wetland." Solvents were also discharged through the on-site septic system that was located between the old KMC building and the 1992 Source Removal Area shown on Figure 2.

D. Initial Responses

The New Hampshire Bureau of Hazardous Waste Management (NHBHWM) issued a Notice of Violation and Order of Abatement to KMC and its former executives to conduct a hydrologic study of the Site in October 1982. KMC took no action and the State began a hydrologic investigation to characterize the Site. In December of 1982 monitoring wells, installed by NHBHWM and the New Hampshire Highway Department, showed significant levels of Volatile Organic Compounds (VOCs) in the ground water. In May 1983 NHBSWM ordered KMC and its officers to remove the waste piles at the Site. KMC did not remove the piles. Further investigations by EPA resulted in a Hazard Ranking Score (HRS) of 40.73 resulting in the Site being added to the NPL in September 1984.

E. Summary of Basis for Taking Action

A Remedial Investigation and Feasibility Study (RIFS) performed by Camp, Dresser and McKee, Inc., under the direction of NHDES, found significant contamination in groundwater, soils and waste pile materials. Based on the RIFS, EPA issued a 1990 ROD that selected both Source Control and Management of Migration remedies for the Site.[5,6]

The Source Control component of the remedy required disposal of septic system components and soils, as well as a waste pile. EPA performed the Source Control component in 1992 by removing and disposing of 13,620 tons of waste pile material, 41.85 tons of crushed drums, a solvent-contaminated septic tank and 12 yards of contaminated septic soils from the area labeled "1992 Source Removal Area."[7]

The Management of Migration component required construction of the GPTS. Construction was completed in 1993 and operations began in September 1993 with the GPTS operating at the approximate rate of 40 gallons per minute. From 1993 to 2005, the GPTS removed and treated approximately 250 million gallons of contaminated water.

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[4] Emery &Garrett Groundwater, Inc., 2008. *Groundwater Supply Assessment Conway Village Fire District Production Wells CVD-1 and DVD-2 Eight-Day Pumping Test and Water Quality Analyses Conducted for the Conway Village Fire District Conway, New Hampshire*. January 2008.

[5] Camp, Dresser and McKee, Inc., *Remedial Investigation/Feasibility Study Report, Kearsarge Metallurgical Corporation Hazardous Waste Site, Conway, New Hampshire*, June 1990.

[6] *Op. cit*., 1990 ROD.

[7] Dean Tagliaferro, OSC, Lexington Lab, EPA Region 1, *On-Scene Coordinator's Report, Kearsarge Metallurgical Corporation Superfund Site, Conway, New Hampshire, July 15, 1992 – October 15, 1992*, page 1.

Table 2 lists the present Interim Cleanup Levels established in the 2012 Amended ROD, their basis, and the maximum concentration in each well.

Table 2. Interim Cleanup Levels at the Kearsarge Metallurgical Corporation Superfund Site.

Contaminant	Interim Cleanup Level (µg/ℓ)	Basis	Maximum Concentration (Year) (µg/ℓ)	Number of Wells that Exceed the Interim Cleanup Level January 2012
Groundwater				
1,1,1-Trichloroethane	200	MCL[1]	18,500 (1990)	0
1,1-Dichloroethene	7	MCL[1]	615 (1990)	4
Trichloroethene	5	MCL[1]	118[5] (1990)	0
1,2-Dichloroethane	5	MCL[1]	14 (1990)	1
1,1-Dichloroethane	81	AGQS[2]	1,560 (1989)	1
Chloroform	80	MCL	ND[5]	0
1,4-Dioxane	3	AGQS[2]	41 (2012)	3
Nickel	700	HI[3]	100[5] (1990)	0
Chromium	50	NIPDWR[4]	4.70[5] (1989)	0
Soils				
1,1,1-Trichloroethane	300	Leaching Model		
Chromium	1,400	HI[4]		

Notes:
[1] MCL – Maximum Contaminant Level established in the 1990 ROD.
[2] AGQS – Ambient Groundwater Quality Standards enacted by New Hampshire and established as an Interim Cleanup Level in the 2012 ROD Amendment. 1,4-Dioxane did not have a cleanup level in 1990.
[3] Non-cancer Interim Cleanup Level (Hazard Index = 1) established in the 1990 ROD.
[4] National Interim Primary Drinking Water Regulation established in the 1990 ROD.
[5] ND – Not detected. Detection limits generally at 2 ug/ℓ for VOCs. For Chromium and Nickel the dates of last analysis are 2006 and 2004, respectively. The detection limit for Chromium was 10 ug/ℓ and Nickel was 5 ug/ℓ.

IV. Remedial Actions

A. Remedy Selection

The Remedial Action Objectives (RAOs) identified in the 1990 ROD were:

Management of Migration

- Minimize further horizontal and vertical migration of contaminated groundwater from the KMC Site.
- Minimize negative impacts to Pequawket Pond resulting from discharge of contaminated groundwater.

Source Control

- Prevent the inhalation of wind-blown fine particulate materials from the waste piles.
- Reduce the risks associated with ingestion of, or physical contact with, metals in the waste piles.
- Prevent release of other contaminants in the waste piles.
- Prevent the migration of contaminants from the septic system and surrounding soils that could further degrade groundwater quality.
- Reduce the risk associated with inhalation of VOCs and physical contact with the contents of the septic system or the surrounding soils.

Remedy selection was documented in the EPA's ROD dated 29 September 1990. The selected management of migration and source control remedies were implemented in 1992 and 1993, respectively. The RAOs for the source control component were met in 1992. To meet the management of migration RAOs the GPTS operated from 1993 to 2005. The implementation of the 1990 ROD is discussed below in Section IV.B.

Based on sampling and models performed after the remedial actions at the Site, EPA issued the 2012 Amended ROD changing the management of migration remedy. The 2012 Amended ROD found that all of the 1990 RAOs had been met and that only a small area of groundwater remained above cleanup levels. In 2009, an analysis using the Monitoring and Remedy Optimization software found that groundwater contamination was not migrating.[8] Further analysis and modeling showed that due to diffusive flux from the aquifer materials, cleanup times would be 15 years for pump-and-treat and 18 years for Monitored Natural Attenuation (MNA). Based on the above, the 2012 Ameneded ROD changed the management of migration remedy in the 1990 ROD to MNA. The 2012 Amended ROD also updated ICLs to the values shown in Table 2.

B. Remedy Implementation

Execution of the 1990 ROD source control remedy in 1992 resulted in the removal of 13,620 tons of waste pile material, 41.85 tons of crushed drums, a solvent-contaminated septic tank and 12 yards of contaminated septic soils. The source control remedy met all ICLs and RAOs established in the 1990 ROD.

To implement the 1990 ROD management of migration remedy EPA designed and built a 40 gallon-per-minute GPTS which operated from 1993 to 2005.[9] To hasten groundwater cleanup,

[8] U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, *Final Report: Technical Assistance for the Kearsarge Metallurgical Corporation Superfund Site, Conway, New Hampshire, EPA Region 1*. EPA-542-09-014, December 2009.

[9] EPA Region 1, *Focused Feasibility Study*, 76 pages.

NHDES, with EPA funding, also excavated and removed 5,670 tons of solvent-contaminated soils from the aquifer at the Site in 2003. It was estimated that this excavation removed 150 pounds of contaminants from the subsurface. Although the excavation did not remove all contaminated soils, it was determined that additional excavation would be impractical.[10] Groundwater extraction resumed and continued until December 2005 when EPA and NHDES agreed to stop extraction and treatment to observe the behavior of the remaining contaminants. In 2005, the final year of operation of the GPTS, less than 1 pound of contamination was removed at a cost of more than $200,000 for operation and maintenance (O&M) of the GPTS.

Approximately 225 pounds of Site contaminants were removed from the aquifer underlying the Site by the GPTS. The 2003 excavation removed about 150 pounds of contaminants, therefore approximately 375 pounds of contaminants were removed from the aquifer from 1993 to 2005. Based on post-excavation soil gas surveys, it was estimated that approximately 3 pounds of contaminants remained in the aquifer.[11] Thus the remedial actions performed from 1993 to 2005 removed greater than 99% of the groundwater contamination.

The remaining 3 pounds of contamination at the Site are located approximately 8 to 9 feet below the ground surface in approximately 1,300 cubic yards of saturated silt located in a wetland 100 feet east of the GPTS building. The properties of the silt prevent efficient withdrawal of the remaining contaminants by pumping. Reverse matrix diffusion, the slow desorption of contaminants from the silt and saturated soils within the aquifer, controls the rate of groundwater cleanup. The similarity in cleanup times for the GPTS and MNA led EPA to change the management of migration remedy to MNA in the 2012 Amended ROD.

The MNA remedy in the 2012 Amended ROD consists of monitoring groundwater contamination at least 2 times per year and periodic assessments of the progress in attaining ICLs. The components of the MNA remedy include:

1. Perform long-term groundwater monitoring to measure the success of attenuation mechanisms in the aquifer functioning to reduce contamination and prevent migration.
2. Revise the Activity and Use Restriction to not allow residential homes or other non-industrial or non-commercial buildings on the Site to prevent the real or potential unacceptable risk from vapor intrusion.
3. Implement a contingent remedy if MNA is unable to restore groundwater and contaminated groundwater migrates off-site.
4. Conduct Five-Year CERCLA reviews.

[10] Weston Solutions, Inc., *Technical Memorandum, Soil Removal Cost Estimate, Kearsarge Metallurgical Corporation Site,* June 8, 2012.

[11] Weston Solutions, Inc., *Geoprobe Investigation Report, Kearsarge Metallurgical Corporation, Conway, New Hampshire*, 2008.

C. Operations and Maintenance

The continuing operation and maintenance (O&M) activities required for the current remedy as described in the 2012 Amended ROD consist of:

- Monitoring groundwater.
- Performing assessments of progress in attaining ICLs.
- Monitoring for compliance with Institutional Controls.

The EPA and NHDES perform these tasks at least two times per year.

V. Progress Since the Last Review

EPA completed the last Five-Year Review in September 2008. During that Five-Year Review the EPA determined the following with respect to the protectiveness of the remedy:

- The source control remedy (OU-1) was protective of human health and the environment because the waste piles and contaminated leach field soils that could contribute to direct exposure contact were removed in 1992.
- A protectiveness determination of the management of migration remedy (OU2) could not be made at that time and was deferred until further information was obtained through the following actions:
    - Evaluate the implementation of institutional controls.
    - Evaluate the vapor intrusion pathway using appropriate guidance.
    - Complete an MNA Evaluation Study including additional delineation of the contaminant concentrations in the aquitard to determine the remaining mass of contaminants, modeling of the ground water, evaluation of MNA criteria applicable to the Site, and timeframes till cleanup standards are met.
    - If appropriate, change the remedy to MNA.

In 2010 a Five Year Addendum was issued documenting an instrument for institutional controls. The institutional controls were finally established by an Activity and Use Restriction (AUR) recorded on the property on March 29, 2013.

The vapor intrusion pathway was evaluated in the 2012 Amended ROD which found no risk posed to workers in buildings that overlie the Site.[12] A risk may occur for any residences that may be placed on the property in the future, but the AUR precludes the use of this property for residential or non-commercial or non-industrial purposes.

The final two bullets regarding the protectiveness for the management of migration remedy were addressed by a Focused Feasibility Study and then the 2012 Amended ROD. A public meeting for the proposed remedy change was held on May 22, 2012 and the public hearing was held on June 19, 2012. Only 3 persons, all Town officials, were present for the hearing and no comments were offered. The comment period closed on June 21, 2012 with no comments.

The issues and recommendations identified in the 2008 Five-Year Review were addressed as outlined in Table 3.

[12] *Op. cit.*, 2012 Amended ROD, p. 12.

Table 3 Issues, Recommendations and Follow-up Actions from 2008 Five-Year Review
Adapted from Table 5 of 2008 Five-Year Review

Issue	Recommendation	Actions Performed to Address Recommendation
1) Since shutdown of the ground water treatment facility, initial improvements to the ground water quality may not be continuing as expected and the contaminated ground water plume may not be stable.	Complete MNA Evaluation Study including additional delineation of the contaminant mass, modeling, and evaluation of MNA criteria.	Two efforts addressed this issue, EPA headquarters provided a contractor to evaluate the Site with the MAROs model. That model found that the contaminant plumes were small, less than 0.5 acre in lateral dimension and not migrating. Weston, the State's contractor, conducted additional investigations and produced groundwater models to show that the Site contaminants were not migrating and were amenable to MNA.
2) Land ownership by defunct corporations may limit ability to implement and monitor institutional controls.	Evaluate options to implement institutional controls on appropriate properties.	The town of Conway, New Hampshire, took ownership of the property and placed a revised Activity and Use Restriction on the property prior to marketing for reuse.
3) ROD does not include potential for MNA or institutional controls in the remedy.	Issue future decision document with public meeting and comment period to include MNA, if appropriate, and ICs in the remedy.	Following an evaluation of data provided by EPA headquarters contractor and Weston, EPA issued a 2012 Focused Feasibility Study. Based on the Focused Feasibility Study EPA issued a 2012 Amended ROD that changed the management of migration remedy from pump-and-treat to MNA and called for the establishment of institutional controls.
4) There is a potential for VOC vapor migration into the treatment plant building from ground water. Inhalation of VOCs could occur if any building above the groundwater plume is occupied.	Evaluate the vapor intrusion pathway and determine if it is a concern using appropriate guidance.	The vapor intrusion pathway was evaluated and described in the 2012 Amended ROD. It was found that no risk was posed to workers in a commercial or industrial setting, but that a risk may occur if homes were to be built and occupied on the Site.

VI. Five-Year Review Process

A. Administrative Components

The Remedial Project Manager, Darryl Luce, conducted the Kearsarge Metallurgical Corporation Superfund Site Five-Year Review with assistance from Andrew Hoffman, NHDES Project Manager. The Five-Year Review consisted of:

- Reviewing relevant documents listed in the reference section of this document;
- Conducting a review and technical assessment of data collected during implementation of the selected remedy, and;
- Performing interviews and a Site inspection.

B. Community Notification and Involvement

The EPA published a notice of the initiation of the Five-Year Review in the local newspaper, the Conway Daily Sun, in February 2013 noting that the Five-Year Review process will be completed and publicly available in September 2013. A copy of the public notice is included in Appendix A. The level of community interest in the Site has been low within the last decade and no public meeting was held.

C. Document Review

This Five-Year Review consisted of a review of relevant documents including O&M Records and monitoring data. The 1990 Record of Decision and 2012 Amended Record of Decision and various literature sources were also consulted. A Reference Section is provided at the end of this Five-Year Review.

D. Data Review

The EPA analyzed trends in groundwater from the Site. No Site contaminants have been found in surface water bodies surrounding the Site, including Pequawket Pond. Groundwater remains the sole contaminated media at the Site and does not appear to be increasing in concentration on-site or migrating off-site. The primary contaminants at the Site are 1,1-DCE and 1,1-DCA, although 1,1,1-TCA, Vinyl Chloride, 1,4-Dioxane, and 1,2-DCA are present in a few wells at relatively low concentrations.

In the 2012 Amended ROD the MNA remedy had two evaluation criteria for implementing a contingent remedy: [13]

> "The decision to design and implement additional response actions would be performed if either of the two following trigger conditions occur:
>
> 1. The concentration of either 1,1-DCE or 1,1-DCA in wells MW-3010 or MW-3008 rises above the concentration found in December 2010; for MW-3010: 578 ppb and 235 ppb, respectively, and for MW-3008: 175 ppb and 101 ppb, respectively, in any two consecutive sampling events, or;
> 2. The concentration of any contaminant in any of the monitored wells increases by 100% over its December 2010 concentration, and is above its cleanup level, in any two consecutive sampling events."

[13] *Op. cit.*, 2012 AROD, p. 31.

Both criteria had been violated as of the last sampling round in May 2013.

An analysis of the monitoring data indicate that the implementation of any contingent remedy will require a greater understanding of the relationship between water levels in the aquifer and Pequawket Pond, and how the storm drain affects the transmission of that water and contamination in the aquifer before proceeding. Further discussions with NHDES will be necessary to determine means to better define this interaction. A more complete analysis of exceedence of the Contingent Remedy Critieria in the 2012 Amended ROD, as well as contaminant conditions and trends at the Site is in Appendix D - Technical Assessment to this Five-Year Review.

E. Site Inspection

Darryl Luce, EPA, and Andrew Hoffman, NHDES, conducted a Site visit on March 12, 2013. No hazards or any condition that would call into question the protectiveness of the remedy were found during that inspection.

All administrative aspects of Site remediation appear to be satisfied at the time of this review. The Site inspection activities are documented in a checklist and photolog included as Appendix B and C, respectively.

F. Interviews and Public Input

During the Public Hearing for the 2012 ROD Amendment held on June 19, 2012 only the Town Manager, the Director of the Department of Public Works, a Selectman, and the camera operator were present. No comments were received during the Public Hearing or during the 30-day Public Comment Period. The public meeting was also lightly attended. Therefore, EPA conducted no public meetings for this Five Year Review. A notice of this Five-Year Review and solicitation of comments was placed in the Conway Daily Sun, a local newspaper.

After the March 12, 2013 Site visit, Mssrs. Luce and Hoffman met with the Town Department of Public Works Director, Paul Degliangeli. Mr. Degliangeli's concerns with the Site were returning it to commercial re-use and EPA's ponderous mechanism for releasing liens on Superfund sites. He voiced no concerns over conditions at the Site.

Earl Sires, the Town Manager, only asked when the property could be advertised for sale and reuse. No other public input or written concerns were expressed regarding the Site, either electronically or through traditional mail.

G. ReUse Assessment

The Town desires to return the Site to active re-use as a commercial facility and will be advertising the land for sale in the near future.

VII. Technical Assessment

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

YES – Although the MNA remedy for groundwater exceeds the criteria for implementing a contingent remedy, an analysis of the data found that it is unlikely that concentrations are increasing and moving off-site. It is still expected that cleanup levels will be attained in the 18 years following the 2012 Amended ROD, in 2030. The Activity and Use Restriction is monitored for compliance to ensure that there are no completed exposure pathways to contaminated groundwater.

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

YES - Data provided and analyzed in Appendix D indicate no change in Site conditions which would warrant a re-evaluation of risk.

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

NO – Contaminants are limited primarily to three wells within a shallow sand aquifer in a wetland.

Technical Assessment Summary

VOC contaminants occur in a very limited area of the overburden aquifer, less than 0.5 acres laterally and 3 to 4 feet vertically, and are at concentrations that exceed ICLs in few wells. The remaining groundwater contaminants are recalcitrant to remediation due to reverse matrix diffusion limiting the rate of recovery or treatment. Natural processes will attain cleanup levels in a time-frame similar to active pump-and-treat due to this diffusion property.

Although there is no current risk posed from Site contaminants to drinking water users or from surface water, there may be a future risk. Future risk may occur if contaminated groundwater were to be used for drinking water purposes or if residential homes were to be constructed above contaminated groundwater. Therefore, monitoring of groundwater and continuation of the AUR for the Site is needed to ensure protectiveness of the remedy until groundwater cleanup levels are achieved. A more detailed analysis of Site conditions is presented further in the Technical Assessment in Appendix D.

VIII. Issues

This Five Year Review identifies two issues, identified in Table 4, related to the contamination in the overburden ground water that may affect the protectiveness of the remedy.

Table 4: Summary of Issues		
Issue	**Affects Protectiveness (Y/N)**	
	Current	**Future**
1) Overburden groundwater remains contaminated above cleanup levels.	N	Y
2) Contingent remedy criteria established in the 2012 Amended ROD have been violated indicating the need to implement a contingent groundwater remedy.	N	Y

IX. Recommendations and Follow-up Actions

The issues identified in Table 4 points to actions that need to be taken to ensure long-term protectiveness at the Site and are listed below in Table 5.

Table 5: Recommendations and Follow-up Actions						
Issue	**Recommendations and Follow-up Actions**	**Party Responsible**	**Oversight Agency**	**Milestone Date**	**Affects Protectiveness (Y/N)**	
					Current	**Future**
1	Continue monitoring groundwater and surface water at the Site. a. Monitor groundwater and surface water biannually. b. Monitor institutional controls. c. Evaluate the effectiveness of monitored natural attenuation in attaining cleanup levels.	NHDES	EPA	a. Biannual, Oct, May. b. Annual, May. c. December 2015	N	Y
2	Assess the interaction of the drainage culvert and Pequawket Pond with on-site groundwater to determine contaminant and hydraulic behavior before implementing a contingent remedy.	NHDES	EPA	December 2015	N	Y

X. Protectiveness Statement

The remedial actions taken are protective of human health and the environment in the short-term because there are no completed exposure pathways. However, to be protective in the long-term, a number of follow-up actions are necessary: continue monitoring of Institutional Controls, continue monitoring groundwater, evaluate the interaction of the surface water in Pequawket Pond and the Site groundwater, and assess the need to implement a contingent remedy to reduce concentrations of volatile organic contaminants in Site groundwater.

XI. Next Review

This Site requires on-going, policy, Five-Year Reviews. The next review will be conducted and issued in 2018, five years from the date of signature of this report.

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Weston Solutions, Inc., *Geoprobe Investigation Report, Kearsarge MetallurgicalCorporation, Conway, New Hampshire*, 2008.

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APPENDIX A: PUBLIC NOTICE TO START FIVE-YEAR REVIEW

EPA Starts Five-Year Review of Kearsarge Metallurgical Corporation Superfund Site

The U.S. Environmental Protection Agency (EPA) is beginning its fourth Five-Year Review of the Kearsarge Metallurgical Corporation Superfund Site, in Conway, NH. Five-Year Reviews are required by law to determine if the cleanup is protective of human health and the environment. This Five-Year Review will be completed by September 2013 and the results will be publicly available.

The Kearsarge Metallurgical Corporation Superfund Site cleanup plan included the removal of deteriorated and leaking drums, the removal of a waste pile, soil excavation, pumping and treating of groundwater, and the planting of poplar trees to reduce groundwater flow and enable micro-organisms to consume contaminants. Current efforts will reduce groundwater contamination through monitored natural attenuation. Contaminants at the Site include volatile organic compounds and 1,4-dioxane in the groundwater. The area is supplied with clean water from a water supply system.

More information about the cleanup can be found on-line at www.epa.gov/superfund/sites/kearsarge or at the Conway Public Library.

For more information, contact:
Darryl Luce
Toll Free 1-888-372-7341, ext.81336
luce.darryl@epa.gov
www.epa.gov/superfund/sites/tibbetts

APPENDIX B: INSPECTION CHECKLIST

Site Inspection Checklist

I. SITE INFORMATION

Site name: Kearsarge Metallurgical Corporation	**Date of inspection:** 12 March 2013
Location and Region: Barrington, NH; EPA Region I	**EPA ID:** NHD062002001
Agency, office, or company leading the five-year review: EPA Region I	**Weather/temperature:** Foggy, cool approximately 30° Fahrenheit. Snow present on the ground.

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☑ Institutional controls
- ☐ Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☑ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls
- ☐ Other _____

Attachments: ☐ Inspection team roster attached ☐ Site map attached

II. INTERVIEWS

1. **O&M site manager:** Andrew Hoffman (Name) Project Manager, NHDES. (Title) March 12, 2013 (Date)
   Interviewed ☑ at site ☐ at office ☐ by phone Phone no. 603-271-6778
   Problems, suggestions; None, O&M restricted to monitoring.

2. **O&M staff:** None

3. **Local regulatory authorities and response agencies**: None.
   Problems; suggestions: None.

4. **Other interviews**: ☑ Reports in Section VI.F. of the Five-Year Review.
   Paul Degliangeli, Director, Conway Department of Public Works.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED

1. **O&M Documents**

☐ O&M manual	☐ Readily available	☐ Up to date	☑ N/A
☐ As-built drawings	☐ Readily available	☐ Up to date	☑ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☑ N/A

Remarks: None.

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

Remarks: None.

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

Remarks: None.

Site Inspection Checklist (Continued)

4.	**Permits and Service Agreements**			
	☐ Air discharge permit	☐ Readily available	☐ Up to date	☑ N/A
	☐ Effluent discharge	☐ Readily available	☐ Up to date	☑ N/A
	☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☑ N/A
	☐ Other permits_____	☐ Readily available	☐ Up to date	☑ N/A
	Remarks: None.			
5.	**Gas Generation Records**	☐ Readily available	☐ Up to date	☑ N/A
	Remarks: None.			
6.	**Settlement Monument Records**	☐ Readily available	☐ Up to date	☑ N/A
	Remarks: None.			
7.	**Groundwater Monitoring Records**	☑ Readily available	☑ Up to date	☐ N/A
	Remarks: None.			
8.	**Leachate Extraction Records**	☐ Readily available	☐ Up to date	☑ N/A
	Remarks: None.			
9.	**Discharge Compliance Records**			
	☐ Air	☐ Readily available	☐ Up to date	☑ N/A
	☐ Water (effluent)	☐ Readily available	☐ Up to date	☑ N/A
	Remarks: None.			
10.	**Daily Access/Security Logs**	☐ Readily available	☐ Up to date	☑ N/A
	Remarks: None.			

IV. O&M COSTS

1. **O&M Organization**

☑ State in-house ☐ Contractor for State
☐ PRP in-house ☐ Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other: None.

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

A. Fencing ☑ N/A

Remarks: A Fence is present so that the town may keep vandals out of an existing building. No risk is associated with trespassing.

B. Other Access Restrictions

Signs and other security measures: None.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

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

Type of monitoring: Visual inspections and water bills. Frequency: Annual, periodic.
Responsible party/agency: Town of Conway.

Contact: Paul Degliangeli	DPW Director	1-603-447-3811
Name	Title	Phone no.

Reporting is up-to-date	☑ Yes	☐ No	☐ N/A
Reports are verified by the lead agency	☑ Yes	☐ No	☐ N/A
Specific requirements in deed or decision documents have been met:	☑ Yes	☐ No	☐ N/A
Violations have been reported:	☐ Yes	☑ No	☐ N/A

Other problems or suggestions: None.

Site Inspection Checklist (Continued)

2. **Adequacy** ☑ ICs are adequate ☐ ICs are inadequate ☐ N/A Remarks: None.
D. General
1. **Vandalism/trespassing** ☐ Location shown on site map ☑ No vandalism evident Remarks: None.
2. **Land use changes on site** ☑ N/A Remarks: None presently, the land is vacant.
3. **Land use changes off site** ☐ Applicable ☑ N/A Remarks: None.
VI. GENERAL SITE CONDITIONS
A. Roads ☐ Applicable ☑ N/A
B. Other Site Conditions: None.
VII. LANDFILL COVERS ☐ Applicable ☑ N/A
VIII. VERTICAL BARRIER WALLS ☐ Applicable ☑ N/A
IX. REMEDIAL ACTION ☑ Applicable ☐ N/A
A. Treatment System ☐ Applicable ☑ N/A Remarks: None.
B. Monitoring Data
1. **Monitoring Data:** ☑ Is routinely submitted on time ☑ Is of acceptable quality
2. **Monitoring data suggests**: ☑ Groundwater plume is effectively contained under ambient conditions. ☑ Contaminant concentrations are declining
C. Monitored Natural Attenuation **Monitoring Wells** (natural attenuation remedy) ☑ Properly secured/locked ☑ Functioning ☑ Routinely sampled ☑ Good condition ☑ All required wells located ☐ Needs Maintenance ☐ N/A Remarks: Technical assessment of the remedy is located in Appendix D of this Report.
X. OTHER REMEDIES None.
XI. OVERALL OBSERVATIONS
A. Implementation of the Remedy: The current remedy is monitored natural attenuation. Additional sampling and analysis will occur during the spring and summer of 2014.
B. Adequacy of O&M: None.
C. Early Indicators of Potential Remedy Problems: None.
D. Opportunities for Optimization: None.

APPENDIX C: PHOTOGRAPHS DOCUMENTING SITE CONDITIONS

PHOTOGRAPHY LOG SHEET
Kearsarge Metallurgical Corporation Superfund Site ● Conway, New Hampshire

SCENE: View is looking south along Hobbs Street. In the immediate foreground is the Groundwater Pump-and-Treat system building built in 1993. Further to the right, and more distant, is the remaining portion of the old KMC building.

DATE/TIME: March 12, 2013 **PHOTOGRAPHY BY:** D. Luce

PHOTOGRAPHY LOG SHEET
Kearsarge Metallurgical Corporation Superfund Site ● Conway, New Hampshire

SCENE: View is looking eastward from the southeast corner of the Groundwater Pump-and-Treat system building. The area shown is a wetland and just inside the far wood-line is the most contaminated wells, MW-3010 and MW-3008.

DATE/TIME: March 12, 2013 **PHOTOGRAPHY BY:** D. Luce

PHOTOGRAPHY LOG SHEET
Kearsarge Metallurgical Corporation Superfund Site ● Conway, New Hampshire

SCENE: Still standing at the southeast corner of the Groundwater Pump-and-Treat system building but now looking southwestward. The old KMC building stood just inside the fence and was just removed in December. The remaining structure was the newer, west wing of the KMC building and may still be used. The waste pile removed in 1992 was just within and to the left (east) of the fence shown.
DATE/TIME: March 12, 2013 **PHOTOGRAPHY BY:** D. Luce

APPENDIX D: TECHNICAL ASSESSMENT

Technical Assessment of Contaminant Status
Kearsarge Metallurgical Corporation Superfund Site
Conway, New Hampshire
July 2013

The 1990 ROD remedy selected groundwater pump and treat to attain cleanup levels in groundwater. After 12 years of active groundwater remediation, removal of portions of the contaminated aquifer, and several studies to determine the nature of groundwater contamination EPA issued a Record of Decision Amendment in 2012. The 2012 Amended ROD selected monitored natural attenuation (MNA) to attain Interim Cleanup Levels (ICLs) in groundwater.

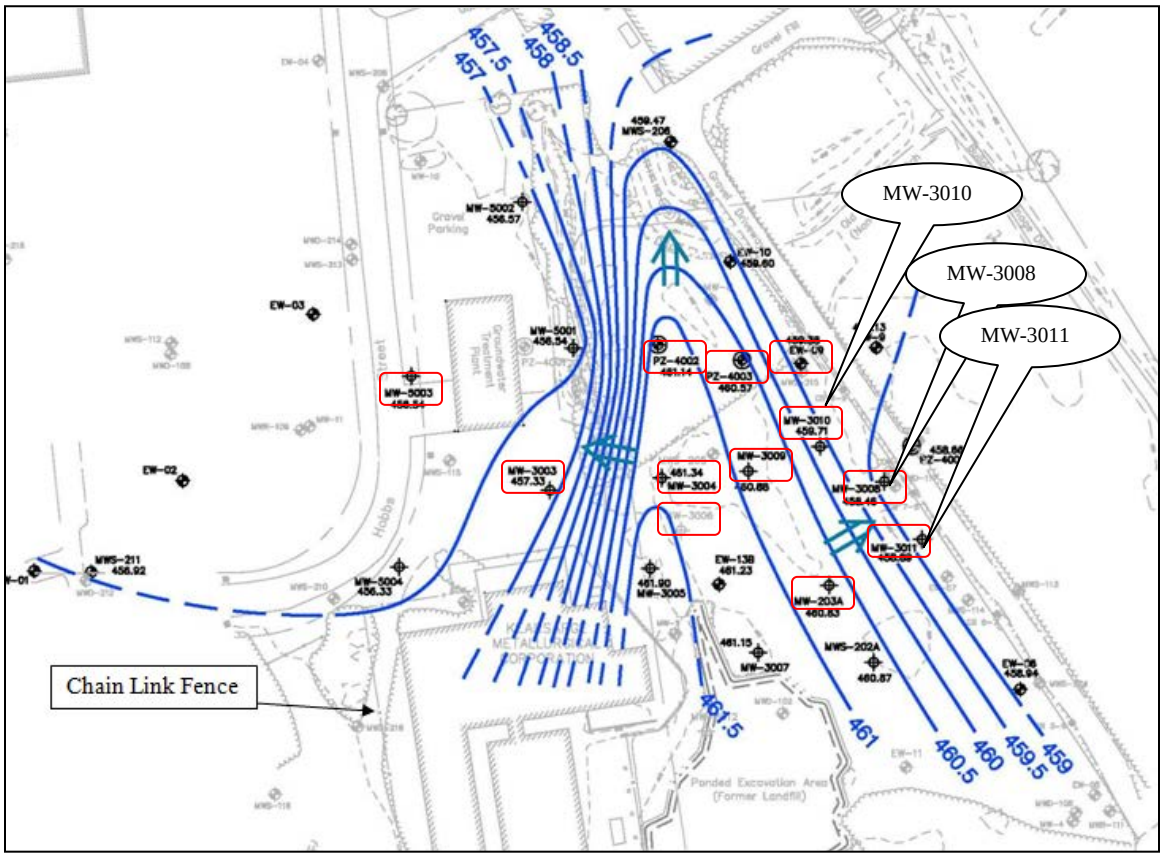
MNA was selected because the modeled cleanup times for groundwater pump-and-treat and MNA were similar,15 years and 18 years, respectively. The similar, approximate cleanup times is because contaminants are absorbed to a silty-clay matrix and their release is governed by reverse matrix diffusion. The 2012 Amended ROD selected a contingent remedy in case contaminants increased in concentration and became a threat to migrate off-site or create additional risk. The two evaluation criteria for implementing a contingent remedy in the 2012 Amended ROD: [14]

> "The decision to design and implement additional response actions would be performed if either of the two following trigger conditions occur:
>
> 1. The concentration of either 1,1-DCE or 1,1-DCA in wells MW-3010 or MW-3008 rises above the concentration found in December 2010; for MW-3010: 578 ppb and 235 ppb, respectively, and for MW-3008: 175 ppb and 101 ppb, respectively, in any two consecutive sampling events, or;
> 2. The concentration of any contaminant in any of the monitored wells increases by 100% over its December 2010 concentration, and is above its cleanup level, in any two consecutive sampling events."

Both criteria had been violated as of the last sampling round in May 2013. Groundwater monitoring occurs twice a year. The monitoring wells (shaded in yellow) and groundwater contours for late-November 2007 are shown below in Figure D1.

[14] *Op. cit.*, 2012 AROD, p. 31.

Figure D1. The Site, groundwater monitoring network, and typical late-November groundwater contours. Monitoring wells are outlined in red. The three problematic wells, MW-3010, -3008, and -3011, are labeled for easier identification.



The two critical contaminants of concern in this analysis are 1,1-DCE and 1,1-DCA, respectively. Table D1, below, shows the results for all monitoring points for 1,1-DCE, the most prevalent and highest concentration contaminant at the Site. Tables D2 and D3, that follow, have the same conventions as Table D1. The tables show the following conventions:

- Concentrations that exceed ICLs are in yellow.
- Both of the contingent remedy criteria in the 2012 Amended ROD reference the concentrations present during the December 2010 sampling round as the base concentrations for future comparison. The cell at the top of the column for the December 2010 round in each table is highlighted in green.
- There are also two critical wells, MW-3010 and MW-3008, which were selected because they represent the highest concentrations and were presumed to be at the core of the contaminant plume. These two wells are bolded in the tables.
- The red highlighted concentrations with white letters are those concentrations that exceed the first criterion.
- The blue highlighted concentrations with white letters are those concentrations that exceed the second criterion.

Table D1 has the following results for all monitoring points for 1,1-DCE since December 2010:

Table D1: 1,1-DCE (µg/l)

Well	DEC 10	OCT 11	JAN 12	OCT 12	MAY 13
EW-9	**2.1**	2.9	1	4.4	<2
MWS-203A	**2.6**	2.4	3.5	7.3	6.5
MW-3003	**30**	15.9	<1	45	45
MW-3004	**<2**	<1	<1	<4	<2
MW-3006	**12**	4.8	5.2	13	7.7
MW-3008	**175**	89.8	100	96	57
MW-3009	**8.8**	10.3	6.3	15	19
MW-3010	**578**	220	420	943	571
MW-3011	**<2**	7.2	14	28	30
MW-5003	**NS**	1	16	<2	<2
PZ-4002	**NS**	<1	NS	<2	<2
PZ-4003	**<2**	<1	1.1	<2	<2

Notes:

1. The first column of results, "DEC 10" is the benchmark for the two criteria in the Amended ROD. These values are bolded for clarity.
2. Wells MW-3010 and MW-3008 are bolded as Criterion 1 applies only to them with respect to 1,1-DCE and 1,1-DCA. Criterion 2 applies to all wells and all contaminants.
3. Yellow shaded cells exceed the ICL, which for 1,1 DCE is 7 µg/l or ppb.
4. Red highlighted concentrations exceed Criterion 1.
5. Blue highlighted concentrations exceed Criterion 2.
6. "NS" = Not Sampled.

Criterion #1: Is not violated with respect to 1,1-DCE although the concentration in well MW-3010 comes very close. This well also varies greatly in concentration and the reason for this variance over such short time frames has not been resolved MW-3010 is the most contaminated well at the Site and is located on the eastern side of the property, adjacent to the drainage culvert. During the October 2012 sampling round the result did exceed the trigger in Criterion #1 for well MW-3010, but the following sampling round did not exceed the test in two consecutive monitoring events. Concentrations of 1,1-DCE in well MW-3008 have been on a consistent declining trend.

Criterion #2: Only one well, MW-3011, exceeded the trigger level set in Criterion #2 in the Amended ROD for 1,1-DCE, but also for 1,1-DCA, and 1,4-Dioxane as shown in Tables D2 and D3. The concentration for all contaminants in well MW-3011 during the benchmark round, December 2010, were at or below detection limits which is a factor in this exceeding Criterion #2. Tables D2 and D3 below shows that similar to 1,1-DCE, only well MW-3011 violates criterion #2. MW-3011 is highlighted in blue.

Table D2: 1,1-DCA (µg/l)

Well	DEC 10	OCT 11	JAN 12	OCT 12	MAY 13
EW-9	<2	<1	<1	2.3	<2
MWS-203A	7.3	<1	7.8	18	16
MW-3003	12	<1	<1	22	18
MW-3004	<2	<1	<1	<4	<2
MW-3006	2.5	<1	1.3	2.5	<2
MW-3008	101	1.6	49	50	35
MW-3009	6.3	<1	2.3	6.5	7.4
MW-3010	235	14.1	190	433	246
MW-3011	2.6	<1	45	89	88
MW-5003	NS	<1	4.9	<2	<2
PZ-4002	NS	<1	NS	<2	<2
PZ-4003	<2	<1	<1	<2	<2

Notes: As above in Table 1 with the exception that the Yellow shaded cells exceed the ICL for 1,1 DCA, 81 µg/l or ppb.

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Table D3: 1,4-Dioxane (µg/l)

Well	DEC 10	OCT 11	JAN 12	OCT 12	MAY 13
EW-9	NS	NS	<2	<0.2	<0.2
MWS-203A	NS	NS	<2	0.79	1.23
MW-3003	<2	<2	<2	0.87	0.77
MW-3004	NS	NS	<2	<0.2	<0.2
MW-3006	NS	NS	<2	0.35	0.28
MW-3008	6.3	4.1	5.7	4.27	2.81
MW-3009	1.4	<2	<2	0.45	0.97
MW-3010	34	25	41	59	39
MW-3011	<2	4.5	6.8	6.26	9.35
MW-5003	NS	<2	<2	<0.2	<0.2
PZ-4002	NS	NS	NS	<0.2	<0.2
PZ-4003	NS	NS	<2	<0.2	<0.2

Notes: As above in Table 1 with the exception that the Yellow shaded cells exceed the ICL for 1,4 Dioxane, 3 µg/l or ppb.

In addition to Criterion #1 being violated for 1,1-DCA in Well MW-3010, Well MW-3011 exceeds criterion #2 for all three compounds in Tables D1, D2 and D3. In such case, the 2012 Amended ROD would direct that an oxidizing compound be injected into the affected areas surrounding these wells, and that further assessments occur before considering the use of a small-scale pump-and-treat system in that area.[15] But there are several factors to consider before implementing any contingent remedy:

1. **Water from the Drainage Culvert influences the closer wells.** One confounding issue at the Site is that the groundwater along the eastern edge of the Site is highly influenced by the water level in Pequawket Pond. The level in the pond is controlled by boards and the pond level is lowered significantly prior to winter to minimize damage to docks. The storm drain that runs north-south through the Site, immediately adjacent to wells MW-3010, -3008, and -3011, transmits the effect of the pond water lowering instantly along the length of the drain. This generates the groundwater contours seen on Figure D1.

   Wells MW-3010 and MW-3008 are 80 and 40 feet away from MW-3011, respectively, but all three wells are within 10 feet of a storm drain (See Figure 2 in the Five Year Review and Figure D1 above). The rapid transmission of water in the drainage culvert affects water levels, and perhaps concentrations, dramatically in these wells.

   The contingent remedy set out in the 2012 Amended ROD called for an *in situ* application of an oxidizing compound followed by monitoring. Because of the rapid and significant changes in water levels and concentrations in the wells that exceed the criteria, due to the changing elevation of Pequawket Pond, an assessment of that interaction is necessary. The application of oxidizing compound would require a lengthy residence time to be fully effective, and implementation of the *in situ* remedy without understanding the hydraulics present may create additional problems and render the treatment ineffective.

[15] USEPA, Record of Decision Amendment, 2012, p. 31.

2. **Contaminant concentrations in wells other than MW-3010 and MW-3008, including MW-3011 are low to below detection**: This is shown in Table D4, below:

Table D4: Sampling results for May 2013. All concentrations in (µg/l).

Well	1,1-DCE	1,1-DCA	1,4-Dioxane	Vinyl Chloride	1,2-DCA	1,1,1-TCA
EW-9	<2	<2	<0.2	<2	<2	3.5
MWS-203A	6.5	16	1.23	<2	<2	<2
MW-3003	45	18	0.77	<2	<2	41
MW-3004	<2	<2	<0.2	<2	<2	<2
MW-3006	7.7	<2	0.28	<2	<2	12
MW-3008	57	35	2.81	6.5	<2	<2
MW-3009	19	7.4	0.97	<2	<2	27
MW-3010	571	246	39	<20	28	181
MW-3011	30	88	9.35	<2	<2	<2
MW-5003	<2	<2	<0.2	<2	<2	<2
PZ-4002	<2	<2	<0.2	<2	<2	<2
PZ-4003	<2	<2	<0.2	<2	<2	<2
ICL	**7**	**81**	**3**	**2**	**5**	**200**

Notes:
1) Vinyl Chloride has not had a formal ICL established at the Site, and it has not been detected in the past. It is most likely a by-product of natural attenuation through biodegradation of 1,1-DCE.
2) Yellow cells are those that exceed ICLs.

3. **The contaminant plume and incremental risk is not changing**: The sentinel wells, MW-5003, PZ-4002, PZ-4003, and MW-203A, show no increase that would indicate the potential for off-site migration. The primary well that would indicate westward migration, MW-5003, shows no detection of contaminants of concern (Table D4). Northward migration would be seen in wells PZ-4002 and PZ-4003, which are also both below ICLs. One well that may bear watching is MW-203A, which would indicate possible migration towards Pequawket Pond. Although concentrations are below ICLs in MW-203A, there is a trend that could indicate an increase in concentrations.

An indicator of overall conditions is Weighted Total ICL. This value is constructed by normalizing the concentrations of all contaminants to their ICLs, e.g., a concentration of 7 µg/l of 1,1-DCE would give a value of "1," and 14 µg/l would give a value of "2." Those values are then summed for all wells and all contaminants with an ICL to yield a single value for a monitoring round. This value provides a measure of by how much contamination exceeds all cleanup levels in each sampling round. Figure D2 shows the value calculated for KMC for each of the sampling rounds since December 2010.

Figure D2. Weighted Total ICL for all contaminants in groundwater at the KMC Site.

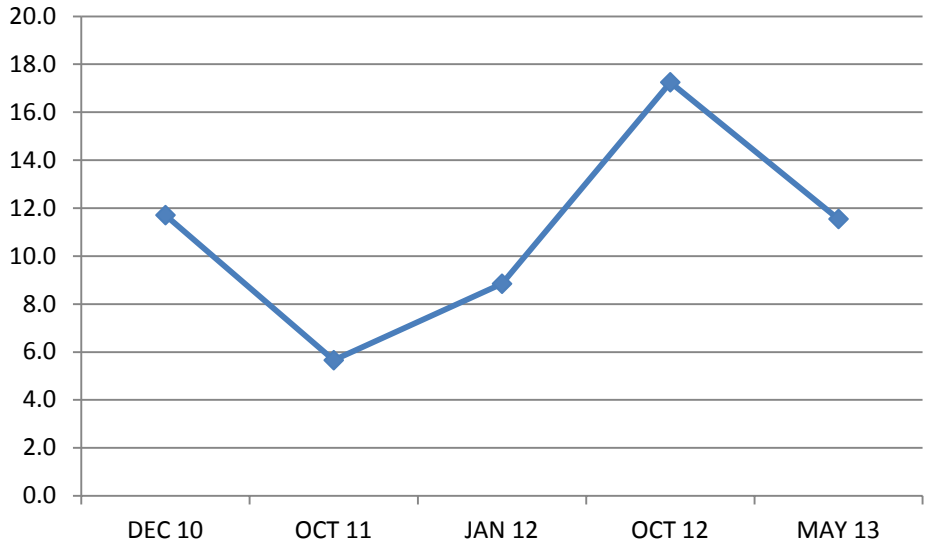
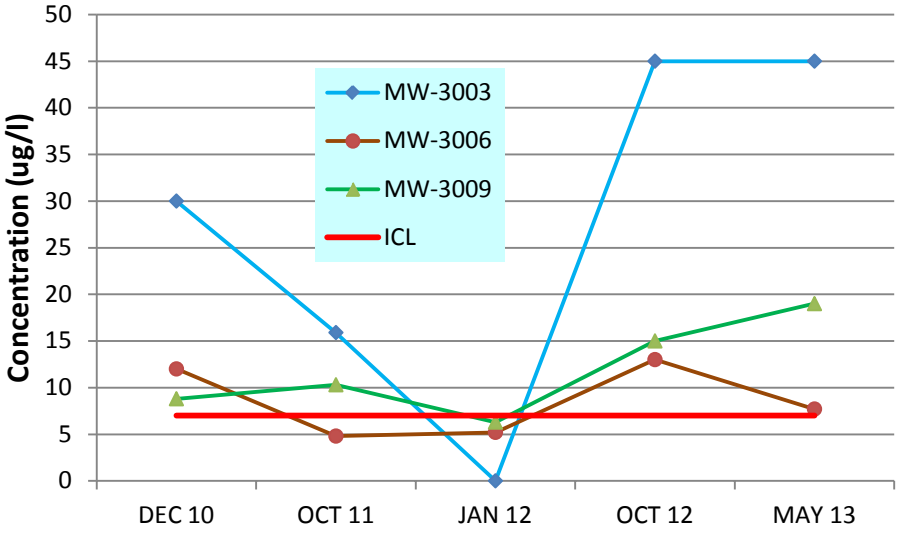


Figure D2 shows that the overall concentrations have fluctuated around a central value of about 12 times the ICL and that there is no clear upward trend.

4. **The remaining wells are either clean or stable in concentration**: Wells EW-3 and MW-3004 have been below detection limits for virtually all sampling rounds. The remaining wells: MW-3003, MW-3006 and MW-3009 are only contaminated by 1,1-DCE which is relatively low in concentration and not generally increasing as shown below in Figure D3.

Figure D3. 1,1-DCE in Monitoring wells MW-3003, MW-3006 and MW-3009.



Summary

Criterion #1 and #2 of the 2012 Amended ROD contingency trigger were violated in wells MW-3010 and MW-3011. However, contaminant concentrations in these two wells remain low, do not appear to be migrating, and are likely to be heavily influenced by the surface water management in Pequawket Pond. All other monitoring wells are declining in concentration or are below ICLs.

The goal of the 2012 Amended ROD criteria was to ensure that Site contaminants did not migrate off-site at concentrations that would generate a risk to human health or the environment. The close hydraulic connection between the monitoring wells that exceed the criteria and Pequawket Pond points to the need to collect additional data to determine the relationship between water levels, the contamination in the aquifer, and the connection to the storm drain before assessing the need or means to implement a contingent remedy. This will require the collection of additional water samples as well as monitoring water levels and water chemistry in Catch Basin CB 5-6, which is adjacent to well MW-3008, and other components of the storm drain that may have an impact on hydrogeology at the Site.