

Current Projects Using AgroRemed®/VaporRemed®

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February 28, 2021

DeeAar Holdings, LLC

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Abandoned Gas Station in Mays Landing, NJ

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Site location



Figure: Site: An Abandoned Gas Station

Background

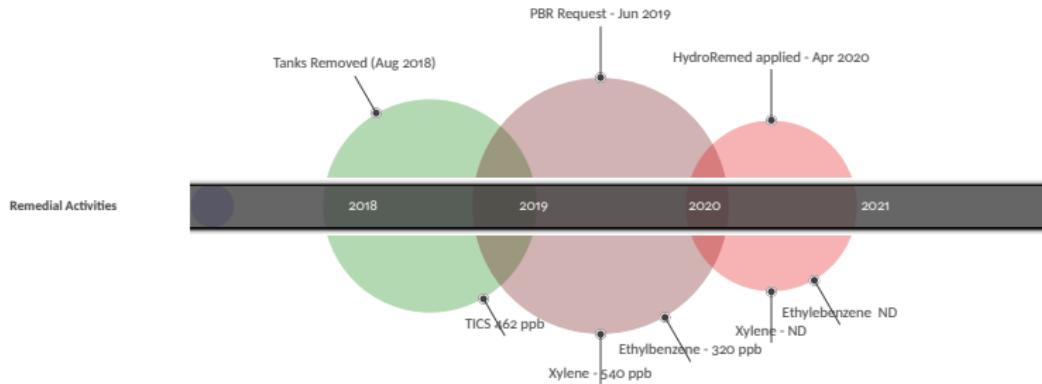
Tank

1 x 1000 gallon kerosene UST
2 x 8000 gallon UST
2 x 3000 gallon leaded gasoline
1 x 2000 gallon leaded gasoline UST

- ▶ The gas station has been abandoned for over ten (10) years.
- ▶ At the time of cleanup, the team could arrive at an estimated gas tanks.
- ▶ Tanks were removed in 2018.
- ▶ Contamination baselines were established in 2019.
- ▶ HydroRemed was added to site in April 2020.
- ▶ The hydrocarbon contamination levels have been non-detect (ND) for two samples.
- ▶ Secondary contamination has been detected and is being addressed.

Current State : The monitoring for levels of secondary contamination is continuing.

Mays Landing - Remediation Timeline contd.



Contaminated Gas Station in Antrim, NH

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Site location

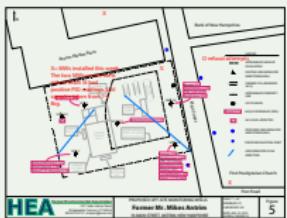


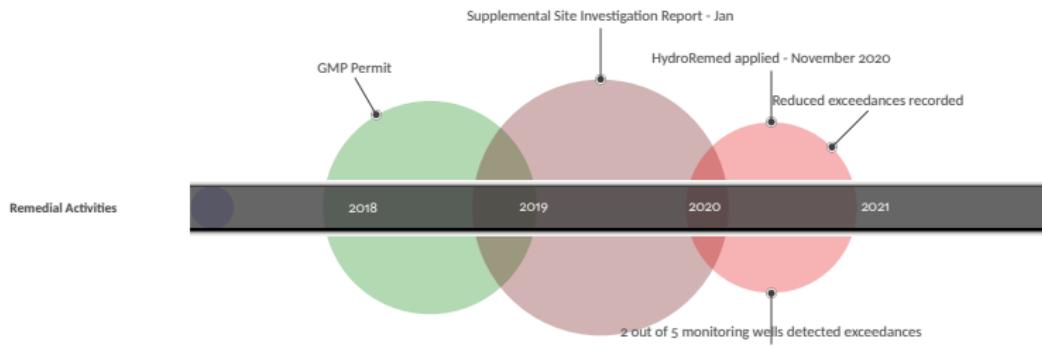
Figure: Sitemap of monitoring wells

Background

- ▶ The site is a former retail gasoline and fueling facility, reportedly since 1970s;
- ▶ In 1988, several underground storage tanks were removed.
- ▶ Previous remedial efforts at the site were conducted by prior consultants and included the use of an in-situ submerged oxygen curtain (ISOC) in 2002 and bio-augmentation via the addition of live bacterial cultures in 2004 to remediate residual petroleum contaminant levels in groundwater at the site.
- ▶ Our group acquired the property in July 2018;
- ▶ The project is currently 70 % complete. There are exceedances recorded near two monitoring wells;
- ▶ Groundwater from MW-101 contained concentrations of 11 VOCs and 3 PAHs, including concentrations of benzene (32 parts per billion [ppb]) and naphthalene (160 ppb) that exceeded the New Hampshire Ambient Groundwater Quality Standards (AGQS);
- ▶ Groundwater from MW-102 contained concentrations of eight VOCs and 3 PAHs, none of which exceeded the AGQS; and
- ▶ * Details are in the attached report.

Current State : Active. We are reaching out to the DES to discuss our protocol to address the remaining 30% of contamination.

Antrim NH - Remediation Timeline contd.



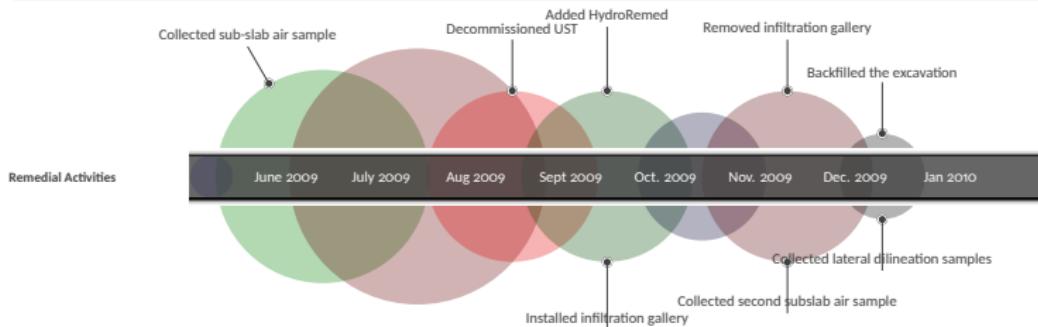
Past Projects using AgroRemed/HydroRemed



- ▶ UST decommissioning and complex soil-only risk-based cleanup,
Portland OR
- ▶ VDEQ DEQ PC# 055160
- ▶ CAP Implementation Report - Former Snow Hill Zooms Snow Hill
Mattaponi VA
- ▶ 30 * 15 meters of railroad cleaned up with a single application of
AgroRemed Smedjebacken Railway Station, Sweden

UST Decommissioning and Complex Soil-only Risk-based Cleanup

- ... "As suggested by the results of the second sub-slab air sample, the microbes were particularly successful in degrading the plume beneath the basement slab. " - Mark N, Geohydrologist, Xavier Environmental, Inc.
Please click on this link for details.



Site location

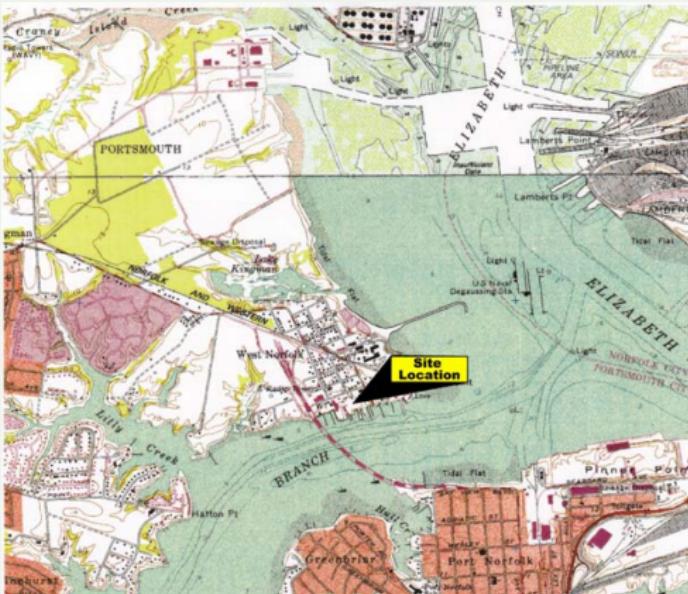
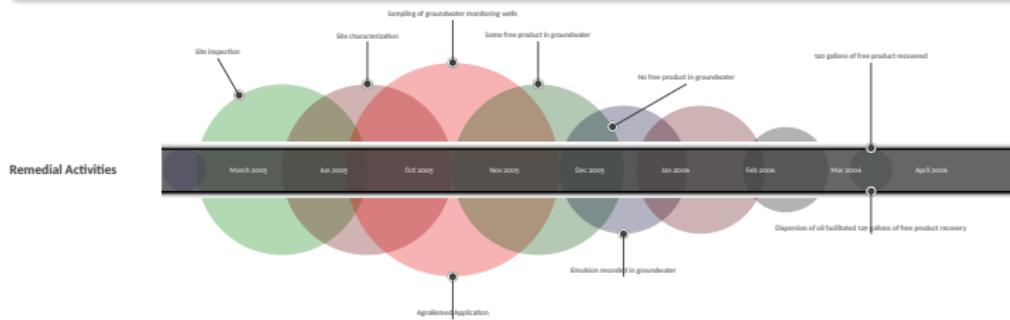


Figure: Site Location

VDEQ DEQ PC# O5516O (2)

"... InSitu Bioremediation was requested by the DEQ, as a cost effective method of remediation at this site. A product known as AgroRemed® was chosen, because of its ability to address all phases of petroleum contamination using a single application." Marvin S, Project Geologist. [Link to the report.](#)



A notable aspect of the groundwater data shows that free product on Dec 30th reduced to 0. This reduction can be attributed to the addition of AgroRemed on 18th Oct, 2005. Further, the free product in Jan 2006 was in the form of an emulsion. The author's conclusion based on this data is that the emulsion is evidence of the biodespersion enabled by AgroRemed. In retrospect, that is, after observing field data in numerous projects since 2005, we assert that this emulsion phase is critical for effective bioremediation of oil contamination on the field.

"... .The application of AgroRemed appears to have reduced the levels of dissolved phase contamination in the groundwater and increased dispersion of the free product, resulting in an increase in the amount of free product in MW-4. Recovery of the free product utilizing aggressive fluid vapor recovery (AFVR) appears to be effective; therefore, its^a continued use is recommended. " Project Geologist

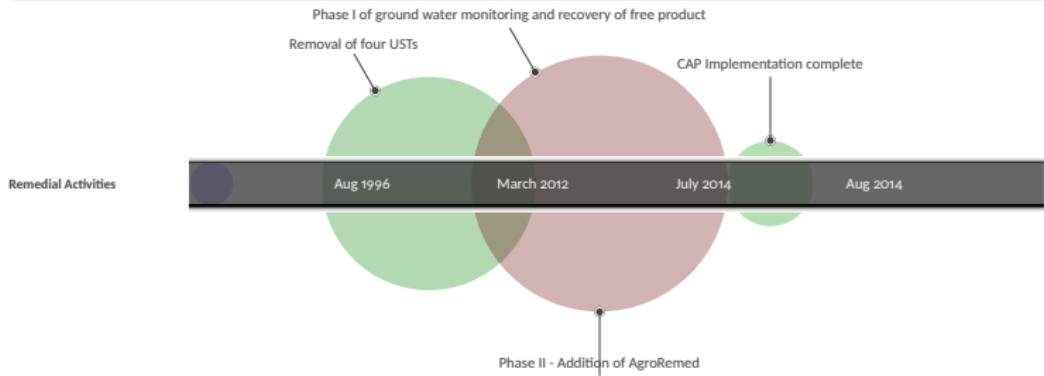
^ahere "its" refers to the AFVR and not AgroRemed. There was no need to apply AgroRemed after the application in Oct 2005.

CAP Implementation Report - Former Snow Hill Zooms Snow Hill VA

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Petroleum contamination, primarily gasoline range hydrocarbons, was identified during removal of four underground storage tanks (USTs) in August 1996 at the former Snow Hill Zooms in Mattaponi, VA. [Please click on this link for details.](#)



30 15 meters of railroad cleanup using AgroRemed Smedjebacken Railway Station, Sweden

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2 hours' downtime



enzymex
BIOREMEDIATION



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BIOREMEDIATION

After 4 weeks



enzymex
BIOREMEDIATION

30 meters of railroad heavily contaminated during 80 years of small leakage of trains was cleaned up by a single application of AgroRemed. The image gallery draws attention to the observation that it took only two hours of downtime for the railway station to complete the application and cleanup an accumulated contamination of over 80 years. ^a Please click on this link for details.

^a This aspect is relevant when cleanup crews need to decide on a window-of-opportunity, typically when applying dispersants : AgroRemed as is shown here can be added to a spill at any time of the lifetime of a spill. This property is further explored in extraction of USLFO from waste asphalt.[Link here.](#)

Some more references

References from [Sarva Bio Remed's online shop](#), with their permission.

- ▶ [Cleanup of contaminated soil at ANA Shipyard, 2006](#)
- ▶ [Corrective Action Plan VDEQ PC#911427](#)
- ▶ [Corrective Action Plan - VDEQ PC#972073](#)
- ▶ [Corrective Action Plan VDEQ PC# 055074](#)
- ▶ [PADEP closure report documenting removal of one 500-gallon tank and two 1000-gallon tanks](#)

About DeeAar Holdings, LLC



Our group specializes in bioremediation of contaminated properties such as,

- ▶ abandoned gas stations;
- ▶ and properties contaminated with TCE/PCE.

We strive reduce the time-to-market for contaminated properties to realize value to our clients.

Team



- ▶ - Dinkar Ganti, Lead Developer, DeeAar Holdings, LLC.



- ▶ **Sarva Bio Remed, LLC.**

Sarva Bio Remed, LLC is a leader in providing and developing innovative environmental solutions for remediation of contaminants including gasoline, number 2 heating oil, asphalt, PCE/TCE.

Appendix

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ANALYTE	CAS	(ug/g)	Conc	Q	RL	MDL
INDIRECT/NEUTRAL EXTRACTABLES BY GC-MS						
Benzene	71-43-2	5	ND	0.5	0.18	
1,3-butadiene	106-54-9	5	ND	0.79	0.26	
Chloroethane	593-71-8	2	ND	0.6	0.17	
Methyl n-butyl ether	625-58-6	5	ND	1	0.17	
Kyrene (1,4D)	12330-20-7	2	ND	0.4	0.13	
2-Methyl-1,3-butadiene	124-88-2	5	0.28	J	0.5	0.13
Acetone	67-64-1	50	5.5	J	5	1.5
Carbon disulfide	75-15-0	5	ND	5	0.3	
2-Ethylhexane	142-91-7	2	ND	0.65	0.2	
VOLATILE ORGANICS BY GC/MS-TIC						
Total VOC Compounds		-	-	-	-	-
BASE/NEUTRAL EXTRACTABLES BY GC/MS - WESTBOOUGH LAB						
Acetone	67-02-1	50	ND	2	0.44	
Naphthalene	91-20-3	5	3.2	J	3	0.86
1,3-butadiene	106-54-9	5	4.4	J	4	1.3
Acetone	67-64-1	5	ND	2	0.43	
Piperazine	66-06-6	ND	ND	2	0.33	
Dimethylsulfide	102-48-9	ND	ND	2	0.6	
2-Methylpropanoate	62-57-6	ND	ND	2	0.65	
Carboxylic	69-74-6	ND	ND	2	0.69	
BASE/NEUTRAL EXTRACTABLES BY GC/MS - WESTBOOUGH LAB-TIC						
Total TIC Compounds		ND	J	0	0	0
BASE/NEUTRAL EXTRACTABLES BY GC/MS-SIM						
1,3-butadiene	106-54-9	0.3	0.1	0.1	0.02	
Acetone	67-02-1	0.3	0.09	J	0.1	0.02
Steric acid	216-99-2	0.3	0.08	0.1	0.05	
Benzyl alcohol	92-99-3	0.3	0.08	J	0.1	0.05
Thiophene	107-05-9	0.3	0.08	J	0.1	0.05
Indole (L-3,4-dihydro)	123-39-5	0.2	0.09	J	0.1	0.05

* Concentration is not performed on parameters with non-heterotic counts.

Eight Valleyуп Drive, Westborough, MA 01581-1211
859-884-6220 | Fax: 508-889-9233 859-423-0220
www.alphalab.com

Figure: Concentration Levels, ML : Dec 2018

Appendix - Contd.

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June 24, 2020

Permit Coordinator
Oil Remediation and Compliance Bureau
New Hampshire Department of Environmental Services
29 Hazen Drive, P.O. Box 95
Concord, NH 03302-0095

Subject: April 2020 Groundwater Management Permit Data Submitted, Dissolved Contaminant Plume Delineation Report, and 2020 Periodic Summary Report; Mr. Mike's Arctic, 74 Main Street, Antrim, New Hampshire (NHDES #198904114, LGST Project #0000794)

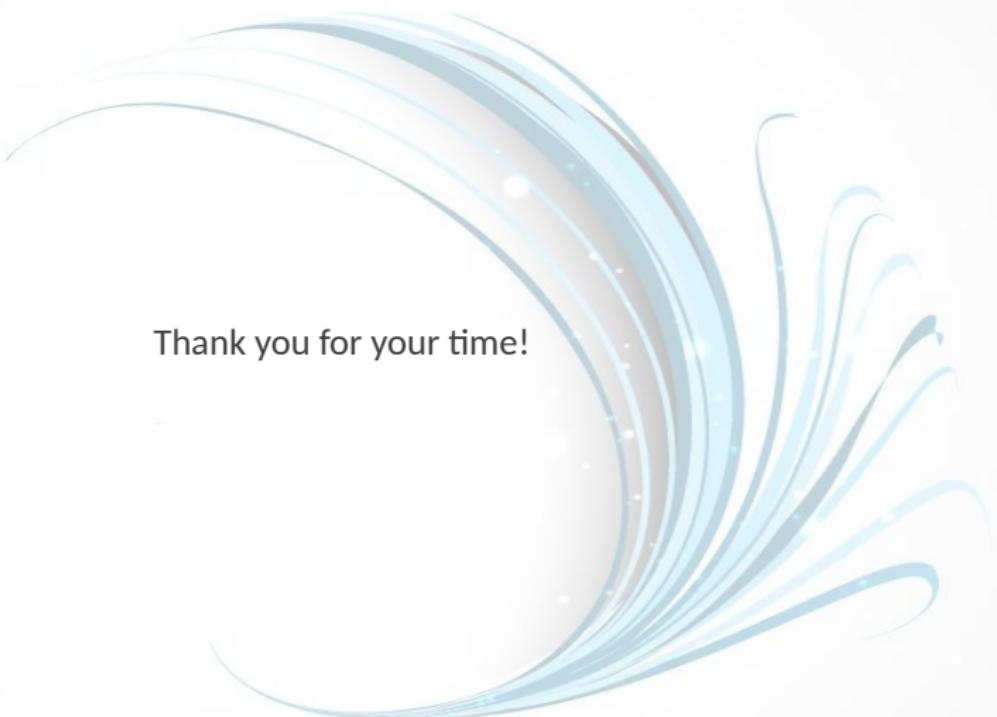
Dear Coordinator:

Groundwater sampling was completed at the Mr. Mike's Arctic site on April 9, 2020, following the expansion of the groundwater monitoring well network on March 11 & 18, 2020. This report contains the following three parts:

1. An April 2020 Groundwater Management Permit (GMP) Data Submittal, which includes site sampling results for three preexisting and one newly-installed onsite monitoring wells (MWS) and three newly-installed offsite MWS, located at adjacent properties to the north and south of the site;
2. A Dissolved Contaminant Plume Delineation Report, which includes a summary of recent monitoring well installations, as requested by NHDES in the April 23, 2019 reply letter to HGA's Supplemental Site Investigation Report, submitted January 26, 2019; and
3. A Periodic Summary Report, which includes a summary of groundwater quality data from the period 2017-2020, groundwater data trends, groundwater gradients, plume constituent distributions, human receptor information, an updated conceptual site model, and recommendations for further site activities.

Figure: Snapshot of the report submitted in June 2020, AN

This document presents a high-level overview. Details are available for review.



A large, stylized graphic in the background features several thick, curved lines in shades of blue, white, and light orange. These lines sweep from the top left towards the bottom right, creating a sense of motion and energy. Small, glowing white dots are scattered along the curves, resembling stars or particles.

Thank you for your time!