



MtBE Remediation Fund

Annual Report

FY 2016

Voices from the Public – New Hampshire Citizen Quotes

“Hello Deb. Thank you so much for your prompt service. All the folks in your department impressed me to the extreme.”

“On behalf of Little Falls Cooperative, Inc., I would like to take this opportunity to express our heartfelt thanks to you and many members of your MtBE organization... for your help in overseeing the project to connect our little community to City water in order to escape the MtBE contamination that had been present in our well water for several years. Your efforts on our behalf are very much appreciated. For at least five years we were unable to drink or even cook with our well water and relied on bottled water that your agency was nice enough to supply us. We are now connected to City water, and I can't tell you how satisfying it feels to actually turn on the tap and know we can safely use the water that comes out! Many, many thanks to you from the residents of Little Falls Cooperative, Inc.” Sherman Cody, Former President of the Little Falls Cooperative

“Thank you for sending two professional women out to collect a drinking water sample from my well.”

“Deb - thank you so much for the very quick response on the water testing... If you are overseeing this project you deserve a high-five.”

“Upon learning that I worked at NHDES, I was cornered by a citizen... He was so grateful to the MTBE bureau for the work they are doing that he wanted to thank me... even though I told him I'm not in that particular bureau. He didn't mention any names but was excited to know that his well was free of contaminants. Keep up the good work MTBE folks!”

When the news of tank removal funding reached an owner, the response was: “Halleluliah! Thank you. It was brought up at the annual state inspection on Wednesday.”

MtBE Remediation Fund Annual Report

Prepared by
Gary Lynn, *Administrator*
MtBE Remediation Bureau

Thomas S. Burack, *Commissioner*
Clark Freise, *Assistant Commissioner*
Michael Wimsatt, *Director, Waste Management Division*

September, 2016



29 Hazen Drive, Concord, NH
des.nh.gov

Table of Contents

Executive Summary.....	iv
Introduction.....	1
Establishment of the MtBE Remediation Bureau.....	3
Progress on Workplan Elements.....	4
Program Financial Status.....	11

APPENDICES

A-1: Case History – Richmond Four Corners.....	15
A-2: Case History – Derry Sampling District.....	17
A-3: Case History – Little Falls Cooperative Mobile Home Park.....	19
A-4: Case History – Town of Plaistow Fire Suppression System Conversion..	20
A-5: Case History – Underground Storage Tank Removal Program.....	21
A-6: Case History – MVRF Release Prevention Program.....	23

EXECUTIVE SUMMARY

The New Hampshire Department of Environmental Services (NHDES) established the MtBE Remediation Bureau in 2014. The new bureau completed its first full year of operation in 2015 and was fully staffed for the first time during FY 2016. Although it would be impractical to summarize all activities that occurred in fiscal year 2015, program highlights are provided below to illustrate the breadth of Bureau accomplishments.

The MtBE Remediation Bureau is actively implementing permanent solutions to MtBE-contaminated water supplies. Typically, the options for permanent solutions involve the construction of additional water infrastructure such as the extension of water lines, the development of water supplies, water supply treatment or the installation of wells for replacement of MtBE-contaminated water supply wells. During FY 2016, the MtBE Remediation Bureau completed its first water line extension project from Rochester's water system to the Little Falls Cooperative. Little Falls Cooperative's MtBE-contaminated water supply wells are ready for decommissioning and the 30 homes are now connected to the City of Rochester's water system. There are four additional water line extension projects in the design phase – located in Atkinson, Derry, Epsom and Windham. These four projects involve several additional miles of water line that will be added to Derry's, Epsom Village District's and Pennichuck Corporation's existing water systems, respectively, and will connect dozens of users of contaminated water supplies to safe, regulated water systems.

MtBE Remediation Bureau infrastructure-related projects also include the installation of new wells to replace contaminated water supply wells. MtBE Remediation Bureau is assisting with the installation of water supply wells in Dover and North Conway. In Dover's case, an MtBE-contaminated, large-scale production well is being taken out of service and replaced with a new well in a more protected portion of the same aquifer. MtBE Remediation Bureau is paying for the project through the construction of the pump house and connection to the water system and has already funded pump testing and permitting activities. In North Conway, the existing production well was destroyed by Hurricane Irene and the replacement well needs to be relocated farther from the river. The MtBE Remediation Bureau is providing funding to help ensure that an existing MtBE plume will not impact the replacement water supply well. In addition to these infrastructure projects, additional projects are in the feasibility stage in Plaistow, Chester and Lee.

The drinking water supply sampling program has been very active this year and supports all other MtBE Remediation Bureau program efforts by providing information on the extent and occurrence of MtBE contamination. This information is useful in defining the scope of water line extensions, investigating the extent of groundwater contamination and determining the need for water supply well treatment. To date, approximately 3,100 water supplies have been sampled. MtBE has been detected in approximately 564 water supply wells by the sampling program. The sampling program has also developed information regarding the leaching of high levels of MtBE and TBA from new PEX plastic pipe. MtBE and TBA are manufacturing byproducts of the polymerization initiator (the initiator starts the reaction that forms the plastic). Data in the literature document this phenomenon but additional data collected by our program revealed that longer-term impacts can occur with plumbing that is not flushed. California data on heavily flushed plumbing revealed high contamination levels for a relatively short period of time (90 days). The MtBE Remediation Bureau's data indicate that plumbing containing stagnant water, such as that in new, unoccupied homes, remains contaminated for significantly longer time periods.

The MtBE Remediation Bureau has completed a number of large scale remedial projects. In total, more than 10,000 tons of contaminated soil was removed from sites in Boscawen, Chichester, Conway, Dover, Exeter, Laconia, Portsmouth and Richmond. In addition to remedial projects, a number of investigations have been completed, including delineation of a MtBE-contamination plume in an area that was under consideration as a potential water supply source (i.e., the Mountain Lake Water District).

The prevention program seeks to prevent and reduce MtBE threats to New Hampshire aquifers. The two major classes of gasoline releases that are currently being addressed under this program are underground storage tank

and motor vehicle recycling facility (MVRF) releases. Underground storage tank releases are the largest single source of MtBE contamination in New Hampshire. To address underground storage tanks, the MtBE Remediation Bureau has developed an underground storage tank removal program that is designed to remove higher-risk tanks and to expedite investigation of releases. To date, 197 tanks have been removed. The average age of the tanks that have been removed is approximately 28 years and many of the tank systems had failed tank system components or higher-risk single-wall piping or tank. Tank system manufacturers provide 20 to 30 year limited warranties for tanks. The warranty period and a variety of studies on tank system releases indicate that a 28-year-old tank is at the end of its useful life expectancy. Removal of these older tanks before releases occur is a highly cost effective and prudent aquifer protection measure.

The tank removal program has benefits beyond release prevention. Removal of tank systems has facilitated a number of large-scale remedial cleanups where previously inaccessible MtBE-contaminated soil continued to serve as a source of groundwater and soil vapor contamination. The resultant removal of residual contamination sources created reinvestment and resale opportunities at a number of properties. The Town of Richmond, for example, is receiving cleanup assistance for the tax-deeded former Richmond Four Corners gasoline site, which will help put the property back into productive use and back on the municipal tax roll.

The MVRF release prevention program is working actively with the Automotive and Truck Recycling Association of New Hampshire to reduce gasoline releases. To date, 60% of all active, licensed MVRFs have applied for inclusion in the release reduction program. MtBE Remediation Bureau program has provided spill prevention equipment to 75 of the MVRFs. This is a large percentage of the most active facilities and should help to significantly improve existing practices and reduce gasoline releases. In addition to the purchase of spill prevention equipment, MtBE Remediation Bureau has developed a concrete spill containment pad installation program. About one third (31 facilities) of the active MVRF in New Hampshire are participating in this program. The spill containment pads are being installed in areas used for gasoline transfers, car dismantling or gasoline storage. The concrete pads are being located in the most active portions of the MVRFs and before installation of the pads, existing gasoline contamination issues, if any are identified, are addressed. As a result, the projects combine investigation, remediation and release prevention activities as appropriate.

Approximately \$7 million of funds have been expended this fiscal year and an additional \$3 million in work scopes have been approved. This work is either currently in progress or completed (and for which invoices are outstanding and awaiting submittal to the MtBE Remediation Bureau). This is a substantial increase from the previous fiscal years. Program assistance has spanned the entire state. Figure 1 graphically depicts the geographical locations of the assistance that has been provided to date plus a limited number of locations that will be assisted during the remainder of 2016.

Figure 1 MtBE Remediation Bureau Assistance Project Locations

Through FY 2015

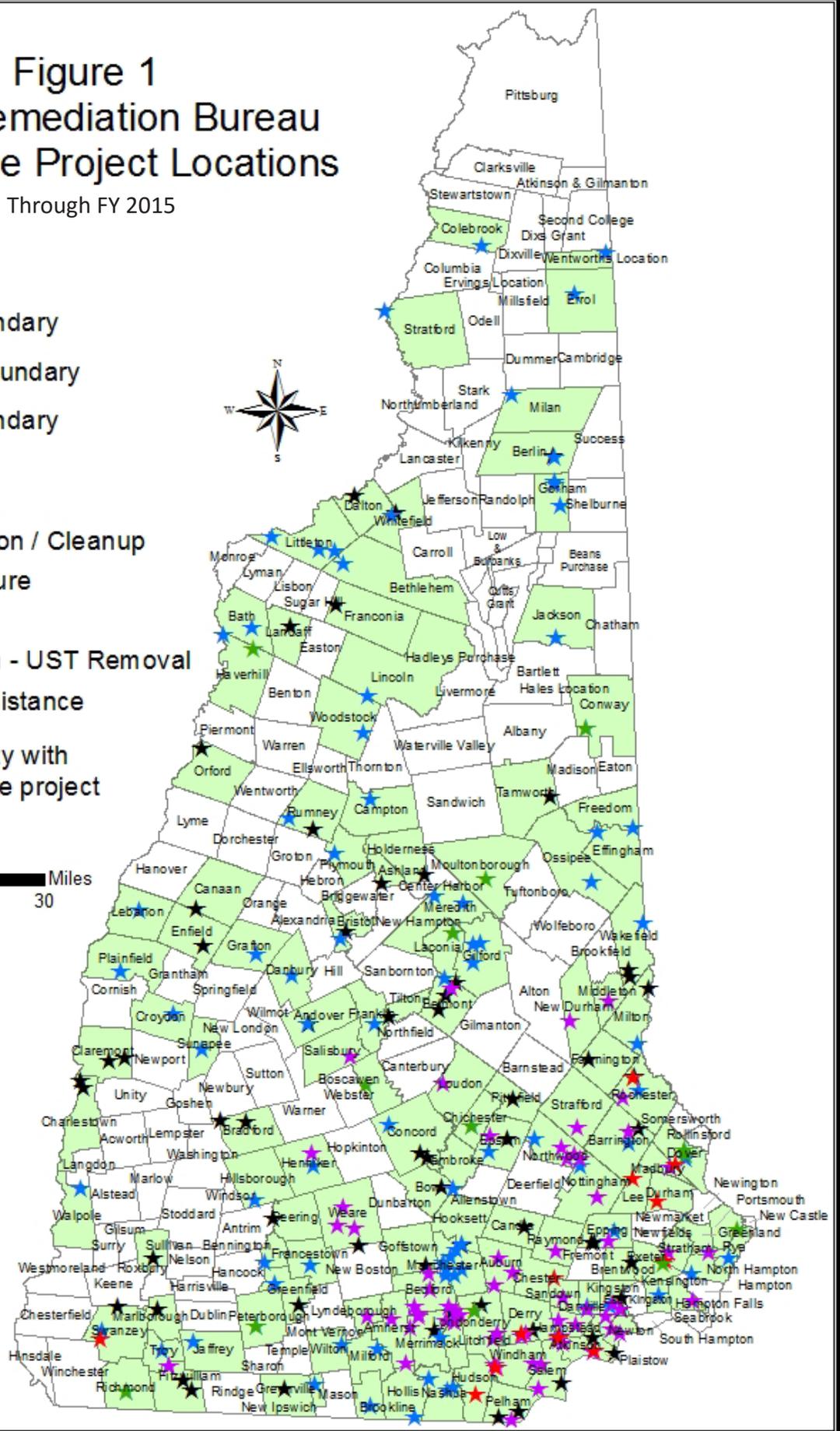
Legend

-  Town Boundary
-  County Boundary
-  State Boundary

Project Type

-  Investigation / Cleanup
-  Infrastructure
-  Sampling
-  Prevention - UST Removal
-  MVRF Assistance
-  Municipality with at least one project

0 5 10 20 30 Miles



INTRODUCTION

In 2003, the New Hampshire Department of Justice (DOJ) sued several refiners and suppliers of gasoline seeking damages for the statewide problem of methyl-tertiary butyl ether (MtBE) contamination. The State settled with all but one of the defendants. After deductions from the settlement payments for eligible legal fees and other costs, the court-ordered settlements set aside \$81,630,000 for remediation of MtBE contamination. In 2013, DOJ went to trial against ExxonMobil Corporation, the remaining defendant. In April 2013, after three months of trial, the jury awarded the State of New Hampshire \$236,372,644, plus pre-judgment interest. On October 2, 2015, the New Hampshire Supreme Court affirmed the jury verdict and later rejected ExxonMobil's motion to reconsider the Court's ruling. ExxonMobil filed a petition for writ of certiorari with the U.S. Supreme Court on January 20, 2016. The U.S. Supreme Court denied the petition in an order that was released on May 16, 2016. In June of 2016, ExxonMobil Corporation deposited \$307,174,716.28 into the New Hampshire Drinking Water and Groundwater Trust Fund (Trust Fund), which was established by SB 380 for this express purpose. Immediately following the deposit, 10% of the award was transferred to the State's revenue stabilization account, in accordance with State law, leaving \$276,455,444.60 in the Trust Fund.

The Trust Fund was established this legislative session by Senate Bill 380. The settlement funds are managed separately from the newly-created Trust Fund under the terms of the settlement agreements. Since these two types of funds are managed separately and under different frameworks, this annual report will not discuss funds obtained from the ExxonMobil litigation in any further detail.

The Governor and Executive Council and the Fiscal Committee of the General Court in 2013 authorized a \$22,316,661 budget using the MtBE settlement funds for the remediation of MtBE contamination for the biennium ending June 30, 2015. The spending authorization was amended in August 2015 and December 2015 to extend the end date for that budget until June 30, 2017. During the June 2016 fiscal committee meeting, additional funding was approved for fiscal year 2017.

The appropriation included allocation of funds and approval of staffing to implement the program. Eligible assistance activities discussed in the request included:

- Installation and improvement of public water supply infrastructure in areas having significant MtBE contamination.
- Investigation and remediation of existing contamination.
- Testing at-risk private water wells.
- Implementation of measures to prevent further MtBE contamination.

The New Hampshire Department of Environmental Services (NHDES) and DOJ developed a Memorandum of Understanding (MOU) outlining an interdepartmental approach to the expenditure and administration of the funds. The MOU between NHDES and DOJ calls for the preparation of an annual report and submittal of the report to the Fiscal Committee, Governor and Executive Council, and House and Senate Leadership. This report has been prepared to satisfy that requirement and summarizes work completed to date relative to the execution of NHDES' Implementation Plan approved by the Attorney General's Office in 2014, following extensive public input.

Challenges and Methods for Identifying and Mitigating MtBE Impacts To Groundwater

MtBE does not readily biodegrade and is very persistent in New Hampshire drinking water aquifers. Although MtBE has not been a component of gasoline sold in New Hampshire gasoline since the effective date of the State's January 1, 2007 MtBE ban, it is still commonly found in our groundwater.

MtBE is a potential carcinogen and causes objectionable taste and odor in drinking water when present at high concentrations. Reduction of MtBE concentrations in our aquifers is a priority due to its prevalence and harmful

properties. MtBE remains the most common non-naturally occurring contaminant in drinking water supplies in New Hampshire. A 2005 study conducted by the United States Geological Survey (USGS) and NHDES in Rockingham County found MtBE present in detectable concentrations in 40% of public wells tested and in 21% of private wells (J.D. Ayotte, Argue and McGarry, 2005). A follow-up study, published in 2008, confirmed that MtBE contamination of public and private wells is a statewide problem (Joseph D. Ayotte et al., 2008). More recently, based on sampling conducted by NHDES in 2014 and 2015, MtBE was found in approximately 18% of samples collected from over three thousand drinking water wells.

NHDES and USGS are also jointly investigating the current statewide occurrence of MtBE in New Hampshire drinking water. This ongoing USGS-led study returns to a subset of the 340 drinking water wells that were randomly tested by USGS approximately a decade ago. One hundred and ninety-five of the original, randomly-sampled wells were resampled. The resampling effort detected a statistically significant decline in the frequency of detection of MtBE (originally over 20% with detections). However, MtBE was detected a decade after the originally testing program in a staggering 10% of the 195 randomly-selected drinking water wells. The results of that study will be used to develop information on contamination trends in overburden and bedrock aquifers. Tentative results indicate that New Hampshire's relatively cold bedrock aquifers are very slow to cleanup. The final USGS report, or a link to the report, will be posted on the NHDES webpage when it is released by USGS.

There are approximately 600 known MtBE sites and a significant number of potential, currently undiscovered sites in New Hampshire (see Figure 2). Based on a review of data for the known sites, the most common source of the most serious MtBE contamination problems are releases from underground storage tanks (USTs) and the related tank systems. Less important but significant, are gasoline releases from auto salvage operations (during gasoline transfers or storage). UST releases are typically identified during closure of the tanks and piping or during environmental investigations prompted by property acquisitions. As a result, there may be UST releases

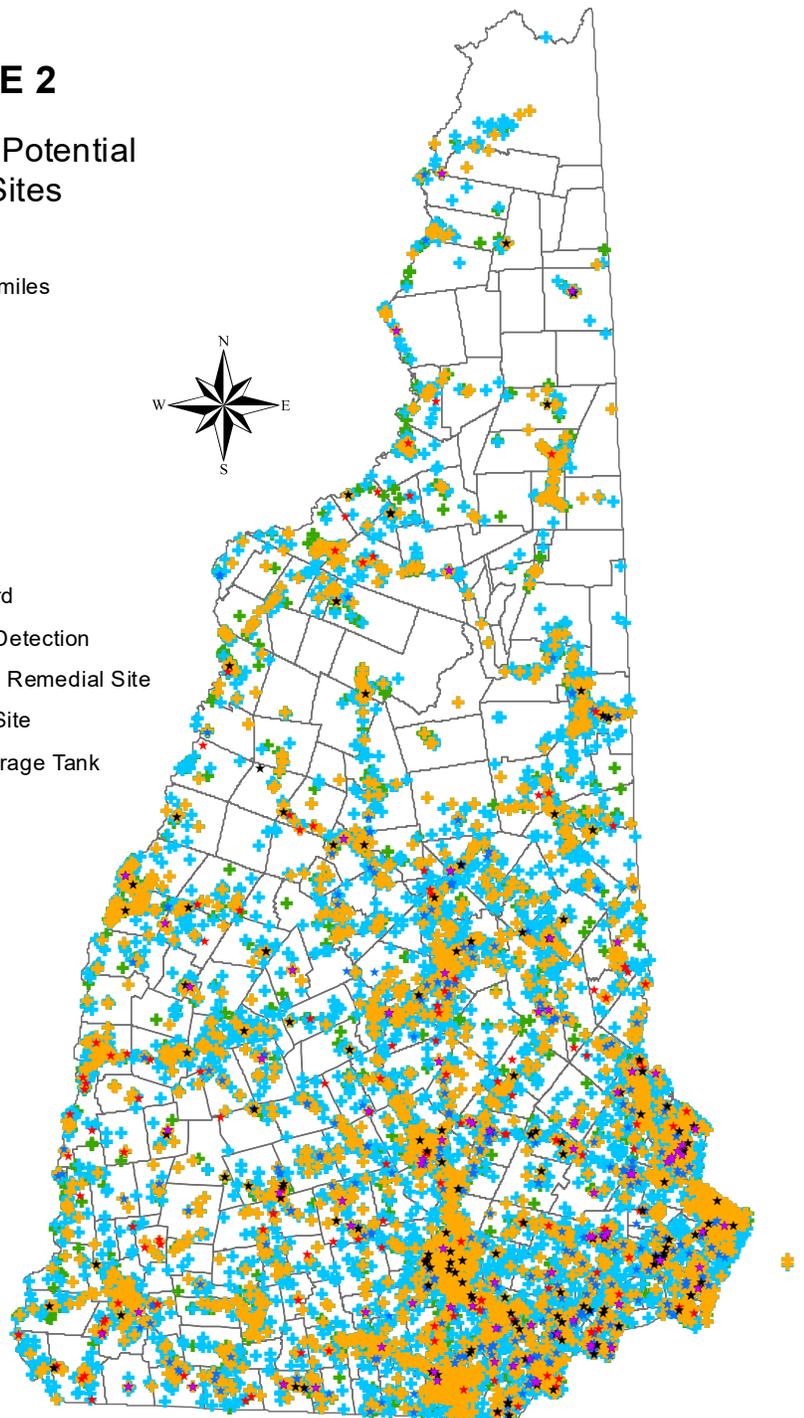
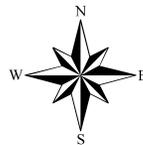
FIGURE 2

Known and Potential MtBE Sites

1 in = 18 miles

Legend

-  Town Boundary
-  High Priority Site
-  Priority Site
-  Auto Salvage Yard
-  PWS with MtBE Detection
-  Gasoline Related Remedial Site
-  Other Remedial Site
-  Underground Storage Tank



that have not been identified at facilities that are still in operation and under long-term, stable ownership. Routine NHDES inspections of operating tank systems and pending closures of outdated tank systems over the coming years may reveal additional gasoline release sites. Discovery of sites and cleanup of existing sites is a priority for protection of New Hampshire aquifers. These sites typically contain subsurface areas of gasoline-contaminated soil. This soil contamination slowly leaches out MtBE and other gasoline contaminants into groundwater. Restoration of the impacted aquifer is accelerated by the removal of this ongoing source of groundwater contamination.

Further complicating the problem is the presence of old gasoline containing MtBE. If this gasoline is not properly managed, additional MtBE can be released to New Hampshire aquifers. Old gasoline is present in junked cars that have not been used since 2007 or in inactive underground storage tanks. Motor Vehicle Salvage Yards end up managing cars with old gas. In addition, in practically every community in the state there are locations where old cars have been abandoned, as well as unlicensed “junkyards” where old vehicles are stored without having their fluids removed. There are also a surprising number of underground storage tanks still in the ground and containing pre-2007 gasoline. These tanks exist at former retail gasoline stations that were shut down due to low profit margins, many were converted to auto sales or repair businesses. Changes made to the underground storage tank rules in September, 2013 made it illegal to keep single-wall tank systems in temporary closure indefinitely. To ensure compliance with the rule change and to address the threats posed by substandard tanks in temporary closure, NHDES has worked to identify out-of-service storage tanks and, when appropriate, facilitate their removal.

MtBE impacts to New Hampshire’s groundwater are numerous and varied. Addressing these impacts and preventing further degradation of groundwater quality requires a variety of approaches that need to be implemented in concert. To that end, NHDES has established the MtBE Remediation Bureau to identify, investigate, remediate and mitigate the effects of past and potentially on-going releases of MtBE-containing gasoline and to reduce the potential for further releases of MtBE-containing gasoline to the environment. The MtBE Remediation Bureau is staffed with professional engineers, geologists and scientists who are working together to implement a comprehensive MtBE corrective action work plan.

ESTABLISHMENT OF THE MtBE REMEDIATION BUREAU

The MtBE Remediation Bureau was established in April, 2014, and the Bureau achieved full staffing by September, 2015. At this point in time, all necessary contracts are in place and the associated claims and payment processes are fully operational. The following sections discuss the overall progress that has been made in the development and implementation of programs to address MtBE contamination in New Hampshire since establishment of the Bureau.

Program Essentials – Reimbursement Process

The MtBE Remediation Program site investigation, remediation and prevention efforts rely heavily on the reimbursement of environmental consultants and contractors who work directly for facility owners. This process leverages business and private sector resources to accomplish more than could be completed solely with program resources and contracts. The reimbursement system has been operational for over a year and approximately six million dollars in claims have been paid. The reimbursement model has proven highly successful and efficient for the new program and closely tracks the experiences of the State’s existing Oil Discharge and Disposal Cleanup Fund (ODD Fund).

Program Essentials - Contracts

The MtBE Remediation Program has all necessary contracts in place. These include contracts for laboratory services, environmental consultants, installation of water treatment systems, spill response/underground storage tank

removal and a USGS cooperative assistance agreement. A brief discussion of each of the contracts follows.

NHDES has existing five-year contracts with three of the leading emergency response services providers (Clean Harbors, Cyn Environmental and National Response Corporation) in northern New England for field work related to the cleanup of spills and releases of contaminants. These contracts have been amended to facilitate use of MtBE Settlement Funds to remove underground storage tanks and clean up MtBE contamination. Contract amendments for the existing Emergency Response contracts were approved by Governor and Executive Council at their October 1, 2014 meeting. Additional funding was added to these contracts in August 2015 to meet the high demand for the removal of potentially leaking underground storage tanks (approved by G&C on August 26, 2015).

A laboratory services contract to support a private water supply well sampling and analysis program for identifying and monitoring MtBE-impacted water supplies was put into place in 2015. The laboratory contract bidding process yielded a contract with an in-state laboratory that secured highly competitive pricing for VOC analysis and pickup of samples from the state offices. The contract was rebid in 2016 and Nelson Analytical of Manchester, NH will continue to provide the contract laboratory services.

NHDES amended its existing contract with Secondwind Environmental to facilitate use of MtBE Settlement Funds for expedited installation and service of point-of-entry (POE) water treatment systems associated with MtBE-impacted drinking water supply wells.

The MtBE Remediation Bureau secured two environmental consulting service contracts in 2015. Nobis Engineering of Concord, New Hampshire is providing services related to the investigation and remediation of MtBE-contaminated sites and Weston Sampson Engineers Inc. (Portsmouth office) is providing services related to the design and construction of drinking water infrastructure.

NHDES and USGS have developed a joint agreement for a statewide study of the extent of MtBE contamination and the longevity of MtBE contamination in overburden and bedrock aquifers in New Hampshire. The agreement leverages matching federal funds and USGS staffing resources, and was approved by G&C on January 28, 2015.

Public Outreach

The DOJ/NHDES MOU included the development of a detailed implementation plan, which was finalized after extensive input from the public on MtBE settlement fund-eligible activities and programs. Outreach efforts continued in 2015 and 2016, including presentations and/or meetings with the New England Water Works Association, NH BIA's Consultant's Day, NH BIA's Water Resources Conference, NHDES' Source Water Protection Conference, Automotive and Truck Recyclers Association, National Society of Professional Engineers, and meetings with municipal and state officials.

PROGRESS ON WORKPLAN ELEMENTS

The Implementation Plan describes an integrated approach to addressing the MtBE challenges that were discussed in the previous sections of this report. The four main elements of the work plan are:

- Installation and improvement of public water supply infrastructure in areas having significant MtBE contamination.
- Investigation and remediation of MtBE contaminated sites.
- Testing at-risk private water wells.
- Implementation of measures to prevent further MtBE contamination.

Integration of all of the plan elements is important to improving the overall effectiveness of the program. Remov-

al of underground storage tanks is a prevention-related project that also facilitates remediation and investigation efforts. Sampling of water wells is an effective tool for assisting with potential MtBE related infrastructure projects. The sampling effort helps define the extent of contamination associated with a contaminated site and assists in determining the scope of any water line extension project that might be necessary to address MtBE-impacted supply wells. Extension of water lines is a preferred, permanent solution to addressing contaminated drinking water supply wells. In many cases, connection to water distribution systems can be the best and most cost effective overall solution to addressing a high risk contaminated site. The following sections describe each standard work-plan element. It is important to note that the integrated nature of the program magnifies the benefits of the individual plan elements.

Site Investigation and Remediation

Gasoline-impacted soils in contact with the water table create long-term sources of MtBE contamination of aquifers because the contaminants slowly and continuously leach from the contaminated soil into the surrounding groundwater. When this contaminated groundwater flows away from the gasoline release site, nearby water supplies and additional portions of the aquifer become contaminated. To minimize impacts from gasoline releases, the timely identification, investigation and remediation of gasoline-contaminated soil (i.e., source areas) is essential. In fact, the most cost-effective method of minimizing the total amount of MtBE released to New Hampshire's aquifers, after prevention of the spill in the first place, is the removal of contaminant source areas. This is because it is easier and less expensive to address a relatively small volume of contaminated soil than an enormous volume of groundwater.

Removal of source areas immediately reduces the release of high concentrations of contaminants into the aquifer. This allows the concentration of MtBE and other contaminants to more rapidly attenuate over time as a result of dilution and microbial degradation. The process of reducing the contamination in the aquifer by these attenuation processes cannot truly begin until the ongoing release of contamination from source areas is mitigated. Biodegradation is a very slow process for MtBE, which is why minimization of the amount of MtBE released into New Hampshire aquifers is a crucial part of NHDES' approach to remediation of MtBE impacts to New Hampshire's groundwater resource.

To accomplish this objective, the MtBE Remediation Bureau funds:

- Soil boring and soil sampling programs to delineate source areas.
- Monitoring well installation and investigative activities to define the extent of groundwater contamination.
- Drinking water well sampling.
- Removal of underground storage tanks to facilitate remediation.
- Remediation of contamination.



Photo of contaminated soil excavation at TDL Gas and Foods in Dover.

To date, NHDES has completed remedial projects in Boscawen, Chichester, Dover, Exeter Laconia and Richmond. These projects typically involved the removal of underground storage tanks and contaminated soil that was inaccessible prior to tank system removal. Approximately 10,000 tons of highly-contaminated soil has been removed and properly disposed. It is noteworthy that all of the remedial projects were completed at sites that were also eligible for one of the State's petroleum reimbursement funds and that the clean-ups had the added benefit of reducing the State's long-term liabilities under those funds.

The project case study of the Richmond Four Corners Store (see Appendix A-1) describes a site that involved many of these measures.

Identification of Impacted Private Water Supply Wells – Private Well Sampling

Based on a review of the existing New Hampshire data on MtBE occurrence, it has been estimated that 10% of all private drinking water wells in New Hampshire are contaminated with MtBE. Further, approximately 1% to 2% of all private drinking water wells are estimated to be above the state drinking water standard. Additional contaminated water supplies will likely be discovered as additional property is developed, commercial and industrial properties are transferred to other parties, unlicensed junkyards are discovered, additional water supply wells are installed as part of property development, and “end of life” tank systems are removed or replaced. To reduce public health impacts from MtBE in drinking water, it is essential to identify the impacted water supplies. The sampling program seeks to accomplish this important task.

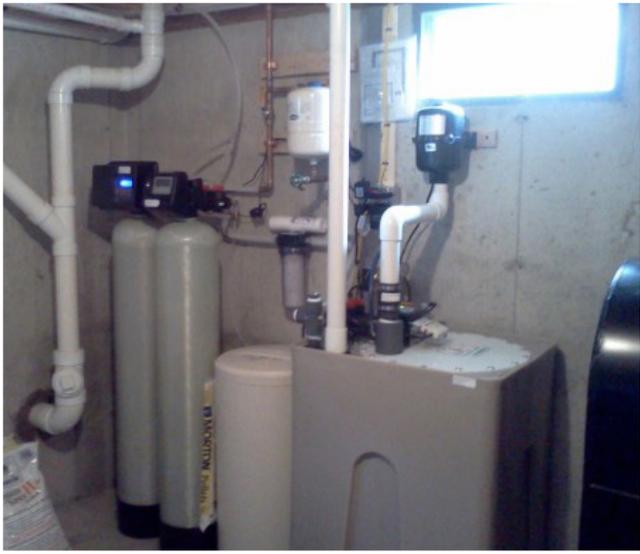


Photo of water treatment system that addresses complex MtBE contamination issues.

Public water supplies are routinely monitored and the monitoring results are provided to NHDES on a quarterly basis. Private drinking water wells are not routinely tested and, if testing is conducted, volatile organic contaminant analysis that would identify MtBE contamination is rarely performed. The sampling program fills this void by collecting and analyzing drinking water supplies in high MtBE risk settings.

To identify water wells that are at risk for MtBE contamination, NHDES uses information available in the state’s geographic information system (GIS) and contaminated sites database. In the analysis, areas that are at risk for MtBE contamination are prioritized based on the existence of known or potential sites located within close proximity to the water supplies. The density and proximity of the water supplies are factored into the analysis. NHDES reviews the GIS data and then establishes sampling districts. After the preliminary sampling district has been established, NHDES discusses the sampling district and program with

municipal officials before sending out letters requesting voluntary participation in the sampling program. If property owners do not respond to letters and are in a particularly high-risk area, NHDES will attempt to contact the property owner by telephone or make a neighborhood visit to explain the program and existing information available about MtBE risks. As soon as the sampling analytical results become available, the results are forwarded to the property owner. If MtBE is above Ambient Groundwater Quality Standards, NHDES immediately contacts the property owner and collects a confirmation sample. Following confirmation of an MtBE impact above the Ambient Groundwater Quality Standard, NHDES offers the property owner bottled water and the subsequent installation of a point-of-entry treatment system. If public water infrastructure is nearby and an extension of a water line is cost-effective, MtBE Remediation Bureau will pursue connection to the water system.

As of the end of FY 2016, sampling districts have been created in 39 municipalities. Table 1 summarizes the data collected from these sampling districts. It is noteworthy that the MtBE Remediation Bureau’s sampling program is detecting a MtBE-contaminated water well approximately every day and a water well that exceeds Ambient Groundwater Quality Standards every month. Treatment systems have been installed whenever requested by the property owners with water wells with contamination exceeding the State’s ambient groundwater quality standards. NHDES also detected a water supply in Nottingham believed to be impacted by leaching of high levels of MtBE and TBA from new PEX-a tubing. NHDES provided bottled water and sampling services to the impacted homeowner while the source of the contamination (tubing rather than a nearby gasoline release) was being investigated.

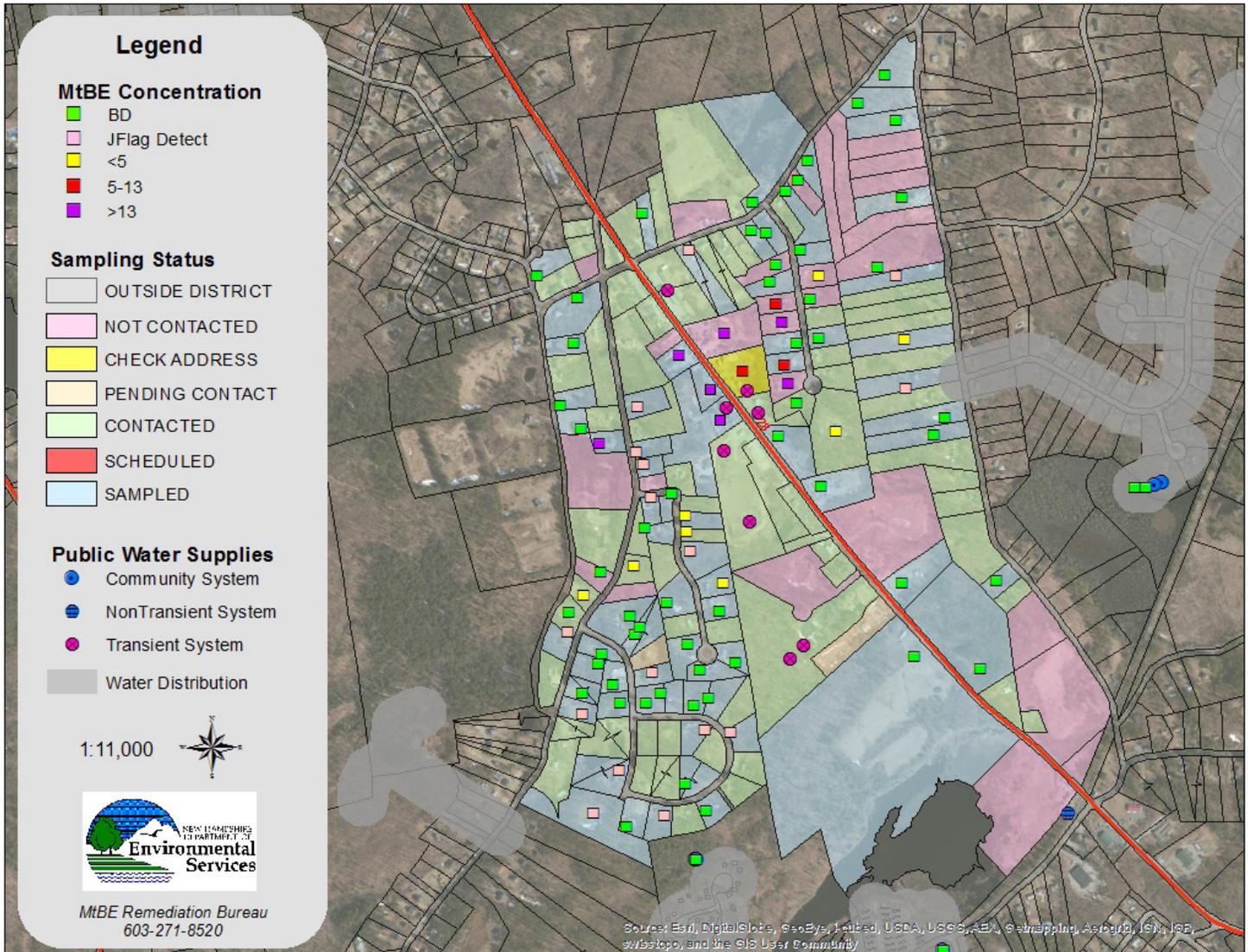
Table 1 – MtBE Detections in Water Supply Wells

Town	Invited to Participate	Scheduled for sampling	Sampled & Analyzed	MtBE < AGQS	MtBE > AGQS	Participation Rate
Amherst	239	7	101	7		76.6%
Atkinson	168		101	23		60.7%
Auburn	132		61	5		47.0%
Barrington	122	1	88	5		73.0%
Bedford	690	6	386	34		71.0%
Belmont	50		26	4		56.0%
Danville	166	1	88	31	1	55.4%
Derry	183	1	103	29	4	60.1%
Epping	41		15	6		36.6%
Epsom	73		20	7		28.8%
Fitzwilliam	8	1				12.5%
Hampstead	129		73	17		57.4%
Hampton Falls	38		16	3		44.7%
Henniker	16		10	4		62.5%
Hollis	25		12			100.0%
Kingston	256		109	24		44.5%
Litchfield	406	2	267	62		98.5%
Londonderry	159		99	13	1	65.4%
Loudon	214	8	85	18		43.5%
Madbury	81		58	6		72.8%
Manchester	30		16	4		90.0%
Merrimack	102	3	46	4		82.4%
Middleton	72	1	35	8	1	51.4%
Mont Vernon	162		111	9		70.4%
New Durham	105		48	11		45.7%
Newton	313	4	149	36		49.2%
Northwood	301		167	42		56.5%
Nottingham	204		103	7	1	52.9%
Pelham	86		33	9		38.4%
Plaistow	214	2	98	31	1	48.1%
Rochester	79	2	42	1		55.7%
Salem	159	12	67	10		59.7%
Salisbury	71		42	7		59.2%
Sandown	112		64	5		59.8%
Strafford	77	2	28	10		39.0%
Stratham	179		79	14		50.3%
Troy	4					0.0%
Weare	313	6	128	14		42.8%
Windham	271		112	33		50.6%
Totals	6050	59	3086	555 (18%)	9	59.6%

Table 1 illustrates the very high level of participation (60%) in this voluntary sampling program. It should be noted that the participation rate has been adjusted to take into account samples that have been collected but not yet analyzed and also situations in which multiple homeowners are connected to the same well.

To illustrate the typical scope of a sampling district, Figure 3 below depicts the Derry sampling district. Additional information on the Derry sampling district is contained in the case study in Appendix A-2.

Figure 3 - Derry Sampling District



Permanent Solutions for Contaminated Water Supplies

Immediate response actions taken to address drinking water contamination typically involve provision of bottled water and eventually the installation of point-of-entry treatment (POE) systems. These solutions require constant attention and maintenance. The cumulative costs to maintain POEs are significant and there are contaminant exposure risks if the POEs are not properly maintained or when water use patterns change significantly. As a result, POE installation and provision of bottled water are not the preferred long-term solutions to water quality problems. To ensure that permanent solutions to contaminated water supplies are implemented whenever feasible, NHDES has established a program that assists with the extension of public water supply lines to contaminated properties or the improvement of public water infrastructure when it is cost-effective and necessary to address MtBE contamination problems.



Water line installation at the Little Falls Cooperative in Rochester.

In some cases, a public water system may be contaminated with MtBE. The solution to the contamination may be the installation of a treatment system, interconnection of the public water system to another system, or the installation of an alternative water supply well. NHDES is evaluating all known MtBE-contaminated water supplies to determine whether it is appropriate to implement a permanent solution involving water distribution system expansion or development of other water supply infrastructure.

There are twelve drinking water supply infrastructure projects currently under evaluation, in process or completed. These projects include five water line extension projects, two municipal supply well replacement/relocation projects and five feasibility studies associated with water distribution system conversion/expansion projects. Four of the five water line extension projects are in the design process (Waterhouse Country Store site in Windham, Atkinson Sunoco site, Epsom Traffic Circle and the Kershaw site in Derry). A water line extension to address the Little Falls Cooperative Mobile Home Park contaminated water supply wells has been completed and 30 homes are now connected to the Rochester public water system.

In addition to the five water line extension projects discussed above, the MtBE Remediation Bureau is assisting the city of Dover with the replacement of its Griffin Well. The Griffin Well is contaminated with MtBE that originates from the Madbury Metals recycling facility. The recently-completed phase of the Griffin Well replacement project is the construction of a new test well and completion of a pump test at the replacement well location. This successfully-completed phase will be followed up with permitting, design and construction phases. In North Conway, the water district would like to replace a water supply well that was damaged during a flood. Unfortunately, the new location is much nearer to an existing MtBE contamination plume. The MtBE Remediation Bureau has agreed to fund a pump test and groundwater sampling to determine whether the new well location will alter the existing MtBE contamination plume and threaten the new water supply.

The remaining five projects are feasibility studies. The largest of these is in Plaistow, examining the cost and suitability of conversion of Plaistow's fire suppression system into a potable water system. Plaistow's fire suppression system serves the area that is highly-impacted by MtBE contamination originating from the former Plaistow Lido station. Conversion of the fire suppression system would allow NHDES to terminate the operation of a large number of point-of-entry treatment systems installed on individual water supplies. Water line extension feasibility studies are also being completed to determine whether it is feasible to extend a water line to MtBE-contaminated properties at the Lee traffic circle and for sites in Stratham and Swanzey. A feasibility study is being conducted in Chester to evaluate the creation of a water system to address contamination in the vicinity of the LeClair's Junkyard.



Ledge probes for the Windham water line extension.

Project case studies for the Little Falls Cooperative project and the Town of Plaistow project are provided in Appendix A-3 and Appendix A-4, respectively.

Prevention

Identification and Removal of Underground Storage Tanks

To address undetected UST gasoline releases and facilitate more effective site investigations and remedial actions at existing sites, the MtBE Remediation Bureau developed a UST removal program that targets removal of the worst of New Hampshire's underground storage tank systems (older tanks, tanks not in service, high-risk single wall systems, facilities ceasing operations and other tank systems considered to represent a risk for MtBE release to groundwater). This program helps expedite the removal of tank systems that represent a potential source of ongoing or future releases and also provides a means to assist facility owners who have limited financial capacity to complete the necessary tank removals and reduce the risk of potentially costly releases.

Implementation of the UST removal program creates opportunities to:

- Remove leaking tank systems.
- Investigate past releases.
- Remove or otherwise remediate contaminated soil.
- Remove substandard UST systems before a release occurs.

To date, NHDES has removed 197 underground storage tank systems by using the State of New Hampshire's tank removal contract or via private contractors working under the reimbursement process, and approximately 10,000 tons of contaminated soil was removed during these projects.

The average age of tanks removed by the program is 28 years and the majority of the tank or piping systems that were removed were the more leak-prone single wall systems. A number of the double wall tanks that were removed were in temporary closure due to the failure of one of the tank system walls. The interest in UST removal projects is high and NHDES is actively scheduling additional UST system removals for 2016. UST removals typically take place during the construction season due to the difficulty of removing tanks and repaving during the winter. As part of the efforts to address underground storage tank issues via this program, NHDES has reached out to municipalities and other state agencies that have obsolete and potentially leaking tank systems. To date, tank removal and/or remedial assistance has been provided to the towns of Meredith, Pembroke and Plainfield and the cities of Exeter and Nashua. NHDES has also removed or provided reimbursement for the removal of underground tanks on behalf of the New Hampshire Department of Safety, Marine Patrol Division and New Hampshire Department of Transportation.



50s vintage dispenser, post removal.



Tank top uncovered during UST removal.



Tank that was buried under the water table after controlled float out of the excavation.



USTs prior to removal from the tank graves.



Motor Vehicle Recycling Facility Spill Prevention Assistance

In the early part of the last decade, NHDES reviewed the locations of licensed Motor Vehicle Recycling Facilities (MVRF) and their proximity to private drinking water supply wells. Water supply wells in close proximity to MVRFs were sampled on a voluntary basis. A high percentage of the MVRF in environmentally-sensitive settings were found to have impacted drinking water wells. NHDES manages several dozen MVRF-related MtBE contamination sites, a number of which were discovered during this initial sampling program. Several of these sites have caused widespread private well MtBE contamination.

MVRFs collect, transfer, store and use automobile fluids when they recycle cars. Poor fluid management practices during the recycling process can result in spills of MtBE-containing gasoline that can contaminate groundwater. NHDES has found that consistent implementation of Best Management Practices (BMPs) minimizes releases of MtBE-containing gasoline to aquifers by reducing spills and releases. This year, following collaboration with an industry work group and their trade association, NHDES purchased gasoline spill prevention equipment from a New Hampshire manufacturer and had the equipment delivered to 75 MVRFs that process a substantial percentage of the end-of-life cars in New Hampshire. The new equipment will minimize the potential for gasoline spills, facilitate the recycling of gasoline and improve the safe handling of a highly flammable material.

In addition to the purchase of spill prevention equipment, the MtBE Remediation Bureau has developed a concrete spill containment pad installation program. About one third (30 facilities) of the active MVRF in New Hampshire are participating in this program. The spill containment pads are being installed in areas used for gasoline transfers, car dismantling or gasoline storage. The concrete pads are being located in the most active portions of the MVRFs and before installation of the pads existing gasoline contamination issues, if any are identified, are addressed. As a result, the projects combine investigation, remediation and release prevention activities as appropriate.

Project case studies for the UST Removal and MVRF spill prevention equipment initiatives are provided in Appendix A-5 and A-6 respectively. Pictures of the spill prevention equipment (Gas Buggy™), an integrated gas tank drill, gasoline transfer and storage system, are provided below.



Warren's picking up a gas buggy to save the state on delivery charges.



Members of the Automotive and Truck Recyclers Association (ATRA) and NHDES next to their equipment.



Picture of a gas buggy and drill system.

PROGRAM FINANCIAL STATUS

Table 2 summarizes the financial status of the program. In FY 2015 and 2016, the reimbursement program and contracts necessary to complete projects were put into place. As a result, there was a significant increase in both the number of projects initiated and completed. The year-to-year increase in reimbursement expenditures is split relatively evenly across the main program elements and reflects the completion of the bureau's first large-scale infrastructure project, a large number of tank removals, multiple large-scale remedial projects and the first phase of

MVRF spill prevention equipment purchases.

The large increase from FY 2015 to RY 2016 in state contract expenditures was primarily a result of the heavy volume of underground storage tank removals. There was some additional increase in laboratory contract expenditures as well and related to a full year, rather than half of a year, of drinking water well sampling.

Approximately \$7 million of funds have been expended in FY 2016 and an additional \$3 million in work scopes have been approved. This work is either currently in progress or has been completed (and invoices for the completed work are outstanding and awaiting submittal to MtBE Remediation Bureau). This overall activity level represents a substantial increase over FY 2015. Since the program inception in 2014, over 90% of all expenditures have funded actual cleanup work, water supply testing, water supply infrastructure improvement/replacement projects, MtBE Remediation Bureau labor costs associated with project management and other direct services. The remainder of the expenditures pay for building rent, Office of Information Technology support services and other routine expenses necessary for program operation.

Table 3 summarizes the larger projects that are currently underway. The bulk of the projected project costs shown in Table 3 are related to infrastructure or prevention projects. Significant additional spending related to remedial projects is likely to occur during 2016 as additional tank removals are completed and associated MtBE-containing gasoline releases are identified. Also, additional investigation and remediation work associated with releases identified by facility owners who are taking the lead on tank closures will also likely be required in 2016.

Table 2 – Program Expenses – FY 2015 vs. 2016

	FY 2015 Expenses	FY 2016 Expenses
Salary and Benefits		
Salary	634,031	813,819
Benefits	<u>364,449</u>	<u>461,263</u>
Subtotal Salary & Benefits:	998,480	1,275,082
Operating Expenses		
Current Expense	17,867	20,846
Transfers to OIT	65,889	28,303
Building Rent	62,723	55,513
Equipment	49,017	57,924
Computer Hardware, Software and Telecommunications	18,732	14,765
Indirect Costs	56,771	118,101
Employee Training	2,149	3,247
In-State Travel	<u>4,377</u>	<u>5,468</u>
Subtotal Operating Expenses:	277,525	304,167
Contracts/Reimbursements		
Contractual	348,943	1,116,950
CL 300 MtBE Fund Reimbursements	<u>1,539,047</u>	<u>4,352,644</u>
Subtotal Reimbursements/Contractual:	1,887,990	5,469,594
Total Expenses:	<u>\$3,163,995</u>	<u>\$7,048,843</u>
Total Spent Since Inception: \$10.3 million		

Table 3 – Work in Progress – Large Projects Only

Project Name	Total Eligible Project Cost	Approved Budgets (to date)	Paid	Status
Lee Circle Mobil	\$1,500,000	\$59,832	\$29,054	Water line extension (at feasibility study step)
Waterhouse Country Store	\$1,200,000	\$138,882	\$88,786	Water line extension in Windham
Kershaw’s water line extension	\$2,500,000	\$290,088	\$49,953	Derry core water system extension
Atkinson Sunoco	\$200,000	\$47,143	\$3,516	Water line extension
Epsom Traffic Circle	\$750,000	\$14,911		Water line extension to Traffic Circle
Plaistow Fire Suppression System Conversion (Lido site)	\$4,000,000	\$190,958	\$164,551	Plaistow’s fire suppression system conversion and contaminated water supply well connections.
Griffin Well Replacement	\$1,900,000	\$631,025	\$433,864	Dover’s Griffin water supply well replacement
USGS Joint Sampling and Trend Study	\$140,000	\$140,000		Joint study on MtBE trends. USGS matching funds are not included.
MVRF concrete release prevention pads and cleanups	\$1,500,000	\$133,281		Thirty one concrete release control pads and related cleanups.
UST removals in approximately 100 locations/200 tanks	\$2,800,000	\$2,500,000 approximate	\$2,000,000 approximate	UST Removals. 197 tanks removed (many invoices are pending for completed projects and 11 additional tank removals are scheduled)
Totals	\$16,490,000	\$4,146,120	\$2,769,724	

Note: Table 3 summarizes large projects that are ongoing but have not been completed. Additional smaller projects have been approved and are either lumped together in the table or are omitted. This table includes the estimated total cost of the listed projects and the existing approved budgets.



APPENDICES

A-1: Case History – Richmond Four Corners Store

Overview

The Richmond Four Corners Store is in the heart of the Town of Richmond. It is located at the intersection of the two main roads in town and is near the Fire Department and Library.

History

Richmond Four Corners Store operated as a classic New Hampshire country store and retail fuel station from the early 1900s until 2013. Over that time period, at least five underground storage tanks have been located at the property. In 1992, high levels of gasoline contamination were detected in a neighbor's water supply well. An investigation was completed and point-of-entry treatment systems (POEs) were installed to treat five impacted area water supplies. A number of site cleanup efforts were undertaken, including a 225 cubic yard soil excavation in 1995 and the operation of a groundwater pump and treatment system from 2004 to 2008. Full remediation of the site failed during these previous attempts because access to a significant quantity of contaminated soil was blocked by the presence of an operating underground storage tank and piping system.

At A Glance

DES Site #: 199206008

Site Location: 3 Winchester Road, Richmond

Bureau Actions: Contaminated Soil Removal

MtBE Fund Cost: \$149,687 to date. The second phase of soil excavation will be invoiced in 2016.

Outcomes:

- Leaking tank system removed.
- 964 tons of petroleum contaminated soil removed and properly disposed of.
- Treatment systems maintained at contaminated water supplies.



Richmond Four Corners Store contaminated soil excavation in July 2014

In 2013, the Richmond Four Corners Store was shut down due to insufficient funds. In 2014, the property mortgage holder initiated the foreclosure process by conducting an environmental due diligence investigation. The property was recently taken for back taxes by the town of Richmond.

MtBE Bureau Investigation and Remediation Actions

The Town of Richmond, the property owner and the Southwest Regional Planning Commission worked together to apply for brownfields assistance to remove the existing underground storage tank system

from the property. The Town of Richmond was very engaged with this project because of the back taxes, the central location of the property and the boarded-up/in-foreclosure nature of the store. The MtBE Bureau quickly became involved with these initial discussions and, collectively, the decision was made to proceed with a joint project that combined the removal of the tank system and excavation of soil contamination that surrounded the tank system.

In July 2014, the Southwest Regional Planning Commission removed the 12,000 gallon underground gasoline storage tank and associated piping. During the removal of the tank system, there was an opportunity to observe the tank system piping. It appeared that the piping was Total Containment, Inc. Enviroflex pipe (aka "yellow pipe"). NHDES has been systematically requiring the removal of this type of piping because it is chemically incompatible with gasoline. NHDES was unaware of this substandard installation of pipe. Upon further inspection of the dispenser piping, the outer pipe appeared blackened and stained indicating the presence of gasoline between the inner and outer pipes of the double walled system.

During excavation, there was enough petroleum vapor from the soil contamination to ignite as the excavator bucket scraped against one of the cobbles in the excavation pit. This suggests that gasoline was recently released in addition to the larger, older gasoline release. Approximately 964 tons of contaminated soil was removed, including some contaminated soil removed from beneath the earthen floor of the building. The excavation project generated a great deal of community interest and one gracious and grateful nearby landowner provided freshly baked corn muffins and lemon bars to the hungry work crew.

A tank closure and remedial implementation report was submitted to NHDES in late 2014. Soil contamination extending under the existing building foundation could not be removed and was left in place. The Town of Richmond subsequently acquired the site for back taxes and held a community charrette with Southwest Regional Planning Commission to consider possible future uses of the property. Due to the prominent central location of the property, the Town of Richmond wanted to ensure that the property would be put to its best possible use. In 2015, Richmond received brownfields funding for the demolition of the dilapidated building, which made it possible to remove the remaining contaminated soil. The remaining contamination (1,835 tons of contaminated soil) was removed in November 2015, using MtBE funds.

Current Status

The property is now set for redevelopment. The Town of Richmond is marketing the property to developers for future uses compatible with its central location in town and proximity to town offices. Contaminated drinking water supply wells have responded favorably to the first phase of remediation and it is anticipated that significant progress toward aquifer cleanup will result from the recent removal action.

NOTE: complete NHDES site records can be accessed online at the NHDES website using OoneStop for the site number referenced on the first page of the case history.

A-2: Case History – Derry Sampling District and Water Line Extension Project

Overview

The Derry Sampling District was created to address concerns about the presence of an MtBE contamination plume in an area with a high density of private water supply wells. A geographical information system (GIS) analysis of the area found a large number of automobile-related businesses, several known contaminated water supply wells, an existing gas station and dry-cleaner release site.

NHDES discussed a proposed sampling approach with municipal officials and notified local elected officials prior to initiation of work. Letters were then sent to property owners in the sampling district. Based on initial sampling results, follow up one-on-one canvassing of the Blunt Road and Route 28 area was conducted because of the large number of contaminated water supplies found in these areas.

At A Glance

DES Site #: 199512007

Site Location: Derry

Bureau Actions: Drinking Water Well Sampling

Outcomes:

- 76 wells sampled
- 33 Contaminated water supplies
- 7 POEs installed
- 7 homes provided with bottled water

Sampling Results – MtBE

Fifty-three percent of the property owners (76) elected to participate in this voluntary sampling program. MtBE was detected in 33 samples of these water supplies. Seven water supplies exceed the State’s drinking water standard and a total of ten water supplies are above the State’s notification standard of 5 ppb. Additional sampling is in process along Stark Road. The decision to proceed with the additional sampling was prompted by the determination that the contamination plume was much larger than originally anticipated. Currently, the known MtBE contamination plume is approximately one mile in length.

Sampling Results – Other

NHDES also provides the option for property owners to have sampling crews collect conventional and radiological samples for analysis. The analyses are paid for by the property owners due to restrictions on the use of MtBE funds. Analysis of the results for the additional analyses identified a number of additional, significant water quality concerns in the area. Specifically, of the 17 properties requesting additional testing, 16 exceeded one or more of the State’s water quality standards. The following contaminants were detected: arsenic (two properties over standards), chloride (one property over standards), copper (three properties over standards), E. coli or total coliform (six properties over standards), lead (nine properties over standards), manganese (six properties over standards), radon (five properties over standards) and uranium (one property over standards). The MtBE Remediation Bureau referred the property owners to other programs at NHDES for information on these compounds and provided advice on proper wellhead construction when the well caps were missing or improperly secured.

Water Treatment and Risk Reduction

NHDES offered bottled water to all the properties with wells contaminated with significant levels of MtBE. NHDES subsequently installed POE systems for all property owners whose wells contained MtBE concentrations over the State standard except, for one property owner who declined MtBE Remediation Bureau’s offer of assistance.

Water Line Extension

NHDES and Derry are collaboratively working on a water line extension to the contaminated properties. Providing potable water from the Derry core water system will create a permanent solution for the impacted properties. This will eliminate the costs and maintenance challenges imposed by the large number of individual POEs.

The water line extension will benefit Derry in multiple ways. In addition to addressing the MtBE-contaminated water supplies, the proposed water line extension will connect the isolated Woodlands Community water system to Derry's core water system. Derry owns the Woodlands Community water system; this system currently has both water quality (corrosivity) and capacity problems. Connection of the Woodlands system to Derry's core system will solve both problems. While Derry will need to fund the additional costs required to interconnect, the MtBE-related funding of the overall project makes it possible to achieve Derry's objective of elimination of this inefficient, duplicative water system.

To facilitate this project, NHDES expedited additional water supply sampling on Stark Road to ensure that the full extent of water extension needs were identified and to determine Derry's share of the interconnection to Woodlands cost. NHDES then had its contractor, Weston and Sampson, complete an engineering estimate of MtBE remediation fund-eligible and total project costs. Based on this cost estimate, NHDES provided Derry information on available funding, Derry's share of the project costs and estimated total project costs.

Derry town council approved the water line extension project April 5, 2016, and project groundbreaking took place on September 8, 2016. Derry hopes to complete the installation of the water line by the end of 2016.

NOTE: complete NHDES site records can be accessed online at the NHDES website using OoneStop for the site number referenced on the first page of the case history.

A-3: Case History – Little Falls Cooperative Mobile Home Park

Overview

The 30-unit Little Falls Cooperative Mobile Home Park is located in Rochester and is immediately downgradient of a junkyard and a gas station. Gasoline releases from the junkyard resulted in MtBE-contamination of the groundwater.

The groundwater contamination plume impacted the water supply of Little Falls Cooperative. The Cooperative obtained its water from four wells and the mobile homes were each connected to one of the four wells. The water system was unregulated because no single well served more than 25 people. Two of the wells were contaminated with MtBE and there was concern that the other wells could become contaminated in the future, particularly if one or more of the existing wells was taken out of service. The former water system had additional problems that needed to be addressed, such as the location of three of the wells being in an area subject to flooding and high concentrations of metals. The City of Rochester water line runs by the entrance of the mobile home park. NHDES approved a project to extend Rochester's water line and connect each to the mobile homes to the municipal water system. In October 2015, contractors working for NHDES completed the water line extension, providing clean, safe drinking water to the homeowners.

At A Glance

DES Site #: 201009016

Site Location: Little Falls MHP Cooperative in Rochester

Bureau Actions: Water Line Extension

Outcomes:

- Site Survey, plans and specifications completed
- Water line extension completed
- Road repaved to address connection road cuts
- Thirty homes connected to Rochester water system

Cost: Approximately \$525,000



Water line installation workers in a trench box.

Fourteen hundred feet of water line, a central metering pit and individual metering pits for each house were installed by a local, Rochester contractor, S.U.R. Construction, Inc. The total project cost was within the engineer's original project estimate.

Project Status

Now that the water line is in place, the existing water supply wells will be decommissioned. Groundwater monitoring wells will be installed, as necessary, to meet the requirements of the existing groundwater monitoring program.

Schedule

Decommissioning of the old wells and pump houses and installation of replacement groundwater monitoring wells will be completed in 2016.

NOTE: complete NHDES site records can be accessed online at the NHDES website using OoneStop for the site number referenced on the first page of the case history.

A-4: Case History – Town of Plaistow Fire Suppression System Conversion

Overview

The Plaistow Lido site is located at the intersection of Route 125 and East Road in Plaistow. The Lido gas station release was one of the largest in gasoline volume released and extent of groundwater impact in state history and multiple remedies have been implemented at this site including soil vapor extraction (SVE), excavation and chemical oxidation. The contaminant plume has not been significantly reduced by the remedial work completed to date due to the size of the release (greater than 10,000 gallons of gasoline but impossible to accurately estimate) and complexity of the site.

Plaistow is interested in addressing the MtBE drinking water supply contamination issues, primarily from the Lido site, by converting the Town's existing fire suppression system into a potable water system. The fire system distribution network extends to most of the contaminated water supply areas and also extends several miles toward potential potable water sources, such as the City of Haverhill, Massachusetts water system. The initial project consists of a feasibility study to evaluate whether conversion of the fire suppression system is a cost-effective solution to the MtBE contamination. The feasibility study evaluates potential sources of potable water and the cost and work needed to upgrade the fire suppression system. If the feasibility study findings are favorable, the next phase would be the conversion of the fire suppression system and development of a water supply.

At A Glance

DES Site #: 201009016

Site Location: Town of Plaistow

Bureau Actions: Fire Suppression System Conversion Feasibility Study

Outcomes:

- Feasibility Study complete
- Negotiations with City of Haverhill initiated.

Project Status and Schedule

NHDES has approved the development of a feasibility study that will evaluate the existing fire suppression system piping and storage tank. The scope of work includes estimation of potable water demand and the cost for system conversion. The cost estimate also includes the additional piping necessary to connect the properties on which existing private wells are contaminated with MtBE. For the fire suppression system to be converted into a public water supply, potable water must be provided. The potable water can come from an existing public water system or from a new water source. The feasibility study includes evaluation of the possibility of connecting to an existing water system, such as those operated by the Hampstead Water Company or the City of Haverhill, or the development of a new water supply.

The feasibility study was completed in June 2016 and the results presented to the Select Board. Initial test results on the integrity of the fire suppression system are favorable and the project is feasible if a cost-effective source of potable water can be developed. The City of Haverhill has recently expressed a willingness to pursue supplying potable water to the contaminated properties and for fire suppression. The Select Board voted to proceed with discussion with Haverhill. Interconnection to Haverhill's water system would save over a million dollars on necessary repairs to the existing fire suppression system pump station and storage tank. NHDES is funding the engineering services necessary to pursue this highly-desirable and cost-effective option (Haverhill's water system is approximately two thousand feet away). The additional engineering evaluation will include an estimate of Plaistow water demand, determine whether a pump station and storage is necessary and will include the presentations and meetings with Haverhill.

NOTE: complete NHDES site records can be accessed online at the NHDES website using OneStop for the site number referenced on the first page of the case history.

A-5: Case History – Underground Storage Tank Removal Program

Overview

The MtBE Remediation Bureau received approval from Governor and Council (G&C) for the underground storage tank (UST) removal program contracts on October 1, 2014. NHDES initiated the first batch of tank removals shortly after G&C authorization. One hundred ninety-five USTs have been removed to date. Additionally, UST removal work will continue throughout FY 2017.

Site Selection

UST removal projects are selected to address tanks that pose a threat to New Hampshire aquifers. The tanks that were removed during 2015 fell into the following categories:

- Tanks that had been out of use for a significant period of time.
- Tanks with problematic installations or obsolete components.
- Tanks which prevent access to contaminated soil.
- Tanks at retail facilities that are permanently leaving the business of selling gasoline.

Tanks that are not in use typically are not as well maintained as operating tanks. For example, the sumps are not routinely opened and monthly inspections are no longer conducted. Since maintenance of these tanks decreases and the tanks become a liability for the property owners and the environment, removal of the tanks is a priority.

Older tank systems with obsolete components or substandard installations are also a priority for removal. For example, many of these types of tank systems have either single wall piping or tanks. Current rules require the use of substantially more release-resistant double wall systems. There may also be tank system installations that are particularly problematic. The New Hampshire Marine Patrol's tank system in Gilford was a prominent example of this type of situation. The tank was installed below the water table and the tank sumps typically were filled with water. In a situation like this, any spill or overflow of gasoline will immediately impact groundwater.

The Richmond Four Corners, Chichester Mobil, Bob's Gulf (Dover), Rymes Heating Oil (Peterborough), Conway Circle K and Gulbicki's Towing (Laconia) UST removal projects were selected to facilitate removal of contaminated soil under or surrounding tanks or pump islands. Additional remedial projects, such as Wentworth Mobil (Portsmouth) and Exeter Green Valley, were selected at sites at which tanks had been recently removed. The Richmond Four Corners project is highlighted in a separate case study because of its importance to the town of Richmond (central location and tax-deeded property) and the surrounding contaminated water supply well implications.

Release Prevention

One of the key objectives of the UST removal program is to prevent the future release of gasoline. The value of UST system removal as a means of preventing additional aquifer contamination was demonstrated by these initial projects. The Gulbicki's Towing project, for example, revealed the ongoing release of gasoline from the out-of-use tank system. According to the consultant, the USTs were filled by groundwater through holes in the vent lines. The contaminated water was then discharged in the vicinity of the former dispenser island through the fuel lines. With the removal of the USTs and elimination of the ongoing discharge, groundwater quality will improve at this site.

At A Glance

Site Location: Ninety-four locations in seventy-one municipalities.

Bureau Actions: Tanks and contaminated soil removed.

MtBE Fund Cost: Approximately \$2 million, some bills still pending

Outcomes:

- 197 potentially leaking tanks removed.
- Approximately 10,000 tons of petroleum contaminated soil removed and properly disposed of.

At the Richmond Four Corners Store, the piping system was leaking. Prior to the completion of this project, NHDES and the property owner were unaware of this ongoing leak. If the tank system had been returned to active use, additional gasoline would have been released in an area with vulnerable private water supplies. Removal of the tank system and contaminated soil reduced long-term State ODD fund liabilities and accelerated aquifer restoration for the center of the Town of Richmond.

As previously noted, the Marine Patrol tank sumps were frequently full of water and posed no impediment to gasoline releases to the aquifer. Removal of the tank system before a significant release occurred was highly desirable. As can be seen from these situations, removal of unnecessary, unwanted and high-risk UST systems has a number of benefits to the State, as well as property owners.

Remedial Progress

Significant remedial progress was made at ten of the facilities. At most of these sites, some contaminated soil was removed. Approximately 10,000 tons of contaminated soil was removed from remedial sites addressed by the program. Several of the sites were located in areas with impacted drinking water wells and remedial efforts will have a significant positive impact on water quality in the affected aquifers.



Submerged Marine Patrol Tank exposed for removal. The hold down straps were broken and the tank was floated so that water would not get in the tank during cleaning.



Marine Patrol Tank after being floated out of the tank grave.

Future

NHDES is evaluating all existing tank systems that do not comply with the December 2015 regulatory requirement to upgrade to double wall technology. NHDES continues to find non-compliant tanks and to schedule removals of release-prone tanks on an ongoing basis.

NOTE: complete NHDES site records can be accessed online at the NHDES website using OoneStop for the site number referenced on the first page of the case history.

A-6: Case History – MVRF Release Prevention Program

Overview

Motor Vehicle Recycling Facilities (MVRF) provide an essential service to the state by recycling end-of-life vehicles and thereby making inexpensive used parts available to consumers. As part of this service, it is necessary to handle significant volumes of automotive fluids which, if handled improperly, can result in a risk to groundwater. NHDES developed an assistance program to help ensure that best practices in the management of automotive fluids are in place. To ensure that the MVRF assistance program is both cost effective and pragmatic, NHDES and the Automotive and Truck Recyclers Association of New Hampshire (ATRA) established a joint work group. After a series of well-attended and thoughtful meetings in 2015, a consensus decision was made to create a grant program that reimburses the cost to purchase spill prevention equipment. Working together with ATRA and the work group was essential and ensured that the spill prevention equipment (WEN Industries Gas Buggy fuel tank drill, gasoline transfer and mobile storage tank system) meshed with MVRF operations while minimizing the risk of spills.

New Hampshire MVRFs have a long history of working with WEN Industries, an instate manufacturer of vehicle recycling spill prevention equipment. Because of the strong relationship between instate recyclers, ATRA and WEN Industries, it was possible for ATRA to negotiate a steep volume discount on WEN's spill prevention equipment. ATRA also encouraged its members who are located close to WEN's manufacturing facility to pick up the equipment to save on shipping costs. Additionally, ATRA managed the State's reimbursement request paperwork for the applicants. This greatly simplified the equipment procurement process. All of the spill prevention equipment is now in use at participating MVRFs.

WEN Industries' participation was very important to the program's success. WEN Industries was founded in New Hampshire in 1956 and was one of the first manufacturers of auto dismantling products. WEN Industries manufactures the equipment purchased by the assistance program: the Gas Buggy and Fuel Tank Drill System. This equipment is used to safely transfer gasoline from scrapped to operating vehicles. WEN Industries' owner, Jim Hyde, indicated that the equipment order allowed him to hire an additional welder for his Merrimack, NH manufacturing facility. Although the spill prevention equipment assistance is focused on the minimization of MtBE-containing gasoline spills, a significant side benefit is improvements in gasoline transfer safety. In the past, there have been burns and fatalities when gasoline was transferred without considering the potential for sparks (i.e., hand drill use, etc); these types of injuries will be minimized with the new equipment. Feedback from Brian Lee, owner of White Mountain Auto Brokers, indicates that there is another unexpected benefit of the spill prevention program – namely faster fluid transfer. “His boys think the equipment is slick in that it saves about 45 minutes in car processing time.” Mr. Lee reports achieving safer transfers and fewer spills, and all at a lower total labor cost.

Future

The next phase of the spill prevention program will be the installation of impervious concrete pads in fluids management areas. About one-third (30 facilities) of the active MVRFs in New Hampshire are participating in this program. The spill containment pads are being installed in areas used for gasoline transfers, car dismantling or gasoline

At A Glance

Site Location: Statewide

Bureau Actions: Established work group, created assistance application process, delivery of spill prevention equipment and initiation of impervious concrete pad program.

Outcomes:

- 88 spill prevention devices delivered to date.
- 80 MVRF participating (approximately 80% of licensed facilities).
- 30 concrete spill containment pad projects approved and half of them are underway.
- 500 tons of contaminated soil being removed for a concrete pad project.

storage. The concrete pads are being located in the most active portions of the MVRFs and before installation of the pads, existing gasoline contamination issues, if any are identified, are addressed. As a result, the projects combine investigation, remediation and release prevention activities, as appropriate. Initial geotechnical and contamination identification field work is currently being completed on approximately a dozen of the facilities and NHDES hopes to finish all of the installations during 2016.

NOTE: complete NHDES site records can be accessed online at the NHDES website using OneStop for the site number referenced on the first page of the case history.



The owner of WEN Industries, Jim Hyde, is in the middle of the picture; he is flanked by representatives of four Green Yards and two NHDES staffers. All four yards picked up their equipment from WEN Industries that day to save on shipping costs.