PROTECTING OUR CHILDREN AND THEIR ENVIRONMENT:

AN INVESTIGATION TO DETERMINE WHETHER RELEASES OF OIL OR HAZARDOUS MATERIALS ARE AFFECTING SCHOOLS AND ENVIRONMENTAL JUSTICE AREAS IN FALL RIVER, MASSACHUSETTS

Prepared by the Bureau of Waste Site Cleanup
Massachusetts Department of Environmental Protection

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EXECUTIVE SUMMARY

The mission of the Massachusetts Department of Environmental Protection (DEP) is to protect and enhance the quality of the Commonwealth's natural resources – its air, water and land – in order to protect the health, safety and welfare of its citizens. DEP's Bureau of Waste Site Cleanup is responsible to ensure timely and effective responses to over 2,000 environmental emergencies each year, such as oil spills and chemical fires, and to ensure that more than 6,000 contaminated properties across the Commonwealth are cleaned up properly. The regulations that govern the investigation and cleanup of chemical spills and contaminated property in Massachusetts are known as the Massachusetts Contingency Plan (MCP). DEP is also committed to keeping citizens informed about important environmental matters that may affect their communities. To that end, DEP's Bureau of Waste Site Cleanup (BWSC) has prepared this report to update the citizens of Fall River on the status of environmental cleanups in certain key areas of the city.

The objective of this study was to ensure that MCP sites and facilities that generate hazardous waste do not pose risk to children attending school in Fall River or residents living in environmental justice areas. DEP conducted a targeted exposure pathway assessment and a regulatory compliance evaluation of MCP sites and facilities that generate hazardous waste in the City of Fall River to determine if they have the potential to adversely impact the health, safety and welfare of school children, a particularly sensitive receptor group, or residents in environmental justice areas. DEP evaluated all response actions conducted at MCP sites located within 1000 feet of 48 Fall River schools as well as targeted response actions conducted at MCP sites located in designated environmental justice areas in Fall River.

DEP designed the exposure pathway assessment to: evaluate the types and concentrations of chemicals released at a site; determine if the chemicals impacted soil, groundwater and/or air quality; and ultimately, whether any "sensitive receptor" (such as a child) could be exposed to or come into contact with environmental contamination. DEP designed the compliance evaluation to determine whether the parties legally required to clean up the MCP sites were conducting response actions in accordance with MCP performance standards and cleanup deadlines.

MCP sites and hazardous waste facilities were prioritized based upon the relative potential risk for children to be exposed to soil, groundwater and/or air contamination from these locations. Highest priority was given to releases that could impact indoor air in nearby schools or homes and sites where children might come into contact with contaminated surficial soil or could be exposed to contaminated fugitive dust blowing off-site.

To implement the exposure pathway assessment and regulatory compliance evaluation, DEP conducted file and data reviews, audited cleanup reports, and evaluated the compliance status of the parties required to cleanup the MCP sites identified throughout the study area. DEP also conducted targeted inspections of MCP sites with operating cleanup systems and selected facilities that generate hazardous waste in the study area.

DEP evaluated a total of 89 reported releases of oil or hazardous materials at MCP sites located within 1000 feet of 33 schools and at additional locations within a designated environmental justice area. No releases were reported within the 1000-foot radius of 15 schools. DEP also evaluated businesses that generate hazardous waste in the same target areas.

The exposure pathway assessment revealed that:

- No site conditions were found that could pose a health risk as a result of indoor air contamination caused by vapor migration from contaminated groundwater into nearby homes or schools;
- No sites were found that pose a health risk to nearby residents or school children as a result of a direct contact hazard or airborne dust from surficial soil contamination; and
- No MCP sites in the study area were found to impact the drinking water provided to residents of Fall River. Fall River is served by a public water supply system with reservoirs outside the study area.

The regulatory compliance evaluation findings include:

- Response actions conducted by parties responsible for the contamination have been conducted properly at the majority (87%) of sites within the study area.
- DEP identified 12 sites where response actions were found to be inadequate or behind schedule. Site conditions were evaluated at these locations and found not to pose risk to schools or nearby residents. DEP initiated enforcement actions in order to get the parties responsible for the cleanups back on schedule.
- As a result of its enforcement efforts, DEP has raised the compliance rate to 96% and anticipates the remaining locations will return to compliance in the near future.

DEP is committed to continue auditing response actions at MCP sites and taking enforcement actions when necessary to ensure that contamination is cleaned up properly and on time in Fall River and across Massachusetts.

An electronic copy of this report can be found at DEP's web site: **Mass.Gov/dep/bwsc/school.htm**.

If readers would like more information about this evaluation or any specific MCP site in Fall River, please contact:

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1.0 INTRODUCTION

Many of us are aware of locations in our communities that have been affected by environmental contamination. In some cities, residents in more densely populated urban neighborhoods live side-by-side with numbers of large and small sources of environmental pollution that may pose a health risk if not properly controlled. The Department of Environmental Protection (DEP) is responsible for making sure that environmental contamination is cleaned up properly and in a timely manner as well as ensuring that our air and water are clean, solid and hazardous wastes are managed safely and wetlands and coastal resources are preserved. DEP is also committed to keeping citizens informed about important environmental matters that may affect their communities. To that end, DEP's Bureau of Waste Site Cleanup (BWSC) has prepared this report to update the citizens of Fall River on the status of environmental cleanups in certain key areas of the city.

The regulations that govern the investigation and cleanup of chemical spills and contaminated property in Massachusetts are known as the **Massachusetts Contingency Plan**[1] (the "**MCP**"; 310 CMR 40.0000). To evaluate compliance with the MCP, DEP conducted a targeted review of **MCP sites** in five Massachusetts cities – Fall River, Worcester, Holyoke, Springfield and Chelsea. These cities were chosen because the Commonwealth of Massachusetts Executive Office of Environmental Affairs (EOEA) has designated some of their neighborhoods as **Environmental Justice (EJ)** areas. Environmental justice is based on the principle that all people have a right to be protected from environmental pollution and to live in and enjoy a clean and healthful environment. Environmental justice areas tend to have a higher than average number of MCP sites than other communities. The average number of MCP sites in cities and towns with EJ areas is over 170, while the average number of MCP sites for cities and towns without EJ areas is 40. This could be attributed to the fact that most EJ areas are located within densely populated areas that often may have high concentrations of industrial and commercial facilities. *Figure 1* illustrates designated EJ areas within the City of Fall River. DEP evaluated all MCP sites requiring accelerated or time-critical response actions and selected additional categories of response actions in these areas.

Because children are more likely to experience health problems from environmental **contamination** than adults and most children spend up to half their weekday hours away from home at **school**, DEP focused its evaluation on MCP sites and hazardous waste generators located near schools. The schools that were the focus of this study encompass public and private primary and secondary schools as identified by the Massachusetts Department of Education (MDOE). The location and status of the schools (e.g., open or closed) were verified with the City of Fall River School Department. *Figure 2* identifies the 48 school locations evaluated in the City of Fall River.

DEP evaluated how it might be possible for children or adults to come into contact with or otherwise be exposed to environmental contamination at MCP sites located within 1000 feet of a school or in an EJ area. This type of evaluation is called an **exposure pathway** assessment. A key principle of such an assessment is, "no exposure – no risk". The exposure pathways evaluated in this study include:

[1] This report contains terminology that may be new to the readers. With this in mind, **Appendix A** presents definitions for terms commonly used by the DEP when implementing the MCP. All words in this report appearing in **bold** typeface are defined or explained in an alphabetical list in Appendix A.

- Ingestion of **contaminated media** (e.g., drinking water, surficial soils) – has contamination at an MCP site impacted a drinking water supply or is there potential for incidental ingestion of contaminated soil?
- Direct contact – is contaminated soil or debris accessible? Can a person unknowingly or otherwise come into contact with contaminated soil or debris? and,
- Inhalation – can contaminated dust or vapors pollute outdoor (ambient) air? Can chemicals somehow affect the indoor air quality of nearby buildings?

Drinking water was eliminated from further review as an exposure pathway of concern because the City of Fall River receives its drinking water from a public water supply system that draws water from North Watuppa Pond and the Copicut Reservoir. None of the MCP sites in the study area are near these water supply sources. In addition, Massachusetts Drinking Water Supply Regulations require that public water suppliers regularly test the water provided to consumers and that the water meets applicable drinking water standards. The exposure pathway evaluation then focused on MCP sites with releases of the type that could result in impacts to indoor air in nearby schools and homes and sites where people might come into contact with contaminated surficial soil or could be exposed to fugitive dust blowing off-site.

While not within the scope of this evaluation, it should be noted that DEP has several programs that work to promote a "healthy school environment." DEP inspects school asbestos removal projects to ensure that the material is properly contained and disposed of. DEP also works with school districts across Massachusetts to reduce exposures to diesel pollutants from idling school buses. Scientific studies indicate that exposure to exhaust from diesel vehicles over time can cause serious health problems. In light of the importance of this matter, DEP has recently conducted numbers of inspections at schools throughout the state, citing several school bus fleet operators for excessive bus idling. DEP has also developed "Best Management Practices for Reducing Diesel Pollution at Schools" for school departments and bus operators. Information about these programs can be obtained at: http://www.mass.gov/dep/.

The remainder of this report provides an explanation of the study methodology and the findings of the exposure pathway assessment and regulatory compliance evaluation. The following section provides background information to familiarize the reader with DEP's regulations that apply to MCP sites.

2.0 THE MASSACHUSETTS CONTINGENCY PLAN

This section describes the investigation, cleanup requirements and deadlines applicable to MCP sites evaluated by DEP in this study.

2.1 REGULATORY REQUIREMENTS

The regulations that govern the investigation and cleanup of chemical spills and contaminated property in Massachusetts are known as the Massachusetts Contingency Plan (the MCP; 310 CMR 40.0000). The MCP requires that a party investigating or cleaning up an oil or chemical spill or contaminated property (called "MCP sites" in this report) hire a **Licensed Site Professional** (**LSP**) to oversee and direct response actions and that this work be done in compliance with the MCP's performance and cleanup standards. These parties are required to send in various reports to DEP by specific deadlines to document that they have completed the job in a manner that is protective of public health. DEP **audits** a large number of submittals to verify that the work was done properly and issues findings, violation notices and, when necessary, enforceable orders and penalties to parties who fail to submit investigation and cleanup reports to DEP on time, fail to do work properly or fail to conduct cleanups at all. In certain cases where the responsible parties are either unable or unwilling to take needed actions, DEP can intervene and draw money from the **state "Superfund"** to hire contractors to conduct investigations or perform cleanups.

The MCP describes the steps a person must take to notify DEP of a release of oil or hazardous materials and investigate and cleanup environmental contamination in a manner that is protective of public health and the environment. In addition, the MCP lists various types of reports that must be submitted to document that a site has been investigated properly, that certain investigation or cleanup end-points have been reached and that environmental tests prove that a cleanup meets the MCP's requirements to achieve a condition of **No Significant Risk** to public health, welfare and the environment at the site. Additional information regarding the regulations and background information about the MCP cleanup program can be obtained at: http://www.state.ma.us/dep/bwsc/regs.htm.

2.2 MCP PROGRESS REPORTS

The MCP requires parties to routinely report on site investigation and cleanup progress. This information is communicated to DEP in a wide variety of required reports, which must be filed by specific MCP submittal deadlines.

Preliminary response actions and risk reduction measures are taken soon after contamination is discovered in response to time-critical conditions (releases that pose an unacceptable risk for a short period of time) and may be implemented when necessary at any time during a cleanup. Two types of Preliminary Response Actions reviewed during this study are **Immediate Response Actions** (**IRAs**) and **Utility-related Abatement Measures** (**URAMs**).

The MCP requires parties to conduct IRAs at all sites where a sudden release of oil or hazardous materials above an MCP **Reportable Quantity** occurs or where a time-critical release of oil or hazardous materials is discovered. Examples of sudden releases are fuel spills from truck saddle tanks and ruptured drums or chemical releases as the result of a fire. Time-critical releases include indoor air contamination or contamination of a private drinking water supply well caused by a chemical spill or underground fuel storage tank leak. Once the

immediate exposure problems caused by the IRA condition are controlled, additional response actions may be needed to find the source of the problem and define the nature and extent of the release in order to determine its impact on soil, groundwater and surface water (see "Tier Classification" and "Phase II/III Investigations" below). IRAs require DEP approval and are overseen by LSPs. DEP oversees and manages more complex IRA cases. IRA Plans are due within 60 days of notification to DEP of time-critical releases. IRA Status Reports are due 120 days after the IRA Plan is submitted and every six months thereafter until the IRA is completed and an IRA Completion Statement is filed with the DEP.

When underground utility (water, sewer, electric, etc.) repair or construction work encounters contaminated soil and/or groundwater, the MCP requires that a URAM Plan be submitted to DEP to ensure that the utility work will be conducted under the supervision of an LSP in order to protect the workers and ensure that contaminated media is properly handled. URAM Status Reports are due 120 days after the URAM Plan is submitted and every six months thereafter until the URAM is completed and an URAM Completion Statement is filed with the DEP.

Completion of Preliminary Response Actions often results in cleanup of the site in less than a year resulting in the submittal to DEP of a closure report (see "Response Action Outcome" below). If a site can not be cleaned up within one year, the MCP has deadlines directing parties to submit progress reports to DEP to show that work is being conducted over time. The following progress reports are due to the DEP in the event that a **Potentially Responsible Party** (PRP) does not close out the site within one year.

- A **Tier Classification** together with a **Phase I Initial Site Investigation Report** must be submitted within one year of release notification (knowledge of contamination). More complicated sites are classified in the MCP as a **Tier I Site** and a permit from DEP is needed in order for a person to conduct response actions. The permit review process allows DEP to check to make sure the work proposed is technically sound and likely to comply with the MCP's performance standards. Less complicated sites are classified as **Tier II Sites**. A DEP permit is not needed for work to proceed at a Tier II Site. DEP audits submittals for both Tier I and Tier II sites.

- Within two years of the date of Tier Classification, a person doing a cleanup must submit a **Phase II - Comprehensive Site Assessment** and a **Phase III - Identification, Evaluation and Selection of Comprehensive Remedial Action Alternatives Report** to DEP. These reports provide a detailed description of the environmental problem at a site and identify the techniques that will be used to cleanup the contamination if a cleanup is shown to be necessary, respectively.

- Within three years of the date of Tier Classification, a **Phase IV - Remedial Action Plan** must be submitted to DEP. Remedial Action Plans often describe the treatment system designed to remove contamination from soil or groundwater. A groundwater system typically involves recovery wells pumped to a treatment/filtration system. A soil treatment system extracts contamination in vapor form from soil for treatment. These systems may need to be operated for months or longer (sometimes for years) in order to effectively remove contamination from the environment. Sites with operating treatment systems are in **Phase V** or **Remedy Operation Status (ROS).** System monitoring reports must be submitted to DEP until a condition of No Significant Risk has been achieved at which point a **Response Action Outcome** can be submitted.

2.3 SITE CLOSURE REPORT

When a cleanup is complete, a site closure report also known as a Response Action Outcome (RAO) Statement must be submitted to DEP by an LSP. An RAO provides information about the investigation of a release and the scientific explanation that supports the conclusion that the release no longer poses a condition of significant risk to public health, safety, welfare or the environment. An RAO can be submitted as soon as a cleanup is completed (the sooner the better). Many cleanups done as IRAs, for example, finish the job quickly and result in RAOs. However, some cleanups may take years to investigate, understand and clean up due to their complexity.

In order to set limits on how long a cleanup can continue, the MCP contains deadlines by which an RAO and its various supporting documents must be submitted to DEP. The MCP allows up to six years after release notification is made to DEP officials for an RAO to be submitted. It is important to note that, since 1993, when the MCP was revised to allow LSP oversight of response actions, over 20,000 releases of oil or hazardous materials have been cleaned up in Massachusetts with 60% of potentially responsible parties submitting an RAO to DEP within one year of release notification and 85% submitting an RAO within three years of release notification.

3.0 EXPOSURE PATHWAY ASSESSMENT AND REGULATORY COMPLIANCE EVALUATION

This section describes the exposure pathway assessment and regulatory compliance evaluation objectives (Section 3.1), the geographic study areas (Section 3.2) and the methodology developed to implement the evaluation (Section 3.3). A discussion of the findings including DEP enforcement actions is presented in Section 3.4.

3.1 OBJECTIVES

The primary objective of this study was to ensure that MCP sites do not pose risk to children attending school in Fall River. Specifically, the objectives included ensuring that school children, a particularly sensitive receptor group, and residents in EJ areas are not exposed to chemicals released from MCP sites and that the parties responsible for cleaning up MCP sites are conducting response actions in accordance with the MCP's performance standards and progress report deadlines.

3.2 STUDY AREAS

DEP reviewed the compliance status of all MCP sites located within 1000 feet of the forty-eight identified Fall River schools (see schools mapped on *Figure 3*). DEP identified thirty-three schools that had MCP sites located within a 1000-foot radius of the school (see *Table 1*). Fifteen schools did not have any MCP sites located within 1000 feet (see *Table 2*).

DEP also evaluated businesses located within 1000 feet of a Fall River school that generate hazardous waste. *Figure 4* shows the location of **Hazardous Waste Generators** evaluated during this project.

Finally, DEP expanded the study beyond the investigation of MCP sites and hazardous waste generators within 1000 feet of a school to include a review of all sites requiring time-critical and other key response actions in designated environmental justice areas in Fall River. *Figure 5* shows the MCP sites located within designated EJ areas that were evaluated during this study.

3.3 METHODOLOGY

DEP prioritized review of MCP sites based on the exposure pathway assessment – could chemicals released at a site pose risk to sensitive receptors? DEP screened all MCP sites in the study area to evaluate the potential for children and other residents to be exposed to contaminants from MCP sites. Highest priority was given to releases that involved contaminated groundwater that might impact indoor air in nearby schools or homes (see *Appendix B* for more information about this pathway) and sites where people might come into direct contact with contaminated surficial soil or could be exposed to fugitive dust blowing off-site.

DEP then conducted a comprehensive regulatory compliance evaluation of all MCP sites in the study area based upon the findings of the exposure pathway assessment. As part of the regulatory compliance evaluation, DEP checked to make sure cleanup reports and RAOs were being provided to DEP in accordance with MCP deadlines. DEP also reviewed the quality of ongoing and completed cleanups in the study area to ensure that the work was technically sound. DEP also conducted targeted inspections of MCP sites and hazardous waste generators in the study area.

The comprehensive regulatory compliance evaluation involved the following tasks:

- The compliance status (the progress of cleanups) for all MCP sites within 1000 feet of the schools was reviewed. If the response actions were lagging, a more detailed evaluation was conducted to determine if the delay was reasonable due to complicated site conditions or other reasons beyond the control of the potentially responsible party.

- Sites with active remedial systems were inspected to ensure that cleanup operations were being conducted properly.

- The quality of cleanups was evaluated for those sites where response actions were not relatively simple and straightforward. The evaluation focused on releases of an unknown quantity of material or where significant soil and/or groundwater contamination had the potential to expose the community to oil or hazardous materials rather than simple, straightforward cleanups such as a spill of a known quantity of fuel to a paved surface. This evaluation assessed a wide variety of MCP response actions including time critical response actions (IRAs), comprehensive response actions (Phase II – Phase V) and sites that have been closed out (sites with an RAO submittal).

- DEP reviewed records to identify facilities that generate hazardous waste in the study area to determine if a compliance inspection was warranted. DEP evaluated the nature of the facility and its proximity to a school, the types and quantities of oil or hazardous materials used, the past compliance history of the facility, the length of time the facility has been in operation, and if there were known releases at the facility. Using these criteria, four facilities were evaluated and three facilities were identified for inspection. If noncompliance was noted during the inspection, the cause of noncompliance was evaluated to determine if it would likely result in a release that could affect the neighboring area.

- The compliance status of targeted MCP sites within designated Environmental Justice areas of Fall River was evaluated. Specifically, four types of response actions were prioritized for evaluation:

    - Immediate Response Action (IRA) sites were reviewed to ensure that sensitive receptors were not exposed nor had the potential to become exposed to contamination from MCP sites.

    - Sites with operating remedial systems (Phase V or Remedy Operation Status for soil or groundwater treatment or removal) were audited (including a field inspection) to ensure that the systems were effectively removing contaminants.

    - Utility Related Abatement Measure (URAM) submittals were reviewed to ensure that response actions were conducted properly, the source of the contamination has been identified, and the individuals responsible for the cleanup have been notified. Because the party undertaking the URAM is not required to take the site to closure (an RAO), the party responsible for the release discovered during the utility construction must be identified so that a complete cleanup is conducted in a timely manner.

    - **Downgradient Property Status** (DPS) submittals were evaluated to ensure that the sources of contamination have been identified and the appropriate parties notified of their obligations. DPS submittals are filed at locations where contamination is

reported to have migrated onto the property from another neighboring (upgradient) location. As is the case with URAMs, the party filing DPS is not required to take the site to closure (an RAO).

When violations were found during this evaluation, enforcement action was taken to bring the parties back into compliance (see discussion in Section 3.4.3). DEP was also prepared to conduct the response actions using its state environmental cleanup contractors at any MCP site in noncompliance where DEP determined that site conditions posed a serious risk to the public and the potentially responsible parties were unwilling or unable to conduct the work in a timely manner.

3.4 FINDINGS

DEP identified a total of 89 locations where a release of oil or hazardous material had been reported to DEP in Fall River within 1000 feet of 33 schools [*Table 1*] or within an environmental justice area [*Tables 3 through 6*]. DEP also identified four hazardous waste generators that met the study criteria for further evaluation in the target areas [*Table 7*]. No releases were reported near 15 schools [*Table 2*].

3.4.1 Exposure Pathway Assessment

The exposure pathway assessment considered the types of chemicals released at a site and whether or not the chemicals impacted soil, groundwater or air quality. The exposure pathway assessment performed for the study areas revealed the following:

- No MCP sites were found to impact the drinking water provided to residents of Fall River. Fall River is served by a public water supply system with reservoirs outside the study area;
- No sites were found that pose a health risk to nearby residents or school children as a result of a direct contact hazard or airborne dust from surficial soil contamination; and
- No site conditions were found that could pose a health risk as a result of indoor air contamination caused by vapor migration from contaminated groundwater into nearby homes or schools.

3.4.2 Regulatory Compliance Evaluation

3.4.2.1 Petroleum Releases

Of the 89 MCP sites identified in the study areas, 70 sites involved the release of petroleum products to the environment. Petroleum products include gasoline, diesel fuel, home and heavy commercial grades of heating oil. Forty-nine petroleum releases were related to leaking fuel storage tanks. The remaining 21 petroleum releases were related to sudden spills.

DEP prioritized the review of leaking fuel storage tanks because long-term fuel storage tank leaks are more likely to result in sites with groundwater contamination and subsequently, potential indoor air quality impacts. Indoor air contamination may occur if **volatile organic compounds** (VOCs) migrate from contaminated groundwater flowing near or under a school building into the structure itself. (See *Appendix B* for more information regarding the indoor air quality.) The 49 petroleum releases related to leaking fuel storage tanks included:

- 36 sites involving leaking underground fuel storage tanks (USTs);
- three sites involving leaking above ground storage tanks (ASTs); and

- ten sites involving residual petroleum contamination found in the subsurface soils and/or groundwater. Residual petroleum contamination is usually related to releases from historic petroleum storage tanks that were removed many years ago.

DEP audited each of the 49 fuel storage tank related releases and found:

- Cleanup has been completed at 33 sites; and
- Response actions are ongoing at 16 sites. Of these sites:
  - nine sites have long-term remedial systems in operation and
  - seven sites are undergoing comprehensive site investigations.

DEP's regulatory compliance evaluation of these 49 sites identified seven sites with violations ranging from late submittals to incomplete site investigations. Two additional sites were identified that require additional information and comprehensive audits to determine if the Response Action Outcome Statement filed for the site meet MCP performance standards and if additional assessment or cleanup will be necessary. These audits are currently being conducted. Based upon the information available and DEP experience, DEP determined that the violations identified and site-specific conditions at these locations did not require accelerated response actions and did not result in a health risk to school children or nearby residents.

DEP identified 21 locations where sudden petroleum releases occurred. These releases include spills from fuel transfer operations (e.g. overfills), vehicle accidents, etc. Since these releases are sudden and the quantity of each release can be reasonably estimated, there is low likelihood for widespread impact to soil or groundwater. These sites are generally cleaned up quickly and effectively with little residual contamination remaining in the environment and therefore pose low potential for sensitive receptor exposure. DEP's audit of the 21 sudden petroleum releases found:

- Cleanup had been completed at 17 releases;
- Two releases are undergoing active investigation; and
- Two releases have not submitted final cleanup reports (RAOs). However, cleanup at these releases is believed to be complete.

DEP review determined that four of the 21 sudden petroleum releases were in non-compliance. None of these releases were found to pose a risk to the school children or nearby residents.

3.4.2.2 Hazardous Materials Releases

The remaining 19 releases involve hazardous materials (industrial chemicals such as acids, solvents, metals, etc.). Ten of these releases resulted in subsurface soil or groundwater contamination, which is indicative of long-term leaks from above or underground storage tanks and/or historical dumping. These types of releases usually pose a greater long-term exposure risk than a sudden release of a known quantity, such as a ruptured drum. DEP review of the ten releases found:

- Cleanup has been completed at two sites; and
- Eight sites are undergoing active investigation or remediation.

DEP audit of these sites found one location to be in noncompliance with required report submittal deadlines.

Nine releases of hazardous materials were related to sudden spills to the ground surface. DEP review found that clean up has been completed at all of these locations and that the response actions conducted were in compliance with the MCP.

3.4.2.3 Targeted Review of Response Actions in Environmental Justice Areas

DEP also conducted a targeted review of response actions at MCP sites within designated Environmental Justice areas of Fall River. Specifically, the following four types of response actions were evaluated: Immediate Response Actions (IRA), Phase V or Remedy Operation Status, Utility-related Abatement Measures, and Downgradient Property Status (DPS) submittals.

DEP identified nine sites where time-critical response actions (IRAs) are currently required [*Table 3*]. DEP's evaluation of these IRA sites revealed that six of these sites were not in compliance with one or more requirements of the MCP. Review of site-specific conditions showed that none of the sites posed a risk to school children or nearby residents.

DEP reviewed nine sites where long-term cleanup actions are being implemented (Phase V or Remedy Operation Status) [*Table 4*]. DEP inspected the operating remedial systems at each site and found the systems are being operated in compliance with the MCP.

Utility-related Abatement Measure (URAM) plans were submitted for four locations in the study area when contamination was discovered during utility construction projects [*Table 5*]. In two cases, the source(s) of contamination have been identified and the potentially responsible parties have been notified of their cleanup obligations. DEP is working to identify the sources of contamination at the remaining locations. None of the releases were found to require an accelerated response action such as an IRA.

Downgradient Property Status (DPS) submittals were filed for four locations where contamination was discovered in the study area [*Table 6*]. DEP identified the source of contamination in three of the Downgradient Property Status (DPS) submittals and is currently investigating the source of the fourth. In the three instances where accelerated response actions were found to be necessary, the party responsible for the release has taken timely and proper action and site conditions do not appear to pose risk to school children or nearby residents.

3.4.2.4 Hazardous Waste Generators

DEP identified four hazardous waste generators that required evaluation to confirm that waste was being handled, stored and disposed of properly [*Table 7*]. DEP conducted compliance inspections at three facilities. No significant violations were found. No activity was observed that would suggest unpermitted discharges of hazardous wastes or waste oil to the environment.

3.4.3 DEP Utilization of State Environmental Cleanup Contractors

DEP was prepared to utilize its state environmental cleanup contractors to conduct response actions at any MCP site in noncompliance where, as a result of this evaluation, DEP determined that site conditions posed a serious risk to the public and the potentially responsible parties were unwilling or unable to conduct the work. No such instances of noncompliance were identified in the study area; therefore, it was not necessary for DEP to mobilize its contractors to perform response actions as part of this study.

3.4.4 DEP Enforcement Actions

DEP regularly tracks potentially responsible parties' compliance with submittal deadlines and "triages" the quality of report submittals, particularly those related to IRAs, Tier Classification, Phase V/ROS and RAO. In addition, through both targeted and random selection processes, DEP conducts technical audits and compliance reviews of a large number of Response Action Outcomes (RAOs) each year to ensure that response actions were done properly and that public health and the environment was protected.

As a result of DEP's routine auditing and compliance review processes, enforcement actions had previously been taken at 20 of the sites (23%) in the study area prior to the initiation of this study. Enforcement actions taken previous to and as a result of this study included:

- Issuance of Notices of Noncompliance (NONs), which set enforceable deadlines by which potentially responsible parties are required to correct violations;
- Negotiation of Administrative Consent Orders, which are enforceable agreements with parties establishing deadlines for cleanup to be completed; and,
- Issuance of Unilateral Orders and Penalties, which requires a party to conduct cleanup actions within prescribed deadlines and pay a penalty for past noncompliance.

As a result of this project, DEP initiated new enforcement actions at ten MCP sites (11%) where noncompliance was identified. Six NONs were issued to potentially responsible parties for sites due to missed MCP submittal deadlines. Four of these locations have returned to compliance and one site has made significant progress toward returning to compliance. Two NONs were issued to resolve errors found in deed restrictions, which are required by the MCP to document contamination remaining in subsurface soils. Both of these sites have returned to compliance. DEP issued one NON that invalidated a Response Action Outcome Statement and required that additional work be conducted. This site is making significant progress toward returning to compliance. DEP also issued a Unilateral Order and Penalty to a site owner for failing to comply with a NON issued prior to the initiation of this study.

DEP initiated enforcement actions and reached enforceable agreements with the potentially responsible parties at two sites involving petroleum releases to paved surfaces prior to the initiation of this study. In both cases, DEP believes that cleanup actions have been completed, however, a Response Action Outcome has not been filed. One party is no longer financially viable; DEP is actively pursuing the second party to enforce the conditions of the agreement and has issued a penalty for failing to comply with the agreement.

It is important to note that the compliance rate of parties conducting cleanups at MCP sites in Fall River under the privatized MCP program prior to the initiation of this study was 87%. This includes sites that are currently in compliance with the regulations or sites that are meeting their obligations to return to compliance. The additional enforcement actions initiated as a result of the targeted evaluation of all sites in the study areas has raised the compliance rate to 96%. With the exception of the one site where the party is no longer financially viable, DEP anticipates all remaining locations will return to compliance in the near future.

DEP's routine auditing and compliance evaluation processes, as well as targeted regulatory compliance evaluations like this study, help ensure that the cleanups being conducted by the private sector are protective of public health and the environment and that the small percentage of parties missing MCP deadlines or not conducting work properly return to compliance.

4.0 CONCLUSIONS

DEP conducted a targeted exposure pathway assessment and regulatory compliance evaluation of MCP sites and facilities that generate hazardous waste in the City of Fall River to determine if they have the potential to adversely impact the health, safety and welfare of school children, a particularly sensitive receptor group, or residents living in EJ areas. DEP evaluated all response actions conducted at MCP sites located within 1000 feet of Fall River schools as well as certain response actions conducted at MCP sites located in designated environmental justice areas in Fall River. Review of specific MCP sites and hazardous waste facilities in the study was prioritized based upon the relative potential risk for children to be exposed to soil, groundwater or air contamination from the sites and facilities. Highest priority was given to releases that could impact indoor air in nearby schools or homes and sites where children might come into contact with contaminated surficial soil or could be exposed to contaminated fugitive dust blowing off-site.

The exposure pathway assessment and regulatory compliance evaluation determined that school children and residents within the study areas are not exposed to oil or hazardous materials from MCP sites or facilities that generate hazardous waste. The regulatory compliance evaluation also found that the majority of potentially responsible parties were conducting response actions in accordance with the MCP's performance standards and progress report deadlines.

Although DEP found twelve MCP sites in noncompliance with the Massachusetts Contingency Plan and/or other relevant environmental regulations during this study, based upon available information DEP determined that there were no documented instances where noncompliance has resulted in school children, residents, workers, and visitors being exposed to oil or hazardous materials from these sites. Further, when violations were found during this evaluation, enforcement action was taken by DEP to bring the parties back into compliance.

DEP is committed to ensure the protection of the Commonwealth's public health, welfare, safety and environment. DEP will continue to audit response actions at MCP sites and take enforcement actions when necessary to ensure that contamination is cleaned up properly and on time in Fall River and across Massachusetts.

The findings and conclusions stated in this report are based upon information available to DEP at the time this report was prepared. DEP's statements do not represent DEP regulatory approval under the Massachusetts Contingency Plan (the MCP; 310 CMR 40.0000) of response actions conducted at any site, property or location listed in this report. DEP reserves the right to require response actions under the MCP at any property or location listed in this report should information become available that indicates such response actions are warranted. DEP also reserves the right to initiate appropriate enforcement actions to achieve compliance with the MCP should such actions be found to be necessary.

TABLES

TABLE 1

Compliance Evaluation of MCP Sites Located Within 1000 Feet of Fall River Schools[1]

Alphabetical By School Name

Atlantis Charter School (Level K-8): 2501 South Main Street

RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-0564	Sunoco Service Station	2322 South Main Street	Leaking Gasoline UST	Phase V	DEP audit determined cleanup is progressing properly.	NO
4-0786	Getty Service Station	2291 South Main Street	Leaking Gasoline UST	RAO	DEP audit determined that cleanup was adequate. DEP initiated enforcement to require revision/ratification of deed restriction. Site has returned to compliance.	NO
4-11102	School / Convent	2501 South Main Street	Leaking Gasoline UST	RAO	DEP audit determined that cleanup was adequate.	NO
4-11941	Jenson Manufacturing Company	126 Shove Street	17 Gallon Heating Oil Overfill	RAO	DEP audit determined that cleanup was adequate.	NO
4-12382	NE Electropolishing Company	220 Shove Street	150 Gallons of Diesel Fuel Released from a Vehicle	RAO	DEP review determined cleanup was completed.	NO
4-14675	Former Enos Citgo	2608 South Main Street	Leaking Gasoline UST; Petroleum contaminated soil	RAO	DEP audit determined that cleanup was adequate.	NO
4-14702	Mobil Station	2322 South Main Street	Leaking Gasoline UST	Release linked to 4-0564	DEP audit determined cleanup is progressing properly.	NO
4-18431	McGovern's Family Restaurant	310 Shove Street	23 Gallons Mineral Oil Released from a Transformer	RAO	DEP audit determined that cleanup was adequate.	NO

Key to terms used in this table:

RTN: a "Release Tracking Number" is assigned to releases reported to DEP for tracking purposes.

UST: underground storage tank

Status: This column lists the MCP status for each site. See Section 2 for the definitions for each status type.

(1) Only schools with MCP Sites within 1000 feet are included in this table. Some RTNs appear more than once since the 1000-foot radii for some schools overlap. Some properties have more than one RTN indicating more than one release has been reported on the property. Multiple RTNs for one property are "linked" together under one property address.

BMC Durfee High School (Level 9-12): 360 Elsbree Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-16773	Road Spill	Elsbree Street	100 Gallons of Diesel Fuel from a Vehicle Accident	RAO	DEP review determined cleanup was completed.	NO
Boys Club Alternative School (Level K-5): 803 Bedford Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-0699	Furniture City	40 County Street	Leaking Gasoline UST	Waiver Completion Statement	DEP audit determined that cleanup was adequate.	NO
4-1102	Shop Rite Liquors	879 Pleasant Street	Residual Petroleum Contamination in Soil	No Further Action	DEP determined that no cleanup was necessary.	NO
4-1109	Independent Laundry	192 18th Street	Historic Release of Dry Cleaning Solvents	Phase II	DEP has determined that assessment is progressing properly.	NO
4-6070	Property	673 Bedford Street	Leaking Heating Oil UST	Tier 1D (Default Site)	DEP has initiated higher-level enforcement for failure to perform required response actions.	NO
4-12082	Aberdeen Manufacturing	847 Pleasant Street	Heating Oil Contaminated Soil	RAO	DEP audit determined that cleanup was adequate.	NO
Charles V Carroll School (Level PreK-5): 117 Hood Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-16407	Airport & Riggenbach Road	1325 Main Street	Solvents Released from Floor Drain	RAO	DEP audit determined that cleanup was adequate.	NO
4-16832	Motiva Gas Station	1082 North Main Street	Leaking Gasoline UST	Phase IV	DEP audit determined that cleanup is progressing properly.	NO
4-17269	Motiva Gas Station	1082 North Main Street	Leaking Gasoline UST	Release linked to 4-16832	DEP audit determined that cleanup is progressing properly.	NO

Coughlin School (Level K-5): 1975 Pleasant Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-1122	Property	99 Irving Street	Leaking Heating Oil UST	Tier 1D (Default site)	DEP initiated enforcement due to missed submittals. Site has returned to compliance. RAO submitted 12/30/04. DEP audit determined that cleanup was adequate.	NO
Davol School (Level K-5): 112 Flint Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-12554	Pole #2	Quequechan Street	20 Gallon Mineral Oil Spill from Transformer	RAO	DEP review determined cleanup was completed.	NO
East Gate Christian Academy (Level K-12): 397 Bay Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-12458	Pioneer Finishing	1 Middle Street	30 Gallons of Hydrochloric Acid Released from AST	RAO	DEP review determined cleanup was completed.	NO
4-13173	Pioneer Finishing	1 Middle Street	12 Gallons of Mineral Spirits from a Drum	RAO	DEP review determined cleanup was completed.	NO
4-17649	Close to 916 Bay Street	Bay Street	25 Gallons of Hydraulic Oil Spilled	RAO	DEP review determined cleanup was completed.	NO
Edmond P Talbot Middle School (Level 6-8): 124 Melrose Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-14254	No Location Aid	151 McClosky Street	30 Gallon Spill of Home Heating Oil	RAO	DEP audit determined that cleanup was adequate.	NO
Fall River Alternative School (Level 6-8): 278 President Ave						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-16832	Motiva Gas Station	1082 North Main Street	Leaking Gasoline UST	Phase IV	DEP audit determined that cleanup is progressing properly.	NO
4-17269	Motiva Gas Station	1082 North Main Street	Leaking Gasoline UST	Release linked to 4-16832	DEP audit determined that cleanup is progressing properly.	NO

Fall River Deaconess School (Level K-6): 309 French Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-17503	Charlton Memorial Hospital	363 Highland Ave	20 Gallon Overfill of Diesel Fuel	RAO	DEP review determined cleanup was completed.	NO
Fowler Elementary School (Level K-6): 286 Sprague Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-10102	St Stanislaus School	Rockland Street	65 Gallons of Mineral Oil from a Transformer	RAO	DEP review determined cleanup was completed.	NO
Harriet T Healy School (Level K-5): 726 Hicks Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-11375	Argus Realty	109 Howe Street	White Powdery Material Reported in Cook Pond/ Solvents (TCE) detected in Groundwater	IRA/Phase IV	DEP review determined that response actions are progressing properly.	NO
4-13573	Argus Realty	109 Howe Street	Petroleum Contaminated Soil at UST Removal	RAO	DEP audit determined that cleanup was adequate.	NO
4-14540	Argus Realty	109 Howe Street	Groundwater pH< 2 Historic Phosphoric Acid Release	IRA/Phase IV	DEP review determined that response actions are progressing properly.	NO
4-18547	Argus Realty	109 Howe Street	Petroleum Compounds Detected in Groundwater	Phase II	DEP review determined that assessment is progressing properly.	NO
4-15886	Reflex Corporation	109 Howe Street	Solvents detected in Groundwater	Release linked to 4-11375	DEP review determined that assessment is progressing properly.	NO
Hector L Belisle School (Level K-6): 40 Clarkson Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-6076	Fall River Metals	1611 Bay Street	Leaking Fuel Oil UST	RAO	DEP audit determined that cleanup was adequate.	NO
4-17801	Vacant Lot	1611 Bay Street	Petroleum Contamination in Soil	RAO	DEP audit determined that contaminant concentrations are below risk standards.	NO

Henry Lord Middle School (Level 6-8): 151 Amity Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-10643	No Location Aid	864 Stafford Road	Leaking Gasoline UST	RAO	DEP audit determined that cleanup was adequate.	NO
Holy Name School (Level PreK-8): 850 Pearce Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-16339	Cumberland Farms	Robeson Street	20 Gallon Spill of Diesel Fuel	RAO	DEP audit determined that cleanup was adequate.	NO
Holy Trinity School (Level PreK-8): 64 Lamphor Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-10643	No Location Aid	864 Stafford Road	Leaking Gasoline UST	RAO	DEP audit determined that cleanup was adequate.	NO
John J Doran School (Level PreK-5): 101 Fountain Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-0081	Tillotson Corporation	106 Ferry Street	Referral from EPA due to improper drum storage	Not a Site	DEP review determined that a release did not occur.	NO
4-0358	Quaker Fabrics	81 Ferry Street	#6 Fuel Oil released onto ground surface	Phase II	DEP audit determined additional assessment is necessary. DEP initiated enforcement actions. DEP is negotiating an Administrative Consent Order with enforceable deadlines.	NO
4-0884	Property	125 Broadway	Petroleum & Lead Contamination in Urban Fill	LSP filed No Further Action Determination	DEP audit determined contaminant concentrations were below reportable concentrations.	NO
4-10147	State Pier/Battleship Cove	Water Street	350 lbs of Sodium Hydroxide discarded in dumpster	RAO	DEP review determined cleanup was completed.	NO
4-10686	Tillotson Company	106 Ferry Street	3000 gallons sodium hydroxide released from ruptured pipe	RAO	DEP review determined cleanup was completed.	NO

John J Doran School (Level PreK-5): 101 Fountain Street (Continued)						
4-12220	Borden & Remington	106 Ferry Street	Threat of Release from Improperly Stored Drums of Industrial Chemicals	RAO	DEP audit determined drums were removed and no release occurred.	NO
4-12865	No Location Aid	106 Ferry Street	15 gallons of alcohol released from ruptured pipe	RAO	DEP review determined cleanup was completed.	NO
4-13126	Quaker Fabrics- J Plant	81 Ferry Street	Free Product (#4 Heating Oil) discovered on Groundwater	Release linked to 4-0358	DEP audit determined additional assessment is necessary. DEP initiated enforcement actions. DEP is negotiating an Administrative Consent Order with enforceable deadlines.	NO
4-13688	J&P Gas Inc.	167 Broadway	Leaking Gasoline USTs	RAO	DEP audit & site inspection determined additional documentation is necessary to support RAO.	NO
4-14761	Heveatex	106 Ferry Street	100 gallons of liquid plastic compound (methyl methacrylate) overfill	RAO	DEP review determined cleanup was completed.	NO
4-14634	No Location Aid	106 Ferry Street	900 gallons of ferric chloride solution released from railroad tank car	RAO	DEP review determined cleanup was completed.	NO
4-15354	Quaker Fabrics	81 Ferry Street	50 gallons of mineral oil released from a transformer	RAO	DEP review determined cleanup was completed.	NO
4-17940	Borden Light Marina	Ferry Street	Diesel fuel release from leaking boat resulting in oil sheen on water	Regulated by Coast Guard	Coast Guard oversaw cleanup. DEP determined that release was adequately regulated.	NO
Laurel Lake School (Level K-5): 152 Orswell Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-0795	Shell Service Station	19 Laurel Street	Leaking Gasoline & Fuel Oil USTs	RAO	DEP audit determined that cleanup was adequate.	NO

Leontine Lincoln School (Level K-5): 439 Pine Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-12428	WW Leach Building	196 Bedford Street	Leaking #2 Heating Oil UST	RAO	DEP audit determined that the RAO does not meet all MCP performance standards. DEP will require additional assessment be conducted at this site.	NO
Matthew J Kuss Middle School (Level 6-8): 289 Rock Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-10513	NYNEX Switching Station	326 North Main Street	Leaking Diesel Fuel & #2 Oil USTs	RAO	DEP audit determined that cleanup was adequate.	NO
Morton Middle School (Level 6-8): 376 President Ave						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-16407	Airport & Riggenbach Road	1325 Main Street	Solvents Released from Floor Drain	RAO	DEP audit determined that cleanup was adequate.	NO
4-16832	Motiva Gas Station	1082 North Main Street	Leaking Gasoline UST	Phase IV	DEP audit determined that cleanup is progressing properly.	NO
4-17269	Motiva Gas Station	1082 North Main Street	Leaking Gasoline UST	Release linked to 4-16832	DEP audit determined that cleanup is progressing properly.	NO
N B Borden School (Level K-5): 45 Morgan Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-17782	Commercial Building	289 Milliken Blvd	Gasoline Odors in Basement	RAO	DEP audit determined that response actions were adequate.	NO

Osborn Street School (Level K-6): 160 Osborn Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-10102	St Stanislaus School	Rockland Street	65 Gallons of Mineral Oil from a Transformer	RAO	DEP review determined cleanup was completed.	NO
4-12949	Getty Gas Station	969 South Main Street	Leaking Gasoline UST	RAO	DEP audit determined that cleanup was adequate.	NO
4-13764	Hebert-Hathaway Funeral Home	945 South Main Street	Leaking Gasoline UST from upgradient property resulted in groundwater contamination	DPS related to 4-14227	DEP audit of DPS determined that it was adequate.	NO
4-14227	Main Street Garage	969 South Main Street	Leaking Gasoline UST	Phase V	DEP audit determined that cleanup is progressing properly.	NO
4-15292	Saint Anne's Hospital	795 Middle Street	Leaking AST; Petroleum contaminated soil	RAO	DEP audit determined that cleanup was adequate.	NO
4-15456	Main Street Garage	969 South Main Street	Leaking Gasoline UST	Release linked to 4-14227	DEP audit determined that cleanup is progressing properly.	NO
Ralph M Small School (Level K-5): 140 London Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-0343	Bedford Street Extra Mart	1012 Bedford Street	Leaking Gasoline UST Piping	RAO	DEP audit determined that cleanup was adequate. DEP initiated enforcement to require revision of deed restriction. Site has returned to compliance.	NO
Samuel Watson School (Level K-5): 935 Eastern Avenue						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-0829	Elbe Cesco Inc	649 Alden	Leaking UST; Petroleum contaminated soil & groundwater	RAO	DEP audit determined that cleanup was adequate.	NO

Spencer Borden School (Level PreK-5): 1400 President Avenue						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-16773	Road Spill	Elsbree Street	100 Gallons Diesel Fuel Release from Vehicle Accident	RAO	DEP review determined cleanup was completed.	NO
St Anne School (Level PreK-8): 240 Forest Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-11771	No Location Aid	353 Ridge Street	30 Gallon Spill of Home Heating Oil	RAO	DEP review determined cleanup was completed.	NO
4-12949	Getty Gas Station	969 South Main Street	Leaking Gasoline UST	RAO	DEP audit determined that cleanup was adequate.	NO
4-13764	Hebert-Hathaway Funeral Home	945 South Main Street	Leaking Gasoline UST on upgradient property resulted in groundwater contamination	DPS related to 4-14227	DEP audit of DPS determined that it was adequate.	NO
4-14227	Main Street Garage	969 South Main Street	Leaking Gasoline UST	Phase V	DEP audit determined that cleanup is progressing properly.	NO
4-15292	Saint Anne's Hospital	795 Middle Street	Leaking Fuel Oil ASTs	RAO	DEP audit determined that cleanup was adequate.	NO
4-15456	Main Street Gas	969 South Main Street	Leaking Gasoline UST	Release linked to 4-14227	DEP audit determined that cleanup is progressing properly.	NO
St Michael Elementary School (Level K-8): 209 Essex Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-12673	Brightman Street Bridge	Brightman Street	Petroleum, Solvent & Metal Contaminated Fill & Groundwater	RAO	DEP audit determined that contaminant concentrations are below risk standards.	NO
4-12767	Old Sagamore #1	140 Ace Street	50 Gallon Spill of Heating Oil	RAO	DEP review determined cleanup was completed.	NO
4-12929	Demers Citgo	405 Brightman Street	Leaking Gasoline UST	RAO	DEP audit determined that RAO is invalid. DEP initiated enforcement to require additional assessment. Site is returning to compliance by meeting DEP established compliance deadlines.	NO
4-15656	Taunton River	Brightman Street Bridge	100 Gallon Vegetable Oil Spill to the River	Regulated by Coast Guard	Coast Guard oversaw cleanup.	NO

St Stanislaus School (Level PreK-8): 37 Rockland Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-10102	St Stanislaus School	Rockland Street	65 Gallons of Mineral Oil from a Transformer	RAO	DEP review determined cleanup was completed.	NO
4-10875	No Location Aid	1173 South Main Street	Leaking Heating Oil UST	RAO	DEP audit determined that cleanup was adequate.	NO
4-12949	Getty Gas Station	969 South Main Street	Leaking Gasoline UST	RAO	DEP audit determined that cleanup was adequate.	NO
4-13764	Hebert-Hathaway Funeral Home	945 South Main Street	Leaking Gasoline UST from upgradient property resulted in groundwater contamination	DPS related to 4-14227	DEP audit of DPS determined that it was adequate.	NO
4-14227	Main Street Garage	969 South Main Street	Leaking Gasoline UST	Phase V	DEP audit determined that cleanup is progressing properly.	NO
4-15456	Main Street Gas	969 South Main Street	Leaking Gasoline UST	Release linked to 4-14227	DEP audit determined that cleanup is progressing properly.	NO
4-17304	No Location Aid	813 Broadway	Leaking Gasoline & Fuel Oil USTs	RAO	DEP audit determined that cleanup was adequate.	NO
Stone School (Level PreK-2): 1207 Globe Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-0224	Dias Auto Center	208 Stafford Road	Leaking Gasoline UST	RAO	DEP audit determined that cleanup was adequate.	NO
4-10491	Richie's Automotive	182 Stafford Road	Leaking Heating Oil UST	IRA/Tier 1D	DEP initiated enforcement due to failure of PRP to conduct required response actions. Site has returned to compliance. RAO submitted 5/31/05. DEP audit determined that cleanup was adequate.	NO
4-16675	Globe and Slade Street	Stafford Road	40 Gallon Spill of Hydraulic Oil from a Vehicle	RAO	DEP audit determined that cleanup was adequate.	NO

Westal School (Level K-5): 276 Maple Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-10513	NYNEX Switching Station	326 North Main Street	Leaking Diesel Fuel & #2 Oil USTs	RAO	DEP audit determined that cleanup was adequate.	NO
4-14763	Dept of Employment and Training	446 North Main Street	Leaking Heating Oil UST	RAO	DEP audit determined that cleanup was adequate.	NO
William J Wiley School (Level K-5): 2585 North Main Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-0749	Shell Oil Company	1 New Street	Historic Releases of Petroleum at a Bulk Oil Facility	Phase V	DEP audit determined that cleanup is progressing properly.	NO
4-0930	Shell Bulk Fuel Terminal	1 New Street	Historic Releases of Petroleum at a Bulk Oil Facility	Phase IV	DEP audit determined that cleanup is progressing properly.	NO
William S Greene School (Level PreK-5): 409 Cambridge Street						
RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*School Children at risk?*
4-16308	Greene School	Cambridge and Jackson	Residual Heating Oil Contamination in Soil	RAO	DEP audit determined that cleanup was adequate.	NO

TABLE 2

Fall River Schools With No MCP Sites Located Within 1000 Feet

NAME	***ADDRESS***
ANTIOCH SCHOOL LEVEL PreK-8	618 ROCK STREET
A S LETOURNEAU SCHOOL LEVEL K-5	323 ANTHONY STREET
BISHOP CONNOLLY HIGH SCHOOL LEVEL 9-12	373 ELSBREE STREET
DIMAN REGIONAL VOCATIONAL TECHNICAL HIGH SCHOOL LEVEL 9-12	251 STONEHAVEN ROAD
ESPIRITO SANTO ELEMENTARY SCHOOL LEVEL PreK-8	143 EVERETT STREET
HUGO A DUBUQUE SCHOOL LEVEL K-5	330 OAK GROVE AVENUE
JAMES TANSEY SCHOOL LEVEL PreK-5	711 RAY STREET
NORTH END ELEMENTARY SCHOOL LEVEL PreK-5	1899 MERIDIAN STREET
NOTRE DAME SCHOOL LEVEL PreK-8	34 ST JOSEPH STREET
SAINTS PETER + PAUL SCHOOL LEVEL PreK-8	240 DOVER STREET
SETON ACADEMY LEVEL PreK-8	300 NORTH EASTERN AVENUE
SLADE SCHOOL LEVEL K-6	200 LEWIS STREET
ST VINCENT SCHOOL LEVEL PreK-12	2425 HIGHLAND AVENUE
SUSAN H WIXON SCHOOL LEVEL K-5	263 HAMLET STREET
WILLIAM CONNELL SCHOOL LEVEL K-5	650 PLYMOUTH AVENUE

TABLE 3

Compliance Evaluation of MCP Sites with Open Immediate Response Actions Located Within a Fall River Designated Environmental Justice Area[1]

RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action/ Determination*	*Children/ Residents at risk?*
4-10491	Ritchie's Automotive*	182 Stafford Street	Leaking Underground Heating Oil Storage Tank	Preliminary Response Actions	DEP initiated enforcement actions due to PRP failure to conduct required response actions. Site has returned to compliance. RAO submitted 5/31/05/. DEP audit determined that cleanup was adequate.	NO
4-11375	Argus Realty Limited Partnership*	109 Howe Street	Solvents (TCE) & metals (nickel & lead) detected in groundwater	Phase IV	DEP audit determined that cleanup is progressing properly.	NO
4-12558	Southeastern Regional Transit Authority	601 Brayton Ave	Free-phase diesel oil discovered on groundwater	Phase III	DEP initiated enforcement actions due to numerous missed report submittal deadlines. Site has returned to compliance.	NO
4-14540	Argus Realty Limited Partnership*	109 Howe Street	Groundwater pH<2 due to historic phosphoric acid release	Phase IV	DEP audit determined that response actions are progressing properly.	NO
4-14583	DLD Transport, Inc	Rte 195 East – Exit 8A	25 gallons of diesel / waste oil released from drum to road	Preliminary Response Actions	DEP initiated higher -level enforcement actions due to PRP failure to conduct required response actions. PRP no longer viable. Road spill was cleaned up by MA Highway Dept. & environmental contractors up but is lacking proper documentation (RAO).	NO

(1) Sites with asterisks (*) are also located within 1000 feet of a school.

Table 3 – Page 2 of 2
Compliance Evaluation of MCP Sites with Open Immediate Response Actions Located Within a Fall River Designated Environmental Justice Area

RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action/ Determination*	*Children/ Residents at risk?*
4-15177	Residential Property	777 New Boston Road	Sudden release of 275 gallons of heating oil into a basement	Phase II	DEP initiated enforcement action for failure of PRP to conduct required response actions. Site has returned to compliance.	NO
4-17259	Alert Ambulance/Hess Station	175 Milliken Blvd	25 gallons of gasoline released to the pavement	Tier 1D Default Site	DEP initiated higher-level enforcement actions due to PRP failure to conduct required response actions.	NO
4-17647	New England Gas Company	66 5th Street	Cyanide detected in groundwater	Phase II	DEP audit determined that cleanup is progressing properly.	NO
4-18142	Former Globe Manufacturing Company	456 Bedford Street	Free-phase toluene detected on groundwater	Preliminary Response Actions	DEP initiated enforcement actions for failure to submit required status reports. Site has returned to compliance.	NO

TABLE 4

Compliance Evaluation of MCP Sites in Phase V or Remedy Operation Status Located Within a Fall River Designated Environmental Justice Area[1]

RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*Children/ Residents at risk?*
4-0564	Former Gasoline Station*	2322 South Main Street	Leaking Gasoline Underground Storage Tank	Phase V	DEP audit determined that cleanup (bioremediation) is progressing properly.	NO
4-1062	Shell Service Station	33 Mariano Bishop Blvd	Leaking Gasoline Underground Storage Tank	Phase V	DEP audit determined that cleanup (peroxide injection to enhance biological activity) is progressing properly.	NO
4-1066	Mobil Station	408 Rhode Island Ave	Leaking Gasoline Underground Storage Tank	Phase V	DEP audit determined that cleanup (monitored natural attenuation) is progressing properly.	NO
4-1071	Coca Cola Bottling Company	1244 Davol Street	Leaking Diesel Underground Storage Tank	Remedy Operation Status	DEP audit determined that cleanup (enhanced fluid recovery with surfactant & bioenhancement compound application) is progressing properly.	NO
4-0749	Shell Oil Company*	1 New Street	Numerous historical releases at a bulk oil facility with free-phase petroleum on groundwater	Phase V	DEP audit determined that cleanup is progressing properly. DEP inspection of groundwater recovery & treatment system determined system is in compliance.	NO
4-11245	Gold Metal Bakery	1397 Bay Street	Leaking Gasoline Underground Storage Tank	Phase V	DEP audit determined that cleanup is progressing properly. DEP inspection of biological treatment system determined system is in compliance.	NO

(1) Sites with asterisks (*) are also located within 1000 feet of a school.

Compliance Evaluation of MCP Sites in Phase V or Remedy Operation Status Located Within a Fall River Designated Environmental Justice Area

RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*Children/ Residents at risk?*
4-14227	Main Street Garage*	969 South Main Street	Leaking Gasoline Underground Storage Tank	Phase V	DEP audit determined that cleanup is progressing properly. DEP inspection of soil vapor extraction treatment system determined system is in compliance.	NO
4-14895	Merit Station	614 Pleasant Street	Leaking Gasoline Underground Storage Tank	Remedy Operation Status	DEP audit determined that cleanup (oxygen releasing compounds injection to enhance biological activity) is progressing properly.	NO
4-14702	Former Gasoline Station*	2322 South Main Street	1000 Gallons released from Leaking Gasoline Underground Storage Tank	Phase V	Release linked to RTN 4-0564. DEP audit determined that cleanup (bioremediation) is progressing properly.	NO

TABLE 5

Compliance Evaluation of MCP Sites with Utility-Related Abatement Measures Located Within a Fall River Designated Environmental Justice Area[1]

RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*Children/ Residents at risk?*
4-14919	Birch Street*	Birch Street	Petroleum impacted soil discovered during sewer line installation	URAM Completed	DEP audited URAM Completion Statement and identified a New England Gas Co. bulk oil storage facility a potential source of the contamination. New England Gas Co has agreed to conduct an investigation in this area.	NO
4-17254	Beneath Braga Bridge	Pond Street	Petroleum impacted groundwater discovered during gas line installation	URAM Completed	DEP is evaluating the location for potential sources of contamination – Site Discovery activities are ongoing	NO
4-18524	Along Francis Street	Francis and Plymouth Street	Petroleum impacted soil discovered during gas line installation and repair	URAM Completed	DEP is evaluating the location for potential sources of contamination – Site Discovery activities are ongoing	NO
4-17493	Hathaway Street Substation	Hathaway Street	Petroleum impacted soil discovered during electric line construction	URAM Completed & RAO	Massachusetts Electric Co. conducted response actions and recently completed cleanup of the site. DEP audit determined that cleanup was adequate.	NO

(1) Sites with asterisks (*) are also located within 1000 feet of a school.

TABLE 6

Compliance Evaluation of MCP Sites with Downgradient Property Status Submittals Located Within a Fall River Designated Environmental Justice Area[1]

RTN	*Site Name*	*Street Address*	*Description of Release*	*Status*	*DEP Action / Determination*	*Children/ Residents at risk?*
4-18902	Gold Metal Bakery	1397 Bay Street	Chlorinated solvents detected in groundwater	Phase II	DEP audit of DPS determined it was adequate. DEP issued a Notice of Responsibly to Westrex (4-0891). Westrex is conducting assessment and remedial activities related to this release.	NO
4-13595	THB Warehouse and Home Center	500 Rodman Street	Chromium detected in groundwater	RAO	DEP audit of DPS determined it was adequate. DEP is evaluating the location for potential sources of contamination – Site Discovery activities are ongoing	NO
4-13764	Hebert-Hathaway Funeral Home*	945 South Main Street	Gasoline contaminated groundwater	Phase V	DEP audit of DPS determined it was adequate. DEP issued a Notice of Responsibility to abutting gasoline station (Walsh Corp 4-14227). Walsh Corp implemented a soil vapor extraction system to address release. DEP inspection of treatment system determined system is in compliance.	NO
4-15520	Massachusetts Electric Co	60 / 82 Hartwell Street	Coal gas waste detected in soil	Phase IV	DEP audit of DPS determined it was adequate. DEP issued a Notice of Responsibility to New England Gas (4-16721). New England Gas is conducting assessment and remedial activities related to this release.	NO

(1) Sites with asterisks (*) are also located within 1000 feet of a school.

TABLE 7

Compliance Evaluation of Inspected Hazardous Waste Generators Located Within 1000 Feet of Fall River Schools

Site Name	*Site Address*	*Type of Facility*	*DEP Compliance Evaluation Results*	*Conclusions*
Abrite Quality Cleaners	181 Presidents Ave	Dry Cleaner	DEP inspection revealed minor violations regarding record keeping and signage – enforcement undertaken to address violations.	No indication of any unpermitted discharges to the environment.
Demers Brothers Citgo	402 Brightman Street	Gas Station	DEP inspection revealed violations regarding record keeping of hazardous waste manifests and an outdoor waste oil storage tank lacking proper protection– enforcement undertaken to address violations. All certifications and permits are current.	No indication of any unpermitted discharges to the environment.
John's Auto Service and Sales	334 President Ave	Automotive Repair Garage	DEP inspection revealed no significant violations. Floor drains noted during the inspection reportedly discharge to an oil/water separator. All certifications and permits are current.	DEP is following up to confirm that floor drains in the vehicle maintenance bays are connected to the sanitary sewer system.
Crosson Oil Company	825 Eastern Ave	Petroleum Dispensing Facility	DEP evaluation revealed that all certifications and permits are current.	No indication of any release from existing USTs.

FIGURES

Figure 1

Fall River Environmental Justice Areas

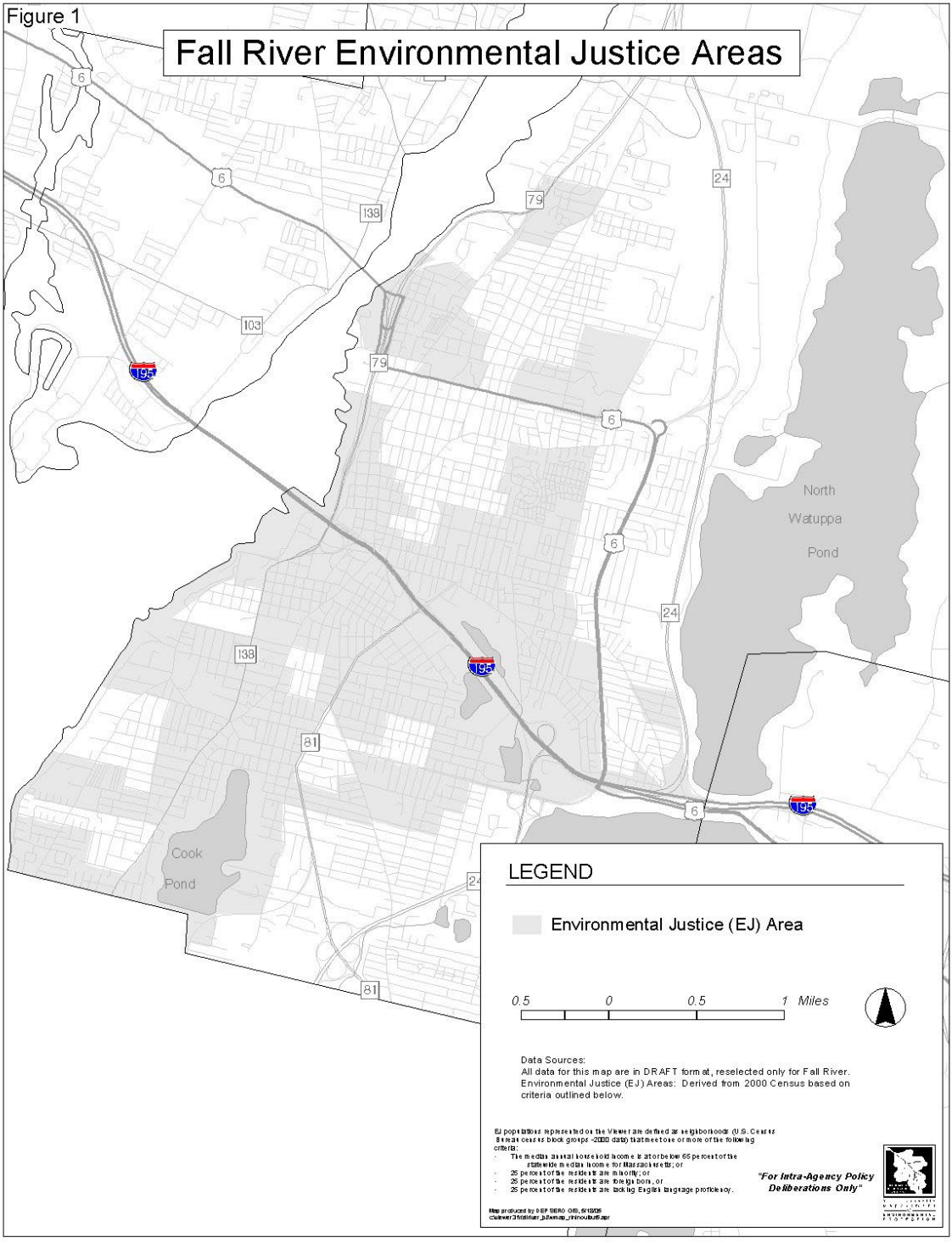
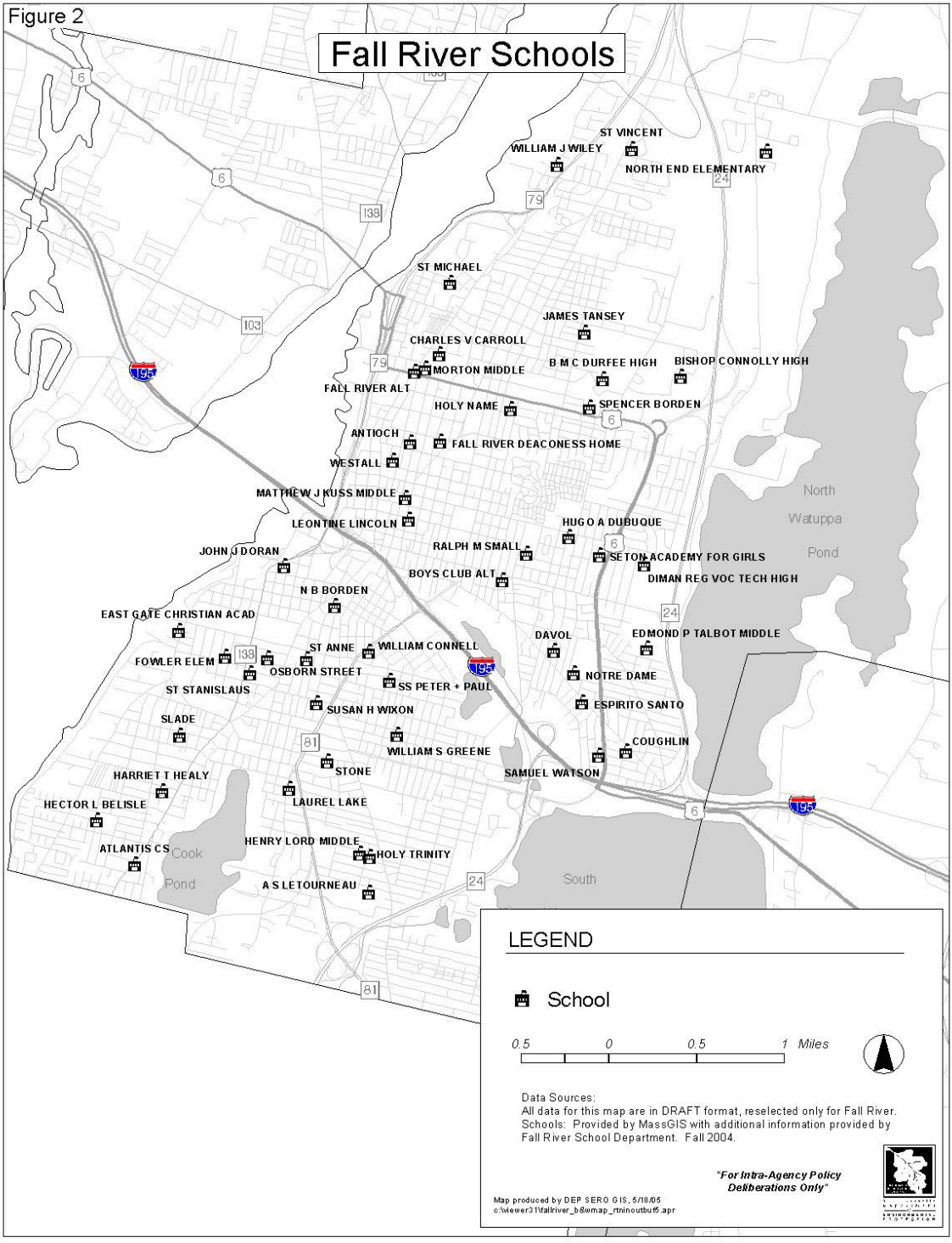


Figure 2



LEGEND

School

0.5 0 0.5 1 Miles

Data Sources:
All data for this map are in DRAFT format, reselected only for Fall River.
Schools: Provided by MassGIS with additional information provided by Fall River School Department. Fall 2004.

"For Intra-Agency Policy Deliberations Only"

Map produced by DEP SERO GIS, 5/18/05
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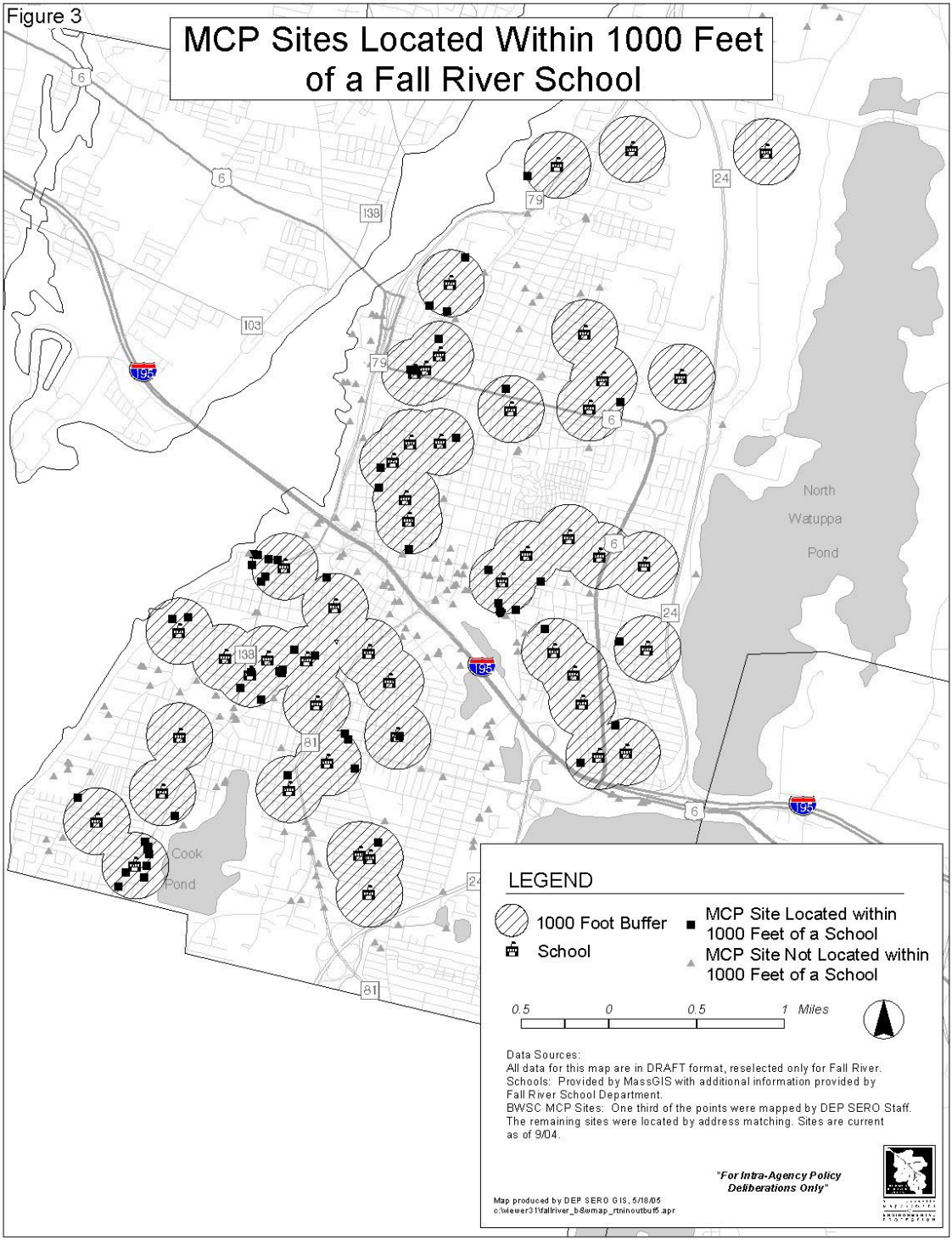
Figure 3

MCP Sites Located Within 1000 Feet of a Fall River School



Data Sources:
All data for this map are in DRAFT format, reselected only for Fall River.
Schools: Provided by MassGIS with additional information provided by Fall River School Department.
BWSC MCP Sites: One third of the points were mapped by DEP SERO Staff. The remaining sites were located by address matching. Sites are current as of 9/04.

"For Intra-Agency Policy Deliberations Only"

Map produced by DEP SERO GIS, 5/18/05
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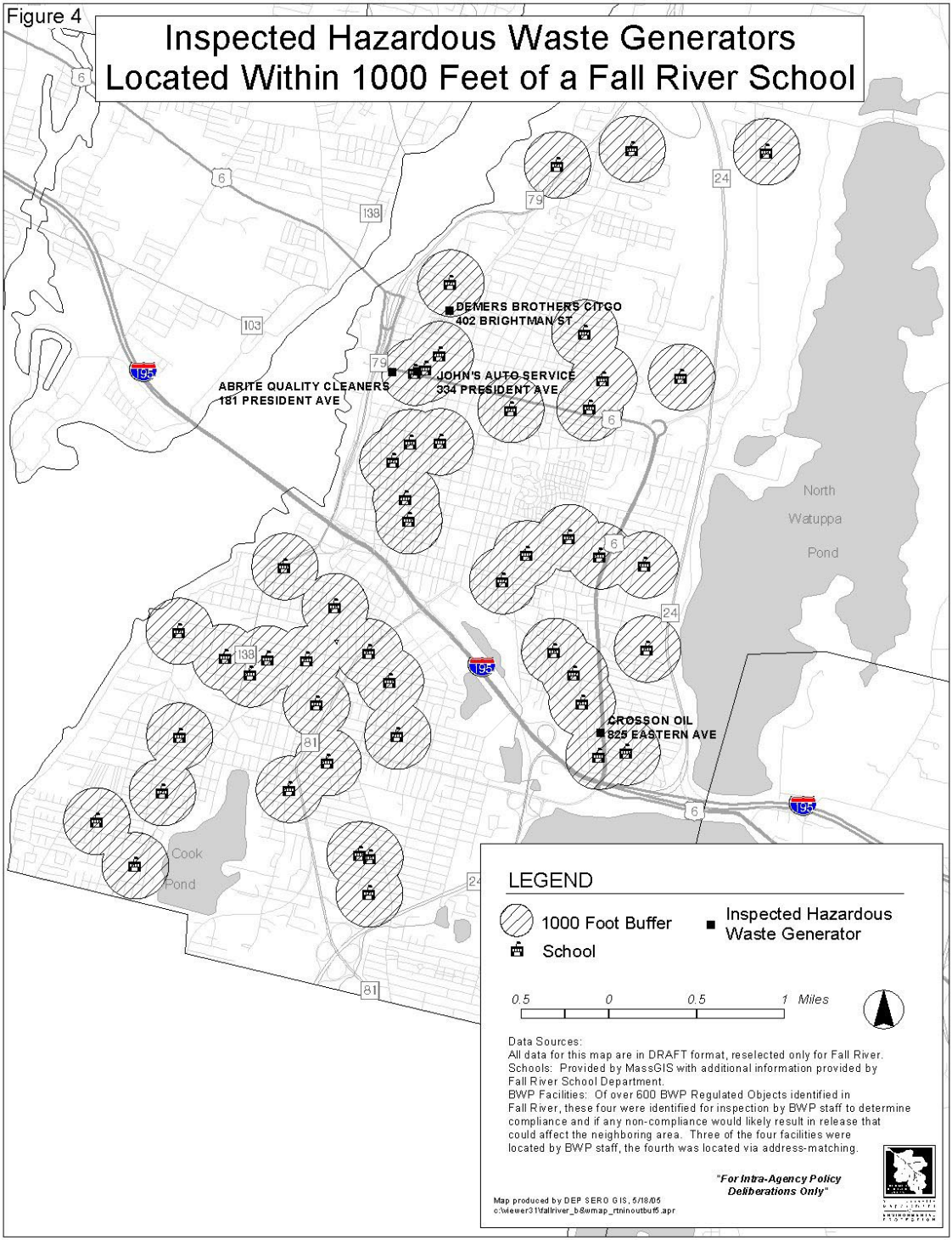
Figure 4

Inspected Hazardous Waste Generators Located Within 1000 Feet of a Fall River School



Data Sources:
All data for this map are in DRAFT format, reselected only for Fall River.
Schools: Provided by MassGIS with additional information provided by Fall River School Department.
BWP Facilities: Of over 600 BWP Regulated Objects identified in Fall River, these four were identified for inspection by BWP staff to determine compliance and if any non-compliance would likely result in release that could affect the neighboring area. Three of the four facilities were located by BWP staff, the fourth was located via address-matching.

"For Intra-Agency Policy Deliberations Only"

Map produced by DEP SERO GIS, 5/18/05
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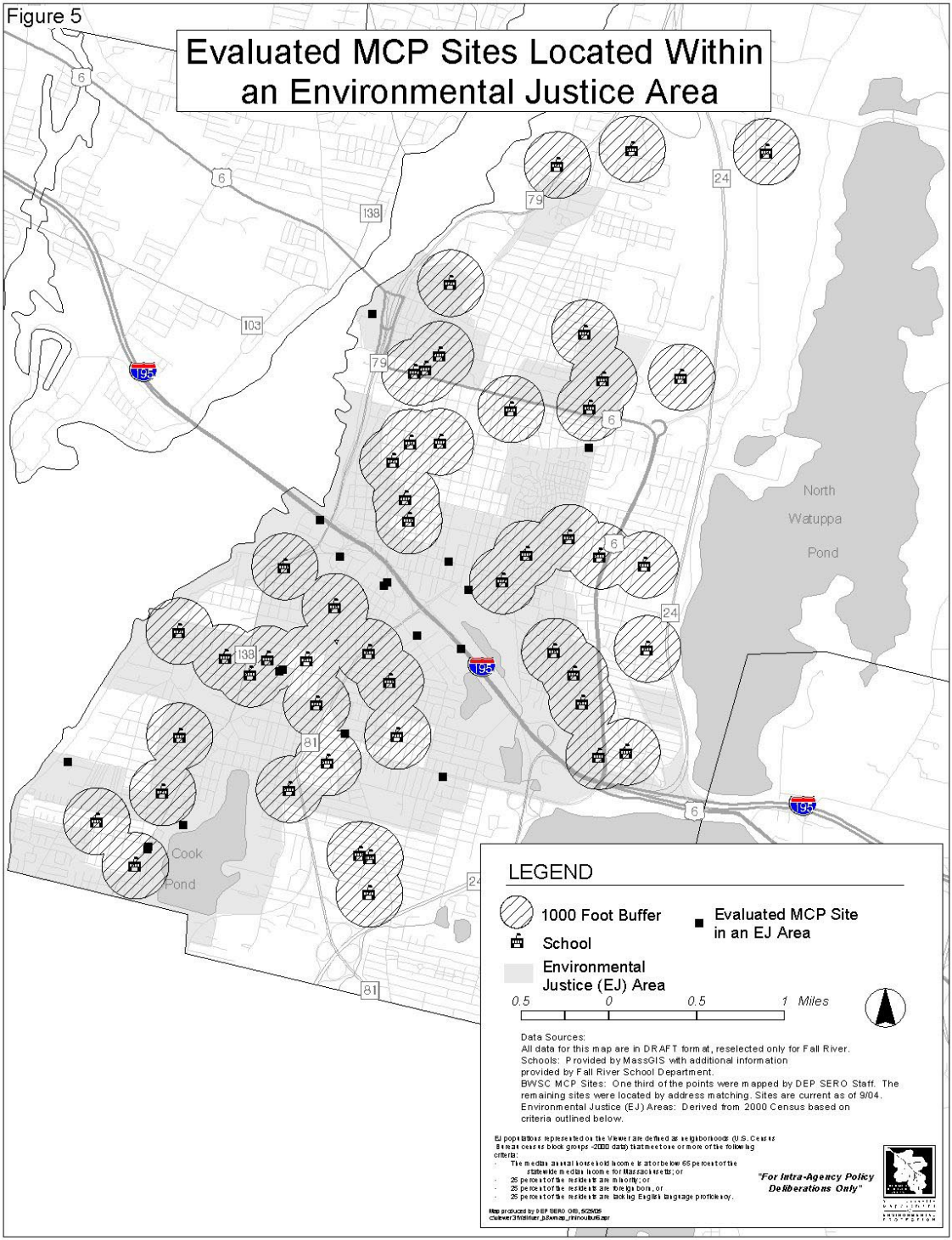
Figure 5

Evaluated MCP Sites Located Within an Environmental Justice Area



APPENDIX A

DEFINITIONS

APPENDIX A – DEFINITIONS

This section contains the definition for terms used in this report that readers may not be familiar with. A comprehensive overview of the Massachusetts Contingency Plan, 310 CMR 40.0000, and Department and Bureau of Waste Site Cleanup operations can be obtained at DEP's web page - http://www.mass.gov/dep/dephome.htm

Audits - Sites that are not actively overseen by DEP are subject to audit by the agency. In general, DEP may conduct a *random audit* of a Response Action Outcome statement within 2 years of filing, or, where evidence exists indicating a potential problem with a site or filing, a *targeted audit* of a Response Action Outcome statement within 5 years of filing. Unless and until a site/submittal is audited by the agency and found to be in noncompliance, the opinions/findings of the Licensed Site Professional are considered to be valid and complete.

Contaminated media – This term includes contaminated groundwater, sediments, soil and/or surface water.

Contamination – This "catchall" term includes materials regulated by the MCP (oil, hazardous materials and hazardous waste). The study **DID NOT** review the impact of other potential environmental contaminants such as lead and/or copper in drinking water, asbestos and laboratory chemicals. Other programs address these items and information about the State's Healthy Schools program can be found at the following web sites: http://www.mphaweb.org/pol_schools_healthyschools.html and http://www.state.ma.us/dph/beha/iaq/schools/schools.htm.

Downgradient Property Status (DPS) – DEP recognizes that people whose property has been affected by contamination from an upgradient or upstream source may not be able to meet the requirements of the MCP because they do not control the source of contamination. Downgradient Property Status provisions allow people in this circumstance to provide DEP with information showing that contamination on their property is coming from an upgradient property. Once this information (called a "Downgradient Property Status Submittal") is filed in accordance with the MCP, the Downgradient Property Status becomes effective and DEP suspends the deadlines for certain submittals and fees.

Environmental Justice (EJ) - The EJ Policy, developed by the Massachusetts Executive Office of Environmental Affairs, directs state resources to serve the high minority, non-English speaking and low-income neighborhoods across the state. These resources ensure that EJ populations have a strong voice in environmental decision-making, receive the full protection afforded them through existing environmental rules and regulations, and increase access to investments that enhance quality of life in these communities by restoring degraded natural resources, enhancing open space and building the urban park network. Environmental justice is based on the principle that all people have a right to be protected from environmental pollution and to live in and enjoy a clean and healthful environment. Environmental justice is the equal protection and meaningful involvement of all people with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies and the equitable distribution of environmental benefits. Maps showing EJ areas in Massachusetts can be found at http://www.mass.gov/mgis/ej.htm.

Exposure Pathway – The mechanism by which human or environmental receptors inhale, consume, absorb, or otherwise take in oil or hazardous material at an **exposure point**.

Exposure Point – A location of potential contact between a human or environmental receptor and a release of oil or hazardous material. An exposure point may describe an area or zone of potential exposure, as well as a discrete point.

Hazardous Waste Generators – The study reviewed the compliance status of businesses and facilities that generate, store, treat, or dispose of hazardous waste. Information about DEP's Hazardous Waste program can be found at http://www.mass.gov/dep/bwp/dhm/dhmpubs.htm

Immediate Response Action (IRA)- An IRA is an early risk reduction measure required to be conducted at any site when certain time-critical conditions are present, such as a sudden spill or a potential imminent hazard.

Licensed Site Professional (LSP) – An LSP is a professional with considerable experience in the field of MCP site assessment and cleanup, including removal actions. An LSP issues "Waste Site Cleanup Activity Opinions" describing whether contamination is present at a site, what work is needed to clean up any contamination found, and whether that work has been completed in accordance with the MCP. These opinions are based on field assessment, sampling, and careful study of a site. The Licensed Site Professional Board of Registration is independent of DEP. The Board determines whether a person applying for an LSP license meets the licensing qualifications, administers a licensing exam, issues licenses, ensures that LSPs meet requirements for continuing education, and disciplines individuals who do not uphold professional standards. DEP audits LSP Opinions to ensure that the work conducted which led to the Opinion complies with environmental laws and regulations. More information is available by contacting the LSP Board at (617) 556-1091 or visiting its website at http://www.state.ma.us/lsp/. Most LSPs are also members of the LSP Association. Visit its website at http://www.lspa.org/index.html.

Massachusetts Contingency Plan (MCP) – The Bureau of Waste Site Cleanup (BWSC) is responsible for implementing the MCP, 310 CMR 40.0000. The MCP contains the regulations for the notification, assessment and cleanup of releases to the environment of oil or hazardous materials. The regulations are codified in M.G.L. Chapter 21E (c.21E), the Massachusetts Oil and Hazardous Materials Release, Prevention and Response Act (the Statute). The Bureau of Waste Site Cleanup (BWSC) is responsible for implementing the MCP. The regulations and background information about the MCP cleanup program can be found at:
http://www.state.ma.us/dep/bwsc/regs.htm.

MCP site – This is a location where a release (e.g., leak, spill or discharge) of oil or hazardous materials has occurred in a quantity or at a concentration in soil or groundwater that requires reporting to DEP.

No Significant Risk – This is the standard used for determining when a cleanup is complete. A risk assessment is used to characterize the risk associated with an MCP site and determine if a condition of No Significant Risk to human health, safety, public welfare and the environment exists at the site or has been achieved after an environmental cleanup has been completed. Once this condition is achieved, response actions are finished and a Response Action Outcome (RAO) can be filed.

Phase I Initial Site Investigation Report (Phase I)– A Phase I Report summarizes the results of Initial Site Investigation Activities and Preliminary Repose Actions conducted at a site. The report includes a description of the site, site history, site map, site hydrological conditions, contaminant migration pathway and exposure potential as well as an evaluation for the need to conduct Immediate Response Actions at the site.

Phase II Comprehensive Site Assessment Report (Phase II) - A Phase II is a comprehensive site evaluation of the nature and extent of the contamination at the site. The Phase II also evaluates the magnitude of the risk posed by the contamination at the site.

Phase III Identification, Evaluation and Selection of Comprehensive Remedial Action Alternatives Report (Phase III) - A Phase III presents the evaluation of feasible clean up options if a Phase II concludes that a cleanup is necessary.

Phase IV Report Remedial Action Plan (Phase IV)- The Phase IV report contains the detailed design and construction plans for remedial systems and a schedule for the cleanup work.

Potentially Responsible Party - A person who is potentially liable for a release of oil or hazardous material and is required to conduct response actions.

Release Tracking Number (RTN) – When a release of oil or hazardous materials is reported to DEP, a tracking number is assigned through BWSC's response action tracking database. The public can access basic information about the status of any site in the database at: http://www.mass.gov/dep/bwsc/sites/report.htm.

Reportable Quantity - The quantity of oil or hazardous materials, the release of which or threat of release of which requires notification to the DEP.

Response Action Outcome (RAO) - Also referred to as a closure report in this document, an RAO constitutes the final document submitted for a site. The RAO contains all information that has been collected during the cleanup and documents, according to a professional opinion prepared by an LSP, that the site has been cleaned up to a condition of No Significant Risk.

School - Schools included in the study were identified as public and private, primary and secondary schools as identified by the Massachusetts Department of Education. The location and status of public schools were verified with the City of Fall River School Department.

State "Superfund" - At any point in the process, if the party potentially responsible for the assessment and cleanup of a contaminated site is either unable or unwilling to take needed actions, DEP can draw money from the state "superfund" to hire contractors to start and/or finish the job. DEP also has state contractors on standby 24 hours a day to respond to emergency and spill conditions, if necessary. If the state expends funds for such cleanups, DEP may recover up to 3 times its expenses from potentially responsible parties - a strong incentive for those parties that are financially capable to undertake the work themselves.

Tier Classification – Sites that are not cleaned up within one year after the person conducting response actions using the MCP's numerical site ranking system scores being reported to DEP and classified as Tier I or Tier II (see below). The date of Tier Classification starts the compliance "clock" running for submittal of Phase reports and a Response Action Outcome.

Tier I Site – If a site is classified as Tier I, a permit must be obtained from DEP before additional site investigation and cleanup can proceed. Tier I sites are further divided into three categories based on the complexity of the site.

Tier II Site – If a site is classified as Tier II, a permit does not need to be obtained from DEP additional site investigation and cleanup can proceed.

Utility-related Abatement Measure (URAM) – A URAM is conducted in response to contamination discovered during the installation, repair, replacement or decommissioning of underground utilities such as sanitary sewerage, water, or drainage systems, steam lines and natural gas pipelines.

Volatile Organic Compounds (VOCs) – VOCs are organic compounds with a boiling point less than 200 degrees Celsius. A wide array of VOCs are contained in and emitted by products used in home, office, school, and arts/crafts and hobby activities. These products, which number in the thousands, include:

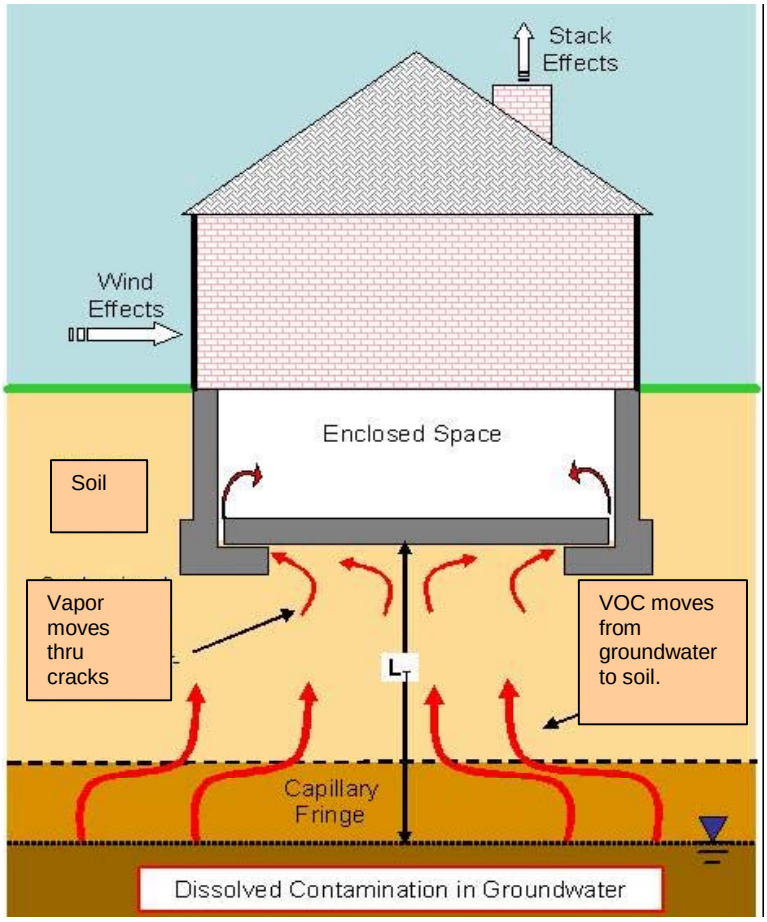
- personal items such as scents and hair sprays;
- household products such as finishes, rug and oven cleaners, paints and lacquers (and their thinners), paint strippers, pesticides (see below);
- dry-cleaning fluids;
- building materials and home furnishings;
- office equipment such as some copiers and printers;
- office products such as correction fluids and carbonless copy paper;
- graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions.

APPENDIX B

INDOOR AIR EXPOSURE PATHWAY

APPENDIX B - INDOOR AIR EXPOSURE PATHWAY

What leads to indoor air impacts?
Under the right conditions, certain **volatile organic compounds** (**VOCs**) can evaporate from groundwater and migrate upwards through soil. When this type of vapor migration happens in an undeveloped area, the vapor disperses into the ambient air. However, in certain circumstances, if there is a building in the way, vapors can enter the building and impact indoor air quality.



Chemicals of concern: Only certain chemicals are a concern. Metals like lead or chromium do not cause indoor air vapors problems. Chlorinated VOCs (e.g., dry cleaning chemicals like PCE or cleaning solvents like TCEC) are more of a problem than non-chlorinated VOCs (e.g., petroleum products). The non-chlorinated VOCs in petroleum do not typically migrate in groundwater more than a few hundred feet from the point they are released (e.g., from an underground storage tank leak) and they can rapidly biodegrade in soil beneath a building, essentially removing them from the soil. Chlorinated VOC contamination in groundwater can travel hundreds of feet and does not biodegrade quickly, allowing a wide area to be impacted with persistent levels of contamination that have a higher potential to migrate upwards into buildings. A wide array of VOCs are contained in and emitted by products used in home, office, school, and arts/crafts and hobby activities. These products, which number in the thousands, include:

- personal items such as scents and hair sprays;
- household products such as finishes, rug and oven cleaners, paints and lacquers (and their thinners), paint strippers, pesticides (see below);
- dry-cleaning fluids;
- building materials and home furnishings;
- office equipment such as some copiers and printers;
- office products such as correction fluids and carbonless copy paper;
- graphics and craft materials including glues and adhesives, permanent markers, and photographic solutions.

At room temperature, VOCs are emitted as gases from certain solids or liquids. VOCs include a variety of chemicals (e.g., formaldehyde, benzene, perchloroethylene), some of which may have short- and long-term effects. Concentrations of many VOCs are consistently higher indoors than outdoors. A study by the federal U.S. Environmental Protection Agency, covering six communities in various parts of the United States, found indoor levels up to ten times higher than those outdoors -- even in locations with significant outdoor air pollution sources, such as petrochemical plants.

How do vapors get into buildings? Vapor migration to a building is more likely to happen if the building is "under-pressurized". There are a number of factors that cause under-pressurization:

- temperature differences between indoor air and the surrounding soils;
- wind and barometric pressure changes;
- "stack effects" of chimneys and flues;
- the operation of exhaust fans/vents; and
- negative pressures created by operation and venting of gas and oil furnaces.

During winter months, a frost layer, frozen ground or snow cover tends to increase the chance of vapor migration to buildings by temporarily preventing vapors from escaping through the exposed ground surface. This is also the time of year when heating boilers are in operation and windows remain closed.

Vapors from contaminated groundwater or soil can migrate into buildings through cracks in masonry foundations. Of particular concern are the small perimeter cracks that generally develop in poured concrete foundations at the intersection of the footing/wall/slab. Other problem areas are the annular spaces around utility pipes, holes in slabs for sump pumps and French drains or crawl spaces with dirt floors.

Testing: Testing for indoor air vapor problems is relatively easy. First, groundwater and soil near and under a building can be tested to see if chemicals that volatize are present at concentrations that might impact indoor air quality. Soil gas samples just beneath a concrete slab can be tested since vapors tend to accumulate in void spaces. Finally, indoor air quality samples can be collected and analyzed for very low chemical concentrations (e.g. parts per billion).

Eliminating indoor air quality problems: In the short term, steps can be taken to prevent vapors from entering a building. Cracks in foundation floors and joints can be sealed with grout or latex caulking. Drainage sumps and crawl spaces can be covered, sealed and externally vented. Adjustments can be made to HVAC systems that allow for fresh/outside air to be used for combustion air in order to prevent depressurization problems. If these measures are not successful, a sub-slab depressurization and venting system can be installed to collect vapors under a foundation and treat them, if necessary, before they are vented to the atmosphere. The long term and preferred permanent solution is to eliminate the source of the chemicals that is impacting groundwater and soil and, if necessary, treat contaminated groundwater that has migrated from the source area that is found to be causing indoor air quality problems.