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IRA COMPLETION, PHASE IV COMPLETION AND CLASS A-2 RESPONSE ACTION OUTCOME STATEMENT

American Auto Auction
93-123 Williams Street
North Dighton, Massachusetts
MADEP RTN #4-16565

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Submitted to:

Massachusetts Department of Environmental Protection
Southeast Regional Office
Bureau of Waste Site Cleanup
20 Riverside Drive
Lakeville, Massachusetts 02347

Prepared for:

American Auto Auction
93-123 Williams Street
North Dighton, Massachusetts 02764

Prepared by:

***SAGE* Environmental, Inc.**
172 Armistice Blvd.
Pawtucket, Rhode Island 02860

SAGE Project No. R035B

April 2007

172 Armistice Blvd.
Pawtucket, Rhode Island 02860
401-723-9900
FAX 401-723-9973
www.sageenviromental.net

April 5, 2007

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Massachusetts Department of Environmental Protection
Southeast Regional Office
Bureau of Waste Site Cleanup
20 Riverside Drive
Lakeville, Massachusetts 02347

RE: IRA Completion, Phase IV Completion and Response Action Outcome Statement
93-123 Williams Street
North Dighton, Massachusetts
RTN #4-16565

Dear Madam or Sir:

On behalf of American Auto Auction, *SAGE* Environmental, Inc. (*SAGE)* offers the enclosed IRA Completion, Phase IV Completion, and Response Action Outcome (RAO) Statement for the referenced property (Site).

This report is provided to present recent confirmatory analytical data and summarize the findings from previous investigations to demonstrate that no further response actions are warranted at the Site. A completed Class A-2 RAO Statement Transmittal Form (BWSC 104), IRA Transmittal Form (BWSC 105) and a Comprehensive Response Action Transmittal form (BWSC 108) are included in **Appendix 1** of the report. A completed Massachusetts Department of Environmental BWSC RAO Technical Screening Audit Form is included as **Appendix 7**.

Should you have any questions or comments, please do not hesitate to contact our office.

Sincerely,
SAGE Environmental, Inc.

Stephen R. Lemoine
Environmental Scientist

Rick Mandile
Principal

SRL/RM:car

Attachment

c: Mike Schaefer, American Auto Auction
Kimberly Tisa, USEPA
Denise Labowski, AIG Technical Services
Matthew E. Hackman, LSP

172 Armistice Blvd.
Pawtucket, Rhode Island 02860
401-723-9900
FAX 401-723-9973
www.sageenviromental.net

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1.0 INTRODUCTION

SAGE Environmental, Inc. (*SAGE*) was retained by American Auto Auction to prepare a Response Action Outcome (RAO) Statement for the property identified by Release Tracking Number (RTN) 4-16565 located at 93-123 Williams Street in North Dighton, Massachusetts (herein after the Site). The location of the Site is depicted on **Figure 1**. This report is provided to supplement data from a Phase II Comprehensive Site Investigation completed in September 2004, provide IRA and Phase IV Completion Statements, and, to demonstrate that a Class A-2 RAO has been achieved.

A copy of the completed Class A-2 RAO Statement transmittal form (BWSC-104), IRA transmittal Form (BWSC 105), and Phase IV Transmittal form (BWSC 108) is included as **Appendix 1**.

1.1 Regulatory Background

Information regarding the regulatory history of the release and parties undertaking response actions is summarized below:

Release Notification Date:	September 15, 2001
Release Tracking Number:	4-16565
Compliance Status:	Tier II, Phase IV
Site Operator:	American Auto Auction 123 Williams Street North Dighton, MA 02724 Mike Schaefer, Assistant General Manager
Current Licensed Site Professional:	Matthew E. Hackman, LSP No. 9456 *SAGE* Environmental, Inc. 172 Armistice Boulevard Pawtucket, RI 02860
Other RTNs pertaining to the property:	4-16839
Latitude and longitude:	41° 52' 33' and 71° 9' 53", respectively
UTM coordinates:	320399E and 4638007N

1.2 Site Description

The Site includes the area of the former Taunton Expo Building, the downslope parking lot areas to the east of the Expo Building, an intermittent stream which extends downstream from the parking lot for approximately 3,000 feet, and approximately 260 feet of grass road shoulder downslope to the west of the former Expo Building. The total Site area is approximately 10 acres, of which approximately 4.0 acres are paved with bituminous concrete ("asphalt"). The Site is located on property, which incorporates portions of four lots and a common easement area bordering Williams Street which is owned by the Town of Dighton. A Plat Map, which depicts the approximate Site boundaries, is included as **Figure 2**. A Site Plan, which depicts major Site features, is attached as **Figure 3**. A Site Plan of the road shoulder area is included as **Figure 4**.

The Site currently contains a small one-story auto reconditioning building and a paved parking lot used for wholesale auto auctioning. The east portion of the Site contains woodland and a constructed drainage ditch with an intermittent stream. The woodland area is isolated from the paved parking lot by a chain link fence.

Approximately 2,500 cars are auctioned or transferred through the facility per week. Automotive washing and light body repair, including painting, are performed within the Recon building. The wash water is stored in aboveground holding tanks within the building and transported off-site for disposal by J.P. Noonan Company.

1.3 Surrounding Area Description

The Site is bound by a vacant lot to the north and undeveloped woodland to the east. To the south is an automotive auction building and an office used by the American Auto Auction. Williams Street bounds the Site to the west. A single-family residence is located to the northwest, approximately 350 feet from the Site boundary.

1.4 Regional Characteristics

According to demographic data obtained from Boston Globe Publishing, the residential population within one-half mile of the Site is estimated to be 98 people (based on the 2000 Census). There are no institutions (as defined in 310 CMR 40.0006) within 500 feet of the Site.

1.5 Reporting Categories

Because a residence is located within 500 feet of the Site, pursuant to 310 CMR 40.0361, the applicable MCP soil reporting category is "RCS-1". Because the Site is not located within a current or potential drinking water source area, the applicable reporting category for groundwater is "RCGW-2".

1.6 Sensitive Receptors

The MADEP Bureau of Waste Site Cleanup Site Scoring Map, which is included as **Appendix 2**, indicates the following:

- No areas mapped as a potentially productive aquifer are shown within a 500-foot radius of the site. An approved Zone II for a public water supply is located approximately 1,500 feet west of the Site along the Segregansett River;
- The Site and surrounding 500-foot radius are not within a 100-year flood plain;
- There are no ground, surface or non-community public water supplies mapped within a 1,000-foot radius.

The Site is not located within 500 feet of the Interim Wellhead Protection area or Zone II for the two nearest municipal water supply wells which are approximately 1,800 feet west of the Site, or within any other current or potential drinking water source area, as mapped by MassGIS. There are no private / non-municipal water supply wells within 500 feet of the Site. No water supply wells are known to have been impacted by the release. However, the northern portion of the Site falls within 30 feet of an existing occupied building.

The Site contains an intermittent stream which is not located within the Zone A of a Class A surface water body. However, this stream discharges to a Zone A surface water supply located approximately 4,000 feet downstream.

The Site and surrounding areas are connected to municipal sewer and water services available from the Town of Dighton.

1.7 Risk Assessment Methods and Applicable Soil and Groundwater Categories

MCP Method 1 risk characterization was used to evaluate soil and groundwater within the disposal site boundary.

The Site is not located within a current or potential drinking water source area, and thus groundwater category GW-1 ***does not*** apply.

Groundwater is typically shallower than 15 feet below grade at the location of the occupied building within the disposal site boundary. Pursuant to 310 CMR 40.0932(2), the applicable Method 1 standard for groundwater in this portion of the Site is "GW-2".

According to the MCP, groundwater at all disposal sites is considered a potential source of discharge to surface waters and shall be additionally categorized "GW-3".

Thus the applicable groundwater categories for the Site are "GW-2" and "GW-3".

The portion of the disposal site that is the American Auto Auction property is substantially paved with bituminous concrete paving, with the exception of small grassed/vegetated areas along Williams Street. The portion of the disposal site east of the chain-link fence is in a wooded/vegetated area.

Adults are present with high frequency but low intensity (due to paving) at the American Auto Auction property. Children may be present, but with low frequency and low intensity (due to paving). Thus the applicable MCP Method 1 soil categories in the paved areas (0-15 feet below grade or fbg) are S-2 and S-3, based on current site use.

In the wooded and vegetated areas, Adults and Children are presumed present with low frequency, but high intensity. Thus the applicable MCP Method 1 soil categories in the vegetated areas (0-15 fbg) are S-1 and S-2, based on current site use.

However, no restriction (Activity and Use Limitation) is being placed on the properties involved, and thus future site use is unrestricted.

Accordingly, the applicable MCP Method 1 soil categories at this site are S-1 (0-15 fbg) and S-3 (>15 fbg).

Site stormwater drainage discharges into a constructed earthen drainage swale, which apparently was previously a natural stream (shown as an unnamed stream on the USGS topographic map, (see **Figure 1**), and which continues southerly as a natural stream, discharging to a wetlands area. Contaminants released by the fire (see **Section 1.6**, below) were carried into this drainage swale and stream and thus impacted sediment and surface water.

Because environmental media other than soil and groundwater are present at the disposal site and were impacted by the release, a MCP Method 3 environmental risk characterization was used to assess sediment and surface water.

Additional discussion of environmental receptors is presented below in **Section 2.0** and subsequent sections.

1.8 Summary of Previous Environmental Investigations

Previous environmental investigations conducted at the Site are summarized in **Table 1**. Results of these investigations are summarized in **Section 4.0**.

Table 1
List of Previous Response Action Reports
93-123 Williams Street
North Dighton, Massachusetts

Immediate Response Action (IRA) Plan	October 2001	*SAGE*
IRA Status Report #1	January 2002	*SAGE*
IRA Modification	April 2002	*SAGE*
IRA Status Report #2	July 2002	*SAGE*
Phase I Initial Site Investigation	September 2002	*SAGE*
IRA Status Report #3	January 2003	*SAGE*
IRA Status Report #4	July 2003	*SAGE*
IRA Status Report #5	January 2004	*SAGE*
IRA Status Report #6	July 2004	*SAGE*
Phase II Comprehensive Site Investigation	September 2004	*SAGE*
IRA Status Report #7	January 2005	*SAGE*
IRA Status Report #8	July 2005	*SAGE*
IRA Status Report #9	January 2006	*SAGE*
IRA Status Report, Phase III Remedial Action Plan, Phase IV Remedy Implementation Plan	July 2006	*SAGE*

1.9 Release Description and Summary of Immediate Response Actions

A fire began Saturday night, September 15, 2001, destroying a three-story building known as the Taunton Expo – a large flea market for approximately 250 vendors. *SAGE* arrived on-site Sunday, September 16, 2001, at approximately 12:00 p.m. Within the burned building were electrical transformers, voltage regulators, and switchgear containing dielectric fluids ("transformer oils"). For convenience, this equipment will herein after be referred to as "transformers." Field testing of transformer oils by representatives of the MADEP suggested that some of the oils contained greater than 50 parts per million (ppm) of polychlorinated biphenyls (PCBs), specifically congeners Aroclors 1254 and 1242.

Subsequent laboratory analysis confirmed that ***one*** of these oils had PCB concentrations of over 95% PCBs. All known transformers and electrical equipment were emptied of their remaining contents into segregated 55-gallon drums. All of the transformers and electrical units were secured by wrapping them in 6-mil polyethylene plastic prior to eventual off-site disposal at a TSCA permitted facility.

Based on available equipment labels and volume estimation, it is *SAGE*'s opinion that approximately 600 gallons of transformer oil was associated with this equipment. Approximately 100 gallons of transformer oil was recovered. Assuming all units were initially full, up to 500 gallons of transformer oil may have been released from these units to the environment. Based on laboratory analysis of six transformer oil samples PCB concentrations were observed to range from 13 mg/kg to 1,000,000 mg/kg (100%).

The oil appears to have been transported by way of a large volume of water that was applied to the building for fire suppression purposes. It appears that the oil was released during the fire as a result of the building collapsing on the transformer units and/or their being grabbed by an excavator-mounted grappling arm. Additionally, it appears that the oil was transported via storm water running across the parking lot and into drainage culverts and swales, which discharge into a constructed drainage swale or ditch (shown as an intermittent stream on the United States Geological Survey quadrangle map) east of the parking lot. This constructed swale or ditch discharges to wetlands located approximately 1/8 of a mile east of the release location.

Contaminated fire-water run-off flowed from the fire location over the paved parking lot, and the grassed verge adjacent to the drainage swale, in sheet flow, the limits of which are shown in **Figure 3**. However, once this flow encountered the drainage swale, the flow was confined to the swale and intermittent stream, and thus the lateral extent of the release was well defined, confined by the banks of the swale/stream channel.

SAGE personnel followed the constructed swale or drainage ditch for approximately ¾ of a mile. There appeared to be an approximate 1,000-foot stretch of swale, ditch or stream bottom that was visibly impacted with a probable mix of oil from the transformers, ash from the fire, and likely, regular parking lot runoff containing crankcase (motor) oil drippage incidental to the operation of motor vehicles. This visible impact had a black and greasy appearance that extended approximately one to two inches into the streambed. Laboratory results of this visibly impacted soil revealed PCBs of less than 1 parts per million (ppm) for all but one sample. A sediment sample collected at the farthest area of known separate phase oil extent exhibited a total PCB concentration of approximately 11.8 ppm. PCB content in water from the stream has ranged from non-detect (< 0.30 part per billion (ppb)) to 15 ppb.

On September 16, 2001, separate phase oil was contained with oil absorbent pads and booms in the stream and drainage swale. Booms were placed beyond the farthest observed separate phase oil, to prevent further migration. Oil saturated pads and booms were changed out and replaced on September 18, 2001 and again on November 16, 2001. The booms were finally removed for disposal by Frank Corporation on July 26, 2002, when no separate phase oil had been observed for over six months.

Based on a Site meeting on September 20, 2001 with MADEP and U.S. Environmental Protection Agency (EPA) representatives, the PCB soil/sediment IRA objective for the Site was determined to be 1.0 ppm (1 mg/Kg) or less, and the groundwater and surface water objectives were determined to be 0.5 µg/l. Oral approval was granted by the EPA and MADEP representatives to remove the top two inches of sediment and/or obvious transformer oil stained soils from the constructed drainage channel and associated feeder swales and the intermittent stream bed.

Beginning October 2, 2001 and continuing through November 16, 2001, the top two inches of sediment were excavated from the bottom and banks of the drainage channel, and associated feeder swales, and the intermittent stream bed by Frank Corporation of New Bedford, Massachusetts. Excavation was performed primarily by hand using shovels and buckets. A backhoe with blade and/or a Bobcat™ with front bucket was used where the channel areas were accessible. Excavated material (remediation waste) was stored temporarily on-Site in 20-yard steel roll-offs lined with 6-mil plastic sheeting, pending waste characterization.

Confirmatory samples were collected at approximately 50-foot intervals from the center of each excavated channel, streambed or swale. Sample locations were marked with stakes, which were located using a Trimble Model TSC1 global positioning system (GPS). Contaminants detected in on-Site media following the completion of initial spill response and sediment excavation (performed as an Immediate Response Action) included PCBs and extractable petroleum hydrocarbons (EPHs), including hydrocarbon ranges and Polycyclic Aromatic Hydrocarbons (PAH) as would be expected from the presence of ash from the fire, but also would be expected as components of crankcase oil drippage from the parking lot.

Within the swale and stream areas of the Site, post-excavation sediment samples for EPH analysis were collected from eight channel locations, which had previously been sampled in September 2001 prior to remediation. EPH at concentrations above background levels appeared to be present in stream sediments at locations MSW-1 and SP-1. (See **Figure 3** for sampling locations). Subsequently, an additional three inches of sediment was removed from these areas on July 26, 2002 and August 2, 2002. Additional confirmatory sampling was conducted to confirm remaining sediment conditions in the stream/swale areas.

The results of those investigations indicated that PCBs exceed the Threshold Effect Concentration (TEC) at one location in the middle swale area (Location MSW-1). Laboratory results for EPH samples indicated that one sample (Location NSW-1) from the north swale area had concentrations of the C_{19}-C_{36} aliphatic range hydrocarbons that exceeded the 90th percentile of the background concentration. Subsequently additional sediment was removed from swale areas (MSW-1 and NSW-1) on April 19, 2004.

Subsequently, post-excavation sampling results indicated that the concentration of PCBs in sediments was reduced to below the TECs, and, the level of EPH was reduced to concentrations below the 90th Percentile of Background for all EPH ranges and target analytes.

At the western disposal site boundary, the Williams Street road shoulder (unpaved surficial soils), EPH was detected in soils at location "SS-2" at concentrations which were elevated relative to the site-specific background EPH concentrations and which were in excess of the Method 1, S-1/GW-2 standard. In view of these results, three inches of soil was excavated from the SS-2 area on July 26, 2002.

Confirmatory analytical results indicated that EPH still remained in residual soils at concentrations above the Method 1 S-1/GW-2 standards. Subsequently, during December 2003, additional soil and groundwater investigations were performed to better define the lateral and vertical extent of the contamination and to evaluate site-specific background concentrations for EPH in soils.

Background sediment samples for extractable petroleum hydrocarbons (EPH) analysis were collected from 12 locations in adjacent drainage channels, which were not impacted by runoff from the fire. Post-excavation sediment samples for EPH analysis were collected from eight channel locations, which were previously sampled in September 2001, prior to excavation. For comparison purposes, on November 2 and November 5, 2001, background sediment samples for EPH analysis were collected from twelve (12) locations in drainage channels on the property, which were not impacted by runoff from the fire. These sample locations, identified as SSW-1 (0-1″), MSW-1 (0-1″), NSW-1 (0-1″), SP-6A, SP-7, SP-8, SP-9, SP-10, BK-1, BK-2, BK-3, BK-4, BK-5, BK-6, BK-7, BK-8, BK-9, BK-10, BK-11, BK-12, are depicted on **Figure 3**.

Based on *SAGE*'s evaluation of the additional soil sampling analytical data, nine soil sample locations within the impacted area of the road shoulder were observed to have concentrations of EPH constituents which exceeded the 90th Percentile Background Concentration. Five of these nine soil sample locations had concentrations of EPH exceeding <u>both</u> the 90th Percentile Background Concentration <u>and</u> Method 1 S-1/GW-2 Standards.

Because the road shoulder is a common easement area owned by the Town of Dighton, implementation of an Activity and Use Limitation would be problematic. Excavation of the impacted soil was thus chosen as the selected remedial alternative to achieve a condition of no significant risk. Hence, on July 21-22, 2004, using a backhoe, impacted soils in the road shoulder area were excavated to a depth of 12 inches. Following excavation, eight confirmatory composite soil samples were collected from the excavation bottoms and sidewalls. Based on the analytical results, the soils in this area of the Site were remediated to concentrations which were below both the MCP Method 1 S1/GW-2 and 90th Percentile Background Concentration.

Thus soils along the Williams Street road shoulder (western disposal site boundary) have been remediated to background conditions and a condition of No Significant Risk, under all foreseeable site uses, was achieved in this location.

2.0 ENVIRONMENTAL FATE AND TRANSPORT OF OIL AND/OR HAZARDOUS MATERIALS

2.1 Constituents of Concern

Based on analytical results and *SAGE*'s conceptual site model, *SAGE* has identified the following constituents of concern (COCs) at this disposal site:

- PCBs from transformer oils; and
- EPH, including target analyte polycyclic aromatic hydrocarbons (PAHs) resulting from the combustion of hydrocarbon materials, primarily wood and particularly plastics, and including transformer oils resulting from the September 15, 2001 fire.

Contaminants in fire-water runoff may include numerous non-specific chemicals associated with the combustion of building materials and chemicals which may have been stored at the facility. Due to the temperature of the fire, which destroyed the building, it is unlikely that VOC constituents would remain, and most of the metals such as copper and lead from solder or piping would have been melted and combined with the ash.

Large (approximately 18 inch) structural steel I-beams were significantly warped by the fire, causing the building to collapse. From "Steel Construction" by Francis L. Brannigan (Fire Nuggets, October-November 2003): "When heated to higher temperatures (above 1,300°F), which are common at major fires, the yield point of steel is drastically reduced. At this temperature, steel members may fail, bringing about a collapse of the structure."

(http://www.firenuggets.com/x_ARDSIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII/oct2003index.htm)

Flame temperatures in room fires typically reach a maximum of 900-1,000 C (1,632-1,832 °F). [Temperatures in Flames and Fires, Dr. Vytenis Barbrauskas/Fire Science & Technology: http://www.doctorfire.com/flametmp.html]

Thus *SAGE* estimates that fire temperature was in the range of 900- 1,000 C.

Although pure lead melts at 328 C (622 °F) and boils at about 1,650 C (3,000 °F), and pure tin melts at 232 C (414 °F) and boils at 2,270C (4,118 °F), typical tin (60%)-lead (40%) solder melts at 190 C (374 °F), being a nearly eutectic mixture. By comparison, copper melts at 1,083 C (1,981 °F) and boils at 2,652 C (4,806 °F).

Other heavy metals have similar melting points, except for arsenic, which sublimes at atmospheric pressure ("boiling point" 613 C or 1,135 F, while its melting point (under pressure) is 817 C (1,503 °F).

Arsenic was not known or suspected to be present; however, it may be a constituent of fireproofing and of wood preservative. Any arsenic that might have been present would have been completely volatilized in such a fire as occurred the night of September 15, 2001. Lead and tin from tin-lead solder in copper piping would be completely melted and combined with ash remaining at the building location as fire debris. Copper would be softened and partly melted and combined with ash. These metals would not be expected to be carried with the fire water due to their density relative to water, and thus would remain at the fire location.

All ash and fire debris was removed from the site as part of the fire clean-up, leaving a concrete slab.

The minimal amount of volatilized metals would have associated with solid particulate ash which was excavated from the swale and stream areas. By verifying the absence of ash, using PCBs and EPH (especially PAH target analytes) as indicators of the presence of combustion products, the removal of heavy metals is also verified.

It is not known whether asbestos was present in the former Taunton Expo site building however it would be suspected to be potentially present due to the age of the building. Any asbestos would have been removed along with the fire debris. Asbestos was not detected in representative samples of on-site soil or sediment. Laboratory reports documenting asbestos testing are included in the Phase I report.

2.1.1 PCBs and combustion products of PCB containing transformer oils

PCBs, specifically the congeners Aroclor 1254 and Aroclor 1016/1242, were identified in high concentrations (>50 mg/kg) in dielectric fluid from four of the six transformers which were destroyed by the fire. Immediately after the release, PCBs were detected in separate phase oil on the stream surface and in stream water. Following the completion of initial response and sediment excavation activities, PCBs were not detected in stream waters but were observed at a low frequency in stream sediments at concentrations which were in excess of the MADEP TECs (60 ug/kg). PCBs were further detected at a concentration of 250 ug/kg in one soil sample (SS-1), collected from the grass road shoulder west of the former Expo Building. PCBs have not been detected in groundwater, catch basin sediments, or the storm drain outfall west of Williams Street.

PCBs are mixtures of synthetic chlorinated organic chemicals with the same basic chemical structure and similar physical properties ranging from oily liquids to waxy solids. Due to their non-flammability, chemical stability, high boiling point, and electrical insulating properties, PCBs were used in hundreds of industrial and commercial applications including electrical, heat transfer, and hydraulic equipment; as plasticizers in paints, plastics and rubber products; in pigments, dyes and carbonless copy paper and many other applications until their manufacture was banned in 1977.

PCBs have been shown to cause cancer in animals. PCBs have also been shown to cause a number of serious non-cancer health effects in animals, including effects on the immune system, reproductive system, nervous system, and endocrine system. PCBs have a relatively low solubility but they do not degrade easily in the natural environment and hence will bioaccumulate in aquatic organisms. The persistence and environmental toxicity of PCBs in the environment is generally considered to be "high".

CDC/NIOSH has some information on the fate of PCB containing transformer oils in fires described in their CURRENT INTELLIGENCE BULLETIN 45, "Polychlorinated Biphenyls (PCB's): **Potential Health Hazards from Electrical Equipment Fires or Failures",** February 24, 1986. [http://www.cdc.gov/niosh/86111_45.html]

In particular: "Fire-related incidents are defined as incidents involving electrical equipment containing PCB's in which sufficient heat from any source causes the release of PCB's from the equipment casing. In soot-producing incidents an actual fire occurs in or near the PCB-containing electrical equipment eventually resulting in exposure of the PCB's to extremely high temperatures and in the formation and distribution of a black, carbonaceous material. PCB's have been identified in soot following numerous electrical equipment fires.[11-17] Polychlorinated dibenzofurans (PCDF's)[11-15,17-20] and polychlorinated dibenzo-p-dioxins (PCDD's)[12-15,17-20] have also been identified following

this type of fire-related incident. Laboratory studies have confirmed that PCDF's and PCDD's are formed from the pyrolysis of PCB's[21-24] or chlorobenzenes[25] at temperatures ranging from 500° to 700°C (932° to 1292°F).

In addition to PCDD's and PCDF's, other polychlorinated hydrocarbons have been identified in soot from electrical equipment fires. Polychlorinated biphenylenes,[13,26] polychlorinated pyrenes,[26] and polychlorinated diphenyl ethers[18] have been detected in soot samples collected following capacitor or transformer fires."

The primary concern from this and other references found regarding the breakdown of PCB in fires seems to regard the primary health exposure risk as exposure to aerosols and fine smoke or soot particles in the air during the fire event.

Eschenroeder and Faeder[1] performed a Monte-Carlo analysis of the human health risk from inhalation of combustion products from PCB transformer oil fires. PCDF was used as their indicator, since this appears to be the primary product formed, although CDC[2] reported TCDF (but no detectable TCDD) found resulting from an askarel (PCB 1260) transformer oil fire. This reference is useful because it compared the relative concentrations of PCB and combustion products found in wipe samples after the fire.

PCB concentrations ranged from 30,000,000 ug/m^2 for heavily contaminated areas to 4,700 ug/m^2 for an area of no visible contamination, compared to TCDF concentrations ranging from 41,224 ng/m^2 for heavily contaminated areas to 5 ng/m^2 for an area of no visible contamination.

Thus the concentrations of TCDF generated were approximately one million times lower than the corresponding PCB concentrations.

Of course, results can vary, but, in general, the amount of potential pyrolysis products of PCB transformer oils developed in fires appears to range from 10^{-4} to 10^{-6} of the concentration of PCB detected after the fire. This seems reasonable in light of well-documented evidence that combustion temperatures exceeding 2,000-2,400C are required for destruction of PCBs, while *SAGE* determined that fire temperatures in this case were likely no more than 900-1,000 C. The final concentrations achieved, e.g. maximum of <19 ug/kg in sediment at location PE 1275-NE on November , 2006 (see **Section 5.1, Table 30**, below) would thus be expected to have a potential maximum corresponding concentration of TCDF of approximately 2 ng/kg to 20 pg/kg , which are below feasible

[1] Alan Q. Eschenroeder, Edward J. Faeder (1988)
A Monte Carlo Analysis of Health Risks from PCB-Contaminated Mineral Oil Transformer Fires Risk Analysis 8 (2), 291–297. doi:10.1111/j.1539-6924.1988.tb01182.x
[2]CDC: MMWR Weekly, September 13, 1985/34(36); 557-9

analytical detection limits. Note that PCB final concentrations were "not detected" in soil, sediment or groundwater.

Thus *SAGE's* LSP concludes that it was reasonable to use PCB as an indicator compound to determine no significant risk concentrations in soil, sediment, groundwater and surface water

2.1.2 Extractable Petroleum Hydrocarbons

The EPH constituents detected in onsite sediments included C_9-C_{18} aliphatic, C_{19}-C_{36} aliphatic and C_{11}-C_{22} aromatic range hydrocarbons, and the target analytes acenapthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene indeno(1,2,3-cd) pyrene, napthalene, phenanthrene, and pyrene.

EPH constituents detected in onsite soils include C_{19}-C_{36} aliphatic and C_{11}-C_{22} aromatic range hydrocarbons and target analytes acenapthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd) pyrene, phenanthrene, and pyrene.

EPH constituents detected in groundwater include C_{11}-C_{22} aromatic range hydrocarbons and target analytes acenapthylene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, and pyrene.

The only EPH constituent detected in surface water was C_{11}-C_{22} aromatic range hydrocarbons, which were initially detected in one stream sample at sample location SP-1, located approximately 3,000 feet downstream from the release. However, subsequent sampling failed to detect any EPH constituents.

EPH hydrocarbon ranges are present in transformer oils, waste oils and motor fuels, and the C_{11}-C_{22} aromatic range hydrocarbons and especially the target analyte PAH are commonly associated with pyrogenic material (e.g. coal ash and wood ash) and other products of combustion such as motor vehicle exhaust Much of the EPH detected onsite are "background" occurrences derived from non-regulated parking lot and/or road/highway runoff which has impacted the stream sediments and the adjacent unpaved areas with exposed soil.

The environmental fate and transport behavior of individual EPH constituents varies with the size and shape of the molecule. In general, EPH compounds have a low volatility, a relatively low tendency to biodegrade, and are likely to accumulate in soils, sediments

and biota. Water solubility and mobility of EPH decreases with increasing molecular weight. Low molecular weight PAHs such as pyrene, phenanthrene, and naphthalene, tend to be somewhat mobile and can be moderately persistent in groundwater or surface water. However, these low molecular weight PAH are also the first to be destroyed in high temperature combustion.

2.2 Identification and Characterization of Potential Pathways

The MCP requires consideration of potential pathways for the migration of oil and/or hazardous materials. These potential pathways include air, soil, groundwater, surface water, sediment, and the food chain. The potential threat to indoor air quality must also be considered.

2.2.1 Air

The constituents of concern, PCBs and EPH, are relatively non-volatile compounds (vapor pressure $\leq$0.01 Pa or $\leq 10^{-8}$ atm). EPH and PCBs detected in soil and sediment are not located in proximity to any occupied structure. The areas around all site buildings are paved with no exposed surface soils. These constituents are not expected to significantly migrate via volatilization or dust releases. Adverse impacts to indoor air quality either on-Site or off-Site are not anticipated.

2.2.2 Soil and Sediment

Data indicate that EPH and PCBs were detected in soils west of the former Expo Building and within sediments in an intermittent stream on the east side of the Site. Human exposure would be expected to potentially occur via dermal contact or ingestion. Potential exposure would most likely happen in the event of excavation activities associated with subsurface and/or overhead utilities at the area west of the former Expo Building where municipal drains and overhead power lines are located. In addition, PCBs in sediments have a high potential for bioaccumulation, thus creating a potential for human exposure through the consumption of fish.

2.2.3 Groundwater

The Site is not located within a current or potential drinking water source area. Constituents of concern were not detected in overburden groundwater at concentrations in excess of Method 1, GW-1 standards. Because overburden groundwater was not significantly impacted, bedrock contamination is unlikely. Exposure via groundwater is not anticipated.

2.2.4 Surface Water

EPH in the form of C_{11}-C_{22} aromatic range hydrocarbons were historically detected in one surface water sample collected from the intermittent stream at sample location SP-1, located approximately 3,000 feet down stream from the release. Human exposure would be expected to potentially occur via dermal contact or ingestion. Migration of contamination downstream could result in a potential discharge of contaminants to the Segreganset River, a Class A surface water which is used as a drinking water supply. Biological receptors, including fish, could also be adversely impacted.

2.3 Receptor Exposure Assessment

2.3.1 Human Receptors

As indicated in **Section 1.3**, the Site is currently used for commercial purposes. Accordingly, the frequency of use by children would be low. Adults are present at the Site at a high frequency. The intensity of use is considered low for both children and adults. Soils over the majority of the Site are considered potentially accessible, as they are located below paving (primarily bituminous concrete). An exception is the road shoulder area at the west side of the Site where EPH impacted soils are not covered by pavement and the soils are located within 300 feet of a house where children reside. However the frequency of use by children would still be low because the road shoulder would not be an area which would be frequented by children.

Data indicate that EPH and PCBs were detected in sediment samples collected from drainage swales and the intermittent stream. Environmental exposure to these contaminants could occur via direct contact and ingestion by both aquatic and terrestrial organisms. PCBs in sediments have a high potential for bioaccumulation, creating a further potential for human or biological exposure through the consumption of fish or waterfowl and through other food chain pathways.

2.3.2 Environmental Receptors

Environmental exposure to PCBs and EPH would be expected to occur via direct contact and ingestion by both aquatic and terrestrial organisms. PCB's (and some EPH constituents) in sediments and surface waters are considered to be "persistent" contaminants, have a high potential for bioaccumulation, creating a further potential for biological exposure through the consumption of fish or waterfowl and through other food chain pathways. PAH are "polycyclic organic matter" or POM and POM, along with

PCB, are defined in Section 112 of the Clean Air Act of 1990 as "persistent, bioaccumulative and toxic (PBT) compounds.

3.0 CONCEPTUAL SITE MODEL

The Taunton Expo fire on September 15, 2001 was a massive conflagration that completely destroyed the existing building, and developed fire temperatures that warped 18-inch steel beams. The Taunton fire marshal observed to *SAGE*'s LSP that he had not encountered such a high "fuel load" in a fire in his experience. Active fire suppression efforts (fire truck on-site spraying water) continued for almost a week.

According to the fire marshal, the fire was primarily fueled by the large amount of plastic, paper and wood materials stored in the building for sale at the flea market. In addition, the electrical transformers were ruptured by the heat of the fire and released their dielectric fluid (transformer oil), which contained varying concentrations of PCB. Thus *SAGE* expected that the primary contaminants of the fire would be products of hydrocarbon combustion, polycyclic aromatic hydrocarbons (PAH). Due to the fire temperature, no VOC would remain, and any "light" metals, such as lead or tin from solder, would have been melted and combined with fire ash remaining at the fire location. Any arsenic would have been vaporized. At the estimated fire temperature (900-1,000C), even the PCB containing transformer oils, and surrounding bituminous concrete, were at least partly combusted (pyrolysis).

As described in **Section 2.1.1** above, a host of PCB-related compounds of varying toxicity may have been produced and dispersed into the atmosphere during the fire event. The airborne soot from this fire would have been well dispersed and deposited over a wide area. The highest concentrations of this soot would be that carried by fire water and concentrated into the relatively small area of the drainage swale and connected intermittent stream.

Analysis for these compounds is difficult and expensive. Thus *SAGE* chose a remedial strategy of removing all residues (soot, ash, oil) of PCB containing transformer oils that contaminated environmental media (soil, sediment and surface water). In order to confirm that all such residues had been removed, *SAGE* selected PCB as the indicator compound (similar to the selection of the indicator compounds used to represent carbon ranges in the MA EPH method). *(See discussion in **Section 2.1.1** above.)*

Thus contaminated media, primarily soil and sediment, were removed (by excavation) until the goal of PCB below the Threshold Effect Concentrations (TEC) was reached, or PCB were no longer detected, as verified by confirmation sampling. Because the source compounds were PCB congeners Aroclor 1254 and, to a lesser extent, Aroclor 1242,

pyrolysis byproducts of these congeners would be potentially present only at much lower (10^{-4} to 10^{-6}) concentrations. Thus be reducing the source PCB to below TEC or to non-detect, *SAGE* could be confident that any potential pyrolysis products had similarly been reduced to concentrations that would pose no significant risk to human health or the environment.

The former Taunton Expo building was surrounded by paved parking areas. The topography of the site slopes steeply to the east, creating a natural bowl or funnel directing runoff from fire suppression water to a distinct, approximately 300-foot long area along the eastern property fence where the bituminous concrete pavement ends and vegetated soils begin. The surface topography to the west of the former building, toward Williams Street, slopes much more gradually toward Williams Street and the grassed verge and drainage swale between the paved parking area and Williams Street.

Thus *SAGE*'s Conceptual Site Model (CSM) is that the contaminants released were products of combustion (EPH and PAH) from plastic, paper, wood and transformer oil, and PCB from the released transformer oil. Due to the location of the transformers, the transformer oils, including oil and partly combusted oil containing PCB, were released to the east, carried by fire suppression water toward the adjacent vegetated area and storm drainage swale. The ash and other partly combusted hydrocarbons (EPH and PAH) were carried both to the east, and, to a lesser extent, to the west, again by the flow of fire suppression water.

The ash, soot and partly combusted hydrocarbons were particulate materials, and thus had limited mobility once deposited. The oil and partly combusted oils, including partly combusted (pyrolyzed) transformer oils, containing PCB remained in "light" (less dense than water) non-aqueous phase liquid (LNAPL) form and were carried by fire suppression water to the storm drainage system/stream where they could be re-suspended by subsequent storm events until and unless collected and contained.

Although the vegetated woodland area to the east is unpaved land, the sheet flow observed by *SAGE* during and immediately after the fire terminated at the drainage swale just east of the paved parking area. Water, containing ash, EPH and PCB, and pyrolysis and combustion products was then confined to the drainage swale and constructed swale, which becomes the intermittent stream shown on the USGS map. Thus the lateral extent of contamination was geographically confined to the streambed and stream banks. Based on the rapid removal of streambed and stream bank soil subsequent to the fire, there was not time available for these contaminants to permeate vertically into sub-surface soil or groundwater.

Based on available volume information and assuming that all transformers were initially full to capacity and all transformer oil was released during the fire, *SAGE* conservatively

estimates that a total of 500 gallons of transformer oil was released during the fire. It appears that the oil was released as a result of the building collapsing on the transformers or their being grabbed by an excavator-mounted grappling arm. The transformer oil was transported via a large volume of water that was applied for fire suppression purposes. The main component of this fire runoff was observed to run to the east across the main parking lot and entered drainage swales at the edge of the parking lot, which discharge to the intermittent stream.

A log-jam area, located at location SP-1 (3650 feet downstream), appears to have prevented floating oil from flowing further downstream. The primary residual impacts from the release were to sediments, in the drainage swales and in the main channel of the intermittent stream. A minor component of fire runoff may have entered two storm water catch basins and discharged to the intermittent stream via culverts. However, analyses of sediments in the catch basins showed these sediments to have not been impacted by PCBs, likely because the catch basin sumps were already filled to capacity with sediment at the time of the release.

A minor component of PCB-laden fire runoff infiltrated a former electric manhole which was north of the building and a former basement parking garage under the east side of the building, based on analyses of fire suppression water contained in these structures. *SAGE* also sampled soil and groundwater near these locations at MW-1, MW-4, MW-5, MW-7, MW-8, MW-9, MW-10 and MW-11. Based on analytical results, groundwater and soil in these areas was not adversely impacted by PCBs or EPHs or in areas downgradient from the electric manhole and basement.

Based on observed runoff flow patterns and as evidenced by soil analytical data, a small component of transformer oil runoff appears to have discharged to the west onto a grass road shoulder which borders the eastern side of Williams Street. As indicated by several areas with EPH constituent concentrations, which were above 90th percentile background concentrations, the extent of significant soil impact extended for approximately 250 to 260 feet along Williams Street.

There appear to have been no PCB impacts to storm drains on Williams Street as evidenced by the absence of PCBs in samples collected from sediments immediately at the outfalls on the west side of Williams Street.

Because the road shoulder is a common easement area owned by the Town of Dighton, implementation of an Activity and Use Limitation would be problematic. Excavation and offsite disposal of the impacted soil was thusly chosen as the selected remedial alternative to achieve a condition of no significant risk under an Immediate Response Action.

4.0 RESULTS OF INVESTIGATIONS

As indicated above, Immediate Response Actions (IRA) have been conducted at the Site yielding data necessary to determine the nature and extent of Site contaminants. Data from these investigations have been previously submitted to MADEP in IRA Status Reports 1 through 11, in the Phase I Initial site investigation, and in the Phase II Comprehensive site investigation. A summary of pertinent data gained during previous response actions is appended in the Phase II report issued in September 2004. Recent soil and sediment analytical data obtained since September 2004 is included in **Appendix 3** (Soil) and **Appendix 4** (Sediment) of this report.

Based upon the information and data detailed in this report and previous IRA status reports, site contaminants identified in soil, sediment, groundwater and surface water appear to have been reduced by Immediate Response Actions to levels which do not pose a Significant Risk of Harm to Public Health or the Environment and to levels which either approach or achieve background conditions. After initial evaluation, *SAGE* concluded that no Imminent Hazard or Substantial Hazard, existed, however a Condition of Substantial Release Migration was known or believed to exist, thus requiring continuation of the IRA.

4.1 PCBs (including PCB degradation products)

4.1.1 Sediment

Shortly after the fire during September 17 through September 20, 2001, *SAGE* collected twenty-seven (27) sediment samples from drainage swales, stream channels and along the pavement perimeter, which was impacted by fire runoff. These samples were submitted to a Massachusetts-certified laboratory for analyses of PCBs via EPA Method 8082. Laboratory results are summarized on **Table 2** and the sample locations are depicted on **Figure 3**. Laboratory reports and chain of custody documentation are included in **Appendix 3**. Note that some of the chains of custody have mistakenly identified the sampled media as "soil", since the stream channel is an intermittent stream and it was not easy to distinguish between "soil" and "sediment". Based on *SAGE's* review of these data, PCB impacts to sediments were greatest in the "middle swale" (the MSW samples) and in the downstream areas of the main stream channel (location SP-1). Both Aroclor 1254 and Aroclor 1242 congeners were detected in the sediments.

Table 2
Pre-Excavation Sediment Analytical Results - PCBs
93-123 Williams Street
North Dighton, Massachusetts

Aroclor 1016/1242	<17	<17	<14	<50	<50	<50	<50	<50	85.7	<50	<50	<50	<50	<50	<50	<50	<50	3060[a]	<50	<50	<50	<50	<50	<50	<50	<50	<50	NE
Aroclor 1254	<17	140	21	<50	<50	<50	<50	<50	493	<50	<50	625	<50	<50	<50	<50	<50	8780[a]	<50	369	<50	<50	232	169	338	759	889	NE
Total PCB	<17	**140**	21	<50	<50	<50	<50	<50	**578.7**	<50	<50	**625**	<50	<50	<50	<50	<50	**11840[a]**	<50	**369**	<50	<50	**232**	**169**	**338**	**759**	**889**	60

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)
Sample Results:
a: Analyte concentration in this sample exceeds the MADEP standard for: S1/GW1 & S1/GW3 type soil
SSW=South Swale
FP=Fence Post
MSW=Middle Swale
NSW=North Swale
SP=Sample Point
TEC = Threshold Effect Concentration per MADEP-ORS ITG "Revised Sediment Screening Values" (January 2006)
NE=No standard has been established for this analyte

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Following the initial excavation of two inches of sediment from the drainage swales and stream channel during October through November 2001, confirmatory grab sediment samples were collected at approximate 50-foot intervals. Laboratory analysis using EPA Method 8082 for PCB indicated that only seven (7) of eighty post-excavation sediment samples had detected concentrations of total PCBs which ranged from 61 ug/kg (at location 1100'-1150') to 510 ug/kg (location 3600'-3650'/SP-1). Laboratory results are summarized on **Table 3**. Sample locations are depicted on **Figure 3**. All seven detected PCB concentrations were significantly below the IRA objective of 1,000 ug/kg but were in excess of the TEC of 60 ug/kg (later published by the MADEP in May, 2002 and revised in January, 2006).

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Table 3
Post-Excavation Sediment Analytical Results - PCBs
Samples Collected October-November 2001

10/2/01	0-50	<50	<50	<50	<50	<50	<50	<50
10/3/01	50-100	<50	<50	<50	<50	<50	<50	<50
	100-150	<50	<50	<50	<50	<50	<50	<50
10/4/01	150-200	<50	<50	<50	<50	<50	<50	<50
10/5/01	200-250	<50	<50	<50	<50	<50	<50	<50
10/19/01	250-300	<50	<50	<50	<50	<50	<50	<50
	300-350	<50	<50	<50	<50	<50	<50	<50
	350-400	<50	<50	<50	<50	<50	<50	<50
	400-450	<50	<50	<50	<50	<50	<50	<50
10/11/01	450-500	<50	<50	<50	<50	<50	<50	<50
10/10/11	500-550	<50	<50	<50	<50	<50	<50	<50
	550-600	<50	<50	<50	<50	<50	<50	<50
10/12/01	600-650	<50	<50	<50	<50	<50	<50	<50
	650-700	<50	<50	<50	<50	<50	<50	<50
	700-750	<50	<50	<50	<50	<50	<50	<50
	750-800	<50	<50	<50	<50	<50	<50	<50
	800-850	<50	<50	<50	<50	<50	<50	<50
	850-900	<50	<50	<50	<50	<50	<50	<50
	900-950	<50	<50	<50	<50	<50	<50	<50
10/15/01	950-1000	<50	<50	<50	<50	<50	<50	<50
	1000-1050	<50	<50	<50	<50	<50	<50	<50
10/18/01	1050-1100	<50	<50	<50	<50	<50	<50	<50
	1100-1150	<50	<50	<50	<50	**61**	<50	**61**
	1150-1200	<50	<50	<50	<50	<50	<50	<50
	1200-1250	<50	<50	<50	<50	<50	<50	<50
10/19/01	1250-1300	<50	<50	<50	<50	**136**	<50	**136**
	1300-1350	<50	<50	<50	<50	**91.5**	<50	**91.5**
	1350-1400	<50	<50	<50	<50	<50	<50	<50
	1400-1450	<50	<50	<50	<50	<50	<50	<50
	1450-1500	<50	<50	<50	<50	<50	<50	<50
	1500-1550	<50	<50	<50	<50	<50	<50	<50
10/22/01	1550-1600	<50	<50	<50	<50	<50	<50	<50
	1600-1650	<50	<50	<50	<50	<50	<50	<50
	1650-1700	<50	<50	<50	<50	<50	<50	<50
10/23/01	1700-1750	<50	<50	<50	<50	<50	<50	<50
	1750-1800	<50	<50	<50	<50	<50	<50	<50
10/24/01	1800-1850	<50	<50	<50	<50	<50	<50	<50
	1850-1900	<50	<50	<50	<50	<50	<50	<50
	1900-1950	<50	<50	<50	<50	<50	<50	<50
	1950-2000	<50	<50	<50	<50	<50	<50	<50
	2000-2050	<50	<50	<50	<50	<50	<50	<50
10/25/01	2050-2100	<18	<18	<18	<18	<18	<18	<18
	2100-2150	<17	<17	<17	<17	**62**	<17	**62**
	2150-2200	<17	<17	<17	<17	<17	<17	<17
	2200-2250	<16	<16	<16	<16	<16	<16	<16
	2250-2300	<16	<16	<16	<16	<16	<16	<16
	2300-2350	<16	<16	<16	<16	<16	<16	<16
	2350-2400	<17	<17	<17	<17	<17	<17	<17
	2400-2450	<17	<17	<17	<17	<17	<17	<17
10/26/01	2450-2500	<18	<18	<18	<18	<18	<18	<18
	2500-2550	<18	<18	<18	<18	<18	<18	<18
	2550-2600	<17	<17	<17	<17	<17	<17	<17
	2600-2650	<16	<16	<16	<16	<16	<16	<16
10/29/01	2650-2700	<17	<17	<17	<17	<17	<17	<17
	2700-2750	<18	<18	<18	<18	<18	<18	<18
	2750-2800	<17	<17	<17	<17	<17	<17	<17
	2800-2850	<16	<16	<16	<16	<16	<16	<16
	2850-2900	<18	<18	<18	<18	<18	<18	<18
	2900-2950	<16	<16	<16	<16	<16	<16	<16
	2950-3000	<18	<18	<18	<18	<18	<18	<18
10/30/01	3000-3050	<19	<19	**250**	<19	<19	<19	**250**
	3050-3100	<14	<14	<14	<14	<14	<14	<14
	3100-3150	<50	<50	<50	<50	<50	<50	<50
	3150-3200	<50	<50	<50	<50	<50	<50	<50
	3200-3250	<50	<50	<50	<50	**79.6**	<50	**79.6**
	3250-3300	<50	<50	<50	<50	<50	<50	<50
	3300-3350	<50	<50	<50	<50	<50	<50	<50
	3350-3400	<50	<50	<50	<50	<50	<50	<50
	3400-3450	<50	<50	<50	<50	<50	<50	<50
	3450-3500	<50	<50	<50	<50	<50	<50	<50
	3500-3550	<50	<50	<50	<50	<50	<50	<50
	3550-3600	<50	<50	<50	<50	<50	<50	<50
	3600-3650 (SP-1)	<54	<54	**510**	<54	<54	<54	**510**
10/29/01	SP-50	<50	<50	<50	<50	<50	<50	<50
	SP-100	<50	<50	<50	<50	<50	<50	<50
	SP-150	<50	<50	<50	<50	<50	<50	<50
	SP-200	<50	<50	<50	<50	<50	<50	<50
11/2/01	PE SF-4 (3200)	<19	<19	<19	<19	<19	<19	<19
	PE SF-1 (3675)	<54	<54	<54	<54	<54	<54	<54

ND = Not Detected - Below the Analytical Detection Limit (0.50 ug/kg or less)
NS = Not Sampled

No PCBs were detected in sediment samples collected within the channel section extending 200 feet downstream from the terminus of excavation activities (samples SP-50 through SP-200). No PCBs were detected in sediment samples collected from two on-site catch basins or from the drain manhole located in the main parking lot.

To obtain data representative of post-remediation sediment conditions, the above-described seven locations were re-sampled by *SAGE* during March 2003. It should be noted that in response to EPH concentrations (**Section 4.2**), the SP-1 location (3600-3650') (i.e., the location that yielded the highest post-excavation PCB result) was re-excavated on August 6, 2002.All samples were collected in accordance with MADEP's Quality Assurance and Quality Control Guidelines (WSC-CAM-VIIA). Laboratory results are summarized on **Table 4** and sample locations are depicted on **Figure 3**. Laboratory results indicated that PCBs exceeded the TEC at only one location in the middle swale area (Location 1300'-1350', MSW-1).

PCBs at the remaining six locations were below the TEC, possibly the result of dilution by natural attenuation processes.

Table 4
Post-Excavation Sediment Analytical Results - PCBs
Samples Collected March 28, 2003

[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Aroclor 1254	48	52	69	<16	<18	<18	<38	<33	NE
Total PCB	48	52	69	<16	<18	<18	<38	<33	60

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)

TEC = Threshold Effect Concentration per MADEP-ORS ITG "Revised Sediment Screening Values" (January 2006)MADEP SEDSCRN Technical Update, May 2002

NE = No standard has been established for this substance

FD = Field Duplicate

SAGE ENVIRONMENTAL

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Following the initial excavation of two inches of sediment from the drainage swales and stream channel during October through November 2001, confirmatory grab sediment samples were collected at approximate 50-foot intervals. Laboratory analysis using EPA Method 8082 for PCB indicated that only seven (7) of eighty post-excavation sediment samples had detected concentrations of total PCBs which ranged from 61 ug/kg (location 1100'-1150') to 510 ug/kg (location 3600'-3650'/SP-1). Laboratory results are summarized in **Table 3**. Sample locations are depicted on **Figure 3**. All seven detected PCB concentrations were significantly below the IRA objective of 1,000 ug/kg.

No PCBs were detected in sediment samples collected within the channel section extending 200 feet downstream from the terminus of excavation activities (samples SP-50 through SP-200). No PCBs were detected in sediment samples collected from two on-site catch basins or from the drain manhole located in the main parking lot.

At this point, it was decided to show that the preliminary remediation goal of reducing PCB concentrations in sediment to less than 1 mg/kg (<1,000 ug/kg) had been achieved and the focus of the response actions shifted to characterizing risk, in order to carefully evaluate the data from the swale and to determine what, if any, additional remedial efforts would be needed.

Pursuant to 310 CMR 40.0992, MCP Method 3 was used to characterize the risk of harm posed by the Site to health, public welfare and the environment for sediment and surface water media. A Stage I environmental screening pursuant to 310 CMR 40.0995 (**Section 4.3** of this report) indicated no visible evidence of long-term environmental harm due to sediment or surface water conditions.

However, in May of 2002 MADEP adopted the consensus-based TECs for 28 chemicals for use in screening freshwater sediment for risk to benthic organisms. In light of the new standard, *SAGE* re-evaluated PCB sediment data by comparing it with the TEC for Total PCBs of 59.8 ug/kg. The results of the comparison indicated that the detections of PCBs in the seven post-excavation samples were above the TEC standard.

The revised findings of the Stage I Environmental screening concluded that potential future environmental exposure had been identified at the Site due to concentrations of residual EPHs and PCBs in excess of established screening criteria which remain in stream and swale sediments. Pursuant to the requirements of 310 CMR 40.0995(3)(b), a Stage II Ecological Risk Characterization initiated.

To obtain data representative of post-remediation sediment conditions, the above-described seven post-excavation locations were re-sampled by *SAGE* during March 2003. All samples were collected in accordance with in accordance with MADEP's Quality Assurance and Quality Control Guidelines (WSC-CAM-VIIA). Laboratory results are

summarized on **Table 4** and sample locations are depicted on **Figure 3**. Laboratory results indicated that PCBs exceeded the TEC at only one location in the middle swale area (Location 1300'-1350', MSW-1). PCBs at the other six locations were below the TEC, possibly the result of dilution by natural attenuation processes.

Subsequently, additional sediment excavation in the middle swale was performed at location MSW-1 on April 19, 2004. EPH-contaminated sediment at another nearby location in the north swale, NSW-1, was also excavated on the same day. Approximately three inches of sediment was hand excavated from the swale channel over a channel length extending approximately 15 feet. Approximately one drum of sediment and debris was removed. Following excavation, confirmatory composite samples were collected and submitted to a Massachusetts-certified laboratory for analysis for PCBs via EPA Method 8082 using promulgated MADEP QA/QC methods.

The post-excavation laboratory results from the April 2004 excavation are summarized on **Table 5**. Based on these analytical results, PCBs at location MSW-1 had now been reduced to concentrations below the TEC. Based on the data collected, no sediment in the swale/stream areas would be likely to exceed the TEC for PCBs. Further response actions with regards to PCBs in sediment were thus determined to be unwarranted. Laboratory analytical reports, including chain of custody documentation, are included in the Phase II report.

Table 5
Post-excavation Sediment Analytical Results - PCBs and EPHs
Samples Collected April 19, 2004

C9-C18 Aliphatics	<12000		1000000	17000	NE
C19-C36 Aliphatics	26000		2500000	104400	NE
C11-C22 Aromatics	<12000		800000	296000	NE
Acenaphthene	<49		1000000	320	NE
Acenaphthylene	88		100000	135	NE
Anthracene	78		1000000	1068	57.2
Benzo[a]anthracene	92		700	1680	108
Benzo[a]pyrene	<49		700	808	150
Benzo[b]fluoranthene	62		700	1160	NE
Benzo[g,h,i]perylene	<49		1000000	284	NE
Benzo[k]fluoranthene	91		7000	506	NE
Chrysene	110		7000	1700	166
Dibenz[a,h]anthracene	<49		700	170	33
Fluoranthene	<49		1000000	5260	423
Fluorene	<49		1000000	446	77.4
Indeno[1,2,3-cd]pyrene	<49		700	314	NE
Phenanthrene	<49		100000	4440	176
Pyrene	99		700000	4340	195
2-Methylnaphthalene	<49		500000	135	NE
Naphthalene	<49		100000	170	176
Total PAHs	1110				1610
Aroclor 1016		<16	NE	NE	NE
Aroclor 1221		<16	NE	NE	NE
Aroclor 1232		<16	NE	NE	NE
Aroclor 1242		<16	NE	NE	NE
Aroclor 1248		<16	NE	NE	NE
Aroclor 1254		<16	NE	NE	NE
Aroclor 1260		<16	NE	NE	NE
Total PCB		<16	2000	NE	60

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

NA: Analysis not performed
<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)
NE = No standard has been established for this substance

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To evaluate potential impacts by PCB-laden fire suppression water and subsequent stormwater (contaminated from fire debris) runoff west of the release area, *SAGE* located the outfall for the storm drains on Williams Street. The outfall, a 48-inch metal pipe, was found in a wooded area located on the west side of the roadway. The approximate location of the outfall is depicted on **Figure 3**. One sediment sample ("West Outfall") was collected on March 31, 2004 from the channel directly below the base of the outfall and submitted to a Massachusetts certified laboratory for analysis for PCBs via EPA Method 8082. Laboratory results indicated no detected PCBs above the method detection limit of 41 ug/kg (below the TEC of 60 ug/Kg). The laboratory analytical report, including chain of custody documentation, is included in the Phase II report.

4.1.2 Soil

PCBs were detected at a maximum concentration of 250 ug/kg in one soil sample (SS-1) collected from the grass shoulder on the south side of the driveway west of the former Expo Building. This concentration is below the IRA objective of 1,000 ug/kg and the Method 1 S-1/GW-2 standard of 2,000 ug/kg. Since *SAGE* knows of no other mechanism by which these PCB could have been deposited at this location, *SAGE* infers that some PCBs were flushed westerly into this area by fire suppression runoff, but that the volume and concentration was insignificant. Analytical data indicate that soils in this area were significantly impacted by the release of EPHs, which may have been, in part, derived from dielectric fluids released during the fire, although they are most likely to have resulted from combustion of the wood, paper and plastic which comprised the bulk of the "fuel" for the fire. Impacts to soil by EPHs are described in **Sections 4.2** and **5.3** of this report. Analytical data for PCBs in road shoulder soils is summarized in **Table 6**.

Table 6
Pre-Excavation Soil Analytical Results
Road Shoulder Area – PCBs and EPHs
93-123 Williams Street
North Dighton, Massachusetts

C19-C36 Aliphatics	47000	230000	32000	2500000	2500000	20000000
C11-C22 Aromatics	200000[a]	**1600000[ac]**	290000[a]	800000	800000	10000000
Acenaphthene	<110	<1100	290	1000000	1000000	10000000
Acenaphthylene	310	<1100	150	100000	100000	10000000
Anthracene	250	2100	820	1000000	1000000	10000000
Benzo[a]anthracene	**890[ac]**	**15000[ac]**	**4600[ac]**	700	700	100000
Benzo[a]pyrene	**910[ac]**	**12000[ac]**	**4000[ac]**	700	700	100000
Benzo[b]fluoranthene	**920[ac]**	**17000[ac]**	**5700[ac]**	700	700	100000
Benzo[g,h,i]perylene	550	3600	1500	1000000	1000000	10000000
Benzo[k]fluoranthene	840	**16000[ac]**	3700	7000	7000	400000
Chrysene	1000	**22000[ac]**	6000	7000	7000	400000
Dibenz[a,h]anthracene	260	**2300[ac]**	**760[ac]**	700	700	100000
Fluoranthene	1600	41000	11000	1000000	1000000	10000000
Fluorene	<110	<1100	350	1000000	1000000	10000000
Indeno[1,2,3-cd]pyrene	600	**4800[ac]**	**1800[ac]**	700	700	100000
Phenanthrene	500	18000	5300	700000	100000	10000000
Pyrene	1400	33000	8600	700000	700000	10000000
Aroclor 1242	250	<14	<16			
Total PCB	250	<14	<16	2000	2000	100000

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)

Sample Results:

a-c: Analyte concentration in this sample exceeds the MADEP standard for:

a: S1/GW1 type soil

SS=Soil Sample

* Per MCP 310 CMR 40 40.097(6)(a), dated 5/30/97. Current standard concentrations per 310 CMR 40 40.097(6)(a) dated 3/24/06, are higher for some constituents.

To evaluate potential objectionable impacts from the seepage of PCB runoff to soil and/or to groundwater which might have infiltrated into an electric manhole on the north side of the building, *SAGE* installed two soil borings completed as monitor wells on November 11, 2002. Prior to drilling, the location of the former manhole was determined using a Trimble Model TSC1 global positioning unit. The first monitor well, MW-4, was located approximately 10 feet northeast of the manhole. The second monitor well, MW-5, was

located approximately 10 feet southeast of the manhole. The construction details of each well are depicted on boring logs included in the Phase II report. Soil field screening results are included on the boring logs. One soil sample from each boring was retained for laboratory analysis. Samples were selected from the zone near the top of the apparent overburden aquifer. The samples were submitted to a Massachusetts-certified laboratory for analysis for PCBs via EPA Method 8082. Laboratory results indicated no detected concentrations of PCBs. Analytical reports including Chain-of-Custody documentation are included in the Phase II report. Analytical results compared to S-2 and S-3 standards are summarized on **Table 7**.

Table 7
Soil Analytical Results: MW-4 and MW-5
93-123 Williams Street
North Dighton, Massachusetts

Aroclor 1016	<14	<14	NE	NE	NE	NE	NE	NE	NE
Aroclor 1221	<14	<14	NE	NE	NE	NE	NE	NE	NE
Aroclor 1232	<14	<14	NE	NE	NE	NE	NE	NE	NE
Aroclor 1242	<14	<14	NE	NE	NE	NE	NE	NE	NE
Aroclor 1248	<14	<14	NE	NE	NE	NE	NE	NE	NE
Aroclor 1254	<14	<14	NE	NE	NE	NE	NE	NE	NE
Aroclor 1260	<14	<14	NE	NE	NE	NE	NE	NE	NE
Total PCBs	<14	<14	2000	2000	2000	2000	2000	2000	100000

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)
NE = No Standard is established for this substance
* Per MCP Technical Update 05232002

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To further evaluate soil and groundwater conditions *SAGE* advanced six (6) soil borings (MW-6-2 through MW-11) on August 26-27, 2003. Boring MW-6-2 was drilled to replace former monitor well MW-6 which was destroyed during parking lot paving. Borings MW-7 and MW-8 were located within the footprint of the former Expo Center Building to evaluate potential impacts from contaminated runoff, which may have entered the building basement, which was observed to contain water in the days after the fire. MW-9 and MW-11 were situated to evaluate the area immediately downgradient of the former Expo building, and, MW-10 was located to evaluate potential impacts from a storm water catch basin which is situated within the area of impact by contaminated runoff. Soil boring and monitor well locations are identified on **Figure 3**. The construction details of each well are depicted on the boring logs included in the Phase II report. Soil field screening results are included on the boring logs.

Selected soil samples from MW-7, MW-8, MW-9, and MW-10 were submitted for laboratory analysis of PCBs using EPA Method 8082 and EPH using promulgated MADEP QA/QC methods. Laboratory results indicated no detected PCBs in any of the soil samples. Laboratory results are summarized on **Table 8**. Laboratory Reports are included in the Phase II report.

Table 8
Analytical Summary: Soil Samples from MW-7, MW-8, MW-9, and MW-10
PCBs and EPHs
93-123 Williams Street
North Dighton, Massachusetts

C9-C18 Aliphatics	<11000	<11000	<10000	<11000	<11000	<11000	1000000	1000000	2500000	2500000	5000000	5000000	NE
C19-C36 Aliphatics	<11000	<11000	<10000	<11000	<11000	<11000	2500000	2500000	5000000	5000000	5000000	5000000	NE
C11-C22 Aromatics	47000	<11000	<10000	<11000	14000	<11000	800000	800000	2000000	2000000	5000000	5000000	NE
Acenaphthene	<110	<110	<100	<110	<110	<110	1000000	1000000	2500000	2500000	5000000	4000000	500
Acenaphthylene	<110	<110	<100	<110	<110	<110	100000	100000	2500000	1000000	2500000	1000000	500
Anthracene	<110	<110	<100	<110	<110	<110	1000000	1000000	2500000	2500000	5000000	5000000	1000
Benzo[a]anthracene	150	<110	<100	<110	<110	<110	700	700	1000	1000	4000	4000	2000
Benzo[a]pyrene	150	<110	<100	<110	<110	<110	700	700	700	700	700	700	2000
Benzo[b]fluoranthene	170	<110	<100	<110	<110	<110	700	700	1000	1000	4000	4000	2000
Benzo[g,h,i]perylene	<110	<110	<100	<110	<110	<110	1000000	1000000	2500000	2500000	2500000	2500000	1000
Benzo[k]fluoranthene	<110	<110	<100	<110	<110	<110	7000	7000	10000	10000	40000	40000	1000
Chrysene	160	<110	<100	<110	<110	<110	7000	7000	10000	10000	40000	40000	2000
Dibenz[a,h]anthracene	<110	<110	<100	<110	<110	<110	700	700	700	700	800	800	500
Fluoranthene	310	<110	<100	<110	<110	<110	1000000	1000000	2000000	1000000	5000000	1000000	4000
Fluorene	<110	<110	<100	<110	<110	<110	1000000	1000000	2000000	2000000	5000000	4000000	1000
Indeno[1,2,3-cd]pyrene	<110	<110	<100	<110	<110	<110	700	700	1000	1000	4000	4000	1000
Phenanthrene	220	<110	<100	<110	<110	<110	1000000	100000	2500000	100000	2500000	100000	3000
Pyrene	320	<110	<100	<110	<110	<110	700000	700000	2000000	2000000	5000000	5000000	4000
2-Methylnaphthalene	<110	<110	<100	<110	<110	<110	500000	500000	1000000	1000000	2000000	1000000	500
Naphthalene	<110	<110	<100	<110	<110	<110	100000	100000	1000000	1000000	1000000	1000000	500
Aroclor 1016	<14	<15	<14	<14	<14	<15	NE	NE	NE	NE	NE	NE	NE
Aroclor 1221	<14	<15	<14	<14	<14	<15	NE	NE	NE	NE	NE	NE	NE
Aroclor 1232	<14	<15	<14	<14	<14	<15	NE	NE	NE	NE	NE	NE	NE
Aroclor 1242	<14	<15	<14	<14	<14	<15	NE	NE	NE	NE	NE	NE	NE
Aroclor 1248	<14	<15	<14	<14	<14	<15	NE	NE	NE	NE	NE	NE	NE
Aroclor 1254	<14	<15	<14	<14	<14	<15	NE	NE	NE	NE	NE	NE	NE
Aroclor 1260	<14	<15	<14	<14	<14	<15	NE	NE	NE	NE	NE	NE	NE
Total PCBs	<14	<15	<14	<14	<14	<15	2000	2000	2000	2000	2000	2000	NE

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)
NE = Not Established
**Per MADEP Technical Update 05232002

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4.1.3 Surface Water and Runoff

An initial round of stream and surface runoff sampling was conducted prior to sediment excavation in the period from September 19 through September 26, 2001. Samples were collected using a Teflon pond ladle. Samples were submitted to a Massachusetts-certified laboratory for the analysis of PCBs via EPA Method 8082. One sample from the garage basement was additionally analyzed for semivolatiles via EPA Method 8270. Chain-of Custody forms and Certificates of analysis are included in the Phase II Report. Laboratory results are summarized on **Table 9**.

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Table 9
Runoff and Stream Analytical Results
93-123 Williams Street
North Dighton, Massachusetts

Aroclor 1016	<0.4	<0.6	<0.4	<0.41	<40	<0.3	<0.3	<0.3	<0.3		<0.1	NE
Aroclor 1221	<0.4	<0.6	<0.4	<0.41	<40	<0.3	<0.3	<0.3	<0.3		<0.1	NE
Aroclor 1232	<0.4	<0.6	<0.4	<0.41	<40	<0.3	<0.3	<0.3	<0.3		<0.1	NE
Aroclor 1242	11	<0.6	<0.4	<0.41	<40	24.5	<0.3	<0.3	<0.3		<0.1	NE
Aroclor 1248	<0.4	<0.6	<0.4	<0.41	<40	<0.3	<0.3	<0.3	<0.3		<0.1	NE
Aroclor 1254	5	<0.6	15	4.8	420	<0.3	<0.3	<0.3	<0.3		<0.1	NE
Aroclor 1260	<0.4	<0.6	<0.4	<0.41	<40	<0.3	<0.3	<0.3	<0.3		<0.1	NE
Total PCB	16	<0.6	15	4.8	420	24.5	<0.3	<0.3	<0.3		<0.1	0.014
C9-C18 Aliphatics										<110	210	NE
C19-C36 Aliphatics										<110	4600	NE
C11-C22 Aromatics										380	13000	NE
Acenaphthene	2.6									<1.1	<1	520
Acenaphthylene	23									<1.1	<1	NE
Anthracene	5.9									<1.1	<1	NE
Benzo[a]anthracene	3.2									<1.1	<1	NE
Benzo[a]pyrene	3.6									0.22	<1	NE
Benzo[b]fluoranthene	2.4									<1.1	<1	NE
Benzo[g,h,i]perylene	3.6									<0.54	<1	NE
Benzo[k]fluoranthene	2.3									<1.1	<1	NE
Chrysene	3.3									<1.1	<1	NE
Dibenz[a,h]anthracene	0.78									<0.54	<1	NE
Fluoranthene	10									<1.1	2.8	NE
Fluorene	9									<1.1	<1	NE
Indeno[1,2,3-cd]pyrene	2.6									<0.54	<1	NE
Phenanthrene	23									<1.1	2.4	30
Pyrene	13									<1.1	2.0	NE
2-Methylnaphthalene	14									<1.1	<1	NE
Naphthalene	33									<1.1	<1	620

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

NA: Not applicable
<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)
Sample Results:
CB = Catch Basin runoff sample
BR= "Brook" (i.e. the intermittent stream)
SP = "Sample Point" in the intermittent stream
* Per 310 CMR 40.1516(1) dated 10/21/99

PCBs in excess of the IRA water objective (0.5 ug/L) were noted in water samples collected from the stream channel in downstream areas; within runoff water which accumulated in the Expo garage basement; within runoff water which entered an electric manhole on the north side of the Expo building; and, in pavement runoff collected at the northwest side of the Expo building. Subsequent subsurface testing revealed that PCB runoff did not significantly impact soils or groundwater in the vicinity of the electric manhole, the garage basement, and that there appeared to be no release to the environment at these locations. The soil at the west side of the Site was found to contain PCBs at one location, however the concentration was substantially below the applicable MCP Method 1 soil concentration.

Thus the main impact of PCBs from runoff appears to have been that which was channeled into the drainage swale, which, in turn, impacted surface water in the associated intermittent stream. PCBs were initially detected at 4.8 ug/l in stream samples collected at the Tremont Street culvert on September 19, 2001, but this concentration decreased to below analytical detection limits as observed in later samples collected on September 26, 2001 and in fourteen subsequent sampling events conducted both during and after sediment excavation activities. Based on these findings, there appear to be no significant long-term impacts to surface waters by PCBs. Analytical results for surface water samples collected from the stream at the Tremont Street culvert are summarized on **Table 10**.

Table 10
Surface Water Analytical Results Summary - Tremont Street Culvert
93-123 Williams Street
North Dighton, Massachusetts

Aroclor 1016	<0.3[a]	<50[a]	<0.3[a]	<0.3[a]	<0.3[a]	<0.4[a]	<0.45[a]	<0.43[a]	<0.4[a]	<0.1[a]	<0.2[a]	<0.01	<0.0083	<0.02[a]	<0.01	—
Aroclor 1221	<0.3[a]	<50[a]	<0.3[a]	<0.3[a]	<0.3[a]	<0.4[a]	<0.45[a]	<0.43[a]	<0.4[a]	<0.1[a]	<0.2[a]	<0.01	<0.0083	<0.02[a]	<0.01	—
Aroclor 1232	<0.3[a]	<50[a]	<0.3[a]	<0.3[a]	<0.3[a]	<0.4[a]	<0.45[a]	<0.43[a]	<0.4[a]	<0.1[a]	<0.2[a]	<0.01	<0.0083	<0.02[a]	<0.01	—
Aroclor 1242	<0.3[a]	<50[a]	<0.3[a]	<0.3[a]	<0.3[a]	<0.4[a]	<0.45[a]	<0.43[a]	<0.4[a]	<0.1[a]	<0.2[a]	<0.01	<0.0083	<0.02[a]	<0.01	—
Aroclor 1248	<0.3[a]	<50[a]	<0.3[a]	<0.3[a]	<0.3[a]	<0.4[a]	<0.45[a]	<0.43[a]	<0.4[a]	<0.1[a]	<0.2[a]	<0.01	<0.0083	<0.02[a]	<0.01	—
Aroclor 1254	<0.3[a]	<50[a]	<0.3[a]	<0.3[a]	<0.3[a]	<0.4[a]	<0.45[a]	<0.43[a]	<0.4[a]	<0.1[a]	<0.2[a]	<0.01	<0.0083	<0.02[a]	<0.01	—
Aroclor 1260	<0.3[a]	<50[a]	<0.3[a]	<0.3[a]	<0.3[a]	<0.4[a]	<0.45[a]	<0.43[a]	<0.4[a]	<0.1[a]	<0.2[a]	<0.01	<0.0083	<0.02[a]	<0.01	—
Total PCB	<0.3[a]	<50[a]	<0.3[a]	<0.3[a]	<0.3[a]	<0.4[a]	<0.45[a]	<0.43[a]	<0.4[a]	<0.1[a]	<0.2[a]	<0.01	<0.0083	<0.02[a]	<0.01	0.014
C9-C18 Aliphatics										<110		<110	<110	<100	<100	NE
C19-C36 Aliphatics										<110		<110	<110	<100	<100	NE
C11-C22 Aromatics										<110		<110	<110	<100	<100	NE
Acenaphthene										<1.1		<1.1	<1.1	<1	<1	520
Acenaphthylene										<1.1		<1.1	<1.1	<1	<1	NE
Anthracene										<1.1		<1.1	<1.1	<1	<1	NE
Benzo[a]anthracene										<1.1		<1.1	<1.1	<1	<1	NE
Benzo[a]pyrene										0.22		<0.22	<0.21	<0.2	<0.2	NE
Benzo[b]fluoranthene										<1.1		<1.1	<1.1	<1	<1	NE
Benzo[g,h,i]perylene										<0.56		<0.56	<0.53	<0.5	<0.5	NE
Benzo[k]fluoranthene										<1.1		<1.1	<1.1	<1	<1	NE
Chrysene										<1.1		<1.1	<1.1	<1	<1	NE
Dibenz[a,h]anthracene										<0.56		<0.56	<0.53	<0.5	<0.5	NE
Fluoranthene										<1.1		<1.1	<1.1	<1	<1	NE
Fluorene										<1.1		<1.1	<1.1	<1	<1	NE
Indeno[1,2,3-cd]pyrene										<0.56		<0.56	<0.53	<0.5	<0.5	NE
Phenanthrene										<1.1		<1.1	<1.1	<1	<1	6.3
Pyrene										<1.1		<1.1	<1.1	<1	<1	NE
2-Methylnaphthalene										<1.1		<1.1	<1.1	<1	<1	NE
Naphthalene										<1.1		<1.1	<1.1	<1	<1	620

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

NA: Not applicable
<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)
Sample Results:
a: Although the analyte was not detected, the laboratory quantitation limit for this sample exceeds the applicable MADEP standard.
* Per 310 CMR 40.1516(1) dated 10/21/99

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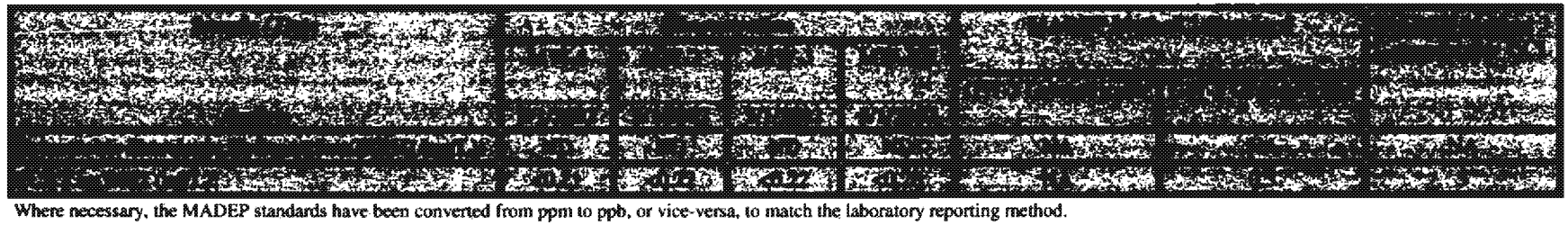
4.1.4 Groundwater

To evaluate for potential impacts to groundwater from the subject release, on April 22, 2002 *SAGE* installed three monitor wells on the Site. The first monitor well (MW-1) was located directly downgradient (east) of the former Expo Building to evaluate potential impacts from seepage of contaminated runoff into the building's basement and other conduits. The second monitor well (MW-2) was located to evaluate potential impacts from runoff seepage adjacent to a major drainage swale outfall at the parking lot edge. The third monitor well (MW-3), located within ten (10) feet of the stream, was intended to evaluate potential groundwater impacts immediately downstream of the area of immediate runoff and infiltration impact. In addition, groundwater samples were collected from an existing two-inch monitor well (MW-EX), which *SAGE* had discovered in the lower parking lot within the area of runoff impact. Monitor well locations are depicted on **Figure 3**. Test boring and monitor well construction logs are included in the Phase II report.

Groundwater samples were collected from the four on-Site monitor wells on May 1, 2002. Samples were collected using dedicated, disposable bailers. Prior to sample collection, groundwater depths were gauged and each well was purged of at least three well volumes of water. Groundwater samples were collected and stored in analyte-specific glass containers. Samples were submitted to a Massachusetts-certified laboratory for analysis for PCBs via EPA Method 8082 and EPHs using MADEP methods. Laboratory analytical reports including Chain-of-Custody documentation are included in the Phase II report. Laboratory results, summarized in **Table 11,** revealed no concentrations of PCBs or EPH constituents above method detection limits or applicable MCP Method 1 standards.

This result is consistent with *SAGE*'s CSM that the PCB and EPH contaminants were transported across the paved area by fire-water into the drainage swale and intermittent stream, and thus localized to a relatively small area, and did not have opportunity to migrate to or through the soil matrix to groundwater.

Table 11
Groundwater Analytical Results – PCBs and EPHs
May, 2002
93-123 Williams Street
North Dighton, Massachusetts



Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

ND: No analytes detected above quantitation limits

<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)

SAGE ENVIRONMENTAL

ED_002022B_00026560-00045

On September 19, 2001, *SAGE* collected a sample of surface water runoff, which had accumulated in the bottom of an electric manhole located along the north side of the former Expo Building. Laboratory analysis of the runoff sample revealed 420 ug/L of PCBs (as Aroclor 1254), significantly in excess of the Method 1, GW-3 standard of 0.3 ug/L. Before additional investigations could be conducted, the manhole was pumped dry, cleaned, excavated and removed during building demolition (February-March 2002).

To evaluate whether there had been a release of this runoff to the environment, for example by seepage from the manhole to soil and/or groundwater, on November 11, 2002 *SAGE* installed two soil borings completed as monitor wells adjacent to the manhole. Prior to drilling, the location of the former manhole was determined using a Trimble Model TSC1 global positioning unit. The first monitor well, MW-4, was located approximately 10 feet northeast of the manhole. The second monitor well, MW-5, was located approximately 10 feet southeast of the manhole. Detailed classifications and descriptions of recovered soils, along with field screening results, are included in the Soil Boring Logs in the Phase II report.

Groundwater samples were collected from the two monitor wells on November 18, 2002. Samples were collected using dedicated, disposable bailers. Prior to sample collection, groundwater depths were gauged and each well was purged of at least three well volumes of water. Groundwater samples were collected and stored in analyte-specific glass containers. Samples were submitted to a Massachusetts-certified laboratory for analysis for PCBs via EPA Method 8082. Laboratory analytical reports including Chain-of-Custody documentation are included in the Phase II report. Laboratory results, summarized in **Table 12**, revealed no PCBs above laboratory method detection limits or Method 1 Standards indicating that PCB runoff into the electric manhole had not impacted groundwater.

Table 12
Groundwater Analytical Results: PCBs, MW-4 and MW-5
Electric Manhole Area
93-123 Williams Street
North Dighton, Massachusetts

Aroclor 1016	<0.22	<0.2	NE	NE	NE
Aroclor 1221	<0.22	<0.2	NE	NE	NE
Aroclor 1232	<0.22	<0.2	NE	NE	NE
Aroclor 1242	<0.22	<0.2	NE	NE	NE
Aroclor 1248	<0.22	<0.2	NE	NE	NE
Aroclor 1254	<0.22	<0.2	NE	NE	NE
Aroclor 1260	<0.22	<0.2	NE	NE	NE
Total PCB	<0.22	<0.2	NE	0.3	5

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

NE: No standard is established for the substance

<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)

On February 24, 2003, *SAGE* installed four test borings in the roadside area at the west portion of the Site. To evaluate potential groundwater impacts by EPHs, one monitor well, designated as MW-6, was installed in boring B-2. Groundwater samples were collected from MW-6 on February 28, 2003, however PCBs were not analyzed during this sampling round. To further evaluate groundwater conditions *SAGE* installed six new monitor wells (MW-6-2 through MW-11) on August 26-27, 2003. MW-6-2 was drilled to replace former monitor well MW-6 which was destroyed during parking lot paving. MW-7 and MW-8 were located within the footprint of the former Expo Center Building to evaluate whether contaminated runoff, which was observed to have entered the building basement might have been released to the environment. MW-9 and MW-11 were situated to evaluate the area immediately downgradient of the former Expo building, and, MW-10 was located to evaluate potential impacts from a storm water catch basin which is situated within the area of impact by contaminated runoff. Monitor well locations are identified on **Figure 3**. Test boring and monitor well logs are included in the Phase II report.

Groundwater sampling of all usable monitor wells on the site was performed on September 8, 2003, November 25, 2003, March 25, 2004, and June 23, 2004. All

groundwater samples were collected in accordance with MADEP WSC-CAM-VIIA guidelines. Prior to sample collection, groundwater depths were gauged and each well was purged of at least three well volumes of water. Groundwater samples were collected and stored in analyte-specific glass containers. Samples were submitted to a Massachusetts-certified laboratory for analysis for PCBs via EPA Method 8082 and EPH with target analytes using promulgated MADEP QA/QC methods. Laboratory analytical reports including Chain-of-Custody documentation are included as **Appendix 5**.

Laboratory results, summarized in **Tables 13, 14, 15 and 16** revealed no detected concentrations of PCBs in any of the monitor wells. Based on these findings, groundwater on the site has not been impacted by the release of PCBs. Non-aqueous phase liquid (NAPL) has never been observed in any monitor well.

Table 13
Analytical Summary: Groundwater Samples Collected September 8, 2003
93-123 Williams Street
North Dighton, Massachusetts

C9-C18 Aliphatics	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	1000	20000	100000
C19-C36 Aliphatics	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	NE	20000	100000
C11-C22 Aromatics	130	130	<100	180	360	130	<100	120	240	140	<100	<100	50000	30000	100000
Acenaphthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE	5000	50000
Acenaphthylene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE	3000	30000
Anthracene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE	3000	30000
Benzo[a]anthracene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE	1000	10000
Benzo[a]pyrene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	**0.2**[#]	<0.2	<0.2	NE	500	5000
Benzo[b]fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE	400	4000
Benzo[g,h,i]perylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NE	3000	30000
Benzo[k]fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE	100	1000
Chrysene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE	3000	30000
Dibenz[a,h]anthracene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NE	40	400
Fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE	200	2000
Fluorene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE	3000	30000
Indeno[1,2,3-cd]pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NE	100	1000
Phenanthrene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE	50	400
Pyrene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE	20	800
2-Methylnaphthalene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	10000	3000	100000
Naphthalene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1000	20000	100000
Aroclor 1016	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	NE	NE	NE
Aroclor 1221	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	NE	NE	NE
Aroclor 1232	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	NE	NE	NE
Aroclor 1242	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	NE	NE	NE
Aroclor 1248	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	NE	NE	NE
Aroclor 1254	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	NE	NE	NE
Aroclor 1260	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	NE	NE	NE
Total PCB	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	<0.4[#]	NE	0.3	5

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

NE: No standard is established for the substance

<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)

Sample Results:

: Analyte concentration in this sample exceeds the MADEP standard for

l: Although the analyte was not detected, the laboratory quantitation limit for this sample exceeds the MADEP standard for GW3 type groundwater

s: Database information indicates analyte concentration exceeds an RC, and as such may constitute an additional Site reporting requirement

t: Although the analyte was not detected, the laboratory quantitation limit for the sample exceeds a MADEP Reportable Concentration

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Table 14
Analytical Summary: Groundwater Samples Collected November 25, 2003
93-123 Williams Street
North Dighton, Massachusetts

C9-C18 Aliphatics	<110	<100	<100	<100	<100	<100	<100		<110	<110	<100	<110	1000	20000	100000
C19-C36 Aliphatics	<110	<100	210	140	<100	140	<100		<110	<110	<100	<110	NE	20000	100000
C11-C22 Aromatics	120	120	120	200	<100	<100	<100		<110	<110	140	<110	50000	30000	100000
Acenaphthene	<1.1	<1	<1	<1	<1	<1	<1		<1.1	<1.1	<1	<1.1	NE	5000	50000
Acenaphthylene	<1.1	<1	<1	<1	<1	<1	<1		<1.1	<1.1	<1	<1.1	NE	3000	30000
Anthracene	<1.1	<1	<1	<1	<1	<1	<1		<1.1	<1.1	<1	<1.1	NE	3000	30000
Benzo[a]anthracene	<1.1	<1	<1	<1	<1	<1	<1		<1.1	<1.1	<1	<1.1	NE	1000	10000
Benzo[a]pyrene	<0.21	<0.21	<0.2	<0.2	<0.2	<0.21	<0.21		<0.22	<0.23	<0.2	<0.22	NE	500	5000
Benzo[b]fluoranthene	<1.1	<1	<1	<1	<1	<1	<1		<1.1	<1.1	<1	<1.1	NE	400	4000
Benzo[g,h,i]perylene	<0.53	<0.52	<0.5	<0.5	<0.5	<0.53	<0.53		<0.56	<0.57	<0.5	<0.54	NE	3000	30000
Benzo[k]fluoranthene	<1.1	<1	<1	<1	<1	<1	<1		<1.1	<1.1	<1	<1.1	NE	100	1000
Chrysene	<1.1	<1	<1	<1	<1	<1	<1		<1.1	<1.1	<1	<1.1	NE	3000	30000
Dibenz[a,h]anthracene	<0.53	<0.52	<0.5	<0.5	<0.5	<0.53	<0.53		<0.56	<0.57	<0.5	<0.54	NE	40	400
Fluoranthene	<1.1	<1	<1	<1	<1	<1	<1		<1.1	<1.1	<1	<1.1	NE	200	2000
Fluorene	<1.1	<1	<1	<1	<1	<1	<1		<1.1	<1.1	<1	<1.1	NE	3000	30000
Indeno[1,2,3-cd]pyrene	<0.53	<0.52	<0.5	<0.5	<0.5	<0.53	<0.53		<0.56	<0.57	<0.5	<0.54	NE	100	1000
Phenanthrene	<1.1	<1	<1	<1	<1	<1	<1		<1.1	<1.1	<1	<1.1	NE	50	400
Pyrene	<1.1	<1	<1	<1	<1	<1	<1		<1.1	<1.1	<1	<1.1	NE	20	800
2-Methylnaphthalene	<1.1	<1	<1	<1	<1	<1	<1		<1.1	<1.1	<1	<1.1	10000	3000	100000
Naphthalene	<1.1	<1	<1	<1	<1	<1	<1		<1.1	<1.1	<1	<1.1	1000	20000	100000
Aroclor 1016	<0.0087	<0.01	<0.01	<0.0083	<0.0083	<0.0083	<0.011	<0.01	<0.008	<0.009	<0.0088	<0.0091	NE	NE	NE
Aroclor 1221	<0.0087	<0.01	<0.01	<0.0083	<0.0083	<0.0083	<0.011	<0.01	<0.008	<0.009	<0.0088	<0.0091	NE	NE	NE
Aroclor 1232	<0.0087	<0.01	<0.01	<0.0083	<0.0083	<0.0083	<0.011	<0.01	<0.008	<0.009	<0.0088	<0.0091	NE	NE	NE
Aroclor 1242	<0.0087	<0.01	<0.01	<0.0083	<0.0083	<0.0083	<0.011	<0.01	<0.008	<0.009	<0.0088	<0.0091	NE	NE	NE
Aroclor 1248	<0.0087	<0.01	<0.01	<0.0083	<0.0083	<0.0083	<0.011	<0.01	<0.008	<0.009	<0.0088	<0.0091	NE	NE	NE
Aroclor 1254	<0.0087	<0.01	<0.01	<0.0083	<0.0083	<0.0083	<0.011	<0.01	<0.008	<0.009	<0.0088	<0.0091	NE	NE	NE
Aroclor 1260	<0.0087	<0.01	<0.01	<0.0083	<0.0083	<0.0083	<0.011	<0.01	<0.008	<0.009	<0.0088	<0.0091	NE	NE	NE
Total PCB	<0.0087	<0.01	<0.01	<0.0083	<0.0083	<0.0083	<0.011	<0.01	<0.008	<0.009	<0.0088	<0.0091	NE	0.3	5

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

NA: Analysis not performed

NE: No standard is established for the substance

<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)

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Table 16
Analytical Summary: Groundwater Samples Collected June 23, 2004
93-123 Williams Street
North Dighton, Massachusetts

C9-C18 Aliphatics	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	1000		100000
C19-C36 Aliphatics	<100	160	<100	<100	<100	<100	<100	<100	<100	<100	200	<100	NE		100000
C11-C22 Aromatics	<100	250	<100	<100	<100	<100	210	<100	<100	150	210	<100	50000		100000
Acenaphthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE		50000
Acenaphthylene	<1	1.5	<1	<1	<1	<1	1.4	<1	<1	1.6	2.2	<1	NE		30000
Anthracene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE		30000
Benzo[a]anthracene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1.3	<1	NE		10000
Benzo[a]pyrene	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.62	<0.2	NE		5000
Benzo[b]fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	NE		4000
Benzo[g,h,i]perylene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NE		30000
Benzo[k]fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE		1000
Chrysene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE		30000
Dibenz[a,h]anthracene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NE		400
Fluoranthene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE		2000
Fluorene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE		30000
Indeno[1,2,3-cd]pyrene	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	NE		1000
Phenanthrene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	NE		400
Pyrene	<1	1	<1	<1	<1	<1	<1	<1	<1	<1	1.5	<1	NE		800
2-Methylnaphthalene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	10000		100000
Naphthalene	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1000		100000
Aroclor 1016	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE		NE
Aroclor 1221	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE		NE
Aroclor 1232	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE		NE
Aroclor 1242	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE		NE
Aroclor 1248	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE		NE
Aroclor 1254	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE		NE
Aroclor 1260	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE		NE
Total PCB	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	NE		5

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

NE: No standard is established for the substance

<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)

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4.2 EPHs

4.2.1 Sediment

Eight of the twenty seven pre-excavation sediment samples collected by *SAGE* during September 17 through September 20, 2001 were submitted to a Massachusetts-certified laboratory for analysis of EPHs. With consideration to these data, detected concentrations of C19-C36 aliphatics, C11-C22 aromatics, and several polycyclic aromatic hydrocarbon (PAH) constituents were observed in all of the samples. The concentration of one or more PAHs exceeded the MADEP TECs at six of the eight locations. Laboratory results are summarized on **Table 17** and the sample locations are depicted on **Figure 3**. Laboratory reports and chain of custody documentation are included in **Appendix 3** (note that some of the chains of custody have improperly identified the sampled media as "soil").

Table 17
Pre-excavation Sediment Analytical Results – EPHs
93-123 Williams Street
North Dighton, Massachusetts

C9-C18 Aliphatics	<13,000	**180,000**	**44,000**																	**120,000**	**110,000**	<26,000	**670,000**	**530,000**	NE	*17000*
C19-C36 Aliphatics	86,000	**400,000**	**170,000**																	**220,000**	**350,000**	35,000	**620,000**	**1,000,000**	NE	*104400*
C11-C22 Aromatics	**340,000***	**1,300,000***	**640,000***																	**760,000***	**670,000***	69,000	**2,900,000***	**4,700,000***	NE	*296000*
Acenaphthene	<130	160	<100																	260	<200	<260	**560**	**770**	NE	*320*
Acenaphthylene	<130	**150**	<100																	<120	**410**	<260	**2,300**	**3,900**	NE	*135*
Anthracene	<130	260	<100																	190	270	320	630	900	57.2	*1068*
Benzo[a]anthracene	390	1,600*	110																	560	650	**1,900***	610	550	108	*1680*
Benzo[a]pyrene	310	**1,100***	<100																	400	680	**1,300***	<480	<390	150	*808*
Benzo[b]fluoranthene	480	**1,900***	120																	640	1,000	**1,900***	620	500	NE	*1160*
Benzo[g,h,i]perylene	170	**460**	<100																	**300**	<200	<260	<480	<390	NE	*284*
Benzo[k]fluoranthene	310	**950**	<100																	280	**680**	**1,400**	<480	<390	NE	*506*
Chrysene	640	**2,400**	210																	500	1,000	1,600	820	740	166	*1700*
Dibenz[a,h]anthracene	<130	**230**	<100																	130	<200	**610**	<480	<390	33	*170*
Fluoranthene	1,600	5,200	400																	1,800	2,300	4,900	2,400	2,700	423	*5260*
Fluorene	<130	260	<100																	400	**460**	<260	**1,300**	**2,000**	77.4	*446*
Indeno[1,2,3-cd]pyrene	170	**500**	<100																	<120	**560**	**1,200***	<480	<390	NE	*314*
Phenanthrene	830	2,700	360																	1,200	2,200	1,500	3,100	4,400	204	*4440*
Pyrene	1,200	3,900	400																	1,400	1,800	4,000	2,000	2,500	195	*4340*
2-Methylnaphthalene	<130	<120	<100																	<120	**250**	<260	**1,100**	**2,000**	NE	*135*
Naphthalene	<130	<120	<100																	<120	**500**	<260	**3,100**	**5,400***	176	170

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)
NA: Not analyzed
Bolded values indicate an exceedance of the applicable Suitably Analogous Standard or Background Concentration
Naphthalene & 2-methylnaphthalene were never detected in any background samples or confirmatory samples.
SSW=South Swale
MSW=Middle Swale
NSW=North Swale
SP=Sample Point in stream

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The on-site drainage swales and the intermittent stream are fed by storm runoff from the site paved parking lot and roadways. Thousands of automobiles, sport utility vehicles, minivans, light trucks and vans are processed through the auction facility each week, and are parked and moved around for preparation, auction and sale/pickup. Auction rules allow potential buyers to start, but not move, vehicles to assess their condition, and thus a significant amount of vehicle idling and cold starts occurs. The large number of parked cars results in visibly observable releases of petroleum hydrocarbons incidental to the operation of motor vehicles, mostly from minor leakage of crankcase oil and from exhaust, both of which are a source of EPH to stormwater.

In addition, the property owner maintains the paving in good condition. However, with a significant portion of the property paved, this also results in a source of EPH to stormwater.

As such, a significant component of the EPHs observed in on-site sediments is attributable to impacts by non-regulated storm runoff, rather than releases of combustion products and transformer oil from the single fire event.

Thus, to establish background concentrations for EPHs, on November 2 through November 5, 2001 *SAGE* collected sediment samples from twelve (12) locations in drainage channels in the vicinity of the property which were not impacted by runoff from the fire. An additional three (3) background samples were collected from locations in stormwater drainages north of the Site on May 13, 2003. Using data from these fifteen background samples, the 90th Percentile of Background Concentration was calculated for each EPH constituent. Where a constituent concentration was below analytical detection limits, 1/2 of the analytical detection limit was used to calculate the 90th Percentile. Laboratory results and the calculated 90th Percentile concentrations are summarized on **Table 18**.

Table 18
Analytical Summary: Background Sediment Samples, EPHs
93-123 Williams Street
North Dighton, Massachusetts

C9-C18 Aliphatics	*5000*	*7000*	*5500*	*7500*	*7000*	*8000*	*7000*	*15500*	*10500*	*6500*	*7000*	*8500*	*18000*	*7000*	32000	17000	NE
C19-C36 Aliphatics	18000	43000	*5500*	*7500*	*7000*	*8000*	65000	110000	*10500*	*6500*	67000	21000	96000	33000	380000	104400	NE
C11-C22 Aromatics	97000	140000	33000	44000	47000	26000	200000	320000	26000	27000	260000	53000	50000	130000	930000	296000	NE
Acenaphthene	*50*	*70*	*55*	*75*	*70*	*80*	*70*	*155*	*105*	*65*	200	*85*	*180*	480	400	320	NE
Acenaphthylene	*50*	*70*	*55*	*75*	*70*	*80*	*70*	*155*	*105*	*65*	*70*	*85*	*180*	*70*	*90*	135	NE
Anthracene	*50*	*70*	*55*	*75*	*70*	*80*	*70*	*155*	*105*	*65*	1300	*85*	*180*	1200	870	1068	57.2
Benzo[a]anthracene	180	150	*55*	*75*	180	*80*	320	580	*105*	*65*	1800	*85*	*180*	4900	1500	1680	108
Benzo[a]pyrene	120	*70*	*55*	*75*	170	*80*	210	520	*105*	*65*	960	*85*	*180*	2200	580	808	150
Benzo[b]fluoranthene	240	170	*55*	*75*	310	*80*	480	950	*105*	*65*	1300	*85*	*180*	4300	950	1160	NE
Benzo[g,h,i]perylene	*50*	*70*	*55*	*75*	*70*	*80*	*70*	*155*	*105*	*65*	340	*85*	*180*	780	200	284	NE
Benzo[k]fluoranthene	*50*	*70*	*55*	*75*	*70*	*80*	170	380	*105*	*65*	590	*85*	*180*	1600	370	506	NE
Chrysene	230	210	*55*	*75*	270	*80*	450	910	*105*	*65*	1700	*85*	*180*	6600	1700	1700	166
Dibenz[a,h]anthracene	*50*	*70*	*55*	*75*	*70*	*80*	*70*	*155*	*105*	*65*	*70*	*85*	*180*	220	*90*	170	33
Fluoranthene	360	380	120	170	600	*80*	1100	2300	*105*	*65*	4300	*85*	*180*	23000	5900	5260	423
Fluorene	*50*	*70*	*55*	*75*	*70*	*80*	*70*	*155*	*105*	*65*	440	*85*	*180*	590	450	446	77.4
Indeno[1,2,3-cd]pyrene	*50*	*70*	*55*	*75*	*70*	*80*	*70*	*155*	*105*	*65*	390	*85*	*180*	870	200	314	NE
Phenanthrene	220	220	*55*	*75*	220	*80*	540	990	*105*	*65*	4600	*85*	*180*	11000	4200	4440	204
Pyrene	350	370	170	150	480	80	900	1800	*105*	65	4100	85	*180*	17000	4500	4340	195
2-Methylnaphthalene	*50*	*70*	*55*	*75*	*70*	*80*	*70*	*155*	*105*	*65*	*70*	*85*	*180*	*70*	*90*	135	NE
Naphthalene	*50*	*70*	*55*	*75*	*70*	*80*	*70*	*155*	*105*	*115*	*70*	*85*	*180*	*70*	190	170	176
Total PAHs	122200	192270	45115	60445	63930	43360	276800	455325	48785	41155	356300	83945	167060	244950	1364280	440336	1610

NE: None established
Naphthalene & 2-methylnaphthalene were never detected in any background samples or confirmatory samples.
Dibenz[a,h]anthracene was never detected in any background sample with the exception of BK-14 sampled on 5/13/03.
Italics indicate value reported is 1/2 of detection limit.

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Based on the analysis of sediment samples collected from the fifteen (15) locations, EPHs are ubiquitous as "background" within area sediments, as was expected. The C11-C22 aromatics were the most frequently observed and generally highest concentrations observed of the EPH ranges. Most of the EPH target analyte PAHs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene were also detected in background sediment samples.

On November 14, 2001, following the completion of initial sediment excavation activities, *SAGE* collected confirmatory post-excavation sediment samples from eight representative locations in the swales and the intermittent stream. To provide additional data, an additional three locations in the intermittent stream were later sampled on March 15, 2002. The samples were submitted to a Massachusetts-certified laboratory for laboratory analysis of EPH using MADEP methods. Laboratory results are summarized on **Table 19** and the sample locations are depicted on **Figure 3**. Laboratory reports and chain of custody documentation are included in **Appendix 3**.

In general, the post-excavation laboratory results indicated an overall fourfold to tenfold decrease in EPH constituent concentrations following sediment excavation. However, an initial analysis of the data indicated that some EPH constituent concentrations, particularly the C11-C22 aromatic fraction in the middle drainage swale (location MSW-1) and the lower downstream area (location SP-1), were significantly greater than the highest observed background constituent concentrations that were currently available (only 12 background samples were available at that time). In view of these results, an additional three inches of sediment was subsequently excavated from these areas on July 26, 2002 (at MSW-1) and August 2, 2002 (at SP-1). Excavation was performed manually, by workers with hand shovels, by Frank Corporation of New Bedford, Massachusetts. Following excavation, confirmatory samples were again collected and analyzed for EPHs. Laboratory results indicated that EPH constituent concentrations were now below the 90th percentile of background at these two locations. The post-excavation analytical data for locations MSW-1 and SP-1 are included on **Table 19**.

On May 13, 2003 three additional sediment background samples (BK-13, BK-14, and BK-15) were collected from the north portion of the site area. In addition, to confirm existing site conditions, six additional confirmatory samples were collected from key locations in the drainage swales and the stream. Laboratory results for the additional background samples were summarized previously on **Table 18**. Analytical data for the six confirmatory samples from the swales and stream are summarized on **Table 20**.

Table 19
Post-excavation Sediment Analytical Results – EPH
November 2001 through August 2002
93-123 Williams Street
North Dighton, Massachusetts

C9-C18 Aliphatics	<12000	**25000**	<13000	<14000	<13000	<13000	<13000	<13000	<12000	<19000	<46000	<11000	<11000	—	17000
C19-C36 Aliphatics	33000	64000	24000	18000	<13000	<13000	<13000	<13000	<12000	53000	**170000**	23000	<11000	—	104400
C11-C22 Aromatics	100000	**330000**	94000	62000	36000	51000	44000	40000	63000	170000	**380000**	180000	38000	—	296000
2-Methylnaphthalene	<120	**270**	<130	<140	<130	<130	<130	<130	<120	<190	<4560	<110	<110	—	135
Acenaphthene	<120	210	<130	<140	<130	<130	<130	<130	<120	<190	<460	<110	<110	—	320
Anthracene	<120	740	340	220	<130	<130	<130	<130	<120	<190	<460	<110	<110	57.2	1068
Benzo[a]anthracene	300	**2600**	1600	1000	290	360	430	320	<120	<190	<460	360	<110	108	1680
Benzo[a]pyrene	350	**2400**	**1300**	800	240	320	370	260	<120	<190	<460	330	<110	150	808
Benzo[b]fluoranthene	440	**2800**	**1400**	1000	270	380	430	260	130	<190	<460	430	<110	—	1160
Benzo[g,h,i]perylene	240	**620**	**340**	210	<130	<130	<130	<130	<120	<190	<460	130	<110	—	284
Benzo[k]fluoranthene	350	**2300**	**1400**	**700**	220	320	380	320	<120	<190	<460	430	<110	—	506
Chrysene	460	**3200**	**1800**	1200	340	470	520	400	140	<190	<460	620	<110	166	1700
Dibenz[a,h]anthracene	<120	**370**	**220**	<140	<130	<130	<130	<130	<120	<190	<460	<110	<110	—	170
Fluoranthene	810	**5600**	2800	2000	650	1000	1000	820	270	240	<460	1400	<110	—	5260
Indeno[1,2,3-cd]pyrene	<120	**380**	<130	<140	<130	<130	<130	<130	<120	<190	<460	<110	<110	—	314
Naphthalene	240	**770**	**440**	**270**	<130	<130	<130	<130	<120	<190	<460	<110	<110	176	170
Phenanthrene	400	3200	1200	1100	270	460	430	370	<120	<190	<460	600	<110	204	4440
Pyrene	660	**4500**	2300	1700	580	820	840	650	220	220	<460	1100	<110	195	4340

MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.
NA: Analysis not performed
ND: No analytes detected above quantitation limits
<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)
Sample Results:
Bolded values exceed the 90th Percentile Background Concentration.

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Table 20
Analytical Summary: Post Excavation Sediment Samples, EPHs
May 2003
93-123 Williams Street
North Dighton, Massachusetts

C9-C18 Aliphatics	*5500*	*6000*	*6000*	*8500*	*6500*	*6500*	17000	NE
C19-C36 Aliphatics	**140000**	71000	*6000*	44000	20000	16000	104400	NE
C11-C22 Aromatics	260000	73000	*6000*	53000	34000	18000	296000	NE
Acenaphthene	*55*	140	*60*	*85*	*65*	*65*	320	NE
Acenapthylene	*55*	*60*	*60*	*85*	*65*	*65*	135	NE
Anthracene	140	250	*60*	*85*	*65*	290	1068	57.2
Benzo[a]anthracene	520	400	*60*	270	670	890	1680	108
Benzo[a]pyrene	280	170	*60*	*85*	310	400	808	150
Benzo[b]fluoranthene	570	300	*60*	300	540	650	1160	NE
Benzo[g,h,i]perylene	*55*	*60*	*60*	*85*	*65*	*65*	284	NE
Benzo[k]fluoranthene	180	*60*	*60*	*85*	220	200	506	NE
Chrysene	880	520	160	450	870	1000	1700	166
Dibenz[a,h]anthracene	*55*	*60*	*60*	*85*	*65*	*65*	170	33
Fluoranthene	2300	2100	510	1100	2600	3300	5260	423
Fluorene	*55*	200	*60*	*85*	*65*	*65*	446	77.4
Indeno[1,2,3-cd]pyrene	*55*	*60*	*60*	*85*	*65*	*65*	314	NE
Phenanthrene	1100	1800	200	470	1100	1400	4440	204
Pyrene	1700	1500	380	920	2000	2500	4340	195
2-Methylnaphthalene	*55*	*60*	*60*	*85*	*65*	*65*	135	NE
Naphthalene	*55*	*60*	*60*	*85*	*65*	*65*	170	176
Total PAHs	413610	157800	20030	109945	69395	51650	440336	1610

Sample Results:
Results in bold indicate an exceedance of the 90th Percentile of Reported Concentrations
Naphthalene & 2-methylnaphthalene were never detected in any background samples or confirmatory samples.
Dibenz[a,h]anthracene was never detected in any background sample with the exception of BK-14 sampled on 5/13/03.
Italics indicate value reported is 1/2 of detection limit.

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Based on the analytical results summarized in **Table 20**, one location in the north swale (NSW-1) was noted to have a level of C19-C36 aliphatics which exceeded the 90th Percentile background concentration. EPH constituents at the other five locations were all below the 90th percentile background concentrations.

Subsequently, additional sediment excavation was performed at location NSW-1 on April 19, 2004. PCB-contaminated sediment at another nearby location in the middle swale, MSW-1, was also excavated on the same day. Approximately three inches of sediment was hand excavated from the swale channel over a channel length extending approximately 15 feet. Approximately one drum of sediment and debris was removed. Following excavation, confirmatory composite samples were collected and submitted to a Massachusetts-certified laboratory for analysis for EPHs using promulgated MADEP QA/QC methods. These post-excavation laboratory results are summarized previously in **Table 5**. Based on the post-excavation analytical results, EPH constituents at location NSW-1 had now been reduced to concentrations below the 90th percentile background concentration. Based on the available data, there appear to be no remaining areas in the swale/stream where EPHs are likely to exceed background concentrations in sediment. Response actions with regard to EPHs in sediment are thus complete. Laboratory analytical reports, including chain of custody documentation, are included in **Appendix 3**.

4.2.2 Soil

On March 20, 2002, *SAGE* collected three soil samples from the grass shoulder located approximately twenty (20) feet west of the former Expo Building. The purpose of the sampling was to evaluate potential impacts from transformer oil runoff, which flowed in a westerly direction during the September 2001 release. Soil samples were collected from 0 to 1-inch depth using a Teflon hand trowel. Samples were submitted to a Massachusetts-certified laboratory for the analysis of PCBs via EPA Method 8082, EPH using MADEP methods, and asbestos using both EPA-600/M4-82-020 (PLM) and EPA 600/R-93/116 (TEM). Laboratory reports are included in **Appendix 3**. Laboratory results indicated no detected asbestos. The laboratory results for PCBs and EPHs have been summarized previously on **Table 6**.

As shown in **Table 6**, the level of PAHs was observed to be in excess of the Method 1 S-1 standard in all three samples. The level of C11-C22 aromatics in sample SS-2 (1,600,000 ug/kg) was elevated relative to the highest background concentration observed in nearby sediments (320,000 ug/kg) and the Method 1 S-1/GW-2 standard (800,000 ug/kg). *SAGE* concluded that it was possible that this C11-C22 aromatics contamination was a result of a release associated with the fire, although it might also have been related to the operation of motor vehicles along Williams Street. Accordingly, three inches of

soil was subsequently excavated from the SS-2 area on July 26, 2002. Following excavation, a confirmatory sample was collected and analyzed for EPHs and PCBs. Post-excavation laboratory results are summarized on **Table 21**.

Table 21
Post-Excavation Soil Analytical Results: PCBs and EPHs in SS-2 Area
July 26, 2002
93-123 Williams Street
North Dighton, Massachusetts

C11-C22 Aromatics	630000	800000	800000	10000000
Acenaphthene	500	1000000	1000000	10000000
Anthracene	1500	1000000	1000000	10000000
Benzo[a]anthracene	**12000**[bc]	700	700	100000
Benzo[a]pyrene	**16000**[bc]	700	700	100000
Benzo[b]fluoranthene	**21000**[bc]	700	700	100000
Benzo[g,h,i]perylene	12000	1000000	1000000	10000000
Benzo[k]fluoranthene	**14000**[bc]	7000	7000	400000
Chrysene	**16000**[bc]	7000	7000	400000
Fluoranthene	36000	1000000	1000000	10000000
Fluorene	520	1000000	1000000	10000000
Indeno[1,2,3-cd]pyrene	**12000**[bc]	700	700	100000
Phenanthrene	14000	1000000	100000	10000000
Pyrene	28000	700000	700000	10000000

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

ND: No analytes detected above quantitation limits
<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)
Sample Results:
b-c: Analyte concentration in this sample exceeds the MADEP standard for:
b: S1/GW2 type soil
c: S1/GW3 type soil

In view of the above data, the post-excavation soil sample from SS-2 had no detected PCBs but several detected EPHs. The level of C11-C22 aromatics (630,000 ug/kg) was considerably lower than the pre-excavation concentration (1,600,000 ug/kg) and is also lower than the Method 1 S-1/GW-2 standard (800,000 ug/kg). Thirteen (13) PAHs were also detected in the sample. The levels of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, and indeno(1,2,3-cd) pyrene exceeded the applicable Method 1, S-1 standard. It appeared that much of the observed EPH constituents were

background contaminants caused by the proximity to Williams Street and were not likely the result of a release related to the fire.

On February 19, 2003, *SAGE* drilled three hand borings in the grass road shoulder. Borings were drilled with a stainless steel hand auger to refusal depth (approximately 1.0 to 1.5 feet). Recovered soils were screened for volatile organic compounds (VOCs) in the field with an HNU Model HW-101 PID using the jar headspace method. The PID was equipped with a 10.2eV lamp and calibrated to an isobutylene standard. In addition, soil samples were screened for total petroleum hydrocarbons (TPHs) via EPA Method 9074 using a Dexsil Petroflag™ soil test kit. This method is suitable for determining the quantitative concentration of TPHs where a high detection limit (10 ppm) is acceptable. Field screening results are summarized in **Table 22**.

On February 24, 2003, *SAGE* installed four test borings in the roadside area. Borings were located north, south, east and west of previous sample location SS-2 which was noted to have elevated EPHs. The east downgradient boring was completed as a groundwater monitor well (MW-6). The location of the test borings and the monitor well is depicted on **Figure 3** and **Figure 4**. Detailed classifications and descriptions of recovered soils are included in the Soil Boring and Monitor well Logs in **Appendix 4**.

Recovered soils were screened for VOCs in the field with a HNU Model HW-101 PID using the jar headspace method. The PID was equipped with a 10.2eV lamp and calibrated to an isobutylene standard. In addition, soil samples were screened for TPHs via EPA Method 9074 using a Dexsil Petroflag™ soil test kit. Field screening results are summarized on **Table 22**.

Table 22
Soil Screening Results
Hand Borings and Machine Borings: February, 2003
93-123 Williams Street
North Dighton, Massachusetts

HB SS1	0-1	0.0	162*
	1-2	0.0	130
	2-3	0.0	0
HB SS2	0-1	0.0	69*
	1-2	0.0	14
	2-3	0.0	17*
HB SS3	0-1	0.0	129*
	1-2	0.0	15
	2-3	0.0	4
B1	0 - 2.5	1.0	25**
	2.5 - 5.0	0.6	14
	5.0 - 7.5	0.4	8
	7.5 - 10.0	0.2	24*
	10.0 - 15.0	ND	19
	15.0 - 20.0	ND	11
B2	0 - 2.5	0.9	279*
	2.5 - 5.0	0.2	34
	5.0 - 7.5	0.3	17
	7.5 - 10.0	ND	10
	10.0 - 15.0	ND	1
	15.0 - 20.0	ND	8
B3	0 - 2.5	ND	13**
	2.5 - 5.0	ND	16
	5.0 - 7.5	0.6	21
	7.5 - 10.0	ND	14
	10.0 - 15.0	ND	8
	15.0 - 20.0	ND	8
B4	0 - 2.5	ND	237*
	2.5 - 5.0	ND	17
	5.0 - 7.5	ND	19
	7.5 - 10.0	ND	14
	10.0 - 15.0	ND	24
	15.0 - 20.0	ND	183

All readings taken using HNU model P101 with 10.2 eV lamp
Petroflag analysis based on 9.3°C
ND = None Detected
* = Submitted for lab analysis of EPHs
** = Sample contained visible pavement asphalt and was used for fingerprint analysis

Based on Petroflag results, selected soil samples from selected hand borings and machine borings were retained for laboratory analysis. The samples were submitted to a Massachusetts-certified laboratory for analysis for EPH. Analytical reports including Chain-of-Custody documentation are included as **Appendix 3**.

To obtain background data for soils, on May 13, 2003 *SAGE* drilled four hand borings (HB BK-1, HB BK-2, HB BK-3 and HB BK-4) in the grass road shoulder outside the area of runoff impact from the fire. Borings were drilled with a stainless steel hand auger to approximately one foot below surface grade. Samples from 0 to 1 foot depth were submitted to a Massachusetts-certified laboratory for analysis for EPHs. To obtain additional background data in soils, on December 5, 2003 *SAGE* drilled eight (8) additional hand borings (HB-BK-5 through HB-BK-12) in the grass road shoulder. These borings were located on both the east and west sides of Williams Street beyond areas of likely runoff impact from the fire. The location of the borings is depicted on **Figure 3** and **Figure 4**. All soil samples were collected in accordance with in accordance with MADEP's Quality Assurance and Quality Control Guidelines (WSC-CAM-VIIA). These analytical results, including the analytical results from previous background sampling conducted in May, 2003, were used to calculate a 90th Percentile Background Concentration for EPH constituents in soils. All background analytical data and results are summarized on **Table 23**.

On March 28, 2003, three additional hand borings (HB SS-3, HB SS-4, and HB SS-5) were drilled in area of potential impact within the grass road shoulder. Borings were drilled with a stainless steel hand auger to refusal depth (approximately 2.0 to 3.0 feet). Selected samples were submitted to a Massachusetts-certified laboratory for analysis for EPH. The boring locations are depicted on **Figure 3** and **Figure 4**. Analytical reports including Chain-of-Custody documentation are included as **Appendix 3**.

Table 23
Background Soil Samples HB-BK-1 through HB-BK-12
Road Shoulder Area
93-123 Williams Street
North Dighton, Massachusetts

C9-C18 Aliphatics	*5500*	*5500*	*5500*	*5500*	*6000*	11000	*6000*	*5000*	*5500*	*5500*	*5500*	*5000*	*5000*	6000
C19-C36 Aliphatics	41000	41000	35000	45000	29000	33000	*12000*	58000	*11000*	*11500*	68000	540000	74000	73400
C11-C22 Aromatics	100000	77000	43000	60000	27000	54000	51000	41000	37000	*5500*	47000	120000	52000	97700
Acenaphthene	250	*55*	*55*	130	*60*	160	*60*	*50*	*55*	*55*	*55*	*50*	*50*	154
Acenapthylene	*55*	*55*	*55*	*55*	*60*	190	120	*50*	*55*	*55*	180	200	150	189
Anthracene	640	*55*	180	330	*60*	360	280	*50*	*55*	*55*	220	190	140	357
Benzo[a]anthracene	2600	160	760	990	1200	1800	1500	680	740	*55*	850	1100	910	1770
Benzo[a]pyrene	2100	130	570	600	1200	1800	1400	*50*	780	*55*	800	1200	1000	1760
Benzo[b]fluoranthene	3700	220	970	1000	3000	3300	3200	*50*	2800	260	2400	2800	2000	3290
Benzo[g,h,i]perylene	920	*55*	230	220	*60*	1500	990	*50*	730	*55*	*55*	830	660	983
Benzo[k]fluoranthene	1300	*55*	370	340	770	1000	840	*50*	2900	*55*	510	1000	730	1270
Chrysene	3700	190	1000	1200	1500	2700	2000	1100	1100	*55*	1400	2100	1500	2640
Dibenz[a,h]anthracene	*55*	*55*	*55*	*55*	*60*	340	*60*	*50*	*55*	*55*	*55*	*50*	*50*	60
Fluoranthene	8600	340	2400	3000	160	5500	3800	2000	1900	160	3100	4000	2800	5350
Fluorene	330	*55*	*55*	170	*60*	140	*60*	*50*	*55*	*55*	*55*	*50*	*50*	167
Indeno[1,2,3-cd]pyrene	890	*55*	240	220	*60*	1200	210	*50*	160	*55*	180	980	850	962
Phenanthrene	4700	210	1200	1900	1400	2500	1600	720	700	120	1900	1700	1200	2380
Pyrene	6400	290	1800	2300	3000	5000	3400	1800	1600	140	2400	3700	2400	4870
2-Methylnaphthalene	*55*	*55*	*55*	*55*	*60*	*55*	*60*	*50*	*55*	*55*	*55*	*50*	*50*	59
Naphthalene	*55*	*55*	*55*	*55*	*60*	*55*	*60*	*50*	*55*	*55*	*55*	*50*	*50*	59
Total PAHs	182850	125590	93550	123120	74770	125600	88640	110900	67295	23895	134770	685050	145590	203420

Naphthalene & 2-methylnaphthalene were never detected in any background samples.
Italics indicate value reported is 1/2 of detection limit.
* HB-BK-7-2 was rejected due to low surrogate recovery. HB-BK-7-2 is a resample of this location. The higher of the two concentration values was used in calculating the 90th percentile concentrations.

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Table 24
Analytical Summary: Soil Samples from Road Shoulder
Compared to 90th Percentile Background and Method 1 Standards with EPC Evaluation
93-123 Williams Street
North Dighton, Massachusetts

C9-C18 Aliphatics	*6000*	**6500**	**6500**	*6000*	*6000*	*5000*	*5500*	*5500*	*5500*	*5500*	*5500*	*5500*	*5500*	*6000*	*15500*	6000	1000000	1000000					
C19-C36 Aliphatics	22000	6500	6500	6000	36000	14000	14000	22000	16000	5500	5500	5500	47000	32000	*15500*	73400	2500000	2500000					
C11-C22 Aromatics	**120000**	67000	32000	75000	9500	22000	18000	70000	15000	5500	5500	16000	**200000**	**290000**	**630000**	97700	800000	800000					
Acenaphthene	**160**	65	65	60	140	50	55	150	55	55	55	55	55	**290**	**500**	154	1000000	1000000					
Acenaphthylene	60	65	65	60	60	50	55	55	55	55	55	55	**310**	150	*155*	189	100000	100000					
Anthracene	**550**	250	65	280	**420**	55	55	**400**	55	55	55	55	250	**820**	**1500**	357	1000000	1000000					
Benzo[a]anthracene	**2000**	1400	380	1400	**2000**	390	360	**2000**	220	55	55	55	890	**4000**	***[illegible]**	1770	700	700	Y		Y	N	931
Benzo[a]pyrene	1600	1200	350	1200	**[illegible]**	370	290	**1900**	200	55	55	55	910	**4000**	***[illegible]**	1760	700	700	Y		Y	N	798
Benzo[b]fluoranthene	2200	1600	530	1900	**3000**	650	540	**[illegible]**	370	120	55	55	920	**3000**	***[illegible]**	3290	700	700	Y		Y	N	1235
Benzo[g,h,i]perylene	680	610	180	580	**1300**	230	210	**1100**	120	55	55	55	550	**1500**	**12000**	983	1000000	1000000					
Benzo[k]fluoranthene	**1700**	**1500**	340	1100	1200	210	230	**1300**	140	55	55	55	840	**3700**	***[illegible]**	1270	70000	7000	Y	N	Y		671
Chrysene	**3100**	2000	570	2100	**3200**	550	520	**3200**	350	55	55	55	1000	**6000**	**[illegible]**	2640	70000	7000	Y	N	Y	N	1288
Dibenz[a,h]anthracene	**330**	**220**	65	**270**	60	50	55	55	55	55	55	55	260	**700**	*155*	60	700	700	Y	N	Y		121
Fluoranthene	**11000**	4900	1400	**[illegible]**	**8200**	1200	1000	**8200**	860	210	55	240	1600	**11000**	**36000**	5350	1000000	1000000					
Fluorene	**220**	65	65	140	**200**	50	55	**190**	55	55	55	55	55	**350**	**520**	167	1000000	1000000					
Indeno[1,2,3-cd]pyrene	700	600	180	590	280	210	190	**1000**	55	55	55	55	600	**[illegible]**	***[illegible]**	962	700	700	Y		Y		359
Phenanthrene	**4900**	2100	640	**2500**	**3400**	550	550	**3600**	440	55	55	310	500	**5300**	**14000**	2380	1000000	100000					
Pyrene	**7600**	3600	1000	4100	**6000**	1100	870	**6300**	620	180	55	180	1400	**8600**	**20000**	4870	700000	700000					
2-Methylnaphthalene	**60**	65	65	**60**	**60**	50	55	55	55	55	55	55	55	**60**	*155*	59	500000	500000					
Naphthalene	**60**	65	65	**60**	**60**	50	55	55	55	55	55	55	55	**60**	*155*	59	100000	100000					
Total PAHs	185220	100305	51045	109200	84180	46815	42645	130860	40260	17780	17435	28500	262750	382690	845140	203[illegible]	--	--					

Sample Results:

Italics indicate value reported is 1/2 of detection limit.
Results in bold indicate an exceedance of the 90th Percentile of Background Concentrations.

Results hi-lighted in yellow indicate an exceedance of both 90th percentile background concentrations and Method 1 Standards.

Results highlighted in green indicate an exceedance of EPC Evaluation Criteria

Naphthalene and 2-Methylnaphthalene were never detected in any background samples.

Notes:

Sample B-2, 0-2.5' not included in table because sample contained new road asphalt; used for fingerprint analysis.

Sample SS-2, 3/20/2002 not included in table because this soil zone was excavated; see post-excavation sample PE-SS-2.

Sample B-4, 15-17' not included in table because depth was greater than 15 feet.

*= Exceedance of EPC evaluation criteria

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All relevant soil analytical data from hand borings and test borings within the area of impact which was collected in March 2002, July 2002, February 2003, and March 2003 is summarized on **Table 24**. The results are compared to: 1) the 90th Percentile Background Concentration for EPH constituents, and 2) the MADEP Method 1 Standards. Results for fifteen sample locations indicate nine locations within the impacted area where EPH constituents exceeded the 90th Percentile Background Concentration for one or more EPH constituents (see the bolded values on **Table 24**). Five sample locations were identified where EPHs exceeded both the 90th Percentile Background Concentration and the Method 1 Standards (see values highlighted in yellow on **Table 24**).

One sample location at the middle portion of the impacted area, PE-SS-2, was noted to have concentrations of four EPH compounds which were greater than ten times the MADEP Method 1 standard. An adjacent sample, SS-3, also had relatively 'elevated' EPH constituent concentrations where the Method 1 standards are exceeded. Assuming that soils within these two "hotspot" areas were removed by excavation, an Exposure Point Concentration (arithmetic average) was calculated using the remaining thirteen data points. The results indicate, that even with removal of the two elevated contamination areas, the subsequent Exposure Point Concentration for benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene would still exceed the Method 1 Standard for these compounds. Thus it appeared necessary, to achieve a condition of no significant risk, that virtually the entirety of the impacted soil area should be removed. Accordingly, impacted soils to a depth of 1 foot were excavated and disposed on July 21 and July 22, 2004.

Following excavation, eight confirmatory composite soil samples were collected from the excavation bottoms and sidewalls. These samples were screened in the field for TPHs via EPA Method 9074 using a Dexsil Petroflag™ soil test kit. This method is suitable for determining the quantitative concentration of TPHs but has a high detection limit (approx. 10 mg/kg). The location of the confirmatory samples is depicted on **Figure 5**. Field screening results are summarized on **Table 25**.

Table 25
PetroFlag Field Test Data
American Auto Auction
123 Williams Street
North Dighton, Massachusetts

[illegible]	[illegible]	[illegible]
Blank	7-21-04 / 1315	0
Cal	7-21-04 / 1315	1000
PE-SS-3	7-21-04 / 1316	181
PE-SS-4	7-21-04 / 1318	5.0
Sidewall south	7-21-04 / 1338	0
PE-SS-5	7-22-04 / 915	0
Sidewall East	7-11-04 / 1030	0
Sidewall West	7-22-04 / 1040	0
PE-SS-6	7-22-04 / 1050	50
Sidewall North	7-22-04 / 1100	0

PE = Bottom sample at 12" depth
Response factor of 5 was used for all samples. All samples were 10.0 grams by weight

Based on the above screening data potentially elevated TPH was observed at excavation bottom locations PE-SS-3 and PE-SS-6. Accordingly an additional three inches of soil was excavated from these areas prior to backfilling the excavation.

Eight confirmatory composite samples and one blind field duplicate were submitted to a Massachusetts-certified laboratory for analysis of EPHs using promulgated MADEP QA/QC methods. Laboratory results are summarized and compared to Method 1 standards, site-specific background concentrations, and MADEP background concentrations on **Table 26**.

Table 26
Analytical Summary: Post-Excavation Confirmatory Soil Samples from Road Shoulder
Compared to Background and Method 1 Standards with EPC Evaluation
93-123 Williams Street
North Dighton, Massachusetts

C9-C18 Aliphatics	<11000	<11000	<11000	<11000	<11000	<11000	<11000	<12000	<11000	1000000	1000000	2500000	2500000	5000000	5000000	1000000	1000000	2500000	2500000	5000000	5000000	6000	NE	
C19-C36 Aliphatics	<11000	<11000	<11000	<11000	<11000	<11000	<11000	<12000	<11000	2500000	2500000	5000000	5000000	5000000	5000000	2500000	2500000	5000000	5000000	5000000	5000000	73400	NE	
C11-C22 Aromatics	<11000	16000	18000	22000	14000	30000	21000	15000	<11000	800000	800000	2000000	2000000	5000000	5000000	800000	800000	2000000	2000000	5000000	5000000	97700	NE	
Acenaphthene	<110	<110	<110	<110	<110	<110	<110	<120	<110	1000000	1000000	2500000	2500000	5000000	4000000	1000000	1000000	2500000	2500000	5000000	4000000	157	500	
Acenaphthylene	<110	<110	120	230	230	<110	<110	<120	<110	100000	100000	2500000	1000000	2500000	1000000	100000	100000	2500000	1000000	2500000	1000000	189	500	
Anthracene	270	<110	<110	110	<110	160	<110	<120	<110	1000000	1000000	2500000	2500000	5000000	5000000	1000000	1000000	2500000	2500000	5000000	5000000	357	1000	
Benzo[a]anthracene	<110	280	<110	360	120	**830**[bc]	<110	150	<110	700	700	1000	1000	4000	4000	7000	7000	40000	40000	300000	300000	1770	2000	238
Benzo[a]pyrene	120	360	<110	430	150	**1000**[bcdefg]	<110	180	<110	700	700	700	700	700	700	2000	2000	4000	4000	30000	30000	1760	2000	293
Benzo[b]fluoranthene	230	570	200	**770**[bc]	220	**1700**[bcdef]	160	340	170	700	700	1000	1000	4000	4000	7000	7000	40000	40000	300000	300000	3290	2000	524
Benzo[g,h,i]perylene	<110	370	<110	380	<110	630	<110	150	<110	1000000	1000000	2500000	2500000	2500000	2500000	1000000	1000000	2500000	2500000	2500000	2500000	983	1000	
Benzo[k]fluoranthene	<110	210	<110	290	<110	630	<110	<120	<110	7000	7000	10000	10000	40000	40000	70000	70000	400000	400000	3000000	3000000	1270	1000	
Chrysene	160	410	140	510	180	1300	130	180	110	7000	7000	10000	10000	40000	40000	7000	7000	10000	10000	40000	40000	2640	2000	
Dibenz[a,h]anthracene	<110	<110	<110	<110	<110	170	<110	<120	<110	700	700	700	700	800	800	700	700	4000	4000	30000	30000	60	500	
Fluoranthene	<110	780	190	860	230	2500	170	320	180	1000000	1000000	2000000	1000000	5000000	1000000	1000000	1000000	3000000	3000000	5000000	5000000	5350	4000	
Fluorene	120	<110	<110	<110	<110	<110	<110	<120	<110	1000000	1000000	2000000	2000000	5000000	4000000	1000000	1000000	2000000	2000000	5000000	4000000	167	1000	
Indeno[1,2,3-cd]pyrene	<110	220	<110	340	120	680	<110	140	<110	700	700	1000	1000	4000	4000	7000	7000	40000	40000	300000	300000	971	1000	
Phenanthrene	<110	290	<110	350	<110	1000	<110	<120	<110	1000000	100000	2500000	100000	2500000	100000	1000000	100000	2500000	100000	2500000	100000	2440	3000	
Pyrene	260	720	210	820	280	2200	270	380	200	700000	700000	2000000	2000000	5000000	5000000	1000000	1000000	3000000	3000000	5000000	5000000	4870	4000	
2-Methylnaphthalene	<110	<110	<110	<110	<110	<110	<110	<120	<110	500000	500000	1000000	1000000	2000000	1000000	500000	500000	1000000	1000000	2000000	1000000	59.5	500	
Naphthalene	<110	<110	<110	<110	<110	<110	<110	<120	<110	100000	100000	1000000	1000000	1000000	1000000	40000	500000	40000	1000000	40000	3000000	59.5	500	
Aroclor 1016	<15									—	—	—	—	—	—	NE	NE	NE	NE	NE	NE	—	—	—
Aroclor 1221	<15									—	—	—	—	—	—	NE	NE	NE	NE	NE	NE	—	—	—
Aroclor 1232	<15									—	—	—	—	—	—	NE	NE	NE	NE	NE	NE	—	—	—
Aroclor 1242	<15									—	—	—	—	—	—	NE	NE	NE	NE	NE	NE	—	—	—
Aroclor 1248	<15									—	—	—	—	—	—	NE	NE	NE	NE	NE	NE	—	—	—
Aroclor 1254	<15									—	—	—	—	—	—	NE	NE	NE	NE	NE	NE	—	—	—
Aroclor 1260	<15									—	—	—	—	—	—	NE	NE	NE	NE	NE	NE	—	—	—
Total PCB	<15									2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	NE	NE	NA

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

NA: Analysis not performed
<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)
Sample Results:
b-c: Analyte concentration in this sample exceeds the MADEP standard for:
b: S1/GW2 type soil
c: S1/GW3 type soil
d: S2/GW2 type soil
e: S2/GW3 type soil
f: S3/GW2 type soil
g: S3/GW3 type soil
*PE-SS-17 is a blind duplicate of PE-SS-4
** From twelve samples in site vicinity. See Table 23 for the data.
***Per MADEP Technical Update 05232002
****Arithmetic average of eight post-excavation samples. PE-SS-17 was not used because it was a duplicate.
Bolded values exceed the Method 1 Standard.

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As shown in **Table 26**, the concentration of benzo(b)fluoranthene exceeded the former MCP Method 1, S-1 standard in bottom sample PE-SS-6 (from the north side of the excavation), and the concentration of benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene exceeded the former Method 1, S-1 standard in bottom sample PE-SS-3 (from the south side of the excavation). However, the concentrations of these compounds are lower than the site-specific background concentrations (as determined under this investigation, see **Table 23**) and the MADEP-published background concentrations for natural soils. The calculated exposure point concentrations for these three compounds, based on the arithmetic averaging of concentrations in the eight confirmatory samples, were lower than the applicable former Method 1, S-1 standards. No one data point concentration was 10 times the Method 1 standard, and no Upper Concentration Limits (UCLs) were exceeded. Thus, based on these findings, soils at the Site were remediated to concentrations which achieved background conditions, and to concentrations which achieved a condition of No Significant Risk under all foreseeable site uses. Later MCP revisions, dated July 28, 2006, raised the Method 1 Standards for the above compounds such that no Method 1 Standards were exceeded, thus making exposure point averaging unnecessary.

4.2.3 Surface Water and Runoff

Limited initial sampling for EPHs in runoff and surface water was conducted on September 19, 2001 and March 15, 2002. One runoff sample from the garage basement was analyzed for semivolatiles via EPA Method 8270. One sample from the intermittent stream at location SP-1 was analyzed for EPHs using MADEP Methods. Chain-of Custody forms and Certificates of analysis are included in **Appendix 3**. Laboratory results are summarized on previous **Table 9.**

With consideration to the data in **Table 9**, seventeen PAHs were detected in the runoff sample from the garage basement. PAHs were not detected in the stream sample from SP-1, however C11-C22 aromatics were detected at 380 ug/L.

Subsequent groundwater testing in the vicinity of the former garage basement indicated no measurable impacts by EPHs to groundwater in this area of the site. Subsequent sampling of the intermittent stream at the Tremont Street culvert was conducted on March 15, 2002, September 8, 2003, November 25, 2004, March 25, 2004, and June 23, 2004. These analytical results are summarized on previous **Table 10**. Laboratory results indicated no detected EPH constituents in any of these samples. Based on these findings there appear to have been no long term impacts by EPHs to the stream.

4.2.4 Groundwater

Groundwater sampling of all usable monitor wells on the site was performed on September 8, 2003, November 25, 2003, March 25, 2004, and June 23, 2004. All groundwater samples were collected in accordance with MADEP WSC-CAM-VIIA guidelines. Prior to sample collection, groundwater depths were gauged and each well was purged of at least three well volumes of water. Groundwater samples were collected and stored in analyte-specific containers. Samples were submitted to a Massachusetts-certified laboratory for analysis for PCBs via EPA Method 8082 and EPH with target analytes using promulgated MADEP QA/QC methods. Laboratory analytical reports including Chain-of-Custody documentation are included as **Appendix 5**.

Laboratory results, summarized in previous **Tables 13, 14, 15 and 16** revealed sporadic low levels of C11-C22 aromatics and/or C19-C36 aliphatics in MW-1, MW-2, MW-3 , MW-6-2, MW-7, MW-8, MW-9, MW-10, MW-11, MW-EX, and MW-EX-2. Only monitor well MW-5 has had no detected EPHs. In all monitor wells the observed constituent concentrations are significantly less than 1/2 the applicable Method 1, GW-2/GW-3 standards. Based on these findings, groundwater on the Site has not been significantly impacted by the release of EPHs. The detected EPH constituents are suspected to be background occurrences attributable to historic impacts by non-regulated parking lot runoff rather than the subject release from the fire.

A final round of groundwater gauging and sampling was conducted on September 1, 2004. Samples were collected from all usable monitor wells using dedicated, disposable bailers. MW-4 and MW-EX2 were dry and hence could not be sampled. All groundwater samples were collected in accordance with CAM guidance. Prior to sample collection, groundwater depths were gauged and each well was purged of at least three well volumes of water. Groundwater samples were collected and stored in analyte-specific glass containers. Samples were submitted to a Massachusetts-certified laboratory for analysis for PCBs via EPA Method 8082 and EPH with target analytes using promulgated MADEP QA/QC methods. Laboratory analytical reports including Chain-of-Custody documentation are included as **Appendix 5**. Laboratory results, included in **Table 27** below, indicated no detected concentrations of PCBs.

An overburden groundwater contour map based on the September 2004 gauging round is included as **Figure 6**. The map depicts an overall easterly groundwater flow direction towards the on-site stream with an indication of water table mounding over the area of the former Expo Building. This groundwater flow determination is consistent with previous determinations from previous gauging events.

C9-C18 Aliphatics		20000	100000
C19-C36 Aliphatics		20000	100000
C11-C22 Aromatics		30000	100000
Acenaphthene		5000	50000
Acenaphthylene		3000	30000
Anthracene		3000	30000
Benzo[a]anthracene		1000	10000
Benzo[a]pyrene		500	5000
Benzo[b]fluoranthene		400	4000
Benzo[g,h,i]perylene		3000	30000
Benzo[k]fluoranthene		100	1000
Chrysene		3000	30000
Dibenz[a,h]anthracene		40	400
Fluoranthene		200	2000
Fluorene		3000	30000
Indeno[1,2,3-cd]pyrene		100	1000
Phenanthrene		50	400
Pyrene		20	800
2-Methylnaphthalene		3000	100000
Naphthalene		20000	100000
Aroclor 1016		NE	NE
Aroclor 1221		NE	NE
Aroclor 1232		NE	NE
Aroclor 1242		NE	NE
Aroclor 1248		NE	NE
Aroclor 1254		NE	NE
Aroclor 1260		NE	NE
Total PCB		0.3	5

Where necessary, the MADEP stan

NE: No standard is established for

<x: Indicates analyte concentration

: Analyte concentration in this sam

4.3 Evidence of Past or Current Environmental Harm / Stage One Environmental Screening

Within one week of the oil spill, *SAGE* personnel observed at least three dead fish, specifically red pickerel (*Esox Americanus*) in the intermittent stream. Dead amphibians, such as frogs, were not apparent. The water in the stream was observed to be extremely turbid due to ash in runoff from the fire, as well as increased flow from that runoff. It appears likely that anoxic conditions may have locally existed in the stream at that time but field measurements were not collected to verify this. The high turbidity would also have been potentially life-threatening to fish and amphibian species

Since the release of transformer oil resulting from the fire on September 15, 2001, extensive Immediate Response Action (IRA) activities have been performed to remediate the impacts of the oil release. These response actions have included the removal of free oil with absorbant pads/booms and the excavation and disposal of over 120 tons of oil-impacted sediment from the swales and stream bed. *SAGE* personnel visited the site on several occasions in February 2002 through July 2004 since these response actions were completed. Aside from some dead stumps and a few small trees, which had to be removed to facilitate excavation of the streambed, *SAGE* has observed no evidence of any missing, dead or stressed organisms anywhere on the Site or in areas downstream from the Site. The understory vegetation, which was impacted by the excavation activities (e.g., brush, weeds and wildflowers), appears to have quickly recovered to pre-excavation conditions.

4.4 Sediment Screening Benchmark Concentrations

Since the completion of IRA activities approximately 110 post-excavation sediment samples have been collected from the streambed for PCB and/or EPH analyses. Based on recent post-excavation data collected in March 2003 and April 2004, sampling results indicate that the level of PCBs in sediments has been reduced to concentrations below the MADEP TEC (< 60 ug/kg) and the level of EPHs has been reduced to concentrations below the 90th Percentile of Background for all EPH constituents. Post-excavation results for PCBs in sediments have been previously summarized in **Tables 3, 4, and 5** of this report. The restoration of EPHs to background levels is discussed in **Section 4.2.1** of this report.

5.0 RECENT IMMEDIATE RESPONSE ACTIONS AND INVESTIGATORY ACTIVITIES

To further verify that PCBs in site sediment and soil were adequately remediated to a Condition of No Significant Risk, additional soil and sediment confirmatory sampling was conducted on June 6, 2006. To eliminate a TEC exceedance in the swale area and a PCB detection in soil along the fence line, additional limited sediment and soil excavation was performed by *SAGE* on June 22, 2006. The data and results are presented as follows:

5.1 Sediment

On June 6, 2006, *SAGE* collected seventeen (17) sediment samples from the swales and stream channels, which were previously impacted by fire runoff. Eight (8) samples were collected from the swale area west of the fence where previous post-excavation detections of PCBs were observed. Nine (9) sediment samples were additionally collected from the middle of the main stream channel in a statistically random manner. Samples in the stream channel were collected at locations, which were intermediate between previous sampling locations (i.e. at the 25 and 75 foot intervals rather than at the previous 50- foot footage marks). Samples were collected from 0 to 3 inches depth using a steel trench shovel. The samples were submitted to a Massachusetts-certified laboratory for analyses of PCBs via EPA Method 8082. Laboratory results are summarized on **Table 28**. Laboratory reports are included in **Appendix 4**.

Aroclor 1016	<18	<15	<16	<40		NE
Aroclor 1221	<18	<15	<16	<40		NE
Aroclor 1232	<18	<15	<16	<40		NE
Aroclor 1242	<18	<15	<16	<40		NE
Aroclor 1248	<18	<15	<16	<40		NE
Aroclor 1254	<18	<15	<16	<40		NE
Aroclor 1260	<18	<15	<16	<40		NE
Total PCB	<18	<15	<16	<40		59.860

Where necessary, the MADEP standards have been converted from ppm to p

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<x: Indicates analyte concentration not detected at or above specified labora

a: Analyte concentration in this sample exceeds the MADEP Threshold Effe

TEC = Threshold Effect Concentration per MADEP DEP-ORS ITG "Revise May 2002

The above data indicate one sampling location in the middle swale at **1275'** where the sediment TEC (60 ug/kg) was exceeded. To remedy this condition, approximately three-fourths of a drum of sediment was hand excavated by *SAGE* on June 22, 2006. Sediment was excavated over an area covering approximately 16 square feet to a depth of approximately 3 inches below the swale bed. Following excavation, four discrete confirmatory samples were collected at the northwest (NW), southwest (SW), northeast (NE), and southeast (SE) corners of the excavation. Laboratory results are summarized on **Table 29**. Laboratory reports are included in **Appendix 4**.

Table 29
Post-Excavation Sediment Analytical Summary - PCBs
Compared to TECs and Method 1 Standards,
Samples Collected June 22, 2006

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Aroclor 1016	<21	<16	<23	<19	NE	NE
Aroclor 1221	<21	<16	<23	<19	NE	NE
Aroclor 1232	<21	<16	<23	<19	NE	NE
Aroclor 1242	<21	<16	<23	<19	NE	NE
Aroclor 1248	<21	<16	<23	<19	NE	NE
Aroclor 1254	<21	<16	46	<19	NE	NE
Aroclor 1260	<21	<16	<23	<19	NE	NE
Total PCB	<21	<16	46	<19	2000	59.860

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)

TEC = Threshold Effect Concentration per MADEP-ORS ITG "Revised Sediment Screening Values" (January 2006)MADEP SEDSCRN Technical Update, May 2002

As shown in **Table 29**, above, there was only one sample in which PCB in sediment was detected above reporting limits, at sample location **PE 1275-NE**. However, the concentration detected (46 ug/kg) is less than the TEC (60 ug/kg). A data usability review of the laboratory analysis for this sample revealed low surrogate and MS/MSD recoveries. Hence the location was re-sampled on November 1, 2006. No PCB congeners or total PCB were detected above the reporting limit of <19 ug/Kg. Laboratory results are summarized on **Table 30.** Laboratory reports are included in **Appendix 3**.

Table 30
Post-Excavation Sediment Analytical Summary - PCBs
Compared to TECs and Method 1 Standards,
Samples Collected November 1, 2006

Aroclor 1016	<19	<16	<16	NE	NE
Aroclor 1221	<19	<16	<16	NE	NE
Aroclor 1232	<19	<16	<16	NE	NE
Aroclor 1242	<19	<16	<16	NE	NE
Aroclor 1248	<19	<16	<16	NE	NE
Aroclor 1254	<19	<16	<16	NE	NE
Aroclor 1260	<19	<16	<16	NE	NE
Total PCB	<19	<16	<16	2000	10000060

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)
TEC = Threshold Effect Concentration per MADEP-ORS ITG "Revised Sediment Screening Values" (January 2006)

Based on the above confirmatory laboratory results, sediments at the Site have been remediated to concentrations that are below the applicable threshold effects concentration for PCBs and would appear to pose no significant risk.

5.2 Soil

On June 6, 2006, *SAGE* collected five (5) soil samples from the soil at the edge of the pavement along the fence line, which were previously impacted by fire runoff. Eight (8) samples were collected from the swale area west of the fence line where previous post-excavation detections of PCBs were observed. Nine (9) sediment samples were additionally collected from the main stream channel in a statistically random manner. Samples were collected from 0 to 3 inches depth using a steel trench shovel. Sample locations correspond to the number of fence posts starting at the main access gate to the Site. The soil samples were submitted to a Massachusetts-certified laboratory for analyses of PCBs via EPA Method 8082. Laboratory results are summarized on **Table 31**. Laboratory reports are included in **Appendix 3**.

Table 31
Post-Excavation Soil Analytical Summary - PCBs
Compared to Method 1 Standards,
Samples Collected June 6, 2006

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Aroclor 1016	<16	<16	<16	<16	<19	<25	NE	NE
Aroclor 1221	<16	<16	<16	<16	<19	<25	NE	NE
Aroclor 1232	<16	<16	<16	<16	<19	<25	NE	NE
Aroclor 1242	<16	<16	<16	<16	<19	<25	NE	NE
Aroclor 1248	<16	<16	<16	<16	<19	<25	NE	NE
Aroclor 1254	<16	71	<16	<16	<19	<25	NE	NE
Aroclor 1260	<16	<16	<16	<16	<19	<25	NE	NE
Total PCB	<16	71	<16	<16	<19	<25	2000	100000

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)

FD = Blind Field Duplicate collected from FP 2.5.

The above data indicate one soil sampling location at FP **10.5'** where PCBs were detected at 71 ug/kg. To remedy this condition to achieve pristine background conditions, one 3-gallon bucket of soil was hand excavated by *SAGE* on June 22, 2006. Following excavation, one composite confirmatory sample was collected and submitted for PCB analysis. Laboratory results are summarized on **Table 32**. Laboratory reports are included in **Appendix 3**.

Table 32
Post-Excavation Soil Analytical Summary - PCBs
Compared to Method 1 Standards,
Samples Collected June 6, 2006

Aroclor 1016	<16	NE	NE
Aroclor 1221	<16	NE	NE
Aroclor 1232	<16	NE	NE
Aroclor 1242	<16	NE	NE
Aroclor 1248	<16	NE	NE
Aroclor 1254	<16	NE	NE
Aroclor 1260	<16	NE	NE
Total PCB	<16	2000	100000

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)

The above data indicate that no PCBs were detected above the analytical detection limit (16 ug/kg).

A data usability review of the laboratory analysis for sample FP 40.5 collected on June 6, 2006 and for former background soil sample HB-BK-7 collected December 6, 2003 revealed low MS/MSD recoveries. Hence these locations were re-sampled on November 1, 2006. Laboratory results are summarized on **Table 33**. Laboratory reports are included in **Appendix 3**.

Table 33
Post-Excavation Soil Analytical Summary - PCBs
Compared to Method 1 Standards,
Samples Collected November 1, 2006

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
C9-C18 Aliphatics		<10000	<11000	1000000	2500000	5000000	20000000
C19-C36 Aliphatics		58000	37000	2500000	5000000	5000000	20000000
C11-C22 Aromatics		41000	22000	800000	2000000	5000000	10000000
Acenaphthene		<100	<110	1000000	2500000	4000000	10000000
Acenaphthylene		<100	<110	100000	1000000	1000000	10000000
Anthracene		<100	<110	1000000	2500000	5000000	10000000
Benzo[a]anthracene		680	580	7000	40000	300000	3000000
Benzo[a]pyrene		<100	<110	2000	4000	30000	300000
Benzo[b]fluoranthene		<100	<110	7000	40000	300000	3000000
Benzo[g,h,i]perylene		<100	<110	1000000	2500000	2500000	10000000
Benzo[k]fluoranthene		<100	<110	70000	400000	3000000	10000000
Chrysene		1100	750	7000	10000	40000	400000
Dibenz[a,h]anthracene		<100	<110	700	4000	30000	300000
Fluoranthene		2000	1400	1000000	3000000	5000000	10000000
Fluorene		<100	<110	1000000	2000000	4000000	10000000
Indeno[1,2,3-cd]pyrene		<100	<110	7000	40000	300000	3000000
Phenanthrene		720	560	100000	100000	100000	10000000
Pyrene		1800	1200	1000000	3000000	5000000	10000000
2-Methylnaphthalene		<100	<110	500000	1000000	1000000	10000000
Naphthalene		<100	<110	500000	1000000	3000000	10000000
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Aroclor 1016	<15			—	—	—	—
Aroclor 1221	<15			—	—	—	—
Aroclor 1232	<15			—	—	—	—
Aroclor 1242	<15			—	—	—	—
Aroclor 1248	<15			—	—	—	—
Aroclor 1254	<15			—	—	—	—
Aroclor 1260	<15			—	—	—	—
Total PCB	<15			2000	2000	2000	100000

Where necessary, the MADEP standards have been converted from ppm to ppb, or vice-versa, to match the laboratory reporting method.

NA: Analysis not performed

<x: Indicates analyte concentration not detected at or above specified laboratory quantitation limit (x)

*FD = Blind duplicate of HB-BK-7

Based on the above confirmatory laboratory results, soils at the Site have been remediated to concentrations that are below the applicable Method 1 standards and below background conditions.

6.0 DATA USABILITY ASSESSMENT

6.1 Analytical Data Usability Assessment

Refer to **Appendix 6** for the detailed data usability assessments associated with each phase of sampling. In general, the analytical data are usable for MCP decisions and a Representativeness Evaluation based on the Compendium of Analytical Methods (CAM) requirements for accuracy, precision, and sensitivity. Although there were select quality control (QC) nonconformances, the data are valid as reported and may be used for decision-making purposes without limitations for the 2003 (post 8/30) and 2004 soil and sediment data, and 2006 soil, sediment, groundwater, and surface water data.

Issues noted with the 2001, 2002, and 2003, 2004 (groundwater and surface water) data are discussed further in **Section 6.3**, Achievement of Data Quality Objectives.

6.1.1 Evaluation of Pre-CAM Data

Soil, sediment, groundwater, and surface water data generated before August 1, 2003 were generated prior to the implementation of the CAM (Pre-CAM Data). Although these data were generated using either MADEP methods (i.e., EPH and VPH) or SW-846 methods, an additional evaluation was required to assess the adequacy of the pre-CAM analyses to ensure that the data exhibited adequate accuracy, precision, and sensitivity pursuant to 310 CMR 40.1056(2)(k).

In general, it was determined that the pre-CAM data were acceptable to support the Representativeness Evaluation. However, the following issues were noted with soil, sediment, surface water and groundwater samples collected in 2001, 2002, and groundwater and surface water data collected in 2003 and 2004.

- The EPH analyses of soil, sediment, surface water, and groundwater were performed using gas chromatography/mass spectrometry without fractionation. This is considered a significant modification under the CAM and may not produce equivalent results to the CAM methods, as written. Supplemental CAM-compliant data were collected in 2003, 2004, and 2006 and can be used to support the RAO determinations.

- All of the PCB analytical data provided by Geolabs were pre-CAM data. Laboratory Control Samples (LCSs) and Matrix Spike/Matrix Spike Duplicate (MS/MSDs) were spiked with Aroclor 1254 instead of using Aroclors 1016 and 1260. While this method differs from the CAM procedure as written, it is

considered a minor modification, and should not affect achievement of data quality objectives.

- No LCS duplicate or MSD data were provided by Premier Laboratory for groundwater or surface water data collected prior to September 2004. Therefore, the analytical precision of this data was not adequately demonstrated by the reports provided. However, groundwater and surface water results were subsequently verified by supplemental data collected with Presumptive Certainty that yielded comparable results. The CAM-compliant data can be used to support the RAO.

- One General Reporting item was noted for PCB analyses by Geolabs. Concentrations of Aroclors 1016 and 1242 are reported as one combined value in Geolabs reports. However, since this 2001 data was used to determine the presence PCBs, the combination of the results did not likely have an adverse effect on achievement of that data quality objective. Supplemental CAM-compliant data were collected and can be used to support RAO determinations.

Tables 34, 35 and **36** summarize the results of data evaluations of the pre-CAM data.

Table 34
Comparability Evaluation for Pre-CAM Data
2001 Geolabs Soil, Sediment and Groundwater Data (PCBs and EPH)

GC/MS Tunes (GC/MS methods	Laboratory Analytical Accuracy	NA	Not evaluated
Initial Calibration (Reporting Limit)	Laboratory Analytical Accuracy	NA	Not evaluated
Continuing Calibration	Laboratory Analytical Accuracy	NA	Not evaluated
Interference Checks (Metals only)	Laboratory Analytical Accuracy	NA	Not evaluated
	Laboratory Method		

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6.1.2 Rejection of Analytical Data

Appendix II of the Draft Interim Data Usability Guidance (May 2006) was used to determine if gross failures of quality control existed in the soil and sediment data sets. In general there were no gross failures of quality control in the sampling or analytical procedures.

However, six of the 339 data points were judged to be unusable for the Representativeness Evaluation. The ND results of PCB analysis by Method 8082 for sediment sample PE 2750'-2800', collected on September 25, 2001, were rejected per the Draft Interim Data Usability Guidance (IDUG) because surrogate recovery was less than 10% due to matrix interference and the result was ND.

Sediment sample 2200'-2250', collected on September 25, 2001, was rejected because the matrix spike recovery was less than 10% due to matrix interference and the result was ND.

Sediment sample 3675', collected on June 6, 2006, was not rejected, but was considered not useable for the RAO because the reporting limits are elevated for the sample due to high moisture content. The reporting limit (120 µg/kg) exceeds MCP Regulatory limit (60 µg/kg). On September 26, 2006, a replacement sample was collected from location 3675'. The replacement sample's analysis had a detection limit of 47 µg/kg.

Soil samples HB-SS-1: 0'-1', HB-SS-2: 0'-1', and HB-SS-3: 0'-1', collected on February 19, 2003, were rejected because they exceeded twice the holding times per the IDUG; however, these soils were later excavated.

Supplemental "replacement" samples with Presumptive Certainty were collected for the unusable sediment samples 2750'-2800' and 2200'-2250' on November 1, 2006. Results are presented in **Table 30**. Results were ND (< 16 ug/Kg) for total PCB as well as all individual PCB congeners, and thus well below the TEC of 60 ug/kg total PCB.

6.2 Field Quality Control Data Usability Assessment

Quality control in the field was assessed in the individual Data Usability Assessments provided in Appendix 6. Acceptable holding times were achieved for all analyses performed from 2000 to 2006 with the exception of three soil samples HB-SS-1: 0'-1', HB-SS-2: 0'-1', HB-SS-3: 0'-1' which were rejected because the exceeded twice the holding times per the IDUG, as described in **Section 6.1** above.

Sampling procedures and sample preservation techniques were conducted in accordance with *SAGE*'s standard practices, which are consistent with MADEP guidelines. In general, the data are usable for MCP decisions and a Representativeness Evaluation due to acceptable accuracy, precision, and sensitivity on the basis of the field quality control component of the program.

6.3 Achievement of Data Quality Objectives

Data Quality Objectives for the American Auto Auction Site were based on the following site investigation phases:

- Assessment of the nature and extent of impacts from the release of PCB and EPH containing transformer dielectric fluids to environmental media (including soil, sediment, surface water, and groundwater).
- Evaluation of the potential risks posed by Site contaminants to human health, safety, public welfare and the environment.
- Evaluation of site-specific background concentrations of EPHs in sediment and soil.
- Evaluation of post-remedial concentrations of contaminants-of-concern in impacted media.
- Characterization of impacted media and materials for the determination of appropriate disposal alternatives.
- Evaluation of the success of the Site remediation activities in achieving a condition of No Significant Risk as defined by the MCP.

These investigation phases resulted in the specific data quality objectives described below.

As discussed in previous Sections of this RAO, initial site investigation and cleanup was performed in accord with an Immediate Response Action Plan dated October 2001. The plan was developed based on a site meeting with the MADEP and representatives of the U.S. Environmental Protection Agency (USEPA), which occurred on September 20, 2001. Based on that meeting, the agreed IRA objective for PCBs in soil and sediment was determined to be 1.0 ppm or less and the groundwater objective was agreed to be 0.5 ppb. Since the development of the initial IRA Plan, site cleanup and data quality objectives had to be adjusted to reflect the following:

1) Current (July 28, 2006) MCP Method 1 Standards for contaminants-of-concern (i.e., PCBs, EPHs, and asbestos) in soil and groundwater in accord with 310 CMR 40.0975;

2) MADEP-published sediment screening benchmarks for EPHs and PCBs in sediments per Technical Updates issued in May 2002 and revised in January 2006;
3) MADEP-published representative background levels for PAHs in soil per MADEP Technical Update May 2002;
4) 90th percentile background concentrations for EPHs in road shoulder soils and stream sediments, which were determined by site-specific testing during the course of the subject investigation.

During each phase of sampling, *SAGE* performed data usability assessments to evaluate whether or not the data were usable to achieve project objectives. In addition, any cautions or limitations on the data, which could affect the achievement of these objectives or the decision-making process were also noted. **Table 37** summarizes the data issues discovered during the individual data usability assessments performed on the 2001, 2002, and early 2003 data which could affect the achievement of the project objectives and how these issues were reconciled. Although data collected after August 1, 2003 is Post-CAM data, it was reviewed for CAM compliance. Table 4-3 also summarizes less significant issues discovered during the individual data usability assessments performed on the 2003 and 2004 data and how these issues were reconciled. There were no cautions or limitations on the data for 2006, as noted in the Data Usability Assessments in **Appendix 6.**

Table 37
Potential Data Limitations

EPH in soil and groundwater performed using GC/MS with no fractionation and therefore not comparable with CAM requirements as written.	This EPH method deviation is expected to only affect the quantification of detected hydrocarbon ranges. The pre-CAM data was primarily used to determine the presence or extent of contamination. Non-detect "ND" results from EPH analysis by GC/MS analysis without fractionation should be comparable to CAM compliant methods. In most cases, when contamination was detected, soil/sediment excavation was performed followed by CAM-compliant confirmatory sampling. Supplemental CAM-compliant data were collected in 2003, 2004, and 2006 and can be used to support the RAO determinations.

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7.0 REPRESENTATIVENESS EVALUATION

SAGE prepared this Representativeness Evaluation to describe the extent to which Site data provide an accurate representation of Site environmental characteristics pursuant to 310 CMR 40.1056(2)(k) of the MCP and the Draft Interim Data Usability Guidance document prepared by DEP, dated May 12, 2006. The precision, accuracy and sensitivity of the site data used in this Representativeness Evaluation was discussed in the Data Usability Assessment section (**Section 4.0**) of the this RAO. As stated in the Data Usability Assessment, the data are valid as reported and may be used for decision-making purposes without limitations for the 2003 (post 8/30) and 2004 soil and sediment data, and 2006 soil, sediment, groundwater, and surface water data. Potential limitations were identified with respect to some of the data collected during 2001 and 2002, and for 2003 and 2004 (groundwater and surface water) sampling events. These potential limitations are identified and addressed as appropriate throughout this Representativeness Evaluation.

7.1 Conceptual Site Model

Based on available volume information and assuming that all transformers were initially full to capacity, *SAGE* broadly estimates that a total of 500 gallons of transformer oil was released during the fire. It appears that the oil was released as a result of the building collapsing on the transformers or their being grabbed by an excavator-mounted grappling arm. The transformer oil was transported via a large volume of water that was applied for fire suppression purposes. The main component of this fire runoff was observed to run to the east across the paved main parking lot, where it then entered drainage swales at the edge of the parking lot, which in turn discharge to the intermittent stream.

Thus the sheet flow of fire suppression water across the paved parking area was channelized when it reached the drainage swales at the border of the paved area, confining the contaminated fire suppression water to a very limited geographic area defined by the drainage swales and intermittent stream. A log jam area, located approximately 3,000 feet downstream at locations SP-1 (3650'), appears to have prevented any major quantity of oil from flowing further downstream. The primary residual impacts from the release were to sediments in the drainage swales and in the main channel of the intermittent stream.

A minor component of fire runoff may have entered two storm water catch basins and discharged to the intermittent stream via culverts. However, sediments in the catch basins appear to have not been impacted by PCBs. This may be because the catch basin sumps were already filled to capacity with sediment at the time of the release, and,

because the PCBs were contained in a floating oil matrix, the PCBs never contacted the catch basin sediments. Or it may be that PCB contaminated fire water did not enter these catch basins.

As evidence by analytical data, a minor component of PCB-laden fire runoff infiltrated a former electric manhole which was north of the building and a former basement parking garage under the east side of the building. Based on analytical results, groundwater and soil in these areas does not appear to have been adversely impacted by PCBs or EPHs or in areas downgradient to the electric manhole and basement, and thus *SAGE* concludes that the fire runoff was confined by these structures and subsequently removed during remediation, and was not released to the environment..

Based on runoff flow patterns observed by *SAGE* personnel in the days immediately after the fire, and as evidenced by soil analytical data, a small component of fire runoff carrying PCB containing transformer oil appears to have discharged to the west onto a grass road shoulder, which borders Williams Street. As indicated by several areas with EPH range or target analyte concentrations which are above 90th percentile background concentrations, the extent of significant soil impact extended for approximately 250 to 260 feet. The exact source of these EPH cannot be identified, since releases of motor oil, incidental to the operation of motor vehicles, tar and asphalt compounds used in road construction and maintenance, ash and combustion products from hydrocarbon (wood, paper, plastic) materials from the fire, along with the transformer oils, are all potential sources of EPH ranges and target analytes.

There appear to have been no PCB impacts to storm drains on Williams Street as evidenced by the absence of detectable PCBs in outfall sediments west of Williams Street. Because the road shoulder is a common easement area owned by the Town of Dighton, implementation of an Activity and Use Limitation would be problematic. Excavation of the impacted soil was thusly chosen as the selected remedial alternative to achieve a condition of no significant risk. These activities are described in **Section 5.3** of this report.

7.2 Work Plan, Data Quality Objectives and Data Collection Approach

As discussed in previous Sections of this RAO, initial site investigation and cleanup was performed in accord with an Immediate Response Action Plan dated October 2001. The plan was developed based on a site meeting with the MADEP and representatives of the U.S. Environmental Protection Agency (USEPA), which occurred on September 20, 2001. Based on that meeting, the agreed IRA objective for PCBs in soil and sediment was determined to be 1.0 ppm or less and the groundwater objective was agreed to be 0.5

ppb. Since the development of the initial IRA Plan, site cleanup and data quality objectives had to be adjusted to reflect the following:

1) Current (July 28, 2006) MCP Method 1 Standards for contaminants-of-concern (i.e. PCBs, EPHs, and asbestos) in soil and groundwater in accord with 310 CMR 40.0975;
2) MADEP-published sediment screening benchmarks for EPHs and PCBs in sediments per Technical Updates issued in May 2002 and revised in January 2006;
3) MADEP-published representative background levels for PAHs in soil per MADEP Technical Update May 2002;
4) 90th percentile background concentrations for EPHs in road shoulder soils and stream sediments, which were determined by site-specific testing under the course of the subject investigation.

Due to the emergency nature of the Immediate Response Actions, a Quality Assurance Project Plan (QAPP) could not be developed prior to the onset of IRA activities.

Site testing activities and methods, including the rationale for the testing, are summarized in the following discussion. For screening and analytical results, the reader is referred to the body of the RAO report. Construction details for monitor wells and laboratory reports are presented in the Appendices to the RAO.

7.2.1 Site Testing

The Data Quality Objectives (DQOs) for the site were to collect data that could be used to assess the nature and extent of impacts from the release of transformer dielectric fluids to environmental media (including soil, sediment, surface water, and groundwater); to evaluate site specific background concentrations of EPHs in sediment and soil; to evaluate post remedial concentrations of contaminants-of-concern in impacted media; and, to characterize impacted media and materials for the determination of appropriate disposal alternatives.

Pre-remedial site testing included the following activities:

1) The collection of fire runoff samples from asphalt pavement to evaluate impacts by PCBs;
2) The collection of soil samples at the edge of asphalt pavement to evaluate impacts by PCB-contaminated fire runoff;
3) The collection of sediment samples from steam and swale areas to evaluate impacts by PCBs;

4) The collection of surface water and floating free product samples to evaluate impacts by PCBs;
5) The collection of fire runoff samples, which collected in a former basement garage and a former electric manhole to evaluate impacts by semi-volatiles and/or PCBs;

The during-remediation and post-remediation testing program included the following activities:

1) The collection of over one hundred (100) post-excavation confirmatory sediment samples from swale and stream areas;
2) The collection of fourteen (14) surface water samples from selected stream locations during and after sediment excavation in streambed areas;
3) The drilling of test borings and the installation of eleven (11) monitor wells in areas within and downgradient to the release;
4) The collection of representative soil samples from the test borings to evaluate impacts by PCBs and /or EPHs;
5) The collection of groundwater samples from the new monitor wells and two previously existing monitor wells to evaluate impacts by PCBs and EPHs;
6) The collection of sediment samples from stormwater catch basins and a storm drain to evaluate impacts by PCBs and EPHs;
7) The drilling of hand borings and the collection of soil samples within a road shoulder area to evaluate impacts by PCBs and EPHs;
8) The collection of post-excavation confirmatory soil samples from the road shoulder area.

7.2.1.1 Surface Water and Runoff

To evaluate impacts by the release of PCBs from transformer oil, fire runoff samples and surface water samples were collected shortly after the fire on September 17, 2001; September 19, 2001; and September 25, 2001. Samples were collected from the stream (samples BR-1 and BR-2); from the basement of a former parking garage; from the sump of a former electric manhole; from near the northwest corner of a fence which surrounded the former Expo Building; and from various locations in the parking lot downslope of the former Expo Building. Samples were collected using a Teflon pond ladle, which was cleaned between locations by rinsing with de-ionized water. Samples were submitted to a Massachusetts-certified laboratory for the analysis of PCBs via EPA Method 8082.

During and following site remediation in the period from September 26, 2001 up until June 6, 2006, a total of seventeen (17) stream samples were collected at the culvert, which crosses Tremont Street. This culvert was selected for sampling because its outfall is the downstream confluence of a broad upstream wetland that may have been potentially

impacted by the release. Samples were collected using a Teflon pond ladle, which was cleaned with de-ionized water prior to sampling. Samples were submitted to a Massachusetts-certified laboratory for the analysis of PCBs via EPA Method 8082. Later samples, collected after September 8, 2003, were additionally analyzed for EPHs. Most of these surface water sample analyses did not include a laboratory control sample duplicate or a matrix spike duplicate as required by the CAM. Therefore, analytical precision may not have been adequately demonstrated by laboratory. However, surface water results were subsequently verified by supplemental data collected with Presumptive Certainty that yielded comparable results.

Following remedial sediment excavation, on March 15, 2002 a surface water sample was collected from stream location "SP-1" to test for the presence of EPHs, which were previously identified at elevated concentrations in previous sediment samples from this area. On March 20, 2006, a runoff sample was collected from the northern storm water catch basin to determine if there was any residual impact from the release of PCBs and EPHs. These samples were collected using a Teflon pond ladle, which was cleaned between locations by rinsing with de-ionized water. The other two catch basins on the site were dry and hence could not be sampled for runoff.

7.2.1.2 Soil

On March 20, 2002, *SAGE* personnel collected three soil samples from the grass shoulder located twenty (20) feet west of the former Expo Building. The purpose of the sampling was to determine potential impacts from transformer-oil runoff and asbestos-containing materials, which potentially may have flowed in a westerly direction during the release. Soil samples were collected from zero (0) to one (1) inch depth using a clean Teflon™ hand trowel. Samples were submitted to a Massachusetts-certified laboratory for the analysis of PCBs via EPA Method 8082, EPH using MADEP methods, and asbestos using both EPA-600/M4-82-020 (PLM) and EPA 600/R-93/116 (TEM).

On February 19, 2003, *SAGE* drilled three hand borings in the grass road shoulder. Borings were drilled with a stainless steel hand auger to refusal depth (approximately 1.0 to 1.5 feet). Recovered soils were screened for VOCs in the field with an HNU Model HW-101 PID using the jar headspace method. The PID was equipped with a 10.2eV lamp and calibrated to an isobutylene standard. The PID screening method detects volatile compounds associated with petroleum constituents and common solvents. In addition, soil samples were screened for TPHs via EPA Method 9074 using a Dexsil Petroflag™ soil test kit. The Petroflag™ method detects a wide range of petroleum hydrocarbons including semi-volatile compounds not detectable by PID.

On February 24, 2003, *SAGE* installed four test borings in the roadside area west of the former Expo Building. Borings were located north, south, east and west of previous

sample location SS-2, which was noted to have elevated EPHs. Borings were advanced by Environmental Drilling, Inc. of Sterling, Massachusetts utilizing a truck-mounted Geoprobe™ rig. *SAGE* personnel were on-site to supervise drilling and characterize subsurface conditions. Recovered soils were screened for VOCs in the field with a HNU Model HW-101 PID using the jar headspace method. The PID was equipped with a 10.2eV lamp and calibrated to an isobutylene standard. This screening method detects compounds associated with petroleum constituents and common solvents. In addition, soil samples were screened for TPH via EPA Method 9074 using a Dexsil Petroflag™ soil test kit.

No VOC were detected in soil samples. However, based on Petroflag results, selected soil samples from selected hand borings and machine borings were retained for laboratory analysis. The samples were submitted to a Massachusetts-certified laboratory for analysis for EPH, to compare to the Petroflag™ results and to MCP Method 1 soil criteria.

On March 28, 2003, three additional hand borings (HB SS-3, HB SS-4, and HB SS-5) were drilled in the grass road shoulder west of the former Expo Building. Borings were drilled with a clean stainless steel hand auger to refusal depth (approximately 2.0 to 3.0 feet). Selected samples were submitted to a Massachusetts-certified laboratory for analysis for EPHs.

To obtain background data for soils, on May 13, 2003 *SAGE* drilled four additional hand borings (HB BK-1, HB BK-2, HB BK-3 and HB BK-4) in the grass road shoulder outside the area of runoff impact from the fire. Borings were drilled with a clean stainless steel hand auger to approximately one foot below surface grade. Samples from 0 to 1 foot depth were submitted to a Massachusetts-certified laboratory for analysis for EPHs.

To further evaluate soil and groundwater conditions throughout the Site, *SAGE* advanced six (6) soil borings (MW-6-2 through MW-11) on August 26-27, 2003. Drilling was performed by EDI/Geosearch, Inc. of Sterling, Massachusetts using hollow stem augers. Samples were collected using a split spoon sampler, which was cleaned with de-ionized water prior to use and between drilling locations.

Boring MW-6-2 was drilled to replace former monitor well MW-6 which was destroyed during parking lot re-paving. Borings MW-7 and MW-8 were located within the footprint of the former Expo Center Building to evaluate potential impacts from contaminated fire runoff, which may have entered the building basement. MW-9 and MW-11 were situated to evaluate the area immediately downgradient of the former Expo Center Building. MW-10 was located to evaluate potential impacts from contaminated fire runoff to a storm water catch basin, which is situated within the area of impact.

Recovered soils from these borings were screened for VOCs in the field with an HNU Model HW-101 photoionization detector (PID) using the jar headspace method. The PID was equipped with a 10.2eV lamp and calibrated to an isobutylene standard. Field screening results detected no VOCs in any of the recovered soil samples. All soil samples were collected in accordance with Massachusetts CAM guidance. Selected soil samples from MW-7, MW-8, MW-9, and MW-10 were submitted for laboratory analysis of PCBs using EPA Method 8082 and for EPHs using promulgated MADEP QA/QC methods.

To obtain additional background data for EPH in soils, on December 5, 2003 *SAGE* drilled eight (8) additional hand borings (HB-BK-5 through HB-BK-12) in the grass road shoulder. Hand borings were located on both the east and west sides of Williams Street beyond areas of likely runoff impact from the fire. Borings were drilled with a clean stainless steel hand auger to approximately one foot below surface grade. Soil samples from 0 to 1 foot depth were submitted to a Massachusetts-certified laboratory for analysis for EPH.

On July 21-22, 2004, using a backhoe, impacted soils in the road shoulder area were excavated to a depth of 12 inches. Following excavation, eight confirmatory composite soil samples were collected from the excavation bottoms and sidewalls. Samples were collected using a clean Teflon hand trowel. These samples were screened in the field for TPH via EPA Method 9074 using a Dexsil Petroflag™ soil test kit. Based on the screening data, potentially elevated TPH was observed at excavation bottom locations PE-SS-3 and PE-SS-6. Accordingly, an additional three inches of soil was excavated from these areas prior to backfilling the excavation. Following excavation, eight confirmatory composite samples and one blind field duplicate were collected with a clean Teflon hand trowel and submitted to a Massachusetts-certified laboratory for analysis of EPH using promulgated MADEP QA/QC methods.

On June 6, 2006, *SAGE* collected five (5) soil samples from the soil from the easterly edge of the asphalt pavement along the fence line, which had been impacted by fire runoff. These samples were collected for final confirmation to verify that soils at the edge of the asphalt pavement were not significantly impacted by PCB-laden runoff from the fire. Samples were collected from 0 to 3 inches depth, using a clean steel trench shovel, at each fence post and halfway between fence posts. Sample locations designations correspond to the number of fence posts (FP), starting at the main access gate to this area of the site. The soil samples were submitted to a Massachusetts-certified laboratory for analyses of PCBs via EPA Method 8082. The results indicated that at one sampling location at FP-10.5 where PCBs were detected at 71 ug/kg, just above the sediment TEC of 60 ug/Kg, but significantly below the MCP Method 1 S-1 soil concentration of 1,000 ug/Kg. In order to remediate to background conditions, one 3-gallon bucket of soil was hand excavated by *SAGE* on June 22, 2006. Following

excavation, one composite confirmatory sample was collected using a clean steel trench shovel. The confirmatory laboratory results indicated that no PCBs were detected above the analytical detection limit (16 ug/kg).

7.2.1.3 Sediment

During September 17 through September 20, 2001, *SAGE* collected twenty-seven (27) pre-excavation sediment/soil samples from the swales, stream channels and along the pavement perimeter, which was impacted by fire runoff. Samples were collected from the approximate center of each channel/swale using a Teflon trowel, which was decontaminated prior to use. The trowel was cleaned in between sampling locations by rinsing with de-ionized water. These samples were submitted to a Massachusetts-certified laboratory for analyses of PCBs via EPA Method 8082. Eight (8) of these sediment/soil samples were additionally analyzed for EPH using MADEP Methods. For comparison purposes, on November 2 and November 5, 2001, background sediment samples for EPH analysis were collected from twelve (12) locations in drainage channels on the property, which were not impacted by runoff from the fire. Samples were collected with a clean Teflon hand trowel from the middle of the stream channel/swales.

Following the excavation of the top two inches of sediment from the drainage channels and swales, confirmatory samples were collected at approximate 50-foot intervals. A total of approximately seventy-nine (79) samples were collected between October 1, 2001 and November 30, 2001. Sample locations were marked by wooden stakes, which were placed on the bank of the stream/swale at 50-foot intervals. Samples were additionally collected at 50-foot intervals in the stream channel extending approximately 200 feet downstream of the terminus of sediment excavation. These were discrete samples, which were collected from the center of each channel/swale using a Teflon trowel, which was decontaminated prior to each use. The trowel was cleaned in between sampling locations by rinsing with de-ionized water. Samples were submitted to a Massachusetts-certified laboratory for the analysis of PCBs via EPA Method 8082. In addition, post-excavation sediment samples for EPH analysis were collected from the above-referenced eight (8) channel locations, which were previously sampled in September 2001, prior to the initial sediment excavation.

According to DEP-ORS Interim Technical Guidance, "Averaging Area for Benthic Invertebrate Assessments " (January 2006), "MassDEP recommends averaging sediment concentrations over areas no greater than 1000 square feet to evaluate benthic invertebrate exposures." Since sediment samples were collected at a minimum of every 50 feet along the streambed (and the average streambed width is less than 10 feet) then the spatial sampling frequency for sediments in the streambed is at least one sample per 500 square feet. This frequency is well within the January 2006 guidance.

All of the PCB analytical data provided by Geolabs were pre-CAM data (2001). Laboratory Control Samples (LCS) and MS/MSDs were spiked with Aroclor 1254 instead of using Aroclors 1016 and 1260. While this method differs from the CAM procedure as written, it is considered a minor modification and does not prevent a reasonable measure of Laboratory Method Accuracy and Precision and Method Accuracy and Precision in Sample Matrices.

Concentrations in sediments reported for Aroclors 1016 and 1242 are combined in Geolabs reports from 2001. But, since data was generally used to determine the presence of total PCBs, and not any specific congener, the combined results did not have an adverse effect on the data quality objective. Supplemental CAM-compliant data were collected and were used to support this RAO.

To obtain additional post-excavation EPH data from the streambed where elevated EPH had been observed in the 2001 sampling events, *SAGE* collected three sediment samples from the 3,050, 3,250' and SP-1 stream locations on March 15, 2002. Samples were submitted to a Massachusetts-certified laboratory for EPH analysis using MADEP methods. In addition, one confirmatory sample was collected from the 1,850' location in the streambed for PCBs. (This sample was inadvertently omitted during the previous confirmatory sampling conducted in November 2001). This sample was analyzed for PCBs only using EPA Method 8082. Samples were collected using a Teflon™ trowel which was decontaminated prior to use and between sampling locations by rinsing with de-ionized water.

On March 20, 2002, *SAGE* collected sediment samples from two catch basin sumps and one drain manhole located in the parking lot within the area of runoff impact. Samples were collected using a stainless steel hand auger, which was decontaminated prior to use and between sampling locations. Samples were submitted to a Massachusetts-certified laboratory for PCB analysis via EPA Method 8082 and EPHs using MADEP methods.
Laboratory results for previous confirmatory post-excavation sediment samples collected at locations MSW-1 and SP-1 revealed C11-C22 aromatic concentrations, which were slightly elevated (330,000 and 380,000 ug/kg, respectively) relative to the highest nearby background concentration (320,000 ug/kg). Location MSW-1 was situated in a feeder swale at the north end of the site; Location SP-1 was situated at the downstream portion of the Site. In view of these results, an additional three inches of sediment was subsequently excavated from these areas on July 26, 2002 and August 2, 2002. Employees of Frank Corporation of New Bedford, Massachusetts, performed excavation manually, using hand-shovels. Following excavation, representative confirmatory samples were collected by *SAGE* and analyzed for EPHs, PCBs and asbestos. The confirmatory samples were a composite of three grab samples collected across the width of the swale. Samples were collected using a Teflon™ trowel, which was decontaminated prior to use and between sampling locations. The results indicated no detected asbestos,

and no C11-C22 aromatic range concentrations that exceeded the highest nearby background concentration. PCBs were not detected but had high detection limits with <200 ug/kg for the sample from MSW-1 and <71 ug/kg for the sample from SP-1.

To verify the post-excavation concentration of PCBs in stream and swale areas relative to the MADEP WSC-95-141, "Guidance for Disposal Site Risk Characterization, section 9.6.3, Stage I Environmental Screening and then-current Threshold Effects Concentrations (TEC), seven sediment samples were collected by *SAGE* on March 28, 2003. The samples were collected at locations where previous post-excavation samples had detected PCBs. Samples were collected from 0 to 3 inches depth using a clean Teflon hand trowel. Samples were submitted to a Massachusetts-certified laboratory for PCB analysis via EPA Method 8082. One field duplicate sample (3,000'-3,050') was collected for data quality enhancement evaluation. Laboratory results indicated only one location, 1300'-1350' (near MSW-1), where the TEC for total PCBs was exceeded.

[Note: All detected PCB and EPH target analytes were subsequently compared to the current MADEP-published TECs (DEP-ORS Interim Technical Update "Revised Sediment Screening Values", January 2006). The TEC for total PCB did not change significantly, having been raised from the pre-January 2006 concentration of 59.8 ug/Kg to the current 60 ug/Kg.]

To determine the post-excavation concentration of EPH in stream and swale areas, six sediment samples were collected by *SAGE* on May 13, 2003. The samples were collected at locations where previous post-excavation samples had detected EPH. In addition, three additional background sediment samples (BK-13 through BK-15) were also collected on May 13, 2003 from swales and drainages in areas north of the area of spill impact. Samples were collected from 0 to 3 inches depth using a Teflon hand trowel. Samples were submitted to a Massachusetts-certified laboratory for EPH analysis using MADEP Methods. Results indicated one sample location from the north swale area, NSW-1, where the concentration of C19-C36 aliphatics exceeded the 90th percentile background concentration. Subsequently, *SAGE* compared the EPH target analytes to the current MADEP-published TECs (DEP-ORS Interim Technical Update "Revised Sediment Screening Values", January 2006). No EPH target analytes exceeded the established TECs in any of these samples.

As discussed in the Data Usability Section of this report, a significant deviation to the DEP EPH analytical method (GC/MS without fractionation) was employed during the site investigation from 2001 to August 2003 (pre-CAM), which produced data that are not directly comparable to CAM-compliant data. However, this deviation is expected to only affect the quantification of detected hydrocarbon ranges, and not the quantification of target analytes. More importantly, it is our current understanding based on conversations with laboratory personnel, that this deviation does not affect detection limits. In other

words, non-detect EPH results from pre-CAM data should be comparable to non-detect EPH results from CAM-compliant data. This is significant because, the pre-CAM EPH results were used initially to evaluate the extent of EPH impact, and later to evaluate the effectiveness of soil and sediment excavation. During an iterative process of excavation and confirmatory sampling, *SAGE* believes that the fire runoff impacted soils and sediments have been removed. Since identifying impacted soil was the data quality objective at this stage of the IRA, quantification of hydrocarbon ranges was not a critical data quality objective. In the final iterations of the sediment excavation process, sample concentrations were compared to the 90th Percentile of site-specific background concentrations to evaluate risk. Some of these data were also pre-CAM. However, final confirmatory concentrations of hydrocarbon ranges were generally an order of magnitude below the 90th Percentile of Background Concentrations. It is unlikely that EPH analyses performed using GC/MS without fractionation would have reduced detected concentrations to this degree, and the usability of the data was not adversely affected.

Previous sampling investigations conducted in March 2003 indicated that PCBs exceeded the then current TEC at one location in the middle swale area (Location MSW-1). In addition, laboratory results for EPH indicated that one sample from the north swale area had concentrations of the C19-C36 aliphatic hydrocarbon range that exceeded the 90th percentile background concentration (Location NSW-1).

Based on the above findings, excavation activities performed through 2003 had not reduced contaminant levels in sediments at MSW-1 and NSW-1 to levels below site-specific background and/or the applicable TECs for sediment. Consequently, *SAGE* performed additional sediment excavation at MSW-1 and NSW-1 on April 19, 2004.

Approximately three inches of sediment was hand excavated from each swale channel over a channel length extending approximately 15 feet. Approximately one drum of sediment and debris was excavated from each location. Following excavation, confirmatory samples were collected. The confirmatory samples were a composite of three grab samples collected across the swale. Samples were collected using a Teflon™ trowel, which was decontaminated prior to use and between sampling locations. The composite from MSW-1 was submitted to a Massachusetts-certified laboratory for analysis for PCBs via EPA Method 8082. The composite from NSW-1 was analyzed for EPH with target analytes using promulgated MADEP "Presumptive Certainty" QA/QC methods. Based on the post-excavation analytical results, PCBs at location MSW-1 were now reduced to concentrations below the then-current (and current) TEC. EPH at location NSW-1 were reduced to concentrations below the 90th Percentile of site-specific background for all EPH ranges and target analytes. These last confirmatory EPH samples were CAM-compliant and meet Presumptive Certainty.

To further verify that PCBs in site sediment and soil were adequately remediated to a Condition of No Significant Risk, a final round of soil and sediment confirmatory sampling was conducted. On June 6, 2006, *SAGE* collected seventeen (17) sediment samples from the swales and stream channels, which were previously impacted by fire runoff. Eight (8) samples were collected from the swale area west of the fence where previous post-excavation detections of PCBs were observed. Nine (9) sediment samples were collected from the middle of the main stream channel in a statistically random manner. Samples in the stream channel were collected at locations that were intermediate between previous sampling locations (i.e. at the 25 and 75 foot intervals rather than at the previous 50-foot footage marks). Statistically random locations were selected using a web based random number generator.

Samples were collected from 0 to 3 inches depth using a steel trench shovel, which was cleaned prior to use and between sampling locations. The samples were submitted to a Massachusetts-certified laboratory for analyses of PCBs via EPA Method 8082. The laboratory results revealed one sampling location in the middle swale at location 1275' where the sediment TEC (60 ug/kg) was exceeded. To remedy this condition, approximately three-fourths of a drum of sediment was hand excavated by *SAGE* on June 22, 2006. Sediment was excavated over an area covering approximately 16 square feet to a depth of approximately 3 inches below the swale bed. Following excavation, four discrete confirmatory samples were collected at the northwest (NW), southwest (SW), northeast (NE), and southeast (SE) quadrants of the excavation. The laboratory results indicated only one detection of PCB above reporting limits, at sample location PE 1275-NE, however the concentration (46 ug/kg) was lower than the TEC (60 ug/kg). A data usability review of the laboratory analysis for this sample revealed low surrogate and MS/MSD recoveries. Hence the location was re-sampled on November 1, 2006. No PCB congeners or total PCB were detected above the reporting limit of <19 ug/Kg.

7.2.1.4 Groundwater

To evaluate for potential impacts to groundwater from the subject release, *SAGE* initially installed three monitor wells on the Site. The first monitor well (MW-1) was located directly downgradient (east) of the former Expo Center Building to evaluate potential impacts from seepage of contaminated runoff into the building's basement and other conduits. The second monitor well (MW-2) was located to evaluate potential impacts from runoff seepage adjacent to a major drainage swale outfall at the parking lot edge. The third monitor well (MW-3), located within ten (10) feet of the stream, was intended to evaluate potential groundwater impacts immediately downstream of the area of immediate runoff and infiltration impact. In addition, groundwater samples were collected from an existing two-inch monitor well located in the parking lot within the area of runoff impact. Drilling activities were conducted on April 22, 2002. Borings were advanced by Environmental Drilling, Inc., of Sterling, Massachusetts, utilizing a track-

mounted Geoprobe™ rig. *SAGE* personnel were on-site to supervise drilling and characterize subsurface conditions. Each monitor well was constructed with five (5) to ten (10) feet of 1.0-inch diameter PVC well screen. Flush-threaded 1.0-inch diameter PVC riser pipe was then installed to the ground surface and fitted with an expandable locking plug. On installation of well material, each borehole was backfilled with silica sand to a depth above the screened interval where a bentonite seal was installed. Remaining annular space above bentonite seals was backfilled with auger cuttings. A protective steel road box was then nested within a concrete surface seal to secure each well. Each monitor well was developed using a peristaltic pump after installation.

Groundwater samples were first collected from the four monitor wells on May 1, 2002. Samples were collected using dedicated, disposable polyethylene bailers. Prior to sample collection, groundwater depths were gauged and each well was purged of at least three well volumes of water. Groundwater samples were collected and stored in analyte-specific glass containers. Samples were submitted to a Massachusetts-certified laboratory for analysis for PCBs via EPA Method 8082 and EPH using MADEP methods.

To evaluate potential release to the environment from fire runoff contained within the former electric manhole, on November 11, 2002 *SAGE* installed two monitor wells. Prior to drilling, the location of the former manhole was determined using a Trimble Model TSC1 global positioning unit. The first monitor well, MW-4, was located approximately 10 feet northeast of the manhole. The second monitor well, MW-5, was located approximately 10 feet southeast of the manhole. Borings were advanced by ADH Environmental, Inc., of Framingham, Massachusetts utilizing a track-mounted Geoprobe™ rig. *SAGE* personnel were on-site to supervise drilling and characterize subsurface conditions. Groundwater monitor wells were installed in both soil borings. Each monitor well was constructed with fourteen (14) to fifteen (15) feet of 1.25-inch diameter PVC well screen. Flush-threaded 1.25-inch diameter PVC riser pipe was then installed to the ground surface and fitted with an expandable locking plug. Upon installation of well material, each borehole was backfilled with silica sand to a depth above the screened interval where a bentonite seal was installed. Remaining annular space above bentonite seals was backfilled with auger cuttings (i.e., native soils). A protective steel road box was then nested within a concrete surface seal to secure each well. Each monitor well was developed using a peristaltic pump after installation.

Groundwater samples were collected from the two monitor wells on November 18, 2002. Samples were collected using dedicated, disposable polyethylene bailers. Prior to sample collection, groundwater depths were gauged and each well was purged of at least three well volumes of water. Groundwater samples were collected and stored in analyte-specific glass containers. Samples were submitted to a Massachusetts-certified laboratory for analysis for PCBs via EPA Method 8082. Laboratory results, revealed no PCBs

above laboratory method detection limits or applicable MCP Method 1 GW-3 concentrations.

On February 24, 2003, *SAGE* installed four test borings in the roadside area. To evaluate potential groundwater impacts in areas west of the former Expo Center Building, one monitor well, designated as MW-6, was installed in boring B-2. The monitor well was constructed with ten (10) feet of 1.25-inch diameter PVC well screen. Flush-threaded 1.25-inch diameter PVC riser pipe was then installed to the ground surface and fitted with an expandable locking plug. Upon installation of well material, the borehole was backfilled with silica sand to a depth above the screened interval where a bentonite seal was installed. Remaining annular space above the bentonite seal was backfilled with auger cuttings. A protective steel road box was then nested within a concrete surface seal to secure the well. The monitor well was developed using a peristaltic pump after installation.

Groundwater samples were first collected from MW-6 on February 28, 2003. In addition, groundwater samples were collected from an existing monitor well which was discovered by *SAGE* at a location approximately 60 feet south of MW-6. This monitor well was designated by *SAGE* as "MW-EX2". Samples were collected using dedicated, disposable polyethylene bailers. Prior to sample collection, groundwater depths were gauged and each well was purged of at least three well volumes of water. Groundwater samples were collected and stored in analyte-specific glass containers. Samples were submitted to a Massachusetts-certified laboratory for analysis for EPH.

To further evaluate soil and groundwater conditions comprehensively across the east portion of the Site, *SAGE* advanced six (6) soil borings (MW-6-2 through MW-11) on August 26-27, 2003. Drilling was performed by EDI/Geosearch, Inc. of Sterling, Massachusetts using hollow stem augers. Boring MW-6-2 was drilled to replace former monitor well MW-6 which was destroyed during parking lot paving. Borings MW-7 and MW-8 were located within the footprint of the former Expo Center Building to evaluate potential impacts from contaminated fire runoff, which was observed to have entered the building basement. MW-9 and MW-11 were situated to evaluate the area immediately downgradient of the former Expo building, and, MW-10 was located to evaluate potential impacts from a storm water catch basin which is situated within the path of the contaminated fire runoff. Borings were completed as monitor wells, which were constructed using 2-inch diameter PVC well casing. Each monitor well was fitted with an expandable locking plug. Each borehole was backfilled with silica sand to approximately one foot above the screen where a bentonite seal was installed. The remaining borehole was backfilled with soil cuttings. A protective road box was then nested within a concrete surface seal.

Groundwater sampling of all usable monitor wells on the Site was performed on September 8, 2003, November 25, 2003, March 25, 2004, June 23, 2004, and September 1, 2004. Note that during some sampling events, some monitor wells were dry and hence they could not be sampled. All groundwater samples were collected in accordance with MADEP WSC-CAM-VIIA guidelines. Prior to sample collection, groundwater depths were gauged and each well was purged of at least three well volumes of water. Samples were collected using dedicated, disposable polyethylene bailers. Groundwater samples were collected and stored in analyte-specific glass containers. Samples were submitted to a Massachusetts-certified laboratory for analysis for PCBs via EPA Method 8082 and EPH with target analytes using promulgated MADEP QA/QC methods. Laboratory results revealed no detected concentrations of PCBs in any of the samples.

Most of these groundwater sample analyses did not include a laboratory control sample duplicate or a matrix spike duplicate as required by the CAM. Therefore, analytical precision may not have been adequately demonstrated by laboratory. However, groundwater results were subsequently verified by supplemental data collected with Presumptive Certainty that yielded comparable results.

7.3 Use of Field/Screening Data

During field investigations, *SAGE* utilized field screening methods to aid in the selection of potentially impacted soil samples for laboratory analysis. Field screening of soil samples included use of a HNU Model HW-101 PID using the jar headspace method. The PID was equipped with a 10.2eV lamp and calibrated to an isobutylene standard. This screening method detects compounds associated with petroleum constituents and common solvents. In addition, selected soil samples were screened for total petroleum hydrocarbons (TPH) via EPA Method 9074 using a Dexsil Petroflag™ soil test kit. This method is suitable for determining the quantitative concentration of TPHs where a high detection limit (10 ppm) is acceptable. Additional information describing the use of field screening data is presented **Section 7.2.1.2** of this report.

7.4 Selection of Sampling Locations and Depths

The rationale for the selection of sampling locations and is presented for individual media sampling events in **Section 7.2** of this report.

7.5 Number and Spatial Distribution of Sampling Locations

The rationale for the spatial distribution of sampling locations is discussed for individual media in **Section 7.2** of this report.

7.6 Temporal Distribution of Samples

The nature of surface water and sediment contamination encountered at this Site indicates that the temporal distribution of samples is significant, given that contaminants in these media would have a tendency to migrate under influences by stream flow and runoff. As such, post remedial sampling was performed over a broad time period and during a variety of seasons, extending from approximately November 2001 until June 2006. Likewise, groundwater sampling was conducted over a period extending from May 2002 until June 2004. To evaluate seasonal affects, representative groundwater sampling events were performed in spring, summer, fall and winter.

7.7 Critical Samples

Critical soil samples have been identified as those samples used in the calculation of exposure point concentrations for the Method 1 risk characterization presented in **Section 7.0.** These samples include all post-excavation confirmatory soil samples collected from the road shoulder excavation on July 21-22, 2004. Critical sediment samples have been identified as all post-final-excavation sediment samples, as these sample concentrations were used for determining a condition of No Significant Risk.

7.8 Completeness

Six of the 339 data points were judged to be unusable for the Representativeness Evaluation presented in **Section 4.0** of this RAO. The ND results of PCB analysis by Method 8082 for Sample PE 2750'-2800' were rejected per Draft Interim Data Usability Guidance (IDUG) because surrogate recovery was less than 10% due to matrix interference and the result was ND. Sample 2200'-2250' was rejected because the matrix spike recovery was less than 10% due to matrix interference and the result was ND. Samples HB-SS-1: 0'-1', HB-SS-2: 0'-1', HB-SS-3: 0'-1', were rejected because the exceeded twice the holding times per the IDUG. Sample 3675' collected on 6/6/2006 was not rejected, but was considered not useable for the RAO because the reporting limit was elevated for the sample due to high moisture content (the reporting limit (120 ug/Kg) exceeded the TEC (60)).

Replacement samples were collected for all six locations. Therefore, 100% completeness was achieved for all site data.

7.9 Uncertainty and Inconsistency

The following areas of uncertainty associated with this Representativeness Evaluation were identified:

- The Pre-CAM EPH analyses of soil, sediment, surface water, and groundwater were performed using gas chromatography/mass spectrometry without fractionation. This modified method may not produce equivalent results to the CAM methods, as written. Supplemental CAM-compliant data were collected in or after 2003 and can be used to support the RAO determinations. Additional rationale as to why these data quality limitations do not significantly affect the representativeness of the Site data is provided in **Section 7.7**.

- All of the Laboratory Control Samples (LCS) and MS/MSDs for PCB analytical data provided by Geolabs (2001) were spiked with Aroclor 1254 instead of using Aroclors 1016 and 1260. While this method differs from the CAM procedure as written, it is considered a minor modification, and should not affect achievement of data quality objectives.

- No LCS duplicate or MSD data for groundwater or surface water were provided by Premier Laboratory for samples collected through September 2004. Therefore, the analytical precision of this data was not adequately demonstrated by the reports provided. However, groundwater and surface water results were subsequently verified by supplemental data collected with Presumptive Certainty that yielded comparable results.

- Concentrations reported for Aroclors 1016 and 1242 are combined in Geolabs reports instead of being listed individually. However, since this data was used to determine <u>if</u> total PCBs were present, the combination of the results did not likely have an adverse effect on the data quality objective, and in most cases, supplemental CAM-compliant data were collected and can be used to support RAO determinations.

7.10 Conclusion from Representativeness Evaluation

SAGE has drawn the following conclusions regarding the representativeness of Site data to actual Site conditions:

- As indicated by the Data Usability Assessment presented in **Section 4.0** of this RAO, the Site data used in this RAO to demonstrate that a condition of No

Significant Risk has been achieved are consistent with and/or comparable to current MADEP CAM requirements and "Presumptive Certainty."

- Site sampling locations were selected as part of Immediate Response Actions conducted at the Site to generate data necessary to determine the nature and extent of Site contaminants. Subsequent site testing locations were selected to augment the data obtained during the previous phases of work, verify soil and sediment excavation, and to provide sufficient spatial coverage of the site.
- The number of samples, sample depths, spatial and temporal distribution of the samples is sufficient to identify releases from the suspected source areas and to delineate the extent of oil and/or hazardous materials contamination at the Site.
- No significant discrepancies between Site history information, field screening results, and/or laboratory sample results were identified that would undermine the conclusions of this RAO. Based on the above conclusions, *SAGE* has determined that the Site data are sufficiently representative of actual site conditions and may be used to support this RAO.

8.0 EXTENT OF CONTAMINATION

As indicated above, previous Immediate Response actions have been completed at the Site yielding data necessary to determine the nature and extent of contamination. A summary of pertinent data gained during previous response actions has been compiled and are appended as follows **Appendix 3 - Historical Soil, Sediment and Surface Water Analytical Data; Appendix 4 - Test Boring and Monitor Well Logs; and Appendix 5 - Historical Groundwater Analytical Data.** These data, in conjunction with data obtained from recent investigations, were utilized to characterize the extent of contamination on the Site.

8.1 Sediments

Based on initial laboratory data, sediments impacted by transformer oils originally extended from the east parking lot edge through an area of wooded drainage swales and extended down the intermittent stream channel for approximately 3,650 feet. The sediments in the catch basin sumps in the east parking lot were evidently were not impacted by PCBs, likely because the sumps were filled with sediment up to invert levels at the time of the release. Since the completion of IRA activities, detected levels of total PCBs in drainage swale and intermittent stream sediments were noted to remain in only two upstream areas of the intermittent stream channel at sample locations 1100'-1150' (49 ug/Kg) and 1250'-1300' (56 ug/Kg), both of which are below the current TEC (see post-excavation data on **Table 4** and **Table 5**).

One confirmation sediment sample, at location 3675', collected on June 6, 2006, was reported "not detected" for total PCBs (See Table 38, below) at a reporting limit of <120 ug/Kg. The reporting limit was elevated for the sample due to high moisture content and exceeded the TEC (60 ug/Kg). On September 26, 2006, a replacement sample was collected from location 3675'. The analytical results were ND with a reporting limit of 47 ug/Kg. *SAGE* concludes that No Significant Risk exists.

EPH have been removed to background levels. Sediments at a storm drain outfall west of the release area do not appear to have been impacted by the release of PCBs since no PCB congeners were detected.

8.2 Soil

A westerly component of runoff flow from the fire appears to have impacted approximately 260 feet soils to approximately 12 inches depth within a grass-covered road shoulder bordering Williams Street. The primary contaminant of concern in this area of the Site was EPH. Since the completion of soil excavation activities in July 2004, levels of EPH constituents have been reduced to concentrations which are below site-specific background with exposure point concentrations that are lower than Method 1, S-1 standards.

8.3 Surface Water

PCBs in excess of the IRA water objective (0.5 ug/L) were noted in water samples collected from the stream channel in downstream areas; within fire runoff water which accumulated in the Expo Center Building garage basement; within fire runoff water which entered an electric manhole on the north side of the Expo Center Building; and, in pavement fire runoff collected at the northwest side of the Expo Center Building. Subsequent subsurface testing revealed that PCB contaminated fire runoff was not released to soils or groundwater in the vicinity of the electric manhole or the garage basement and did not adversely impact the soil at the west side of the Site.

PCBs were initially detected at 4.8 ug/l in stream samples collected at the Tremont Street culvert on September 19, 2001 but this concentration decreased to below analytical detection limits as observed in later samples collected on September 26, 2001 and in fourteen subsequent sampling events conducted both during and after sediment excavation activities. Based on these findings, there appear to be no significant long-term impacts to stream waters by PCBs.

Seventeen PAH were initially detected in a runoff sample from the garage basement. Subsequent groundwater testing in the vicinity of the former garage basement indicated no significant impacts by EPH to groundwater in this area of the site. Analysis for EPH in samples collected from the stream at the Tremont Street culvert was conducted on March 15, 2002, September 8, 2003, November 25, 2004, March 25, 2004, and June 23, 2004. Laboratory results indicated no detected EPH ranges or target analytes in any of these samples. Based on these finding, there appear to have been no long-term impacts by EPHs to surface waters.

8.4 Groundwater

Based on data obtained from five comprehensive rounds of groundwater sampling, in which no PCB congeners were detected in any sample, on-site groundwater does not appear to have been impacted by the release of PCBs.

Laboratory results revealed sporadic low levels of C11-C22 aromatics and/or C19-C36 aliphatics in MW-1, MW-2, MW-3, MW-6-2, MW-7, MW-8, MW-9, MW-10, MW-11, MW-EX, and MW-EX-2. Only monitor well MW-5 has had no detected EPH ranges or target analytes. In all monitor wells the observed concentrations were significantly less than 1/2 the applicable Method 1, GW-2/GW-3 standards. Free product (NAPL) has not been observed at any monitoring well. Based on these findings, groundwater on the Site has not been adversely impacted by the release of EPH from the fire and groundwater EPH range and target analyte concentrations are below their respective MCP Method 1 GW-2 and GW-3 groundwater criteria. The detected EPH constituents are suspected to be background occurrences attributable to historic impacts by non-regulated parking lot runoff, rather than the subject release.

9.0 METHOD 1 / METHOD 3 RISK CHARACTERIZATIONS

9.1 Method 1 - Soil and Groundwater

Pursuant to 310 CMR 40.0971, MCP Method 1 was chosen to characterize the risk of harm posed by the Site to health, public welfare and the environment for soil and groundwater media. Method 1 may be used when the presence of oil and/hazardous material is limited to soil and/or groundwater. A Stage I environmental screening pursuant to 310 CMR 40.0995 (**Section 4.3 and 4.4** of this report) indicated no visible evidence of long term environmental harm due to soil or groundwater conditions.

Post-excavation soil analytical data indicate detected concentrations of three EPH constituents. The data, presented in **Table 26,** indicated that the concentration of benzo(b)fluoranthene exceeds the Method 1, S-1 standard in bottom sample PE-SS-6 (from the north side of the excavation) and the concentration of benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene exceed the Method 1, S-1 standard in bottom sample PE-SS-3 (from the south side of the excavation). However, the concentrations of these compounds are lower than the site-specific background concentrations (as determined under this investigation, see **Table 23**) and the MADEP-published background concentrations for natural soils.

The calculated exposure point concentrations performed in accord with 310 CMR 40.0926 for these three compounds are lower than the applicable Method 1, S-1 standards. No one data point concentration is 10 times the Method 1 standard and no Upper Concentration Limits (UCLs) are exceeded. Thus, based on these findings, soils at the Site have been remediated to concentrations which achieve background conditions, and to concentrations which achieve a condition of No Significant Risk under all foreseeable site uses. A Notice of Activity and Use Limitation (AUL) pursuant to the requirements of 310 CMR 40.1074 is not required to maintain a condition of no significant risk for soils on the Site.

Groundwater analytical data indicate on-site groundwaters do not appear to have been impacted by the release of PCBs from the fire, since no PCB congeners were detected in groundwater. Laboratory results summarized in **Tables 13, 14, 15** and **16** revealed sporadic low levels of C11-C22 aromatic range and/or C19-C36 aliphatic range hydrocarbons in MW-1, MW-2, MW-3, MW-6-2, MW-7, MW-8, MW-9, MW-10, MW-11, MW-EX, and MW-EX-2. In all monitor wells the observed EPH constituent concentrations are significantly less than 1/2 the applicable Method 1, GW-2/GW-3 standards. Free product (NAPL) has not been observed at any monitoring well location. Based on these findings, groundwater on the Site has not been significantly impacted by the release of EPHs. The detected EPH constituents are suspected to be background occurrences attributable to historic impacts by non-regulated parking lot runoff rather than the subject release. Based on this data, *SAGE* concludes that groundwater on the Site poses no significant risk of harm to health, public welfare and the environment, and that groundwater at the site is at ambient background for this location.

9.2 Method 3 - Sediment and Surface Water

Pursuant to 310 CMR 40.0992, MCP Method 3 was used to characterize the risk of harm posed by the Site to health, public welfare and the environment for sediment and surface water media. Method 3 relies upon detailed information about the Site, the oil and/or hazardous material, and potential exposures to human and environmental receptors under

all current or reasonably foreseeable site activities and uses to characterize the risk of harm. A Stage I environmental screening pursuant to 310 CMR 40.0995 (**Section 4.3** of this report) indicated no visible evidence of long term environmental harm due to sediment or surface water conditions.

Post excavation data for current site conditions are summarized on **Table 38**. As indicated on **Table 38**, all PCB concentrations are below the new MADEP-published Threshold Effect Concentrations (TECs) *(DEP-ORS Interim Technical Update "Revised Sediment Screening Values", January 2006)* of 60.ug/kg. The TEC is the contaminant concentration below which harmful effects of on sediment-dwelling organisms are not expected to be observed. According to the January 2006 Technical Update, "If each detected sediment contaminant concentration is equal to or less than the sediment screening criterion for the contaminant, no further evaluation of the risk of harm from the sediment is required."

In addition, all remaining PCB concentrations are significantly lower than the Method 1, S-1 standard for soil. Based on this data, *SAGE* concludes that the remaining PCBs in sediments pose no significant risk of harm to health, public welfare and the environment.

Since the completion of IRA activities, EPH in sediment appear to have been reduced to concentrations which are below the 90th Percentile of site specific background. The final post excavation analytical data for EPH ranges and target analytes compared to the 90th Percentile of site-specific background concentrations are summarized on previous **Table 5** and **Table 20**. Pursuant to MADEP Policy #WSC-04-160 *"the site-specific background is the cleanup standard for that compound"*. As such, additional remedial efforts to achieve concentration reductions in sediment below a level of no significant risk are not required.

Since the completion of IRA activities, PCBs and EPHs have not been analytically detectable in surface waters. The analytical detection limits for the majority of surface water samples have been at or below the established MADEP Fresh Water Chronic Criteria (see **Table 10**). Thus, it is the opinion of *SAGE* that the concentration of contaminants in surface waters (if indeed any are present) poses no significant risk of harm to health, public welfare and the environment.

Aroclor 1016	<18	<15	<16	<40	<16	NE	NE	13.3
Aroclor 1221	<18	<15	<16	<40	<16	NE	NE	13.3
Aroclor 1232	<18	<15	<16	<40	<16	NE	NE	13.3
Aroclor 1242	<18	<15	<16	<40	<16	NE	NE	13.3
Aroclor 1248	<18	<15	<16	<40	<16	NE	NE	13.3
Aroclor 1254	<18	<15	<16	<40	<16	NE	NE	13.3
Aroclor 1260	<18	<15	<16	<40	<16	NE	NE	13.3
Total PCB	<18	<15	<16	<40	<16	2000	60	13.3

Where necessary, the MADEP standards have been converted fr

<x: Indicates analyte concentration not detected at or above specifi

a: Analyte concentration in this sample exceeds the MADEP Thresl

TEC = Threshold Effect Concentration per MADEP-ORS ITG "Rev

*Where concentrations are below detection limits, ½ the detection li

10.0 FEASIBILITY OF ACHIEVING OR APPROACHING BACKGROUND

10.1 PCBs

Based on post-remediation confirmatory analytical results, PCBs in soil and surface water appear to have been reduced to background concentrations. These data are presented and discussed in **Section 4.1.2** and **Section 5.3** (Soil) and **Section 4.1.3** (Surface Water). Based on available data, groundwater at the Site appears to have never been impacted by PCBs.

With regards to sediment, post-remediation confirmatory analytical results (**Table 38**) indicate that no detectable concentrations of PCBs currently remain in stream or swale sediments. For the purpose of this investigation, any detected concentration of PCBs in sediment is considered to be a "non-background" condition, although it may be possible that airborne dust, etc., may have resulted in some background PCB occurrences. As such, background conditions for PCBs in sediment appear to have been *achieved* at this Site. (Note: Sample 3675' in **Table 38** has a detection reporting limit of 120 ug/Kg. The location was re-sampled and the replacement sample analysis results were ND with a detection reporting limit of 47 ug/kg.)

10.2 EPHs

Based on an analysis of site-specific background data and post-remediation confirmatory analytical results, the level of EPH in sediment, soil, and surface water appear to have been reduced to background concentrations. These data are presented and discussed in **Section 4.2.1** (Sediment), **Section 5.3** (Soil), and **Section 4.2.2** (Surface Water).

With regards to groundwater, laboratory results summarized in previous **Tables 13, 14, 15 and 16** revealed sporadic low levels of C11-C22 aromatic range and/or C19-C36 aliphatic range hydrocarbons in groundwater samples from MW-1, MW-2, MW-3, MW-6-2, MW-7, MW-8, MW-9, MW-10, MW-11, MW-EX, and MW-EX-2. Although a detailed evaluation of background conditions for EPH ranges and target analytes in groundwater in the site vicinity was not performed, *SAGE* believes that the low level EPH constituents detected in on-site groundwater are background occurrences attributable to historic impacts by the infiltration of non-regulated parking lot and roadway runoff rather than the subject release (fire).

In all groundwater samples the observed EPH constituent concentrations are significantly less than 1/2 the applicable Method 1, GW-2/GW-3 standards. Therefore, in accord with MADEP Policy WSC-04-160, background conditions for EPH have been *approached* but not *achieved*. Because a large area (≥10 acres) and volume (≥ 19 million gallons) of aquifer has been impacted by EPH, the additional costs to remediate groundwater to background conditions would clearly be greater than 20% of the cost to achieve a condition of No Significant Risk. As such, the cost of implementation of groundwater remediation to *achieve* background would not be justified by the benefits.

11.0 REMEDIATION WASTE

As of September 15, 2003, approximately 130 tons of remediation waste generated under IRA activities was transported and disposed. These wastes included non-Department of Transportation (DOT) regulated transformer oils, Toxic Substance Control Act (TSCA) regulated PCB transformer oils, TSCA regulated PCB solid wastes and mixtures, TSCA regulated PCB transformers, non-PCB transformers and switchgear, non-PCB oily debris, non-PCB soil cuttings from drilling operations, non-PCB catch basin sludge, and approximately 100 tons of TSCA regulated PCB-contaminated sediment and debris. This material was disposed at the CWM Hazardous Waste Landfill in Model City, New York, Transcycle Industries in Pell City, Alabama, and Northland Environmental, Inc. in Providence, Rhode Island. Manifests and Certificates of Disposal are provided in the Phase I Report dated September 2002, IRA Status Report #3 dated January 2003, and IRA Status Report #5 dated January 2004.

IRA wastes generated from sediment excavation in the swale areas on April 19, 2004 included two drums of PCB sediment and debris, which was transported on August 19, 2004 and disposed at the CWM Hazardous Waste Landfill in Model City, New York. Approximately 138 tons of soil, potentially and actually contaminated by EPH, from soil excavation along the road shoulder area on July 21-22, 2004 was transported under Bill of Lading (BOL) to Aggregate Recycling, Inc. in Eliot, Maine for asphalt batching. The BOL and associated waste characterization data has been provided in previous IRA Status Reports.

IRA wastes generated in 2006 from sediment excavations in the swale areas and soil excavations along the fence line in June 2006 were drummed and transported, along with one drum of location stakes and personal protective equipment (PPE), on January 19, 2007. This material was disposed at the CWM landfill referenced above. Manifests and Certificates of Disposal are provided in **Appendix 8**.

12.0 CONCLUSIONS, IRA COMPLETION, PHASE IV COMPLETION AND RESPONSE ACTION OUTCOME STATEMENT

In accordance with the requirements of 310 CMR 40.0427(1) and 310 CMR 40.0427(7) it is *SAGE*'s LSP's opinion that the requirements for an IRA Completion Report have been achieved as the following conditions have been met:

- Site conditions have been stabilized;
- Any potential Imminent Hazard(s) to health, safety, public welfare and the environment, have been eliminated;
- No Substantial Hazard exists. The potential for a Substantial Hazard has been considered on an ongoing basis throughout the IRA, and conditions that might potentially give rise to a Substantial Hazard have been continuously evaluated throughout the IRA, as documented in the IRA Status Reports. It is *SAGE*'s LSP's opinion that no Substantial Hazard condition exists, or is known to have existed;
- Critical Exposure Pathway(s) have been eliminated, or determined not to exist.
  A Class A-2 Response Action Outcome has been achieved.

All stockpiled/stored remediation waste generated as a result of the Immediate Response Action has been removed from the Site pursuant to the provisions of 310 CMR 40.0030.

Based upon the information detailed in this report and the included combined Method 1(soil and groundwater) /Method 3 (surface water and sediment) Risk Characterization, *SAGE* concludes that site contaminants identified in soil, sediment, groundwater and surface water have been remediated to levels which do not pose a Significant Risk of Harm to Public Health or the Environment and/or to levels which either approach or achieve background conditions. No further Response Actions are necessary at this Site as a level of No Significant Risk and a Permanent Solution has been achieved. A **Class A-2 RAO** has been achieved pursuant to 310 CMR 40.1036(3) as the following conditions have been met:

- A Permanent Solution has been achieved;
- The level of OHM in the environment may not have been reduced to background for all constituents in all media, (specifically EPH in groundwater, as "background" for groundwater could not practicably be determined);
- A level of No Significant Risk to human health or the environment has been achieved;
- OHMs at the Site do not exceed an applicable Upper Concentration Limit in Soil or Groundwater listed at 310 CMR 40.0996(7); and,

- One or more Activity and Use Limitations are not required to maintain a level of No Significant Risk.

Based on the findings of this investigation and to best of *SAGE's* knowledge there appear to be no on-going or uncontrolled contaminant sources on the Site.

As indicated, it is the opinion of the LSP that the IRA Activities completed at the Site have achieved a Class A-2 Response Action Outcome. As such, it is *SAGE*'s LSP's opinion that further Comprehensive Response Actions are unnecessary. This report, in conjunction with the attached BWSC 108, constitutes the completion of Phase IV.

13.0 LIMITATIONS

Data obtained from public agencies, site inspections, data mapping sources, and analytical laboratories, as well as information summarized in reports by prior investigators, may have been used in the characterization of this Site. The accuracy of the conclusions derived from these data is based solely on the accuracy of the data reported and/or supplied. Should data be made available concerning the Site which is not included in this report, it should be reported to *SAGE* so that findings, conclusions, and/or recommendations can be altered and modified (if necessary).

Events occurring on the Site after on-Site inspections are beyond the scope of this report. As such, *SAGE* makes no expressed or implied representations, warranties or guarantees regarding any changes in the condition of the premises after the date of the on-Site inspection(s).

Any qualitative or quantitative information regarding the Site, which was not available to *SAGE* at the time of this assessment, may result in modification(s) to the conclusions and/or representations made in this report.

Due to the fact that geological and soil formations are inherently random, variable, and indeterminate (heterogeneous) in nature, the professional services and opinions provided by *SAGE* under our agreement are not guaranteed to be a representation of complete Site conditions, which are variable and subject to change with time or the result of natural or man-made processes. Although our services are extensive, opinions, findings, and conclusions presented are limited to and by the data supplied, reported, and/or obtained. Unless specified herein, this investigation did not include evaluation of: asbestos-containing materials, radon, lead-based paint, lead in drinking water, wetlands, regulatory compliance, industrial hygiene, health and safety or other OSHA compliance, cultural and historic resources, ecological resources, endangered species, indoor air quality,

electromagnetic fields, formaldehyde, high-voltage power lines, non-point sources or best management practices for silviculture. Under the terms of the agreement no attempt was made to determine the compliance or regulatory status of present or former owners or operators of the site with respect to federal, state, municipal, environmental, and land use laws or regulations.

SAGE has retained a copy of this report. No deletions or additions are permitted without the written consent of *SAGE*. The report, including data, maps, and figures contained herein, are not suitable for use in its present form, for any ongoing or pending litigation. Use of this report, in whole or in part, by parties other than those authorized by *SAGE* is prohibited.