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**IMMEDIATE RESPONSE ACTION
STATUS REPORT**

**BARGE B120 SPILL
BUZZARDS BAY, MASSACHUSETTS
RTN 4-17786**

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IMMEDIATE RESPONSE ACTION STATUS REPORT

BARGE B120 SPILL BUZZARDS BAY, MASSACHUSETTS RTN 4-17786

1.0 INTRODUCTION

GeoInsight, Inc. (GeoInsight) prepared this Immediate Response Action (IRA) Status Report on behalf of Bouchard Transportation Company, Inc. ("Bouchard" or "RP") for the release of oil into Buzzards Bay, Massachusetts. The response actions described in this report were conducted pursuant to the September 15, 2003 IRA Plan (the "IRA Plan") prepared by GeoInsight. The IRA Plan was prepared in response to a September 8, 2003 *Request for IRA With Interim Deadline* letter from the Massachusetts Department of Environmental Protection (MADEP). Several modifications were made to the September 15, 2003 IRA Plan in consultation with MADEP, the National Oceanic & Atmospheric Administration (NOAA), and the U.S. Coast Guard (USCG). These modifications to the IRA Plan were summarized in a September 29, 2003 Errata Sheet. Additional modifications to the IRA Plan were proposed to conduct cleanup activities at Long Island (Hoppy's Landing) in Fairhaven, Massachusetts. These additional modifications to the IRA Plan were summarized in IRA Plan Modification reports dated April 23, 2004 and July 8, 2004. This status report covers the period from July 23, 2004 until December 31, 2004. Response actions conducted after December 31, 2004 will be summarized in subsequent status reports.

The activities conducted pursuant to the IRA Plan supplement the activities conducted in accordance with the May 23, 2003 Immediate Response Action: Treatment and Completion Guidelines Plan (IRATCGP) that was developed for this incident by the Unified Command. The Unified Command was comprised of representatives from the USCG, MADEP, and the RP. Field activities conducted as part of the IRATCGP were completed as of September 3, 2003. The IRA activities bridge the transition period from the end of the IRATCGP activities and the

performance of post-IRA response actions conducted under the Massachusetts Contingency Plan (MCP), 310 CMR 40.0000 and the Oil Pollution Act of 1990 (OPA 1990).

As part of response actions conducted under the MCP, a Phase I Initial Site Investigation (Phase I) and Conceptual Site Model (CSM), Tier Classification, Tier 1A Permit Application, and Phase II Conceptual Scope of Work were submitted to MADEP on May 3, 2004. The release was classified as a Tier 1A disposal site in accordance with the site scoring guidelines in the MCP. On May 21, 2004, a Partial Class A-2 Response Action Outcome (RAO) Statement was submitted for a portion of the shoreline impacted by the release; specifically the 57 shoreline segments where the maximum degree of oiling was categorized as “very light” or “light” as well as three sandy shoreline segments where the maximum degree of oiling was characterized as “moderate.” As described in the partial RAO, a condition of No Significant Risk was achieved for these 57 segments and additional response actions are not required under the MCP. Although MCP response actions are considered to be complete at these segments, additional characterization may be conducted at these segments as part of the ongoing Natural Resource Damage Assessment (NRDA) being conducted pursuant to OPA 1990. Refer to the RAO statement for specific information regarding the 57 segments included in the partial RAO.

2.0 RELEASE BACKGROUND AND ENVIRONMENTAL SETTING

On April 27, 2003, a release of No. 6 fuel oil was reported from Bouchard Barge #120 (B120) into Buzzards Bay, Massachusetts. The exact area where the release occurred is unknown, but the approximate location of the oil that was initially spotted on the water surface is shown on Figure 1. Winds and currents moved the oil primarily to the north, northwest, and northeast and the oil came ashore on sections of shoreline abutting Buzzards Bay in Westport, Dartmouth, New Bedford, Fairhaven, Mattapoisett, Marion, Wareham, Bourne, and Falmouth. Isolated occurrences of tar balls/patties to the south and southeast on the Elizabeth Islands and in Rhode Island to the west were also observed, although some of these occurrences were later determined not to be related to the release.

The initial CSM included as part of the Phase I report summarized the general understanding of the movement and distribution of the released oil and evaluated potential exposure pathways to human and environmental receptors. The CSM was supported by field observations, data collected during the initial assessment, and shoreline conditions. The CSM indicated that the majority of the released oil was stranded in the intertidal zone on the shoreline and was removed by the initial cleanup operations. In general, the remaining oil on the shoreline is present on exposed rock surfaces and subject to natural weathering processes. A revised CSM is currently being prepared for inclusion in the forthcoming Phase II Scope of Work. The CSM is being revised to include pertinent literature on oil spills, updated field results, and additional data, including modeling information on the transport and fate of released oil.

2.1 SHORELINE IDENTIFICATION

Unified Command initially divided the oiled shorelines into 15 geographical divisions to facilitate cleanup operations. The divisions extending from the Elizabeth Islands and Cape Cod (to the east and south of the Cape Cod Canal) were labeled with an “E” prefix, and the divisions to the west of the Cape Cod Canal were labeled with a “W” prefix. The divisions were subdivided into 149 individual shoreline segments during Shoreline Cleanup Assessment Team

(SCAT) reconnaissance visits. For example, shoreline segment W1E-04 corresponds to Crescent Beach in Mattapoisett (west of the Cape Cod Canal in geographical division 1E, segment 04). The shoreline segments are identified on Figure 1. Of the original 149 segments, 29 were subsequently confirmed to be unoiled and are not considered further under the IRA Plan.

Therefore, the remaining 120 segments were oiled and considered part of the “disposal site” as defined in the MCP. Of these 120 segments, a condition of No Significant Risk was found to be present at 57 segments, and a partial Class A-2 RAO was filed for these segments. A list of the remaining 63 segments at which response actions are currently being conducted is presented in Table 1.

2.2 SHORELINE CLASSIFICATION

Individual shoreline segments were classified based upon the shoreline composition, public use, and habitat. As described in the IRATCGP, the shoreline in the vicinity of the release area was divided into the following shoreline classifications:

Shoreline Classification	Shoreline Type
1A	Heavily utilized, public recreational sand beaches
1B	Less utilized, semi-public and private sand beaches
1C	Mixed sand and gravel, gravel (pebble to boulder) and rip rap Groins (jetties)
1D	Rip rap seawalls, bulkheads, piers, docks, and pilings
1E	Rocky shorelines
1F	Salt marshes
2	Roseate tern habitat (Ram Island, Bird Island, and Penikese Island, in particular)
3	Piping plover habitat

More than one classification type may be present at a particular shoreline segment. This site-specific classification was developed using the Environmental Sensitivity Index (ESI) codes, which were developed by NOAA (1999) in response to other oil spills in the context of evaluating shoreline habitat type. This approach for shoreline classification has been widely utilized by the scientific community in assessing and responding to oil spills.

2.3 SENSITIVE RECEPTORS

Potential sensitive receptors identified in the project area include water resources (aquifers, public and private water supply wells), critical habitats, threatened and endangered species, and humans.

Review of information provided by MassGIS indicated that areas to the east and southeast of the Cape Cod Canal, as well as the Elizabeth Islands to the south, are within a Medium Yield Potentially Productive Aquifer and a USEPA-Designated Sole Source Aquifer. A High Yield Potentially Productive Aquifer is located near the Cape Cod Canal. Municipal public supply wells near the shoreline are located in Bourne, Falmouth, Fairhaven, Mattapoisett, and on Cuttyhunk Island (part of the Elizabeth Islands). Non-community public water supplies are located near the shoreline in Westport, Dartmouth, and Wareham.

The intertidal zone of the shoreline provides habitat for wildlife species, such as shorebirds and marine invertebrates. Information obtained from the Natural Heritage and Endangered Species Program (NHESP) indicated that several threatened or endangered species are present in certain areas of Buzzards Bay. For example, two bird species that utilize the intertidal zone of the shoreline for foraging habitat in this area include the roseate tern (*Sterna dougallii*), an endangered species under Massachusetts and Federal law, and the piping plover (*Charadrius melodus*), a threatened species under Massachusetts and Federal law. Several Buzzards Bay areas are designated as rare and critical habitats according to NHESP information. Naushon and Pasque Islands (Elizabeth Islands) are designated as areas that may contain rare wetland habitats. Areas west of the Cape Cod Canal may also contain rare wetland habitats as well as Protected

Open Spaces. An area of Critical Environmental Concern is also present near Phinney's Harbor in Bourne. Maps from MassGIS and NHESP showing sensitive receptor information were included in the May 3, 2004 Phase I report.

Buzzards Bay is comprised of various public and privately owned shoreline types, including sand beaches, mixed sand/gravel beaches and rocky shorelines. In general, public sand beaches are heavily utilized by visitors, local residents and fishermen, who are considered sensitive receptors. People use the shoreline primarily for seasonal recreational activities, such as swimming, fishing, or walking. Rocky shorelines are also used for recreational activities, but to a lesser extent.

3.0 RESPONSE ACTIONS

The objectives of the IRA Plan are to address potential Imminent Hazards, if present, and to respond to time-critical conditions that necessitate immediate response actions. These objectives were developed to meet the applicable General Provisions for Immediate Response Actions listed in 310 CMR 40.0411(1), which are to assess the release, threat of release, or site conditions and, where appropriate, contain, isolate, remove or secure a release or threat of release of oil in order to:

- (a) abate, prevent or eliminate any Imminent Hazard to health, safety, public welfare or the environment; and/or
- (b) respond to any other time-critical release, threat of release and/or site conditions.

The IRA response action strategies include:

1. Removing potentially mobile oil (oil that has the potential to mobilize and impact other areas); and
2. Addressing potential Imminent Hazards to human health, public welfare, safety, and the environment, as listed in 310 CMR 40.0321.

IRA activities conducted during this monitoring period consisted of evaluating the presence of buried oil on the Leisure Shores and Howard's Beach portion of the Brandt Island West segment (segment W1F-02), inspecting segments that were adjacent to closed shellfish beds, responding to reports of oil from citizens, conducting visual inspections of other segments (focused upon segments that did not pass the original IRAC process and segments where the maximum degree of oiling was identified as "heavy"), and conducting limited cleanup operations at the Leisure Shores Beach (in segment W1F-02) and Strawberry Point (in segments W1E-02 and W1E-03) to remove residual oil. Figures 3 through 26 present the segments where IRA activities were conducted and the locations of specific activities. Specific information regarding these activities is summarized below.

3.1 EVALUATING SEGMENTS WITH THE POTENTIAL FOR BURIED OIL AND INSPECTING SEGMENTS ADJACENT TO CLOSED SHELLFISH BEDS

As part of the initial IRA Plan, inspections for potentially buried oil were conducted between November 2003 and April 2004 at the following segments to evaluate whether natural erosional processes over the winter would expose potentially buried oil:

Segment Identification	Segment Name
E1-11	Scraggy Neck South
W1F-01	Brandt Beach
W1F-02	Brandt Island West
W2A-12	Rocky Point to East Cove (Fairhaven Town Beach)
W3A-02	Salter's Point West
W3A-04	Salter's Point East
W3A-05	Round Hill Beach West
W3A-06	Round Hill Beach East (added to inspection list on November 24, 2003)
W3C-04	Barney's Joy (East of Barbed Wire)

The inspections for potentially buried oil were scheduled to be completed by the spring of 2004 because natural processes tend to erode beach sediments in the winter and deposit beach sediments in the summer. Therefore inspections for potentially buried oil would be expected to be of limited value during the summer. As described in the September 2004 IRA Status Report, with the exception of segment W1F-02 (Brandt Island West), the inspections for potentially buried oil did not reveal buried oil at these segments, and inspections for potentially buried oil were considered to be complete as of April 2004. However, oil was encountered at segment W1F-02 during the inspections, and therefore periodic inspections were continued at this segment after April 2004.

Additional inspections were also conducted at segments adjacent to closed shellfish beds in July 2004. Shellfish beds were closed by the Massachusetts Division of Marine Fisheries shortly after the release occurred. Most of the closed shellfish beds were re-opened by the summer of 2004, but portions of several beds remained closed because of agency concerns of residual oil in lower intertidal and shallow subtidal habitats associated with specific shellfish beds. These inspections were conducted to evaluate whether there was residual oil in the intertidal and shallow subtidal zones at these locations that would preclude reopening the shellfish beds. The closed portions of shellfish beds, and the shoreline segments adjacent to these beds, are depicted on Figure 2. Inspections at the shellfish beds consisted of:

- Visually inspecting the shoreline segment for visible oil on the beach surface in the intertidal zone;
- Excavating trenches on the shoreline to investigate the potential presence of oil below the surface in the intertidal zone;
- Using clam rakes and absorbent pads to wipe rocks in the shallow subtidal zone (to depths of approximately 3 feet) to replicate potential conditions encountered by recreational clam fishermen;
- Conducting chain drags (using absorbent material attached to a heavy object) via boat in subtidal areas at selected offshore locations; and
- Collecting subtidal sediment samples at selected locations for laboratory analysis of extractable petroleum hydrocarbons (EPH) and polynuclear aromatic hydrocarbons (PAH).

Table 2 summarizes the segments inspected, the dates of the inspections, and a summary of the field observations. Additional information is presented below.

3.1.1 Inspection of Segments With the Potential for Buried Oil

During this monitoring period, inspections for potentially buried oil at segment W1F-02 were conducted on July 27, August 10, August 31, September 8, and September 27, 2004.

The July 27, 2004 inspection was conducted as part of the shellfish bed evaluation. Buried oil was observed in the upper intertidal area at approximately 5 to 7 inches below ground surface and within an area approximately 2 inches in diameter. The inspection team removed the sediment mixed with oil from this area and no further evidence of buried oil was observed at this segment at the time of the inspection.

The August 10, 2004 inspection revealed limited evidence of buried oil. A small seam of buried oil was observed in the intertidal zone in the vicinity of where buried oil was removed on July 27, 2004. The buried oil was removed by the inspection team and consisted of small pockets of tacky oil 1 to 6 inches in diameter and approximately 6 to 14 inches deep within an area 20 feet in length and 3 feet in width. No further evidence of buried oil was observed at the time of the inspection, except for a small cobble coated with hardened oil found in a trench between Brandt Island Road and Brandt Island Causeway buried approximately 4 inches deep.

On August 31, GeoInsight and MADEP personnel visited Leisure Shores to evaluate for the presence of oil encountered by MADEP in the lower intertidal zone during a MADEP inspection of the beach. Shallow test pits were excavated in the lower and middle intertidal zone. Small globules, ranging from pinhead-size to 2 millimeters, and rainbow sheen were observed on the water in the test pits. Two samples (LS-OS-S01 and LS-OS-S02) of oil-impacted sediment were collected and sent to B&B Laboratories (B&B) for fingerprint analysis. The analytical results are summarized in Table 3 and a copy of the laboratory report is attached in Appendix A. Please note that these samples were collected for fingerprint analysis and were selectively composed of the sediment containing the most visible oil. These samples are therefore considered to be worst-case samples, and the hydrocarbon concentrations are not likely representative of average conditions at this location.

During both September 2004 inspections, oil was encountered in the lower intertidal zone at Leisure Shores in an area bounded by a rock groin to the west (with a small stream crossing the groin), and a smaller groin to the east, near a grill in the shape of a torpedo. The oil consisted

primarily of small globules ranging in size from approximately 1 millimeter (mm) to 7 mm in diameter. These small globules were found as either discrete particles in the subtidal sediment, adhered to small rocks or shells, or floating on the water surface in trenches excavated by the inspection team. Initial evaluation indicated that the oil distribution appeared to be discontinuous, with some areas of the beach containing oil particles and other areas apparently free of oil globules. The September 8, 2004 field investigation at Leisure Shores is summarized in a September 21, 2004 letter, which is attached as Appendix B.

Cleanup activities were conducted at Leisure Shores in response to the observed small globules, and these cleanup activities are described in Section 3.4.1. After these cleanup activities were conducted, sediment samples were collected on December 9, 2004 from Leisure Shores Beach/Howard's Beach to evaluate residual oil concentrations in intertidal sediment. A total of 21 samples were collected at nine locations from the affected intertidal area of Leisure Shores. Samples were collected from the location on the beach where the heaviest oil was initially encountered in September and at eight additional locations within a 20-foot radius of that point. The sample locations are depicted in Figure 6.

Sampling was conducted at low tide; however, because the samples were collected from the intertidal area some of the samples contained substantial amounts of water. Therefore, excess water was drained from the sample jar in an effort to provide the laboratories with adequate sample volume to perform the analyses. A double volume of sample material was collected at each sample location to facilitate analyses for PAH and EPH analysis. One sample volume was sent to Groundwater Analytical, Inc. for laboratory analysis of EPH hydrocarbon fractions and the other sample volume was sent to B&B Laboratories for analysis of PAH.

The detected concentrations of PAH in the sediment samples were compared to the Effects Range-Low (ERL) values published by the National Oceanographic and Atmospheric Administration (NOAA) in the Screening Quick Reference Table (SQuiRT). The ERL values are used to conservatively evaluate potential impacts to marine organisms. The detected PAH and EPH concentrations were also compared to the Method 1 S-1 Risk Characterization

Standards published in the Massachusetts Contingency Plan (MCP), 310 CMR 40.0000. The Method 1 S-1 Risk Characterization Standards are used to evaluate potential risk of human exposure to soil; while this standard is used for surficial soil exposure and is not directly applicable to subtidal sediments, it is a useful comparison to evaluate potential human health risks. The Method 1 S-1 standards vary according to the classification of the underlying ground water, and therefore there are three Method 1 S-1 Risk Characterization Standards; one for each ground water classification (GW-1, GW-2, and GW-3).

Analytical results indicated that EPH hydrocarbon fractions and PAH target analytes were below the detection limit for EPH and subsequently were below the Method 1 Risk Characterization Standards and also below the NOAA's ERL for both total PAH and individual PAHs. The analytical and screening results are included in Table 3.

Figure 2 shows the locations of the trenches excavated at this segment (except for the trenches excavated on September 8, 2004, which are included in the figure attached to the September 21, 2004 letter in Appendix B) to inspect for potentially buried oil.

3.1.2 Inspection of Segments Adjacent to Closed Shellfish Beds

Table 4 presents the GPS coordinates of trenches excavated in the intertidal zone and subtidal areas raked with clam rakes with attached absorbent pads during this monitoring period. Table 2 summarizes field observations collected during the buried oil inspections and the closed shellfish bed inspections.

During these inspections, residual oil observed was removed by the inspection team. Residual oil typically consisted of insignificant amounts of small tarballs or small oiled wrack patties in some upper intertidal areas. Residual oil was removed from Nye's Cove (W1E-01), Brandt Beach (W1F-01), Brandt Island West (W1F-02) and Barney's Joy (W3C-03). These oil-containing materials were added to the remediation waste generated during cleanup operations (refer to Section 3.4 for information regarding cleanup activities) for proper disposal. Small

areas of dried splatter or oil stains on rock surfaces in the upper intertidal zone were observed at some locations that did not warrant removal, however, evidence of oil was not observed at most locations. Oil was not observed in the lower intertidal zone or shallow subtidal zone during chain drags or clam raking activities.

As part of the inspections of the closed shellfish beds, subtidal sediment samples were collected offshore from several segments to evaluate the presence or absence of residual oil in subtidal sediments. Subtidal sediment samples were collected from a boat using a Petite Ponar sediment sampler and the position of each sediment sample was recorded using a GPS. Sediment samples were analyzed for EPH fractions using the MADEP EPH analytical method and PAH target analytes by USEPA Method 8270. Analytical results are summarized in Table 5 and copies of the laboratory analytical reports are attached as Appendix C. Figures 3 through 26 show the locations of intertidal trenches, shellfish raking areas, subtidal sediment samples, and chain drags at individual segments.

The detected PAH and EPH fraction concentrations in all samples were well below applicable NOAA SQuiRT ERL values and MADEP Method 1 S-1 Risk Characterization Standards (GW-1, GW-2, and GW-3). The detected PAH concentrations were generally low, typically only slightly above the laboratory detection limit. The field surveys and laboratory analyses found no evidence of residual oil in subtidal areas proximal to shellfish beds. Negligible amounts of residual oil were observed in the upper intertidal areas of some segments, mainly consisting of stained rocks, which was dry (not tacky to the touch and not mobile). The results of these surveys support re-opening of these shellfish beds that did not warrant remediation.

Inspection of the analytical data indicates that although some of the PAH compounds may be consistent with B120 oil, the samples appear to also contain PAH derived from sources other than the B120 oil. PAH are found in petroleum hydrocarbons, such as B120 oil (“petrogenic” PAH) and can also be generated as a product of combustion (“pyrogenic” PAH). Pyrogenic PAH are often found in ash (wood or coal), cinders, or waste oil and these pyrogenic PAH can be spread through atmospheric deposition. Samples with a pyrogenic PAH signature typically

contain the “heavy” end PAH, such as benzo(b)fluoranthene, benzo(a)pyrene, indeno(1,2,3-cd)pyrene, and benzo(g,h,i)perlyene. The presence of these and other pyrogenic PAH compounds in some of these samples suggests that there is a mixture of oil, including possibly the presence of B120 oil, along with various pyrogenic sources. While the contribution of the non-B120 PAH does not affect the comparison to applicable standards presented above, it is important to note that the non-B120 PAH are likely present in other areas of Buzzards Bay and the presence of these PAH in sediment samples by themselves does not necessarily indicate the presence of B120 oil.

3.2 RESPONSE TO CITIZEN REPORTS OF OIL

After the closure of the incident command post in September 3, 2003, local residents were directed to call GeoInsight to report oil potentially associated with the B120 spill. Personnel from GeoInsight and, when available, a representative from Gallagher Marine Services, responded to reports of oil within 24 hours of the call. A summary of call reports and responses during this monitoring period is included as Table 6. During this monitoring period, GeoInsight received two reports of oil. On August 27, 2004, GeoInsight received a phone call reporting “fist-sized tarballs” on the east side of West Island in Fairhaven. On September 9, 2004, GeoInsight received a phone call from a citizen who collected a sample of suspected oil from a beach in Mattapoisett.

Oil was not present at either location. GeoInsight inspected the east side of West Island in Fairhaven on August 28 and 29, 2004 and oil was not observed (other than small stains of dried residual splatter). Black algae was observed on many of the rocks on this shoreline that could have been mistaken for oil. The sample of material collected from a Mattapoisett beach by a resident consisted of algae and was not oil. No other reports of oil were received during this monitoring period.

In addition to the reports of oil above, GeoInsight and MADEP personnel visited Holly Woods in Mattapoisett (shoreline segment W1D-04) to evaluate oil reported in a marsh and sandy beach

area on August 31, 2004. The initial call and response regarding this report of oil was described in the September 2004 IRA Status report. Fingerprinting analysis of oil samples collected from this location showed that the oil was not associated with the B120 release. Cleanup activities were conducted by MADEP at this location to remove residual oil. A copy of the analytical report comparing the results of these oil samples to the B120 oil is attached as Appendix D.

3.3 INSPECTIONS OF OTHER SEGMENTS

In August and September 2004, GeoInsight and ENTRIX conducted visual inspections of selected shoreline segments to evaluate residual visible oil. The visual inspections focused upon segments that did not pass the original IRAC criteria and segments where the initial degree of relative oiling was characterized as “heavy.” A list of the inspected segments and a summary of the field observations are included in Table 7.

While the field teams were conducting visual inspections of these segments, ENTRIX collected surface sediment samples from selected marshes and surface water samples from tidal pools at some of the segments. In addition to surface sediment samples, marsh core samples were collected at Hoppy’s Landing in Fairhaven (located in segment W2A-10) and from a reference station located in the interior marsh at Nye’s Cove (W1E-01). A total of four marsh sediment cores were collected using a hand auger to also sample subsurface sediment at the base of the marsh mat. Refer to Figure 17 for the locations of the marsh and tidal pool sediment samples. Samples were analyzed for EPH fractions using the MADEP EPH analytical method and PAH target analytes by USEPA Method 8270. Analytical results are summarized in Tables 8 and 9 and copies of the laboratory analytical reports are attached in Appendix E.

The detected concentrations of PAH in the marsh sediment samples were compared to the NOAA SQuiRT ERL values. The dissolved EPH concentrations were compared to the MADEP surface water guidelines published in the October 31, 2002 *Characterizing Risks Posed by Petroleum Contaminated Sites: Implementation of the MADEP VPH/EPH Approach*.

PAH and EPH hydrocarbon fractions were not detected in the tidal pool surface water samples. Therefore, surface water concentrations were below ambient surface water quality criteria and MADEP surface water guidelines

EPH fractions and PAH in marsh sediment samples were below applicable MCP and ERL guidelines for total PAH. However, two marsh sediment samples from one location (Harbor View in Fairhaven; shoreline segment W2A-02) contained concentrations of some individual PAHs above ERL guidelines. Specifically, the samples had concentrations of acenaphthene, fluorene, phenanthrene, and fluoranthene above ERL guidelines. It is important to note that this segment is located near New Bedford Harbor, and the detected PAH may be associated with non-B120 sources from New Bedford Harbor. Field observations documented pieces of what appeared to be roadway asphalt in this segment by the inspection team. A comparison of the laboratory results for the two marsh sediments with the B120 oil indicates little resemblance between the hydrocarbon composition of the marsh samples with the B120 source oil. In particular, the alkylated PAH compounds are the dominant components of the B120 oil but are absent in the marsh sediment samples. In addition, the dominant "parent" PAH compounds in the marsh sediment samples are only minor components of the B120 oil. Those differences cannot be explained by weathering processes. Instead, the 4- and 5-ring PAH compounds in the marsh sediment samples are consistent with a combustion source. The lower molecular weight PAH are generally characteristic of a highly weathered oil that is unrelated to the B120 fuel (because it has none of the components that are resistant to weathering). This weathered oil fingerprint in combination with the high molecular weight PAH from a combustion source is common to that in many urban environments receiving stormwater runoff.

Therefore, the slightly elevated concentrations of acenaphthene, fluorene, phenanthrene, and fluoranthene relative to ERLs may not be associated with impacts from B120 oil but from typical combustion and other urban hydrocarbon sources, probably as the result of runoff and atmospheric deposition. The results of these surveys indicate there is no Imminent Hazard associated with potential oil remaining in previously oiled marshes.

3.4 CLEANUP ACTIVITIES

Additional cleanup was conducted at Leisure Shores(W1F-02) and Strawberry Point(W1E-01, W1E-02 and W1E-03) in Mattapoisett during this monitoring period to remove residual oil. Cleanup activities at these two locations are summarized below.

3.4.1 Leisure Shores

Due to the presence of small, discontinuous globules of oil in the lower intertidal zone at Leisure Shores, additional cleanup activities were conducted to remove residual oil. The proposed cleanup activities were described in a letter dated September 21, 2004, a copy of which is attached in Appendix B. On September 23, 2004, personnel from GeoInsight and Fleet Environmental Services, Inc. (Fleet) conducted cleanup activities, which consisted of manually raking the lower subtidal zone to expose residual oil and then using oil absorbent material to remove the exposed oil. Photographs of the cleanup operation are attached as Appendix F.

On October 27, 2004, a post-cleanup inspection was conducted at both Leisure Shores and Howard's Beach (both areas are located in W1F-02). A small amount (less than approximately 250 milliliters) of hardened splattered rocks and shells, and some small tarballs, were found on the surface at Howard's Beach and removed. Small globules of oil were encountered in some of the test pits excavated in the lower intertidal portion of Leisure Shores.

Due to the continued presence of oil at this location, additional inspection activities have been conducted and are scheduled to continue at this location during the first quarter of 2005. The inspections consist of conducting monthly beach profiles at Leisure Shores and Howard's Beach to evaluate whether the beach sediments (and associated tarballs) are mobilized by seasonal erosional and accretional processes.

Beach profiling surveys were initiated at Leisure Shores and Howard's Beach in November and December 2004. As part of the profiles, GeoInsight surveyed the locations and elevations of

eight arbitrary benchmarks to reference the profiles. The benchmarks consisted of either small drillholes installed in the larger rocks on the groins, or locations associated with some of the features at the beach (e.g., the “Leisure Shores sign, the “torpedo barbecue”). Beach profiling surveys were conducted on November 9 and December 7, 2004 using an autolevel and standard surveying techniques. The surveys were conducted at 5-foot intervals along six transects (labeled H1 through H6) that were approximately perpendicular to the shoreline. Profile elevations were referenced relative to an arbitrary 10-foot datum established by ENTRIX in June 2003 at the top of the western post that currently supports the “torpedo barbecue” at this segment. Figure 27 shows the transect locations. Elevation data for the individual transects are presented in Figures 28 through 33. Figures 28 through 30 (transects H1 through H3) also include beach profile data collected by ENTRIX in June and July 2003. These profile measurements were collected by ENTRIX before and after the rock removal and replacement work that was conducted under the direction of Unified Command.

The beach profile surveys did not indicate substantial changes in shoreline elevation during these monitoring events. In addition, the beach profile surveys collected in November and December 2004 were comparable to the June and July 2003 profiles, indicating that the beach was relatively stable. The need for additional cleanup activities will be re-evaluated in April 2005.

3.4.2 Strawberry Point

On October 27, 2004, personnel from GeoInsight and ENTRIX met with MADEP representatives to inspect for the presence of residual oil at Angelica (W1E-01), Strawberry Cove (W1E-02), and Strawberry Point (W1E-03). Cleanup operations were previously conducted at Strawberry Point in May and June 2004 (refer to previous IRA status reports for information on these cleanup operations), but small, discontinuous amounts of residual oil were still present in some locations.

Small amounts of oil were observed at Angelica Point (W1E-01), and this oil was removed during the inspection. Additional cleanup activities were not required at Angelica Point. Areas

of “pavement” were observed near the tip of Strawberry Point and small, discontinuous areas (less than 1-foot diameter) of pavement were observed in the upper intertidal zone on the west side of Strawberry Point including a portion of the shoreline in Strawberry Cove. During the inspection, the inspection team also encountered about 20 absorbent pads saturated with diesel or No. 2 fuel oil, not B120 oil. These pads were found along the wrack line at the upper intertidal zone and appeared to have washed ashore, likely from a boat or other marine vessel. These pads were not associated with the B120 release, but were removed by the inspection team. The pads were kept by the MADEP representatives for proper disposal.

The field inspectors agreed that additional cleanup should be conducted to remove the residual pavement at Strawberry Point. The proposed cleanup activities were summarized in a letter dated December 1, 2004, a copy of which is attached as Appendix G. Between December 6 and December 8, 2004, cleanup operations were conducted by GeoInsight, ENTRIX, and Fleet to remove the residual oil. The approximate areas where residual oil was removed is shown on Figure 34. Residual oil was removed using hand tools and transported in plastic bags to a roll-off container that was temporarily staged at Mattapoissett Harbor. Photographs of the cleanup operations are attached as Appendix H. A summary of cleanup activities conducted during this monitoring period is presented in Table 10.

4.0 REMEDIATION WASTE

Remediation waste generated during IRA cleanup activities at Leisure Shores and Strawberry Point were transported by Fleet to the American Ref-Fuel (SEMASS) facility in Rochester/West Wareham, Massachusetts for disposal in accordance with applicable requirements.

Documentation of remediation waste disposal is included in Appendix I. A total of approximately 2.56 tons (5,120 pounds) of remediation waste were generated during this period.

Waste transport and disposal information is summarized in Table 11.

5.0 SUMMARY AND FUTURE IRA ACTIVITIES

IRA activities, consisting of continued monitoring for potentially buried oil at segment W1F-02, inspecting intertidal and shallow subtidal areas adjacent to closed shellfish beds, visual inspection of other segments, and cleanup activities at Leisure Shores and Strawberry Point, were conducted during this monitoring period. The results of these surveys indicated there is currently no imminent hazard to health, safety, public welfare, or the environment; nor any time-critical release or threat of a release associated with B120 oil. Sampling of surface water, subtidal sediments, and marsh and beach sediments was also conducted. Petroleum hydrocarbons were not detected in the surface water samples thereby satisfying ambient water quality criteria and MADEP surface water guidelines. PAH concentrations in subtidal sediments and beach sediments satisfied NOAA SQuiRT ERLs and MADEP Method 1 S-1 Risk Characterization Standards. PAH concentrations in marsh sediments generally satisfied MADEP Method 1 S-1 Risk Characterization Standards, and the only exceedances of NOAA SQuiRT ERLs were in two sediment samples from open location and elevated concentrations may be associated with combustion derived PAHs, not B120 oil. A total of 2.56 tons of oiled rocks, sediment, and absorbent material were generated and disposed during cleanup operations in this monitoring period.

Additional monitoring, consisting of beach profile surveys, will be conducted in the winter and spring of 2005 at Leisure Shores and Howard's Beach in Mattapoissett to evaluate sediment movement in the intertidal zone. Additional inspections for potentially buried oil will also be conducted in the spring of 2005 at this location. Based on buried oil findings, the need for additional cleanup activities will be evaluated. GeoInsight will continue to respond to reports of oil from citizens as part of ongoing IRA activities. The next IRA status report will be submitted in September 2005 summarizing IRA activities for the next reporting period.