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September 12, 2006

Mr. Robert F. L. Dorr
60 Crescent Street
Providence, RI 02097

**Subject: Historical Records
Former Gorham Site
333 Adelaide Avenue
Providence, Rhode Island
MACTEC Project No. 3650-05-0041**

Dear Mr. Dorr:

MACTEC Engineering and Consulting, Inc. (MACTEC) has prepared this letter on behalf of Textron, Inc. (Textron) to provide information about ground penetrating radar (GPR) survey work and monitoring well MW-K, in response to your request in a letter dated August 10, 2006.

GPR Survey Inquiry

On April 25, 2006, we returned your call from that morning regarding the 1995 GPR survey conducted at the Gorham Site. Both Textron and MACTEC reviewed our project files and reports for the Gorham Site to identify related documents. During our call, we stated that we found the 1994 Work Plan proposing the use of GPR and a brief description of the use of the GPR for the site investigation. A May 1995 Remedial Investigation (RI) report indicated that the GPR survey was conducted, but a GPR summary report was not prepared by the subcontractor or appended to the RI report. Please refer to the attachments for sections of the 1994 Work Plan and the 1995 RI report.

We determined that the GPR survey was used as a field screening tool to identify buried utilities and structures to guide the investigation and for the safe placement of soil borings/monitoring wells. In addition, the GPR survey was used to locate buried pipes in the vicinity of the Cove.

MACTEC contacted the GPR subcontractor, formerly Geophysics GPR International, Inc. of Needham, Massachusetts. This company no longer operates in Massachusetts and is now operating out of Longueuil, Québec under the name Géophysique GPR International, Inc. On August 31, 2006, MACTEC contacted the Quebec office and asked them to review their project files for a report from the 1995 GPR survey at the Gorham Site. On September 11, 2006, the

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archive search was completed and no report was found. Proposal documentation for the GPR survey was identified. Mr. Daniel Campos of Géophysique GPR International, Inc. indicated that he was "not confident" of finding any report for the project. He said only some of the documentation from the Needham office was transferred to the Longueuil office and that it was likely that only field work was completed with no report.

MACTEC reviewed field notes from the three days of the GPR survey. The field notes indicate that the GPR survey was used to clear areas for drilling. In some instances when the metal detector was used, interference was noted. Poor penetration was also identified in some areas of the Site. The field notes indicate that the GPR subcontractor field marked utilities and hits. No mention of a report or written summary of the GPR survey was made in the field notes in the three days of the GPR survey. Based on the archival review at Textron, MACTEC, and Géophysique GPR International, Inc., no report has been identified and it appears that the GPR was used as a field investigation tool only.

MW-K Inquiry

Per your request, MACTEC reviewed reports from the Gorham Site as well as the field notebook during the time when non-aqueous phase liquid (NAPL) was discovered in MW-K. These reports include: ABB Environmental "Remedial Investigation Report: Gorham Manufacturing Facility" May 1995; ABB Environmental "Supplemental Remedial Investigation Work Plan" July 1995; ABB Environmental Field Notebook for Gorham Site from 2/16/94 – 11/4/97; "ABB Environmental "Limited Design Investigation Report" August 1996; and Harding Lawson Associates "Site Investigation Summary Report and Risk Assessment: Former Gorham Manufacturing Site" July 1999.

Based on the reviewed reports and field notes, the presence of a small amount of NAPL was noted in MW-K in 1994. In 1995, ABB performed a baildown test to determine if recoverable thicknesses of NAPL were present in the formation adjacent to MW-K. The results of the baildown test, which were documented in the December 1995 ABB Environmental Supplemental Site Investigation Report, determined that less than a half-inch of NAPL was present in the formation adjacent to MW-K and that recovery of the NAPL was technically impractical. The text from that report is copied below:

> *"Baildown Test*
>
> *On September 26, 1995, the depth to water and oil was measured in well MW-K using an oil/water interface probe to determine the initial thickness of oil in the well. The thickness of the product was 0.04 feet. Although this thickness is not sufficient for an accurate test, a bail down test was attempted at well location MW-K to estimate actual product thickness in the formation and to assess qualitatively the mobility of the product. A clear bailer was used to evacuate the oil from the well. The oil/water probe was then lowered into the well and the depth to the top of the oil and the oil/water interface was monitored. Readings were collected every thirty seconds for four minutes, then in one-minute intervals for the next five minutes and five-minute intervals for the following half-hour. The final product thickness was 0.04 feet. Because the product thickness was so small, the test did not yield any data that could be used to calculate formation product thickness or mobility."* (Section 2.2)
>
> "*The thickness of light, non-aqueous-phase liquid (LNAPL, probably lubricating oil) in well MW-K (0.04 feet, less than one-half inch) appears to have diminished over the past year. The extent of the thin layer of LNAPL is not known, but it does not extend to the property boundary. Due to the small thickness of product, and the absence of detectable impact to groundwater, recovery of the LNAPL from this location is considered to be technically impractical.*" (Section 5.0)

The NAPL has been generally described as lubricating oil from an unknown source. In Section 1.4 of the July 1999, Harding Lawson Associates *Site Investigation Summary Report and Risk Assessment*, identified the MW-K NAPL and listed the following description: "There were no USTs in the vicinity of this detection. The source of this oil has not been determined."

It should be noted MW-K was destroyed during construction activities at the Stop & Shop and was located in the area of the current parking lot. In above-referenced baildown test, the NAPL in MW-K was of a limited thickness that was not recoverable. Possible residual NAPL in the vicinity of former monitoring MW-K is currently under remediation and assessment.

We hope that this letter will address your request of August 10, 2006 to MACTEC. Please contact either me (781) 245-6606 or Greg Simpson of Textron (401) 457-2635 if you have any further questions regarding the Gorham Site.

Sincerely,
MACTEC Engineering and Consulting, Inc.

David E. Heislein
Project Manager

Attachments: ABB Environmental Services, Inc. "Remedial Investigation Work Plan" May 1994. (Including cover page, table of contents, and pages 3-7, 3-8, 5-5, 5-6, and 5-7).
ABB Environmental Services, Inc. "Remedial Investigation Report" May 1995. (Including cover page, and pages 2-1 and 2-2).

cc: G. Simpson, Textron Inc.
J. Martella, RIDEM
MACTEC Project Files

REMEDIAL INVESTIGATION WORK PLAN

GORHAM MANUFACTURING SITE
PROVIDENCE, RHODE ISLAND

Prepared for:

Textron Inc.
Providence, Rhode Island

Prepared by:

ABB Environmental Services, Inc.
Wakefield, Massachusetts

PN: 07478.08

May 1994

REMEDIAL INVESTIGATION WORK PLAN

GORHAM MANUFACTURING SITE
PROVIDENCE, RHODE ISLAND

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REMEDIAL INVESTIGATION WORK PLAN

GORHAM/TEXTRON SITE
PROVIDENCE, RHODE ISLAND

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3.8 TASK 8 - GEOPHYSICAL SURVEY

A geophysical survey will be conducted during initial field activities to supplement research on subsurface utility locations under Task 2. Details procedures for the conduct of the proposed survey are provided in Section 5.4.2.

A ground penetrating radar (GPR) survey will be conducted to map subsurface utilities and other buried features. Survey objectives include:

- tracing the five pipes observed at the North Bank Area;
- locating underground concrete vaults presumed to function historically as fuel storage tanks; and
- determining the location of existing underground utilities to be cleared prior to TerraProbe or borehole advancement.

A GPR survey is particularly effective in mapping buried utility lines, underground storage tanks, and subsurface metallic debris. To a lesser extent, because contrasts exist between natural soil and materials like concrete and ceramics, GPR can also be used to map locations of buried objects made of these materials. Major changes in soil stratigraphy can also be detected with GPR. Disruption of continuous undisturbed soil horizons, like those associated with backfilled excavations (e.g., trenches), can also be mapped.

The GPR unit is operated by a two-person survey crew from a field vehicle with the remote antenna towed either manually or behind a motorized vehicle. Reflected wave signals are transferred to a graphic strip chart recorder on the GPR unit. The signals recorded in the field will be interpreted on site by a trained geophysicist. Significant reflectors identified in the field on the strip chart will be marked in the field with flagging or spray paint. GPR traverse lines will be selected in a reconnaissance mode (no formal grid established) tracing underground piping and other subsurface targets as they are discovered.

To confirm pipe connections that may be identified between floor drains or catch basins and the North Bank outfall pipes, an attempt will be made to flush potable water down these lines while monitoring discharge (if any).

As a means to supplement the results of the GPR survey, a metal detector will also be used to confirm and/or provide higher resolution mapping of subsurface targets as they are identified. The metal detector can be used either remotely at the surface to locate subsurface metallic objects (inductive mode) or by applying a signal directly to a known utility at the surface (e.g., cast iron pipe exiting the North Bank slope) and mapping the subsurface trace (conductive mode).

The GPR survey is scheduled for three to five days in the field.

3.9 TASK 9 - BUILDING N TANK REMOVALS

Two fuel-oil tanks were exposed on the north side of Building N during the Hunter (1989) investigation. Approximately 5 feet of soil was excavated to expose the tanks, however, only the tops were visible. The two tanks are believed to have a capacity of 6,500 gallons each. Evidence of a potential release was identified at well GZA-6, located downgradient of Building N, where toluene (0.560 mg/ℓ) and ethylbenzene (0.980 mg/ℓ) were detected by GZA (1988) and TPH (10.6 mg/ℓ) was detected by Hunter (1989) in groundwater.

Since these tanks are located in a swale behind Building N, which in turn is at the top of an embankment leading down to Mashapaug Cove, it would be difficult to assess if a release has occurred using standard, investigative techniques. Instead, the two tanks will be removed. Prior to their excavation, a sample of oil will be collected from each tank, if any remains, for GC fingerprint analysis (modified EPA Method 8100). The tanks will then be removed in accordance with RIDEM regulation DEM-DWM-UST05-93 (UST Regulations), Section 15.00. Obviously stained soils, or soils exhibiting elevated PID readings, will be segregated. Stockpiled material will be sampled for analysis to determine the final disposition of the excavated soils. Depending on the volume of excavated material, two to four composite samples will be analyzed for TPH. Three to five soil samples will be obtained from the excavation sidewalls and bottom for TPH analysis.

The tank removal and sampling is expected to require two to three days in the field. Subsequent disposal of soils, if required, would occur in the following weeks. A Closure Assessment report will be developed consistent with Section 15.10 of the UST Regulations and will be submitted to the RIDEM, Underground Tank Section within 30 days of the second tank removal.

5.3.4 Sample Containers

Sample containers will be wiped clean at the sample site, transferred to a clean carrier, and transported to the sample handling area. Samples will be packed for transportation to the analytical laboratory. The sample identities will be noted and COC procedures initiated as described in Section 6.0 of this Work Plan.

The samples are then stored on ice in a secure area prior to shipment. Sample containers, preservation, and holding time requirements are listed in Table 5-1.

5.4 FIELD INVESTIGATION TECHNIQUES AND PROCEDURES

5.4.1 Mobilization

To streamline field tasks and minimize project delays at commencement of field activities, the following mobilization tasks will be implemented prior to initiating field investigation activities:

1. A central office facility (e.g., trailer, or a secure portion of the abandoned facility) will be established near the former Production Area to function as headquarters for ABB-ES field program activities. The field office will have electrical power, telephone communication, a two-way radio base station, a portable computer, and a refrigerator for sample storage. The office will also serve as the location for field project files, field equipment storage, sample staging, and possibly the field gas chromatograph (field GC).

2. Subcontractor drilling equipment and supplies are to be staged in a designated location during mobilization, prior to the initiation of subsurface exploration activities. The equipment will decontaminated prior to arrival on-site as prescribed in Subsection 5.3.

3. A temporary, centrally-located decontamination pad will be constructed in the former Production Area, where most of the subsurface explorations will be conducted. These pads will be constructed during drilling equipment mobilization, prior to the initiation of field activities (see Subsection 5.3).

4. All sampling and health and safety equipment and materials will be staged in the field office.

5. Team meetings will comprise the final phase of mobilization. Meetings will focus on project health and safety requirements, installation policies and procedures to be followed, field sampling procedures, site access requirements, and drilling requirements (e.g., decontamination, waste handling, and well installation).

5.4.2 Surface Geophysical Surveying Methods

A geophysical survey of the general areas targeted for subsurface exploration will be conducted prior to the beginning of the drilling program. Ground penetrating radar (GPR) will be used to identify subsurface utilities, vaults, and other buried features to clear these areas prior to intrusive activities. A metal detector survey will be used to supplement the GPR survey as necessary.

5.4.2.1 Ground Penetrating Radar Survey. The GPR survey method uses electromagnetic waves in the frequency range of 80 to 1,000 megahertz to define subsurface stratigraphy. With this surveying method, electromagnetic energy is radiated downward into the subsurface from an antenna that is pulled slowly across the ground at speeds varying from about 0.25 to 5 miles per hour (mph), depending on the amount of detail desired and the nature of the target. The radio wave energy is reflected from surfaces where there is a contrast in the electrical properties of subsurface materials. These surfaces may be naturally occurring geologic horizons (e.g., soil layers, changes in moisture content, voids, and fractures in bedrock) or manmade (e.g., buried utilities, tanks, drums, or dunnage). The reflected energy is processed and displayed as a continuous strip chart recording of distance versus time, where time can be thought of as approximately proportional to depth. The depth of penetration of a GPR system is highly site-specific, and generally depends on the soil types at the site (clean sands are best), moisture conditions (dry is best) and the frequency of the antenna (the lower the frequency, the deeper the penetration and the less the resolution).

The GPR unit will be operated from a utility vehicle with the remote transmitter/receiver antenna towed manually. Reflected radar signals, transferred to a graphic strip chart recorder on the GPR unit will be interpreted directly in the field. Interpreted reflectors will be marked at the surface with flagging or spray paint during the survey.

Several factors may adversely effect the quality, and the ability to collect interpretable data. They include: physical access limitations for both the utility vehicle and towed antenna, contrasts in electrical properties between soil and subsurface targets (clay pipe and concrete objects are more difficult to locate than metallic objects because of the lower contrast), the size and depth of subsurface objects (deeper and smaller objects are more difficult to locate), and the clay content and degree of water saturation of soils. Wet clay-rich soils can significantly attenuate the radar signal making interpretation difficult and sometimes impossible.

Because of the inherent flexibility in data collection and ease in interpretation, GPR survey lines can be selected in the field based on preliminary interpretations. Survey lines can be concentrated in areas where the targets are likely to exist for better resolution. Survey line spacings are increased or decreased in response to success of data collection efforts at the time of the survey. The GPR survey is generally conducted by a two-person crew, one individual to tow the antenna along survey lines and the other to monitor the strip chart output for field interpretation.

5.4.2.2 Metal Detector Survey. Metal detectors are designed to locate buried metallic objects including ferrous metallic materials such as iron and steel as well as nonferrous metallic materials like copper and aluminum. Metal detectors are frequently used to locate utility lines, underground storage tanks, and buried drums. In this survey, the metal detector will be used to supplement the GPR survey results in interpreting the size, configuration, and composition of subsurface targets.

In the inductive mode, the metal detector operates by producing an alternating magnetic field around a transmitting coil. A second, receiving coil, is adjusted to null out the "primary" transmitted magnetic field. In the presence of this primary magnetic field, electrical eddy currents are created in buried metallic objects that in turn establish secondary magnetic fields. The interaction of the primary and secondary magnetic fields upsets the balance in the receiving coil. The magnitude of this imbalance is output to both a meter and audio signal.

In the conductive mode, typically used in subsurface pipe location, the metal detector produces an electric signal that is transferred directly to an exposed portion of the target at the surface (e.g. pipeline valve, fire hydrant, or electrical conduit). The magnetic field produced around the buried portion of the target by the conducted signal is detected at the surface by a receiving coil of the metal detector.

VOLUME I
REMEDIAL INVESTIGATION REPORT

GORHAM MANUFACTURING FACILITY
333 ADELAIDE AVENUE
PROVIDENCE, RHODE ISLAND
MAY 1995

VOLUME 1
REMEDIAL INVESTIGATION REPORT
GORHAM MANUFACTURING FACILITY
333 ADELAIDE AVENUE
PROVIDENCE, RHODE ISLAND

Prepared for:

Textron Incorporated
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Prepared by:

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Wakefield, Massachusetts

PN: 09111.15

MAY 1995

2.0 STUDY AREA INVESTIGATION

The Remedial Investigation field activities were conducted by ABB Environmental Services, Inc. (ABB-ES) on behalf of Textron, in several mobilizations between July and December 1994. This section describes the sampling locations, procedures, and analytical methods for each medium sampled.

2.1 PRELIMINARY ACTIVITIES

Prior to commencing the intrusive field activities, several tasks were performed. A utilities search was conducted via the research of public utility plans and an onsite geophysical survey. Additionally, a wetland delineation was performed to determine if any of the anticipated field activities were within wetland or perimeter wetland boundaries.

2.1.1 Review of Water and Sewer Plans

Site-specific plans of subsurface utilities at the Gorham property were reviewed. Information pertaining to the public water and sewer systems were researched at the City of Providence Water Supply Board and Public Works Department, respectively, on August 30, 1994. On September 1, 1994, ABB-ES personnel inspected the Site and using the utility plans as guides, identified the presence/absence of lines, catch basins, manholes and roof drains.

2.1.2 Geophysical Survey

A geophysical survey was conducted on September 20, 21, 22 and 30, 1994 to supplement research on subsurface utility locations and to clear locations for intrusive field activities. Geophysics GPR International, Inc. of Needham, Massachusetts was subcontracted to perform the survey. Geophysical surveys were conducted in the following areas: at all new monitoring well locations, the former UST located near Building BB, the Production Area, between Buildings R and I, behind Building N, the former fuel oil vault and along portions of the North Bank.

A ground penetrating radar (GPR) survey was employed to map subsurface utilities and other buried features. A remote antenna was towed along traverse lines selected in a reconnaissance mode. Reflected wave signals, transferred to a graphic strip chart recorder on the GPR unit, were interpreted on site by a trained geophysicist. Significant reflectors identified on the strip chart were marked in the field with flagging or spray paint. When trying to locate pipes in the North Bank Area, the GPR survey was supplemented with a metal detector to provide higher resolution mapping. The metal detector was used remotely at the surface (inductive mode) and by applying a signal directly to the pipe at the surface and mapping the subsurface trace (conductive mode).

2.1.3Wetland Delineation

On September 1, 1994, wetland resource areas associated with Mashapaug Cove were delineated by an ABB-ES wetland biologist. The purpose of this effort was to determine whether any intrusive activities planned as part of the remedial investigation were located within "perimeter wetlands" as defined by the Rhode Island Department of Environmental Management (RIDEM) "Rules and Regulations Governing the Administration and Enforcement of the Fresh Water Wetlands Act". These rules and regulations were adopted in March 1994 pursuant to Chapters 2-1-18 through 2-1-24, inclusive of the Rhode Island General Laws of 1956, as amended (i.e., the Freshwater Wetlands Act).

The landward extension of vegetated wetlands was delineated following the three parameter methodology prescribed by the Army Corps of Engineers Wetland Delineation Manual (COE, 1987), and wetland indicator status of plants observed in these wetlands were determined according to the National List of Plant Species That Occur in Wetlands: Northeast (Region 1) (USFWS, 1988). Data provided in the 1:24,000 scale USGS topographic and National Wetland Inventory maps for Providence, RI and the USDA Soil County Survey (Rhode Island) were reviewed prior to conducting the delineation.