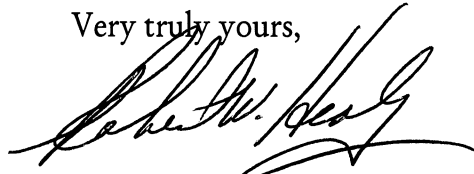


Outcome report (as well as the associated risk characterization) concludes that no additional remedial actions are required for the site.

Copies of the full reports are on file and available for review at the City Clerk's office.

Very truly yours,

A handwritten signature in black ink, appearing to read "Robert W. Healy", with a stylized flourish at the end.

Robert W. Healy

**RESPONSE ACTION OUTCOME
DEP SITE NO. 3-1959
POLAROID CORPORATION
784 MEMORIAL DRIVE
CAMBRIDGE, MASSACHUSETTS**

PREPARED FOR:
Polaroid Corporation
784 Memorial Drive
Cambridge, Massachusetts

PREPARED BY:
GZA GeoEnvironmental, Inc.
Newton, Massachusetts

September 1994
File No. 13488

September 26, 1994
File No. 13488-C,PC



Massachusetts Department of
Environmental Protection
Northeast Region
10 Commerce Way
Woburn, Massachusetts 01801

Attn: Mr. Kingsley Ndi

320 Needham Street
Newton Upper Falls
Massachusetts 02164
617-969-0050
FAX 617-965-7769

Re: DEP Site No. 3-1959
Response Action Outcome
784 Memorial Drive
Cambridge, Massachusetts

Dear Mr. Ndi:

Attached is our Response Action Outcome report following a Release Abatement Measure (RAM) in regard to the above referenced site. The report documents the activities completed during the RAM and includes a risk characterization study.

Results indicated that after removal of a small volume of contaminated soils, the site poses no significant risk of harm to health, safety, public welfare or the environment. A Class A-2 Response Action Outcome has been achieved and a Response Action Outcome Statement is included as part of the report (Appendix B).

Please contact the undersigned for any questions or discussion (617-630-6175)

A Subsidiary of GZA
GeoEnvironmental
Technologies, Inc.

Very truly yours,

GZA GEOENVIRONMENTAL, INC.

Paul F. Reiter
Technical Consultant /
Associate Principal
LSP No. 5767



Sara R. Hanna
Consultant/ Reviewer

cc: Mr. James Harrison, Polaroid Corporation

1.00 INTRODUCTION



GZA GeoEnvironmental, Inc. (GZA) has prepared this Response Action Outcome (RAO) report regarding Polaroid Corporation's 784 Memorial Drive parcel in Cambridge, Massachusetts (DEP Site No. 3-1959). The report was conducted to comply with Subpart J of the 1993 Massachusetts Contingency Plan (MCP).

Our Phase I report for the site was submitted to the Massachusetts Department of Environmental Protection (DEP) in June 1994. The investigation included over 40 borings and monitoring wells provided at the site to test soil and groundwater (see Figure 2). Our report concluded that only two localized areas with contaminants above applicable reportable concentrations were present at the site, and that a Release Abatement Measure (RAM) involving soil removal should be conducted to reduce potential public health risks. One of these areas was inside Building 7, where former underground tanks stored volatile organic compounds (VOCs), primarily toluene and methyl ethyl ketone (MEK). Groundwater concentrations of toluene and 1,1-dichloroethene (1,1-DCE) slightly exceeded applicable reportable concentrations (RCGW-2) at one well (P-8). The other location was in the main parking lot, where a shallow soil sample from one boring (GZ-25) indicated the presence of total petroleum hydrocarbons slightly over the applicable reportable concentration (RCS-1). A RAM Plan was submitted to DEP in June 1994 to remove soils in both of these areas. A groundwater monitoring well was also to be installed to replace well P-8 for monitoring groundwater after the RAM. The RAM was conducted in August 1994, after presumptive approval by DEP. [DEP correspondence dated July 11, 1994 indicated they received a complete RAM Plan on July 7, 1994; therefore, presumptive approval occurred twenty-one days later, on July 28, 1994].

The Phase I report also indicated that the southwest area of the site, where gasoline contamination was previously detected, showed groundwater concentrations significantly below applicable reportable concentrations for VOCs and total petroleum hydrocarbons (TPH). These concentrations had declined significantly since 1988 due to the remediation of a release of gasoline at the abutting 772 Memorial Drive parcel (also owned by Polaroid Corporation) by utilizing a bioremediation treatment system. A Waiver Completion Statement, the equivalent of a Response Action Outcome, has been filed for this site by Polaroid, indicating no further action required. This Waiver Completion Statement was filed on July 15, 1994 by Polaroid Corporation and acknowledged as received by DEP on July 22, 1994. Both the Completion Statement and DEP's acknowledgement letter are provided in Appendix I.

The scope of work for this report includes the following:

1. a description of a Release Abatement Measure (RAM) conducted to remove a small volume of contaminated soils;

2. a Risk Characterization based on analyses results of soil and groundwater; and
3. a Response Action Outcome Statement (Appendix B) pursuant to 310 CMR 40.1000.

Please note, this report is subject to the limitations provided in Appendix A.



1.10 SUMMARY OF FINDINGS

This report contains information regarding the removal of contaminated soils and an assessment of remaining soils and groundwater. The results of these response actions indicate that concentrations of contaminants in soils and groundwater remaining at the site are below applicable Method 1 risk characterization standards specified in the MCP. A risk characterization was completed in accordance with Method 1 (310 CMR 40.097) indicating the site poses no significant risk or imminent hazard to health, safety, public welfare or the environment. A Response Action Outcome Statement has been completed indicating a Class A-2 outcome has been achieved. This outcome means remedial actions have provided a permanent solution, background concentrations have not been reached (but the cost of doing so is disproportionate to the benefit), and no Activities and Use Limitations (AULs) are necessary to maintain a level of no significant risk at the site. It is our opinion that no other MCP reporting requirements or actions are necessary at the site.

2.00 RELEASE ABATEMENT MEASURE

A Release Abatement Measure (RAM) was conducted to remove a small volume of contaminated soils below the watertable in the vicinity of former underground tanks. Another excavation was conducted at well B-25 to remove petroleum contaminated soils, if present. The RAM was conducted on August 3, 1994 after presumptive DEP approval of the RAM Plan in accordance with the MCP. Details of the RAM are presented below, following the outline of 310 CMR 40.0446.

2.10 DESCRIPTION OF SITE CONDITIONS, RELEASE, AND SURROUNDING RECEPTORS

Site Conditions

The site is the location of Polaroid's Memorial Drive facility and consists of approximately 5.5 acres at 784 Memorial Drive in Cambridge Massachusetts as shown on the attached locus plan (Figure 1). The site is located at latitude 42°22'33" and longitude 71°6'55", and Universal Transverse Mercator (UTM) coordinates 4,691,600 meters North, 325,800 meters East. Figure 2 is a site plan depicting pertinent features of the property. The site consists of buildings, paved parking areas and lawn areas. Two large buildings at the southeast end

4.60 RISK CHARACTERIZATION CONCLUSIONS



The Massachusetts Contingency Plan relies upon the use of numerical standards for chemicals in groundwater and soil to characterize risk of harm to health, public welfare, and the environment. According to the approach used here, if all exposure point concentrations are less than the corresponding applicable Massachusetts Contingency Plan Method 1 Soil and Groundwater Standards, a condition of no significant risk of harm to health, public welfare, and the environment has been achieved. Exposure point concentrations were compared to applicable Massachusetts Contingency Plan Method 1 Soil and Groundwater Standards. Results indicate that none of the estimated exposure point concentrations exceed the applicable standards. Therefore, in accordance with Massachusetts Contingency Plan regulations, a condition of no significant risk of harm to health, public welfare, and the environment has been demonstrated to have been achieved at the site.

The Massachusetts Contingency Plan indicates that a level of no significant risk to safety has been achieved if the conditions at the site, which are related to a release of oil or hazardous materials, do not currently and will not in the foreseeable future pose a threat of physical harm or bodily injury to people. In this risk characterization, current and reasonably foreseeable conditions at the site and in the surrounding environment were compared to applicable or suitably analogous safety standards and no release-related conditions were identified which may pose a threat of physical harm or bodily injury to people. Therefore, based on this comparison, a level of no significant risk to safety also exists at the site.

5.00 RESPONSE ACTION OUTCOME

The following information is required for a Response Action Outcome (RAO) under Subpart J of 310 CMR 40.0000.

Based on the conclusions of the risk characterization showing no significant risk has been achieved at the site, a Class A-2 Response Action Outcome has been determined to be appropriate for this site. The Response Action Outcome Statement is provided in Appendix B. The Class A-2 Outcome indicates the following:

1. remedial actions have provided a permanent solution,
2. background concentrations have not been reached (but the cost of doing so is disproportionate to the benefit), and
3. no Activities and Use Limitations (AULs) are necessary to maintain a level of no significant risk at the site (Pursuant to CMR 40.0923(3)(a)(2), exposure point

concentrations in soils are below Method 1 S-1, GW-2 and S-1, GW-3 Standards, as shown in Table 1).

5.10 SITE BOUNDARIES

The attached Appendix H describes the metes and bounds of the four individual parcels comprising the 784 Memorial Drive site to which this Response Action Outcome (RAO) applies. The property line shown in Figure 2 is an approximation of the site, consisting of the boundary of these combined four parcels.



5.20 DISPOSAL SITE SOURCE CONTROL

Uncontrolled sources within the disposal site boundary have been controlled by removing contaminated soils as discussed above in Section 2.00.

5.30 FEASIBILITY EVALUATION

In accordance with 310 CMR 40.0860, we believe that it is not cost beneficial to remediate the site to background levels because current concentrations of detected compounds are well below the applicable MCP Method 1 Standards and close to background concentrations. In addition, most of the groundwater is below Massachusetts drinking water standards. Detectable concentrations are expected to decrease with time without any remediation. Also, the low level of contaminants will be subject to natural biodegradation and concentrations will attenuate to background levels over time. Costs to reduce residual contaminant levels to background concentrations via further soil excavation and groundwater remediation would be substantial. These actions would not provide significant additional risk reduction since the site, in its current state, poses no significant risk.



2 PARK DRIVE, SUITE 5
WESTFORD, MASSACHUSETTS 01886-3528

■ TEL (508) 392-9310
■ FAX (508) 392-9315

July 14, 1994

Mr. James C. Harrison
Site Environmental Engineer
Polaroid Corporation
750 Main Street
Cambridge, MA 02139

RE: Waiver Completion Statement
772 Memorial Drive
DEP File #3-1369
Terra Vac #42-4254

Dear Mr. Harrison:

The above-referenced site is presently a non-priority site with a Waiver of DEP Approvals (Waiver), which was approved by the DEP on December 10, 1990.

Terra Vac has installed and operated a groundwater bioremediation system at this site. The operation of this system is described in the attached document, *Final Operations Report*, 772 Memorial Drive, Cambridge.

In order to document that a condition of "No Significant Risk" has been achieved at the site as a result of the remediation, Terra Vac has completed a *Public Health and Environmental Risk Characterization* (attached). The principal finding of this report is that a permanent solution has been reached at the site as a result of the remedial project, and that no significant risk is associated with the residual contamination remaining on the site.

According to DEP's transition requirements for sites with Waiver of DEP Approvals which were approved by the Department prior to August 2, 1993, this site "must complete any response actions at the site in accordance with the waiver criteria specified in the 1988 MCP (310 CMR 40.537). In addition, the "Waiver Completion Statement



TERRA VAC

Mr. Jim Harrison, Polaroid Corporation
Waiver Completion Statement
July 15, 1994

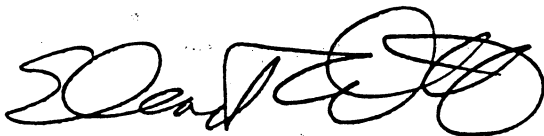
must indicate whether a Permanent Solution (as defined in the revised MCP, 310 CMR 42.1000) has been achieved in the opinion of the waiver recipient's consultant," in this case, Terra Vac.

As the risk assessment of the site included all exposure scenarios which were consistent with the site's use historically and for the foreseeable future, and No Significant Risk was found with any of the exposures, no further remedial action is warranted at the site. Additionally, it is the opinion of Terra Vac that the Phase II site assessment and the completion of the Remedial Response constitute a permanent solution as specified under the 1993 MCP, 310 CMR 40.1000. A "permanent solution means a measure or combination of measures which will, when implemented, ensure attainment of a level of control of each identified substance of concern at a disposal site or in the surrounding environment such that no substance of concern will present a significant risk of damage to health, safety, public welfare, or the environment during any foreseeable period of time."

Please find attached a copy of the "completion statement" which represents Terra Vac's formal statement that a permanent solution has been reached and that no further action is necessary at the site. Terra Vac recommends that the completion statement, along with the *Final Operations Report* and the *Public Health and Environmental Risk Characterization* be forwarded to the Massachusetts Department of Environmental Protection - Division of Waste Site Clean-up, with a copy to the Division of Water Pollution Control.

We are pleased to have been of service to Polaroid Corporation, and look forward to working with you in the future.

Sincerely,



David E. Ott, P.E.
Division Manager, New England

cc: E. Malmanis, Terra Vac
File 42-4254.80

REMEDIAL RESPONSE ACTION COMPLETION STATEMENT

Do not send this form in with the application form. Detach this page and reserve it until the remedial response action is completed. At that time, submit this statement to the Department.

A. SITE INFORMATION:

Name of Disposal Site: Exxon Service Station

DEQE Site ID Number: 3-1369

Address: 772 Memorial Drive
(STREET)

Cambridge Mass. 02139
(CITY/TOWN) (STATE) (ZIP CODE)

C. STATEMENT OF CONFORMANCE:

I certify that the remedial action for Exxon Service Station has been
(SITE NAME)

completed in accordance with the approved waiver application dated 11/05/90,
(MONTH/DAY/YEAR)

M.G.L. c. 21E, and the Massachusetts Contingency Plan.

James Harrison 7/15/94
(SIGNATURE OF APPLICANT/DATE)

(for P. Harco Corp)

D. STATEMENT OF COMPLETION:

Provide an opinion as to whether the remedial response action constitutes a permanent solution under M.G.L. c.21E and provide a basis for that opinion. This opinion must be signed by the applicant and the applicant's consultant.

The Remedial Response Action constitutes a permanent solution under M.G.L. c.21E. The basis for this opinion is provided in the reports "Public Health and Environmental Risk Characterization, 772 Memorial Drive," and "Final Operations Report, 772 Memorial Drive".

James Harrison 7/15/94
(SIGNATURE OF APPLICANT/DATE)

617-386-8217
(PHONE NUMBER)

Terra Vac
(NAME OF CONSULTANT FIRM)
Please Print

[Signature] 7/15/94
(SIGNATURE OF APPLICANT'S REMEDIAL RESPONSE
ACTION CONSULTANT/ DATE)

**FINAL OPERATIONS REPORT
772 MEMORIAL DRIVE
CAMBRIDGE, MASSACHUSETTS**

July 15, 1994

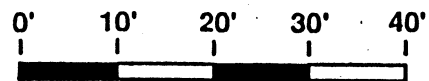
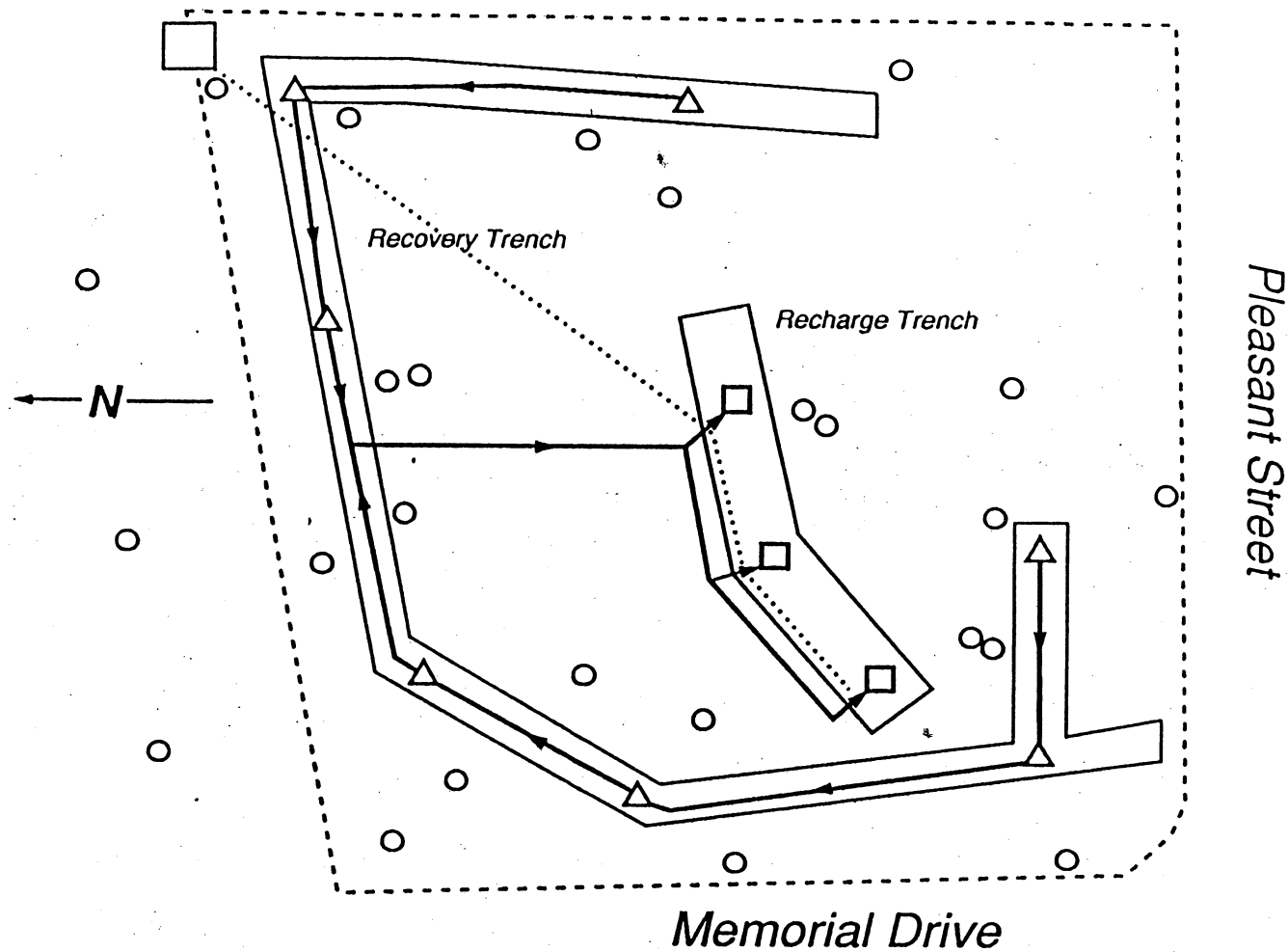
EXECUTIVE SUMMARY

The property located at 772 Memorial Drive, Cambridge, Massachusetts, had previously been used as a service station. Underground storage tanks had been used to store gasoline. During removal of these tanks, hydrocarbon contamination of the soil and groundwater was noted.

On behalf of Polaroid Corporation, Terra Vac installed and operated a groundwater bio-remediation system at this property for the removal of petroleum hydrocarbons. The system began operation in December of 1992, and continues to operate. The treatment system extracts water from the outer edges of the property, and re-injects the extracted water in the center of the property. During the injection process, nutrients and oxygen are added.

Over the 17 months of operation, the system has effectively reduced aromatic hydrocarbon concentrations using enhanced *in situ* biodegradation. The total BTEX concentration in the system effluent has been reduced by 99.8%, from 4,130 ppb to 9 ppb. Similar decreases have been seen in the site monitoring wells. The average groundwater concentrations of ethylbenzene, toluene and xylenes have been reduced to below the Massachusetts Groundwater Standard (MGS) (314 CMR 6.07); the average benzene concentration has been reduced by 93.7% to 20 ppb, just slightly above the MGS of 5 ppb. All concentrations are well below the 1993 Massachusetts Contingency Plan (MCP) GW-2 and GW-3 standards.

Power/Instrument Shed



Legend

△ Recovery Well

□ Recharge Well

○ Monitoring Well and Piezometer

————— Recycle Water Line

- - - - - Air Sparging Line

Figure 1 Bioremediation System

EXECUTIVE SUMMARY

Terra Vac has performed a Public Health and Environmental Risk Characterization on the 772 Memorial Drive property in Cambridge, Massachusetts. This risk assessment was conducted using Massachusetts Department of Environmental Protection (MADEP) risk characterization guidance for Massachusetts Contingency Plan (MCP) sites. This risk assessment borrows heavily from the Phase II risk assessment submitted for this site, "Public Health and Environmental Risk Characterization, 772 Memorial Drive" (GZA, 1991); and updates the risk assessments based on post-remediation monitoring results.

On-site exposure pathways were not evaluated, as these pathways were analyzed in the Phase II report and found to pose no significant risk even before remedial activities.

Potential human health risks were evaluated for inhalation exposures for off-site workers in utility trenches along Memorial Drive. Estimated trench air concentrations were orders of magnitude below acceptable industrial standards, even assuming a worst-case scenario of no trench ventilation.

An evaluation of the off-site risks due to the potential incremental increase in compounds in the Charles River was also performed. The assessment includes an evaluation of the potential fate of compounds and their potential effect on off-site human and aquatic life receptors. This work indicated that the contribution of compounds in groundwater originating from the site does not pose a significant risk to off-site receptors.

20 → Average site groundwater concentrations were compared to Massachusetts Groundwater Standards (MGS) (314 CMR 6.07), as well as the GW-2 and GW-3 standards presented in the 1993 MCP (310 CMR 40.0975). All compounds are well below the GW-2 and GW-3 standards; only benzene, with an average observed ground water concentration of 2 ppb, is above the MGS of 5 ppb. In addition, contact with groundwater is not anticipated, as site groundwater does not contribute to an existing or future water supply, and excavation below the water table is not anticipated.



CITY OF CAMBRIDGE

CAMBRIDGE, MASSACHUSETTS 02139

TEL 349-4300

FAX 349-4307

EXECUTIVE DEPARTMENT
ROBERT W. HEALY
City Manager

RICHARD C. ROSSI
Deputy City Manager

June 23, 1997

TO THE HONORABLE, THE CITY COUNCIL:

I am forwarding summaries of environmental documents prepared for Polaroid property on Memorial Drive. It is important to note that there are technically two Massachusetts Contingency Plan (MCP) sites located at the Polaroid property. One site is 772 Memorial Drive, which has Release Tracking Number (RTN) 3-1369; the other site is 784 Memorial Drive, which has RTN 3-1959. The 772 Memorial Drive site is a former Exxon Station. The 784 Memorial Drive site is the Polaroid building itself.

The following items pertaining to 772 Memorial Drive are attached:

- Letter to James C. Harrison, Polaroid's Site Environmental Engineer, from David Ott of Terra Vac, the consultant that remediated the groundwater on-site. This letter explains why the site warrants a "Completion Statement," which means that a final solution has been achieved whereby the site poses "No Significant Risk," as defined by the MCP.
- The Remedial Response Action Completion Statement form.
- The "Executive Summary" and "Figure 1. Bioremediation System" of the Final Operations Report, 772 Memorial Drive, Cambridge, MA, Terra Vac, July 15, 1994.
- The "Executive Summary" of Public Health Risk Characterization, 772 Memorial Drive, Cambridge, MA, Terra Vac, July 15, 1994.

The following materials submitted pertain to 784 Memorial Drive:

- Letter of Transmittal as well as the following sections of the Response Action Outcome (RAO) report submitted to DEP September 26, 1994: "1.00 Introduction" (pages 1-2), "4.60 Risk Characterization Conclusions" (page 14), and "5.00 Response Action Outcome" (pages 14-15). The Response Action

Consent Agenda #22

S-391

Relative to summaries of environmental documents prepared for Polaroid property on Memorial Drive.

In City Council June 23, 1997

PLACED ON FILE