CITY OF OAKLAND

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Public Works Agency
Environmental Services Divison

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November 11, 2010

Mr. Paresh Khatri
Hazardous Materials Specialist
Alameda County Environmental Health Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

Subject: Proposed Removal of Remediation Equipment and Continued Hydrogen Peroxide Injection at 7101 Edgewater Drive, Oakland, California

Reference: ACEH Fuel Leak Case No. RO0000293, GeoTracker Global ID T0600100375

Dear Mr. Khatri:

The City of Oakland is pleased to submit the attached letter report prepared by OTG EnviroEngineering Solutions, Inc (OTG). The City agrees with OTG's recommendation and seeks your approval of the following two tasks as discussed in the letter report:

- Removal of all equipment installed for Plume C and D areas remediation as the separate-phase hydrocarbons (SPH) has been successfully eliminated from these areas.
- Continued monthly hydrogen peroxide injection to all remediation wells in Plume A through D areas through December 2011 to enhance natural attenuation of dissolved phase hydrocarbons.

Certification

I certify under penalty of law that this document and attachments are prepared under my direction or supervision in accordance with the system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing the violations.

Please contact me at (510)238-6361 if you have questions or comments.

Sincerely

Gopakumar Nair
Environmental Program Specialist

OTG EnviroEngineering Solutions, Inc.

November 11, 2010

Mr. Gopal Nair
Environmental Program Specialist
City of Oakland – PWA/ESD
250 Frank H. Ogawa Plaza, Suite 5301
Oakland, CA 94612

Subject: Evaluation of Remediation Progress and Recommendation for Removal of Remediation Equipment, 7101 Edgewater Drive, Oakland, California

Reference: ACEH Fuel Leak Case No. RO0000293, GeoTracker Global ID T0600100375

Dear Mr. Nair:

OTG EnviroEngineering Solutions, Inc. (OTG) is pleased to present this evaluation letter report and recommendation for removal of the remediation equipment operated at the City of Oakland Municipal Services Center (MSC), which is located at 7101 Edgewater Drive, Oakland, California.

The remediation system operated at the MSC has successfully achieved its design goal – complete removal of separate phase hydrocarbons (SPH) from Areas C and D, where SPH was identified in a comprehensive site investigation conducted in December 2000 by Baseline Environmental Consulting (Baseline, January 2001). Four areas with SPH were characterized through the investigation, which were labeled as Plume A, B, C, and D, respectively (see attached Figure). Majority of the identified SPH existed in Plume D area. The removal of SPH at Plumes A and B was achieved by hydrogen peroxide injections.

The remediation system was installed following the submittal to and approval by the Alameda County Environmental Health Department (ACEH) of the following reports:

- *Evaluation of Free-Product Removal Alternatives* (URS Corporation, June 2001);
- *TPE Pilot Test and Feasibility Report* (Cambria Environmental Technology, Inc., August 2002); and
- *Dual-Phase Extraction Work Plan* (URS Corporation, October 2004).

The remediation system included seven pneumatic product skimmers (all installed in Plume D area wells), dual-phase vacuum extraction (liquid and soil vapor) from 13 wells within Plume D area and from six wells within Plume C area, treatment of the extracted soil vapor by a thermal oxidizer, and treatment of the extracted groundwater through an oil/water separator and three 2,000-pounds of activated carbon vessels connected in series. Details of the remediation system were documented in a *Startup Report* (OTG, June 2006). The remediation system

commenced operation on May 22, 2006 and was shutdown on December 23, 2009 for plume observations. Remediation system operation and discharge reports were submitted quarterly.

As summarized in the *Self- Monitoring Report – Fourth Quarter & Year 2009* (OTG & LFR, January 2010), approximately 62,000 pounds of hydrocarbons (or about 9,000 gallons) was removed from Plumes C and D areas from May 22, 2006 through December 23, 2009. Of that amount removed, 94.4% was through soil vapor extraction, 4.3% (380 gallons) was through free product recovery by the pneumatic pumps, and 1.3% was through groundwater removal.

While the active extraction remediation was applied in Plumes C and D areas, hydrogen peroxide (in 7 to 15% concentrations) was injected monthly into remediation wells within Plume A and B areas. Hydrogen peroxide addition was initially recommended for Plume A in the *Evaluation of Free-Product Removal Alternatives* (URS Corporation, June 2001) and was expanded to include Plume B. The hydrogen peroxide addition was found equally effective in the destruction and removal of hydrocarbons as the remediation system operated in Plume C and D areas.

Since the remediation system was turn off on December 23, 2009, all wells within Plumes A through D areas have been checked monthly and floating product (SPH) has not been observed in any of the wells. The semi-annual groundwater monitorings conducted in April and October 2010 also confirmed that SPH has been removed.

Based on the progress of the remediation and the post-remediation observations discussed above, OTG concludes that the source (free-phase product or SPH) within Plumes A through D areas has been successfully eliminated and recommends the removal of remediation equipment installed for the remediation of Plumes C and D. All remediation wells should remain in place for observations and hydrogen peroxide addition. To enhance natural attenuation of the dissolved phase hydrocarbons, OTG recommends monthly hydrogen peroxide addition (in 7 to 15% concentrations) to all remediation wells in Plumes A through D areas through December 2011, at which time an evaluation of effectiveness should be performed.

Certification

"I certify under penalty of law that this document and all attachments are prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Please call the undersigned at (510) 465-8982 if you have questions or comments.

Sincerely,
OTG EnviroEngineering Solutions, Inc.

Xinggang Tong, PhD, PE
Project Manager

Attachment: Site Map

REFERENCES

Baseline Environmental Consulting, *Site History and Characterization*, January 2001

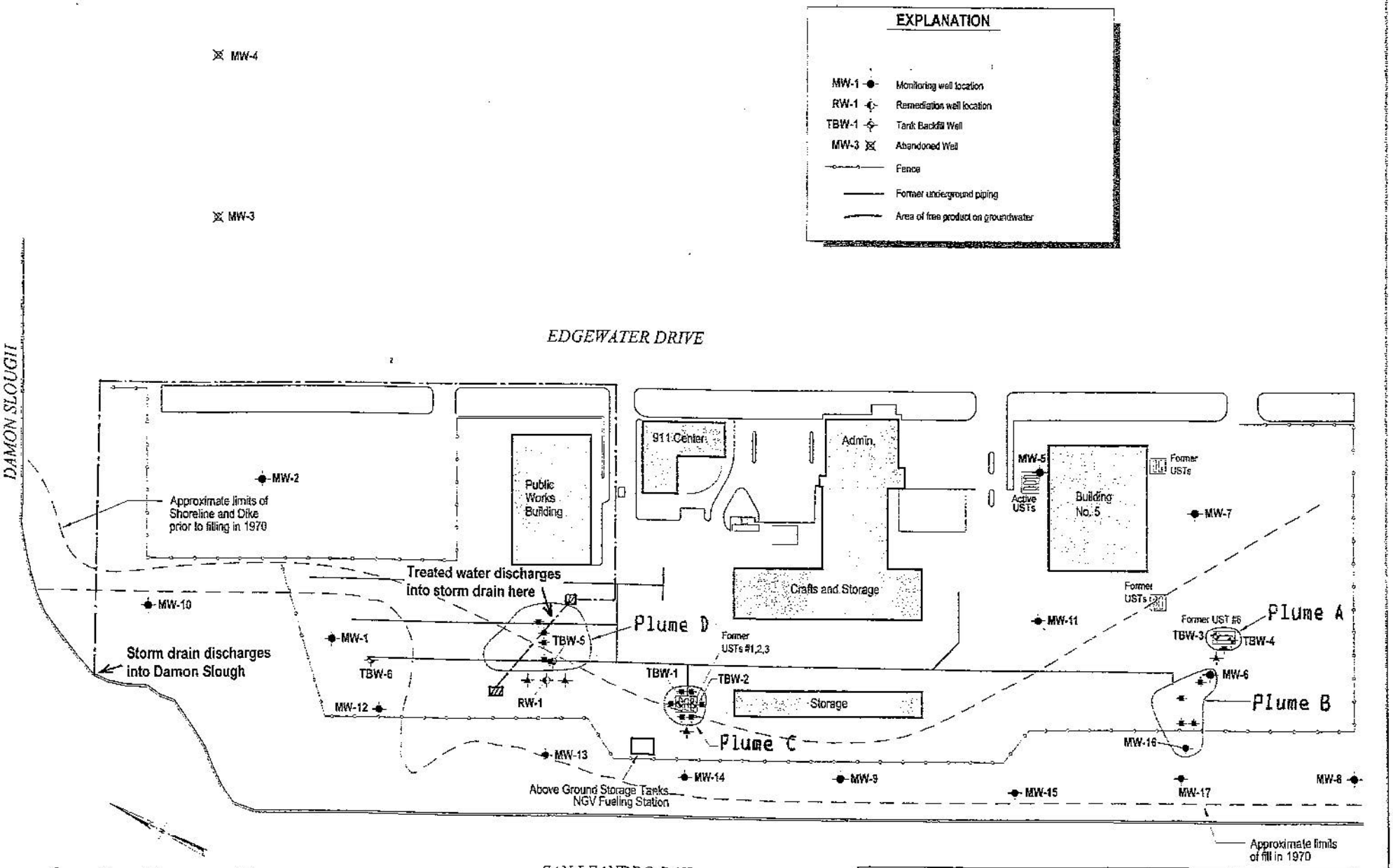
Cambria Environmental Technology, Inc. *TPE Pilot Test and Feasibility Report*, August 13, 2002.

OTG EnviroEngineering Solutions, Inc. *Startup Report, Groundwater Remediation at City of Oakland Municipal Services Center*, June 2006.

OTG EnviroEngineering Solutions, Inc. and LFR, an ARCADIS Company, *Self-Monitoring Report – Fourth Quarter & Year 2009, Groundwater Remediation at City of Oakland Municipal Services Center,* January 2010

URS Corporation, *Evaluation of Free-Product Removal Alternatives, City of Oakland Municipal Service Center*, June 2001.

URS Corporation, *Dual-Phase Extraction Work Plan, City of Oakland Municipal Services Center*, October, 2004.



June 2006

FIGURE 2 Identification of Free-Phase Petroleum Product Locations

EnviroEngineering Solutions, Inc.

City of Oakland Municipal Services Center
7101 Edgewater Drive, Oakland, CA