Health Care Services

Alameda County Environmental Health
Meeting Sign-In Sheet

CITY OF OAKLAND MUNICPAL SERVICE CENTER
7101 EDGEWATER DRIVE, OAKLAND
RO0000293

Wednesday, October 7, 2009
10:30 AM

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City of Oakland
Municipal Services Center

Overview

- 17-acres of filled tidal marsh, owned by Port of Oakland
- City of Oakland has leased and operated as a maintenance yard since 1971
- Extensive underground fuel leaks during the 1970s and 1980s
- Four major hydrocarbon plumes
- Groundwater monitoring from 1989 to present
- Eleven leaking tanks, 2,650 ft of piping, and the hydrant system removed 1995-1998
- 97% of free product recovered through aggressive remedial actions since 2001

Objectives

1. Conduct Risk Assessment to Establish Cleanup Goals
2. Meet RWQCB Low Risk Groundwater Criteria
3. Confirm Successful Cleanup with Groundwater Monitoring
4. Obtain No Further Action designation for all former USTs and piping

STATUS UPDATE

Environmental Activities
City of Oakland
Municipal Service Center

Presentation for the Alameda County Environmental Health
Local Oversight Program

October 7, 2009

Presenters:
Gopal Nair, City of Oakland
Chuck Pardini, P.G., Amy Goldberg-Day, Toxicologist, LFR Inc.
Xinggang Tong, PhD, PE, OTG EnviroEngineering Solutions, Inc.

Municipal Service Center (MSC)

I. Introduction

II. Remediation Activities

III. Remediation Results

IV. Site Analysis Using RWQCB Criteria for Low-Risk Fuel Sites

V. Recommendations

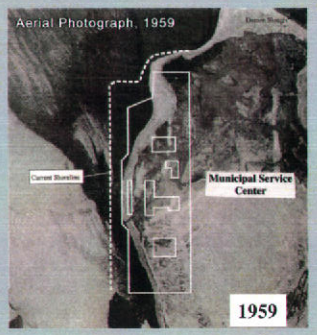
VI. Summary

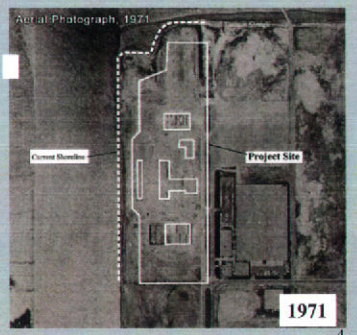
Introduction

- **MSC - 7101 Edgewater Dr.**
- **Leased by City for corporation yard**
- **Owned by Port of Oakland**

Introduction (con't.)

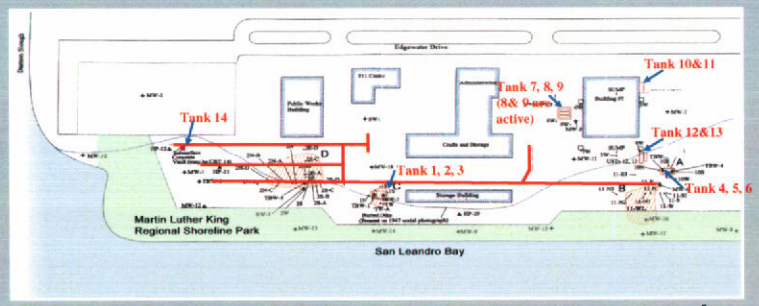
- 17-acre site was part of a tidal marsh; partially filled in the early part of the 20th century, completely filled between 1968 and 1971
- MSC constructed in 1971





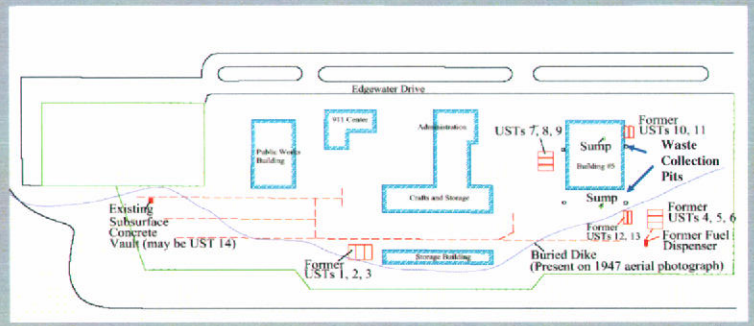
Introduction (con't.)

- Formerly, 14 underground tanks (USTs) with pressurized fuel hydrant system
- Two USTs currently active (USTs 8 and 9)



Introduction (con't.)

- 'Known' sources related to USTs - Leaking tanks, hydrant system, dispensers
- 'Unknown' sources- Imported fill material

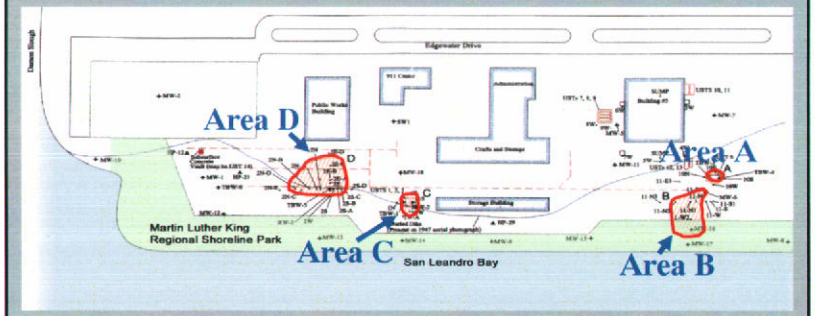


Introduction (con't.)

- **History of Environmental Activities**
  - 17 soil investigations since 1987
  - 21 monitoring wells and 26 remediation wells installed
  - Groundwater monitoring from 1989 to 2002; semiannual from 2002 to present
  - Performed a review of the Site's history
  - Investigated preferential utility pathways, UST 7 and concrete vault, 2007

Introduction (con't.)

- Investigation in 2000 identified four areas with free product



Introduction (con't.)

Chemicals Detected

- Chemicals from Site Activities
  - Total petroleum hydrocarbons as diesel (TPH-d)
  - TPH as motor oil (TPH-mo)
  - TPH as kerosene (TPH-k)
  - TPH as gasoline (TPH-g)
  - Benzene, toluene, ethylbenzene, and xylenes (BTEX)
- Chemicals from Non-Site Activities (Fill Material)
  - Polycyclic aromatic hydrocarbons (PAHs)

Remediation Activities

- **Soil**
  - Removal of USTs, piping, hydrant system, and over-excavation of soils from1995 through 1998
  - Storm drains in Area D sealed and lined after 2000
  - UST 7 closed in place in 2003
  - Four waste collection pits and two sumps near Building 5 decommissioned in 2007 (not UST-related)

Remediation Activities (con't.)

- **Groundwater**
  - Skimming Free Product in Area D from 2001- 2003 (200 gallons removed)
  - Vacuum Dual-Phase Extraction (DPE) Pilot Testing in 2002 (800 gallons removed)
  - Hydrogen Peroxide Injection from 2003 through 2008 (nearly complete removal of product in Areas A and B)
  - Removed 11 unsealed tank backfill wells and repaired 2 remediation wells in Spring 2007

Remediation Activities (con't.)

- **Summary of Areas C and D Remediation - May 2006 through June 2009**
  - Active Skimming and DPE System, Area D from May 2006 to present
  - Installed DPE in Area C in May 2009
  - 379 gallons free product recovered
  - Extracted and treated 2.6 million gallons of groundwater and discharged under NPDES Permit
  - Soil gas extracted, thermally oxidized and discharged under BAAQMD Permit
  - Total of 58,000 pounds of TPH plus unknown constituents removed

Remediation Activities (con't.)

Free Product Removal and Groundwater Remediation at Areas C & D

Piping to remediation wells

Oil/water separator

Dual-phase extraction & vapor abatement

Activated carbon treatment

Remediation Activities (con't.)

Product Recovered Does Not Resemble Gasoline or Diesel

Tar-Like Material Deposited Inside Knock out Tank of Dual-Phase Extraction System

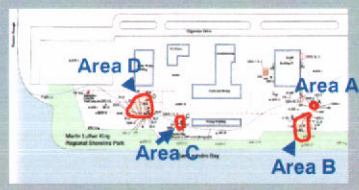
Free Product Recovered by Skimmers

Remediation Results

- **Remediation Impact - Separate Phase Hydrocarbon (SPH)**
  - SPH has decreased significantly in wells in Plumes B, C, and D
  - Demonstrated in plume figures and graphs for wells in Plumes B, C, and D

Remediation Results (con't.)

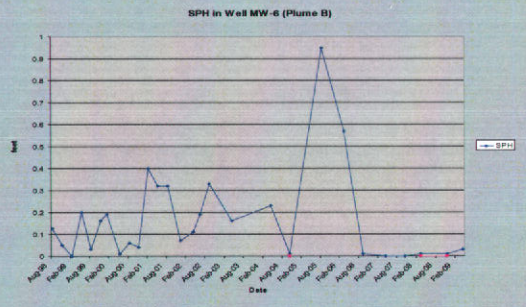
Plume Extent - 2000



Plume Extent - 2009

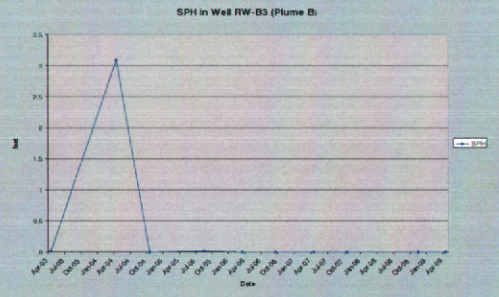
Remediation Results (con't.)

- SPH Trend in Well MW-6 (Plume B)



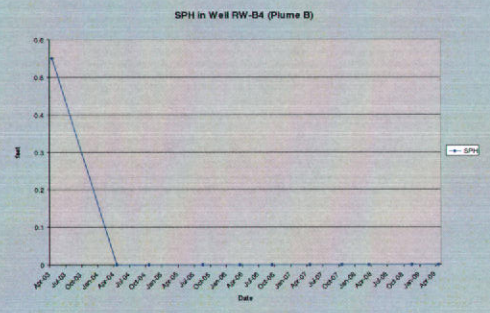
Remediation Results (con't.)

- SPH Trend in Well RW-B3 (Plume B)



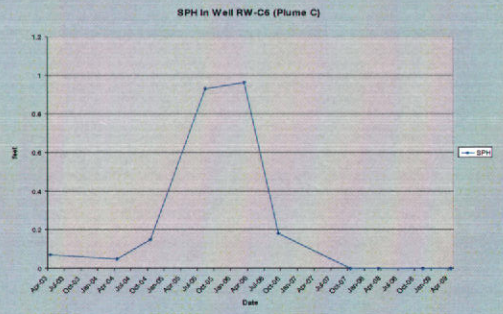
Remediation Results (con't.)

- SPH Trend in Well RW-B4 (Plume B)



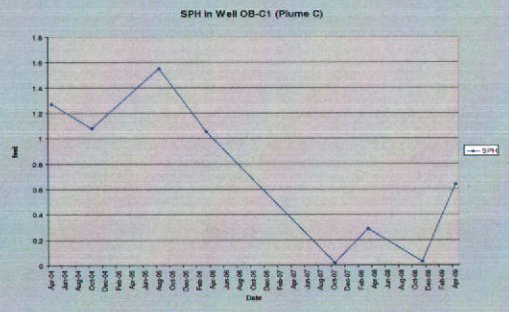
Remediation Results (con't.)

- SPH Trend in Well RW-C6 (Plume C)



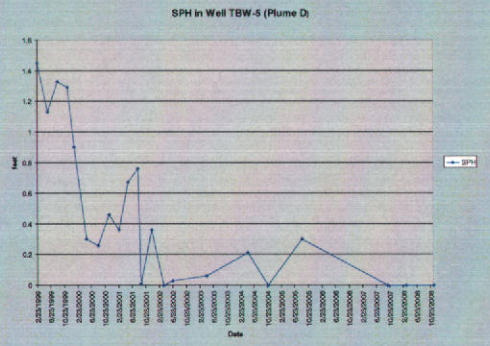
Remediation Results (con't.)

- SPH Trend in Well OB-C1 (Plume C)



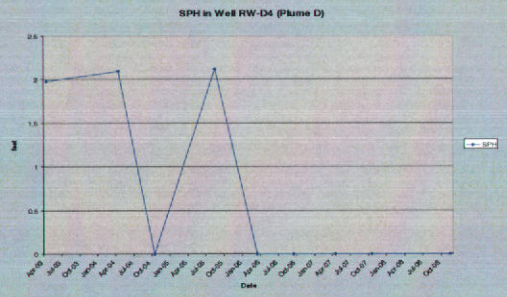
Remediation Results (con't.)

- SPH Trend in Well TBW-5 (Plume D)



Remediation Results (con't.)

- **SPH Trend in Well RW-D4 (Plume D)**

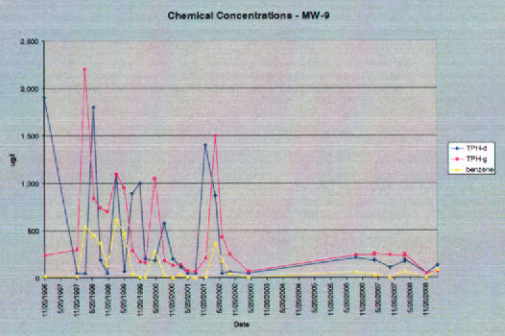


Remediation Results (con't.)

- **Remediation Impact – Groundwater Concentrations**
  - TPH-d, TPH-g, and benzene concentrations have decreased since groundwater remediation began
  - Demonstrated in graphs for wells downgradient of Plumes B, C, and D, and along Site perimeter

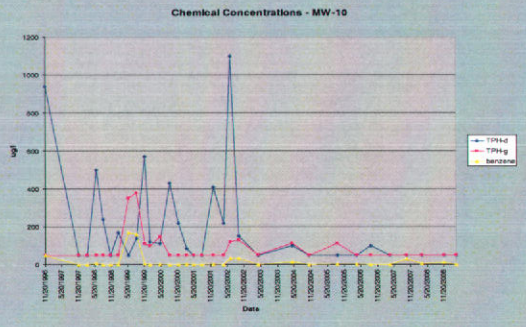
Remediation Results (con't.)

- **Chemical Concentration Trend in Well MW-9**



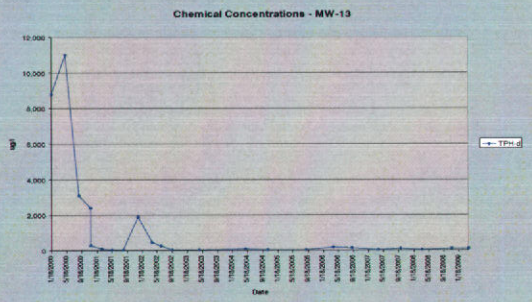
Remediation Results (con't.)

- **Chemical Concentration Trend in Well MW-10**



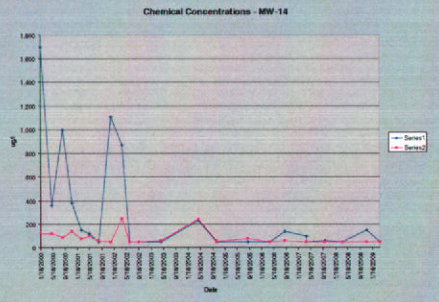
Remediation Results (con't.)

- **Chemical Concentration Trend in Well MW-13**



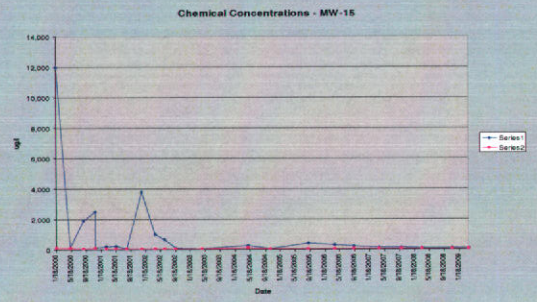
Remediation Results (con't.)

- **Chemical Concentration Trend in Well MW-14**



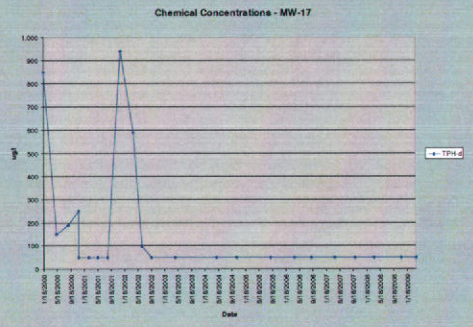
Remediation Results (con't.)

- **Chemical Concentration Trend in Well MW-15**



Remediation Results (con't.)

- **Chemical Concentration Trend in Well MW-17**



Site Analysis Using RWQCB's Criteria for Low-Risk Fuel Sites

Criteria for Low-Risk Fuel Sites

- RWQCB established six criteria to evaluate low-risk groundwater sites for closure (RWQCB, 1996)
- Compare current conditions at the MSC Site to the six criteria

Site Analysis Using RWQCB's Criteria for Low-Risk Fuel Sites (con't.)

- **Six Criteria for Low-Risk Groundwater Site**
  - Criteria 1:The leak has been stopped and ongoing sources, including free product, have been removed or remediated
  - Criteria 2: The site has been adequately characterized
  - Criteria 3: The dissolved hydrocarbon plume is not migrating
  - Criteria 4: No water wells, deeper drinking water aquifers, surface water, or other sensitive receptors are likely to be impacted
  - Criteria 5: The site presents no significant risk to human health
  - Criteria 6: The site presents no significant risk to the environment

Site Analysis Using RWQCB's Criteria for Low-Risk Fuel Sites (con't.)

- **Criteria 1:The leak has been stopped and ongoing sources, including free product, have been removed or remediated**
- **Current Condition at MSC:**
  - Leaking USTs and associated fuel hydrants have been removed
  - The two active USTs are double contained and meet current UST regulations
  - Nearly all free product has been removed from the identified plume areas
  - Vacuum extraction in Plume C area for residual free product
  - Peroxide injection in MW-6 (Plume B)

Site Analysis Using RWQCB's Criteria for Low-Risk Fuel Sites (con't.)

- **Criteria 2: The site has been adequately characterized**
- **Current Condition at MSC:**
  - 17 soil investigations since 1987
  - 21 monitoring wells and 26 remediation wells have been installed
  - Quarterly groundwater monitoring from 1989 to 2002; semiannual groundwater monitoring from 2002 to present
  - Site data compiled using GIS

Site Analysis Using RWQCB's Criteria for Low-Risk Fuel Sites (con't.)

- **Criteria 3: The dissolved hydrocarbon plume is not migrating**
- **Current Condition at MSC:**
  - Concentrations of dissolved hydrocarbons have shown a decreasing trend and the plume(s) are shrinking

Site Analysis Using RWQCB's Criteria for Low-Risk Fuel Sites (con't.)

- **Criteria 4: No water wells, deeper drinking water aquifers, surface water, or other sensitive receptors are likely to be impacted**
- **Current Condition at MSC:**
  - No known water wells within ¼-mile of MSC (to be confirmed with a well survey)
  - No deep drinking water aquifer
  - No impact to the Bay (chemicals are not detected in perimeter monitoring wells)
  - No impact to the Martin Luther King Park

Site Analysis Using RWQCB's Criteria for Low-Risk Fuel Sites (con't.)

- **Criteria 5: The site presents no significant risk to human health**
- **Current Condition at MSC:**
  - Potential risk to human health will be evaluated in the proposed risk assessment

Site Analysis Using RWQCB's Criteria for Low-Risk Fuel Sites(con't.)

- **Criteria 6: The site presents no significant risk to the environment**
- **Current Condition at MSC:**
  - Potential risk to the environment will be evaluated in the proposed risk assessment

Recommendations

- Increase coordination and communication with ACEH
- Continue periodic monitoring and remediation
  - Continue semi-annual monitoring through 2010; annual monitoring beginning in 2011
  - Continue DPE remediation at Areas C and D through December 2009
  - Continue peroxide injection in Area B wells
- Complete risk assessment (human health and ecological) and develop site-specific, risk-based cleanup goals, if necessary – 2010
- If appropriate, obtain a No Further Action designation for the MSC site - late 2011

Recommendations (con't.)

- **Risk Assessment**
  - Identify chemicals of potential concern
  - Identify pathways and receptors to be evaluated
  - Conduct human health risk evaluation
  - Conduct ecological risk evaluation
  - Establish cleanup goals

Recommendations (con't.)

- **Chemicals of Potential Concern**
  - TPH as diesel
  - TPH as motor oil
  - TPH as gasoline
  - Benzene, toluene, ethylbenzene, and xylenes

Recommendations (con't.)

- **Pathways to be Evaluated**
  - Source and mechanism of chemical release
  - Retention or transport medium
  - Point of potential contact with the contaminated medium (exposure point)
  - Exposure route (i.e., inhalation) at the exposure point

Recommendations (con't.)

- **Human Health Risk Evaluation**
  - Consider carcinogenic and non-carcinogenic endpoints
  - Consider current and future use
  - Assess total estimated cancer risk and chronic non-cancer health hazard

Recommendations (con't.)

- **Ecological Risk Assessment**
  - Screen estimated entrance COPC concentrations in groundwater to the COPC's ESL for the protection of aquatic receptors
  - A 10 times dilution attenuation factor will be applied to groundwater
  - If below the screening criteria, then no ecological risk is assumed

Recommendations (con't.)

- **Establish Site-Specific Cleanup Goals**
  - Use the results of the human and ecological risk assessments to select COPC(s) for cleanup goal development
  - Calculate concentration for COPC(s) to remain at Site that does not pose a risk to human health or the environment

Summary

- The MSC site has a long history
- Two sources of chemicals
  - USTs
  - Fill material
- Significant remedial activity
- Declining product thickness and dissolved TPH concentrations

Summary (con't.)

- Identify pathway to closure
  - Compare Site characteristics to criteria in RWQCB guidance
  - Continue monitoring and remediation
  - Conduct a Risk Assessment
  - Request a No Further Action designation

Questions and Discussion