

Site Status Update

May 14, 2008

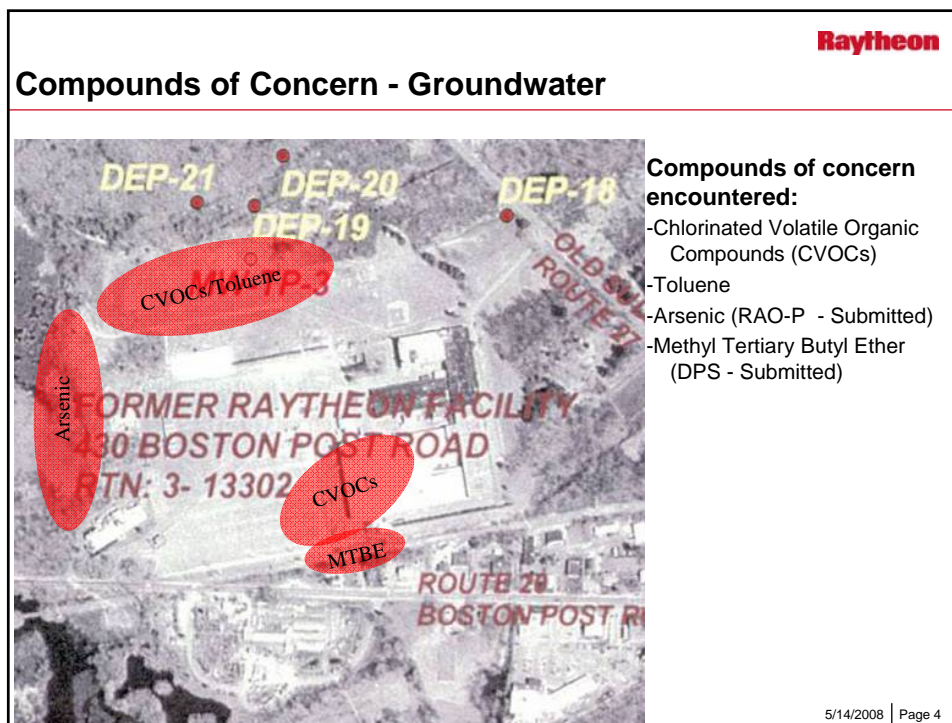
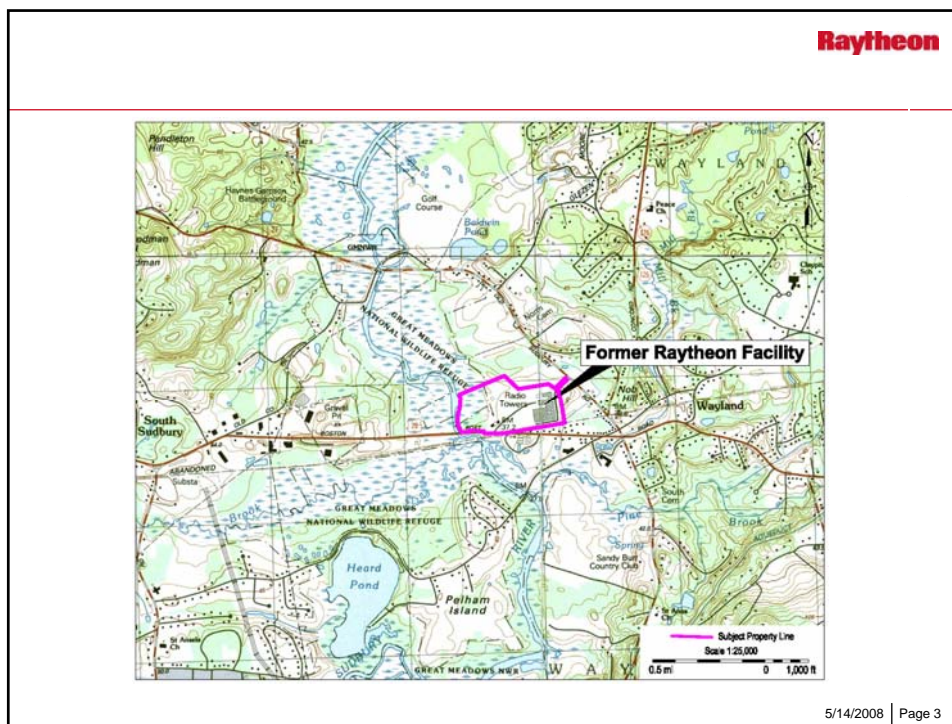
Former Raytheon Facility Wayland, Massachusetts

Presented by:
Louis "Chip" Burkhardt
Raytheon Company

Update on Site Activities

- Phase IV Remedy Implementation Plan Addendum (RTN 3-22408)
 - Summary of enhanced reductive dechlorination program
- Southern Area In Situ Chemical Oxidation (RTN 3-13302)
 - MW-33 Area Injection: November-December 2007
 - MW-202 Area follow-up: May 2008
 - Main Building Area Injection: March 2008 - Present
 - Pre-remedial characterization: December & February 2008
 - Injection: Ongoing
- General Site Activities
 - Site-wide groundwater gauging and sampling
 - Wetland Monitoring

Question and Answer Period





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Phase IV – Remedy
Implementation Plan Addendum
RTN 3-22408

5/14/2008 | Page 6

Phase IV Remedy Implementation Plan

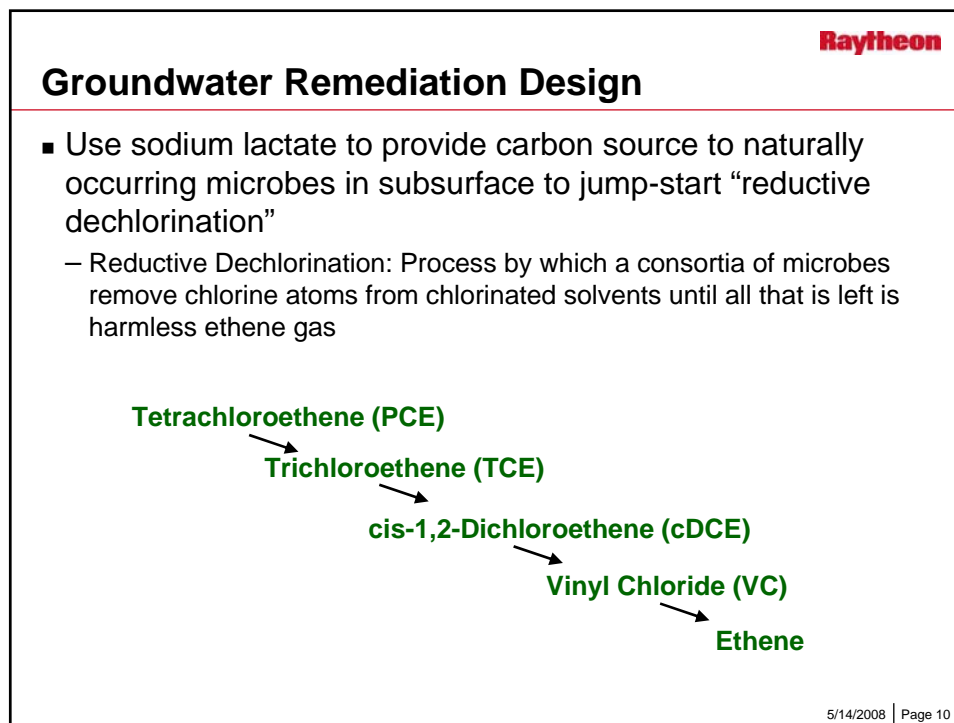
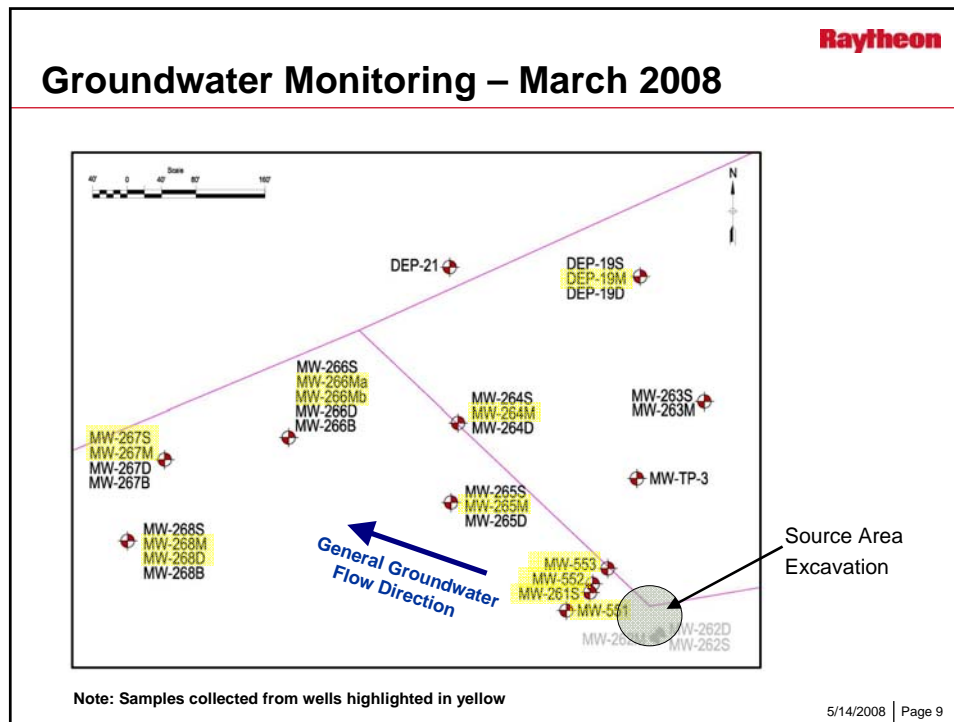
Phase IV RIP submitted to DEP on 11 August 2006.

- Presented plan to conduct Northern Area source area soil excavation
 - Excavation completed in 2007 and summary presented at November PIP meeting
- Presented plan to conduct bioremediation of source area groundwater

Phase IV RIP Addendum provides an updated plan to conduct the bioremediation program based on groundwater data collected in March 2008

Baseline Groundwater Monitoring

- March 2008 - Collected samples from 13 Northern Area wells to determine groundwater conditions 6 months after contaminated soil excavation
 - Monitored chlorinated volatile organic compounds (CVOCs), microbial presence, and several geochemical indicators of efficacy of bioremediation
- Data used to refine remedial design as described in Phase IV RIP Addendum



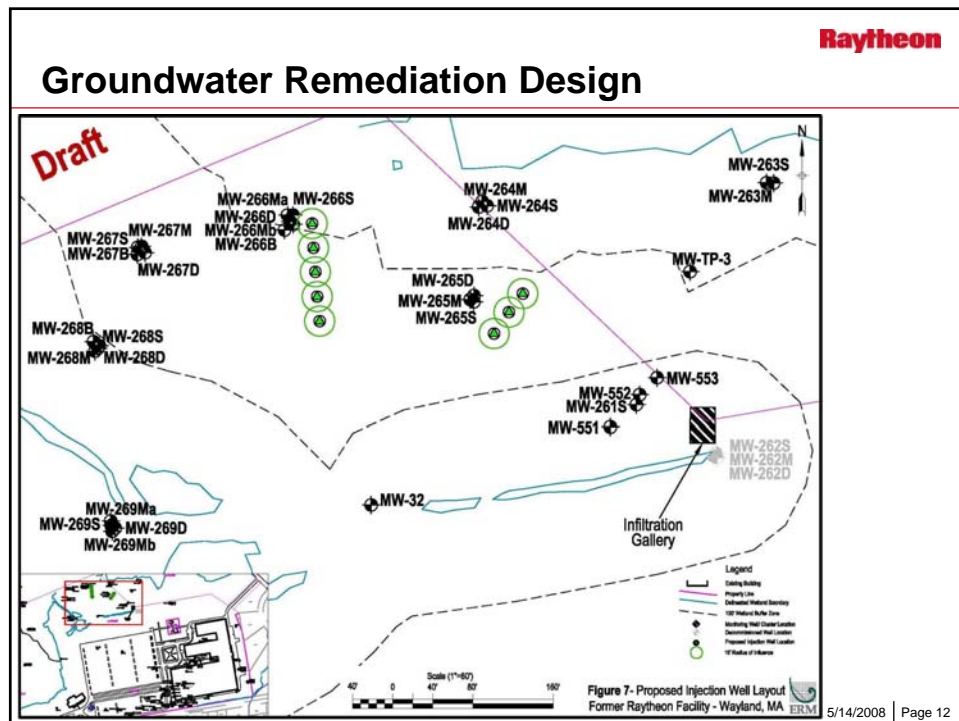
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Groundwater Remediation Design

Sodium Lactate Delivery Methods

- **Infiltration Gallery**
 - Installed at bottom of cofferdam excavation (25' below grade)
 - Comprised of slotted PVC pipe network feeding into ¾" crushed stone bed measuring 40' long, 15' wide, and 6' high
- **Two Injection Well Transects**
 - First transect, 200 feet downgradient from infiltration gallery:
 - 3 wells screened from 10' to 20' feet below grade
 - Second transect, 400 feet downgradient from infiltration gallery:
 - 5 wells screened from 60' to 70' below grade

5/14/2008 | Page 11



Groundwater Remediation Design

Performance Monitoring Program

- First Phase
 - Utilize down-hole water quality probe to measure geochemical parameters. Once a change in groundwater chemistry is observed, move to second phase
- Second Phase
 - Groundwater sample collection and analysis for a suite of chemicals and parameters similar to those selected for March 2008 baseline sampling round (CVOs, dissolved metals, dissolved gases, etc.)
- Data from the Performance Monitoring Program will be used to design additional injections, if required

5/14/2008 | Page 13

Groundwater Remediation Design

Implementation Schedule

- Summer 2008
 - Install Injection Wells
 - Conduct Initial Sodium Lactate Injection
 - Initiate performance monitoring
- Fall 2008
 - Submit Final Inspection Report and Phase IV Completion Statement (Summarizing both the soil excavation and the bioremediation programs)
 - Submit Remedy Operation Status Opinion and Submittal for RTN 3-22408 prior to expiration of Tier IB Permit on 23 December 2008

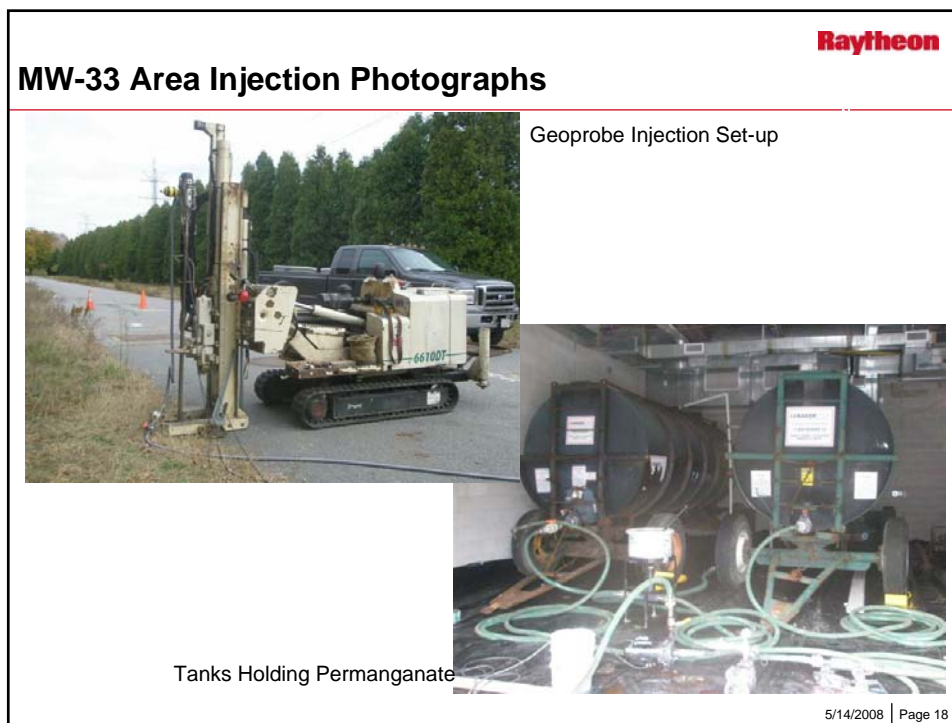
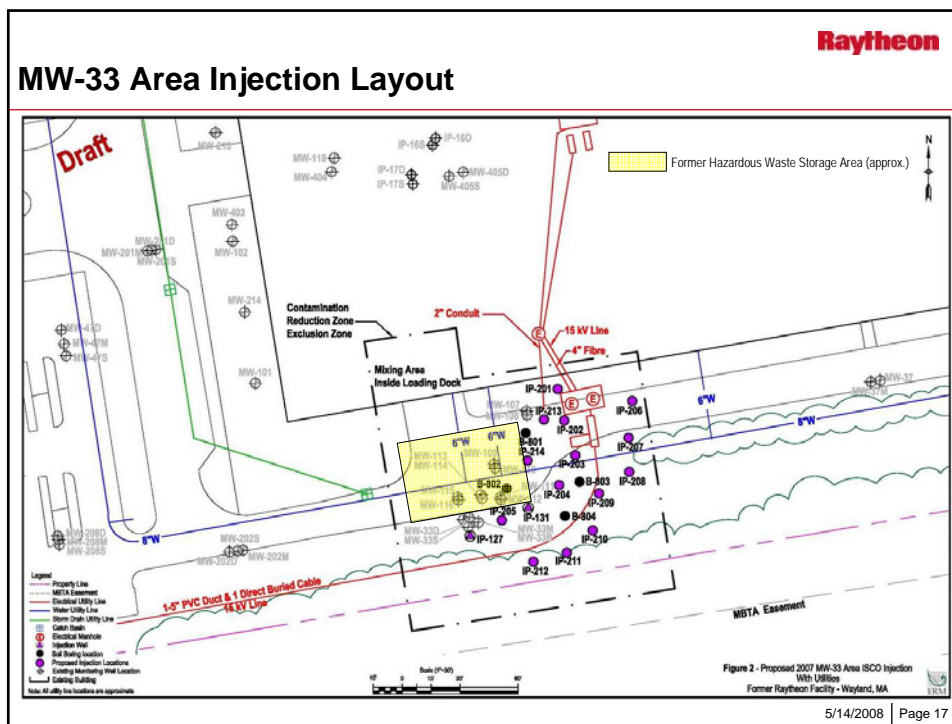
5/14/2008 | Page 14

MW-33 Area In Situ Chemical Oxidation (ISCO) RTN 3-13302

MW-33 Area ISCO

Groundwater Remediation in the MW-33 Area

- Injection conducted from 12 to 28 November 2007
 - ISCO conducted using potassium permanganate (KMnO_4) in the MW-33 Area. Activity implemented under Remedy Operation Status (ROS).
- Approximately 37,000 gallons of permanganate (using 0.75% and 1.5% average concentration by weight) injected at 16 injection locations.
 - Permanganate injected using Geoprobe-mounted pressure pulse technology (14 locations) and existing injection wells (2 locations).
 - Roughly 4,200 pounds of KMnO_4



MW-202 Area ISCO RTN 3-13302

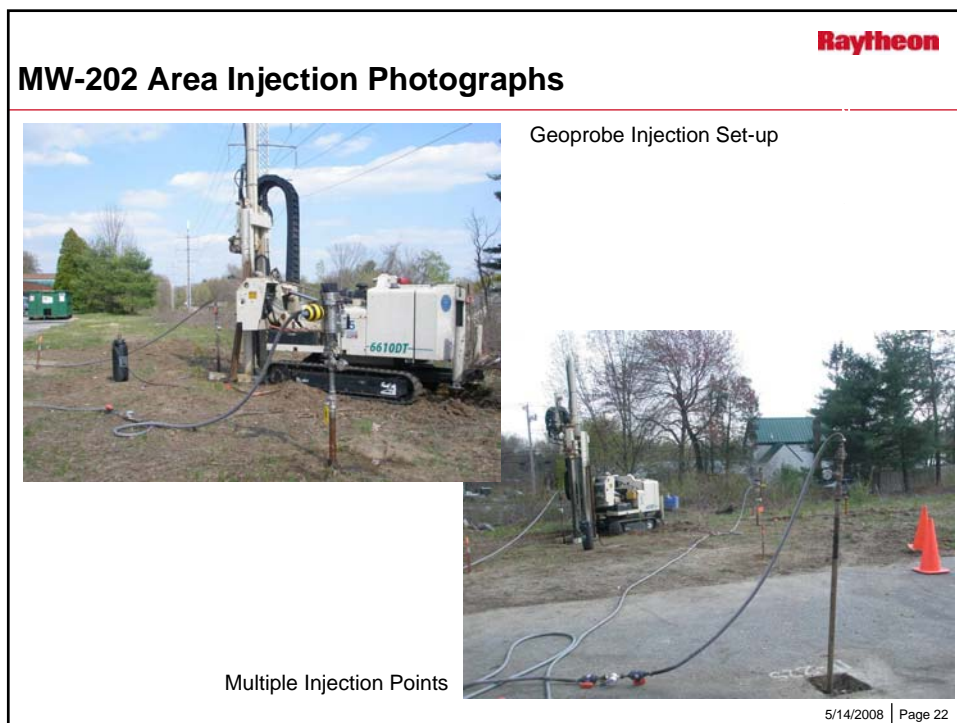
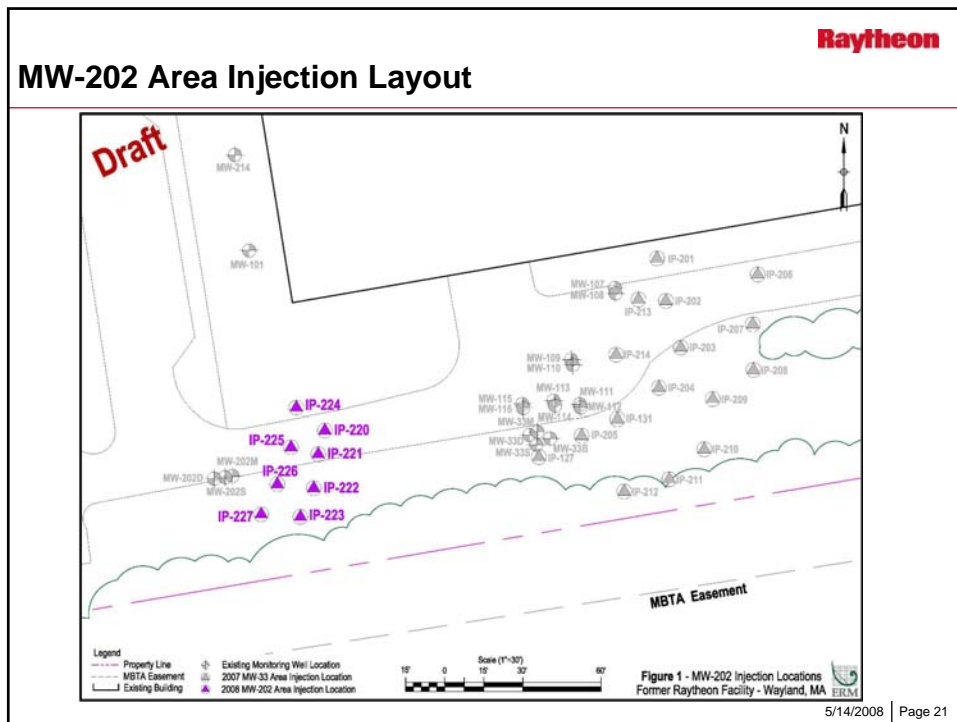
5/14/2008 | Page 19

MW-202 Area ISCO

Implementation

- Designed to target CVOC concentrations at the downgradient (western) extent of the MW-33 Area
 - Utilized same injection strategy and methods as November MW-33 Area injection
- Injection conducted from 28 April to 2 May 2008
 - Total of approximately 13,000 gallons of potassium permanganate injected in 8 locations at depths from approximately 20 to 40 feet below grade
 - Roughly 2,200 pounds of KMnO_4

5/14/2008 | Page 20



Main Building Area ISCO RTN 3-13302

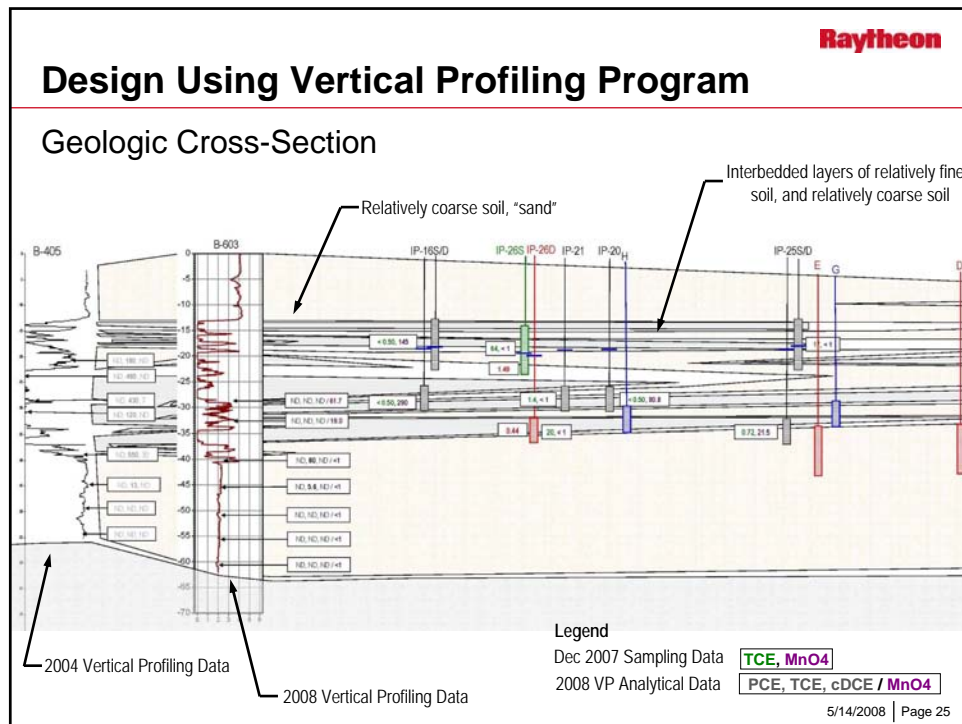
5/14/2008 | Page 23

Main Building Area ISCO

Pre-Remedial Characterization Activities

- Groundwater samples collected in December 2007 from existing injection points inside building
 - Analyzed for CVOCs and permanganate
- Vertical profiling program designed to fill data gaps identified during December sampling
 - Total of 37 groundwater samples collected from varying depths at 8 locations
 - Data used to identify locations in the subsurface with persistent CVOC concentrations

5/14/2008 | Page 24



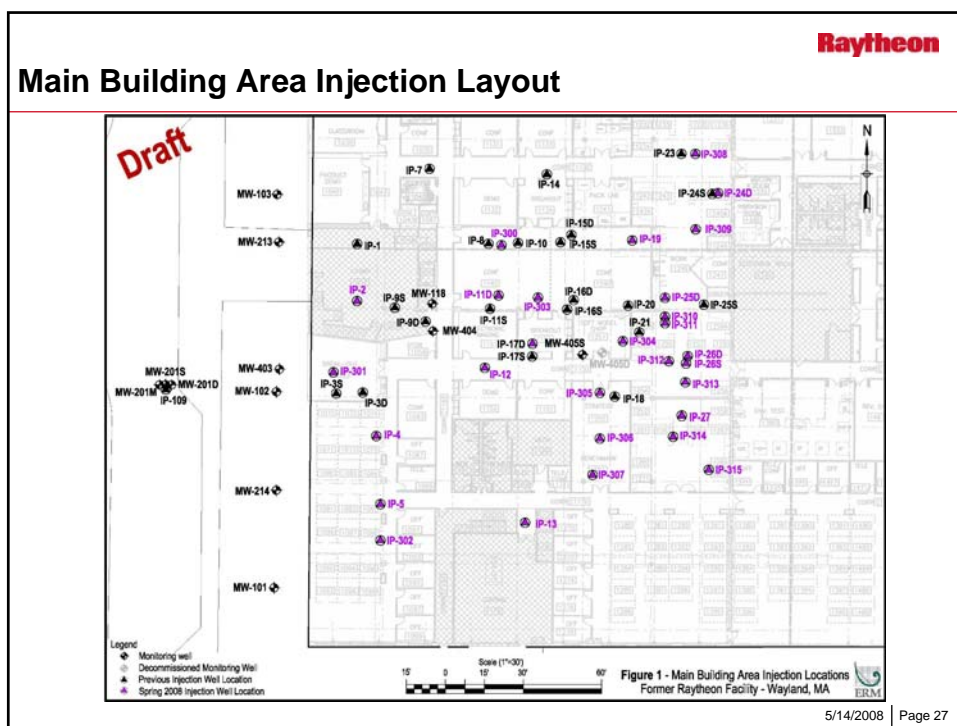
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Main Building Area ISCO

Remedial Design and Implementation

- Geologically-determined ISCO strategy
 - Type of oxidant, potassium permanganate (KMnO₄) or sodium permanganate (NaMnO₄), chosen based on physical properties of the subsurface
 - KMnO₄ applied to 5 existing and 9 new injection points
 - Approximately 52,000 gallons, roughly 10,000 pounds
 - NaMnO₄ applied to 8 existing and 8 new injection points
 - Approximately 7,500 gallons, roughly 9,000 pounds
- Injection conducted from 16 April to 9 May 2008
- Currently demobilizing from Site

5/14/2008 | Page 26



ISCO Reporting

- ISCO injections conducted in the past few months will be summarized in an upcoming Remedy Operation Status Submittal

Update on Site Activities: Groundwater Gauging and Monitoring

Groundwater Gauging

Calendar Year 2008 Groundwater Gauging

- Site-wide gauging rounds to be conducted in May and October
 - Water levels to be measured in 97 monitoring wells

Calendar Year 2008 Groundwater Monitoring

- Monitoring round conducted in February, additional rounds scheduled for May, July, and October
 - Monitoring data summarized in upcoming Remedy Operation Status Submittal

Update on Site Activities Wetland Monitoring

Wetland Monitoring

Submittals

- Annual Restoration Monitoring Report submitted 13 December 2007
 - Restoration area is meeting all Standards for Success with the exception of vegetation standards pertaining to invasive species and survival of planted buttonbush
 - Order of Conditions requires no less than 90% areal coverage of non-invasive species – Only 69% of the area is non-invasive
 - Order of Conditions requires 100% survivorship of planted buttonbush – Additional shrubs were planted in 2007 to bring the total number of individuals to 34, 9 more than the required 25
- Invasive Species Management Plan submitted to the Wayland Conservation Commission on 28 February 2008.
 - Determined control of invasive purple loosestrife in the restoration area is only feasible via removal of seed heads

Wetland Monitoring

Restoration Monitoring

- Monitoring rounds scheduled for early, mid, and late growing seasons
 - First monitoring round will be scheduled based on draining of wetland from spring flood
- All monitoring rounds will be summarized in the 2008 Annual Wetland Restoration Monitoring Report

PIP Schedule

- The next PIP meeting is likely to be scheduled in Fall 2008.
 - Any questions or comments regarding the Site should be directed to:

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- Raytheon will continue to make documents available at the information repositories (Public Library and Board of Health) and website:

www.ermne.com
username: raytheon
password: wayland

Q & A