



FINAL FORMER MARINE CORPS AIR STATION (MCAS) TUSTIN 87th Restoration Advisory Board (RAB) Meeting Minutes

Meeting Location: Tustin Senior Center, Tustin, California

Meeting Date/Time: 04 November 2009/7:10 pm – 8:36 pm

Minutes Prepared by: Tony Guiang, CDM

Attachment:

1. MCAS Tustin Environmental Program Status
2. Presentation Slides: “Update on the UST Site 222 Petroleum Corrective Action Program”

WELCOME/INTRODUCTIONS/AGENDA REVIEW:

Mr. Jim Callian, Base Realignment and Closure (BRAC) Environmental Coordinator (BEC) and Navy RAB Co-Chair, welcomed everyone to the 87th RAB meeting.

Mr. Callian asked for self-introductions and asked all those in attendance to please sign the meeting attendance sheets. A total of 21 people were in attendance. Mr. Callian noted he had copies of all the agency correspondences since the last meeting (09 September 2009) and invited anyone to view them at their leisure.

Prior to the meeting, Susan Reynolds (RAB member) notified Mr. Callian she would be unable to attend the RAB meeting. Additionally, Ms. Cristina Fu (Department of Toxic Substance Control [DTSC]) sent an email which stated that she would not be able to attend this evening’s meeting. Mr. Callian noted Mr. John Broderick’s (Regional Water Quality Control Board [RWQCB]) absence from the RAB meeting was due to the Governor’s ban on overtime for state employees.

APPROVAL OF 09 SEPTEMBER 2009 RAB MEETING MINUTES

Mr. Callian and Mr. Don Zweifel (RAB Community Co-Chair) asked the RAB members if they had any comments or questions on the Meeting Minutes. Mr. Matt West (city of Tustin) requested that the minutes be revised to read “Agreements between the County and the developer have been terminated.” The requested revisions found on Page 5, 3rd paragraph were noted and once incorporated, the minutes would be considered Final.

ANNOUNCEMENTS/REVIEW OF ACTION ITEMS

Mr. Callian presented a series of slides which included a brief summary of the agenda, points of contact information for key BRAC Cleanup Team (BCT) members including the regulatory agencies (United States Environmental Protection Agency [U.S. EPA], DTSC, and RWQCB). In addition, he presented the locations, hours of operation, and points of contact for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Administrative Record (AR) File and CERCLA Information Repository (IR). Mr. Callian

presented several slides on environmental websites and a slide on the proposed RAB meeting dates for 2010.

Mr. Matt Suarez (RAB member) asked what the RWQCB function was with regard to environmental cleanup at Former MCAS Tustin. Mr. Callian replied the RWQCB has always provided oversight on Navy projects and has authority over water quality issues as opposed to the DTSC who has more jurisdiction over potential contaminants in soil. In addition, Mr. Callian noted both agencies were part of California Environmental Protection Agency (Cal/EPA).

MCAS TUSTIN ENVIRONMENTAL STATUS UPDATE

Mr. Callian presented the RAB with an update on the MCAS Tustin Environmental Status (Attachment 1); copies of the update were distributed as part of the RAB handouts.

Mr. Callian explained the activities and document milestones for Operable Unit (OU)-1A and OU-1B were the same and therefore would be discussed simultaneously. Mr. Callian provided a brief summary of the on-going operation and maintenance (O&M) activities and document milestones for OU-1A and OU-1B. He noted the chemical of concern (COC) in groundwater at OU-1A is 1, 2, 3-trichloropropane (1, 2, 3-TCP) found at Installation Restoration Program (IRP)-13 South and the COC in groundwater at OU-1B is trichloroethene (TCE) found at IRP-3 and IRP-12. Mr. Callian explained that after reviewing all the OU-1A and OU-1B data, the U.S. EPA concurred on the OU-1A and OU-1B Operating Properly and Successfully (OPS) determination for these sites. The Navy will move forward with issuance of a Draft Final OPS.

Mr. Callian provided a brief summary of the on-going O&M activities and document milestones for OU-3.

Mr. Callian provided a brief summary of the upcoming field activities and document milestones for OU-4B which comprises six sites (IRP-5S[a], IRP-6, IRP-11, IRP-13W, Miscellaneous Major Spill-04 [MMS-04], and the Mingled Plumes Area [MPA]). Mr. Callian noted a Draft Final Record of Decision (ROD) will be issued in November 2009 for OU-4B and explained the new format, referred to as an I-ROD for "Improved" ROD, contains hyperlinks to references.

Mr. Callian provided a brief summary of the upcoming field activities and document milestones for the methyl tertiary-butyl ether (MTBE) plume at Underground Storage Tank (UST) Site 222 and explained the subject would be discussed in more detail in the upcoming RAB presentation. Additionally, Mr. Callian expressed his appreciation to Mr. Zweifel for taking the time to thoroughly review the Annual 2008 Petroleum Corrective Action Program (PCAP) Progress Monitoring Report for UST Site 222 and finding a discrepancy in the date of closure for the gasoline station in the Executive Summary and in the body of the text. Mr. Callian noted that the date for the closure of the gasoline station would be corrected to January 1992.

REGULATORY AGENCY UPDATE

Mr. Ram Peddada, DTSC

Mr. Peddada provided the RAB with an update of the documents reviewed by the DTSC which included the following:

- Draft OPS Report for OU-1A and OU-1B; and
- Draft OU-4B ROD/Remedial Action Plan (RAP).

As mentioned by Mr. Callian, Mr. Peddada noted the U.S. EPA provided concurrence on the OPS determination. Once this is complete, the property will be suitable for transfer to the city.

Mr. Peddada explained the Draft OU-4B ROD/RAP presents the Navy's preferred remedy to address the three low and three medium concentration sites comprised by OU-4B. He noted the DTSC has reviewed the Draft ROD/RAP and are waiting on the Navy's responses to DTSC comments. When comments are addressed to DTSC's satisfaction, the ROD/RAP will progress to a Draft Final; anticipated to be by November 2009 with a Final ROD/RAP by January 2010.

At the end of Mr. Peddada's update, Mr. Zweifel suggested that Mr. Peddada's dedication and support to the RAB be commended. The Navy also expressed their appreciation to Mr. Peddada.

Mr. Callian reminded the RAB of the inclusion of updated Tustin Plume Maps with the evening's handouts. He thanked the City of Tustin for providing the aerial photograph base map which was taken in June 2008.

UST 222 - PCAP STATUS UPDATE

Before giving the floor to Mr. Cardinale (Navy Remedial Project Manager [RPM]), Mr. Callian asked the RAB to hold their comments and questions on the UST 222 PCAP Status Update until the end of the presentation. He noted Navy RPMs would be available after the meeting to address any comments and answer all questions. In addition, he directed the RAB's attention to the list of acronyms found at the end of the presentation handout (Slide 29).

The UST Site 222 PCAP Status Update presentation took place in two parts. The first part of the presentation was given by Mr. Cardinale who gave a detailed site overview and the second part of the presentation was given by Mr. Mike Wolff (ECS, Inc.) who provided specific information with regard to the progress at Treatment Areas 1 and 2.

Mr. Cardinale began the first part of the presentation by showing the slides titled; "Update on UST Site 222 Petroleum Corrective Action Program" (Attachment 2); the slides were also distributed as part of the RAB handout. His presentation provided a site overview which included discussion on the site background (Slide 3), PCAP cleanup objectives (Slide 4), Treatment Areas 1 and 2 locations (Slide 5), Final PCAP components (Slide 6), and PCAP operational data (Slide 8). In addition to the Location Map provided in Slide 5, an 11 x 17 Well

Location Map was provided as part of the presentation handout. Mr. Cardinale's presentation also included photographs of the groundwater treatment system (Slide 7).

Mr. Wolff began his presentation by providing a brief description of air sparging (AS) and soil vapor extraction (SVE) technology currently operating in Treatment Area 1 and showing a schematic diagram of a typical AS/SVE system (Slide 9). He noted Treatment Area 1 comprises the Source Area where contaminants are primarily in the 1st water bearing zone (WBZ). Mr. Wolff noted AS/SVE was an effective technology in certain formations for removing contamination from groundwater. Mr. Wolff showed photographs of the surface configuration of the AS/SVE system (Slides 10, 15, and 16).

Mr. Wolff provided a detailed summation of operational data since system startup in March 2008 (Slide 11). He explained the significant decrease in contaminant concentrations upon system startup observed in Treatment Area 1 is a typical scenario for groundwater treatment systems. Additionally, when the system is shut down, rebound may be encountered as was observed at UST Site 222 in one groundwater monitoring well (222MW03S). He noted through continuous monitoring and depending on the magnitude of the rebound, the system would be turned on again with the goal of eventually obtaining a rebound below the cleanup goal (300 micrograms per liter [$\mu\text{g/L}$]). Mr. Wolff noted the Navy was continuing to monitor the well and has preliminary data since the re-start up in September 2009 which shows the concentrations are once again reported to be below cleanup goals. It was later explained in the meeting by Mr. Cardinale, the rebound encountered in 222MW03S may be due to a small area of native impacted soil left in place.

Mr. Wolff provided a summary of optimization steps conducted at the Treatment Area 1 AS/SVE systems and results (Slides 13 and 14). Optimization steps included conducting step tests, installing higher flow-rate pumps, and focusing the AS in the vicinity of well 222MW03 (the well which experienced significant rebound). He noted a minimum of four quarters of data were required to determine when monitoring of the system is complete. In addition, Mr. Wolff provided the RAB with a summary of upcoming activities proposed for Treatment Area 1 (Slide 17).

Mr. Wolff closed his discussion of Treatment Area 1 by providing an Exit Strategy chart showing the stage at which the system was currently operating (Slide 19). He noted Treatment Area 1 was currently operating in the rebound monitoring stage where rebound was being evaluated in comparison to cleanup criteria. He reiterated the ultimate goal for the Treatment Area 1 operations was to progress to a no further action (NFA) determination once the rebound cycles fall consistently below the cleanup goals.

Mr. Wolff provided a summary of Treatment Area 2 optimization and operational data (Slide 21). As noted earlier in the presentation, Treatment Area 2 comprises the downgradient area where contamination is primarily in the 2nd WBZ. Mr. Wolff noted optimization measures at Treatment Area 2 included using packers in extraction wells to allow discrete sampling of 1st and 2nd WBZ wells, focusing extraction in 2nd WBZ, installing higher-flow rate pumps, and conducting capture zone analysis (Slide 20).

Mr. Wolff provided a detailed step-by-step description of how the capture zone analysis was conducted using groundwater elevations from Area 2 of the PCAP (Slides 22 through 26). The

steps include precisely locating the area on the surface of the earth using the Universal Transverse Mercator (UTM) coordinates (see Slide 22); overlaying groundwater level data (see Slide 23); incorporating groundwater gradient vectors which show the magnitude and direction of groundwater flow (see Slide 24); and finally overlaying the cultural features associated with the site (see Slide 25). Mr. Wolff presented the final Plume Capture Map for the PCAP area (see Slide 26) showing a series of closed contours or depressions in the water table representing where water is being extracted, or lowered by pumping.

Mr. Wolff closed his discussion of Treatment Area 2 by providing an Exit Strategy chart showing the stage at which the system was currently operating (Slide 27). He reiterated the ultimate goal for the Treatment Area 2 operations was to progress to an NFA determination once the rebound cycles fall consistently below the cleanup goals.

In conclusion, the presentation provided upcoming activities proposed for both Treatment Areas 1 and 2 (Slide 28). Mr. Callian reiterated the Plume Capture Maps are analogous to topographic maps except they represent curvature of the surface of the water. With regard to OU-1A and 1B, he noted that contaminant flow is in the direction of groundwater flow as depicted in the Plume Capture Map. Mr. Wolff asked the RAB if there were any comments or questions.

Mr. Zweifel asked whether the Navy felt one year of monitoring was sufficient to make the determination that rebound would continue to occur at levels below the cleanup goal. Citing Slide 18 where rebound continues to take place, albeit below cleanup goals, Mr. Zweifel felt it would behoove the Navy to extend the monitoring with consideration for factors such as precipitation, which may cause rebound to occur above clean up goals. Mr. Wolff concurred with Mr. Zweifel's comment that precipitation could in fact cause spikes in rebound. He noted the Navy feels a full year of monitoring is adequate because it provides seasonal variation and noted significant rebound spikes above the cleanup goal typically occur within the first few months of the monitoring period. Furthermore, Mr. Wolff explained it is more important to evaluate the pattern of rebound rather than its occurrence. He added that by observing the trend, which in this case shows the magnitude of rebound lesser than the preceding, and projecting a trend line, an assumption can be deduced that rebound will eventually reach an asymptotic condition meaning each rebound will be less than the preceding and eventually zero out to infinity. Mr. Wolff explained if in fact a heavy rain period caused rebound to exceed cleanup goals, the system would be re-started.

To augment, Mr. Cardinale explained the Navy is following the monitoring protocol and objectives outlined in the Final PCAP for UST Site 222 which received concurrence from all the regulatory agencies and was reviewed by stakeholders. Referring to Slide 12 which shows only one of five wells with significant rebound, Mr. Cardinale noted the data supports one year of monitoring is sufficient to determine rebound trends and with the exception of the small area of impacted soil left in place at well location 222MW03S, a significant amount of contaminated mass has been extracted from groundwater. Mr. Callian added owing to the hydrophilic nature of the contaminant (MTBE) at UST Site 222, the contaminant is not likely to rebound to levels above cleanup goals.

Mr. Zweifel expressed his concern about the small area of impacted soil left in place at the site and asked why this was disregarded by the Navy when cleanup of the site was first initiated.

Ms. Arnold explained one year of monitoring after system shut down, as documented in the Final PCAP, received concurrence from the agencies and stakeholders. Ms. Arnold noted the graphs (see Slides 12, 18, and 21) show concentrations continuing to decrease. She added focus should be directed towards getting to the cleanup goal by system optimization and by following the logic set forth in the Final PCAP in order to reach an NFA determination for the site.

In reference to the location of 222MW03S, which happens to be at the location where the impacted soil is left in place, Mr. Suarez asked how the Navy was so sure this location is the only source area (hotspot) currently remaining at the site. Mr. Wolff acknowledged the comment and concurred with the "what if" limitations involved with groundwater investigations. However, years of investigations which identified locations where hazardous materials were stored in the area, led to the array of monitoring points currently at the site and the significant number of samples from 46 wells provide a good representation of site conditions. Mr. Wolff noted lengthy periods of monitoring and stressing of the system, leads him to believe that if there were another area where MTBE had gone undetected, it would be easily identifiable and evident. He noted this has not occurred and therefore he is confident that this location is the only location where MTBE is still present at low concentrations.

To augment, Mr. Dhananjay Rawal (ECS) noted approximately 66,000 tons of impacted soil at the site had been removed and therefore with the exception of this small area of impacted soil, there are no other areas at the site considered to be a source area (hotspot). Mr. Suarez asked for clarification on how soils were excavated, noting that if soils were removed uniformly across the entire tank area, the small area of impacted soil still left in place identified by the significant rebound in 222MW03S would not exist. Mr. Cardinale noted that most of the impacted soil at this location had been excavated, with the exception of a small amount around 222MW03S. He added that the Navy would continue to focus their extraction at this location (222MW03S) and noted the elevated concentrations are very low and localized.

Mr. Zweifel asked if there were any restrictive deed covenants for this impacted soil area. Ms. Arnold replied that the Navy was not at the point of transferring this property; however, at the time of property transfer any restrictions necessary to protect human health and the environment would be issued.

Mr. Zweifel asked how large the impacted soil area is at 222MW03S. Mr. Wolff replied he did not know but once this information is researched, the information will be made available to the RAB. He noted that qualitatively, the area is small because all the wells in that area are within close proximity to one another and only one well is showing the spike. He noted, in his experience, during such investigations it is not unusual for small areas of impacted soil to be left in-place due to obstructions such as underground piping or buildings that may have been encountered during the excavations.

Mr. West asked whether there were samples collected from the area north of 222MW03S to further delimit the impacted-soil area identified in Treatment Area 1. Mr. Wolff replied there are more than likely other investigations (e.g., soil) which took place prior to and during the time the tanks in that location were being excavated that are not identified on the maps. He added extensive sampling took place during the tank excavations, which were to the depth

where groundwater was encountered and numerous step-out samples would have been collected to achieve a clean perimeter, as is typically done during tank excavations.

Mr. Zweifel asked to see a map of groundwater flow direction in a Treatment Area 1. Mr. Zweifel was directed to Slide 25. Mr. Callian cautioned that the groundwater flow direction on this map reflects groundwater being affected by extraction of water at extraction wells.

FUTURE TOPICS/SCHEDULE NEXT RAB AND SUBCOMITTEE MEETINGS/ MEETING EVALUATION AND CLOSING

Mr. Callian announced the next scheduled meeting would take place on 17 February 2010 and provided the RAB with the schedule through December 2010.

Mr. Callian asked for any suggestions on future topics. Mr. Zweifel asked for a comprehensive update on the UST Site 222 PCAP.

In closing, Mr. Callian asked for a meeting evaluation. No comments were provided. Mr. Callian thanked the RAB and the meeting was adjourned.

LIST OF HANDOUTS PROVIDED AT THE MEETING

- 04 November 2009 Former MCAS Tustin RAB Meeting Agenda
- RAB Meeting Schedule
- Former MCAS Tustin - Where to Get More Information
- Environmental Websites
- MCAS Tustin Environmental Program Status
- Presentation Slides: "UST Site 222 PCAP Update "
- Former MCAS Tustin RAB Mission Statement
- Former MCAS Tustin RAB Fact Sheet/Membership Application
- Former MCAS Tustin Mailing List Coupon

Copies of the meeting minutes and handouts provided at the 04 November 2009 RAB meeting are available at the CERCLA IR for former MCAS Tustin located at the University of California, Irvine, Main Library, Government Publications Section. Library hours are 8am to 7pm Monday through Thursday; 8am to 5pm Friday and Saturday; and 1pm to 5pm on Sunday. It is recommended that people call the library for confirmation of these hours as they may be modified during final exam and holiday periods. The Government Publications Section may be reached at (949) 824-7362. In addition, copies of the meeting minutes and handouts are also available at the CERCLA AR File maintained at Building 307 at former MCAS El Toro by Ms. Rawal. Documents can be viewed by appointment (call Ms. Rawal at [949] 726-5398) between 9am and 1pm Monday through Thursday.

Final minutes from previous RAB meetings can be found on the internet at the Navy BRAC website: www.bracpmo.navy.mil

INTERNET SITES

Navy and Marine Corps Internet Access

BRAC PMO Web Site (includes RAB meeting minutes): <http://www.bracpmo.navy.mil/>

For Tustin RAB information:

http://www.bracpmo.navy.mil/bracbases/california/tustin/rab_information.aspx

Department of Defense - Environmental Cleanup Home Page Web Site:

<http://www.dtic.mil/envirodod/>

U.S. EPA:

Homepage: www.epa.gov

Superfund information: www.epa.gov/superfund

National Center for Environmental Assessment: www.epa.gov/ncea

Federal Register Environmental Documents: www.epa.gov/federalregister

Link to Envirostor via U.S. EPA: www.epa.gov/region09/EnviroStor.html

Cal/EPA:

Homepage: www.calepa.ca.gov

Department of Toxic Substances Control: www.dtsc.ca.gov

Department of Toxic Substances Control: www.envirostor.dtsc.ca.gov/public

Department of Health Services, reorganized into the Department of Health Care Services and the Department of Public Health: www.dhs.ca.gov

Santa Ana Regional Water Quality Control Board: www.waterboards.ca.gov/santaana

Environmental data for regulated facilities in California: www.geotracker.waterboards.ca.gov

November 2009

FORMER MARINE CORPS AIR STATION TUSTIN ENVIRONMENTAL PROGRAM STATUS

Operable Unit 1A (Installation Restoration Program [IRP] Site 13 South – 1,2,3- Trichloropropane [TCP] plume)

Carve-Out: CO-5

Brief Project History:

- 2002: Time Critical Removal Action (hydraulic containment)
- 2004: Final Record of Decision (ROD): Selected remedy includes:
 - Hydraulic containment of contaminated groundwater;
 - Construction, operation, and maintenance of hydraulic containment system;
 - Hot-spot soil removal to enhance groundwater remedy and;
 - Implementation of institutional controls.
- 2007: Final Remedial Design and Remedial Action Implementation
- December 2007: Treatment system operational
- July 2008: Issued 1st Quarter Groundwater 2008 Groundwater Progress Monitoring Report
- October 2008: Issued 2nd Quarter 2008 Groundwater Progress Monitoring Report
- December 2008: Issued Final Interim-Remedial Action Completion Report (I-RACR); the main purpose of the I-RACR is to document that the remedy has been constructed per the Final Remedial Design
- December 2008: Issued 3rd Quarter 2008 Groundwater Progress Monitoring Report
- May 2009: Issued Draft 2008 Annual OU-1A and OU-1B Performance Evaluation Report
- May 2009: Issued Draft Operating Properly and Successfully (OPS) Report.
- July 2009: Issued 1st Quarter 2009 Groundwater Progress Monitoring Report.
- September 2009: Issued Final Long Term Operation and Maintenance Plan (OMP).
- October 2009: Issued 2nd Quarter 2009 Groundwater Progress Monitoring Report.

Next steps:

- On-going operation and maintenance activities.
 - Biweekly, monthly and quarterly inspections;
 - Quarterly effluent sampling for compliance with Orange County Sanitation District discharge requirements; and
 - Quarterly groundwater monitoring.
 - Data used to track system performance and optimize system.
- **December 01, 2009:** Issue Draft Final 2008 Annual OU-1A and OU-1B Performance Evaluation Report*
- **December 01, 2009:** Issue Draft Final OPS Report
- **December 23, 2009:** Issue 3rd Quarter 2009 Groundwater Progress Monitoring Report

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FORMER MARINE CORPS AIR STATION TUSTIN ENVIRONMENTAL PROGRAM STATUS

Operable Unit 1B (IRP Sites 3 and 12 – Trichloroethene [TCE] plumes)

Carve-Outs: CO-5 and CO-6

Brief Project History:

- 2004: Final ROD: Selected remedy includes:
 - Hydraulic containment of contaminated groundwater;
 - Construction, operation, and maintenance of a hydraulic containment system;
 - Hot-spot soil removal to enhance groundwater remedy and;
 - Implementation of institutional controls.
- 2007: Final Remedial Design and Remedial Action Implementation
- January 2008: Treatment system operational
- July 2008: Issued 1st Quarter 2008 Groundwater Progress Monitoring Report
- October 2008: Issued 2nd Quarter 2008 Groundwater Progress Monitoring Report
- December 2008: Issued Final I-RACR. The main purpose of the I-RACR is to document that the remedy has been constructed per the Final Remedial Design
- December 2008: Issued 3rd Quarter 2008 Groundwater Progress Monitoring Report
- May 2009: Issued Draft 2008 Annual OU-1A and OU-1B Performance Evaluation Report
- May 2009: Issued Draft OPS Report
- July 2009: Issued 1st Quarter 2009 Groundwater Progress Monitoring Report
- September 2009: Issued Final Long Term OMP
- October 2009: Issued 2nd Quarter 2009 Groundwater Progress Monitoring Report

Next steps:

- On-going operation and maintenance activities.
 - Biweekly, monthly, and quarterly inspections;
 - Quarterly effluent sampling for compliance with Orange County Sanitation District discharge requirements; and
 - Quarterly groundwater monitoring.
 - Data used to track system performance and optimize system.
- **December 01, 2009**: Issue Draft Final 2008 Annual OU-1A and OU-1B Performance Evaluation Report
- **December 01, 2009**: Issue Draft Final OPS Report
- **December 23, 2009**: Issue 3rd Quarter 2009 Groundwater Progress Monitoring Report

November 2009

FORMER MARINE CORPS AIR STATION TUSTIN ENVIRONMENTAL PROGRAM STATUS

Operable Unit 3 (Site 1– Moffett Trenches landfill)

Carve-Out: CO-10 – PARCEL TRANSFERRED IN 2006

Brief Project History:

- December 2001: Final ROD
- May 2003: Final OMP
- November 2003: Final OPS Report
 - U.S. EPA approval obtained in March 2004
- October 2006: Final First Five-Year Review
- On-going operation and maintenance activities
- June 2009: Issued Draft 2008 Annual Groundwater Monitoring Report
- October 2009: Issued Draft Final 2008 Annual Groundwater Monitoring Report

Next steps:

- Continue operation and maintenance activities
- **December 2009:** Issue Final/Replacement Pages for the 2008 Annual Groundwater Monitoring Report

Operable Unit 4B (IRP-5S[a], IRP-6, IRP-11, IRP-13W, MMS-04, and Mingled Plumes Area [MPA])

Carve-Outs: CO-2, CO-5, and CO-9

Brief Project History:

- 2000: Draft OU-4 Focused Feasibility Study (FS)
- 2003: OU-4 Shallow Groundwater Investigation
- 2004: OU-4 Technical Memorandum presents results of shallow groundwater investigation
- 2005-2006: Groundwater Monitoring
- 2007: IRP-6 and MPA Supplemental Investigation
- September 2008: Final Technical Memorandum Supplemental Investigation at IRP-6 and MPA
- October 2008: Final FS Report
- February 2009: Proposed Plan. Public comment period: February 04-March 06, 2009
- May 2009: Issued Final Work Plan for Groundwater Monitoring OU-4B Sites (IRP-5S[a], IRP-6, IRP-11, IRP-13W, MMS-04, and MPA)
- June 2009: Issued Final Work Plan for Installation of Groundwater Monitoring Wells at OU-4B Sites (MPA, MMS-04, IRP-11, and IRP-13W)
- June 2009: Issued Draft Record of Decision/Remedial Action Plan for OU-4B

Next steps:

- **November 16, 2009:** Issued Draft Final ROD
- **January 2010:** Issue Final ROD
- **January 29, 2010:** Issue 3rd Quarter Groundwater Progress Monitoring Data Summary Report

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FORMER MARINE CORPS AIR STATION TUSTIN ENVIRONMENTAL PROGRAM STATUS

MTBE Plume (UST Site 222)

Carve-Outs: CO-5

Brief Project History:

- 2001: Interim-Petroleum Corrective Action Program (PCAP) plan implemented
- 2006: Final Soil Closure Report
- 2006: Interim PCAP Addendum No. 2 – Revised Cleanup Goals: 1st WBZ: 300 micrograms per liter (ug/L), 2nd WBZ: 44 ug/L, and 3rd WBZ: 13 ug/L.
- 2007: Final PCAP
- 2007/2008: Implement Final PCAP; Additional monitoring and extraction wells installed. Air Sparging/Soil Vapor Extraction (AS/SVE) initiated in March 2008.
- September 2008: AS/SVE system shut down for rebound monitoring per the Final PCAP requirements
- December 2008: Issued 1st and 2nd Quarter 2008 Groundwater Progress Monitoring Report
- April 2009: Issued 3rd Quarter 2008 Groundwater Progress Monitoring Report
- May 2009: Issued Draft Final Annual 2007 PCAP Progress Report
- July 2009: Issued Draft Annual 2008 PCAP Progress Report
- August 2009: Issued 1st Quarter 2009 Groundwater Monitoring Progress Report
- September 2009: Issued 2nd Quarter 2009 Groundwater Progress Monitoring Report
- September 2009: Issued Final Annual 7 PCAP Progress Report
- October 2009: Issued Final/Replacement Pages for the Annual 2008 PCAP Progress Monitoring Report

Next steps:

- On-going operation and maintenance activities:
 - Quarterly Groundwater Monitoring
 - Data used to track system performance, optimize system, and support Final PCAP Closure Report
- Quarterly effluent sampling for compliance with Orange County Sanitation District discharge permit requirements
- January 2010– Issue 3rd Quarter 2009 Groundwater Progress Monitoring Report

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FORMER MARINE CORPS AIR STATION TUSTIN ENVIRONMENTAL PROGRAM STATUS

FOST Summary

FOST #1 signed August 29, 2001	Parcels 3, 21, 38, 39 and portions of 40
FOST #2 signed September 28, 2001	Parcels 4-8, 10-12, 14, 25, 26, 30-33, 37, 42 and portions of 40 and 41
FOST #3 signed April 22, 2002	Parcels 23, 29, 34, 35 and 36, and portions of 1, 16, 17, 24, 27, 28, 40 and 41
FOST #4 signed September 26, 2002	Portions of 24 (PS clean area in CO-5)
FOST #5 signed December 17, 2002	COs 8 and 11
FOST #6 signed September 29, 2004	CO-10 and portion of CO-5
FOST #7 signed May 20, 2005	COs 3 and 7 and portion of CO-5
FOST #8 signed February 2006	COs 1 and 4

FOSL Summary

FOSL #2 signed February 28, 2002	COs 1 thru 4
FOSL #3 signed April 26, 2002	COs 5 thru 11

Acronyms

AST	Aboveground Storage Tank	MNA	Monitored Natural Attenuation	PS	Public Sale Parcel
AOC	Area of Concern	MPA	Mingled Plumes Area	RCRA	Resource Conservation and Recovery Act
BCT	BRAC Cleanup Team (Navy, EPA, Cal EPA)	MMS	Miscellaneous Major Spill	ROD	Record of Decision
CO	Carve-Out area	NFA	No Further Action	TCE	Trichloroethene
EE/CA	Engineering Evaluation/ Cost Analysis	OMP	Operations and Maintenance Plan	TCP	1,2,3-Trichloropropane
FOSL	Finding of Suitability to Lease	OPS	Operating Properly and Successfully	ug/L	Micrograms per liter
FOST	Finding of Suitability to Transfer	OU	Operable Unit	UST	Underground Storage Tank
FS	Feasibility Study	PCAP	Petroleum Corrective Action Program	WBZ	Water-Bearing Zone
I-RACR	Interim-Remedial Action Completion Report	MTBE	Methyl tert butyl ether		



Welcome



Update on the UST Site 222 Petroleum Corrective Action Program

**Former MCAS Tustin, California
Restoration Advisory Board Meeting
November 4, 2009**

**Louie Cardinale, PE, Navy Project Manager
Michael Wolff, PG, ECS Inc.**



Presentation Overview



➤ Site Overview

- Background
- Final PCAP Cleanup Objectives
- Treatment Areas 1 & 2 Locations
- Final PCAP Components
- Groundwater Treatment System
- PCAP Operational Data

➤ Treatment Area 1 (Source Area) Progress

- Air Sparge (AS)/Soil Vapor Extraction (SVE) System Schematic
- Reduction of Methyl Tert Butyl Ether (MTBE) Concentrations in Groundwater
- AS/SVE, Groundwater Extraction Operation and Optimization
- MTBE Mass Removal
- MTBE Concentration Reduction
- Treatment Area 1 Exit Strategy

➤ Treatment Area 2 (Downgradient Area) Progress

- MTBE Concentration Reduction
- Treatment Area 2 Activities
- MTBE Plume Capture Analysis
- Treatment Area 2 Exit Strategy

➤ Upcoming Activities



Site Overview



Background:

- **Underground Storage Tank (UST) Site 222 is a Former Gasoline Station With a Total of Seven USTs**
 - **Four Gasoline, Two Motor Oil, and One Waste Oil USTs**
 - **All USTs Removed Along With Associated Piping in 1998**
 - **Total of 66,700 Tons of Soil Removed From the Site Between 1998 and 2005 [No Further Action (NFA) from Regional Water Quality Control Board (RWQCB) in Feb 2006]**
- **Present Concern at UST 222 is Groundwater Impacted by MTBE**



Site Overview



Final PCAP Cleanup Objectives:

- **Reduce Current Concentrations of MTBE in the First and Second Water Bearing Zones (WBZs) to Below Cleanup Goals (Established in 2005)**
 - **First WBZ – 300 micrograms/liter ($\mu\text{g}/\text{L}$)**
 - **Second WBZ – 44 $\mu\text{g}/\text{L}$**
 - **Third WBZ – 13 $\mu\text{g}/\text{L}$**
- **Protect the Regional Drinking Water Aquifer by Preventing MTBE From Impacting the Third WBZ**
- **Prevent Migration of MTBE Beyond the Current Carve-Out Boundary**



Site Overview



Final PCAP Components:

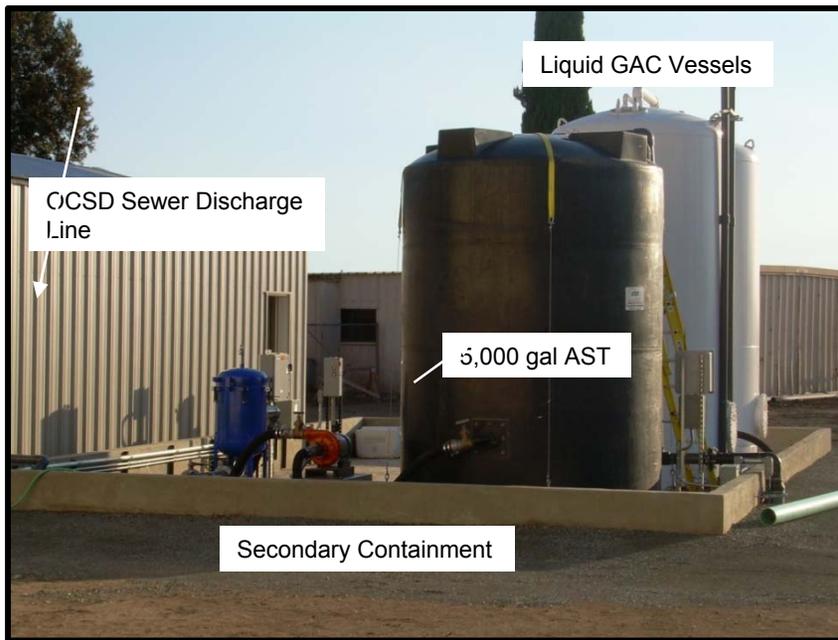
- **Air Sparge/Soil Vapor Extraction (AS/SVE) in Area 1**
- **Eight Groundwater Extraction Wells**
 - **Two in Treatment Area 1 Screened in First WBZ**
 - **Six in Treatment Area 2 Screened Primarily in Second WBZ**
- **Monitoring Well Network to Evaluate System Performance**
- **Treatment and Disposal Facility**
 - **Equalization Tank**
 - **Transfer Pump**
 - **Granular Activated Carbon (GAC) Treatment Vessels**
 - **Disposal of Treated Water to Sewer Under Permit With Orange County Sanitation District (OCSD)**



Site Overview



Groundwater Treatment System



Prior to Fencing



With Fencing



Site Overview



- **PCAP Operational Data**
 - **Current Extraction/Treatment Rate: 50 gallons per minute**
 - **Monthly Treated Groundwater Discharge Rate to Sewer: 2,160,000 Gallons**
- **Total Volume of Groundwater Treated (10/31/09)**
 - **Total Discharged/Recycled: 205,711,119 Gallons**
- **MTBE removed from groundwater through Oct 2009:**
 - **4,268 pounds**



Treatment Area 1 Progress



Surface Configuration of Air Sparge (AS)/Soil Vapor Extraction (SVE) System





Treatment Area 1 Progress



AS/SVE and Groundwater Extraction

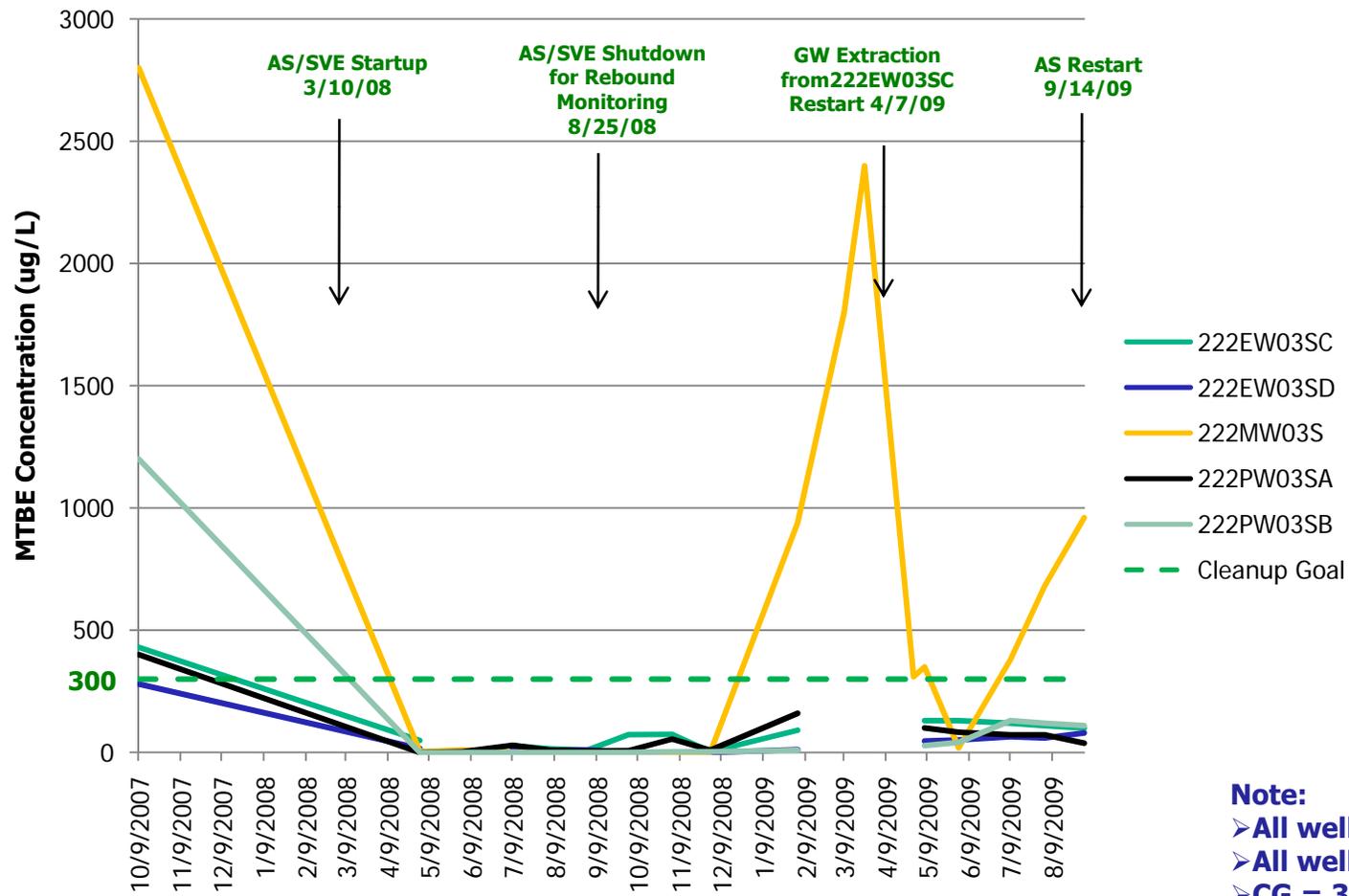
- **AS/SVE system began operation Mar 10, 2008**
- **By May 2008, MTBE concentrations in monitoring well 222MW03S decreased from more than 4,000 $\mu\text{g/L}$ to less than 1 $\mu\text{g/L}$**
- **MTBE rebound monitoring began Sep 2, 2008**
- **MTBE concentrations in monitoring well 222MW03S rebounded to a maximum of 2,400 $\mu\text{g/L}$**
- **Groundwater extraction well 222EW03SC was restarted on Apr 7, 2009**



Treatment Area 1 Progress



Reduction of MTBE Concentrations in Groundwater



Note:
➤ All wells in source area
➤ All wells in First WBZ
➤ CG = 300 µg/L



Treatment Area 1 Progress



Groundwater Extraction Optimization

- **Monitoring well 222MW03S redeveloped and step-tested in Apr 2009 to determine if well was suitable for use as extraction well (determined to be unsuitable)**
- **MTBE concentration after step-test was 190 $\mu\text{g/L}$**
- **Restarted groundwater extraction (Apr 7, 2009) from 222EW03SC**
- **Installed new higher flow rate 15 gallons per minute (GPM) extraction pump in 222EW03SC in Sep 2009**



Treatment Area 1 Progress



Air Sparge Optimization

- **AS system restarted Sep 14, 2009**
- **Injection of air focused on sparge wells in the vicinity of 222MW03S**
- **Injection flow rate optimized in range of 3-10 standard cubic feet per minute (SCFM) at 10-20 pounds per square inch (psi)**



Treatment Area 1 Progress



Air Sparging Restarted in Vicinity of 222MW03S





Treatment Area 1 Progress



Air Sparging Setup in 222MW03S





Treatment Area 1 Progress



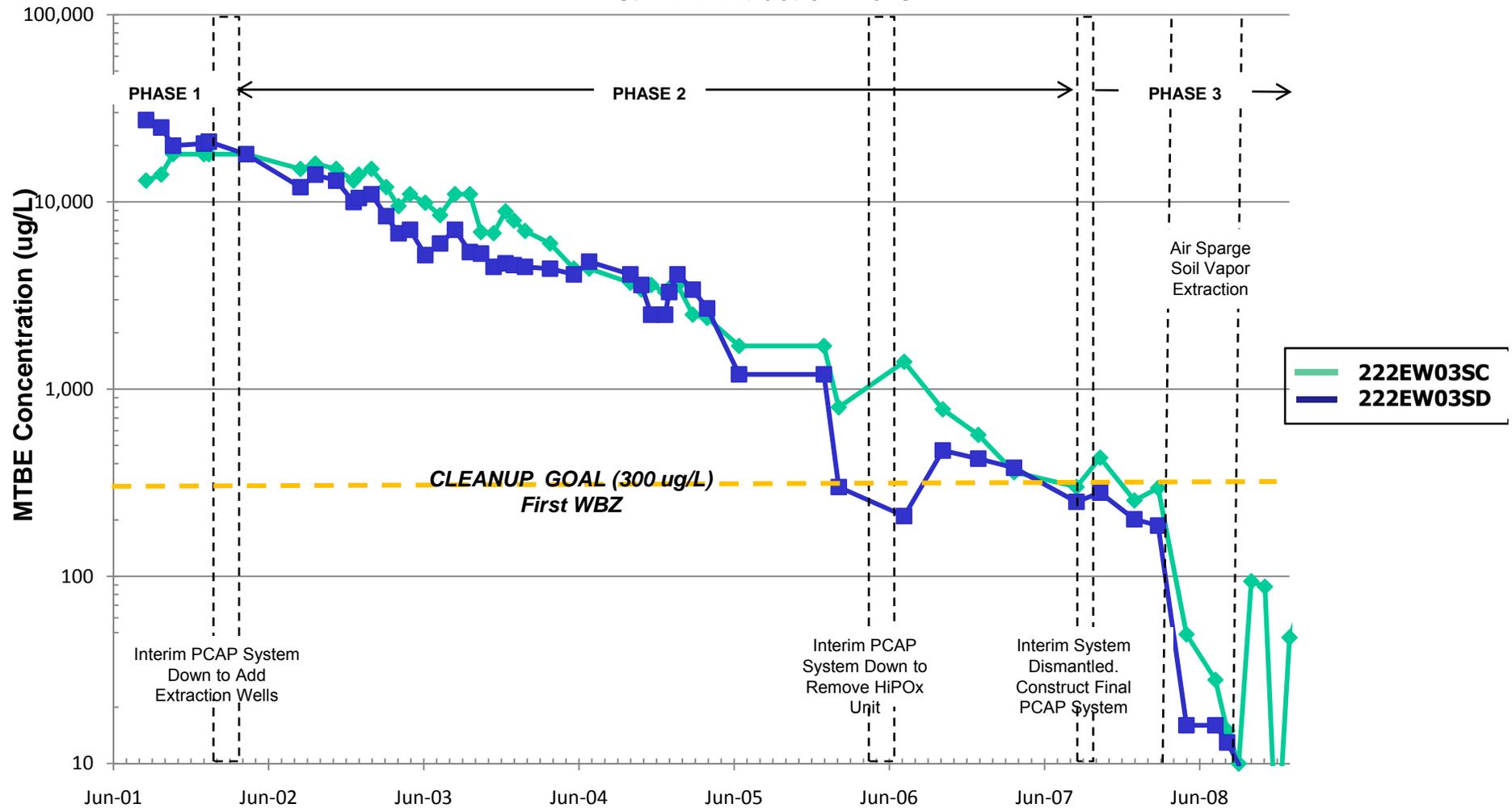
AS System Performance and MTBE Rebound Monitoring:

- Monthly groundwater sampling to evaluate performance of AS system that began in early Oct 2009**
- Anticipate AS system shutdown Dec 2009**
- Four Quarters of sampling to monitor MTBE rebound**



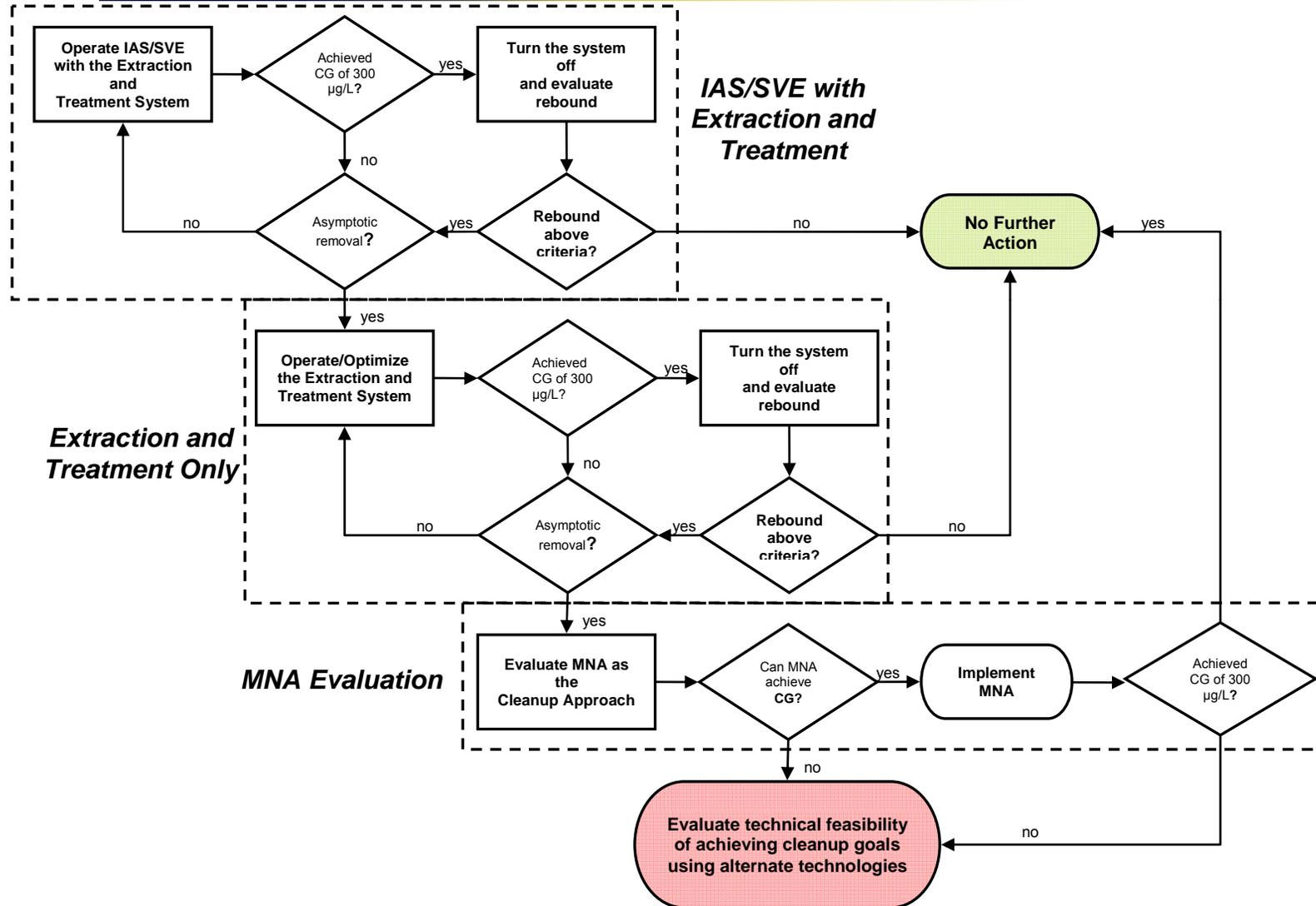
Treatment Area 1 Progress

MTBE Concentration Reduction First WBZ Extraction Wells





Treatment Area 1 Exit Strategy





Treatment Area 2 Progress



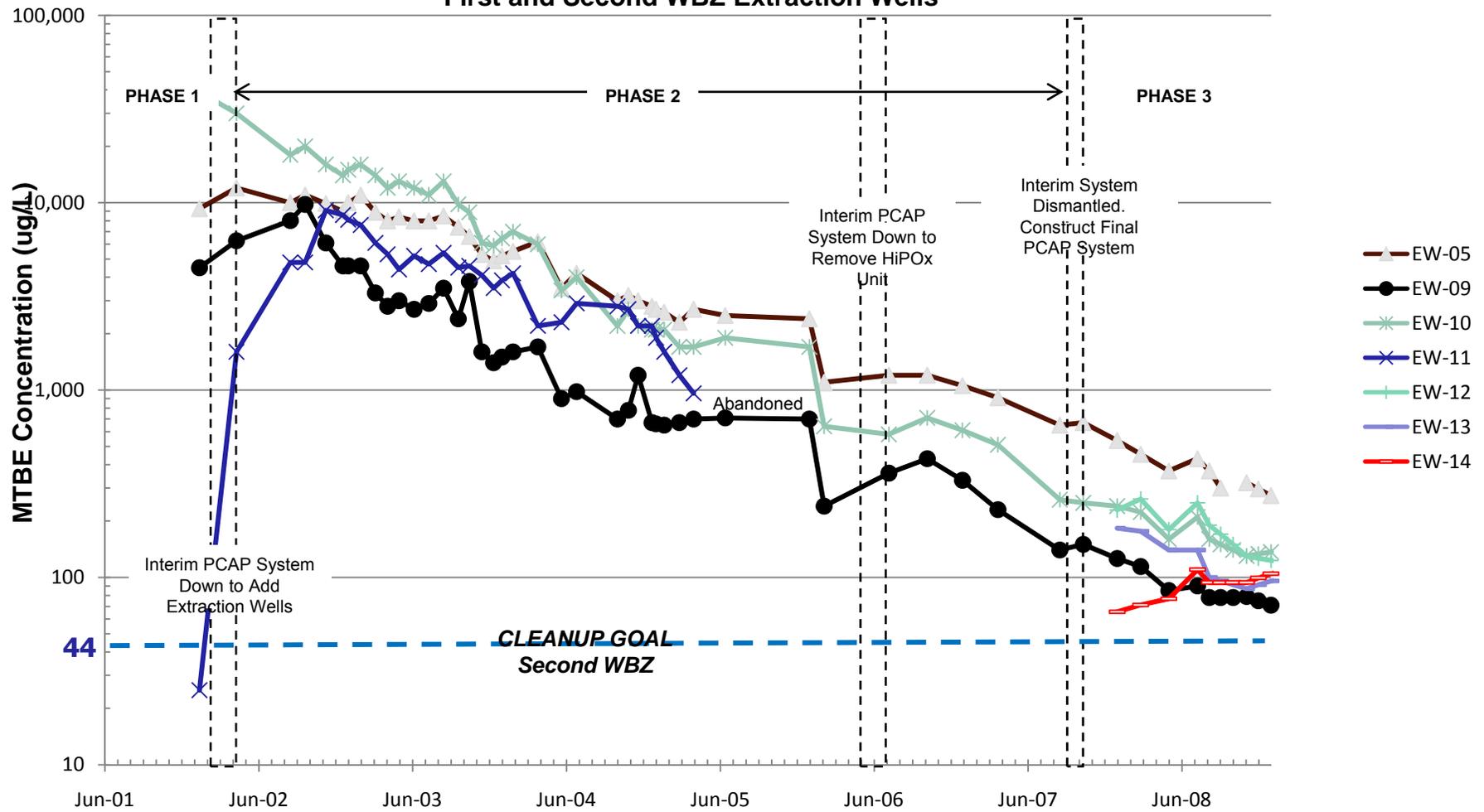
- **Treatment Area 2 Optimization:**
 - Discrete sampling of First and Second WBZ Extraction Wells (222EW05, 222EW09, 222EW10, and 222EW13)
 - Focus extraction on Second WBZ wells 222EW05, 222EW09, and 222EW13 (First WBZ below CG)
 - Completed extraction well packer (222EW05, 222EW09, and 222EW13) sampling to evaluate effectiveness in Aug 2009.
 - Installed higher-flow pump at IS72EX07D to improve groundwater capture. Data currently under review
 - Capture analysis to confirm plume capture



Treatment Area 2 Progress



CONCENTRATION OF MTBE First and Second WBZ Extraction Wells





Treatment Area 2 Progress



Evaluation of Plume Capture Using
Groundwater Level Data from 2nd
Quarter 2009

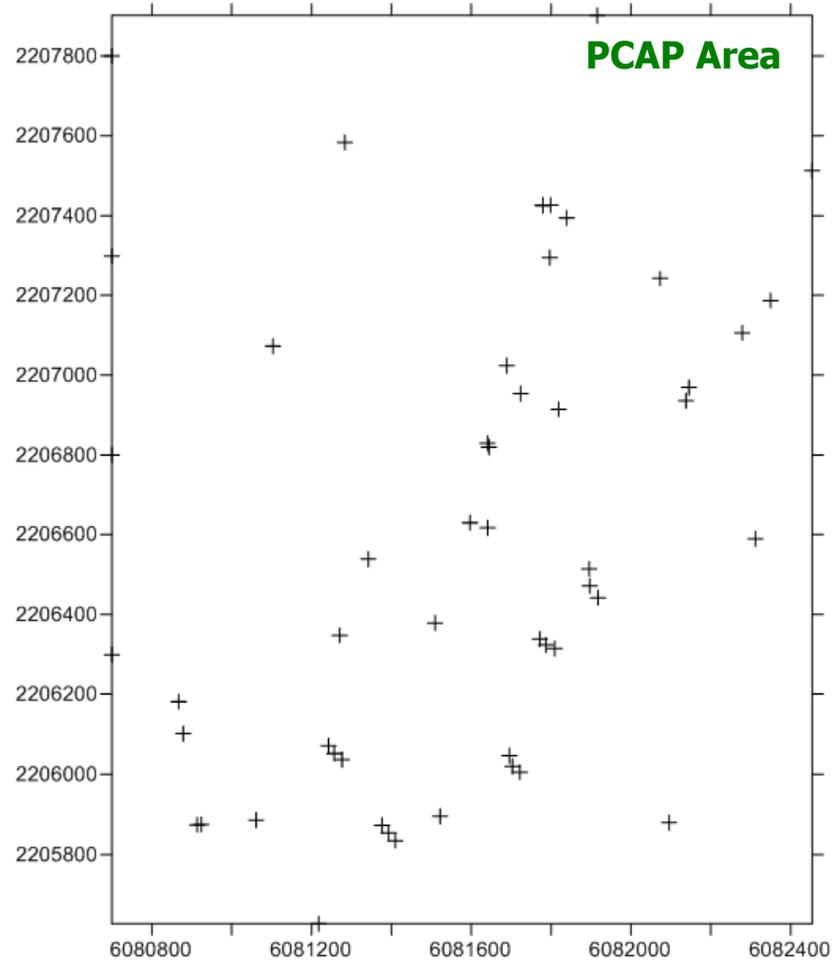
(Methodology)

First Step:

- Establish model domain by constructing a grid with spatially-related data points representing extraction and monitoring well locations using Universal Transverse Mercator (UTM) coordinates

- In this example we are using SURFER version 9.2.397 May 18, 2009, by Golden Software, Inc.

Northing





Treatment Area 2 Progress

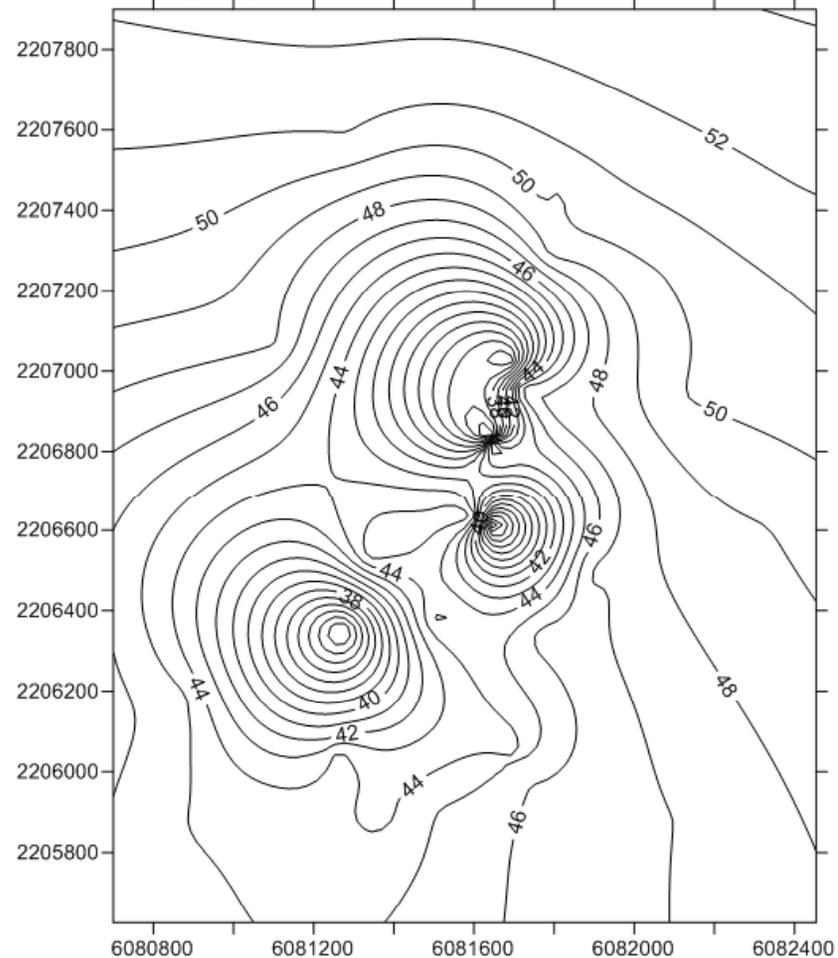


MTBE Plume Capture:

Second Step:

- Construct a database of groundwater levels for each WBZ (2nd Quarter 2009)
- For water levels in extraction wells, use well efficiency analysis to estimate effective groundwater level in the aquifer outside the well
- Link the grid to the database
- Using SURFER, perform data interpolation by kriging
- Generate groundwater elevation contours (for this example we have selected a one-foot contour interval)

PCAP Area





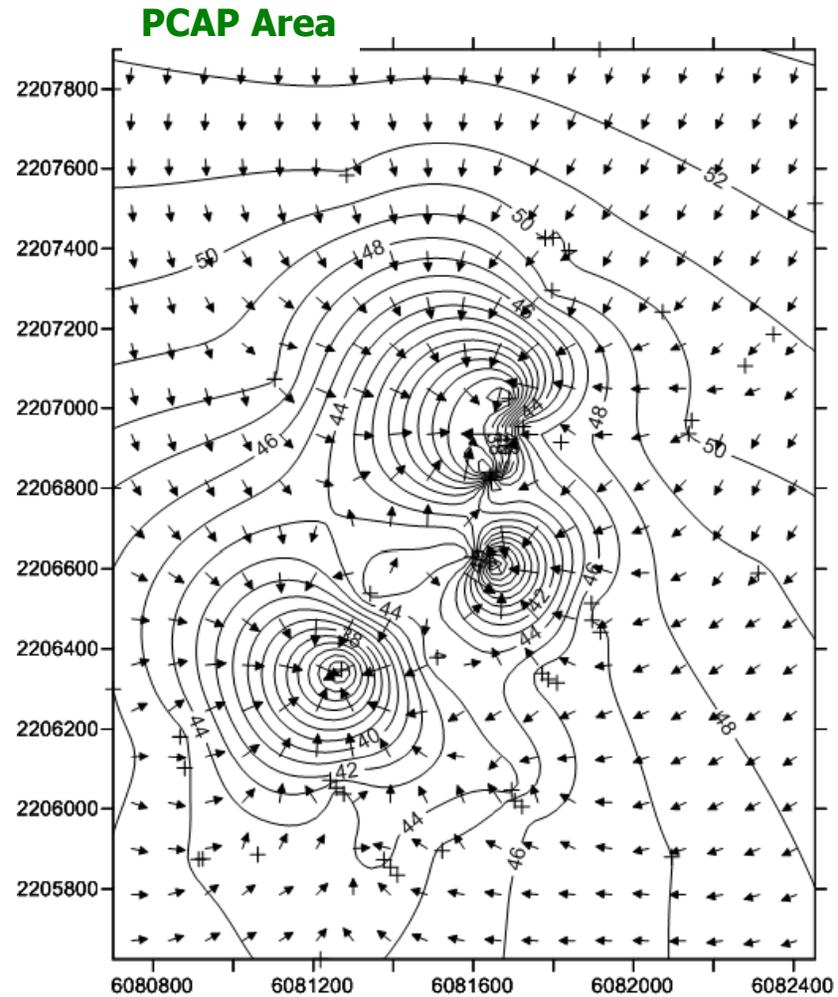
Treatment Area 2 Progress



MTBE Plume Capture:

Third Step:

- Generate a groundwater gradient vector map of the model domain (vectors show local groundwater flow direction)
- Note areas of closed contours with inward oriented flow vectors – these areas represent depressions in the groundwater surface caused by pumping from extraction wells





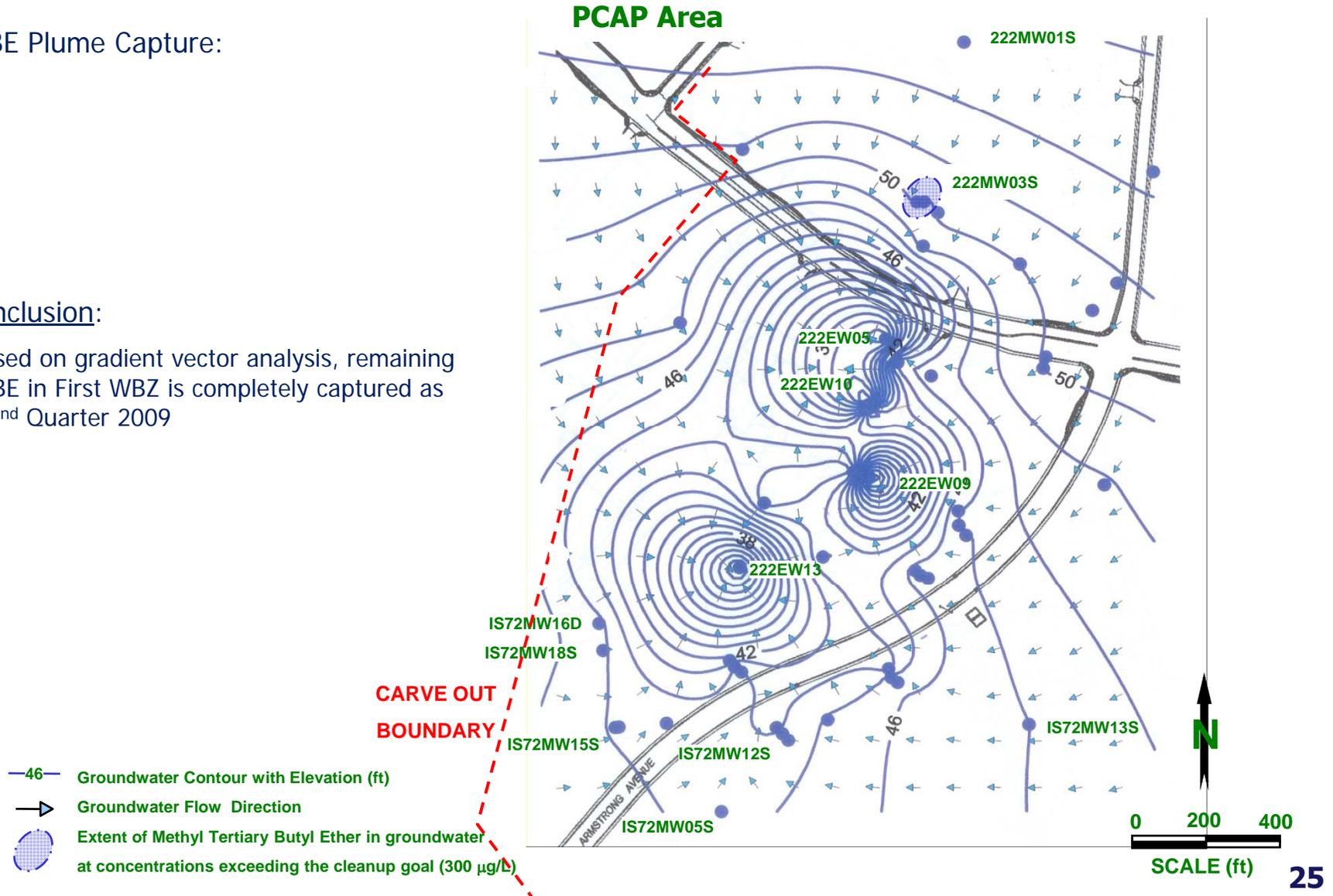
Treatment Area 2 Progress



MTBE Plume Capture:

Conclusion:

- Based on gradient vector analysis, remaining MTBE in First WBZ is completely captured as of 2nd Quarter 2009





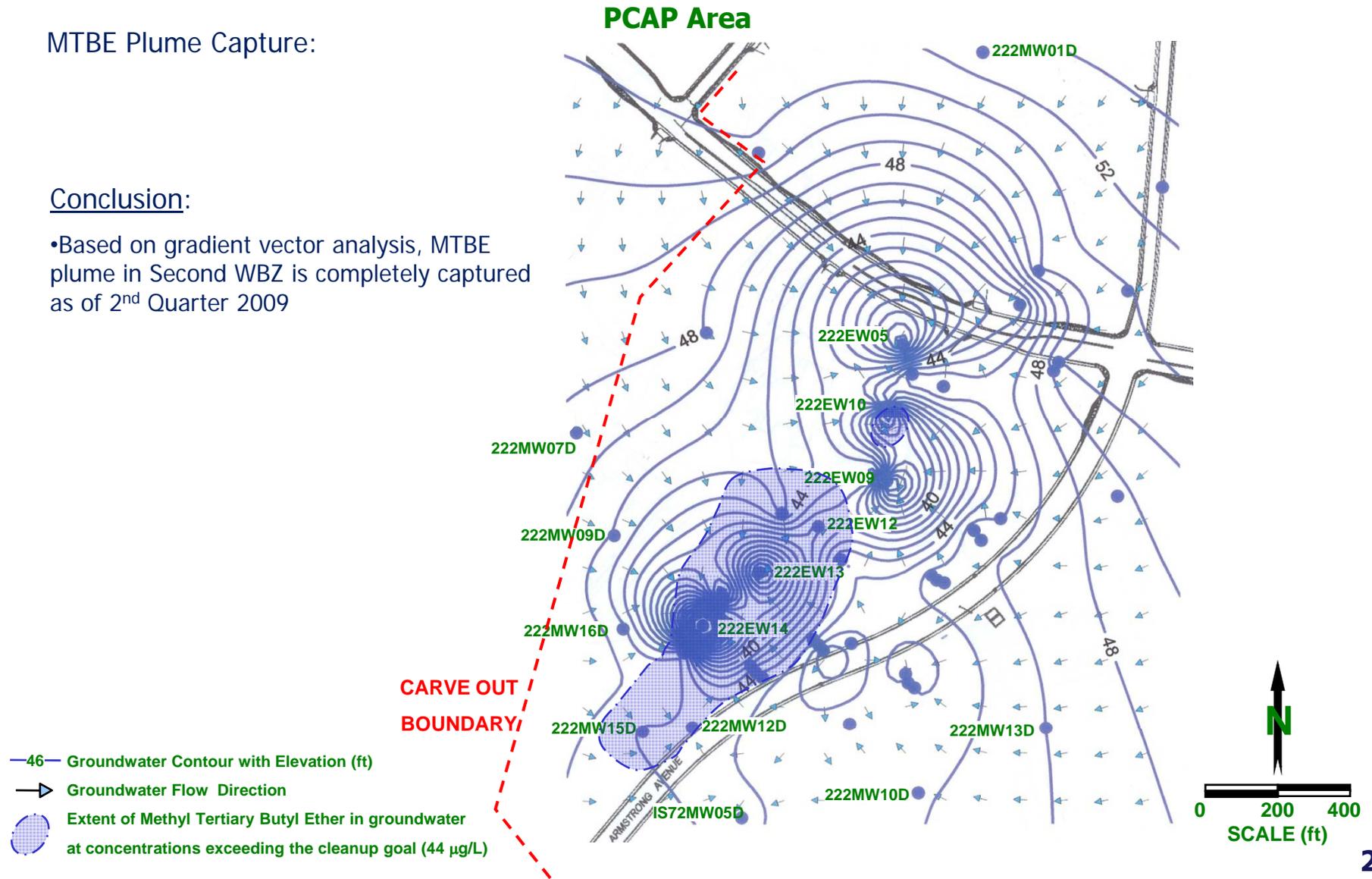
MTBE Plume Capture



MTBE Plume Capture:

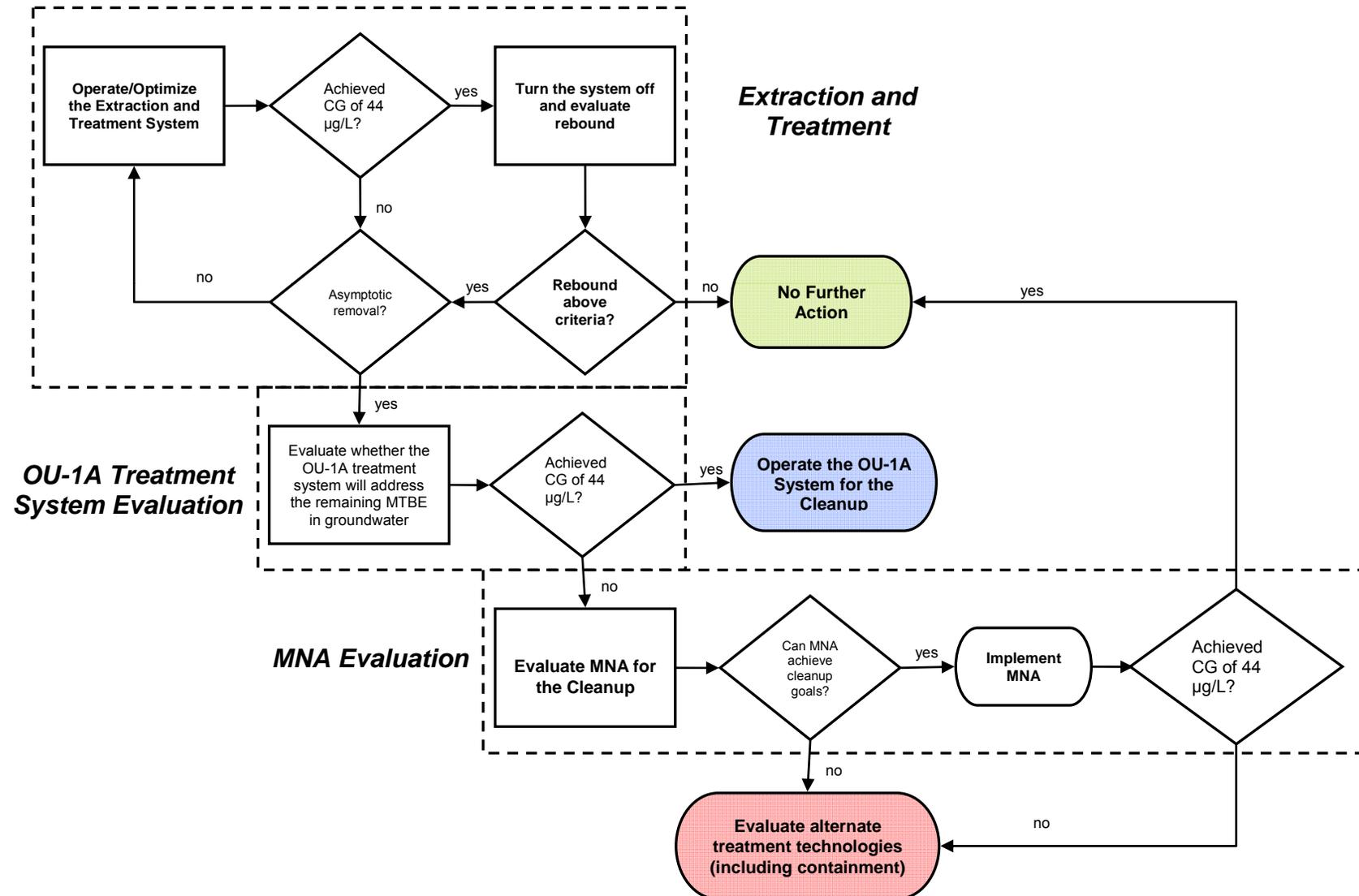
Conclusion:

- Based on gradient vector analysis, MTBE plume in Second WBZ is completely captured as of 2nd Quarter 2009





Treatment Area 2 Exit Strategy





Upcoming Activities



- **Treatment Area 1**
 - Continue Operation of AS System and Monthly Monitoring of AS System Effectiveness
 - Continue Quarterly Groundwater Monitoring
 - Continue System Optimization
- **Treatment Area 2**
 - Continue Operation of GW Extraction and Treatment System
 - Continue Quarterly Groundwater Monitoring
 - Continue System Optimization
- **Site Closure**
 - Attain Concentrations Below CGs in All Areas of UST Site 222
 - Prepare Site Closure Report
 - Obtain Regulatory Concurrence



Acronyms



AST – Aboveground Storage Tank
AS/SVE – Air Sparge / Soil Vapor Extraction
BRAC – Base Realignment And Closure
CG – Cleanup Goal
GAC – Granular Activated Carbon
GPM – Gallons Per Minute
GW – Groundwater
LTM – long-term monitoring
MNA – monitored natural attenuation
MTBE – methyl tert-butyl ether
OCSD – Orange County Sanitation District
PCAP – Petroleum Corrective Action Program
psi – pounds per square inch
SCFM – standard cubic feet per minute
UST – Underground Storage Tank
 $\mu\text{g/L}$ – micrograms per liter
WBZ – Water Bearing Zone