



# **FINAL**

## **FORMER MARINE CORPS AIR STATION (MCAS) TUSTIN**

### **85<sup>th</sup> Restoration Advisory Board (RAB) Meeting Minutes**

**Meeting Location:** Tustin Senior Center, Tustin, California

**Meeting Date/Time:** 13 May 2009/7:07 pm - 9:03 pm

**Minutes Prepared by:** Tony Guiang, CDM

#### **Attachment:**

1. MCAS Tustin Environmental Program Status
2. Presentation Slides: "Operating Properly and Successfully (OPS) Demonstration for Operable Unit (OU) -1A and -1B"

#### **WELCOME/INTRODUCTIONS/AGENDA REVIEW:**

Mr. Jim Callian, Base Realignment and Closure (BRAC) Environmental Coordinator (BEC) and Navy RAB Community Co-Chair, welcomed everyone to the 85<sup>th</sup> RAB meeting. He announced and expressed his delight in assuming his new role as the new BEC. Mr. Callian noted he was assuming the BEC position formerly held by Mr. Rick Weissenborn and more recently the Interim BEC role held by Ms. Deb Theroux. Mr. Callian gave a brief self-introduction of his education and technical background. Mr. Callian's affiliation with MCAS Tustin cleanup began in April 2000 when he worked with Bechtel, Inc. on the Navy Comprehensive Long-Term Environmental Action Navy (CLEAN) contract.

Mr. Callian asked for self-introductions for those in attendance. After introductions were completed, Mr. Callian noted he received commendation from the United States Environmental Protection Agency (U.S. EPA) on the overall efficiency of the Navy team and MCAS Tustin RAB.

Mr. Callian announced there were information packets available for the RAB on the table outside the meeting room. The information packets include important information including the agenda, contact information, and presentation slides. He noted Ms. Sue Reynolds, RAB member, notified him that she would be unable to attend the RAB meeting and asked RAB members to notify either he or Mr. Zweifel if they are unable to attend future RAB meetings.

#### **APPROVAL OF 19 NOVEMBER 2008 and 11 FEBRUARY 2009 RAB MEETING MINUTES**

Mr. Zweifel opened the floor for discussion on any questions or corrections to the 19 November 2008 RAB meeting minutes. No comments were made and the RAB approved the minutes.

Mr. Zweifel opened the floor for discussion on any questions or corrections to the 11 February 2009 RAB meeting minutes. No comments were made and the RAB approved the minutes.

## ANNOUNCEMENTS/REVIEW OF ACTION ITEMS

Mr. Callian provided a brief summary of the Agenda. Mr. Callian presented a series of slides to include point of contact information for key BRAC Cleanup Team (BCT) members and their Agency (U.S. EPA, Department of Toxic Substance Control [DTSC], and Regional Water Quality Control Board [RWQCB]) counterparts. In addition, he presented the locations, hours of operation, and point 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 including a resource made available through the DTSC called EnviroStor. Also included in the introductory slides were the proposed RAB meeting dates for 2009. The next scheduled RAB meeting is 9 September 2009.

Further discussion on the topic of the next schedule meeting took place. Mr. Zweifel expressed his opposition to having a long time span between the current meeting (13 May 2009) and the next scheduled meeting in September. He asked the subject be brought to the table and welcomed discussion from the RAB. In addition, Mr. Zweifel asked whether the RAB members were satisfied with the proposed meeting dates of 9 September 2009 and 4 November 2009. Ms. Content Arnold, Lead Navy Remedial Project Manager, explained the RAB and the Navy agreed upon a September 2009 meeting taking into account the conflicting schedules of RAB members during the month of July 2009 owing to scheduled vacations. She added, moving the proposed July 2009 meeting to August 2009 also conflicted with the unavailability of a meeting room and therefore, a September meeting was proposed.

In addition to discussing a September 2009 meeting date, Ms. Mary Lynn Norby, RAB member, asked for further discussion on the possibility of changing the meeting days from Wednesday to Thursday. She noted her preference to meet on Tuesdays and Thursdays. Mr. Kopecky, RAB member, asked Mr. Zweifel what day of the week he would prefer to hold the RAB meeting. Mr. Zweifel asked Mr. Dana Ogden, City of Tustin, to respond; he indicated that any day except Tuesday would work for him. Ms. Patricia Hannon, RWQCB, responded she was available any day of the week with the exception of the 2<sup>nd</sup> Tuesday of the month. Further discussion among RAB members took place on the selection of the most feasible meeting day for the RAB. Ms. Arnold added the RAB meetings have been held on Wednesday in the past because Mr. Peddada, DTSC, had schedule conflicts with other days of the week. The RAB agreed to table the matter until all parties are contacted and concurrence is reached on a Thursday meeting day.

Returning to the 9 September 2009 meeting date, Ms. Norby expressed her opinion that the proposed meeting date of 9 September 2009 should be dependent on the documents and activities proposed within that time-frame. Ms. Arnold added the 9 September 2009 date is only a few weeks off the previously scheduled August meeting date. The RAB concurred with the 9 September 2009 meeting date. The RAB also agreed to meet in advance to schedule meeting dates for 2010.

Mr. Callian asked attendees to sign the sign-in sheets.

## **RAB CHARTER REVIEW**

Mr. Callian showed a presentation slide of the RAB Mission Statement, herein referred to as "Charter," to the RAB. He read an excerpt from the RAB Charter, signed on 12 March 1998, describing the purpose and function of the RAB.

As a matter of clarification, Ms. Norby noted the Navy was not included in the text as an advisory to MCAS Tustin and other agencies and noted MCAS Tustin no longer exists today and should therefore be referred to as Former MCAS Tustin. Mr. Zweifel responded by saying the MCAS Tustin designation was correct and reflects the Charter at the time it was written, in 1998. Ms. Norby suggested updating the RAB Mission Statement.

## **IRP ENVIRONMENTAL STATUS UPDATE**

Mr. Callian presented the RAB with the Installation Restoration Program (IRP) Environmental Status Update and copies of the update were distributed as part of the RAB handouts.

Mr. Callian provided a brief summary of the upcoming field activities and document milestones for OU-1A and OU-1B. He noted the activities and document milestones for OU-1A and OU-1B were the same. Mr. Callian noted the OU-1A and OU-1B (OPS) Report, a CERCLA requirement prior to federal agencies transferring properties to non-federal entities, would be the subject of the RAB presentation.

Mr. Callian provided a brief summary of the upcoming field activities and document milestones for OU-4B. He explained the new format for the upcoming Record of Decision (ROD) and brought examples of the document for the RAB to review. He noted the new format would include background documents of historical data, which are hyperlinked making the document more user-friendly and more in line with current community policy regarding sustainability and a "greener" approach.

Ms. Arnold noted two items in the IRP Environmental Status Update requiring correction. She noted the 21 May 2009 issuance of a Work Plan for Installation of Groundwater Monitoring Wells should be a Final version and the 20 May 2009 issuance of a 2007 Petroleum Corrective Action (PCAP) report should be a Draft Final version.

Mr. Callian provided a brief summary of the upcoming field activities and document milestones for UST Site 222. Mr. Zweifel asked why the Final PCAP Annual Report to be issued on 20 May 2009 is a 2007 Annual Report instead of a 2008. Mr. Callian acknowledged this fact and explained the Navy has had lengthy discussion with members of the community and the RAB with regard to this, and they have become more up to speed with their reporting, citing the 2008 Draft Annual is scheduled for July of this year. Mr. Kopecky asked whether the 2008 PCAP Report would include the past quarterly groundwater data from the past three months and asked when they could expect to see results which may indicate rebound has occurred. In response, Ms. Arnold noted the 2008 PCAP Report will include historical sampling events through 2008. Mr. Louie Cardinale, Navy Remedial Project Manager (RPM), responded that the results of any rebound evaluation would be reported in a 1<sup>st</sup> Quarter 2009 report.

Mr. Nicholas Steenhaut, from Environ and on behalf of the South Orange County Community College District (SOCCCD), asked at what point during the PCAP remedy an OPS determination would be made. He asked whether the Navy had a target endpoint or an estimated time-frame for the OPS determination or will the Navy continue monitoring the system to see what happens. In response, Mr. Cardinale, stated an endpoint for this project is when the remedy arrives at the point when a closure report can be issued based on methyl-tert-butyl ether (MTBE) concentrations detected below cleanup goals. Mr. Callian stated the Navy would have to evaluate all the PCAP project data results before coming to a conclusive closure determination because some areas at the site are cleaning up quicker than expected. In addition, he noted the corrective action should indicate it is meeting performance objectives outlined in the Final PCAP. Ms. Arnold noted the Final PCAP lays out all the steps leading up to the closure report. At that time, the Navy will continue to evaluate all data and will coordinate with the respective regulatory agencies before moving forward with the closure report. In addition, she noted that OPS was a CERCLA requirement and didn't pertain to the UST 222 petroleum corrective action. Mr. Steenhaut asked several questions regarding OPS and the MCAS Tustin remaining disposal strategy. Ms. Arnold noted Mr. Steenhaut's question would best be addressed and answered in more detail by Ms. Theroux, Deputy Base Closure Manager. Ms. Arnold noted you could transfer property prior to it being cleaned. Mr. Steenhaut confirmed that cleanup at the site can be on-going while the property in the process of being transferred. To augment, Mr. Ogden added the Navy could transfer a property once a remedy is in place.

## **REGULATORY AGENCY UPDATE**

### **Ms. Patricia Hannon, Project Manager, RWQCB**

Ms. Hannon provided the following summary of documents reviewed since the last RAB meeting:

- Draft Work Plan for Groundwater Monitoring at OU-4B Sites.
- Draft Work Plan for Installation of Groundwater Monitoring Wells at OU-4B Sites.

Ms. Hannon added there were some comments regarding an apparent disconnect between the two Work Plan documents, but these comments were resolved between the RWQCB and the Navy. She noted there were 12 additional groundwater monitoring wells being proposed in the 1<sup>st</sup> water bearing zone (WBZ) at OU-4B. To augment, Mr. Callian noted one of the wells would be installed at Miscellaneous Major Spill (MMS)-04 where trichloroethylene (TCE) was reported at 7 micrograms per liter ( $\mu\text{g}/\text{L}$ ) at one location, exceeding the respective maximum contaminant level (MCL) of 5  $\mu\text{g}/\text{L}$ . He stated, as documented in the Proposed Plan for OU-4B, the Navy proposes installing one monitoring well at this location and collecting a groundwater sample to determine whether no further action (NFA) could be recommended for the site based on whether or not the results exceeded the MCL. Mr. Steenhaut asked how the Navy was certain the exceedance detected during the sampling, which may have taken place up to 6 years ago, had not migrated. Mr. Callian responded the exceedance was reported in only one location, in an area where several hydropunch samples were collected. The Navy's proposal is to install only one well at the exact location where the one groundwater sample exceeded MCL. Mr. Zweifel asked whether computer modeling was used to arrive at this proposed action. Mr.

Callian responded that computer modeling indicates that regardless of what the concentrations are, all the potential groundwater contamination at MMS-04 would be captured by the OU-1A system currently in operation.

For point of clarification, Ms Norby asked what the schedule for review was for the upcoming Draft ROD for OU-4B and the Draft Final ROD for OU-4B. In response, Ms. Arnold noted the Draft ROD for OU-4B is scheduled for submittal on 15 June 2009 with a 61-day agency review period. The Draft Final ROD for OU-4B is scheduled for submittal on 19 October 2009 with a 31-day agency review period. The Draft ROD will be available at the CERCLA IR for public review from 15 June 2009 to 14 August 2009. She noted a public review includes review by RAB members.

**Mr. Callian, on behalf of Mr. Ram Peddada, DTSC**

On behalf of Mr. Peddada, Mr. Callian provided the RAB with an update of the documents reviewed by DTSC since the last RAB meeting. He noted he had copies of agency letters, which include comments on documents reviewed since the last meeting and they were available to RAB members who were interested in viewing them. The documents reviewed by Mr. Peddada include the following:

- Draft Work Plan for Groundwater Monitoring at OU-4B Sites.
- Draft Work Plan for Installation of Groundwater Monitoring Wells at OU-4B Sites.

Mr. Zweifel asked Ms. Hannon if she was in concurrence with Mr. Peddada's comments on the documents. Ms. Hannon replied she had not read the letters from DTSC and therefore she did not know what type of comments Mr. Peddada had on the documents. Mr. Cardinale responded the comments from Mr. Peddada were similar to those provided by Ms. Hannon and since then, they have been resolved in a teleconference. He noted the comments were concerning the discrepancies in the number of wells presented in the Draft Work Plan for Groundwater Monitoring at OU-4B Sites and in the Draft Work Plan for Installation of Groundwater Monitoring Wells at OU-4B Sites. Mr. Callian noted Mr. Peddada would be providing the Navy with concurrence on the response to comments (RTCs) tomorrow (14 May 2009).

To further clarify the discrepancies between the two documents, Ms. Hannon explained that the installation of new monitoring wells in the 2<sup>nd</sup> and 3<sup>rd</sup> WBZs at the Mingled Plumes Area (MPA) was not included in the Draft Work Plan for Installation of Groundwater Monitoring Wells at OU-4B Sites, yet sampling of existing wells is addressed in the Draft Work Plan for Groundwater Monitoring at OU-4B Sites. She noted that new well installations in the 1<sup>st</sup> WBZ at the MPA would take place before the program progresses further towards a Final ROD and the installation and sampling of additional wells in the 2<sup>nd</sup> and 3<sup>rd</sup> WBZ would be evaluated in the design phase. Mr. Zweifel asked Ms. Hannon whether she concurs with the number of wells proposed for installation. Ms. Hannon concurred and added further evaluation of data would be considered depending on how things progress. Mr. Zweifel noted since there is not much precipitation causing horizontal movement of the plume there may not be cause to worry. Mr. Cardinale reiterated the purpose of installing and monitoring these wells is to support the chosen remedy and further characterize groundwater at the site. He further added that once

the remedy is chosen and the ROD is in place then the program would progress towards a Remedial Design (RD) and it is during this phase when more investigation in terms of additional testing and whatever else is needed to design the system is conducted. For point of clarification, Ms. Arnold noted the RD would begin after the finalization of the ROD.

In closing, Mr. Zweifel asked the RAB's patience in taking the time to discuss these issues owing to the fact that the RAB only meets quarterly and members need to re-familiarize themselves with the current programs and various technologies implemented at MCAS Tustin. To augment, Mr. Callian noted MCAS Tustin is a very mature program with remedies far along in the remedial process. Therefore, as expected, there are fewer questions being brought to the table.

### **SUBCOMMITTEE TECHNICAL MEETING REPORT**

Mr. Callian provided the RAB with a brief summary of the subcommittee technical meeting, which occurred on 24 March 2009. He noted the subcommittee technical meeting, which was well attended, was held to address concerns regarding the migration or potential migration of the methyl-tertiary-butyl ether (MTBE) plume outside the Carve-Out (CO) area. In addition, other questions raised during the subcommittee meeting included the methodology used to determine the extent of MTBE in the 1<sup>st</sup> and 2<sup>nd</sup> WBZs. Mr. Callian stated the Navy provided a slide presentation that detailed the history of the PCAP program up to the current interpretation and was successful in addressing all of the questions regarding potential plume migration and its proximity to the CO boundary. Mr. Callian noted he received nothing but positive responses about the information presented in the meeting. In addition, he noted there were copies of the presentation available at the handout table and welcomed further discussion of the subcommittee technical meeting after the RAB meeting.

### **OU-1A AND OU-1B OPERATING PROPERLY AND SUCCESSFULLY REPORT**

Mr. Cardinale began the presentation by showing the RAB the locations of the plumes at OU-1A, OU-1B (North) and OU-1B (South), and providing a brief summary of the cleanup effort taking place at these sites. He went on to explain the remedial action (RA) presented in the ROD includes the following components: Limited soil removal to optimize the remedy; construction, operation, and maintenance of a groundwater extraction, treatment and monitoring system to achieve hydraulic containment and hot spot removal; and institutional controls. To further clarify, he noted hydraulic containment includes the extraction wells along the toe or leading edge of the plume and hot spot removal includes extraction wells where the source areas were. Mr. Cardinale noted the Navy has reached a milestone in the program, in that an OPS demonstration can now be made. He noted the Draft OPS Report was due on 27 May 2009 and explained tonight's presentation was to provide the RAB with a better understanding of the OPS demonstration and to show all the regulatory requirements are met. Mr. Cardinale introduced Mr. Wolff, Enviro Compliance Solutions, Inc (ECS).

Mr. Wolff began his presentation by giving a self-introduction at Mr. Zweifel's request. He showed a series of presentation slides titled, "Operating Properly and Successfully (OPS) Demonstration, Remedial Actions for Operable Units (OU) - 1A and -1B" and started by providing the RAB a brief overview of the topics he intended to cover. He noted that although the information may already be familiar to many in attendance, he noted the importance of

understanding the definition and purpose of an OPS demonstration. Mr. Wolff provided the definition and purpose of OPS; a summary of the regulatory background and the current regulations guiding OPS demonstration; U.S. EPA acceptance criteria; a review of the ROD groundwater remedy for OU-1A and OU-1B; and the importance of remedy optimization over time. Mr. Wolff noted this was particularly important to groundwater where the remedy takes place over an extended period. Mr. Wolff explained he would finish his presentation by matching up the reality of the OU-1A and OU-1B performance with the U.S. EPA acceptance criteria and present the conclusion on whether the remedies are meeting the OPS criteria. Mr. Wolff noted the presentation would cover upcoming milestones including a table of contents of the upcoming document and referred the RAB to the acronym list at the end of the handout presentation.

While providing the RAB with the definitions of “Operating Properly” and “Operating Successfully”, Mr. Wolff emphasized the OPS demonstration was an important milestone in the CERCLA process. He noted that reaching this milestone ascertains the remedy is operating as designed per the approved Remedial Design. Additionally, he emphasized the OPS determination does not mean the RAOs have been achieved, but that the RA will achieve RAOs in the future.

Mr. Wolff described the four primary decision factors for OPS demonstration. They included risk to public health and the environment, enforceability, technology reliability, and site characterization.

Ms. Elysee James, Orange County Register, asked if a certain percentage of a remedy, during OPS demonstration, needed to be complete before a property is transferred. Mr. Wolff responded that each situation is different and has unique characteristics and added there is no percentage complete requirement for OPS determination. He noted that once the site has reached the OPS milestone and all the information required by the U.S. EPA is presented and reviewed not only by U.S. EPA, but by other regulatory agencies and by the public, then U.S. EPA has the option to certify that OPS has been achieved. Once the certification of OPS has occurred, the site has passed the milestone. Ms. James asked whether the remedy for the entire parcel of land had to be complete prior to the transfer of the parcel. Mr. Wolff responded there are areas called carve-outs (COs) which are parcels carved out of the subject property that have not yet been transferred. These may include areas where the Navy is currently implementing various remedies. Mr. Wolff explained reaching this milestone is a key point in the process to certifying these parcels can be transferred.

Mr. Steenhaut asked what happens when the U.S. EPA certifies the system is meeting the OPS requirements, several years down the road should unforeseen events occur, and target goals are not being met. Mr. Wolff responded there are contingency plans in place to address unforeseen events. To further address the question, Mr. Wolff continued with his discussion on the six core criteria for groundwater extraction remedies.

Mr. Wolff elaborated on the discussion of Institutional Controls (ICs), one of the six core criteria for groundwater remedies. In response to Mr. Steenhaut’s question earlier on, he added ICs were a key aspect for groundwater remedies and comprised a number of different things; many of which are built into the process.

Mr. Wolff briefly explained the additional nine criteria for consideration in groundwater extraction remedies. He made special note of the Remedy Contingency Plan criteria stating there are specific contingency triggers and decision logic in place within the RD to address unforeseen events during the course of the long-term remedy.

For point of clarification on Criteria #6 – Future Use of Aquifer, Mr. Zweifel asked whether the aquifer in question referred to the 1<sup>st</sup> WBZ aquifer and whether the intended “use” was for potable or drinking water. He also asked for clarification on what aquifer the criterion was referring to. Mr. Wolff responded the criterion was a general requirement and for OU-1A and OU-1B, the remedy applies to shallow groundwater in the 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> WBZs which is not used for drinking. He added groundwater in these WBZs is not used for potable purposes and are all above the regional aquifer, the source for drinking water. He reiterated that one of the purposes of the remedy is to protect the regional aquifer. Mr. Wolff added that not only do the ICs in place restrict use of water in the future but they also restrict future action by any party that may interfere with the remedy in any way. Mr. Zweifel noted that for years, the water from the Irvine subbasin has not been suitable for anything other than for agricultural purposes and asked for clarification on the Irvine subbasin boundaries in relation to MCAS Tustin.

As an added note, Mr. Callian stated the remedy in place at OU-1A and OU-1B provides for hydraulic containment of the plume both laterally and vertically, and the RAO for the remedy is to contain the plume within the current boundaries.

In response to Mr. Zweifel’s question, Mr. Wolff noted the Irvine subbasin comprises a very large area and it definitely encompasses El Toro and contains a vast portion of highly potable groundwater used for domestic purposes. He added the remedy at OU-1A and OU-1B is in place to address groundwater in the shallow WBZs which is not potable because it is contaminated with volatile organic compounds (VOCs) at these locations, and because for many decades owing to its agriculture use, has been contaminated with nitrates. He added these shallow WBZs, which occur above about 100 feet below ground surface (bgs), does not contain a large enough volume to be used as potable source. The regional aquifer, which is high quality drinkable groundwater, occurs at a deeper depth throughout the Irvine subbasin and is unaffected by the remedy. In an effort to prevent moving further away from the subject at hand, Mr. Callian explained that an aquifer was a geologic strata capable of producing water at an economic quantity, as an example, one suitable for supplying a municipality. He added the shallow WBZs at MCAS Tustin are not referred to as aquifers, because they do not produce enough volume to be considered aquifers. In closing and to further augment the response to the question asked by Mr. Steenhaut on addressing unforeseen future events that may diminish the effectiveness of a remedy in place, Mr. Callian noted as part of the remedy required by CERCLA, a Five-Year Review will be conducted at the site. The Five-Year Review will evaluate the effectiveness of the remedy in achieving RAOs.

Given the scenario that an OPS determination is reached and the property transferred, Mr. Steenhaut asked what limitations a developer would have with regard to being able to further develop the property where five years down the line it is determined that the remedy is not meeting RAOs. Mr. Callian responded they were unable to address this at this time but noted OU-1A and OU-1B had no further action determination for soils. He noted the revisions made

to the remedy will address groundwater and therefore installation of additional monitoring wells and extraction wells may be needed.

Mr. Wolff noted when properties are transferred, the Navy has access rights to the property to come back and do whatever needs to be done. This is all part of the property transfer process.

Mr. Wolff provided a summary of the RAOs, the groundwater remedy systems in place at OU-1A and OU-1B, a brief history of the remedial activities at the sites and on-going remedial action activities. Mr. Wolff noted the RAOs are reported in two separate RODs for OU-1B and OU-1A.

During the discussion of the RAO to protect ecological receptors at OU-1A and OU-1B, Mr. Zweifel asked about the fate of the pond turtles affected by the development. Mr. West responded the developers moved the turtles to another location and into a new habitat. Mr. Zweifel strongly objected to moving an ecological receptor from its natural habitat.

Mr. Wolff provided examples of the remedial action optimization measures for the site and noted they are documented in the agency concurred ROD and RD. He showed three figures (Slides 17, 18, and 19) which provided examples of capture zones calculated under different optimization scenarios. Mr. Steenhaut asked what order of magnitude for the hydraulic conductivity was used during the calculation of theoretical capture zones. Mr. Wolff did not remember the exact numbers used but welcomed further discussion on the topic after the meeting. He noted transmissivity was used during the capture zone evaluation.

Mr. Wolff showed the next slides (Slides 20, 21, and 22) which summarized how the selected remedy at OU-1A and OU-1B satisfies the U.S. EPA factors for OPS demonstrations.

Mr. Wolff concluded his presentation by opening the floor for additional questions, comments, and suggestions. Ms. Norby expressed her appreciation for providing enlarged versions of the figures in the RAB handouts. No further questions were asked.

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

Mr. Callian asked for any suggestions on future topics. Mr. Zweifel asked for further discussion on the ecological receptors. Specifically, how many receptors were displaced by the developer and where were they moved. Ms. Norby asked for further discussion on the Draft OU-4B ROD. A motion on the floor included an update on UST 222 PCAP.

In closing, Mr. Zweifel asked for meeting evaluation. Mr. Kopecky applauded Mr. Wolff's presentation on the OU-1A and OU-1B OPS Demonstration and added it provided the RAB a valuable opportunity to re-review the process. Mr. Zweifel thanked the RAB and the meeting was adjourned.

## **LIST OF HANDOUTS PROVIDED AT THE MEETING**

- May 13, 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: "Operating Properly and Successfully (OPS) Demonstration, Remedial Actions for Operable Unit (OU) - 1A and -1B "
- 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 13 May 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](http://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](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](http://www.epa.gov)

Superfund information: [www.epa.gov/superfund](http://www.epa.gov/superfund)

National Center for Environmental Assessment: [www.epa.gov/ncea](http://www.epa.gov/ncea)

Federal Register Environmental Documents: [www.epa.gov/federalregister](http://www.epa.gov/federalregister)

Link to Envirostor via U.S. EPA: [www.epa.gov/region09/EnviroStor.html](http://www.epa.gov/region09/EnviroStor.html)

**Cal/EPA:**

Homepage: [www.calepa.ca.gov](http://www.calepa.ca.gov)

Department of Toxic Substances Control: [www.dtsc.ca.gov](http://www.dtsc.ca.gov)

Department of Toxic Substances Control: [www.envirostor.dtsc.ca.gov/public](http://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](http://www.dhs.ca.gov)

Santa Ana Regional Water Quality Control Board: [www.waterboards.ca.gov/santaana](http://www.waterboards.ca.gov/santaana)

Environmental data for regulated facilities in California: [www.geotracker.waterboards.ca.gov](http://www.geotracker.waterboards.ca.gov)

## MCAS TUSTIN ENVIRONMENTAL PROGRAM STATUS

### Operable Unit 1A (Installation Restoration Program [IRP] Site 13South – 1,2,3-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: North treatment system operational.
- July 2008: Issued 1<sup>st</sup> Quarter Groundwater Progress Monitoring Report.
- July 2008: Issued Draft Interim-Remedial Action Completion Report (I-RACR). The main purpose of the I-RACR is to document that the remedy has been constructed.
- October 2008: Issued 2<sup>nd</sup> Quarter Groundwater Progress Monitoring Report.
- December 2008: Issued Final I-RACR.
- December 2008: 3<sup>rd</sup> Quarter Groundwater Progress Monitoring Report.
- April 2009: Issued Draft Long Term Operation and Maintenance Plan (OMP).

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.
- **May 27, 2009:** Issue Draft 2008 Annual OU-1A and OU-1B Performance Evaluation Report.
- **May 27, 2009:** Issue Draft Operating Properly and Successfully (OPS) Report.
- **August 4, 2009:** Issue Draft Final Long Term OMP.
- **September 28, 2009:** Issue Final 2008 Annual OU-1A and OU-1B Performance Evaluation Report.
- **September 30, 2009:** Issue Draft Final OPS Report.

### Operable Unit 1B (IRP Sites 3 and 12 --TCE plumes)

Carve-Outs: CO-5 and CO-6

Brief Project History:

- 2004: Final Record of Decision (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.
- December 2007: North treatment system operational.
- July 2008: Issued 1<sup>st</sup> Quarter Groundwater Progress Monitoring Report.
- July 2008: Issued Draft I-RACR.
- October 2008: Issued 2<sup>nd</sup> Quarter Groundwater Progress Monitoring Report.
- December 2008: Issued Final I-RACR.

## MCAS TUSTIN ENVIRONMENTAL PROGRAM STATUS

### Operable Unit 1B Brief Project History continued:

- December 2008: 3<sup>rd</sup> Quarter Groundwater Progress Monitoring Report.
- April 2009: Issued Draft Long Term OMP.

### Operable Unit 1B (IRP Sites 3 and 12 --TCE plumes) Continued:

#### 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.
- **May 27, 2009:** Issue Draft 2008 Annual OU-1A and OU-1B Performance Evaluation Report.
- **May 27, 2009:** Issue Draft OPS Report.
- **August 4, 2009:** Issue Draft Final Long Term OMP.
- **September 28, 2009:** Issue Final 2008 Annual OU-1A and OU-1B Performance Evaluation Report.
- **September 30, 2009:** Issue Draft Final OPS Report.

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

#### Carve-Outs: CO-5 and CO-6

#### 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.
- February 2009: Issued Draft Work Plan for Groundwater Monitoring OU-4B Sites (IRP-5S[a], IRP-6, IRP-11, IRP-13W, MMS-04, and MPA)
- March 2009: Issued Draft Work Plan for Installation of Groundwater Monitoring Wells at OU-4B Sites (MPA, MMS-04, IRP-11, and IRP-13W)

#### Next steps:

- **May 21, 2009:** Issue Draft Work Plan for Installation of Groundwater Monitoring Wells at OU-4B Sites (MPA, MMS-04, IRP-11, and IRP-13W)
- **June 2009\*:** Issue Final Work Plan for Groundwater Monitoring OU-4B Sites (IRP-5S[a], IRP-6, IRP-11, IRP-13W, MMS-04, and MPA)
- **June 15, 2009:** Issue Draft ROD.  
\*Tentative Date

## MCAS 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: 1<sup>st</sup> WBZ: 300 micrograms per liter (ug/L), 2<sup>nd</sup> WBZ: 44 ug/L, and 3<sup>rd</sup> 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 1<sup>st</sup> and 2<sup>nd</sup> Quarter 2008 Groundwater Progress Monitoring Report
- April 2009: Issued 3<sup>rd</sup> Quarter 2008 Groundwater 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.
- **May 20, 2009** – Issue Final 2007 PCAP Annual Report
- **July 15, 2009**: Issue Annual 2008 PCAP Progress Report.

### 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

May 2009

## MCAS TUSTIN ENVIRONMENTAL PROGRAM STATUS

### 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
		MTBE	Methyl tert butyl ether		



# **Operating Properly and Successfully (OPS) Demonstration**

## **Remedial Actions for Operable Units (OU) -1A and -1B**

**Former Marine Corps Air Station Tustin  
Restoration Advisory Board Meeting  
13 May 2009**

Louie Cardinale, P.E. - Navy BRAC Remedial Project Manager  
Michael Wolff, P.G., C.E.G. – ECS Inc.



# Presentation Overview



- **Operating “Properly” and “Successfully” (OPS) – what does this mean?**
- **Purpose of OPS Demonstration**
- **Regulatory Background**
- **United States Environmental Protection Agency (U.S. EPA) Acceptance Criteria**
- **Review of Record of Decision (ROD) Groundwater Remedy for OU-1A and OU-1B**
- **Importance of Remedy Optimization Over Time**
- **Does the Groundwater Remedy Meet OPS Criteria?**
- **OPS Document Format**
- **Conclusion**



## OPS Definitions



- **Operating “Properly”** means operating as designed per the approved Remedial Design (RD)
- **Operating “Successfully”** means that the remedial action will achieve the Remedial Action Objectives (RAOs) presented in the ROD and must be protective of human health and the environment



## Purposes of OPS Demonstration



- **Demonstrates that the remedy is protective of human health and the environment**
- **Satisfies Comprehensive Environmental Response Compensation and Liability Act (CERCLA) requirement for transfer of federal government-owned property to non-federal entities.**
- **Provides basis for certification by the U.S. EPA Regional Administrator prior to property transfer.**



# Regulatory Background



- **CERCLA enacted in 1980**
  
- **Superfund Amendments and Reauthorization Act (SARA) enacted in 1986**
  - Added the provision that OPS must be demonstrated before federally-owned contaminated property could be transferred to non-federal entities
  - U.S. EPA Regional Administrator certifies OPS
  
- **Community Environmental Response Facilitation Act (CERFA) enacted in 1992**
  - Emphasized that transfer of federal property to local communities is an economic priority
  - Clarified that OPS can be demonstrated prior to actual achievement of RAOs as long as the remedial action will eventually achieve RAOs, and that appropriate Institutional Controls (ICs) are in-place to protect public health and the environment



# U.S. EPA Acceptance Criteria



## ➤ Guidance For Evaluation of Federal Agency Demonstrations Established in 1996

### ➤ Available online at

<http://www.epa.gov/swerffrr/documents/896mm.htm>

### ➤ Established Four Primary Decision Factors:

1. Risk to Public Health or the Environment
2. Enforceability
3. Technology Reliability
4. Site Characterization



# U.S. EPA Acceptance Criteria (cont.)



## Guidance for Groundwater Extraction Remedies (Six Core Criteria)

1. Construction of the source control portion of the remedy is complete and in accordance with the approved design, where necessary to protect human health and the environment.
2. Construction of the groundwater remedy is complete and in accordance with the approved design.
3. The system is pumping, treating and discharging groundwater in accordance with the approved design.



## U.S. EPA Acceptance Criteria (cont.)



### Guidance for Groundwater Extraction Remedies (Six Core Criteria)

4. Groundwater elevation data show inward gradients throughout plume for all affected aquifers.
5. Appropriate Institutional Controls (ICs) are in place.
6. The monitoring system has been completed in accordance with the approved design and is providing adequate data to evaluate remedy performance and determine compliance with regulatory permits.



## U.S. EPA Acceptance Criteria (cont.)



### Guidance for Groundwater Extraction Remedies (Additional Criteria for Consideration)

1. Contaminant distribution and changes over time.
2. Hydrogeology of the site, especially conditions that would increase remediation time frames.
3. Groundwater modeling studies of remedy performance and time required to meet RAOs.
4. Contaminant chemistry.
5. Likelihood that RAOs are not achievable, necessitating an Applicable or Relevant and Appropriate Requirement (ARAR) waiver.
6. Future use of the aquifer.
7. Current and future receptors.
8. Operation and maintenance plans.
9. Remedy contingency plans.



# ROD Groundwater Remedy OU-1A and OU-1B



## Soil: No Further Action (NFA)

## Groundwater Contaminants of Concern (COCs):

- OU-1A: 1,2,3-trichloropropane (TCP)  
(remediation goal = 0.5 micrograms per liter [ $\mu\text{g/L}$ ])  
Trichloroethene (TCE) (remediation goal = Maximum Contaminant Level (MCL) = 5  $\mu\text{g/L}$ )
- OU-1B North and South:  
TCE (remediation goal = 5  $\mu\text{g/L}$ )

## Selected Groundwater Remedy:

1. Construction, operation and maintenance of a groundwater extraction, treatment and monitoring system
2. Hydraulic containment (of groundwater plumes) with hot-spot groundwater extraction to optimize the remedy
3. Limited soil removal to optimize the remedy
4. ICs to prevent extraction and use of shallow contaminated groundwater



## RAOs OU-1A and -1B Groundwater



- Reduce concentrations of volatile organic compounds (VOCs) in groundwater to levels consistent with remediation goals, or until the plumes have stabilized, and prevent or limit VOC migration beyond the current plume boundaries.
- Protect human health by preventing extraction of VOC-impacted shallow groundwater for domestic use until remediation goals are achieved.
- Protect ecological receptors in Peters Canyon Channel and Barranca Channel by preventing the off-station migration of groundwater that contains VOCs at concentrations exceeding site remediation goals.
- Implement appropriate remedial actions as necessary to facilitate the transfer and reuse of the properties.



# Groundwater Remedy Systems OU-1A and -1B



- Groundwater extraction wells (EWs) and conveyance system:
  - OU-1A - 9 EWs
  - OU-1B North - 4 EWs
  - OU-1B South - 8 EWs
- Treatment systems:
  - Single system for OU-1A/-1B North, separate system for OU-1B South
  - Process equipment: holding tank, feed pump, three granulated activated carbon (GAC) vessels for each system
  - Control equipment: level sensors, pressure gauges, master control panel, and communication system
- Discharge systems:
  - Both systems discharge to IRWD sanitary sewer laterals that connect to OCSD main sewer trunk lines



# Remedial System Installation



## Remedial construction implemented between June and December 2007

- OU-1A/-1B North treatment system was started on November 16, 2007 and began full-time operation on December 4, 2007
- OU-1B South treatment system was started on December 26, 2007 and began full-time operation on January 2, 2008

## Interim – Remedial Action Completion Report (I-RACR)

- Summarizes remedial action implemented in accordance with the Final RODs and Final Remedial Design/Remedial Action Work Plan (RD/RAWP)
- Documents the successful installation, construction quality control (QC) inspection process, startup and operation of the groundwater extraction and treatment systems



# Ongoing Remedial Action Activities



## Regular System Operations, Maintenance & Monitoring:

- Biweekly inspections (treatment plants)
- Monthly inspections and maintenance (treatment plants); sampling to monitor effectiveness of GAC treatment.
- Quarterly inspections and maintenance (treatment plants and extraction wells); sampling of effluent to comply with Orange County Sanitation District discharge requirements.



# Ongoing Remedial Action Activities (continued)



## Quarterly Groundwater Monitoring

- Water level measurements (130 wells) to evaluate groundwater flow directions.
- Groundwater sampling (50 wells) to delineate the plume.
- Groundwater sampling at 21 EWs to evaluate system performance.

**All of the above information is used to evaluate performance and optimize the extraction systems.**



# Remedial Action Optimization



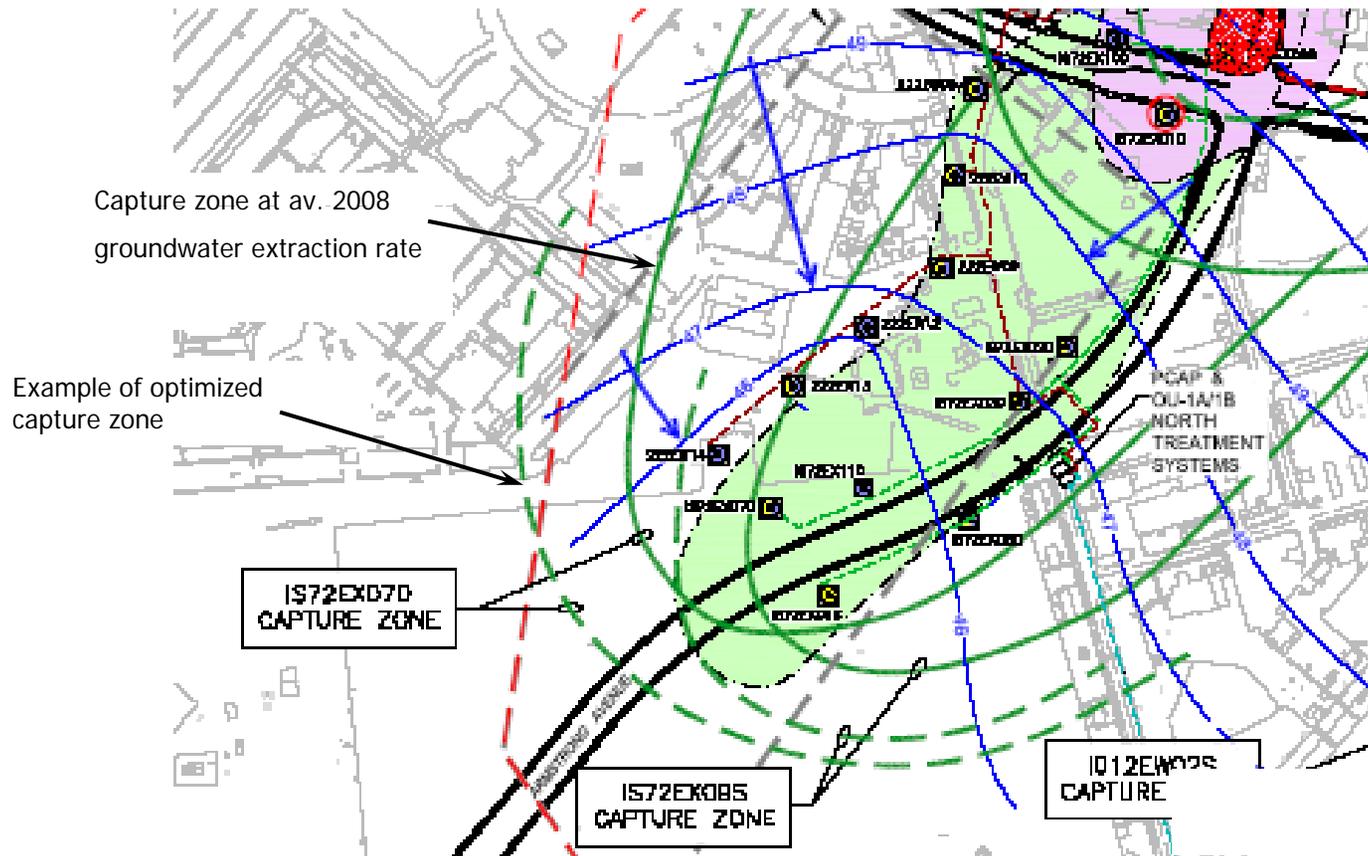
- **Optimization Measures May Consist of:**
  - Increases/decreases to extraction well pumping rates
  - Addition of extraction wells
  - Modifications to treatment system
  - Modifications to treated effluent discharge methodology
- **All of the above are contemplated in the approved ROD and RD**



# Remedial Action Optimization



## EXAMPLE 1 – OU-1A Hydraulic Containment – 1<sup>st</sup> WBZ

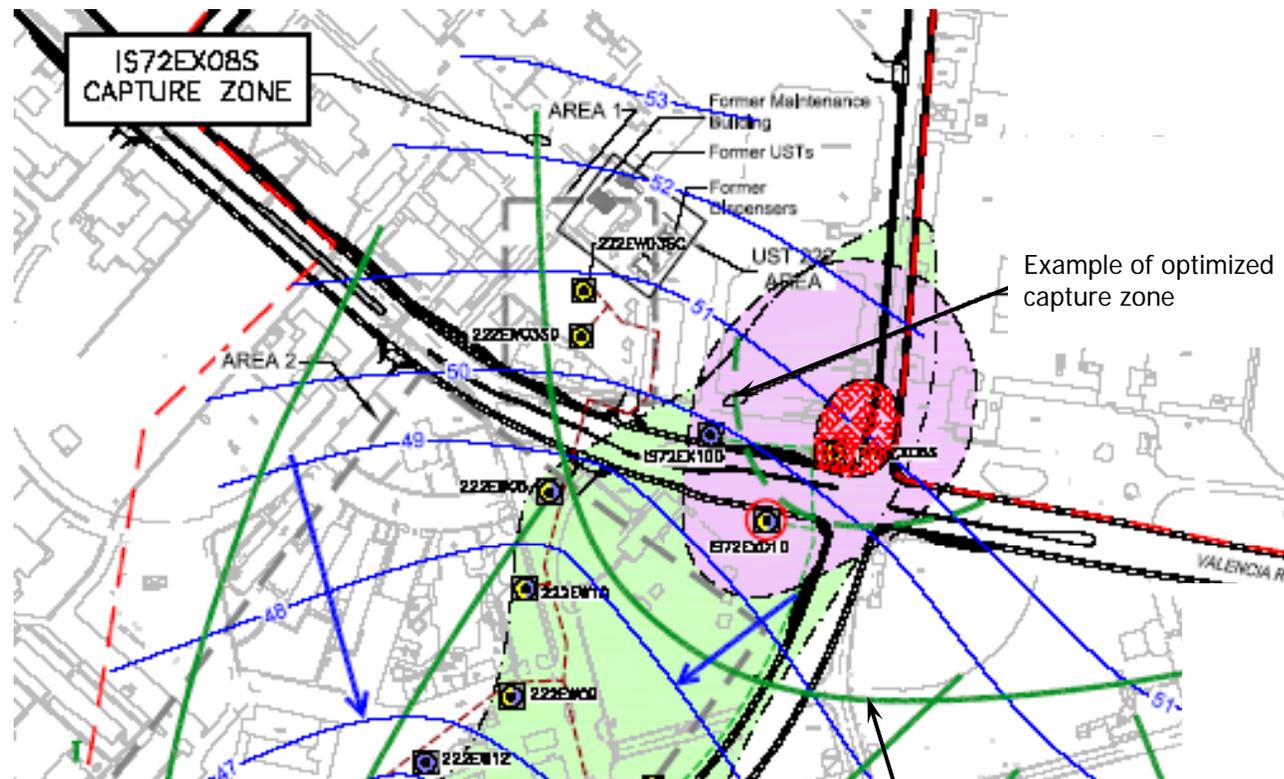




# Remedial Action Optimization



## EXAMPLE 2 – OU-1A Hot Spot Removal – 1<sup>st</sup> WBZ



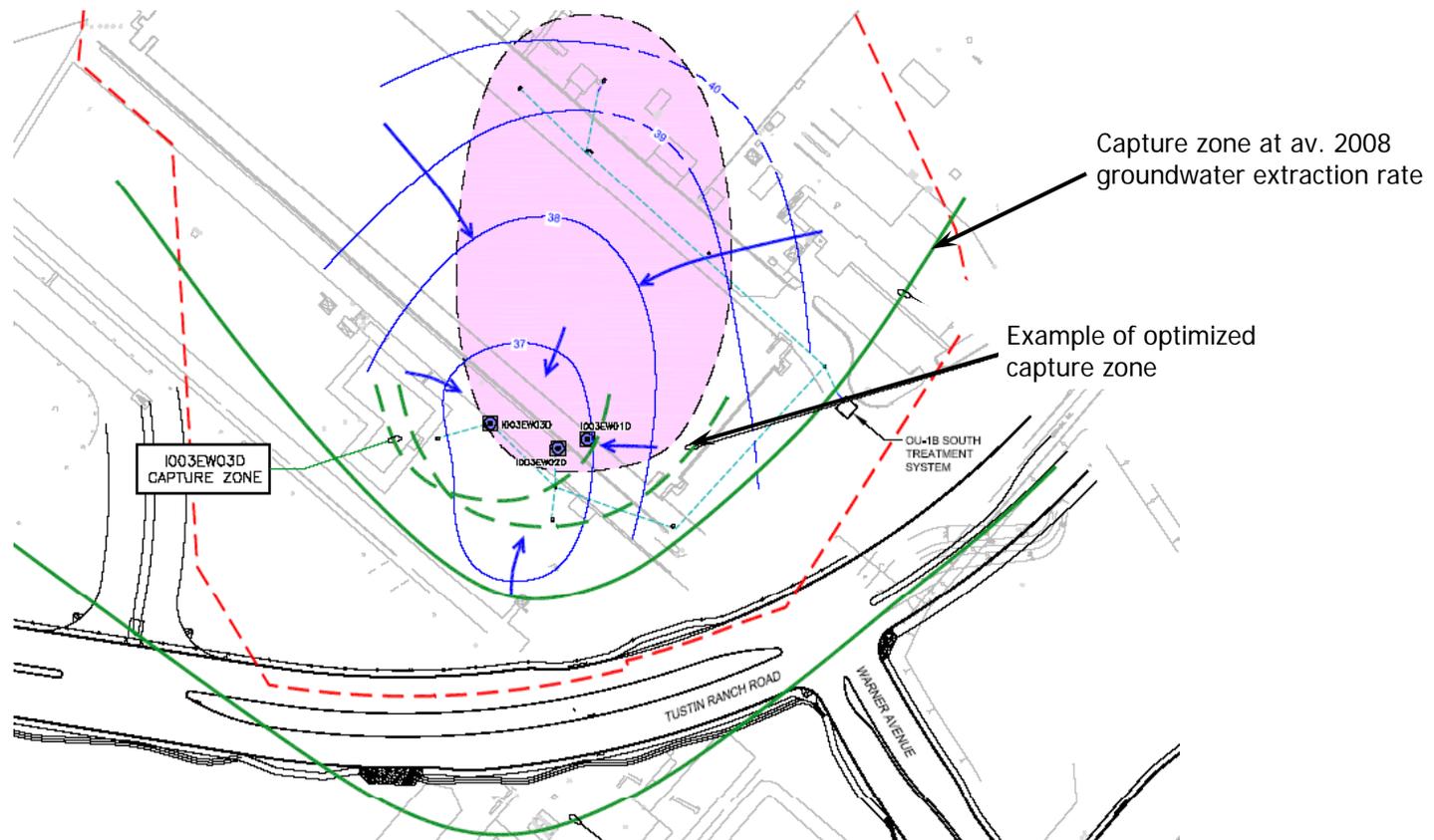
Capture zone at av. 2008  
groundwater extraction rate



# Remedial Action Optimization



## EXAMPLE 3 – OU-1B South Hydraulic Containment – 2<sup>nd</sup> WBZ





# Remedy Satisfaction of U.S. EPA OPS Criteria



## FUNDAMENTAL DECISION FACTORS

USEPA Decision Factors	Evaluation Considerations	OU-1A/-1B Groundwater Remedial Action Demonstration
<p>1. Risk to public health and the environment</p>	<ul style="list-style-type: none"> <li>• Should be no current exposures that pose unacceptable risk to public health or the environment</li> <li>• ICs should be clearly identified and agreed upon</li> <li>• Remedy should account for unforeseen technical problems that could result in unacceptable risk</li> </ul>	<ul style="list-style-type: none"> <li>• There are no human or ecological receptors currently exposed to COCs in groundwater</li> <li>• Contaminant migration in groundwater is being controlled</li> <li>• ICs are specified in the RODs for OU-1A and OU-1B and include Land Use Controls in the Remedial Design (LUC RD), to which EPA and State regulatory agencies are signatories</li> <li>• ICs assure protectiveness independent of system operation; contingency triggers (e.g., groundwater monitoring of hot spot and hydraulic containment wells)</li> <li>• Operations &amp; Maintenance (O&amp;M) decision logic incorporated in the RD provides mechanisms for remedy expansion/ optimization to enhance COC capture and prevent or limit plume migration should the need arise.</li> </ul>



# Remedy Satisfaction of U.S. EPA OPS Criteria (cont.)



## FUNDAMENTAL DECISION FACTORS

USEPA Decision Factors	Evaluation Considerations	OU-1A/-1B Groundwater Remedial Action Demonstration
2. Enforceability	<ul style="list-style-type: none"> <li>Should be a mechanism to assure the Federal agency (i.e., DoN) continues O&amp;M and optimizes remedy as needed</li> </ul>	<ul style="list-style-type: none"> <li>The legally-binding ROD contains detailed provisions for continued operation and optimization of the RA prior to and following parcel transfer by deed</li> <li>Required O&amp;M reporting and agency review and CERCLA 5-year reviews provide needed enforcement opportunities</li> </ul>



# Remedy Satisfaction of U.S. EPA OPS Criteria (cont.)



## FUNDAMENTAL DECISION FACTORS

USEPA Decision Factors	Evaluation Considerations	OU-1A/-1B Groundwater Remedial Action Demonstration
<p>3. Technology reliability</p>	<ul style="list-style-type: none"> <li>Technology should be proven to successfully mitigate the COCs</li> </ul>	<ul style="list-style-type: none"> <li>Groundwater extraction and treatment for VOCs are considered presumptive remedies by U.S. EPA</li> <li><i>Ex-situ</i> VOC treatment via carbon adsorption is a proven technology that is accepted by U.S. EPA for treatment of VOC impacted groundwater</li> </ul>



# Remedy Satisfaction of U.S. EPA OPS Criteria (cont.)



## FUNDAMENTAL DECISION FACTORS

USEPA Decision Factors	Evaluation Considerations	OU-1A/-1B Groundwater Remedial Action Demonstration
4. Site characterization	<ul style="list-style-type: none"> <li>Site characterization should be adequate to support remedy implementation and appropriate for the complexity of the site</li> </ul>	<ul style="list-style-type: none"> <li>The OU-1A,1B subsurface has been well-characterized through logging and sampling of borings and monitoring wells screened in all three water bearing zones over more than 10 years</li> <li>A numerical groundwater flow and solute transport model has been developed and calibrated to improve understanding of site hydraulics and plume behavior</li> <li>The long performance track records for the remedial technologies demonstrate their suitability for addressing VOCs under site-specific hydrogeologic and land use conditions</li> </ul>



# CONCLUSION



**The Groundwater Remedy for OU-1A and  
OU-1B is Operating Properly and Successfully  
in Accordance with U.S. EPA Criteria**



## Upcoming Milestones



### **Draft Final Operation and Maintenance (O&M) Plan (June 2009)**

- Outline long-term O&M, monitoring, and optimization procedures

### **Draft 2008 Annual Groundwater Remedy Status Report (May 2009)**

- Present results from O&M, monitoring, including conclusions and recommendations based on the data.

### **Draft OPS Report (May 2009)**

- Demonstration that systems are OPS in accordance with U.S. EPA guidelines.



# OPS Report Table of Contents



## **1.0 INTRODUCTION**

## **2.0 BACKGROUND**

## **3.0 GROUNDWATER VOC REMEDIAL ACTIONS**

### **3.1 Groundwater Remedial Action Objectives**

### **3.2 Institutional Controls**

### **3.3 Removal of Soil VOC Sources**

### **3.4 Groundwater Extraction**

### **3.5 Groundwater VOC Treatment and Discharge**

### **3.6 Groundwater Monitoring in 2008**

## **4.0 OPERATING PROPERLY AND SUCCESSFULLY CRITERIA**

### **4.1 USEPA Evaluation Criteria**

### **4.2 Comparison of Groundwater VOC Actions and Results with OPS Criteria**

## **5.0 OPS DEMONSTRATION CONCLUSIONS**

## **6.0 REFERENCES**



Questions?





# Acronyms and Abbreviations



ARAR	Applicable or Relevant and Appropriate Requirement
BRAC	Base realignment and closure
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERFA	Community Environmental Response Facility Act
COC	chemical of concern
DoN	Department of Navy
EW	extraction well
GAC	granulated activated carbon
I-RACR	Interim – Remedial Action Completion Report
IRP	Installation Restoration Program
IRWD	Irvine Ranch Water District
LUC	Land Use Controls
MCL	Maximum Contaminant Level
O&M	operation and maintenance
OCSD	Orange County Sanitation District
OPS	operating properly and successfully
OU	operable unit
QC	quality control
RAO	Remedial Action Objective
RD	Remedial Design
RD/RAWP	Remedial Design/Remedial Action Work Plan
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
TCE	trichloroethene
TCP	trichloropropane
µg/L	micrograms per liter
U.S. EPA	United States Environmental Protection Agency
VOC	volatile organic compound
WBZ	water bearing zone