FINAL
NAVAL AIR STATION ALAMEDA
Restoration Advisory Board (RAB) Meeting Minutes

www.bracpmo.navy.mil
Building 1, Suite 140, Community Conference Center
Alameda Point
Alameda, California

June 4, 2009

The following participants attended the meeting:

Co-Chairs:

Patrick Brooks	Base Realignment and Closure (BRAC) Program Management Office (PMO) West, BRAC Environmental Coordinator (BEC), Department of the Navy Co-chair
Dale Smith	Restoration Advisory Board (RAB) Community Co-chair

Attendees:

Anna-Marie Cook	U.S. Environmental Protection Agency (EPA)
Linda Henry	Brown and Caldwell
Fred Hoffman	RAB
George Humphreys	RAB
Joan Konrad	RAB
Jeff Knoth	RAB
James Leach	RAB
Gretchen Lipow	Community member
Dot Lofstrom	Department of Toxic Substances Control (DTSC)
John McGuire	Shaw Environmental, Inc. (Shaw)
Mary Parker	BRAC Project Manager (PM)
Derek Robinson	BRAC Lead Remedial PM
Peter Russell	Russell Resources/Alameda Reuse and Redevelopment Authority (ARRA)
Marcus Simpson	DTSC

Russell Sirabian	Battelle
Bill Smith	Community member
Radhika Sreenivasan	St. George Chadux Corp.
Jean Sweeney	RAB
Jim Sweeney	RAB
Michael John Torrey	RAB
Tommie Jean Valmassy	Tetra Tech EM Inc.
John West	San Francisco Regional Water Quality Control Board (Regional Water Board)

The meeting agenda is provided in Attachment A.

MEETING SUMMARY

I. Approval of May RAB Meeting Minutes

Dale Smith (RAB Community Co-Chair) called the June 2009 Former Naval Air Station Alameda (Alameda Point) RAB meeting to order at 6:35 p.m. Ms. Smith asked for comments on the May 2009 RAB meeting minutes. RAB members provided comments, which will be incorporated into the final set of minutes for May 2009.

The following comments were provided by Mrs. Jean Sweeney (RAB):

- Mrs. Sweeney indicated that Mr. Doug deHaan (Vice Mayor of Alameda) was present at the May RAB meeting and the statements attributed to Mr. Doug Biggs were by Mr. Doug deHaan. Mrs. Sweeney asked this change be made on pages 6, 7 and 8 of 10.

The following comments were provided by Mr. George Humphreys (RAB):

- Page 6 of 10, second paragraph, first sentence, "Mr. Humphreys expressed his concern that the piers could rust and become a potential exposure route for humans because of metals" will be revised to "Mr. Humphreys expressed his concern that rebar in the concrete piers could rust and cause the roadway to collapse; thereafter, the contaminated sediment would present a potential exposure route for humans."

- Page 6 of 10, second paragraph, second sentence, "Mr. Humphreys also said that the PRGs for the Seaplane Lagoon assumed that the birds were present only one-tenth of the time and hence the same assumption should be used for this site" will be revised to "Mr. Humphreys also said that Site 24 used the same PRGs as the Seaplane Lagoon and assumed that the birds were present only one-tenth of the time. Hence, the same assumption should be used for this site."

- Page 6 of 10, second paragraph, fourth sentence, "He added that the cleanup levels should be much lower to make the…" will be revised to "He added that the cleanup levels should be much lower."

- Page 9 of 10, sixth paragraph, second sentence, "Mr. Humphreys said that many of those building have not been sampled" will be revised to "Mr. Humphreys said that the soil under many of those building has not been sampled."

The following comment was provided by Ms. Smith:

- Page 5 of 10, fourth paragraph, ninth sentence, "Mr. Smith said that..." will be corrected to "Mr. Brooks said that…."

Pat Brooks (RAB Navy Co-Chair) and the RAB discussed the brief paragraphs the Navy had inserted into the minutes as a clarification statement. It was agreed that any clarification notes inserted by the Navy will be italicized and will be in a separate paragraph titled "Notes."

The May RAB meeting minutes were approved as modified.

II. Co-Chair Announcements

Ms. Smith said that she smelled creosote in Seaplane Lagoon and noted the smell was strong. Ms. Smith also said she had noticed a boom around the area to prevent the oil from entering the bay. Mr. Brooks said he thought that the boom is intended to prevent the loose timber from entering navigable portions of the Bay. Ms. Smith asked the Navy for an update on the boom at the next RAB meeting.

Ms. Smith said she is aware there is a lead and asbestos abatement program that the Navy undertakes at all BRAC installations. Ms. Smith asked if this program is a one-time event at Alameda Point or if the Navy plans a rotating assessment and a survey. Mr. Brooks said that he will obtain more details about the program and provide the RAB an update at the next RAB meeting.

Ms. Smith asked if the Navy could provide any updates on the Radiological Affairs Support Office (RASO) plans for radiological investigations at Alameda Point. Ms. Smith noted RASO was considering new plans for the basewide radiological investigation because of the anomaly found at the Seaplane Lagoon. Mr. Brooks said that he would provide an update during the next RAB meeting.

Ms. Smith said that the RAB submitted comments on the Installation Restoration (IR) Site 24 Proposed Plan (PP) as an electronic file on Monday, June 1, and will submit a written copy to the Navy soon. She noted that the RAB members state in the comments provided that they feel the sediment characterization and the depth of sediment removal were not adequate. Ms. Smith said that the RAB also has concerns about the preliminary remediation goals (PRGs). Mr. Brooks said that the Navy will provide responses to these written comments in the Record of Decision

(ROD) document as part of the responsiveness summary. Ms. Joan Konrad asked if the RAB will receive a copy of the ROD. Mr. Brooks confirmed the RAB will receive an electronic copy of the ROD document.

Ms. Smith asked Mr. Brooks for an update on the IR Site 1 sampling event. In addition, she said that the RAB would like a comprehensive list of improvements at all sites. Mr. Brooks responded he would provide an update at the next RAB meeting. Ms. Smith asked if RAB meetings are recorded because she would like to verify text from the March 2009 RAB minutes. Mr. Brooks confirmed that the meetings are recorded and that the March minutes were revised after the tape was reviewed.

Ms. Smith said that the RAB received responses to its questions on the Site 24 PP from the Navy project manager (PM) just one day before the comment period on the PP closed. As a result, the RAB could not consider the answers when its comments were submitted. Ms. Smith added that the PM was also unable to answer many of RAB's questions. Mr. Brooks said that the standard procedure has been for the Navy to provide answers to questions from the RAB by the next RAB meeting, which was the case for the Site 24 PP. Mr. Brooks added that the RAB can e-mail him for immediate assistance. Mr. Brooks suggested that deadlines be established for responses to RAB questions that require a response sooner than the next RAB meeting.

Ms. Parker distributed the handout *Site 24 (Pier Area) Sediment History and Rationale for Sampling Depth; Action Item from the May 2009 RAB Meeting* (Attachment B-1). Mr. Brooks noted this handout is provided as a response to a question from the May meeting asked by Bill Smith (community member.) George Humphreys (RAB member) asked where the Site 24 Remedial Investigation (RI) report mentioned the 0.8 centimeter per year (cm/year) sedimentation rate described in the handout. Mary Parker (Navy) said it is provided in the feasibility study (FS). Mr. Humphreys said that Figure 6-5 in the FS does not show that Site 24 and Site 17 are in one forage area. Ms. Parker asked the RAB to refer to the text (page 6-16) of the RI report.

As a point of order, Joan Konrad (RAB member) said the RAB meetings could be more productive if the Navy would discuss and clarify specific RAB questions not related to the scheduled presentation at a technical subcommittee meeting. Mr. Brooks said the Navy would attend a technical subcommittee meeting to answer questions and discuss technical matters in greater detail if the RAB schedules the meeting and invites the Navy. John West (Regional Water Board) suggested e-mail communications among the RAB, Navy, and the regulators to answer any outstanding questions.

III. OU-2C Feasibility Study

Mr. Brooks introduced Ms. Parker to begin the presentation: *Operable Unit (OU) - 2C Draft FS.* Ms. Parker introduced Linda Henry (Brown and Caldwell) to start the presentation (Attachment B-2).

Dr. Henry reviewed the topics for the presentation and the site background, showed maps of the site location and the areas evaluated in the FS, and then reviewed the recommendations and conclusions from the RI. Dr. Henry discussed the risk results for the exposure units. During the review of slide 8, Marcus Simpson (DTSC) asked if Exposure Units 1, 2, and 3 correlate to Sites 5, 10, and 12. Dr. Henry said the exposure units do not correlate to Sites 5, 10, and 12. She explained that the exposure units were divided on the basis of areas of distinct physical or chemical features. Exposure Unit 2 is Building 5, Exposure Unit 3 has large areas of contamination, and the rest of the area, was grouped as Exposure Unit 1, where contaminant concentrations are lower.

Dot Lofstrom (DTSC) said that the risk driver for Western Exposure Unit 1 was naphthalene in soil. She asked about the proximity of the groundwater plume to Exposure Unit 1. Dr. Henry said she was not sure of the distance to the plume. However, the risk calculations included the risk of volatile compounds from the groundwater. She added that the risk analysis included groundwater and soil and the cumulative risk showed that naphthalene in soil was the risk driver.

Mr. Humphreys asked if the exposure unit division in the FS was same as in previous documents. Ms. Henry said that the Exposure Units 1, 2, and 3 are the same as in the RI report. However, Exposure Unit 1 has been further divided into east and west. She said that eastern Exposure Unit 1 is recommended for no further action while western Exposure Unit 1 requires additional analysis, which is provided in the FS. Ms. Lofstrom said that this further breakdown of Exposure Unit 1 was at the request of the regulators.

During the review of Slide 9, Exposure Units 2 and 3, Mr. Humphreys said that SunCal proposes to build residences in this area and asked if residential exposure was evaluated. Dr. Henry responded that no further action for Exposure Unit 1 is based on residential use. However, remedial action objectives for commercial reuse were considered for Exposure Units 2 and 3.

During her review of Slide 11, Dr. Henry noted that EPA's regional screening level (RSL) has recently replaced EPA's published PRGs. The remedial action objectives are based on the current toxicity factor from the RSLs. Fred Hoffman (RAB member) asked if the RSLs and PRGs were synonymous. Ms. Parker said that the RSLs and PRGs are not synonymous. Dr. Henry said that only the lead PRGs were based on the RSL. Jean Sweeney (RAB member) asked if the RSLs were more protective. Dr. Henry said that both are protective. Mr. Humphreys asked if there is a difference between commercial and industrial exposure. Dr. Henry said they are synonymous.

Mr. Hoffman noted during the review of Slide 13 that the PRG for vinyl chloride (VC) in groundwater, 75.7 micrograms per liter (µg/L), is based on indoor air levels that emanate from groundwater. He asked how the Navy was addressing the groundwater. Dr. Henry said that the only threat posed by VC is through indoor air; therefore, the cleanup level is for indoor air. Ms. Lofstrom asked if Mr. Hoffman's concern is related to protection of groundwater as well as Seaplane Lagoon and the bay. She noted that Dr. Henry is a toxicologist and would not be an expert on migration of the groundwater into Seaplane Lagoon. Mr. West said that the groundwater in this area is not a source of drinking water. Ms. Smith said that the shallow

groundwater with high concentrations of VC could affect the ecosystem. Mr. West agreed that the VC could affect the ecosystem if it enters Seaplane Lagoon. Ms. Smith said that the groundwater could migrate to the refuge and up to the surface of the wetland. Mr. Hoffman stated he was concerned that the groundwater goals are too high. Dr. Henry clarified that the indoor air goals are more protective based on the soil gas data collected at Building 5 and the groundwater model. Dr. Henry said that there was an extra measure of protection in using the groundwater model to set cleanup levels because site data indicates that the groundwater model is overly conservative. When soil gas data (preferred by DTSC) are used in the model, the indoor air concentrations are lower than when groundwater data are used. Soil gas data are more representative of concentrations that might migrate into indoor air than groundwater concentrations because soil gas is closer to the building foundation.

Mrs. Sweeney said that chromium is deadly, and the PRGs for it seem high. Dr. Henry said that chromium comes in two forms: trivalent and hexavalent. She said that trivalent chromium is less toxic, and the chromium in the soil is the trivalent form. Ms. Smith asked if the soil and groundwater were tested for hexavalent chromium. Dr. Henry said they were tested and added that a small fraction was hexavalent, although she did not know the exact amount of hexavalent chromium detected. Mr. Humphreys said that the trivalent chromium can be converted into hexavalent chromium under oxidizing conditions. Dr. Henry said that the kinetics of chromium are slow and need strong oxidizers, which are not present naturally in soil, nor can air oxidize chromium.

Mr. Hoffman asked if the PRGs are based on risk and not on applicable or relevant and appropriate requirements (ARARs). Ms. Parker said the PRGs are based on risk, but ARARs also are considered in the FS. Peter Russell (ARRA) said that according to the analysis, there is virtually no migration of the groundwater into the Seaplane Lagoon. The FS is intended to clean up the western Exposure Unit 1 to residential reuse levels, so the important aspect is preventing the contaminated groundwater under Building 5 from migrating and contaminating the residential area. Dr. Russell said that the analysis concluded that the migration of groundwater does not extend into the western area at levels that are too high for residential use. The higher levels of groundwater contamination are under the building primarily to the east and are not migrating, but must be cleaned up. Dr. Russell added there is no ecological section in this document, as it was concluded early on that there is no ecological exposure at this site. Ms. Smith asked if the groundwater under the building will be cleaned up. Dr. Henry said it will be cleaned up. Mr. Humphreys asked if the Navy checked for radium inside the ventilation ducts inside Building 5. Mr. Brooks said that a preliminary check on radium has been conducted. He added that there is a basewide radiological program to clean the pipes.

Ms. Parker continued the presentation. During the review of Slide 14, Mr. Hoffman asked about the high concentrations of VC. Ms. Parker said the concentrations exceeded 10,000 µg/L. Ms. Lofstrom said that the concentration of trichloroethene (TCE) had been 220,000 µg/L before the six-phase heating was conducted.

During a review of Slide 26, Ms. Smith asked if the Navy plans to drill holes through the building to treat the contamination beneath Building 5 if required. Ms. Parker said that is correct

for some alternatives in the FS. Dr. Russell clarified that not all alternatives involve remediation beneath the building and that some involve capping. He said that Alternatives 4 and 5 clean up all of the known soil contamination, while Alternatives 2 and 3 use the building floor as the cap. Dr. Russell said that the developer will need to either install a cap or clean up the soil if the building will be torn down. Therefore, from a developer's point of view, Alternatives 4 and 5 would be the best options. Mrs. Sweeney asked about the cost of tearing down the building. Mr. Brooks said that it would be less expensive for the Navy to initiate removal of soil contaminants beneath the floor than to tear down the building. Ms. Smith asked if the Navy would address the utility line under the building. Mr. Brooks said that these details will be provided in the remedial design after the alternative has been selected. Mr. Humphreys asked about green technology. Ms. Parker said that Russ Sirabian (Battelle) would discuss green technology in the latter part of the presentation.

During the review of Slide 27, Mr. Hoffman asked what separates the shallow first water-bearing zone (FWBZ) from the deep water bearing zone. Ms. Parker said that a clay layer separates the two zones. She added that remedial goals for deep groundwater are based on modeling. Mrs. Sweeney asked how deep the FWBZ was. Ms. Parker said that the FWBZ is 20 to 40 feet below ground surface.

Ms. Parker introduced Mr. Sirabian to present the Sustainable Environmental Restoration Analysis (SERA). On Slide 55, Mrs. Sweeney said her understanding is that six-phase heating is the only way to treat the dense nonaqueous phase liquid (DNAPL); therefore, in situ technology cannot be used, although its impact is lower. Mr. Sirabian clarified that the technology does not need to be ruled out simply because a technology has a high carbon dioxide footprint. SERA is a tool to evaluate the technology and consider it while selecting the most suitable technology. Mr. Humphreys said that the regenerated activated carbon is created by heating to drive out the adsorbed contaminant and catalytic oxidation ultimately releases carbon dioxide. He asked if the process is considered in the carbon footprint calculation. Mr. Sirabian said the process is taken into account when the carbon footprint is calculated. He said that virgin carbon has a higher footprint than regenerated carbon. The manufacturing process itself is energy intensive. Mr. Sirabian said that the analysis assumed that the first batch was virgin carbon and the subsequent batches were regenerated carbon. The regenerated carbon has a lower footprint on a per-pound basis in the initial batch but the regeneration factor is considered.

Mrs. Sweeney said that the greenest solution would be bioremediation of soil and groundwater. Mr. Sirabian said that bioremediation is a part of every groundwater remedy at OU-2C. He added that bioremediation has a lower impact than the other technologies. He indicated that there should be a transition from a more aggressive to a passive remedy at the correct time to attain sustainability. Ms. Smith noted that bioremediation is time consuming. Mr. Sirabian said that bioremediation has been found to address volatile organic compounds but requires a long time, so bioremediation is often used along with other technologies.

IV. BRAC Cleanup Team (BCT) Update

Ms. Anna Marie Cook (EPA) said that participants discussed the OU-2C FS during the May 2009 BCT meeting. Mr. Brooks distributed the *May BCT Meeting Agenda* (Attachment B-3), which lists all of the topics discussed at the meeting.

Ms. Cook distributed her handout, *Building 5 Adaptive Reuse Plan for Green Development* (Attachment B-4). Ms. Cook explained this EPA proposal was put forth based on a request from EPA headquarters in February. Ms. Cook said that EPA has funding not to exceed $30,000 per project for land revitalization or green development projects, and requested project nominations from the various EPA regions. She said that EPA's objective for the projects is to reduce adverse effect to land by reducing waste generation and reuse of contaminated land, stimulating infrastructural development and promoting stewardship and green technology. Ms. Cook said that EPA was concerned about Building 5 because; the city is likely to demolish the building although the Navy does not plan to demolish the building. Ms. Cook said that she submitted a proposal to EPA headquarters to evaluate and prepare a life cycle analysis for Building 5. The two scenarios with Building 5 would be (1) demolish the building, salvage for scrap, and send the rest to the landfill, or (2) refurbish the building and attract new green technologies into the building. She noted that the building is ideally located for reuse. Ms. Cook also said that EPA Region 9 has been awarded the funding for this project to evaluate Building 5. She added that EPA will work closely with the City of Alameda to evaluate various options for Building 5.

V. Community and RAB Comment Period

Mr. Brooks distributed the map *Transfer Parcel Status, Operable Units, and IR Sites* (Attachment B-5). Mr. Torrey asked if the Navy can provide an update on the large submerged object in the Seaplane Lagoon. Mr. Brooks said that Navy is in the contractual stage to investigate the object.

Mr. Bill Smith (community member) thanked the Navy for its response to his question on the sediment history of Site 24. He said that he would have liked a sediment core diagram showing the average deposition rate in addition to the Navy's response. Mr. Smith said that he was surprised to discover that chlorinated hydrocarbons are migrating toward what will be a housing area according to the reuse plan. He stated he believes this migration might be the reason the SunCal development plan shows caps. Mr. Smith said that he has concerns about using caps, because capping traps gases that can build up. He suggested the use of well-ventilated spaces to prevent accumulation of gas.

Mr. Brooks provided the list *Upcoming Documents for RAB Review* (Attachment B-6). He noted the deadline for providing written comments on the OU-2C Draft FS. Ms. Lofstrom said that DTSC will be asking for a 30-day extension on the deadline. Mr. Hoffman asked if the RAB could obtain a CD copy of the Draft FS. Ms. Smith said that she has an electronic copy of the Draft FS for review and RAB members could obtain it. Ms. Smith said that comments on the Site 28 work plan (benzo[a] pyrene plume) are due on June 20.

Derek Robinson (Navy) said that a series of corrective actions were conducted for jet fuels in OU-2A. After the spill was discovered, the Navy undertook a spill response and excavated soil. Later, the Navy removed two oil/water separators, constructed and operated the dual vapor extraction system, and monitored rebound. Mr. Robinson said that a report completed in 2007 summarizes the actions for the jet fuel removal in the area referred to as Corrective Action Area (CAA) 13. Ms. Smith asked if the project was complete. Mr. Robinson said that rebound monitoring is being conducted to confirm the action is complete. Mr. Humphreys asked how much fuel was spilled. Mr. Robinson replied that the exact amount was not known, but that 3,500 to 17,000 gallons was approximated as the amount of jet fuel spilled prior to remedial efforts. Mr. Humphreys asked how much fuel was recovered. Mr. Robinson said that jet fuel was removed by allowing it to drain into a trench, and that 4,000 gallons of jet fuel was recovered.

Mr. Brooks said that the Navy plans to bring in a meeting facilitator to keep the RAB meeting on schedule and to help track action items and due dates. He stated that a facilitator will attend beginning with the August RAB meeting. Mr. Brooks noted that there will be no RAB meeting in July and that the next RAB meeting will be held on August 6, 2009.

VII. Meeting Adjournment

The meeting was adjourned at 9:40 p.m.

Action Items

Action Items:	Action Item Update:
1. Request for Presentations: a. Bayport Sewer systems and change in the plumes over time.	1. Pending.
2. Mr. Brooks will provide information on the large submerged, unidentified object in the Seaplane Lagoon and radium^{226}.	2. Pending
3. Mr. Robinson will find out about the area with the jet fuel issue.	3. Completed
4. Mr. Brooks to provide update on the issue of the strong creosote odor in Seaplane Lagoon and the oil floating boom.	4. New
5. Mr. Brooks to provide update on the Navy's next lead and asbestos survey event.	5. New
6. Mr. Brooks to provide an update on radiological investigation by RASO.	6. New
7. Mr. Brooks to provide a list of cleanup improvements for all sites.	7. New

ATTACHMENT A

NAVAL AIR STATION ALAMEDA
RESTORATION ADVISORY BOARD MEETING AGENDA

June 4, 2009

(1 page)

RESTORATION ADVISORY BOARD

NAVAL AIR STATION, ALAMEDA

AGENDA

JUNE 4, 2009, 6:30 PM

ALAMEDA POINT – BUILDING 1 – SUITE 140
COMMUNITY CONFERENCE ROOM
(FROM PARKING LOT ON W MIDWAY AVE, ENTER THROUGH MIDDLE WING)

TIME	SUBJECT	PRESENTER
6:30 - 6:45	Approval of Minutes	Ms. Dale Smith
6:45 - 7:00	Co-Chair Announcements	Co-Chairs
7:00 – 8:00	OU-2C Feasibility Study	Mary Parker
8:00 – 8:15	BCT Update	Anna-Marie Cook
8:15 – 8:30	Community & RAB Comment Period	Community & RAB
8:30	RAB Meeting Adjournment	

ATTACHMENT B

NAVAL AIR STATION ALAMEDA
RESTORATION ADVISORY BOARD MEETING HANDOUT MATERIALS

June 4, 2009

B-1 Site 24 Sediment History and Rationale for Sampling Depth. Distributed by Mary Parker, Navy PM. (1 page)

B-2 OU-2C Draft Feasibility Study. Distributed by Mary Parker, Navy PM. (31 pages)

B-3 May BCT Meeting Agenda. Distributed by Pat Brooks, Navy Co-Chair (1 page)

B-4 Building 5 Adaptive Reuse Plan for Green Development. Distributed by Anna-Marie Cook, U.S Environmental Protection Agency (2 pages)

B-5 Transfer Parcel Status, Operable Units, and IR Sites Status Map. Distributed by Pat Brooks, Navy Co-Chair (1 page)

B-6 Upcoming Documents for RAB Review. Distributed by Pat Brooks, Navy Co-Chair (1 page)

ATTACHMENT B-1

SITE 24 SEDIMENT HISTORY AND RATIONALE FOR SAMPLING DEPTH

(1 page)

Site 24 (Pier Area) Site/Sediment History and Rationale for Sampling Depth
Action Item from May 2009 RAB Meeting

The Navy began using the piers in 1943, and activities in nearby areas began later, primarily in the 1950s. The piers were actively used by the Navy to berth a variety of vessels until 1997, when NAS Alameda was closed. Throughout this period, the pier area was routinely dredged for navigational purposes. Site 24 berthing areas and the turning basin were dredged to approximately 46 feet.

Storm-sewer lines J, K, and L have outfalls in Site 24 and were potential sources of contaminants. In the 1990s these lines and catch basins were cleaned and/or replaced. Sediment samples throughout Site 24 were collected between the sediment surface and 20 inches below surface. The sediment shelf adjacent to and beneath Wharf Road was not accessible to the dredging equipment. The Remedial Investigation (RI) and Feasibility Study (FS) Reports identified sediment along the shelf and beneath Wharf Road in the northeastern corner of Site 24 around Outfall J and to the south between Outfall J and K for clean-up.

The Site 24 FS Report uses a sedimentation rate of 0.8 cm/year in its evaluations. This is considered a typical rate for a site like this. In the South Basin adjacent to Hunters Point, a rate of ~ 1 cm/year was determined. With subsurface samples collected in 2005 and 2006: 2006-1943 = 63 years multiplied by 0.8 cm/year = 50 cm, which is 20 inches "down". RI samples were collected to a depth of 20 inches. In addition, the FS Report specifies additional sediment sampling to verify the extent of contaminants as part of remediation Alternatives 3 through 5. Alternative 5, Sediment Removal/Dredging, is the alternative recommended in the Proposed Plan.

BY: MARY PARKER, NAVY PROJECT MANAGER

MAY 2009

ATTACHMENT B-2

OU-2C DRAFT FEASIBILITY STUDY

(31 pages)

Operable Unit-2C
Draft Feasibility Study
Alameda Point, CA

RAB Meeting
June 4, 2009

Mary Parker, Navy Project Manager
Dr. Linda Henry, Brown and Caldwell
Russ Sirabian, Battelle

1

Topics

- Site Background
- OU-2C RI Recommendations and Conclusions
- Evaluation of Western Exposure Unit 1
- Remedial Action Objectives (RAOs)
- Preliminary Remediation Goals (preliminary RGs)
  - Soil
  - Shallow Groundwater (Shallow First Water-Bearing Zone [FWBZ])
  - Deep Groundwater (Deep FWBZ and Second Water-Bearing Zone)
- Technologies Evaluated
- Soil Remedial Alternatives
- Groundwater Remedial Alternatives
- Sustainable Environmental Restoration

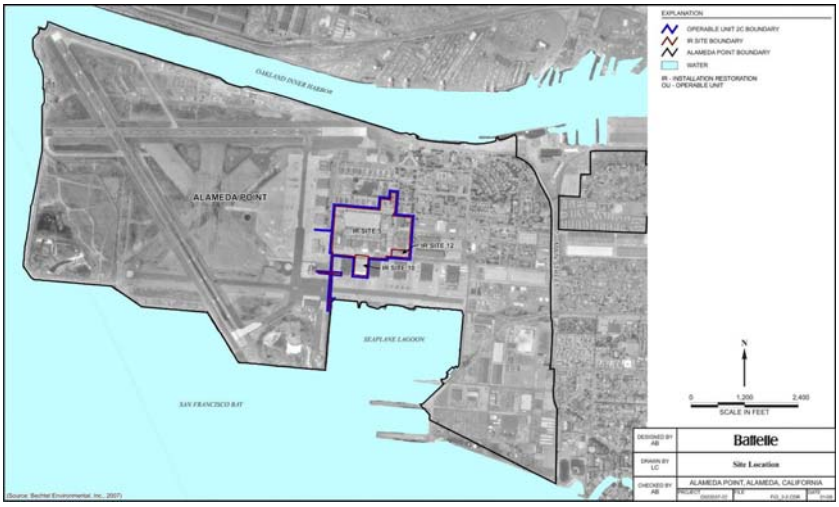
2

Site Background

- OU-2C is approximately 53 acres in size and consists of IR Sites 5, 10, and 12. IR Site 5 is ~47 acres. Most of OU-2C is covered by buildings, and areas not covered by buildings are largely paved.
  - IR Site 5 is the former Naval Air Rework Facility
  - IR Site 10 is the former Missile Rework Facility
  - IR Site 12 is the former Alameda NAS Power Station
- Planned future use for IR Site 5 is commercial.
- OU-2C divided into three subareas: Exposure Units 1, 2, and 3.
- Two local areas within Exposure Unit 1 were identified to facilitate the characterization of risk: Local Area 1 (east of Building 5) and Local Area 2 (northwest of Building 5).

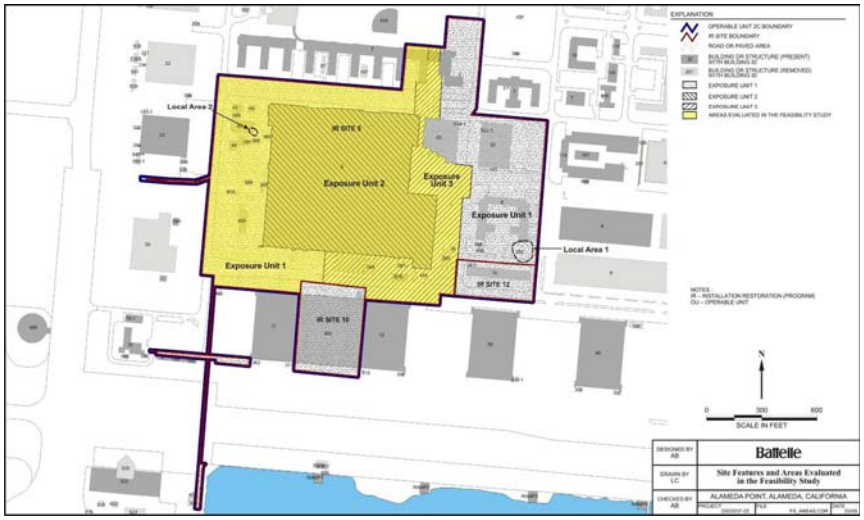
3

OU-2C Site Locations



4

OU-2C Site Features and Areas Evaluated in the FS



5

RI Report Recommendations & Conclusions

- No further action for IR Site 10, IR Site 12, and Eastern Exposure Unit 1.
- Local Area 1 (inside Exposure Unit 1) addressed through the Alameda Point petroleum cleanup program.
- FS evaluates
  - IR Site 5 Western Exposure Unit 1
  - IR Site 5 Exposure Unit 2 (Bldg. 5) including potentially radiologically-impacted piping that remains beneath Building 5
  - IR Site 5 Exposure Unit 3

6

FS Risk Assessment for Western Exposure Unit 1

- Western Exposure Unit 1 consists of area located to the west, southwest, and northwest of Building 5
- Local Area 2 is not included in this human health risk assessment because action is planned in this local area to address volatile organic compounds (VOCs) in soil

7

Risk Results for Western Exposure Unit 1

- Cancer risk for a potential future resident is 2×10^{-5}, which is within the risk management range
- Risk primarily based on a single location with naphthalene assumed to be throughout the vadose zone under the residence; however, concentrations in samples collected from deeper intervals at the same location are substantially lower.
- Maximum naphthalene soil concentration in Western Exposure Unit 1 is 0.54 mg/kg, which is well below the U.S. EPA 2008 residential Regional Screening Level (RSL) of 3.9 mg/kg.

No further evaluation is required in the FS for Western Exposure Unit 1.

8

Remedial Action Objectives
IR Site 5 Exposure Units 2 and 3

- Protect future commercial receptors (as represented by future office workers) from potentially unacceptable risks associated with the presence of chemicals of concern (COCs) in soil and shallow groundwater;
- Prevent exposure to radionuclides of concern in radiologically impacted portions of OU-2C at concentrations that exceed preliminary remedial goals (RGs); and
- Provide source control for deep groundwater zones to reduce downgradient migration of contaminants and potentially unacceptable risks to downgradient receptors.

9

Preliminary
Remediation Goals (RGs)

- Preliminary RGs derived for soil and shallow groundwater
  - protective for the future office worker receptor at a risk level of 1×10^{-6} and/or a non-cancer hazard of 1
  - otherwise based on relevant background levels or published values
- Preliminary RGs for deep groundwater based on chemical transport modeling

10

Preliminary Remediation Goals

- For VOCs in shallow groundwater, the preliminary RGs are based on protection of the indoor air pathway.
- For metals, the preliminary RG is the higher of a site-specific background value for OU-2C or protection of contact with soil (ingestion, etc.)
- Preliminary RGs for soil and shallow groundwater are based on the methods presented in OU-2C RI human health risk assessment and updated with more current EPA toxicity factors.
- For lead in soil, the Regional Screening Level (RSL) (U.S. EPA, 2008) for industrial exposure was selected as the preliminary RG.

11

Preliminary RGs		
Soil (mg/kg)		
Arsenic	9.14	Background
Chromium	1,400	Inhalation of dust
Lead	800	U.S. EPA RSL
Thallium	66	Ingestion and dermal contact
Ethylbenzene	0.86	Indoor air
Tetrachloroethene	0.36	Indoor air
Trichloroethene	1.1	Indoor air
1,2,4-Trimethylbenzene	12.8	Indoor air
Ra-226	1.56 pCi/g	Background
Shallow Groundwater (µg/L)		
1,1-Dichloroethane	1,260	Indoor air
Trichloroethene	560	Indoor air
Vinyl chloride	75.7	Indoor air
Deep Groundwater (µg/L)		
Total VOCs	1,000	Modeling of chemical transport
Vinyl chloride	163	Modeling of chemical transport

12

1,1-DCA Isoconcentration Map Shallow FWBZ

13

TCE Isoconcentration Map Shallow FWBZ

14

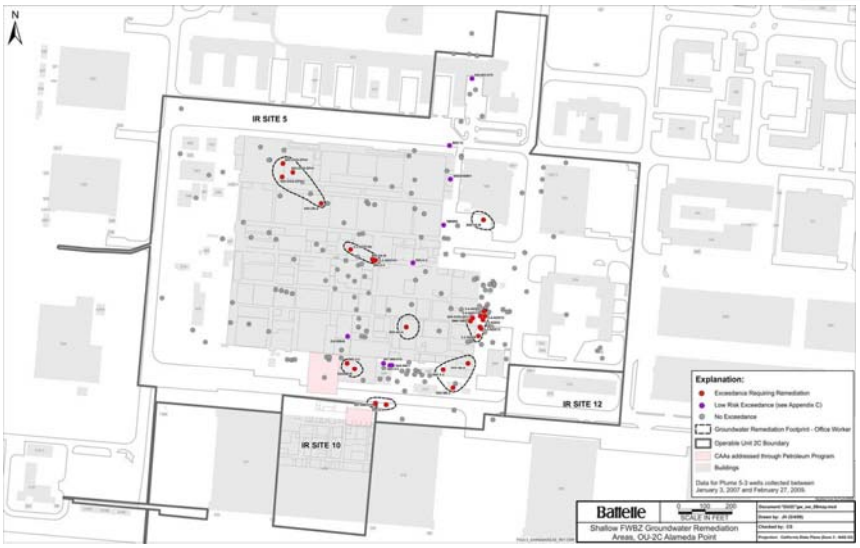
Vinyl Chloride Isoconcentration Map Shallow FWBZ

15

Soil Remediation Areas

16

Shallow FWBZ Groundwater Remediation Areas



17

Deep Groundwater Remediation Areas

18

Technologies Evaluated

The following medium-specific actions were evaluated in the FS:

- No action
- Institutional controls (ICs)
- Monitoring
- Monitored natural attenuation (MNA)
- Containment
- Removal (includes pump and treat)
- Ex situ treatment (includes pump and treat)
- In situ treatment
- Disposal

19

Technology Screening

Pump and Treat Evaluated:

- Groundwater extraction and ex-situ treatment and disposal (as the primary treatment)
- Works well for dissolved phase source removal/containment
- Not a good technology to rapidly treat groundwater to low clean-up levels
- Typically large carbon footprint/not “green”
- Typically long-term/needs to run for many years
- Therefore, not carried through as an alternative.
- Note: Injection/circulation of amendments using pumping was retained.

20

Soil Remedial Alternatives

- S1. No Action
- S2. Engineered Cap, ICs, and Monitoring
- S3. Excavation, Engineered Cap, Off-site Disposal, ICs, and Monitoring
- S4. Excavation, Off-site Disposal, ICs, and Monitoring
- S5. Excavation, Soil Vapor Extraction (SVE), Off-site Disposal, ICs, and Monitoring

21

Brief Description of each Soil Alternative

- S1. No Action:
  - no active remediation of impacted soil
  - no ICs or monitoring
- S2. Engineered Cap, ICs, and Monitoring:
  - maintain Building 5 and surrounding paved areas in its current location to function as an engineered cap
  - implement ICs
  - pre-design sampling to verify exact locations of chemicals exceeding soil preliminary RGs
  - five year reviews for 30 years

22

Brief Description of each Soil Alternative

- S3. Excavation, Engineered Cap, Off-site Disposal, ICs, and Monitoring:
  - excavate soil outside the Building 5 footprint that contain concentrations of COCs above the preliminary RGs for soil
  - excavate soil within Local Area 2 characterized by risks assuming future residential land use
  - appropriate disposal of approximately 2,300 cubic yards
  - maintain Building 5 in its current location to function as an engineered cap
  - implement ICs
  - pre-design sampling to verify exact locations of chemicals exceeding soil preliminary RGs
  - post-construction sampling to confirm preliminary RGs have been achieved
  - five year reviews for 30 years

23

Brief Description of each Soil Alternative

- S4. Excavation, Off-site Disposal, ICs, and Monitoring:
  - excavate soil within and outside the Building 5 footprint that contain concentrations of COCs above the preliminary RGs for soil
  - excavate soil within Local Area 2 characterized by risks assuming future residential land use
  - excavate abandoned piping segments and surrounding soil
  - appropriate disposal of approximately 9,600 cubic yards
  - implement ICs
  - pre-design sampling to verify exact locations of chemicals exceeding soil preliminary RGs
  - post-construction sampling to confirm preliminary RGs have been achieved
  - five year reviews for 30 years

24

Brief Description of each Soil Alternative

- S5. Excavation, SVE, Off-site Disposal, ICs, and Monitoring:
  - excavate soil within and outside the Building 5 footprint that contain concentrations of COCs above the preliminary RGs for soil
  - excavate soil within Local Area 2 characterized by risks assuming future residential land use
  - excavate abandoned piping segments and surrounding soil
  - appropriate disposal of approximately 8000 cubic yards
  - implement SVE to address VOCs with concentrations above preliminary RGs; approximately 10 SVE locations across the site
  - implement ICs
  - pre-design sampling to verify exact locations of chemicals exceeding soil preliminary RGs
  - post-construction sampling to confirm preliminary RGs have been achieved and effective operation of SVE system
  - five year reviews for 30 years

25

Cost Summary for each Soil Alternative

Description	Alternative S2 Cap, Ics	Alternative S3 Cap, Excavation, Disposal, Backfill, Ics	Alternative S4 Excavation, Disposal, Backfill, Ics	Alternative S5 SVE, Excavation, Disposal, Backfill, Ics
Remedial Design and Project Management				
Remedial Design	--	$84,800	$562,400	$546,500
Project Management	--	$42,400	$351,500	$341,600
Construction Management	--	$56,500	$421,800	$409,900
Total Design Costs	--	***$183,700***	***$1,335,700***	***$1,298,000***
Capital Costs				
IC Implementation Plan	$100,000	$100,000	$100,000	$100,000
SVE System Installation	--	--	--	$92,300
Site Excavation and Backfill	--	$321,500	$1,242,200	$1,077,700
Radiological Screening of Excavation Soil	--	--	$1,271,200	$1,271,200
Off-site disposal	--	$285,000	$4,416,800	$4,290,200
Subtotal	***$100,000***	***$706,500***	***$7,030,200***	***$6,831,400***
Contingency	$20,000	$141,300	$1,406,000	$1,366,300
Total Capital Costs	***$120,000***	***$847,800***	***$8,436,200***	***$8,197,700***
Operation and Maintenance				
SVE Operation and Maintenance	--	--	--	$136,700
Enforcing Institutional Controls	$2,000	$2,000	$2,000	$2,000
5-Year Reviews	$75,000	$75,000	$75,000	$75,000
Subtotal	***$510,000***	***$510,000***	***$510,000***	***$646,700***
Contingency	$102,000	$102,000	$102,000	$129,300
Total O&M Costs (30 Years)	***$612,000***	***$612,000***	***$612,000***	***$776,000***
TOTAL COST	**$732,000**	**$1,643,500**	**$10,383,900**	**$10,271,700**
Total NPV (2009)	**$510,700**	**$1,422,200**	**$10,162,600**	**$10,045,900**

26

Groundwater Remedial Alternatives

Shallow First Water-Bearing Zone (FWBZ)

- GS1. No Action
- GS2. In situ Chemical Oxidation (ISCO), Enhanced Bioremediation, ICs, and Monitoring
- GS3. In situ Chemical Reduction (ISCR), Enhanced Bioremediation, ICs, and Monitoring
- GS4. Air Sparging-Soil Vapor Extraction (AS-SVE), Enhanced Bioremediation, ICs, and Monitoring
- GS5. Electrical Resistive Heating (ERH), ISCO/ISCR/AS-SVE, Enhanced Bioremediation, ICs, and Monitoring

Deep FWBZ and Second Water-Bearing Zone (SWBZ)

- GD1. No Action
- GD2. ICs and Monitoring
- GD3. ISCO, ICs, and Monitoring
- GD4. ISCR, ICs, and Monitoring
- GD5. ERH, ICs, and Monitoring

27

Brief Description of each Shallow Groundwater Alternative

- GS1. No Action:
  - no active remediation
  - no ICs and monitoring
- GS2. ISCO, Enhanced Bioremediation, ICs, & Monitoring:
  - ISCO to treat higher concentration areas of 1,1-DCA and VC located immediately north and east of Plume 5-3
  - approximately 19,550 square feet (sf); approx. 28 injection points
  - more dilute plume located to the south of and beneath the remainder of Building 5 would be treated using enhanced bioremediation; approximately 29,850 sf
  - implement ICs
  - pre-design sampling to verify exact locations of chemicals exceeding groundwater preliminary RGs
  - conduct performance monitoring during the ISCO injection process
  - perform post-injection monitoring to confirm that preliminary RGs have been achieved
  - five year reviews for 30 years

28

Brief Description of each Shallow Groundwater Alternative

- GS3. ISCR, Enhanced Bioremediation, ICs, & Monitoring:
  - ISCR (assumed ZVI) to treat higher concentration areas of 1,1-DCA and VC located immediately north and east of Plume 5-3
  - approximately 19,550 sf; targeted treatment interval from 5 to 20 ft bgs; approximately 115 injection locations
  - more dilute plume located to the south of and beneath the remainder of Building 5 would be treated using enhanced bioremediation; approximately 29,850 sf
  - implement ICs
  - pre-design sampling to verify exact locations of chemicals exceeding groundwater preliminary RGs
  - conduct performance monitoring during the ISCR injection process
  - perform post-injection monitoring to confirm that preliminary RGs have been achieved
  - five year reviews for 30 years

29

Brief Description of each Shallow Groundwater Alternative

- GS4. AS-SVE, Enhanced Bioremediation, ICs, and Monitoring:
  - AS-SVE to treat higher concentration areas of 1,1-DCA and VC located immediately north and east of Plume 5-3
  - approximately 19,550 sf; approximately 36 AS and 21 SVE injection locations
  - more dilute plume located to the south of and beneath the remainder of Building 5 would be treated using enhanced bioremediation; approximately 29,850 sf
  - implement ICs
  - pre-design sampling to verify exact locations of chemicals exceeding groundwater preliminary RGs
  - conduct performance monitoring during the AS-SVE process
  - perform post-injection monitoring to confirm that preliminary RGs have been achieved
  - five year reviews for 30 years

30

Brief Description of each Shallow Groundwater Alternative

- GS5. ERH, ISCO/ISCR/AS-SVE, Enhanced Bioremediation, ICs, and Monitoring:
  - ERH to treat higher concentration areas of DNAPL and VOCs greater than 10,000 ug/L to achieve total chlorinated VOC concentrations of 1,000 ug/L or less
  - approximately 5100 sf; approximately 6 electrodes and vapor extraction wells
  - following completion of the ERH treatment, the remaining concentrations areas would be treated with either ISCO, ISCR, or AS-SVE,
  - more dilute plume located to the south of and beneath the remainder of Building 5 would be treated using enhanced bioremediation; approximately 29,850 sf
  - implement ICs
  - pre-design sampling to verify exact locations of chemicals exceeding groundwater preliminary RGs
  - conduct performance monitoring during the ISCO/ISCR/AS-SVE injection process
  - perform post-injection monitoring to confirm that preliminary RGs have been achieved
  - five year reviews for 30 years

31

Cost Summary for each Shallow Groundwater Alternative

Description	Alternative GS2 ISCO, Enhanced Bioremediation, Ics	Alternative GS3 ISCR, Enhanced Bioremediation, Ics	Alternative GS4 AS/SVE, Enhanced Bioremediation, Ics	Alternative GS5 ERH, ISCO, Enhanced Bioremediation, ICs
Remedial Design and Project Management				
Remedial Design/MNA Plan Preparation	$120,900	$406,600	$151,100	$364,600
Project Management	$64,500	$216,800	$80,600	$194,500
Construction Management	$80,600	$271,000	$100,800	$243,100
Total Design Costs	***$266,000***	***$894,400***	***$332,500***	***$802,200***
Capital Costs				
IC Implementation Plan	$100,000	$100,000	$100,000	$100,000
ISCO Injection	$210,000	--	--	$210,000
ISCR Injection	--	$1,797,100	--	--
AS/SVE System Construction	--	--	$378,000	--
ERH	--	--	--	$1,354,000
Enhanced Bioremediation	$359,800	$359,800	$359,800	$359,800
Off-site Disposal	$1,800	$1,800	$1,800	$1,800
Subtotal	***$671,600***	***$2,258,700***	***$839,600***	***$2,025,600***
Contingency	$134,300	$451,700	$167,900	$405,100
Total Capital Costs	***$805,900***	***$2,710,400***	***$1,007,500***	***$2,430,700***
Operation and Maintenance				
AS/SVE Operation and Maintenance	--	--	$536,500	--
Enforcing Institutional Controls	$2,000	$2,000	$2,000	$2,000
Groundwater Monitoring	$23,700	$23,700	$23,700	$23,700
Off-site Disposal	$2,500	$2,500	$2,500	$2,500
Annual Reporting	$50,000	$50,000	$50,000	$50,000
5-Year Reviews	$75,000	$75,000	$75,000	$75,000
Subtotal (Years 1- 5)	***$400,000***	***$400,000***	***$1,002,500***	***$400,000***
Subtotal (Years 6 - 30)	***$425,000***	***$425,000***	***$425,000***	***$425,000***
Contingency	$178,200	$178,200	$285,500	$178,200
Total O&M Costs (30 Years)	***$1,069,200***	***$1,069,200***	***$1,713,000***	***$1,069,200***
TOTAL COST	**$2,141,100**	**$4,674,000**	**$3,053,000**	**$4,302,100**
Total NPV (2009)	**$1,870,700**	**$4,416,600**	**$2,778,100**	**$4,044,700**

32

Brief Description of each Deep Groundwater Alternative

- GD1. No Action:
  - no active remediation
  - no ICs and monitoring
- GD2. ICs and Monitoring:
  - implement ICs to restrict groundwater use
  - five year reviews for 30 years

33

Brief Description of each Deep Groundwater Alternative

- GD3. ISCO, ICs, and Monitoring:
  - ISCO to treat groundwater with total chlorinated VOC concentrations greater than the 1,000 ug/L preliminary RG in the deep FWBZ and SWBZ
  - approximately 5000 sf in the deep FWBZ (approximately 20 to 40 ft bgs) and 1500 sf in the SWBZ (approximately 40 to 70 ft bgs)
  - approximately 8 injection locations in the deep FWBZ and 3 injection locations in the SWBZ
  - implement ICs
  - pre-design sampling to verify exact locations of chemicals exceeding groundwater preliminary RGs
  - conduct performance monitoring during the ISCO injection process
  - perform post-injection monitoring to confirm that preliminary RGs have been achieved
  - five year reviews for 30 years

34

Brief Description of each Deep Groundwater Alternative

- GD4. ISCR, ICs, and Monitoring:
  - ISCR (using ZVI) to treat groundwater with total chlorinated VOC concentrations greater than the 1,000 ug/L preliminary RG in the deep FWBZ and SWBZ
  - approximately 5000 sf in the deep FWBZ (approximately 20 to 40 ft bgs) and 1500 sf in the SWBZ (approximately 40 to 70 ft bgs)
  - approximately 11 injection locations in the deep FWBZ and 3 injection locations in the SWBZ
  - implement ICs
  - pre-design sampling to verify exact locations of chemicals exceeding groundwater preliminary RGs
  - conduct performance monitoring during the ISCR injection process
  - perform post-injection monitoring to confirm that preliminary RGs have been achieved
  - five year reviews for 30 years

35

Brief Description of each Deep Groundwater Alternative

- GD5. ERH, ICs, and Monitoring:
  - ERH to treat groundwater with total chlorinated VOC concentrations greater than the 1,000 ug/L preliminary RG in the deep FWBZ and SWBZ
  - approximately 5000 sf in the deep FWBZ (approximately 20 to 40 ft bgs) and 1500 sf in the SWBZ (approximately 40 to 70 ft bgs)
  - 10 electrodes and vapor extraction wells
  - implement ICs
  - pre-design sampling to verify exact locations of chemicals exceeding groundwater preliminary RGs
  - conduct performance monitoring during the ERH process
  - perform post-injection monitoring to confirm that preliminary RGs have been achieved
  - five year reviews for 30 years

36

Cost Summary for each Deep Groundwater Alternative

Description	Alternative GD2 ICs	Alternative GD3 ISCO, ICs	Alternative GD4 ISCR, ICs	Alternative GD5 SPH, ICs
Remedial Design and Project Management				
Remedial Design/MNA Plan Preparation	--	$73,100	$135,600	$173,500
Project Management	--	$36,600	$72,300	$92,500
Construction Management	--	$43,900	$90,400	$115,700
Total Design Costs	**--**	***$153,600***	***$298,300***	***$381,700***
Capital Costs				
IC Implementation Plan	$100,000	$100,000	$100,000	$100,000
ISCO Injection	--	$201,000	--	--
ISCR Injection	--	--	$649,800	--
ERH	--	--	--	$832,800
Off-site Disposal	--	$3,700	$3,700	$31,000
Subtotal	***$100,000***	***$304,700***	***$753,500***	***$963,800***
Contingency	$20,000	$60,900	$150,700	$192,800
Total Capital Costs	***$120,000***	***$365,600***	***$904,200***	***$1,156,600***
Operation and Maintenance				
Enforcing Institutional Controls	$2,000	$2,000	$2,000	$2,000
5-Year Reviews	$75,000	$75,000	$75,000	$75,000
Subtotal (Years 1- 30)	***$510,000***	***$510,000***	***$510,000***	***$510,000***
Contingency	$102,000	$102,000	$102,000	$102,000
Total O&M Costs (30 Years)	***$612,000***	***$612,000***	***$612,000***	***$612,000***
TOTAL COST	**$732,000**	**$1,131,200**	**$1,814,500**	**$2,150,300**
Total NPV (2009)	**$510,700**	**$909,900**	**$1,593,200**	**$1,929,000**

37

Comparative Analysis for Soil Alternatives

NCP Criteria	ALTERNATIVE S1 No Action[a]	S2 ICs and Monitoring	S3 Excavation, Engineered Cap, Off-site Disposal, ICs, and Monitoring	S4 Excavation, Off-site Disposal, ICs, and Monitoring	S5 Excavation, SVE, Off-site Disposal, ICs, and Monitoring
Overall protectiveness	No	Yes	Yes	Yes	Yes
Compliance with ARARs	NA	Yes	Yes	Yes	Yes
Long-term effectiveness and permanence	NA	●	●	●	●
Reduction of toxicity, mobility, or volume through treatment	NA	○	○	◑	◑
Short-term effectiveness	NA	●	◑	◑	◑
Implementability	NA	◑	◑	◑	◑
Cost[b] ($M)	NA	● 0.51	◑ 1.42	○ 10.16	○ 10.05

Notes:

a. Balancing criteria are not evaluated for the No Action alternative because it does not meet the threshold criteria.

b. Cost estimates are based on net present value estimates.

Acronyms/Abbreviations:

ARAR – applicable or relevant and appropriate requirement
IC – institutional control
M – million
NA – not applicable
NCP – National Oil and Hazardous Substances Pollution Contingency Plan

Relative Performance:

● = high
◑ = medium
○ = low

38

Comparative Analysis for Shallow FWBZ Groundwater Alternatives

NCP Criteria	ALTERNATIVE				
	GS1 No Action[a]	GS2 ISCO, Enhanced Bioremediation, ICs, and Monitoring	GS3 ISCR, Enhanced Bioremediation, ICs, and Monitoring	GS4 AS-SVE, Enhanced Bioremediation, ICs, and Monitoring	GS5 ERH, ISCO, Enhanced Bioremediation, ICs, and Monitoring
Overall protectiveness	No	Yes	Yes	Yes	Yes
Compliance with ARARs	NA	Yes	Yes	Yes	Yes
Long-term effectiveness and permanence	NA	●	●	●	●
Reduction of toxicity, mobility, or volume through treatment	NA	●	●	●	●
Short-term effectiveness	NA	◑	●	◑	◑
Implementability	NA	●	◑	●	◑
Cost[b] ($M)	NA	● 1.87	◑ 4.42	◑ 2.78	◑ 4.04

Notes:

a. Balancing criteria are not evaluated for the No Action alternative because it does not meet the threshold criteria.

b. Cost estimates are based on net present value estimates.

Acronyms/Abbreviations:

ARAR – applicable or relevant and appropriate requirement
AS-SVE – air sparge-soil vapor extraction
ERH – electrical resistive heating
IC – institutional control
ISCO – in-situ chemical oxidation
ISCR – in-situ chemical reduction
M – million
NA – not applicable
NCP – National Oil and Hazardous Substances Pollution Contingency Plan

Relative Performance:

● = high
◑ = medium
○ = low

39

Comparative Analysis for Deep FWBZ and SWBZ Groundwater Alternatives

NCP Criteria	ALTERNATIVE				
	GD1 No Action[a]	GD2 ICs and Monitoring	GD3 ISCO, ICs, and Monitoring	GD4 ISCR, ICs, and Monitoring	GD5 ERH, ICs, and Monitoring
Overall protectiveness	No	Yes	Yes	Yes	Yes
Compliance with ARARs	NA	Yes	Yes	Yes	Yes
Long-term effectiveness and permanence	NA	○	●	●	●
Reduction of toxicity, mobility, or volume through treatment	NA	○	●	●	●
Short-term effectiveness	NA	●	◑	●	●
Implementability	NA	●	●	◑	◑
Cost[b] ($M)	NA	● 0.51	● 0.91	◑ 1.59	○ 1.93

Notes:

a. Balancing criteria are not evaluated for the No Action alternative because it does not meet the threshold criteria.

b. Cost estimates are based on net present value estimates.

Acronyms/Abbreviations:

ARAR – applicable or relevant and appropriate requirement
ERH – electrical resistive heating
IC – institutional control
ISCO – in-situ chemical oxidation
ISCR – in-situ chemical reduction
M – million
NA – not applicable
NCP – National Oil and Hazardous Substances Pollution Contingency Plan

Relative Performance:

● = high
◑ = medium
○ = low

40

Sustainable Environmental Restoration (SER) Analysis

- Introduction
  - What is SER and why is it now being considered
  - How are results of the SER analysis used
- Metrics evaluated
- Tool used for analysis
  - Tool framework
  - Basis of Calculations
- Results for each media
  - Summary of environmental footprint of each alternative
  - Identification of high impact activities
  - Potential impact mitigation techniques

41

What is SER?

- Remedial Alternatives must first meet traditional requirements
  - Protection of human health and the environment
  - Compliance with ARARs
- SER evaluates environmental "footprint"
  - Consumption of natural resources
    - Non-renewable energy
    - Water
    - Other resources include landfill space, top soil, etc.
  - Air emissions
    - Greenhouse gases (GHGs) (e.g. CO_2, CH_4, N_2O)
    - Criteria pollutants (e.g. NO_X, SO_X, PM)
  - Collateral Risk (accidental injury or death)
  - Disturbances (noise, traffic, odor)

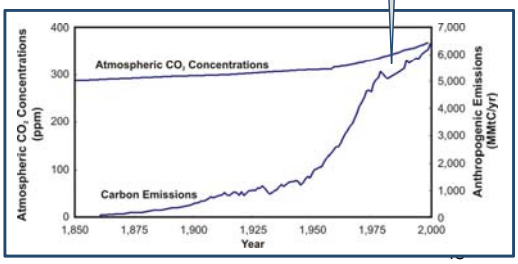
42

Why consider sustainability?

- Greater awareness of climate change
  - Adverse impacts have become a reality
  - Link to GHG emissions is generally accepted
- Greater emphasis on waste reduction & conservation of resources, particularly non-renewable energy
- More interest in considering sustainability and taking a more holistic view of remediation

Greater emphasis is required on GHG emissions to combat rising CO_2 concentrations in the atmosphere

- Almost 4.1 billion metric tons of carbon is added to the atmosphere by anthropogenic activity every year.
- Every small conservation practice can impact this delicate carbon cycle



Source: ORNL, 2000

How are Results of SER Analysis Used

- Allow the environmental footprint to be considered during remedy evaluation
  - Emphasis is still on protection of human health and the environment and compliance with ARARs
  - While calculation of metrics is objective, weighting of importance is subjective
- Identify elements of selected remedy that results in the greatest impacts or *footprint*
  - Consider the old 80:20 rule
    - 80% of the impacts are caused by 20% of the activities
  - Can now focus impact mitigation techniques on the activities that cause the greatest impact

44

SER Metrics Evaluated

Metrics calculated with tool:

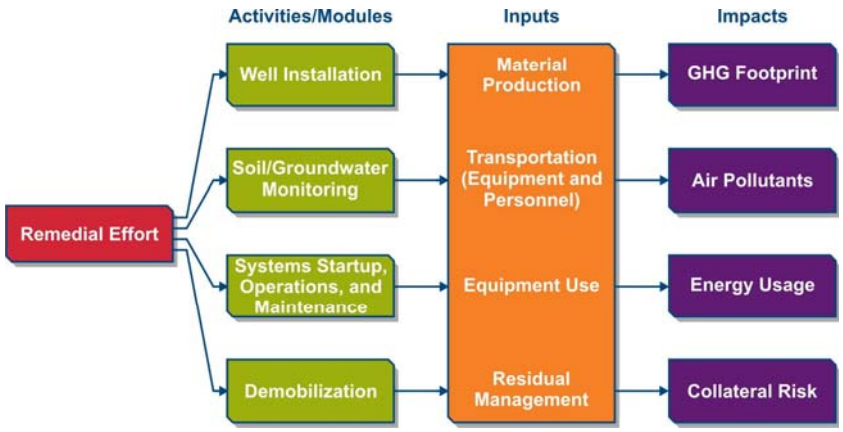
- Energy Consumption
  - Expressed as MWH
- Greenhouse Gases Emitted
  - Expressed as metric tons CO_2e and includes CO_2, CH_4, and N_2O
- Air Quality Parameters Emitted
  - NO_x, SO_x, PM in metric tons
- Collateral Risk
  - Includes probability of injury and probability of death

Metrics evaluated outside tool:

- Lost or gained resources
  - Includes land, top soil, water, landfill space, ecological impacts
- Disturbances
  - Includes noise, traffic, odors
- Impact mitigation analysis

45

Evaluation Framework



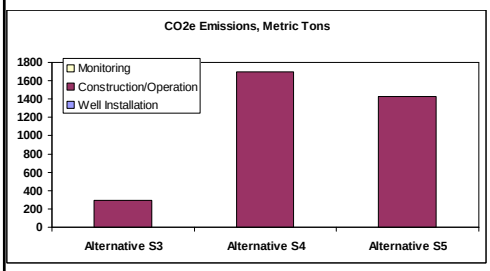
46

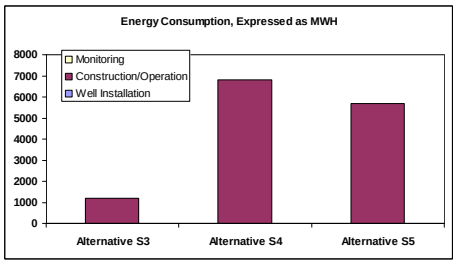
SER Analysis for OU-2C Alameda Point, CA

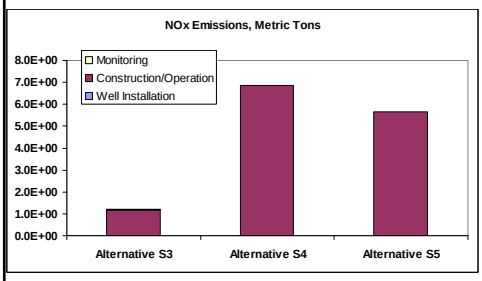
- Assumptions for each alternative are stated in FS (Appendix E)
- Assumptions are used as evaluation inputs
- Outputs include
  - Summary of comparative analysis of impacts among alternative
  - Breakdown of impacts based on activity type
  - Detailed breakdown of impacts by activity

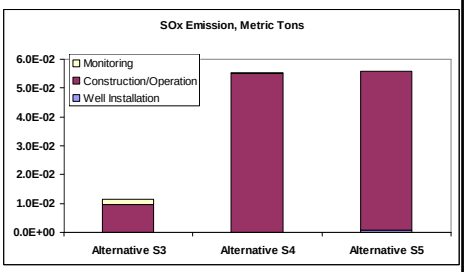
47

Summary of Soil Remedy Impacts



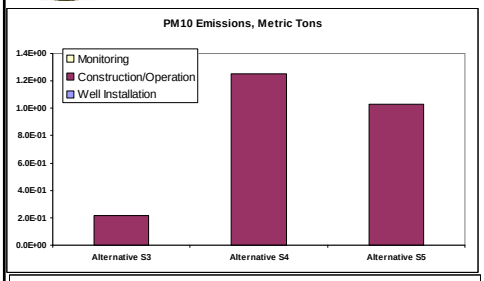


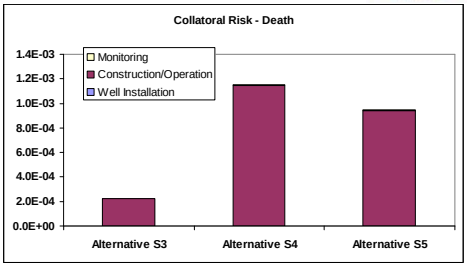


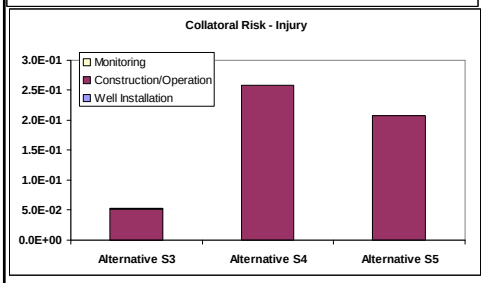


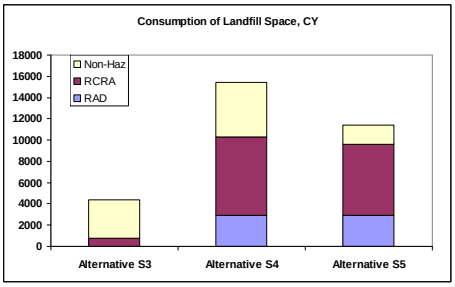
48

Summary of Soil Remedy Impacts









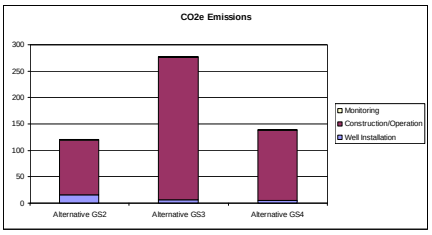
49

Conclusions for Soil Alternatives

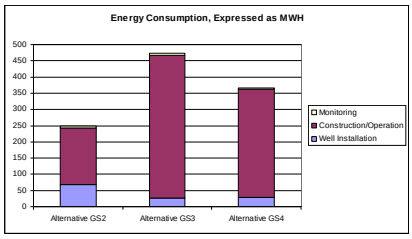
- Alternative Comparison: For all metrics considered, S3 results in the least impact and S4 has the greatest impact
- Impact Drivers: Impacts mostly from transportation of equipment and materials
  - Large volume of soil transported to landfills and subsequent import of clean fill
- Impact Mitigation: Best potential mitigation methods may include:
  - Additional characterization to minimize volume of soil excavated and shipped off-site
    - Investigation into the possibility of rail shipments
    - Use of greener fuels (e.g. biodiesel)
    - Use of after-treatment technologies for emission reduction
    - Idle control plan & other operating strategies to improve efficiency of site activities

50

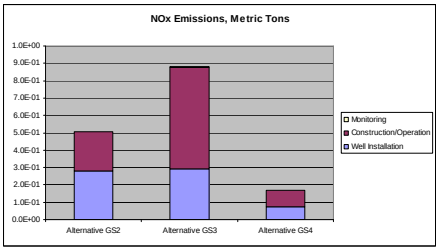
Summary of Shallow Groundwater Remedy Impacts



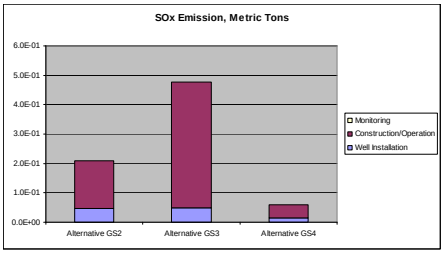
ERH Adds 300 metric tons CO2e



ERH Adds 800 MWHs



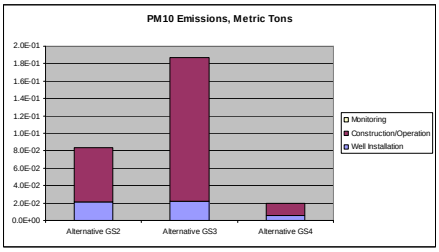
ERH Adds 0.15 metric tons NOx



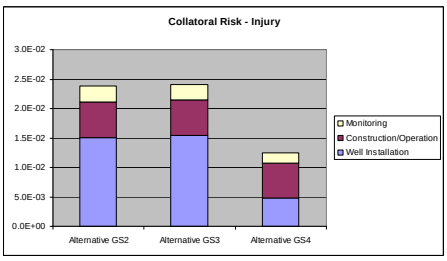
ERH Adds 5.2×10^{-2} metric tons SOx

51

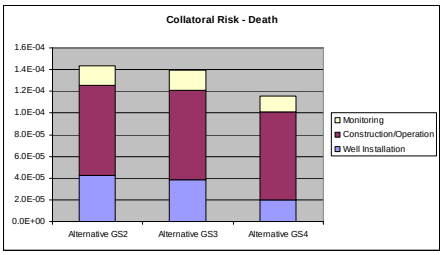
Summary of Shallow Groundwater Remedy Impacts



ERH adds 1.4×10^{-3} metric tons PM



ERH adds 8.3×10^{-4}



ERH adds 2.9×10^{-6}

52

Conclusions for Shallow Groundwater Alternatives

- Alternative Comparison: For most metrics considered, GS3 results in the greatest impact
  - For collateral risk, GS2 and GS3 are similar
  - For GHG emissions and energy usage, GS2 has the least impact, but for all other metrics GS4 has the least impact
- Impact Drivers:
  - For GHG emissions, energy usage, and air emissions, the impact is primarily driven by the consumption of treatment chemicals that are injected into the subsurface.
  - Injection well installation is a significant factor for all other metrics.
  - Personnel travel is the most significant driver for collateral risk that results in a fatality
  - Equipment use is the most significant driver for collateral risk that results in an injury
  - If ERH is applied, this would have a large impact on GHG emissions and energy

53

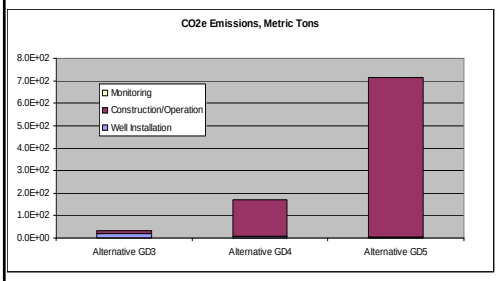
Conclusions for Shallow Groundwater Alternatives

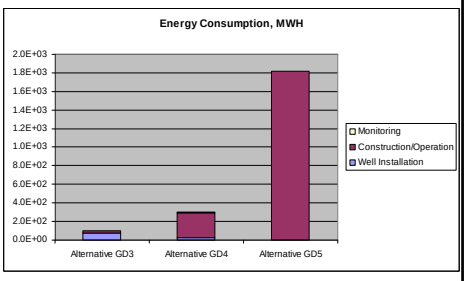
Impact Mitigation: Best potential methods may include:

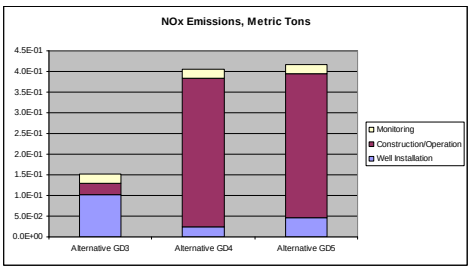
- Additional characterization to minimize treatment area
- Additional design and/or pilot testing to optimize injection strategy
- For Groundwater Alternative GS4, additional mitigation methods may include:
  - High or premium efficiency motors and/or variable frequency drives for the AS-SVE equipment
  - Ensuring proper sizing of AS-SVE equipment
  - Applying pulsing for AS system
  - Ensuring proper conditioning of air into the GAC units to optimize adsorption efficiency of the GAC
  - Developing performance objectives and an exit strategy to ensure that the system or components of the system are taken off-line at the appropriate time

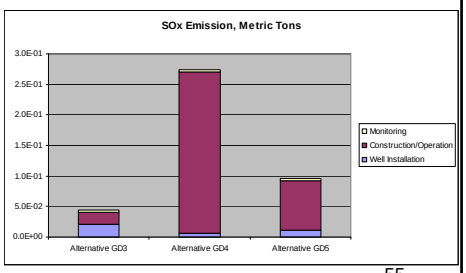
54

Summary of Deep Groundwater Remedy Impacts









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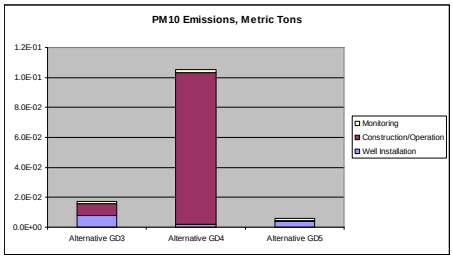
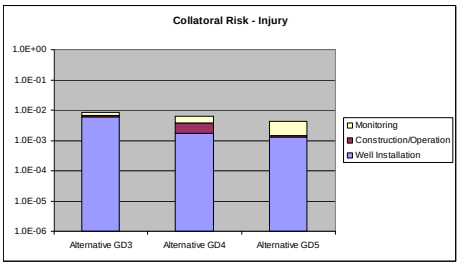
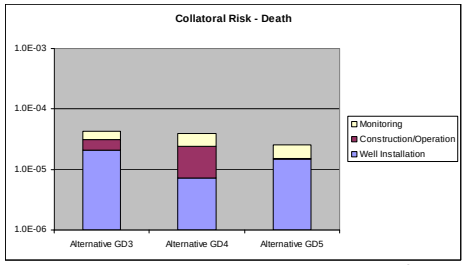
Summary of Deep Groundwater Remedy Impacts







56

Conclusions for Deep Groundwater Alternatives

- Alternative Comparison:
  - GD3 has the lowest impact for all metrics considered, with the exception of collateral risk, where all alternatives are similar
  - GD4 has the greatest impact for criteria pollutants
  - GD5 has the greatest impact for GHG emissions and energy use
- Impact Drivers:
  - For GHG emissions, energy usage, and air emissions, the impact is primarily driven by the consumption of the oxidant chemicals, ZVI and operation of ERH
  - Injection well installation is a significant factor for all other metrics
  - Personnel travel is the most significant driver for collateral risk that results in a fatality
  - Equipment use is the most significant driver for collateral risk that results in an injury

57

Conclusions for Deep Groundwater Alternatives

Impact Mitigation: Best potential methods may include:

- Additional characterization to minimize treatment area
- Additional design and/or pilot testing to optimize injection strategy

58

Summary of SER Review

Soil					
Alternative	**Sustainability Metric**	**GHG Emissions**	**Energy Usage**	**Air Emissions**	**Collateral Risk**
Soil Alternative S3	Relative Impact	Low	Low	Low	Low
	Impact Drivers	Transportation of Equipment	Transportation of Equipment	Transportation of Equipment	Transportation of Equipment
Soil Alternative S4	Relative Impact	High	High	High	High
	Impact Drivers	Transportation of Equipment	Transportation of Equipment	Transportation of Equipment	Transportation of Equipment
Soil Alternative S5	Relative Impact	Medium	Medium	Medium	Medium
	Impact Drivers	Transportation of Equipment	Transportation of Equipment	Transportation of Equipment	Transportation of Equipment
Shallow FWBZ Groundwater					
Alternative	**Sustainability Metric**	**GHG Emissions**	**Energy Usage**	**Air Emissions**	**Collateral Risk**
Groundwater Alternative GS2	Relative Impact	Low	Low	Medium	High
	Impact Drivers	Consumption of oxidant and biostimulant	Consumption of oxidant and biostimulant	Consumption of oxidant and biostimulant, and well Intallation	Personnel Travel
Groundwater Alternative GS3	Relative Impact	High	High	High	High
	Impact Drivers	Consumption of ZVI Media	Consumption of ZVI Media	Consumption of ZVI Media	Personnel Travel
Groundwater Alternative GS4	Relative Impact	Medium	Medium	Low	Low
	Impact Drivers	Operation of SVE Equipment	Operation of SVE Equipment	Operation of SVE Equipment and consumption of biostimulant and GAC media	Personnel Travel

59

Summary of SER Review

Deep FWBZ and SWBZ Groundwater					
Alternative	**Sustainability Metric**	**GHG Emissions**	**Energy Usage**	**Air Emissions**	**Collateral Risk**
Groundwater Alternative GD3	Relative Impact	Low	Low	Low	High
	Impact Drivers	Consumption of oxidant	Consumption of oxidant	Consumption of oxidant	Operation of drilling equipment
Groundwater Alternative GD4	Relative Impact	Medium	Medium	High	Medium
	Impact Drivers	Consumption of ZVI Media	Consumption of ZVI Media	Operation of drilling equipment	Personnel Travel
Groundwater Alternative GD5	Relative Impact	High	High	Medium	Low
	Impact Drivers	Operation of ERH	Operation of ERH	Operation of ERH	Personnel Travel

60

Questions??

61

ATTACHMENT B-3

MAY BCT MEETING AGENDA

(1 page)

AGENDA

BRAC CLEANUP TEAM MEETING
FORMER NAS ALAMEDA

May 19, 2009 10:00 a.m – 12:00 p.m.
Alameda Point, 950 West Mall Square, Room 140

Item	Time	Subject/Goals and Objectives	Presenter
1	10:00 – 10:15	**Introductions** **Finalize Meeting Minutes from the April 21, 2009 BCT Meeting** **Review Action Items** **Other Miscellaneous Announcements**	Pat Brooks
2	10:15 – 11:45	**OU-2C Feasibility Study**	Mary Parker
3	11:45 – 12:00	**Meeting wrap up, "Look ahead" of the SMP milestones and Fieldwork for the Next Two Months, Next Meeting**	Derek Robinson Pat Brooks
4	12:00		**Adjourn**

ATTACHMENT B-4

BUILDING 5 ADAPTIVE REUSE PLAN FOR GREEN DEVELOPMENT

(2 pages)

NAVAL AIR STATION ALAMEDA – BUILDING 5 ADAPTIVE REUSE PLAN FOR GREEN DEVELOPMENT

Introduction:

Part of the legacy of closing military installations is a glut of large, well constructed, unoccupied industrial buildings. Typically a reuse authority assumes the expense and logistical difficulties of tearing these massive buildings down, and the cost of reconstructing replacement structures. The public and the environment indirectly bear the burdens through such consequences as having landfill space taken up by the demolished building materials and the impact of CO_2 pollution from emissions generated by numerous trucks transporting debris through neighborhoods to the landfill. Even accompanying demolition of buildings with conscientious recycling efforts has been deemed extremely costly and logistically difficult by local governments. A lifecycle analysis can be performed on whether it is more cost effective, community friendly and environmentally responsible to demolish a well-constructed, still viable building, and construct a new one in its place or save the building and publicize that it is available, potentially for interested green businesses to bring revenues into local communities. What if these massive buildings, many already serviced with sewer, water and power and located in areas with nearby ports, freeways and airports, were to be revitalized and offered to green technology manufacturing companies?

Former NAS Alameda offers such an opportunity with Building 5, a massive former aircraft rework facility, complete with reinforced concrete floors, large overhead support beams used for gantry cranes, working water, power and sewer systems and a sufficiently large footprint to house more than one industry. The nearby former runways offer excellent opportunities to test out alternative energy vehicle performance and the neighboring deep-water Port of Oakland, which borders former NAS Alameda, allows for easy delivery and export of manufactured goods. The currently vacant building is ideally suited for an adaptive reuse evaluation.

Background:

Throughout the Second World War, the Vietnam War and the intervening years, the U.S. Navy used Building 5 at NAS Alameda to rehabilitate, maintain, build, and rebuild aircraft and machinery for the Nation's defense. Since the Navy's departure in 1996, the building has sat largely vacant. The site is currently undergoing an extensive remediation effort.

Building 5 represents a unique asset to the region as a future home to start up and establish green businesses that need large industrial spaces, within the heart of the Bay Area. The building includes 528,770 square feet of medium industrial space, 263,391 of high bay hangar space and 118,221 square feet of commercial office space. The building is 930 feet long by 780 feet wide and 63 feet high. The five hangar doors on the north

side of the building, leading into the high bay hangar space are 40 feet tall. The clear height of the hangar is 45 feet. The building is nearly all clear span with support columns in the center of the high bay. The area of the columns also contains high stack parts storage as well as an automated small parts storage bin. The building lends itself to house a variety of manufacturing processes and has been considered for use 1) during the Bay Bridge retrofit project; 2) for Tesla Motors electric car production and; 3) recently a German manufacturer of automated machine works. Building 5 and its 910,000 square feet of existing manufacturing space fully occupied by green businesses would be a benefit to the rehabilitation project and to the region's economy.

Objectives:

This contract would evaluate the efficacy of refurbishing the existing Building 5 for up-and-coming green manufacturing businesses and the resulting environmental benefits from adaptive reuse; the potential cost savings and future revenue to the City of Alameda from reusing the building and establishing new business within the former military installation; and the impact of implementing and enforcing Institutional Controls on the soil beneath the concrete of the existing building. The assessment would create a regional demonstration project for creative adaptive reuse to serve the green economy by creating almost 1 million square feet of manufacturing space for start up and established green businesses under one roof. Lessons learned from an in-depth analysis of this specific example could be offered as a green alternative for building use at the many other closed military installations both in California and nationally. Additionally, successful implementation of this project would further EPA's goals of promoting sustainable development, undertaking remediation with decreased environmental footprints and assisting local communities.

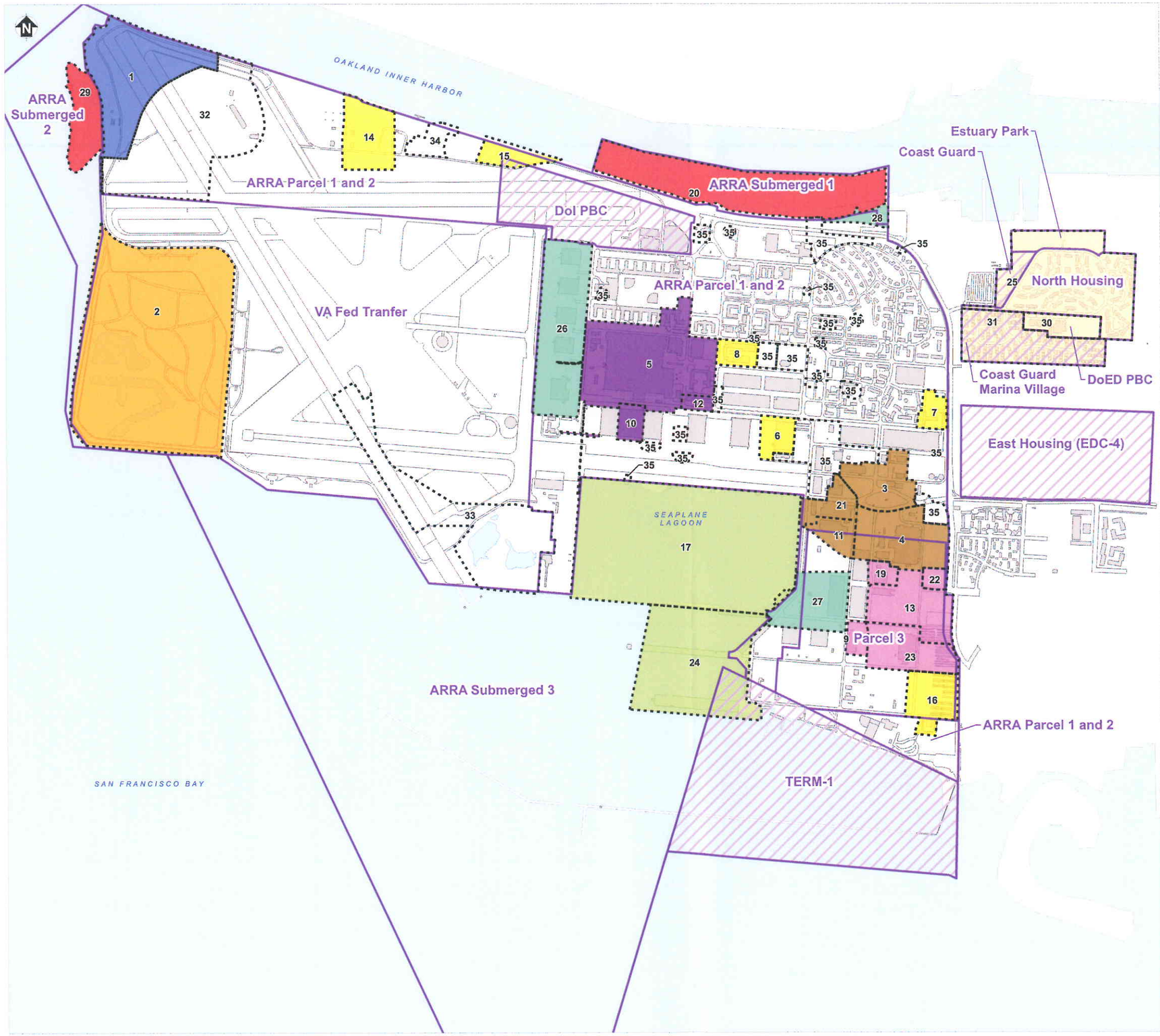
Target Audience:

Specifically, the City of Alameda Reuse and Redevelopment Authority and the community of Alameda would benefit from realizing the cost savings and the net environmental benefit adaptive reuse of Building 5 could yield. The outcome of this contract, with the conclusions and recommendations would be of interest to many local governments and communities located in or near cities with closed military installations across the nation. The prospect of moving new businesses into already existing buildings would be of interest to reuse agencies, real estate developers and real estate agents who are dealing with the collapse of the housing and commercial real estate sectors and may be ready to explore and promote new and sustainable avenues in these markets. Cities, counties and States would benefit with increased revenue from manufacturing businesses buying or leasing these buildings, hiring local workers and paying taxes. Start-up companies in the green manufacturing sector would be interested in knowing the availability of large existing buildings to launch their businesses.

ATTACHMENT B-5

TRANSFER PARCEL STATUS, OPERABLE UNITS, AND INSTALLATION RESTORATION SITES MAP

(1 page)



- Operable Unit 1
- Operable Unit 2A
- Operable Unit 2B
- Operable Unit 2C
- Operable Unit 3
- Operable Unit 4A
- Operable Unit 4B
- Operable Unit 4C
- Operable Unit 5
- Operable Unit 6
- Installation Restoration Site
- Transferred
- Untransferred
- Buildings
- Site Features
- Water

ARRA Alameda Reuse and Redevelopment Authority
DoED Department of Education
DoI Department of the Interior
EDC Economic Development Conveyance
FED Federal
PBC Public Benefit Conveyance
TERM Reverted to City
VA Department of Veterans Affairs

450 0 450 900
Feet

SulTech

Alameda Point, Alameda, CA
U.S. Department of the Navy, BRAC PMO West, San Diego, CA

TRANSFER PARCEL STATUS, OPERABLE UNITS, AND INSTALLATION RESTORATION SITES

February 2009

ATTACHMENT B-6

UPCOMING DOCUMENTS FOR RAB REVIEW

(1 page)

Upcoming Documents for RAB Review

June 2009

Size	Document		Estimated Transmittal Date
Large	Site 1	Draft Preliminary Design WP and SAP	June
Large	OU-1	Draft Final Remedial Design/Remedial Action Work Plan	June
Large	Site 2	Proposed Plan	June
Small	Site 34	Draft Feasibility Study	June
Medium	Site 34	Draft Wetlands Delineation	June
Large	Site 1	Draft Final Record of Decision	July
Large	Site 35	Draft Final Record of Decision	July
Small	Site 5	Draft DNAPL Removal Action Completion Report	July
Large	Basewide Bldgs.	Draft Basewide Radiological Surveys WP and SAP	July