

**FINAL  
NAVAL AIR STATION ALAMEDA RESTORATION ADVISORY BOARD  
MEETING SUMMARY**

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Building 1, Suite 140, Community Conference Center  
Alameda Point  
Alameda, California

October 5, 2006

The following participants attended the meeting:

**Co-Chairs:**

George Humphreys	Restoration Advisory Board (RAB) Community Co-chair
Thomas Macchiarella	Base Realignment and Closure (BRAC) Program Management Office (PMO) West, BRAC Environmental Coordinator (BEC), Navy Co-chair

**Attendees:**

Salem Attiga	Environmental Management Services, Inc. (EMS Inc.)
Steve Bachofer	St. Mary's College
Andrew Baughman	BRAC PMO-West, Remedial Project Manager (RPM)
Doug Biggs	Alameda Point Collaborative (APC) Representative
Kevin Bricknell	Tetra Tech EM Inc. (Tetra Tech)
Neil Coe	RAB
Tommie Jean Damrel	Tetra Tech
Diana Davis	EMS Inc.
Robert De Luca	RAB
Jamie Hamm	Sullivan International Group (Sullivan)
Craig Hunter	Tetra Tech
Gina Kathuria	Regional Water Quality Control Board (Water Board)
Joan Konrad	RAB
Dot Lofstrom	California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC)
Patrick Lynch	Community member
Frank Matarrese	Alameda City Council
John McMillan	Shaw Environmental and Infrastructure, Inc. (Shaw)
Samantha Murray	Golden Gate Audubon Society
Mark Ripperda	U.S. Environmental Protection Agency (EPA)

Peter Russell	Russell Resources, Inc./City of Alameda
Erich Simon	Water Board
Christy Smith	U.S. Fish and Wildlife Service (USFWS)
Peter Strauss	RAB advisor for the technical assistance for public participation (TAPP) grant
Jean Sweeney	RAB
Jim Sweeney	RAB
Michael John Torrey	RAB/Housing Authority of the City
Linda Williams	Alameda Library

The meeting agenda is provided in Attachment A.

## MEETING SUMMARY

### I. Approval of Minutes

Mr. Humphreys called the meeting to order at 6:30 p.m. and asked for comments on the minutes from the RAB meeting held on September 7, 2006.

Mr. Humphreys provided the following comments:

- Page 4 of 8, third paragraph, the first sentence will be revised to read, “Mr. Peterson commented that the Navy took over the property from the city in 1936, contaminated the land, and now wants the city to buy it back for \$108.5 million.”
- Page 6 of 8, Section V, fourth paragraph, the second to last sentence will be attributed to Mr. Humphreys and not to Mr. Leach.
- Page 7 of 8, Section V, second paragraph, first sentence will be revised to read, “Mr. Leach noted that there are ICs [institutional controls] in place for the Marsh Crust area north of Atlantic Avenue; they have been in place for a couple of years but they do not work, and he is wondering why the Navy is still promoting them.”
- Page 7 of 8, Section V, second paragraph, third sentence will be revised to read, “Mr. Leach noted that this ordinance does not conceptually work, because anyone who wants to dig down more than 4 feet must test the soil, which is expensive and discourages people from following the ordinance. He does not believe that the ordinance will be effective for this reason.”
- Page 7 of 8, the second to last sentence on the page, the word “proportional” will be replaced with “nonlinear.”

Mr. Torrey provided the following comment:

- Page 2 of 8, list of RAB attendees, the hyphen from “Michael-John Torrey” will be removed.

The minutes were approved as amended.

## II. Co-Chair Announcements

Mr. Humphreys distributed the list of documents the RAB received during September 2006 (Attachment B-1). Noteworthy documents received include the proposed plan (PP) for Installation Restoration (IR) Site 1 and the draft feasibility study (FS) report for IR Site 2.

Mr. Humphreys noted that absences are excused for Ms. Dale Smith and Mr. Jim Leach for this RAB meeting.

Mr. Macchiarella said that the RAB will call for new community co-chair nominations during the November meeting. Additionally, numerous items were scheduled to be presented during the November RAB, but there is not enough time to adequately cover them all. He reported that these items include the Operable Unit (OU) 2C remedial investigation (RI) work plan, the Site 2 FS, the Site 32 RI, the Site 27 PP, the Site 1 TAPP review comments presentation, and the RAB co-chair nominations.

Mr. Macchiarella added that the reports for Sites 1 and 2 and the comments from the TAPP grant advisor are all directly related and should be presented because the RAB is interested in these two sites. Not much discussion has occurred about the Site 32 RI, which concerns a plume of volatile organic compounds (VOCs) in groundwater. A public meeting will be scheduled for the Site 27 PP that RAB members can attend if they have questions or want more information. Ms. Sweeney noted that Site 27 is near the dock area. Since it is near the water, she believes that the RAB should be provided more information on this site before the public meeting. Mr. Macchiarella said that he will work with Mr. Humphreys to narrow the list of agenda items for the November meeting.

Mr. Macchiarella said he would like the RAB to convene a Site 1 sub-committee so that RAB members can express their concerns about the site to the TAPP grant advisor. After the RAB receives the TAPP comments, they can be reviewed and edited and submitted on Site 1. Mr. Humphreys asked for volunteers on the sub-committee; Ms. Konrad, Mr. and Ms. Sweeney, and Mr. Torrey offered to serve on the sub-committee. Mr. Humphreys asked the RAB members if they would be available to meet on October 10, 2006. The members responded that they were available, and Mr. Macchiarella noted that October 10th would be suitable because it would allow Mr. Baughman to attend. Mr. Strauss noted that the November RAB meeting will be held after the comments for Site 1 have already been submitted and he asked if this schedule is acceptable to the RAB members. Mr. Macchiarella noted that the TAPP schedule will include meetings to discuss the RAB concerns, followed by a RAB review of the comments provided by the TAPP advisor. The comments will then be submitted to the Navy and will be presented by the advisor to the entire RAB at the next RAB meeting.

Mr. Humphreys asked if the Navy still plans a tour of Site 1 for Mr. Strauss. If so, he and Ms. Smith would like to attend. Mr. Macchiarella responded that the Navy is not conducting a tour of Site 1 and is not prepared for another tour at this time. Mr. Ripperda noted that it would be beneficial for one or two RAB members to attend a tour with Mr. Strauss. Mr. Macchiarella asked the RAB members to talk with him after the meeting if they are interested in this.

Mr. Matarrese asked if the public library's decision to no longer house the information repository could be discussed. Mr. Macchiarella had previously announced that the Alameda public library, which houses one of the Navy's two information repositories, is moving. Not enough room is available in the new library to continue to house the Navy's information repository. The new Alameda library has agreed to maintain near-term documents that are open for public review. Older documents will be moved to the DTSC and archived. All the documents currently in the library will also be archived at the DTSC. In the future, the city and the DTSC could work together to send copies from the full IR to the Library upon request. Ms. Williams added that requests for information on previously archived reports will first be

directed to the information repository located in Building 1. Mr. Macchiarella noted that the Navy will continue to maintain the repository in Building 1.

### **III. Sites 1, 2 & 32 Removal Action Update**

Mr. Humphreys introduced Mr. Baughman, who gave a presentation on the time-critical removal action (TCRA), planned for IR Sites 1, 2, and 32. The presentation covered the background and location information for the sites, an overview of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process, a review of the TCRA activities planned at the site, a schedule of events, and a summary of the project. A handout of the presentation is included as Attachment B-2.

IR Site 1 comprises 78 acres and is located in the northwestern corner of Alameda Point. The site was previously known as the 1943 to 1956 Disposal Area. IR Site 32 makes up 5.8 acres, is located in the northwestern corner of the base east of Site 1, and is occupied by Buildings 594 and 82. It was previously used to store equipment, vehicles, and aircraft. IR Site 2 comprises 110 acres, is located in the southwestern corner of the base, and was the main landfill from 1956 to 1978. Slide 3 shows an aerial view of the sites, and Slide 4 shows the boundaries for each of the sites. The CERCLA process at the sites began with a preliminary assessment/site inspection (PA/SI) and was followed by an RI (the current stage for Site 32), then an FS (the current stage for Site 2), and a PP (the current stage for Site 1). After the PP is finalized, the site moves to the record of decision (ROD) stage, followed by the remedial design (RD), and then the remedial action (RA).

The RAB voiced support for a TCRA at the sites during the February 2006 meeting. As a result, the Navy proceeded with planning the TCRA. Following Alternative S6-4 from the IR Site 1 FS, the Navy will remove radium 226 from the surface and subsurface and the disposal trench. Additionally, the Navy will be removing the former pistol range berm. The Navy will screen and remove material potentially posing an explosive hazard (MPPEH) following Alternative S4-4 from the IR Site 1 FS. After the berm has been removed and the site has been screened, the soil will be disposed of off-site. Slide 7 shows a map of the former pistol range. Slides 8 through 10 are photographs of the sites.

Activities planned at the sites also include an environmental resources survey and biological monitoring. The field work will begin in November or December 2006. Vegetation in the area will be cleared and a topographic survey will be conducted. An MPPEH and geophysical survey will be conducted on the former pistol range, and then excavation will begin at the former firing range berm and debris pits, the area containing radioactive material, and the disposal trench. Post-excavation activities include sampling and stockpile characterization before the soil is removed for off-site disposal. The sites will undergo restoration, and the field teams will demobilize in June 2007. Slide 12 shows a diagram of the screening equipment to be used at the lead berm and MPPEH area, and Slide 13 shows pictures of typical screening equipment for this type of work.

The schedule for the project includes issuing the draft action memorandum and TCRA work plan for agency review during the week of October 9, 2006. Mobilization to conduct field work will begin in December or January 2006, the removal action will begin in February 2007, excavation will be finished by May 2007, and all field work will be complete by June 2007.

Ms. Sweeney asked if rain would delay the field work, and Mr. Baughman responded it will not. Mr. Humphreys asked how the Navy would clean up the radium located below the depth where the radium meter cannot detect radium from the surface. Mr. Baughman responded that the radium at Site 1 is confined within the boundaries of the landfill where radium dials were actually disposed of. If any exists outside the landfill, it would be confined to surface soils due to grading of the landfill.

Additionally, if during excavation, the trench is not found in the expected area, then the Navy will address the trench in the remedial action phase where the soil for the entire Site 1B is proposed to be excavated and removed off-site. Ms. Sweeney asked if the Navy would attempt to locate the trench if it is not located within Area 1B. Mr. Baughman responded that the only information available to the Navy locates the trench in the area of Site 1B. Mr. Ripperda noted that the Navy is fairly certain that the trench is in the area. Mr. Bachofer asked if downwind dust and particulates would be monitored when the soil is screened. Mr. Baughman responded that dust and particulates will be monitored and will be included in the work plan. Ms. Konrad asked why zinc is considered a hazardous material. Mr. Macchiarella responded that zinc can be considered hazardous in high concentrations.

#### **IV. Site 1 Proposed Plan Presentation**

Mr. Baughman presented the PP for IR Site 1, formerly known as the 1946 to 1956 Disposal Area. The presentation handout is included as Attachment B-3. The PP provides an overview of the site location, background, and characteristics. It discusses the past investigations and provides an overview of the risk assessment, the remedial action objectives, and the remediation alternatives. The PP also provides a comparative analysis of the alternatives and lists the preferred alternative for the public's review.

Site 1 occupies 78 acres in the northwestern corner of the base. The area was used as a waste disposal and burn area from 1943 through 1956. The area also contained pistol, skeet, and target ranges, aircraft engine and parts storage, and aircraft runway and taxi areas. Radium Dials were disposed of in the landfill, but some radium is found outside the boundaries of the landfill due to grading activities. There was also a baseball field and three closed aboveground storage tanks on the site. Slide 4 shows a map of the boundaries of Site 1.

Site 1 was divided into five geologic areas and one site-wide radium-contaminated waste area and wetlands. Area 1 is the former waste disposal area (Area 1A) and the burn area (Area 1B). Area 2 is the paved airport runways and taxiways outside of Area 1. Area 3 is the unpaved areas outside of the runways, taxiways, and Area 1. Area 4 is the former pistol range berm. Area 5 is the shoreline area. Three seasonal wetlands cover 15.5 acres within Areas 1, 2, and 3. Slide 6 shows the locations of each of the areas within Site 1.

Previous investigations at Site 1 include an initial assessment study (IAS) completed in 1983 that included interviews with people who worked at Alameda while the base was still active. The IAS attempted to describe the history of each of the areas of the base. The environmental baseline survey (EBS) was conducted in 1995, was followed by the final RI in 1999, and the final FS in 2006. As a management tool, groundwater at Site 1 has been divided into three areas. The first area is the unconfined, first water-bearing zone (FWBZ) contaminated with a plume of VOCs. The second area is the unconfined FWBZ outside of the VOC plume. The third area is the confined second water-bearing zone (SWBZ) underlying the FWBZ which contains no significant concentrations of contaminants. Slide 9 shows a map of the VOC plume in the FWBZ.

The human health risk assessment (HHRA) evaluated risk posed to human health. The noncancer hazard index is below 1; however, the cancer risk exceeds the risk management range for occupational and recreational uses. The ecological risk assessment (ERA) evaluated whether unacceptable risk is posed to plants, fish, reptiles, and mammals. The ERA concluded there is risk to small mammals and birds from pesticides and metals in soil and to aquatic life from metals in groundwater. Slides 11 and 12 show the remedial action objectives (RAOs) for soil and groundwater. The slides list the chemicals of concern and the remedial goals.

The remedial alternatives evaluated for soil in Area 1 consist of S1-1 with no action proposed; S1-2 includes a soil cover, wetlands mitigation plan (WMP), and institutional controls (ICs); S1-3 is an engineered alternative cap, WMP, and ICs; S1-4a includes excavation and off-site disposal, a soil cover, a radiological and MPPEH sweep, WMP, and ICs; S1-4b involves excavation and off-site disposal, an engineered alternative cap, a radiological screening and MPPEH sweep, WMP, and ICs; S1-5 includes a complete removal of the soil and WMP. Slide 14 shows a schematic diagram of the differences between a soil cover and an engineered alternative cap.

Alternatives evaluated for Area 2 consist of S2-1, no action; S2-3, pavement maintenance with ICs; and S2-4, pavement demolition, excavation and off-site disposal, radiological screening and an MPPEH sweep, removal of hot spots in soil, and ICs. In Area 3, the alternatives for soil included S3-1, no action; S3-4, a Tier 2 ERA, hot spot relocation, and WMP; and S3-5, a Tier 2 ERA, hot spot removal with off-site disposal, ICs, and WMP. In Area 4, alternatives evaluated for soil included S4-1, no action; S4-2, removal, screening, and relocating; S4-3, removal, screening, and relocation with off-site disposal; and S4-4, which includes removal, screening, and off-site disposal.

In Area 5, the alternatives for soil include S5-1, no action; S5-3, confirmation sampling and ICs; S5-4, confirmation sampling, hot spot relocation, and ICs; S5-5, confirmation sampling, relocation of hot spots and shoreline debris, and ICs; and S5-6, confirmation sampling, removal of hot spots and shoreline debris, and ICs. The alternatives for the site-wide radium-contaminated soil include S6-1, no action; S6-4, removal of radium-contaminated waste in Areas 3 and 5 and one location in Area 1B, with a cover and cap for the remaining radium waste in Area 1, and WMP; and S6-5, removal of all radium-contaminated soil and items, and a WMP. Groundwater remediation alternatives include GW1, no action; GW2, source removal, WMP, monitoring, and ICs; GW3, in situ chemical oxidation (ISCO), monitored natural attenuation (MNA), monitoring, and ICs; GW4, in situ bioremediation (ISB) and MNA, monitoring, and ICs; GW5, zero-valent iron (ZVI) powder injection, MNA, monitoring, and ICs; and GW6, source removal, ZVI powder injection, MNA, monitoring, and ICs. All of these alternatives were compared with the evaluation criteria in the National Contingency Plan on Slides 22 through 28.

The preferred alternative for each area is as follows: Area 1 – S1-4a (excavation and off-site disposal for Area 1b, a soil cover for Area 1a, a radiological and MPPEH sweep, WMP, and ICs); Area 2 – S2-3 (pavement maintenance with ICs); Area 3 – S3-4 (a Tier 2 ERA, hot spot relocation, and WMP); Area 4 – S4-4 (removal, screening, and off-site disposal); Area 5 – S5-4 (confirmation sampling, hot spot relocation) and for site-wide radium-contaminated waste, S6-4 (removal of radium-contaminated waste in Areas 3 and 5 and one location in Area 1B, with a cover and cap for the remaining radium waste in Area 1, and WMP); and groundwater – GW3 (ISCO, MNA, monitoring, and ICs). Slide 29 shows map of Site 1 with the preferred alternative for each of the areas. The preferred alternative for the site-wide radium-contaminated soil includes removal and disposal off-site of soil that contains radium (except Area 1a) and a final status survey after the removal action. The Navy is expediting this alternative under the TCRA, along with removal of the lead berm following alternative S4-4. The preferred groundwater alternative is to treat the VOC plume using ISCO and MNA. There will also be long-term monitoring of metals and VOCs to ensure a permanent reduction in the concentration of VOCs and associated risks. The ICs on the property will restrict well installation or construction without Navy and agency consent.

Mr. Humphreys asked about stabilizing the boundaries of the landfill so that liquefaction during an earthquake does not cause the landfill to slide into San Francisco Bay. He added that there is no mention in the PP of a seismic stability wall for the boundaries of the landfill. Mr. Macchiarella responded that the remedial design will decide how to make the landfill seismically stable. He added that the Navy must follow certain regulations for seismic stability of the landfill. He added that a seismic stability wall may not be needed along the entire length of the landfill boundary. Mr. Humphreys commented that seismic walls are expensive. Mr. Baughman noted that the cost for these alternatives does not include

constructing a seismic wall. Mr. Humphreys added that sunken barges are located along the shoreline of Site 1 and asked if they would be included as part of the seismic stability wall. Mr. Baughman responded that they would not be included.

Mr. Humphreys noted that the 1989 earthquake caused liquefaction at Harbor Bay and he does not see how a cap can provide protection when sediments in the landfill behave as quicksand. Mr. Ripperda noted that the Navy will repair the cover if an earthquake causes it to fail. Ms. Konrad commented that the proposed reuse of the site will be a golf course, where additional soil will be placed on top of the existing landfill; she asked how the will Navy stop contaminants from migrating to the surface of the golf course. Mr. Ripperda responded no type of seal can guarantee containment of contaminants under every circumstance. Ms. Konrad asked about responsibility for cleanup if contamination surfaces in the future. Mr. Macchiarella responded that the Navy would probably be responsible for maintaining the integrity of the cap. Ms. Konrad asked if the city will be aware of the environmental conditions at the site. Mr. Macchiarella responded that Mr. Russell is representing the city and is aware of the environmental conditions at each site. Mr. Russell added that, in the event that the landfill sustains damage from an earthquake, the Navy will clean up the damage even if the city does agree to clean up or maintain the soil cover if the city cannot pay for cleanup when it is needed. However, the city might not agree to accept responsibility for cleanup.

Ms. Konrad asked how the Navy will maintain the pavement on the runways if imported soil covers the paved areas. Mr. Baughman responded that the Navy would not maintain the pavement; instead, the additional soil on the runways will act as an additional barrier to exposure from soil beneath the runways. Mr. Ripperda noted that the paved areas are outside of the landfill and therefore should be outside of the areas affected by waste deposited in the landfill. As a result, the city and EPA do not agree with imposing ICs on this area of the site.

Mr. Baughman noted that public comments on this PP are due October 27, 2006. The response to public comments is provided in a responsiveness summary in the ROD. The preferred alternative for each of the areas will also be documented in the ROD. A public notice will appear in the local newspaper to announce that the signed ROD is available. The RD and RA work plan will then be completed and the remedy will be implemented. Slide 33 provides the contact information for Mr. Macchiarella, Mr. Ripperda, Ms. Lofstrom, and Mr. Simon.

Ms. Sweeney asked if the plume of VOCs near the proposed beach area and public park is the same that is discussed in the PP. Mr. Baughman responded that it is the same. Mr. Humphreys noted that the figure that shows the VOC plume in the PP does not provide a scale, although he recalls that it is only 50 to 60 feet from the edge of the plume to the shoreline. He also noted that the Navy has not collected any data from this area and therefore has not delineated the extent of groundwater contamination and whether it is migrating into the bay. He noted that concentrations in monitoring wells are decreasing rapidly maybe because sea water is mixing with the groundwater and diluting the plume. He asked if the Navy has analyzed samples for contaminants in the beach sand. Mr. Baughman responded that samples were collected from the beach and that this information has been included in the FS report. Mr. Humphreys said that he would expect contamination at the beach from the VOC plume. He added that the groundwater data are 8 years old and that contaminants have probably been migrating into the bay for at least the last 8 years. Mr. Macchiarella noted that the funnel and gate system may have been installed on the property for this purpose. He added that additional data will be collected at the remedial design stage to further delineate the extent of contamination.

Mr. Humphreys proposed that the Navy design a clay soil cap tied into a perimeter slurry cutoff wall around this area to detain groundwater while remediation is under way or if ISCO does not achieve remediation goals. He asked if the treatment remedy will cause the radium at the site to be released into

the groundwater. Mr. Ripperda added that radium has not been detected in groundwater, and Mr. Baughman added that all the radium outside of Area 1A will be removed from the site. Mr. Humphreys said that polychlorinated biphenyls (PCBs) are a problem at the beach; he recalled a television broadcast that showed how Orca whales are affected by PCBs in Puget Sound. He added that trace amounts below laboratory detection limits are probably entering the bay and concentrating in the food chain. Mr. Baughman noted that any hot spots found on the beach would be removed and relocated in Area 1a. Mr. Macchiarella noted that Mr. Humphreys might want to direct this comment to the agencies. He noted that PCBs might become a problem later, similar to dichlorodiphenyltrichloroethane (DDT). Mr. Ripperda said that he would also like all chemicals removed that bioaccumulate in the food chain; however, the data from the monitoring wells and the beach sampling did not indicate that PCBs were migrating into the bay.

Mr. Biggs asked about the steps the Navy takes for community education. Mr. Macchiarella said that he did not know and would have to look into his question. Mr. Bachofer asked why the Navy decided not to chose the ZVI alternative. Mr. Baughman responded that ZVI require high-pressure injections, and the soil and shallow groundwater at the site would cause the ZVI to return to the surface rather than remaining in the saturated zone. Mr. Ripperda also added that the funnel and gate system at the site is a ZVI system that was not maintained by the University of Waterloo who installed the system as part of a pilot test. Mr. Bachofer asked if the funnel and gate system should be used in lieu of the ZVI injection systems. Mr. Ripperda noted that the funnel and gate system stops contamination from migrating but does not remove the source. Mr. Bachofer noted that it would not require as much labor to maintain a funnel and gate system. Mr. Ripperda responded that the agencies want the sources of the contamination cleaned up faster than a funnel and gate system would allow. Mr. Humphreys asked about the impact of the golf course irrigation system on the plume of VOCs. Mr. Ripperda responded that the VOC plume will be remediated before the golf course is built. Mr. Humphreys asked about the length of time required to clean up the site. Mr. Macchiarella responded that the ISCO will require about a year if it is effective. The remedies also include ICs, which will prevent disturbance to the landfill.

Ms. Lofstrom, responding to an earlier comment from Ms. Konrad, noted that the agencies are not concerned that contaminants may migrate to the surface during an earthquake; rather, the soil cover will help minimize infiltration of rainwater into the groundwater. An unidentified community member asked if the site would support a bike trail. Mr. Macchiarella responded that the site will be ready for recreational use after it has been remediated.

## **V. BCT Activities**

Mr. Ripperda said that the Navy will collect more core samples at the Seaplane Lagoon for the remedial design in early November.

## **VI. Community and RAB Comment Period**

Mr. Lynch commented that there is no legal reason why the Navy can not extend the 30-day review for the Site 1 PP. This extended review would provide more opportunity for the RAB to hear the comments from the TAPP advisor. Additionally, he noted that neither the information repository at the library nor in Building 1 at Alameda Point will be open to the public on weekends or after hours. He said that the public would be required to take time from work to review the information that is in the repositories to participate in cleanup at Alameda Point. He also said that a great deal of activity is under way at Site 4 within Building 360. Since no documents are available for review on that site, he would like the Navy to explain current activities. Mr. Macchiarella responded that the activity at Site 4 is associated with a removal action that is part of the six-phase heating system for plume 4-1. Some data will be available for that project and will be presented to the RAB within the next several meetings. Mr. Macchiarella believes

that the work falls under the work plan for the six-phase heating removal action which includes Sites 4 and 5. Mr. Lynch said that he is concerned because there are a large number of unlabeled drums in a temporary constructed fenced-off area with no warning signs. He said that if these drums contain hazardous waste, then the minimum requirements for managing hazardous waste are not being met. Mr. Macchiarella responded that much of the project is occurring indoors, but he will investigate the drums.

Mr. Biggs asked if additional copies of the list of documents received by the RAB could be provided for the community members. Mr. Macchiarella noted that Mr. Humphreys copies the list on his own. Mr. Macchiarella said that he will e-mail Mr. Biggs a copy of the documents list.

Mr. Strauss noted that Mr. Macchiarella did not address the first part of Mr. Lynch's question on the 30-day comment period. Mr. Macchiarella responded that the Navy can extend the 30-day comment period if the agencies agree and the RAB requests. The RAB members requested to extend the comment period by 2 weeks and the BCT members present concurred with the schedule change.

A community member said that the airfield at Alameda Point has subsided as much as 18 inches in some areas. Mr. Humphreys noted that some locations of Alameda Annex have also settled.

Ms. Murray asked when the FS for Site 2 was issued and when comments are due. Mr. Baughman responded that the report was issued on September 20, 2006, and comments are due on November 20, 2006. Ms. Murray requested a copy of this report, and Mr. Baughman agreed to provide a copy. Mr. Macchiarella apologized that he did not send a copy of this report to Ms. Murray.

Mr. Humphreys asked if the RAB will be allowed to submit comments on the ROD. Mr. Macchiarella responded that typically communities and RABs do not comment on the RODs, but on the PP and that community/RAB comments on PPs are included as attachments to RODs. Mr. Humphreys noted that the RAB does not review the RODs. Mr. Macchiarella said that the RODs are included in the information repositories and notices appear in the newspapers after they are finalized and signed. Ms. Sweeney said that she obtained copies of former RODs. Mr. Macchiarella added that the RAB and public are afforded the opportunity to comment on PPs and it would not be feasible to receive additional comments on RODs, considering the requirements of the Federal Facility Agreement.

Ms. Sweeney noted that she received a publication in the mail that the Marsh Crust was 5 to 7 inches deep, and she thought the Marsh Crust was much thicker. Mr. Macchiarella responded that the depth to the Marsh Crust varies and he believes that its thickness does too. Ms. Sweeney asked if the Marsh Crust creates groundwater plumes. Mr. Macchiarella responded that the Marsh Crust does not generally create groundwater plumes. He asked if she was referring to the OU-5/IR-02 FISCAs groundwater plume. Ms. Sweeney replied that she is. Mr. Macchiarella responded that the Navy does not know the exact cause of the groundwater plume. It could be attributed to the Marsh Crust, but the Navy is not certain. Ms. Sweeney commented that if the source was the Marsh Crust then maybe it is not the Navy's responsibility to clean up. Mr. Macchiarella agreed that such an argument could be made under those circumstances.

The meeting was adjourned at 8:30 p.m.

**ATTACHMENT A**

**NAVAL AIR STATION ALAMEDA  
RESTORATION ADVISORY BOARD MEETING AGENDA  
October 5, 2006**

**(One Page)**

# ***RESTORATION ADVISORY BOARD***

***NAVAL AIR STATION, ALAMEDA***

## ***AGENDA***

**OCTOBER 5, 2006, 6:30 PM**

**ALAMEDA POINT – BUILDING 1 – SUITE 140**

**COMMUNITY CONFERENCE ROOM**

**(FROM PARKING LOT ON W MIDWAY AVE, ENTER THROUGH MIDDLE WING)**

<b><u>TIME</u></b>	<b><u>SUBJECT</u></b>	<b><u>PRESENTER</u></b>
<b>6:30 - 6:45</b>	<b>Welcome, Introduction, and Approval of Minutes</b>	<b>Mr. George Humphreys</b>
<b>6:45 - 7:00</b>	<b>Co-Chair Announcements</b>	<b>Co-Chairs</b>
<b>7:00 – 7:20</b>	<b>Site 1, 2 &amp; 32 Removal Action Update</b>	<b>Mr. Andrew Baughman</b>
<b>7:20 – 7:50</b>	<b>Site 1 Proposed Plan Presentation</b>	<b>Mr. Andrew Baughman</b>
<b>7:50 – 8:00</b>	<b>BCT Activities</b>	<b>Ms. Anna-Marie Cook</b>
<b>8:00 – 8:30</b>	<b>Community &amp; RAB Comment Period</b>	<b>Community &amp; RAB</b>
<b>8:30</b>	<b>RAB Meeting Adjournment</b>	

For more information on the Alameda Point RAB please visit [www.bracpmo.navy.mil](http://www.bracpmo.navy.mil)

**ATTACHMENT B**

**NAVAL AIR STATION ALAMEDA  
RESTORATION ADVISORY BOARD MEETING HANDOUT MATERIALS**

- B-1 List of Reports Received during September 2006, George Humphreys, RAB Community Co-Chair (2 pages)
- B-2 Presentation on Sites 1, 2, & 32 Removal Actions, presented by Andrew Baughman, Navy (8 pages)
- B-3 Presentation on Proposed Plan for IR Site 1, presented by Andrew Baughman, Navy (18 pages)

**ATTACHMENT B-1**

**LIST OF REPORTS RECEIVED SEPTEMBER 2006**

**(Two Pages)**

Restoration Advisory Board  
Reports and Correspondence  
Received during September 2006

Reports

1. September 6, 2006, "Draft Removal Action Workplan, Western One-Third of Installation Restoration Site 02, Former Fleet Industrial Supply Center, Oakland", prepared by Department of Toxic Substances Control.
2. September 11, 2006, "Draft Work Plan for Supplemental Remedial Investigation Sampling at Operable Unit 2C, Alameda Point, Alameda, California", prepared by Bechtel Environmental, Inc. for BRAC Program Management Office West.
3. September 11, 2006, "Quarterly Technical Memoranda for Corrective Action Areas 4C, 6, 7, 11, and 13 (Buildings 397 and 530), Alameda Point, Alameda, California", prepared by Shaw Environmental Inc. for BRAC Program Management Office West.
4. September 18, 2006, "Final Addendum 1, Offshore Sediment Study Work Plan at Oakland Inner Harbor, Pier Area, Todd Shipyard and Western Bayside", prepared by Battelle, BBL Inc., and Neptune & Company for BRAC Program Management Office West.
5. September 20, 2006, "Draft, Feasibility Study Report, IR Site 2, West Beach Landfill and Wetlands, Alameda Point, California", prepared by Battelle and BBL, Inc. for BRAC Program Management Office West.
6. September 27, 2006, "Draft Remedial Investigation Report, IR Site 32, Northwestern Ordnance Storage Area, Alameda Point, Alameda, California", prepared by Bechtel Environmental, Inc. for BRAC Program Management Office West.
7. September 27, 2006, "Proposed Plan for IR Site 1, 1943-1956 Disposal Area, Former NAS Alameda", prepared by BRAC Program Management Office West.
8. September 27, 2006, "Draft Feasibility Study Report for Installation Restoration Site 2, West Beach Landfill and Wetlands, Alameda Point", (12 replacement pages to correct discrepancies in acreages used to estimate costs for soil remedial alternatives in Appendix D) prepared by Battelle and BBL, Inc. for BRAC Program Management Office West.

Correspondence

1. August 31, 2006 (received September 7, 2006), "Technical Memorandum Subslab Soil Gas Investigation of Buildings 14, 113, 162, 163A, and 398, Alameda Point", from Ms. Anna-Marie Cook U. S. EPA, Region IX to Mr. Thomas Macchiarella, BRAC Program Management Office West.
2. September 8, 2006, "Comments on Draft Addendum 1 to the Final Offshore Sediment Study Work Plan at Oakland Inner Harbor, Pier Area, Todd Shipyard, and Western Bayside, Alameda Point, Alameda, California", from Ms. Judy C.

- Huang, P. E., California RWQCB to Mr. Thomas L. Macchiarella, BRAC Program Management Office West.
3. September 7, 2006, "Review of the Draft Addendum 1, Offshore Sediment Study Work Plan at Oakland Inner Harbor, Pier Area, Todd Shipyard and Western Bayside, Alameda Point, Alameda, California, August 2006", from Xuan-Mai Tran, U. S. EPA to Mr. Thomas Macchiarella, BRAC Program Management Office West.
  4. September 8, 2006, "Review of Draft Addendum 1, Offshore Sediment Study Work Plan at Oakland Inner Harbor, Pier Area, Todd Shipyard and Western Bayside, Alameda Point, Alameda, California", from Ms. Dot Lofstrom, P. G., DTSC to Mr. Thomas L. Macchiarella BRAC Program Management Office West.
  5. September 18, 2006, "Review of Technical Memorandum to Supplement the Administrative Record for Installation Restoration Site 28, Todd Shipyards, Alameda Point, Alameda", from Ms. Anna-Marie Cook, U. S. EPA to Mr. Thomas Macchiarella, BRAC Program Management Office West.
  6. September 21, 2006, "Draft Record of Decision Site 14, Former Firefighter Training Area, Alameda Point", from Ms. Anna-Marie Cook, U. S. EPA to Mr. Thomas Macchiarella, BRAC Program Management Office West
  7. September 26, 2006, "Designation of San Francisco Bay Water Board Remedial Project Manager", from Ms. Gina Kathuria to Mr. Thomas L. Macchiarella BRAC Program Management Office West.

**ATTACHMENT B-2**  
**PRESENTATION ON IR SITES 1, 2, & 32**  
**(Eight Pages)**



**Welcome**

**BRAC  
PMO**

**UPDATE**

**Time-Critical Removal Action (TCRA)**

**IR Site 1, 2, & 32**

**Alameda Point, Alameda**

**October 5, 2006**

***Andrew L. Baughman, P.E.***



**Overview**

**BRAC  
PMO**

- **Background and Location**
- **CERCLA Process**
- **Time-Critical Removal Action (TCRA)**
- **Planned Activities**
- **Schedule**
- **Summary**



## Site Locations and Backgrounds

**BRAC  
PMO**

- **Installation Restoration (IR) Site 1 (78 Acres)**
  - Located in NW corner of Alameda Point
  - 1943-1956 Disposal Area
- **IR Site 32 (5.8 Acres)**
  - Located in NW corner of Alameda Point
  - Equipment, vehicle, and aircraft storage
  - 2 Buildings (594 and 82)
- **IR Site 2 (110 Acres)**
  - Located in SW corner of Alameda Point
  - Main disposal area from 1956-1978

2



## Aerial Photograph

**BRAC  
PMO**

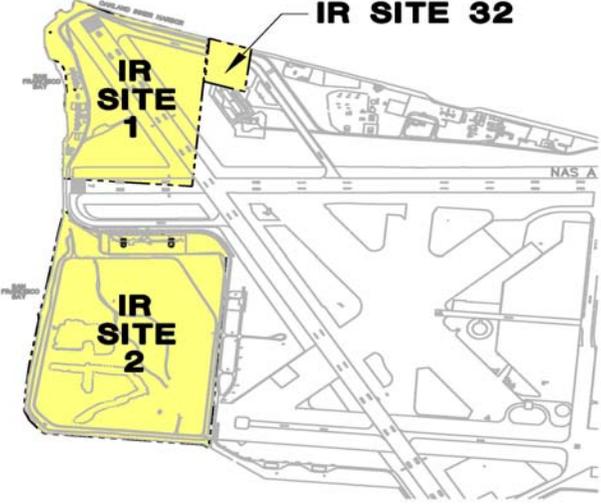


3



## IR Site 1, 2, & 32

**BRAC  
PMO**

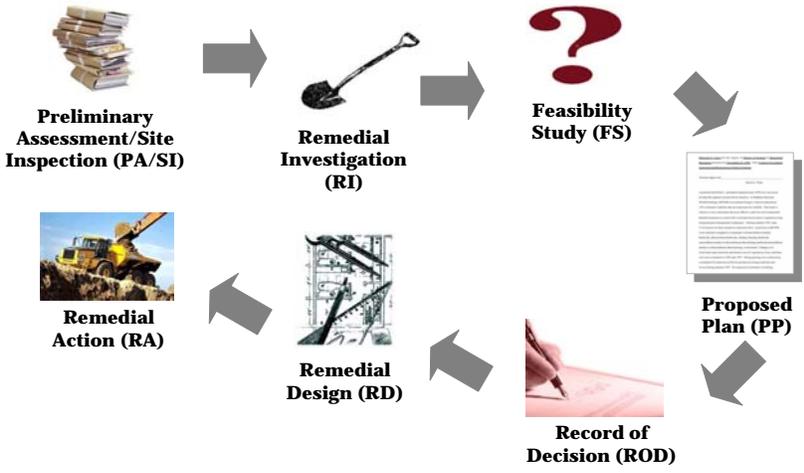


4



## CERCLA PROCESS

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```

graph TD
    PA[Preliminary Assessment/Site Inspection (PA/SI)] --> RI[Remedial Investigation (RI)]
    RI --> FS[Feasibility Study (FS)]
    FS --> PP[Proposed Plan (PP)]
    PP --> ROD[Record of Decision (ROD)]
    ROD --> RD[Remedial Design (RD)]
    RD --> RA[Remedial Action (RA)]
    RA --> PA
  
```

5





## Firing Range

**BRAC  
PMO**



8



## Areas Planned for Removal

**BRAC  
PMO**



9



## Disposal Trench Location

BRAC  
PMO



10



## PLANNED ACTIVITIES

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PMO

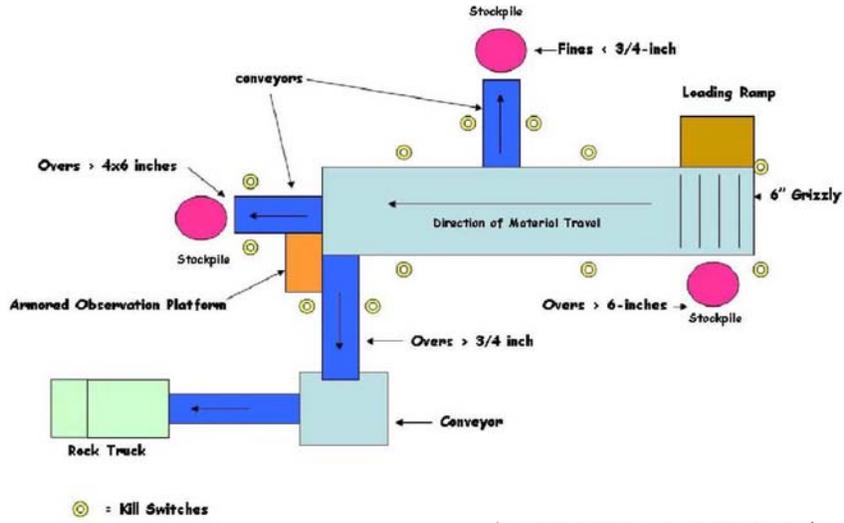
- **Environmental resources survey/biological monitoring**
- **Mobilization (November/December 2006)**
- **Vegetation clearance**
- **Topographic survey**
- **MPPEH survey/geophysical survey**
- **Excavation activities**
  - Excavation of former Firing-range Berm and debris pits
  - Removal of radioactive material
  - Excavation of disposal trench
- **Post-excavation sampling and stockpile characterization**
- **Site restoration and demobilization (June 2007)**

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# Screening Plant Configuration

BRAC PMO



# Typical Screen Plant

BRAC PMO





## Schedule

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PMO**

- **The Draft Action Memorandum and the Time Critical Removal Action work plan will be completed in the next week**
- **Mobilization – December/January 2006**
- **Start Removal Action– February 2007**
- **Finish Excavation – May 2007**
- **Field Work Complete – June 2007**

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## Questions?

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PMO**



15

**ATTACHMENT B-3**

**PRESENTATION ON PROPOSED PLAN FOR IR SITE 1**

**(18 Pages)**



**WELCOME**

**BRAC  
PMO**

**Operable Unit-3  
Installation Restoration (IR) Site 1  
1943-1956 Disposal Area  
PROPOSED PLAN  
Alameda Point, Alameda**

Andrew Baughman, P.E.  
Remedial Project Manager  
BRAC Program Management Office

*October 5, 2006*



**OVERVIEW**

**BRAC  
PMO**

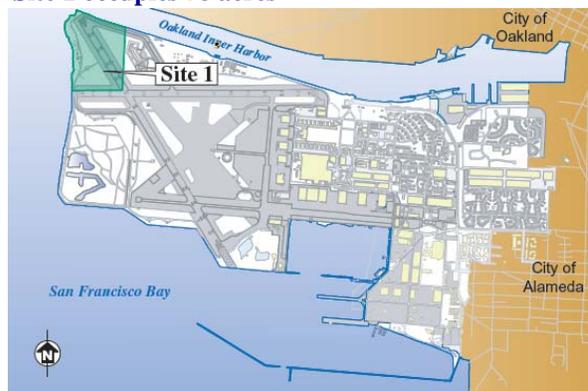
- 1. Site location, background, and characteristics**
- 2. Past investigations**
- 3. Risk assessment and remedial action objectives**
- 4. Remediation alternatives**
- 5. Comparative analysis and preferred alternatives**
- 6. Next steps**
- 7. Additional information**



## SITE LOCATION

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PMO**

- Located in Northwestern portion of Alameda Point
- Site 1 occupies 78 acres



2



## SITE BACKGROUND

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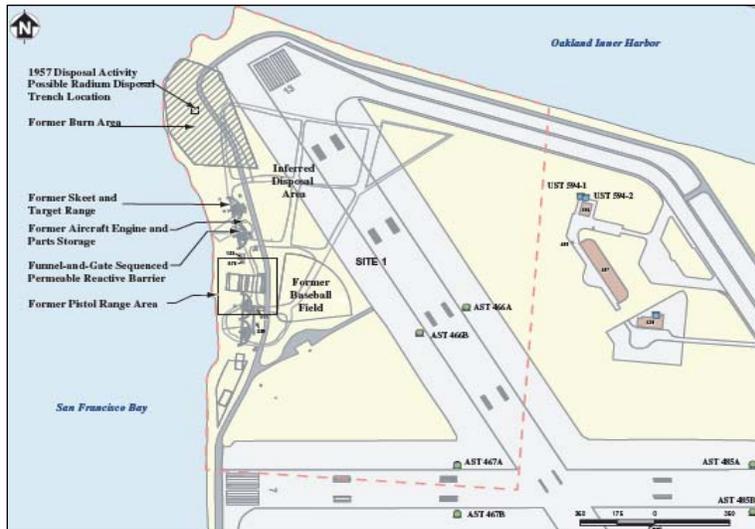
- Waste disposal and burn areas, 1943 to 1956
- Pistol, skeet & target ranges
- Aircraft engine & parts storage
- Aircraft runway and taxiway
- Site-wide radium-waste dispersal (as radium dials)
- Baseball field
- Three closed aboveground storage tanks

3



## SITE BACKGROUND

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4



## AREAS OF IR SITE 1

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•As a management tool, Site 1 soil was divided into 5 geographic areas, one site-wide radium-impacted waste area, and Wetlands

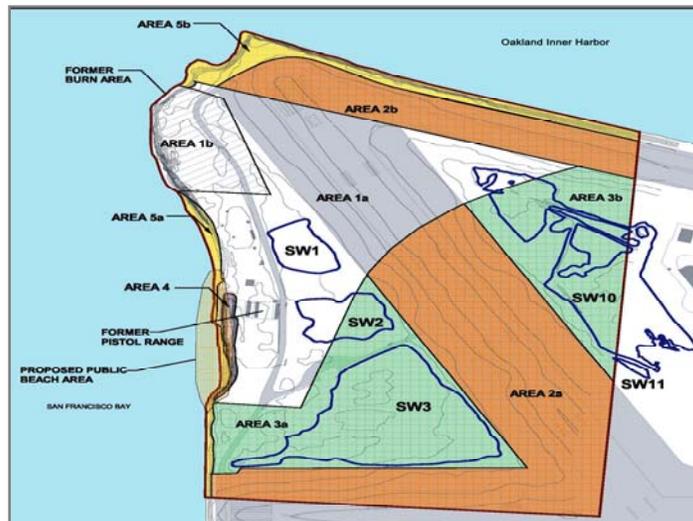
- |                                 |  |
|---------------------------------|--|
| Area 1                          | –Former waste disposal (Area 1a) and burn (Area 1b) areas                  |
| Area 2                          | –Paved airport runways and taxiways  |
| Area 3                          | –Unpaved areas outside runways, taxiways, and waste disposal & burn areas  |
| Area 4                          | –Former pistol range berm  |
| Area 5                          | – Shoreline Area   |
| Site-wide radium-impacted waste | – Areas within Site 1 with elevated radium levels above background in soil |
| Wetlands                        | – 3 seasonal wetlands of about 15.5 acres within Areas 1, 2 and 3          |

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## AREAS OF IR SITE 1

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## PAST INVESTIGATIONS

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### Investigations at Site 1

- **Initial Assessment Study (IAS) in 1983**
- **Environmental Baseline Surveys (EBS) in 1995**
- **Final Remedial Investigation (RI) in 1999**
- **Final Feasibility Study (FS) in 2006**

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## SUMMARY OF GROUNDWATER INVESTIGATIONS

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As a management tool, Site 1 divided into 3 groundwater areas

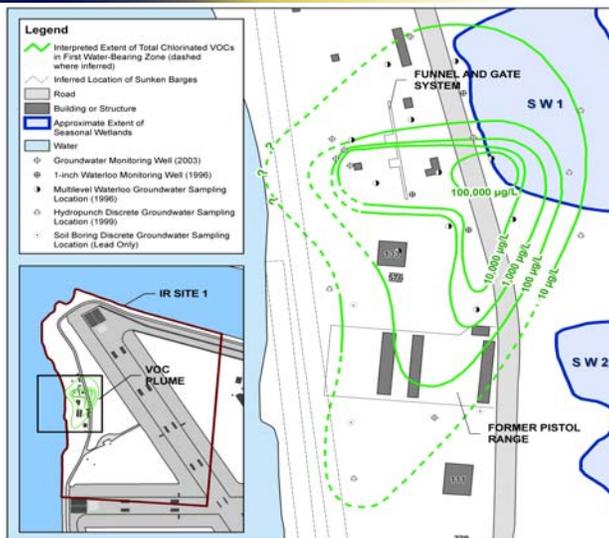
- **Unconfined, first waterbearing zone (FWBZ)**
  - Volatile organic compound (VOC) plume
- **Unconfined FWBZ outside VOC plume**
- **Confined second waterbearing zone (SWBZ) underlying FWBZ**
  - No significant concentrations of contaminants

8



## GROUNDWATER – VOC PLUME WITHIN FWBZ

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## HUMAN HEALTH & ECOLOGICAL RISK ASSESSMENTS

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- **Evaluated whether unacceptable risk is posed to Human Health**
  - Noncancer HIs below 1
  - Cancer exceeds the risk management range for occupational and recreational uses
- **Evaluated whether unacceptable risk is posed to plants, fish, reptiles, and mammals**
  - Risk to small mammals and birds from pesticides and metals in soil
  - Risk to aquatic life from metals in groundwater

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## REMEDIAL ACTION OBJECTIVES (RAOs) SOIL

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Chemicals of Concern (COC)	Remedial Goal (mg/kg)*	Chemicals of Concern (COC)	Remedial Goal (mg/kg)*
<i>Polynuclear Aromatic Hydrocarbons (PAHs)</i>		<i>Polychlorinated Biphenyls (PCBs)</i>	
Benzo(a)anthracene	16.4	Aroclor-1254	0.38
Benzo(a)fluoranthene	16.4	Aroclor-1260	0.38
Indeno(1,2,3-cd)pyrene	1.6	<i>Metals</i>	
Dibenzo(a,h)anthracene	2.7	Cadmium	0.76
<i>Pesticides</i>		Chromium (hexavalent)	3.1
4,4'-DDD	1.2	Lead	56
4,4'-DDT	1.2	Zinc	300

\* Bechtel, 2006. *Final Feasibility Study Report, IR Site 1, 1943-1956 Disposal Area Alameda Point, Alameda, California, Volume I, Part B, Appendix C, p.C-27*

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## REMEDIAL ACTION OBJECTIVES (RAOs) GROUNDWATER

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PMO

Chemicals of Concern (COC)	Remedial Goal (µg/L)*	Chemicals of Concern (COC)	Remedial Goal (µg/L)*
<i>Volatile Organic Compounds (VOCs)</i>		<i>Metals</i>	
1,1-Dichloroethene	3.2	Arsenic	36
Benzene	71	Copper	3.1
Trichloroethene	81	Mercury	0.025
Vinyl Chloride	525	Nickel	8.2
<i>Semivolatile Organic Compounds (SVOCs)</i>		Silver	1.9
Bis(2-chloroethyl) ether	1.4	Zinc	81
Bis(2-ethylhexyl)phthalate	5.9		
2,4-Dimethylphenol	2,300		

\* Bechtel, 2006. *Final Feasibility Study Report, IR Site 1, 1943-1956 Disposal Area Alameda Point, Alameda, California, Volume 1, Part A, Table 3-3*

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## REMEDIAL ALTERNATIVES SOIL AREA 1, FORMER WASTE DISPOSAL AND BURN AREAS

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Remedial Alternative	Components of Remedial Alternative
S1-1	No Action
S1-2	Soil Cover, Wetlands Mitigation Plan (WMP), Institutional Controls (IC)
S1-3	Engineered Alternative Cap, WMP, and ICs
S1-4a	Excavation and Off-Site Disposal, Soil Cover, Radiological and MEC Sweep, WMP and ICs
S1-4b	Excavation and Off-Site Disposal, Engineered Alternative Cap, Radiological Screening and MEC Sweep, WMP, and ICs
S1-5	Complete Removal, WMP

**Wetlands Mitigation Plan (WMP):** A compensatory plan for the 2.1 acres of existing seasonal wetlands that will be impacted during installation of the soil cover.

**Institutional Controls (ICs):** ICs limit the use of land or activities that take place within an area.

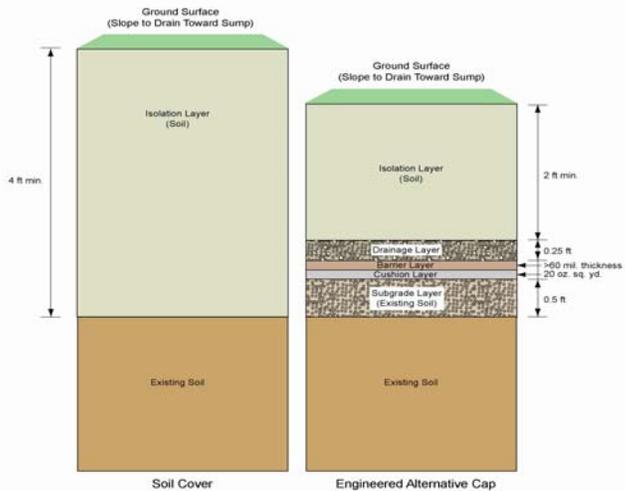
**Radiological and MEC Sweep:** Would be conducted in the excavation area prior to excavation. Radiological screening would continue after each one foot of excavation depth. Radium impacted waste in the excavated soil/debris would be segregated and disposed separately from other soil and debris.

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# SOIL COVER AND ENGINEERED ALTERNATIVE CAP

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# REMEDIAL ALTERNATIVES SOIL AREA 2, PAVED AREAS (OUTSIDE DISPOSAL AREAS)

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Remedial Alternative	Components of Remedial Alternative
<b>S2-1</b>	No Action
<b>S2-3</b>	Pavement Maintenance, ICs
<b>S2-4</b>	Pavement Demolition, Excavation and Off-Site Disposal, Radiological Screening, and MEC Sweep, Removal of Soil Hot Spots, ICs



## REMEDIAL ALTERNATIVES SOIL AREA 3, UNPAVED AREAS OUTSIDE DISPOSAL AREAS

**BRAC  
PMO**

Remedial Alternative	Components of Remedial Alternative
S3-1	No Action
S3-4	Tier 2 Ecological Risk Assessment, Hot Spot Relocation, ICs, WMP
S3-5	Tier 2 Ecological Risk Assessment, Hot Spot Removal, and Off-Site Disposal, ICs, WMP

**Wetlands Mitigation Plan (WMP):** Little or no impact to the wetlands, but any impacts would be addressed in a wetlands mitigation plan.

**Tier 2 Ecological Risk Assessment:** Collect soil samples from the wetlands to confirm if chemical concentrations exceed remediation goals.

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## REMEDIAL ALTERNATIVES SOIL AREA 4, FIRING RANGE BERM

**BRAC  
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Remedial Alternative	Components of Remedial Alternative
S4-1	No Action
S4-2	Removal, Screening, Relocation
S4-3	Removal, Screening, and Relocation/Off-Site Disposal
S4-4	Removal, Screening, Off-Site Disposal

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## REMEDIAL ALTERNATIVES SOIL AREA 5, SHORELINE AREAS

**BRAC  
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Remedial Alternative	Components of Remedial Alternative
S5-1	No Action
S5-3	Confirmation Sampling, ICs
S5-4	Confirmation Sampling, Hot Spot Relocation, ICs
S5-5	Confirmation Sampling, Hot Spot Relocation, Shoreline Debris Relocation, ICs
S5-6	Confirmation Sampling, Hot Spot Removal, Shoreline Debris Removal, ICs

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## REMEDIAL ALTERNATIVES SITE-WIDE RADIUM-IMPACTED SOIL

**BRAC  
PMO**

Remedial Alternative	Components of Remedial Alternative
S6-1	No Action
S6-4	Removal of Radium-Impacted Waste in Areas 3 and 5 and One Location in Area 1b, Cover/Cap Remaining Radium-Impacted Waste in Area 1, WMP
S6-5	Removal of All Radium-Impacted Soil and Items, WMP

**Wetlands Mitigation Plan (WMP):** Little or no impact to the wetlands, but any impacts would be addressed in a wetlands mitigation plan.

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## REMEDIAL ALTERNATIVES GROUNDWATER

BRAC  
PMO

Remedial Alternative	Components of Remedial Alternative
GW1	No Action
GW2	Source Removal, WMP, Monitoring, ICs
GW3	In Situ Chemical Oxidation (ISCO), MNA, Monitoring, ICs
GW4	In Situ Bioremediation (ISB) and MNA, Monitoring, ICs
GW5a	Zero-Valent Iron (ZVI) Powder Injection and MNA, Monitoring and ICs
GW5b	Source Removal, ZVI Powder Injection and MNA, Monitoring, and ICs

**ISCO:** Treatment that accelerates breakdown of contaminants by injecting oxidizing chemicals into groundwater.

**ISB:** Treatment involving injection of chemicals into contaminated groundwater to accelerate the natural degradation of contaminants into nonharmful byproducts.

**ZVI:** Treatment involving injection of iron pellets into contaminated groundwater to promote chemical degradation of contaminants into nonharmful byproducts.

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## REMEDIAL ALTERNATIVES: COMPARISON CRITERIA

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### National Contingency Plan (NCP) Evaluation Criteria

1. Overall protection of human health and the environment
2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)
3. Long-term effectiveness and permanence
4. Reduction of toxicity, mobility, or volume through treatment
5. Short-term effectiveness
6. Implementability
7. Cost
8. State acceptance
9. Community acceptance

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## COMPARATIVE ANALYSIS AREA 1, FORMER WASTE DISPOSAL AND BURN AREAS

**BRAC  
PMO**

Alternatives	Protective Overall?	Compliance with ARARs?	Long-Term Effectiveness/ Permanence	Reduction of Toxicity, Mobility, or Volume through Treatment	Short-Term Effectiveness	Implement-ability	Cost (\$M)
S1-1: No Action	No	NA	○	○	○	●	0
S1-2: Soil Cover, WMP, and ICs	Yes	Yes	◐	○	●	●	3.3
S1-3: Engineered Alternative Cap, WMP, and ICs	Yes	Yes	◐	○	◐	◐	15.1
S1-4a: Removal of Waste from Area 1b, Soil Cover for Area 1a, and ICs	Yes	Yes	◑	○	●	◑	18.1
S1-4b: Removal of Waste from Area 1b, Engineered Alternative Cap for Area 1a, and ICs	Yes	Yes	◐	○	◐	○	24.0
S1-5. Complete Removal	Yes	Yes	●	◐	○	○	91.9

Notes: Text in green indicates preferred alternative. ○ = Low; ◐ = Moderate; ● = High.

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## COMPARATIVE ANALYSIS AREA 2, PAVED AREAS OUTSIDE DISPOSAL AREAS

**BRAC  
PMO**

Alternatives	Protective Overall?	Compliance with ARARs?	Long-Term Effectiveness/ Permanence	Reduction of Toxicity, Mobility, or Volume through Treatment	Short-Term Effectiveness	Implement-ability	Cost (\$M)
S2-1: No Action	No	NA	○	○	○	●	0
S2-3: Pavement Maintenance and ICs	Yes	Yes	◑	○	●	●	0.3
S2-4: Demolition, Sampling, Hot Spot Removal, and ICs	Yes	Yes	●	◐	◐	○	4.7

Notes: Text in green indicates preferred alternative. ○ = Low; ◐ = Moderate; ● = High.

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## COMPARATIVE ANALYSIS AREA 3, UNPAVED AREAS OUTSIDE DISPOSAL AREAS

**BRAC  
PMO**

Alternative	Overall Protection of Human Health and Environment	Compliance with ARARs	Long-Term Effectiveness/ Permanence	Reduction of Toxicity, Mobility, or Volume via Treatment	Short-Term Effectiveness	Implementability	Cost (\$M)
S3-1: No Action	No	Not Applicable	○	○	○	●	0
S3-4: Tier 2 Ecological Risk Assessment, Hot Spot Relocation, and ICs	Yes	Yes	●	○	◐	◐	0.5
S3-5: Tier 2 Ecological Risk Assessment, Hot Spot Removal, and ICs	Yes	Yes	●	◐	○	◐	1.8

Notes: Text in green indicates preferred alternative. ○ = Low; ◐ = Moderate; ● = High. 24



## COMPARATIVE ANALYSIS AREA 4, FIRING-RANGE BERM

**BRAC  
PMO**

Alternatives	Protective Overall?	Compliance with ARARs?	Long-Term Effectiveness/ Permanence	Reduction of Toxicity, Mobility, or Volume through Treatment	Short-Term Effectiveness	Implementability	Cost (\$M)
S4-1: No Action	No	NA	○	○	○	●	0
S4-2: Removal, Screening, and Relocation	Yes	Yes	○	○	●	●	0.3
S4-3: Removal, Screening, and Relocation/Off-Site Disposal	Yes	Yes	◐	◐	◐	◐	1.4
S4-4: Removal, Screening, and Off-Site Disposal	Yes	Yes	●	◐	○	○	1.9

Notes: Text in green indicates preferred alternative. ○ = Low; ◐ = Moderate; ● = High. 25



## COMPARATIVE ANALYSIS AREA 5, SHORELINE AREAS

**BRAC  
PMO**

Alternatives	Protective Overall?	Compliance with ARARs?	Long-Term Effectiveness/ Permanence	Reduction of Toxicity, Mobility, or Volume through Treatment	Short-Term Effectiveness	Implement-ability	Cost (\$M)
S5-1: No Action	No	NA	○	○	○	●	0
S5-3: Confirmation Sampling and ICs	Yes	Yes	○	○	●	●	0.4
S5-4: Confirmation Sampling, Hot Spot Relocation, and ICs	Yes	Yes	○	○	◐	◐	1.4
S5-5: Confirmation Sampling, Hot Spot Relocation, Shoreline Debris Relocation, and ICs	Yes	Yes	◐	○	◐	○	2.2
S5-6: Confirmation Sampling, Hot Spot Removal, Shoreline Debris Removal, and ICs	Yes	Yes	●	◐	○	○	5.9

Notes: Text in green indicates preferred alternative. ○ = Low; ◐ = Moderate; ● = High.



## COMPARATIVE ANALYSIS SITE-WIDE RADIUM-IMPACTED WASTE

**BRAC  
PMO**

Alternatives	Protective Overall?	Compliance with ARARs?	Long-Term Effectiveness/ Permanence	Reduction of Toxicity, Mobility, or Volume through Treatment	Short-Term Effectiveness	Implement-ability	Cost (\$M)
S6-1: No Action	No	Not Applicable	○	○	○	●	0
S6-4: Removal of Radium-Impacted Waste in Areas 3 and 5 and in One Location of Area 1b, and Cover/Cap Remaining Radium-Impacted Waste in Area 1	Yes	Yes	◐	◐	●	◐	2.1
S6-5: Removal of all Radium-Impacted Waste	Yes	Yes	●	●	○	○	14.7

Notes: Text in green indicates preferred alternative. ○ = Low; ◐ = Moderate; ● = High.



## COMPARATIVE ANALYSIS GROUNDWATER

**BRAC  
PMO**

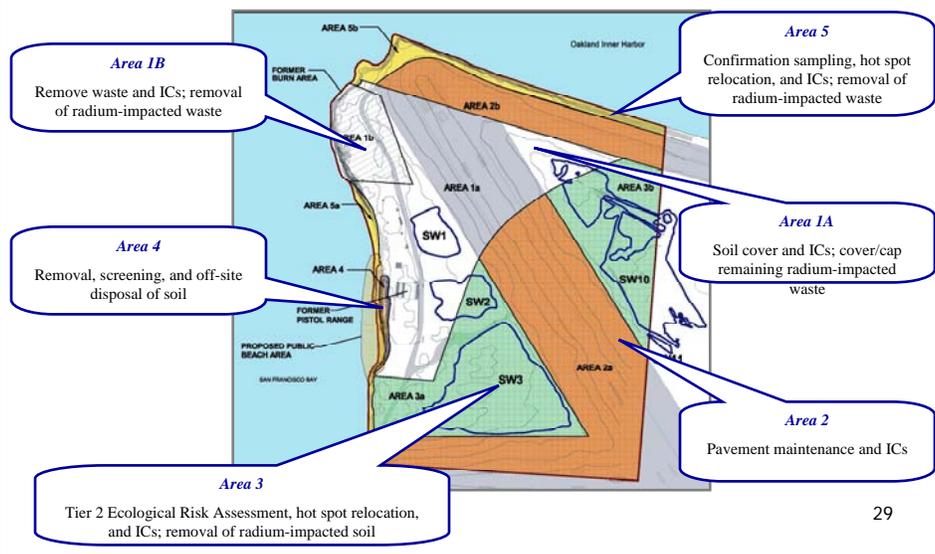
Alternative	Protective Overall?	Compliance with ARARs	Long-Term Effectiveness/Permanence	Reduction of Toxicity, Mobility, or Volume via Treatment	Short-Term Effectiveness	Implementability	Cost (\$M)
GW1: No Action	No	NA	○	○	○	●	0
GW2: Source Removal, MNA, Monitoring, and ICs	Yes	Yes	◐	◐	○	◐	7.2
GW3: ISCO, MNA, Monitoring, and ICs	Yes	Yes	●	●	◐	○	6.0
GW4: ISB, MNA, Monitoring, and ICs	Yes	Yes	●	◐	◐	◐	6.1
GW5A: ZVI Powder Injection, MNA, Monitoring, and ICs	Yes	Yes	●	◐	◐	○	8.8
GW5B: Source Removal, ZVI Powder Injection, MNA, Monitoring, and ICs	Yes	Yes	●	●	◐	●	8.7

Notes: Text in green indicates preferred alternative. ○ = Low; ◐ = Moderate; ● = High.



## PREFERRED SOIL ALTERNATIVES

**BRAC  
PMO**





## PREFERRED SITE-WIDE RADIUM-IMPACTED SOIL ALTERNATIVE

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- **Removal and dispose off site all soil impacted by radium (except Area 1a)**
- **Final Status survey following removal action**
- **Navy expediting this alternative under a time-critical removal action (TCRA)**

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## PREFERRED GROUNDWATER ALTERNATIVE

BRAC  
PMO

- **Treat VOC groundwater plume using**
  - In situ chemical oxidation (ISCO)
  - Monitored natural attenuation (MNA)
- **Long-term monitoring of metals and VOCs to ensure permanent reduction of VOCs and associated risks**
- **Institutional Controls (ICs) to restrict well installation or construction without Navy and agency consent**

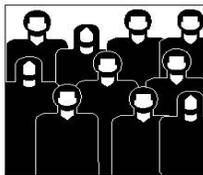
31



## NEXT STEPS

**BRAC  
PMO**

- **Public comments on the proposed plan due October 27, 2006**
- **Response to public comments provided in a responsiveness summary in the record of decision (ROD)**
- **Document the preferred alternative in the ROD**
- **Public notice in the local newspaper to announce the availability of the signed ROD**
- **Prepare the remedial design and remedial action work plan**
- **Implement remedy**



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## ADDITIONAL INFORMATION

**BRAC  
PMO**

### Site Contacts

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<p><b>Ms. Dot Lofstrom</b> Project Manager Department of Toxic Substances Control 8800 California Center Drive Sacramento, CA 95826 (916) 255-6449</p>	<p><b>Mr. Eric Simon</b> Project Manager San Francisco Bay RWQCB 1515 Clay Street, Suite 1400 Oakland, CA 94612 (510) 622-2300</p>

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## COMMENT INFORMATION

**BRAC  
PMO**

- Public comment period, September 27 to October 27, 2006
- Public meeting, October 24, 2006 at Main Office Building, 950 West Mall Square, Room 201, 6:30pm to 8:00pm
- Mail, email, or fax comments:

**Mr. Thomas Macchiarella**

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