FINAL
NAVAL AIR STATION ALAMEDA RESTORATION ADVISORY BOARD
MEETING SUMMARY

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

December 7, 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:	
Jim Barse	Community member
Andrew Baughman	BRAC PMO-West, Remedial Project Manager (RPM)
Doug Biggs	Alameda Point Collaborative (APC) Representative
Dan Carroll	Kleinfelder/Bechtel
Anna-Marie Cook	U.S. Environmental Protection Agency (EPA)
Tommie Jean Damrel	Tetra Tech EM Inc. (Tetra Tech)
Alona Davis	Sullivan International Group (Sullivan)
Diana Davis	Environmental Management Services, Inc. (EMS)
Michele Dermer	Bechtel
Jamie Hamm	Sullivan
Linda Henry	Brown & Caldwell
Michelle Hurst	BRAC PMO-West Remedial Project Manager (RPM)
Joan Konrad	RAB
James Leach	RAB
Dot Lofstrom	California Environmental Protection Agency (Cal/EPA) Department of Toxic Substances Control (DTSC)
John McMillan	Shaw Environmental and Infrastructure, Inc. (Shaw)
Kurt Peterson	RAB
Peter Russell	Russell Resources, Inc./City of Alameda
Erich Simon	Regional Water Quality Control Board (Water Board)

Dale Smith	RAB/Golden Gate Audubon Society
Peter Strauss	RAB advisor for the technical assistance for public participation (TAPP) grant
Cathy Stumpenhaus	Bechtel
Jean Sweeney	RAB
Jim Sweeney	RAB
Michael John Torrey	RAB/Housing Authority of the City
Travis Williamson	Battelle

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 meeting attendees introduced themselves. He said that absences are excused for Bert Morgan and Neil Coe. Mr. Humphreys asked for comments on the minutes from the RAB meeting held on November 2, 2006.

Mr. Macchiarella provided the following comment:

- Front page of Attachment B, items B-4 and B-6, the words "presented by" will be removed.

Mr. Humphreys provided the following comments:

- Page 4 of 9, first paragraph, the following sentence will be inserted before the last sentence, "Mr. Williamson said that there were no VOCs *[volatile organic compounds]* or benzene at Site 2, but that PCBs *[polychlorinated biphenyls]* were present."
- Page 6 of 9, first paragraph, the sentence "Mr. Leach noted that his calculations for removing 8 feet of soil over the landfill would result in 32 barges for soil removal and at the Navy's cost it would be $10 million a day," will be revised to, "Mr. Leach noted that his calculations for removing 8 feet of soil over the landfill would result in 32 barges for soil removal. Based on this amount, the Navy's cost would be $10 million a day."
- Page 6 of 9, last paragraph, last sentence, the statement "elevated background concentrations" will be replaced with "higher cleanup goal concentrations."
- Page 7 of 9, second paragraph, last sentence, "3,600 years" will be changed to "1,600 years."
- Front page of Attachment B, item B-6, "Site 1"will be changed to "Site 2."
- Cover page of Attachment B-6, "Site 1" will be replaced with "Site 2."

Ms. Smith provided the following comments:

- Page 7 of 9, fifth paragraph, sixth line, the word "form" will be changed to "from."
- Page 8 of 9, last paragraph, first sentence, the word "protect" will be changed to "protective."

Ms. Lofstrom provided the following comment:

- Page 9 of 9, last full paragraph, the statement, "DTSC has agreed to compromise on the origin of the fill material for the soil cap," will be revised to, "DTSC has agreed to compromise on a less prescriptive soil cap."

The minutes were approved as amended.

II. Co-Chair Announcements

Mr. Humphreys distributed the list of documents the RAB received during November 2006 (Attachment B-1). Noteworthy documents received include the proposed plan (PP) for Site 27.

Mr. Humphreys said that the RAB met during the month with Mr. Peter Strauss, the TAPP grant consultant. After the meeting, the RAB drafted a comment letter and attached Mr. Strauss' edited comments. Mr. Humphreys provided a copy to be included in the attachments (Attachment B-2).

Mr. Macchiarella reminded the RAB that the Site 27 PP is available for review and that the public comment period is open November 20 to December 22. The public meeting is scheduled for December 12. He added that the annual newsletter, *Alameda Point Focus*, will be mailed out in January 2007 and will include special articles on record of decisions (RODs) and a technology update at Site 26. Mr. Macchiarella added that he provides the RAB a review of the projects from the past year normally during the December meeting, but because the agenda is full, his update will be postponed until January 2007.

III. Vote for Community Co-Chair

Mr. Macchiarella said that the nominations were made in November and that Mr. Humphreys was the only nominee. He then asked the RAB members for a vote on Mr. Humphreys. The vote was unanimous for Mr. Humphreys to continue as community co-chair for the next year.

IV. Site 27 Proposed Plan

Mr. Humphreys introduced Ms. Michelle Hurst and Mr. Dan Carroll to present the Site 27 PP. A handout of the presentation is included as Attachment B-3. Ms. Hurst noted that she became project manager for Site 27 recently. The last presentation to the RAB on Site 27 was the feasibility study (FS) in November 2005; in December 2005, the RAB voted to support Alternative 6B, which was discussed further in the presentation.

The topics of the presentation included the purpose of the PP, aerial photos and a site history of Site 27, regulatory agency involvement, a summary of the remedial investigation (RI) and the risk from soil and groundwater, a summary of alternatives in the feasibility study (FS), details of the preferred alternative, and the status of the project.

The presentation summarized the investigations and work on Site 27 to date; presented the preferred alternative, full-scale in situ chemical oxidation (ISCO) to clean up groundwater (referred as Alternative 6B in the PP); and informed the public that the Navy and regulatory agencies are working together and have agreed with the preferred alternative.

Slide 4 was a map showing the location of Site 27 on Alameda Point. Slide 5 showed historical aerial photographs from 1937 and 1947 of the area that is currently Site 27. In 1937, the area that is now Installation Restoration (IR) Site 27 was part of San Francisco Bay. By 1945, the site was filled and paved, and Building 168 was constructed in 1946. The Navy used the site for ship repair and painting, vehicle wash-down, equipment and materials staging and storage, and chemical handling and storage in Building 168. Currently the site is leased for similar uses. Mr. Peterson asked about the depth of the

water in the area of Site 27 in 1937. Ms. Stumpenhaus was not able to directly answer his question, but replied that the bay is approximately 20 feet deep off shore.

The original size of the site was 2.2 acres at the former location of removed tanks and was expanded to 15.8 acres to include contamination identified in the remedial investigation (RI). The site is bounded by the Seaplane Lagoon to the west. Most of the site is paved or covered by structures with a small grass-covered area. Current photos of the site were shown on Slides 8 and 9. Ms. Hurst identified Building 168, the Seaplane Lagoon, and Ferry Point Road in the photos. She noted that the eastern boundary of the site is the east side of Building 168. Mr. Peterson asked where the small grass-covered area is on the map. Ms. Hurst identified the area on the map. Ms. Sweeney asked if Nelson's Marine is the tenant in Building 168. Ms. Stumpenhaus said that Nelson's Marine does not occupy Building 168.

Mr. Humphreys asked for clarification on the current use of Building 168. Ms. Hurst replied that the current uses are similar to previous uses. Mr. McMillan clarified that Building 168 is occupied by a reserve fleet with uses similar to former Navy activities. Mr. Macchiarella noted that the city, and not the Navy, leases the buildings to tenants. Mr. Peterson asked about the nature of the lines between the road and Building 168 in the aerial photo from 1947. Ms. Stumpenhaus replied that it was a staging area for loading and offloading docked ships.

Ms. Hurst introduced Mr. Carroll to continue the presentation. Mr. Carroll noted that the RI was completed 2 years ago. Using data from the RI, the FS presented several remedial options, and one for groundwater was chosen for the PP. Mr. Carroll also said that no specific contaminant sources were found in the soil during the RI; therefore, no further action is recommended for soil. Mr. Peterson asked if pollutants that originated from inside the building could pass through soil and now remain only in groundwater. Mr. Carroll replied that the scenario is possible because groundwater is shallow at 4 to 6 feet below ground surface (bgs); the soil is thin and sandy. Given these conditions, the contaminants would not be expected to be retained in the soil and would leach into groundwater.

The RI identified primarily chlorinated solvents or VOCs in the groundwater. Over time, solvents degrade naturally through bacterial processes and only the daughter products created by the breakdown remain. Several compounds were found that were mostly from specific solvent spills. The RI data also showed arsenic at concentrations above drinking water standards. It is believed that the arsenic is present as a result of the natural arsenic leaching from the soil and will no longer be a problem once the VOCs have been remediated. There were undocumented chemical releases at the site, but the extent of the solvents in groundwater has been delineated. Mr. Peterson asked if equipment was repaired and cleaned inside or outside of the building. Mr. Carroll replied that groundwater contaminants have mainly been found just outside the building and that a likely cause would be spills, but he added that there is no clear source. Mr. Peterson asked if soil samples were collected beneath Building 168. Mr. Carroll replied that they have been collected beneath the building. Ms. Stumpenhaus said that samples were obtained by drilling through the floor.

Slide 13 was a map that showed the plume of VOCs in groundwater under Site 27. Mr. Carroll identified the areas where the highest concentrations of solvents were found in groundwater. Concentrations in these areas were higher than 0.1 parts per million (ppm) or 100 parts per billion (ppb). Alternatives were developed to address these areas and were called "source area treatment alternatives" or "higher concentration source alternatives." Other alternatives addressed the entire groundwater plume.
Mr. Carroll identified the outermost contour that represents areas with concentrations that exceed drinking water standards, which is 0.5 ppb for vinyl chloride.

Ms. Sweeney asked if there is a retaining wall along the wharf. Mr. Carroll identified the area on the map and replied that a sheet pile wall was driven in during construction of that section of the island in the early

1940s. Ms. Sweeney asked if the groundwater plume penetrated this wall. Mr. Carroll replied that there has been no investigation to determine if the wall remains. He added that there may be some residual iron, but that it would not be expected to be a competent wall. He added that it would not constrain the groundwater plume. Ms. Sweeney asked about the depth of the wall. Ms. Stumpenhaus replied that the wall is 18 feet deep. She added that sheet piles were installed along the northern part of Seaplane Lagoon and then filled with concrete. The area discussed contained only a row of sheet piles, so the wall was never solid. Ms. Dermer commented that the RAB members could review construction drawings after the meeting.

The RI summarizes risks posed to people and the environment. The definition of risk is the likelihood or probability that a hazardous substance released to the environment would cause adverse effects on exposed human or ecological receptors. The only pathway of concern for human health was a site resident drinking or showering in the groundwater. Therefore, drinking water standards were considered as cleanup goals for the site. Possible ecological risk was reviewed in depth because it appeared that low concentrations of contaminants may be entering the bay, but no risk was identified.

Ms. Sweeney asked for clarification on ecological risk. Mr. Carroll replied that risk to benthic organisms — organisms such as clams and worms that live in the sediment — was evaluated in the RI, and there was no risk to these animals. Ms. Sweeney then asked why the site is being cleaned up. Mr. Carroll replied that the site is being cleaned up because solvents in groundwater are at concentrations higher than drinking water standards, and drinking water standards apply to this site.

Ms. Smith asked if any benthic species were found during this investigation. Mr. Carroll replied that the investigation compared the concentrations in groundwater with standards that might have an impact on the species. Ms. Smith commented that the study did not identify benthic species but instead considered only the chemical concentrations. Ms. Henry replied that toxicity was evaluated but no risk was found for VOCs because VOCs do not tend to accumulate in marine organisms, as do other contaminants such as metals.

The remedial action objectives were to protect beneficial uses of groundwater and surface water because the site adjoins the lagoon, to prevent domestic use of groundwater, and that the cleanup goals would be based on the drinking water standards (maximum contaminant levels [MCLs]).

A list of remedial alternatives was developed in that context. Natural attenuation processes were considered because the solvents break down naturally. Both source area and full-scale in situ bioremediation (ISB) treatments were considered, which include means to enhance the natural breakdown process with vegetable oil or similar substances. Air sparging was considered, in which air is bubbled into the groundwater to volatilize the chemicals. Source area and full-scale in situ chemical oxidation (ISCO) treatments were also considered. The preferred alternative is Alternative 6B, full-scale ISCO, which will address the entire plume that was shown on Slide 13. The alternatives are put through a detailed comparative analysis with the nine criteria that are established in federal regulations. The preferred alternative, Alternative 6B, has high long-term effectiveness and permanence, and it reduces toxicity, mobility, or volume through a treatment well. Alternative 6B rated lower in implementability because of the amount of site work to be conducted. This extensive field work would include drilling about 600 injection points and will require months to implement. This technology is proven and has been used at Alameda Point numerous times in the past.

Mr. Peterson asked about the cleanup timeframe for the alternatives. Mr. Carroll answered that some of the alternatives would require up to 70 years to reach drinking water standards. The preferred Alternative 6B will reach the drinking water standards in about 6 months, followed by a period of groundwater monitoring. Mr. Peterson commented that the short-term effectiveness should have a higher preference.

Mr. Carroll replied that short-term effectiveness does not consider only time, but also how long is required to put the remedy in place and how long the remedy takes to reach the goals. Alternative 6B is the fastest means to clean up the site. Slide 17 showed a chart comparing each of the alternatives.

Mr. Carroll explained that Fenton's chemistry employs an oxidizer, such as hydrogen peroxide, that is injected into the ground and activated with iron, creating a strong oxidizing process that destroys the solvents in the water. Modified Fenton's process removes some of the negative aspects of that strong process. There is no significant rise in temperature — only about 1 to 2 degrees in the groundwater — and it is near-neutral pH, so the process does not mobilize metals. The chemistry was previously used effectively at Site 9, which is several hundred yards southeast of this site. Field work will take several months, and cleanup goals should be met within 6 months. Monitoring and sampling of groundwater will verify that goals have been met.

The PP was mailed to 750 interested parties and should have been received on November 20, 2006. The public comment period has been ongoing for 2 weeks and will end on December 22, 2006. This same presentation will be given during the public meeting on Tuesday, December 12, 2006.

In reference to the VOC plume map, Ms. Konrad asked about the toxicity of total VOCs at a concentration of 100 micrograms per liter (µg/L). Mr. Carroll answered that it is about 50 to 100 times the drinking water standards, which range from 0.5 to 5 µg/L. It does not pose a risk to people unless they drink it or shower in it. Ms. Konrad then pointed out that the 100 µg/L area of the plume is only about 150 feet from the lagoon and asked whether the plume would migrate into the lagoon. Ms. Henry answered that the remedial goals for this site — drinking water standards — would be protective of the organisms in the lagoon. Ms. Sweeney asked if the water was tested at the edge of the lagoon. Ms. Henry replied that only groundwater was sampled and not bay water. Mr. Carroll commented that the Navy continues to sample a number of wells near the edge of the lagoon shown in the southeastern corner of the map. Concentrations have decreased over the last 15 years and are currently at or near drinking water standards. Mr. Humphreys asked if levels could be a result of tidal action that causes dilution by sea water. Mr. Carroll replied that part is a result of dilution and part is caused by more aggressive bacterial action in that area. Mr. Macchiarella noted that a RAB presentation in 2005 showed dilution by water from the lagoon was not the only factor that decreased the concentrations in groundwater.

Ms. Konrad asked for the depth of the fresh water table. Ms. Stumpenhaus replied that depth to the top of the water table is 5 to 6 feet bgs and that fresh water extends to 15 feet bgs. Mr. Humphreys asked if the risk to humans from showering would be posed by vapor inhalation instead of drinking. Mr. Carroll replied that the domestic use includes drinking and volatilization in the shower. Mr. Humphreys asked if there was risk to the workers inside the buildings from volatilization of chemicals such as vinyl chloride. Mr. Carroll replied that the risk was evaluated and found not to be a concern. Ms. Henry said that two risk assessments for indoor air inhalation were completed for the building. Mr. Sweeney asked about movement of the plume. Mr. Carroll replied that, over time, solvent plumes stop migrating, become stable, and then begin contracting. This plume is stable.

Referring to the table that compares alternatives, Mr. Peterson commented that Alternative 3 has the best short-term effectiveness. Mr. Carroll replied that Alternative 3 is easy and quick to implement and requires no drilling. Mr. Peterson then asked why implementability is included in short-term effectiveness. Mr. Carroll replied that the EPA diagram in the PP defines short-term effectiveness, which includes protection of human health during construction and time to reach remediation goals. He added that institutional controls could be implemented within a few months.

V. Observations on Site 2 FS

Mr. Humphreys introduced Mr. Strauss, the TAPP grant advisor to the RAB. His presentation focused on the FS for Site 2. A handout of the presentation is included as Attachment B-4. Slide 2 shows a list of the documents that were reviewed. They include the Site 2 draft FS, the Site 2 RI and appendices, the initial assessment study (IAS), the geotechnical FS, a report on removal of buried radioactive devices from 1999, the historical radiological assessment (HRA) report from 2000, and the radiation survey.

Slide 3 was a map of the wetlands within Site 2. Mr. Strauss identified the footprint of the landfill, the salt marsh wetlands, seasonal wetlands, the radioactive waste storage shack, and the slurry wall on the Site 2 map. He noted that the landfill overlaps the salt marsh wetlands in some areas. The slurry wall was built in the 1980s to prevent migration of waste into the bay.

Slide 4 showed the approximate location of wastes identified in the IAS. Mr. Strauss pointed out that dredge spoils were removed from the Seaplane Lagoon.

The objectives of the FS are to develop remediation goals, assess suitable remediation strategies, and select an appropriate remediation plan. Mr. Strauss was concerned that the recommendations to implement soil Alternative 2 and groundwater Alternative 2 were not the appropriate remedies. He commented that the recommended alternative may be subject to change after further review.

The FS is followed by the PP and then the ROD, which is the key legal framework for cleanup and presents a strategic plan for achieving the remediation goals. Once the ROD is signed, there is no requirement to include the community in decision making in a substantial way. Mr. Strauss pointed out that today's meeting is an opportune time to comment on the plan.

Mr. Strauss noted that his comments would be presented in four categories, which he described as (1) things that are known, (2) things that are unknown, (3) things that are off the radar screen, and (4) questions, followed by a period for comments and opinions.

The comments are divided into information categories including site characteristics, delineation of waste, landfill construction, contaminants and contaminant distribution, fate and transport, monitoring, human health risk assessment (HHRA), ecological risk assessment (ERA), seismic stability, future use, remedial options, and applicable or relevant and appropriate requirements (ARARs).

Mr. Strauss noted two comments on site characteristics. Shallow groundwater may be in communication with the bay and the wetland ponds, providing a transport mechanism for dissolved contaminants. He said that there is no analysis of the potential migration of contaminants from Site 2 to offshore and subsequent effects on ecological receptors in the bay.

Regarding delineation of waste, Mr. Strauss questioned the extent that the Navy has defined the eastern boundary of the landfill. He commented that a small portion of the north pond, which is part of the wetland, was surveyed but that it was unclear what was found. He was concerned that the radiation survey of Site 2 did not include the wetland portion of Site 2. No trenches were dug in the wetlands to further delineate the waste. Dredge spoils in the wetlands came from the Seaplane Lagoon, where nuclear ships were docked and maintained, but the content of the spoils is unclear. Reports say that waste was moved to the landfill in a "closed process."

Ms. Sweeney asked about the meaning of closed process. Mr. Strauss replied that waste was contained on board a ship, and then the waste was transported to the landfill in a way that no contamination was released. He then recommended that the Navy determine the content of these dredge spoils. He noted

that it is possible that radiation surveying of the wetlands would require dewatering, which would cause some wetland destruction. Mr. Williamson commented he could not speak about the radiological survey, but that he was aware that some samples collected from the wetlands were analyzed for radioisotopes. Mr. Strauss then said that four samples were collected from that area. Mr. Peterson asked when the dredged soil was placed in the landfill. Mr. Strauss replied that it may have been more than 20 years ago. Mr. Humphreys commented that radium was used for painting radium dials in Building 5 that entered the storm drains and was transported into the Seaplane Lagoon. He added that dredged material from the lagoon would likely contain radium. He said that the radiation found is probably from radium from Building 5, rather than radioactive waste from the ships. Ms. Sweeney asked about the origin of the dredge material. Mr. Strauss replied it came from the Seaplane Lagoon. Mr. Macchiarella commented that it is probable that the ships were not in the lagoon but instead were docked to the piers outside of the lagoon.

Mr. Strauss explained his comments regarding landfill construction. The slurry wall constructed in the 1980s along the western edge of the landfill "appears" to be effective. The existing cover, estimated to be 2 inches to 2 feet thick, is inconsistent and permeable. Birds nest along the berms that surround the landfill and should be protected during remediation. Mr. Leach asked about the meaning of "effective." Mr. Strauss replied that it means effective in stopping groundwater movement into the bay. He said that he would like additional confirmation because one of the remedial alternatives for groundwater is to expand the slurry wall.

There were several comments regarding contaminants and contaminant distribution. The FS states that there is a barrier between the first water bearing zone (FWBZ) and the second water bearing zone (SWBZ), but some of the same contaminants are found in both zones. Mr. Torrey asked if it was possible that the contaminants moved from the FWBZ to the SWBZ. Mr. Strauss said it may be possible that they are not completely confined layers. Little is known about quantity of drums, liquid wastes, waste oil, pesticides, and asbestos that were disposed of in the landfill. Ms. Sweeney commented that she thought no drums had been found. Mr. Strauss said drums were found at the radioactive waste storage shack. Items removed in the 1999 response action near the radioactive waste storage shack were radium dials and buttons and several unidentified objects. Mr. Strauss questioned whether they consisted of anything other than radium-226. Mr. Torrey asked about the term "rad" Mr. Strauss used in his presentation. Mr. Strauss replied that the "rad shack" was a radioactive waste storage shack and that much of the waste may have been radium-containing paints. Mr. Strauss said that high radium isotopes levels have been found in the groundwater monitoring well near the shoreline north of the wetlands. Mr. Strauss noted that they are five times higher than the drinking water standard, and he commented that it would be important to know whether the Navy has a plan to deal with this contamination. Ms. Sweeney asked if this contamination was in the vicinity of the "rad shack," and Mr. Strauss replied that it was. Mr. Humphreys asked if it was included in the Navy's time critical removal action (TCRA) for radioactivity. Mr. Strauss replied that he did not believe it was and noted that this contamination was in groundwater. He also noted that it is unclear how radium is mobilized from soil to groundwater. He commented that it would be important to know whether any investigations had studied transport of biocides such as tributyltin from sandblasting grit used for ship maintenance.

Mr. Strauss noted concerns that using China Camp State Park (CCSP) data to establish background levels may not be appropriate. He added that Site 2 was built with dredged fill of varying origins and that there is no relation between CCSP and Site 2, except for the possibility of similar sediment properties. Ms. Sweeney asked if CCSP also was created from dredged fill. Mr. Strauss replied that it was not. Mr. Peterson asked if anyone knew why China Camp data were used. Ms. Smith commented that the RAB had requested data that would represent "natural" conditions rather than use of data from elsewhere on the base. Mr. Williamson commented that there are limited options in finding a habitat similar to the wetlands at Site 2. There are similar wetlands at CCSP and this was one of the main lines of reasoning

for choosing China Camp. He also noted that data from China Camp were used as background only for the wetland areas at Site 2.

Mr. Strauss noted that it is recognized that erosion could play a substantial role in movement of contamination. He was concerned that there are plumes of benzene and chlorobenzene in the FWBZ and that episodic precipitation events could play a role in transporting contaminants. He commented that transport of contaminants via groundwater should be controlled. He also pointed out that it is possible that groundwater from the landfill could affect groundwater beneath wetland surface waters and surface water in the bay. He recommended that the Navy consider the factor of sea rises induced by global warming and subsequent flooding. He noted that some contaminants, such as radium 226, may be more prone to migrate when exposed to saltwater. Mr. Strauss identified the benzene plume on the map from Slide 2, showing that is under the landfill and ponds. Mr. Humphreys commented that page 5 of the minutes from the previous meeting indicate that Alternative 3 includes a hydraulic barrier that would surround the landfill. Mr. Strauss replied that the proposed slurry wall would be extended along the downgradient edge only and does not surround the landfill.

Mr. Strauss comments that monitoring included only three wells in the FWBZ within the landfill footprint. He said that it is unclear whether the Navy proposes additional monitoring wells in the landfill for the monitored natural attenuation (MNA) remedy.

There were five comments regarding the ERA. Mr. Strauss was concerned that aquatic organisms were not considered drivers for potential risk management. He pointed out that benthic organisms accumulate contaminants. Mr. Humphreys mentioned that the RI reported that no benthic organisms were found. Mr. Strauss replied that primarily sea worms were found in the wetlands. Ms. Sweeney asked what it meant when organisms accumulate contaminants. Mr. Strauss explained that in laboratory tests, organisms exposed to the sediment accumulated some of the contaminants in tissue. He was concerned that the ERA did not consider groundwater for any of the ecological receptors. He was also concerned that effects on migratory species along the Pacific flyway were not considered or evaluated. He further questioned how the wetland species were selected.

He offered three comments regarding seismic stability. Mr. Strauss noted that the geotechnical FS concluded that a cement gravity wall with stone columns would be the most feasible remedial strategy to mitigate seismic hazards. He compared the cost of earthquake drains at $4 or $5 per foot with the cost of stone columns at $75 per foot. He also suggested the Navy explain how earthquake drains work.

Mr. Strauss questioned the practicality of placing a wildlife refuge and educational center in an area that contains pesticides and other contaminants. He commented that children may be the primary site visitors and was concerned that this factor was not adequately considered in the HHRA. Mr. Torrey asked how animals might be relocated if it would not become a wildlife refuge. Mr. Strauss said he could not answer that question.

Mr. Strauss commented that the range of considered alternatives was reasonable and that remedies should be designed for ecosystem enhancement. Soil Alternative 2, a cap, was the selected preferred alternative. Groundwater Alternative 2, MNA, was the preferred alternative. No further remediation is planned for the wetland area. The $18 million cost difference between Alternatives 2 and 4 seemed high, especially if TCRA is avoided. He questioned the problems radioactive anomalies create for in situ technologies in soil, the contaminant load of the dredged material, and whether wetlands destroyed by the cap would have to be mitigated. There was no consideration of in situ biological treatments in groundwater to speed chemical breakdown. There was no discussion of remediation in the dredge spoil area or of hot spot removal outside of the “rad shack” area. Mr. Strauss noted that controlling infiltration would be an advantage for source control because MNA is proposed. To a large degree, MNA relies on sorption,

meaning that contaminants will attach themselves to soil particles, which inhibits their transport via groundwater. He questioned whether the Navy evaluated environmental changes that may release contaminants to the groundwater. He then commented that there is not sufficient evidence to support biodegradation and that recent groundwater data do not demonstrate that substantial attenuation is occurring. EPA requires that MNA control the source, be accomplished within a reasonable time frame, and be supported by multiple lines of evidence; however, none seem to be present in the FS. One groundwater option considered was to build a physical barrier on the downstream side of the landfill that would extend the existing slurry wall so that the landfill is isolated from the bay and wetlands. Mr. Strauss suggested that the gravity wall and hydraulic barrier should be designed together to reduce costs. Mr. Humphreys asked if by "gravity wall" he meant a seismic stability barrier. Mr. Strauss replied that the interpretation was correct. He also commented that the FS should specify treatment options in detail. He was also concerned whether any of the proposed actions would affect the seasonal wetlands.

Mr. Strauss agreed that State Water Resources Control Board Resolutions 68-16 and 92-49 apply to groundwater at Site 2, and he encouraged the Water Board to ensure compliance with the resolutions. He noted that the Navy does not want to treat residuals as Resource Conservation and Recovery Act (RCRA) wastes, but he recommends that the residuals be treated as RCRA waste.

Ms. Konrad asked how Mr. Strauss' comments would be used. Mr. Macchiarella replied that Mr. Strauss provides his comments to the RAB and, in turn, the RAB provides comments to the Navy, as was the case for the PP for Site 1. Those comments were submitted to the Navy, and the PP comments are addressed in the ROD. With respect to Site 2, the RAB comments will be addressed in the next version of the FS. Ms. Konrad commented that she does not feel capable of judging the comments by Mr. Strauss or of deciding whether his comments are correct. Mr. Macchiarella replied that after the Navy responds to the comments from the RAB and Mr. Strauss, the public will be able to judge whether the Navy agrees with a comment or the Navy's justification if it disagrees with a comment. Mr. Peterson commented that the RAB members still will decide if they agree with Mr. Strauss' concerns. Mr. Baughman commented that Mr. Strauss will be preparing a formal written letter of these comments that may be easier for the RAB to study and understand.

VI. Community and RAB Comment Period

Mr. Humphreys noted that the RAB should schedule time to meet with Mr. Strauss. He suggested a tentative date and time of Thursday, December 14, at 6:30 p.m.

Mr. Humphreys said that some time ago the RAB had brought up the question of lead chips that washed down from demolition of the water tower into the storm drains. He noted that the results should have been included in the FS by Bechtel. He asked about the results of the lead chip contamination in the storm drains. Mr. Macchiarella responded that the data were included in the Site 35 RI/FS. Ms. Cook noted that there was a detection in a sample from the storm drain that was higher than background and that it would be removed. Mr. Macchiarella stated he could provide a more complete answer later. Mr. Humphreys pointed out that there was a plan to drive concrete columns around Treasure Island for seismic stability that would cost $300 million. He asked why this plan would be selected if the earthquake drains were effective. Ms. Smith commented that the Treasure Island RAB deals only with remediation and not with development or building and that the Citizen's Advisory Board (CAB) discusses these issues.

The meeting adjourned at 8:20 pm.

ATTACHMENT A

NAVAL AIR STATION ALAMEDA
RESTORATION ADVISORY BOARD MEETING AGENDA
December 7, 2006

(One Page)

RESTORATION ADVISORY BOARD

NAVAL AIR STATION, ALAMEDA

AGENDA

DECEMBER 7, 2006, 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 - 6:40	**Approval of Minutes**	**Mr. George Humphreys**
6:40 - 6:50	**Co-Chair Announcements**	**Co-Chairs**
6:50 – 6:55	**Vote for Community Co-Chair**	**Mr. Thomas Macchiarella**
6:55 – 7:20	**Site 27 Proposed Plan Brief**	**Ms. Michelle Hurst & Mr. Dan Carroll**
7:20 – 7:45	**Site 2 Feasibility Study TAPP Advisor Observations**	**Mr. Peter Strauss**
7:45 – 8:00	**Community & RAB Comment Period**	**Community & RAB**
8:00	**RAB Meeting Adjournment**	
8:15– 8:30	**Informal discussions with BCT/RAB and Holiday Party***	**All**

*** RAB members: Bring your favorite small potluck item if you wish!**

ATTACHMENT B

NAVAL AIR STATION ALAMEDA
RESTORATION ADVISORY BOARD MEETING HANDOUT MATERIALS

B-1 List of Reports Received during November 2006, George Humphreys, RAB Community Co-Chair (One page)

B-2 Comments on the Proposed Plan for IR Site 1 and Review by TAPP Consultant, George Humphreys, RAB Community Co-Chair (18 pages)

B-3 Presentation on Proposed Plan for IR Site 27, presented by Michelle Hurst, Navy, and Dan Carroll, Kleinfelder/Bechtel (10 pages)

B-4 Presentation of Preliminary Observations of Draft Feasibility Study for IR Site 2, presented by Peter Strauss, TAPP Grant reviewer (14 pages)

ATTACHMENT B-1

LIST OF REPORTS RECEIVED NOVEMBER 2006

(One Page)

Restoration Advisory Board
Reports and Correspondence
Received during November 2006

Reports

1. Aug. 10, 2006, "Draft Final Field Workplan for Data Gap Sampling Installation Restoration Site 26, Alameda Point, Alameda, California", prepared by Innovative Technical Solutions, Inc. for BRAC Program Management Office West.
2. Oct. 27, 2006, "Draft Historical Radiological Assessment Report, Alameda Point, California", Prepared by Weston Solutions, Inc. for BRAC Program Management Office West.
3. Oct. 11, 2006, "Draft Time Critical Removal Action Work Plan, Installation Restoration Sites 1, 2, and 32 Former Naval Air Station Alameda, Alameda Point, Alameda, California", prepared by TetraTech EC, Inc. for BRAC Program Management Office West.
4. November 8, 2006, "Final Record of Decision, Site 17 Seaplane Lagoon, Alameda Point, Alameda, California", prepared by Battelle for BRAC Program Management Office West.
5. Oct. 20, 2006, "Draft Pre-Design Work Plan for Operable Unit 5/IR-02, Former FISC Annex, Alameda, California", prepared by TetraTech EC Inc., for BRAC Program Management Office West.
6. November 20, 2006, "Proposed Plan for IR Site 27, Dock Zone, Former NAS Alameda", BRAC Program Management Office West.

Correspondence

1. Oct. 19, 2006, (received Nov. 2, 2006), letter requesting 30-day extension for review of Draft Record of Decision for OU-1, IR Sites 6, 7, 8, and 16, Former NAS Alameda, Alameda Point, from Ms. Anna-Marie Cook, U. S. EPA Region IX to Mr. Thomas Macchiarella, BRAC Program Management Office West.
2. November 7, 2006, "Re : Draft Remedial Investigation/Feasibility Study Report IR Site 35, Areas of Concern in Transfer Parcel EDC-5, Alameda Point", from Ms. Anna-Marie Cook, U. S. EPA Region IX to Mr. Thomas Macchiarella, BRAC Program Management Office West.
3. November 9, 2006, "Draft Record of Decision Operable Unit 5/IR-02 Groundwater, Former Naval Air Station Alameda and Fleet Industrial Supply Center Oakland", from Ms. Anna-Marie Cook, U. S. EPA Region IX , to Mfr. Thomas Macchiarella, BRAC Program Management Office West.

ATTACHMENT B-2

RAB COMMENTS ON THE PROPOSED PLAN FOR IR SITE 1 AND REVIEW BY TAPP CONSULTANT

(18 Pages)

George B. Humphreys, RAB Co-chair
25 Captains Drive
Alameda, CA 94502-6417
November 10, 2006

Mr. Thomas L. Macchiarella
BRAC Environmental Coordinator
Department of the Navy
BRAC Program Management Office West
1455 Frazee Road, Suite 900
San Diego, CA 92108-4310

Subject: Comments on Proposed Plan for IR Site 1 and Review by TAPP consultant, Mr. Peter Strauss

Dear Mr. Macchiarella:

The community RAB members and RAB Audubon/Sierra Club representative have reviewed the attached letter and comments on the Proposed Plan prepared by the TAPP consultant Mr. Peter Strauss. The undersigned RAB members endorse and concur with Mr. Strauss's comments and conclusions.

Mr. Strauss has done an outstanding job of reviewing the myriad documents and background materials, considering the limited time available. We are deeply appreciative to the Navy for financing this TAPP grant review. Without this help, it would have been virtually impossible for us to devote the time and effort which would have been necessary to review this proposed plan.

Mr. Strauss's insightful analysis has brought to light a number of data gaps and uncertainties, particularly with regard to soil in Area 1a and contaminated groundwater. By fragmenting its assessment into different areas and media, the Navy may have eliminated from consideration certain holistic approaches such as a low-permeability cap, combined with a hydraulic barrier around the waste cell area and groundwater treatment. Further, the Navy's reluctance to commit to specific design criteria at this point in the process makes it difficult to evaluate or accept its preferred alternatives. Therefore, we have reluctantly concluded that Alternative S-1-5, "Complete Removal" is the only acceptable solution for soil in Area 1a(the waste-cell area).

Under Alternative S-1-5, it appears that the wastes removed would have to be scanned for radioactivity so that radium, and possibly other radioisotopes, could be separated out prior to the separate off-site disposal of radioactive and chemical hazardous wastes. This could circumvent the problem of disposing of "mixed wastes". During excavation it may be possible to identify and sort out inert, uncontaminated materials.

"Complete removal" would include excavation and removal of hazardous wastes in cells or other areas underneath the runway(s). The concrete rubble created by demolition of that portion of the runway(s) over the wastes probably would have a significant salvage value.

The contaminated groundwater would have to be pumped out of the excavation pits and extensively treated prior to disposal. Appropriate protective measures would have to be taken to protect workers against any hazardous gases and vapors, such as vinyl chloride. Finally, the excavated area would have to be backfilled with clean soil.

The many uncertainties associated with the Navy's preferred solution will continue to haunt Site 1 remediation until the waste cell hazardous materials are excavated and removed offsite. These unresolved problems include:

1. Whether a soil cap and shoreline seismic stability barrier can be designed adequate to meet a design basis seismic event
2. The difficulty of detecting cap failure and repairing it after the cap is covered up by the golf course
3. Transference to the City and/or park district of unacceptable costs for future cleanup and repair of the cap and perimeter bank failure due to inadequate seismic design criteria. This would include the cost of environmental damage insurance.
4. Whether the preferred in-situ chemical oxidation (ISCO) will be able to achieve cleanup goals for all groundwater contaminants
5. Whether the oxidative reagent (Fenton's reagent) or seawater will release other contaminants, such as radium and other metals, into the Bay
6. The lack of a definitive survey to identify special status species. This could substantially affect cleanup goals.
7. Possible future lowering of cleanup level goals for certain chemicals such as TCE, DCE, and vinyl chloride
8. There is a high probability that contaminated groundwater has been escaping into the Bay for many years.("Draft Alameda Basewide Annual Groundwater Monitoring Report, Spring 2006", Oct. 2006) The true mixing point at which these contaminants are mixing with Bay waters is apparently some distance inland from the shoreline. It is questionable whether the higher contaminant concentrations at this point were used in the ecological risk assessment.
9. Possible future damage to and release of Area 1a wastes due to global warming, rising sea levels and seismically generated tsunamis
10. The wastes in Site 1 have not been adequately characterized as to types, quantities, or location.

In retrospect, the disposal of hazardous wastes and materials into Sites 1 and 2, immediately adjacent to San Francisco Bay, was extremely ill-advised. Certainly, such practices would never be seriously considered today. The alternatives proposed by the Navy for closure of Site 1 do not even meet closure standards for landfills containing municipal wastes.

Now is the time to confront the inevitable conclusion that these wastes must be excavated and removed from the site. We are acutely aware that there are high costs associated with this approach, but further delaying hard decisions will, in the long run, make the costs even higher. This site closure will to be plagued with problems and questions, unless effective action is initiated soon.

Sincerely,

George B Humphreys

George B. Humphreys, P. E.
Restoration Advisory Board, Co-chair

Attachments: 1

Copies to:

Mr. Mark Ripperda, U. S. EPA Region 9

Ms. Dot Lofstrom, DTSC

Mr. Erich Simon, RWQCB

Mr. Frank Matarrese, Alameda City Council

PM STRAUSS & ASSOCIATES
Energy and Environmental Consulting Services

November 10, 2006

Thomas Macchiarella
BRAC Program Management Office
1455 Frazee Road, Ste. 900
San Diego, CA 92108
Attn: BPMOW.TLM

Subject: The Proposed Plan for Site 1

Dear Thomas:

It is clear that a lot of work has gone into the Proposed Plan. However, based on my analysis, I do not believe it will assure protection to the public, the future landowners and the environment. I do believe that there are elements of the Proposed Plan that are important to begin. Therefore, my overarching recommendation is that this Plan become an interim Plan until certain information is developed.

From years of environmental experience with cleanup, significant uncertainty about attaining deadlines and Remedial Action Objectives (RAOs) require adopting a flexible, adaptive approach for cleanup. There are always going to be some unknowns in a cleanup, but these should be limited to the extent possible. The Proposed Plan will lead to the Record of Decision, which is the key legal framework for cleanup of the site. The ROD is essentially the strategic Plan for achieving the RAOs. That being stated, the Navy is placing too much emphasis on resolving issues in the remedial design phase, where public stakeholders have little or no say.

Elements of the Plan that should begin without further investigation or delay include removal of the pistol range berm and removal of radioactively contaminated wastes in areas 3, 5, 1b, and the site of the radium disposal trench. However, if groundwater is encountered at Area 1b, it is my recommendation that work should be halted until one of the important data gaps is resolved; that is, an evaluation of dioxins and furans in groundwater in the former burn area. If results are positive, this should be followed by a determination of an appropriate treatment system for removing this contaminant from the dewatering activities. When this is completed, then full excavation of the burn area should proceed.

Following are my major conclusions and recommendations, based on my review of documents. A more detailed exposition of these conclusions and recommendations can be found in the Comments on the Proposed Plan.

317 Rutledge Street, San Francisco, CA 94110 Phone/Fax: (415) 647-4404
e-mail: pstrauss@igc.apc.org

1. Other potential groundwater constituents, as identified in data gaps in the Feasibility Study should be evaluated prior to a final ROD.
2. Geophysical surveys to determine the extent of waste in the landfill and proximity to San Francisco Bay should be evaluated prior to a final ROD.
3. The entire issue of seismic stability should be revisited prior to a final ROD. Resolution of this involves the remedy selection and is not appropriate to be left to the design phase.
4. A wetland mitigation ratio of 2:1 should be the minimum ratio allowed.
5. The scope of Site 1 should include sediments that are immediately adjacent to the landfill, for these potentially contain contaminants from past migration from the landfill. Offshore sediments are currently being addressed by the regional sediment work group and were not addressed in the Site 1 FS Report.
6. The groundwater plume to be treated needs a complete characterization before a final remedy is selected. Recent experience with the proposed remedy has indicated that the magnitude and location of contaminants are critical for successful implementation.
7. There is concern that the remedy may lead to the release of other contaminants, including radium and metals. The Plan should include a capture and monitoring system to be used when the groundwater is undergoing treatment so that excess oxidants and potentially released contaminants are not released beyond the treatment area. A network of "Guard wells" (i.e., extraction wells at the downstream boundary of the treatment zone) and "Sentinel Wells" (monitoring wells to ensure that the guard wells are capturing released contaminants) should be developed and included in the Plan.
8. I think that the Navy should not rely on Monitored Natural Attenuation (MNA) for a major role in the groundwater remedy, especially since there are DNAPLs in the groundwater plume. Although the FS indicates that there is breakdown of TCE into Dichloroethene (DCE) and vinyl chloride, the attenuation process often stalls at this point, with a buildup of vinyl chloride, which is probably more toxic than TCE. Realizing that the proposed remedy removes some of the source through ISCO, I believe that the Navy must have an objective that at least 75 percent of the reduction takes place through biological or chemical destruction, not through dispersal and diffusion.
9. I recommend that along with ISCO, enhanced in-situ biological remediation be retained, especially if monitoring downstream indicates that there are still high levels of vinyl chloride.
10. There has not been a sufficient survey to identify special-status species. Habitat exists for a number of special status and rare and endangered species. There are rare and endangered and species of special status at Alameda Point, including but not limited to the Least Tern, the Alameda Song Sparrow, and possibly wetland and marsh species such as the Salt marsh harvest mouse and the Salt marsh

wandering shrew, the Great Blue Heron, and the Clapper Rail. These species are often risk drivers at wetland and marsh sites.

11. Little attention is paid in the documents about how radionuclides and other chemicals can be mobilized by changing environmental conditions. If waste is left in place, in what is an unlined pit, it is incumbent upon the Navy to further investigate factors that would mobilize contaminants and determine a mechanism for monitoring environmental change.

12. Under the Navy's recommended alternative for soil in Area 1a, radium would be left in place. I recommend that the Navy establish a low threshold level for wastes that are left.

13. I recommend that the Navy adopt a cleanup level for human health risk that is equivalent to a one-in-one million excess cancer risks.

14. The risk assessment should include the latest information, including the 2006 finding by the National Academy of Sciences (NAS) that EPA's 2001 draft health risk assessment for TCE was valid.

15. It is my opinion that if waste is going to remain in place, an engineered cap that limits water infiltration is necessary.

16. The cap design should include a bio-barrier to prevent burrowing animals.

17. It is unclear whether the Navy has considered the re-use plan for golf course in its remedial design. The golf course would impose additional structural parameters in the case of a seismic event, and would require a great deal of irrigation water that would infiltrate the cap. Both of these elements need to be looked at in the cap /cover design.

18. It is worth considering that climate change is expected to cause sea levels to rise by approximately 3 feet over the next 100 years. All proposed remedies that are adjacent to the Bay should take this into consideration.

19. I agree that State Water Resource Control Board Resolution (SWRCB) 68-16 (i.e., the non-degradation policy) and SWRCB Resolution 92-49 apply to groundwater at this site.

20. It is crucial that the Plan state who will be responsible for maintaining the stability and performance of the cap once a golf course is put in place.

21. This is the most confusing Proposed Plan that I have read, and I think it would be helpful for all concerned that a better explanation of the Site 1 proposed remedy be rewritten.

Yours very truly,

Peter M. Strauss

Comments on the Proposed Plan for Site 1

On Behalf of the Alameda Point Restoration Advisory Board

Peter Strauss

PM Strauss & Associates

November 6, 2006

COMMENTS

Data Gaps

1. The resolution of many data gaps is not addressed in the proposed plan; instead, they are planned for the remedial design stage. In 2004, the Environmental Protection Agency (EPA) Remedial Project Manager (RPM) expressed frustration with the lack of data used in the Remedial Investigation/Feasibility Study (RI/FS). He expressed concern that that the lack of information could compromise the ability of stakeholders to select a final alternative. If an alternative was selected that relied on extensive data collection during remedial design to verify assumptions, he cautioned that time-consuming Record of Decision (ROD) amendments could potentially be required. It is my opinion that each of the data gaps should be resolved before a final plan is completed. These include:
    - **Delineation of Trichloroethene (TCE) in groundwater at the north end of Site 1, adjacent to the inner harbor**. The lateral extent of TCE in this area has not been defined. The FS reported that this will be investigated as part of the remedial design phase; however, it may be investigated sooner. At this time, we don't know if this analysis was completed and whether there will be additional groundwater remediation required.
    - **Analysis for 1,4-dioxane in groundwater using lower detection limit**. 1,4-dioxane is a solvent stabilizer that was added to Trichloroethane (TCA) and other solvents. The groundwater analysis used a high detection limit so that this contaminant was not fully characterized. Information about the presence of 1,4-dioxane in groundwater in the plume area will be available during the remedial design phase of the project. Yet, it is not clear whether the In-Situ Chemical Oxidation (ISCO) process fully works on this chemical.
    - **Analysis of groundwater in the burn area for dioxins/furans**. At the latest, groundwater samples will be collected during the remedial design phase from the monitoring wells in the burn area and analyzed for dioxins and furans. The presence of dioxins and furans will be an important consideration on how this area is remediated.
    - **Analysis for explosive constituents in groundwater**. Analysis of groundwater samples for constituents indicative of ordnance in first water-bearing zone (FWBZ) groundwater will be conducted during the remedial design phase of the project. Again, a treatment system for constituents indicative of explosives may require different treatment than ISCO.
    - **Radiological survey of the riprap slope areas**. Information about the presence of radium-impacted waste in the shoreline areas will be available during the remedial design phase of the project. This is a major concern for human and ecological health and may affect the scope of the remedy, and lead to further investigation whether radium has made its way into the Bay.
    - **Assessment of residual impacts in the waste disposal area**. Installation of four interior and/or perimeter wells has been included in all the active groundwater remedial alternatives. Groundwater data from these wells will be available during the remedial design phase of the project and will be used to evaluate groundwater quality in the waste disposal area and assess whether drummed liquids were disposed of at Site 1. One of the concerns is that there are drummed wastes in the landfill, which may require spot excavation. Covering it with a cap before this is known is premature.

known is premature.

- **Ecological risk assessment (ERA) for unpaved areas of Site 1 outside the disposal area.** An ERA of the unpaved interior areas of Site 1 will be performed as part of the remedial alternatives for soil in Area 3. The ERA will be conducted during the remedial design stage of the project and the results of the ERA will be used to determine the extent of the hot spot removals in Area 3.
- **Wetlands evaluation.** An evaluation of the functionality and extent of wetlands in Areas 1 and 3 will be conducted during the remedial design stage for mitigation planning purposes. The final mitigation ratio and amount of mitigation will also be determined at that time based on the location and type of wetlands. Again, this determination should be part of the proposed plan and vetted before the public.
- **Geophysical surveys.** Geophysical surveys would be conducted to assess the limits of buried waste and the proximity of waste to the San Francisco Bay under preferred alternatives S1-4 and S5-4. This clearly is a characterization activity, and proposals or areas affected require this information prior to remedy selection. Additionally, depending on the results of the buried waste delineation activities, the recommended geotechnical remedy (3,000-foot-long soil cement gravity wall and stone columns) may not be the most feasible and cost-effective geotechnical remedy for Site 1.

Scope

2. The proposed plan covers Site 1 but not the contamination that potentially has emanated from Site 1 into the Bay and the inner harbor. The FS and responses to comments on the FS all point out that the waste has been sitting in groundwater for some time, and much of it has probably been sorbed or has washed into the bay. During the mid-1990s, sediment samples were taken and at that time, the Navy determined that results were expected for ambient concentrations in the San Francisco Bay and unlikely to pose an increased health or ecological risk relative to the rest of the bay. Offshore sediments are currently being addressed by the regional sediment work group and are therefore not addressed in the Site 1 FS Report. Due to advances in the science of ecological risk and estimates of "ambient levels", this statement is no longer valid. The low tidal areas adjacent to Site 1 should be included in the scope of this plan, or an amendment to the plan.

Groundwater

3. In-situ Chemical Oxidation (ISCO) works if the oxidizing agent comes into contact with the contaminant. Whether or not ISCO will work at the particular site depends on the soil/geology of that location, the source area characteristics and how well the VOC plume is characterized. Yet, the characterization of the VOC plume is incomplete, as shown on Figure 4 of the Proposed Plan. A recent experience with ISCO in Rhode Island has proven ineffective, probably because the magnitude of contamination was not yet fully understood.

4. The common oxidants are hydrogen peroxide-based Fenton's Reagent, and potassium manganate ($KMnO_4$), better known as permanganate. Fenton's Reagent is produced on site by adding an iron catalyst to a hydrogen peroxide solution, and works best with a pH adjustment. The Regional Water Quality Control Board (RWQCB) RPM expressed concern that ISCO may cause the release of other

contaminants now stabilized in the landfill (metals). The most common oxidant delivery method involves the injection of oxidants, and the targeted delivery of oxidants to the contaminant zones may require both injection and extraction wells. The Proposed plan must make clear that it will capture the oxidants if there is a release of other contaminants. This will also require frequent sampling downstream after initial injection.

5. In a related point, the selection of the oxidizing agent should preclude activation or release of other contaminants (such as Radium-226) that may be trapped in the saturated and vadose zones. The Proposed Plan should indicate if this is a potential problem, and what would be done to mitigate it. Since the Radiological investigation only characterized surface anomalies, it is not certain whether parts of the area that are scheduled for ISCO would have radionuclides below the two foot depth.

6. The plan should include a capture and monitoring system to be used when the groundwater is undergoing treatment so that excess oxidants and potentially released contaminants are not released beyond the treatment area. A network of "Guard wells" (i.e., extraction wells at the downstream boundary of the treatment zone) and "Sentinel Wells" (monitoring wells to ensure that the guard wells are capturing released contaminants) should be developed and included in the plan.

7. I was struck by the somewhat lenient groundwater cleanup goals. The remediation goal for vinyl chloride, a known carcinogen, is three orders of magnitude greater than the drinking water standard; TCE is an order of magnitude higher than the drinking water standard. Although it is acknowledged by the regulators that the groundwater is a not potential drinking water source, these high contaminant levels are of concern as they make their way to the bay. It is important to note that a dispute exists between the RWQCB and the Navy over whether it must comply with California's non-degradation policy (SWRB 68-16 and 92-49), which has as one of its objectives limiting polluted waters from contaminating less polluted waters. Additionally, as the groundwater is shallow and flows just under the "sandy beach", vapors from the underlying shallow groundwater may be released. In particular, vinyl chloride vapors should be assessed using the most recent scientific information.

8. I think it is important that the Navy does not rely on Monitored Natural Attenuation (MNA) for a major role in the groundwater remedy. Public stakeholders at many sites view "natural attenuation" with skepticism and some view it as a do nothing approach. Although the FS indicates that there is breakdown of TCE into Dichloroethene (DCE) and vinyl chloride, the attenuation process often stalls at this point, with a buildup of vinyl chloride, which is probably more toxic than TCE. Realizing that the proposed remedy removes some of the source through ISCO, I believe that the Navy must have an objective that at least 75 percent of the reduction takes place through biological or chemical destruction, not through dispersal and diffusion. This may be achievable, as the FS points out that ISCO at the Naval Weapons Station Seal Beach reduced VOCs by 80%.

9. The high level of DCE in groundwater (3,900 ppb) and vinyl chloride (9,400 ppb) west of the former engine parts storage and cleaning area is probably the result of natural breakdown of TCE. It supports the conclusion that some attenuation is occurring; however, vinyl chloride is more persistent, more mobile, and more toxic than its parent products (e.g., TCE). This "line of evidence" to demonstrate that natural attenuation is occurring is not sufficient by itself to persuade agencies that that MNA will continue to work as a remedy. EPA puts the burden of proof on the party that proposes natural attenuation as a cleanup remedy, and requires "multiple "lines of evidence". While natural attenuation in general has both advantages and disadvantages, the proponent must present convincing site-specific technical evidence that natural attenuation will effectively protect human health and the environment and, furthermore, that it will achieve remedial objectives within a reasonable time frame. Project proponents must demonstrate that human or environmental receptors will not be exposed to greater risks during the long natural attenuation process.

10. There is continued concern that ISCO is not effective at treating a large mass of volatile organic compounds (VOCs), such as is found in dense non-aqueous phase liquids (DNAPLs). Rebound, or the rise in contaminant levels after it was seemingly reduced, may be high if an appreciable DNAPL mass remains in the source zone and soil/groundwater. However, based on the literature, Fenton's Reagent is somewhat effective if it comes into contact with the DNAPL.

11. TCE, a common contaminant found in groundwater, is sold under about fifty different trade names. Some of these products contain additives used as stabilizers, which make up two to eight percent of the total weight. These stabilizers are numerous and they have not been considered when developing strategies for natural attenuation. For example, the most common stabilizer, 1,4-dioxane in TCA, does not readily attenuate, and is only going to be looked at in the remedial design phase. The matter of stabilizers, particularly 1,4-dioxane, should be analyzed as soon as possible, as it may lead to a different remedial strategy for groundwater.

12. I recommend that along with ISCO, enhanced in-situ biological remediation be retained, especially if monitoring downstream indicates that there are still high levels of vinyl chloride.

Soil

13. Some of the soil remediation goals seem high. I anticipate that most of the remediation goals will be determined by ecological assessment, with some of the goals being determined for the seasonal wetlands. Realizing that the ecological assessment is species and habitat specific, I encourage the Navy to consult with all parties about species of concern. It should also be noted that the EPA, the RWQCB and the Navy agreed to cleanup goals at Moffett after considerable debate and community input. Below I have compared the Alameda Point soil remediation goals to sediment goals at Moffett Field, in the South Bay. I am particularly struck by the difference in goals for DDT in soil at Alameda Point and those at Moffett.

Comparison of Alameda Point Soil Cleanup Goals and Moffett Sediment Cleanup Goals

	Alameda Pt.	Moffett – Salt Marsh		Moffett – Open Water	
Contaminant		Low TRV	High TRV	Low TRV	High TRV
PCB µg/kg	380	59	210	97	1,179
DDT µg/kg	1,200	0.51	109	0.51	109
Lead mg/kg	56	0.01	93	0.38	151
Zinc mg/kg	300	6.5	314	66	664

µg/kg micrograms per kilogram
mg/kg milligrams per kilogram
TRV threshold reference value

Ecological Risk

14. There has not been a survey to identify special-status species. Brown pelicans have been seen flying to the beach area, and habitat exists for a number of special status and rare and endangered species.

15. Given that we know that there are rare and endangered and species of special status at Alameda Point, including but not limited to the Least Tern, the Alameda Song Sparrow, and possibly wetland and marsh species such as the Salt marsh harvest mouse and the Salt marsh wandering shrew, as well as species of special status, including the Great Blue Heron, and the Clapper Rail, these species should be considered in risk calculations. Below I have included a Table for cleanup goals for those species at Moffett Field, under a salt marsh scenario.

		Lead mg/kg	Zinc mg/kg	DDT µg/kg	PCB µg/kg
Alameda Song Sparrow	TRVhigh	**93.8**	518	251	881
	TRVlow	0.24	51.8	1.17	72.7
Clapper Rail	TRVhigh	202	886	356	1,574
	TRVlow	0.51	88.6	1.66	130
Great Blue	TRVhigh	209	803	**109**	2,856
	TRVlow	0.53	80.3	**0.51**	236
Salt Marsh Wandering Shrew	TRVhigh	1,416	**314**	513	**210**
	TRVlow	**0.01**	**6.5**	25.6	**59**

Note: Numbers in **bold** are risk drivers

16. It is important to note that polychlorinated biphenyls (PCBs), lead and cadmium were found in soils that are part of the seasonal wetlands. The seasonal wetlands provide rest, shelter, and forage for Canada geese and other migratory water fowl, as well as for raptors. Some of the marsh species may occupy those sites during part of the year. Identification of those species is a necessary step before soil cleanup goals should be adopted for soils within the seasonal wetlands. Special status species and some marsh species should be included in any revised ERA.

17. VOCs and benzene are groundwater contaminants that underlie SW1 (i.e., seasonal wetland 1). It is important that any overlap of the wetlands and these plumes are fully characterized for eco-risk, including sediment and vapor transport.

18. Some of the wetlands will be affected or destroyed by the remedies, requiring the Navy to mitigate the wetlands. Most often this is done on at least a 2:1 ratio because creating a new wetland is difficult and often fails. The Navy has failed to commit to a mitigation ratio, and I recommend that it do so in the proposed plan.

Radiological Characterization and Cleanup

19. Albeit that radiological characterization is difficult and only detected near-surface anomalies, it is important to point out that little attention is paid in the documents about to how radionuclides (radium, strontium$_{90,}$ and perhaps medical wastes that were disposed of from Oak Knoll Naval Hospital) can be mobilized by changing environmental conditions, as is pointed out in the concern about using an acidic oxidizer like Fenton's Reagent. Because this landfill is an unlined pit, it is incumbent upon the Navy to further investigate factors that would mobilize contaminants and determine a mechanism for monitoring environmental change and ensuring that radionuclides will not be transported in the future.

20. As is noted in the Final Radiological Characterization Report "[O]ther naval installations, including Oak Knoll Naval Hospital, Naval Supply Center Oakland, and Treasure Island, also used the site for waste disposal." It is not clear whether any of these facilities also may have disposed of low level radioactive waste at Site 1, but a full record of what other wastes have been disposed of at Alameda Point should be fully investigated. There has been extensive information generated about disposal activities of radioactive waste at three other Bay Area Naval facilities (Hunter's Point, Treasure Island and Mare Island). For example, records were declassified in 2001 for the Naval Radiological Defense Laboratory, which was located at Hunter's Point Naval Shipyard. It is not clear from the background information in the RI/FS whether this information was reviewed to determine other sources of radioactive materials at Site 1.

21. All radium-impacted waste in Areas 1b, 3 and 5 exceeding 4,000 counts per minute (cpm) above background would be removed, as described for Alternative S6-4. Area 1b and wastes that are near a suspected former radiological disposal trench contain all radium-impacted waste exceeding 200,000 cpm that would be removed. The remainder of radium in Area 1a would be left in place. There appears that there is no threshold value given for radium contaminated wastes that are going to be left in Area 1a. I recommend that the Navy establish a threshold level for wastes which will remain on site.

22. The Navy needs to establish a protocol for removal of radioactive substances and confirmation sampling. Specifically, when radioactive substances are encountered, it will be important to know how much waste and surrounding soil will be removed. For example, if a radioactive dial is encountered, how much soil around and beneath the dial will be removed? Also, please identify what type of confirmation/verification sampling will be conducted to ensure that soil left in

place is clean. It is recommended that as the Navy begins excavation of any radioactive material, it confirm that the area is clean using the high-purity germanium detector (HPGe), along with confirmation samples that are sent to the laboratory for gamma spectroscopy.

23. The field survey of radiological waste was done with using a sodium-iodide (NaI) detector, and confirmed with an HPGe detector. Both detect gamma rays. HPGe detectors are "favored when definitive spectroscopic measurements are needed." (Technology Overview: Real Time Measurement of Radionuclides in Soil: Technology and Case Studies, Interstate Technology and Regulatory Council, February, 2006). Citing recent experience at the Fernald uranium processing facility in Ohio, the Department of Energy (DOE) recommended using the HPGe detector for Radium-226, which is a weak gamma emitter (i.e., alpha and beta are not picked up by either detector). An example of the different sensitivity (i.e., detection limits) of the two detectors is shown in the Table below.

COC	Fernald Action Limit (pCi/g)	Minimum Detectable Concentration (pCi/g)	
		HPGe	NaI
Uranium	55	1.9	78
Ra-226	1.5	0.075	1.1

pCi/g Pico Curies per gram

Burn Area

24. For Area 1b, excavation activities are assumed to extend into groundwater, requiring a dewatering and sediment filtration system. Extracted groundwater is assumed to require treatment for removal of dissolved heavy metals and VOCs. A temporary treatment system would be brought on-site and operated with an ion exchange for metals removal and granular activated carbon (GAC) for VOC removal. The system is assumed to operate at 100 gallons per minute during excavation, and to discharge to the San Francisco Bay. Dewatering would require planning, treatment system oversight, and a sampling program for the duration of the dewatering program. Note that dioxins/furans are still being investigated; yet it is not clear whether GAC would be appropriate to remove these contaminants from the waste stream. This element of the remedy should be discussed in the proposed plan. More importantly, it suggests that almost all groundwater underlying Area 1 is contaminated with heavy metals and VOCs. Again, I can only conclude that contaminated groundwater and leachate are making their way to the Bay.

Human Risk

25. The National Contingency Plan [Section 300.430 (e)(2)(A)(2)]states that "For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6} using information on the relationship

between dose and response. The 10^{-6} risk level shall be used as the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure;". I recommend that the Navy adopt the "point of departure' as its remedial goal.

26. The risk assessment should include the latest information, including the 2006 finding by the National Academy of Sciences (NAS) that EPA's 2001 draft health risk assessment for TCE and the Science Advisory Board's review of the draft TCE Health Risk Assessment (http://www.epa.gov/sab/pdf/ehc03002.pdf.). As such, I expect that allowable groundwater contamination standards and health risks for TCE in the air will change and be stricter in the future. TCE was only the first of many substances to be reviewed. I expect that the allowable standards for its daughter products (DCE and vinyl chloride) will also be reviewed and possibly changed. Although the effectiveness of remedies is evaluated in a Five Year Review, which includes changes in standards, it is important that the proposed remedy for groundwater take this new information into consideration. Most importantly, the question remains as to whether the proposed remedy can achieve those new standards.

    In August 2001, U.S. EPA's Office of Research and Development (ORD) released the draft Trichloroethylene Health Risk Assessment: Synthesis and Characterization (TCE Health Risk Assessment) for external peer review. The draft TCE Health Risk Assessment took into account recent scientific studies of the health risks posed by TCE. According to the draft TCE Health Risk Assessment, for those who have increased susceptibility and/or higher background exposures, TCE could pose a higher risk than previously considered. Standards for cleanup are expected to be even stricter than the preliminary remediation goal (PRG) for TCE (2.3 ppb). The Science Advisory Board, a team of outside experts convened by U.S. EPA, reviewed the draft TCE Health Risk Assessment in 2002, and concurred with the results. In 2003, Region IX promulgated a "provisional" PRG for air that was an order of 65 times stricter than had been applied prior to 2003. Both the Department of Defense and Department of Energy strongly objected and EPA backed off enforcement of the provisional PRG until NAS external review. This review was completed this year and concurred with the EPA Health Risk Assessment.

    Additionally, California has a Public Health Goal (PHG) that should become a "To-Be-Considered" Applicable or Relevant and Appropriate Requirement (ARAR). For TCE in groundwater, the PHG was changed from 2.3 ppb to 0.8 ppb. This is assumed to be equivalent to an increased risk of 1 in a million excess lifetime cancers. This latter number was adopted by the Office of Environmental Health Hazard Assessment, and is in conformance with the State Implementation Plan.

Cap Design and Remediation of Area 1

27. It is my opinion that if waste is going to remain in place, then an engineered cap that limits water infiltration is necessary. It is not clear why the engineered cap

has been rejected; or even why a soil only cap would meet regulatory requirements. There is not sufficient evidence to rule out that groundwater will continue to act as a transport mechanism for dissolved contaminants to the Bay. At Moffett, the Runway landfill was also first proposed as a soil cap; the RAB at Moffett and regulators requested that an engineered cap be constructed. The Navy has argued in its response to EPA comments on the FS that since the landfill stopped operating before cover requirements went into effect, it does have to meet some closure requirements (e.g., Section 22 CCR 66264.310(a)(1) requires a cover designed to prevent the downward entry of water into the landfill for 100 years). Whether this statement is correct does not relieve the Navy of choosing a remedy that controls contaminant migration.

28. An alternative not considered in the engineered cap is using a bentonite layer to impede infiltration. This may be less expensive than a geomembrane, and has the benefit of a certain amount of self repair in case of a seismic event.

29. The cap design should include a bio-barrier that prevents burrowing animals from coming into contact with the waste.

30. An engineered cap covering part of Area 1 was not considered, but may be possible for Site 1. The runway in Area 1a may not have to be covered, so long as there is pavement inspection and maintenance program, as suggested by Remedial Alternative S2-4. Note, however, that surface inspection of the runways, or for that matter the proposed soil cap or engineered cap, would not be possible once a golf course is built.

31. The reuse plan has designated the Site 1 area for recreational reuse consisting primarily of a golf course, a beach area, and a shoreline walking path. Additionally, a historic training wall is present along portions of the northern border of Site 1. It is unclear whether the Navy has considered the Golf course in its remedial design. The golf course would impose additional structural parameters in the case of a seismic event, and would require a great deal of irrigation water that would infiltrate the cap. Both of these elements need to be looked at in the cap /cover design.

32. The Soil Cap alternative proposes to use dredge materials from Oakland Harbor. This may not be clean soil, and would require additional study to ensure that there are not additional contaminants being added to the cover. I recommend that if the Navy is going to use dredge spoils for a soil cap, then a rigorous sampling program should be adopted to ensure that contaminants such as lead, PCBs, MTBE and PAHs are screened prior to emplacement.

33. In August 2002, the Geotechnical Feasibility Report "recommended" that a 24-ft wide soil-cement gravity wall with stone columns placed adjacent to and in the fill to reduce the effects of liquefaction and preventing slippage into the San Francisco Bay. However, this element was not included in the proposed remedy and was left for further study in the remedial design stage. By not including this design component, and its costs, into the analysis of alternatives, the exclusion of remedies such as excavation of larger areas is a biased result.

34. In addition, the FS stated that shoreline debris relocation component for one of the alternatives was intended to provide an alternative to a soil-concrete gravity wall that was recommended in the Geotechnical and Seismic FS for Site 1 (2003). This was based on the assumption that excavating buried waste within 25 feet of the shoreline and relocating the excavated waste to the interior of Site 1 may reduce the risk of a waste release to the San Francisco Bay from earthquake-induced lateral spreading. This alternative was not adopted in the proposed plan; however, the FS states that depending on the limits of buried waste and shoreline waste relocation activities, the Navy could reduce the scope of (or eliminate the need for) a geotechnical remedy. This statement goes to the very heart of the criticism of the proposed plan: that is, by not characterizing the waste cells, the proposed remedy is uncertain both in terms of cost and effectiveness.

35. Another element of the proposed plan that should be evaluated for Area 1 is removal of hot spots within Area 1, besides removal of Area 1b. Many comments on the FS were concerned that covering the waste would leave small, time-delayed pockets of material that may contaminate the groundwater and the Bay in the future. Because the Navy has not even determined whether drummed wastes still exist in the landfill or the extent of wastes in the landfill (see Data Gaps), I think it is important that hot spot removal not be precluded from the remedial options. Only after full characterization can the Navy realistically cover the remaining waste.

36. The FS states that the Navy may further evaluate other alternatives to the stone columns during remedial design. Recent experience has shown that considerable cost savings can be achieved with "earthquake drains" offered by Nilex, successfully installed in fill soil used for the approach to the new San Francisco-Oakland Bay Bridge and have undergone a rigorous review and acceptance process by the California Department of Transportation. The entire discussion of seismic stabilization should be revisited, prior to the adoption of the Record of Decision.

37. It is worth considering that most scientists agree that climate change will cause sea levels to rise over the next 100 years. Predictions of a 3 foot rise in sea levels over the next 50-100 years are generally accepted. A sea level rise of 6 inches will change the frequency of a 100 year storm surge to a 10 year storm surge at the entrance to the Bay. All proposed remedies that are adjacent to the Bay should take these facts into consideration. It is worth noting that most of the remedies which leave waste in place are given a rating of moderate for long term effectiveness and permanence. However, in the discussion of this criterion in the FS, there is not a discussion of climate change.

Applicable or Relevant and Appropriate Requirements (ARARs)

38. I agree that State Water Resource Control Board Resolution (SWRCB) 68-16 (i.e., the non-degradation policy) and SWRCB Resolution 92-49 apply to groundwater at this site. This resolution applies to discharges: either underground or above ground discharges as is commonly understood by the general term discharge. I encourage the RWQCB to ensure compliance with these Resolutions.

Range Cleanup

39. The firing range berm had a foundation of concrete mixed with 55-gallon drums of 20 mm projectiles. It is not clear whether the proposed plan and TCRA includes removal of the foundation, or whether there has been an analysis of whether any of the elements, including lead, have migrated from the concrete. If soil below the berm is also to be screened, soil contaminated with both metals and organic compounds may make this solution difficult. If soil contains volatile organic compounds (VOCs), it would be akin to aerating the soil and may require additional regulatory oversight. Measures should be taken to prevent wind-borne particulates that may be laden with lead if dry screening is a step in the process.

40. The skeet range, next to the pistol range, generated lead shot and fragments of clay pigeons. These clay pigeon fragments contained PAHs. Some clay pigeon fragments are still evident on the surface within the line of fire. The zone of fire in the bay was designated as Site 29, and is not a subject of this Proposed Plan. However, ranges such as this have a great deal of scatter, and some lead shot is potentially beyond the Site 29 boundary, very near to the shoreline. At low tides, shorebirds feed in this area, and the lead shot in particular poses a threat. The Navy should take note that EPA's guidance document on Best Management Practices at Outdoor Shooting Ranges (EPA Region 2, 2001) strongly states that "Shooting into water bodies or wetlands should not occur". Most current best practice manuals, even those developed by sport shooting organizations, do not advocate shooting into water or wetlands.

41. Has depleted uranium (DU) been used in any of the shells? Does the Navy need to list a cleanup standard for DU?

Institutional Controls

42. The Institutional Controls, as set forth in the Proposed Plan, have two difficulties, related to the eventual conversion of Site 1 into a golf course and public beach. Proposed land-use restrictions, although specified, fail to state how they will be enforced, and who will enforce them. For example, the City has proposed building a golf course over the landfill cap essentially adding approximately 8-feet of additional soil. Aside from destroying the cap vegetation cover, the added weight and irrigation regime may cause additional infiltration, increase leachate and reduce stability. It is crucial that the Plan state who would be responsible for maintaining the stability and performance of the cap.

ATTACHMENT B-3

PROPOSED PLAN FOR IR SITE 27

(10 Pages)

BRAC PMO

Proposed Plan for IR Site 27 Former NAS Alameda

Restoration Advisory Board Meeting

December 7, 2006

Dan Carroll – Kleinfelder/Bechtel
Michelle Hurst – Navy Project Manager

BRAC PMO

Topics

- Purpose
- Background Information
- Regulatory Agencies
- Remedial Investigation Summary
- Feasibility Study Summary
- Preferred Alternative
- Current Status

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Purpose

- Summarize investigations and work to date
- Present the preferred alternative, full-scale *in situ* chemical oxidation (ISCO), to clean up groundwater
- Inform the public that the federal and state regulatory agencies are working with the Navy and agree with the preferred alternative

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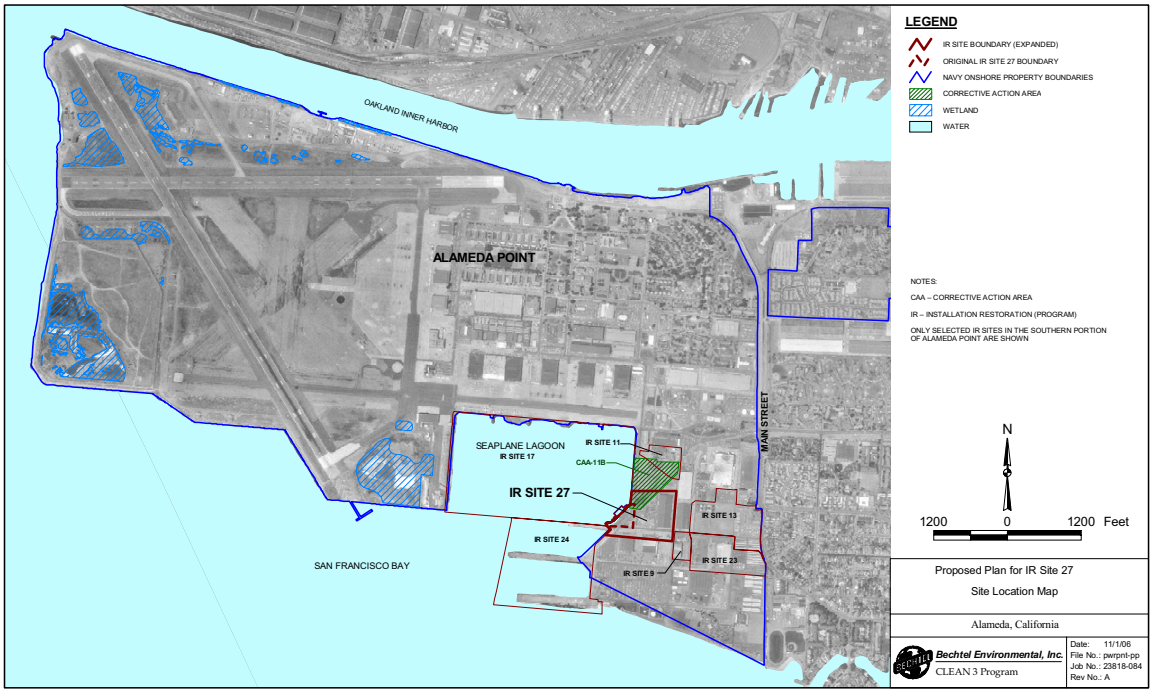
Background Information: Location



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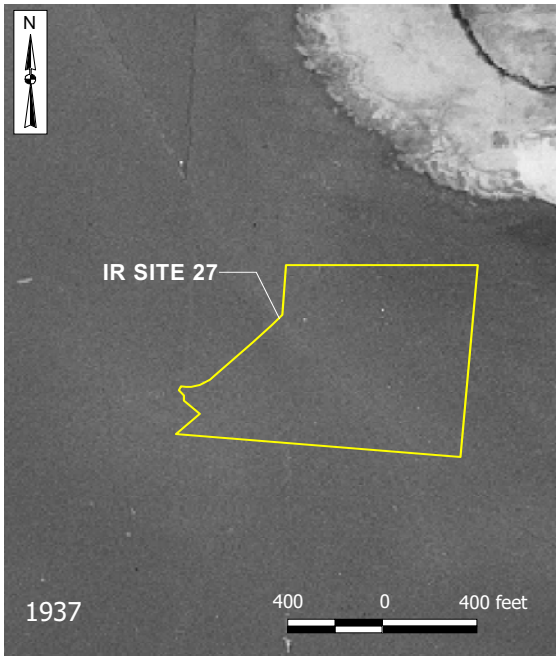
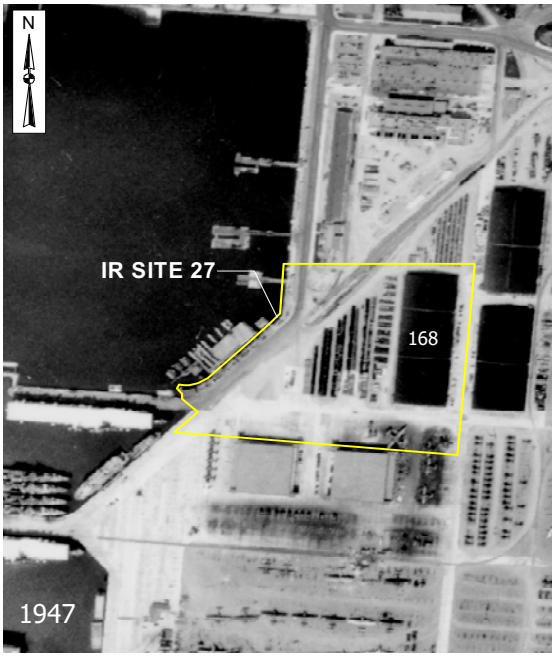
Background Information: Historical Aerial Photos





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Background Information: Site History

- Site was filled and paved by 1945
- Building 168 warehouse constructed in 1946
- Site was used by the Navy for:
  - Ship repair and painting
  - Vehicle wash-down
  - Equipment and materials staging and storage
  - Chemical handling and storage in Building 168
- Site currently leased for similar uses

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Background Information: Site Description

- Original size: 2.2 acres at former location of removed tanks
- Expanded size: 15.8 acres
- Bounded by Seaplane Lagoon to west
- Primarily paved (>75%) with buildings, structures, and storage areas

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Northwest Corner of IR Site 27 Facing South

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Southwest Corner of IR Site 27 Facing Northeast

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Regulatory Agencies

- State:
  - Department of Toxic Substances Control (DTSC)
  - Regional Water Quality Control Board (RWQCB)
- Federal:
  - U.S Environmental Protection Agency (EPA)

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Remedial Investigation Summary: Soil

- Chlorinated volatile organic compounds (VOCs): concentrations less than preliminary remediation goals, no source identified
- No further action recommended for soil

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Remedial Investigation Summary: Groundwater

- Chlorinated VOCs and arsenic in groundwater above regulatory criteria
- Potential VOC sources: undocumented historical chemical releases at the site
- Arsenic: limited to center of VOC plume, likely from background levels in soil

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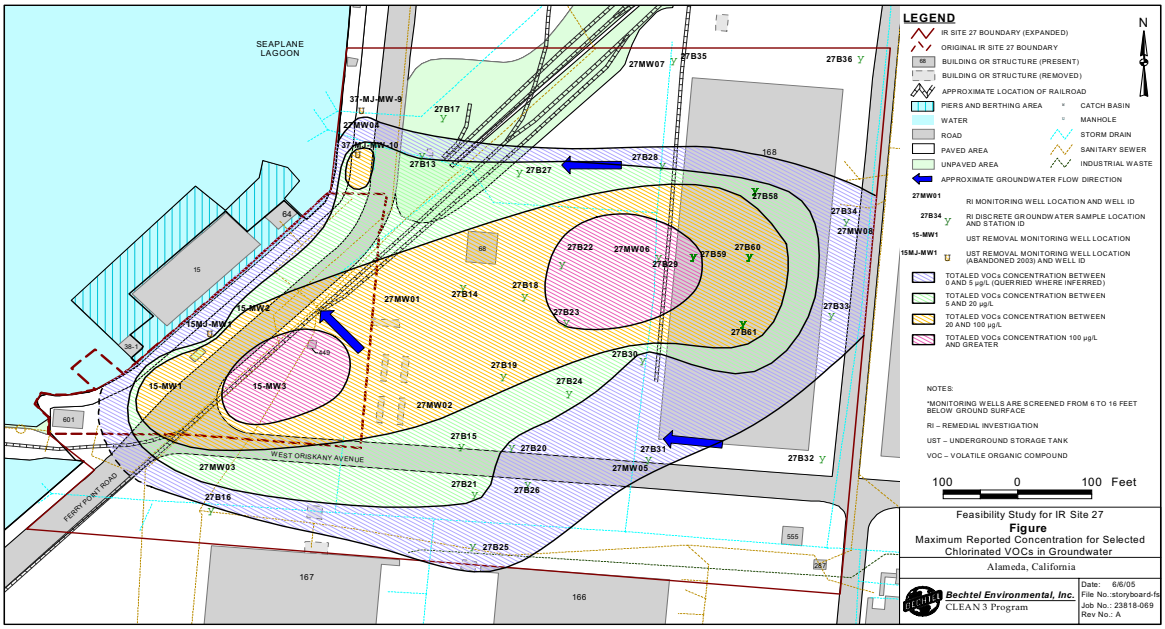
Remedial Investigation Summary: VOC Plume in Groundwater



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Remedial Investigation Summary: Risk

- Definition of Risk: The likelihood or probability that a hazardous substance released to the environment will cause adverse effects on exposed human or ecological receptors
- Human health risk – All pathways were evaluated. Only risk for a site resident drinking and showering with the groundwater needs to be further addressed
- No ecological risk

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Feasibility Study Summary: Remedial Action Objectives and Cleanup Goals

- Protect beneficial uses of groundwater and surface water
- Prevent domestic use of groundwater
- Proposed cleanup goals for groundwater are drinking water standards (MCLs)

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Feasibility Study Summary: Development of Alternatives

1	No Action
2	*Institutional Controls (ICs) - screened out*
3	Monitored Natural Attenuation (MNA) and ICs
4A	In Situ Bioremediation (ISB) Source Area Treatment, MNA, and ICs
4B	*Full-Scale ISB Treatment, MNA, and ICs - screened out*
5	*Air Sparging Source Area Treatment, MNA, and ICs - screened out*
6A	In Situ Chemical Oxidation (ISCO) Source Area Treatment, MNA, and ICs
6B	Full-Scale ISCO Treatment and Groundwater Confirmation Sampling
7	Dynamic Circulation Source Area Treatment, MNA, and ICs
8	*Zero Valent Iron Source Area Treatment, MNA, and ICs - screened out*

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Feasibility Study Summary: Comparision of Alternatives

Comparative Analysis of Alternatives for Groundwater						
	1	3	4A	6A	6B	7
NCP Criteria	No Action	MNA, ICs	ISB, MNA, ICs	ISCO, MNAs, ICs	Full-Scale ISCO, GW Sampling	DSC, MNA, ICs
Overall Protectiveness	No	Yes	Yes	Yes	Yes	Yes
ARARs Compliance	No	Yes	Yes	Yes	Yes	Yes
Long-term Effectiveness and Permanence	None	◑	●	●	●	◑
Reduction of Toxicity, Mobility, or Volume through Treatment	None	○	◑	◑	●	◑
Short-term Effectiveness	None	●	◑	◑	◑	○
Implementability	None	●	●	●	○	◑
Cost ($M)	0	2.75	3.03	2.22	2.08	3.03
State Acceptance	State Concurs with Proposed Remedy					
Community Acceptance	To be evaluated after the Public Comment Period					

Alternative 6B is the Preferred Alternative

○ = low
◑ = moderate
● = high

DSC Dynamic Subsurface Circulation
GW Groundwater
IC Institutional control
ISB In situ bioremediation
ISCO In situ chemical oxidation
MNA Monitored natural attenuation
NCP National Oil and Hazardous Substances Pollution Contingency Plan

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Preferred Alternative

Alternative 6B – Full-Scale ISCO and Groundwater Confirmation Sampling

- Chemical oxidation process
- Modified Fenton's reaction
- Dilute hydrogen peroxide injection
- After peroxide, iron catalyst injected
- Used at neighboring IR Site 9 successfully
- Up to 570 direct-push injection points
- Assumed duration of 3 years (about 75 days of treatment and 3 years of groundwater confirmation sampling)
- Groundwater sampling to track effectiveness

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Current Status

- Proposed Plan mailed to approximately 750 interested parties and individuals
- Public Notice published on November 20, 2006 (Oakland Tribune, Alameda Journal, and Alameda Times-Star)
- Public Comment Period – November 20, 2006 through December 22, 2006
- Public Meeting – December 12, 2006

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QUESTIONS

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QUESTIONS

ATTACHMENT B-4

TAPP GRANT PRELIMINARY REVIEW ON FEASIBILITY STUDY FOR IR SITE 2

(14 Pages)

OBSERVATIONS

Draft Feasibility Study (FS) for Site 2

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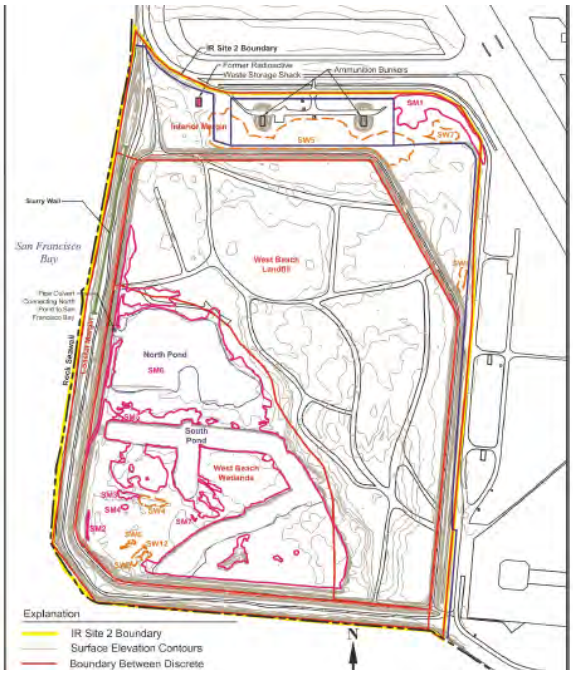
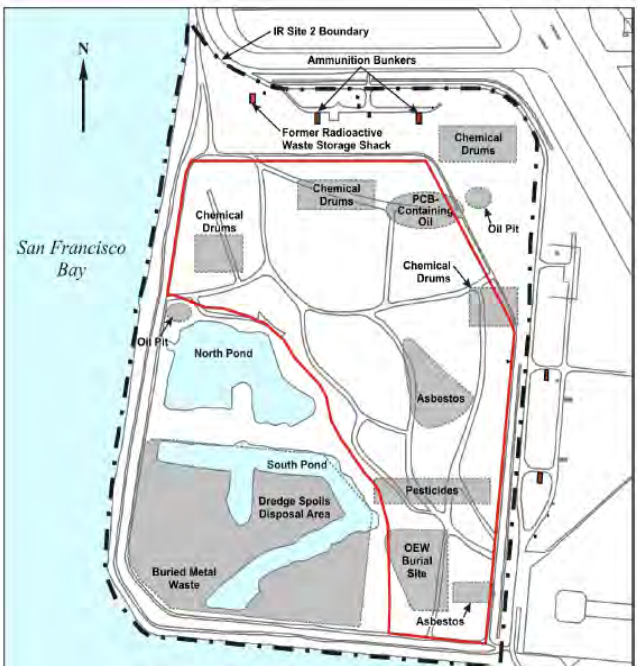
Methodology

- Review Published Documents, including basic CERCLA Documents:
  - Draft Feasibility Study (FS)
  - Remedial Investigation and Appendices
  - Initial Assessment Study
  - Geotechnical FS (seismic hazards)
  - Removal of Buried Radioactive Devices (1999) (Rad Shack)
  - Historical Radiation Assessment (2000)
  - Radiation Survey
- Meet with RAB focus/technical group

Site 2 - Wetlands



Approximate Location of Wastes from Initial Assessment Report



Purpose of the FS

- **"This FS is intended to satisfy the first three of these objectives (i.e., the development of remediation goals, the assessment of suitable remediation strategies, and the selection of an appropriate remediation plan). The development of a remedial design and implementation of a site remedy will occur after this FS has been approved and other decision documents have been fully developed."**

- The FS is followed by a Proposed Plan, that in turn is followed by the Record of Decision (ROD). This is the key legal framework for cleanup of the site. The ROD is essentially the **Strategic Plan** for achieving the remedial goals.
- After the ROD is signed, there is no requirement to include communities in clean-up decisions in a substantial way.

Organization

- A former Secretary of Defense liked to say that "**We know** there are some things **we** do not **know.** But there are also unknown unknowns - the ones **we don't know we don't know**."
- There was a certain amount of wisdom in that statement, and I've taken a cue from him and tried to look at the information that was developed in that light to prepare my comments.

I've divided the information into 5 categories:

1. Things that are known
2. Things that are unknown
3. Things that are unknown unknowns (or in the vernacular, things off the radar screen)
4. Questions
5. Comments/Opinions

- The latter 4 categories formed the basis of my comments.

Information Categories

Information was divided into twelve categories:

- Site Characteristics
- Delineation Of Waste
- Landfill Construction
- Contaminants and Contaminant Distribution
- Fate and Transport
- Monitoring
- Human Health Risk Assessment (HHRA)
- Ecological Risk Assessment (ERA)
- Seismic Stability
- Future Use
- Remedial Options
- ARARs

Site Characteristics

- Shallow groundwater may be in communication with the Bay and the wetland ponds, providing a transport mechanism for dissolved contaminants
- As with Site 1, there does no analysis of the potential migration of contaminants from Site 2 to offshore, and subsequent effects on ecological receptors in the Bay.

Delineation of Waste

- To what extent has the Navy defined the eastern boundary of the landfill?
- Waste was reportedly placed in a small portion of the North Pond. Has there been any subsequent investigation into the types of waste emplaced?
- Rad Survey did not include the wetland portion of Site 2.

- No trenches were dug in the wetlands to further delineate waste
- 24,000 cubic yards of dredge spoils were disposed of near the South Pond. These spoils came from Seaplane Lagoon, where nuclear ships were docked and maintained.

Landfill Construction

- The slurry wall constructed in the 1980's along the western edge of the landfill "appears" to be effective.
- The existing cover is inconsistent and permeable. Estimated cover is from 2 inches to 2 feet.
- Birds nest along the berm (constructed in the late 1970's) that surround the landfill, and should be protected during remediation.

Contaminants and Contaminant Distribution

- The FS claims that there is a barrier (i.e., confining layer) between the first water bearing zone (FWBZ) and the second water bearing zone (SWBZ). Some of the same contaminants are present in both zones.
- The quantity of drums, liquid wastes, waste oil, pesticides and asbestos are unknown.

- Most items removed in the 1999 response action near the Rad shack were radium dials and buttons. There were several unidentified objects. Did they consist of anything other than radium-226?
- Radium isotopes have their highest levels in a groundwater monitoring well near the shoreline, north of the wetlands. What does the Navy plan to do about it, as it is 5 times drinking water standard?

- How is radium mobilized so that it entered groundwater?
- Sandblasting grit (used for road bed around Site 2) from ship maintenance includes old paint and biocides, such as tributyltin. Has there been any investigation into how this may have been transported?

- In order to establish background levels, China Camp State Park was used.
- CCSP abuts San Pablo Bay in San Rafael.
- Dredged fill of varying origins was placed inside the sea wall, creating Site 2.
- There is no relation between CCSP and Site 2, except for the possibility that sediments share similar properties.

Fate and Transport – Pre-Remediation

- Over the course of time, it is recognized that erosion could play a substantial role in the movement of contamination
- There are plumes made up of benzene and chlorobenzene in the FWBZ
- Episodic precipitation events could play a role in transporting contaminants
- Transport of contaminants via groundwater occurs and should be controlled

- It is possible that groundwater from the landfill could impact groundwater beneath wetland surface waters and surface water in Bay.
- Global warming induced sea rises and subsequent flooding is not considered
- Some contaminants may be more prone to migrate when exposed to saltwater (e.g., Radium-226)

Monitoring

- Only 3 wells in the FWBZ are within landfill footprint.
- For MNA remedy, does the Navy propose additional monitoring wells in the landfill?

Environmental Risk Assessment

- Aquatic organisms are not considered as drivers for potential risk management decision-making
- Benthic organisms seemed to accumulate contaminants.
- The ERA did not consider groundwater for any of the ecological receptors evaluated.
- Were the effects on migratory species evaluated?
- How were wetland species selected?

Seismic Stability

- In the Geotechnical Feasibility Study, a soil cement gravity wall with stone columns was determined to be the most feasible remedial strategy to mitigate seismic hazards.
- The cost of earthquake drains is approximately $4 to $5 per foot compared to the estimated stone column cost of $75 per foot.
- Provide an explanation of how earthquke drains work.

Future Use

- Is it practical to place a wildlife refuge and educational center in an area absent removal of pesticides and other contaminants?
- Were children, primary site visitors for educational purposes, adequately considered in the human health risk assessment?

Remedial Options

- I think the range of alternatives considered is reasonable.
- Remedies should be designed for ecosystem enhancement.
- For the Landfill Soil, a soil cap is preferred (Soil Alternative 2). For the Groundwater, Monitored Natural Attenuation (Groundwater Alternative 2) is preferred.
- No additional remediation is proposed for the wetland area.
- $18 million difference between Alternatives 2 and 4 (Soil Cover and Soil Cover with Hot Spot Removal) seems too high, especially if TCRA is avoided.

- What problems do radioactive anomalies create for in-situ technologies in soil?
- What is the contaminant load of the dredged material?
- Would wetlands that are destroyed by the cap have to be mitigated?
- In-situ bio in groundwater to speed chemical breakdown does not appear to have been considered.
- There is no discussion of remediation of the dredge spoil area.
- There is no discussion of hot spot removal (e.g., pesticide containers), besides from the area near the Rad Shack.

- Because MNA is proposed, controlling infiltration (i.e., engineered cap) would be a large advantage for source control.
- To a large degree, MNA relies upon sorption. That is, contaminants will attach themselves to soil particles and inhibit their transport via groundwater.
- Has the Navy evaluated what environmental changes (e.g., change in pH) that may release contaminants to the groundwater?
- There is not sufficient evidence to support biodegradation.
- Recent groundwater data do not demonstrate that substantial attenuation is occurring.
- EPA requires that MNA control source, be accomplished within a reasonable time frame, and be supported by multiple lines of evidence. None seem to be present in the FS.

- A groundwater option considered is building a physical (hydraulic) barrier on the downstream side of the landfill. This would extend the existing slurry wall so that landfill is isolated from Bay and wetlands.
- Would the gravity wall and hydraulic barrier be designed together, thereby reducing costs?
- The extracted water would be treated and discharged to the Bay. The FS needs to specify treatment options in detail.
- Is any action proposed that would effect seasonal wetlands?

Applicable or Relevant and Appropriate Requirements (ARARs)

- I agree that State Water Resource Control Board Resolution (SWRCB) 68-16 (i.e., the non-degradation policy) and SWRCB Resolution 92-49 apply to groundwater at this site. I encourage the RWQCB to ensure compliance with these Resolutions.
- The Navy does not want to treat residual during treatment of soil and groundwater as RCRA wastes.