



TETRA TECH EM INC.

March 19, 2007

Dear RAB Members,

On behalf of the Navy, enclosed please find the February 7, 2007 final RAB meeting minutes for your information and records.

If there are any questions regarding the enclosed minutes, please contact Carolyn Hunter at (415) 222-8297 or Carolyn.hunter@ttemi.com.

Sincerely,

Carolyn Hunter
Community Relations Specialist
Tetra Tech EMI

FINAL
MEETING MINUTES
RESTORATION ADVISORY BOARD
NAVAL WEAPONS STATION SEAL BEACH, DETACHMENT CONCORD
CONCORD, CALIFORNIA
FEBRUARY 7, 2007

These minutes reflect general issues raised, agreements reached, and action items identified at the Restoration Advisory Board (RAB) meeting for Naval Weapons Station Seal Beach, Detachment Concord (NAVWPNSTA Seal Beach Det Concord), California. The meeting was held from 6:30 p.m. to 8:45 p.m. on February 7, 2007, at the Concord Police Department Community Meeting Room in Concord, California. Agreements and action items are described by topic under Sections I through VI and are summarized in Section VII. A list of participants and their affiliations is included as Attachment A, and the meeting agenda is included as Attachment B.

I. WELCOME, INTRODUCTIONS, PUBLIC COMMENT, AND AGENDA APPROVAL

Welcome and Introductions

The RAB Community Co-Chair, Mary Lou Williams (Concord resident) called the RAB meeting to order and initiated a round of introductions for attendees.

Public Comments

Ms. Williams opened the floor to public comments. No public comments were offered at this time.

March 2007 RAB Agenda Approval

Angela Lind (the U.S. Department of the Navy [Navy] RAB Co-Chair) reviewed the proposed agenda for the March 7, 2007 RAB meeting.

The Navy plans to provide the following presentations for the March 2007 RAB meeting:

- Site 29 Remedial Investigation (RI) Work Plan Overview
- Site 22A RI Work Plan Overview
- Solid Waste Management Units (SWMU) 2, 5, 7, and 18 Pilot Test Field Work Update

Ms. Lind asked the RAB to approve the March 2007 agenda. The RAB voted to approve the March 7, 2007 meeting agenda.

II. JANUARY 2007 RAB MEETING MINUTES APPROVAL

Ms. Lind asked the RAB for comments on the minutes from the meeting held on January 10, 2007. No comments were received on the January 10, 2007 RAB meeting minutes. The Navy will finalize the minutes from the January 10, 2007 meeting and distribute them to the RAB.

Action Item

1. The Navy will finalize and distribute the January 10, 2007 RAB meeting minutes.

III. COMMITTEE REPORTS AND ANNOUNCEMENTS

Ric Notini (City of Concord) stated the City of Concord's Community Advisory Committee (CAC) has been selected. The CAC will meet on the third Tuesday of the month to discuss the reuse planning for the Inland Area.

Mr. Notini announced that the City of Concord is going to hold an open house on March 17, 2007 from 10:00 a.m. to 1:00 p.m. There will be nine different poster stations discussing various reuse related topics. All updates on the reuse process are on the City of Concord's website.

Mr. Notini stated the Navy asked for the City's support for a 90 day extension of the determination of surplus (DOS) for Concord Naval Weapons Station. However, at the City Council meeting on February 6, 2007, the City Council voted 3 to 2 against further postponement of the DOS. Sarah Ann Moore (Navy) stated the Navy is currently processing the paperwork to issue the surplus determination. Ms. Williams stated the *Contra Costa Times* should have a detailed recount of the City Council meeting.

IV. REMEDIAL PROJECT MANAGER (RPM) UPDATE

Navy Update

Ms. Lind stated that the Navy prepared a RPM Update for the Inland Area activities (Attachment C).

Ms. Lind stated that the Tidal Area Navy Team has been working with the agencies in order to determine the Litigation Area Feasibility Study (FS) cleanup goals for sediment.

Environmental Protection Agency (EPA) Update

Phillip Ramsey (EPA) stated that the EPA is reviewing the Removal Action Work Plan for Site 30, Taylor Boulevard Bridge. Site 30 was historically used as a burn ash dump for the town of Port Chicago.

Mr. Ramsey stated that the EPA is reviewing the RI Work Plan for Site 22A. Igor Skaredoff (Martinez resident) asked if the Navy is assessing arsenic at Site 22A. Mr. Ramsey stated that the Navy is evaluating whether arsenic may have been used historically at the Site 22A for fire suppression.

Department of Toxic Substances Control (DTSC) Update

Jim Pinasco (DTSC) stated that he attended the City of Concord's CAC meeting in January 2007.

Mr. Pinasco stated that he is currently reviewing the Draft Final Military Munitions Response Program (MMRP) Preliminary Assessment (PA).

San Francisco Bay Regional Water Quality Control Board (Water Board) Update

Alan Friedman (Water Board) stated that he attended an Underground Storage Tank RPM teleconference call on January 29, 2007.

Mr. Friedman stated that he submitted comments on the Draft Final MMRP PA.

V. THE FINDINGS DISCUSSED IN THE DRAFT MMRP PA

Erin Caruso (Malcolm Pirnie) provided a presentation on the findings discussed in the draft MMRP PA.

The presentation is included as Attachment D.

Ms. Lind stated that the Navy is accepting comments on the MMRP PA if the RAB has any.

Mr. Skaredoff asked if the Site 1 Tidal Area Landfill is going to be assessed as part of the MMRP. Ms. Caruso stated that the entire Tidal Area, including the Site 1 landfill, is considered an MMRP site due to the 1944 Port Chicago explosion.

Mr. Pinasco asked if chemical weapons were transported through the Inland Area and the Tidal Area. Doug Murray (Naval Ordnance Safety and Security Activity [NOSSA]) stated that the only handling of chemical weapons was from the pier to the ship in the Tidal Area. Mr. Pinasco stated that the Navy should confirm that there was no chemical weapon handling in the Inland Area before it is transferred.

Kent Fickett (Mt. Diablo Audubon Society) asked if the Navy assessed the areas that look like vernal pools in the Tidal Area and Inland Area. Mr. Fickett wants to make sure the Navy is protective of the habitat during their assessment. Ms. Caruso stated that the next step in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process is to conduct a site inspection (SI), which is the first phase of the process where samples are collected. At the preliminary assessment (PA) phase, no samples are collected. Ms. Lind stated that the Navy is getting started with preparing work plans for the MMRP SI. Mr. Skaredoff stated he is interested in surface water sampling in the areas that could be vernal pools or wetlands. Mr. Skaredoff asked if the Navy is planning surface water sampling activities. Ms. Moore stated the Inland Area Team is still in the planning process for determining future sampling activities and will take the RAB's concerns back to the Navy RPM who is in charge of the MMRP project in the Inland Area.

Mr. Skaredoff asked if spent uranium was located at NAVWPNSTA Seal Beach Det Concord (formerly known as NAVWPNSTA Concord). Ms. Caruso is unaware of munitions items containing depleted uranium being disposed of at NAVWPNSTA Seal Beach Det Concord.

Mr. Skaredoff asked where the ship that was transporting mustard gas was sunk. Mr. Murray stated the ship was sunk 117 miles offshore. Mr. Skaredoff asked if the Navy sampled along the railroad tracks for mustard gas leaks. Mr. Murray reviewed the chemical properties of mustard gas, and indicated any mustard gas would have been degraded long ago through natural processes including biodegradation, photodegradation, and hydrolysis. He stated the railcars containing mustard gas were transported from Utah along existing Union Pacific Railway lines. Ms. Caruso stated the rail cars containing mustard gas were lined with clay and tarpaper to prevent leakage.

Mr. Friedman asked how the Navy is planning on conducting MMRP sampling in Suisun Bay. Ms. Lind stated she is working with a contractor who dealt with MMRP under water sampling at Mare Island and other sites. The Navy is currently assessing different technologies to investigate Suisun Bay.

Mr. Ramsey stated the EPA is in fairly good agreement on the Draft Final MMRP. EPA does not agree with the Navy classifying Investigation Area (IA) EOD 23A as a no further action site. Mr. Ramsey is providing comments on IA EOD 23A to the Navy. The rest of the Navy's recommendations in the report are consistent with EPA's opinion.

Action Item

2. Ms. Moore will relay the RAB's concerns regarding potential vernal pools at the MMRP sites to the Navy RPM.

VI. MUNITIONS AND EXPLOSIVES OF CONCERN (MEC)

Ms. Lind introduced Mr. Murray and gave brief outline of his MEC background. Mr. Murray provided a presentation on MEC. The presentation is included as Attachment E.

Mr. Murray stated that the Navy uses the new Munitions Response Site Prioritization Protocol (Protocol) when determining the prioritization score of an MMRP site. He also stated that stakeholder input was integral to the Protocol process. Ms. Lind stated she will be using the Navy's NORM program to determine the MMRP site prioritization designations. Ms. Lind asked if Mr. Murray knows of any other RABs that have had input on the site prioritization process. Ms. Caruso stated that the U.S. Army has asked their RABs for input on the site priorities. Mr. Murray stated he is not aware of any Navy sites that are far along enough in the site prioritization process to have used their RABs at this point.

Mr. Fickett asked where is the clay sludge that was washed out of the railcars containing mustard gas. Mr. Murray stated that all material that came into contact with the leaking mustard gas went to an unspecified fill area at NAVWPNSTA Seal Beach Det Concord.

Mr. Skaredoff asked if there were numerous shipments of chemical weapons to NAVWPNSTA Seal Beach Det Concord. Mr. Murray confirmed there were at least seven, two of which contained weapons that had leaked in transit.

Mr. Skaredoff asked if there were containers of the clay treated for mustard gas still on site. Mr. Murray stated he did not see any containers mentioned in the MMRP PA. If there are containers on the base, they are very heavy steel. Mr. Skaredoff stated if this is the type of items that are buried in the Site 1 Tidal Area Landfill, that area should never be slated for reuse. Ms. Lind stated the Site 1 Tidal Area Landfill is always going to be monitored and treated as a landfill.

Luis Garcia Bakarich (EPA) asked if there were any historical records to determine whether the clay exposed to mustard gas was used again. Mr. Murray stated there are no records of that.

Mr. Skaredoff asked if there is a chance the steel containers would corrode and leak under water. Mr. Murray stated the hulk, including the containers in its hold, is resting in nearly 14,000 ft of water and that the colder temperatures and relative lack of oxygenated water would significantly impede corrosion. He further stated that even if/when any mustard agent is released into the sea, hydrolysis would quickly transform the agent into harmless compounds.

Mr. Skaredoff asked about the status of capping the Site 1 Tidal Area Landfill. Ms. Lind stated the Navy is preparing revised landfill cap design drawings to add additional material between the landfill and the cap as a protective measure. Mr. Fickett asked if the added weight of the additional soil will cause contamination to come out the sides of the landfill and go into the groundwater. Ms Lind stated the Navy is closely monitoring the groundwater surrounding the landfill.

Mr. Skaredoff asked if the Navy is going to get the landfill cap in place in 2007. Ms. Lind stated she is

trying to expedite the process in order to get as much as possible done on the site. There are multiple parties that are involved in the review process of the revised landfill cap design drawings. NOSSA is going to be part of the approval process during each step.

VII. OTHER TOPICS, NEXT MEETING, AND ACTION ITEMS

Inland Area Community Relations Plan (CRP) Update

Carolyn Hunter (Tetra Tech EM Inc.) reminded the RAB that comments are due on the CRP interviewee list, questions, and schedule by February 21, 2007. Once the Navy receives the agency and RAB comments, they will begin scheduling interviews. Agnes Vinluan (Contra Costa Environmental Health) asked if this is the same as the update to the CRP done a few years ago. Ms. Hunter stated a CRP was done in 2003 that covered both the Inland Area and Tidal Area. This CRP is going to focus only on the Inland Area portion of NAVWPNSTA Seal Beach Det Concord.

The next RAB meeting is scheduled for 6:30 to 8:30 p.m. on Wednesday, March 7, 2007 at the Concord Police Station Community Room.

The following action items were generated during the RAB meeting on February 7, 2007

No.	Action Item	Target Date for Completion	Completion Date (or Status)
1	The Navy will finalize and distribute the January 10, 2007 RAB meeting minutes.	3/2/07	3/2/07
2	Ms. Moore will relay the RAB's concerns regarding potential vernal pools at the MMRP sites to the Navy RPM.	3/7/07	2/8/07

ATTACHMENT A

**ATTENDEES AND AFFILIATIONS
RESTORATION ADVISORY BOARD MEETING
NAVAL WEAPONS STATION SEAL BEACH, DETACHMENT CONCORD, CALIFORNIA**

FEBRUARY 7, 2007

(One Page)

**ATTENDEES AND AFFILIATIONS
RESTORATION ADVISORY BOARD MEETING
NAVAL WEAPONS STATION SEAL BEACH, DETACHMENT CONCORD, CALIFORNIA
FEBRUARY 7, 2007**

<u>Name</u>	<u>Affiliation</u>	<u>Telephone</u>
Wayne Akiyama	Shaw Group	(925) 288-2003
Lisa Anich*	Friends of Mount Diablo Creek	(925) 689-2642
Luis Garcia-Bakarich	EPA	(415) 972-3237
Beth Byrne	Concord Resident	(925) 686-4815
Harry Byrne	Concord Resident	(925) 686-4815
Joanna Canepa	TtEMI	(425) 877-2806
Erin Caruso	Malcolm Pirnie	(510) 735-3060
Roger Caswell	U.S. Army	(925) 246-4118
Lik-See Chung	TN & Associates	(650) 504-5122
Diana Davis	EMS	(925) 939-0120
Kent Fickett*	Mt. Audubon Society	(925) 254-5156
Alan Friedman	Water Board	(510) 622-2347
Frank Gray	CDFG	(916) 32-9961
Carolyn Hunter	TtEMI	(415) 222-8297
John Kaiser	Water Board	(510) 622-2368
Sylwester Kosowski	U.S. Navy, NAVFAC Southwest	(619) 532-1027
La Rae Landers	U.S. Navy, BRAC PMO West	(619) 532-0970
Angie Lind	U.S. Navy, NAVFAC Southwest	(619) 532-4228
Sarah Ann Moore	U.S. Navy, BRAC PMO West	(619) 532-0965
Doug Murray	NOSSA	(303) 744-5630
Rick Notini	City of Concord	(925) 671-3024
Jim Pinasco	DTSC	(916) 255-3719
Phillip Ramsey	EPA	(415) 972-3006
Cindi Rose	TtEMI	(415) 222-8286
Igor Skaredoff*	Martinez Resident	(925) 229-1371
Agnes Vinluan	Contra Costa Environmental Health	(925) 646-5225 X225
Mary Lou Williams*	Concord Resident	(925) 685-1415

Notes:

<p>* BRAC PMO CDFG DTSC EPA NAVFAC NOSSA TtEMI Water Board</p>	<p>Community Restoration Advisory Board (RAB) Member Base Realignment and Closure Program Management Office California Department of Fish and Game Department of Toxic Substances Control U.S. Environmental Protection Agency Naval Facilities Engineering Command Naval Ordnance Safety and Security Activity Tetra Tech EM Inc. San Francisco Bay Regional Water Quality Control Board</p>
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ATTACHMENT B

**AGENDA
RESTORATION ADVISORY BOARD MEETING
NAVAL WEAPONS STATION SEAL BEACH, DETACHMENT CONCORD, CALIFORNIA**

FEBRUARY 7, 2007
(One Page)

AGENDA

NAVAL WEAPONS STATION SEAL BEACH (NWSSB) DETACHMENT CONCORD RESTORATION ADVISORY BOARD (RAB) MEETING

Wednesday, February 7, 2007
6:30 p.m. – 8:30 p.m.

Location: Concord Police Department Community Meeting Room
1350 Galindo Street, Concord, CA 94520

- 6:30 – 6:45 Call to Order
- Welcome
 - Introductions
 - Public Comments
 - March 2007 Agenda Approval
- Lead: Community Co-chair
- 6:45 – 6:50 Approval of January 2007 Meeting Minutes
Review Unresolved Business
Lead: Navy Co-chair
- 6:50 – 7:00 Committee Reports/Announcements
- RAB Announcements, Reports or other business
 - Remedial Project Managers' Update (Navy/EPA/DTSC/RWQCB)
- 7:00 – 7:25 Presentation: The Findings Discussed in the Draft Final Military Munitions Response Program Preliminary Assessment
Presenter: Erin Caruso (Malcolm Pirnie)
- 7:25 – 7:35 Break
- 7:35 – 8:20 Presentation: Munitions and Explosives of Concern (MEC)
Presenter: Doug Murray from Naval Ordnance Safety and Security Activity (NOSSA)
- 8:20 - 8:30 Presentation: Inland Area Community Relations Plan Update
Presenter: Carolyn Hunter (Tetra Tech EM Inc.)
- 8:30 Adjourn

NWSSB DETACHMENT CONCORD RAB Meetings are held the first Wednesday of every month, unless changed. Information regarding the Environmental Restoration program at NWSSB Detachment Concord can be found at:

- NWSSB DETACHMENT CONCORD program prior to December 2005 -

<http://www.sbeach.navy.mil/Programs/Environmental/IR/IR.htm>

- NWSSB DETACHMENT CONCORD program after December 2005 -

<http://www.navybracpmo.org/brac2005/bracbases/ca/concord/default.aspx>;

In addition, a public voicemail is available for questions at (925) 246-4020

NAVFAC Public Affairs Officer: Mr. Lee Saunders, (619) 532-3100, lee.saunders@navy.mil

Lead RPM Tidal Area and Navy RAB Co-Chair: Mrs. Angie Lind, (619) 532-4228, angela.lind@navy.mil

BRAC Environmental Coordinator: Mr. Rick Weissenborn (619) 532-0952, richard.weissenborn@navy.mil

Community RAB Co-Chair: Mary Lou Williams, Mlou1015@aol.com

ATTACHMENT C

**NAVY REMEDIAL PROJECT MANAGER'S UPDATE
RESTORATION ADVISORY BOARD MEETING
NAVAL WEAPONS STATION SEAL BEACH, DETACHMENT CONCORD, CALIFORNIA**

FEBRUARY 7, 2007
(2 Pages)



Navy RPM Update for 7 February 2007 Meeting of Naval Weapons Station, Detachment Concord Restoration Advisory Board (RAB)

Summary of Navy Remedial Project Manager (RPM) Activities since the last RAB Meeting held on Wednesday, 1 November 2006

Inland Area

Installation Restoration/Munitions Response Programs Sites

- **1 November 2006 through 18 January 2007** - Prepared Draft Final Site 22 RI Report.
- **1 November 2006 through 31 January 2007** – Prepared Draft FSP/QAPP for Site 22A Arsenic Investigation. Draft to agencies on 5 February 2007.
- **1 November 2006 through 31 January 2007** – Navy Internal kick-off of the Munitions SI Project. Started preparing DQOs for presentations to the agencies in February.
- **8 November 2006** - Submitted the Draft Site 29 Work Plan for Agency review.
- **11 December 2006** – Site 22A DQO meeting with the agencies.
- **8 and 9 January 2007** – Received comments on the Draft Site 29 Work Plan from Fish and Game (via DTSC), EPA and the Water Board.
- **9 January 2007** – Navy met with EPA at their office in San Francisco to give an update on the Inland Area Environmental Cleanup Program.
- **18 January 2007** - Submitted the Draft Final Site 22 RI Report for Agency review.
- **24 January 2007** – Received additional comments on the Draft Site 29 Work Plan from DTSC.

SWMUs 2, 5, 7 & 18

- **2 November 2006** - Received EPA comments on the 29 September 2006 draft *Sampling and Analysis Plan for Pilot Test of Air Sparging and Soil Vapor Extraction at SWMU Sites 2, 5, 7, and 18*. Comments included expanding the area of the pilot test, testing in different soil types, installing and sampling groundwater monitoring wells, and extending the duration of the pilot test.
- **8 November 2006** - Received comments from DTSC on the draft *Sampling and Analysis Plan for Pilot Test of Air Sparging and Soil Vapor Extraction at SWMU Sites 2, 5, 7, and 18*. Comments were related to including additional explanation of the rationale for selecting the pilot test location and explanation of how the pilot test results will be used.

- **8 December 2006** - Navy submitted a letter to the EPA requesting a Site Management Plan schedule extension request for the final *Sampling and Analysis Plan for Pilot Test of Air Sparging and Soil Vapor Extraction at SWMU Sites 2, 5, 7, and 18*. The Navy requested submitting the final SAP by February 1, 2007, instead of December 1, 2006. In subsequent discussion with the EPA, it was determined that the SAP is not a primary deliverable and a formal extension request is not necessary.
- **11 December 2006** - Navy submitted preliminary responses to EPA and DTSC comments on the draft *Sampling and Analysis Plan for Pilot Test of Air Sparging and Soil Vapor Extraction at SWMU Sites 2, 5, 7, and 18*
- **13 December 2006** - Navy and EPA discussed responses to comments (RTCs) on the draft *Sampling and Analysis Plan for Pilot Test of Air Sparging and Soil Vapor Extraction at SWMU Sites 2, 5, 7, and 18* via teleconference
- **9 January 2007** - Navy and EPA met to discuss the draft *Sampling and Analysis Plan for Pilot Test of Air Sparging and Soil Vapor Extraction at SWMU Sites 2, 5, 7, and 18* RTCs. The Navy agreed to conduct the air sparging and soil vapor extraction pilot test at an additional location, conduct groundwater sampling, and install a downgradient groundwater monitoring well.
- **29 January 2007** - Navy submitted final *Sampling and Analysis Plan for Pilot Test of Air Sparging and Soil Vapor Extraction at SWMU Sites 2, 5, 7, and 18* which contains the final RTCs as an appendix.

ATTACHMENT D

**THE FINDINGS DISCUSSED IN THE DRAFT FINAL MILITARY MUNITONS
RESPONSE PROGRAM PRESENTATION
RESTORATION ADVISORY BOARD MEETING
NAVAL WEAPONS STATION SEAL BEACH, DETACHMENT CONCORD, CALIFORNIA**

FEBRUARY 7, 2007

(11 Pages)



**Munitions Response Program
Preliminary Assessment
Naval Weapons Station Seal Beach
Detachment Concord**

by
Erin K. Caruso, Malcolm Pirnie, Inc.

February 2007

Outline



- **What is the Munitions Response Program (MRP)?**
- **What is the purpose of the Preliminary Assessment?**
- **What is the process involved for conducting a Preliminary Assessment?**
- **What were the findings of the PA for NWSSB Detachment Concord ?**
- **Questions and Answers**



MMRP Inventory

- **Each Service was required to complete an inventory of defense sites by May 2003.**
- **The Navy's inventory was a coordinated effort of Commander of Naval Operations and the Remedial Program Managers at each installation.**
- **The inventory identified 8 sites at Detachment Concord**
 - **Borrow/Dredge Fill Area**
 - **Railroad Siding Excavations**
 - **Red Rock Disposal Area**
 - **Burn Area Near HE58**
 - **Disposal Area - Seal Creek**
 - **Tidal EOD Above Q Area**
 - **Port Chicago Pier Area**
 - **Former Inland Burning Area**

Preliminary Assessment Objectives



- Determine if the site(s) pose a threat to public health or the environment.
- Determine whether the threat is from an explosive hazard, munitions constituent, or both.
- Differentiate sites that do not require further response action from those that do.
- Prioritize sites for which further remedial investigation is required.
- Gather data needed for Navy / DoD reporting requirements and cost estimates.



Is a site inspection needed?

Approach to Preliminary Assessments



STEP 1

Project Planning

STEP 2

Reviewing Archival Records

STEP 3

Collecting Site Information

STEP 4

Range Reconnaissance

STEP 5

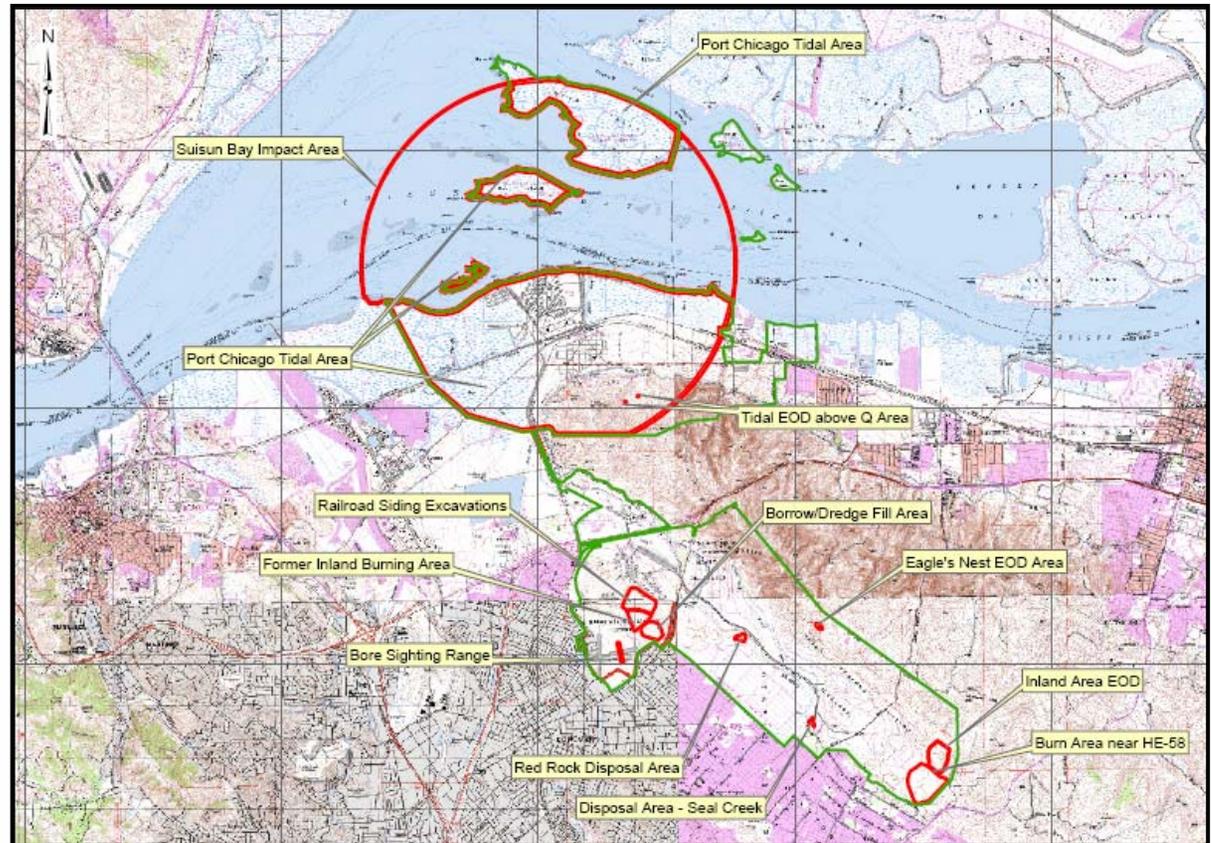
Analyzing the Data

STEP 6

Documenting the Results

MMRP PA Areas of Concern

- Borrow/Dredge Fill Area
- Railroad Siding Excavations
- Red Rock Disposal Area
- Burn Area HE-58
- Disposal Area – Seal Creek
- ☆ Inland Area EOD
- ☆ Eagle’s Nest EOD Area
- Former Inland Burn Area
- ☆ Bore Sighting Range
- Tidal EOD above Q Area
- Port Chicago Tidal Area
- ☆ Suisun Bay Impact Area



☆ Areas of Concern added during the PA process

Borrow/Dredge Fill Area



- **Approximately 27 acres**
- **Disposal of dredge materials from local creeks and the Contra Costa Canal between 1970s and 1980s**
- **No evidence of MEC or MC found during assessment**
- **Recommendation: No Further Action**



Railroad Siding Excavations



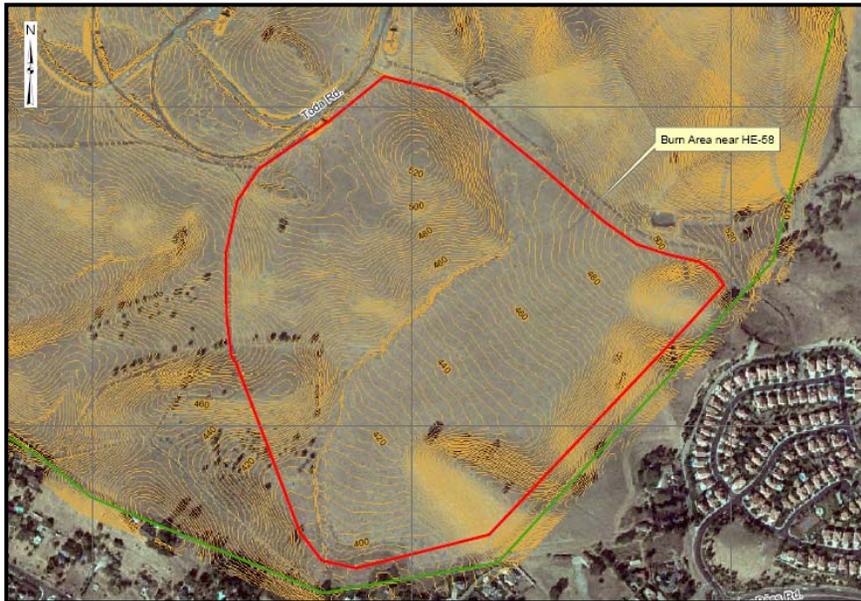
- Approximately 51 acres
- Suspected extension of Former Inland Burn Area between the 1940s and 1970s
- Suspected uses: Emergency destruction and open burn/open detonation (OB/OD)
- Probable munitions flares, smoke chemicals, Thermite grenades, small arms ammunition, flares, pyrotechnic and explosive powders, and smoke chemicals
- Recommendation: Site Inspection for MEC and MC

Red Rock Disposal Area / *Black Pit at Red Rock*

- **Red Rock Disposal Area:**
 - Approximately 5.3 acres
 - Disposal of non-munitions trash and debris
 - No evidence of MEC or MC found during assessment
 - Recommendation: No Further Action
- **Black Pit at Red Rock (IRP Site 16)**
 - Approximately 10-feet-by-15-feet in area, depressed as much as 5-feet
 - Suspected disposal pit
 - Soil analyzed for metals, pesticides, PCBs, other chemicals – all less than or within range of concentrations found during Inland Area remedial investigation
 - No evidence of MEC found during assessment
 - Recommendation: Site Inspection for MC (explosives)



Burn Area near HE-58



- **Approximately 92 acres**
- **Used for training and OB/OD between 1966 and 1978**
- **Probable munitions destroyed include bulk propellants and explosives, pyrotechnics, small arms, and grenades**
- **Limited 1993 geophysical survey found no significant anomalies**
- **Recommendation: Site Inspection for MEC and MC**

Disposal Area – Seal Creek

- Approximately 1.5 acres
- Disposal of non-munitions trash and debris between 1950s and 1983
- No evidence of MEC or MC found during assessment
- Recommendation: No Further Action

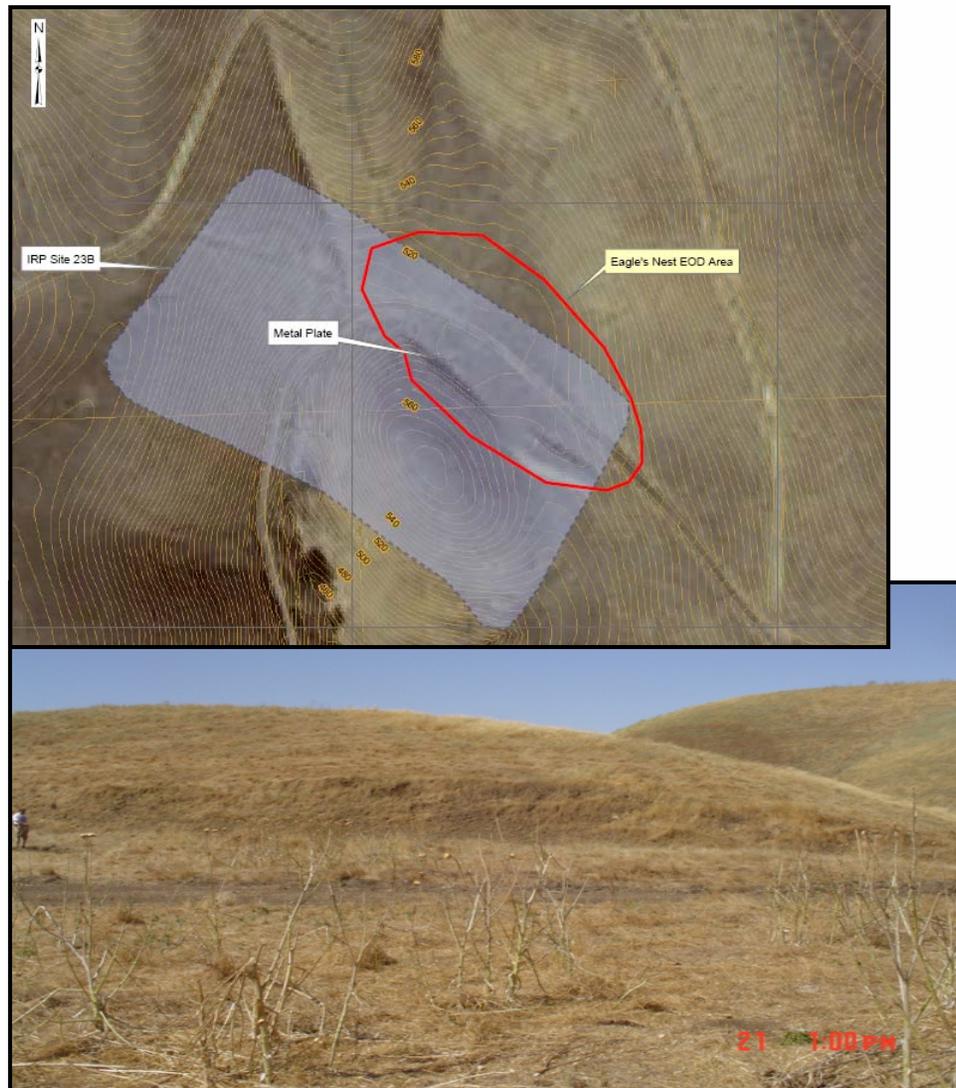


Inland Area EOD



- **Approximately 41 acres**
- **Used for open detonation between 1940s and 1959**
- **Probable munitions destroyed include bulk propellants and explosives, pyrotechnics, small arms, and grenades**
- **Limited 1993 geophysical survey found no significant anomalies**
- **Additional site visit conducted in June 2006**
 - **No evidence found of EOD use**
 - **Given hilly terrain, likely not used for EOD.**
 - **Burn Area near HE-58 (immediately south) is a more likely location.**
- **Recommendation: No Further Action**

Eagle's Nest EOD Area



- Approximately 2.4 acres
- Used for open detonation between 1959 and 1970s
- Probable munitions destroyed include bulk propellants and explosives, pyrotechnics, and small arms
- Limited 1993 geophysical survey found non-MEC related anomalies that were removed
- Recommendation: Site Inspection for MC

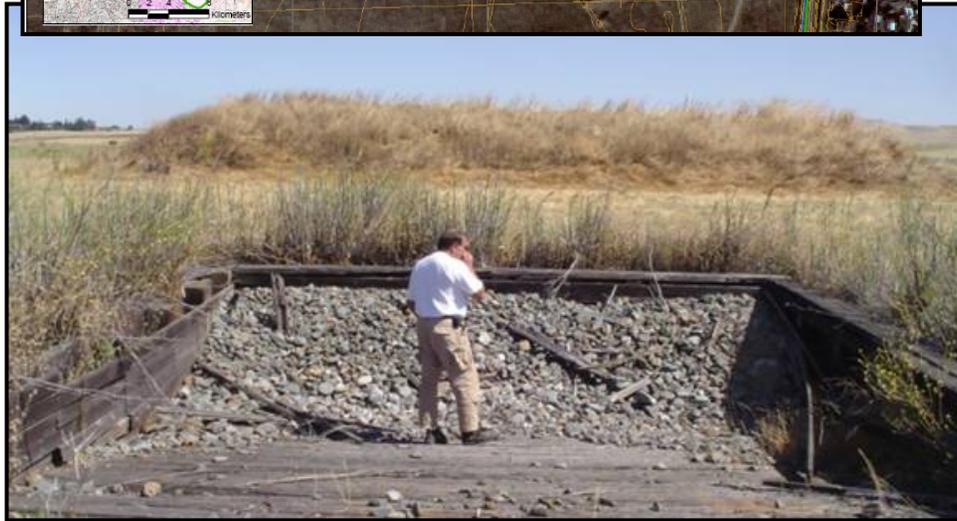
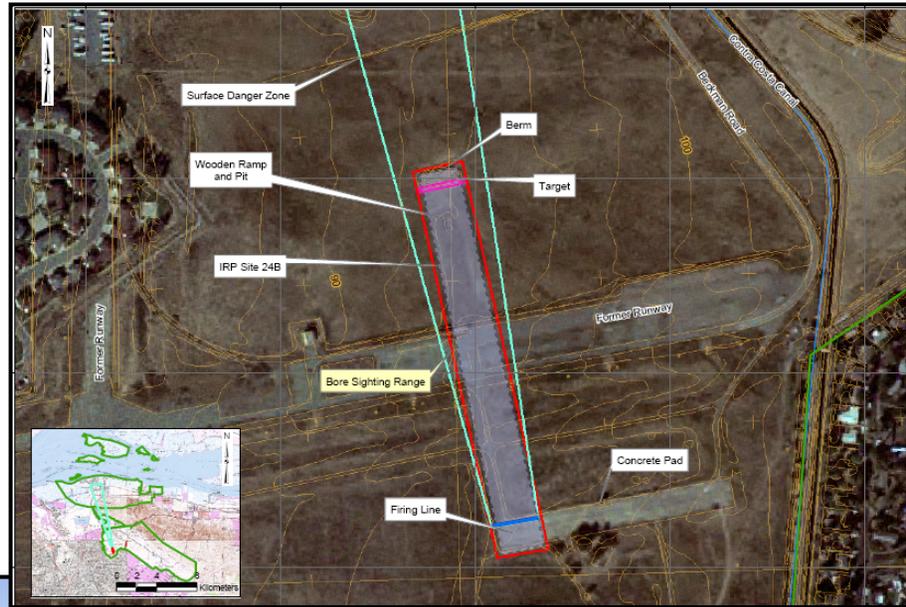
Former Inland Burn Area



- **Approximately 28 acres**
- **Suspected uses: Emergency destruction and OB/OD between the 1940s and 1970s**
- **Probable munitions destroyed: flares, smoke chemicals, Thermite grenades, small arms ammunition, flares, pyrotechnic and explosive powders, and smoke chemicals**
- **Recommendation: Site Inspection for MEC and MC**



Bore Sighting Range



- **Approximately 5.3 acres**
- **Suspected uses: Maintenance and synchronization of machine guns between the 1944 and 1946**
- **Geophysical survey found no MEC related anomalies and soil sampling found low concentration levels of lead (under 30 ppm).**
- **Recommendation: No Further Action**

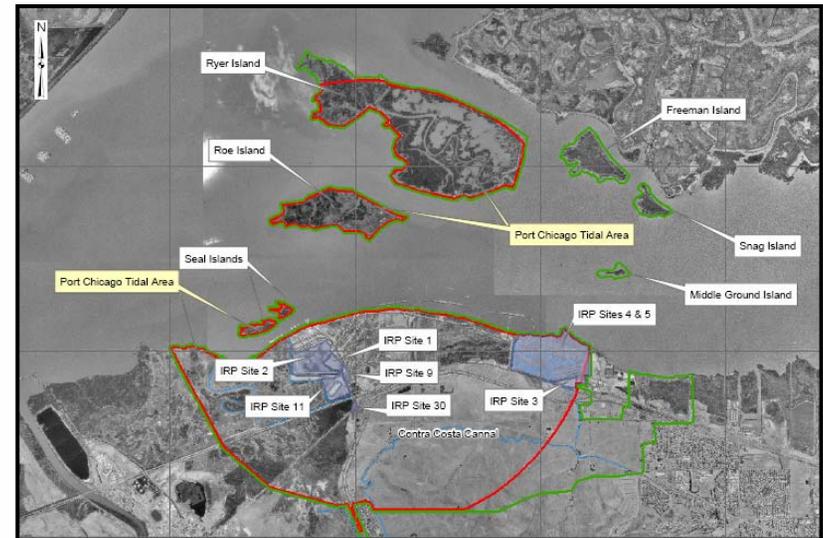
Tidal EOD above Q Area



- Approximately 0.37 acres
- Used for open detonation between early 1970s and 1974
- Probable munitions destroyed include bulk propellants and explosives, pyrotechnics, and small arms
- Recommendation: Site Inspection for MC and MEC

Port Chicago Tidal Area (1)

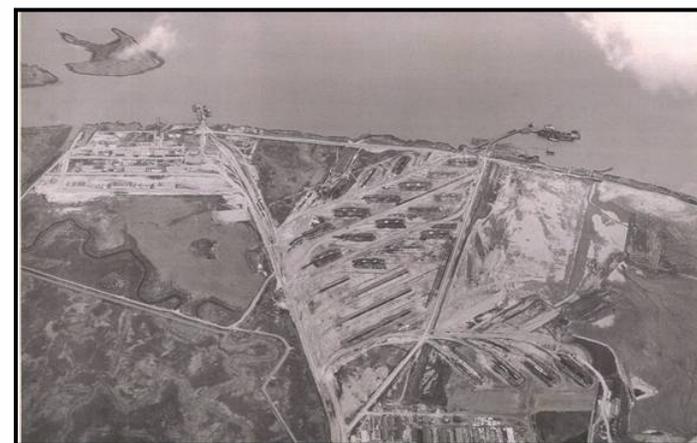
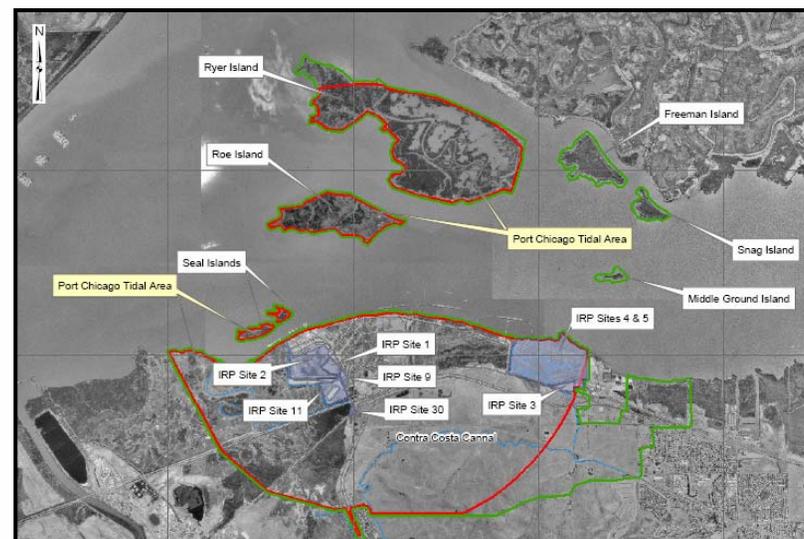
- **Approximately 4,945 acres**
- **1944 explosion of over 5,000 tons of ammunition**
- **Emergency response in 1944 and subsequent EOD actions have removed MEC and MEC scrap**
- **IRP Site 1 Tidal Area Landfill MEC discovery.**
 - **1 inert MK100 Series PD Fuse,**
 - **25 inert 100lb M47 Series and one 250lb M57 series bombs filled with sand**
 - **1 partial 7.2-inch Hedgehog Series Rocket**
 - **1 intact 7.2-inch Hedgehog Series Rocket.**
- **Evidence found that from 1952 through 1980 chemical warfare materials were transshipped through Detachment Concord. (see next slide)**
- **Recommendation: Site Inspection for MC and MEC**



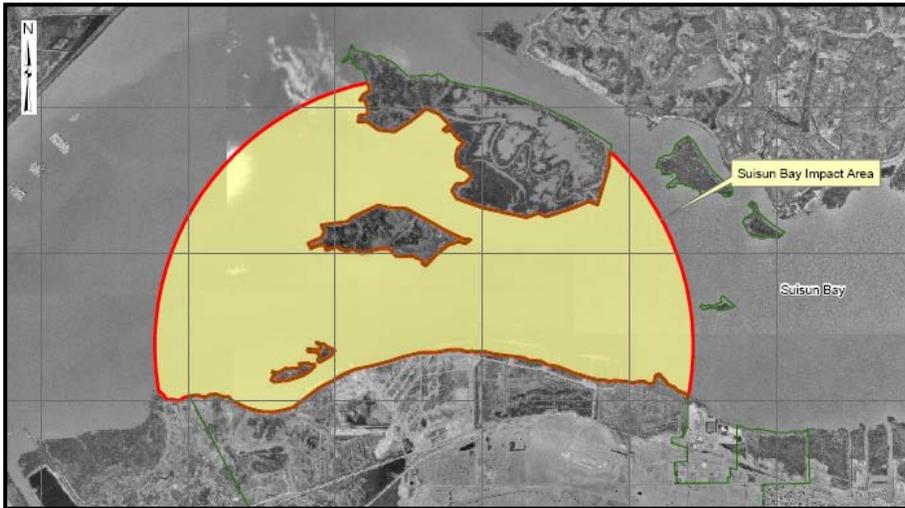
Port Chicago Tidal Area (2)



- Evidence that chemical agents were transshipped through Detachment Concord - specifically mustard gas and lewisite
- One documented case of leakage discovered during shipping operations in 1958
 - Mustard gas stored *without explosives* in inert bomb casings was found to have leaked from the container nose plugs
 - Resulted in a mixture of rainwater, mustard gas and clay in the bottom of the gondola cars
 - Contaminated wet clay was neutralized with bleach, tested to see that the material had been neutralized, and then disposed of in a "fill area" with additional bleach added as an extra precaution.
 - Dried contaminated clay could not be adequately neutralized, so the clay was put into drums with bleach and disposed of at sea along with the shipment of munitions containers.



Suisun Bay Impact Area



- **Approximately 4,830 acres**
- **Covering blast radius from 1944 explosion of over 5,000 tons of ammunition**
- **MEC found in marsh area and on bottom of the bay**
- **Recommendation: Site Inspection for MC and MEC**



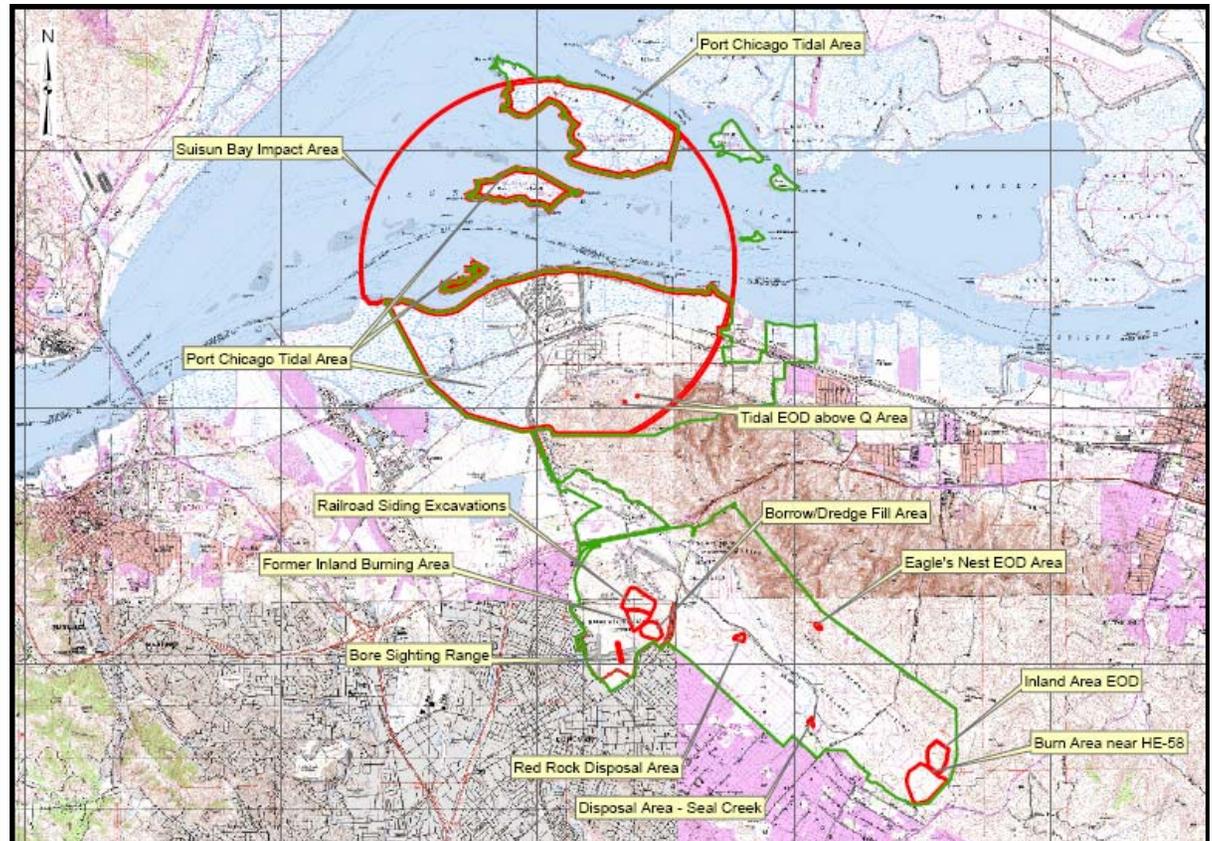
MMRP PA Areas of Concern



No Further Action

or *Site Inspection*

- **Borrow/Dredge Fill Area**
- *Railroad Siding Excavations*
- **Red Rock Disposal Area /Black Pit at Red Rock**
- *Burn Area HE-58*
- **Disposal Area – Seal Creek**
- **Inland Area EOD**
- *Eagle’s Nest EOD Area*
- *Former Inland Burn Area*
- **Bore Sighting Range**
- *Tidal EOD above Q Area*
- *Port Chicago Tidal Area*
- *Suisun Bay Impact Area*



Questions and Answers



Military Munitions Response Program Acronyms



DMM – Discarded Military Munitions

EOD – Explosive Ordnance Disposal

MMRP – Military Munitions Response Program

MEC – Munitions And Explosives of Concern

MC – Munitions Constituents

OB/OD – Open Burn / Open Detonation

UXO – Unexploded Ordnance

ATTACHMENT E

**MUNITIONS AND EXPLOSIVES OF CONCERN PRESENTATION
RESTORATION ADVISORY BOARD MEETING
NAVAL WEAPONS STATION SEAL BEACH, DETACHMENT CONCORD, CALIFORNIA**

FEBRUARY 7, 2007

(16 Pages)



Munitions and Explosives of Concern

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Concord RAB
7 February 2007

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Presentation Overview

- Acronyms and definitions
- Bombs and Bullets 101
- Assessing hazards and risks
- Munitions detection technology
- Munitions cleanup process
- Land Use Controls (LUCs)
- Q&A

Presentation Overview

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Acronyms and Definitions (1)

- Military munition – A complete device charged with explosives, propellants, pyrotechnics, initiating composition, or nuclear, biological, or chemical material for use in military operations, including demolitions. Also called ammunition

[DoD Dictionary of Military and Associated Terms]



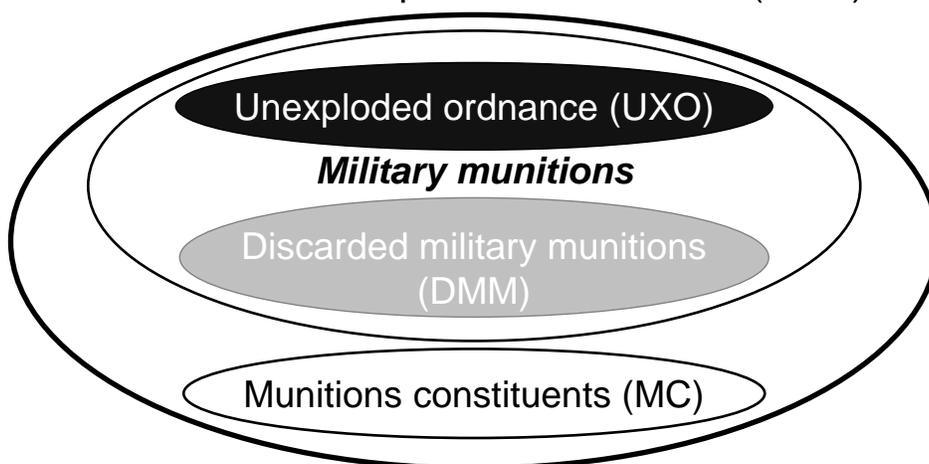
Assorted submunitions. Photo courtesy of U.S. Air Force.

Acronyms and Definitions

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Acronyms and Definitions (2)

- Munitions and explosives of concern (MEC)



Acronyms and Definitions

Sources: MEC – 10 U.S.C. 101; UXO and DMM – 10 U.S.C. 2710

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Presentation Overview

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Explosive Train

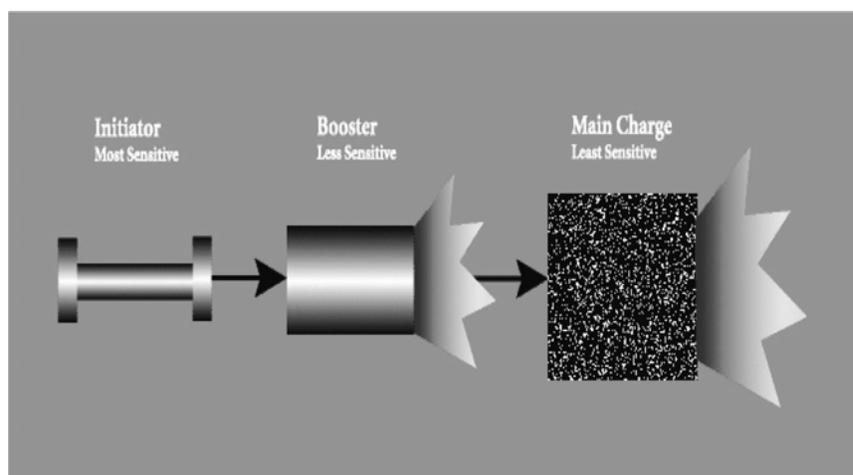


Figure courtesy of U.S. EPA.

Bombs and Bullets 101

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High Explosives

Filler	Uses	Filler	Uses
Amatex	projectiles, bomblets	HTA-3	bombs, projectiles
Ammonal	bombs, mines	Minol	bombs, depth charges
Ammonium picrate	bursting charge in armor-piercing rounds (obsolete)	Octol	shaped and bursting charges
Amatol	bombs, projectiles, shells	Pentolite	projectiles
Baratol	bombs	PETN	boosters, bursters, detonation cord
C-4	demolition explosive	RDX	boosters, bursters
Composition A	projectiles, grenades, bombs	Tetrytols	bursting charges
Composition B	projectiles, grenades, bombs, torpedoes	TNT	Boosters, bursters, demolition charges
Composition C	demolition charges	Torpex	bombs, mines, shaped and depth charges
Cyclotol	bombs, grenades, projectiles, shaped and bursting charges	Tritonal	bombs, projectiles

Bombs and Bullets 101

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Chemical Agents (CA) (1)

- CA contained in projectiles, submunitions, rockets, landmines
- Bulk agent stored in 1-ton casks
- Army designated as DoD manager for Chemical Warfare Material (CWM)
 - ◆ Non-Stockpile Chemical Materiel Program Office, Aberdeen Proving Ground, MD
 - ◆ Army Technical Escort Units respond to CWM finds

M1-02
chemical
bomblet.
Photo
courtesy of
U.S. Army.



Bombs and Bullets 101

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CA (2)

Uses	Agent(s)	Uses	Agent(s)
Blister	Distilled mustard (HD); Nitrogen mustard (HN); Phosgene oximedichloro-doroxime (CX); Lewisite (L); Mustard-Lewisite (HL); Phenylchloroarsine (PD); Ethyldichloroarsine (ED); Methylchloroarsine (MD)	Incapacitating	BZ
		Nerve	Tabun (GA); Sarin (GB); Soman (GD); GF VX; VX
Blood	Hydrogen cyanide (AC); Cyanogen chloride (CK); Arsine (SA)	Tear	Chloroacetophenone (CN); Bromobenzylcyanide (CA); O-chlorobenzylmalonitrile (CS); CR; Chloropicrin (PS)
Choking	Phosgene (CG); Diphosgene (DP)	Vomiting	Diphenylchloroarsine (DA); Adamsite (DM); Diphenylcyanoarsine (DC)

Source: Chemical Warfare Agent Properties; Office of the Assistant to the Secretary of Defense for Nuclear, Chemical, and Biological

Bombs and Bullets 101

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CA (3)

■ Comparative lethality of selected agents (shown as 1LD₅₀)*

- ◆ VX – skin ○
- ◆ VX – inhaled ○
- ◆ GB (Sarin) – skin ○
- ◆ GB (Sarin) – inhaled ○
- ◆ HD (Distilled mustard) – skin ○
- ◆ HD (Distilled mustard) – inhaled ○

* One LD₅₀ is a quantity lethal to 50% of an exposed population. Quantities shown are time-based concentrations. Droplets are approximately to scale and illustrate the size of one LD₅₀ based on pure.

Source: Chemical Warfare Agent Properties; Office of the Assistant to the Secretary of Defense for Nuclear, Chemical, and Biological

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Release of MC and CA into the Environment

- Breached casing can lead to release of MC and CA
- Breaches caused by:
 - ◆ Mechanical breakup
 - ◆ Deflagration
 - ◆ Corrosion
 - Affected by soil moisture, type, pH, buffering capacity, resistivity, electro-chemical potential, aeration, and microbes



Broken open 90-mm projectile. Photo courtesy of U.S. Army.

Presentation Overview

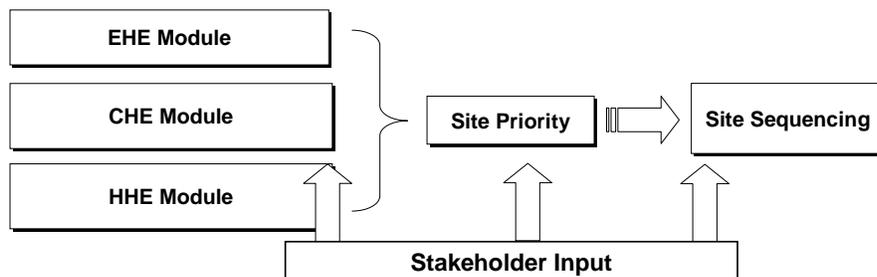
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Assessing Hazards and Risks (1)

- MC (including CA) pose chronic risks
 - ◆ For MC risk assessment use established chemical risk assessment protocols
 - ◆ Use “Chemical Warfare Material Hazard Evaluation” module of the Oct 05 Munitions Response Site Prioritization Protocol (MRSPP)
 - ◆ See <https://www.denix.osd.mil/MMRP>
- MEC pose acute hazards
 - ◆ Use Munitions and Explosives of Concern Hazard Assessment (MEC HA)
 - ◆ See http://www.epa.gov/fedfac/documents/hazard_assess_wrkgrp.htm

Assessing Hazards and Risks (2)

- MRSPP structure:
 - ◆ Explosive Hazard Evaluation (EHE) Module addresses explosive hazards posed by MEC
 - ◆ **Chemical Hazard Evaluation (CHE) Module addresses chemical hazards associated with the effects of CA**
 - ◆ Health Hazard Evaluation (HHE) Module addresses health and environmental hazards posed by MC, to include CA



Assessing Hazards and Risks (3)

- MEC HA analysis generates a score for a specific site and set of conditions
 - ◆ Assumed to be present
 - ◆ Possible in the future at the site
- Total score is then categorized high, moderate, or low, with low being under two conditions

Hazard Level	Potential for explosive incident under current use conditions	Potential for explosive incident under current <i>and</i> future use conditions
1	High	
2	Moderate	
3	Low	
4		Low

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Presentation Overview

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Munitions Detection Technology (1)

- Types
 - ◆ Magnetometers and gradiometers
 - ◆ Electromagnetic induction (EMI)
 - ◆ Ground penetrating radar (GPR)
 - ◆ Multi-sensor systems
 - ◆ Other, e.g., sonic systems, infrared sensors, explosive “sniffers”, neutron backscatter
- Applications
 - ◆ Terrestrial (hand-held, man-portable, or towed)
 - ◆ Underwater (hand-held or towed)
 - ◆ Airborne platforms (fixed- or rotary-wing)

Munitions Detection Technology

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Munitions Detection Technology (2)

Technology	Advantages	Disadvantages
Magnetometers/ Gradiometers	<ul style="list-style-type: none"> ■ Can locate relatively deeper ferrous items ■ Data can be analyzed to estimate target size and depth ■ Can be arrayed, even in man-portable applications 	<ul style="list-style-type: none"> ■ Detects only ferrous materials ■ Effectiveness reduced by magnetic geology ■ Surveys typically result in high false alarm rates (non-MEC items) ■ Subject to interference from large ferrous or current-carrying objects ■ Can be influenced by high concentrations of surface metal
Electromagnetic induction	<ul style="list-style-type: none"> ■ Detects ferrous and non-ferrous metallic objects ■ Effective in detecting near-surface objects ■ Can be effective in geology that challenges magnetometers ■ Provides additional information that can be related to target shape and material properties 	<ul style="list-style-type: none"> ■ Limited depth of investigation ■ Can be influenced by high concentrations of surface metal ■ Subject to interference from large metal objects

Source: Survey of Munitions Response Technologies, June 2006, SERDP/ESTCP/ITRC

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Presentation Overview

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Removal Alternatives (1)

- Hand tools
 - ◆ UXO technicians carefully search for subsurface anomaly
 - ◆ Anomaly exhumed if it is safe to move
- Equipment
 - ◆ Armored/shielded trackhoes, backhoes, bulldozers, etc.
 - ◆ Mechanical screens



3-in Plexiglas shield on excavator.
Photo courtesy of U.S. Navy.

Munitions Cleanup Process

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Removal Alternatives (2)

Subsurface MEC Removal Technologies	Effectiveness	Implementability	Cost	Representative System
Hand excavation	Medium	High	Average	Probe, trowel, shovel, pick, axe
Mechanized removal	Medium	High	Low	Tracked mini-excavator, bulldozer, loader
Massed excavation and screening	High	Medium	High	Earth-moving and screening equipment
Magnetically assisted recovery	Low	High	Low	Magnetic rollers or pick ups
Remotely-operated removal equipment	Low	Low	High	Tracked excavator, dozer, loader

Munitions Cleanup Process

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Treatment Alternatives — Explosives (1)

- Open burning (OB)
 - ◆ Once conducted in open pits or trenches
 - ◆ Now normally conducted on burn pads or in burn pans



Open burning of missile motor on Kaho'olawe Island, HI. Photo courtesy of U.S. Navy.

Munitions Cleanup Process

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Treatment Alternatives — Explosives (2)

- Open detonation (OD)
 - ◆ Blow in place (BIP) when encountering armed munitions
 - ◆ Consolidated “shot” for thermal treatment of surplus or off-spec munitions



Open detonation at Kaho'olawe Island.
Photo and video clip courtesy of U.S. Navy.



Munitions Cleanup Process

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Treatment Alternatives — Explosives and CA

- Contained Detonation Chambers
 - ◆ Designed to fully contain blast overpressure and debris from intentional detonations
 - DDESB approved zero feet quantity-distance safety arc when door is secured
 - T-10 and T-30 are transportable
 - ◆ Model T-10 limited to 1 HE-filled 81mm mortar plus donor charge (<13 lbs TNT)
 - ◆ Model T-30 (<40 lbs TNT) undergoing tests
 - ◆ Models D-100, -130, -200 at Bluegrass AD, KY, Milan AAP, TN, and Crane AAA, IN, respectively



T-10 chamber. Photo and video courtesy of DeMil International.

Munitions Cleanup Process

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CA Decontamination (1)

Agent	Decontamination	Agent	Decontamination
Blister	Super Tropical Bleach (STB); sodium hypochlorite (bleach); fire; Decontamination Solution No. 2 (DS2)	Tear	Aeration in open; sodium carbonate solution or alcoholic caustic soda in closed spaces
Blood	None needed in field	Nerve	STB; dilute alkali or DS2 solution; hot, soapy water
Choking	None needed in field; aeration in closed spaces	Vomiting	None needed in field; alkali solution or DS2 in closed spaces
Incapacitating	Soap and water; shake or brush; hypochlorite or caustic alcoholic solution		

Munitions Cleanup Process

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CA Decontamination (2)

Agent	Results of Decontamination	Volatilization Half-Life
HN1 Nitrogen Mustard	Destroyed with chlorinating agents	1 day in air; 6.2 days in model lake; 3.6 hrs in model river
Lewisite	Reacts to form stable non-toxic cyclic product	Not reported

Sources: Emergency Response Cards published by Centers for Disease Control and Prevention, National Institute for Occupational Safety and Health

Munitions Cleanup Process

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LUCs

- LUCs protect property owners and the public from MEC hazards and MC/CA risks
 - ◆ Limit access or use, or by warning of hazard
- General types of LUCs:
 - ◆ Legal mechanisms
 - Easements, restrictive covenants, reversionary interests, zoning, permitting, siting restrictions, and overlay zoning

Land Use Controls

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LUCs for MRSs

Engineering Controls (ECs)

- ◆ Fences
- ◆ Signs
- ◆ Guards
- ◆ Landfill caps
- ◆ Provision of potable water
- ◆ Slurry walls
- ◆ Sheet pile
- ◆ Pump and treat systems
- ◆ Monitoring wells
- ◆ Vapor extraction systems



Institutional Controls (ICs)

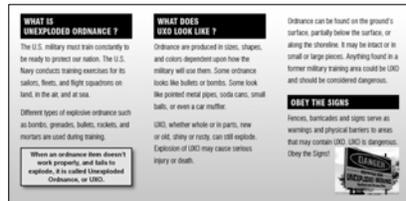
– legal devices imposed to ensure that ECs stay in place and/or restrictions on land use stay in place

- ◆ Easements
- ◆ Equitable servitudes
- ◆ Notices
- ◆ Zoning
- ◆ Educational materials
- ◆ Permits
- ◆ Etc.

* UXO warning sign at the Red Dog Mine, AK. Photo courtesy of U.S. EPA.

MEC-Specific Education Materials

- RAB posters
- Handouts
- Coloring books
- Videos
- Sources:
 - ◆ Members of the Munitions Response Work Group
 - ◆ Navy Environmental and Health Center (NEHC)



Generic tri-folds developed by CNO.

Q&A

