DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR MOBILITY COMMAND
JOINT BASE MCGUIRE-DIX-LAKEHURST

15 June 2012

Mr. Curtis A. Frye
Chief, Environmental Restoration Program
87 CES/CEAN
2403 Vandenberg Avenue
JB MDL, NJ 08641-5104

Ms. Theresa Lettman, RAB Member
Pinelands Preservation Alliance
17 Pemberton Road
Southampton, NJ 08088

Re: Draft Minutes, 10 May 2012 Joint Base McGuire-Dix-Lakehurst (JB MDL) Restoration Advisory Board Meeting

Dear Ms. Lettman:

Attached are the Draft minutes from the 10 May 2012 Restoration Advisory Board (RAB) meeting. The next RAB meeting is tentatively scheduled for Thursday, 9 August 2012 at 6:30 PM, at the Edward Holloway Senior Citizen and Community Center on Main Street in Cookstown, New Jersey.

If you have any questions concerning this matter, please call Mrs. Nicole York-Brestle at (609) 754-0068 or Mr. King Mak at (609) 754-3323.

Sincerely,

CURTIS A. FRYE, P.E., DAFC
Chief, Environmental Restoration Program

Attachments:
1. Draft Meeting Minutes, 10 May 2012
2. Presentation Materials, 10 May 2012
3. Administrative Record Update, 9 May 2012
4. RAB Acronym List, 10 May 2012

Joint Base McGuire-Dix-Lakehurst
Restoration Advisory Board (RAB) Draft Meeting Minutes
Meeting No. 38 – 10 May 2012

SUBJECT: Restoration Advisory Board (RAB) Meeting No. 38 – Meeting Minutes

1) Place: Edward Holloway Senior Citizen Community Center, 5 Cookstown Browns Mills Road, Cookstown, New Jersey

2) Date/Time: Thursday, 10 May 2012; 6:30 PM

3) Co-Chairs: CAPT Andrew Butterfield, Deputy Joint Base Commander, Joint Base McGuire-Dix-Lakehurst
Mr. Michael Tamn, Resident, Pemberton Township, New Jersey

4) Attendees:

Ms. Theresa Lettman	Pinelands Preservation Alliance, RAB Member
Mr. Frank Storm	Resident, Burlington County, RAB Member
Mr. Doug Pocze	US Environmental Protection Agency, Region II
Mrs. Carla Struble	US Environmental Protection Agency, Region II
Mr. Haiyesh Shah	New Jersey Department of Environmental Protection
Mr. Ken Smith	JB MDL, 87 CES/CEAN, Chief, Environmental Division
Mr. Curtis Frye	JB MDL, 87 CES/CEAN, Chief, Environmental Restoration Program
Mr. King Mak	JB MDL, 87 CES/CEAN, Environmental Restoration Program
2nd Lt David Murphy	JB MDL, 87 ABW/PA, Public Affairs
Mrs. Nicole Brestle	JB MDL, 87 CES/CEAN, Environmental Restoration Program (BAH)
Mr. Michael Brown	JB MDL, 87 CES/CEAN, Environmental Restoration Program (BAH)
Mr. Tom Bosselman	Resident, Pemberton Township
Mr. Matthew Csik	Ocean County Health Department
Mr. Graig Lavorgna	Shaw Environmental & Infrastructure
Mr. James Richman	Shaw Environmental & Infrastructure
Dr. Stephen Richardson	Solutions IES
Mr. Karnam Ramanand	Brown and Caldwell

5) Handouts

- JB MDL Restoration Advisory Board, Meeting No.38, 10 May 2012, Agenda
- JB MDL Restoration Advisory Board, Meeting No. 38, 10 May 2012, Presentation Slides
- JB MDL Restoration Advisory Board, Meeting No. 37, 9 February 2012, Draft Meeting Minutes
- JB MDL Restoration Advisory Board, Document Availability List, 10 May 2012
- New Restoration Advisory Board Member Application
- Restoration Advisory Board Acronym List

6) Call to Order:

The meeting was called to order at 6:30 PM by CAPT Butterfield, who welcomed everyone to the meeting and announced that he was serving as the co-chair tonight in place of COL Whitlock.

7) Minutes of Previous Meeting and Review of Agenda Items:

Mr. Tamn asked for a motion to approve the minutes from the 9 February 2012 RAB meeting: a motion was made by Mr. Storm, seconded by Mr. Pocze; the minutes were approved.

8) Review of Action Items from the February 2012 RAB:

JB MDL was asked to gather the former Dix Sanitary Landfill 2-arce parcel transfer data from the Real Property Office.

- JB MDL provided Mrs. Lettman a descriptive map and a copy of the QuitClaim Deed.

Mr. Curtis Frye, Chief, JB MDL Environmental Restoration Program, provided an update on the RAB Member Application Form, which was an outstanding action item that was discussed during the RAB on 9 February 2012. Mr. Frye indicated that the RAB new member application form has been finalized and is ready for distribution.

- There was additional discussion regarding how the application will be distributed. Mrs. Brestle will work with JB MDL Public Affairs to coordinate publication of the application on the JB MDL website. Mrs. Brestle will send an application electronically to Mrs. Struble following the meeting.

9) Air Force Center for Engineering and the Environment (AFCEE) Research and Development (R&D) Project, Bioremediation of Dense Nonaqueous Phase Liquids (BioDNAPL) Pilot Study at McGuire Site SS-36:

Mr. Curtis Frye provided an overview of the ongoing remedial efforts taking place at McGuire Site SS-36. Following this overview, Dr. Stephen Richardson of Solutions IES gave a detailed presentation of this AFCEE funded R&D project. In general:

- Site SS-36 presents a particular challenge because the chlorinated volatile organic compound (cVOC) DNAPL on-site in low-pH aquifers is very difficult to remediate.
- The goal for this project is to study the bioremediation of cVOC DNAPL by injecting emulsified vegetable oil (EVO) into the groundwater plume formulated with a slow-release pH buffer and a bioaugmentation culture within a single mobilization.

There was general dialogue between Dr. Richardson and the RAB members regarding how long groundwater would be monitored for impacts of pH buffering, expected changes in overall groundwater temperature and any potential impact related biodegraded TCE at the site. Key points included:

- Groundwater pH will be raised to neutral (pH = 7), however this will not have any long term impact on groundwater.
- The technology s is potentially a long term solution with minimal risk. There are several injection points and one injection of the substrate. After the injection, groundwater will be monitored for the duration of the project (18-months).

- Any vinyl chloride produced as a result of TCE biodegrading will be addressed through Bioaugmentation. The remaining constituent will be ethene, which non-toxic. Ethene is consumed by natural bacteria in the environment.
- Ms. Lettman inquired as to whether ethene had an effect on the Pinelands ecology. Dr. Richardson agreed to look into this issue further and provide a response.

10) Dix Magazine-1 Area Update:

Mr. Graig Lavorgna, Shaw Program Manager provided an update on the progress of the Bioaugmentation recirculation system at the Magazine-1 site. The update included brief hydrogeology summary including a plume conceptual site model which provided a detailed explanation of site soil permeability and the relation to the Magazine-1 Area soil injection points. Key points included:

- Planning to bioaugment the Kirkwood Formation in May 2012.
- A bromide tracer test is scheduled for the Manasquan Formation in June 2012.
    - The tracer test is being performed to evaluate injectant flow paths in the Manasquan formation and confirm sodium hydroxide distribution to facilitate the anticipated pH rise in this portion of the treatment area.

There was discussion between RAB members and Mr. Lavorgna. Key points included:

- General inquiries regarding the quantity of downgradient monitoring wells and whether those wells are monitored for increases in pH. Mr. Shah stated that the DEP has not seen any increased pH in the monitoring results.
- Ms. Lettman had inquired about the size of the area being disturbed as a result of the MAG-1 remediation and what is to become of the site after the project is completed. Mr. Lavorgna explained that the site will be naturally restored once the project is completed.

11) Public Comment Period:

- Mr. Ramanand of Brown and Caldwell inquired as to whether there were significant biofouling issues due to hydroxide and SDC-9. Mr. Lavorgna responded that as part of the upcoming tracer study in the Manasquan area, the injection wells were being developed to ensure that injection pressures remain low and injectants do not short-circuit to the interface soil zone. Significant fouling of the injection wells had not been observed. The SDC-9 bacteria have not yet been injected at the site.

12) Action Items and Proposed Agenda Topics for the next RAB Meeting:

- Include an update on the Dix National Priority List Sanitary Landfill delisting.
- As requested by Ms. Lettman, Dr. Richardson is going to research the effects of ethene on the Pinelands ecology.

13) Meeting Adjourned:

- Mr. Michael Tamn, RAB Co-Chair, adjourned the meeting at 7:41 PM

87th Air Base Wing

Outstanding Action Items/Questions
from Previous RAB Meeting

Mr. Curtis Frye
Chief, Environmental Restoration Program
87 CES/CEAN

Outstanding Action Items

- Confirm the status of the property/deed issue raised by Theresa Lettman.
  - The parcel is no longer part of JB MDL (Dix) property
  - In 1994 Fort Dix personnel determined that the Pemberton Municipal Building had encroached onto Fort Dix property. To resolve the issue, Congress passed legislation to transfer the encroached property to Pemberton Township
  - To support the real estate action, a National Environmental Policy Act (NEPA) Environmental Assessment (EA) was completed in 2002, and a Finding of Suitability to Transfer (FOST) was signed. The parcel transfer of 2.16 acres was completed in 2007
  - A QuitClaim Deed which consolidated part of Lot 1, Block 942 [2.16 acres, formerly part of Dix] into Pemberton Township's Lot 9.02, Block 812 was signed on April 24, 2008. The township recorded the deed on October 26, 2009 and filed the deed on December 14, 2009

Outstanding Action Items

- Finalize New RAB Member Application
  - ✓Application form is complete and ready for use
- Provide an Update on Dix MAG-1 Site
  - ✓Shaw Environmental giving an update this evening

McGuire Site SS-36

- Multiple Efforts Currently Underway at Site SS-36
  1. CERCLA process for Shaw OU-2 ongoing
     - Draft Remedial Investigation Report under review
     - Completed Treatability Study to support Feasibility Study and Remedial Design
     - Completed Removal Action of TCE source areas at building 2305
  2. Shaw research study evaluating use of electrical current to assist bioremediation
  3. Solutions IES research study evaluating new approach for bioremediation of high concentration CVOC plumes
- Research Studies (2 and 3) Operate Independently of the CERCLA Process
  - Provide technical benefits at no cost to the site

Outstanding Action Items

Questions?

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AFCEE Research and Development Project,
Anaerobic Bioremediation of Dense Non-aqueous Phase Liquids (DNAPLs) at McGuire Site SS-36

Stephen Richardson, Ph.D., P.E.
Solutions IES, Inc.

About AFCEE

- AFCEE: Air Force Center for Engineering and the Environment
- Mission: AFCEE provides integrated engineering and environmental products, services, and advocacy that optimize Air Force and Joint capabilities through sustainable installations
- This study is funded by AFCEE under Contract FA8903-10-C-8110

7

Overview

- Problem Statement
- Project Objective
- Background
- Study Design
- Results
- Going-forward

8

Problem Statement

- Sites contaminated with chlorinated volatile organic compound (cVOC) DNAPL are technically challenging and costly for the Air Force to manage
- DNAPL source areas can significantly increase remedial project costs and ultimately prevent some sites from achieving closure

9

Project Objective

- To demonstrate and validate a new approach for biologically treating high concentrations of chlorinated solvents in low-pH aquifers
- Goal: Cost-effective bioremediation of cVOC DNAPL by injecting emulsified vegetable oil (EVO) formulated with a slow-release pH buffer and a bioaugmentation culture within a ***single*** mobilization

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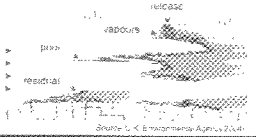
DNAPLs

- Dense non-aqueous phase liquids (DNAPLs)
  - Difficult and expensive to manage
  - Represent very high concentrations of contaminants
  - Serve as long-term sources of groundwater impact
  - Conventional remediation technologies are expensive and often less effective than desired
- Chlorinated Ethenes
  - Tetrachloroethene (PCE)
  - Trichloroethene (TCE)



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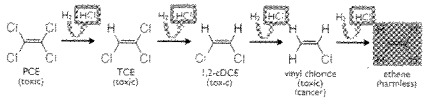
Anaerobic Bioremediation



- Well-established technique for cVOC removal in groundwater
- Distribution of an organic substrate in subsurface
  - consumes oxygen to create anaerobic environment
  - stimulates microbial growth
  - provides reducing e- equivalents to reduce contaminants

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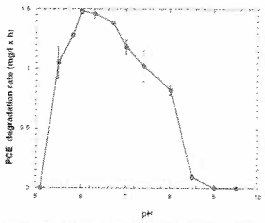
Remedial Challenges

- DNAPL must dissolve for biodegradation to occur
- High concentrations can be toxic to bacteria
- Poor contact between DNAPL and substrate
- Low pH can inhibit microbial activity



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Proposed Strategy

- Introduce buffered emulsified vegetable oil product (EVO) through DNAPL zone
- Partition cVOC into micro-EVO droplets
  - Higher surface area = greater bacterial growth & dissolution
  - Reduced toxicity by cVOC partitioning into EVO
- Integrated buffer maintains pH in optimal range for dechlorination activity
- All bacterial requirements met at single location

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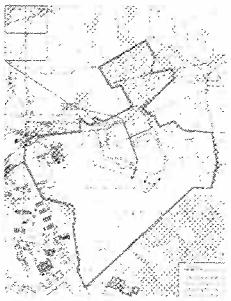
Site Selection

- Site SS-36, McGuire
  - Building 2305 Area
- Well-defined TCE plume
- High TCE concentrations
  - 430 mg/kg soil
  - 18 mg/L groundwater
- Low natural pH (<5 SU)



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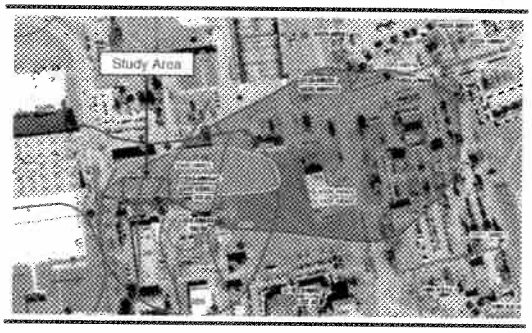
Building 2305, Site SS-36 McGuire



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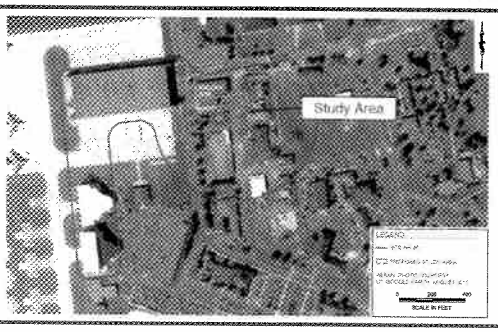
Building 2305, Site SS-36 McGuire



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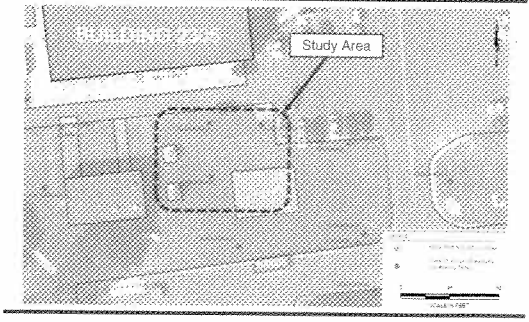
Building 2305, Site SS-36 McGuire



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Site Assessment

- Membrane Interface Probe (MIP)
  - Characterize the contaminant profile
  - 10 borings (SB-1 to SB-10) to a depth of 30 ft bgs
- Hydraulic Profile Tool (HPT)
  - Obtain info on lithology and hydraulic conductivity
  - 4 borings (HPT-1 to HPT-4) to a depth of 30 ft bgs
- Confirmatory soil sampling
  - Two soil borings (SB-11 and SB-12) with continuous sampling from 16 to 24 ft bgs

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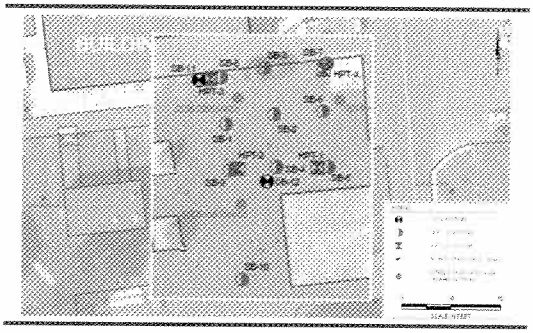
Site Assessment



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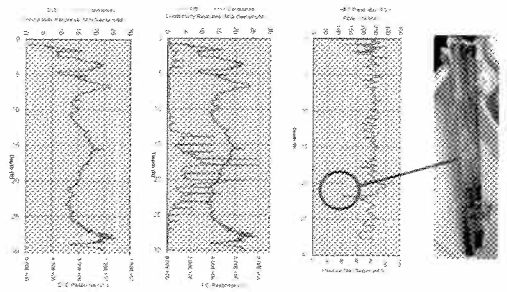
Site Assessment: MIP / HPT



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Pilot-Scale Injection

- Objective 1: Determine the distribution of a buffered emulsified oil formulation through the aquifer material
- Objective 2: Evaluate its performance for raising groundwater pH and reducing TCE concentrations
- Injected 300 gallons of diluted substrate followed by chase water
- Advanced 9 soil borings around injection point
- Performance monitoring: 1, 3, and 6 months

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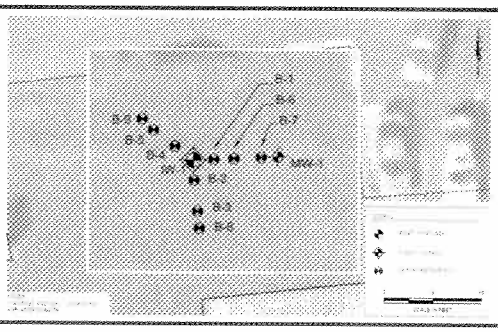
Pilot-Scale Injection



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Pilot-Scale Injection (after 1 month)

- Geochemical indicators
  - Increase in total organic carbon
  - Increase in alkalinity
  - Low redox potential (<200 mV)
  - Increase in pH
- Contaminant Concentrations
  - No significant change in TCE concentrations (yet)
  - Production of vinyl chloride (VC) and ethene
- Good distribution of alkaline buffer in sand lens

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Going Forward

- Continue monitoring pilot-scale injection
- Design full-scale injection based on site assessment and pilot test results

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Project Schedule

Task	Description	Status
1	Site Selection and Historical Data Review	Completed
2	Site Characterization SAP	Completed
3	Site Characterization	Completed
4	Pilot-scale Injection & Monitoring	Ongoing
5	Technology Demonstration Work Plan	Ongoing
6	Technology implementation	June 2012
7	Performance monitoring	August 2012 – February 2014
8	Final Technical Report	September 2014

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Questions ??

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87th Air Base Wing

Bioaugmentation Remedial System Update

Magazine-1 Area, Site SS007

Mr. John J. King
Booz Allen Hamilton GEITA Support
Project Manager
87 CES/CEAN
Mr. Graig Lavorgna
Remediation Engineer
Shaw Environmental & Infrastructure, Inc.

Outline

I. Site Hydrogeology Summary
II. Full-Scale System Design / Build
III. Full-Scale System Operation

"WIN AS ONE"

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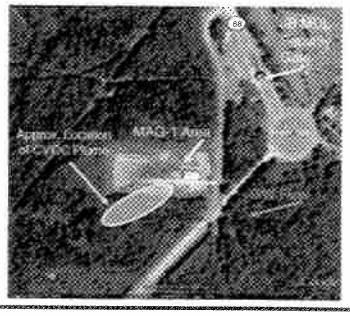
Site Hydrogeology Summary



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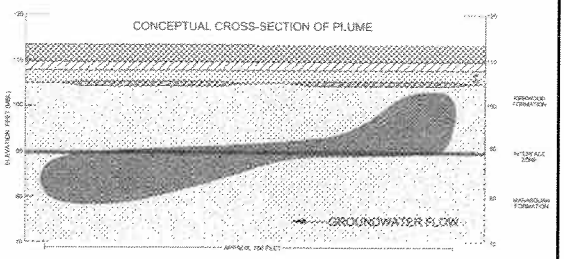
Site Hydrogeology Summary



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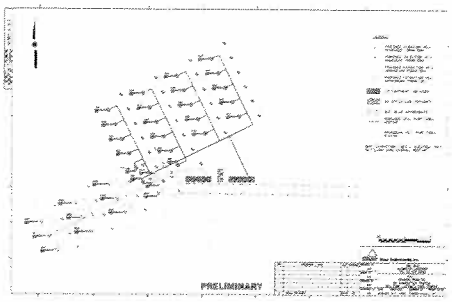
Full-Scale System Design / Build



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Full-Scale System Design / Build

Well Installation (completed May 2011)
- Kirkwood: 26 Injection & 22 Extraction Wells
- Manasquan: 16 Injection & 12 Extraction Wells

Gravel Road & Equipment Lay-down Area (completed June 2011)

Trenching (completed June 2011)
- Tubing from extraction wells / to injection wells
- Power and control wiring to extraction well pumps

Delivery of System Component Boxes (completed June 2011)

Electrical Service Upgrade (completed August 2011)

Final Electrical and Piping Connections (September 2011)

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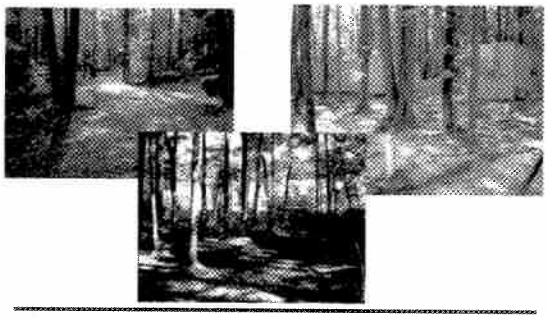
Full-Scale System Design / Build



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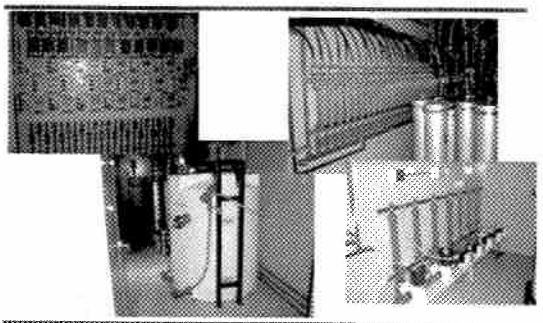
Full-Scale System Design / Build



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Full-Scale System Operation

Baseline Groundwater Sampling – September 2011
System Startup – October 2011
- pH adjustment period began 18 October 2011
  - Bulk injections of sodium hydroxide
    - ✓pH goal: between 5.5 and 8.0
  - Approximately 7,700 gallons into Kirkwood and 4,800 gallons into Manasquan, as of April 2012
- Sodium lactate bulk injection into Kirkwood began 23 March 2012
  - Approximately 1,375 gallons into Kirkwood
    - ✓ORP goal: between -100 mV and -300 mV
  - Manasquan likely ready for lactate by June 2012

Groundwater Sampling Event – April 2012

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Full-Scale System Operation

Anticipated Operational Schedule:

May 2012
- Continue bulk hydroxide injections into Manasquan
- Bioaugment Kirkwood with SDC-9 consortium

June 2012
- Bulk lactate injection into Kirkwood and Manasquan
- Groundwater sampling event

July 2012
- Bioaugment Manasquan with SDC-9 consortium
- Groundwater sampling event

August 2012
- Bulk lactate injection into Kirkwood and Manasquan
- Groundwater sampling event

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Questions?

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August RAB Agenda Ideas

- Tentative RAB date is August 9, 2012
  - ✓ Overview presentation of the McGuire Compliance Sites (Underground Storage Tank Sites)
  - ✓ Removal Action at McGuire Landfill Sites, LF-19 and LF-20
  - ✓ Update by Shaw on McGuire Operable Unit's 1, 2, 3, 4 and 5
  - ✓ Community Relations Plan Update
  - ✓ Administrative Record Update
  - ✓ RAB link on JB MDL Website

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PUBLIC COMMENTS

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JOINT BASE MCGUIRE-DIX-LAKEHURST, N.J.
RESTORATION ADVISORY BOARD (RAB)

Document Availability
Thursday, 10 May 2012

Document Control Point of Contact: Mr. King Mak (609) 754-3323

Background: The documents below have been delivered since the last RAB meeting.

Documents delivered to Mr. Tamn, the RAB Co-Chair:

- Draft Site Inspection Report for Former Lakehurst Proving Grounds and Bombing Targets, Joint Base McGuire-Dix-Lakehurst, Volumes 1-2, February 2012; **Delivered on 30 March 2012**
- Correspondence for Joint Base McGuire-Dix Lakehurst responses to additional USEPA comments to the Lakehurst Five Year Review Report, 12 March 2012; **Delivered on 30 March 2012**.
- Draft Remedial Investigation Report for Operable Unit 2 (OU-2) Sites, Joint Base McGuire-Dix-Lakehurst, Volumes 1-3, December 2011; **Delivered on 30 March 2012.**
- Draft Remedial Investigation Report for Operable Unit 4 (ST-09 and FT-13), Joint Base McGuire-Dix-Lakehurst, December 2011; **Delivered on 30 March 2012.**
- Proposed Plan for BOMARC OT-16, Trichloroethene Groundwater Plume, Joint Base McGuire-Dix-Lakehurst, January 2012; **Delivered on 30 March 2012.**
- Soil Only No Further Action Letter for BOMARC Missile Accident Site, RW-01, Joint Base McGuire-Dix-Lakehurst, 27 March 2012; **Delivered on 10 May 2012.**
- Draft Final Remedial Investigation Report Addendum Operable Unit-3 (OU-3), Sites LF-02, LF-19, LF-20, and WP-21, Joint Base McGuire-Dix-Lakehurst, Volumes 1-2, April 2012; **Delivered on 10 May 2012.**
- Dix Final Background Groundwater Metals Study Report, Joint Base McGuire-Dix-Lakehurst, May 2012; Delivered on **10 May 2012**.

Documents delivered to the Burlington County Library:

- Final Work Plan, Source Area Investigation for OW006, Joint Base McGuire-Dix-Lakehurst, February 2012; **Delivered on 30 March 2012.**
- Dix Final Background Groundwater Metals Study Report, Joint Base McGuire-Dix-Lakehurst, May 2012; Delivered on **10 May 2012**.

JOINT BASE MCGUIRE-DIX-LAKEHURST, N.J.
RESTORATION ADVISORY BOARD (RAB)
LIST OF ACRONYMS AND ABBREVIATIONS

ACRONYM	***MEANING***
AF	Air Force
BOMARC	Boeing and MARC Michigan Aerospace Research Center
COPC	Chemical of Potential Concern
CHE	Chemical Warfare Material Hazard Evaluation
CSE	Comprehensive Site Evaluation
CSM	Conceptual Site Model
DMM	Discarded Military Munitions
DRMO	Defense Reutilization and Marketing Facility
DQO	Data Quality Objective
EE/CA	Engineering Evaluation / Cost Analysis
ESTCP	Environmental Security Technology Certification Program
EHE	Explosive Hazard Evaluation
EVO	Emulsified Vegetable Oil
GPS	Global Positioning System
GW	Ground water
HHE	Health Hazard Evaluation
HASP	Health and Safety Plan
HHRA	Human Health Risk Assessment
HPT	Hydraulic Profiling Tool
HRR	Historical Records Review
HRS	Hazard Ranking System
LF	Landfill
JB MDL	Joint Base McGuire-Dix-Lakehurst
MC	Munitions Constituent
MD	Munitions Debris
MEC	Munitions and Explosives of Concern
MIP	Membrane Interface Probe
MMRP	Military Munitions Response Program
MRSPP	Munitions Response Site Prioritization Protocol
MRA	Munitions Response Area
MRS	Munitions Response Site

MW	Monitoring Well
NTCRA	Non-Time Critical Removal Action
OU	Operable Unit
PAH	Polycyclic Aromatic Hydrocarbon
PAL	Project Action Level
PCB	Polychlorinated Biphenyl
PCE	Tetrachloroethene
pH	measure of acidity or alkalinity
PSL	Project Screening Level
QAPP	Quality Assurance Project Plan
RAB	Restoration Advisory Board
RAM	Removal Action Memorandum
RAWP	Removal Action Work Plan
RI	Remedial Investigation
RIR	Remedial Investigation Report
RIWP	Remedial Investigation Work Plan
SD	Sediment
SLERA	Screening Level Ecological Risk Assessment
sq ft	Square Feet
SW	Surface Water
TCE	Trichloroethene
UST	Underground Storage Tank
UXO	Unexploded Ordnance
VI	Vapor Intrusion
VOC	Volatile Organic Compound
WP	Work Plan
WP	Waste Pit (WP-21, and WP-05)
XRF	X-ray Fluorescence

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