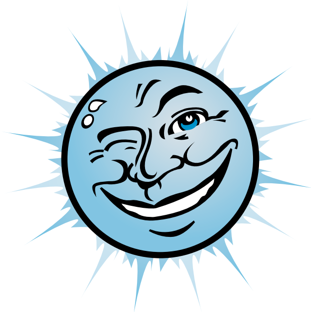
Summer 2000 ❀

RPM News

▲ Remedial Project Manager News ▲

"Communicating Navy Installation Restoration Program News and Information Among All Participants"



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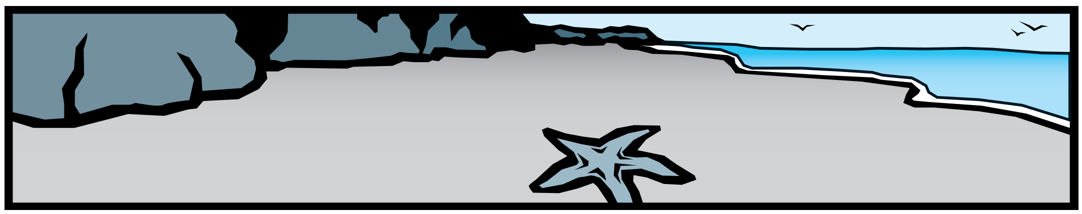
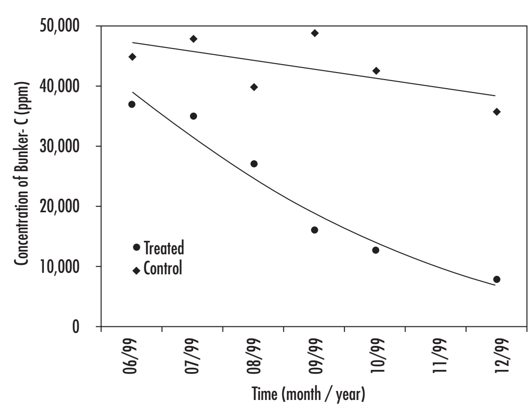
BADCAT Bioremediates by the Bayshore



The Bay Area Defense Conversion Action Team (BADCAT) demonstrated a facultative (aerobic/anaerobic) bioremediation process to degrade diesel and heavy fuel oil, including Bunker-C, at the former Naval Fuel Depot Pt. Molate, California located along the San Francisco Bay. In June 1999, Industrial Ecosystems Inc. (IEI) of Pacifica, California excavated approximately 40 cubic yards of soil and placed it into on-site treatment cells, which were simply constructed from hay bales and plastic sheeting. IEI added a proprietary mixture of microbes, nutrients, and additives and mixed the soil with a backhoe monthly. The degradation progress of Bunker-C fuel oil in the treated soil and control soil is shown in Figure 1. The ultimate goal is to reduce concentrations to 1,000 parts per million (ppm) of total petroleum hydrocarbon and return the cleaned soil to the original excavation pit. The demonstration is scheduled to end in Spring 2000.

In general, bioremediation is a "natural" and permanent remediation alternative for petroleum contaminated soil, is cost effective, and once remediated, may render the soil useable for other projects. In addition, this unique facultative process accelerates the remediation time and is applicable to a wide range of petroleum compounds.

Figure 1. Rapid degradation of Bunker - C



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Remedial Project Manager News

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Using Appropriated Funds

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"BADCAT Bioremediates" continued from page 1

IEI remediated over 500 sites in the oil fields of New Mexico and Colorado. BADCAT provided an opportunity for IEI to demonstrate their proprietary formula and process at a site with environmental variables typical of Navy sites, such as climate, geology, and contaminant type. IEI estimates that their process costs $30 per ton of soil.

To learn more about BADCAT, visit their web page at: www.badcat.org or call (510) 986-0303. For further information about the numerous technologies conducted under the BADCAT program, Navy involvement with BADCAT; or this specific technology, please contact (805) 982-2631, DSN 551-2631 or

To learn more about Industrial Ecosystems Inc, check out: www.industrialecosystems.com

BADCAT is a diverse public/private partnership (see list below) and selects technologies based on needs assessment studies. The demonstrations are completely vendor funded. BADCAT strives to promote acceptance and implementation of innovative technologies by providing an objective peer review of a vendor's demonstration process and exposing the technology to the public, engineering, and decision making communities. Each technology demonstration includes a "Visitor's Day", and invites the public to view the technology in action.

Partnership Members:

- Bay Area Economic Forum
- Bay Area Regional Technology Alliance
- California Environmental Protection Agency
  - Department of Toxic Substances Control
  - Regional Water Quality Control Board
  - Regional Permit Assistance Centers
- Chevron
- Lawrence Livermore National Labs (U.S. Department of Energy)
- San Francisco State University's Center for Public Environmental Oversight
- U.S. Environmental Protection Agency
- U.S. Navy
- Technology specialists and experts

Naval Facilities Engineering Command's

Navy & Marine Corps 2000 Site Cleanup Conference

Training, Conferences, and Visitors

Leaning forward to share the vision and reach the goal, 200 environmental professionals gathered in Oxnard, California for the Navy & Marine Corps Site Cleanup Conference, 15-17 February 2000. The engineers serving on our front lines in the cleanup program heard that the goal of completing clean up of sites contaminated from past operations is within reach. The popular "Washington Perspective" session gave ASN, CNO, OGC, and NAVFAC HQ the chance to brief project managers on the latest policy, and to answer questions. Over 30 technical breakout sessions provided details and insight on actual cleanup projects. Training sessions covered risk assessment, environmental background analysis, and remedy selection. Value added benefits of the conference: networking, sharing lessons learned, and technology transfer. Also, during the week of the conference, several other side meetings took place while all the right people were together, saving travel time and money.

Bernie Shafer receiving Drum-E 2000 award from Dave Olson for his assistance in legal matters.

Drum-E awardees from left to right: David Barclift-NORTHDIV, Karla Jenkins-NFESC, Mark Craig-SOUTHDIV, Helen Lam-PACDIV, Richard Mach-SOUTHWESTDIV, Larry Ramos-WESTDIV, Robert Schirmer-LANTDIV, Frank Zapata-CHESDIV (not pictured), Mark Murphy-NORTHWEST (not pictured).

Asbestos – Polychlorinated Biphenyl Conversion System

The Navy generates a unique waste stream from facility abatement, ship maintenance, and repair projects that contains Polychlorinated Biphenyl (PCB) and Asbestos Containing Material (ACM). The ultimate solution would be a method that completely destroys this waste and results in end product recycling instead of landfill disposal.

Naval Facilities Engineering Service Center (NFESC), Puget Sound Naval Shipyard (PSNS), Engineering Field Activity (EFA) Northwest, and Congressman Norm Dicks, in partnership with Asbestos Recycling Inc. (ARI) of Kent, Washington, are conducting a demonstration of

Washington State's sixth Congressional District representative, Congressman Norm Dicks gives ARI developer Jerry Hermanson, two thumbs up.

PSNS key personnel, Richard Yans and Dennis Buckingham: the movers and shakers for this technology.

just such a technology at PSNS to validate and prove the technology for possible Navy use. The technology, composed of a portable unit, two trailers, and a skid mounted gas scrubber, uses a thermochemical process to convert ACM contaminated with PCBs into stable, non-hazardous material.

The process evenly mixes the waste with mineralizing agents and exposes the mix to approximately 2300^0F, converting the PCB contaminated ACM into an inert, stable, non-hazardous, and non-regulated "clinker" of potentially recyclable material. The waste volume is reduced by almost 90%. Most importantly, cradle-to-grave liabilities associated with PCB-ACM end since all regulated wastes are consumed. The PCB-ACM Conversion System conforms to National Emission Standards for asbestos conversion processes, conforms to federal parameters for PCB destruction, and complies with the Occupational Safety Health Administration (OSHA).

An integral part of the permitting process includes an EPA-approved demonstration test burn at PSNS. All operating parameters defined by Federal, State and Local permits for PCB-ACM processing are monitored and reported. An independent emissions testing company validates destruction removal efficiency.

Currently, the PCB-ACM Destruction Mobile Unit is contained in a controlled environment inside two transportable trailers. The operations trailer is a negative pressure air chamber vented through HEPA filters. Worker exposure is considerably below OSHA permissible exposure limits. Potentially up to 900 pounds of PCB-ACM can be processed through this unit per hour. This first generation prototype is being used to demonstrate technology capabilities and will generate additional data necessary to develop and construct permanent, modular units for Navy-wide implementation. A demonstration test burn at PSNS began in March 2000. Approximately 18 tons of conventional double-bagged ACM contaminated with highly concentrated PCB transformer oil (up to 560,000 ppm) was processed and monitored by the EPA.

Upon successful demonstration and validation, ARI plans to design and construct second-generation modular units. The second-generation units will be transportable systems each capable of processing approximately 900 tons per year and will be approximately half the size of the prototype unit. These units are tentatively planned for Navy installations with landfill limitations or foreign operations that require an alternative in lieu of disposal. Domestic areas of interest include Hawaii, Guam, and Alaska and foreign interests have included Bermuda, Canada, France, Germany, Holland, and Italy.

The head of the Technical Applications Branch at the Port Hueneme, CA division of Naval Facilities Engineering Command. Michael Sargeant is an industrial hygienist at the Engineering Field Activity, Northwest Division of Naval Facilities Engineering Command. Jerry Hermanson of ARI is the proprietor and developer of the Asbestos – Polychlorinated Biphenyl Conversion System.

NFESC key proponent, Jeff Heath meets Congressman Norm Dicks for a site visit at PSNS for the demonstration and validation of the Asbestos-Polychlorinated Biphenyl Conversion System.

ARTTicle – Onsite Portable GC/MS Saves Project Time and Money

Alternative Restoration Technology Team (ARTT) member from Southwest Division is sponsoring the tech transfer of this valuable innovative technology.

The project team at IR Site 9, Naval Air Station (NAS) North Island has been using a portable gas chromatograph/mass spectrometer (GC/MS) at the project site for over nine months, saving significant time and money. INFICON, Inc. manufactures the GC/MS, which is called the HAPSITE. The HAPSITE is a lightweight, field portable GC/MS, about the size of a suitcase, which can detect and quantify volatile organic compounds (VOCs) on-site (See Figure 1). The HAPSITE is self-contained and can operate from a battery. The instrument, equipped with a headspace-sampling accessory, can be used to test VOCs in soil, water or vapor.

About 10 vapor samples or 6 water samples can be analyzed in a regular 8-hour day. Water samples require a longer system startup procedure than vapor samples. Therefore, more vapor samples than water samples can be analyzed in the same time period. Preliminary data can be available to the project team within about 1-hour of collecting the sample. Typical time for receiving reduced and verified data (useable for reporting) is within approximately 24 hours. The project chemist provides data reduction, verification and management for the team.

Cost Evaluation

Initial startup costs for the HAPSITE are significant. The purchase price is about $100,000 for the complete unit, with about another $20,000 required for the initial set of vapor and water standards, glassware, syringes, reagents, etc. Approximately 100 hours of labor are required for training, initial setup and calibration of the HAPSITE. These costs, however, will easily be recovered over the entire life and operation of the instrument. Operating costs include expendables such as replacement standards, carrier gases, sample containers (Tedlar bags), and the labor needed to run samples.

Cost savings to date on the NAS North Island project are estimated at approximately $31,000. Extrapolating the actual project costs over a hypothetical two-year time frame increases the cost savings to over $229,000. These costs are summarized in Tables 1 and 2.

Technical Evaluation

Stability – The stability and ruggedness of the instrument is critical to the field operation. The USEPA Environmental Technology Verification (ETV) program evaluated the unit under various environmental conditions and found no problems with the stability of the instrument. The NAS North Island project team has reported consistent findings based on fieldwork conducted on site to date. The ETV report can be accessed at http://www.clu-in.org/programs/scmt/verstate.htm.

Item	Cost in Dollars	Notes
Actual Project HAPSITE Costs		
Expendables	29,362	Actual to date
Labor (startup)	3,392	Actual one time charge
Labor (operator)	11,974	Actual to date
HAPSITE Purchase	104,000	Purchase price
Total HAPSITE costs to-date	148,728	Approximate cost per sample to-date: $165
Estimated Project Laboratory Costs		
Number of samples		900 analyzed to date
Cost per TO-14	200	Estimated laboratory cost
Total Estimated Laboratory Costs	180,000	
Approximate Savings to-date (Laboratory – HAPSITE)	31,272	

Table 1: Actual Project Costs

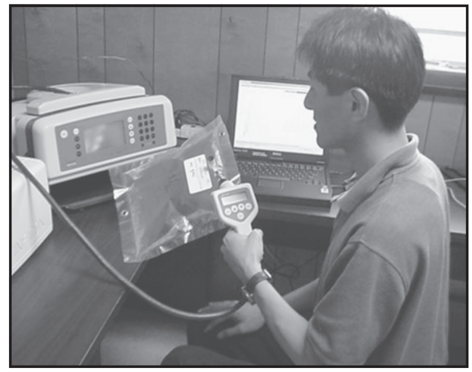

Figure 1: HAPSITE Unit and Project Chemist

Calibration – The ability to easily calibrate the instrument, and then maintain calibration is critical to its usefulness. If calibration is difficult to maintain, higher labor costs will be incurred along with lower confidence in the results. The project HAPSITE has been calibrated once for vapor analyses and has not yet needed recalibration. The instrument has recently been calibrated for water samples, but insufficient time has elapsed to determine the stability of this calibration.

Accuracy – A technical equivalency study has already been performed by the USEPA and reported in the USEPA ETV Report. It is not the intention of this work to repeat the ETV Study. However, in the course of operation of the HAPSITE, the project has had occasion to split samples with a fixed laboratory, with the results generally in agreement. A data comparison between five samples that were split between the HAPSITE and an offsite laboratory is shown in Table 3. The HAPSITE is limited by high detection limits relative to laboratory analyses. However, laboratory measurements are limited by a narrow calibration range and very large dilutions are required (with the associated errors resulting from manipulation of the sample) to keep the target analytes on scale. At this site, project-specific requirements do not demand extremely low detection limits and the tradeoff between higher detection limits and improved accuracy does not negatively impact the project.

Item	Cost in Dollars	Notes
Projected 2-year HAPISTE Cost		Could be single large project or multiple projects.
Expendables	88,086	Based on actual average monthly costs
Labor (startup)	3,392	Actual one time charge
Labor (operator)	115,000	Assumes 113 samples per month
HAPSITE purchase	104,000	Purchase price
Total Projected HAPSITE cost for 2 years	310,478	Projected cost per sample: $ 98
Projected 2-year Laboratory Cost		
Number of samples		2,700 samples, assuming 113 per month
Cost per TO-14	200	Estimated laboratory cost
Total Estimated Laboratory Cost	540,000	
Projected Savings over 2 years (Laboratory – HAPSITE)	229,522	

Table 2: Projected 2-Year Costs

Speed – In one instance, the NAS North Island project team was able to collect and analyze 30 vapor samples in two days using the HAPSITE. Data reduction and reporting required one additional day. An offsite laboratory could have achieved the same turnaround time (TAT) but at additional costs, given a price-premium for 48-hour TAT.

Others issues of note – TAT for the majority of vapor samples collected for the NAS North Island project was not a critical issue. However, TATs may be critical for future work at the site, or for other projects. Therefore, the ability of the HAPSITE to generate results in essentially the same day that the sample is collected, is an important feature. The project also has the ability to prioritize the sequence in which the samples are analyzed when using the HAPSITE, where this is not usually possible with an offsite laboratory.

Summary

Table 2 shows that the purchase and use of the HAPSITE will result in savings to a hypothetical 2-year project, in excess of $229,000. If a short TAT is critical to the project, the cost savings will increase due to price-premiums charged by laboratories for expedited TATs. Additionally, the project will benefit from reduced time in the field and reduced standby time incurred while waiting for laboratory data.

For further information, you may contact:

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(619) 532-0913 DSN: 522-0913

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Technical Leader NAS North Island Project
(619) 437-6326 X 318

Sample ID	91-V-543		91-V-544		91-V545		91TV01792		91TV01810	
Location	91-MP-03		91-MP-11		91-VP-05		VP-01		VP-01	
Sample Date	6/23/99		6/23/99		6/24/99		10/799		10/19/99	
Data Source	Quanterra	HAPSITE	Quanterra	HAPSITE	Quanterra	HAPSITE	ATL	HAPSITE	ATL	HAPSITE
Detected Compound	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)
cis 1,2-DCE	500	635.66	30	33.07	1.9	1.97	1450	1371	58.2	35.61
PCE	4.2	2.37			1.2	1.05			15.1	11.51
Toluene	9.9	11.47					863	1502	29.9	43.92
Vinyl Chloride	3.2	1.86	78							
1,1,1-TCA				109.64						
1,1,2-Trichloro-1,2,2-Trifluoroethane	5.2	4.76								
TCE			180	237.6	13	17.89	14000	13199	164	96.19
Ethylbenzene									1.01	2.13
m & p-Xylene									3.28	6.33
o-Xylene									1.89	5

Table 3: Data Comparison

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