



# Assessment of Ocean Dumped Chemical Weapons

# Approach to Assessment

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- **Selection to best in industry of aspects of Assessment Management**
- **Proven Record of Dealing with Chemical Agent/ Weapons Issues**
- **Extensive History of Public Involvement**
- **Extensive Work Association in Analogous Projects**

# Team

- **Blue Fin**

- Wide Area Survey
  - Ocean Bottom Survey to Establish Location of Major Dump Sites



- **Boston University Marine Program (BUMP)**

- Scientific Planning and Oversight, Literature Review
- Specific Condition Assessment
  - Photographic Assessment, Sediment & Water Samples
  - Biological Assessment of Impact (or lack thereof) on undersea environment
- Data Analysis and Synthesis



- **Battelle**

- Chemical Agent Breakdown Product Analysis of Samples



- **EG&G/URS**

- Archive Research
- Oceanic Risk Assessment
- Public Outreach
- Chemical Agent Project Management
- Chemical Agent Safety



# Bluefin Robotics



- **1989-** MIT Autonomous Underwater Vehicle Laboratory Pioneered Vehicle Technology
  - Capable of Reaching the Sea Floor almost anywhere in the World
  - Robust enough to be Deployed in the Antarctic and the Labrador Sea
    - Proven Reliability, Affordable

- **1997-** Founded as Bluefin Robotics (*Registered in Massachusetts, USA, as a privately held "C" corporation*)
- The Bluefin Team Brings a Unique Set of Skills and Experience
  - Scientific Research and Technology Development with Advanced Underwater Platforms
  - Naval Mine Warfare and General Clandestine Battlespace Preparation
  - Offshore Oil Field Seafloor Surveys, Particularly for Deep-Water Installations



# Boston University Marine Program

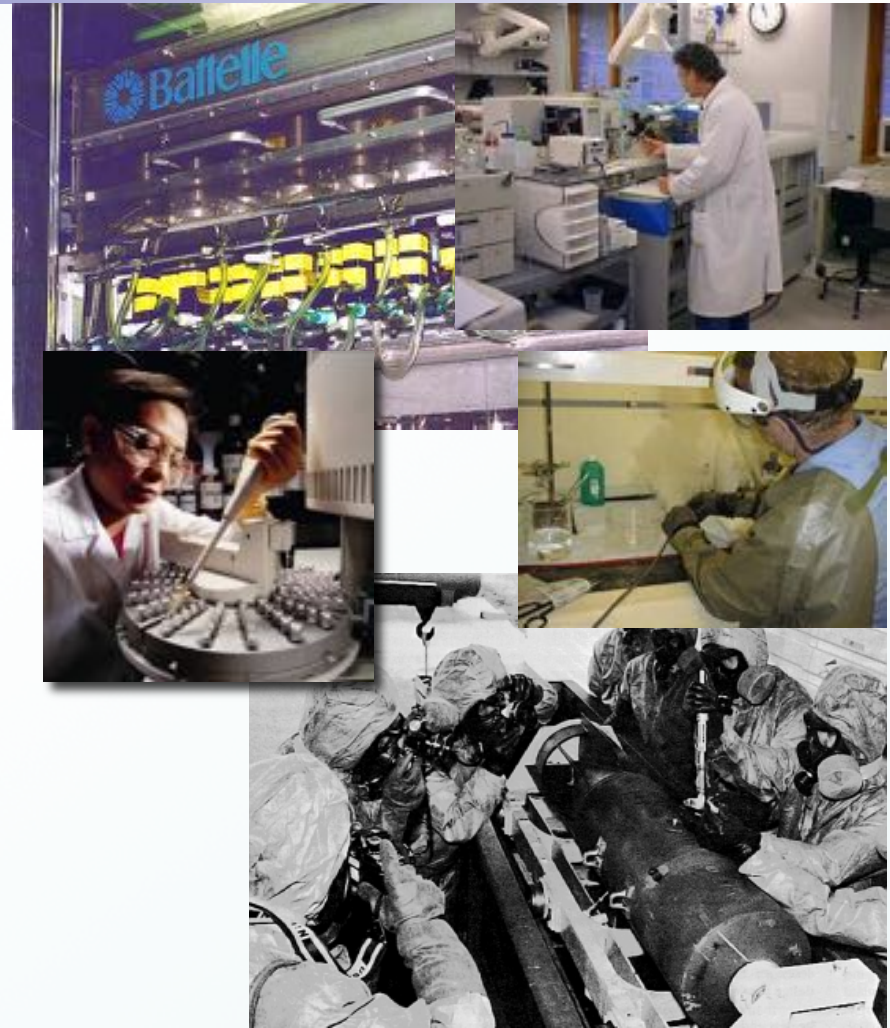
- 20 Year Study of JACADS and Potential Impacts on Deep Ocean and Shallow Reef Ecosystems
- US DoD Coral Reef Task Force Team- Scientific Leader
- Established DOD's Tropical Marine Ecological Assessment Protocols Worldwide
- 35 Years Research Experience on Hawaiian Biota and Oceanography



Underwater HAZMAT Sampling Contaminated Sediments for the JACADS Study

# Battelle Memorial Institute

- **A Nonprofit Charitable Trust Founded in 1929 in Columbus, Ohio by Gordon Battelle**
- **One of the World's Leading Independent Consulting, R&D Organizations :**
  - **19,000 Scientists, Engineers & Support Specialists**
  - **3 Billion in Annual R&D**
  - **50-100 Patented Inventions each Year**
  - **Largest Contractor Surety Chemical Agent Test Facility**



# EG&G Materials Inc

- EG&G Defense Materials, Inc. is the World's largest Chemical Disposal Agency
  - TOCDF-Tooele Chemical Agent Disposal Facility (Deseret Chemical Depot)
    - Handling Chemical Agent in Preparation for the Mustard Campaign.
    - Completed GB and Vx campaigns.
- EG&G Defense Materials, Inc. also manages three other Chemical weapons contracts.
  - COBRATF (Fort McClellan)
    - O&M contract to Department of Homeland Defense
    - Provides operations and maintenance support to COBRA training facility
  - CDTF (Fort Leonard Wood)
    - Provides operations and maintenance support to CDTF
  - RCWDF (Russia (Shchuch'ye)) – CTRIC/DTRA
    - Subcontractor to Parsons, Inc
    - Develop training program
    - Planning and implementation of facilities systemization
    - Pre-startup Operations



TOCDF



US Army Chemical Defense Training Facility (CDTF)

Ft. Leonard Wood, Mo



Chemical Ordnance Biological Radiological/Nuclear Training Facility (COBRATF)

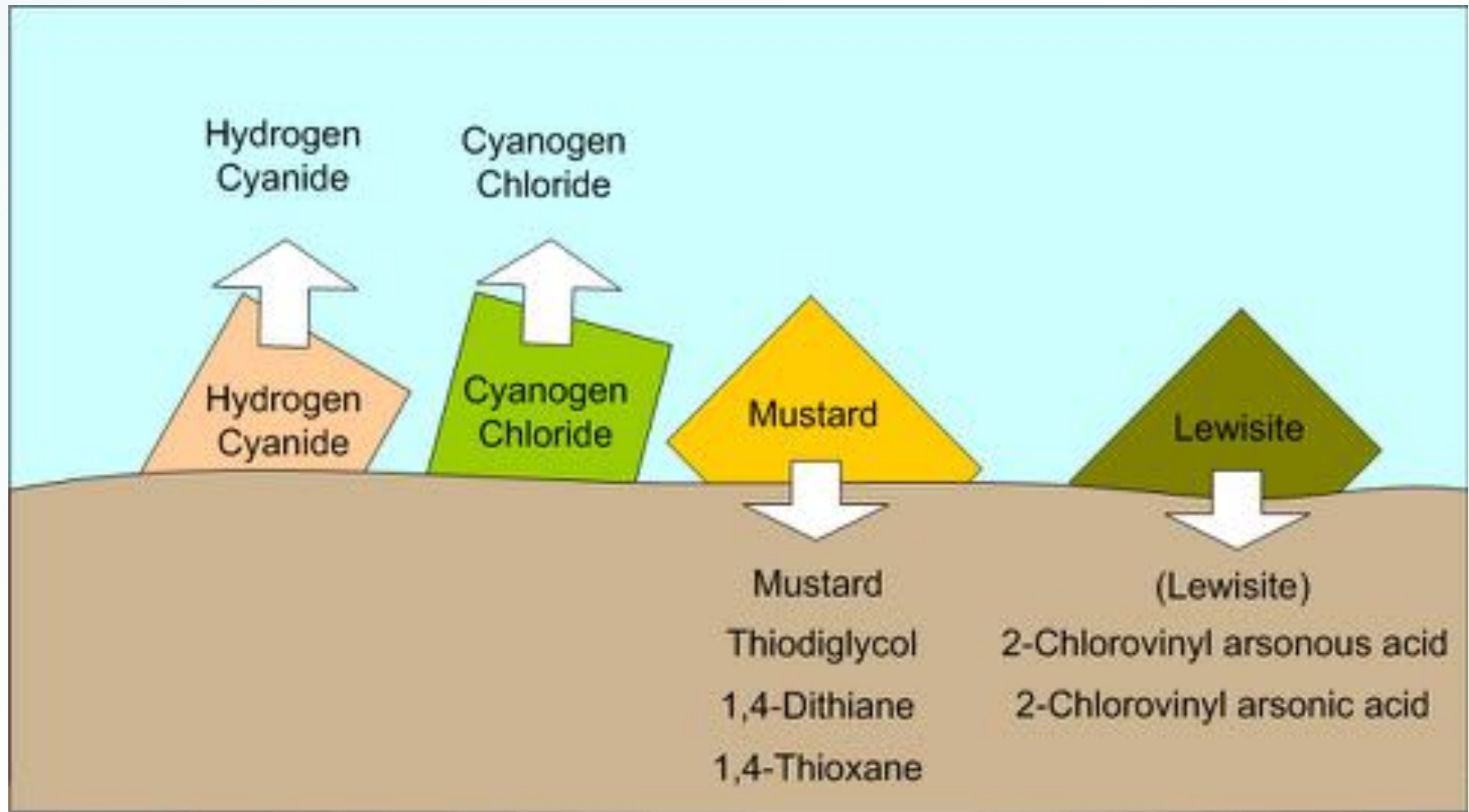
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RCWDF - CTRIC/DTRA

Russia (Shchuch'ye)

# Expected Disposition of Ocean Dumped Chemical Agents





**1983** – as part of the initial JACADS marine assessment to determine background conditions, we conducted a series of deep water dives including inspection of an area where “old weapons” were dumped



Univ. Hawaii submersible



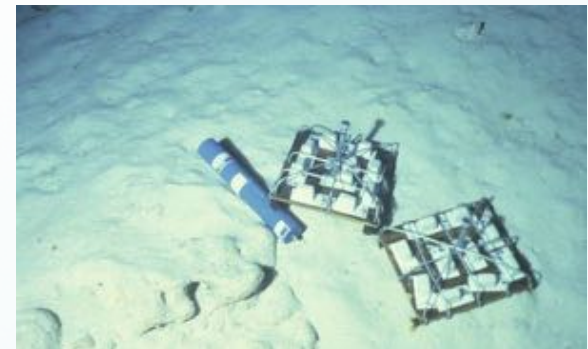
An example of unknown canister at 1300 ft off Johnston Island



Novel on-site experiment development



JACADS



Bottom diffusion experiment at 1300ft.

We developed experimental methods for measuring bottom diffusion rates to assess dispersive and advective processes that would transport leaking benthic material.

# Flow Chart Product

