



**Army Presentation to Nuclear
Regulatory Commission
Possession of DU on Hawaii Ranges**

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The Find

- August 2005
 - An Army Contractor clearing a firing range identifies 15 “tail fin assemblies” as being from the M101 spotting round – a round used with the Davy Crockett.
 - Coincidentally the Army is researching historical range uses and publishes RO-9, Range Operations Report 9 – Davy Crocket.

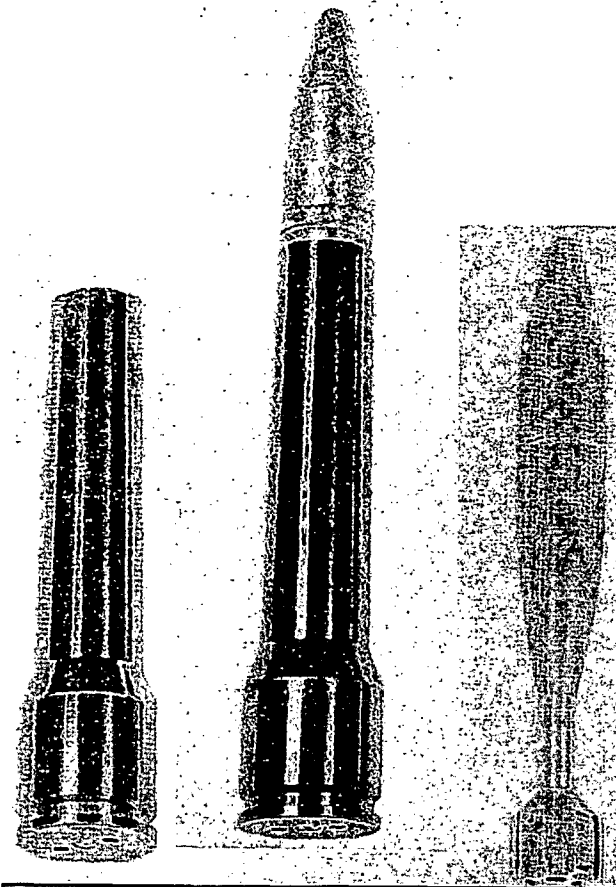
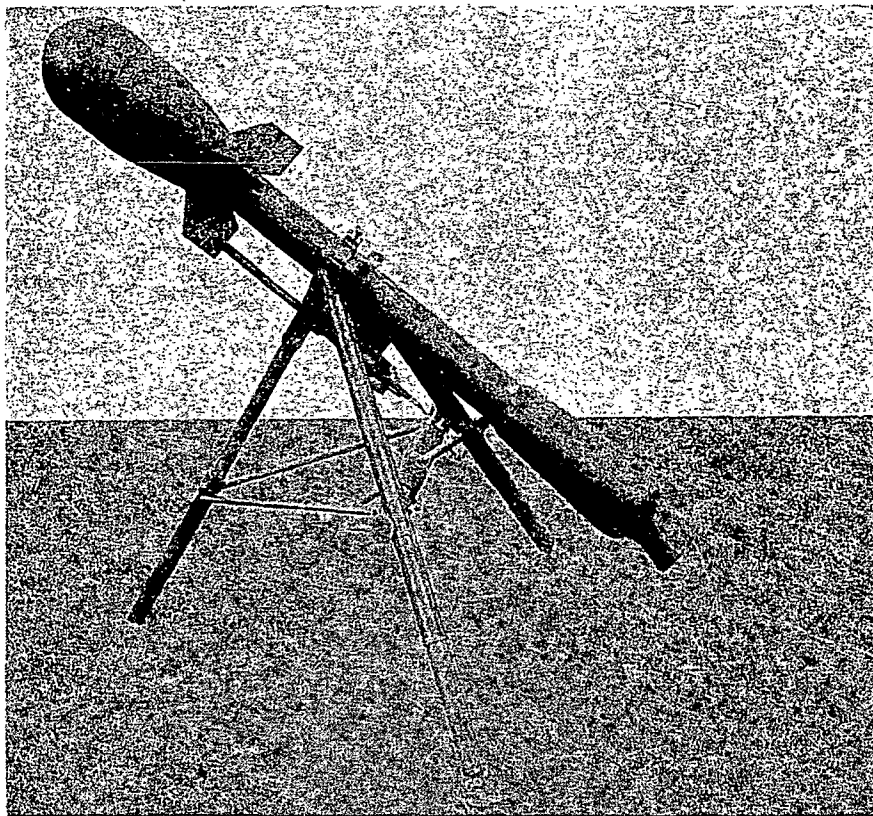
A Brief History

- ❑ Nuclear capable weapon with range of 2 km (M28) and 4 km (M29)
- ❑ M28 fielded from 1962 to 1968
 - ❑ DU only in 20mm M101
- ❑ Firing range needed certain characteristics
 - ❑ Secure firing and impact zones
 - ❑ SDDZ restricted many ranges
 - ❑ Debris removal (sometimes)
- ❑ DU used to mimic trajectory of main round
- ❑ DU was licensed by the AEC for manufacture and distribution to Army field units



Davy Crockett Weapon System

M28/M101 20mm Spotting Round



Cartridge, 20mm Spotting M101

Davy Crockett Weapon System

M28 and M29



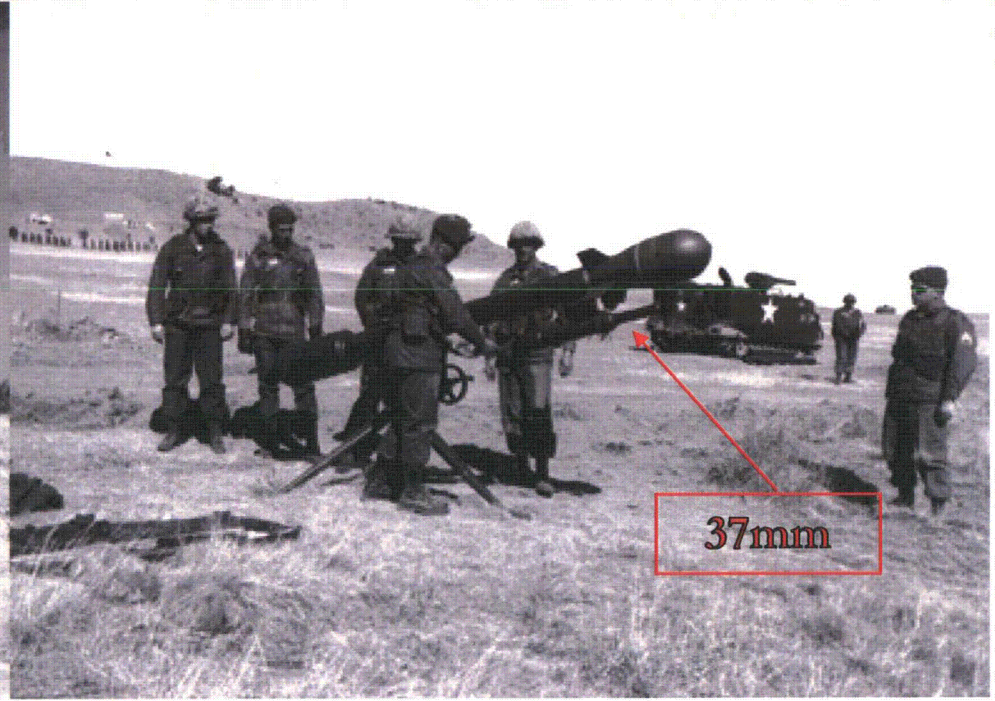
20mm

M 28 Light Weapon

20mm Spotting M101 Cartridge (DU)

120mm diameter Launch Tube

2,000m range



37mm

M 29 Heavy Weapon

37mm Spotting Cartridge (not DU)

155mm diameter Launch Tube

4,000m range

Firing of Practice Round



Known Relevant Information

“Area E represents the firing position. Area F is the back blast danger area and had a base of 200 meters and a height of 100 meters. Area C is the area where the launch piston was expected to impact. Areas A and B constitute the danger area around the impact area. The length “X” is the distance from the firing position to the target/impact area. The M28 weapon system had a maximum range, or X distance, of 2,000 meters and the M29 weapon system had a maximum range of 4,000 meters.”^[1]

^[1] FM 23-20, Davy Crockett Weapons System in Infantry and Armor Units, 18 December 1961, pp. 5-7.

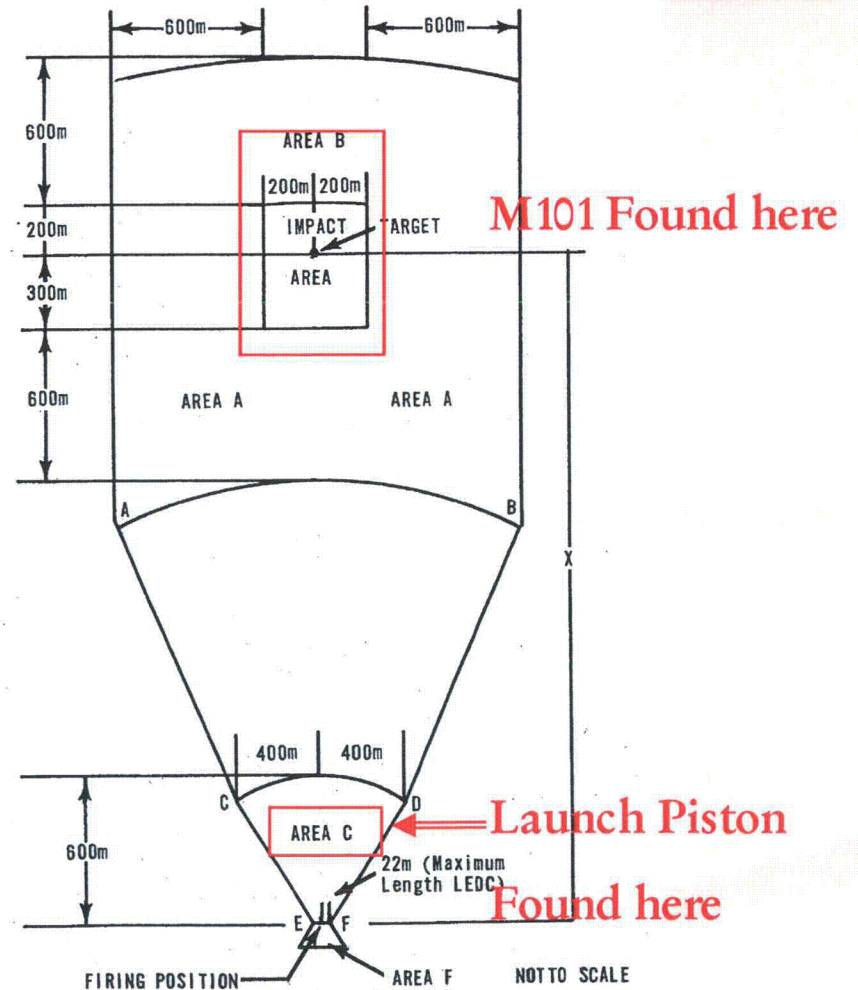


Figure 11-5. For M28 and M29 systems (Davy Crockett).

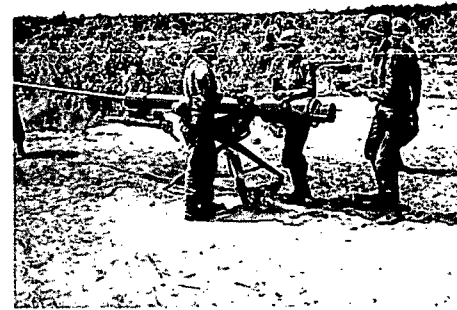
Typical Davy Crockett Weapon System Range Layout,
Circa 1968 ₇

Army Solution

- 4 pt plan to address public concerns
 - Transparency of Action – Army will share all information with the State of Hawaii
 - State of Hawaii will be partner in planning and executing surveys
 - State of Hawaii will be partner in planning and executing a mutually agreed upon response plan
 - Army will provide training to State of Hawaii as needed

Historical Research

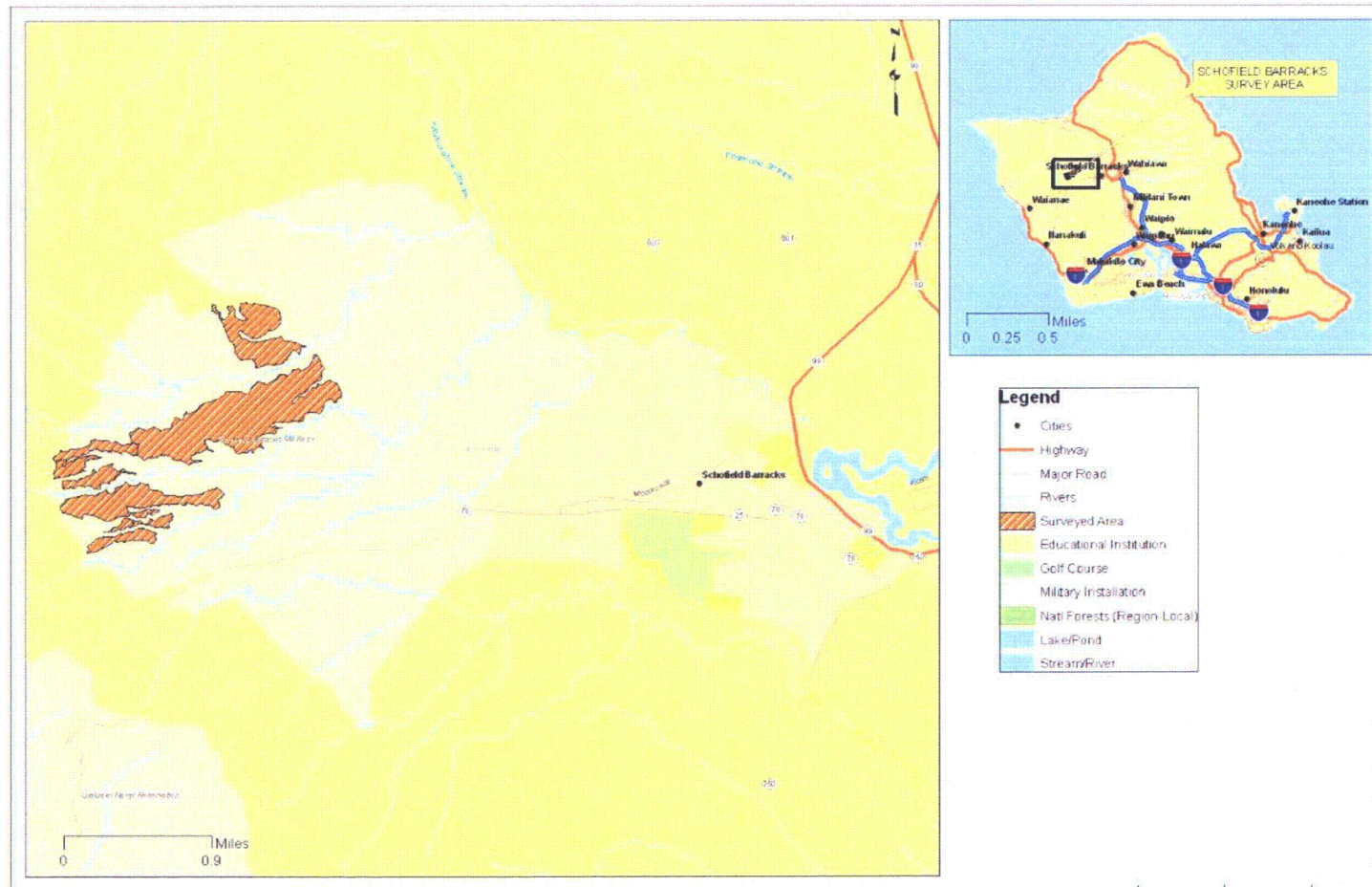
- NARA – National Archives and Records Administration, College Park, MD
- NARA – Regional Offices (e.g., NARAs Seattle, SF, etc.)
- Federal Installations and Repositories
- Internet/Blogs
- Interviews with U.S. Army veterans
- Installation Specific
 - Facilities/Engineering Files
 - Environmental
 - Museums
 - Library/Post Newspaper
 - Range Control
 - Public Affairs
 - Historian



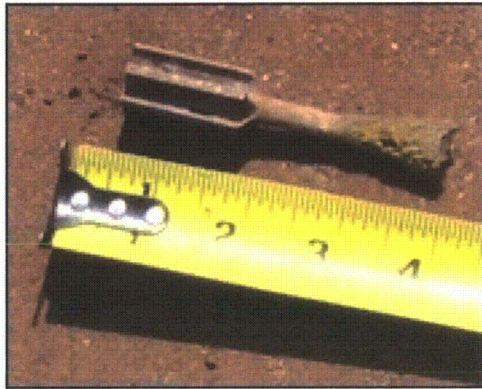
Hawaii Ranges

- Scoping survey confirms DU on Schofield and Pohakuloa ranges, but not Makua
- Army unit at Schofield Barracks is deployed which allows full access to range
- Plan is to do full characterization survey and develop a Baseline Human Health Risk Assessment
- Army builds technical team to provide oversight
 - Health physicists, range management personnel, safety specialists, archeologists, public affairs, and environmental specialists.

Schofield Location



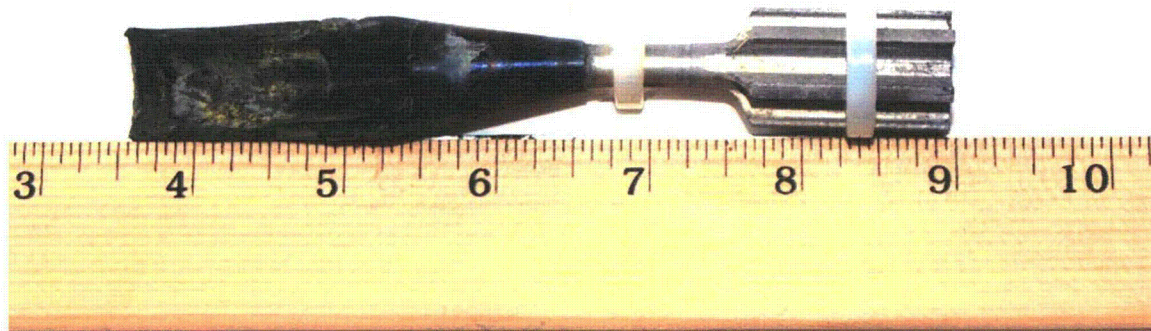
M101 Fragments



■ Tail Fin Assembly found at Schofield Barracks



■ Fragment found at Schofield Barracks



■ Tail Fin Assembly found at Pohakuloa Training Area

Schofield Media Day



Characterization Survey

- Scoping survey used to define area
- Approximately 425 acres covered
 - ~1200 soil samples
 - ~ 60 surface water samples
 - Gamma walkover surveys ~ 25% coverage
- Heavy vegetation requires burn
 - Sample test and reference area
 - Full range burn with air samplers

BHHRA

- Characterization survey results used to prepare Baseline Human Health Risk Assessment
- Scenarios
 - Current/Future Maintenance Worker
 - Future Construction/Remediation Worker
 - Future Adult Cultural Monitor/Visitor
 - Future Site Worker
 - Soldier Training on Site*
- Results demonstrate no increased risk in any scenario

* 2009 BHHRA Addendum

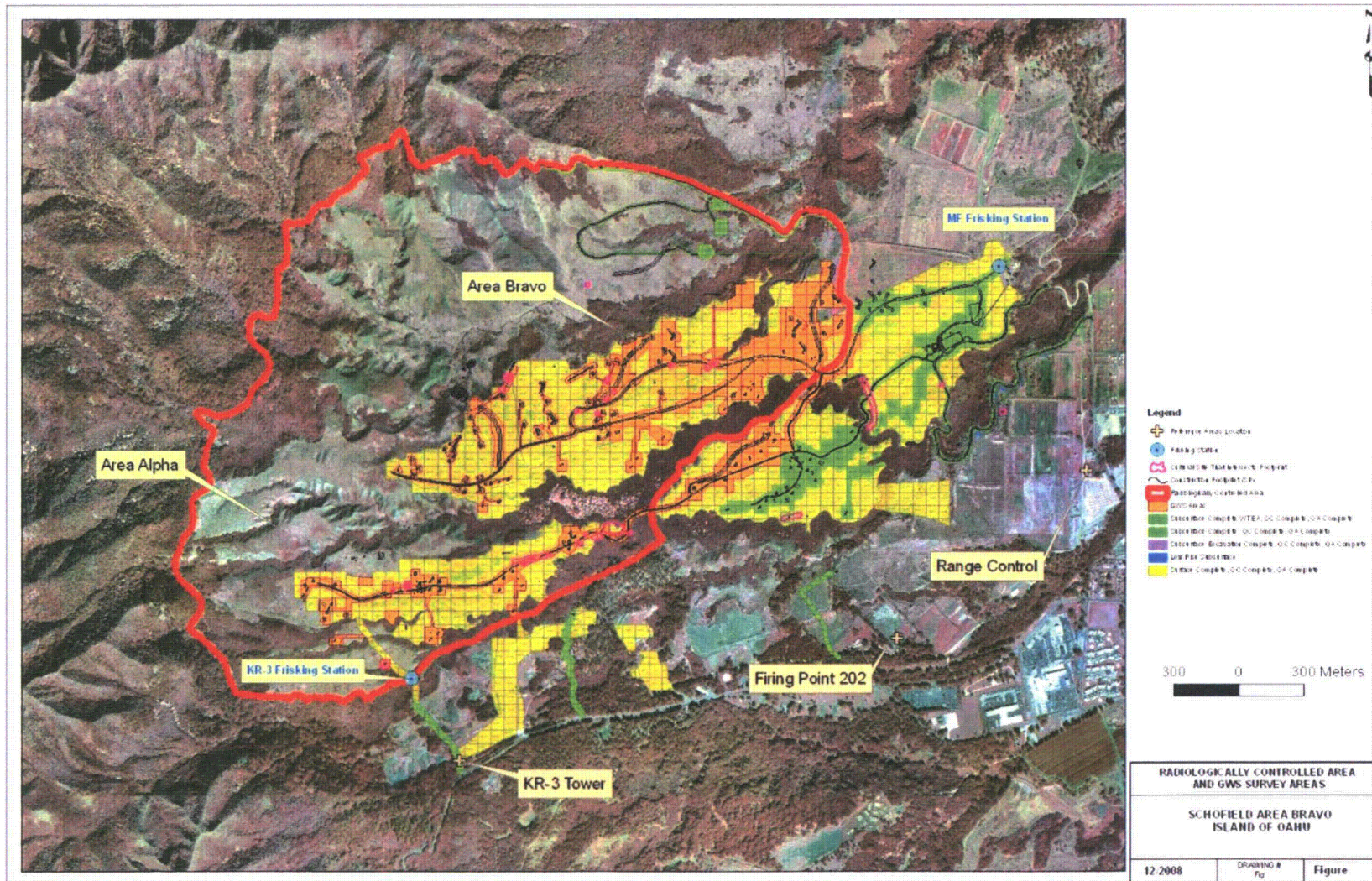
Hawaii Reports

- Phase I Investigation
- Phase II Investigation, Scoping Survey, and Work Plan
- Scoping Survey for Schofield, Makua, and PTA
- Site Characterization Survey
- Technical Memorandums
 - Effluent
 - Total Suspended Particulate - Air Filters
 - BAX Release
 - Monitoring of Air Quality During Burning of Vegetation
 - Makua and PTA Flyover
- Numerous work and safety plans

BAX Construction

- Designed to provide targets and maneuver lanes for training Soldiers
- Areas prioritized and numbered to facilitate planning
- Initially entire area considered RCA
 - Removal/retention based on DU presence
 - Areas 1 and 5 removed following review of data
 - Area 2 removed following reinvestigation of survey results
 - Areas 3 and 4 removed contingent on soil sampling
 - Area 6 retained – confirmed DU

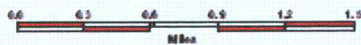
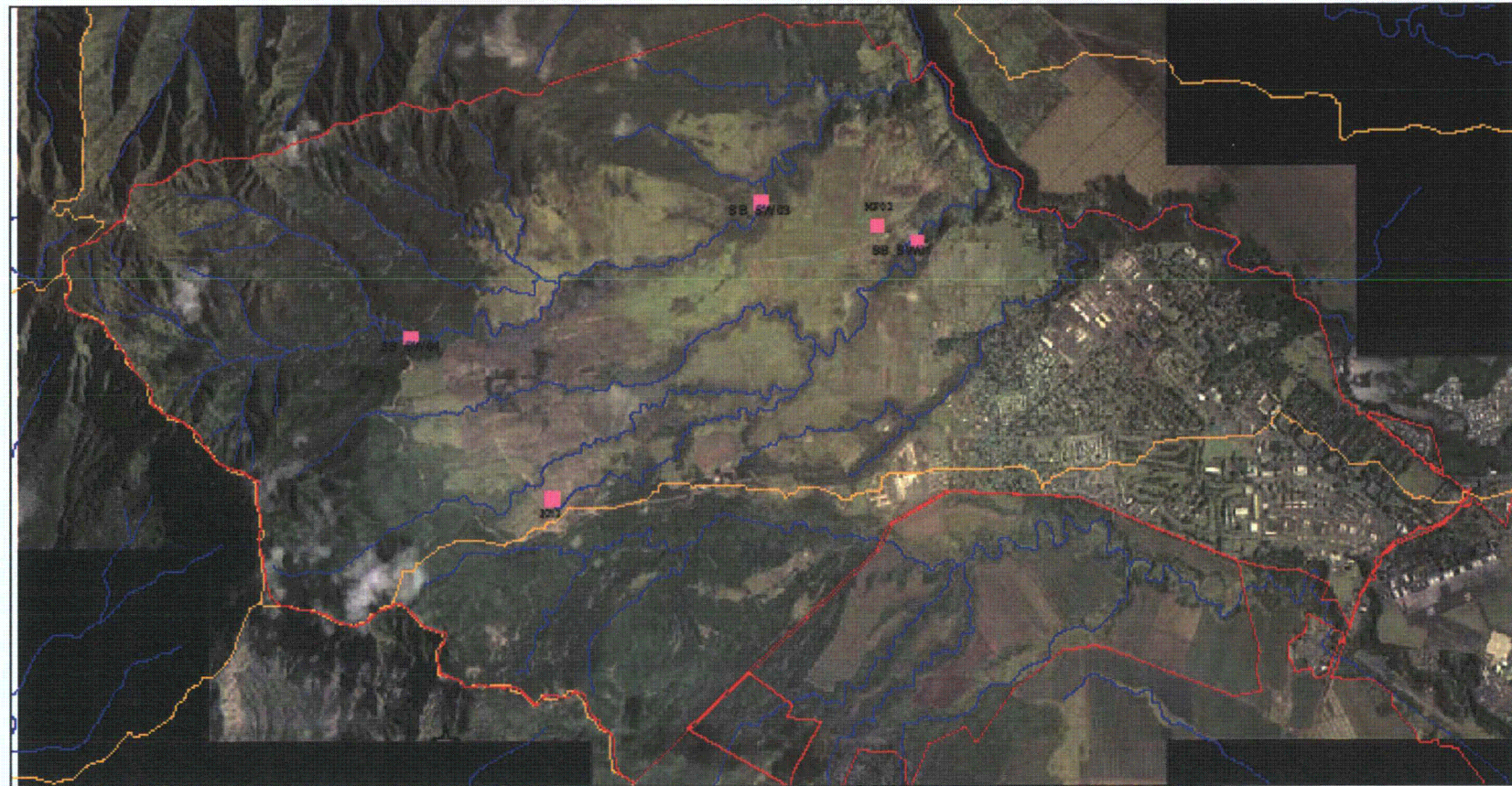
Schofield Range Map - Current



Environmental Monitoring

- Pathway Analysis
 - Final Environmental Impact Statement, 2004
 - Operational Range Assessment Program, 2007
- Environmental Sampling
 - Soil Sampling
 - Surface Water/sediment
- Action Levels
 - 35 pCi/g – Soil/Sediment
 - 150 pCi/l -- Water

Sampling Locations



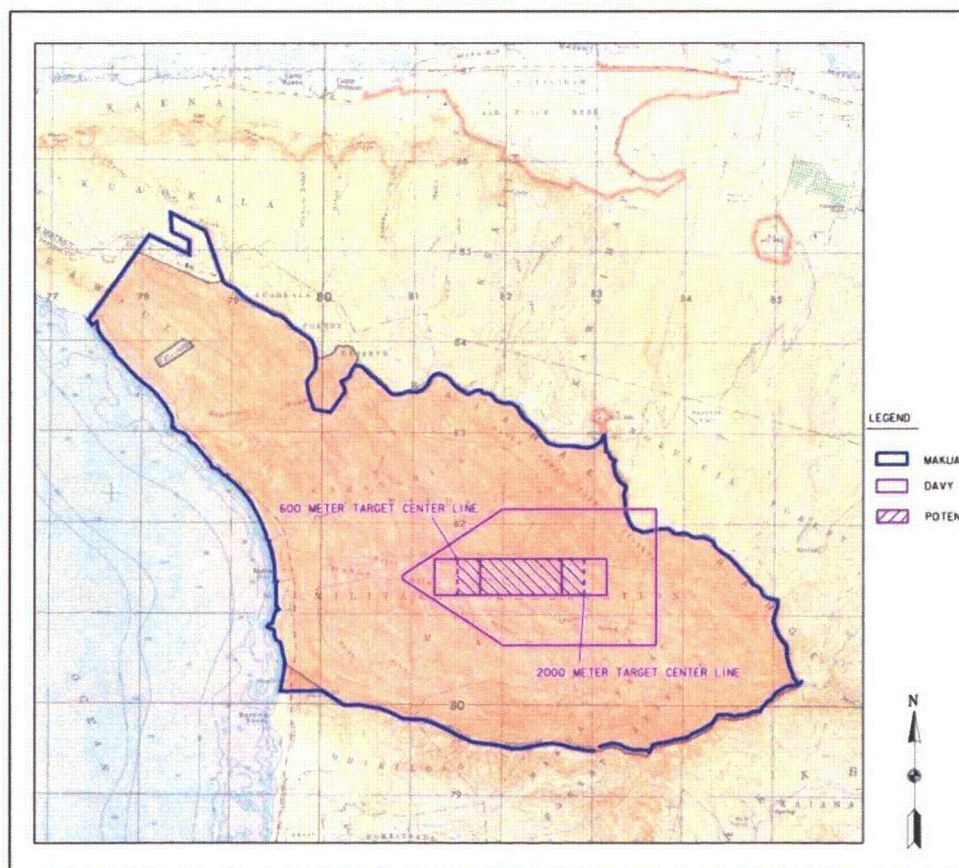
Legend

- Perennial Streams
- surfacewater/soil
- Installation area
- Watershed

SCHOFIELD BARRACKS, OAHU HAWAII DU SAMPLE LOCATIONS

DATUM: UTM, ZONE 4, NAD1983

Makua Military Reservation



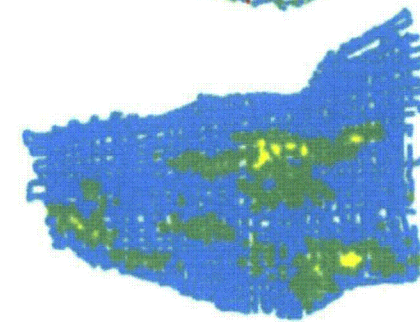
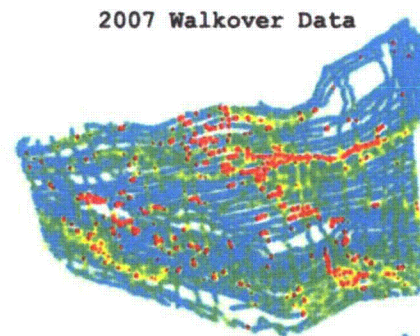
- Identified on ASR as possible firing site
- Heavy vegetation and ICM preclude ground survey
- Perimeter sampling and surface water sampling yielded no DU
- Aerial survey negative

Hawaii



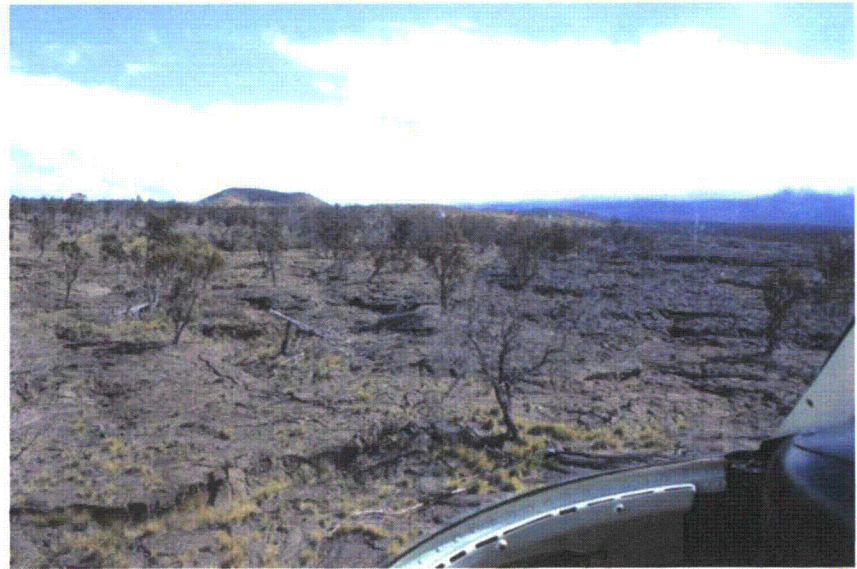
Aerial Survey

- Reasons
 - Difficult terrain to navigate on foot
 - Unexploded ordnance
- Schofield used to validate results
 - Good Air to ground correlation



20 Foot Radius
2008 Flyover Data

Pohakuloa



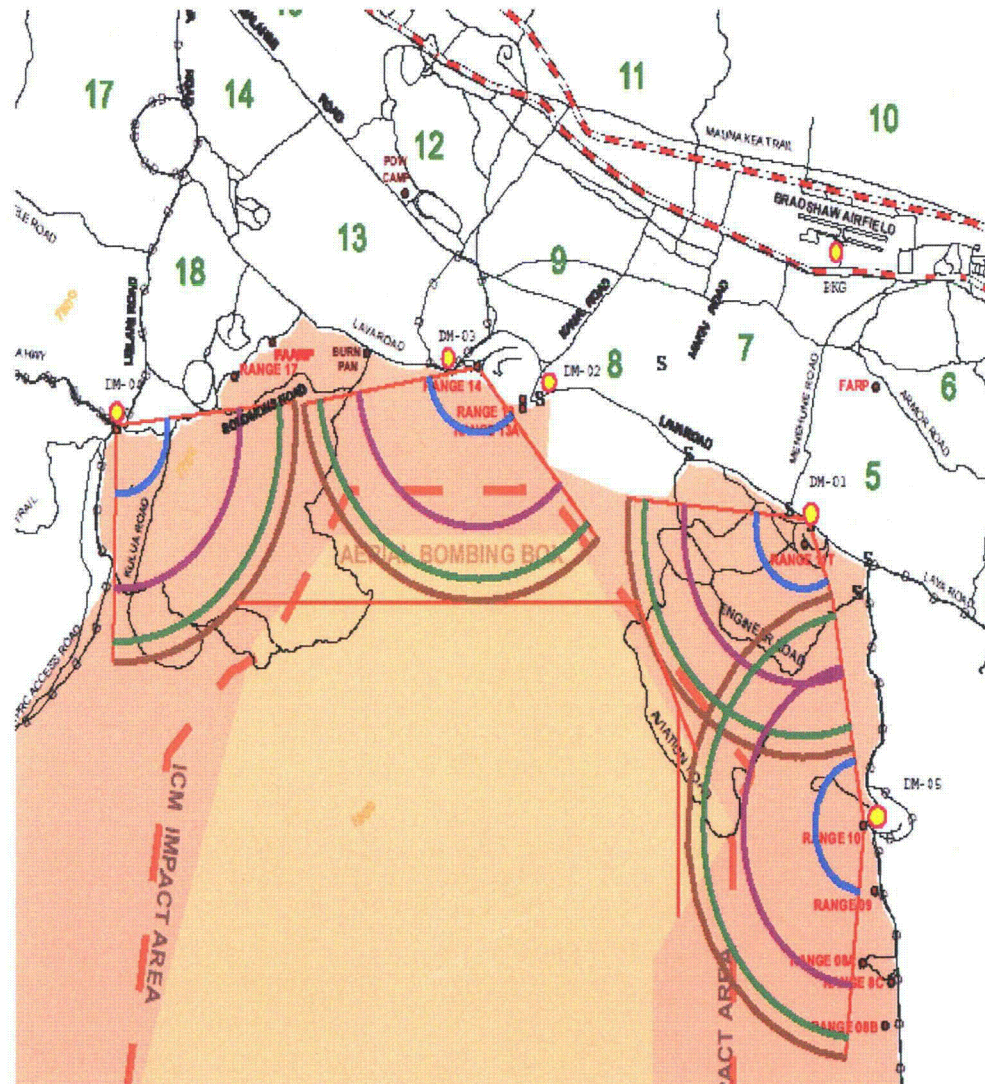
Survey Results

- Aerial Survey
 - Visual survey or pistons
 - Environmental conditions restricted flyover in areas
 - No DU (Pa-234)
- Ground Survey
 - Evaluated areas identified by the Air – No DU
 - Found 2 DU fragments in a no-fly area
- Air Sample Studies
 - No DU detected

Environmental Monitoring

- Pathway Analysis
 - Final Environmental Impact Statement, 2004
 - Operational Range Assessment Program, 2007
- Environmental Sampling
 - Air sampling Study
 - Direct measurements
- Action Level
 - 2x Ambient background

Sampling Locations



Questions? Comments?

