

# Restoration Advisory Board (RAB) Meeting

Former Naval Station Roosevelt Roads  
Ceiba, Puerto Rico

Meeting #18

July 28, 2010



# Use of Jet Assisted Take Off (JATO) Bottles at Cabras Island

Mark Kimes

July 28, 2010



# Questions Raised Regarding Underwater Objects

- **Objects found off shoreline of Cabras Island**
- **Identified by Navy personnel as JATO bottles used to propel target drones**
- **Engineers from Michael Baker Jr. met with NAVSEA personnel who provided product formulation information, environmental data , and simulation modeling results**



# JATO Bottles

- Used to propel BQM 74E target drones during Navy exercises at Cabras Island.
- Two JATOs were used to launch each drone, one under each wing.
- After drones were remotely activated, the JATO bottles would propel the drones for about 1.3 seconds and then the bottles would drop off into the ocean.
- After ignition, temperatures within the JATO bottle reach 4,404°F, according to manufacturer's test data.



# Components of JATO Bottles

- Majority (49%) of JATO propellant composed of Nitrocellulose which burns at 165°F
- Other components of JATO bottle propellant include nitroglycerine (39%) and the ballistic modifier (12%) – used to increase the burning rate of the propellant.
- Navy tests indicate that at 4,403°F, all propellant material within bottle is annihilated.



# Mk 117 MoD 0 JATO Rocket Motor Propellant Description Sheet

# Propellant Composition

PROPELLANT DESCRIPTION SHEET				REPORTS CONTROL SYMBOL EXEMPT-PARA-7-2a AR 335-15					
COMPOSITION PROPELLANT: NOSIH-AA-6 CARPET ROLL SPECIFICATION AS-3028C dated November 3, 2004 and RFD RAD04-03D MFG. AT RADFORD ARMY AMMUNITION PLANT, RADFORD, VA				DA LOT NUMBER RAD0500095003 PACKED AMOUNT 20 Pounds CONTRACT NUMBER N00174-05-C-0025					
ACCEPTED BLEND NUMBERS BG60022, 60023, 60024, 60025, 60026				NITROCELLULOSE					
				NITROGEN CONTENT		KI STARCH (65.5 °C)			
				MAX 12.45 %		45 MBHS 30 MBHS			
				MIN 12.38 %		40 MBHS 30 MBHS			
				AVG. 12.42 %		44 MBHS 30 MBHS			
PRODUCED WITH A BLEND OF HIGH/LOW VISCOSITY GLUCKSTADT LINTERS.									
TEMPERATURES °F		MANUFACTURE OF SOLVENTLESS PROPELLANT				SECONDS			
FROM	TO					FROM	TO		
206°F	210°F	PREROLLING				160 SEC			
148°F	152°F	EVEN SPEED ROLLING				5 MIN			
Propellant mfg. by slurry mix process.									
PROPELLANT COMPOSITION*		TESTS OF FINISHED PROPELLANT			STABILITY AND PHYSICAL TESTS				
CONSTITUENT		PERCENT FORMULA	PERCENT TOLERANCE	PERCENT MEASURED	TALIANI SLOPE 0.3695 (mmHg/min) at 100 MIN. Tallini requirement 1.1 mm Hg/min max at 100 minutes				
NITROCELLULOSE **		49.00	NOM	47.5					
NITROGLYCERIN		38.80	NOM	39.17					
TRIA CETIN		3.25	NOM	3.45	TEMP.	AVG. CROSSWISE MAX	AVG. LENGTHWISE MAX		
DI-N-PROPYL-ADIPATE		2.00	NOM	2.33	°F	STRESS STRAIN	STRESS STRAIN		
2-NITRODIPHENYLAMINE		2.00	1.80 MIN	1.86	psi		psi		
LC-12-15		3.30	NOM	3.71					
CANDELILLA WAX		0.1	NOM	0.07	-65°F	5245.02 0.07	4547.4	0.095	
CARBON BLACK		0.05	NOM	0.08	77°F	506.85 0.360	783.7	0.254	
ALUMINUM		1.50	NOM	1.84	165°F	157.5 0.416	242.6	0.265	
TOTAL		100.00		100.00					
MOISTURE		0.60	MAX	0.31	SPEC FOR TENSILES AT 77°F- LENGTHWISE ONLY STRESS 630 lbs/sq in MINIMUM STRAIN 0.160 MINIMUM				
*MOISTURE FREE BASIS									
**NITROCELLULOSE DETERMINED BY DIFFERENCE					TENSILE INFORMATION AT -65°F AND 165°F IS FOR INFORMATION ONLY				
STRAND BURNING RATE AND HEAT OF EXPLOSION					PROPELLANT DIMENSIONS (Inches)			DATES	
TEMP °F	700psi	900psi	1200psi	1600 psi	2000 psi	2400 psi	2800 psi		
-65°F (MINIMUM)	—	—	0.560	0.520	0.420	0.440	0.490	PACKED	
65°F	0.465	0.530	0.573	0.584	0.541	0.433	0.532	6/10/2006	
165°F (MAXIMUM)	—	—	0.700	0.700	0.760	0.800	0.900	SAMPLED 6/10/2006	
165°F	0.640	0.637	0.703	0.694	0.771	0.788	0.861	TEST FINISHED 7/11/2006	
Average range = 0.079 in/sec Tallini requirement of 0.050 in/sec max Strand burn rates at 700 and 900 psi are for information only								OFFERED 7/21/2006	
HEAT OF EXPLOSION (cal/grm.) AVG.: 1037					STD. DEVIATION: 2.69			DESCRIPTION SHEETS FORWARDED	
TYPE OF PACKING CONTAINER		LEVER PACK DRUM							
REMARKS		MODIFIER LC-12-15 ALUMINUM POWDER			LOT 1035967 5-6017 and 04-511				
This shipment is LAT samples weighing 20 pounds net and 30 pounds gross weight.					Eight of the ten pressures @ -65°F and +165°F exceed the 0.50 in/sec strand burning rate maximum limit				
DESCRIPTION SHEET FOR NOSIH-AA-6 SAMPLES ONLY					THIS MATERIAL MEETS ALL REQUIREMENTS OF AS-3028C dated November 3, 2004, with RFD RAD-04-03D WITH THE EXCEPTION OF SBRs and SDR RANGE				
SIGNATURE OF CONTRACTOR'S REPRESENTATIVE					SIGNATURE OF AAE LLC QUALITY ASSURANCE REPRESENTATIVE				
					Mike Kirchner Quality Assurance Engineer				



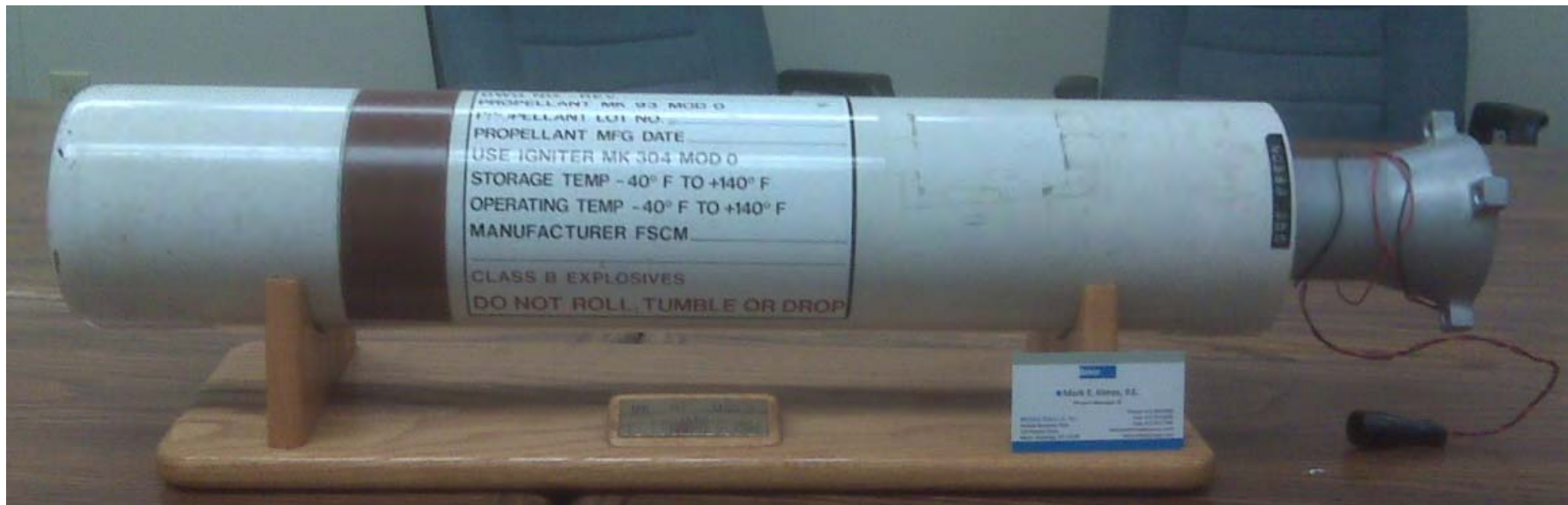
# JATO Bottle Propellant

- Depicts solid fuel propellant prior to placement in JATO bottle



# JATO Bottle Casing

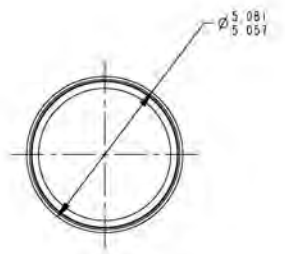
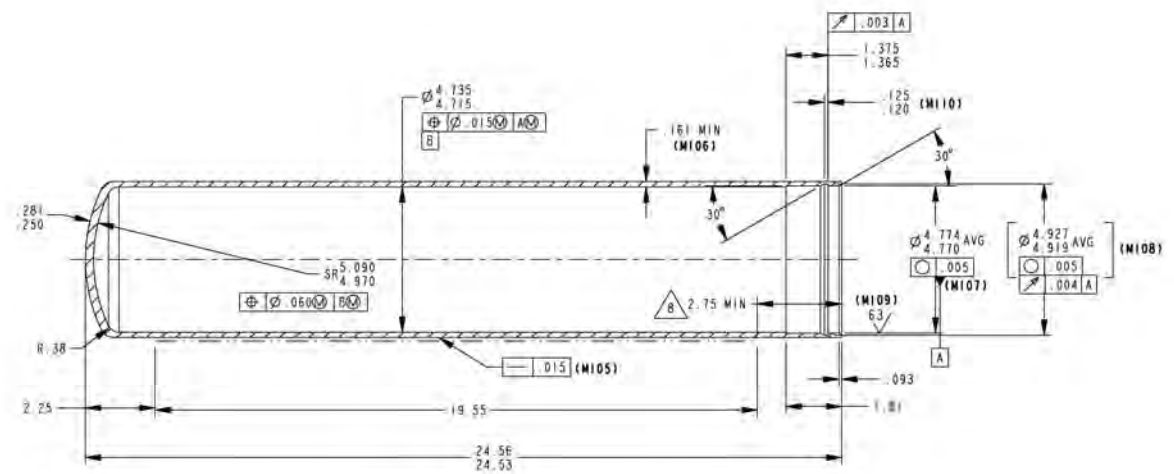
- Composed of painted 4130 carbon steel





REVISIONS			
REV	DESCRIPTION	DATE	APPROVAL
A	SEE ECP 1H8101.1	8/24/81	MEY
C	SEE ECP 1H90054	4/22/91	MEY
E	SEE ECP 1H93009	18JUN93	JCN
F	SEE ECP 1H95023	7JUN95	D.J.S.
G	REDRAWN WITH CHANGE SEE ECP 1H02003, 1H02003.1 R1	6/10/02	REK
H	SEE ECP 1H08007	11/28/07	SM

CAD MAINTAINED CHANGES SHALL BE INCORPORATED BY THE DESIGN ACTIVITY.



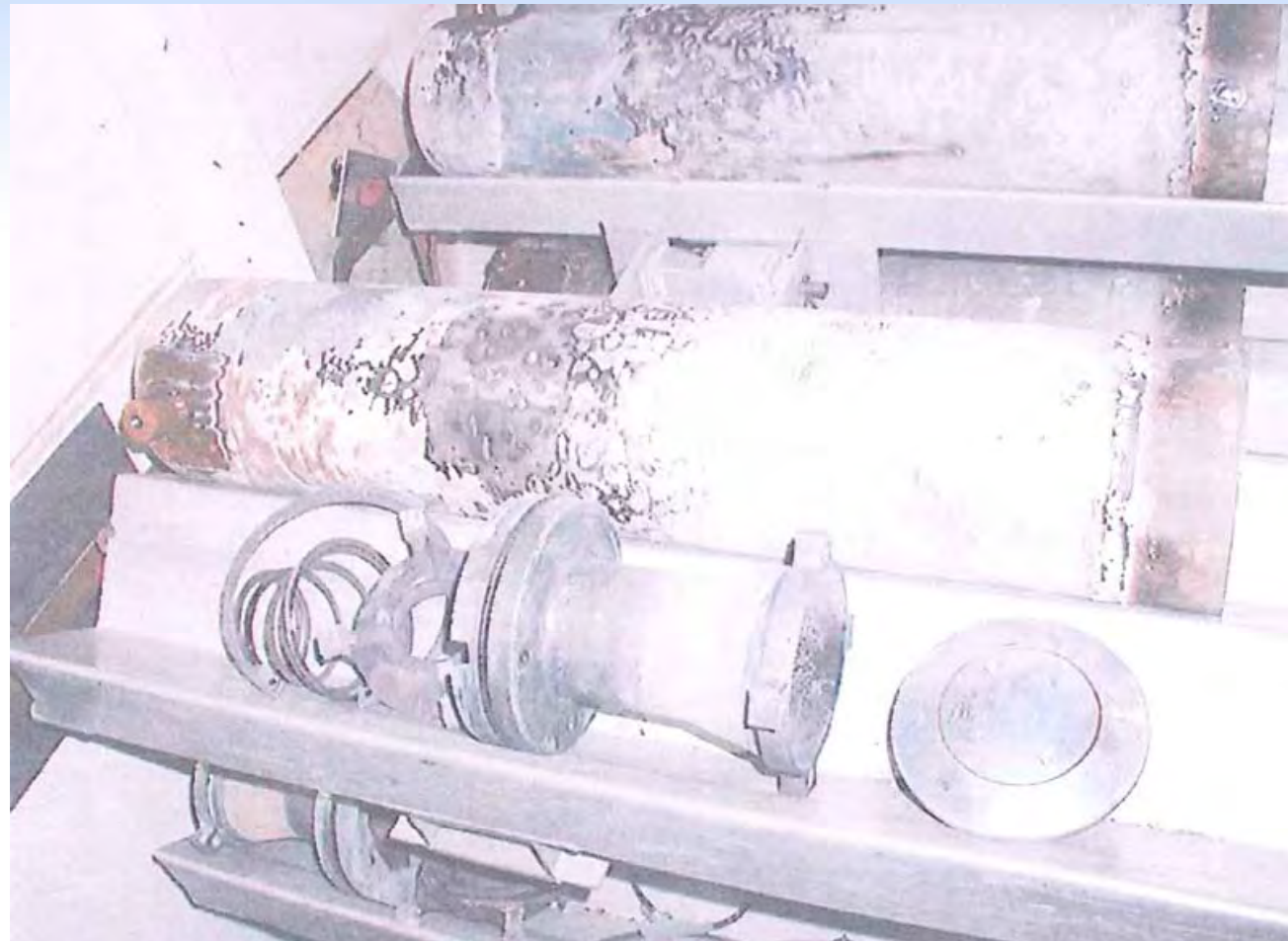
SECTION A-A

SIZE	CAGE CODE	DRAWING NUMBER
D	30003	1506AS106
SCALE: 0.500		SHEET 2 OF 2

# Used JATO Bottle Casing

## Recovered JATO bottle casing

- Tubes recovered and tested for explosives and hazardous constituents indicate “items are completely decontaminated and entirely safe and may be released for general use AND the item was never exposed to hazardous contaminants and may be released for general use.”



Source: Explosives  
Decontamination Tag for Used  
JATO tube

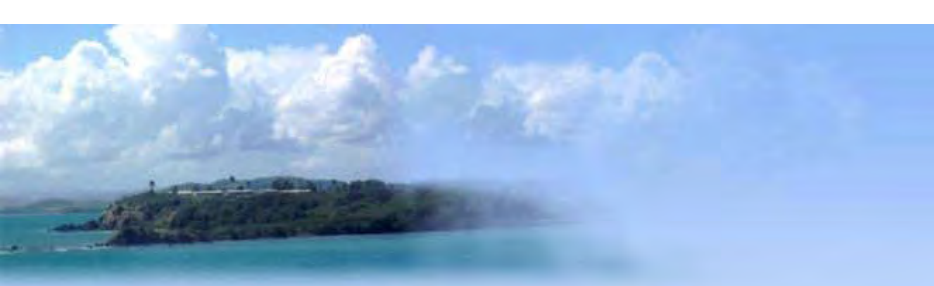


# Modeling of JATO Bottle Location

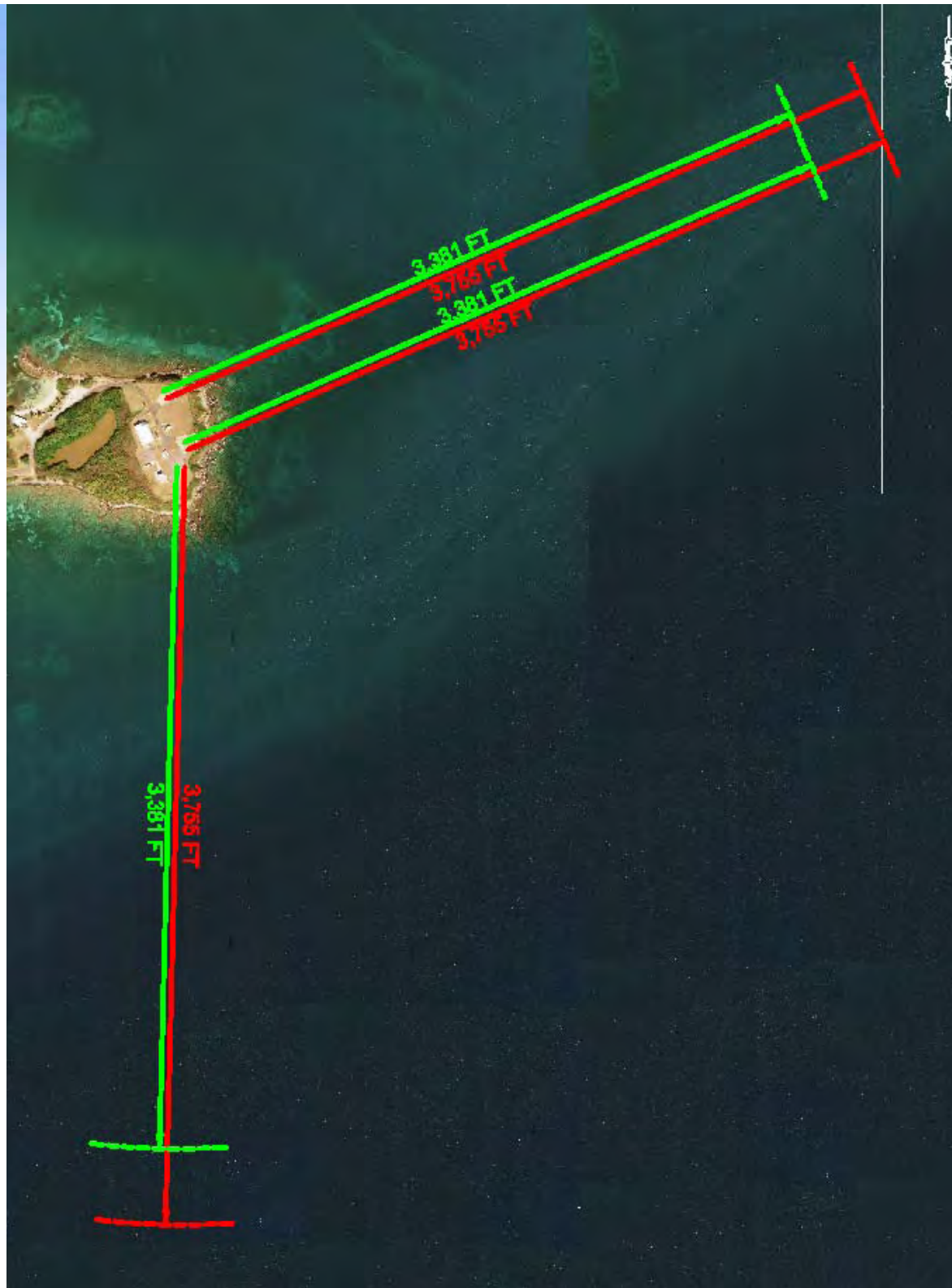
- Engineers at NAVSEA (DOD Energetics) provided analysis of where JATO bottles should be located.
- Results are shown in table below:

<b>Launch Altitude</b> <b>ft</b>	<b>Range</b> <b>ft</b>	<b>Lat Offset</b> <b>ft</b>
0	3381	-16
25	3434	-16.2
50	3484	-16.4
75	3532	-16.6
100	3580	-16.9
200	3755	-17.8





# Approximate distances from launch pads of JATO Bottle Locations



# Conclusions

- **JATO bottle propellant reaches temperatures of 4,403°F during propulsion.**
- **No material remains after burn within steel chamber.**
- **Recovered tubes tested by Navy explosives experts indicate used tubes are completely decontaminated.**
- **Steel casing drops after 1.3 seconds at horizontal distances ranging from 3,400 feet to 3,800 feet from take-off location.**



# Field Investigations

(April 9, 2010 through July 28, 2010)

Mark Kimes

July 28, 2010



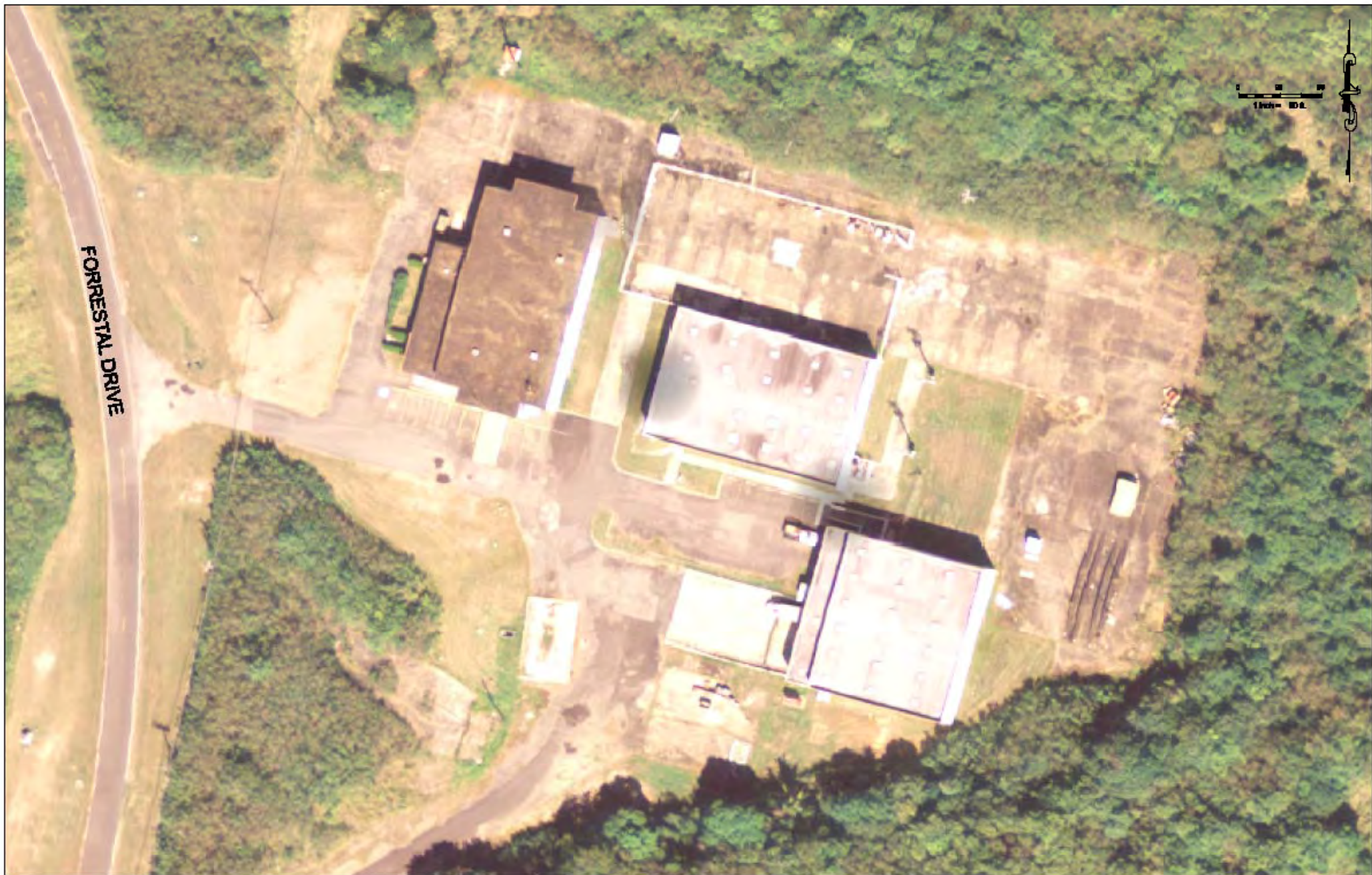


# Field Work (Investigations)

- **SWMU 59 (Formerly Vehicle Maintenance and Refueling Area) CMS Investigation**
  - Level Area with the majority of the site paved. The site is surrounded by secondary growth vegetation.
  - Located within the east/central area of NAPR.
  - Includes existing buildings 377, 2344, and 2345, the aerial photography analysis (APA) from the Phase II ECP Report also described this area as photo identified (PI) Site 7 due to an observation of drums, vehicle racks, stains, and fuel islands from 1958-1985.







FORRESTAL DRIVE

1 inch = 100 ft.

# Field Work (Investigations)

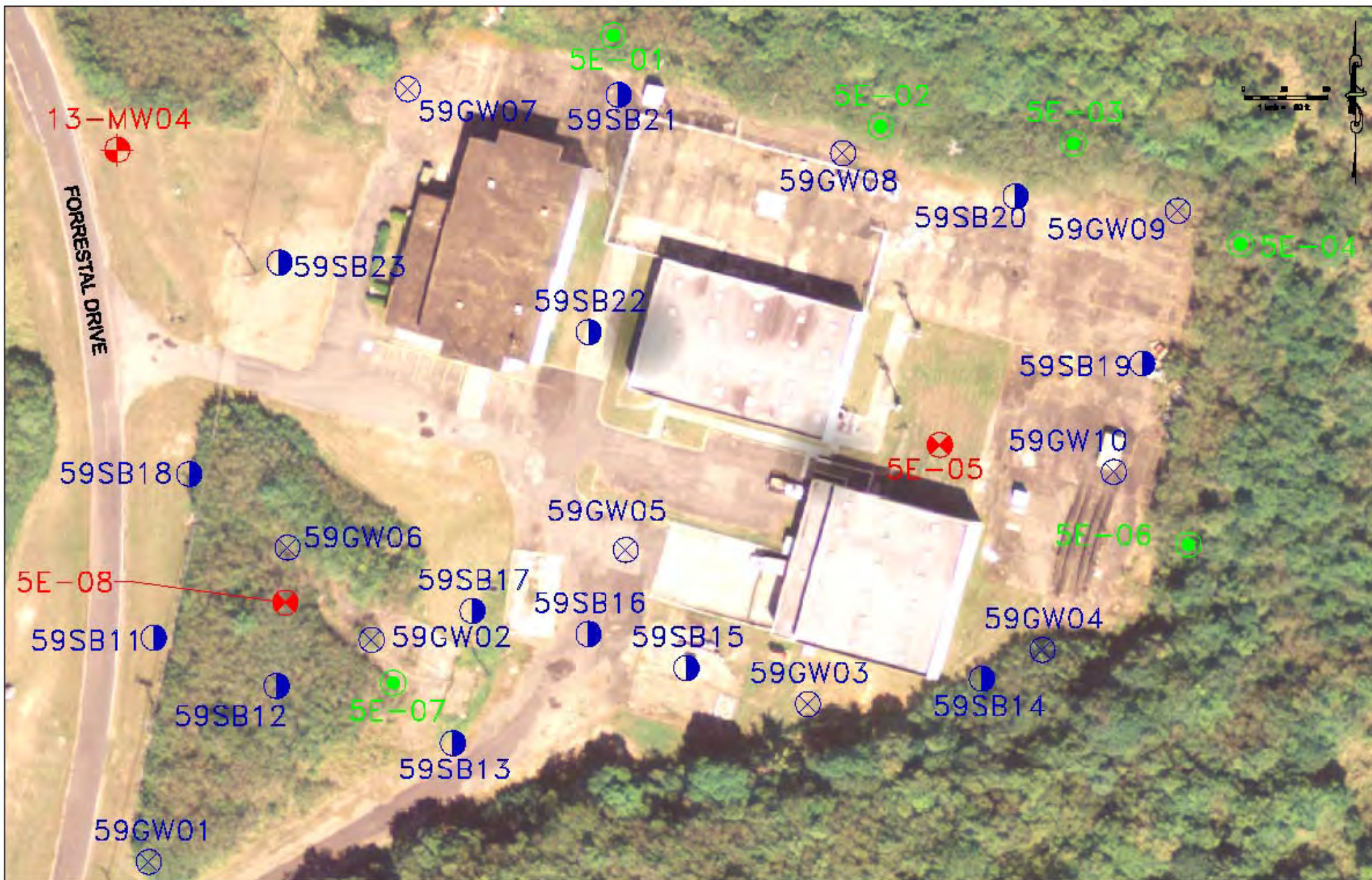
- **SWMU 59 CMS Investigation (Continued)**
  - Mobilized on Monday April 19, 2010 and demobilized on Sunday April 25, 2010.
  - Included the installation of 10 groundwater monitoring wells, and collection of a sediment and surface water sample from the freshwater drainage ditch west of SWMU 59, and Forrestal Drive.



# Field Work (Investigations)

- **SWMU 59 - CMS Investigation (Continued)**
  - Mobilized again on Tuesday May 18, 2010 and demobilized on Wednesday May 26, 2010.
  - Included the advancement of 13 soil borings, collected 10 groundwater samples from 10 newly installed wells, and collected two additional surface water/sediment samples from the freshwater drainage ditch west of SWMU 59, and Forrestal Drive.
  - All monitoring wells and boring locations were surveyed by a local professional land surveyor (PJDC Surveyors) from May 24-26, 2010.





# Field Work (Investigations)

- **SWMU 59 CMS Investigation (Continued)**
  - Analysis of the samples is underway.
  - Data validation of the samples will be conducted following laboratory analysis.

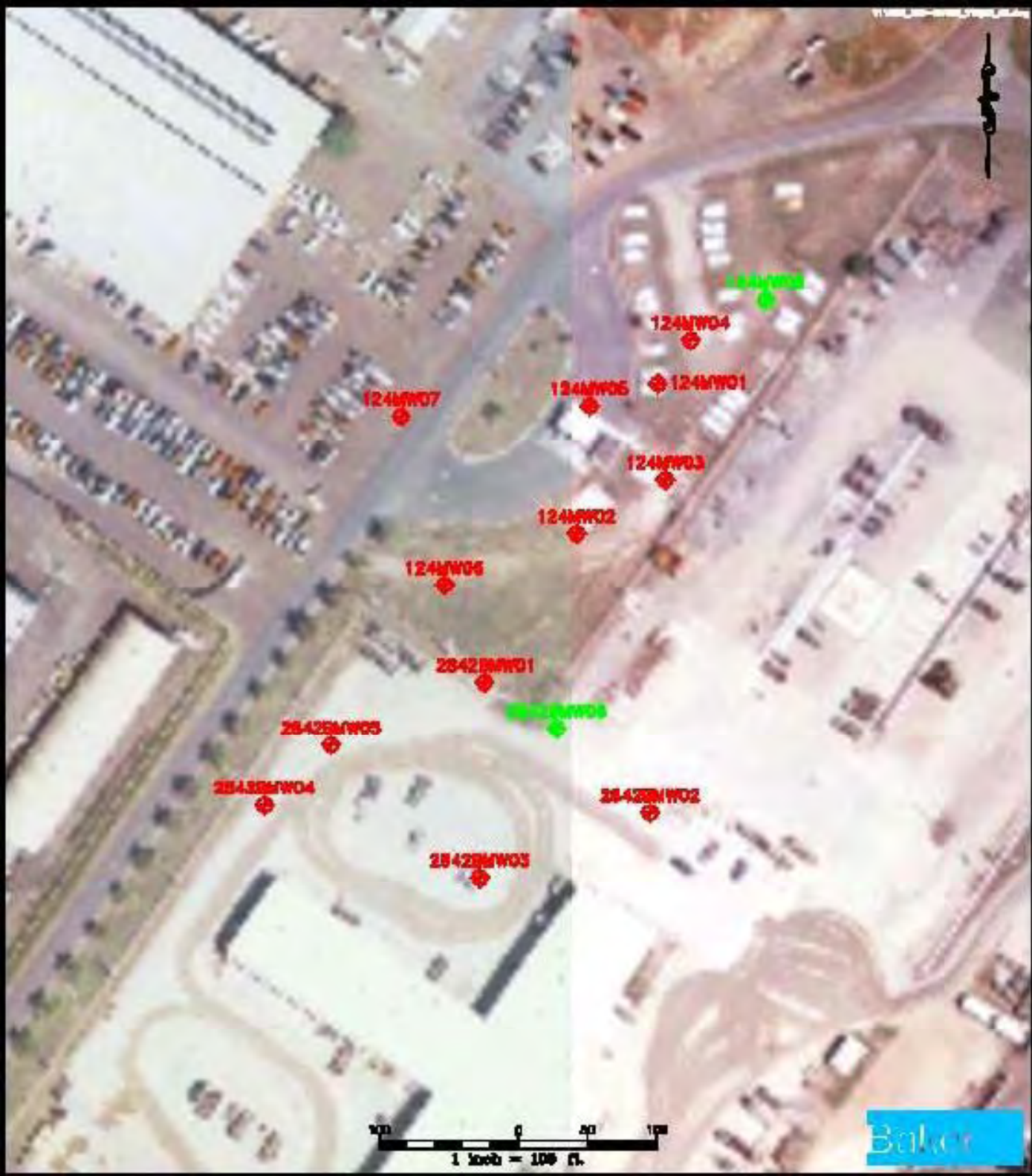
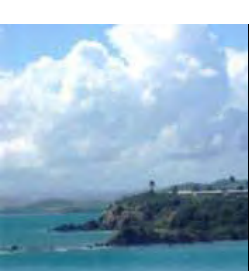


# Field Work (Investigations)

- **AOC F Year 8 Annual (Quarter 1) Groundwater Sampling**
  - Mobilized on Sunday May 19, 2010 and completed sampling on Friday May 28, 2010
  - Conducted the quarterly groundwater sampling from all 8 of the sites (124, 2842B, 520, 731, 734, 735, 1738, and 1995) scheduled for this event.
  - Groundwater samples collected from 5 groundwater monitoring wells for analysis of Appendix IV VOCs, TPH, PAHs, Methane, Sulfate, Appendix IX Dissolved Iron at Site 124
  - Groundwater samples collected from 2 groundwater monitoring wells for analysis of Appendix IV VOCs, TPH, PAHs, Methane, Sulfate, Appendix IX Dissolved Iron at Site 2842B







# Field Work (Investigations)

- **AOC F Year 8 Annual (Quarter 1) Groundwater Sampling (Continued) –**
  - Groundwater samples collected from 4 groundwater monitoring wells for analysis of Appendix IV VOCs, TPH, PAHs, Methane, Sulfate, Appendix IX Dissolved Iron at Site 520
  - Groundwater samples collected from 2 groundwater monitoring wells for analysis of Appendix IV VOCs, TPH, PAHs, Methane, Sulfate, Appendix IX Dissolved Iron at Site 731
  - Groundwater samples collected from 2 groundwater monitoring wells for analysis of Appendix IV VOCs, TPH, PAHs, Methane, Sulfate, Appendix IX Dissolved Iron at Site 734
  - Groundwater samples collected from 11 groundwater monitoring wells for analysis of Appendix IV VOCs, TPH, PAHs, Methane, Sulfate, Appendix IX Dissolved Iron at Site 735





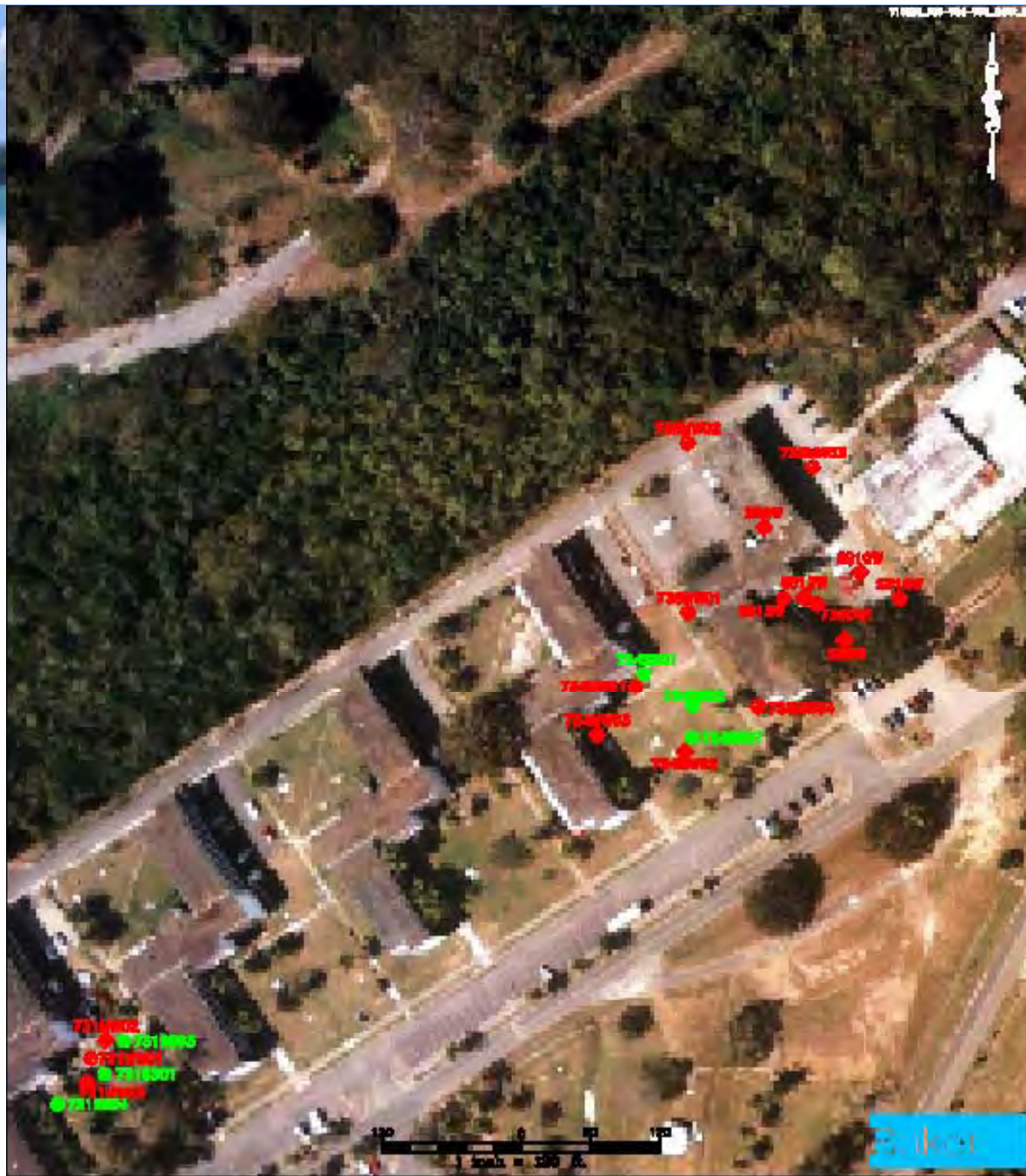
**LEGEND**  
 ♦ - MONITORING WELL

SOURCE: GCO-MARINE, INC., SEPTEMBER 5, 2000.

**FIGURE 3-1**  
**SITE 520**  
**MONITORING WELL LOCATIONS**  
**AOC F MNA WORK PLAN**

NAVAL ACTIVITY PUERTO RICO





- LEGEND**
- ◆ - MONITORING WELL
  - - MNA SOIL BORING

**FIGURE 5-1**  
**MONITORING WELL AND SOIL BORING**  
**LOCATIONS**  
**SITES 731, 734 AND 735**  
**AOC F MNA YEAR 6/**  
**QUARTER 4 REPORT**  
**NAVAL ACTIVITY PUERTO RICO**

SOURCE: GEO-MARINE, INC., SEPTEMBER 6, 2000.



# Field Work (Investigations)

- **AOC F Year 8 Annual (Quarter 1) Groundwater Sampling (Continued) –**
  - Groundwater samples collected from 4 groundwater monitoring wells for analysis of Appendix IV VOCs, TPH, PAHs, Methane, Sulfate, Appendix IX Dissolved Iron at Site 1738
  - Groundwater samples collected from 5 groundwater monitoring wells for analysis of Appendix IV VOCs, TPH, PAHs, Methane, Sulfate, Appendix IX Dissolved Iron at Site 1995





- LEGEND**
- ◆ - MONITORING WELL
  - ◆ - MONITORING WELL (MAY 2008)
  - ◆ - TEMPORARY WELL (MAY 2008)

**FIGURE 4-1**  
**MONITORING WELL LOCATIONS**  
**SITE 173B**  
**AOC F-MONITORED NATURAL**  
**ATTENUATION YEAR 7/QUARTER 3**

NAVAL ACTIVITY PUERTO RICO

SOURCE: BEQ-MARINE, INC., SEPTEMBER 4, 2009.





**LEGEND**

- ◆ - MONITORING WELL
- ◆ - ICHOR PRODUCT RECOVERY WELL LOCATION
- - GROUNDWATER FLOW DIRECTION

SOURCE: GCO-MARINE, INC., SEPTEMBER 6, 2000.

**FIGURE 6-1**  
**SITE 1995**  
**MONITORING WELL LOCATIONS**  
**AOC F MNA WORK PLAN**

NAVAL ACTIVITY PUERTO RICO



# Field Work (Investigations)

- **AOC F Year 8 Annual (Quarter 1) Groundwater Sampling (Continued)**
  - Laboratory Analysis is completed and Data Validation is underway.



- The Draft Monitored Natural Attenuation AOC F – Year 8 Annual (Quarter 1) Report will be submitted to the EPA and PR EQB within 60 days after the data validation is received.



# Field Work (Investigations)

- **SWMU 69 (Aircraft Parking Area) CMS Re-Investigation**
  - Mobilized on Monday July 19, 2010 and demobilized July 21, 2010 due to extreme weather conditions (flooding and heavy rains) and the inability to enter the base to obtain sampling supplies and equipment



# Reports Submitted

- **The Final Work Plan to Conduct the Phase I RCRA Facility Investigation, Addendum No. 1 for Piñeros Island was submitted to the EPA and EQB on April 14, 2010**
  - *This document was submitted in accordance with and addressed regulatory comments dated January 2010*
- **The Draft Monitored Natural Attenuation for AOC F, Year 7, Quarter 4 Report was submitted to the EPA and EQB on April 15, 2010**
  - *This document was submitted in accordance with the schedule in the Revised Final II Monitored Natural Attenuation Work Plan, AOC F dated November 21, 2008*



# Reports Submitted

- **The Draft Sampling Strategy for Disturbed Soil Sampling in SWMU 69 – Aircraft Parking Area was submitted to the EPA and EQB on April 20, 2010**
  - *This strategy has been prepared as a consequence of the violation of land use controls by the Puerto Rico Ports Authority*
- **SWMU 56/Site 56A Source Area Investigation Report was submitted to the EPA and EQB on April 23, 2010**
  - *This report was submitted in accordance with regulatory comments dated February 18, 2010*



# Reports Submitted

- **The Functional Assessment and Supplemental Sediment Sampling Report for the Drainage Ditch Down Gradient from SWMU 56 was submitted on April 23, 2010**
  - *This report was submitted in accordance with regulatory comments dated February 18, 2010*
- **The Draft Full RCRA Facility Investigation Work Plan for SWMU 78 was submitted to the EPA and EQB on April 29, 2010**



# Reports Submitted

- **The Draft MtBE Investigation Work Plan for AOC F site 1738 was submitted to the EPA and EQB on April 29, 2010**
  - *This draft was submitted in accordance with regulatory comments dated September 29, 2009*
- **The Final Monitored Natural Attenuation for AOC F Year 7 Quarter 3 Report was submitted to the EPA and EQB on April 29, 2010**
  - *This document was submitted in accordance with regulatory comments dated March 11, 2010*



# Reports Submitted

- **The replacement pages to Addendums B and C of the Revised Final II Summary Report for Environmental Background Concentrations of Inorganic Compounds at NAPR were submitted to the EPA and EQB on April 29, 2010**
  - *This draft was submitted in accordance with regulatory comments dated March 11, 2010*
- **The Final Semi-Annual Groundwater Monitoring Report for SWMU 3 (Former Solid Waste Landfill), September 2009 Sampling Event was submitted to the EPA and EQB on April 29, 2010**
  - *This document was submitted in accordance with regulatory comments dated March 11, 2010*



# Reports Submitted

- **The Final Corrective Measures Implementation Design Package and Work Plan for SWMU 68 was submitted to the EPA and EQB on May 14, 2010**
  - *This document was submitted in accordance with regulatory comments dated January 28, 2010*
- **Received Regulatory Comments dated May 11, 2010 on May 17, 2010 regarding the following:**
  - *SWMU 69 (Aircraft Parking Area) – Draft Sampling Strategy for Disturbed Soil Sampling*
  - *SWMU 56/Site 56A – Source Area Investigation Report*
  - *SWMU 56 (Hangar 200 Apron) – Functional Assessment and Supplemental Sediment Sampling Report*
  - *AOC F – Site 1738 Draft MtBE Investigation Work Plan*
  - *SWMU 61 (Former Bundy Vehicle Maintenance Facility) – Revised Corrective Measures Study (CMS) Investigation Plan*



# Reports Submitted

- **The RCRA Administrative Order on Consent Quarterly Progress Report (February 1, 2010 to April 30, 2010) was submitted to the EPA and EQB on May 27, 2010**
- **Received regulatory Comments dated May 27, 2010 on June 1, 2010 regarding the following:**
  - *SWMU 1 – Final Steps 6 and 7 of Baseline Ecological Risk Assessment - Approved*
  - *SWMU 2 – Steps 5, 6, and 7 of Baseline Ecological Risk Assessment - Approved*
  - *SWMU 9 – Area B, Tank 214 Proposal for Additional RFI Sampling*
  - *SWMU 73 – Draft Corrective Measures Study Investigation Report*
  - *SWMU 74 – Phase I of the Corrective Measures Study Investigation Report*
  - *SWMU 77 – Phase I RFI Draft Sampling and Analysis Plan*
  - *Revised Final II Summary Report for Environmental background Concentrations of Inorganic Compounds Addendums B and C*



# Reports Submitted

- **The Draft Full RCRA Facility Investigation Work Plan for SWMU 71 was submitted to the EPA and EQB on Jun 11, 2010**
- **The Draft Full RCRA Facility Investigation Work Plan for SWMU 62 was submitted to the EPA and EQB on Jun 18, 2010**
- **The Final Sampling Strategy for Disturbed Soil Sampling at SWMU 69 (Aircraft Parking Area) was submitted to the EPA and EQB on June 18, 2010**
  - *This strategy has been modified to address regulatory comments dated May 11, 2010*



# Reports Submitted

- **Received regulatory Comments dated June 16, 2010 on June 22, 2010 regarding the following:**
  - *SWMUs 7 & 8 Corrective Measures Study Addendum – revised Soil Remedy and Statement of Basis*
  - *AOC E – Phase I RFI Work Plan Addendum No. 1 – Terrestrial Intrusive Investigation Plan*
  - *SWMU 68 – Final Corrective Measures Implementation (CMI) Work Plan and Basis of Design and Technical Specifications*
  - *SWMU 78 – Draft Full RFI Work Plan*
- **Draft Semi-Annual Groundwater Monitoring Report for SWMU 3 (Former Solid Waste Landfill) March Sampling Event was Submitted to the EPA and EQB on June 25, 2010**



# Reports Submitted

- **The Draft Full RCRA Facility Investigation Work Plan for SWMU 70 was submitted to the EPA and EQB on July 1, 2010**
- **The Draft Full RCRA Facility Investigation Report, SWMU 9 Area B, Tank 214 Area Response to Comments and Proposal for Additional Sampling was submitted to the EPA and EQB on July 8, 2010**
  - *This draft is in accordance with comments received on the Draft Full RCRA RFI for SWMU 9 dated July 14, 2009*



# Reports Submitted

- **The Revised Final Phase I of the Corrective Measures Study Investigation for SWMU 74 (Fuel Pipelines and Hydrant Pits) as well as an addendum describing the Phase II Investigation activities were sent to the EPA and EQB on July 9, 2010**
  - *These documents were sent in accordance with regulatory comments dated May 27, 2010*



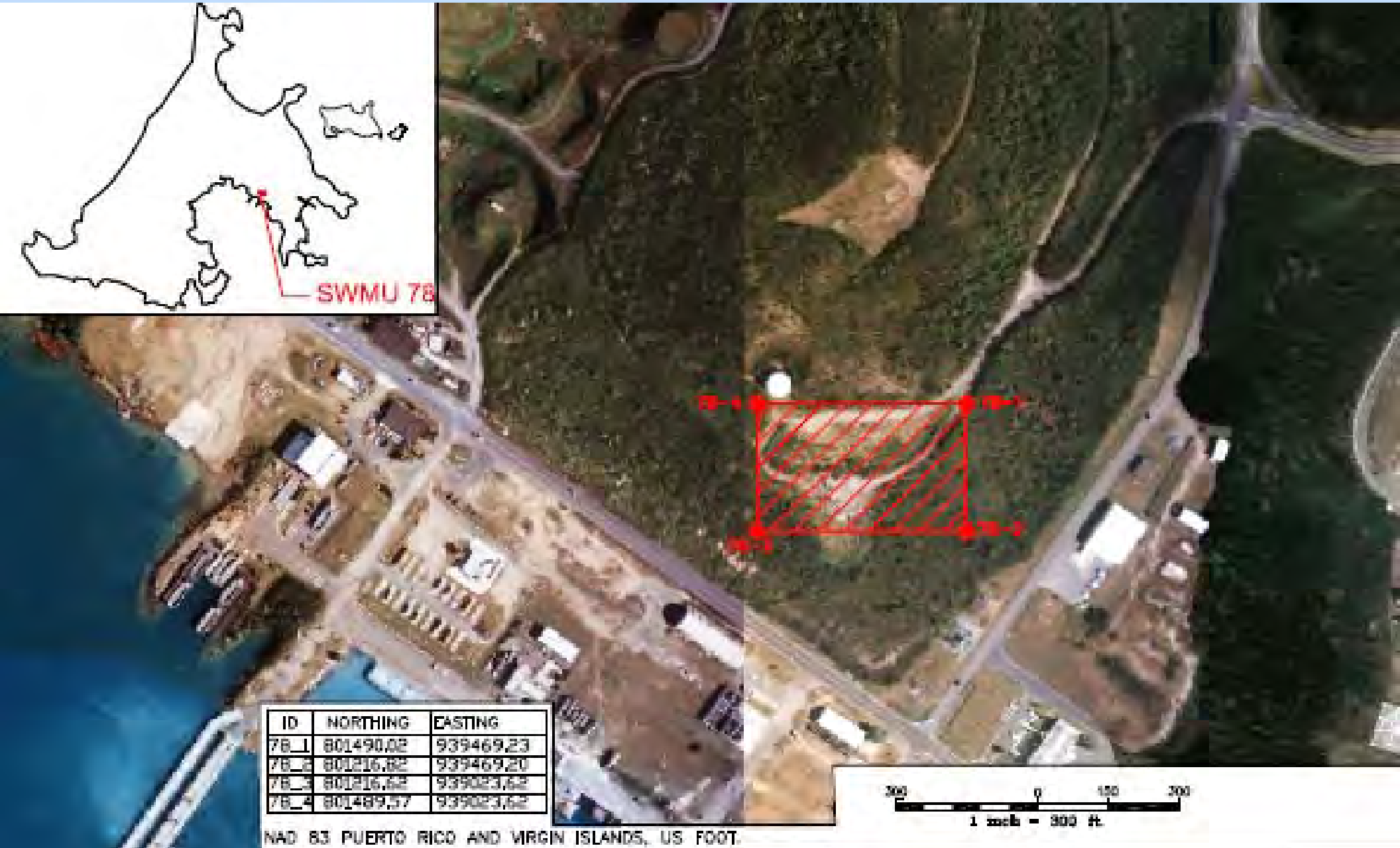
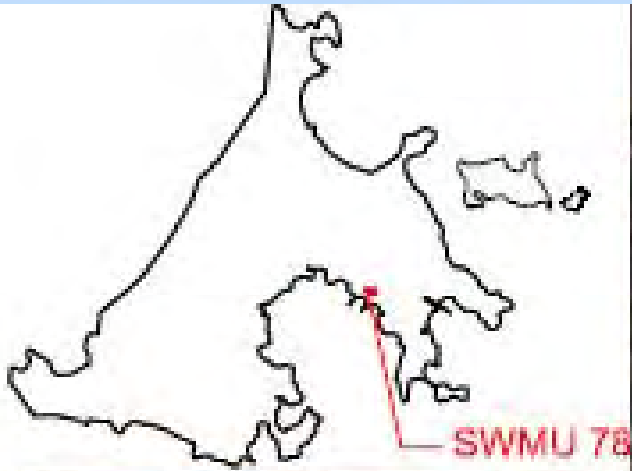
# Construction Update

Mark Davidson

July 28, 2010



# SWMU 78 Transformers



ID	NORTHING	EASTING
78_1	801490.02	939469.23
78_2	801216.62	939469.20
78_3	801216.62	939023.62
78_4	801489.57	939023.62

NAD 83 PUERTO RICO AND VIRGIN ISLANDS, US FOOT.



# SWMU 78 Transformers

- **Over 100 old transformers stored on a concrete pad**
- **Oil was drained from transformers, containerized and properly disposed of (May 2010)**
- **Transformers properly disposed of (June 2010)**
- **Concrete pad pressure washed, liquid containerized and liquid properly disposed of (June 2010)**
- **Full RCRA Facility Investigation (RFI) for soils and groundwater underway**









# Remediation Documents Under Development

- **SWMU 1 (munitions work)**
  - Draft Work Plan for Surface Munitions Removal
  - Draft Explosive Safety Submission
- **SWMU 7 & 8**
  - Draft Corrective Measures Implementation Plan
    - *Best means to remove free product*
  - Draft Work Plan Monitored Natural Attenuation Groundwater Sampling



# Documents Under Development

- **SWMU 54 and SWMU 55**
  - Pilot Test Results Technical Memorandums
    - *pilot study data evaluation*
    - *recommendation for full scale remediation*
- **AOC E**
  - Draft Phase I RCRA Facilities Investigation Report
    - *Terrestrial munitions investigation results*





## **Other public comments and questions?**



# Closing: next RAB meeting

- **Next RAB meeting October 2010**
  - At Club Cívico La Seyba, if available
  - Please remember to call ahead, or send an alternate, if you cannot attend
- **Agenda suggestions for next time?**
  - Call Ramón Figueroa, RAB Community Co-Chair  
(787-235-1473)
- **Thank you for participating!**



# Questions between meetings

Mark Davidson or David Criswell

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Southeast

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843-743-2130 (Criswell)

**Email:**

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