DEPARTMENT OF THE AIR FORCE
AIR FORCE INSTITUTE FOR OPERATIONAL HEALTH (AFMC)
BROOKS CITY-BASE TEXAS

12 March 2004

MEMORANDUM FOR: 174 FW/DT1
ATTENTION: LT COL ROBERT BLANK
PO BOX 320
ANTWERP, NY 13608

FROM: AFIOH/SDRH(AFRMWO)
2350 Gillingham Drive
Brooks City-Base TX 78235-5111

SUBJECT: Consultative Letter, IOH-SD-BR-CL-2004-0048, Radiological Assessment Survey of the Syracuse ANG Andirondack Range 48, Spraugeville NY

1. The Air Force Institute for Operational Health's Environmental Radiation Branch (AFIOH/SDRH) performed a preliminary radiological assessment survey of the Syracuse ANG Andirondack Range 48, Spraugeville NY. The survey was performed by Maj Dan Caputo on 23 Dec 03. The purpose of the survey was to scope out the level of effort required to dispose of a number of missile bodies contaminated with unknown types and quantities of radioactive material. Based on the results of the survey and site visit, it was determined the radioactive contaminate of concern was likely limited to magnesium-thorium (MgTh) alloy, and there were 17 missile bodies in various states of disrepair. The disposal project will require a contractor to perform the preparation, removal, packaging, and disposal. Once the item are removed from the staging area, Air Force health and safety personnel will need to perform a final survey to ensure all debris and missile parts were adequately removed.

2. Background:

a. In Nov 03, TSgt Chris Ford (174th MedSq, Bioenvironmental Engineering Technician) from the Syracuse ANG, NY contacted the Air Force Radioactive and Mixed Waste Office (AFIOH/SDRH-AFRMWO) with a request for guidance on the disposal of radioactive materials from a new operations area on the Adirondack Range. The specific area of interest is the US Army Fort Drum Range Area 48, with the entrance near the town of Spraugeville, NY. Based on the information provided, it was determined additional information would have to be collected in order to properly identify the items in question and to scope the level of effort for disposal.

b. On 23 Dec 03, Maj Dan Caputo from AFIOH/SDRH performed a radiological assessment survey of the missile bodies in question on the 174th FW-operated Adirondack Range 48. The following personnel were contacted during the survey: LtCol Robert Blank, Adirondack Range Commander; TSgt Chris Ford, 174th MedSq Bioenvironmental Engineering Services.

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3. **Survey Equipment:**

- Eberline E600 Meter (SN 02518, calibration date 20030130) with an Eberline SHP 360 beta/gamma frisker probe (SN 761, calibration date 20030115)
- Ludlum Model 19 Micro-R Meter (SN 148191, calibration date 15 Apr 03)
- Innovision/Victoreen Model 451P Pressurized Ion Chamber Survey Meter (SN 212, calibration date 28 Apr 03)

4. Findings:

a. Physical Description: Seventeen missiles bodies were identified with an additional pile of debris. The missiles bodies were of two basic types - identified as type A and B for the purposes of this report. There were 11-type A and 6-type B missiles bodies. The type A missile bodies were approximately 2.5 feet in diameter and ranged in length from 12-20 feet. The type B missile bodies were approximately 3 feet in diameter and ranged in length from 8-30 feet. Although precise weight measurements were not available, all missile bodies were estimated to be less than 2000 lbs. In addition to the main missile bodies, there was one small pile of debris (less than two cubic yards). The missile bodies are in various states of disrepair and degradation. There are numerous panels and pieces that are broken and likely mixed in with surrounding soils. Photos of the missile body types and general condition are contained in attachment 1.

b. Hazards: The radiological contaminant of concern was identified as thorium in a magnesium-thorium (MgTh) alloy solid matrix. Although no isotopic analysis was performed, this determination was based on panel markings (see Atch 2), physical properties (color and density), radiological properties (hard gamma radiation), and process knowledge (radioactive components in locations requiring high-thermal loading). The majority of the radioactive material is associated with panels around combustion chambers (both missile types, Atch 3), electrical and hydraulic conduits (type B missiles, Atch 4), control surfaces (type B missiles, Atch 5), and air foils interior to the missile body (type A missile, Atch 6). Additional hazards to consider are incomplete combustion of fuel or byproducts, UXOs associated with missile components or range operations, sharp objects, and animal byproducts.

c. Radiation Survey Results:

1) Type A Missile: The type A missile bodies appear to only have radioactive components on the intake/front half on the sections. The front intake has radioactive panels around the entire circumference with gamma exposure rate readings of 0.4 mR/hr contact and 0.1 mR/hr at 1 m (Model 451 P). Immediately behind the intake section is a single air foil mounted on the inside on the missile body. The air foil also reads approximately 0.4 mR/hr on contact.

2) Type B Missile: The type B missile bodies have radioactive components primarily on the exhaust section and an electrical/hydraulic conduit cover running the length of the exterior. All components exhibited the same levels of gamma radiation as the type A missile (0.4 mR/hr contact, 0.1 mR/hr at 1 m).

d. Logistics: The site commander, LtCol Blank, stated the roadways into and out of the site are sufficient for any standard road legal vehicles. There is limited accessibility into the debris lay down area during the winter and spring months due to snowfall/thawing. The site maintains plenty of heavy lift equipment and operators to move and load the missile parts. There is plenty of room to stage equipment and containers if necessary. All support activities should be coordinated with the Adirondack Range commander.

e. Ownership/Responsibility: The 17 missiles bodies and debris are AF-owned radioactive commodities and are the responsibility of the AF for disposal. The missiles were used as static displays on the range to simulate surface-to-air threats, and thus they were not designed as primary targets for air-to-ground fire. However, a number of the missiles show signs of direct fire. The Adirondack Range is in the process of being certified as an official AF range, and thus the current responsibility for operations and maintenance falls under the Syracuse ANG 174th FW. This range is not presently being funded under the HQ ACC Range Management Office, and thus this disposal action should be funded by the AF environmental compliance program.

5. Recommendations

a. The 17 missiles bodies and debris should be disposed of by the AFRMWO at the earliest convenience. The AFRMWO will likely need to contract the disposal action to a contractor with sufficient experience with isotope identification, non-radioactive hazard assessment, volume reduction, heavy lifting and loading, and site final status surveys.

b. The type A missile bodies are good candidates for volume reduction. The radioactive material appears to be isolated to the front section of the type A missile body, and thus a 2:1 volume reduction may be realized if the cost-benefit analysis proves this option viable.

c. The contractor should be prepared to package a minimum of four cubic yards of soil and debris. This volume could be increased or reduced based on the degree of survey support provided in the field. A cost-benefit analysis should be performed to determine the feasibility of debris/soil volume reduction versus survey time and complexity.

d. Once all of the missile bodies and radioactive debris/soil is remove and prior to final packaging/shipment, a final status survey (FSS) of the site should be accomplished to ensure all radioactive material was removed. The FSS should follow NUREG 1575 (MARSSIM) survey protocols and documentation requirements.

e. The MgTh material is exempt under l OCFR40 as unimportant quantities of source material. As such, this disposal action should not require U.S. Nuclear Regulatory Commission or other regulatory agency authority. However, the AF Radioisotope Committee should be briefed on this action and concur on this recommended approach.

f. Additional scoping surveys should be performed of the target storage area (adjacent to the operations building) and initial missile emplacement locations. These surveys are recommended to ensure no additional radioactive materials or debris remains on the range or in targets.

6. If you have any comments or questions regarding this consultation, please contact Mr Brian Renaghan at 210-536-6029 (DSN 240-6029).

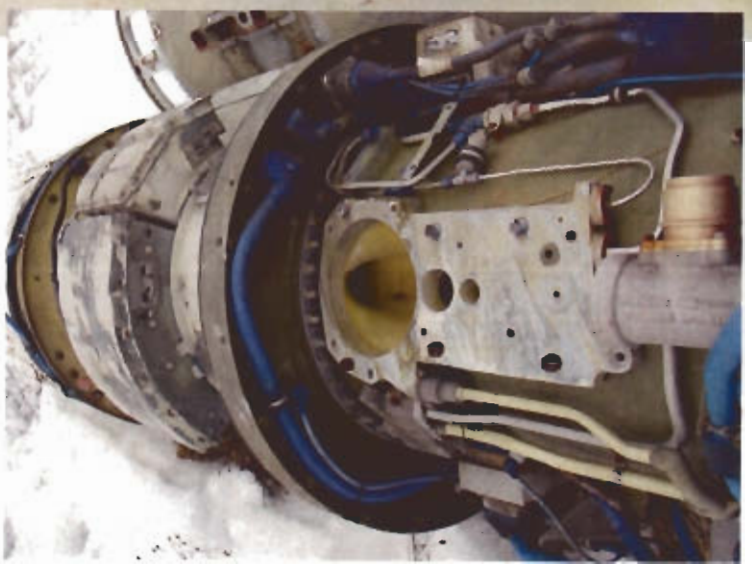
Craig-Alan Bias

CRAIG-ALAN BIAS, Maj, USAF, BSC
Chief, Environmental Radiation Branch

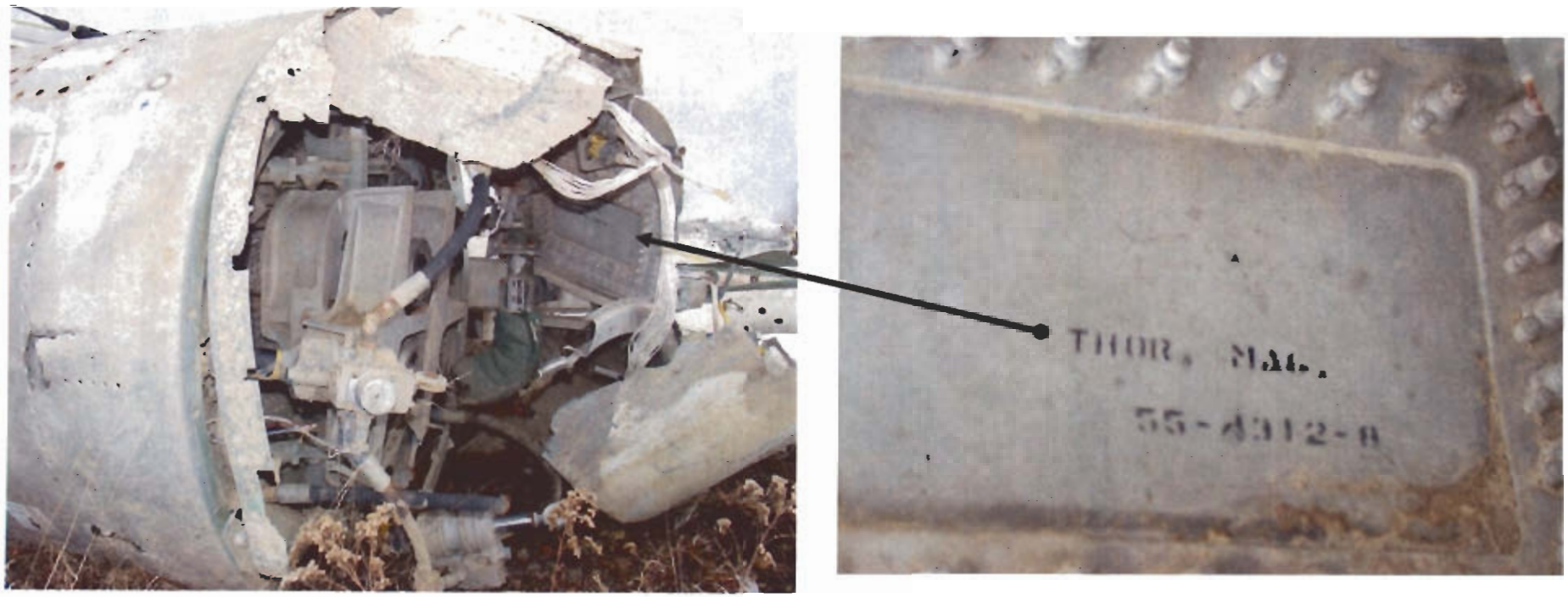
cc:
AFIOH/SDR
AFMOA/SGZR
174 MEDSQ/SGPB

Atchs:
1. Missile Body/Site Photos
2. MgTh Panel Photo
3. Type A and B Combustion Chamber Panel Photos
4. Type B Conduit Cover Photo
5. Type B Control Surface Photo
6. Type A Interior/Exterior Air Foil Photos

Type A Interior/Exterior Air Foil Photos



Photos Confirming MgTh on Type B Missile Body



Type A and B Combustion Chamber Panel Photos

Type B Conduit Cover Photo

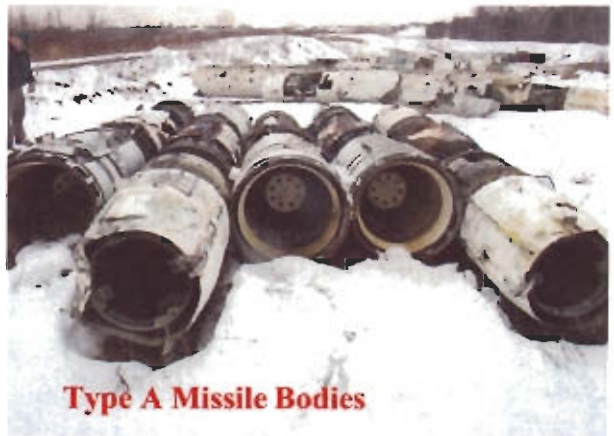
Type B Control Surface Photo

Control Tower and Entrance Road

General Site Condition

General Site Condition

Type A Missile Bodies


Type A Missile Bodies

Type A Missile Bodies

Type B Missile Bodies

Type B Missile Bodies

Type B Missile Bodies