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HISTORICALLY SIGNIFICANT DEPLETED URANIUM TESTING FACILITY ENVIRONMENTAL ASSESSMENT

Joseph A. Fabiano

July 2003

US ARMY
TANK AUTOMOTIVE AND
ARMAMENTS COMMAND
ARMAMENT RDE CENTER

U.S. ARMY ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER

Quality Engineering Directorate

Picatinny Arsenal, New Jersey

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14. ABSTRACT

An environmental assessment, in accordance with the National Environmental Policy Act, was prepared for the proposed decommissioning/remediation action of an approximate 40,000 ft^2 historically significant depleted uranium (Staballoy) testing facility and associated grounds in which no future testing will be conducted. Based on a review of the environmental impacts of the proposed action, the objectives of the Finding of No Significant Impact to the fauna, flora, or human environment have been met. The remediation methods employed will be conservative and are intended to reduce contamination to levels at or below regulatory limits. It is the intent of the U.S. Army Armament Research, Development and Engineering Center, Picatinny Arsenal, New Jersey to restore building 611B to its pre-remediation condition upon conclusion of this project.

15. SUBJECT TERMS

National Environmental Policy Act, EOD, National Historical Preservation Program, Unexploded ordnance (UXO), Duratek, Joint Munitions Command, Depleted uranium (DU), Staballoy, Finding of No Significant Impact (FONSI), Historically significant depleted uranium testing facility, Environmental assessment (EA), Building 611B, SUB0348, Picatinny Arsenal, ARDEC

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ACKNOWLEDGMENT

The author would like to acknowledge Michael S. Styvaert, Headquarters, Department of the Army, U.S. Army Joint Munitions Command, Rock Island, Illinois for his participation in identifying and preparing documentation in accordance with the objectives of the National Environmental Policy Act for determining a Finding of No Significant Impact on the quality of the human environment as a result of the proposed decommissioning/remediation action for Building 611B located at the U.S. Army Armament Research, Development and Engineering Center, Picatinny Arsenal, New Jersey.

The author also wishes to express his appreciation to elements of the Picatinny community for the time and effort they devoted to the critical review of different parts of this report during its preparation.

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INTRODUCTION

The Army has proposed decommissioning building 611B (app A) and associated grounds[1] by surveying, excavating, and decontaminating/remediating, approximately 40,000 ft^2 of property at the U.S. Army Armament Research, Development and Engineering Center (ARDEC), Picatinny Arsenal, New Jersey. Remediation activities will include:

- Complete disconnection of all utilities from building 611B and the removal of any buried utilities in the area surrounding the underground wastewater holding tank by the installation

- Cutting and/or pruning any trees obstructing the removal of the contaminated high efficiency particulate air (HEPA) ventilation system by the installation in coordination with the Environmental Affairs Natural Resource Manager[2]

- Flashing of any empty rounds by the installation[3]

- Screening the site for exposed and buried ordnance by certified unexploded ordnance (UXO) experts

- Disposal of UXO laying on the surface of building 611B and grounds by the ARDEC Explosive Ordnance Disposal and Technology Division prior to the beginning of the contracted remediation work. Upon the initiation of remediation, any UXOs exposed during excavation/remediation will become the responsibility of the PWD/contracting office. A list of the companies that perform UXO disposal can be provided.

- Use of remediation techniques such as washing, abrasion, cutting, scarification, and other typical methods for removal of contamination from building surfaces

- Activities described in the Remediation Work Plan, Rev 0, dated November 1999, such as removal of depleted uranium (DU) contaminated; soil, HEPA air filtration ventilation system (with its stainless steel intake screen, prefilter, 50% filter, 90% filter,

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[1]In the event of a change in the original scope of work that will result in an adverse affect to the structure or an inadvertent discovery of a potential cultural artifact, operations will cease and the proper notifications will be made to implement standing operating procedure (SOP) no. 2 and/or SOP no. 3 contained in the Installation Cultural Resources Management Plan.

[2]Tree(s) obstructing the removal of any of the components from the affected facility are permitted to be cut / pruned between November 15th and April 1st to reduce the impact on the Indiana bat presumed to be present on post and in summer roosts based on limited sampling to date and available favorable habitat. Tree cutting/pruning outside of that prescribed timeframe requires the operations to cease until the Natural Resource Manager can consult with the U.S. Division of Fish Wildlife Service.

[3]Flashing of the empty rounds will be performed so as not to interfere with contractor remediation efforts.

etc.), contaminated roofing materials from the inside storage room, contaminated wood from the gazebo, underground waste water holding tank, hardware, building surfaces (such as asbestos floor tiles and edging), debris, and rubble

- Covering holes created and/or replacing the removed wood from contaminated sections with non-radioactive pieces of wood cut to size.

- Disposal of all radiological material prior to demobilization.

- Restoring any alteration to the structure or topography not included in the Remediation Work Plan (app B) by the installation.

- Transporting (by commercial truck) DU contaminated; soil, HEPA air filtration ventilation system, underground waste water holding tank, hardware, building surfaces (such as asbestos floor tiles and edging, indoor storage area pieces of ceiling/roof or gazebo floor), debris, and rubble as a result of the decommissioning from ARDEC to an authorized and approved low-level radioactive waste disposal facility prior to demobilization.

PURPOSE AND NEED OF THE PROPOSED ACTION

The proposed action of removing any residual contamination present at the site and contaminated materials from the building 611B test facility and associated grounds is a necessary action not only to facilitate its remediation, without additional quality assurance, for unrestricted release in accordance with the Nuclear Regulatory Commission (NRC) approved derived concentration guideline levels (DCGL's) for soil and building surfaces, but also for its removal from ARDEC's Nuclear Regulatory Commission License, number SUB-348, as required by law. The building 611B facility, which is slowly deteriorating, is of historical significance (app C) and eligible for inclusion in the National Historical Preservation Program and National Register of Historic Places.

The NRC licensee for this decommissioning investigation is the U.S. Army ARDEC located at Picatinny Arsenal, New Jersey. The applicable NRC license number is SUB-348, currently operating under amendment 26 with an expiration date of 31 July 2011. The licensee is not attempting to terminate SUB-348 as a result of this decommissioning action. License SUB-348 is a multiple part document, which authorizes laboratories and storage facilities. The focus of this decommissioning action is the building 611B facility and associated grounds, which are no longer used for testing both DU or non-DU munitions and its removal from ARDEC's SUB-348 License.

DESCRIPTION OF THE PROPOSED ACTION

The overall project will be controlled by radiation safety personnel employed by the Department of Defense (DOD) at ARDEC. Their staff will be augmented by the Army's radioactive materials contracting organization and the Joint Munitions Command (JMC). Contract personnel will perform the remediation activities. The contract organization, Duratek, is contracted to ARDEC through the JMC, and is responsible to both organizations for the decommissioning work. Duratek will conduct remediation work activities in support of the

decommissioning under the U.S. Army's NRC Source Material License, number SUB-348, amendment No. 26 with special attention to completing the decommissioning/remediation action with no significant impact on the fauna, flora, or human environment.

The final report for ARDEC's building 611B, together with the appropriate attachments and documentation at the completion of the decommissioning and remediation activities will constitute the majority of the submittal to the NRC for both the unrestricted release using site-specific information on the building 611B site, and its removal from the SUB-348 license.

AFFECTED ENVIRONMENTS

The purpose of this document is to evaluate the environmental impact of a radioactive material remediation of building 611B and associated grounds. The remediation activities will include not only the removal of DU contaminated soil; HEPA ventilation system; underground waste water holding tank dedicated to the collection of potentially DU contaminated water, if it cannot be cleaned; hardware; building surfaces (such as asbestos floor tiles and edging, indoor storage area pieces of ceiling/roof or gazebo floor); debris; and rubble, but also the thorough screening of the site for exposed and buried ordnance by certified UXO experts. The ARDEC EOD will dispose of UXO laying on the surface of building 611B and grounds prior to the beginning of the contracted remediation work. Upon the initiation of remediation, any UXOs exposed during excavation/remediation will become the responsibility of the PWD/contracting office. A list of the companies that perform UXO disposal can be provided. It is incumbent on the installation to flash the empty rounds sitting on the ground and ensure the absence of energetic material in them prior to being turned-in as scrap. The Army decommissioning contractor will obtain any required permits such as a radiation work permit and will decontaminate the building and associated grounds in full compliance with Federal, state, local laws and permits.

The general decommissioning outline is as follows:

- Contractor mobilization
- Site-specific training
- Mark the site boundary limits where the work will be performed and any trees, possibly used as a roost by the Indiana Bat, that are anticipated to be felled or pruned
- Remediation activities
    - Instrument room
    - Foyer room
    - Outside storage area/gazebo
    - Inside storage area
    - HEPA bank
    - Non-DU range/tunnel
    - DU range/tunnel and target room
    - Underground wastewater holding tank

- Outdoor soils
- External military storage shelters (two)
- Potentially contaminated UXO

- Final status survey

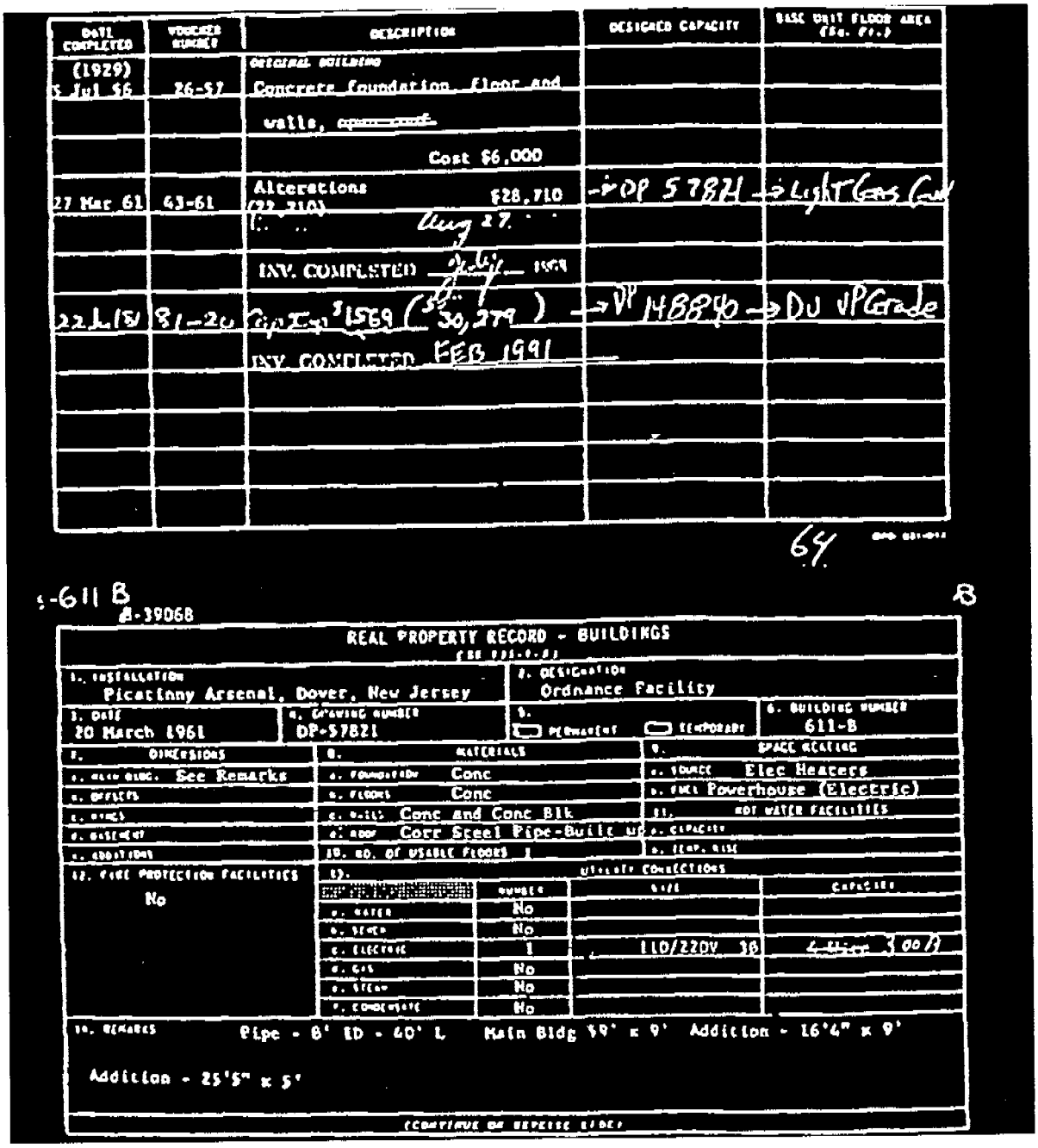
FACILITY DESCRIPTION/OPERATING HISTORY

Building 611B is a contributing structure to the 600 Ordnance Testing Area Historic District here at ARDEC. The building 611B site is located on a large hill that slopes about 10 to 20% from a field littered with spent, un-flashed munitions shells to a road that is below the grade of the building. The road leads to an open storage area with building 611B on the east side.

Building 611B was designed and constructed for the testing of munitions and contained only non-radioactive munitions until approximately 1959, when a 50 ft long east-west tunnel with a cross-sectional area of 47.3 ft^2 and a volume of 2365 ft^3 was added to the existing non-DU tunnel for testing DU projectiles. The underground waste water holding tank, annotated on the Real Property Record, was part of the DU upgrade and used to collect the water from the sink in the instrumentation room where personnel washed their hands and face following entry into the firing area. Based on background investigations of building 611B, this continued up through late 1984 or early 1985 when the Army ceased its DU testing activities in that building. It is no longer used for DU or non-DU munitions testing. Depleted uranium use at that site was limited to indoor firing within the confines of the firing range and target room of the building. The target room was ventilated during firing by a HEPA ventilation system. This system discharged after four stages of air filtration to an outside area above the storage room located at the end of the firing range / target room. The only radionuclide of concern at the site is DU. According to the Radiological Characterization Report (app D, photographs of building 611B before and after characterization); there has been limited migration of DU from the active use areas to adjacent soils and facilities. The Radiological Characterization Report specifically identified activity in the soil surrounding access points, throughout the interior of the structure, and rain washout points. Locations and activity concentrations may be referenced in the "Report of Radiological Characterization," available through the Radiation Protection Office until published. Efforts to initiate the decommissioning process began roughly in the mid 1990's. Amendment 26 of the Source Materials License, issued on 21 October 2002, allowed this installation to proceed with processing the decommissioning plan.

RADIOLOGICAL STATUS OF THE FACILITY

Figure 1 is the real property record for building 611B and indicates the DU-upgrade-complete-date as 22 July 1981. Figures 2 and 3 are the construction drawings for the DU upgrade. Figure 2 is the HEPA installation for venting of the DU target box inside the tunnel. Figure 3 is an illustration of the additions and changes made to the physical structure that was in use for testing Tungsten penetrators. Figure 4 describes modifications to the building 611B instrument room/non-DU tunnel.



DATE COMPLETED	VOUCHER NUMBER	DESCRIPTION	DESIGNED CAPACITY	BASE UNIT FLOOR AREA (Sq. Ft.)
(1929) 5 Jul 56	26-57	ORIGINAL BUILDING Concrete foundation, floor and walls, open-end. Cost $6,000		
27 Mar 61	43-61	Alterations ($28,710) $28,710 Aug 27.	-DP 57821 -> Light Gas Cut	
		INV. COMPLETED July 1969		
22 Jul 87	81-20	Cpt Ex $1569 ($30,279)	-> VP 148840 -> DU VP Grade	
		INV. COMPLETED FEB 1991		

64

611 B
B-39068

B

REAL PROPERTY RECORD - BUILDINGS
(See AR 415-8-1)

1. INSTALLATION: Picatinny Arsenal, Dover, New Jersey
2. DESIGNATION: Ordnance Facility
3. DATE: 20 March 1961
4. DRAWING NUMBER: DP-57821
5. PERMANENT / TEMPORARY
6. BUILDING NUMBER: 611-B

7. DIMENSIONS	8. MATERIALS	9. SPACE HEATING
a. MAIN BLDG. See Remarks	a. FOUNDATION Conc	a. SOURCE Elec Heaters
b. OFFICES	b. FLOORS Conc	b. FUEL Powerhouse (Electric)
c. WINGS	c. WALLS Conc and Conc Blk	11. HOT WATER FACILITIES
d. BASEMENT	d. ROOF Corr Steel Pipe-Built Up	a. CAPACITY
e. ADDITIONS	10. NO. OF USABLE FLOORS 1	b. TEMP. RISE

12. FIRE PROTECTION FACILITIES: No

13. UTILITY CONNECTIONS

	NUMBER	RATE	CAPACITY
a. WATER	No		
b. SEWER	No		
c. ELECTRIC	1	110/220V 3Ø	400A
d. GAS	No		
e. STEAM	No		
f. CONDENSATE	No		

14. REMARKS: Pipe - 8' ID - 40' L Main Bldg 59' x 9' Addition - 16'4" x 9'

Addition - 25'5" x 5'

(CONTINUE ON REVERSE SIDE)

Figure 1
Real property record – buildings

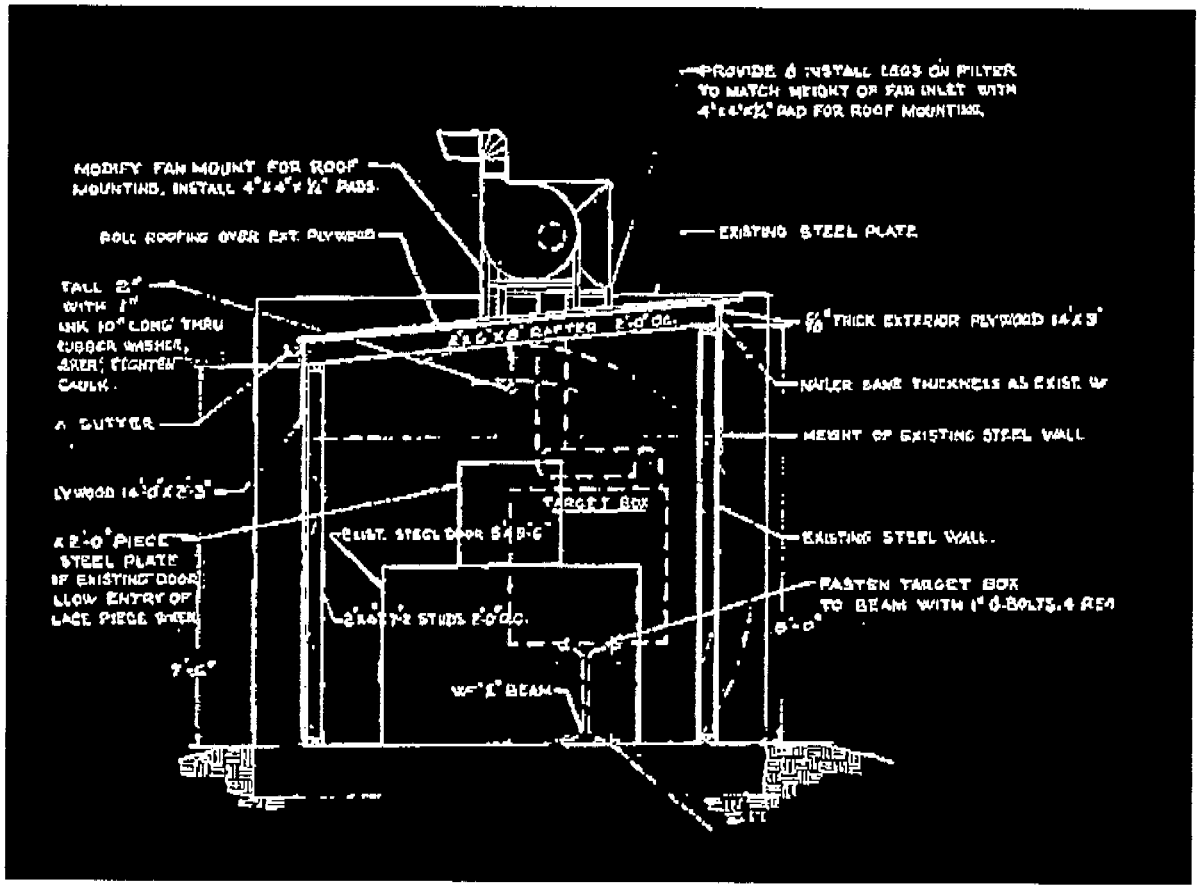


Figure 2
Construction drawing – HEPA

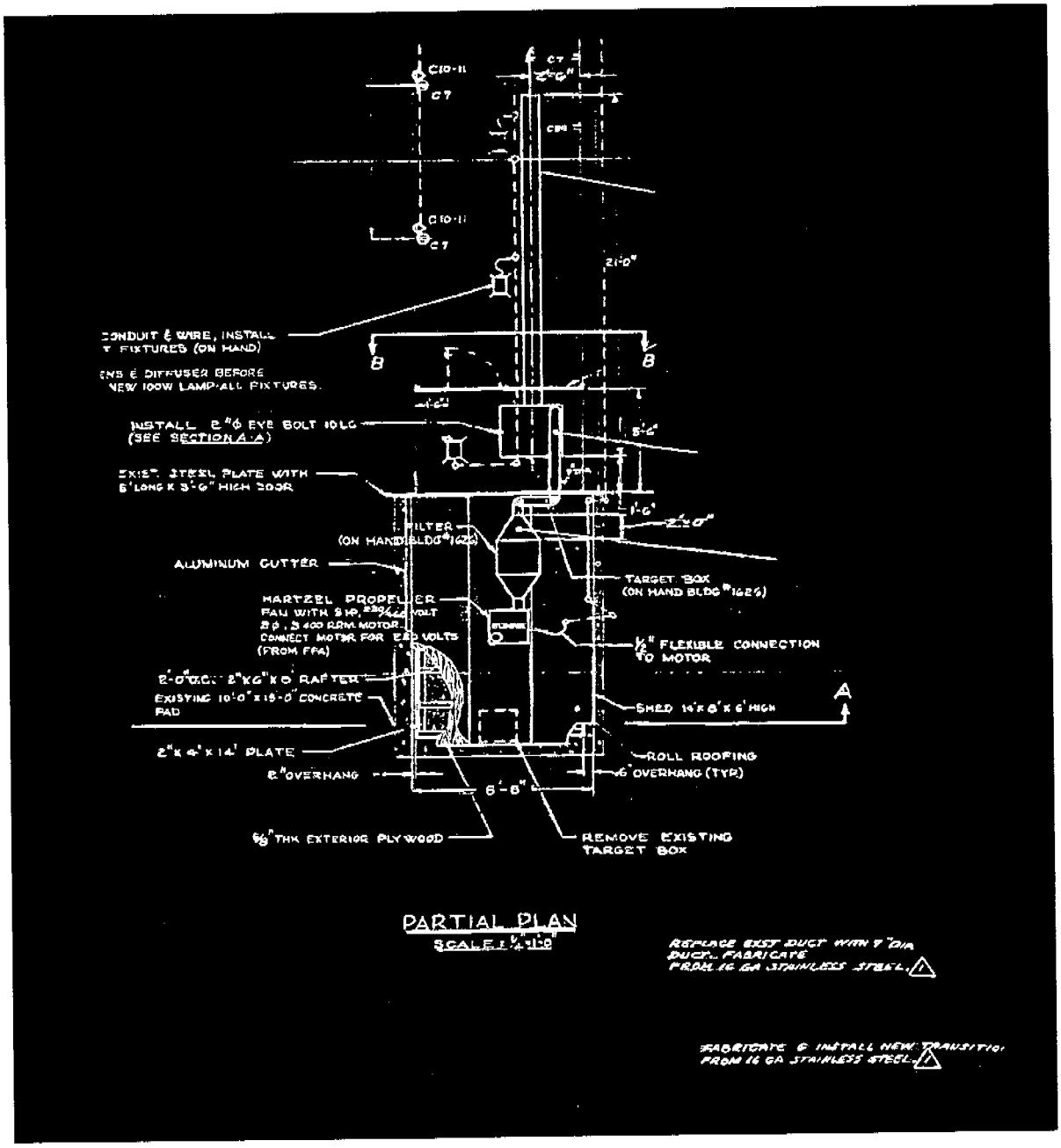


Figure 3
Construction drawing – DU modifications to 611B tunnel area

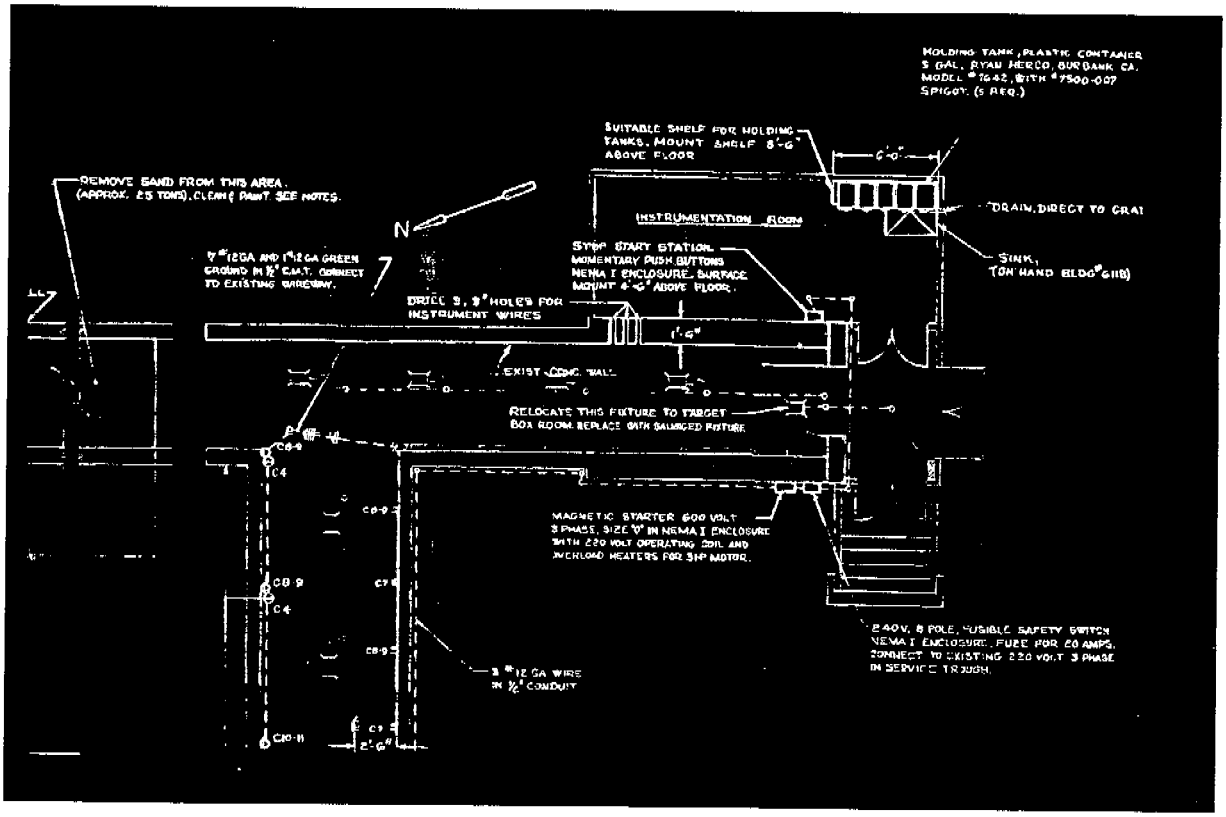


Figure 4
Construction drawing – DU modification to building 611B instrument room/non-DU tunnel

Historical site review indicates that several small fires occurred within the building 611B HEPA ventilation system and contributed to the contamination outside the facility. The Report of Radiological Characterization shows activities above the minimal detectable activity (MDA) at the base of the stairs leading to the foyer, above the underground waste water storage tank, outside the window of the non-DU Tunnel at the back of the structure, in the back yard area adjacent to the inside storage room, at the end of the DU range, at the entrance to the inside storage area, adjacent to the DU firing room near the open storage area, adjacent to the DU firing room near the non-DU range, adjacent to the open storage area near the covered metal, adjacent to the open storage area near the open storage area, adjacent to the open storage area near the DU storage area, adjacent to the open storage area near the entrance stairs, under the metal pile adjacent to the storage box number 2, and under the stairway entrance to the foyer in the rain trough. Activities above the MDA ranged from a low of 1.09 ± 0.37 pCi/g to a high of 106.7 ± 7.8 pCi/g. No other incidents were discovered in the radiological historical files that document spills or leaks of hazardous material during the years of DU testing that would create either a personnel or environmental hazard during cleanup.

Interviews with site personnel indicate that at least two fires occurred in the HEPA ventilation unit. During the characterization phase of the project, the Army contractor collected soil samples from all areas that had the potential to be affected by these incidents. The results

of that soil sampling activity indicate that there are some small quantities of DU contamination in the soil on the backside of the HEPA platform and inside the storage building. The path and pattern of the contamination appears to be associated with migration by rainwater. Location and activity concentrations may be referenced in the Report of Radiological Characterization available in the Radiation Protection Office until published.

All prior building 611B workers were part of the Army's bioassay program and had yearly bioassays. Workers who have not retired and are no longer radiation workers are in the process of having their termination radiation physicals. An evaluation of documented Army bioassay records (maintained at Redstone Arsenal) does not indicate any DU exposures for Picatinny Arsenal workers.

The Army characterization contractor conducted some limited cleanup activities during the characterization phase. The characterization effort involved the survey and release of a significant portion of extraneous materials that were staged in building 611B. This was necessary to make the buildings permanent features/structures accessible for survey.

The results of the previous characterization indicate that the total activity on the permanent structures of B611B is less than 1 millicurie (mCi). The only radionuclide of concern is DU and its short-lived daughter products. Dose rates in the general area of the rooms with the highest contamination are less than 1 millirem (mrem)/hr. The detection capability for contamination on surfaces will primarily focus on the daughter product beta (β) emissions in the 0.1 to 2.3 million electron volts (MeV) range.

The Army intends to decontaminate building 611B and associated grounds for unrestricted use in accordance with conditions numbered 14 and 15 of NRC's SUB-348 license as amended and issued on 21 October 2002. The Army will use a DCGL of no more than 186 pCi/ g of soil, and a DCGL for building surfaces of no more than 5,500 dpm/100 cm^2 providing that the removable fraction of residual contamination is less than 10% of the total residual contamination. Final survey guidance will be in accordance with the Multi-Agency Remediation and Site Survey Investigation Manual (MARSSIM), NUREG-1575.

ALTERNATIVES TO THE PROPOSED ACTION

The Army, in addition to the proposed "remediation to the NRC's unrestricted release" criteria also considered the alternative actions of remediation to the NRC's "restricted release" criteria and the "no action" alternative.

The "restricted release" option under NRC guidelines would require the Army to implement institutional controls to limit the future land use for the decommissioned grounds. Instituting land deed restrictions is a United States General Services Administration (GSA) decision. That agency has not responded favorably to such requests in the past. The Army decided decommissioning the site to unrestricted release conditions would be a superior and more cost effective overall approach.

The "no action" alternative conflicts with NRC's requirement, in 10 CFR 40.42, of timely remediation at sites that have ceased NRC licensed operations. Although there is no immediate threat to the public health and safety from this site, not undertaking remediation, at this time,

does not resolve the regulatory and potential long-term health and safety problems involved in storing this waste. This could lead to the spread of contamination in the area and potentially into the groundwater. The "Report of Radiological Characterization," dated 29 May 29 1997, indicates that radioactive contamination has not spread outside the immediate area of the test facility. No action now would delay remediation until some time in the future, when costs could be much higher than they are today. It is even possible that there would not be a disposal option in the future if the current low-level radioactive waste disposal facilities are closed and no new ones are opened. Removal of the radioactive source term would be a positive impact on the surrounding environment.

To date neither the Installation Restoration Program (IRP) nor any component of the Environmental Office [i.e.; the Environmental Protection Agency (EPA), New Jersey Department of Environmental Protection (NJDEP), or the ARDEC Environmental Affairs Office], expect the groundwater quality to be affected by the proposed decommissioning action and have allowed the cleanup proceedings to continue without objection.

During the interval between the Report of Characterization Survey, dated 29 May 1997 and the actual decommissioning action, scheduled for the summer 2003, the following has taken place. On 19 November 1998, the initial draft of the "Decommissioning Plans for Buildings 611B and 18, dated October 1998," written by Gutierrez-Palmenberg, Inc., was submitted to the NRC. It was returned for revision in March 1999. The JMC in Rock Island, after a bidder's conference, subsequently selected a new contractor, Duratek, to continue with that part of the Decommissioning Plan dealing with the building 611B test facility. On 29 November 1999, a revised Decommissioning Plan for B611B, dated October 1999, Draft A, written by Duratek, in accordance with MARSSIM's decommissioning provisions, was submitted to the NRC through ARDEC's Radiation Protection Office. In a letter dated 24 November 2000, the NRC indicated that the DCGL's for building surfaces, as generated by Duratek, were unacceptable. On 09 May 2002, the contractor generated a "Final Survey Plan for the TACOM-ARDEC Picatinny Arsenal, Building 611B Revision 1, January 2002" that included a revised DCGL based on an assumed industrial exposure scenario. Subsequent to the submission, the NRC amended License SUB-348 with amendment 26, which authorizes a DCGL of 186 pCi/g of soil and a DCGL for the decommissioning of building surfaces of not more than 5,550 dpm/100 cm^2 of surface area providing that the removable fraction of residual contamination is less than 10% of the total residual contamination.

RADIATION PROTECTION PROGRAM

Organization and Responsibilities

The Army's decommissioning contractor, Duratek, will perform the actual fieldwork, but the Army will be held accountable for the building 611B decommissioning/remediation activities covered under the Army's NRC license. The ARDEC Radiation Protection Office will oversee the decommissioning activities. The U.S. Army Headquarters, JMC will augment the ARDEC oversight. Headquarters, JMC is the Army's contracting entity for this decommissioning.

The ARDEC project personnel are:

Radiation Protection
- Richard W. Fliszar — Radiation Protection Officer
- Joseph A. Fabiano — Health Physicist, Contract Interface

Armaments Technology
- Michael F. Clune — Chief, Armaments, Technology Facility

Management
- O.T. Perry — Current IRCC Chairman

Chief of the Safety Division
- Don Lane

Environmental Affairs Division
- Thomas Solecki

Project Manager for Environmental Restoration
- Ted Gabel

Environmental Restoration Hydrologist
- Paul Reibel

Environmental Cultural Resource Manager
- Kelly Ridgel

Environmental Asbestos Program Manager
- Ariel DuCharme

Environmental Natural Resources Manager
- Jonathan Van De Venter

Explosives Ordnance
- Joseph D. Wu

Security Desk Officer (extension 46666)

The Headquarters, JMC project personnel are:

Contracting, Army Rad Waste Office
- Michael Styvaert — Health Physicist
- Kelly Crooks — Senior Health Physicist
- Robert Matthys — Contracting Officer

The key Duratek project personnel are:

Radiation Protection	
Douglas Schult	Certified Health Physicist
Paul A. Jones	Site Safety & Health Officer
Management	
Robert Hornbeck	Operations Manager
Robin Shult	Manager, Byproducts

The Duratek Project Team has over 20 years experience in radioactive project management and operations. Some of the operations performed by the Radiological Engineering and Field Services Division are characterization, decontamination, remediation, decommissioning, surveillance, packaging shipping, consulting, asbestos abatement and UXO screening. Duratek personnel will provide the required skills to decontaminate, remediate, survey, document, and release the structures and associated grounds. They will be responsible for the disposal of UXO and the packaging and shipping of the radioactive waste prior to demobilization.

The ARDEC Project Team will have overall responsibility for the safe completion of the remediation and decommissioning of the building 611B site. Jos. Fabiano and R. Fliszar are responsible for the use, control, and handling of the NRC-licensed radioactive materials.

The Headquarters, JMC Project Team provides the management and guidance associated with the terms of the contract that allows the Duratek team to conduct operations at the Picatinny Arsenal site. In addition, Headquarters, JMC is the DOD Executive Agency for Low-Level Radioactive Waste Disposal. Both JMC and ARDEC have reviewed the Duratek Decommissioning Plan.

Training

Duratek will train and qualify all individuals assigned to this project as radiation workers. Radiation worker training will include, but is not limited to:

- Site-specific health and safety plan
- Radiation worker training
- Respiratory training (as applicable)
- Unexploded ordnance safety training
- Daily tailgate hazard communication
- First aid/CPR training (SSHO)
- Fall protection
- Event reporting
- Operation of decontamination and remediation equipment
- Confined space (as applicable)
- Asbestos safety training

In addition, all project personnel will receive a documented ARDEC site-specific orientation. This will include any training to any site hazards identification and controls encountered during the project.

The contractor's on-site project office will maintain copies of all project personnel training records and safety meeting attendance sheets. These documents shall be available for review as necessary.

Radiological Controls

Both the licensee and Duratek have formal "As Low as Is Reasonably Achievable" (ALARA) programs in accordance with their NRC and State of Tennessee licenses. Duratek has documented the principles of their ALARA program in their Radiation Safety Guide (RSG-2).

The primary gamma exposures associated with DU are from the decay of its short-lived daughter products. Those gamma emissions are in the 50 kilo-electron volt (keV) to 0.1 MeV range on average. Dose rates in the general area of the rooms with the highest contamination are less than 1 mrem/hr. The detection capability for contamination on surfaces will primarily focus on the daughter product beta (β) emissions in the 0.1 to 2.3 MeV range.

In most cases, the DU contamination is readily adhered to the building surfaces. Decontamination will require pressure to remove the material. This makes it highly unlikely that radioactive material will become airborne. For those remediation situations where the contamination may become airborne, Duratek will use a HEPA ventilation system and/or respiratory protection to prevent personnel or environmental contamination. If airborne activities exceed 50% of the derived airborne concentration (DAC) from appendix B of the Code of Federal Regulations (CFR) Title 10, Part 20, the Army will require Duratek to:

- cease all work activities
- implement dust-control measures
- investigate the cause for the airborne activity
- document all findings and measurement
- implement corrective actions before proceeding with decommissioning activities

The decommissioning contractor will adhere to the Army license conditions pertaining to the handling and storage of radioactive waste.

The Army as the NRC licensee will provide overall oversight of the remediation project. The contractor will provide the day-to-day site supervision. Duratek will comply with the ARDEC health physics program, which includes the two volumes of the Radiological Engineering & Decommissioning Services Procedures for Picatinny Arsenal, all Federal National Emissions Standards For Hazardous Air Pollutants (NESHAPS) Regulations, Occupational Safety and Health Act (OSHA) 29CFR 1926.1101, and state requirements concerning asbestos. Duratek will perform the day-to-day health physics operations, (i.e., air sampling and surveying) in accordance with their documented operating procedures for ARDEC except in cases where the ARDEC Health Physics Program Operating Procedures are more restrictive. In those cases, Duratek will adhere to the more stringent Army requirements.

The determination of the degree of risk from all aspects of an exposure situation - including the characteristics of the chemical(s) or radiation to which individuals will be exposed and the conditions that determine degree of exposure - has also been addressed in the two volumes of Radiological Engineering & Decommissioning Services Operating Procedures for Picatinny Arsenal, the state regulations concerning asbestos and Federal regulations. The method of control and prevention of exposure to workers or the public is also a part of these references. Potential sources of contamination that may be created by the remediation activities were addressed in the decommissioning plan, remediation plan, health and safety plan, final survey plan, and the radiological engineering and decommissioning services operating procedures for Picatinny Arsenal. In summary, Duratek will implement radiological controls to include:

- The method of limiting the potential spread of residual contamination especially into the nearby Bear Swamp Brook by removing or remediating the type and activity of radioactive material contamination in the soil at the facility's associated grounds or on the building surfaces in accordance with the DCGL's for decommissioning soil and building surfaces as approved by the NRC in Conditions 14 and 15 of NRC license number SUB-348 amendment 26. Duratek's procedures for indoor/outdoor decontamination actions are addressed in the decommissioning plan; remediation plan; health and safety plan; final survey plan; radiological engineering and decommissioning operating procedures for Picatinny Arsenal; Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM), NUREG-1575.Rev 1; and the USNRC Source Materials License No. SUB-348, as amended.

- Limiting airborne effluent releases to the environment

- Limiting radiation exposure to workers and the public

Duratek will limit the potential for the spread of contamination by surveying and, if necessary, decontaminating all personnel, equipment, and vehicles before they leave the work site.

It is expected that members of the public and non-radiation ARDEC workers will receive less than 10 micro sieverts (uSv) [1 mrem] from all exposure pathways as a result of decommissioning activities.

ENVIRONMENTAL IMPACTS OF PROPOSED ACTION AND ALTERNATIVES

Environmental Impacts

Air Quality

The decommissioning contractor does not expect any adverse impacts to air quality as a result of their planned decommissioning activities. There will be a slight increase in dust emissions during the decontamination of building surfaces and during the removal of the contaminated soil. However, the building 611B facility is in a remote area of the installation and will not have an adverse impact on the ambient air quality. The decommissioning contractor does not expect to generate regulated air emission levels during decontamination, sampling, and excavation activities. There is little likelihood that airborne radioactive material or asbestos

will be a problem during any of the proposed decommissioning/abatement operations because of the responsibilities, prerequisites, precautions and limitations, apparatus, and procedures followed as prescribed in the two volumes of the Radiological Engineering and Decommissioning Services Operating Procedures for Picatinny Arsenal, state regulations concerning asbestos, and Federal regulations pertinent to preventing the escape of dust, debris, and airborne contamination in radiologically controlled areas.

Water Quality/Quantity

The proposed decommissioning action will have a positive environmental impact on the water quality in the area since the decommissioning contractor is proposing to remove all the low-level radioactive contamination from the soil, collect all water used for washing tools and for other decontamination operations, and handle and dispose of the collected water as radioactive waste. Building 611B is not located in either the 100-year or 500-year floodplain of nearby Bear Swamp Brook according to the U.S. Army Corps of Engineers "Waterways Experiment Station (WES) Draft Final Report Identification and Analysis of Wetlands, Floodplains, Threatened and Endangered Species and Archaeological Geomorphology at Picatinny Arsenal, NJ." There are no wetlands located in the immediate project area. Bear Swamp Brook, the small intermittent stream in proximity to the west side of building 611B and grounds and the rarely disturbed wetlands and unique shrub-swamp covering the northern half of Lake Denmark and Picatinny Lake as well as several small ponds, forests, and rocky outcrops remotely located on the installation, which provide varied habitat for a multitude of insects, plants, animals such as the bog turtle and birds should not be impacted by this action. The area containing the radiological hazards will be marked with barriers and signs. The building 611B inside and outside transition zones are illustrated in the Report of Radiological Characterization, dated 29 May 1997. The decommissioning contractor will conduct all activities in a manner protective of Bear Swamp Brook. Hay bales, silt fencing, or other means may be employed to protect Bear Swamp Brook from potential contamination from the proposed action. There will be no water bodies diverted in order to decontaminate the affected site.

Land Use

This action will not have an adverse impact on future land use. The removal of the radioactive contaminated soil and building surfaces will be a beneficial environmental impact.

Waste Disposal

The contaminated material, including soil, will be packaged, handled, and shipped according to the prepared health and safety plan, and in compliance with the Department of Transportation (DOT), and the State and Low-Level Radioactive Waste Compact regulations prior to demobilization. The Army will use the Hazardous Waste Shipment Manifest System in accordance with 10CFR20.2006 (Transfer for disposal and manifests) to track all wastes sent off-site from Picatinny Arsenal through to ultimate disposal, as directed by the Headquarters, JMC. The decommissioning Project Manager shall inspect and sign all shipping manifests. The radioactive contaminated material to be disposed off-site will include contaminated soil; underground wastewater storage tank, if required; contaminated building materials (such as wood, asbestos floor tiles, and edging); hardware; debris; rubble; protective clothing; and disposable tools.

Noise

There will be no significant / prolonged periods of increased noise levels. The decommissioning activities will generate some elevated sound levels for a 6 to 8 week period. The elevated noise will come from the operation of heavy machinery and electrical generators. The noise from these activities is not expected to significantly impact the wildlife or the general public.

Cultural Resources

No unanticipated adverse effects/damage or findings are anticipated to cultural resources. The project will consist of the sampling and removal of radiologically contaminated materials such as wood, asbestos tiles and edging from within the building and wood, the underground wastewater holding tank and any soil from outside the building.

In the event of unanticipated effects/damage, all decommissioning operations will cease and Security (which is generally speaking always first to be notified), then the Radiation Protection Office (which oversees the decommissioning activities of this radiologically controlled site), and the Environmental Affairs Office Cultural Resource Manager (in charge of implementing sections of the Integrated Cultural Resource Management Plan (ICRM)) will be immediately notified. The Cultural Resource Manager under guidance from the ICRM will at that time in coordination with the Installation implement page 5-21 of SOP no. 3, "Unintentional Partial Damage to an NHRP-eligible Building" (app A, encl 2).

If a change in the original scope of work/remediation plan occurs that will result in an adverse effect to the structure, work will cease, and further consultation with the New Jersey State Historical Preservation Office (NJSHPO) will be conducted. Initial consultation was conducted on 15 November 1999 (app A, encl 4), when the initial Remediation Work Plan was provided for comment. Subsequent consultation occurred on 5 February 2003, with a follow-up letter providing the schedule and technical approach for the project.

In the event of an inadvertent discovery of an archaeological, cultural or historical artifact of potential significance during the implementation of the project all decommissioning operations will cease and Security, the Radiation Protection Office and Cultural Resource Manager will be immediately notified. The Cultural Resource Manager under guidance from the ICRM will at that time implement page 5-20 of SOP no. 2 "Unexpected Cultural Resources Discoveries During Construction" (app A, encl 3). The Cultural Resource Manager in coordination with the Installation should treat the findings in accordance with the discovery plan outlined in the SOP as required.

Wildlife/Vegetation

Trees in the area of the building 611B test facility and associated grounds are used as a roost for the Indiana Bat. Anticipated tree felling or pruning is permitted between November 15th and April 1st to reduce the impact to the Indiana bat. The decommissioning contractor is confident based upon all the available and reasonable preponderance of evidence, that the decommissioning activities will have no significant impact on the endangered Indiana Bat species presumed to be at Picatinny.

Tree felling/pruning beyond the window for tree cutting, which closed on 1 April 2003, requires the Natural Resource Manager to be notified for consultation with the U.S Fish and Wildlife Service. The excavation of the underground wastewater-holding tank will be coordinated prior to decommissioning so as to avoid the potential of rainfall migration pathways and/or erosion of the embankment leading downstream into Bear Swamp Brook immediately adjacent to the site.

Permits Required

There are no environmental permits required for this action. Bear Swamp Brook, the intermittent stream in proximity to the west side of building 611B and grounds and remote from the rarely disturbed wetlands and unique shrub-swamp covering the northern half of Lake Denmark and Picatinny Lake as well as several small ponds, forests, and rocky outcrops located on the installation that provide varied habitat for a multitude of insects, plants, animals and birds should not be impacted by this action. The area containing the radiological hazards will be marked with barriers and signs as appropriate.

Trees marked for cutting or pruning outside the November 15th through April 1st 2003 roosting window of the Indiana Bat, will not be touched without approval from the Environmental Affairs Office Natural Resource Manager in consultation with the U.S. Fish and Wildlife Service, as required.

According to prior coordination between the Cultural Resource Manager and the New Jersey State Historical Preservation Officer (NJSHPO) the decommissioning of building 611B and associated grounds will have no adverse impacts and the Installation will restore any un-remediated site to its remediation condition. However, in the event the decommissioning project goes outside of the proposed scope of work and there is an effect or unanticipated effect all decommissioning operations will cease, Security, the Radiation Protection Office and the Environmental Affairs Cultural Resource Manager will be notified. Operations will not resume until the effects can be completely reviewed by the Cultural Resource Manager under guidance from the NJSHPO.

Public Health and Safety

This project involves the removal of a health and safety exposure risk; i.e., a low-level radiation source. The removal of this source will have a positive environmental impact on the area. Individuals that perform sample collection and decommissioning work will follow the guidelines specified in the Picatinny Arsenal – B611B Decommissioning Plan; Remediation Work Plan, Revision 0, dated November 1999; Radiological and Engineering Decommissioning Operating Procedures for Picatinny Arsenal; the Health and Safety Plan, dated October 1999; Final Survey Plan for the ARDEC Picatinny Arsenal, B611B Revision 1, January 2002; and the USNRC License No. SUB-348, Amendment No. 26. The NRC SUB-348 license amendment 26 approves the use of the contractor calculated Derived Concentration Guideline Levels for the decommissioning of the soils and building surfaces at the building 611B test facility area. The decommissioning action should start in the latter part of 2003. The Army and the Army's contractors will handle all radiological contaminated materials including DU contaminated asbestos tiles with radiological controls in place.

Unexploded Ordnance

Over the years, many different types of experimental and production ammunition rounds may have been tested in and around building 611B. As a result of this, no unauthorized or non-certified personnel will reconnoiter, handle ordnance, or decommission/remediate building 611B and associated grounds, which are littered with munitions.

Public Access

The proposed decommissioning activities will not create an inconvenience to the public. The project zone is in a restricted area.

Economic Benefits

Any effects of this proposed project to the local economy are expected to be positive but minor.

Construction Effects

There should not be any alteration to the land surface in the area other than a slight change in the topography surrounding building 611B due to the excavation of the underground wastewater holding tank and removal of contaminated soil.

The contractor, for example, as per the remediation work plan, will replace sections of contaminated wood removed from the ceiling of the inner storage area of the end of the building containing the target area and replace each piece of contaminated plywood removed from the floor of the gazebo with non radioactive wood cut to size.

Plans for restoration of any un-remediated sections of the project area upon project completion are incumbent on the installation. This includes backfill, if necessary.

There should not be any alteration to the land surface in the area other than a slight change in the topography surrounding building 611B due to the excavation of the underground wastewater storage tank and the removal of soil from any of the contaminated areas.

Plans for restoration of the facility and associated grounds upon project completion shall be coordinated with the points of contact at ARDEC for backfill, if necessary, to refill excavated areas, and restoration of any parts of the roof or gazebo floor with like material so as to minimize the impacts and changes to the environmental topography and structures.

Utilities

The project activities will occur in a fairly remote area of the installation. All utilities will be disconnected from building 611B and the absence of buried utilities will be verified in the area surrounding the underground wastewater holding tank prior to the beginning of field activities. Duratek will use gas powered portable generators for powering electrical equipment.

Ionizing and Non-Ionizing Radiation

Depleted uranium with a half-life of 4.51E9 years is the only radioactive contaminant known to be present inside or outside of building 611B. The short-lived DU daughters are gamma and beta emitters that are easily discernable with portable field instrumentation. The environmental impact for this proposed project is positive since the radioactive contamination source will be collected and transported off-site to an authorized low-level radioactive waste disposal facility prior to demobilization.

Army's Proposed Action

The Army is proposing to collect the radiologically contaminated materials from building 611B. The Army intends to remediate the site to the NRC criteria for unrestricted release using site-specific information. The NRC criterion for unrestricted use is 25-mrem/yr total effective dose equivalent (TEDE) to the critical group. For the building 611B site, the contractor determined the worst-case exposure scenario for a residential family (i.e., the critical group) that occupies the land and operates it as a self-sustaining farm.

The Army decommissioning contractor modeled the future residential farm scenario using site-specific environmental parameters to determine acceptable clean up levels. Duratek modeled the site conditions and occupancy scenarios using RESRAD, Version 5.82. The model proposed an unrestricted land use "clean up level" of 186 pCi of DU per gram of soil and a "clean-up level" of not more than 5500 disintegrations per minute of DU per 100 cm^2 surface area providing that the removable fraction of residual contamination is less than 10% of the total residual contamination. These represent the maximum average acceptable contaminant levels that will meet the NRC's release criteria for unrestricted use. In addition, the Army will operate under the concept of as low as reasonable achievable (ALARA). After reviewing the site characterization data and considering the sensitivity of available field instrumentation, by applying ALARA, it is predicted the average concentrations after decommissioning will be approximately 100 pCi/g.

The Army will package and ship the radiologically contaminated material offsite to an acceptable authorized off-site disposal facility prior to demobilization. Non-DU contaminated asbestos materials will be properly bagged and disposed. Duratek will perform a 100% surface survey of the affected areas surrounding building 611B.

Duratek, Inc. expects to ship off-post for disposal approximately 480 ft^3 of stored and unstored waste. It does not include the extra volume of any additional soil generated from underground wastewater holding tank leakage or other surficial migration that might have happened since the characterization survey in 1997. That will also be shipped off-site for disposal. The Army's contractor, Duratek, plans to use steel boxes (DOT strong tight containers) for shipment to the disposal site. As Duratek fills each container, they will properly package and ready-it for shipment. They will survey the exterior surfaces of each container and verify that they are free of loose surface contamination. In addition, Duratek will ensure that each prepared shipment container of unwanted radioactive material is properly sealed, labeled, marked, manifested, and shipped off-post before demobilization. These actions are necessary to prevent the potential spread of contaminated material before and during transport.

Duratek plans to transport the sealed steel containers using, exclusive-use commercial trucks. The Army and Duratek are committed to shipments complying with NRC and DOT package and shipping requirements.

The Army estimates that the maximum expected exposure rate on the exterior surface of the waste shipping containers will be 0.5 milliroentgen (m°R)/hr. The Army estimates that the maximum dose to the onsite worker from this proposed activity will be 0.03 millisieverts [3 mrem]. The Army estimates that the maximum dose to a member of the public from the transportation of this material will be less than 0.01 millisieverts (1 mrem).

Potential short-term environmental impacts associated with the proposed decommissioning activities might include: the potential release to the environment of airborne and liquid effluents which may contain low levels of radioactive contamination during certain activities such as grinding, scabbling, sawing, excavation and packaging; and concern for movement of any liquid effluents during remedial action.

The NRC will require the Army to use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and doses to members of the public that are ALARA to comply with these regulations and the maximum effluent air and water concentrations allowable by NRC regulation 10CFR Part 20, Appendix B, Table 2 and consistent with License Number SUB-348, as amended. If the Army exceeds these effluent constraints, the Army shall report it as provided in Section 20.2203 and promptly take appropriate corrective action to ensure against recurrences.

There is a potential long-term environmental impact as a result of the Army's planned disposal at an offsite disposal facility. This impact is based on the possibility of human intrusion into the material. However, the available disposal facilities are all regulated by State and / or Federal regulations. These regulations require long-term institutional controls of the sites, thus minimizing the potential for human intrusion. The sites will have restrictions in the property deed as a way to ensure that the waste remains undisturbed.

Alternatives

No other alternative will resolve the regulatory and potential long-term health and safety exposure risks involved in storing radiological waste. Both the "no action" alternative and the NRC "restricted release" alternative could lead to the spread of contamination in the area and potentially into the groundwater.

AGENCIES AND INDIVIDUALS CONSULTED

The U.S. Army prepared this environmental assessment in its entirety. No other sources beyond those referenced in this environmental assessment were used. The Army will provide a draft of this environmental assessment to the U.S. NRC and the State of New Jersey Department of Environmental Protection for their review. A Finding of No Significant Impact notice was advertised in the Daily Record and Star Ledger. The general public was given 30 days from the date of public notification (i.e., 10 May 2003 to 09 June 2003) to comment, inspect the environmental assessment, or request further information on this action (app E). Because there were no comments specific to the environmental assessment, the environmental assessment has not changed as a result of the views by the Army.

FINDING OF NO SIGNIFICANT IMPACT

As a result of the review of this report the Army has concluded that this decommissioning/ remediation action will not adversely affect public health and safety or the environment and does not warrant the preparation of an environmental impact statement. Accordingly, it has been determined that a Finding of No Significant Impact (app F) is appropriate.

CONCLUSIONS

A Finding of No Significant Impact (FNSI) is based on the "Report of Radiological Characterization, Building 611B, May 29, 1997;" Remediation Work Plan, Revision 0, dated November 1999; The Health and Safety Plan, dated October 1999; Decommissioning Plan for B611B, Revision 0, dated 1999; and the conditions in Nuclear Regulatory Commission (NRC) License Number SUB-348, Amendment 26, is justified and appropriate, and that the proposed decommissioning action/remediation does not require an Environmental Impact Statement.

The Army believes that the proposed alternative of "remediation to the NRC's unrestricted release" criteria is the most acceptable and responsible alternative. It will result in:

1. Disposal of decommissioning waste from the U.S. Army Armament Research, Development and Engineering Center (ARDEC), Picatinny Arsenal, New Jersey at an approved / authorized off-site disposal facility where it will not cause any significant impacts on the environment. The conditions and restrictions placed on the available facilities, combined with their design provisions and remote locations, provide a higher level of protection of human health and safety or the environment than other identified alternatives.

2. Resources being irreversibly used in the conduct of removal activities and the transportation of waste material for disposal because a portion of the selected disposal facility will be irreversibly committed for disposal of this Army's radioactive decommissioning waste.

3. Compliance of public and occupational dose and effluent limits with Federal regulations.

4. Not significantly affecting the fauna/flora or the quality of the human environment.

5. No unexpected unanticipated adverse effects/damage, findings, or impacts to ambient air quality, water quality/quantity, future land use, waste disposal, noise, or cultural resources.

6. No environmental permits envisioned as required.

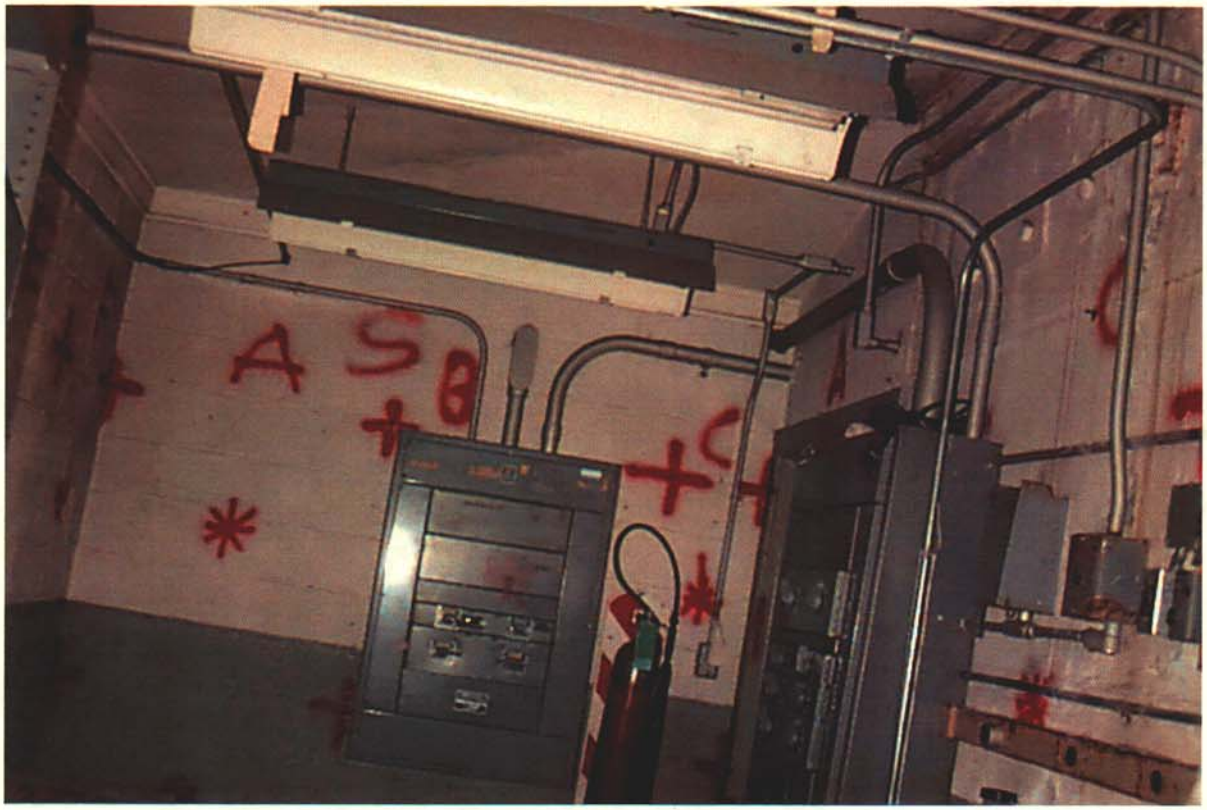
7. Minor positive economic benefits and a positive impact on the surrounding environment because the radioactive contamination source will be collected and transported off-site to an authorized low-level radioactive waste disposal facility.

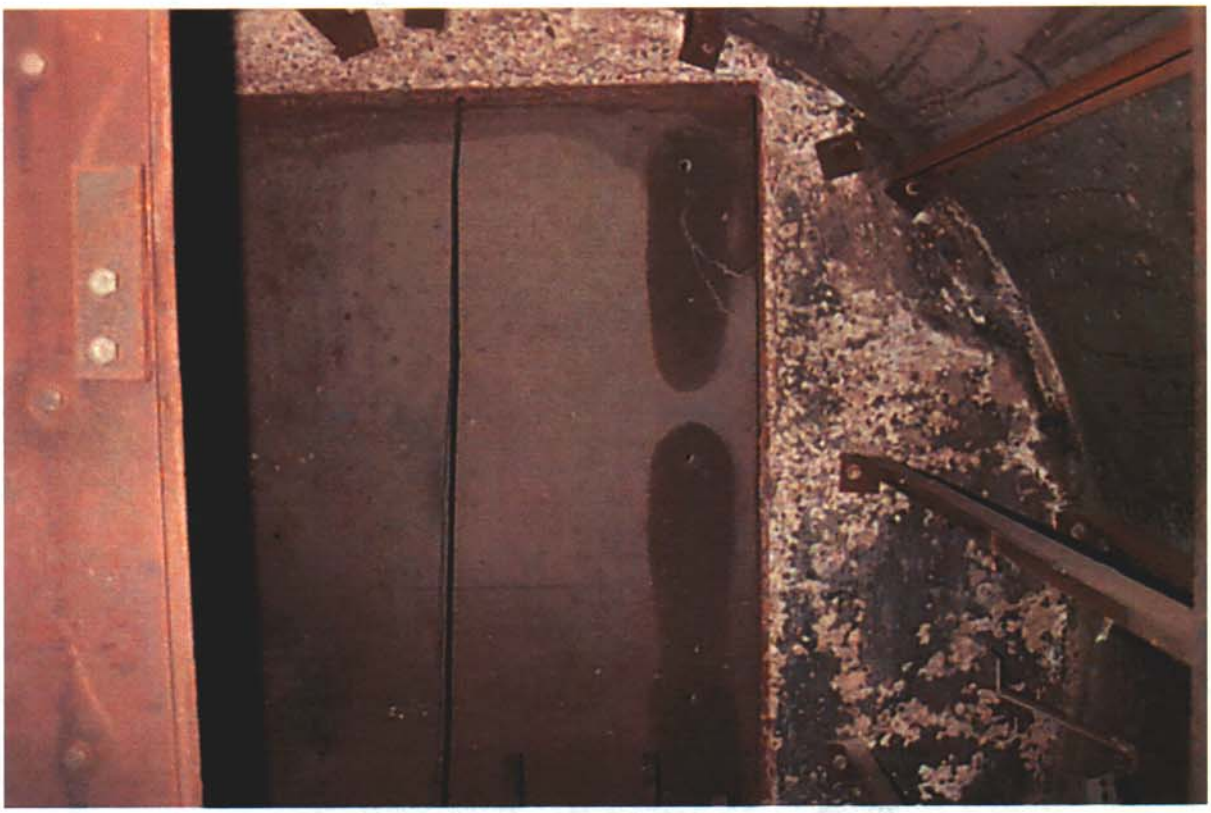
APPENDIX A

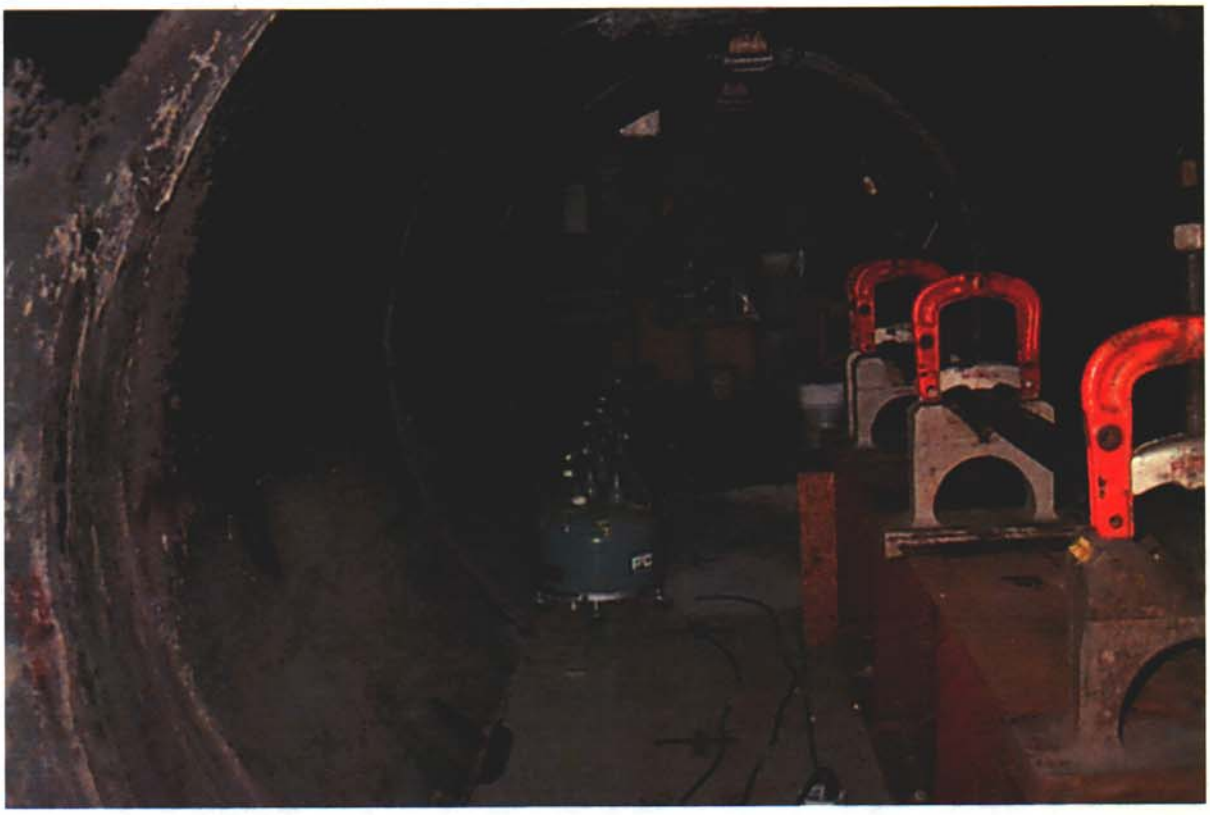
ARDEC'S BUILDING 611B


611


611








RADIOACTIVE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APPENDIX B

REMEDIATION WORK PLAN

DEPARTMENT OF THE ARMY
UNITED STATES ARMY TANK - AUTOMOTIVE AND ARMAMENTS COMMAND
ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
PICATINNY ARSENAL, NEW JERSEY 07806-5000

November 15, 1999

Directorate of Public Works

SUBJECT: Remediation Work Plan for Bldg #611B; Section 106 Consultation

Ms. Dorothy P. Guzzo
Administrator
Deputy State Historic Preservation Officer
State of New Jersey Historic Preservation Office
Department of Environmental Protection
Division of Parks and Forestry
501 East State Street
CN 404
Trenton, New Jersey 08625-0404

Dear Ms. Guzzo:

Enclosed please find a draft plan titled "Remediation Work Plan for TACOM-ARDEC Building 611B" for review and comment as part of the NHPA Section 106 consultation process. Building #611B is a contributing structure to the 600 Ordnance Testing Area Historic District here at TACOM-ARDEC. The purpose of this project is to remediate radioactive contamination at the site, which occurred as a result of testing munitions containing depleted uranium. This is a decommissioning project, meaning no future testing will be conducted within this facility.

The plan details methods for removal of contaminated structural components from the building (floor tiles, gun mounts, HEPA filtering system, etc.), as well as soil remediation in areas adjacent to the structure. The remediation methods employed are conservative and are intended to reduce contamination to levels at or below regulatory limits. Any structural changes to the building will be documented. It is our intent to restore this building to pre-remediation condition upon conclusion of this project.

Printed on Recycled Paper

If you require additional information, please contract Mr. Timothy Miller, this office, (973) 724-3890.

Sincerely,

GTS DURATEK

REMEDIATION WORK PLAN

for the

TACOM-ARDEC
Building 611 B
Picatinny Arsenal, NJ

REVISION 0
November 1999

Prepared by:_____ _____
Paul Jones
Radiological Engineer
Date

Reviewed by:_____ _____
Robert Hornbeck
Operations Manager
Date

Reviewed by:_____ _____
Robin Shult
Byproducts Manager
Date

Approved by:_____ _____
Mike Styvaert
Army Project Manager
Date

Prepared By:

GTS Duratek
Radiological Engineering & Field Services
628 Gallaher Road
Kingston, Tennessee 37763

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1.0 BACKGROUND

Picatinny Arsenal is located near Dover, New Jersey, The arsenal designs, constructs and tests weapon systems for the United States Army. A characterization of Building 611B and associated facilities for radioactive materials, was completed in by Gutierrez-Palmenberg, Inc. (GPI) during April through June of 1997. GTS Duratek has been awarded the contract for decommissioning of Building 611B. The decommissioning is planned to begin in December, 1999.

Building 611B was originally constructed in 1929 for use as a test tunnel for firing artillery rounds. The only radioactive components of concern at the site are made of depleted uranium (DU). In its original configuration, the north-south tunnel (non-DU firing range) was 373', 9" long. The DU tunnel, which is perpendicular to the original tunnel, is approximately 40' long and was built around 1959. On-site personnel have indicated that only the east-west tunnel was used for DU munitions testing.

DU is used in munitions by the United States armed forces for momentum enhancement of projectiles. DU use at the Building 611B site has been limited to firing within the confines of the firing range and target room of the building. The target room was ventilated during firing by a High Efficiency Particulate Air Filter (HEPA) ventilation system. This system discharged after four stages of filtration to a dedicated area above the storage room located at the end of the firing range/target room.

There has been migration of DU from the active use areas to adjacent soils and facilities. DU migration was identified in the initial characterization report which specifically identified the location of activity in soil around access points and rain washout points at the facility.

Building 611B is located within and is a contributing structure to the recently designated Test Site Historic District at TACOM-ARDEC. As a structure which is eligible for inclusion on the National Register of Historic Places, Section 106 of the National Historic Preservation Act requires consultation with the New Jersey Historic Office prior to any significant structural (interior/exterior) work being performed. A letter will be submitted with the remediation plan for Building 611B to the NJSHPO for their review and comments. The state will have 30 days to provide comments to TACOM-ARDEC concerning the planned remediation work.

1.1 Reason for Remediation

The Building 611B site was used for testing of munitions containing DU. Uranium-238 and its short-lived daughters are the only radionuclides of concern in DU. The site has not been used for DU munitions testing since approximately 1985. The facility will no longer be used for DU testing. Remediation of the radioactive contamination at the site is needed to prevent further spread of radioactive material and to ensure timely decommissioning of the facility.

1.2 Management Approach

In areas where surface contamination is found above the limits specified in the Building 611B, Final Survey Plan for the TACOM - ARDEC Picatinny Arsenal Building 611B, controls will be established in accordance with the Picatinny Arsenal Health Physics Program and GTS Duratek procedures as required for protection of workers, the general public, and the environment. These methods and processes for control of work will meet the requirements of Federal regulations and US Army SUB-348 NRC license conditions and procedures.

Areas of elevated activity will be compared to the guideline, remediated and re-surveyed.

GTS Duratek anticipates all areas to be remediated below the guideline value without the need for further analyses.

All contaminated material will either be decontaminated for reuse or disposed as clean material, or packaged and prepared for proper disposal as radioactive waste in accordance with 49 CFR, Industrial Operations Command (IOC) and GTS Duratek procedures. These actions are intended to minimize potential adverse environmental impact.

On-site project work will be completed by GTS Duratek employees with on-site direction provided by the project manager. Records will be maintained on site by the Project Manager.

2.0 SITE DESCRIPTION

Building 611B at the Picatinny Arsenal is located on the side of a large hill which slopes 10% to 20% from a field littered with spent munition shells to a paved road which is below the grade of Building 611B. The road leads to a an open storage structure with Building 611B on the east side.

2.1 Type and Location of facility

Building 611B was constructed with a combination of wood, concrete and metal materials and used for munitions testing including munitions that contain DU. The Building 611B test facility will not remain operational. In June 1999, Building 618B was deemed eligible for inclusion on the National Register of Historic Places.

2.2 Ownership

The TACOM-ARDEC Picatinny Arsenal facility is owned and operated by the United States Army.

2.3 Facility Description

The work area is in an enclosed field with several structures that provided containment for testing and storage of munitions. The main structure is Building 611B that contains the DU munitions testing rooms and the non-DU munitions testing area.

2.4 Buildings

The following are the rooms of building 611B and the surrounding structures requiring survey and remediation.

- Building 611B (Includes Instrumentation room, non-DU firing room, DU firing room, target room, and inside storage area (behind the target room),
- Outside Storage Area (gazebo-like wood structure with floor and roof, no walls),
- Two external storage areas (mobile storage rooms).
- HEPA filter bank (above the storage area).

2.5 Grounds

The area of concern outside of the buildings is a field of approximately 40,000 square feet bounded on one side by a chain link fence. On the other side of the field is a small brook with a maximum width of a few feet and a flow rate of as much as 20 gallons per minute during rainy times.

3.0 OPERATING HISTORY

The facility was designed for testing of munitions and contained only non-radioactive munitions until approximately 1959 when the east-west tunnel was-built for DU munitions testing.

3.1 Licensing and Operations

This facility is licensed by the NRC. Depleted uranium and its associated short-lived daughters are the only radionuclides of concern. This remediation action will be conducted under the license held by the facility. The license number is SUB-348, currently operating under Amendment 21 with an expiration date of May 31, 2001. The licensee will provide oversight of the remediation project, however, the contractor (GTS Duratek) will normally provide the day-to-day site supervision. GTS Duratek personnel will adhere to the TACOM-ARDEC Health Physics Program and any guidance from TACOM-ARDEC personnel. The day-to-day health physics operations, (i.e. air sampling and surveying) will be performed using the GTS Duratek operating procedures except in cases where the TACOM-ARDEC Health Physics Program procedures are more restrictive. The TACOM-ARDEC Health Physics procedures will be followed in these cases.

3.2 Processes

No new processes will be attempted during the remediation phase of this work. Remediation techniques will consist of washing, abrasion, cutting, scarifying, and other typical methods for removal of radioactive contamination from facility surfaces.

3.3 Waste Disposal Practices

Radioactive waste generation for this remediation will be limited to protective clothing, decontamination materials, dusts from vacuuming, HEPA filters, materials identified during the remediation phase as radioactive, cement dusts and dirt, outside soils known to be contaminated, and old packaging for materials. The contaminant has been found to be present in all rooms within Building 611B and in the HEPA ventilation system, the outside storage area, and in the soil outside the access to the Building 611B foyer and the access to the inside storage area.

Waste generated from Building 611B and grounds will be packaged and removed for future disposal. Radioactive waste will be packaged and transported according to guidance provided by GTS Duratek procedures in accordance with U.S. Department of Transportation Regulations contained in 49 CFR Parts 100 to 185. The radioactive waste will be transported to a facility approved for disposal.

As practicable, protective clothing and equipment waste that are generated during this project will be frisked for release as clean waste to ensure that waste volume is minimized. Contaminated waste will be placed into appropriately designed containers. Waste minimization will be incorporated into the entire decontamination project.

In the event that asbestos containing material (ACM) is contaminated and has to be removed, guidelines provided by OSHA and EPA will be incorporated to address working with and disposal of asbestos containing material.

4.0 REMEDIATION ACTIVITIES

This remediation will ensure Building 611B is decontaminated to the limits specified in, The TACOM-ARDEC Building 611B Final Survey Plan, for release of the building and its general area.

The primary concerns about the remediation from a project management standpoint are dose minimization, industrial safety and prevention of further environmental contamination. The following information is provided to establish GTS Duratek management guidelines for the final remediation of the site.

4.1 Objectives

The objectives of this scope of work are to remediate all radioactive materials from the site and ensure proper disposition of any radioactive and or contaminated materials removed or generated, while maintaining radiation dose to workers and members of the public As Low As Reasonably Achievable (ALARA).

Soil samples and exposure rate measurements will be taken to determine compliance with the limiting value of depleted uranium in soil and external radiation above background as provided in the Final Survey Plan for TACOM-ARDEC Building 611B.

In order to meet the preceding objectives, the remediation will include a series of samples, smears, direct activity and exposure rate measurements as described in the Final Survey Plan for the TACOM-ARDEC Building 611B.

4.2 Results of Previous Surveys

Process knowledge has indicated that the only likely radionuclide is Depleted uranium and its associated short-lived daughters. An TACOM-ARDEC radioactive material survey dated in 1996, provided the location of the maximum loose surface activity as the vent opening inside the DU target room.

The total loose surface activity at the site is conservatively estimated to be less than one (1) millicurie. Surface activity was found to be less than anticipated, but more wide spread than originally projected by the characterization work plan. The location of the maximum loose surface activity is the DU Tunnel floor at the DU target room entrance. That loose surface activity concentration was approximately 154,000 dpm/100 cm^2.

4.3 Remediation Procedures

The characterization survey provided information regarding the degree of radioactive contamination of the facility and the approximate amount of material to be removed from the site during this remediation phase. This information has been used to assist in the development of the project plans and procedures for facility remediation.

Controls for ACM may require additional precautions as specified in the project Health and Safety Plan. Work plan amendment(s) may be required and will be performed as necessary prior to working on ACM.

4.3.1 Preparation

In preparation for remediation of the facility, a complete survey for the existence of unexploded ordinance (UXO) was performed during the characterization phase of this project. This survey was conducted by qualified, experienced individuals. All areas where work will be completed for the remediation that have a potential for the presence of UXO shall be cleared prior to allowing GTS Duratek remediation personnel access to these areas, The only areas during the remediation phase where UXO becomes a concern is in outside areas where soil must be removed from the facility.

The following section describes the procedure and precautions for evaluation of the grounds at TACOM-ARDEC – Picatinny Arsenal Building 611B for the presence of unexploded ordnance. Unexploded ordnance is an item of ordnance that has failed to function as designed or has been abandoned or discarded, and is still capable of functioning and causing injury to personnel or damage to structures.

DANGER

No GTS Duratek personnel or visitors will be allowed to walk in, sample in, or excavate soil from areas outside of the work area boundaries. All work areas outside the facility where soil excavation work will be conducted must be checked for the presence of UXO prior to working in those areas.

4.3.2 **UXO Procedures**

4.3.2.1 The work area boundaries will be clearly identified and marked in consultation with the Safety and Occupational Health Specialist with caution tape. This will ensure that all personnel are aware of the site limits.

4.3.2.2 All work areas will be thoroughly screened for the presence of UXO prior to any sampling or soil excavation work.

4.3.2.3 After each area where work will be conducted is determined, Explosive Ordnance Disposal (EOD) personnel will conduct a thorough search. If necessary, the EOD personnel will utilize Schonstedt Magnetic Locators, Model GA-52Cx, or equivalent, to assist in checking areas of limited visibility.

4.3.2.4 All suspect UXO located during the search phase will be identified with pin flags. After all areas are searched, the EOD personnel will return to the suspect UXO items located and attempt to identify them and record their locations.

4.3.2.5 All UXO items identified that are determined to be of an immediate danger will be reported to Security at TACOM-ARDEC 0 phone number 4-6666 as soon as possible for UXO removal by on-post EOD (Explosive Ordnance Detachment).

4.3.2.6 All intrusive sampling points will be checked for geophysical anomalies with the Schonstedt Magnetic Locator Model GA-52Cx, or equivalent, prior to any samples being taken.

4.3.3 **Pre-job Surveys**

4.3.3.1 A survey will be performed to identify and validate the observations of the previous surveys. During the survey, areas identified as above background response will be noted on survey forms. No description as to the methodology used for taking background soil samples has heretofore been seen.

4.3.3.2 An ambient air sample will be taken daily or as indicated by the project manager to identify the typical component of airborne activity present at the work site. This will be used to ensure that work is controlled to account for the natural component and not unnecessarily stopped for sample results due to the presence of natural activity. The RSO or a GTS Site Health and Safety Officer will determine the location of the ambient air sample; it shall be taken approximately 30 feet or more from the known location of activity in Building 611B.

4.3.3.3 Potentially contaminated areas will be posted and/or marked for appropriate PPE, to prevent inadvertent access to the area during remediation operations.

4.3.3.4 All unnecessary materials will be surveyed and removed from the facility. All radioactive materials will be packaged to control contamination prior to removal. Packaged radioactive material will be placed in a controlled storage area located away from work activities.

4.3.3.5 All chips of concrete and dusts will be vacuumed with a High Efficiency Particulate (HEPA) Filter vacuum cleaner, The radioactive waste collected and the filter from that system will be packaged as radioactive waste and stored in a controlled area located away from work activities.

4.3.3.6 Survey results from all areas will be recorded as soon as the readings are taken. A summary of the results obtained will be entered into the project manager's log. Survey results shall be used to determine the degree of contamination of material surfaces.

4.3.4 Remediation

This section provides a detailed procedure for each of the rooms, buildings, and systems to be decontaminated, removed, or disposed of during the remedial action at TACOM-ARDEC Building 611B.

In general, remediation work shall be conducted (as is practical) as the normal decontamination of any surface. For example, decontamination shall be conducted from the area of lowest contamination to areas of highest contamination. Areas of lowest contamination shall be decontaminated first and re-contamination of these areas shall be prevented after cleaning is completed. If needed, porous surfaces should be covered with a non-porous covering to prevent re-contamination of activity into the material surface.

All or part of the existing electrical systems shall be removed from the facility prior to remediation. This serves multiple purposes, it allows for isolation of electrical systems for easy removal, prevents the possibility of electrical shock to remediation workers, and allows for easy removal of electrical systems once supply systems are disconnected. Electrical safety precautions shall be taken at all times during the project. Electrical lockout/tagout procedures shall be followed until all power supply boxes are verified to be de-energized.

The existing water supply to the facility may be terminated and/or verified to be isolated at the main supply location to prevent the inadvertent introduction of liquid.

4.3.4.1 Instrument Room

The instrument room has minor contamination associated with splashing of water or soap from hand washing after working with DU projectiles. The small spots of contamination should be easily removed by washing the wall but if necessary, the contamination will be removed by removing the contaminated paint from the walls. All tiles on the floor will be removed to allow collection of the contaminated dusts that settled into the cracks between tiles over the years.

Contamination removal from the sink area

a. Prepare a drop cloth under the work area to be washed/ decontaminated.
b. Wash the contaminated wall surface with a mild detergent mixture.
c. Dry the surface. Collect all materials used for the decontamination.
d. Monitor the surface to ensure that all detectable activity has been removed.
e. If the wall surface has not been decontaminated, use a mild abrasive such, as steel wool or a pot scrubber for removal of any residue.
f. Do not grind, burn, or seriously abrade the surface without project manager approval. If this is necessary, a method to contain dusts shall be designed to ensure that contamination is not spread from the work area.
g. When all contaminated material has been removed from the sink surfaces, package all contaminated materials (cleaning supplies used, drop cloth, rags, etc.) for disposal.

Removal of the drain system to the Waste-Water Holding Tank

a. Prepare for removal of the drain system by evaluating the outside wall of the facility at the location of the drain pipes. The series of bricks on the outside of the building can be used as an indicator to help locate the drain.

b. Do not open or remove covers from the drain system at this time. The pipe should be kept intact for contamination control until an opening in the floor and wall is made to facilitate easy pipe removal.
c. Remove the outside bricks to allow access to the piping system. Attempt to keep as much of the wall intact as possible. Do not remove any structural members from the wall.
d. Observe the piping configuration to determine how much of the floor and wall to remove in order to work on the pipe.
e. When a clear path is established for removal of the piping system, setup contamination controls (a drop cloth) to contain any contamination which may be released when the pipe is breached.
f. Cut the pipe with a slow reciprocating blade at as many places as needed to facilitate removal.
g. Use controls at each break point to prevent the spread of contamination.
h. Block any remaining open pipes by taping a plastic bag to the end of the open pipe. This will isolate any activity present in the pipe.
i. Package all piping and contaminated radioactive materials used for disposal as radioactive waste.
j. Survey the inside area of the instrument room and all surfaces in the areas which may have been affected by leakage from the drain system.
k. Collect and dispose of all radioactive pieces.

Contamination removal from the floor

a. Remove loose tiles and pry up more tightly bound with a crow bar, pick, screwdriver, or similar tool to minimize breakage of the tiles.
b. Collect all tiles into separate plastic bags (one for contaminated tiles and one for non-radioactive tiles) or similar containment to prevent spread of contamination. A cardboard lining in the bag will prevent breakage of the bag. Do not overload the bags. Double bag material as necessary.
c. When all of the tiles have been removed and separated, package the contaminated portion as radioactive materials and vacuum the dusts from the floor with the HEPA vacuum cleaner. Monitor the area to ensure all radioactive dusts have been collected.
d. After collection of the dusts, remove the tile mastic minimizing the amount of mastic collected as radioactive. Separate the radioactive and non-radioactive mastic in different containers.

4.3.4.2 Foyer Entrance

The contamination in the foyer entrance is associated with foot traffic from the contaminated area and, although it is detectable only on the floor, it also exists in very small quantities on surfaces where contaminated hands rubbed the doorjamb and door surfaces. The small areas of contamination on these surfaces should be easily removed by washing. All tiles on the floor will be removed to allow collection of the contaminated dusts that settled in cracks between tiles.

Contamination removal from doorjamb and door surfaces

a. Prepare a drop cloth under the work area to be decontaminated.
b. Wash the contaminated wall surface with a mild detergent mixture.
c. Dry the surface. Collect all materials used for the decontamination. Monitor the surface to ensure that all detectable activity has been removed.
e. If the wall surface has not been decontaminated, use a mild abrasive such as steel wool or a pot scrubber for removal of any residue.
f. Do not grind, burn, or seriously abrade the surface without project manager approval. If this is necessary, a method to contain dusts shall be provided to ensure that contamination is not spread from the work area.
g. When all material has been removed from the door and doorjamb surfaces, package all contaminated materials (cleaning supplies used, drop cloth, rags, etc.) for disposal.

Contamination removal from floor

a. Remove loose tiles and pry up more tightly bound tiles with a crowbar, pick, screwdriver, or similar tool to minimize breakage of the tiles.
b. Collect all tiles into separate plastic bags (one for contaminated tiles and one for non-radioactive tiles) or similar containment to prevent spread of contamination. A cardboard lining in the bag will prevent breakage of the bag. Do not overload the bags. Double bag material as necessary
c. When all of the tiles have been removed and separated, package the contaminated portion as radioactive materials and vacuum the dusts from the floor with the HEPA vacuum cleaner. Monitor the area to ensure all radioactive dusts have been collected.
d. After collection of the dusts, remove the tile mastic minimizing the amount of mastic collected as radioactive. Separate the radioactive and non-radioactive mastic in different containers.

4.3.4.3 Outside storage area (gazebo)

The outside storage area is a wood frame structure that has been contaminated by transfer of materials from the target and storage rooms of the facility. During the characterization, the wood surfaces of the floor of this area were covered with paint to prevent migration of the activity before remediation.

a. Beginning in the northwest corner of the area, pry up the plywood one piece at a time and cut and/or package the material as survey results require.
b. Vacuum the exposed wood surfaces, as practicable, before, during and after cutting to prevent radioactive dusts and debris from contaminating soil.
c. Remove any vegetation (leaves, grasses, surveying as they are removed.
d. Survey the materials found under the removed wood surface. If any materials are found to be contaminated, remove and package them to control the activity.
e. After each piece of plywood is removed, replace it with a non-radioactive piece cut to size. This must be done to maintain the integrity of the structure.

4.3.4.4 Inside Storage Area

This area is located behind the target room of Building 611B and served as a storage area for items which were used in the firing room and target rooms and for both radioactive and non-radioactive munitions. This room is contaminated in several areas of the walls and floor. It also appears that some activity from the HEPA ventilation system on the roof of this structure has seeped through the roof. This is a postulation based on the presence of loose surface activity on the ceiling of the room.

The floor surfaces of this room are bare concrete, the walls are steel plate and the ceiling is the bottom of the wooden platform supporting the HEPA ventilation system. The back wall of the structure is heavy steel plate designed to be a backstop for very high energy rounds that may have penetrated the back wall of the target room.

Contamination removal from ceiling surfaces

Note: This section should not be completed until the HEPA ventilation system has been removed from the roof of the inside storage area.

a. Re-survey to identify the areas of the ceiling which are above contamination limits. Be sure to survey both the ceiling and the top of the roof once the ventilation system is removed. Based on the observation of leaching of contamination through the wooden surfaces of the roof from the ventilation system, it is likely that levels on top of the roof will be higher than those observed inside the room.
b. If activity is detected on both sides of the wood surface, the most reasonable method for removal of the activity would be removal of the wood.
c. Define the extent of the contamination on the roof and remove any roofing materials that have been contaminated.
d. Identify areas of the roof that are not contaminated and prepare to make cuts to remove the contaminated portion of the roof by cutting on the non-contaminated portion of the wood.
e. Cut the contaminated wood out of the roof without cutting through the roof support structure. To do this, set the saw to cut only the thickness of the wood structure.
f. Remove all contaminated wood from the roof and package as radioactive material for disposal.
g. Cover or replace roofing material as needed to prevent water from seeping through the roof.

Contamination removal from back wall surfaces

a. Remove all items from the room. Some of these materials will have to be cut for packaging. All items should be cut on the non-radioactive portions, if possible, so as to minimize the spread of radioactive contamination. If this is not possible, they should be brought into the contaminated portions of the facility and cut under ventilated conditions.
b. Re-survey the walls of the facility and mark the contaminated areas for decontamination.
c. Place a drop cloth for collection of metal grindings under the area to be decontaminated.
d. Establish ventilation in the area where DU will be removed from the metal wall surface.
e. Establish a fire watch to ensure that none of the sparks from grinding cause fire outside the room.
f. The person grinding to remove activity will wear personal protective equipment as defined in the Site Health and Safety Plan and/or radiation work permit.
g. Grind surfaces to remove activity concentrations to ensure compliance with the remediation guidelines.
h. When all wall surfaces have been decontaminated, package and properly dispose all radioactive or contaminated materials which are no longer useful for decontamination work.

Contamination removal from floor surfaces

a. Clean all non-radioactive debris from the floor and collect radioactive materials (leaves, dirt, etc.) for disposal as radioactive material.
b. Re-survey the floor to identify the contaminated areas.
c. Cover non-contaminated areas to prevent the spread of contamination.
d. Prepare the surface to be decontaminated by painting it with an easily identified color of acrylic-based paint (i.e., fluorescent yellow or orange). Allow the paint to dry on all contaminated areas of the floor.
e. Since it is likely that there was not significant penetration of DU particles into the concrete, a mild surface abrasion should be adequate to dislodge and allow for collection of the particles from the surface.
f. Scarify the area as needed using HEPA filtered vacuum shrouded equipment. Since background count rates are low, monitor frequently to determine when all activity has been removed from the floor surface.
g. When activity is removed from an area, cover that area with plastic to prevent re-contamination.
h. When all wall surfaces have been decontaminated, package and properly dispose of all radioactive or contaminated materials that are no longer useful for decontamination work.

4.3.4.5 HEPA Ventilation System

The HEPA ventilation system used during operations is a three stage filter unit with a collection plenum, fan and motor sections. Contamination levels in the unit are higher than any other levels on-site. Therefore, the unit should be kept intact during all movement and disposal operations.

a. Isolate the ventilation system by disconnecting all electrical connections to the motor assembly. This will prevent any unexpected operation of the system during disassembly.
b. Verify removal of electricity from the system by measurement, and remove the motor from the system.
c. Disconnect and remove the motor structure from the fan assembly, making sure that the final filter continues to isolate the fan from the contaminated area of the system.
d. Disconnect and remove the fan assembly on the system and isolate the filter structure by taping plastic wrap to the open end of the filter to contain the contaminated system.
e. Cut and isolate the plenum from the in take duct by making a contained cut on the intake duct. This will be done inside a bag with a disposable saw. Package both open ends of the intake duct to contain all activity in the pipe.

f. Unbolt the ventilation system structure from the roof by removal of the external bolts that connect it to the steel mounting plate.
g. Ensure all contamination is contained within the assembly by taking a smear survey of the system. If all activity is not contained, wrap additional areas as needed.
h. Prepare a lay down area with pallets and plastic drop cloth for placement of the ventilation system when removed from the roof.
i. Rig the system for removal from the roof and lift it with a crane to the prepared lay down area. The crane position will be reviewed by the TACOM-ARDEC Safety and Occupational Health Specialist.
j. Completely wrap the system and place it into a B-25 box or similar disposal container.
k. Survey and remove the steel support plate on the roof. Wrap and dispose of it as radioactive material.
l. Remove any contaminated roofing material and package for disposal. Cover the remaining portions of the roof and continue with decontamination by using the procedure outlined for the ceiling of the Inside Storage Area.

4.3.4.6 Non-DU Firing Tunnel

The Non-DU tunnel has collected dusts as a result of firing into the target room. The explosions in the target room occurred when DU projectiles were fired into metal targets and were sufficiently powerful to project DU particles and dusts over all interior areas of the building. The dusts in the nonlinear tunnel primarily appear on horizontal surfaces although some vertical walls have also collected dusts from the firing. Many of the contaminated items are associated with the electrical and lighting systems in the non-DU firing range. Asbestos containing materials (ACM) will require controls as specified in the project Health and Safety Plan.

Removal of electrical systems

a. Disconnect electrical systems to the non-DU firing range and verify disconnection by lockout/tagout methods.
b. Remove all of the components of the electrical system and dispose of all components with measurable contamination as radioactive materials.

Contamination removal from vertical wall surfaces

a. Painted wall surfaces will require washing or scabbling to remove the activity from the walls.
b. The first attempt at decontamination will be to wash a small area of the wall with a mild detergent to determine if this simple technique is effective for removal of radioactive materials.
c. Set up a drop cloth area and scrub the contaminated wall surface using a stiff, non-metallic brush and a soapy detergent solution.

d. Monitor the surface of the wall to determine the activity present prior to decontamination using a wash solution.
e. Scrub an area of painted wall 10' by 8' on the target end side of the non-DU range to determine the effectiveness of removal by washing.
f. Monitor the surface after drying to determine the decrease in activity of the area.
g. If there is significant reduction in the surface activity after one wash then the project manager will determine if it is likely that further washing will reduce the activity level below surface contamination limits for remediation.
h. If it is decided to wash further, then continue with steps e. through g. to achieve remediation of the area.

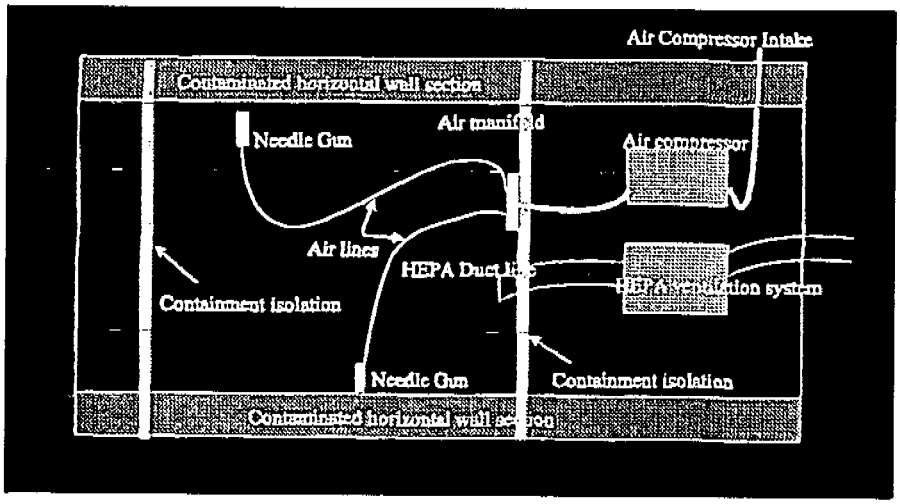
If it is determined that further decontamination by washing will not be effective to remove contamination below the remediation limit, then prepare to remove the contamination by surface abrasion.

Contamination removal from horizontal wall surfaces (ledges and sills)

a. The horizontal wall surfaces (ledges and sills) are rough concrete surfaces that have been painted in some cases. However, the surfaces cannot be decontaminated by washing and will require physical abrasion of the surface.
b. Ensure no other decontamination activities will be done in the same area.
c. Establish a controlled area by posting the area of the room where scabbling will be done.
d. Prepare the area for abrasive removal of radioactive materials by establishing containment of the area with ventilation and service access for the air powered needle guns. Ensure isolation of all areas from outside of the facility by placing tape as needed so as to seal holes to the outside. Construct the containment with specific attention to the location of equipment and isolation of the decontamination area from the open firing range (see Figure 1).

Figure 1
Abrasive Containment
(Example)

Typical arrangement of a work area to contain material during abrasive removal techniques. All surfaces to be protected including tools and equipment are isolated from the work area where concrete dusts and radioactive materials will be airborne.



e. Cover all cracks in the structure and seams in the concrete to prevent dusts from settling into areas where it may be hard to remove them.

f. Place an inlet filter on the structure or integral to the structure to ensure that sufficient air will enter the containment to prevent it from collapsing.

g. Turn on the ventilation system and test the inflow with smoke to the containment from any available opening. If the containment fails to isolate the area, repair the areas of the containment that are preventing isolation and repeat the smoke test.

h. Inspect the structure and support with the radiation protection supervisor to ensure that it has adequate air flow and isolation from other areas of the facility.

i. Turn on the air compressor for the needle guns and ensure that the air entering the chamber does not change the negative atmosphere of the HEPA ventilated containment. If it does, repeat step (g) to ensure adequate isolation of the containment before allowing work inside.

j. Use the needle guns to etch the activity from the surface for collection by the vacuum system. Use adequate personal protective equipment for particles and noise that are generated during use of the needle guns.
k. Before dismantling this containment, use it to perform any other work that requires isolation.
l. Upon completion of all scabbling with the needle gun or other isolation work, vacuum out the containment structure. Dismantle and dispose of the containment material as radioactive waste.

Contamination removal from non-DU tunnel floor

a. Ensure no other decontamination activities will be done in the same area.
b. Clean all non-radioactive debris from the floor and collect radioactive materials (leaves, dirt, etc.) for disposal as radioactive material.
c. Re-survey the floor to identify the contaminated areas.
d. Cover non-contaminated areas to prevent spread of activity from the decontamination of DU contaminated areas.
e. Remove loose tiles and pry up more tightly bound tiles with a crow bar, pick, screwdriver, or similar tool to minimize breakage of the tiles.
f. Collect all tiles into separate plastic bags (one for contaminated tiles and one for non-radioactive tiles) or similar containment to prevent spread of contamination. A cardboard lining in the bag will prevent breakage of the bag. Do not overload the bags. Double bag material as necessary.
g. When all of the tiles have been removed and separated, package the contaminated portion as radioactive materials and vacuum the dusts from the floor with the HEPA vacuum cleaner. Monitor the area to ensure all radioactive dusts have been collected.
h. After collection of the dusts, remove the tile mastic minimizing the amount of mastic collected as radioactive. Contain the radioactive and non-radioactive mastic in different containers.
i. Use the containment constructed for the non-DU tunnel ledge (horizontal wall surfaces) scabbling to ensure proper controls for decontamination at the floor to wall interface on the ramp up to the fired round collection box at the end of the tunnel.
j. Ensure all personnel in the area wear PPE as required by the Health and Safety Plan before starting work in this area.
k. Use a jack hammer or other concrete cutting device to remove concrete from the floor at the wall interface.
l. Make small cuts and survey after each to determine depth for removal.

m. Before dismantling this containment, use it to perform any other work which requires isolation.
n. Upon completion of all jack hammer or other isolation work, vacuum out the containment structure. Dismantle and dispose of the containment material as radioactive waste.

4.3.4.7 DU Firing Tunnel and Target Room

The DU Firing tunnel and DU Target Room have collected radioactive dusts as a result of firing DU projectiles into the target room. The explosions in the target room occurred when DU projectiles were fired into metal targets were sufficiently powerful to project DU particles and dusts over all interior areas of the building. The dusts in the DU tunnel and Target Room primarily appear on floor surfaces, electrical systems, and the gun stand. Many of the items contaminated in this area are associated with the electrical and lighting systems in the DU firing range and the metal wall that separate the DU target room and the DU firing room.

Removal of electrical systems

a. Disconnect all electrical systems to the non-DU firing range and verify disconnection by lockout/tagout methods.
b. Remove all components of the electrical system and dispose of all components with measurable contamination as radioactive materials.

Removal of the separation wall

a. Unbolt all areas of the wall that separates the DU Target Room and the DU Firing Tunnel. This is a steel wall that is provided support by metal braces across the walls and ceiling of the DU Target Room.
b. Package and dispose of all collected metal as radioactive waste as it all contains significant activity.

Removal of the gun stand

Note: The gun stand is 21' long and about 2' high. It is made of steel and is about 18" wide. Many surfaces of this structure are contaminated above limits and may not be practical to decontaminate.

a. If it is decided to decontaminate the gun stand, establish an area similar to that described for scabbling and prepare the area in containment with filtered ventilation.
b. Remove all attachments (like gun vises) from the stand. Package these items and prepare them for disposal or, if decided, decontamination.

c. Identify the most appropriate method of decontamination of this stand by test washing with a detergent. If washing is ineffective, then use abrasive methods as needed. Control all grindings or shavings as radioactive material.
d. After decontamination of the stand, contact site personnel to see if they have any use for it. Assist them in removal of the stand if necessary. If not, cut the stand into five equal parts (about 4 feet 3 inches each). This will make the pieces easier to move and capable of disposal as non-radioactive waste.
e. If it is decided not to decontaminate the stand/or found to be unfeasible, then cut the stand into five equal parts and prepare each part for disposal as radioactive waste.

Contamination removal from wall surfaces

a. The tunnel wall surfaces will require scabbling to remove the activity from the walls.
b. Ensure no other decontamination activities will be done in the same area.
c. Establish a controlled area by posting the area of the room where scabbling will be done.
d. Cover non-contaminated areas to prevent spread of activity from the decontamination of DU contaminated areas.
e. Prepare the area for abrasive removal of radioactive materials by establishing containment of the area with ventilation and service access for the air powered needle guns. Ensure isolation of all areas from outside of the facility by placing tape as needed so as to seal holes to the outside. Construct the containment with specific attention to the location of equipment and to isolation of the decontamination area from the open firing range.
f. Cover all cracks in the structure and seams in the concrete to prevent dusts from settling into areas where it may be hard to remove them.
g. Place an inlet filter on the structure or integral to the structure to ensure that sufficient air will enter the containment to prevent it from collapsing.
h. Turn on the ventilation system and test the inflow with smoke to the containment from any opening that may be available. If the containment fails to isolate the area, repair the areas of the containment that are preventing isolation and repeat the smoke test.
i. Inspect the structure and support with the radiation protection supervisor to ensure that it has adequate air flow and isolation from other areas of the facility.
j. Turn on the air compressor for the needle guns and ensure that the air entering the chamber does not change the negative atmosphere of the HEPA ventilated containment. If it does, repeat step (g) to ensure adequate isolation of the containment before allowing work inside

k. Use the needle guns to etch the activity from the surface for collection by the vacuum system. Use adequate PPE for particles and noise that are generated during use of the needle guns.
l. Before dismantling this containment, use it to perform any other work that requires isolation.
m. Upon completion of all scabbling with the needle gun or other isolation work, vacuum out the containment structure. Dismantle and dispose of the containment material as radioactive waste.

Contamination removal from the DU tunnel floor

The floors of the DU tunnel are poured concrete inside of the large concrete pipe that makes up the walls. Dust from firing DU rounds has settled into cracks between the floor and walls. Dust has also migrated into the cracks between tiles on the floor.

a. Ensure no other decontamination activities will be done in the same area.
b. Ensure all personnel in the area wear PPE as required by the Health and Safety Plan before starting work in this area.
c. Establish a controlled area by posting the area of the room where remediation will be done.
d. Clean all non-radioactive debris from the floor and collect radioactive materials (leaves, dirt, etc.) for proper disposal.
e. Re-survey the floor to identify the contaminated areas.
f. Cover non-contaminated areas to prevent spread of activity from the decontamination of DU contaminated areas.
g. Remove loose tiles and pry up more tightly bound tiles with a crow bar, pick, screwdriver, or similar tool to minimize breakage of the tiles.
h. Collect all tiles into separate plastic bags (one for contaminated tiles and one for non-radioactive tiles) or similar containment to prevent spread of contamination. A cardboard lining in the bag will prevent breakage of the bag. Do not overload the bags. Double bag material as necessary.
i. When all of the tiles have been removed and separated, package the contaminated portion as radioactive materials and vacuum the dusts from the floor with the HEPA vacuum cleaner. Monitor the area to ensure all radioactive dusts have been collected.
j. After collection of the dusts, remove the tile mastic minimizing the amount of mastic collected as radioactive. Contain the radioactive and non-radioactive mastic in different containers.
k. Use the containment constructed for the DU tunnel wall surface scabbling to ensure proper controls for decontamination at the floor/ wall interface.
l. Use a jack hammer or other concrete cutting device to remove concrete from the floor at the wall interface.

m. Make small cuts (approximately six inches) and survey after each to determine depth for removal.
n. Before dismantling this containment, use it to perform any other work that requires isolation.
o. Upon completion of all jack hammer or other isolation work, vacuum out the containment structure. Dismantle and dispose of the containment material as radioactive waste.

4.3.4.8 Soil

The GPI characterization report identified three areas where soil may require remediation. Contamination was possibly spread to the area under the entrance to the foyer by foot traffic. A combination of foot traffic and rain dispersal from the HEPA on the roof is the probable cause of contamination at the entrance to the inside storage area connected to Building 611B. The back side of this storage area was also contaminated by rain run off from the HEPA located on the roof.

Contamination removal from under the foyer entrance

Note: Check with site UXO personnel and/or local utility agencies as necessary to ensure it is safe to dig in the area.

a. Position a B-25 container nearby to hold the contaminated soil.
b. Prepare a clean area, with plastic sheeting or other non-porous material between the dig site and the B-25 box to prevent cross contamination of soil.
c. Block off the stairs to prevent access.
d. Remove portions of the stairs as necessary to perform the dig.
e. Use shovels and heavy equipment as necessary to remove, approximately six inches of soil from the contaminated area and deposit the soil in the B-25 box.
f. Hand frisk the remaining soil to determine whether to remove more soil. If necessary, remove more soil in thin layers (approximately three inches at a time) and frisk between layers.
g. Remove contaminated pavement at the bottom of the steps and frisk to determine further soil removal in this area.
h. After frisk measurements have determined removal of all soil and pavement contaminated above release limits, take three representative soil samples from the remediated area.
i. Remove any contaminated soil from the lay down area and place it inside the B-25 box. If practical, save the lay down material for use at other dig sites.

Contamination removal from the entrance to the Inside Storage Building

Note: Check with site UXO personnel and/or local utility agencies as necessary to ensure it is safe to dig in the area.

a. Position a B-25 container nearby to hold the contaminated soil.
b. Prepare a clean area, with plastic sheeting or other non-porous material between the dig site and the B-25 box to prevent cross contamination of soil.
c. Ensure all site personnel are notified of the dig to take place and are clear of the area.
d. Use shovels and heavy equipment as necessary to remove approximately six inches of soil from the contaminated area and deposit the soil in the B-25 box.
e. Hand frisk the remaining soil to determine whether to remove more soil. If necessary, remove more soil in thin layers (approximately three inches at a time) and frisk between layers.
f. After frisk measurements have determined removal of all soil contaminated above release limits, take three representative soil samples.
g. Remove any contaminated soil from the lay down area and place it inside the B-25 box. If practical, save the lay down material for use at other dig sites.

Contamination removal from the backside of the Inside Storage Building

Note: Check with site UXO personnel and/or local utility agencies as necessary to ensure it is safe to dig in the area.

a. Position a B-25 container nearby to hold the contaminated soil.
b. Prepare a clean area, with plastic sheeting or other non-porous material between the dig site and the B-25 box to prevent cross contamination of soil.
c. Ensure all site personnel are notified of the dig to take place and are clear of the area.
d. Use shovels and heavy equipment as necessary to remove approximately six inches of soil from the contaminated area and deposit the soil in the B-25 box.
e. Hand frisk the remaining soil to determine whether to remove more soil. If necessary, remove more soil in thin layers (approximately three inches at a time) and frisk between layers.
f. After frisk measurements have determined removal of all soil contaminated above release limits, take three representative soil samples.
g. Remove any contaminated soil from the lay down area and place it inside the B-25 box. If practical, save the lay down material for use at other dig sites.

4.3.4.9 Waste Water Holding Tank

The waste water holding tank (WWHT) is located on the west side of the instrument room. Configuration and historical knowledge of the facility describe the WWHT as a catch basin for the wash sink located in the instrument room. During the characterization, minor amounts of contamination were found around the inside of the threads for the cover of the fill pipe and in silt collected from inside the tank, GTS Duratek and/or its contractors will remove the WWHT according to Federal and State regulations. It is anticipated that this tank will be decontaminated as necessary and disposed of as scrap metal.

Tank Removal

NOTE: Check with site UXO personnel and/or local utility agencies as necessary to ensure it is safe to dig in the area.

a. Obtain heavy equipment and personnel as necessary to dig and lift the tank from the ground.
b. Check with site personnel to locate an area to obtain clean fill for the hole once it is excavated and verified to be free of activity.
c. Ensure all site personnel are notified of the dig to take place and are clear of the area. Put up a tape boundary as practical to exclude personnel from the dig area.
d. Disconnect and seal all connections to the WWHT.
e. Prepare separate plastic lay down areas for the soil and WWHT to be removed. Also, stage a B-25 box nearby and prepare a lay down area between it and the dig site.
f. Conduct a detailed survey of the asphalt over the location of the WWHT.
g. Remove the asphalt over the WWHT. If contaminated material is found, separate as practical, any contaminated asphalt material into the B-25 box for disposal as radioactive waste. Pile the clean asphalt outside of the work area.
h. If contaminated material is found, survey as necessary and mark with pin flags the ground areas where contaminated asphalt was found.
i. Ensure that EOD personnel check the area before proceeding.
j. If contaminated material is found, remediate soil from the marked areas, following digging precautions given by EOD, until contamination above background is no longer found. Place contaminated soil in the staged B-25 box.
k. Dig as necessary to uncover the WWHT. Place the clean soil on the prepared lay down area.
l. Use heavy equipment and personnel as necessary to secure and move the WWHT onto the prepared lay down area. Establish a barrier (e.g., caution tape) to keep all personnel away from the hole created by the dig.

m. Survey and swipe the external surfaces of the WWHT.
n. Perform a remote instrument survey of the bottom and sides of the hole. Use safety precautions outlined in the health and safety plan to protect workers near the edge of the excavation.
o. If contamination is found, remediate soil with the heavy digging equipment or shovels and small tools as necessary and resurvey. Place contaminated soil in the staged B-25 box. If one evolution does not remove all measurable contamination, consult with the project manager before continuing attempts.
p. Use the heavy digging equipment to obtain three soil samples; one from the bottom and two from the sides of the hole.
q. Place boundary tape around the hole to exclude personnel.
r. Obtain samples of soil from the clean pile and send off for expedited analysis. Excavated soil will be returned to the hole along with other clean fill pending results of the analysis.
s. Using external surface survey results, decontaminate the outside of the WWHT. Use soapy water and/or abrasive scrub pads as necessary. Grind the surface with tools only at the direction of the project manager. Segregate all radioactive waste for proper disposal,
t. Take precautions as outlined in the health and safety plan and cut the WWHT in half horizontally (lengthwise). The horizontal cut will allow containment of bottom silt from the interior of the WWHT.
u. Survey the interior of each half of the WWHT Decontaminate the interior of the WWHT using rags, soapy water, scrub pads and the HEPA vacuum as necessary. Perform surface grinding with tools only at the direction of the project manager. Segregate all radioactive waste for proper disposal.
v. Survey the interior of the WWHT.
w. Use heavy equipment to dispose of the WWHT as clean waste at a location specified by site personnel.
x. If the soil sample results do not allow return of the soil to the excavated hole, load it into the staged B-25 box for disposal as radioactive waste.
y. Consult with the project manager before backfilling the excavated WWHT hole. Backfill the hole with the clean fill obtained from site personnel and soil removed from the hole (as sample analysis results allow).

5.0 FINAL SURVEY PROCEDURES

The final surveys will be performed in accordance with the Final Survey Plan for the TACOM-ARDEC Building 611B and associated grounds. The surveys will consist of surface scans (beta and gamma), fixed beta measurements, and smears for gross alpha and gross beta analysis on structural surfaces while the survey of the facility grounds will consist of gamma scans and soil sampling for gamma spectroscopy analysis. The surveys will be performed in accordance with MARSSIM while applying site specific derived Concentration Guideline Levels (DCGL) based upon the future use of the facility and the grounds.

5.10.3 Standing Operating Procedure #3

Unintentional Partial Damage to an NRHP-eligible Building.

1. The CRM should be notified of the damage immediately and all work in the immediate area of the damage should cease.

2. The CRM will document any damage both photographically and in a written summary report.

3. The CRM, in consultation with a qualified historic architect, will determine whether repair or reconstruction can be accomplished in accordance with the Secretary of the Interior's Standards for Rehabilitation and thereby have no adverse effect.

4. The project manager and a qualified historic architect, under the direction of the CRM, will develop a plan for repair or rehabilitation, including architectural specifications and photographs.

5. The CRM will submit this plan for review by and concurrence of the New Jersey that the plan meets the Secretary of the Interior's Standards. If the New Jersey HPO concurs, then the plan shall be implemented. If the NJHPO does not concur, then the Section 106 compliance procedures should be followed.

6. The CRM will inform the project manager and contracting officer of the appropriate specifications that must be included within the contract.

7. The project manager will familiarize the contractor with significant features of historic property and protection measures.

encl 2.

5.10.2 Standing Operating Procedure #2

Unexpected Cultural Resources Discoveries During Construction.

Unanticipated discoveries happen most often with projects that involve ground-disturbing activities, although sometimes they involve unforeseen effects on a known historic property. In all cases of unanticipated discovery, the CRM should initiate consultation in accordance with 36 CFR Part 800.13. If the unexpected discovery involves a Native American cultural item as defined by the Native American Graves Protection and Repatriation Act (NAGPRA), see SOP #9. The accidental discoveries of cultural resources during an undertaking can include but are not limited to:

undiscovered/undocumented structural and engineering features; and
undiscovered/undocumented archaeological resources such as foundation remains, burials, artifacts, or other evidence of human occupation.

When such cultural resources are discovered during an undertaking, the CRM will proceed with the treatment of such properties in accordance with the following Discovery Plan.

All work shall cease in the area of the discovery

- The property is to be treated as eligible and avoided until an eligibility determination is made. The CRM will continue to make reasonable efforts to avoid or minimize harm to the property until the NHPA, Archeological Resources Protection Act (ARPA) or NAGPRA requirements are met.
- The contractor or project manager shall notify the installation CRM

immediately of the discovery, who will then notify the New Jersey HPO (and the Council) within 48 hours. The CRM will provide assessments of NRHP eligibility and actions to resolve adverse effects. The New Jersey HPO and Council shall respond with comments within 48 hours.

- The CRM will develop and implement actions that take into account the effects of the undertaking on the property to the extent feasible and any comments provided by the New Jersey HPO (and Council) pursuant to 36 CFR Part 800.13(b).

encl 3.

the documentation available for public inspection prior to approving the undertaking. If the SHPO/THPO, or the Council if it has entered the section 106 process, does not object within 30 days of receipt of an adequately documented finding, the agency official's responsibilities under section 106 are fulfilled.

(2) *Historic properties affected.* If the agency official finds that there are historic properties which may be affected by the undertaking or the SHPO/THPO or the Council objects to the agency official's finding under paragraph (d)(1) of this section, the agency official shall notify all consulting parties, including Indian tribes or Native Hawaiian organizations, invite their views on the effects and assess adverse effects, if any, in accordance with Sec. 800.5.

Sec. 800.5 Assessment of adverse effects.

(a) *Apply criteria of adverse effect.* In consultation with the SHPO/THPO and any Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to identified historic properties, the agency official shall apply the criteria of adverse effect to historic properties within the area of potential effects. The agency official shall consider any views concerning such effects which have been provided by consulting parties and the public.

(1) *Criteria of adverse effect.* An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative.

(2) *Examples of adverse effects.* Adverse effects on historic properties include, but are not limited to:

(i) Physical destruction of or damage to all or part of the property;

(ii) Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary's standards for the treatment of historic properties (36 CFR part 68) and applicable guidelines;

(iii) Removal of the property from its historic location;

(b) *Actions categorically excluded under NEPA.* If a project, activity or program is categorically excluded from NEPA review under an agency's NEPA procedures, the agency official shall determine if it still qualifies as an undertaking requiring review under section 106 pursuant to Sec. 800.3(a). If so, the agency official shall proceed with section 106 review in accordance with the procedures in this subpart.

(c) *Use of the NEPA process for section 106 purposes.* An agency official may use the process and documentation required for the preparation of an EA/FONSI or an EIS/ROD to comply with section 106 in lieu of the procedures set forth in Secs. 800.3 through 800.6 if the agency official has notified in advance the SHPO/THPO and the Council that it intends to do so and the following standards are met.

(1) *Standards for developing environmental documents to comply with Section 106.* During preparation of the EA or draft EIS (DEIS) the agency official shall:

(i) Identify consulting parties either pursuant to Sec. 800.3(f) or through the NEPA scoping process with results consistent with Sec. 800.3(f);

(ii) Identify historic properties and assess the effects of the undertaking on such properties in a manner consistent with the standards and criteria of Secs. 800.4 through 800.5, provided that the scope and timing of these steps may be phased to reflect the agency official's consideration of project alternatives in the NEPA process and the effort is commensurate with the assessment of other environmental factors;

(iii) Consult regarding the effects of the undertaking on historic properties with the SHPO/THPO, Indian tribes, and Native Hawaiian organizations that might attach religious and cultural significance to affected historic properties, other consulting parties, and the Council, where appropriate, during NEPA scoping, environmental analysis, and the preparation of NEPA documents;

(iv) Involve the public in accordance with the agency's published NEPA procedures; and

(v) Develop in consultation with identified consulting parties alternatives and proposed measures that might avoid, minimize or mitigate any adverse effects of the undertaking on historic properties and describe them in the EA or DEIS.

(2) *Review of environmental documents.*

(i) The agency official shall submit the EA, DEIS, or EIS to the SHPO/THPO, Indian tribes, and Native Hawaiian organizations that might attach religious and cultural significance to affected historic

properties, and other consulting parties prior to or when making the document available for public comment. If the document being prepared is a DEIS or EIS, the agency official shall also submit it to the Council.

(ii) Prior to or within the time allowed for public comment on the document, a SHPO/THPO, an Indian tribe or Native Hawaiian organization, another consulting party or the Council may object to the agency official that preparation of the EA, DEIS, or EIS has not met the standards set forth in paragraph (c)(1) of this section or that the substantive resolution of the effects on historic properties proposed in an EA, DEIS, or EIS is inadequate. If the agency official receives such an objection, the agency official shall refer the matter to the Council.

(3) *Resolution of objections.* Within 30 days of the agency official's referral of an objection under paragraph (c)(2)(ii) of this section, the Council shall notify the agency official either that it agrees with the objection, in which case the agency official shall enter into consultation in accordance with Sec. 800.6(b)(2) or seek Council comments in accordance with Sec. 800.7(a), or that it disagrees with the objection, in which case the agency official shall continue its compliance with this section. Failure of the Council to respond within the 30 day period shall be considered disagreement with the objection.

(4) *Approval of the undertaking.* If the agency official has found, during the preparation of an EA or EIS that the effects of an undertaking on historic properties are adverse, the agency official shall develop measures in the EA, DEIS, or EIS to avoid, minimize, or mitigate such effects in accordance with paragraph (c)(1)(v) of this section. The agency official's responsibilities under section 106 and the procedures in this subpart shall then be satisfied when either:

(i) A binding commitment to such proposed measures is incorporated in:

(A) The ROD, if such measures were proposed in a DEIS or EIS; or

(B) An MOA drafted in compliance with Sec. 800.6(c); or

(ii) The Council has commented under Sec. 800.7 and received the agency's response to such comments.

(5) *Modification of the undertaking.* If the undertaking is modified after approval of the FONSI or the ROD in a manner that changes the undertaking oralters its effects on historic properties, or if the agency official fails to ensure that the measures to avoid, minimize or mitigate adverse effects (as specified in either the FONSI or the ROD, or in the binding commitment adopted pursuant to paragraph (c)(4) of this section) are carried out, the agency official shall notify the Council and all consulting parties that supplemental environmental documents will be prepared in compliance with NEPA or that the procedures in Secs.

APPENDIX C

BUILDING 611B HISTORICAL SIGNIFICANCE

HISTORICALLY SIGNIFICANT BUILDING 611B
STABALLOY TESTING RANGE

Building 611B was originally constructed as a non-DU firing range in 1929 for use as a test tunnel for firing artillery rounds. The facility only contained non-radioactive munitions until approximately 1959. It was then modified with the addition of another tunnel which served as an indoor small caliber, depleted uranium (DU)/Staballoy munitions firing range. From 1959 to 1979, there are no records available to substantiate the use/non-use of the building. According to historical records (1) it was first proposed as a Staballoy testing range to the Ionizing Radiation Control Committee on 10 August 1978. (2) An Environmental Impact Statement was pre-pared to consider and balance environmental and other effects of the proposed action and the alternatives available for reducing or avoiding adverse environmental and other effects as well as the environmental, economic, technical and other benefits of the proposed action. (3) The DU operation was in compliance with Federal (such as Title 10 of the Code of Federal Regulations Parts 19, 20 and 40), Army, State and Local regulations; (4) It was covered by ARDEC's Nuclear Regulatory Commission (NRC) License No. SUB-348. (5) A Standing Operating Procedure, SOP 385-1, for radiation workers to follow, was approved by the Committee on 11 Jul 1979; (6) The testing facility was ready to fire Staballoy projectiles by 19 July 1979. (7) Film Badges, surveys, bioassays, air sampling, engineering controls and Radiation Work Permits were used to control exposures to personnel and the concentration of radioactive material on building surfaces and in the air. (8) Small caliber DU munitions testing started on 27 February 1980 and stopped on 26 September 1984. (9) Non-DU testing continued up through 5 May 1989 after which operations ceased completely.

The testing in the facility involved the use of a 13 foot long small, smooth bore, nominal 20 mm, cannon/barrel set up to fire up to 100 grams of scaled down, Staballoy, projectiles, at a maximum rate of 10 rounds per day at a target in a confined "target" room from the firing range. The DU was trapped by a four stage, High Efficiency, Particulate Air Filtration system before discharging to an area at the end of the firing range/target room. One reported filter fire required the clean up of the indoor DU firing range and revision of the SOP. DU waste generated from the operation was temporarily stored in Bunker 3030 for shipment off-post and ultimate disposal.

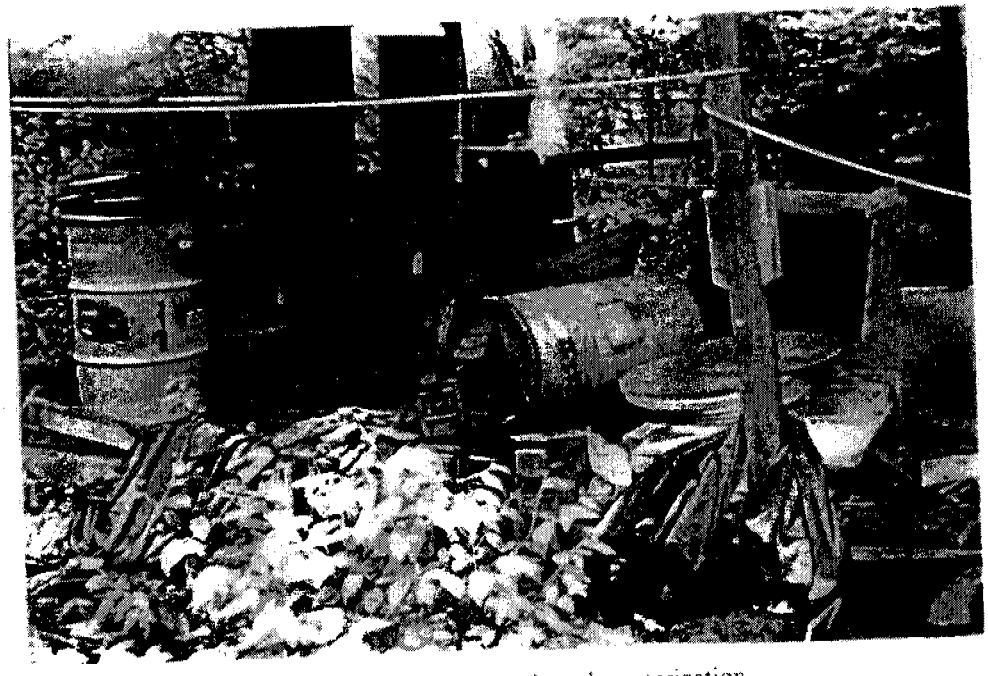
The permanent cessation of radiological operations necessitated the characterization of the approximate 40,000 square foot facility in 1997 prior to its remediation. The reason for the remediation was to meet the radiological criteria for the free release, unrestricted use and deletion of the site from the SUB-348 License. Subsequently, the appropriate decommissioning and environmental documentation was submitted to the Nuclear Regulatory Commission and the State of New Jersey Historical Preservation Office for approval and the public for notification and participation in order to move forward with the Decommissioning Schedule tentatively set for the summer of 2003. Costs for the characterization/ Remediation/Decommissioning actions have been and will be absorbed by the Department of Defense Executive Agency at Rock Island Arsenal. Delays were the result of the time required to prepare/staff the documentation, the agencies to approve the documentation, and the public to comment.

Joseph A. Fabiano
Health Physicist
Radiation Group
Quality Evaluation and Safety Team
Quality Engineering Directorate
p. 1.973.724.3742
f. 1.973. 724.7047

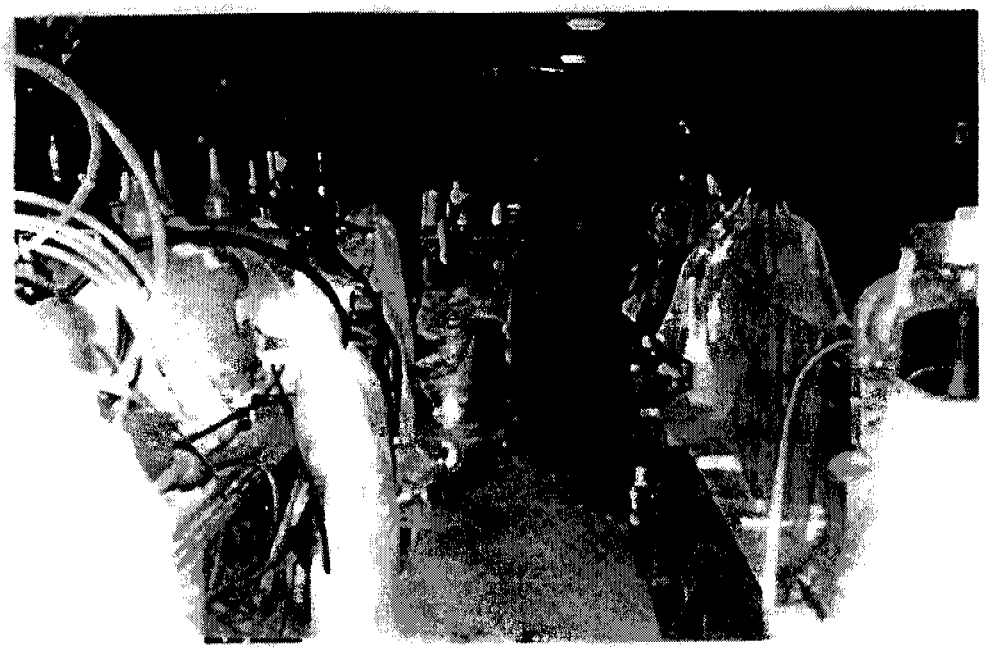
APPENDIX D

BUILDING 611B
BEFORE AND AFTER CHARACTERIZATION

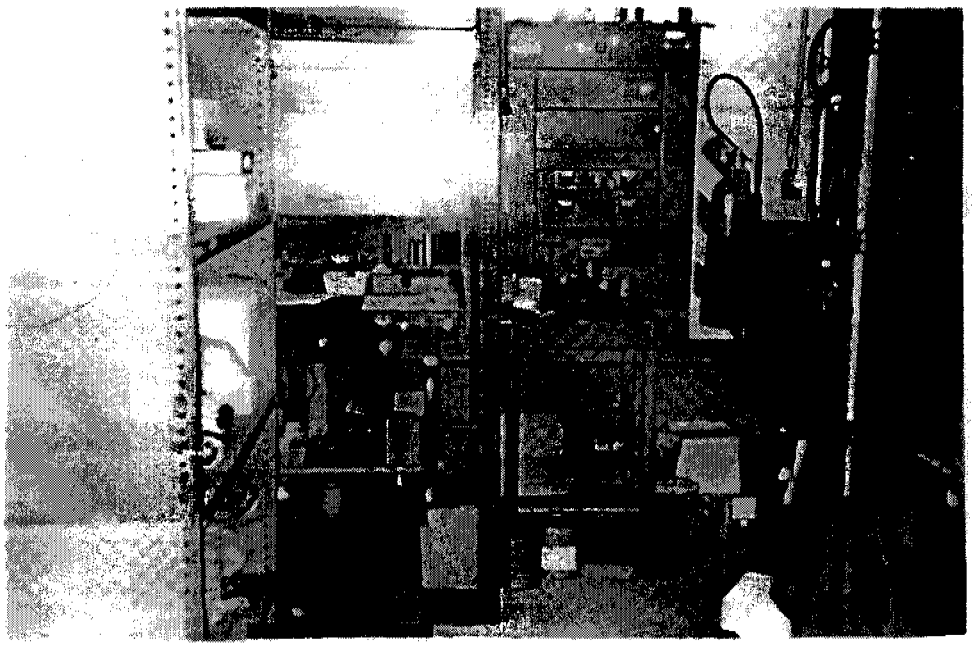
DU Target Room before characterization in foreground



Open Storage Area before characterization



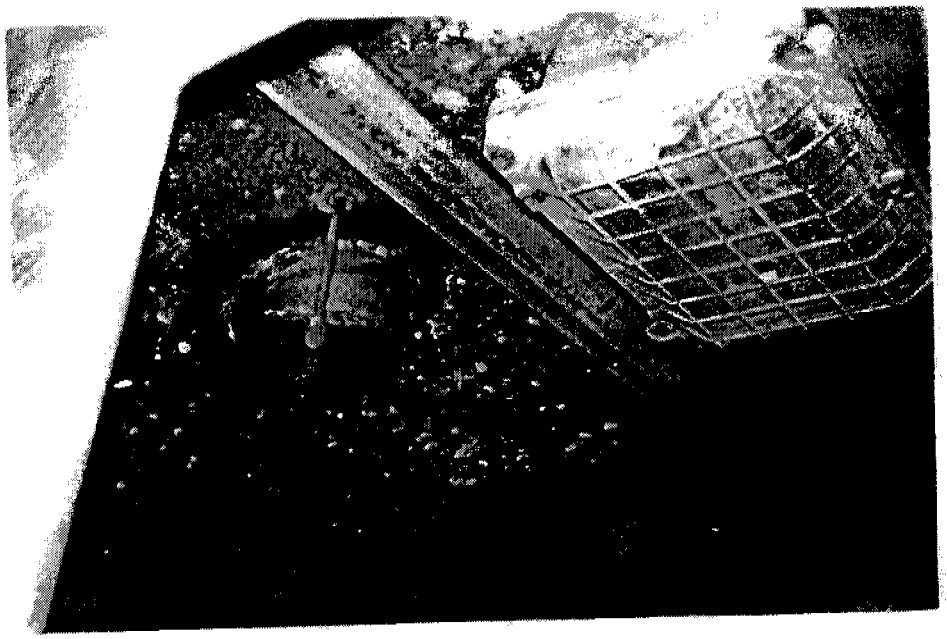
DU Tunnel from Target Room before characterization



Instrument Room before characterization

DU tunnel from entrance at the intersection with the non-DU tunnel before characterization.

Non-DU tunnel from entrance before characterization.



DU Target room ceiling with light fixture and duct to HEPA ventilation before characterization.

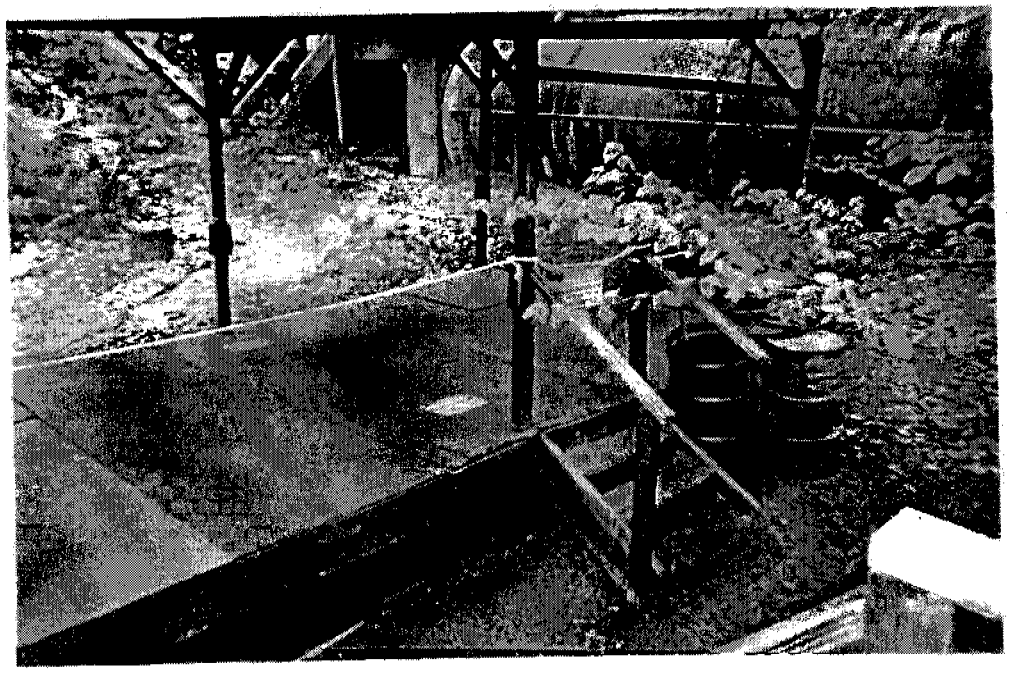
ARDEC Picatinny Arsenal

Building 611 B Characterization

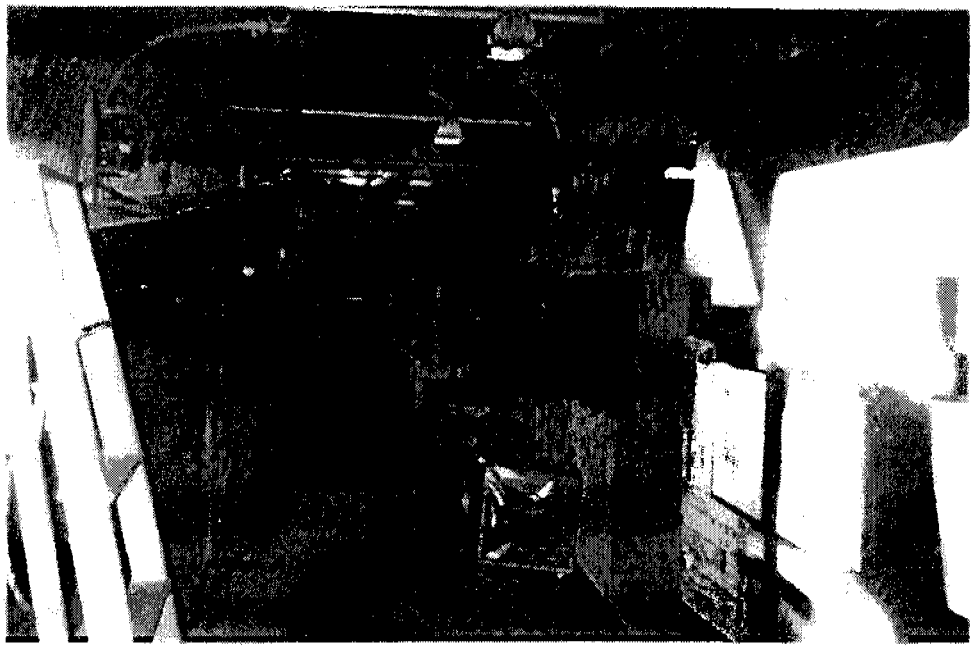
Site Photographs After Characterization

Gutierrez-Palmenberg, Inc.
333 N. Rancho Dr.
Las Vegas, NV 89106
702-647-5699

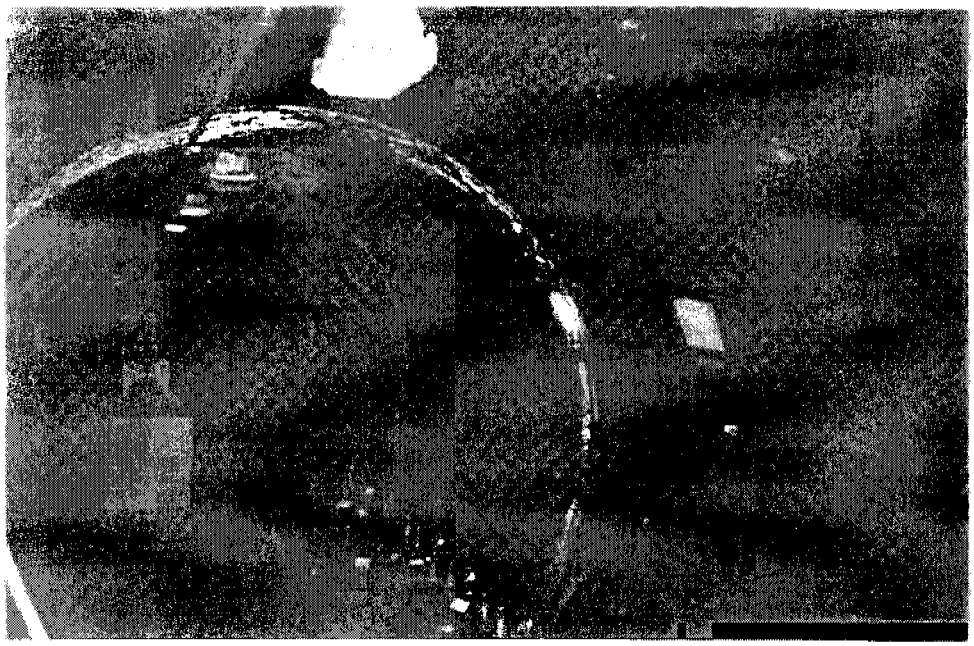
Unexploded ordinance locations adjacent to the brook at the side of the non-DU range.



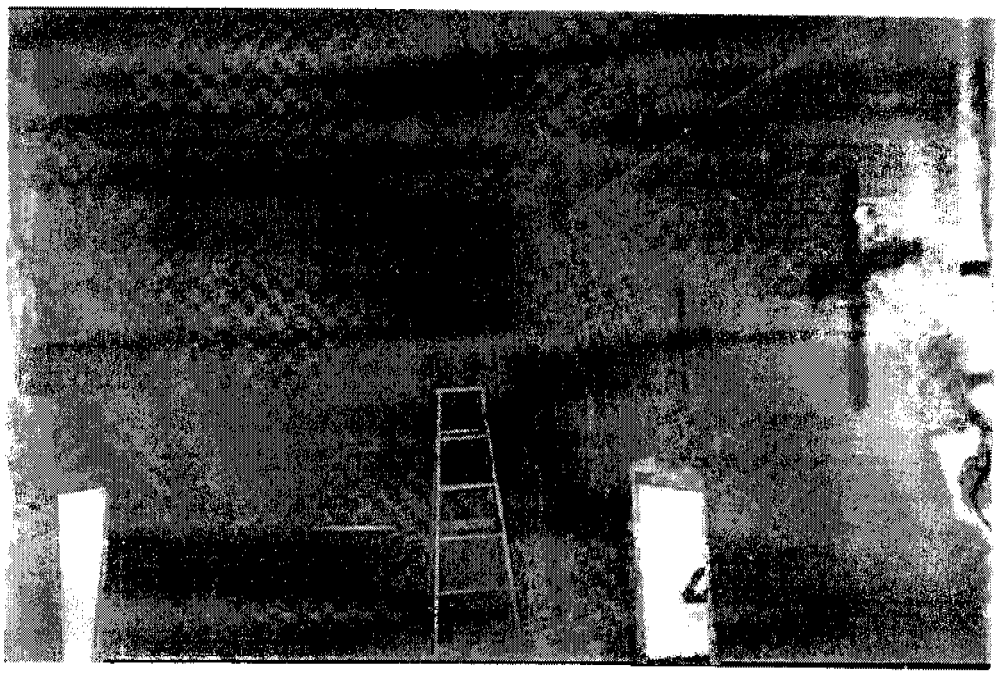
The outside storage area after sealing the floor with latex paint.



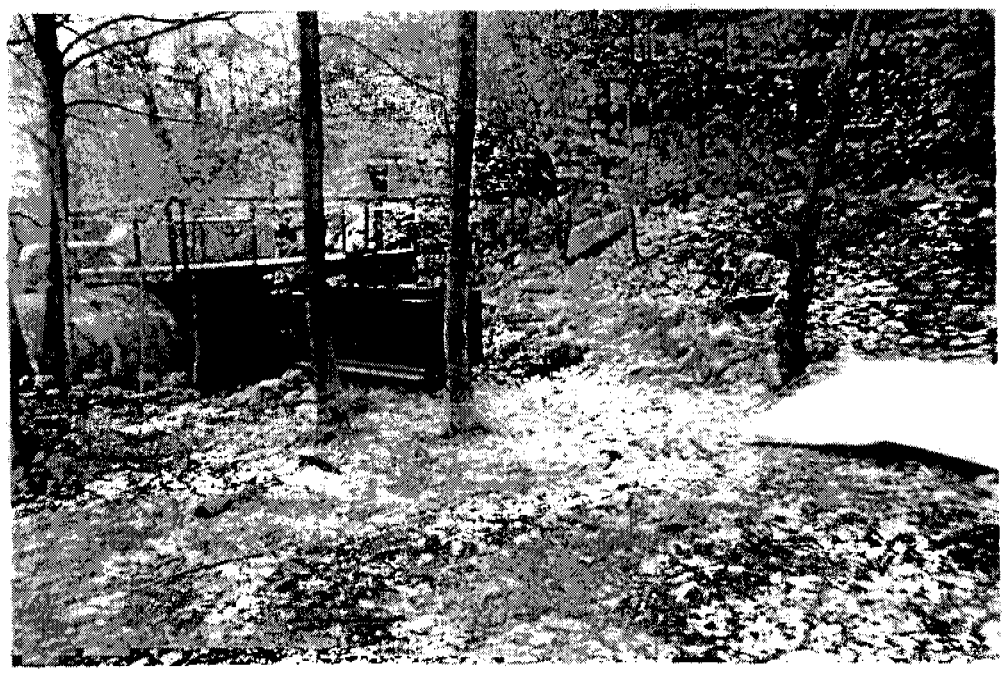
The non-DU firing range from it's entry. The entry to the DU range is on the left side of the tunnel.



Inside the DU firing range facing the target room. Note the firing table on the left.



Inside the non-DU firing range facing the steel catch box.

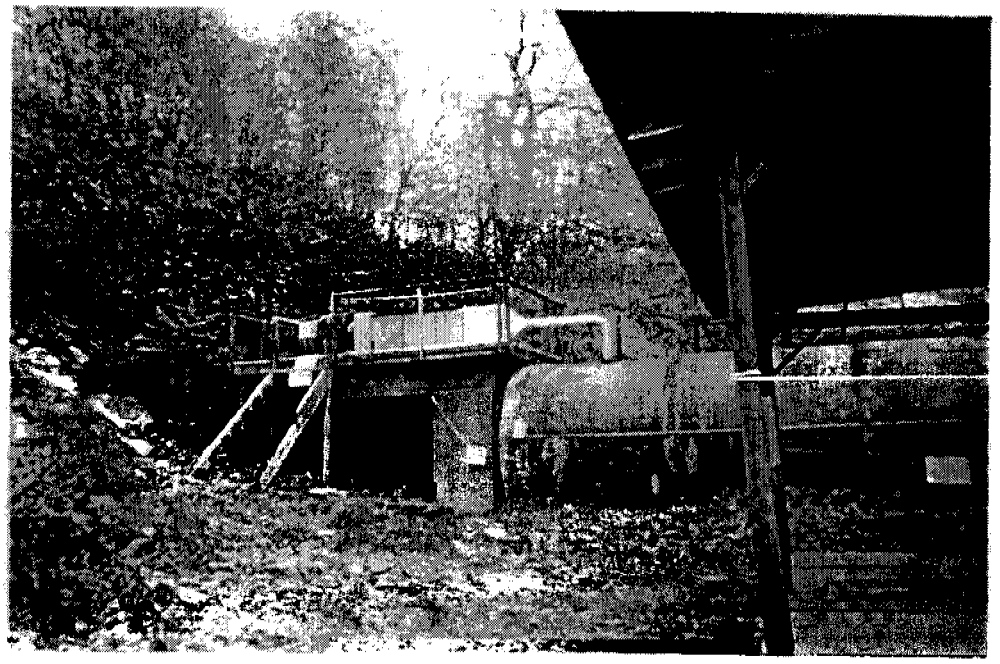


The back yard showing the grounds and locations of unexploded ordinance. The large metal shield and the inside storage area.

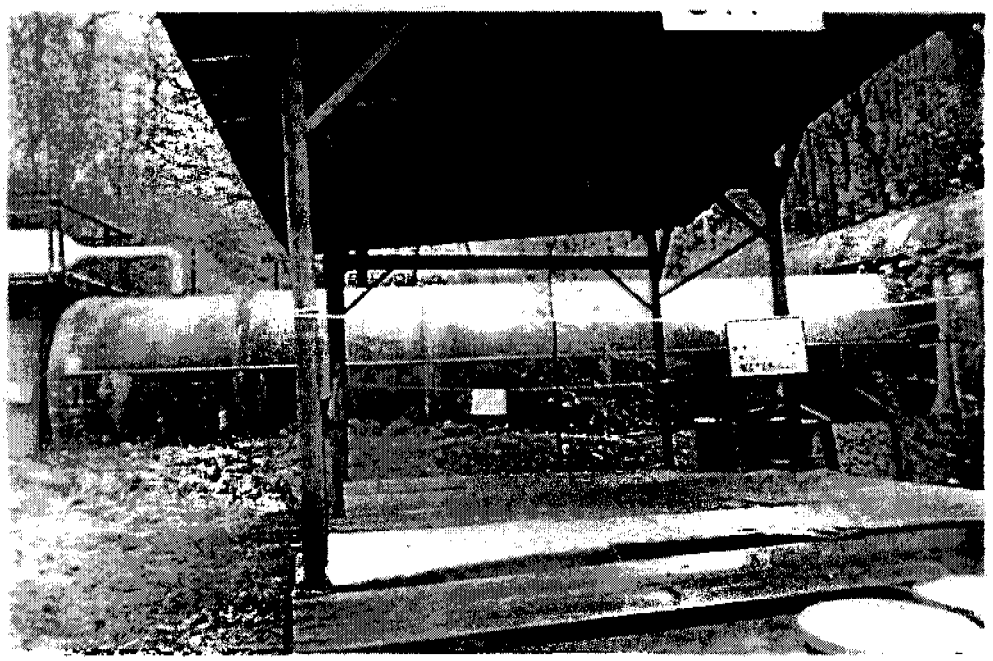
The back yard area showing the place where a building existed behind the non-DU tunnel.

The "back yard" of the facility showing the connection of the DU and non-DU tunnels.

The backside of the non-DU tunnel showing the brook and marked unexploded ordinance.



The inside storage area and HEPA filter system and grounds.



The outside storage area with the DU tunnel in the background. The inside storage area and HEPA area at the left side.

Building 611B entrance showing the connection to the non-DU tunnel. The outside storage area after characterization is at the left.

Building 611B entrance showing the building foyer. The UST is at right center. The instrument room is at the back of the entry way

APPENDIX E
A FINDING OF NO SIGNIFICANT IMPACT PUBLIC NOTICE

1

DAILY RECORD
800 JEFFERSON ROAD
PARSIPPANY, NJ 070540217

CLASSIFIED ADVERTISING

ACCOUNT:

INVOICE: 0000638241 PHONE: 973-724-4159 SALESMAN: 79 AD RATE: LG

U.S. ARMY TACOM-ARDEC
KATHY AUMICK BUILDING 7
PICATINNY ARSEN., NJ 078065000

EXTRA CHARGES: 15.00
AD COST: 96.36
PREPAID: 111.36

BALANCE DUE: 0.00

CLASS: 1000 PUBS: 1 SORT: LEGALN OTICEF
START: 050703 END: 050803 73 LINES 2 TIMES
DAILY: WEEKLY: MONTHLY:

INTERNAL MEMO: FNSI REMOVE RESID.RADIOACTIVE CONTAMIN. RUN 2 DAYS PE

LEGAL NOTICE[B]
FINDING OF NO SIGNIFICANT IMPACT[L]

The United States Army Tank-automotive and Armaments Command, Armament Research, Development and Engineering Center, Picatinny Arsenal, New Jersey has prepared an Environmental Assessment (EA) for the [b]removal of residual radioactive contamination from an approximate 40,000 square foot historically significant depleted uranium testing facility where no future testing will be conducted.[1] The decommissioning/remediation will be done under ARDEC's Source Materials License as amended. The project will involve the removal of DU contaminated: soil, a High Efficiency Particulate Air Filtration System, roofing materials, wood, underground waste water holding tank, hardware, building surfaces, debris and rubble. No other alternative can lead to the release of the building for unrestricted use or resolve the regulatory and potential long-term health and safety exposure risks involved in storing radiological waste. No Action or Restricted Release of the site could lead to the spread of contamination in the area and potentially into the groundwater.

The EA has resulted in a finding of No Significant Impact (FONSI) based on the conclusion that these activities pose no significant threat to the environment at Picatinny Arsenal and the impact for this project can only be positive since the radioactive contamination source will be collected and transported off-site to an authorized low-level radioactive waste disposal facility.

The remediation methods employed are conservative and are intended to reduce contamina-

tion to levels at or below regulatory limits. It is the intent of the U.S. Army TACOM-ARDEC to restore B611B to its pre-remediation condition upon conclusion of this project.

Copies of the EA and the FONSI may be reviewed at the Rockaway Township Public Library, 61 Mt. Hope Road, Rockaway, N.J. 07866, at the Morristown and Morris Township Public Library, 1 Miller Street, Morristown, N.J. 07960 and at Picatinny Arsenal at the Scientific and Technical Information Library, building 59, and the Public Affairs Office, building 1.

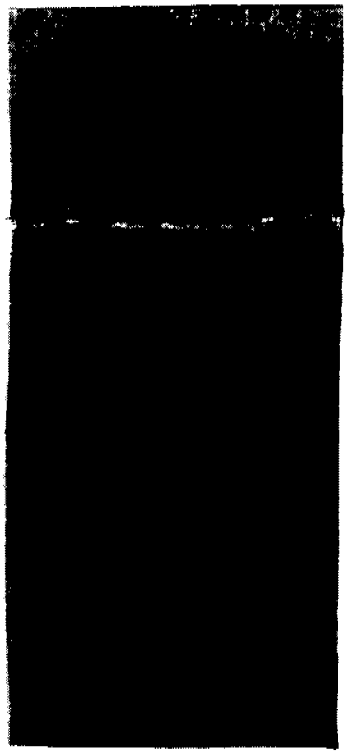
The deadline for submission of written comments is 30 days after publication of this notice. Written comments should be sent to: Commander, TACOM-ARDEC, Attention: AMSTA-AR-QAW-4, Mr. Joseph A. Fabiano, Building 317, Picatinny Arsenal, N.J. 07806-5000.

For further information, please contact the Picatinny Arsenal Public Affairs Office at 973-724.6364.

P.F.$48.16,2-T,5/07,08 [ss]0000638241[invoice]

AFFIDAVIT (PROOF) OF PUBLICATION

STATE OF NEW JERSEY, } ss.
Morris County



LINDA LEAMY

Of full age, being fully sworn according to law, doth depose and say that she/he is employed in the Advertising Marketing Services Dept. of Morris County's Daily Record a newspaper printed and published in the County of Morris, in this State, and generally circulating in Morris, Warren, Sussex, Essex, Union, Passaic and Somerset counties, and the notice, of which the annexed is a printed copy, has been published in said newspaper 2x

Publication being made the 7th & 8th

day of May A.D. 20 03

Sworn to and subscribed before me

this 8th day of May *A.D.* 2003

Notary Public

SHARON GLOVER
NOTARY PUBLIC OF NEW JERSEY
My Commission Expires Nov. 29, 2004

LEGAL NOTICE

FINDING OF NO SIGNIFICANT IMPACT

The United States Army Tank-automotive and Armaments Command, Armament Research, Development and Engineering Center, Picatinny Arsenal, New Jersey has prepared an Environmental Assessment (EA) for the removal of residual radioactive contamination from an approximate 40,000 square foot historically significant depleted uranium testing facility where no future testing will be conducted. The decommissioning/remediation will be done under ARDEC's Source Materials License as amended. The project will involve the removal of DU contaminated: soil, a High Efficiency Particulate Air Filtration System, roofing materials, wood, underground waste water holding tank, hardware, building surfaces, debris and rubble. No other alternative can lead to the release of the building for unrestricted use or resolve the regulatory and potential long-term health and safety exposure risks involved in storing radiological waste. No Action or Restricted Release of the site could lead to the spread of contamination in the area and potentially into the groundwater.

The EA has resulted in a finding of No Significant Impact (FONSI) based on the conclusion that these activities pose no significant threat to the environment at Picatinny Arsenal and the impact for this project can only be positive since the radioactive contamination source will be collected and transported off-site to an authorized low-level radioactive waste disposal facility.

The remediation methods employed are conservative and are intended to reduce contamination to levels at or below regulatory limits. It is the intent of the U.S. Army TACOM-ARDEC to restore B6118 to its pre-remediation condition upon conclusion of this project.

Copies of the EA and the FONSI may be reviewed at the Rockaway Township Public Library, 61 Mt. Hope Road, Rockaway, N.J. 07866, at the Morristown and Morris Township Public Library, 1 Miller Street, Morristown, N.J. 07960 and at Picatinny Arsenal at the Scientific and Technical Information Library, building 59, and the Public Affairs Office, building 1.

The deadline for submission of written comments is 30 days after publication of this notice. Written comments should be sent to: Commander, TACOM-ARDEC, Attention: AMSTA-AR-QAW-4, Mr. Joseph A. Fabiano, Building 317, Picatinny Arsenal, N.J. 07806-5000.

For further information, please contact the Picatinny Arsenal Public Affairs Office at 973-724.6364.

P.F.$48.16,1-T,5/07 0000636241

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P.F.$48.16,2-T,5/07,08 0000636241

P.C12 May 8, 2003 Thursday Daily Record

LEGAL NOTICE

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THE STAR-LEDGER

SATURDAY, MAY 10, 2003

PAGE 24

Finding of No Significant Impact

The United States Army Tank-automotive and Armaments Command, Armament Research, Development and Engineering Center, Picatinny Arsenal, New Jersey has prepared an Environmental Assessment (EA) for the removal of residual radioactive contamination from an approximate 40,000 square foot historically significant depleted uranium testing facility where no future testing will be conducted. The decommissioning/remediation will be done under ARDEC's Source Materials License as amended. The project will involve the removal of DU contaminated: soil, a High Efficiency Particulate Air Filtration System, roofing materials, wood, underground waste water holding tank, hardware, building surfaces, debris and rubble. No other alternative can lead to the release of the building for unrestricted use or resolve the regulatory and potential long-term health and safety exposure risks involved in storing radiological waste. No Action or Restricted Release of the site could lead to the spread of contamination in the area nd potentially into the groundwater.

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The remediation methods employed are conservative and are intended to reduce cotamination to levels at or below regulatory limits. It is the intent of the U.S. Army TACOM-ARDEC to restore B611B to its pre-remediation condition upon conclusion of this project.

Copies of the EA and the FONSI may be reviewed at the Rockaway Township Public Library, 61 Mt. Hope Road, Rockaway, N.J. 07866, at the Morristown and Morris Township Public Library, 1 Miller Street, Morristown, N.J. 07960 and at Picatinny Arsenal at the Scientific and Technical Information Library, building 59, and the Public Affairs Office, building 1.

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For further information, please contact the Picatinny Arsenal Public Affairs Office at 973.724.6364.

Runs 5/9, 10, 2003

NOTICE TO ABSENT DEFENDANTS

STATE OF NEW JERSEY TO:

APPENDIX F

FINDING OF NO SIGNIFICANT IMPACT (FNSI)

U.S. Army Tank-automotive and Armaments Command –
Armament Research, Development and Engineering Center (TACOM-ARDEC)

PICATINNY ARSENAL B611b TEST FACILITY AND ASSOCIATED GROUNDS
FINDING OF NO SIGNIFICANT IMPACT (FNSI)

April 17, 2003

Description of Proposed Action and Alternatives Considered

The proposed decommissioning/remediation action, for which an environmental assessment has been prepared resulting in this FNSI, is the radiological cleanup of the Building (B) 611B Test Facility and grounds. The Army is choosing the unrestricted release approach for decommissioning the site per Title 10 Code of Federal Regulations 40.42, "Expiration and Termination of Licenses and Decommissioning of Sites and Separate Buildings or Outdoor Areas".

The site was designed and constructed in 1929 for testing non-radioactive munitions until 1959 when an east-west tunnel was added for testing depleted uranium (DU) projectiles. This continued up through approximately 1985 when the Army ceased its DU testing activities in B611b. Efforts to initiate the decommissioning process began roughly in the mid 1990's. Amendment 26 of the Source Materials License was issued on October 21, 2002 allowing this installation to proceed with the decommissioning plan

The planned remediation activities will encompass approximately 40,000 square feet. They include: 1. Complete disconnection of all utilities from B611B and the removal of any buried utilities in the area surrounding the underground wastewater holding tank by the installation. 2. Cutting and / or pruning any trees obstructing the removal of the High Efficiency Particulate Air (HEPA) ventilation system by the installation in coordination with the Environmental Affairs Natural Resource Manager. 3. Screening the site for exposed and buried ordnance by certified unexploded ordnance (UXO) experts. 4. Disposal of any live ordnance by qualified contractors. (Names of companies involved with the disposal of ordnance are available through the TACOM-ARDEC Explosive Ordnance Division.). 5. Flashing of any empty rounds by the installation. 6. Use of remediation techniques such as washing, abrasion, cutting, scarification and other typical methods for removal of contamination from building surfaces. 7. Activities described in the Remediation Work Plan, Rev 0, dated Nov 1999 such as removal of : DU contaminated soil, HEPA air filtration ventilation system (with its stainless steel intake screen, prefilter, 50% filter, 90% filter, etc.), contaminated roofing materials from the inside storage room, contaminated wood from the gazebo, underground waste water holding tank, hardware, building surfaces (such as asbestos floor tiles and edging), debris, and rubble. 8. Cover holes and/or replace with non radioactive pieces of wood cut to size. 9. Disposal of all radiological contaminated

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