DEPARTMENT OF THE ARMY
U.S. ARMY ABERDEEN TEST CENTER
400 COLLERAN ROAD
ABERDEEN PROVING GROUND, MARYLAND 21005-5059

REPLY TO
ATTENTION OF

Br. 2

TEDT-AT-COS

26 January 2015

GD 26 JAN 15

MEMORANDUM THRU U.S. Army Test and Evaluation Command (ATEC), Plans and Operations Directorate (CSTE-OP/Mr. Gurvis Davis), 2202 Aberdeen Boulevard, Aberdeen Proving Ground, MD 21005-5051

FOR U.S. Nuclear Regulatory Commission (NRC), Mr. Dennis Lawyer, Division of Nuclear Materials Safety, Region 1, 2100 Renaissance Boulevard, Suite 100, King of Prussia, PA 19406

SUBJECT: Request for Amendment of NRC License SUB-834, Docket No. 04007354

1. This is a request for Amendment of NRC License SUB-834, Docket No. 04007354 dated November 19, 2014. NRC Form 313 is enclosed (Encl 1).

2. U.S. Army Aberdeen Test Center (ATC) submits an update to the Ford's Farm Superbox Facility description (Encl 2). The IOP SL 385-002 Depleted Uranium Contamination Operations at Ford's Farm, Revision 16, dated 2 September 2014 (Encl 3) which replaces the IOP submitted with the application dated August 27, 2008. ATC also requests the addition of new IOP SL 385-004, Ford's Farm Evaporator Operations (Encl 4).

3. Request to change the License Radiation Safety Officer from Mr. Gurvis Davis, ATEC, to Mr. Jeremy Ford, ATC, for all activities under License SUB-834. Mr. Jeremy Ford's qualifications and experience are outlined in enclosure (Encl 5).

4. The point of contact for this action is Mr. Gurvis Davis, Radiation Safety Staff Officer, 443-861-9705, gurvis.davis.civ@mail.mil.

5 Enclosures

GORDON L. GRAHAM
Colonel, LG
Commanding

CF:
U.S. Army Test and Evaluation Command
U.S. Army Public Health Command

NRC FORM 313 (03-2013) 10 CFR 30, 32, 33, 34, 35, 36, 39, and 40

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR MATERIALS LICENSE

APPROVED BY OMB: NO. 3150-0120 EXPIRES: 05/31/2015

Estimated burden per response to comply with this mandatory collection request: 4.3 hours. Submittal of the application is necessary to determine that the applicant is qualified and that adequate procedures exist to protect the public health and safety. Send comments regarding burden estimate to the Information Services Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0120), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW. *AMENDMENTS/RENEWALS THAT INCREASE THE SCOPE OF THE EXISTING LICENSE TO A NEW OR HIGHER FEE CATEGORY WILL REQUIRE A FEE.

APPLICATION FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

OFFICE OF FEDERAL & STATE MATERIALS AND
ENVIRONMENTAL MANAGEMENT PROGRAMS
DIVISION OF MATERIALS SAFETY AND STATE AGREEMENTS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555-0001

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS:

IF YOU ARE LOCATED IN:

ALABAMA, CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, FLORIDA, GEORGIA, KENTUCKY, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, NORTH CAROLINA, PENNSYLVANIA, PUERTO RICO, RHODE ISLAND, SOUTH CAROLINA, TENNESSEE, VERMONT, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA,

SEND APPLICATIONS TO:

LICENSING ASSISTANCE TEAM
DIVISION OF NUCLEAR MATERIALS SAFETY
U.S. NUCLEAR REGULATORY COMMISSION, REGION I
2100 RENAISSANCE BOULEVARD, SUITE 100
KING OF PRUSSIA, PA 19406-2713

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION III
2443 WARRENVILLE ROAD, SUITE 210
LISLE, IL 60532-4352

ALASKA, ARIZONA, ARKANSAS, CALIFORNIA, COLORADO, HAWAII, IDAHO, KANSAS, LOUISIANA, MISSISSIPPI, MONTANA, NEBRASKA, NEVADA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, OREGON, PACIFIC TRUST TERRITORIES, SOUTH DAKOTA, TEXAS, UTAH, WASHINGTON, OR WYOMING,

SEND APPLICATIONS TO:

NUCLEAR MATERIALS LICENSING BRANCH
U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
1600 E. LAMAR BOULEVARD
ARLINGTON, TX 76011-4511

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S.NUCLEAR REGULATORY COMMISSION JURISDICTIONS.

1. THIS IS AN APPLICATION FOR *(Check appropriate item)*

- [ ] A. NEW LICENSE
- [x] B. AMENDMENT TO LICENSE NUMBER SUB-834
- [ ] C. RENEWAL OF LICENSE NUMBER

2. NAME AND MAILING ADDRESS OF APPLICANT *(Include ZIP code)*

Commander
U.S. Army Aberdeen Test Center
400 Colleran Rd
Aberdeen Proving Ground, MD 21005-5059

3. ADDRESS WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

Facilities at APG, MD and
Temporary locations anywhere in United States

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Gurvis Davis

BUSINESS TELEPHONE NUMBER	BUSINESS CELLULAR TELEPHONE NUMBER
(443) 861-9705	(443) 910-0489

BUSINESS EMAIL ADDRESS

gurvis.davis.civ@mail.mil

SUBMIT ITEMS 5 THROUGH 11 ON 8-1/2 X 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL
a. Element and mass number; b. chemical and/or physical form; and c. maiximum amount which will be possessed at any one time. No Change

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED. No Change

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING EXPERIENCE. No Change

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.

9. FACILITIES AND EQUIPMENT. See Attached

10. RADIATION SAFETY PROGRAM. See Attached

11. WASTE MANAGEMENT. No Change

12. LICENSE FEES (Fees required only for new applications, with few exceptions*) *(See 10 CFR 170 and Section 170.31)* FEE CATEGORY: Exempt AMOUNT ENCLOSED $

13. CERTIFICATION. *(Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.*

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35 , 36, 39, AND 40, AND THAT ALL INFORMATION CONTANED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.
WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948 62 STAT. 749 MAKES IT A C RIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

CERTIFYING OFFICER -- TYPED/PRINTED NAME AND TITLE	SIGNATURE	DATE
Gordon L. Graham, Colonel, LG, Commanding		26 Jan 15

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	AMOUNT RECEIVED $	CHECK NUMBER	COMMENTS
APPROVED BY				DATE	

NRC FORM 313 (03-2013)

Encl 1

Ford's Farm Superbox Facility Description

1. GENERAL

a. Location of Fords Farm Test Site

US Army Aberdeen Proving Ground's Fords Farm test area is located within the confines of Aberdeen Proving Ground and 2.3 km from the nearest reservation boundary line. The APG land boundary lines are secured with a chain link fence and posted for no trespassing. The water boundary is patrolled when any water impacts are expected. During non-duty hours it is patrolled on a random time basis. The shore line is posted at prominent points for no trespassing. During normal duty hours, access to Fords Farm is controlled by a Range Control tower operator and by a security gate located on the single access road/entrance point to the facility. During non-duty hours, the security gate is locked and the area is routinely patrolled by security personnel. The actual Fords Farm test area (restricted) is posted with US Army Restricted Area Warning signs in accordance with physical security regulations. The restricted area perimeter is a minimum of 50 meters (irregular circular configuration) from the target enclosure/dome.

b. Purpose of the Test Facility

Fords Farm is a vulnerability/lethality test facility specifically designed to test armor and munitions containing depleted uranium (DU) components in a safe and environmentally compliant manner. Other materials such as tungsten are also tested. The facility is used for testing targets varying in size from armor plates to fully loaded combat vehicles; for research and development of passive and reactive armors using large caliber kinetic energy (KE) projectiles and chemical energy (CE) shaped charge warheads; and performing lethality testing of developmental and production ammunition. Projectiles are fired into test targets using various direct-fire weapons (typically 105 or 120-mm cannons) located at engagement ranges up to 181 meters with projectile velocities varying from 900 to 1800 m/s and DU penetrators of up to 5 kg are fired. CE warheads are statically detonated against targets inside the enclosure. Testing parameters including penetrator size, velocity and geometry as well as target composition and configuration vary for each test/project. The rate of firing is determined by the amount of time required for test setup/preparation and cleanup after each test. The average firing rate is 8 to 10 rounds per week.

c. Test Parameters Affecting Contamination Levels

The penetrator mass and velocity and the types of targets (to include obliquity) being tested will affect the extent of DU aerosolization upon target impact. After target impact the DU material takes the following forms in various amounts:

(1) Bonded to the target materials within the impact area.

(2) Divided into various size particles (visible).

Encl 2

(3) Aerosolized into finely divided particles (microscopic).

(4) Changed to uranium oxide fragments.

(5) Remains as fired material.

d. Pathways for Spread of Contamination

The possible pathways for the spread of DU from the enclosure and the restricted area to the environment are:

(1) Emission of DU aerosol from the enclosure via the exhaust system, or leaks.

(2) Removal of surface contamination on target materials or protective clothing from controlled areas.

(3) Escape of DU fragments from the enclosure.

(4) Disposal of water used for decontamination and dust control in the enclosure.

e. Worker Exposure

The exposure of radiation workers to ionizing radiation is also of concern. The following discussions will show how the facility engineering and operating procedures control personnel exposure and the spread of DU via the above paths.

2. FACILITY DESCRIPTION

a. The facility is comprised of the following primary areas:

(1) Personnel Control Point

(2) Personnel Change Area (Protective Clothing)

(3) Firing Site

(4) Stripper Plate

(5) Up-range Instrumentation Enclosure

(6) Downrange Instrumentation Enclosure

(7) Radiographic Analyzing Facility

(8) Collection Tank

(9) Mechanical Building

(10) Electrical Enclosure

(11) Target Enclosure

b. Description of Facility Areas.

(1) Personnel Control Point. The Main Office of the test facility is located in Building 910. All personnel entering the facility are required to report to the Main Office upon arrival. All required documentation, regulations, and postings are located in this building.

(2) Personnel Change Area (Protective Clothing). The change area is a building specifically designed for and used to change into and out of protective (anti-contamination) clothing. All protective clothing (coveralls, gloves, footwear, etc.) used are retained in this controlled area until properly disposed of as contaminated waste.

(3) Firing Site. The weapon emplacement is at the firing site. The weapon consists of various types of hardware dependent upon the type of test and/or projectile being used. The weapon is generally located between 100 and 181 meters from the target. A rail system is used to move the weapon to the desired engagement range. The weapon is remotely fired from the up-range firing enclosure.

(4) Stripper Plate. A vertical piece of armor plate is positioned approximately 26 meters from the weapon on the line of fire. An aperture in the plate permits passage of the penetrator while the plate stops the discarded hardware (i.e., sabots) from traveling further downrange and damaging the enclosure/facility.

(5) Up-range Instrumentation Enclosure. The up-range instrumentation enclosure houses the computer that is installed to operate the on-site equipment. It is connected by fiber optics to the downrange instrumentation enclosure. This link enables personnel to control/communicate with downrange equipment during test firings while under the protective cover of the up-range enclosure.

(6) Downrange Instrumentation Enclosure. The downrange instrumentation enclosure houses the equipment necessary to record projectile velocities and other instrumentation used to evaluate target and/or munition performance.

(7) Radiographic Analyzing Facility. The digital radiographic analyzing facility is located in one area of Building 910. Orthogonal x-ray and other data is processed and analyzed to assess projectile flight characteristics and munition/target interaction.

(8) Collection Tank. Waste water is stored in a 20,000 gallon collection tank. System piping is a double wall welded piping system. The tank is positioned in a fully enclosed concrete vault with removable roof panels and a 4-foot square roof hatch. This vault provides double containment of potentially DU-contaminated water.

(9) Mechanical Building. The mechanical building is a pre-fabricated Shenango steel building which houses the air compressor. The plant air system utilizes a new Screw style compressor. This compressor is rated at 145 ACFM and 150 psig full load with a 135 psig minimum. A particulate filter is provided before and after a heatless compressed air dryer of the regenerative type. The dryer is rated at 200 scfm minimum at 150 psig and a dew point of -20°F. Compressed air from the plant air system is distributed to the equipment door seal, compressed air station at the staging pad, flow damper operators, the dust collector cleaning nozzles, and the low speed door (LSD) cylinder actuator. Local pressure regulators are used to provide required pressure at the individual devices.

(10) Electrical Enclosure. This pre-fabricated Chieftain building houses the motor control center.

(11) Target Enclosure. The target enclosure consists of an 84-ft diameter hemisphere shaped vessel/dome designed to contain potential contaminants generated during testing. The nominal wall thickness of the steel vessel body is 1-inch. The bottom edge of the vessel is welded to a 3-foot wide ring-like base plate. The floor plate is similar to the base plate and is welded to the inside of the vessel wall 2 feet above the base plate. The base plate and the floor plate are tied together on their outer edges by an angle iron gusset work to provide stability. The lower 8 feet 5 inches of vessel height is referred to as the first course. The first course plate thickness is 1-1/2 inches to provide lower edge reinforcement. Above the first course the plate thickness is nominally 1 inch. Essential welds are full penetration welds. Weld inspection was a 100-percent radiographic test (RT). There are various parts of the vessel to include the air filtration system, flight tunnel, equipment door, low-speed doors, and the fragmentation shield. Each of these is discussed in detail.

c. Air Filtration System.

(1) Supply Air System

Two 4-foot supply air headers move the clean air from the supply air trains into the vessel through a large 6-foot penetration on the top of the vessel. The air travels into the vessel, where it is diffused by a supply air plenum located on the top of the fragmentation shield. Both headers are connected to the vessel penetration through flexible metal bellows to provide relative movement of the vessel and headers. In addition, shock absorbing mounts are used to support the headers on the vessel wall.

The supply air system consists of two independent trains, which are not operated simultaneously due to pressure imbalances. If failure in one train occurs, the other train can be used as a backup. Each train contains a roughing filter, blower, isolation dampers, and ducting.

The roughing filter is provided to filter out dust, insects, and other debris from the outside supply air.

The centrifugal-type blowers in each unit are capable of delivering 32,000 CFM of air. The blowers are driven by 50-hp electric motors and operate only in an off or on mode.

There are two dampers associated with each train. One damper isolates the particular train from the dilution line and one damper isolates the particular train from the containment vessel. These latter two dampers are high pressure dampers and protect the air supply trains from high pressure pulses that can originate within the containment vessel during tests.

The round ducting for the air supply subsystem is 4 feet in diameter. The portion of the ducting outside of the pressure boundary is fabricated from 1/8-inch ASTM A36 carbon steel sheets, and the portion inside of the pressure boundary is fabricated from 3/8-inch ASTM A36 carbon steel sheets. This ducting, which starts at the outlet of the air supply units, proceeds toward the containment vessel and then arches up to the top of the vessel. At the top of the vessel, both trains penetrate the containment vessel through a common 6-foot round duct penetration. Upon entering the structure, the supply air stream is divided so as to obtain proportionate flow rates inside and outside of the fragmentation shield.

(2) Exhaust Air System

The exhaust air system consists of two equal capacity trains. Each train consists of a blower, high efficiency filter system, ducting, and several dampers..

The exhaust blowers, which are centrifugal-type blowers, each have the capability of delivering a minimum of 32,000 CFM of air. The blowers are driven by 100-hp electric motors and are isolated from the ducting with 1/4-inch neoprene boots to dampen the noise transmission.

Each filter train consists of a high-efficiency cartridge filter bank with automatic cleaning and a HEPA filter bank with disposable filters. The combined efficiency of the filters in each train is greater than 99.97 percent. The cartridge (pre-filter) bank will have an efficiency of at least 99.95 percent (at 0.5 μ) over the life of the filters after the filters have been seasoned. The HEPA filter bank has a minimum efficiency of 99.97 percent for aerosol having a homogeneous particle size down to 0.3 μ. All filters within the trains (cartridge and HEPA) have bag in/bag out capabilities, so in the event they become saturated, they can be replaced without personnel exposure to fine DU particulates.

There are eight penetrations from inside the vessel that connect to the exhaust duct that encompasses the vessel in a horseshoe-type arrangement, four on each side of the vessel. The air flow from the containment structure leaves the main part of the structure through a perforated plate, which is the inner wall of a triangular shaped plenum around the periphery of the structure. The flow follows around this peripheral plenum and exits the vessel through the eight penetrations. This circuitous route results in the flow being uniform and with a relatively slow velocity as it exits the vessel and essentially prevents any fragments or sparks from entering the exhaust lines.

(3) Operation and Maintenance

The containment aerosol content is continually monitored. The primary function of the filtration system is to replace the vessel air for personnel safety while preventing any contaminants from escaping into the atmosphere for environmental protection.

(a) Flight Tunnel. The primary purpose of the flight tunnel is to contain the ventable gas volume resulting from a test event that involves detonation of high explosives (HE) less than or equal to 100-pound TNT. The tunnel is 60 feet long and has an external diameter of 16 feet. Tunnel wall thickness is nominally 1/2 inch. An interfacing flange is welded on the vessel side of the tunnel. This flange interfaces with a 16-foot diameter flexible metal bellows. The bellows function is to isolate shock and vibration transmission from the vessel to the tunnel.

(b) Equipment Door. Access for equipment and personnel is provided through the equipment door. When closed, the door is sealed to the door frame to provide pressure containment during testing. The door is a sliding type door that is moved from in front of the door frame. The door is electrically operated, with manual back-up. Support for the door is primarily by the staging pad, located on the outside of the vessel. Two large backing gussets provide load transfer from the door to the concrete pad as a result of blast loading during testing. Door controls are provided on the outside of the vessel for open, close, and stop operations.

(c) Low Speed Door. The low speed door (LSD) closes after passage of a projectile fired during testing to contain contaminated air by-pass. Integrated in the LSD design is the air-exhaust plenum. The plenum is a carbon steel box-like structure with a 36-inch diameter pipe extending through the end of the plenum. A 36-inch diameter hole is located on the side of the plenum to which a flexible duct is attached to provide air collection by the vessel filtration system.

The LSD is a hinged round aluminum plate installed at the end of the plenum. The door is actuated by a 3-inch diameter double acting air cylinder. Air for control of LSD actuation is provided through the plant air system.

(d) Fragmentation Shield. Inside the vessel is a fragmentation shield measuring 40 x 40 x 24 ft high made of 4 inch thick mild steel designed to stop fragments generated during testing from impacting/penetrating the vessel wall. The fragmentation shield is anchored to a steel pad, which is embedded in the vessel's concrete foundation. Doorways for personnel/equipment access and covered portholes to vent overpressure during testing are incorporated into the walls of the shield. An air distribution plenum is located on the top of the shield to uniformly distribute air from the air filtration system throughout the vessel.

d. Modifications Being Considered.

In compliance with the As Low As Reasonably Achievable (ALARA) principle, continued emphasis is placed on methods of lowering exposure of personnel to contaminants and releases to the environment through engineering services. No modifications or changes are made that degrade the performance or integrity of the enclosure and air filtration system; all other modifications are approved by ATC Radiation Safety Committee.

3. OPERATING PROCEDURES

Operating procedures for Fords Farm are detailed in ATC IOP SL 385-002, Depleted Uranium Contamination Operations at Fords Farm, and ATC SOP 385-1067, Firing Weapons Ground-to-Ground and Ground-to-Air. IOP SL 385-002 establishes the procedures and responsibilities for safe operations in DU contaminated areas at Fords Farm. SOP 385-1067 establishes responsibilities, safety requirements, and operating procedures for the firing of weapons.

Access to the facility and basic vessel startup procedures are as follows. Entrance to and exit from the Fords Farm restricted test area during normal duty hours is control by a Range Control tower operator and by a security gate located on the single access road/entrance point to the facility. The operational control for each component is already placed in a standby or automatic control state prior to vessel operation. The Facility Manager will start the Plant Air System, which provides compressed air to all the air actuated valves and controls. This process takes up to 10 minutes to get up to operating pressure. The Facility Manager will turn on the Vessel Monitor, DataRAM 4 (outside next to vessel) and the Exhaust Stack Monitor (at the base of the vessel exhaust stack). These monitors provide real-time monitoring of particulates inside the vessel and being exhausted from the vessel to alert personnel of potential airborne contaminants.

4. RESPONSE TO FIRES

a. The amount of combustible material inside the dome is minimal. Fires caused by testing will be allowed to burn themselves out/self-extinguish.

b. Initial entry by personnel into the dome after a test is made while wearing respiratory protection and other personal protective equipment. Additionally, portable fire extinguishers are carried to extinguish any residual fires.

5. RADIOLOGICAL MONITORING

a. The following instrumentation or methods may be used to measure radiation or monitor personnel in radiologically controlled areas.

1) Portable contamination monitors

2) Portable air samplers

3) Routine smear and dose rate surveys.

4) Air sampling of the ventilation exhaust. The filters will be changed weekly during testing. Changes to the frequency will be determined by the ATC RSO with concurrence of the ATC Radiation Safety Committee.

5) Low volume environmental air samples (operated 24/7)

6) Dose rate monitoring instruments (i.e. AN/PDR-77 with VDR-2)

7) Bioassay (urinalysis) sampling of personnel involved with DU operations.

b. Decontamination, Waste Disposal, and Radiation Worker Exposure.

Decontamination, Waste Disposal, and Radiation Worker Exposure are addressed in SOPs 385-002, Depleted Uranium Contamination Operations at Fords Farm, and SOP 385-7312, Handling, Packaging, and Shipping Radioactive Waste.

c. Air Sample Analysis

The analysis of the air samples is performed using gas-flow proportional counting. Air concentrations are calculated and compared to the regulatory values.

d. Containment Integrity

The integrity of the facility is determined by, but not restricted to, the listed methods.

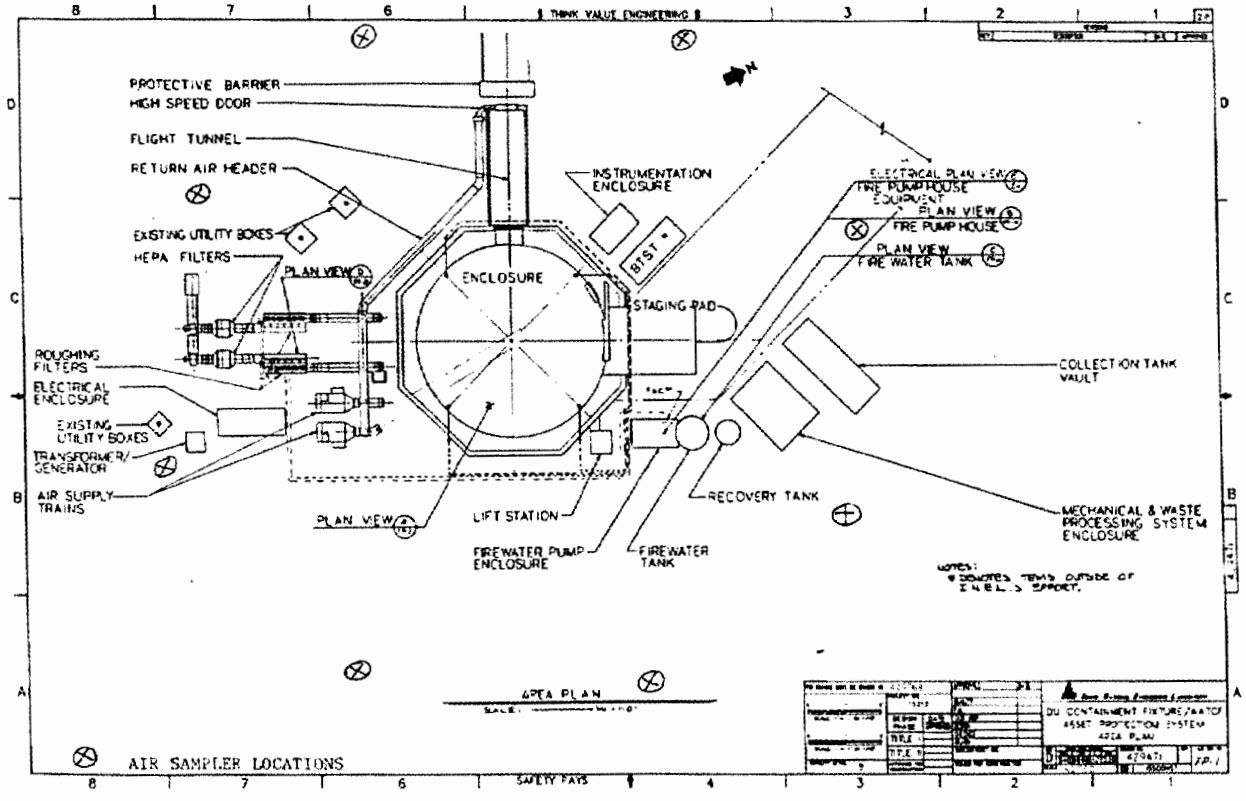
1) Visual inspections of the exhaust train and the filter banks.

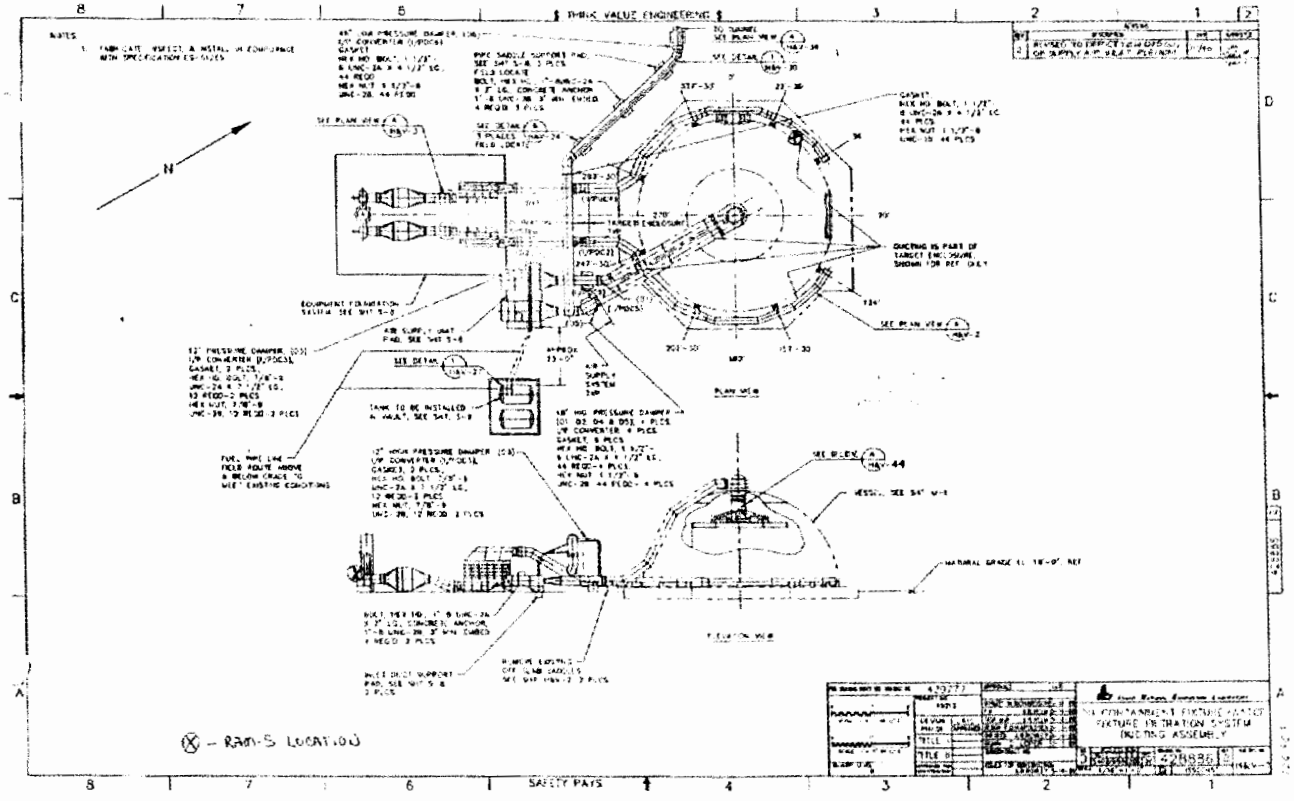
2) Random radiographic coverage of possible leakage areas.

3) Spot sample at random times as determined by the RSO.

4) Visual inspection of the target enclosure/vessel.

The Facility Manager and RSO are responsible for containment integrity. They will make the required visual observations as well as review all the pertinent data relevant to containment integrity. Corrective action will be immediately taken when indicated by the data.


PROTECTIVE BARRIER
HIGH SPEED DOOR
FLIGHT TUNNEL
RETURN AIR HEADER
EXISTING UTILITY BOXES
HEPA FILTERS
PLAN VIEW
ENCLOSURE
INSTRUMENTATION ENCLOSURE
STAGING PAD
ROUGHING FILTERS
ELECTRICAL ENCLOSURE
EXISTING UTILITY BOXES
TRANSFORMER/ GENERATOR
AIR SUPPLY TRAINS
PLAN VIEW
LIFT STATION
FIREWATER PUMP ENCLOSURE
FIREWATER TANK
RECOVERY TANK
COLLECTION TANK VAULT
MECHANICAL & WASTE PROCESSING SYSTEM ENCLOSURE
ELECTRICAL PLAN VIEW
FIRE PUMPHOUSE EQUIPMENT
PLAN VIEW
FIRE PUMP HOUSE
PLAN VIEW
FIRE WATER TANK
NOTES:
* INDICATES ITEMS OUTSIDE OF ENEL'S SUPPORT.
AREA PLAN
AIR SAMPLER LOCATIONS
SAFETY PAYS


PUBLIC VALUE ENGINEERING
SAFETY PATS
⊗ - RAM-S LOCATION

US ARMY ABERDEEN TEST CENTER
ABERDEEN PROVING GROUND, MD 21005-5059

INTERNAL OPERATING PROCEDURE
SL 385-002
2 DECEMBER 2014

FOR

DEPLETED URANIUM CONTAMINATION OPERATIONS AT FORDS FARM

PREPARED BY: _____ DATE: 12/3/14
JULIE A. LONG, Fords Farm Facility Manager, 278-2643

REVIEWED BY: _____ DATE: 12/3/14
JEREMY S. FORD, Radiation Safety, 278-6417

REVIEWED BY: _____ DATE: 12-3-14
HEIDI K. HOOKS, ATC Industrial Hygiene, 278-2536

CONCURRENCE: _____ DATE: 12/10/14
JEANNE M. DITTER, Chief, Safety Program Management Division, 278-2281

APPROVAL: _____ DATE: 12/11/14
MICHAEL P. SCHULZ, Chief, Vulnerability/Lethality Division, 278-7203

End 3

SUPERVISOR'S, TEST DIRECTOR/ENGINEER'S AND EMPLOYEE COMPLIANCE INSTRUCTIONS AND STATEMENTS

All personnel will comply with the procedures and requirements set forth in this internal operating procedure (IOP).

Failure to do so may result in death, personal injury, property damage, and/or damage to equipment entrusted to our care. Individuals who fail to follow this IOP may be subject to disciplinary action.

Any deviation(s) from the procedures set forth herein are not authorized. Changes to this IOP must be coordinated and approved prior to implementation.

When procedures in this IOP do not adequately or specifically cover the requirements to perform the operation or task safely, the operation or task will not be started, or if in progress, will be halted until the IOP has been changed. The supervisor and/or employee in charge are responsible for notifying all personnel involved in the operation or task of any stoppages associated with this IOP.

Initial training on this IOP will be given to newly assigned workers by their first line supervisor. After this training, the worker must sign the Employee's Statement Form. In addition, prior to each operation/task the supervisor or test director will brief workers on at least the following:

a. Specific task requirements and procedures.

b. Individual responsibilities and safety precautions.

c. Any approved changes to the IOP.

SUPERVISOR'S, TEST DIRECTOR/ENGINEER'S AND EMPLOYEE STATEMENT

I have read (or have had read to me) and understand the safety and environmental requirements, personnel and explosive limits (if applicable), work description/methods and inspection requirements necessary to accomplish the operation. My supervisor and/or test director has trained me, and I am familiar with my assignments for the operations covered by the IOP. I agree to abide by these instructions throughout my assignment to the operation.

If the IOP does not cover the methods or the procedures to conduct the operation safely, I will immediately stop the operation and inform my supervisor and/or the worker in charge of the situation.

EMPLOYEE DATE

IOP PREPARER'S
ANNUAL REVIEW

I have reviewed this Internal Operating Procedure. The IOP is technically accurate, work practices have not changed, and proper controls are in place to mitigate all identified hazards.

I have reviewed this Internal Operating Procedure. The IOP is not technically accurate and/or additional hazards have been identified. The following changes are recommended:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(Signature/Date)

1. **PURPOSE:** To establish procedures for safe operations in Depleted Uranium (DU) contaminated areas at Fords Farm.

2. **APPLICABILITY:** The IOP applies to all personnel involved in activities that take place in potentially contaminated areas.

3. **PERSONNEL LIMITS:** Operating and transient personnel are restricted to the minimum number (but never less than two) required to accomplish the task in a safe and efficient manner. Personnel working in potentially contaminated areas at Fords Farm will be required to wear the level of personal protective equipment (PPE) associated with the radiological hazard for the operations conducted. Personnel will also be entered into the DU Medical Surveillance Program.

4. **RESPONSIBILITY:**

a. **Radiation Safety Officer (RSO) will:**

(1) Provide Initial and Annual Radiation Training.

(2) Maintain the Depleted Uranium Medical Surveillance Program.

(3) Investigate any known or suspected overexposure or internal uptake of radioactive material.

(4) Conduct routine inspections of operations conducted in contaminated areas.

b. **Facility Operations Manager will:**

(1) Ensure appropriate decontamination facilities are operational and functional.

(2) Ensure the equipment necessary to support the Radiation Protection Program is functional.

(3) Ensure only qualified personnel conduct operations in contaminated areas.

(4) Notify the supervisor if any operation does not comply with this IOP, Nuclear Regulatory Commission (NRC) License SUB-834, and applicable radiation permits (RP).

(5) Notify the RSO and Safety Process Improvement Division if a facility or operational condition exists that could compromise personnel safety.

c. **Test Officers will:**

(1) Stop testing events if any unsafe condition exists.

(2) Provide necessary resources to ensure operations are conducted in a safe manner.

d. **Supervisors will:**

(1) Ensure personnel working in contaminated areas have appropriate training and to notify the Facility Operations Manager when training is due.

(2) Ensure personnel working in contaminated areas are entered into the Depleted Uranium Medical Surveillance Program.

e. **Industrial Hygiene will:**

(1) Provide Initial and Annual Respiratory Protection Training.

(2) Provide annual fit testing of respirators.

(3) Provide any additional guidance/instructions on an as needed basis in support of Fords Farm appointed Vulnerability/Lethality Technicians (VLTs) who maintain their own respirator equipment due to the Depleted Uranium hazards associated with Fords Farm operations.

f. **Radiation Safety Support will:**

(1) Prepare Personal Air Monitor (Lapel Sampler) for daily operations IAW with paragraph 6e of this IOP and document on Lapel Log Worksheet (Appendix B):

(a) Assign a specifically identified sampler to each individual entering the dome and label the sampler and cartridge with the individual's name and last four digits of their SSN.

(b) At the beginning of each shift, record the start time and flow rate on the Lapel Log Worksheet for each individual.

(c) At the end of each shift, record the end flow rate, stop time, and total run time (in minutes) on the Lapel Log Worksheet for each individual.

(d) Complete the Lapel Log Worksheet and the Radiation Safety forms (Appendix C) to accompany samples for analysis by RS.

g. **Vulnerability/Lethality Technicians (VLTs) will:**

(1) Complete section 4f in its entirety when Radiation Safety support is not available.

(2) Prepare survey meter(s) for daily operations IAW with paragraph 6d of this IOP and document in assigned Quality Control Log Book (See Appendix D for sample page).

(3) Monthly Deep Cleaning of Respirator Masks:

(a) Perform a complete breakdown of mask components to include filters, gaskets, inhalation valves, and nose cone.

(b) Prepare two bins with fresh water. The first bin contains a cleaning solution and the second bin is for rinsing.

(i) Submerse mask components in cleaning solution for 5 minutes.

(ii) Scrub components with approved mask brush.

(iii) Rinse components in second bin.

(c) Dry components with approved drying cloth.

(d) Reassemble mask, replacing components when necessary (wear and/or damaged).

(e) Place new filters on mask (old filters will not be reused).

h. **ALL Radiation Workers will:**

(1) Conduct operations in a manner that ensures exposures will remain As Low As Reasonably Achievable (ALARA).

(2) Notify the Facility Operations Manager, immediate supervisor, and the RSO if a suspected overexposure or internal uptake of radioactive material occurs.

(3) Notify the Facility Operations Manager if a facility or operational condition exists that could compromise personnel safety.

(4) Conduct operations IAW this IOP, NRC License SUB-834, and applicable RP(s).

(5) Ensure adequate supplies are staged in the restricted area including but not limited to:

a. Adequate supply of masslin wipes to perform large area wipe (LAW) surveys.

b. Adequate supply of disposable gloves.

c. Adequate supply of Tyvek coveralls in various sizes.

d. Roll of tape for sealing PPE.

i. **Dome Entry Team Personnel Will**:

(1) Retrieve their prepared Lapel Air sampler and attach as directed in paragraph 7b(1) of this IOP. Personnel will note entry and exit time(s) on the Lapel Log Worksheet so that Radiation Safety support can complete documentation required for Radiation Safety analysis.

(2) Follow all ingress and egress procedures as outlined in paragraph 7b and 7c of this IOP.

(3) Perform daily respirator inspection of personal mask prior to exiting the change room.

(4) Perform decontamination on personal mask as per paragraph 7c(10) and 8b at the end of their shift.

j. **Non Dome Entry Team Personnel Will:**

(1) Place prepared survey meter(s) in designated location(s) for daily operations.

(2) Place clean container for lapel samplers in the unrestricted area of the change room.

(3) Place clean container for respirators in the unrestricted area of the change room.

5. **POTENTIAL HAZARDS:** Hazards are those associated with the heavy metal and radioactive components of DU. Hazards also include non-radioactive contaminants in munitions and targets tested at Fords Farm.

6. **PRE-OPERATIONAL PROCEDURES:**

a. **Powered Air Purifying Respirators (PAPR) Inspection:**

(1) Inspect entire unit for cracks, dirt, or excessive wear.

(2) Inspect breathing tube for punctures, holes, cracks, or excessive wear.

(3) Check gaskets for tears, wear, or distortion.

(4) Check flow rate (must be 6 cfm or higher).

(5) Check headgear for suspension damage.

(6) Check all connections and attachments for fit and tightness.

(7) Examine face piece for tears, cracks, distortion, and excessive wear.

(8) Ensure battery is fully charged.

(9) Change cartridge/filter monthly.

b. **Full Face Respirator Inspection:**

(1) Check for cracks, dirt, distortion, or excessive wear.

(2) Check for tightness of all connections.

(3) Examine inhalation valves for signs of distortion, cracking, or tearing.

(4) Verify filter gaskets are properly seated and in good condition.

(5) Check headgear for loss of elasticity.

(6) Examine face seal for tears, cracks, distortion, and excessive wear.

(7) Change cartridge/filter in accordance with manufacturer recommendations or monthly, whichever comes first.

c. **Air Line Respirator/Welder's Hood Inspection:**

(1) Air compressor is working and carbon monoxide readings are acceptable.

(2) Inspect entire unit for cracks, dirt, or excessive wear.

(3) Inspect breathing tube for punctures, holes, cracks, or excessive wear.

(4) Check gaskets for tears, wear, or distortion.

(5) Check headgear for suspension damage.

(6) Check all connections and attachments for fit and tightness.

(7) Examine face piece for tears, cracks, distortion, and excessive wear.

d. **Radiation Detector Quality Control (QC):**

(1) Inspect the cable that connects the Geiger-Muller (G-M) detector to the survey meter for signs of damage or erratic signal.

(2) Perform a battery check.

(3) Conduct a background reading.

(4) Perform a source/operational check and document in quality control log book.

e. **Personal Air Monitor (Lapel Monitor):**

(1) Attach filter cartridge to air monitor.

(2) Attach air flow calibrator to air monitor.

(3) Turn on air monitor and air flow calibrator.

(4) Adjust flow to 2.00 cfm with small screwdriver.

(5) Write down flow on Lapel Log Worksheet.

(6) Detach air flow calibrator from air monitor and turn off.

f. **Air Samplers:**

Listed are sampling equipment that may be used at Fords Farm.

(1) Spot Sampler. High volume air samplers may be used to measure DU air concentrations at locations about the enclosure structure where particulate leakage could occur. These locations include the flight tunnel, equipment door, and exhaust. The collection medium is a glass fiber filter with a collection efficiency of 99.9 percent for dispersed oil particulate (DOP) aerosol.

(2) Workplace Particulate Monitoring. This air sampler is a commercially made real-time aerosol monitor (DataRAM 4, DR-4000 manufactured by Thermo Scientific). The sample is withdrawn from inside the fragmentation shield after firing. The instrument does not distinguish between DU or other dust particulates (it measures all air particulates), so its measurement gives a conservative estimate of a radiological hazard. The instrument reads out aerosol concentration in terms of μg/m3.

(3) Personal Air Monitor. An individual lapel-mounted sampler (AIRCHEK 52 by SKC Inc.) are worn by the workers upon entering the Fords Farm dome to monitor heavy particulate suspension operations such as clean up.

(4) A Low Volume air sampling station, operated not greater than 5 cubic feet per minute. The pumps are equipped with a constant air flow regulator enabling the system to be adjusted.

(5) An effluent sampler is used to monitor the air ventilation system's exhaust to the environment.

7. OPERATIONAL PROCEDURES:

a. **Fords Farm Dome Entries:**

> **NOTE:**
> All entries into the Fords Farm dome require a minimum of two people. The second person should be ready to assist the individual in emergency egress from the dome.

(1) Determine the respiratory protection requirements based on Personal Air Monitor and Workplace Particulate Monitoring results.

(2) Personnel using a supplied airline respirator shall have an emergency back-up crew ready to assist them if an emergency arises such as loss of supplied air. The back-up crew shall maintain a line of sight with the individual as much as possible. Personnel should establish hand signals in case of an emergency.

b. **Ingress:**

(1) Attach Personal Air Monitor.

(2) Don protective outer garment (i.e. Tyvek).

(3) Tape zipper.

(4) Don first pair of Nitrile gloves or equivalent.

(5) Tape wrists.

(6) Don second pair of disposable gloves.

(7) Sit on bench and remove personal shoes on clean side of restricted area.

(8) Without allowing feet to touch the hot side floor, swing feet over bench and don boots in contaminated area.

(9) Place protective outer garment over boots and tape seam.

(10) If operation requires respirator, visually inspect and don respirator.

(11) Respirator Types:

(a) If wearing full face respirators; attach cartridges and perform user seal checks.

(b) If wearing PAPR, have buddy attach belt, battery, and hose assembly.

(c) If wearing a Supplied Airline respirator with welder's hood, connect airline to hood supply hose fitting.

(12) Don outer leather or work gloves.

(13) Have buddy inspect PPE and taped areas to ensure protection before exiting change room or entering the dome.

(14) Pull up protective outer garment hood.

(15) Proceed into radioactive material restricted area.

c. **Egress:**

(1) Enter change room.

(2) Remove welding jacket if worn.

(3) Remove outer work gloves and place on rack.

(4) Remove tape from zipper, wrists, and boots.

(5) Remove outer pair of disposable gloves **OR** don clean gloves, and then remove the tape from hood and respirator seal.

(6) If wearing PAPR, disconnect hose from helmet, remove belt and place belt on rack.

(7) If wearing a Supplied Airline respirator with welder's helmet, have buddies wipe down the helmet and shroud.

(8) If wearing a full face respirator, remove filters and place into bag.

(9) Remove respirator.

(10) For Full-Face: Rinse the outside of the face piece only in warm water and place in "CLEAN" respirator bin. For PAPR or Supplied Airline respirators: remove the shroud and wipe down exterior surfaces and place items in "CLEAN" bin.

(11) Carefully hold exposed end of Personal Air Monitor and have buddy assist removing Tyvek.

(12) Remove Personal Air Monitor and place in bin.

(13) Sit on bench and remove boots, then swing feet over bench to clean side of restricted area.

(14) Remove remaining nitrile or equivalent gloves.

(15) Put on personal shoes.

(16) Perform 100% radiation frisk, starting with hands and then move from highest point to lowest point. If decontamination fails, notify RSO at 278-6417.

(17) Exit radioactive material restricted area.

(18) Wash hands.

8. POST OPERATIONAL PROCEDURES:

a. **Lapel air samplers:**

(1) Don disposable gloves.

(2) Take the container of samplers to the unrestricted area sink.

(3) Wipe down each sampler and check the wipe for contamination. Un-contaminated samplers may be transported to the office area for recharging.

(4) Perform a large area wipe (LAW) of the container and check for contamination.

b. **Respirators:**

(1) Don disposable gloves.

(2) Remove respirators and components from clean bin and conduct a final rinse for full-face respirator or final wipe down of exterior surfaces on PAPR or Supplied Airline welder's hood.

(3) Perform a direct frisk (using a Ludlum 3 Survey Meter) of PAPR and Supplied Airline shroud or neck covering if it is going to be reused.

(4) Wipe PAPR or Supplied Airline respirator helmet with a large area wipe and check with a meter for contamination.

(5) Place full-face respirator on rack to dry. Place PAPR or Supplied Airline head gear in clean storage area if contamination levels are equal to background using direct frisk (using a Ludlum 3 Survey Meter) and LAW techniques.

(6) When negative pressure full-face respirators are dry, perform a direct frisk (using a Ludlum 3 Survey Meter) on all surfaces to check for contamination. Clean respirators may be placed in storage.

c. **Radioactive Material Surveys:**

(1) Conduct LAW of restricted area bench and check with meter for contamination.

(2) Conduct LAW of metal restricted area table and check with meter for contamination.

(3) Conduct LAW of "CLEAN" respirator bin and check for contamination.

(4) Ensure unrestricted area sink is not contaminated by direct frisk or LAW.

(5) Conduct internal boot survey with meter.

(6) Conduct meter survey and LAW for any items removed from contaminated area (i.e. tools, hoses, tape, camera, etc.).

(7) If contamination is found in any area, attempt to decontaminate. If decontamination fails, notify RSO at 278-6417.

d. **General Maintenance:**

(1) Inventory PPE; notify Facility Operations Manager if supplies are low.

(2) Empty radioactive waste bins.

(3) Clean sinks to prevent buildup of radioactive material.

(4) Inspect respirators.

(5) Refill soap and cleaning supplies.

NOTE:
CHECK WITH RSO PRIOR TO BRINGING CHEMICALS INTO CONTAMINATED AREAS.

9. **INITIAL TRAINING FOR RADIATION WORKERS:** Workers in the contaminated area must have at minimum:

a. Documented training on the health effects of DU.

b. Documented training on the usage of general radiation detection equipment, including procedures on scanning for contamination and LAW surveys.

c. Documented training on respiratory protection.

d. Documented training on PPE, including ingress and egress procedures.

e. Documented 40 hours of on-the-job training supervised by a qualified radiation worker.

NOTE:
ITEMS 9A – 9D MUST BE CONDUCTED PRIOR TO STARTING 40HRS OF ON-THE-JOB TRAINING.

f. Records of completed training shall be maintained at Fords Farm and Radiation Safety Branch.

10. **ANNUAL TRAINING FOR RADIATION WORKERS:** Workers in the contaminated area must have at minimum (which shall be provided):

a. Documented refresher training on the health effects of DU.

b. Documented refresher training on the usage of general radiation detection equipment, including procedures on scanning for contamination and LAW surveys.

c. Documented refresher training on respiratory protection and annual fit test.

d. Documented refresher training on PPE, including ingress and egress procedures and personal air sampler operation.

e. Records of completed training shall be maintained at Fords Farm and Radiation Safety.

11. **VISITORS:** Visitors to the contaminated area shall:

a. Be supervised by a qualified radiation worker at all times.

b. Be provided appropriate PPE.

NOTE: **VISITORS MAY NOT ENTER CONTAMINATED AREAS IF CONDITIONS REQUIRE THE USE OF RESPIRATORY PROTECTION.**

Batch No._____

Aberdeen Test Center
Air Sample Worksheet

Date:_____ Requester:_____

Location:_____
Air sample type:
__ Environmental __ Workplace __ Stack
__ Hi Vol __ Low Vol

Filter type:
__ Glass fiber __ Cellulose __ Membrane

Radionuclide(s):_____

Pump information:
Serial number:_____ Calibrated by:_____
Calibration date:_____

Calibrator information:
Serial number:_____ Date calibrated:_____
Date due:_____

Data:
Start time:_____ Starting flow rate (LPM/CFM):_____
Stop time:_____ Stop flow rate (LPM/CFM):_____
Total run time:_____

Radiation Dose:
Area dose rate (mr/hr):_____ Beta dose rate (mr/hr):_____
Expose time:_____ Estimated dose (mrem):_____
Contamination present? __ Yes __ No
Fixed? __ Yes __ No

Remarks:_____

Diagrams:

LAPEL LOG WORKSHEET

Lapel S/N Cal by	Name SSN	Start Flow Stop Flow	Start Time	Stop Time	Total Run Time	Lab Sample Number	Carrier Number

RADIATION SAFETY FORMS

RADIATION SURVEY REPORT

TO: **JULIE A. LONG, FORDS FARM**	FROM: **RSO**	DATE:

a. Survey Type: _____ Date Performed **7 APR 14** .
b. Permit Number **SLV-RP-8** .

c. Location **FORDS FARM** . Bldg. No. _____ . Room _____ .

c. Instrument used: Make & Model _____ . S/N _____ . Cal Due Date _____ .

d. Instrument used: Make & Model _____ . S/N _____ . Cal Due Date _____ .

e. Summary of Results:

(1) Removable contamination limit exceeded - Yes _____ No _____

(2) External radiation limits exceeded - Yes _____ No _____

(3) Notification of contamination - Date _____ Time _____

(4) Survey performed by **JULIE A. LONG** .

(5) Date swipes counted _____ By _____

REVIEWED _____
Health Physicist

Background Meter Reading: _____

STECS-SO Form 764, 1 Apr 92 RSLF – 022 Rev. 0

Batch No: _____

Request Date: **7 APR 14** Requestor (PRINT): **JULIE A. LONG**

1. Location: **FORDS FARM**
2. Sample Identification:
WIPES / LAPELS / HI-VOLS

Swipe Information:
X Dry Wet

Air Sample Information:
X Lapel ___ Stack **X** High Vol ___ Weekly Air Filters

Environmental Information:
___ Soil ___ Water ___ Other

Analysis Information:

X Low Background _____ Liquid Scintillation ___ Gamma Spec.
Radionuclide(S): **DU**
Number of Smears: ___
REMARKS _____

3. Sample Details:

GROUP	IDENTIFICATION OR SAMPLE NUMBER	CARRIER NO
	BKGD	

4. LAB TECHNICIAN: _____ DATE COMPLETED: _____

5. REVIEWED BY: _____ DATE: _____

ATC FIELD CHAIN OF CUSTODY RECORD

FOR RADIATION SAFETY LABORATORY & ENVIRONMENTAL RADIATION MONITORING PROGRAM

Sample Number	Date	Time	Type Analysis	Preservation	Collected By (PRINT NAME)	Remarks
			TENNELEC (α/β)	N/A		FORDS FARM

Relinquished by:	DATE:	Time:	Received by:
Relinquished by:	DATE:	Time:	Received by:
Relinquished by:	DATE:	Time:	Received by:
Relinquished by:	DATE:	Time:	Received by:
Received in Lab by:		DATE:	Time:

QUALITY CONTROL LOG BOOK SAMPLE

Date	SN	BKgd	Source	CAL DUE DATE
28 OCT 2014	104702	20cpm	3.2	11/14/14
30 OCT 2014	104702	20cpm	3.2	11/14/14
3 Nov 2014	104702	20cpm	3.2	11/14/14
4 Nov 2014	104702	20cpm	3.2	11/14/14
7 Nov 2014	104702	20cpm	3.2	11/14/14
12 Nov 2014	85825	20cpm	3.2	11/29/15
17 Nov 2014	104702	20cpm	3.2	11/14/14
18 Nov 2014	104702	20cpm	3.2	11/14/14
20 Nov 2014	104702	20cpm	3.2	11/14/14
24 Nov 2014	104702	20cpm	3.2	11/14/14
21 Nov 2014	127594	.011mR/hr	.146mR/hr	8-15
24 Nov 2014	104702	22cpm	3.2	11/14/14
25 Nov 2014	104702	20cpm	3.2	11/14/14
26 Nov 2014	85825	20cpm	3.2	11/29/15
1 Dec 2014	104702	20cpm	3.2	11/14/14
2 Dec 2014	104702	20cpm	3.2	11/14/14

US ARMY ABERDEEN TEST CENTER
ABERDEEN PROVING GROUND, MD 21005-5059

INTERNAL OPERATING PROCEDURE

SL 385-004
2 DECEMBER 2014

FOR

FORDS FARM EVAPORATOR OPERATIONS

PREPARED BY: _____ DATE: 12/3/14
JULIE A. LONG, Fords Farm Facility Manager, 410-278-2643

CONCURRENCE: _____ DATE: 12/3/14
JEREMY S. FORD, Radiation Safety, 410-278-6417

CONCURRENCE: _____ DATE: 12/3/14
DAVID W. GOAD, Environmental Division, 410-278-5294

CONCURRENCE: _____ DATE: 12/10/14
JEANNE M. DITTER, Chief, Safety Program Management Division, 278-2281

APPROVAL: _____ DATE: 12/11/14
MICHAEL P. SCHULZ, Chief, Vulnerability/Lethality Division, 278-7203

Encl 4

SUPERVISOR'S, TEST OFFICER'S AND EMPLOYEE COMPLIANCE INSTRUCTIONS AND STATEMENTS

All personnel will comply with the procedures and requirements set forth in this internal operating procedure (IOP).

Failure to do so may result in death, personal injury, property damage, and/or damage to equipment entrusted to our care. Individuals who fail to follow this IOP may be subject to disciplinary action.

Any deviation(s) from the procedures set forth herein are not authorized. Changes to this IOP must be coordinated prior to the approval and implementation.

When procedures in this IOP do not adequately or specifically cover the requirements to perform the operation or task safely, the operation or task will not be started, or if in progress, will be halted until the IOP has been changed. The supervisor and/or employee in charge is responsible for notifying all personnel involved in the operation or task of any stoppages associated with this IOP.

Initial training on this IOP will be given to newly assigned workers by their first line supervisor. After this training, the worker must sign the Employee's Statement Form. In addition, prior to each operation/task the supervisor or Test Officer will brief workers on at least the following:

a. Specific task requirements and procedures.

b. Individual responsibilities and safety precautions.

c. Any approved changes to this IOP.

SUPERVISOR'S, TEST OFFICER'S AND EMPLOYEE STATEMENT

I have read (or have had read to me) and understand the safety and environmental requirements, personnel and explosive limits (if applicable), work description/methods and inspection requirements necessary to accomplish the operation. My supervisor and/or Test Officer has trained me, and I am familiar with my assignments for the operations covered by the IOP. I agree to abide by these instructions throughout my assignment to the operation.

If the IOP does not cover the methods or the procedures to conduct the operation safely, I will immediately stop the operation and inform my supervisor and/or the worker in charge of the situation.

EMPLOYEE DATE

IOP PREPARER'S
ANNUAL REVIEW

☐ I have reviewed this Internal Operating Procedure. The IOP is technically accurate, work practices have not changed, and proper controls are in place to mitigate all identified hazards.

☐ I have reviewed this Internal Operating Procedure. The IOP is not technically accurate and/or additional hazards have been identified. The following changes are recommended:

_____

_____

_____

_____

_____

_____

_____

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_____

_____

_____

_____

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_____

_____

_____

(Signature/Date)

1. **PURPOSE:** To establish safe operating procedures for the use and operation of Lakeview Model E-300 Hot Shot electric heated wastewater evaporator in use at Fords Farm, and to establish proper waste stream controls. This Internal Operating Procedure (IOP) is not a substitute for the use of the manufacturer's operations manual.

2. **APPLICABILITY:** This IOP applies to all personnel involved in radiation contaminated wastewater processes at the Fords Farm Facility.

3. **PERSONNEL LIMITS:** Personnel will be limited to the minimum required for safe and efficient operations of the evaporator. A minimum of two people must be present for any evaporator operations. Observer personnel will be limited to those having an official need.

4. **RESPONSIBILITIES:**

a. The Chief, Vulnerability/Lethality Division, is responsible for the overall enforcement of this IOP. He is further responsible for ensuring only trained personnel are assigned to these operations and that all personnel are informed of any hazard associated with the operation of this equipment and the hazards of depleted uranium (DU).

b. The ATC Radiation Safety Officer (RSO) is responsible for application and enforcement of this IOP through taking necessary actions to protect all personnel, equipment, and facilities from undue ionizing radiation exposure and radioactive contamination. The ATC RSO is also responsible for the training of any personnel with responsibilities to run the equipment or contribute to its use in any way, to include duties, responsibilities and hazards involved, prior to its use. Air monitoring, sampling, and the frequency there of, will be conducted by Radiation Safety Office.

c. The Facility Manager is responsible for ensuring operational readiness and maintenance of the evaporator; verifying that only trained personnel conduct operations with the evaporator; and notifying the supervisor and RSO of any non-compliance with this IOP or conditions that exist that could compromise personnel safety or environmental protection.

d. All individuals involved in the use of this equipment, or who contribute to the waste stream processed by this equipment, are individually responsible for personal compliance with all applicable provisions of this IOP. Only properly trained radiation workers will handle this waste stream in any of its forms (liquid, sludge or solid), or operate the evaporator. These workers will be part of the DU Medical Surveillance Program (ATC Bioassay Program).

e. Generators are responsible for providing a list (in writing) of all materials in the waste stream to the ATC RSO. No hazardous materials (as defined by current Resource Conservation and Recovery Act (RCRA) and Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulations) may be processed by the evaporator at any time.

f. The ATC Environmental Division representative is responsible for reviewing the provided list of materials and verifying/validating, by dated signature, that no hazardous materials will be present in the waste stream prior to operation of the evaporator.

g. The transporter is defined as anyone who transports contaminated water to the site of the evaporator for processing. This includes transport in any container and/or vehicle, if the material is to be processed by the evaporator. Transport vehicles/containers will be routinely surveyed by Radiation Safety personnel to monitor residual contamination.

h. The Evaporator Operator and monitor is Fords Farm personnel or anyone ultimately responsible for the evaporator's proper operation. The individual must be properly trained on the hazards of liquid contamination sources and basic emergency spill response or hazardous waste operations.

5. **PROCEDURES:**

a. PERSONAL PROTECTIVE EQUIPMENT (PPE): No PPE is necessary for transporting the waste from the generator site to the evaporator site; however; the use of rubber gloves is required for the movement of the water to and from holding tanks. The evaporator operator will need to employ the use of insulated rubber gloves and eye protection while working with the evaporator. However, any other equipment they deem appropriate for their own comfort is not discouraged.

b. QUALITY ASSURANCE: Inspections will be conducted quarterly in order to ensure the integrity of the operation. This can be in the form of periodic sampling, documentation monitoring, or site monitoring.

c. SEQUENCE OF OPERATIONS (Evaporator):

1. Be sure that all control panel switches are in the "OFF" position. Turn main power "ON" by turning and arming the disconnect switch on the evaporator control panel. Locate the "High Heater Temperature" control(s) in the upper left corner of the control panel. This is a digital temperature control and is used to indicate the electric heater exchanger temperature and shut down the heaters if the temperature becomes excessive.

2. Check the alarm set point by depressing the button marked "INDEX" on the temperature control. The display will alternate between the letters "SP" and its numerical value. It should be set for approximately 300°F. If it is, depress "INDEX" to return to the temperature display and proceed to the next paragraph. If not, depress the proper "up" or "down" arrow on the control to change the "SP" value. After setting, DEPRESS THE "ENTER" BUTTON! If enter is not pressed, the new value will not be entered into the control. An error message (CHECK) will appear if you attempted to enter an "SP" value less than 200 or greater than 600. Change the "SP" value to eliminate the error message. Depress the "INDEX" button to return to the heater temperature display.

3. The LED marked "AL" should be flashing. This will occur during power up or high heater temperature conditions. Reset by depressing the buttons marked "INDEX AL" and "DOWN ARROW AL". Hold both buttons for 4 seconds and the "AL" light will go out.

4. The highest temperature set point is locked out to prevent tampering. Raising the high heater temperature setting beyond factory setting could damage strip heaters, tank walls, and may allow some oils to be ignited.

5. Turn on the air supply to the transfer pump. Turn on *"Transfer Pump"* by placing the switch on the control panel in the "AUTO" position. The pump will start and fill the unit until the level has raised the primary fill float valve to the full off (raised) position. At this point, the pump will shut off and stop filling. **Check all exterior tank connections and piping for leaks.**

6. Check to see that the evaporator is filled with liquid. The level should be high enough so that the level indicating rod is above the low level cut off switch or in the normal operating level range indicated by the scale on the side of the switch bracket.

7. If the level is at or below the low level cutoff switch (indicated by the disk resting on the low level switch) you can fill the unit by placing the *"Transfer Pump"* switch on the main electrical panel in the "AUTO" position. The transfer pump will start and fill until the float valve reaches normal operating level or the high limit. The heaters cannot and will not operate until the level is above this point. A somewhat faster fill rate can be achieved by opening the hand valve located under the access lid, next to the float valve. Be sure to close this valve after the filling operation. Do not leave the unit unattended with this valve in the open position.

8. To start evaporating, start the blower by depressing the green *"Exhaust Blower Start"* push button on the control panel. The exhaust blower should start. If it does not, shut down all functions and see the *troubleshooting section on page 27 of the evaporator operations manual.*

9. Place the *"Transfer Pump"* switch on the main electrical panel in the "AUTO" position. Pump is activated and will maintain operating level by the action of the primary fill float valve located under the lid. Make sure the hand operated valve next to the float valve is in the closed position. NOTE: Transfer pump switch must be in the "AUTO" position to operate the heaters.

10. To start the heaters, turn the switch marked *"Heaters" to* the "ON" position. To turn the heaters off, place the *"Heaters"* switch in the "OFF" position.

11. The (optional) Overspray/Foam Control Pump *"Spray Pump"* switch should be placed in the "AUTO" position. Should the fluid in the evaporator start to build foam, the sensor will detect this condition and start the pump automatically. See paragraph 2, page 15 of the operations manual for sequence to set digital temperature controller. The set point temperature is factory set for the controller at 170°-190°F. The spray will mechanically break down the foam and draw heat from the boiling liquid, causing the surface to cool and the foam to settle. The pump is time delayed to shut off after the sensor is cooled. To operate the pump manually, place the switch in the "MAN." position. The pump will operate continuously until the switch is placed in the "OFF" or "AUTO" position.

CAUTION!
Make sure valve on fluid line leading to the Overspray/Foam Control Pump is in the OPEN position. Neglecting to have this valve open during operation will cause pump failure.

CAUTION!
Do not operate Overspray/Foam Control Pump when sludge level reaches the intake to the pump. Continually pumping sludge will cause premature wear and may damage the pump. Measure depth of sludge in the intake daily. Clean basket strainer on inlet to pump daily or as required to maintain proper flow through the pump.

12. The evaporator will continue to operate until:

a. The unit runs out of waste fluid at which time it is shut down by the low level cut off switch.

b. The unit is overfilled at which time it is shut down by the high level cut off switch and is indicated by the red flashing strobe beacon.

c. The high heater temperature limit is reached. It is indicated by the flashing LED at the bottom of the temperature limit control.

d. The unit reaches the high fluid temperature which means the contents have concentrated and should be evacuated.

In the event that the primary fill float valve fails and does not shut down the transfer pump, a "High Level" condition will occur. High level conditions will shut down the heaters, transfer pump, and overspray pump and then lockout. To restart, the level must be returned to the normal operating level by draining fluid. Subsequently, the yellow *"Level Reset"* button must be depressed. The flashing strobe beacon will go out and the unit can be restarted. Low level conditions will shut down the heaters, transfer pump, and spray pump and remain in a ready to restart mode. Refilling the evaporator and raising the float actuator above the low level micro switch will automatically restart the evaporator if all conditions are normal. The High Heater Temperature Limit will shut down the heaters only. If you have a high heater temperature limit failure, check to see that the unit has a proper fluid level. (See *troubleshooting section, page 27 of the operations manual)*

13. To stop the unit, place the *"Heaters"* and *"Transfer Pump"* switches in the "OFF" position. The blower can be turned off by depressing the red *"Blower Stop"* button. It is recommended that the blower continue to run until the unit stops generating large amounts of steam.

14. *CAUTION!* To operate the SKIMMER/SLUDGE PUMP (optional) the evaporator heat source (heaters) must be shutdown and the water and sludge that is to be pumped off must not exceed a maximum temperature of 250°F. This is because the air motor in the diaphragm pump cannot operate above this temperature. The material in the evaporator tank can be aided in cooling by continuing to operate the overspray pump and the blower after the heat source has been shut down. Note: In order for free oils to float to the surface, the unit must be shut down for a period of time before skimming. Generally 15 minutes to 30 minutes of no agitation. Do

not pump hot liquids to any receptacle or through any conduit that is not rated for high temperature service.

15. SKIMMING: Manually raise the fluid level in the tank to the top of the skimming weir by opening the fill control valve located at the right side, inside the evaporator tank. Opening this valve allows the transfer pump to rapidly fill the evaporator tank. Allow filling of the tank until no more oil flows over the built-in weir. At the same time as the oil is overflowing the weir, open the upper valve leading to the skimmer/sludge pump and turn on the air supply to the skimmer/sludge pump. Direct the skimmed oil to the final storage or disposal site.

WARNING!
Once oil has been skimmed from the evaporator tank you must shut off the oil skimmer clean out valve before returning to normal evaporator operation. This is to avoid overflowing the weir with hot liquid during an unintential high level condition, creating a hazard of hot pipes leading to the skimmer/sludge pump.

16. SLUDGE REMOVAL: When the wastewater has been reduced to the point where it is a flow-able sludge it is time to transfer the residue of evaporation to the final storage or disposal site. Remember! Maximum allowable temperature of fluid going into the Skimmer/Sludge Pump is 250°F. Open the ball valve at the lower cleanout port and then turn on the air supply to the Skimmer/Sludge pump. Sludge may be scraped to the tank clean out port and/or flushed out by a high pressure water spray.

WARNING!
After unit is cleaned of sludge, the cleanout valve must be closed before resuming normal operation.

e. **MAINTENANCE SCHEDULE:** General Maintenance: Maintenance is well described and outlined in the Installation, Operations, and Maintenance Manual on page 42 for the Model E-300 Hot Shot electric powered evaporator.

1. PERIODIC MAINTENANCE

• Daily check of normal operating level.

• Daily system check and freedom of movement check for the emergency high/low level shutdown operating rod assembly.
1) Push disk down until it contacts the low fluid level micro switch. Heaters shut down, and pumps shut down.
2) Push the disk up until it contacts the high fluid level micro switch. Strobe light should come on, heaters shut down, and pump shuts down.
3) To restart, push reset button on control panel. This procedure checks shutdown and safety systems.

• Daily visual check of entire unit for loose wires, pulleys, abnormal noise, fluid leaks, and operating condition.

• Check blower impeller bearings for noisy operation or grease leaking from seals. The pillow block bearings require grease* after 500 hours. (*Use high temperature non-melting bentone grease, NLG1 grade 2.) If noisy after greasing, replace immediately with direct replacements only.

• Exhaust blower drive belt tension is automatic; periodically check for belt wear. Belt failure will shut down steam vapor exhaust. Tensioner pulley should rotate freely.

• Clean the transparent bowl "T -Strainer" located on the suction side of the transfer pump. Failure to clean the strainer may cause the pump to stall. Unauthorized removal of this strainer and subsequent operation of the unit could cause the fluid level control valve in the evaporator tank to foul and fail. An in-line shut off valve is provided to facilitate the disassembly and cleaning of the T -strainer. This valve is located just ahead of the strainer.

• Daily check and clean basket strainer on inlet of overspray/foam control pump. This is mandatory for the normal seal life of this pump.

• Daily check for plugged spray nozzle(s) on the overspray foam control system by switching to manual position.

• When evaporating waste streams with tramp, free, or emulsified oils that may accumulate, it is recommended that the evaporator be equipped with automatic oil skimming or not operated continuously over an 8-hour period unattended due to the possibility of hazardous conditions being created within the evaporator.

2. CLEAN-OUT MAINTENANCE

• Regular checks of evaporation rates (fluid input) are one of the best indicators of time to clean the unit. When evaporation falls off from normal rates it is time to drain the unit and clean it. The sides of the tank should be inspected weekly and cleaned if any build-up is detected. This is important because all heat transfer is through the lower sides of the tank. Pressure washing and scraping may be required.

• Failure to keep the heating surface clean will result in premature heater failure, tank wall damage, and accelerated corrosion.

• Regular checks of sludge formation in the bottom of the tank should be performed. When sludge reaches a depth of 3-4 inches, it is time to drain the unit and clean the entire interior of the tank. With sludge pump option, pump sludge to final storage tank for proper disposal.

• Periodically inspect and clean blower inlet coalescing filter. Excessive foaming or un-skimmed oils will foul the filter more frequently. Clean with hot water and mild detergent.

• The depth and quantity of oil floating on the surface of the water must be checked each shift (or more often) and oil skimmed off when 1/2 to 1 inch has accumulated. Oil skimming schedule

will depend upon quantity, viscosity, and specific gravity of oil or grease in your waste stream. Pre-separation of oils prior to introduction to the evaporator will minimize skimming frequency. See concentrating oily waste streams, page 34 of the operations manual.

• Excessive or uncontrolled foaming may plug or foul vapor exhaust components. If exhaust airflow is restricted, reduced evaporation will result. Exhaust components will require cleaning to remove obstructions and allow normal operation.

• Experience will best determine your cleaning and maintenance schedule.

6. **ENVIRONMENTAL:** In the event of a spill, call 911 and then the ATC Environmental Division at 278-5294. If safe and feasible, perform spill containment. The user of this IOP is responsible for cleanup of any spill items. Spill containment materials must be available at the test site.

7. **ACCIDENT REPORTING:**

a. Control hazards to prevent further injury or damage.

b. Take care of personnel. Call "911" if there's serious injury.

c. Notify Range Control, if applicable. Call C-Tower at 278-3553.

d. Notify the Safety & Occupational Health Office by calling the Incident Hotline at 278-3898. Notify the area/facility manager. Notify the supervisor(s) of the person(s) involved.

e. Secure the scene. Personnel and equipment involved in the incident will remain onsite until the government Safety Office Investigator has arrived, investigated, and released the scene. Do not remove anything from the scene.

d. Follow accident reporting procedures contained in ATC Reg 385-2, ATC Safety Program, Chapter 2. Submit a Commander's Critical Incident Report (CCIR) immediately, but NLT than four hours after the incident.

8. **POSTING:** A copy of this IOP will be posted in the Fords Farm's Main Office in B910.

9. **TECHNICAL REFERENCES**: The following reference will be kept on-site at Fords Farm at all times.

Installation, Operations, and Maintenance Manual for the Model E-300 Hot Shot Electric Powered Evaporator. Lakeview Engineered Products Inc. 2500 W Jefferson Blvd Fort Wayne IN 46802 Tel: 260-432-3479 Fax: 260-432-6239.

10. **REFERENCES:** Maintenance Schedule

Day / Time	Gallons Fluid Added	Hours of Operation	Oil Layer (inches) or Oil Removed (gals.)	Inches of Sludge Accumulation	Clean Strainers	Clean Exhaust Filter

Jeremy Stephen Ford
[redacted]
Mobile # 734-604-5439
Jeremy.s.ford12@gmail.com

Army Test and Evaluation Command
Aberdeen Proving Grounds, MD

06/2013- present

Health Physicist

Serve as the Radiation Safety working leader and as the Radiation Protection Officer (RPO) for USA Aberdeen Test Center (ATC) under the general supervision of the Chief, Safety Program Management Division, Safety and Occupational Health Office. Delegate the responsibility for such matters as general target dates, objectives, and any major problems anticipated and who may be consulted on the more difficult and controversial problems encountered. Exercise program management and technical staff direction over one of the Army's largest and most diverse radiation protection programs. Program includes depleted uranium testing, radioactive commodity item testing, flash and industrial x-ray programs, dosimetry and bioassay programs, non-ionizing radiation programs (including lasers, microwaves, high intensity lights, and radiofrequency) and radiological environmental monitoring. Develop ATC radiation protection policies and procedures; conduct investigations and tests designs to ensure adequate control and to foster approved techniques in handling, storage and disposal of radioisotopes and other sources of ionizing radiation; review and provide input to test operations involving radioactive materials which are technically complex. Design and develop protective measures and defend their technical adequacy. Manage multiple Nuclear Regulatory Commission (NRC) licenses, DA radiation authorizations and DA permits for non Army agencies. Integrate, coordinate and control all ATC environmental radiological monitoring programs. Develop and justify monitoring protocols and evaluation criteria for experimental activities and defend these procedures to the NRC and higher headquarters in order to acquire license approvals.

Serve as the primary point of technical expertise for the Commander, ATC, for all health physics/radiation protection program elements within the activity and as a technical consultant in field application issues for HQ ATEC. Provide direction and develop policy and procedures for the control of radiation hazards evolving from experimental test and evaluation programs involving depleted uranium (DU) munitions and other test radioactive sources and nuclear reactor operations. Exercise local approval authority over the design of facilities for the testing of hard target impacts with experimental DU munitions. Ensure operational control and shielding adequacy for extremely high powered industrial x-ray operations. Develop control criteria for the conduct of any/all radiation operations at ATC as well as other ATEC installations without their own NRC program licenses. Submit criteria for approval by various national regulatory groups (NRC, EPA, etc.) Responsible for the technical adequacy of the safety and health procedures prescribed and approved through the radiation work permit program which requires the design and development of protective measures and defending their technical sufficiency under the scrutiny of higher headquarters, ARCES, and the NRC. Occasionally investigates modes of protection required for novel radiation application.

Serve as the working leader for a cadre of 3-5 health physicists and technicians, and exercise technical direction over their activities. Ensure they are properly qualified, trained, and experienced to be certified as competent in their areas of support. Plan and assign the work to be accomplished based on priorities determined by the supervisor, set and adjust short term priorities, and prepare schedules for work completion based on selective consideration of the

Encl 5

requirements of the assignments and the specialties of the cadre. Review work for technical quality and conformance to laws and regulations. In addition to reviewing work methods and procedures for opportunities to improve efficiency or effectiveness, have the responsibility for finding innovative ways to eliminate significant bottlenecks and barriers to production.

Independently approach complex and sophisticated technical problems associated with depleted uranium munitions testing and decommissioning of the Army Pulse Radiation Facility. Direct and/or conduct special studies to determine health hazards associated with procurement, use, and storage of radioactive materials and devices.

Develop and implement ATC policy and provide technical advice and assistance to test engineers concerning minimizing or eliminating radiation hazards. Review and approve all radioisotope license applications, applications for DA approvals and standing operating procedures that are developed for the handling and use of radioisotopes and other sources of ionizing radiation. Direct and/or conduct surveys of areas and operations involving sources of ionizing radiation to determine degree of exposure, adequacy of protective measures, and conformance with codes and regulations. Authority to impose additional requirements on operations in progress or to suspend operations in critical cases. Approve designs of shielding systems to protect high power industrial and experimental x-ray operations. Advise on and recommend decontamination procedures following leakage or spills.

52nd Civil Support Team
8202 South Access Rd
Columbus, OH 43217

04/2006 - 06/2013

Science Officer/Survey Team Leader

Supervised eight Chemical, Biological, Radiological, Nuclear, and Explosive (CBRNE) Soldiers who conducted reconnaissance and sampling missions within a hazardous materials incident site. Managed Soldiers training plans and career development, which included their personal development and scheduling of leave. Controlled sampling missions within hazardous materials site. Collected samples according to local policies using FBI 12 step techniques of sampler and facilitator. Maintained collected evidentiary samples according to local chain of custody procedures and other reference lab procedures. Served as subject matter expert (SME) during overt and covert missions at high visibility venues as a part of a joint hazardous assessment team (JHAT). Instructed formal classes with practical exercises to Ohio Civil Support Team members and first responders which included topics on chemical, biological, radiological, nuclear, explosive threat agents, personal protective equipment, and employment of field detection equipment. Recommended locations of area monitors which detect chemical threat agents in air at JHAT events. Coordinated installation of area monitoring equipment with incident commander or other assigned personnel. Wrote and briefed incident action plan (IAP) at an incident site. Unit appointed representative on the Hazardous Materials Technical Advisory Committee for Ohio. Unit appointed representative on the CBRNE Working Group for Ohio. Collaborated with stakeholders in government and private sectors on budgetary issues dealing with proposals to acquire new chemical threat training and equipment. Coordinated with Coast Guard and private industry as part of Maritime Transportation Security Act. Collaborated with private sector industries on exercise development and training plans to ensure their facilities are protected from chemical threat agents or emergencies. Served as point of contact for CBRNE technical questions dealing with laboratories that may be conducting analyses on the chemical threat agents for the unit. Conducted laboratory analysis of chemical, biological, and radiological samples utilizing state of the art instrumentation. Presented technical findings to incident commander and staff orally and in written analytical reports. Spoke at technical conferences within scientific community which included subjects on sample collection and instrument analysis. Wrote reports for record on analysis of collected samples within hazardous materials incident site. Assessed health risks of identified CBRNE

hazards and presented oral reports to incident commander. Advised unit and incident commanders in writing and orally on consequence management actions to protect responders and civilians based on thorough understanding of technical aspects of CBRNE agents. Provided recommendations on sampling plans and techniques within a hazardous materials incident site. Analyzed information collected by the reconnaissance team and other sources and presented data orally and in technical writing for incident commander. Served as subject matter expert on CBRNE agents, production processes, delivery systems, and decontamination processes. Served as safety officer and radiation safety officer. Served as deputy quality manager for the laboratory's ISO 17025 accreditation and maintained all required documents. Participated in monthly proficiency analytical testing in accordance with ISO 17025 and National Guard Bureau standards. Maintained and ordered laboratory reagents and assays. Operated, maintained, and oversaw analysis of CBRNE samples within the Analytical Lab System (ALS). Performed microbiology bench tests. Performed the full range of analytic procedures in both fixed laboratory and field laboratory settings, including examinations to identify and characterize complex matrices (sludge, soil, swipe, liquid, solid, and vegetation). Utilized and operated a variety of highly complex scientific equipment in order to obtain obscure characteristics of a wide-variety of unique CBRNE materials. Performed sample purification and extraction within a class III bio safety glove box. Performed nucleic acid extraction for PCR analysis, liquid organic extraction for GC/MS, Solid phase microextraction for GC/MS, toxin extraction for ECL, and advanced techniques for polarized light microscopy, infrared microscopy, and fluorescence microscopy on all matrices. Maintained advanced detection instruments including troubleshooting and performing user level maintenance. (Experience on instruments including: Bioveris MIM lmmunoassay/Electrochemiluminescence (ECL), Shimadzu GC/MS-QP2010, Smith's Detection IlluminatIR microscope, SmartCycler PCR; Joint Biological Agent Identification Diagnostic System PCR, Olympus BX50 microscope, Ahura First Defender, Ahura TruDefender FTI, HazmatID, HAPSITE Smart Plus, MultiRae plus and Pro, and identiFINDER ULTRA

United States Army 11/2005 - 04/2006
Ypsilanti, MI

Gold Bar Recruiter

Managed recruitment at Spring Arbor University and Washtenaw Community College. Assisted with recruitment at Eastern Michigan University. Developed and executed orientation briefs at local universities and high schools which resulted in 70% increase in ROTC enrollment from previous years. Provided mentorship to the military science level four students and counseled them in military decision making process briefs. Worked as a liaison between cadets and The Michigan Army National Guard. Coordinated and administered staff meetings for the recruiting operations officer. Coordinated and planned the 2006 Military Ball for the Eagle Battalion at Eastern Michigan University which included over 200 guests. Designed information brochures and pamphlets, as well as ordered and maintained stock of recruitment materials.

Peace Corps 06/2000 - 10/2001
Fontem-Azi, Cameroon

Math/Science Volunteer

Instructed Cameroonian children in grades equivalent to 6th-10th in the subjects of math, biology, chemistry, and physics in accordance with the Ministry of Education of Cameroon based on the British educational system. Taught 6 classes a day ranging in attendance from 100 to 200 students. Served as biology faculty head of school. Developed lesson plans which

incorporated local examples which better related to the children. Increased the passing rate of the national exam by 25% from the previous year. Facilitated the construction of a water catchment system that provided two taps of flowing water to the village. Wrote classroom construction proposals for funding, which allowed the classes to be cemented and finished. Wrote and obtained funding for the painting of a world map mural at the school. Developed and taught environmental science courses as an after school club which included parents and students. Instructed a health awareness club which emphasized H.I.V. infection and transmission. Assisted the parent teacher association with collection of funds for school improvements. Facilitated cross cultural awareness within village. Studied French and Pidgin English while teaching classes.

Education:

Indiana University of Pennsylvania
Indiana, PA
Master's Degree [redacted]
GPA: [redacted]
Major: Science of Disaster Response Honors: Summa Cum Laude

PERSONAL INFORMATION WAS REMOVED BY NRC. NO COPY OF THIS INFORMATION WAS RETAINED BY THE NRC.

Eastern Michigan University
Ypsilanti, MI
Bachelor's Degree [redacted]
Major: Biology Minor: Chemistry

Certificates/Training:

06/2014 Radioactive Commodity Identification and Transportation
Communications-Electronics Command

05/2014 Laser optical and radiofrequency radiation hazards
U.S. Public Heath Command

04/2014 Applied Health Physics
Oak Ridge Associated Universities

03/2013 40-Hour Advanced Applied Science (Radioactivity) Course
Battelle Memorial Institute

08/2012 BG-4 Maintenance Class
Drager

08/2012 SCBA Maintenance Class
Drager

02/2012 40-Hour Recognition and Safe Sampling Course
Signature Science, LLC

01/2012 Public Safety WMD Response-Sampling Techniques and Guidelines
Louisiana State University

08/20 II Applied Radiological Response Techniques - 2&3
Y-12 Nuclear and Radiological Field Training Center

05/20 II Modular Emergency Response Radiological Transportation Training
U.S. Department of Energy

05/2011 WMD-CST IED Awareness Course
A-T Solutions, Inc.

04/2011 GCMS for WMD Application Users
Shimadzu Scientific Instruments, Inc.

01/2011 AhuraFD- Chemical Identification System
Thermo Fisher Scientific

11/2010 Advanced CBRNE Training Course
Edgewood Chemical Biological Center

10/2010 Joint Biological Agent Identification and Diagnostic Systems Course
United States Army Academy of Health Sciences

08/2010 ISO/IEC 17025 Training Course
Signature Science, LLC

05/2010 Applied Radiological Response Techniques-I
Defense Threat Reduction Agency

11/2009 Principles of Military Preventative Medicine Course
United States Army Academy of Health Sciences

03/2009 Analytical Laboratory System Increment 1Net Course
United States Anny Chemical School

08/2008 Advanced Hapsite GC/MS Interpretation
National Guard Bureau

05/2008 Advanced Threat Agent Biology Course
Signature Science LLC

04/2008 Advanced Threat Agent Chemistry Course
Signature Science LLC

04/2008 FERN Detection of Threat Agents in Food Products
United States Department of Agriculture

02/2008 Advanced Chemical/Biological Level II Course
Dugway Proving Grounds

01/2008 Blood Borne Pathogens
Ohio Department of Health

12/2007 Threat & Risk Assessment Course
Texas A&M University

09/2007 Emergency Response to Terrorism

Homeland Security

08/2007 IR Microscopy
McCrone Research Institute

07/2007 Field Identification of Biological Warfare Agents
Department of the Army at USAMRIID

06/2007 Operational Radiological Safety
United States Army Chemical School

05/2007 Applied Polarized Light Microscopy
McCrone Research Institute

05/2007 Advanced Polarized Light Microscopy
McCrone Research Institute

05/2007 Fluorescence Microscopy
McCrone Research Institute

04/2007 Hazardous Materials Awareness Level
Missouri Division of Fire Safety

04/2007 Hazardous Materials Operations Level
Missouri Division of Fire Safety

04/2007 Hazardous Materials Technician Level
University of Kansas

02/2007 Advanced Life Support Response to Hazardous Materials Incidents
National Fire Academy

09/2006 Chemical Officer Basic Course
United States Army Chemical School

This is to acknowledge the receipt of your ~~letter/application~~ Memorandum dated

1/26/15, and to inform you that the initial processing which includes an administrative review has been performed.

Amendment (548-834/04007354)

☒ There were no administrative omissions. Your application was assigned to a technical reviewer. Please note that the technical review may identify additional omissions or require additional information.

☐ Please provide to this office within 30 days of your receipt of this card

_____.

A copy of your action has been forwarded to our License Fee & Accounts Receivable Branch, who will contact you separately if there is a fee issue involved.

Your action has been assigned **Mail Control Number** 585971.
When calling to inquire about this action, please refer to this control number.
You may call us on (610) 337-5398, or 337-5260.

NRC FORM 532 (RI)
(6-96)

Sincerely,
Licensing Assistance Team Leader