

SM-1 DEACTIVATED NUCLEAR POWER PLANT DECOMMISSIONING PROJECT FORT BELVOIR, VA INDUSTRY DAY

Brenda Barber, P.E.

Hans Honerlah, CHMM

James Greer

U.S. Army Corps of Engineers, Baltimore District

February 08, 2019

"The views, opinions and findings contained in this report are those of the authors(s) and should not be construed as an official Department of the Army position, policy or decision, unless so designated by other official documentation."



US Army Corps
of Engineers®



AGENDA

- Introduction and Welcoming Remarks
 - Brenda Barber
 - Hans Honerlah
- Ground Rules
 - James Greer
- U.S. Army Nuclear Power Program; Deactivated Nuclear Power Plant Program
 - Hans Honerlah
- Regulatory Framework for the Deactivated Nuclear Power Plant Program
 - Hans Honerlah
- Historical Overview SM-1
 - Hans Honerlah
- Decommissioning Planning
 - Brenda Barber
- Contracting Approach
 - Brenda Barber
- Closing Remarks
 - James Greer



US Army Corps
of Engineers®



ADMINISTRATIVE ANNOUNCEMENTS

- All attendees must sign in
- Briefing is unclassified
- Presentation material should not be distributed or shared
- Please silence your cell phones; if you must take a call, please leave the room so you don't disturb others
- Questions?



US Army Corps
of Engineers®



GROUND RULES

- The purpose of this Industry Day is to discuss the upcoming SM-1 Deactivated Nuclear Power Plant Decommissioning and Dismantlement.
- Active dialogue is encouraged during this presentation and during the one-on-one sessions with our team. Any discussions/dialogue during the Industry Day events are not binding for any party
- All technical and contractual issues discussed during this event are pre-decisional and subject to change as we refine our project requirements
- The USACE team seeks to gain contractor input on the contractual approach to allow our team to ensure an effective solicitation approach and successful project implementation
- Any questions on the project should be submitted to:
James Greer james.a.greer@usace.army.mil



US Army Corps
of Engineers®



PROJECT CONTACT INFORMATION

SM-1 Project Website www.nab.usace.army.mil/SM-1/

- To receive Stakeholder Updates, please call 410-962-2809 or send your e-mail to: cenab-cc@usace.army.mil
- Deactivated Nuclear Power Plant Program website
- <http://www.usace.army.mil/Missions/Environmental/DNPPP/>

Project Manager – Brenda Barber

Health Physicist and COR – Hans Honerlah

Contract Specialist – James Greer (alternate MAJ Trevor Chambers)

Contracting Officer – Laura Wade

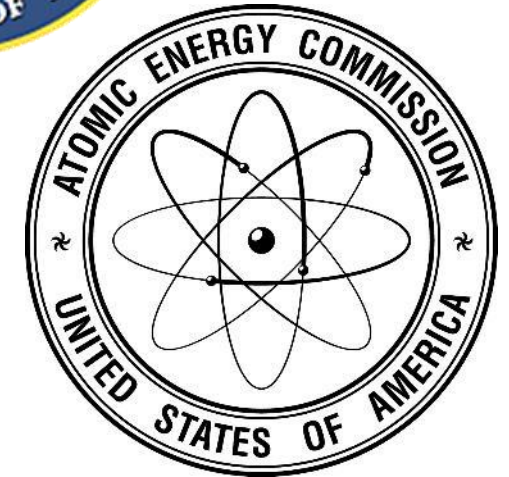


US Army Corps
of Engineers®



U.S. ARMY NUCLEAR POWER PROGRAM

- 1952 Department of Defense (DoD) study to determine the feasibility of developing reactor plants to serve military power needs on land.
- Joint program between DoD and the Atomic Energy Commission.
- Each service participated in the Army managed program.



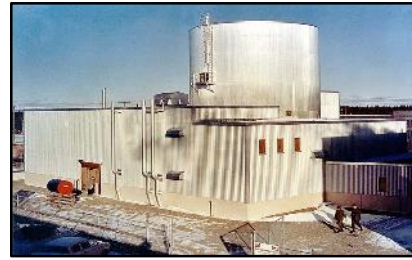
US Army Corps
of Engineers®



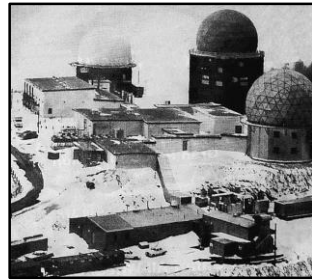
U.S. ARMY NUCLEAR POWER PROGRAM

- Six DOD power reactors fielded between 1957-1976

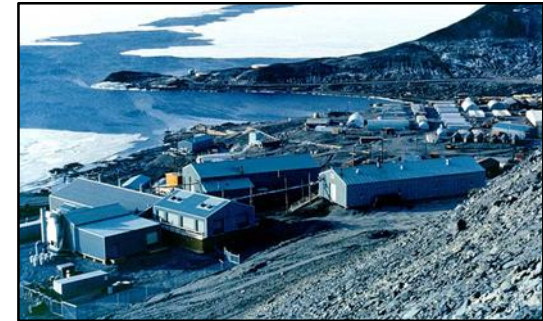
Four Army:



One Air Force:



One Navy:



- Three at National Reactor Testing Station, Idaho



US Army Corps
of Engineers®



ARMY DEACTIVATED NUCLEAR POWER PLANT PROGRAM

- PM2A at Camp Century Greenland was fully decommissioned, the three others were placed into SAFSTOR and are controlled under Army issued Permits, and still require decommissioning
- For the three Army deactivated (fuel removed) reactors placed into safe storage, USACE:
 - Ensures the security of the residual radioactive materials present in the reactors
 - Ensures structural integrity of the facilities and performs required maintenance
 - Performs environmental monitoring to ensure exposure to the public is below limits and 'As Low As Reasonably Achievable'
 - Plans and performs final decommissioning within 60 years post-shutdown



US Army Corps
of Engineers®



CURRENT REGULATORY FRAMEWORK AND OVERSIGHT

- Defense Utilization Facilities Authorized by Section 91.b. of the Atomic Energy Act of 1954
 - Section 110.b. of the AEA Excludes DOD Utilization Facilities from AEC/NRC Licensing
- Army Reactor Program (AR 50-7)
 - Compliance With Federal Standards Required
- Army Radiation Safety Program (DA PAM 385-24)
 - USACE Developed Radiation Protection Programs
- Army Reactor Permits Issued to USACE by U.S. Army Nuclear and Countering WMD Agency (USANCA) in G-3/5/7
- Army Reactor Council Provides Oversight

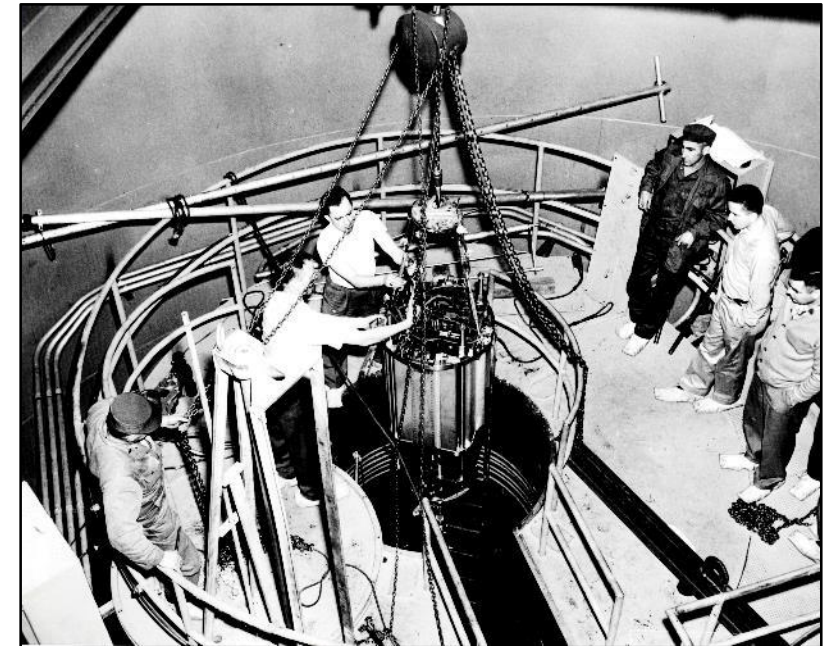
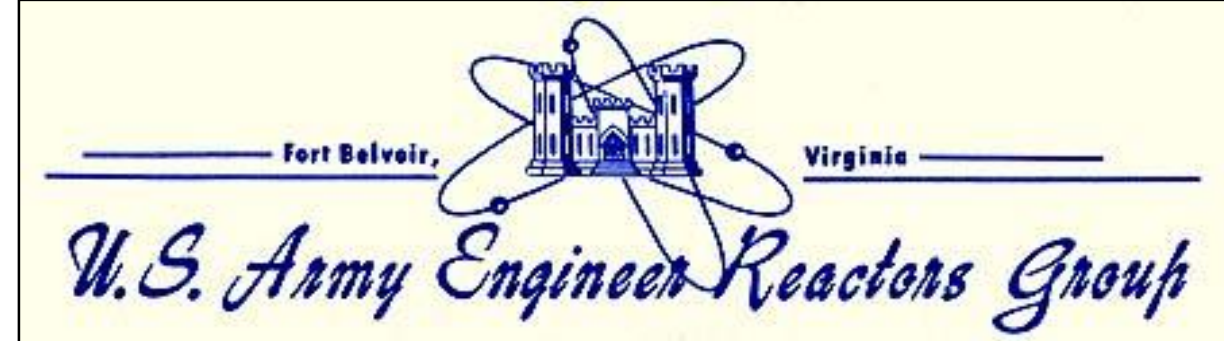


US Army Corps
of Engineers®



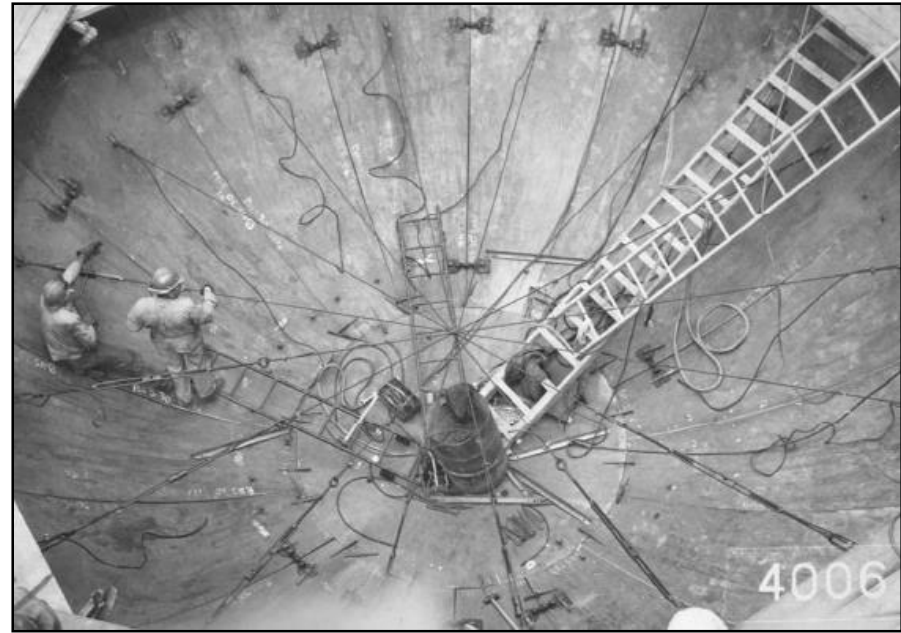
SM-1 TIMELINE: DETAILS

- 1952 : DoD studies development of reactor plants
- 1955: SM-1 Construction Begins
- April 8, 1957: SM-1 Reactor Startup
- March 1973: SM-1 Deactivated
- 1973-1974: Partial Decommissioning
 - Remaining low-level radioactivity placed in safe storage (SAFSTOR) with majority of remaining radioactivity allowed to decay over the years
- 2014: Army Corps awards decommissioning planning contract for SM-1
 - Planning is ongoing



US Army Corps
of Engineers®





1956 Construction Photos



US Army Corps
of Engineers®



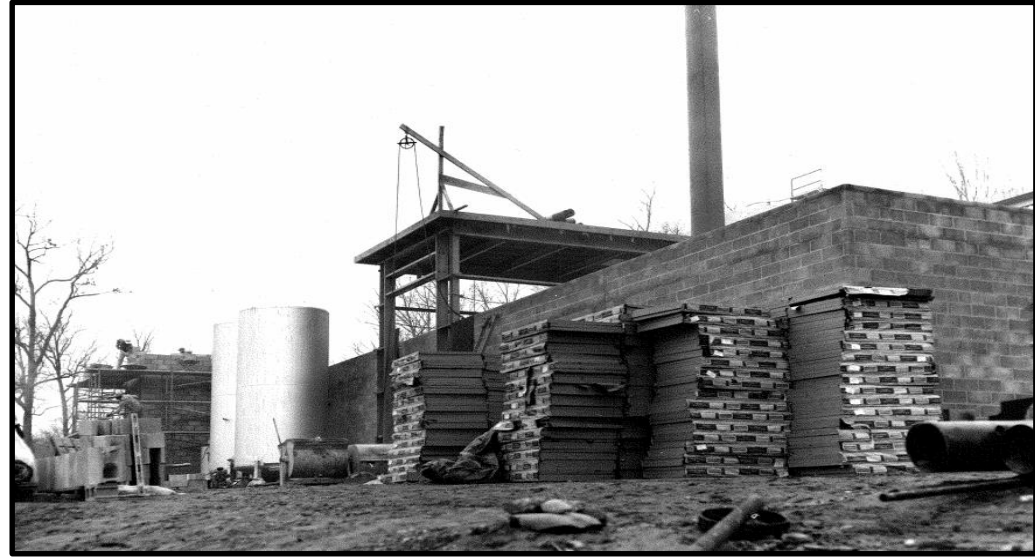


1956
Construction
Photos



US Army Corps
of Engineers®





1960 Construction Photos



US Army Corps
of Engineers®



HISTORIC USE

- SM-1 provided partial power to Fort Belvoir, but was primarily used to train nuclear operators/technicians from all branches of the military from 1957 to 1973
- SM-1 also served as the prototype for the rest of the reactors designed by the Army
- After being deactivated, the SM-1 facility operated as a museum highlighting the Army Nuclear Power Program into the 1980's before being closed for good



Service members from the Army, Air Force and Navy are pictured in the control room of the SM-1, which was used as for training nuclear technicians from all branches.



US Army Corps
of Engineers®



1973-74 PARTIAL DECOMMISSIONING ACTIVITIES AND SAFSTOR

- Removal of the nuclear fuel
- Shipment of the radioactive waste
- Minor decontamination
- Sealing of the reactor containment vessel (which includes the Reactor Pressure Vessel, Steam Generator, Pressurizer, Reactor Coolant Pumps and primary system piping)
- Installing appropriate security, warning signs and monitoring devices
- Remaining radioactivity was contained and has been sealed in safe storage (SAFSTOR) mode for the past 40-plus years
 - Safe storage is a radiological industry practice where radioactive materials are safely stored to allow the shorter-lived radionuclides to decay
- The U.S. Army Corps of Engineers conducts quarterly environmental monitoring to ensure the site does not pose any hazards to the surrounding installation tenants, the community or the environment



US Army Corps
of Engineers®



PRIOR CHARACTERIZATION EFFORTS TO SUPPORT DECOMMISSIONING PLANNING

- 1975 – Army Deactivation and Partial Decommissioning Report
- 1997 - Army Environmental Hygiene Agency Surveys
- USACE - Gamma walkover surveys inside the fenced area
 - Completed in 2009; additional small area surveyed in 2016
- USACE - Biased and systematic soil sampling
 - Executed in 2010 and 2016
- USACE - Characterization surveys of buildings/sites associated with SM-1
 - Completed in 2010



US Army Corps
of Engineers®



PRIOR CHARACTERIZATION EFFORTS TO SUPPORT DECOMMISSIONING PLANNING

- Survey of Gunston Cove sediment
 - 1999 and 2010 Sampling Reports
- Underground pipes
 - All waste pipes and outfall pipes to be removed
 - Geophysical surveys to verify pipes present in 2010 and 2016
 - Investigation of sewer pipes still to be planned/executed
- Soil under and adjacent to SM-1
 - A small amount of soil is assumed to be impacted requiring removal

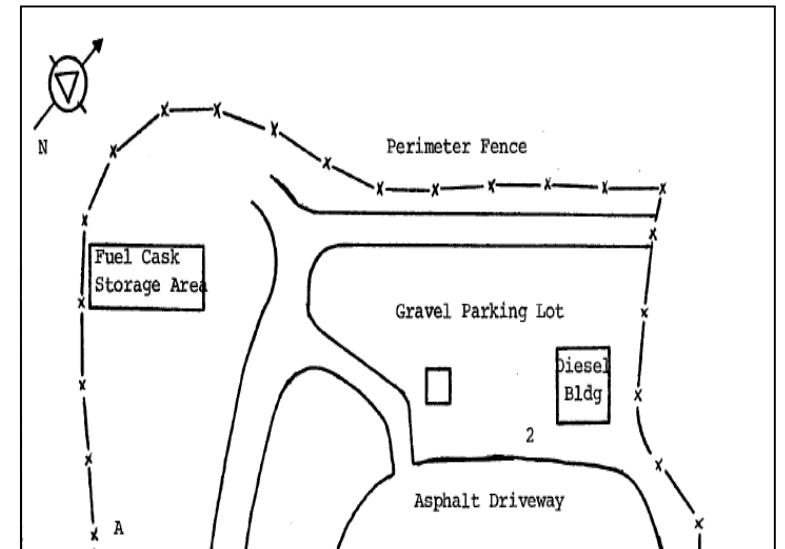


US Army Corps
of Engineers®



DOCUMENTED SPILLS AND CONTAMINATED AREAS

- Burial area behind Diesel Generator Building
 - Area outside control room (reported in interview)
 - Remediated in July 1973 (1975 Decom. Report)
- Liquid Waste Facility
- Storage areas for spent fuel casks
- Area outside spent fuel pit
- Ground near and east of seal pit
- Multiple areas inside Vapor Container



US Army Corps
of Engineers®



ROPACS AND COPACS

ROPACS – Primary Radionuclides of Potential Concern (half-lives > 5 years)

– ^3H , ^{55}Fe , ^{60}Co , ^{63}Ni , ^{90}Sr , ^{99}Tc , ^{137}Cs , ^{152}Eu , ^{154}Eu , ^{155}Eu , ^{234}U , ^{235}U , ^{238}Pu ,
 $^{239/240}\text{Pu}$

The ROPAC are not present across the site and each may be specific to

- Contaminated soils and Building materials
- Primary and secondary systems
- Activated metals
- Activated concrete

COPACS – Contaminants of Potential Concern

- Building materials: Asbestos, lead-based paint, PCBs
 - PCB transformers removed in 1994
- Shielding materials: elemental lead
- Soil: Lead



US Army Corps
of Engineers®



FINAL DECOMMISSIONING PLANNING

- Final Decommissioning Planning Contract Awarded in 2014
 - Planning efforts underway, including development and finalization of plans, environmental compliance and public engagement
- Environmental Compliance
 - A draft Environmental Assessment is being prepared, evaluating potential ecological, cultural, water, public health and safety, and waste management effects associated with the decommissioning of the SM-1 facility at Fort Belvoir
 - » The Army will seek public input regarding this EA as the team works through the development of the document. Initial Townhall meetings were held in January and the team will continue to see input. We anticipate the EA will be ready for public comment later in the year
- Section 106 Compliance (Historic Preservation)
 - The Army is seeking consultation from the state, historic groups and members of the public to determine the cultural impacts of the project and to mitigate any adverse effects identified in accordance with the National Historic Preservation Act
 - » The Army is committed to preserving the history of the SM-1 facility and making information regarding its legacy available to the public



US Army Corps
of Engineers®



REGULATORS

Applicable Regulations

- Atomic Energy Act
- National Environmental Protection Act
- Toxic Substance Control Act
- Clean Air Act
- Clean Water Act
- Endangered Species Act
- Others?

Regulators

- Removal of radioactive materials – Army Reactor Office (ARO)
- Historical/Cultural – VA State Historic Preservation Office (SHPO)
- Environmental protection/permitting – EPA and State



US Army Corps
of Engineers®



PROJECT STAKEHOLDERS

- Regulators
- Other government agencies (e.g., Department of Defense (DoD), Department of the Army, USACE, etc.)
- Public interest groups/neighbors
- Property owner and mission partners (Ft. Belvoir, Night Vision (RDECOM))
- Local, State, and Federal elected officials
- Local jurisdictions



US Army Corps
of Engineers®



PROJECT TEAM

- Members of the project and oversight team include:
 - Professional Engineers
 - Certified Health Physicists (Radiation Safety)
 - Certified Industrial Hygienists
 - Environmental Scientists
 - Regulatory Specialists
 - Safety Specialists
 - Qualified Technicians



US Army Corps
of Engineers®



FEDERAL OVERSIGHT

- U.S. Army Corps of Engineers will provide quality assurance over the contractor and their quality control program
- Corps of Engineers National Environmental Center of Expertise
- Army Reactor Office and Reactor Council
- Oak Ridge Associated Universities – Independent Review



US Army Corps
of Engineers®



SPECIFIC DECOMMISSIONING CHALLENGES AT SM-1

- Site has a small footprint and a limited area for infrastructure to support the project
- Limited transportation routes off installation
 - Team has to evaluate multiple modes of transportation, to possibly include, barge transportation, trucking, railroad transportation or a combination of modes
- Coordination with the installation staff
- Proximity to base housing
- Proximity to the U.S. Capital

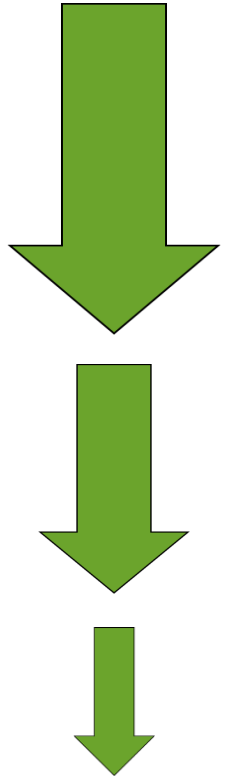


US Army Corps
of Engineers®



DECOMMISSIONING RISKS AND HOW WE REDUCE THEM

- Safety is the Army's number one priority - The safety and health of the community and our workers are paramount to the success of our project
- Trained professionals will use proven techniques and precautions to ensure the safety of the workers and the public
- Work will be completed within containment and all wastes will be properly packaged in compliance with Department of Transportation Guidance



US Army Corps
of Engineers®



SM-1 CONTRACT ACQUISITION APPROACH

- Contract type has been presented to leadership for approval
- Major Steps:
 - Market Research – completed in early 2019
 - Acquisition Planning – through early 2019
 - Draft Performance Work Statement and Bid Schedule – issued in late Jan 2019
 - Issue Request for Proposal – anticipated by mid-2019
 - Evaluate Proposals – Fall 2019 - early 2020
 - Award Decommissioning Contract – 3rd quarter of 2020
- This will be a Cost Reimbursable (CR) type Contract with the potential for some Fixed Price elements (requires a DCAA audited cost accounting system)
- Validated Earned Value Management implementation compliant with the guidelines in ANSI/EIA 748 is required
- Work anticipated to take 5 years to implement



US Army Corps
of Engineers®



REQUEST FOR PROPOSAL WILL LIKELY INCLUDE THE FOLLOWING REQUIREMENTS

- Combination of large and small companies with capabilities and expertise in the following key areas:
 - Project Management
 - Scheduling
 - Cost Estimating
 - Risk Assessment and Analysis
 - Radiological Expertise
 - Health and Safety Expertise
 - Decommissioning Expertise
 - Demolition Expertise
 - Regulatory Compliance
 - Waste Transportation and Disposal



US Army Corps
of Engineers®



SM-1 DECOMMISSIONING IMPLEMENTATION ACTIVITIES

- The selected contractor will prepare plans that will support the decommissioning of the SM-1 in accordance with contract PWS and the Decommissioning Permit issued to the USACE;
- Decommission/dispose of materials in accordance with final plans, decommissioning permits, and relevant Federal and State requirements; and
 - Project management (cost controls, scheduling, manpower resourcing, etc.)
 - Prepare work plans, safety and radiological plans, and prepare complex engineering assessments
 - Removal of all reactor components and radiologically contaminated materials
 - Prepare all radiological waste for proper shipment; then transport and dispose of the waste
 - Perform radiological surveys
 - Perform demolition of non-contaminated equipment and building components
 - Excavate contaminated soils
- Final site restoration

Adherence to NRC and Army, as well as other Federal standards and guidance where relevant and as required by the Army Reactor Office and USACE.



US Army Corps
of Engineers®



SM-1 POTENTIAL SCOPE (TO BE REFINED)

- Proposed scope was outlined in the draft Performance Work Statement issued on FedBiz Ops on January 28, 2019.
- The USACE team has outlined the current planned approach to implement the work at the site
- The USACE team has defined the following task to be implemented as firm fixed price:
 - ✓ Project Management
 - ✓ Development of Work Plans
 - ✓ Travel and Per Diem
 - ✓ Site Preparation
 - ✓ Mobilization
 - ✓ Demobilization
 - ✓ Reporting
- All remaining project tasks are currently slated to be cost reimbursable

The scope is still under development and USACE is seeking input from industry as we refine our documentation.



US Army Corps
of Engineers®



WASTE SEGREGATION PROCESS – WHERE DOES IT ALL GO?



**CLEAN MATERIAL & EQUIPMENT (M&E)
AND DEMOLITION DEBRIS FOR DISPOSAL
OR RECYCLED**



- ELECTRICAL DISTRIBUTION EQUIPMENT
- CONTROL ROOM CONSOLES
- BUILDING DEBRIS
 - STEEL
 - CONCRETE

**TRUCKS and TRAINS TRANSPORT
WASTE**



**HAZARDOUS WASTE TO PERMITTED
LANDFILLS**

- SOIL AND DEBRIS CONTAMINATED WITH VERY LOW LEVELS OF RADIOACTIVITY
- ASBESTOS INSULATION, FLOOR TILES, MASTICS, ETC.
- LEAD-CONTAMINATED SOILS
- UNIVERSAL WASTE



**LOW LEVEL RADIOACTIVE WASTE TO A LICENSED
DISPOSAL FACILITY**

- **RADIOLOGICALLY ACTIVATED**
 - REACTOR PRESSURE VESSEL (RPV)
 - OTHER REACTOR COMPONENTS
- **RADIOLOGICALLY CONTAMINATED**
 - PRIMARY and SECONDARY REACTOR SYSTEMS
 - LIQUID WASTE MANAGEMENT SYSTEM
 - CONTAMINATED SOIL AND DEBRIS



**US Army Corps
of Engineers®**



TRANSPORTATION RECOMMENDATION

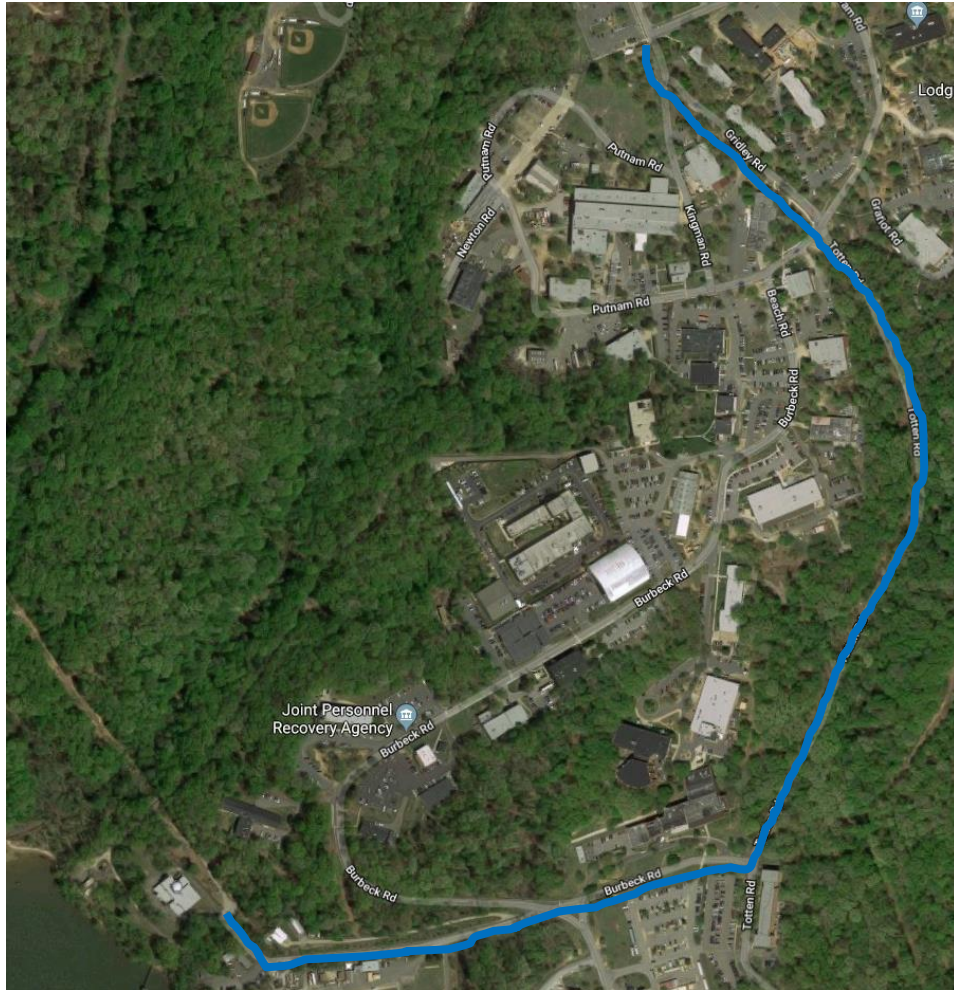
- The team completed a study of two (2) COAs for transportation of the waste from the project off the installation.
 - COA 1 – Truck transport off the installation to a transload facility where waste will be placed on railcars for shipment across country to the disposal facility in Texas
 - COA 2 – Barge transport off the installation to a transload facility where waste will be placed on railcars for shipment across country to the disposal facility in Texas
- The team has reviewed the two COAs and is recommending COA 1 – truck transportation as the lowest risk and most cost effective solution to the Gov't. This approach will require some roadway repair work for the route off of the installation, but the team agreed upon the approach for repairs prior to the start of the project and then the required monitoring throughout the duration of the project. The team is willing to consider alternative transportation approaches from the bidders.



US Army Corps
of Engineers®



TRANSPORTATION ROUTE INTERNAL TO THE 300 AREA



Proposed route out of the 300 Area – Leave SM-1 site, travel along Wilson Road onto Burbeck Road to Totten Road and then onto Gridley Road. Exit the 300 Area onto Gunston Road.

In order to utilize this route, Totten Road will require repair prior the start of the project.

There will be approximately one to two shipments per week. The team can coordinate timeframes for the shipments with the installation to minimize impact to the normal traffic on post



US Army Corps
of Engineers®



TRANSPORTATION ROUTE AFTER LEAVING THE 300 AREA

Figure 3-4, Truck Route from 300 Area

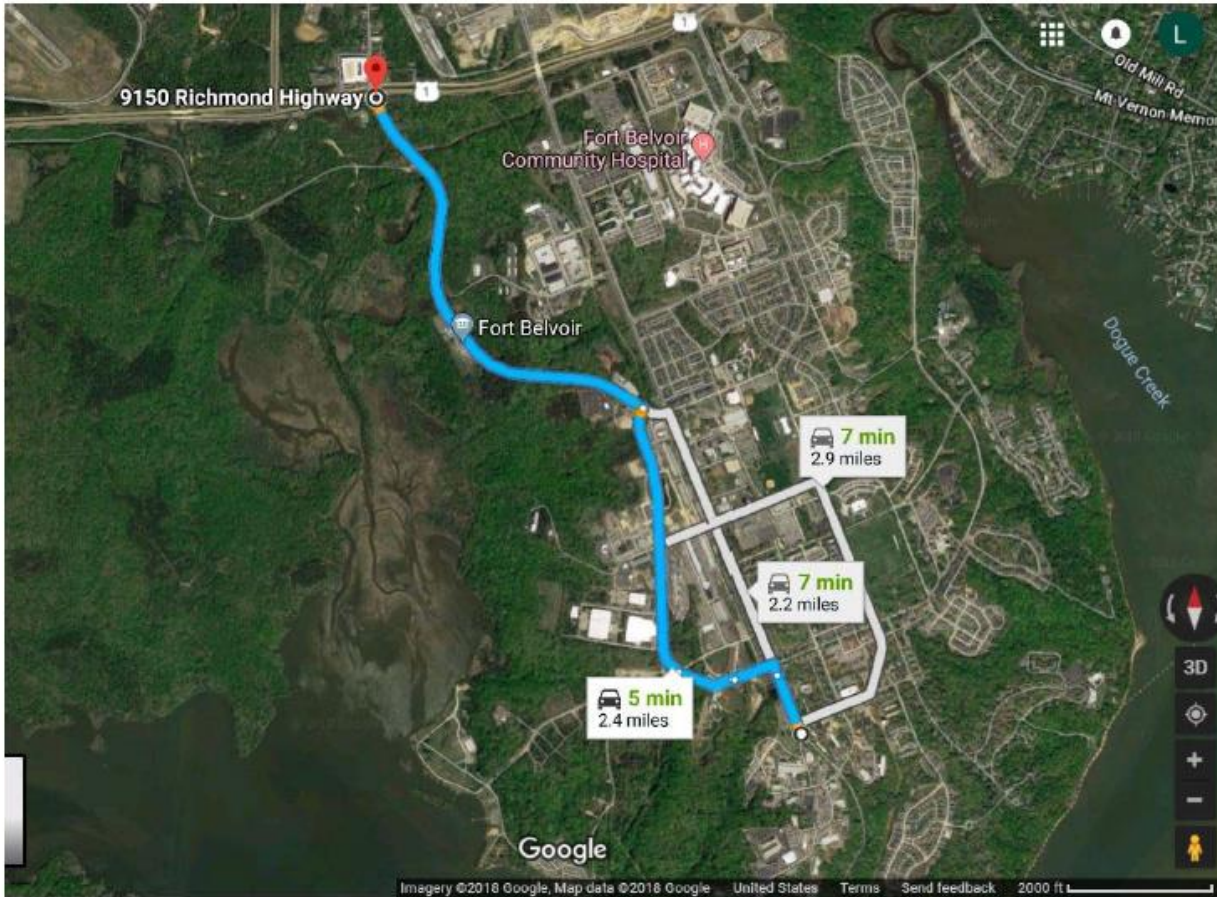
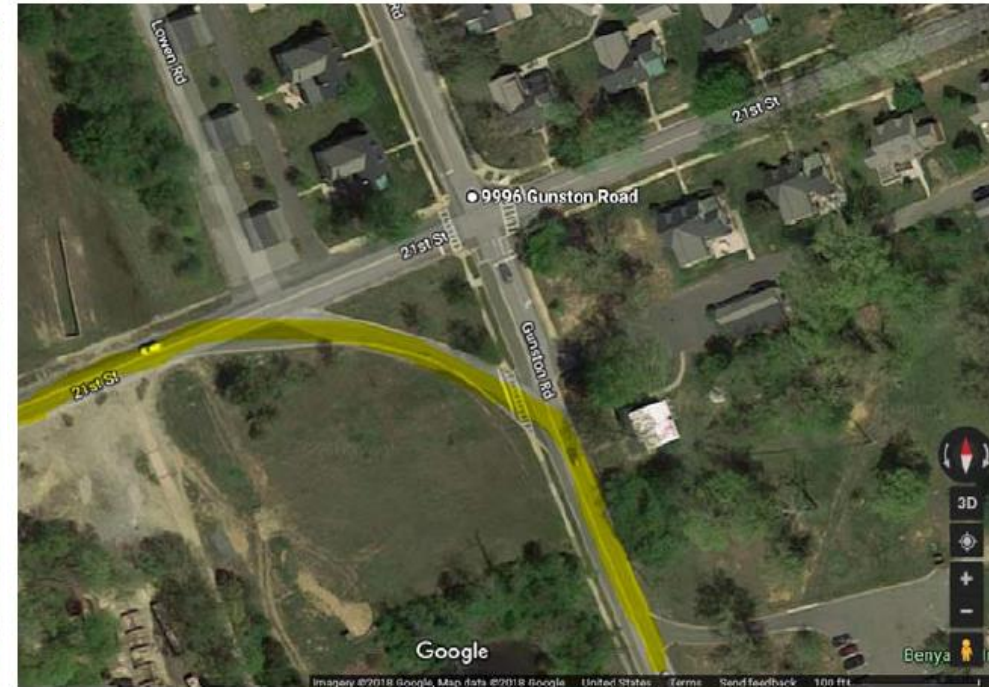


Figure 3-5, Alternate Gunston Road to 21st St. Transition Path



Proposed route from 300 Area to Route 1 –Take Gunston Road onto 21st Street (would like to use the turn lane depicted above), then turn onto Clapp Road towards Theote Road toward Pohick Road which will take the trucks onto Route 1

Some sections of this route will require repair prior to the start of the project as well.



US Army Corps of Engineers®



SM-1 DECOMMISSIONING PATH FORWARD

- Decommissioning planning is underway and is targeted for completion in early 2020
 - Next major milestone will be the draft Environmental Assessment, which will be made available for public review and comment later this year (2019)
- Decommissioning Contract
 - Draft Bid Schedule and Draft PWS were provided to industry for feedback
 - Parties are encouraged to submit any additional questions, comments, suggestion regarding these documents via email to James Greer, Contract Specialist (james.a.greer@usace.army.mil) no later than 22 Feb 2019. Formal Request for Proposals later in 2019
 - Anticipate Decommissioning Contract award scheduled for 3rd quarter 2020
- This timeline means decommissioning work on site will likely not begin until late 2020 or in 2021 at the earliest



US Army Corps
of Engineers®



**Thank you for attending today's event. USACE
appreciates your input on the SM-1 Deactivated
Nuclear Power Plant Decommissioning and
Dismantlement Project.**

**One on One Sessions will follow this presentation in
Room 221.**

Questions?



**US Army Corps
of Engineers®**

