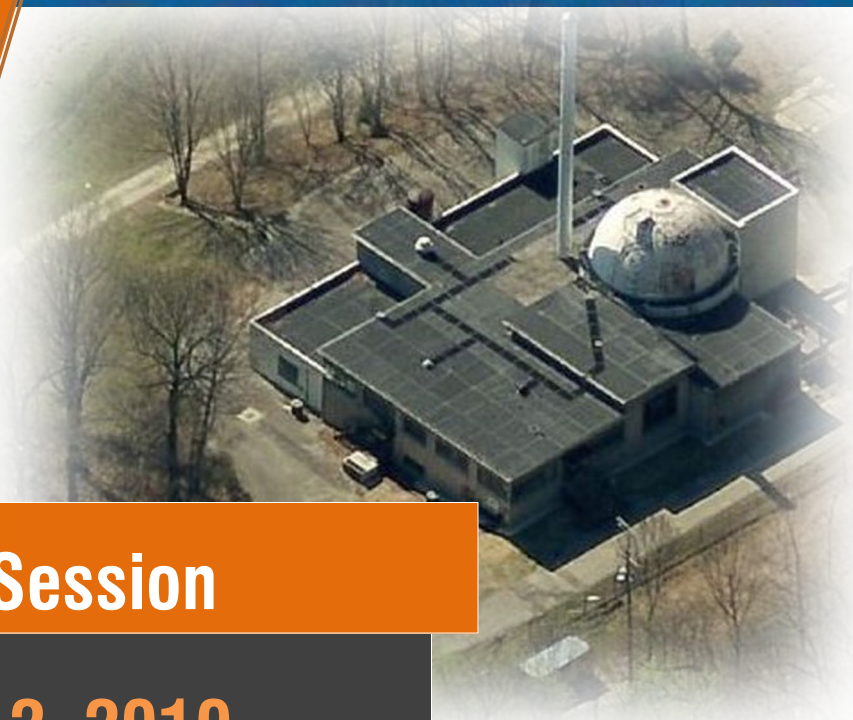
WELCOME

SM-1 DECOMMISSIONING PROJECT



Schedule

Public Info Session

6:30 PM - 7:30 PM

- Open House
- Meet and interact with USACE and Fort Belvoir personnel

7:30PM - 8:30 PM

- Formal Presentation
- Q/A Session
- Poster Availability

March 12, 2019

Off-Post
Fairfax County South
County Government Center
8350 Richmond Hwy,
Alexandria, VA
(Room 221)

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WELCOME

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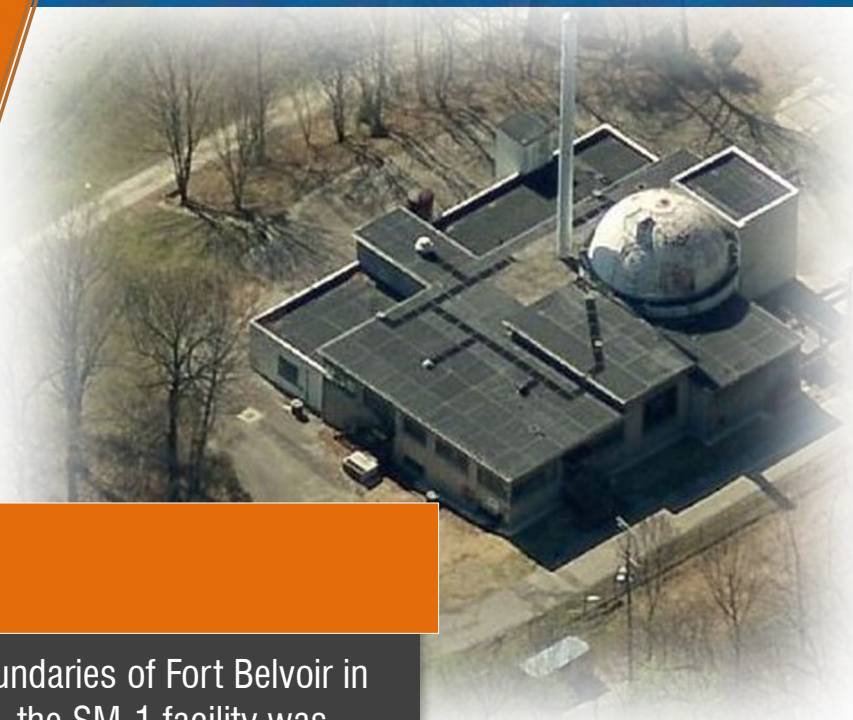

Brief History

The former SM-1 nuclear power plant is situated within the boundaries of Fort Belvoir in Fairfax County, Virginia. After construction completion in 1957, the SM-1 facility was used to train U.S Army power plant operators and was capable of delivering a net 1,750 kilowatts of electrical power. It was the first nuclear power reactor to provide electricity to a commercial power grid in the United States. In 1973, the reactor facility was deactivated (shutdown) and deactivation included removal of the nuclear fuel and sealing of the reactor pressure vessel, decontamination of building areas to the extent possible, and off-site disposal of radioactive wastes. The site is now referred to as the SM-1 Deactivated Nuclear Power Plant. For more than 45 years, the site has been monitored and maintained while the accessible portions of the SM-1 facility have been used as a museum and storage space.

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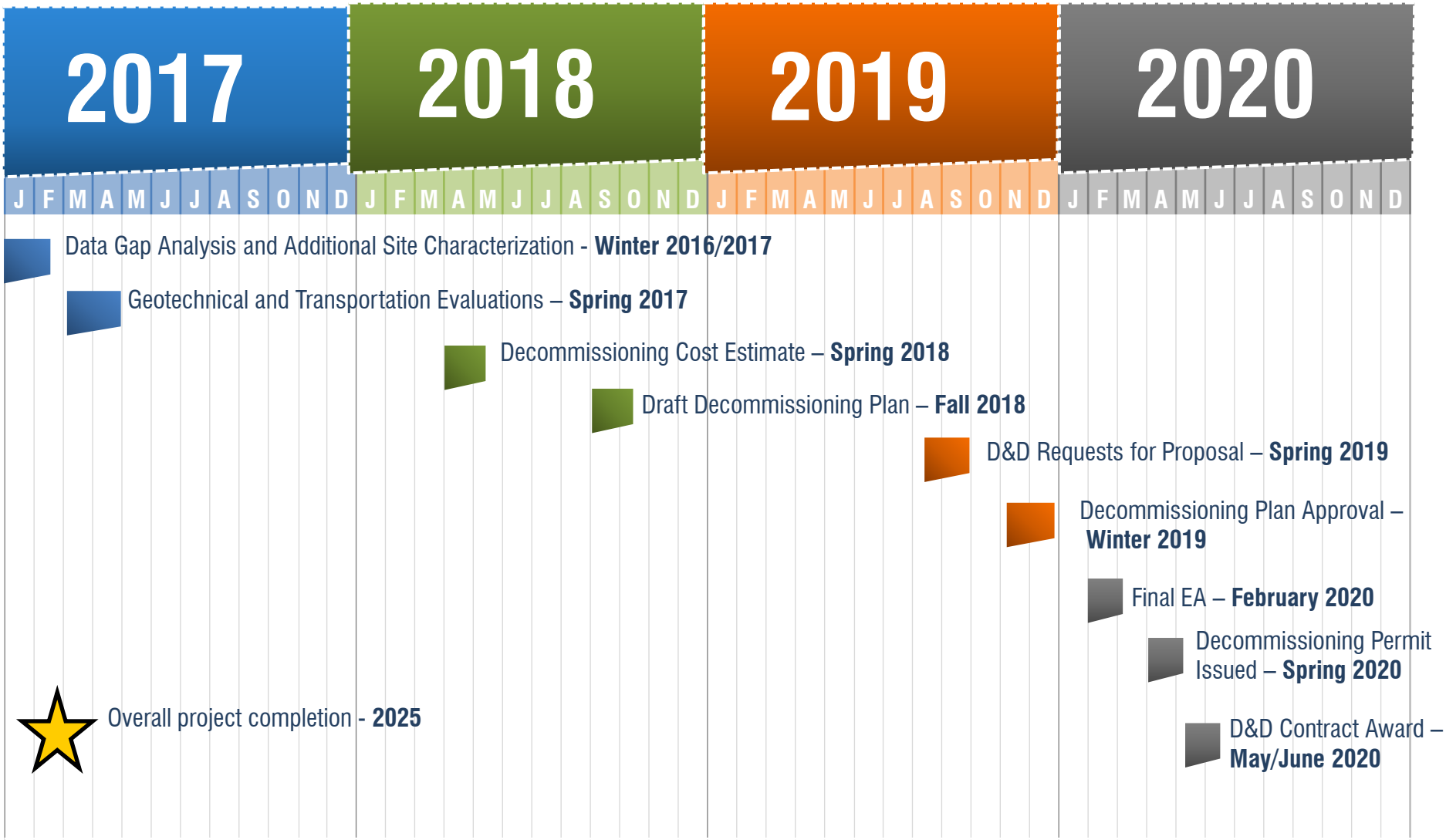
SM-1 TIMELINE/SCHEDULE



TIMELINE FOR THE SM-1 REACTOR FACILITY

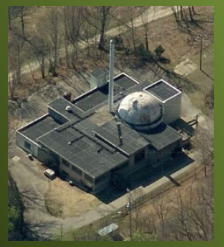
1954
U.S Army Engineer Reactors Group Established

1957-1973
SM-1 served as the Army's primary training facility to train reactor operations personnel

1996
U.S. Army Center for Health Promotion and Preventive Medicine performed extensive surveys of the SM-1 Reactor Facility and surrounding environment to provide an independent review of the environmental monitoring program

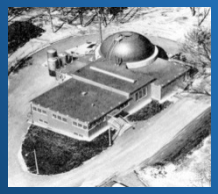
2005
Historical Site Assessment complete

2013
Site Characterization and Survey Report Finalized



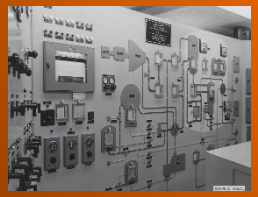
1950s 1960s 1970s 1980s 1990s 2000s 2010s

1957 Construction and start-up of SM-1



1962
SM-1A Reactor startup in Alaska using SM-1 prototype designs

1973-1974
Deactivation and initial decommissioning of SM-1 Reactor



LEGEND

- SM-1 Reactor in use
- Reactor deactivation and initial decommissioning
- Decommissioning planning
- Other

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WASTE SEGREGATION PROCESS

WHERE DOES IT ALL GO?

>50%

CLEAN MATERIAL & EQUIPMENT AND DEMOLITION DEBRIS FOR DISPOSAL OR RECYCLING

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

TRUCKS and TRAINS TRANSPORT WASTE

<25%

<25%

HAZARDOUS WASTE FORMS TO PERMITTED LANDFILLS

- SOIL AND DEBRIS CONTAMINATED WITH VERY LOW LEVELS OF RADIOACTIVITY
- ASBESTOS INSULATION, FLOOR TILES, ADHESIVES, ETC.
- LEAD-CONTAMINATED SOILS
- UNIVERSAL WASTE (fluorescent bulbs, mercury-containing equipment, etc.)

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

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RADIATION, RADIOACTIVITY, AND RISK

WHAT IS RADIATION?

RADIATION
- Invisible energy moving through space

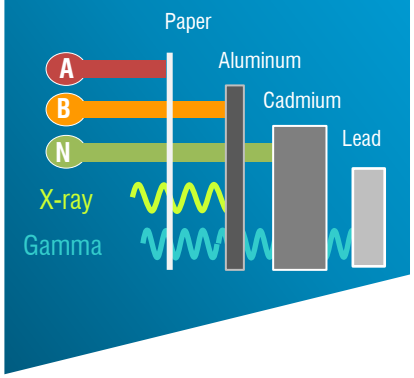
NON–IONIZING RADIATION
- Light, sound, heat or infrared waves, microwaves, radio waves, low frequency power line radiation

IONIZING RADIATION
- A: Alpha particles (fast moving helium nucleus)
- B: Beta particles (fast moving electron)
- N: Neutrons
- Gamma, X-ray

QUANTIFYING RADIATION EXPOSURE
- REM (millirem – 1/1000 REM)

Unit of absorbed dose in the body that measures the impact of deposited energy.

DIFFERENT TYPES OF RADIATION HAVE DIFFERENT PENETRATING POWERS



WHAT IS RADIOACTIVITY?

RADIOACTIVITY
- Spontaneous emission of radiation
- Is reduced as radioactive atoms decay

RADIOACTIVE ATOMS
- Are unstable
- Change or decay until they become stable
- Give off surplus energy by emitting radiation

HALF LIFE
- The time it takes for decay to half the previous radioactivity

QUANTIFYING RADIACTIVITY
- Disintegration per second (d/s)
- The number of atomic nuclei that decay each second

SOME HALF LIVES

5.27 years	Cobalt-60
100.1 years	Nickel-63
4.5 billion years	Uranium-238

WHAT IS RISK ASSESSMENT?

RISK ASSESMENT
- Evaluating benefits versus risk
- Is a smoke detector worth its radiation risk?

NO ANSWER TO THE QUESTION:
- What is a safe level of radiation exposure?

(What is a safe driving speed?)

APPROPRIATE QUESTION TO ASK IS:
- What is the risk associated with a given exposure? (What is the risk of injury for this situation and speed?)

HEALTH RISKS FROM RADIATION COMPARED WITH OTHER SITUATIONS

	Days Life Lost
Unmarried Male	3500
Smoke 20 cigarettes per day	2370
Unmarried Female	1600
Overweight by 20%	985
All accidents combined	435
Auto Accidents	200
Alcohol Consumption (U.S. averages)	130
1000 millirem per year for 30 years, calculated	30
Natural background radiation calculated	8
Medical Diagnostic X-rays	6
Coffee drinker	6

ANNUAL RADIATION DOSES IN MILLIREM - VARIOUS EXPOSURES

5,000 mrem	US OCCUPATIONAL DOSE LIMIT
2,000 mrem	TOBACCO SMOKING
1,500 mrem	UNDERGROUND URANIUM MINES
620 mrem	AVERAGE ANNUAL RADIATION PUBLIC DOSE
200 mrem	RADON IN THE AIR
100 mrem	NUCLEAR REGULATORY COMMISSION PUBLIC DOSE LIMIT
40 mrem	FOOD AND WATER
26 mrem	TERRESTRIAL RADIATION - US AVERAGE
25 mrem	SM-1 SITE RELEASE CRITERIA
10 mrem	CHEST X-RAY
1 mrem	SM-1 MATERIAL RELEASE CRITERIA

mrem =
MILLIREM=1/1000 REM.
UNIT OF ABSORBED DOSE IN THE BODY THAT MEASURES THE IMPACT OF DEPOSITED ENERGY

USACE COMMITMENT – SM-1

RISKS?

Safety is our number one priority. There will be minimal risk to the public as we implement this project. USACE will have a highly skilled team of engineers, scientists, and contractors dedicated to the project. SM-1's nuclear fuel was removed more than 40 years ago.

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