SRS: COLD WAR PRESERVATION PROGRAM

Source: http://nielsbrockprogram.swsi.wikispaces.net

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Savannah River NUCLEAR SOLUTIONS℠
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Purpose

- To provide an update on the SRS Cold War Preservation Program and to fulfill a Strategic & Legacy Management (S&LM) 2013 Work Plan topic.

Driven by the National Historic Preservation Act

President Lyndon B. Johnson signs NHPA, 1966

Fostered the system by which federal agencies…

survey and identify

districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering, and culture, and

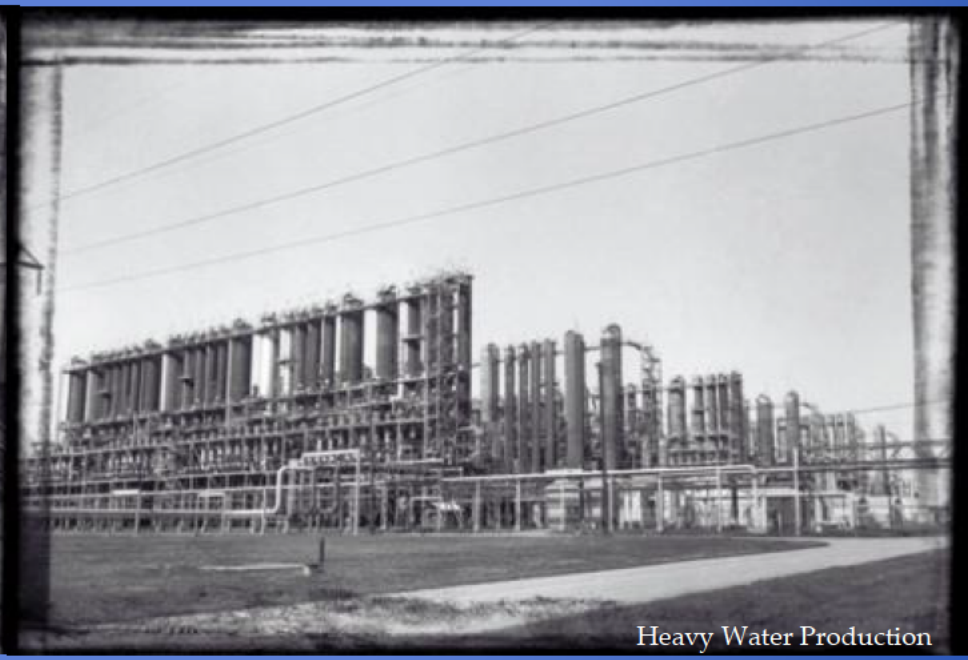
use this information to plan projects

so that, where possible, historic places are preserved.

Preservation of Modern History 1950 to 1989

Program developed as part of the Site's Fiftieth Anniversary

Interior view of Fuel and Target Facility



Heavy Water Production

- SRS recognized the Site's Cold War facilities and equipment as potentially significant and began its Cold War inventory as required under the NHPA.

Programmatic Agreement

Developed with State Historic Preservation Office, Advisory Council, and local stakeholders

For the identification and treatment of resources and artifacts that date from the Site's selection to the end of the Cold War.

- We identify facilities for preservation
- We write histories
- We collect and manage artifacts
- We provide public outreach

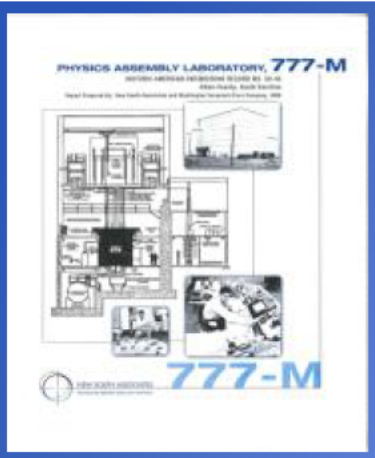
Program Objectives – Resource Identification

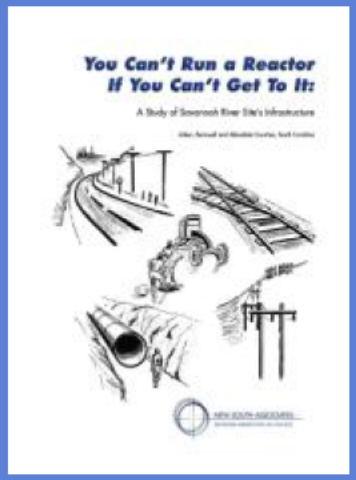
A Area Conceptual Plan Created by Voorhees, Walker, Foley & Smith, 1952

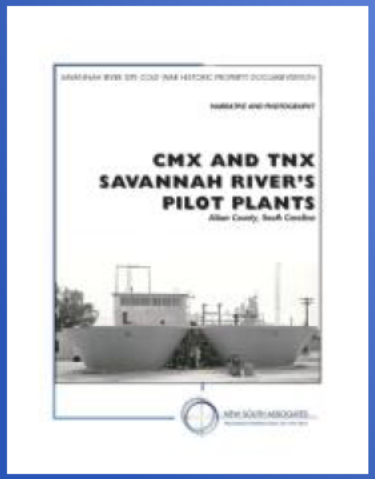
Administration Building after Completion

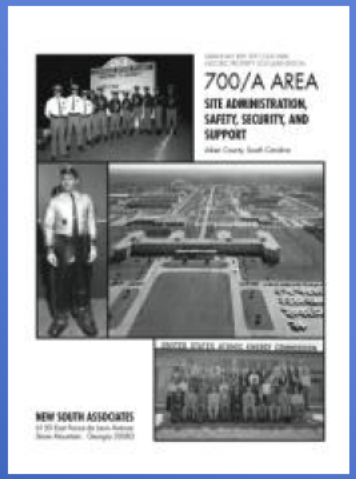
- 220 Cold War resources identified as significant
- Site Layout
- Considered a National Register-eligible Cold War historic district
- Under DOE's Section 110 responsibilities others will be surveyed as facilities reach 50 years of age or meet Criterion Consideration G

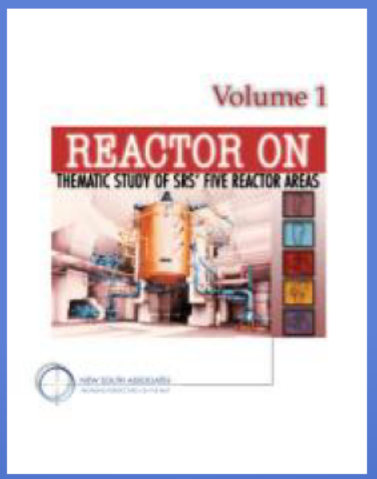
Program Objectives - Documentation











Historic American Engineering Record Documentation of 777-10A, archived at Library of Congress, available online

6 completed thematic studies are available for download from SHPO website or can be used at library

Separations study in draft

Research and development study to be initiated this year

Thematic Studies are linked to Plant Processes

Excerpted From

Circa 1962

We don't dig Uranium out of the ground, and we don't make bombs

But we do nearly everything in between.

PLANT PROCESSES

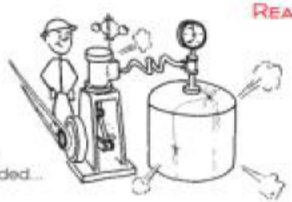
"First forge the fuel..."

Before being charged to the reactor, fuel and target materials are formed into aluminum-clad cylindrical "elements." The aluminum cladding minimizes corrosion and seals radioactive products within the elements.

Fuel and Target Fabrication

Savannah River's large production reactors are moderated and cooled by circulating heavy water. In the stainless steel reactor tank, long cylindrical assemblies of fuel and target elements are positioned in a precise geometrical pattern to form the reactor lattice. Remotely-controlled machines for charging and discharging reactor elements are shown above the reactor top.

Reactor Irradiation



...put the heat where it's needed...

Chemical processing of irradiated materials produces radioactive liquid waste. This material is concentrated and stored in large underground tanks to prevent contamination of the plant environs. Safe management of wastes requires continuous surveillance.

Waste Management

Heavy water (D_2O) used to moderate the reactors is extracted from natural water in a gas-liquid exchange process, which concentrates the trace amounts (0.015%) of heavy water in the Savannah River to about 15% D_2O. A final distillation stage yields extremely pure D_2O at a concentration greater than 99%.

Heavy Water Extraction

...then mix judiciously with D_2O...

After irradiation, fuel and target materials are chemically processed in remotely-controlled shielded facilities to remove radioactive byproducts, to purify the desired product, and to recover the valuable unburned nuclear fuel. A mockup is shown of the process vessels designed for remote operation and maintenance.

Separations

"We make practically all of the free world's supply of heavy water."

PRODUCTS

Plutonium-238
Produced by neutron irradiation of neptunium-237, a byproduct of uranium irradiation. Valuable for its heat generating capacity.

Curium-244
Properties and applications similar to plutonium-238.

Plutonium-239
Used as a nuclear explosive, a breeder reactor fuel, or as the starting target material for production of heavier radioisotopes.

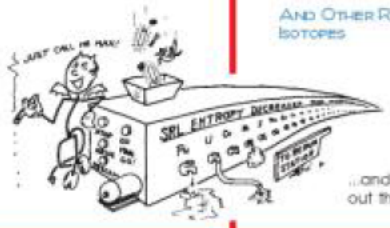
Tritium (Hydrogen-3)
A radioactive isotope of hydrogen, component of thermonuclear explosives, and a potential fuel for thermonuclear fusion power generation.

Cobalt-60
Known radiation source and has long been used for radiotherapy.

Californium-252
One of the rarest man-made isotopes, has great potential value in medicine, industry, research, and education.

Heavy Water (D_2O)
Important nonradioactive product of the Savannah River Plant. It occurs at a concentration of 0.015% in natural water and must be concentrated to 99+% to be useful in reactors as a neutron moderator.

And Other Radioactive Isotopes

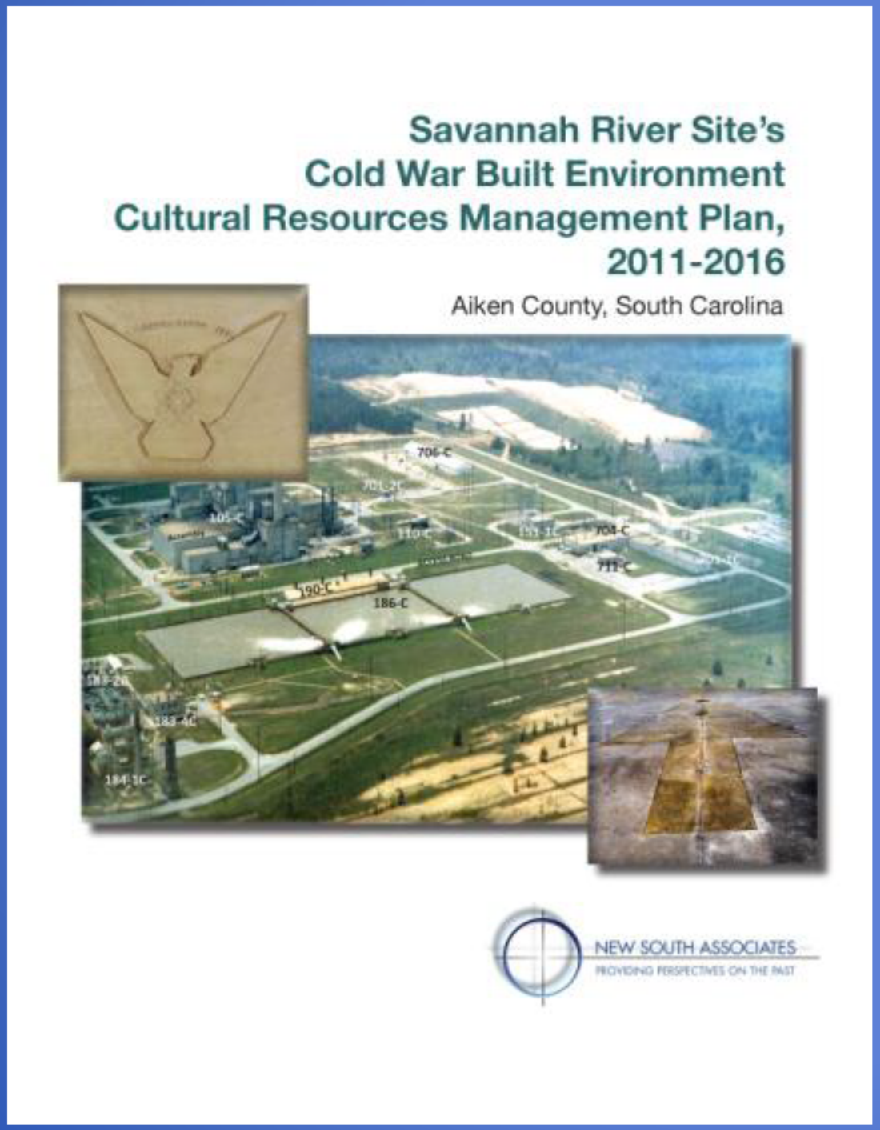


...and lastly, squeeze out the goodies!"

LABORATORY GOALS

Today, we direct the Laboratory's resources increasingly toward peaceful aims - electric power from heavy water reactors, the chemical processing of spent power fuels, the recovery of specific fission products, and the manufacture of special radioisotopes.

Program Objectives: Preservation



Preservation planning for Site

Working with Site Archives

Partnering with Savannah River National Laboratory

Most importantly, educating the work force

Program Objectives: Curation

315-M = Curation!

Facility where artifacts are collected, stored, catalogued, and studied

Provides climate controlled environment

Provides work space for curator and researchers

Houses both Cold War and SRS archaeological collections

Program Objectives: Public Outreach

- Organize Heritage Tourism meetings for preservation community within the CSRA
- Help to update Site exhibits/websites
- Develop traveling exhibits
- Encourage all personnel to learn about the Site's past

Program Objective: Compliance

- Ensure DOE is in compliance with NHPA
- Maintain up to date training in safety and security
- Maintain Historic Preservation Advisory Team Meetings
- Quality Assurance Plan

Feature –

How buildings, photographs, and artifacts tell a story... The Medical Building's Decon Suite

Special Emergency Room/Isolation Area

- Suite of seven rooms created to treat critically irradiated personnel in case of an incident
- Accessed by a Special Ambulance Entrance

Lead Bath

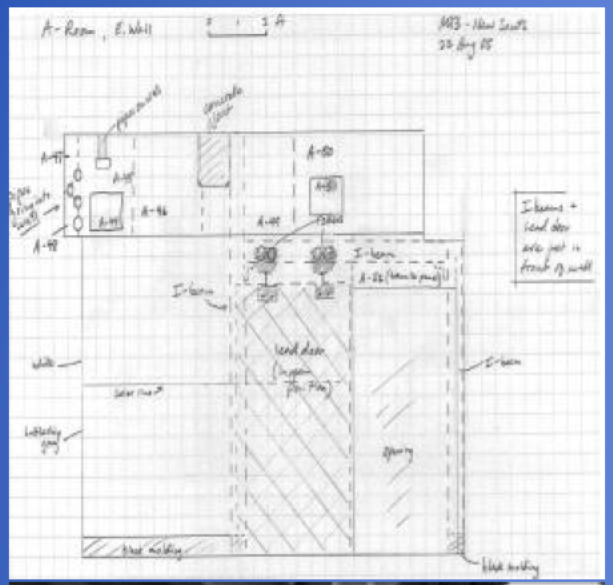
Preparedness

- Lead bath installed in response to an incident at Idaho in 1961 at SL-1
- Equipped with lead shields with viewing windows to protect medical personnel
- Ability to seal off room with sliding shield doors

Photographic Sequence Showing Decontamination Bath Procedure, ca. 1965

Source: SRS Photo Services

Identification and Evaluation Leads to … Preservation Success Story



- The Decon Suite at SRS was fortunately never needed
- It was a well preserved Cold War artifact that spoke volumes about Site Safety a major theme for the Cold War
- Suite and its contents drawn to scale and photographed, building plans preserved
- Historic photography was used to better understand what we were seeing
- Contents including the lead bath were saved and are stored in 315-M for future interpretation