SRS: COLD WAR PRESERVATION PROGRAM UPDATE

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) 2014 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 2014

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

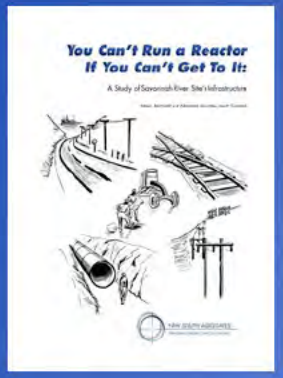
Administration Building after Completion

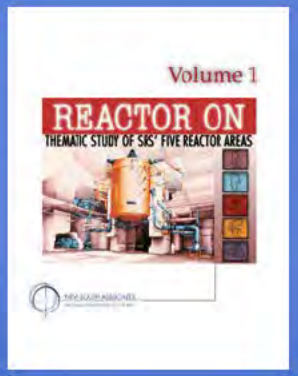
220 Cold War resources identified as significant as well as the Site Layout

Considered a National Register-eligible Cold War historic district

No new Cold War resources such as buildings or structures were identified in 2014

Program Objectives – Documentation 2014





Separations study titled "Bringing it to Form" finalized and accepted by SHPO in September 2014

Research and development study just starting.

Thematic studies available at University of SC Aiken Government document Library or online at

http://shpo.sc.gov/research/Pages/conreps.aspx

Program Objectives: Curation 2014

315-M = Curation!

Accepted 12 new artifacts, five pending

Over 50 boxes of artifacts, reinventoried

Installed "new" shelving

Currently assessing conditions and creating priority list of artifacts for conservation

Program Objectives: Public Outreach in 2014

- Partnered with SRNS Communications Team to share historic photographs through social media program, "Throwback Thursdays"
- Hosted seven tours of Curation Facility (75 visitors) Included the Veterans Curation Lab, SRS Mentoring groups and SRS interns
- Organized four Heritage Tourism meetings for preservation community within the CSRA
- Arranged tour of Plant Vogtle for Historic Preservation group

Program Objective: Compliance 2014

- Ensure DOE is in compliance with NHPA in terms of current undertakings
- Maintain up to date training in safety and security
- Maintain Historic Preservation Advisory Team Meetings on a Quarterly basis
- Working on Cultural Resources Management Plan update

HOW BUILDINGS, PHOTOGRAPHS AND ARTIFACTS TELL STORIES – "BREAKING STORY" 217-F's VAULT DOORS

217-F- STORAGE MAGAZINE

It served the F and H areas as a storage magazine for plutonium and tritium in final packaged form prior to shipment from the plant.

What Goes in, Must Come Out

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

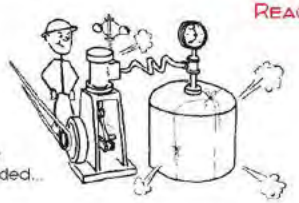
"First forge the fuel..."

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.

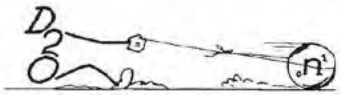
Fuel and Target Fabrication

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

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.

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%.

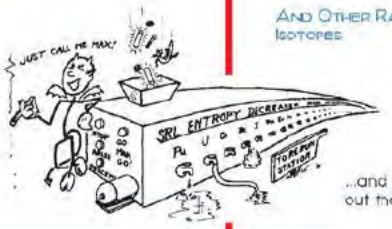
Heavy Water Extraction

...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."



...and lastly, squeeze out the goodiest"

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.

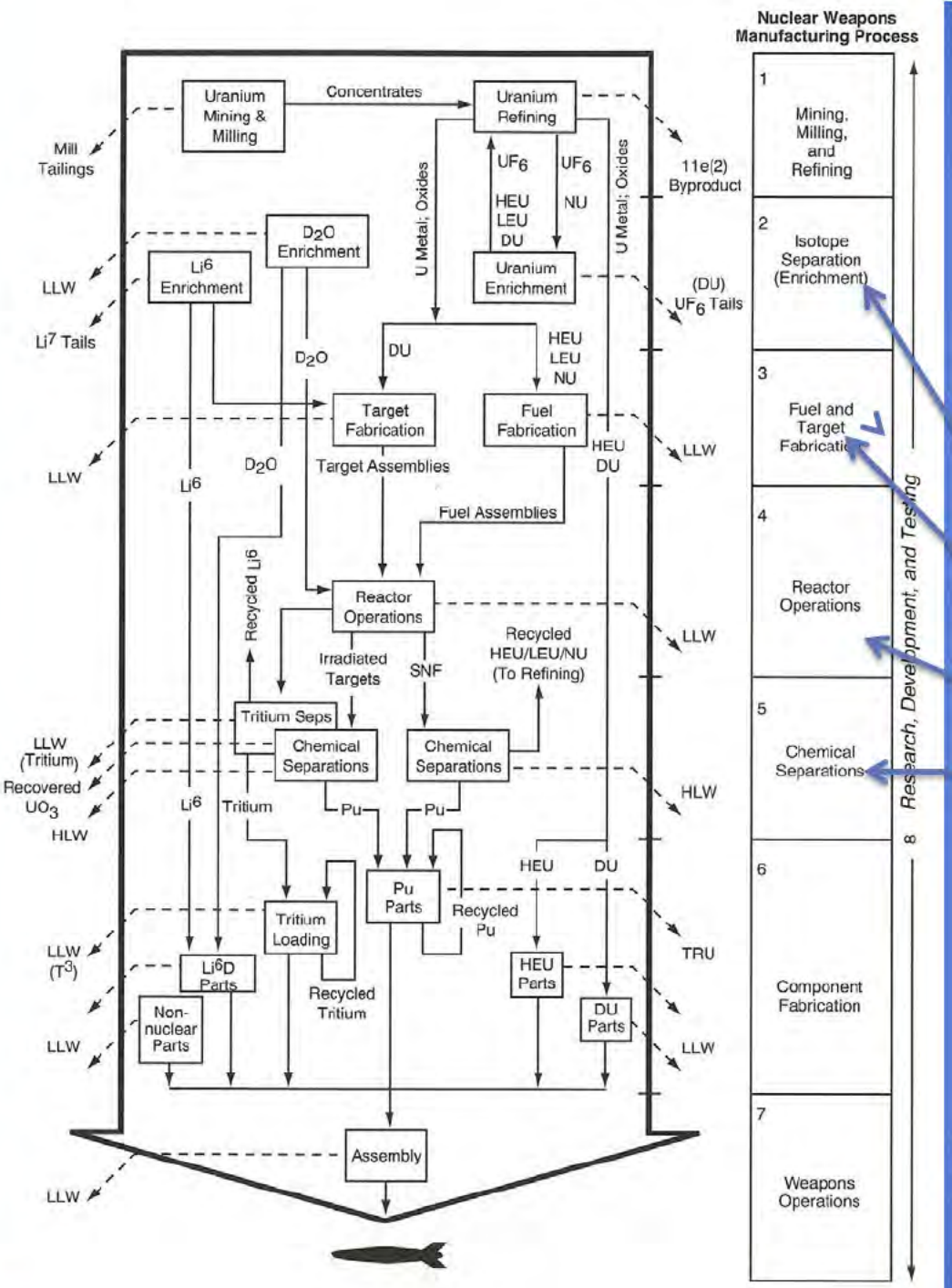
Heavy Water (D_2O)

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

Oblique View Showing Barrier Walls

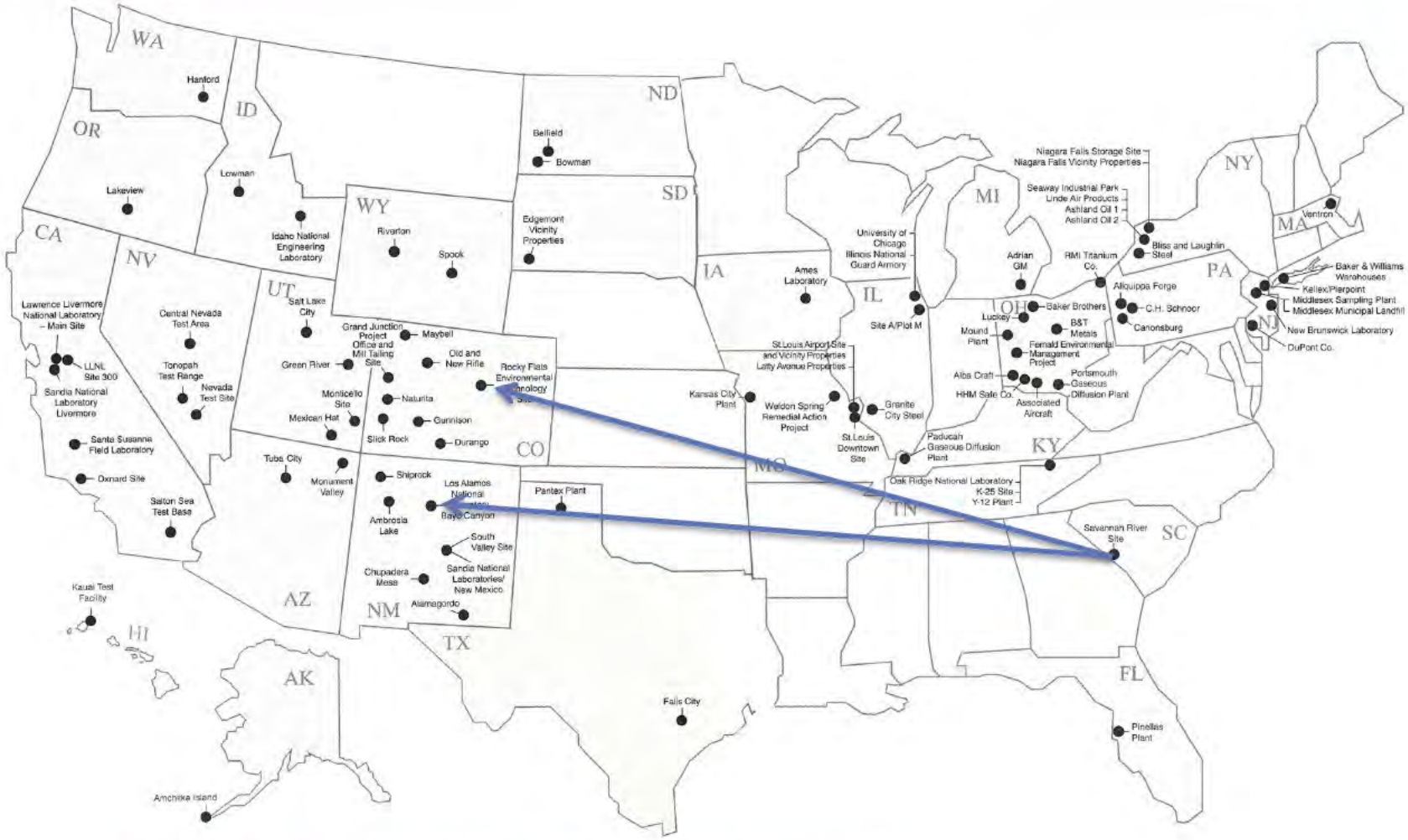
Nuclear Weapons Manufacturing Process



Savannah River Plant

Source: Linking Legacies. US DOE, Office of Environmental Management, 1997

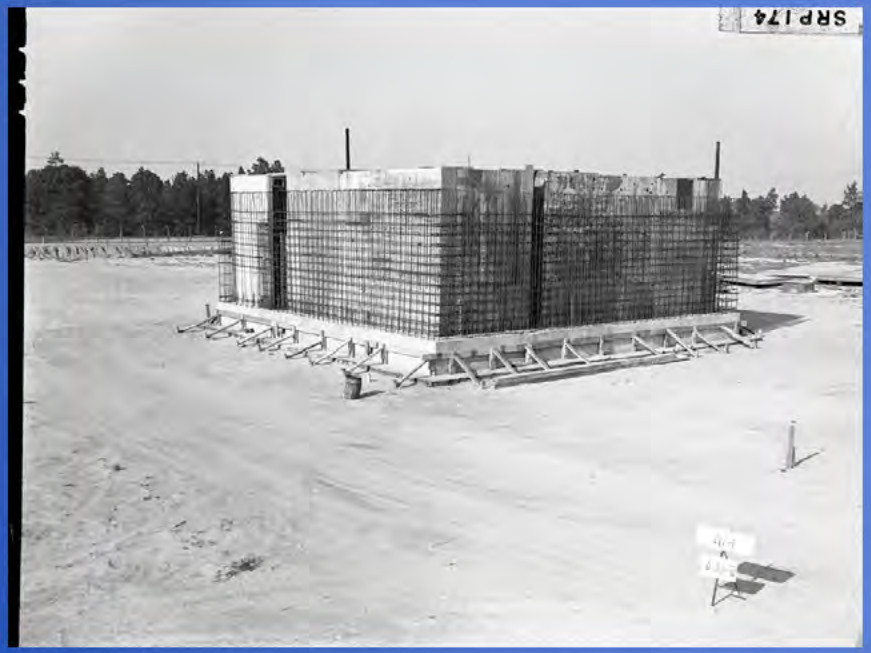
Map of the DOE Weapons Complex – "The Bomb Plant"



Source: Linking Legacies. US DOE, Office of Environmental Management, 1997

History and Description

- Constructed in 1953 in F area.
- Separated by a double fence and had its own guard house.
- One of the few buildings on Site that was under Atomic Energy Commission (AEC) control.
- It was a delivery point where finished products were transferred to the AEC.



FEATURES

- Blast Resistant
- Divided into two unequal sized vaults
- Six-inch thick metal doors
- "All Over the World it's a Safe Name"
- Large vertical concrete visual barriers

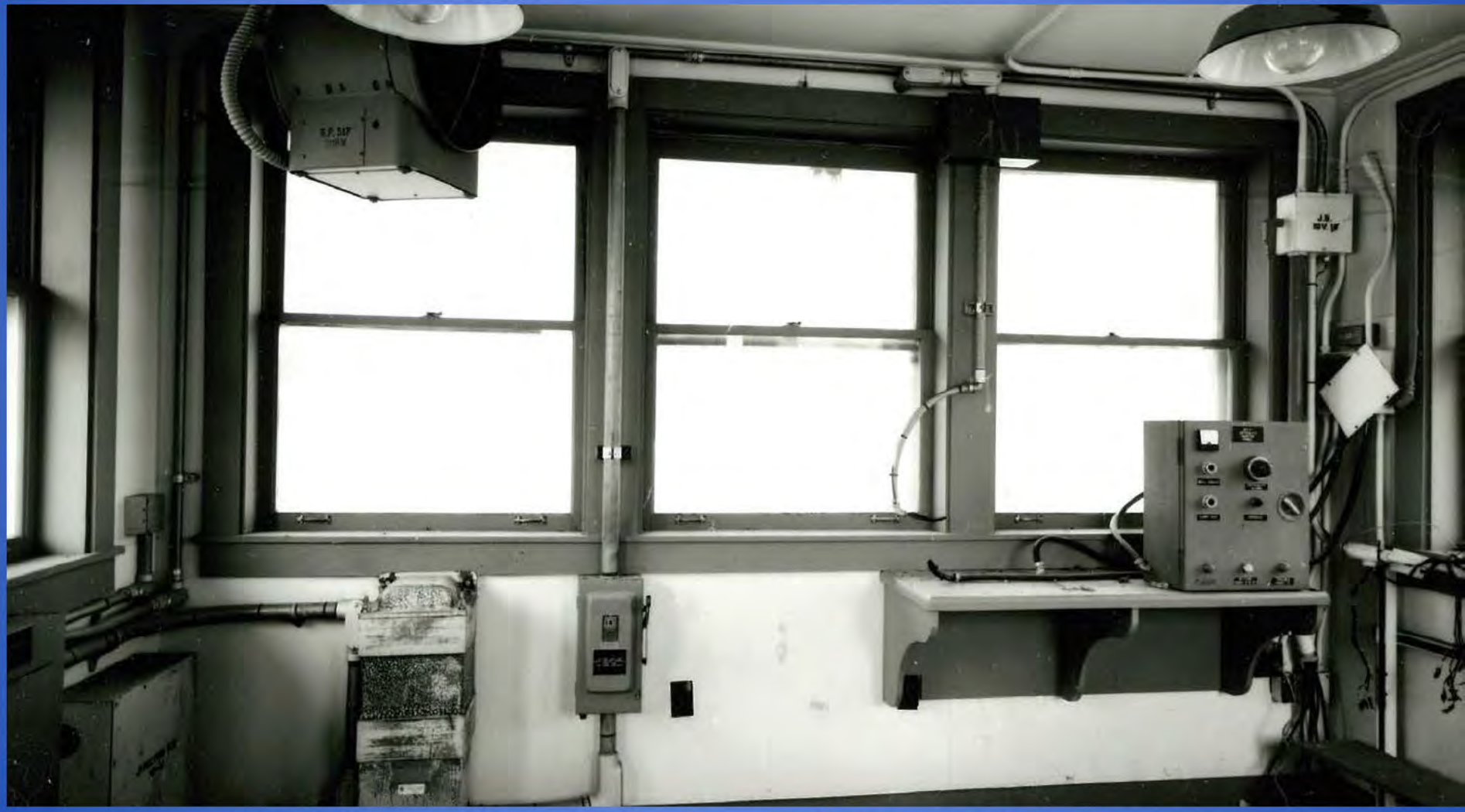
Documentation Views

Both vaults meet the specifications established by the National Surety and Underwriters Codes for Class IV bank vaults. Neither contained any specialized equipment.

Vault B

Guard Shack and Entry

Interior of Guard Shack



- Note: Criticality panel in right background. It was collected as an artifact.

RESEARCH IN PROGRESS

How did the transfer work?

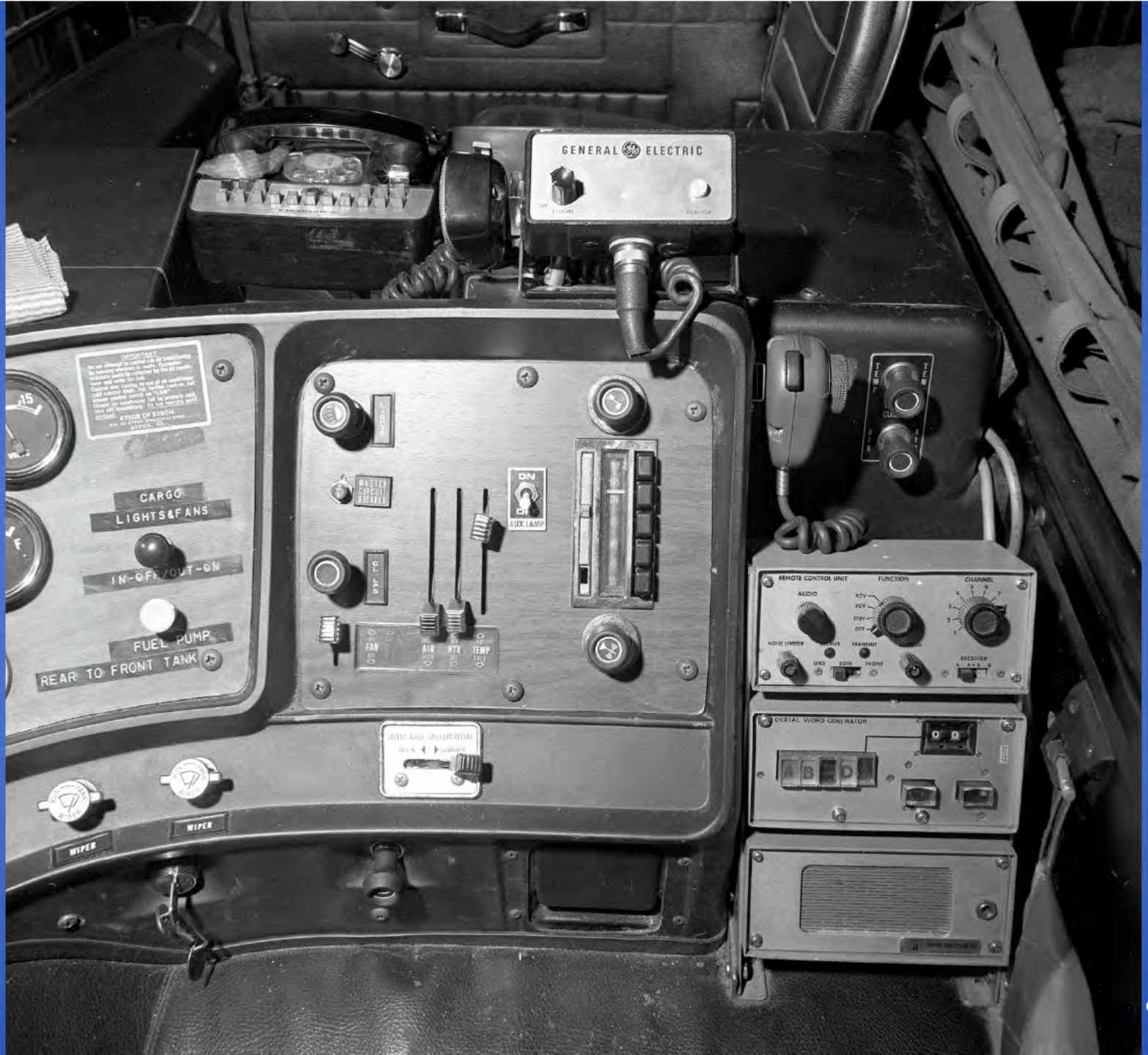
Who were the couriers?

What vehicles were used?

Photos in Site Archives show manipulated car interiors associated with couriers? Are they related to the transfer process?

Initial research suggest that the building was used for its historic function through the early 1970s.

Later used for other purposes?


GENERAL ELECTRIC
CARGO
LIGHTS&FANS
IN-OFF/OUT-ON
FUEL PUMP
REAR TO FRONT TANK
WIPER
WIPER
MASTER CIRCUIT BREAKER
ON
AUX LAMP
FAN
AIR
HTR
TEMP
REMOTE CONTROL UNIT
FUNCTION
CHANNEL
AUDIO
DIGITAL WORD GENERATOR

Research and Preservation Leads to a Great SRS Story and One That Is Little Known

- 217-F's history links the site to the national complex.
- Its size and anonymity belied that importance.
- The building and its vault doors are at odds with the scale of the Site's processes.
- The preserved vault doors are a significant and ironic reminder of the Site's Cold War history.
- Our intention is to create a visible storage exhibit space in the Curation Facility for the vault doors where it can tell that story.