SAVANNAH RIVER SITE

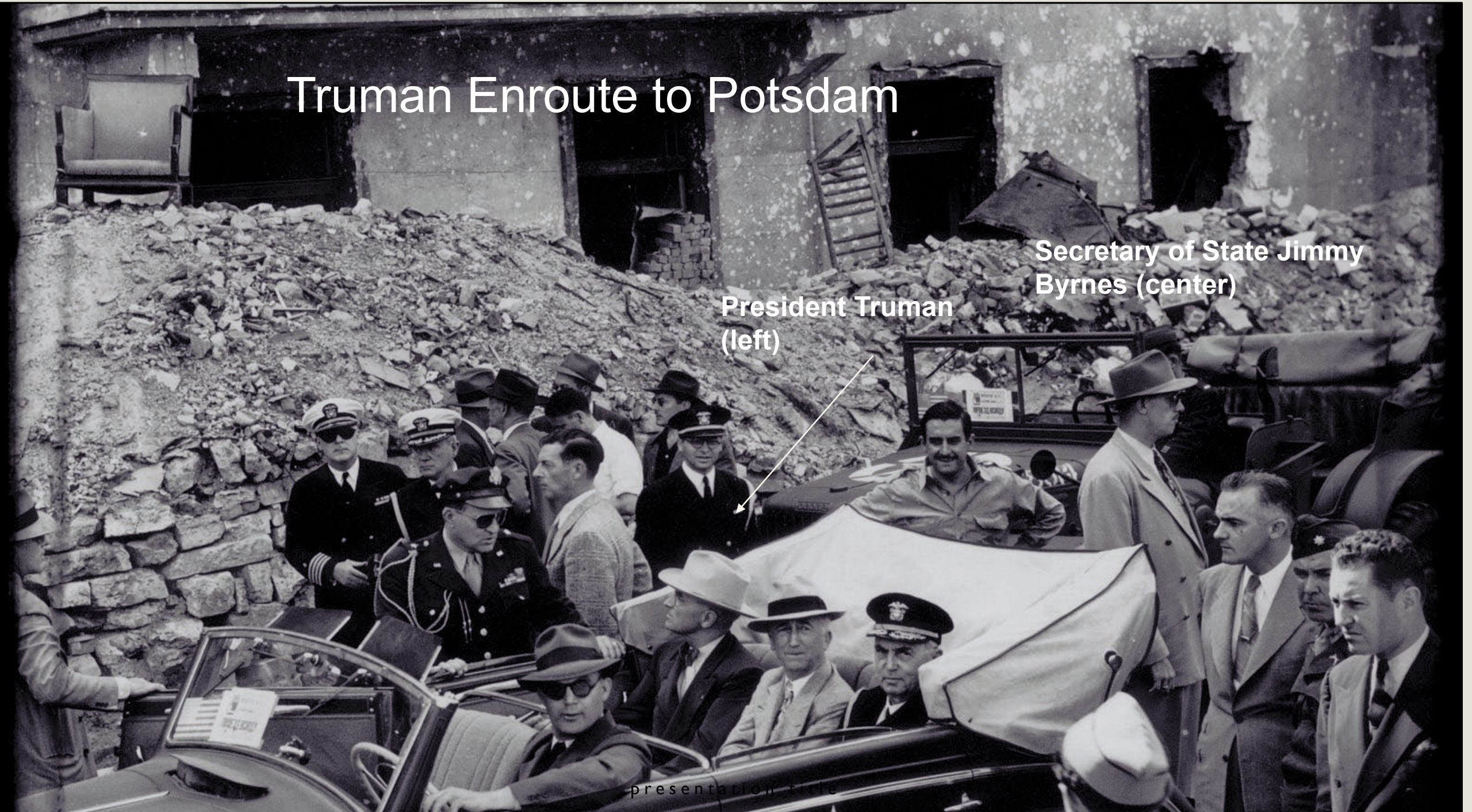
M B Reed, New South Associates

SRS Rooted in the Manhattan Project

Colonel Groves, left, J. Robert Oppenheimer, right

- The Manhattan Engineering District established in 1942.
- Colonel Leslie Groves, who just finished the Pentagon, selected to lead the project. He was allowed enormous leeway; no specific geographical boundaries and virtually no budget limitations.
- His strategy was collaborative, competitive, and razor focused on success.
  - Use scientific personnel and resources culled from the major universities.
  - Work with corporations familiar with the assembly line.
  - Employ federal real estate and construction skills of the Army Corps of Engineers and WPA era project managers.
- Creation of government-owned towns for security

Truman Enroute to Potsdam



ONSET OF COLD WAR

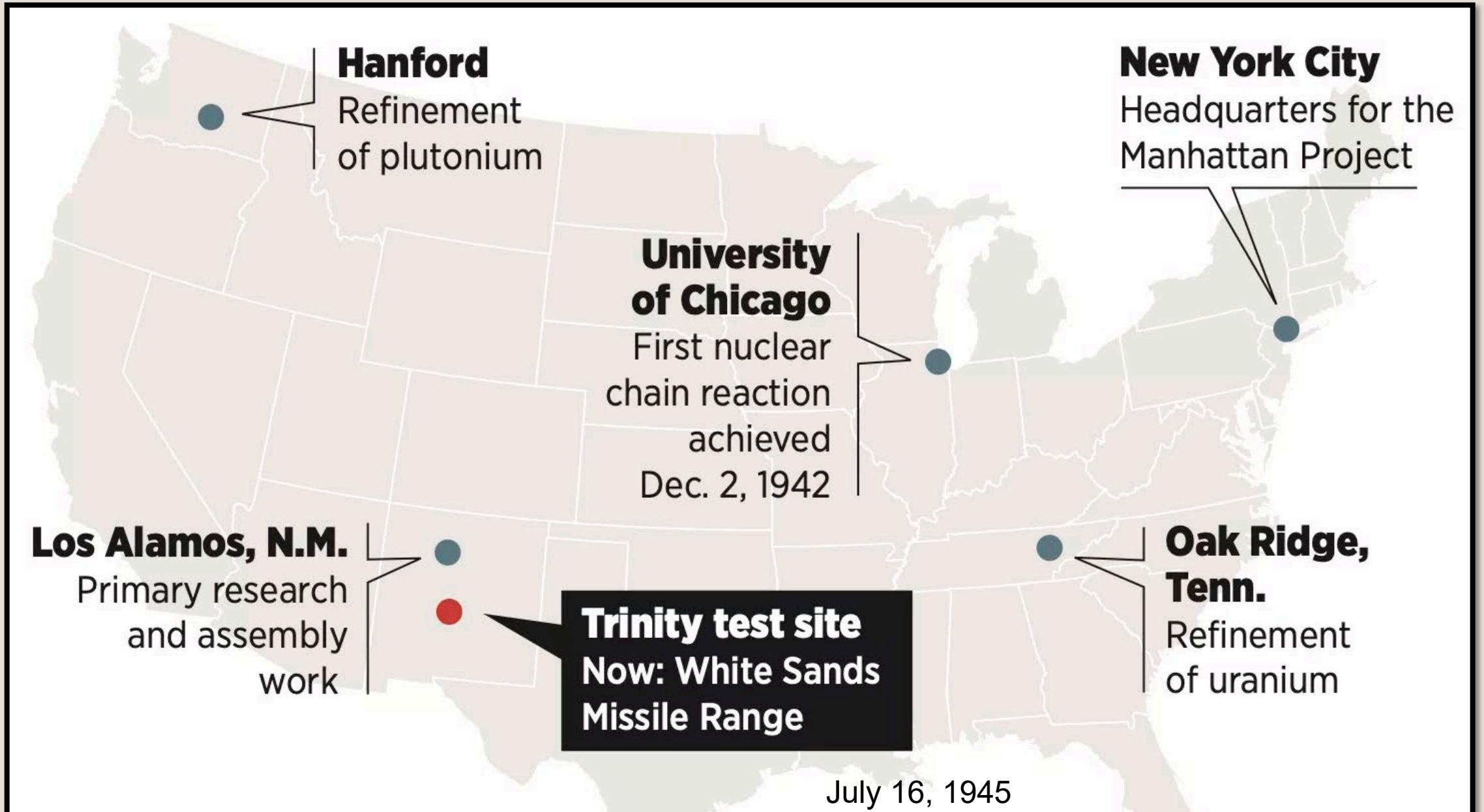
Euphoria that occurred after the Japanese surrender on August 14, 1945, replaced with tension, distrust and fears of mass destruction.

Balance of power that characterized the alliance of US, Great Britain, and Soviet Union started to fall apart as fears of Soviet domination in eastern Europe might become permanent.

Truman Doctrine – 1947 US will aid democracies against threat of authoritarian aggression.

Atomic Energy Act 1946 establishes the civilian Atomic Energy Commission now responsible for America's atomic bomb program.

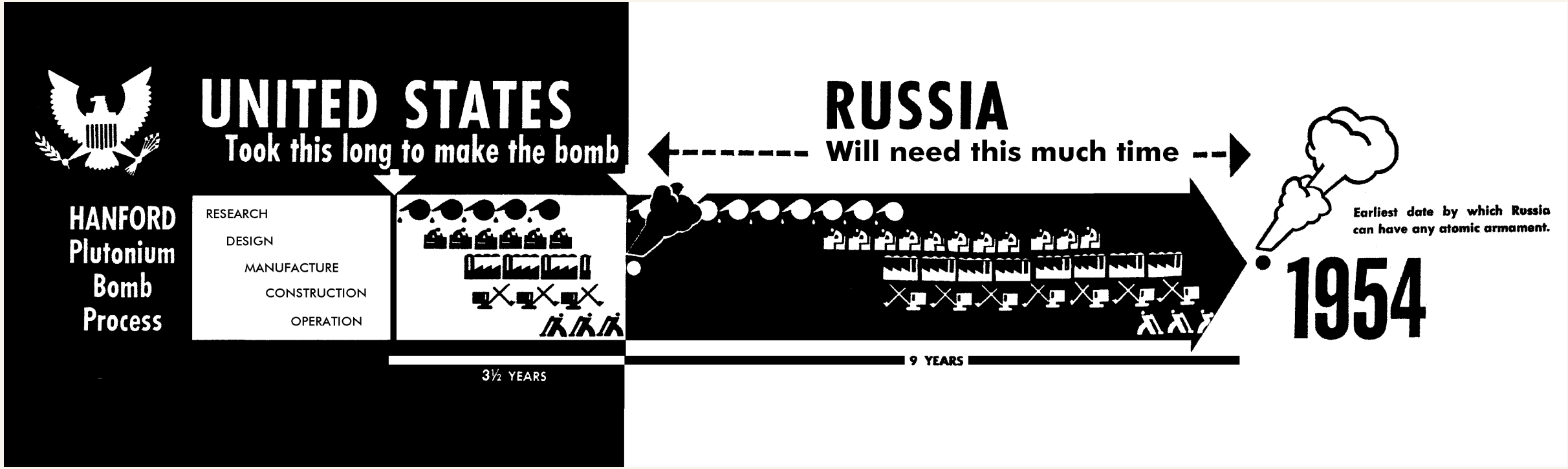
The program needed to end World War II was critical to wage the next one.

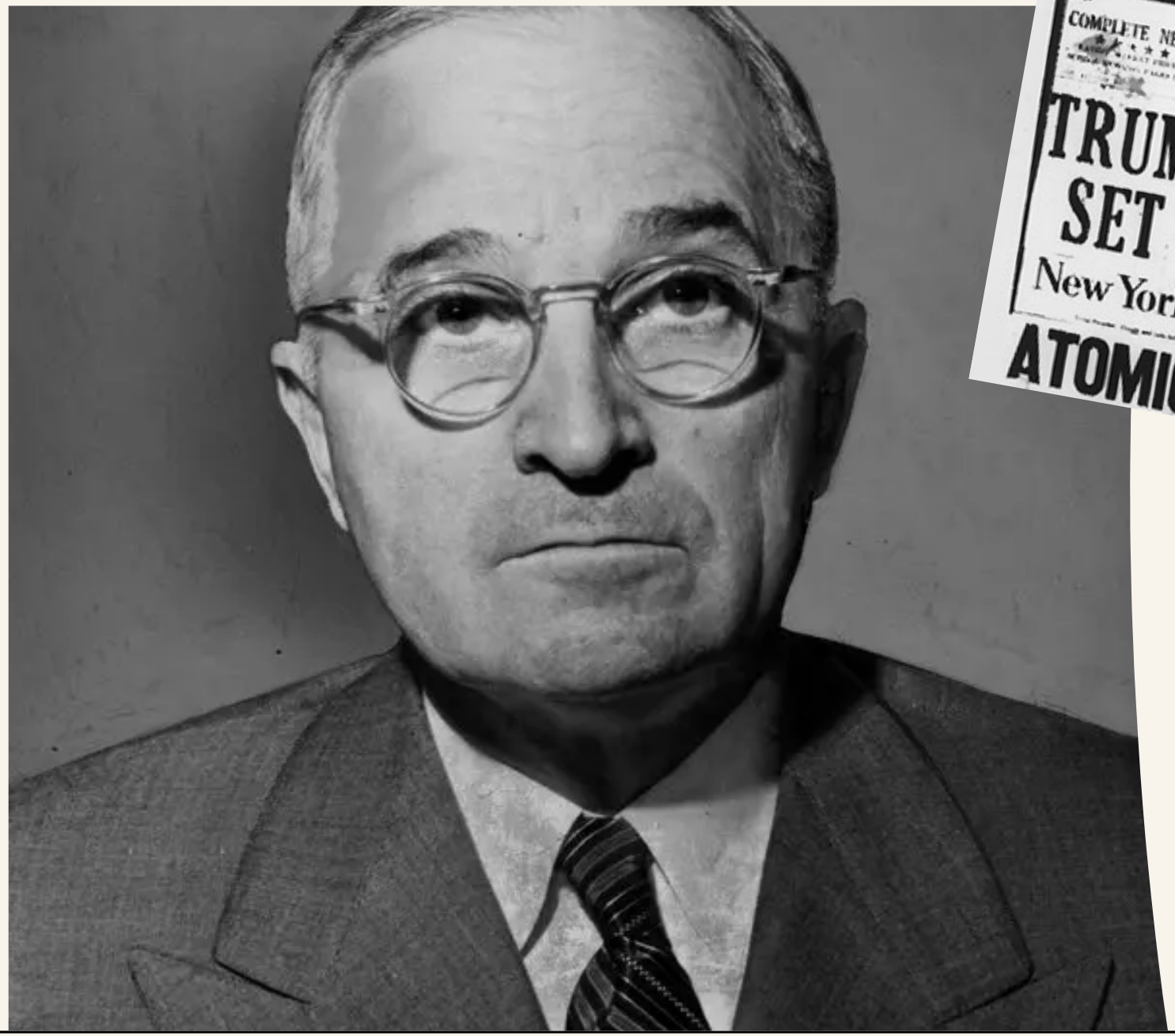


July 16, 1945

Manhattan Project continues after World War II furthering atomic bomb development.

PROGNOSIS: EARLIEST DATE THAT RUSSIA COULD HAVE AN ATOMIC BOMB





Truman announces Russia tested its first atomic weapon on September 29, 1949, to a shocked American public. What lead did America have in atomic weapons and was Russia working on the hydrogen bomb? National debate starts.

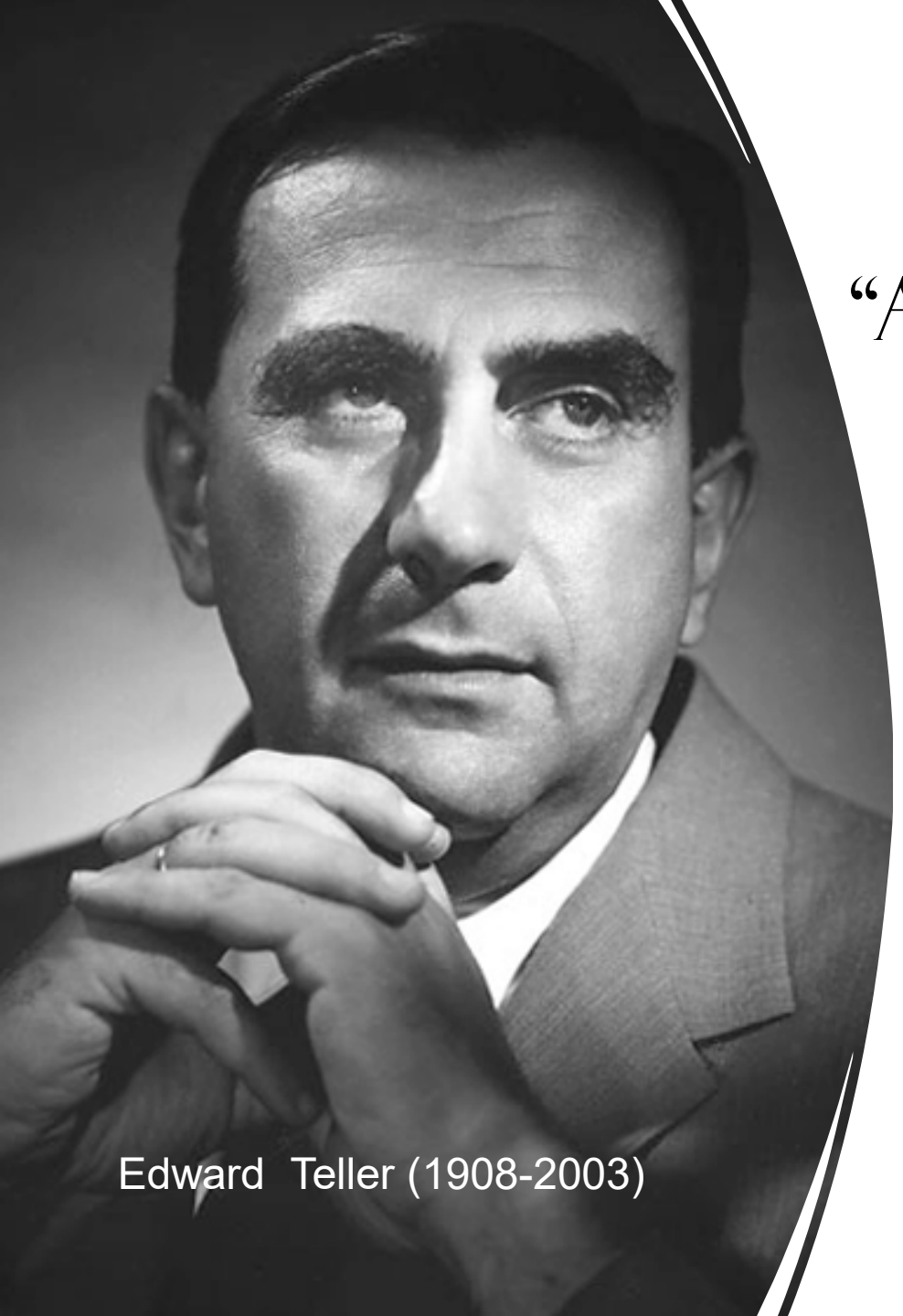
THE MIKE SHOT

“If the Russians demonstrate a Super before we possess one, our situation will be hopeless.”

“US adoption of the Super would signal the world that…we have abandoned our program for peace and we are resigned to war.”

“What worries me is that this thing appears to have caught the imagination, both of the Congressional and military people, as the answer to the problem posed by the Russian advance. It would be folly to oppose the exploration of this weapon.”

“ …time has come for a. **quantum leap** in our planning that is to say that we should now make an intensive effort to get ahead with the Super.”



Edward Teller (1908-2003)

"A CRASH PROGRAM IS NEEDED"

- After Russian bomb, theoretical physicist Teller helped convince President Truman to develop a crash program for the hydrogen bomb.
- Teller and mathematician Stanislaw Ulam, who was working on the Manhattan Project, designed the first hydrogen bomb.
- The bomb was detonated on island of Eniwetok Atoll in the Pacific Marshall Islands, November 1, 1952

JAMES F. BYRNES (1882-1972)

Curtis Nelson, AEC Manager left and Governor Jimmy Byrnes, right

Charleston native, a “neatly made man”

Led the Office of War Mobilization during World War II

Became Truman’s Secretary Of State

Byrnes would get word to Truman that the Trinity test was successful in Potsdam

Cold War Warrior - Strong proponent for using atomic bomb against Japan in 1946

Resigned his cabinet position due to souring relations with Truman

Elected Governor of South Carolina in 1951

ATOMIC BOMB PROGRAM

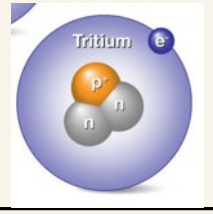
Truman and Atomic Energy Commission (AEC) make plans to develop all kinds of atomic bombs, including “the Super” on January 31, 1950.

The announcement for Savannah River Project would be announced in November.

Source: Department of Energy

SAVANNAH RIVER PROJECT

1950-1956



TRITIUM NEEDED/ NEW SCOPE

Tritium, a radioactive isotope of hydrogen, is a vital ingredient of nuclear bombs. It helps to produce a more efficient chain reaction yielding the same destructive energy from less fuel and smaller, lighter warheads..

Hanford's reactors were only producing enough for research and development not enough for long-term needs.

Atomic Energy Commission began planning for two new reactors of a different design than Hanford's to be built at a new location. They would later add three more reactors to the scope.

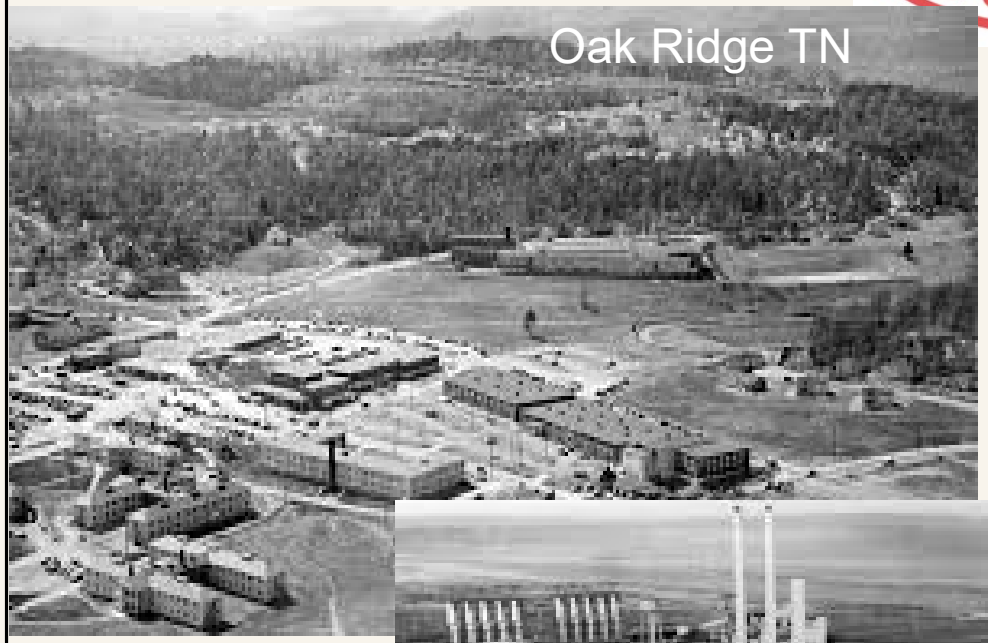
Curtis Nelson, Veteran of WPA era projects, chosen to head up the new plant for AEC.

E. I DU PONT SELECTED AS CONTRACTOR

Source: Smithsonian Institution

Getting Du Pont on board was…

…“Like Getting Babe Ruth In His Prime.”



THE WHITE HOUSE
WASHINGTON

95

October 20, 1950

Dear Mr. Greenewalt:

I appreciated very much your letter of the seventeenth, regarding the contract for the Atomic Plant. I am sure that you will do a good job and that is all I ask.

Sincerely yours,

Harry Truman

Mr. C. H. Greenewalt
President
E. I. Du Pont de Nemours & Company
Wilmington 98, Delaware

Charting the Selection of Site 5

THE FUTURE SAVANNAH RIVER PLANT

"H.G. POP"
It's unclear what this notation means. What do you think?

BIG X
This location did not make the cut. Often, there is a notation about unsuitable topography, climate, population, or a combination.

YELLOW AREAS
Areas identified as potential site locations, perhaps in a different phase from the Red Numbered Areas.

BLUE HATCHED AREAS
Areas identified as potential site locations due to population, proximity to waterways, topography, existing transportation infrastructure, and climate.

RED NUMBERED AREAS
Potential site locations identified in the First Defense Zone after the application of criteria

BLUE ARROWS
Unknown. The arrows are mostly near or associated with Red Numbered Areas. Here are two possibilities:

- The arrows all point in the direction of the closest border of the First Defense Zone from a potential site.
- The arrows could indicate general aviation and military flight paths mentioned in C.H. Topping's report.

LOCATIONS WITH A CIRCLE & NUMBER
Cities or towns with a population of less than 20,000 people. The number indicates the 1950 population - approximately 12,000 in Bridgeton

LOCATIONS WITH A TRIANGLE & NUMBER
Cities or towns with a population of over 20,000 people. The number indicates the 1950 population - approximately 40,000 in Fayetteville

ORANGE LINES
State boundaries

BLACK LINES
20-Mile buffer around suitable waterways

"OUT POP"
These locations had too little population to support the plant

"OK POP"
These locations met the population requirements. All OK Pop areas are in red, indicating this this color is associated with supporting populations

Site 5

MILITARY DEFENSE ZONES
The orange section depicts the area in the first defense zone covered by the topographic maps to the left.

SITE SELECTION PROCESS

DuPont was tasked with identifying a site for a new weapons material production facility in June 1950 by the Atomic Energy Commission (AEC). Then known as Plant 124, several criteria were considered for site selection.

DuPont first applied strategic criteria using defense zones. These three zones were drawn based on the flight ranges of Russia's aircraft, the threat of invasion by water, and the location of large U.S. cities. The desired location for the new facility was within the First Defense Zone, which included most of the southeastern U.S. It excluded a 100-mile buffer of coastline and all of Florida.

A now declassified report by Du Pont Engineer C.H. Topping identifies 84 potential sites within the First Defense Zone. These sites met the following operational criteria:

- Area: 100 square miles available
- Water Supply: Within 20 miles of a water source that could supply 260 cfs (cubic feet per second)
- Supporting Population: 25,000 people within 20.5 to 40 miles from the facility
- Isolation: No more than 15,500 people from 5.5 to 20.5 miles from the facility

The first round of eliminations reduced the initial 84 sites identified in the First Defense Zone down to 19 potential sites by considering site topography, climate, and accessibility including highways and railroads.

By August 2, 1950, only seven sites remained: Site 1 in North Carolina, Sites 5 and 6 in South Carolina, Site 7 in Georgia, Site 45 in Texas, Site 123 in Oklahoma, and Site 125 on the Texas-Oklahoma border.

Site visits to the remaining seven sites were conducted over two weeks from August 6th through the 17th. Five sites were eliminated, leaving only two: Site 5 in South Carolina, and Site 125 on the Texas-Oklahoma border. Site 125 was eliminated due to poor water quality, leaving Site 5 as the most suitable location for the new plant.

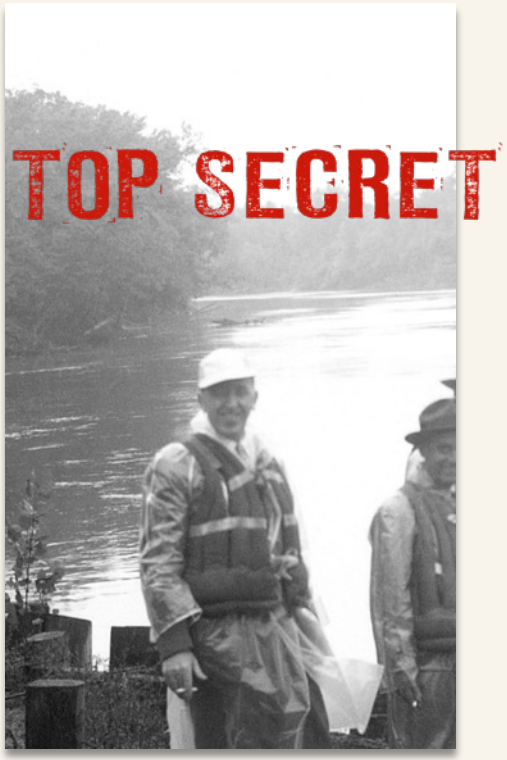
The findings of this study were presented to the AEC on November 22nd, 1950, and the location of the Savannah River Plant was announced to the public on November 29th, 1950.

Site #5 Selected

Located on the Savannah River in Aiken, Barnwell, and Allendale Counties in SC

Over 100 sites evaluated

Field trips to future SRP were taken in secret by DuPont personnel



DuPont's Bob Mason on survey of Site 5

TODAY'S WEATHER

The Augusta Chronicle

LOCAL COTTON

Vol. CLXVI, No. 333 — AUGUSTA, GA., WEDNESDAY MORNING, NOVEMBER 29, 1950 — 114 Pages — Daily, 5c; Sunday, 15c

$260,000,000 H-bomb material facilities will be constructed in S. C. near Augusta

Allies facing 'new war'

Grim note is voiced by Gen. MacArthur

Shocked officials seek urgent steps

Aiken-Barnwell site is selected for plant

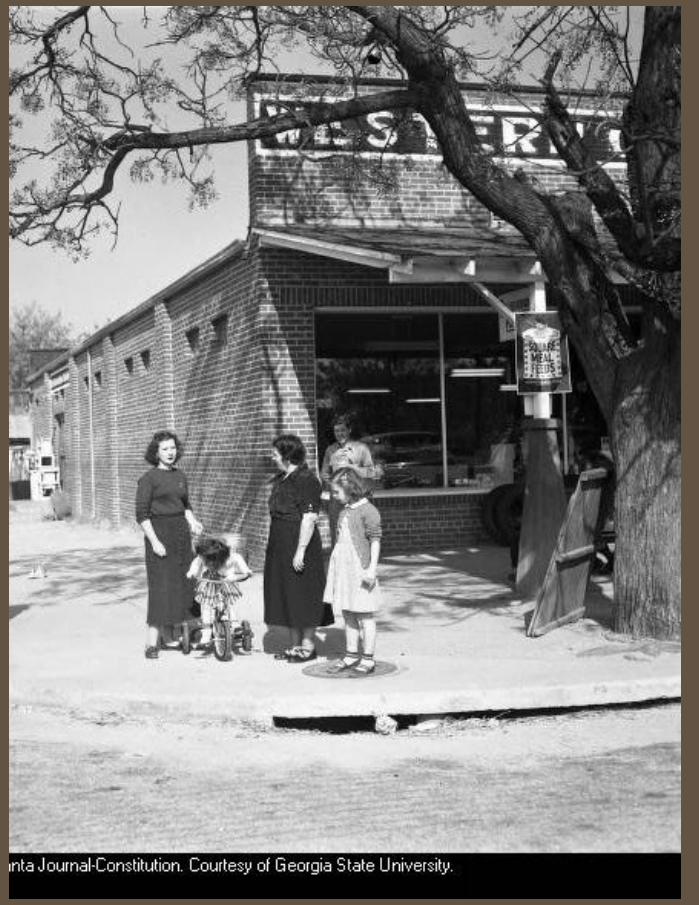
Plant means big boom for Augusta

All will begin to move

Ellenton's residents stunned, but accept news patriotically

Wednesday
November 29,
1950

What is Coming?



STRATEGIC PLAN


SUNDAY NEWS, JANUARY 7, 1951

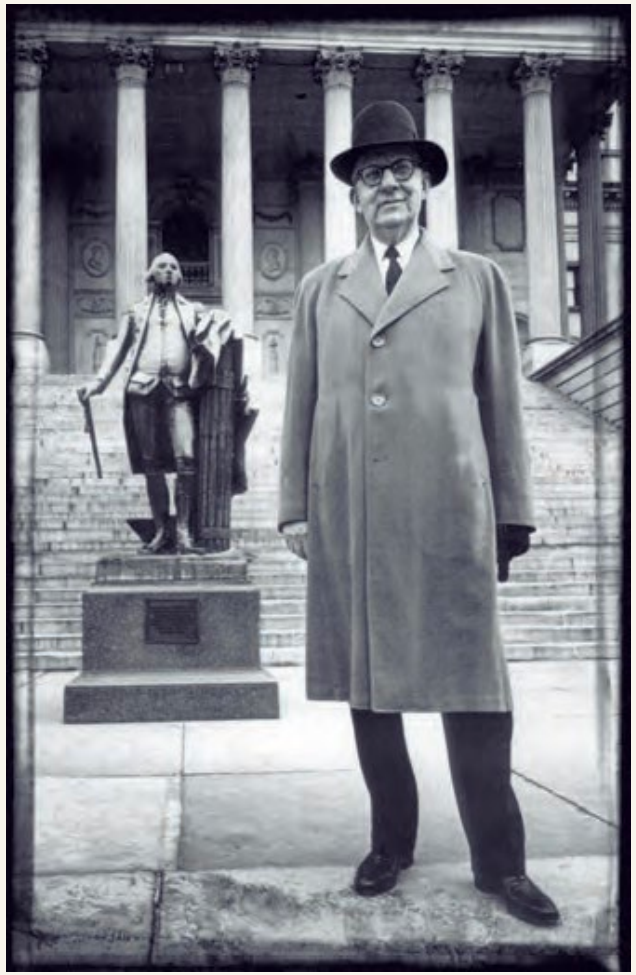
Uprooting a Town for H-Bomb

NOTICE

New York Daily News, January7, 1951

- US Army Corps of Engineers responsible for land acquisition
- 6,000 residents were displaced
- Six towns/villages uprooted: Ellenton, Dunbarton, Meyers Mill, Hawthorne, Robbins, Leigh
- Jackson and New Ellenton would take many of the displaced families
- Plant area was closed to the public on December 14, 1952

REACTIONS: JUBILATION, APPREHENSION, AND HEARTBREAK



State Senator Edgar A. Brown has a smile on his face and relief in his voice, now that the best kept secret of the year has been shared with the public…
- Aiken Standard and Review
December 6, 1950

This development will revolutionize the Savannah River Basin, It will make Augusta a minor metropolis. The new plant will bring in many educated people, technicians, professional men, highly skilled workers, Yankees and Middle Westerners, with other viewpoints on race relations, labor relations, and world affairs. We may not enjoy all the changes, but it is impossible to be conservative about our future.

- Lester Moody, Augusta Chamber of Commerce, *New York Times*, December 10, 1950


THE NEW SOUTH Presents
SAVANNAH VALLEY AREA
HARTWELL DAM
CLARKS HILL DAM
H-BOMB PLANT
SAVANNAH VALLEY BOOSTERS ASSN.
HULME ADV CO.

The Displaced

Announcement came after Thanksgiving at start of holiday season

18 months allotted for a staged evacuation of 1500 families

Ellenton had until March 1, 1952

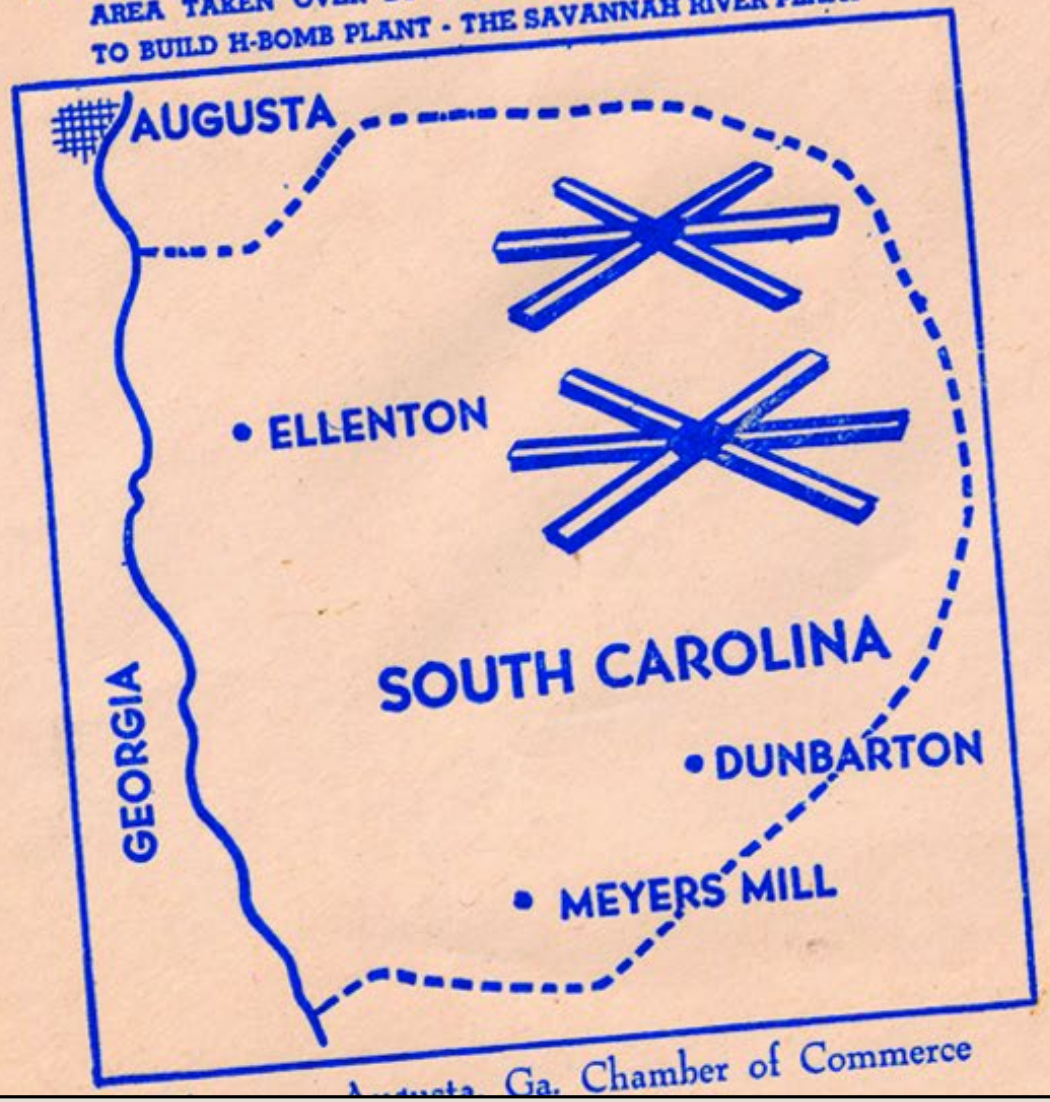
Dunbarton by June 15.

Land appraisers began assessing properties to start acquisition.

1,706 tracts of land were acquired. 74% were farms with small tenant farms in the majority, many of which were farmed by African American families.

LAST DAY of POST OFFICE

AREA TAKEN OVER BY ATOMIC ENERGY COMMISSION
TO BUILD H-BOMB PLANT - THE SAVANNAH RIVER PLANT



Augusta, Ga. Chamber of Commerce

Mr. R. K. Mason
3018 Bransford Road
Augusta, Georgia

Lament for Ellenton

It is hard to
understand why
our town must
be destroyed to
make a bomb that
will destroy someone else's
town that they
love as much as we love ours
- but we feel that
they picked not just
the best spot in the US
but in the world.

We love these
dear hearts
and gentle people
Who live
in our
hometown


LICENSED
HOUSE MOVERS
RALPH SOUTH & SON'S
ELLENTON S.C.

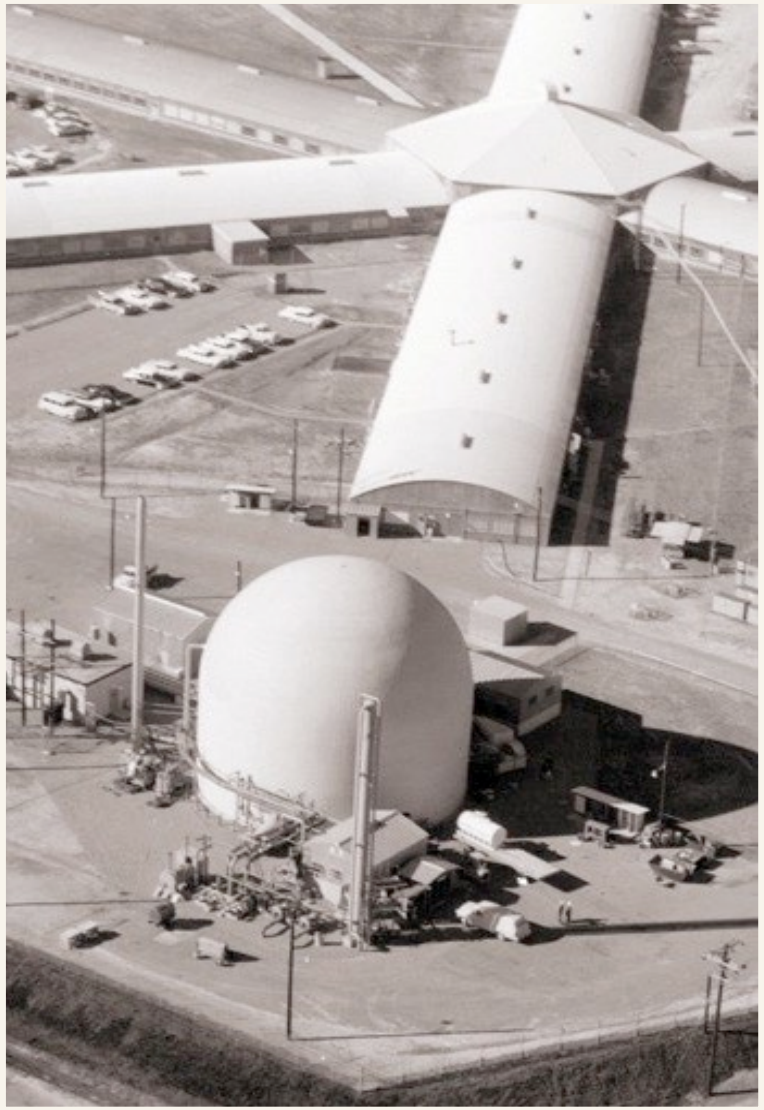

CAUTION
YOU ARE ENTERING THE AREA
OF THE
SAVANNAH RIVER PLANT
WATCH FOR CONSTRUCTION
PERSONNEL & EQUIPMENT
DRIVE CAREFULLY

SAVANNAH RIVER PLANT CONSTRUCTION 1951-1955

Building a complex nuclear weapons component site

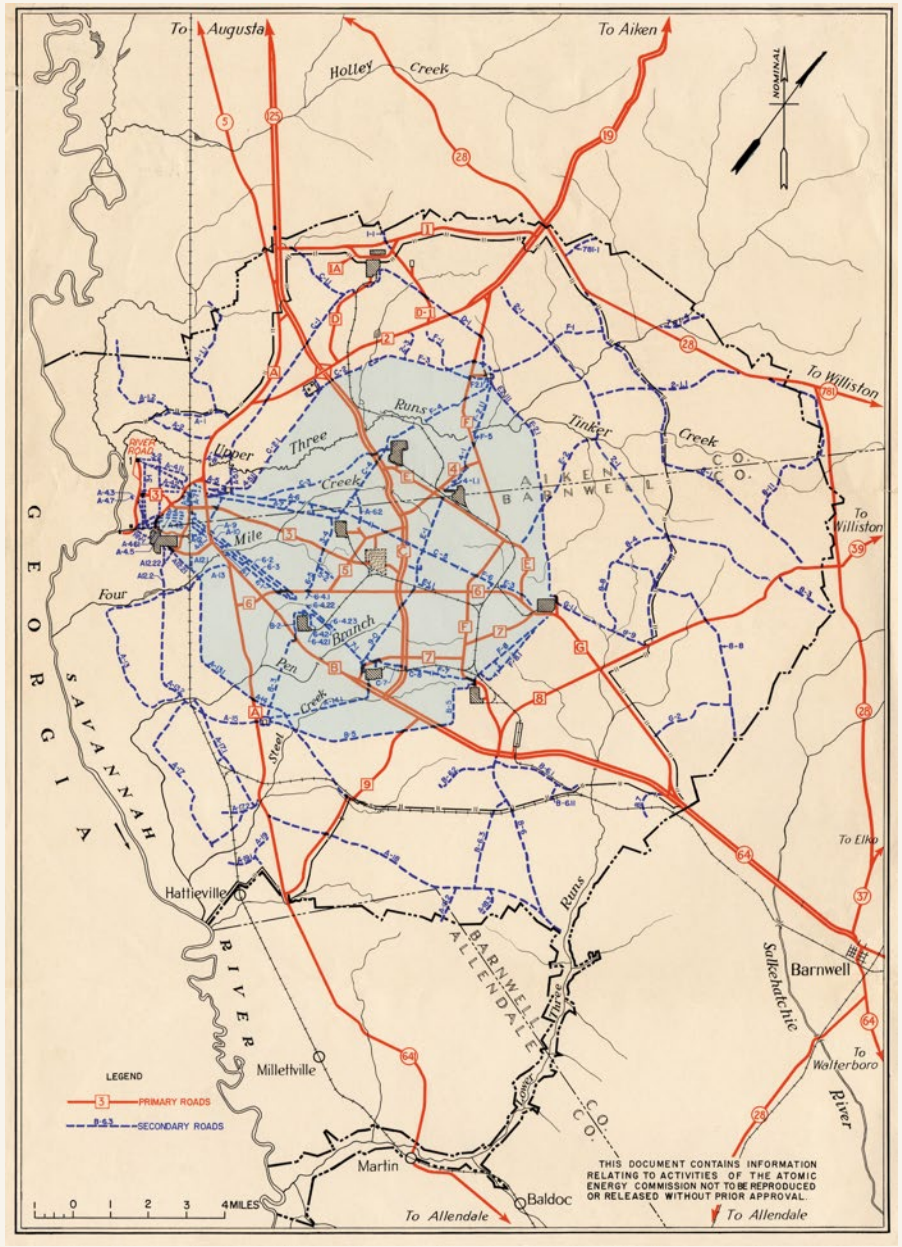
- Five reactors
- Two canyons
- Heavy Water Plant
- Fuel and Target Manufacturing
- Administration
- Infrastructure

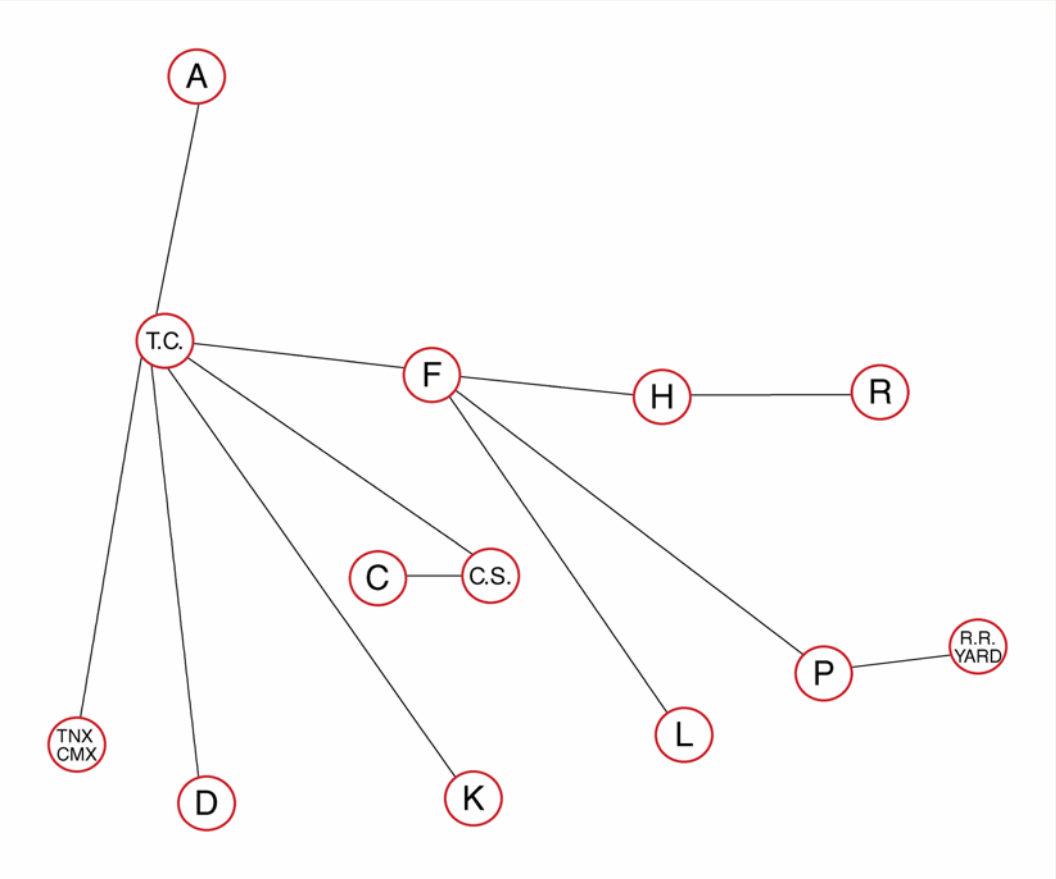
KEY FEATURES



- Layout achieved using best practices
- Fast Paced Schedule-DuPont's corporate and construction know-how
- Use of known subcontractors i.e. Voorhees Foley Walker and Smith
- Use of concrete and Transite and Flexible Design
- Buildings are essentially envelopes covering processes
- Administration Building – Brutalism
- Recording history – each company tasked with providing a written record of their work

INDUSTRIAL LAYOUT

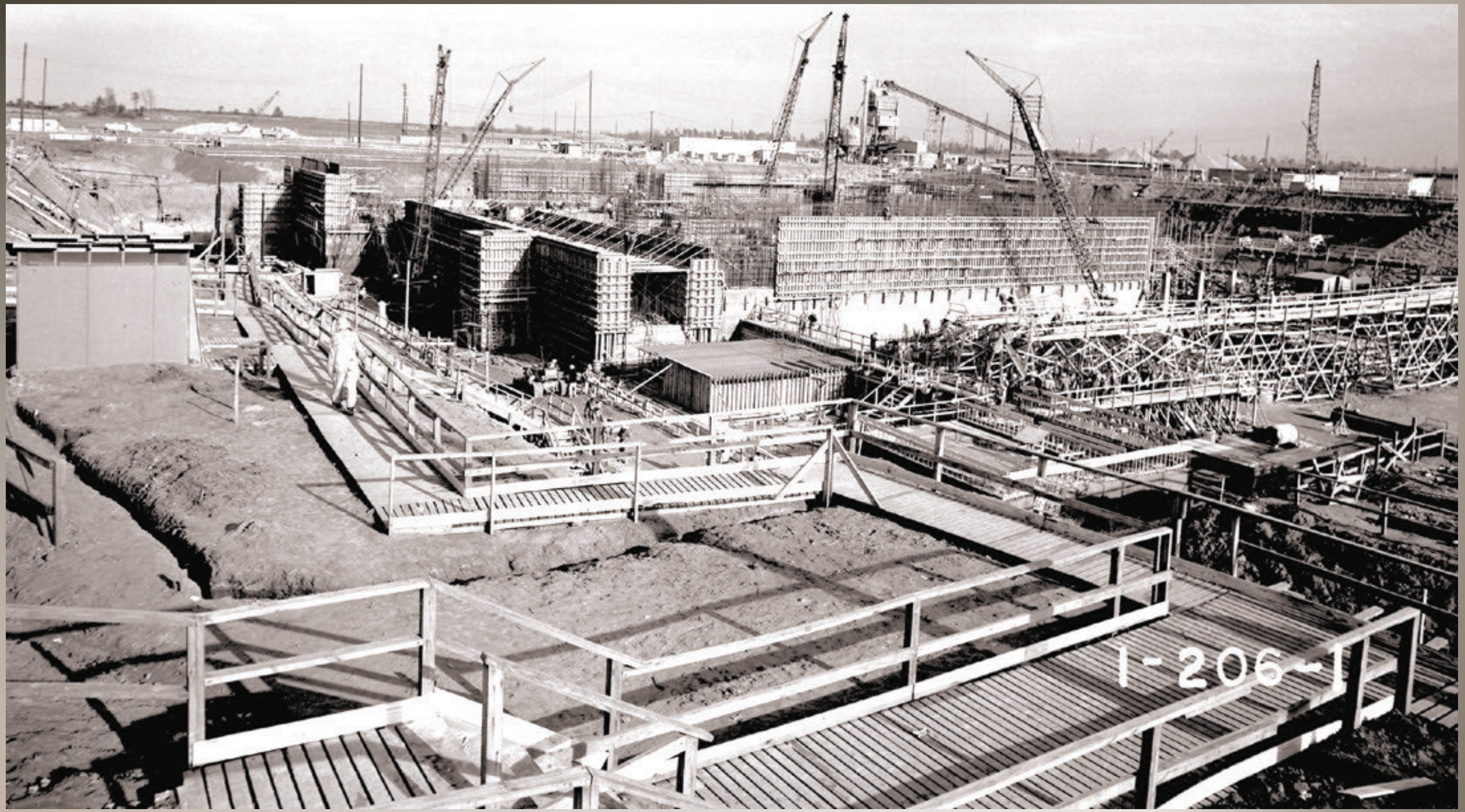




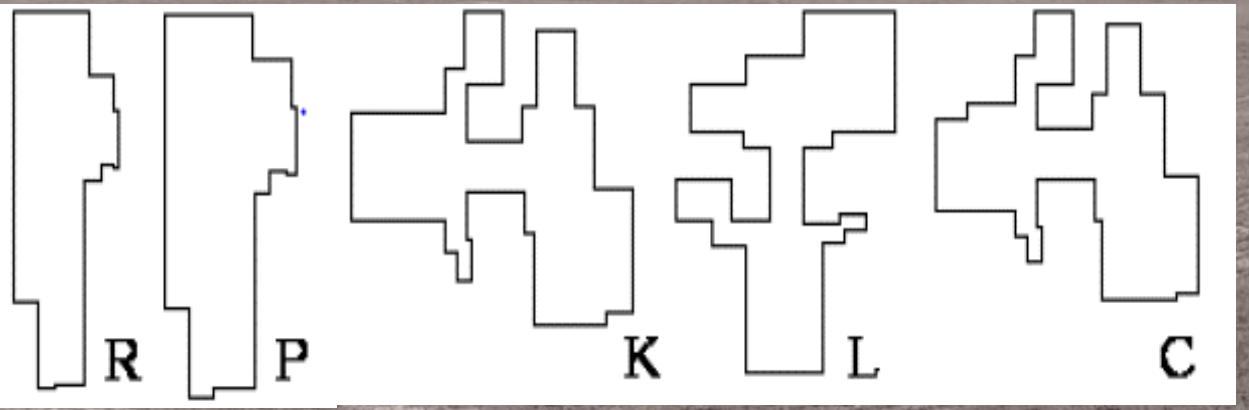
PROGRESS PHOTOGRAPHY GROUP

- Responsible for all progress photography during the Savannah River Project
- Provided photographs for plant newspaper, reports, and the construction histories
- Created 12 “motion pictures”
- Had their own vehicles set up for photography


100-R-AREA


1-206-1

Building	Start Date	Final Acceptance	Went Critical
R Reactor	6/11/1951	11/3/1953	12/28/1953
P Reactor	7/6/1951	1/13/1954	2/20/1954
L Reactor	8/27/1951	9/30/1955	7/2/1954
K Reactor	10/5/1951	10/31/1955	10/15/1954
C Reactor	11/26/1951	9/6/1955	3/28/1955

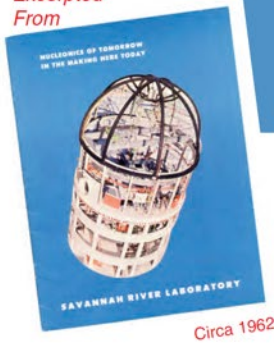


38,000 Workers in 1957 Many Housed in Trailer Courts

Retired Col. Leslie Groves visits Savannah River Project and Meets with Former Hanford DuPont Project Manager Now Head of Construction at SRP Bob Mason

SAVANNAH RIVER PLANT 1950-1989

Excerpted From



Circa 1962

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

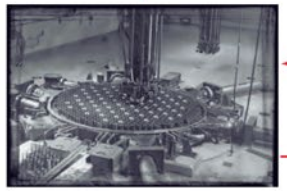
but we do nearly everything in between.

Plant Processes

"First forge the fuel...

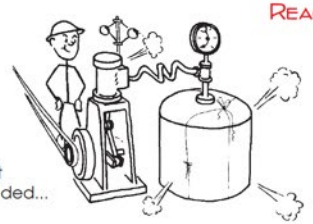
Before being charged to the reactor, fuel and target materials are formed into aluminum-clad cylindrical "elements." The aluminum cladding minimizes corrosion and seals radioactive products within the elements.

Fuel and Target Fabrication

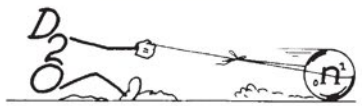


Savannah River's large production reactors are moderated and cooled by circulating heavy water. In the stainless steel reactor tank, long cylindrical assemblies of fuel and target elements are positioned in a precise geometrical pattern to form the reactor lattice. Remotely-controlled machines for charging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

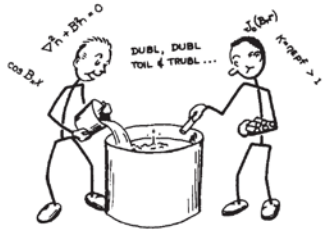
Waste Management

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

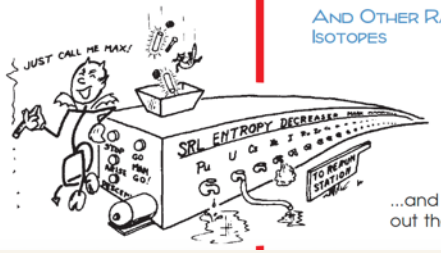


...then mix judiciously with D_2O...

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 goodies!"

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 thermnonuclear explosives, and a potential fuel for thermonuclear fusion power generation.

Cobalt-60

Known radiation source and has long been used for radiotherapy.

Californium-252

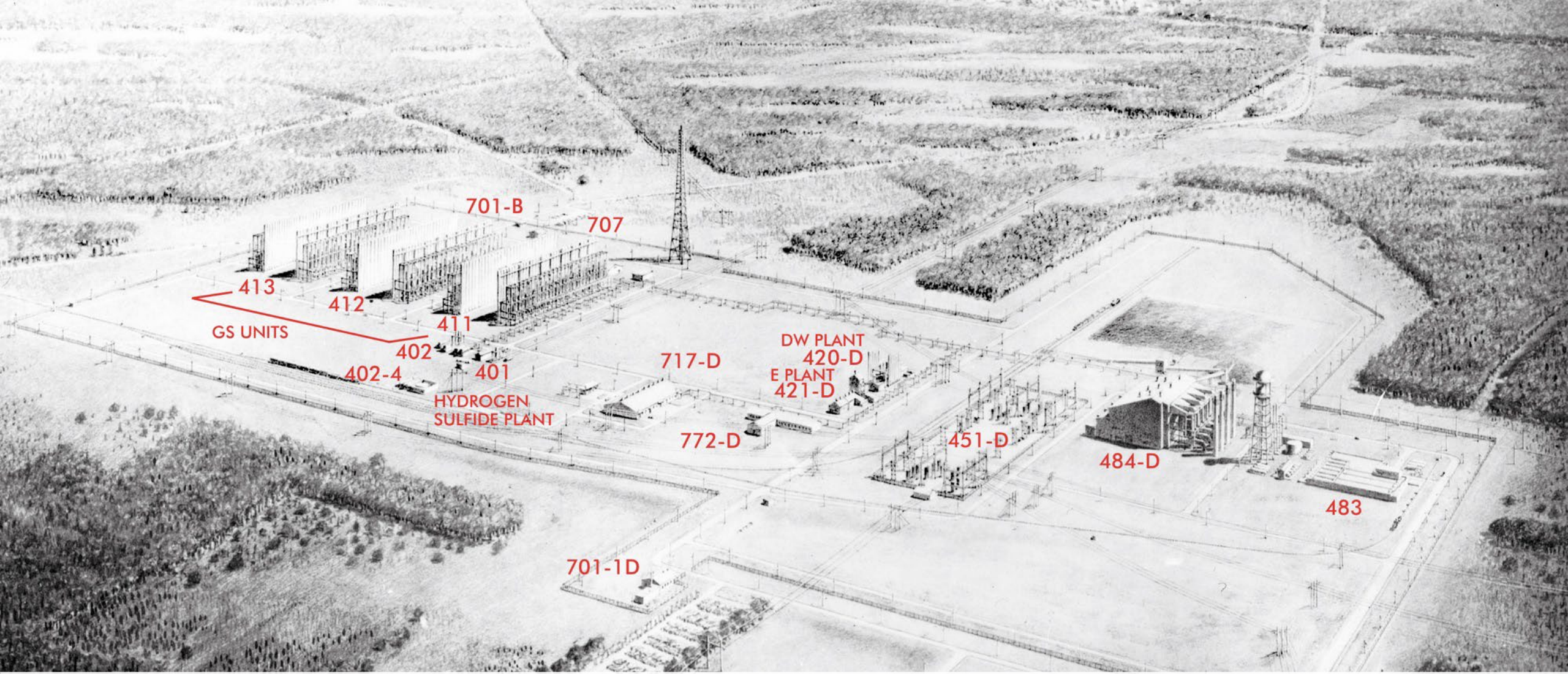
One of the rarest man-made isotopes, has great potential value in medicine, industry, research, and education.

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

WE ARE NOT A BOMB PLANT!



D AREA – Large-Scale Heavy Water Production

NEW REACTOR TECHNOLOGY

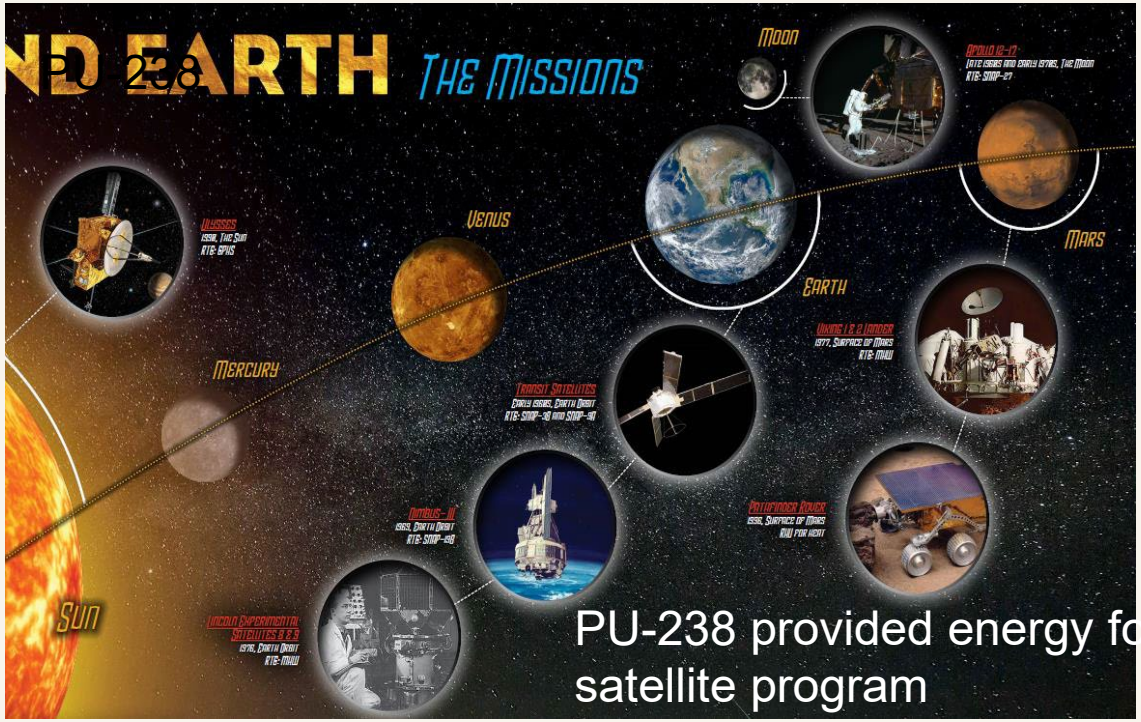
- SRP Reactors were designed to allow for flexibility of products so both plutonium and tritium could be produced.
- Heavy water made this possible, only heavy water test reactors before SRP, not large-scale production
- Heavy water both moderated and cooled reactors

DO YOU HAVE A CLEAR PICTURE OF SECURITY REQUIREMENTS?

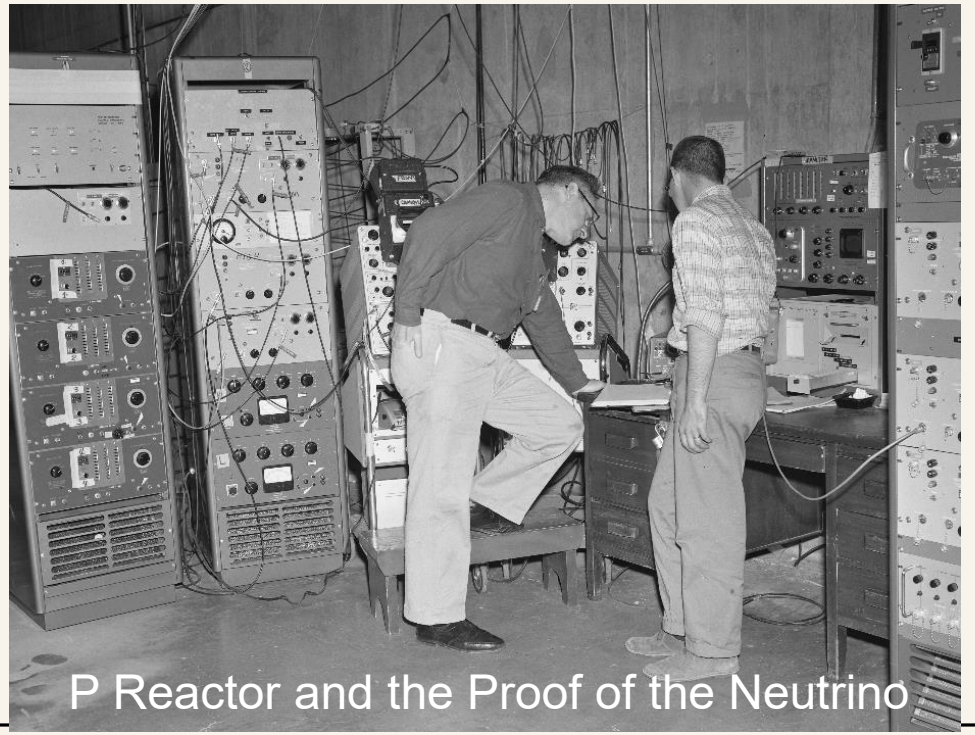
SRP

By the late 1960s, SRP was meeting its production goals, and the plant laboratory was constantly working on process improvements with the operations staff.

Atoms for Peace Movement launched as well as other research opportunities that were associated with a particular skill set at the Plant or to the unique scientific work environments created there.



PU-238 provided energy for satellite program



P Reactor and the Proof of the Neutrino

“You Can’t Run a Reactor If You Can’t Get To It…”

Outside the Fence – No Government Town


Savannah Heights


Carolina Terrace


Lynhurst Housing


Panic Pond

By 1960, Savannah River communities grew substantially, absorbing the incoming work force.

Augusta grew 25%

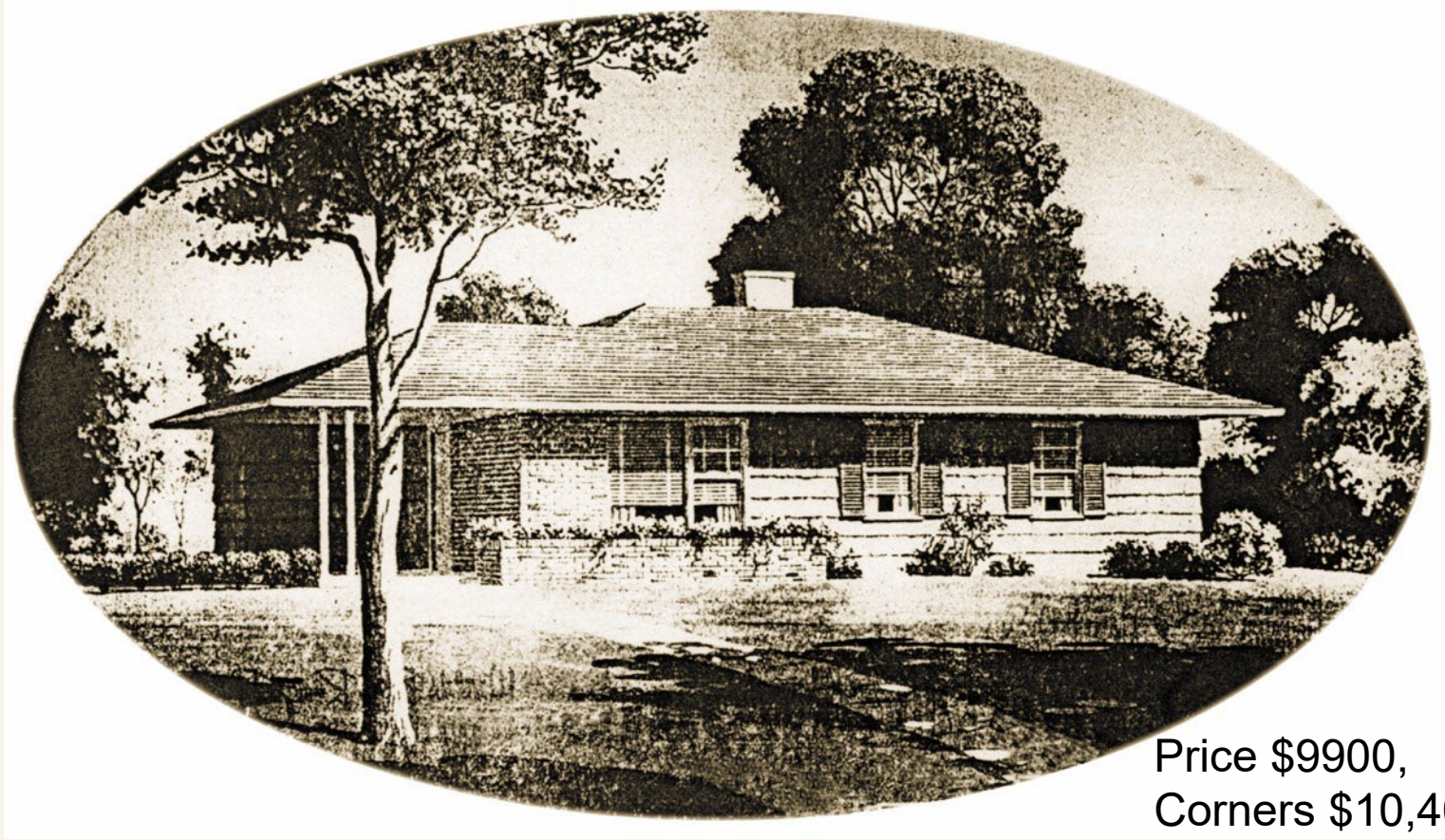
North Augusta tripled its population

Aiken, Williston and Barnwell double their size

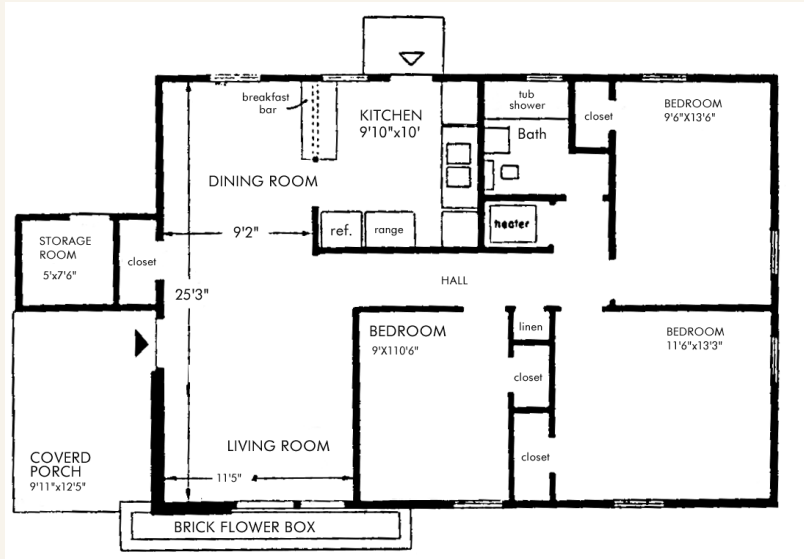
Jackson and New Ellenton became towns

Schools, hospitals, libraries, and roads were also part of this tremendous growth

AEC Leaned into all Federal Agencies for Help Particularly in Securing Housing for Incoming Staff



Price $9900,
Corners $10,400



Ranch House and Other Mid-Century House Type appear in Crosland Park, Silver Bluff, and Virginia Acres


KELLY EDWARDS SCHOOL

TIES TO HIGHER EDUCATION

- Played a role in developing USC Aiken
- Provided grants to Georgia Tech and the University of Florida students interested in atomic energy and related fields
- Promoted science at the high school level by inviting students to tour the plant on Edison's birthday to learn about peaceful applications of atomic energy.
- Membership in professional organizations grew dramatically and national organizations now had local chapters in the CSRA.

COMMUNITY CHEST PROGRAM

SAVANNAH RIVER SITE 1989 TO PRESENT

END OF COLD WAR

1980S

- Began with ramp up , L Reactor startup 1985
- Ended with close of the Cold War
- All reactors shut down by 1989
- Movement toward environmental management
- DWPF groundbreaking
- Tritium mission remains steady moving forward
- Westinghouse assumes management of the Site

Changing of the Guard – 1989 and 2025

1950

1974

1977

2025

1950-1989

1989-2008

2008-current

Environmental Remediation Takes Center Stage

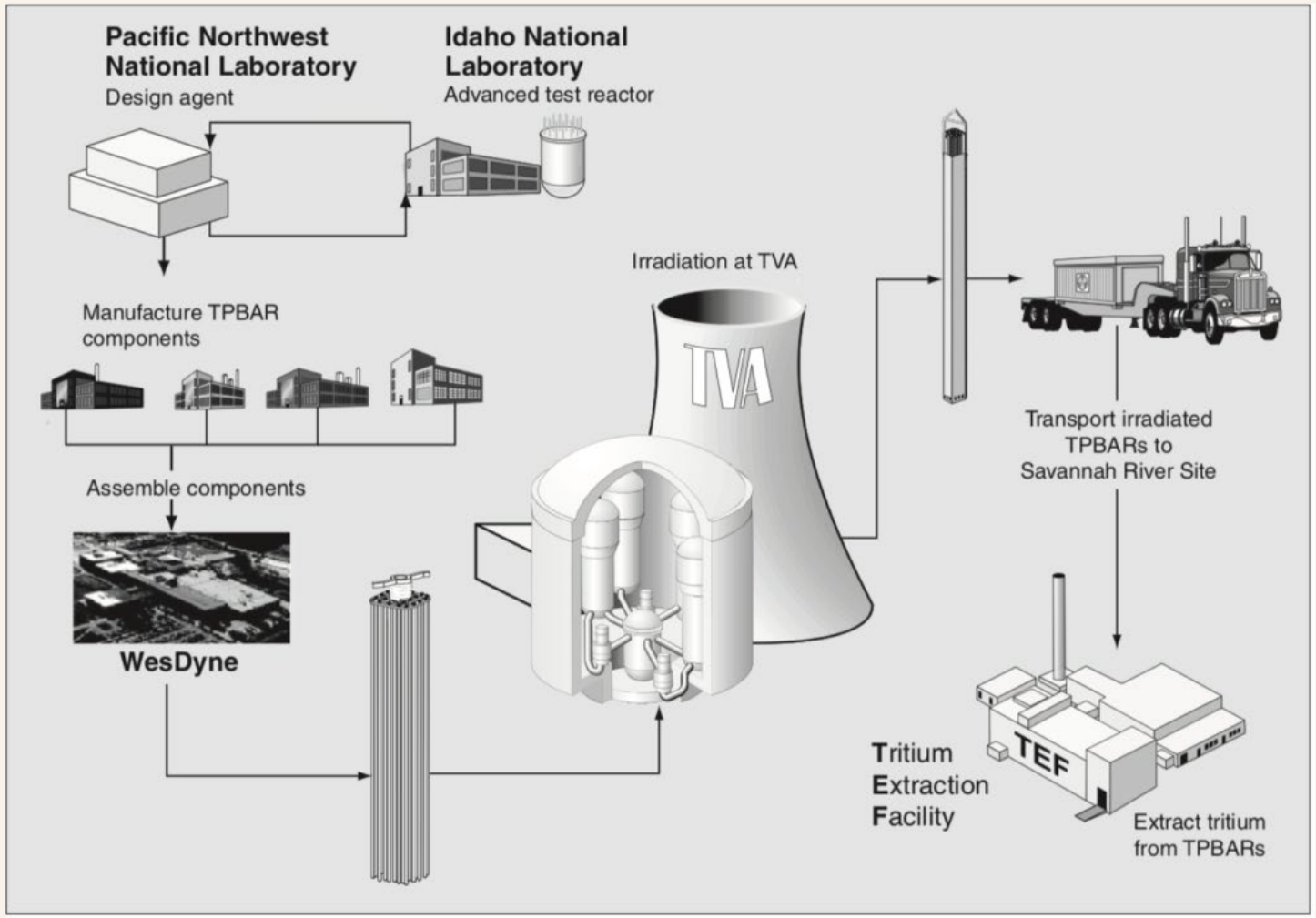
Decommissioning buildings and structures safely including P and R reactors, pilot facilities, and test reactors.

Defense Waste starts operations in 1996 to convert high level radioactive waste stored in tanks into glass that is suitable for long term storage. Only facility of its kind in US. In 2008, the salt form of sludge in the tanks was decontaminated and is disposed at the Saltstone Facility as saltcake.

Savannah River National Laboratory Certified in 2004

Missions:
Address environmental cleanup
Long term stewardship
Nuclear security problems

TRITIUM OUR FIRST AND FUTURE MISSION



Tritium is a critical component of our nation's nuclear stockpile but due to its short half life It needs to be replenished on an ongoing basis.

Two Methods:

Recycling from existing warheads

or

TVA reactors irradiate tritium producing rods that are taken to SRS where tritium is extracted, purified, and loaded into reservoirs to be transported to the Department of Defense.

"Not like the Old Days of the Cold War!"

NEXT CHAPTER: NNSA BECOMES SITE LANDLORD IN 2025

NNSA is historically associated with a part of H Area but will now have stewardship over the 310-square mile site.

On to 100!

THANKS!