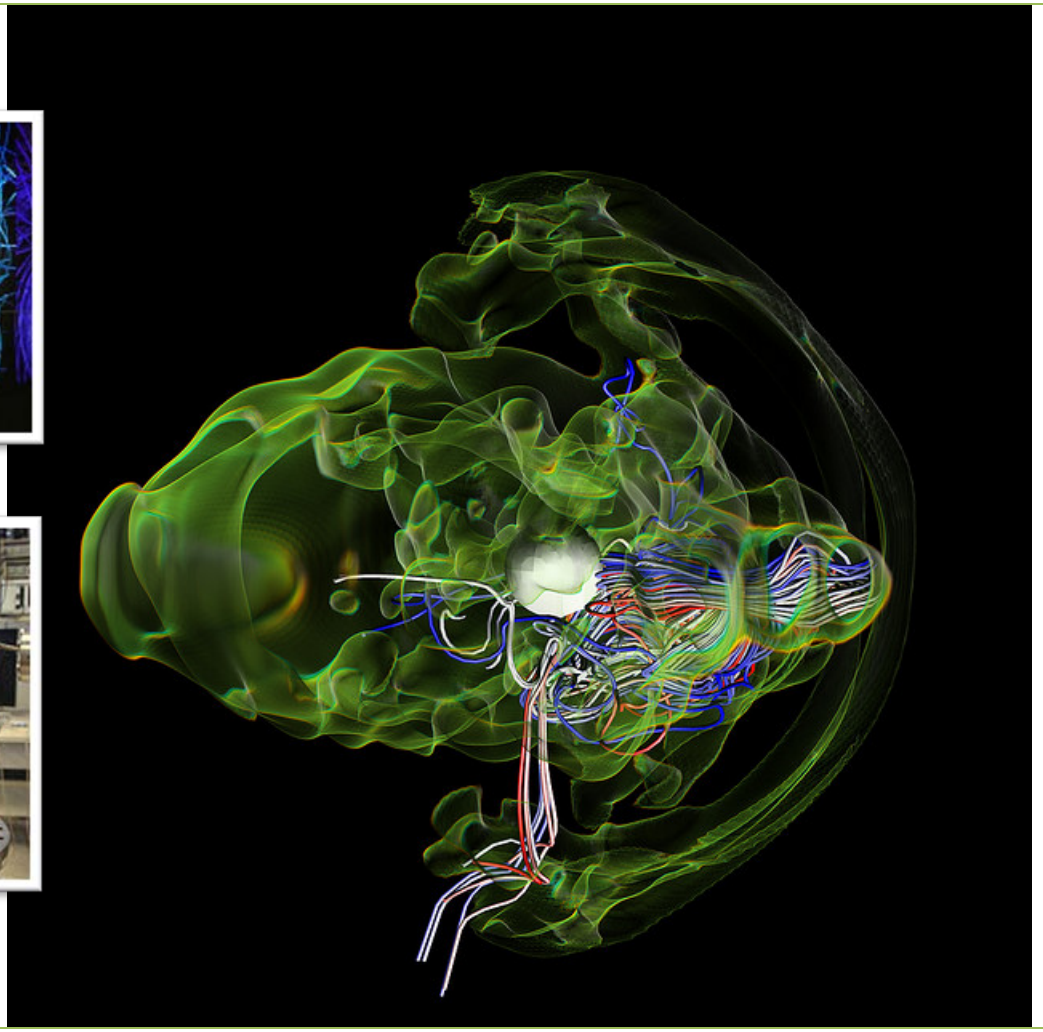
DOE SITE INFORMATION SESSION

ORNL (X10) History & Overview / EEOICPA Processing



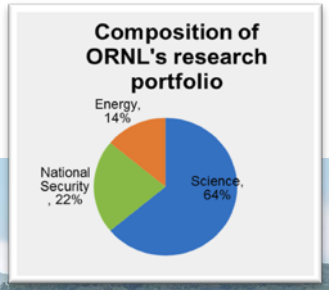
OAK RIDGE National Laboratory

Heidi Fritch

ORNL Workers' Compensation Analyst

OAK RIDGE NATIONAL LABORATORY—DOE's largest science & energy lab

- Staff: 4,400
- Users: 3,200/year
- Budget: $1.4 billion
- Main site: 4,470 acres
- 330+ buildings

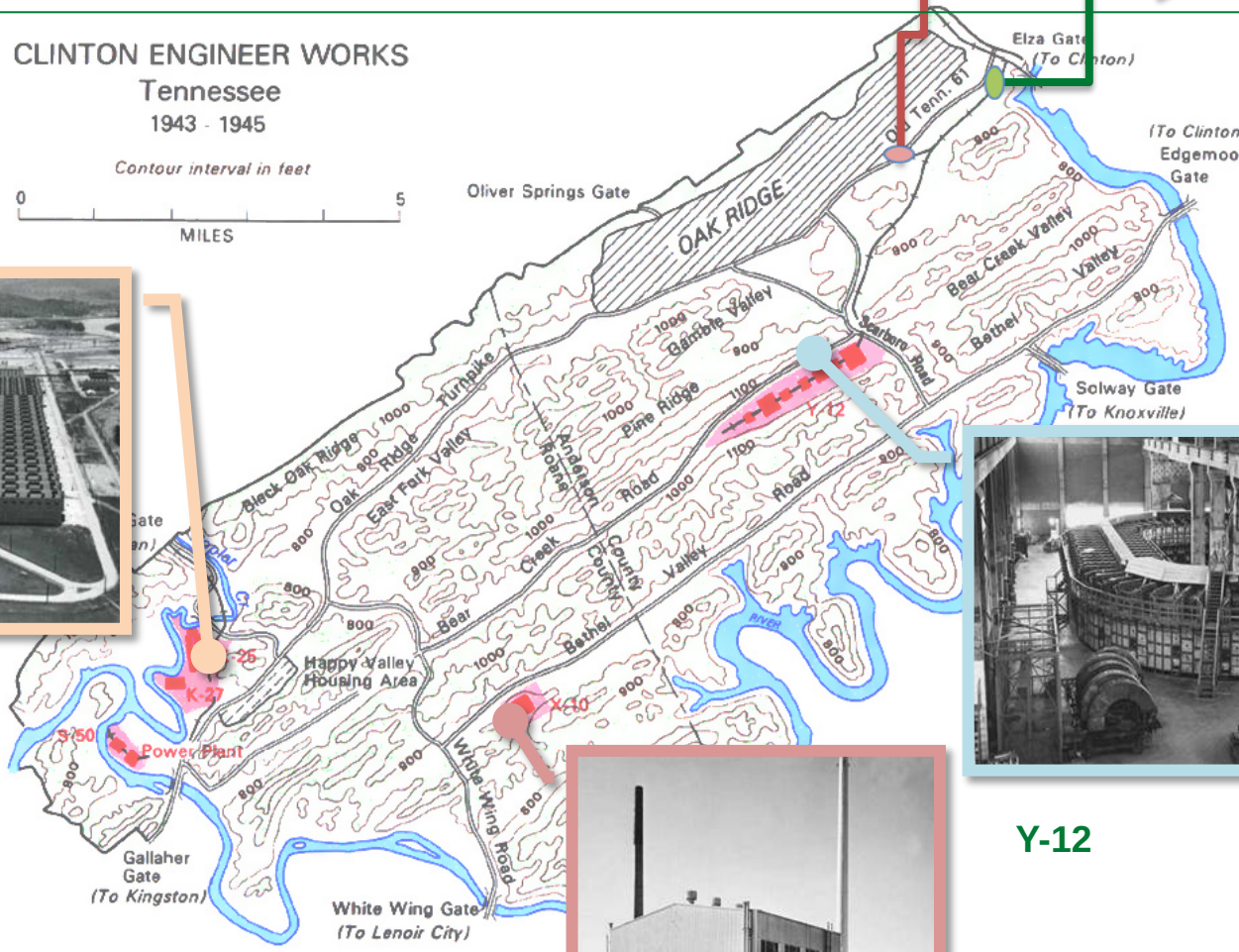


The Manhattan Project in East Tennessee

DOE-ORO

OSTI

K-25



Y-12

X-10

1943-1949 *Clinton Laboratories / X10*

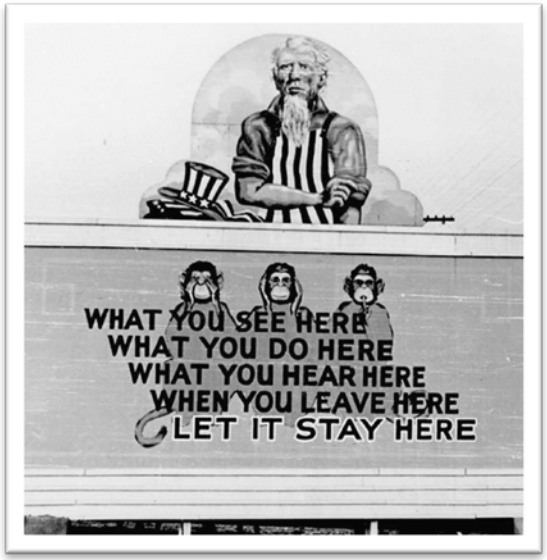
1948-present *Oak Ridge National Laboratory (ORNL)*

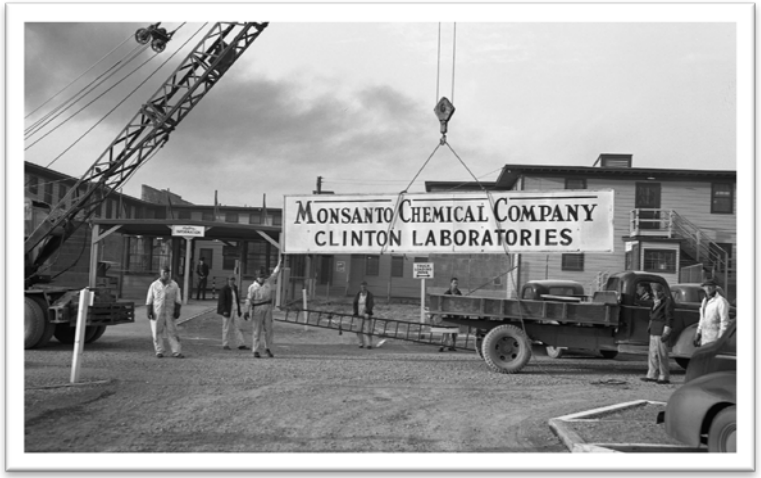
X-10 in 1947

LABORATORY CONTRACTORS

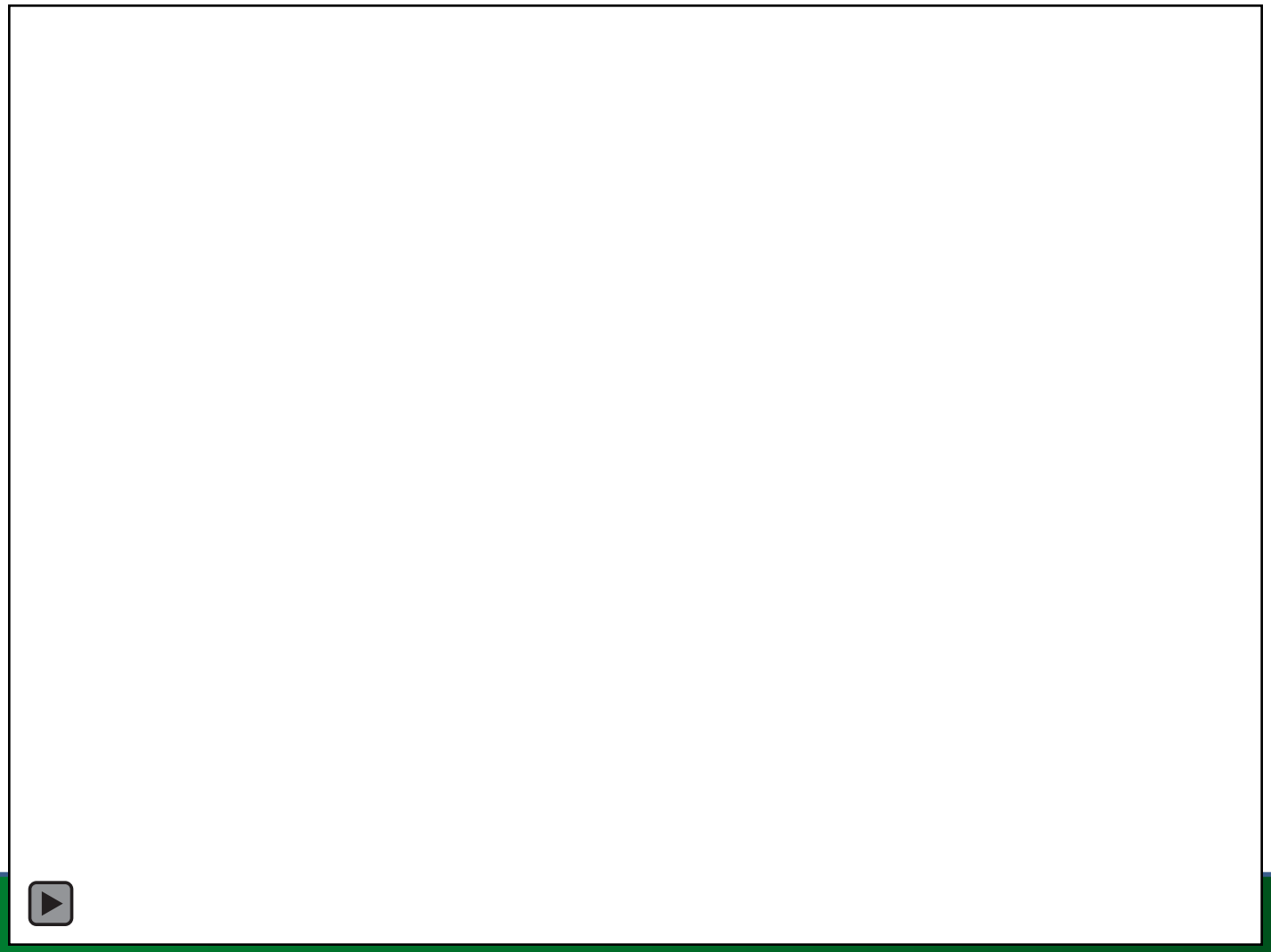
- 1943-1945 University of Chicago
- 1945-1947 Monsanto Chemical
- 1948-1984 Union Carbide and Carbon Corp.
- 1984-1994 Martin Marietta Energy Systems
- 1994-2000 Lockheed Martin Energy Research Corp.
- 2000-present UT-Battelle LLC

Hundreds of prime construction contractors





Video: ORNL History

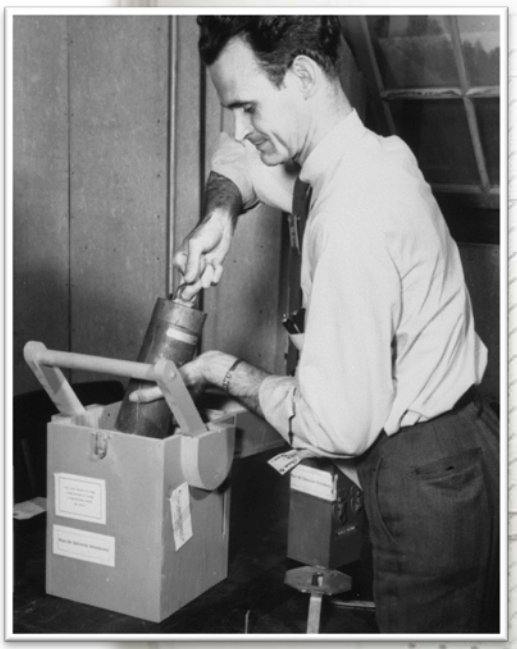


Reactors and Isotopes – What are they?

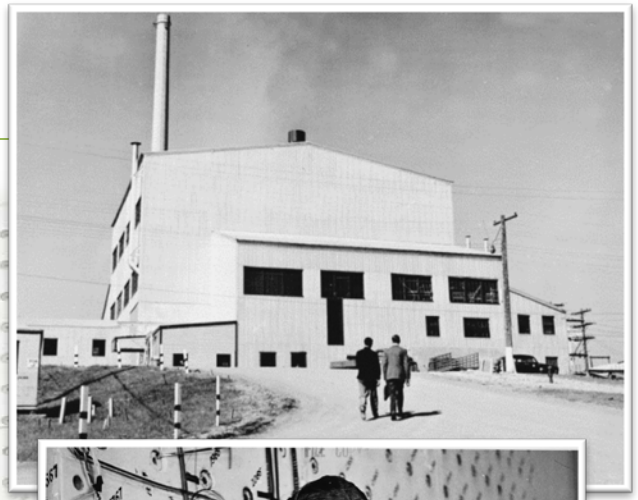
- REACTOR = a device for containing or controlling a nuclear reaction
- NEUTRON = particles in an atom that have a neutral charge
- ISOTOPE = atoms that have been altered from their original state and thus have different properties (ie, uranium-235, plutonium-238, beryllium)
- RADIATION has measurable boundaries

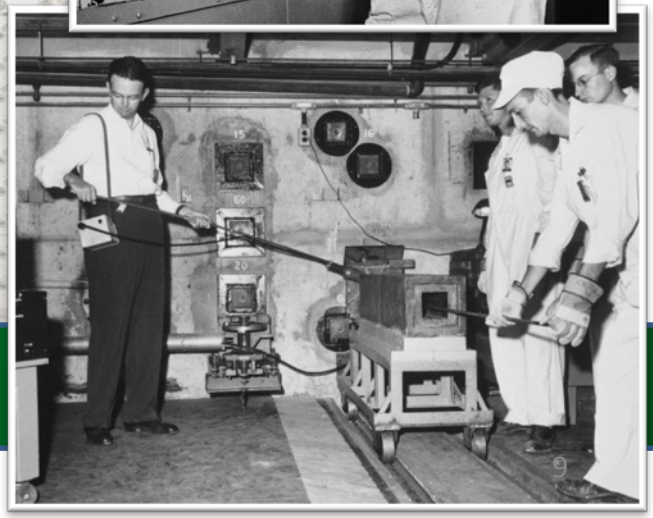
Graphite Reactor 1943-1963

(Bldgs.3001,3002,3003)



- Oak Ridge's first reactor
- 24' square graphite cube with 7' thick concrete walls
- Originally produced plutonium for WWII; later shifted to radioisotope production
- Now a National Historical Landmark

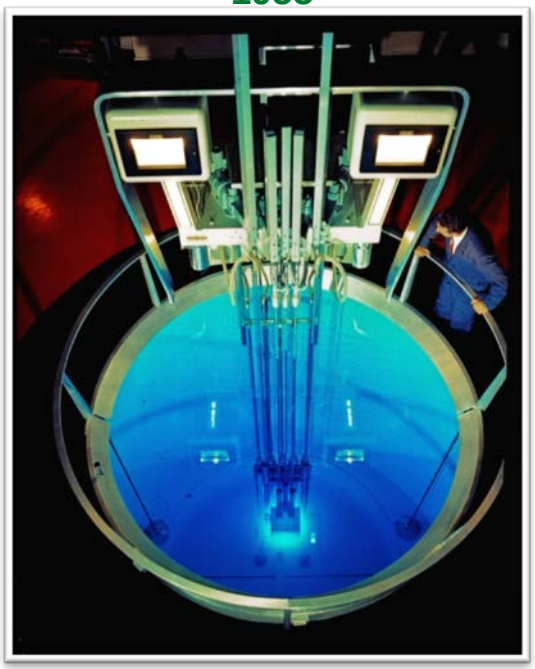




Low Intensity Test Reactor 1948-1968

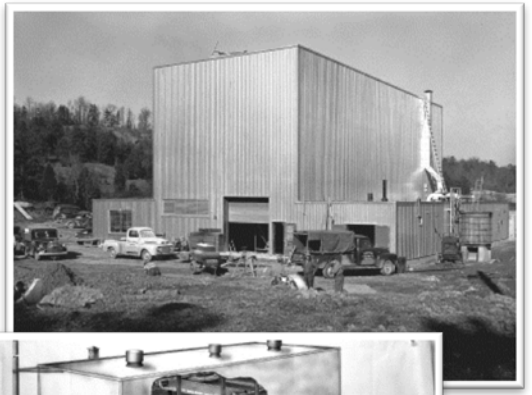
Bldg.3077

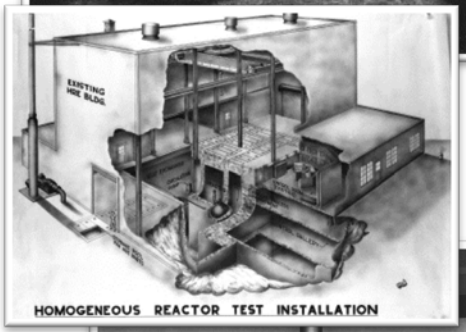
Geneva Conference Reactor 1955

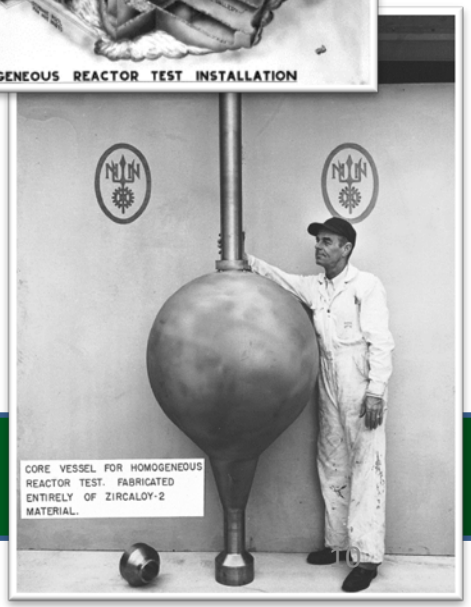


Homogeneous Reactor Experiment 1952-1954 & Homogeneous Reactor Test 1957-1961

Bldg.7500







Aircraft Reactor Experiment (Nuclear Airplane) 1954-1955

- Cold war pressure established ORNL program at Y12
- Never built

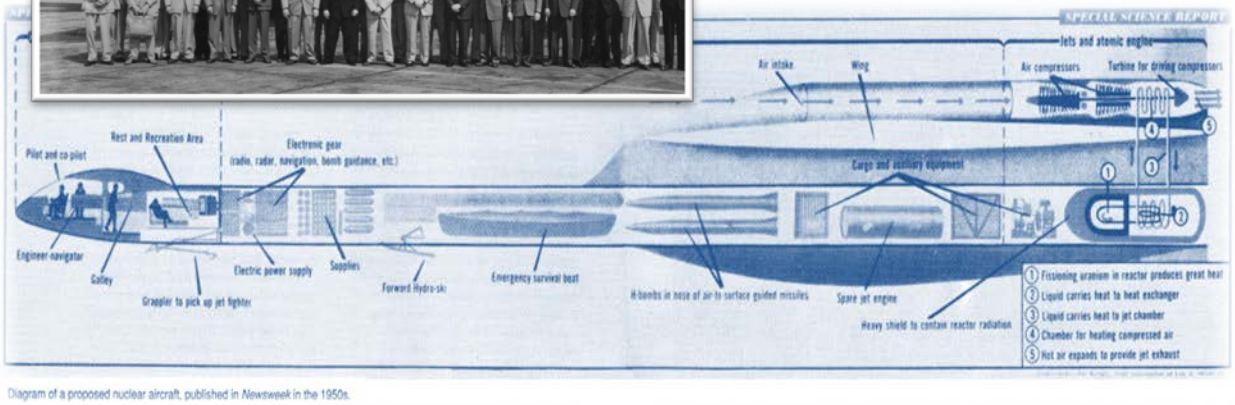
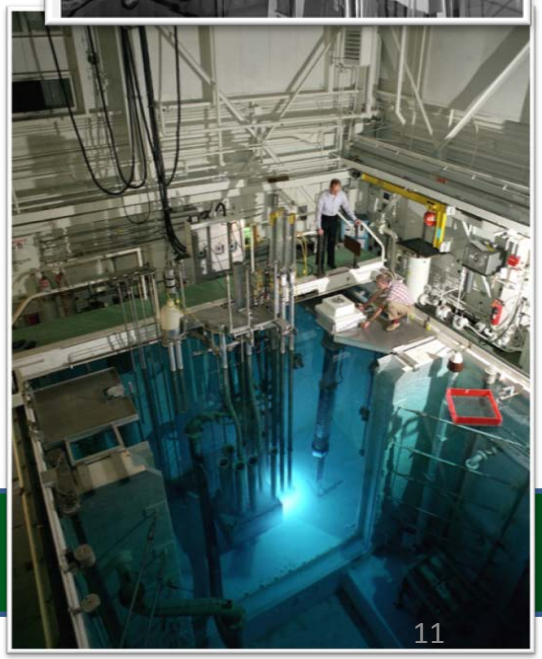


Diagram of a proposed nuclear aircraft, published in *Newsweek* in the 1950s.



Bulk Shielding Reactor 1950-1987

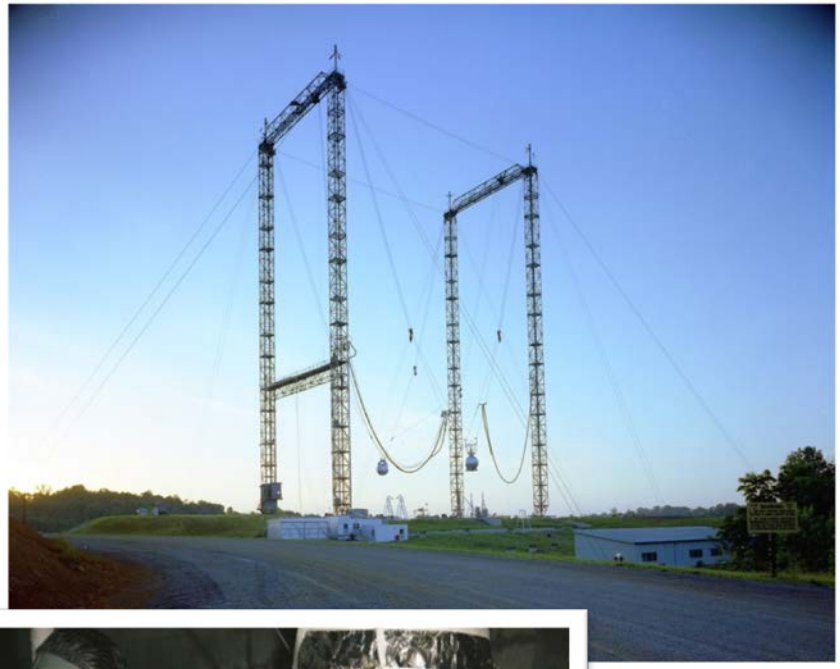
Bldgs.3010,3098,3101,3117,3119

- “Swimming pool” reactor
- Tested shielding capacity of various materials

Tower Shielding Facility 1954-1992

Bldgs.7553,7701,7703,7705,7706,7707,7708

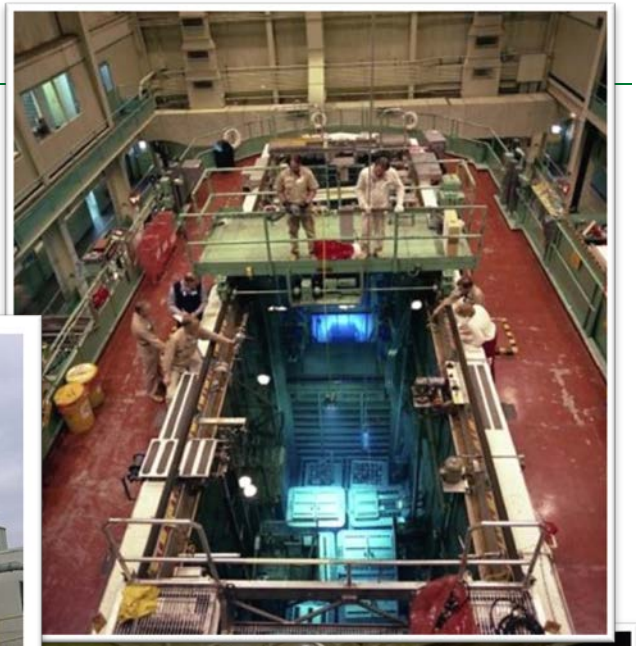
- Originally used to test nuclear airplane's reactor when aloft
- Used in 1960's to develop shielding for astronauts



Oak Ridge Research Reactor 1958-1987

Bldg. 3042

- Used to study effects of radiation
- Probed structure of materials
- Became major world supplier of radioisotopes



- August 2015: Radioactive components removed & shipped to Texas
- Bldg. scheduled for demolition ~2030

Health Physics Research Reactor 1963-1987

Bldgs.7709,7953

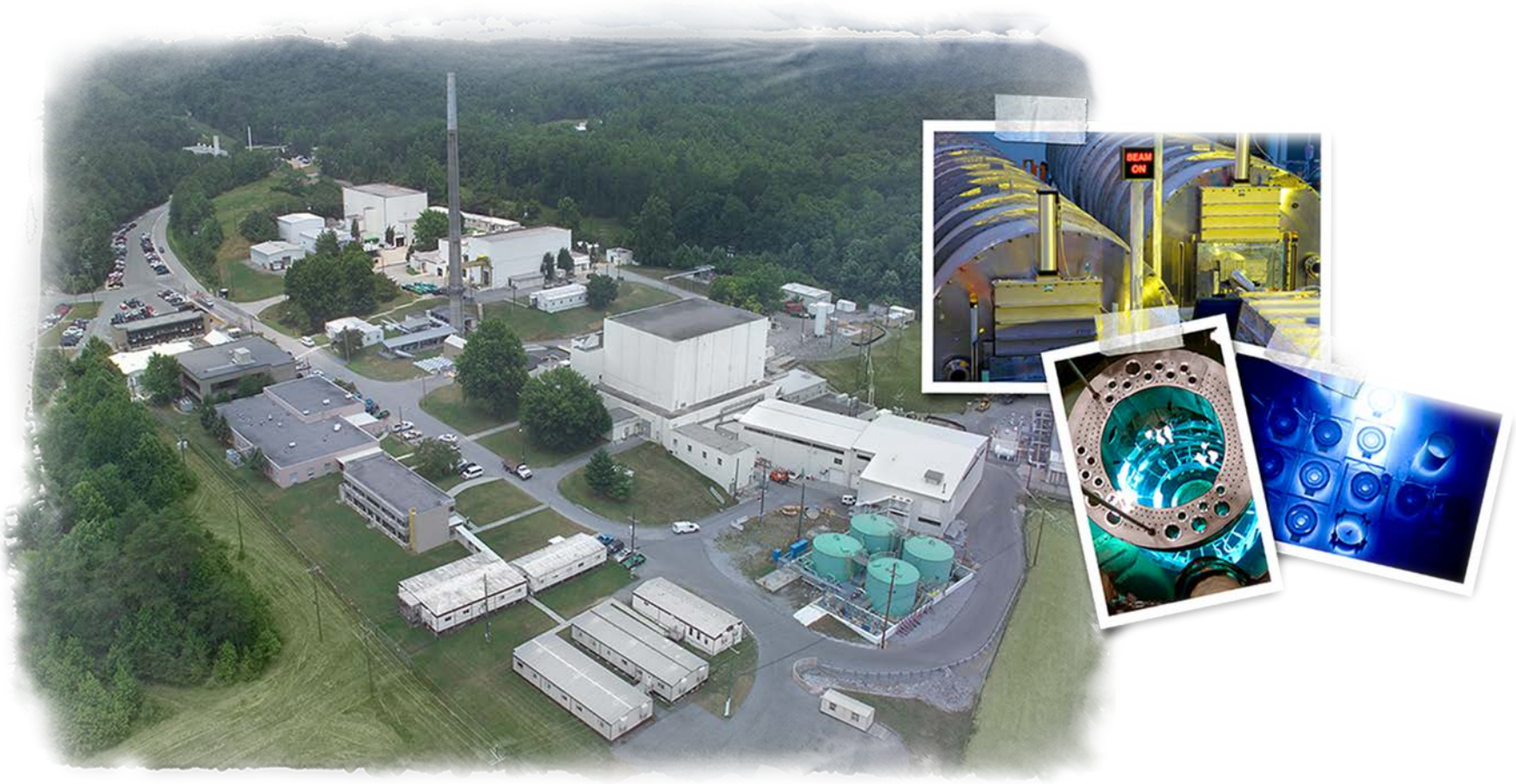
- Produced exposure data for dose limits/dosimeters, and power plant & spacecraft shields

Molten Salt Reactor 1965-1969

Bldgs.7503,7509

- Originally designed for propulsion of nuclear plane

High Flux Isotope Reactor (HFIR)



Operating at 85 megawatts, HFIR is the highest flux reactor-based source of neutrons for research in the United States and is one of the highest in the world. HFIR produces a continuous beam of neutrons that are delivered to specially designed experiment stations. The neutrons produced by HFIR are used to study physics, chemistry, materials science, engineering, and biology.

High-Flux Isotope Reactor (HFIR) 1965-present

Bldgs.7568,7900,7914A,7916,7955,7960

- DOE owned for DOE purposes:
  - Isotope production
  - Beam Scattering research
  - Materials irradiation

Nuclear Safety/Dosimetry

- Trained 1,000+ engineers in reactor safety
- Published “Nuclear Safety” journal – over 30 years
- Established criticality safety standards

- Since 1940s, ORNL health physicists developed and improved personnel radiation monitors
- Dosimetry Program accredited by DOELAP

Tank Farms

- Tank farm construction began in 1943.
- Discontinued use and grouted in place in the early 2000's

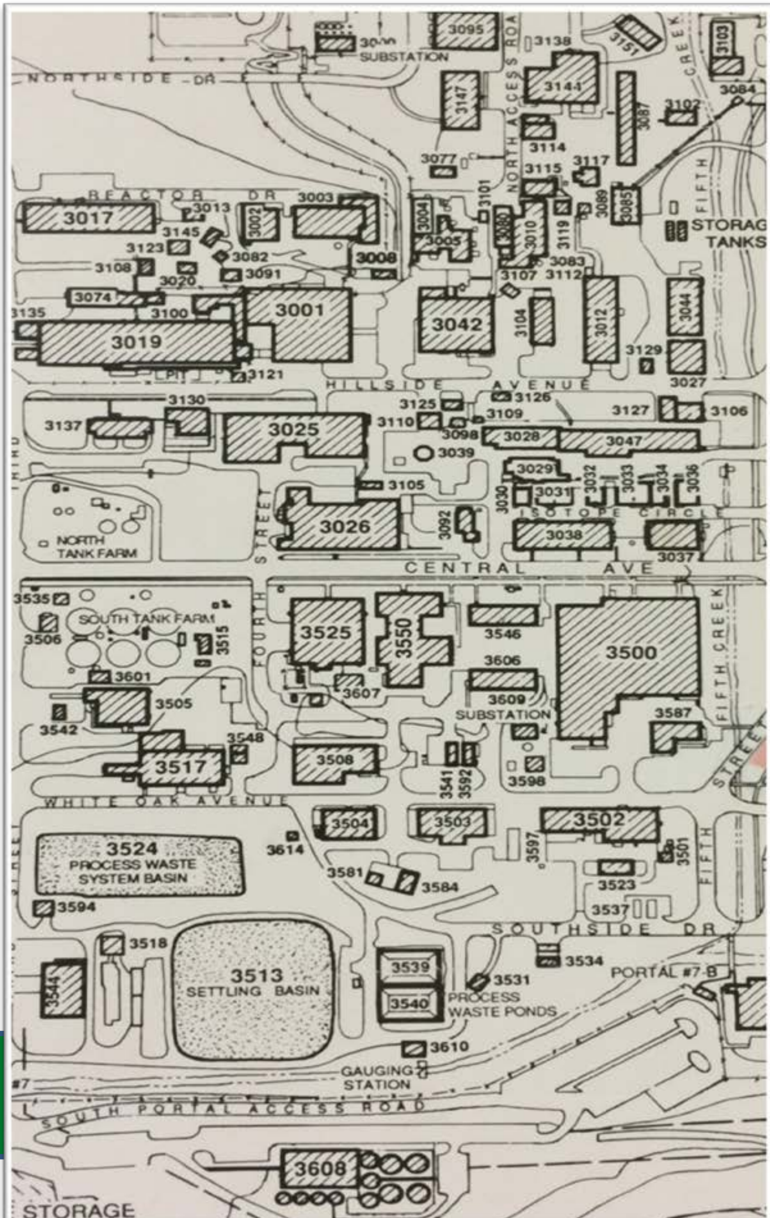
Bldg.3019 - 1943

Hot Cells

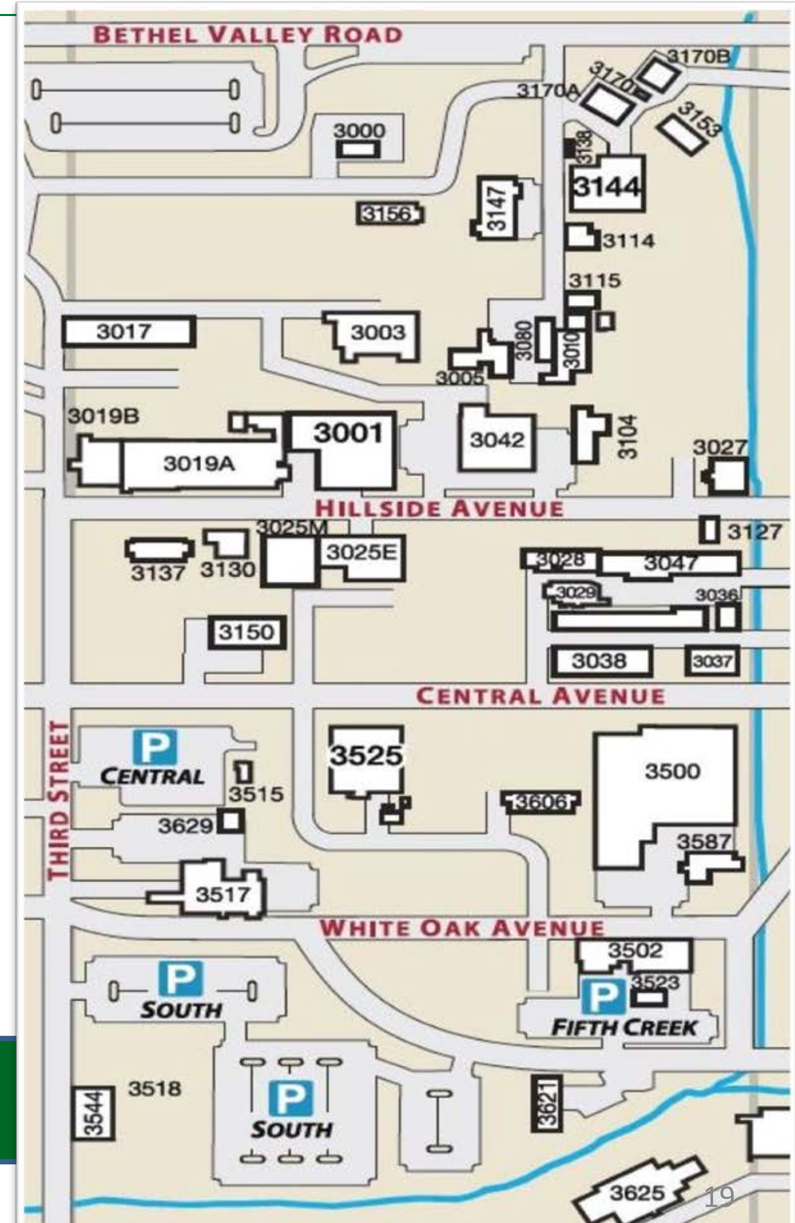
- Shielded nuclear radiation containment chambers
- Containment boxes protect workers from isotopes

3000 Area Remediation & Demolition

THEN



NOW



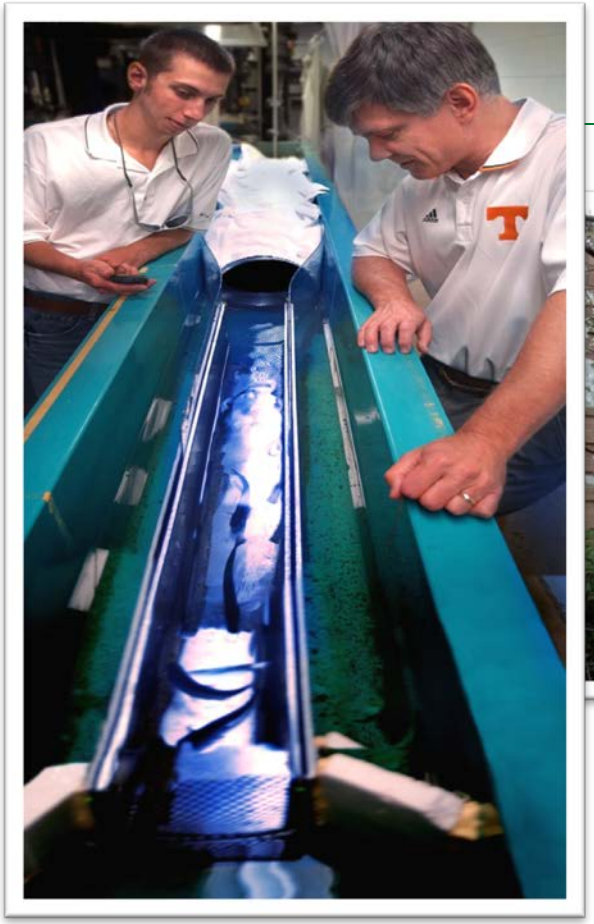
The Mouse House

At Y12; ORNL Bldg.1005

- Pioneered by Bill and Liane Russell; housed at Y12 from 1949-2003
- Moved to ORNL in 2003; transferred to University of NC in 2012
- Inhabited by hundreds of thousands of carefully bred mice
- Established radiation doses
- Discovered health effects of chemicals and disease
- Researched genetic disorders

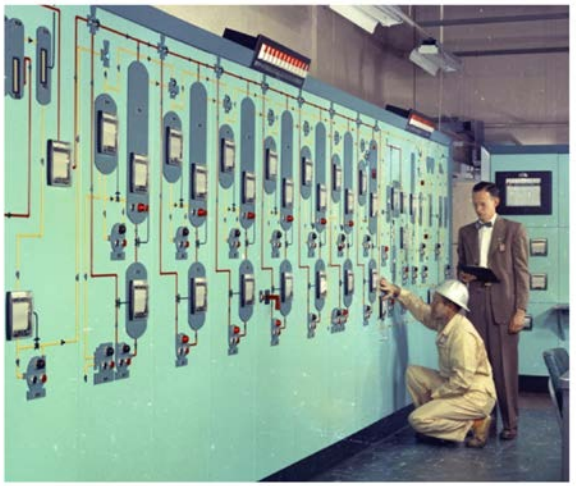
Aquatic Ecology Lab

Bldg.1504

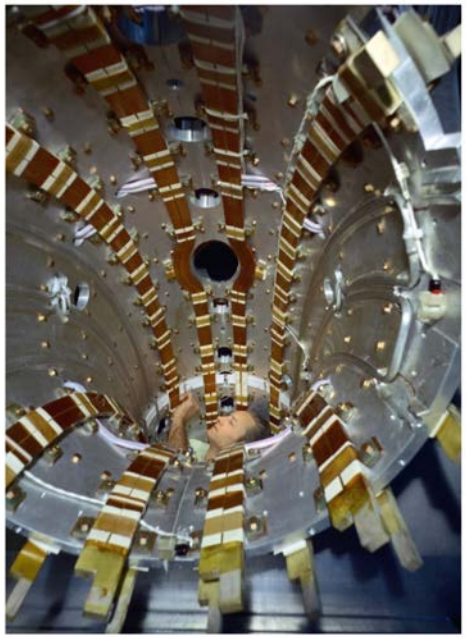


Environmental & Energy R & D

OREX process - 1949

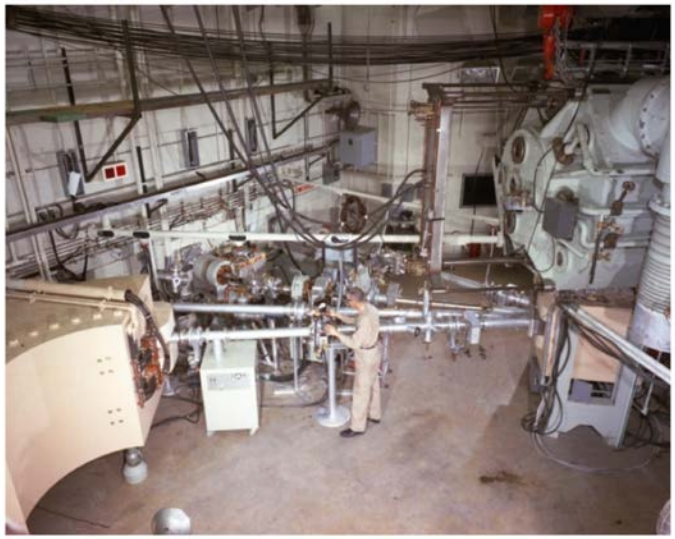


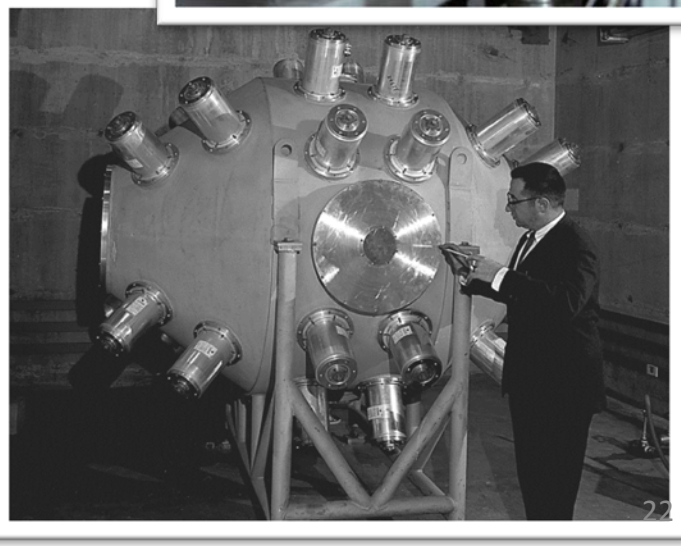
ORMAK (tokamak) - 1971



Oak Ridge Electron Linear Accelerator (ORELA) - 1966

Oak Ridge Isochronous Cyclotron (ORIC) - 1964





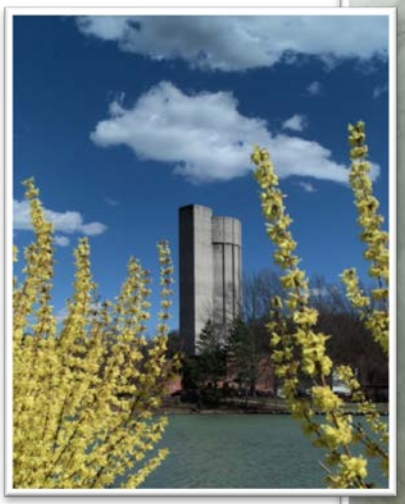
FORMER USER FACILITIES

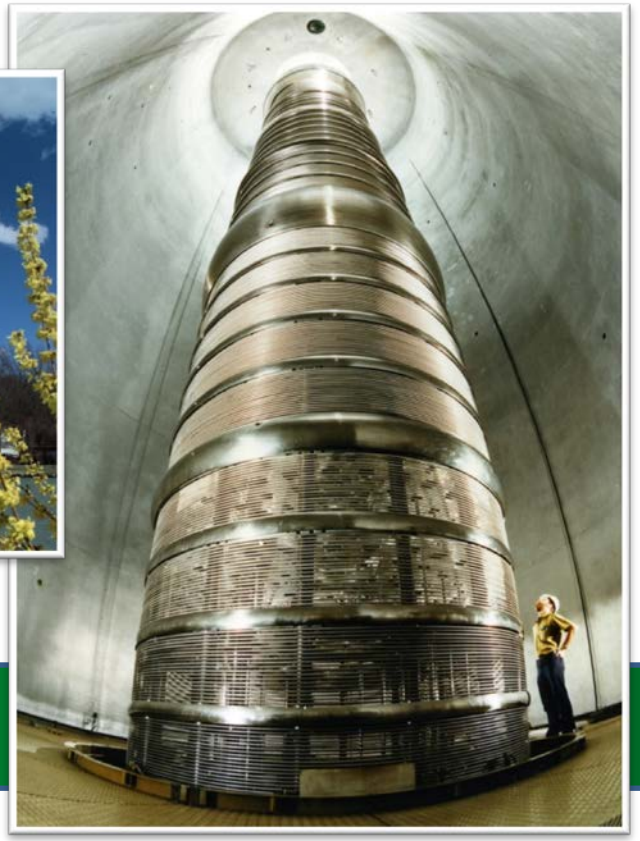
High Temperature Materials Lab (HTML) – 1980-2011

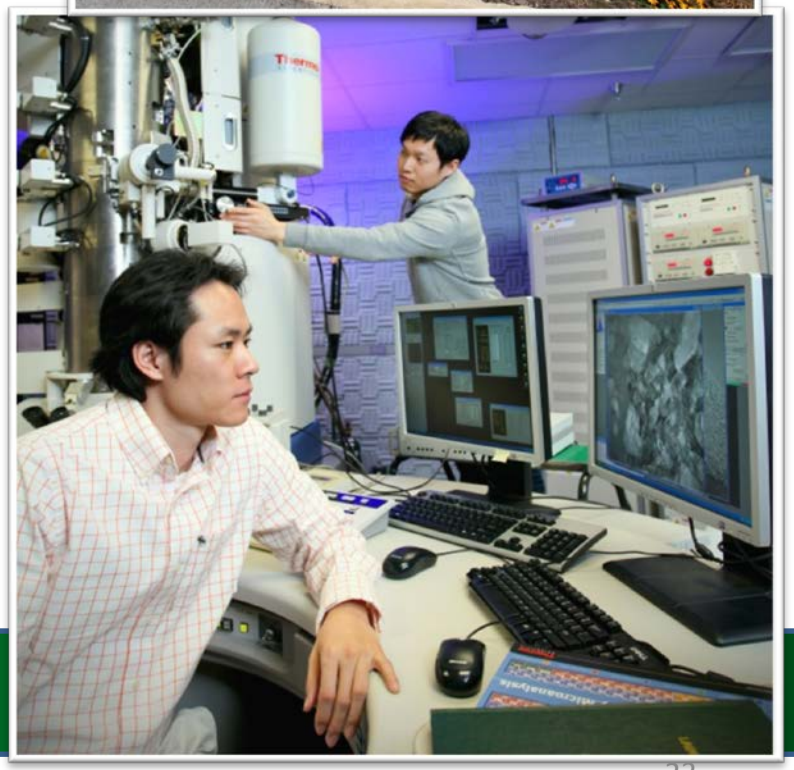
Bldgs.4513,4514,4515,4516

Holifield Heavy Ion Research Facility - 1987-2012

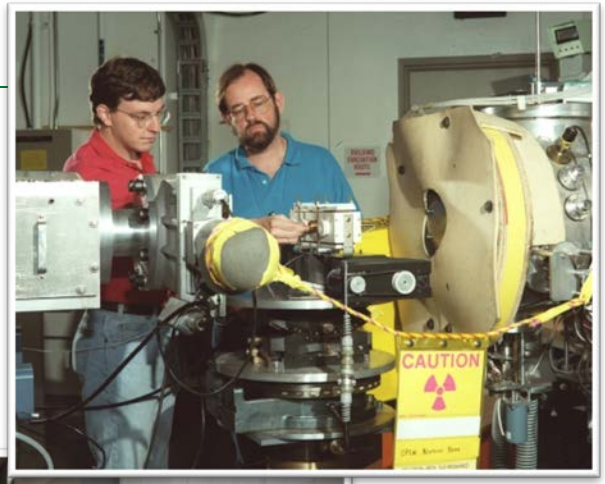
Bldg.6000







National Center for Small Angle Scattering Research

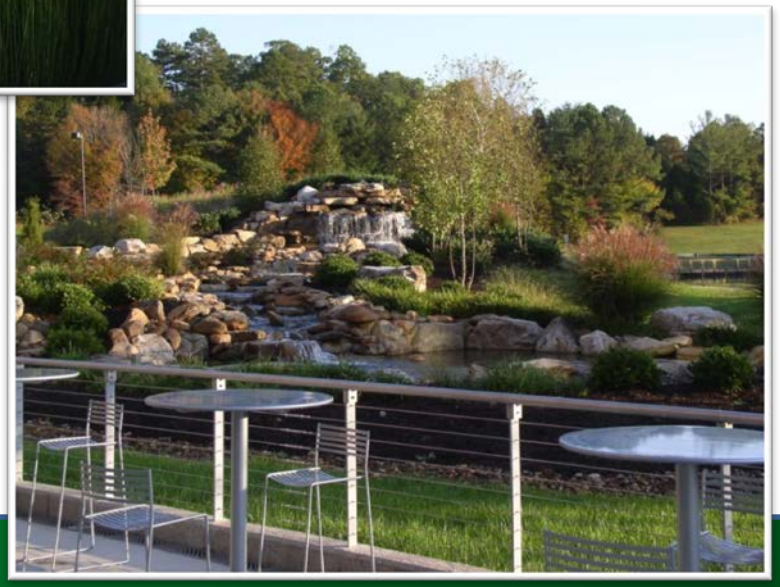


National Environmental Research Park

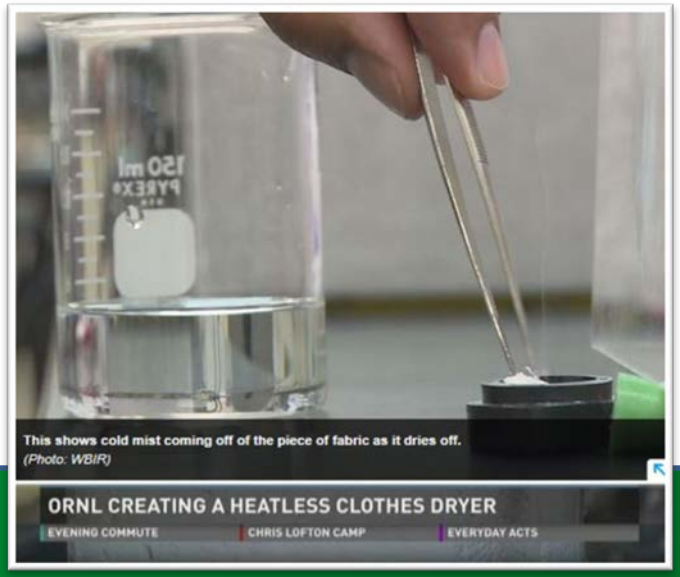
Spallation Neutron Source - SNS

SNS is the world's most powerful pulsed, accelerator-based neutron source for research and development. It produces neutrons with an accelerator-based system that delivers short (microsecond) proton pulses to a target/moderator system, where neutrons are produced by a process called spallation. The neutrons produced by SNS are used to study physics, chemistry, materials science, engineering, and biology.

ORNL's Beautiful Present-Day Campus

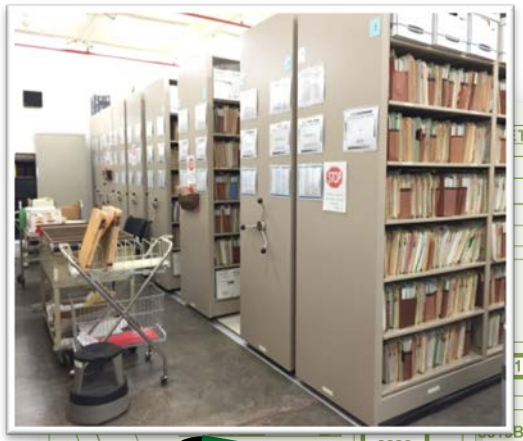


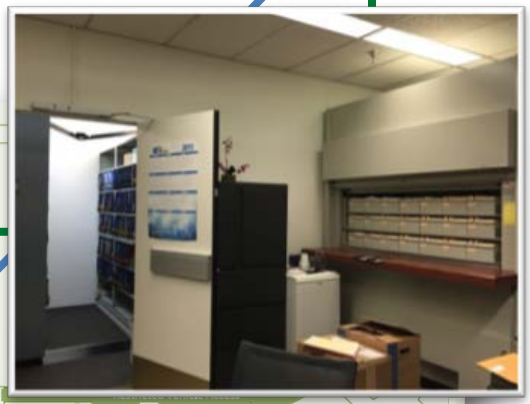
Latest innovations



Video: ORNL Today—Its People and Their Work

Records Request and Retrieval





Records Areas

Nuclear & Radiological Protection Division (RadCon)

- Electronic, paper – back to 1940s
- Early subcontractor records generally unavailable; more recent are available

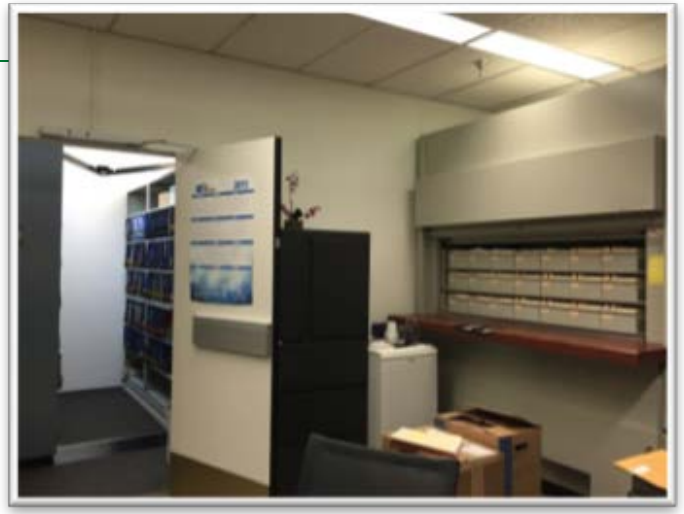
Industrial Hygiene (IH)

- Electronic, paper – back to 1974
- Subcontractor records available occasionally

Safety

- Electronic database, inactive paper records – date back to 1986
- Subcontractor records are available

Records Areas



Personnel Records

- Mostly paper, some electronic – back to 1943
- Some subcontractor records available
- 4-DIGIT ORG. CODES DETERMINE EARLY WORKER LOCATIONS:
  - 3 - - - ORNL employee working at ORNL
  - 4 - - - ORNL employee working at Y12
  - 8 - - - Central Org employees working at all 3 sites (X10,Y12,K25)

ORNL Health Services (Medical)

- Primarily paper and film – back to 1943
- Very limited subcontractor records available

Additional References

www.ornl.gov

VIDEO: "About Oak Ridge National Laboratory"
https://www.youtube.com/watch?v=wYSaj4421U8

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