



BRIEFING TO OAK RIDGE SITE SPECIFIC ADVISORY BOARD

February 12, 2020

WHO IS ISOTEK SYSTEM LLC?

- Isotek is responsible for the security, processing, and disposition of the U-233 inventory stored at 3019. All activity is performed with an emphasis on safety and security.
- Isotek is an unpopulated LLC and is under Atkins Nuclear Secured; part of SNC-Lavalin, a Canadian firm.
- There are currently 180 people working full time at Isotek.
- Isotek is the custodian of Buildings 3017, 3019, 3137, 2026, at ORNL.
- Isotek also leases office space at Building 2040 at ORNL and at 701 Scarborough Rd.



U-233 PROJECT CHRONOLOGY

- Awarded by DOE to Isotek, LLC in October 2003 as cost-plus-award-fee contract
 - Find viable use of material and assure safe storage
- In 2005, Congress directed mission change and transfer of responsibility to EM. Contract restructured for capital project and disposition activities
- 2010-2011: DOE reevaluated project alternatives and determined that a significant portion of the inventory could be directly disposed without processing
- Option 2 was structured as fixed price for direct disposition campaign on January 1, 2012
- Contract structured in 4 options
 - Option 1 – Planning and Design **(Complete)**
 - Option 2 – Direct Disposition **(Complete)**
 - Option 3 – Processing Campaign (Ongoing)
 - Option 4 – Building Deactivation

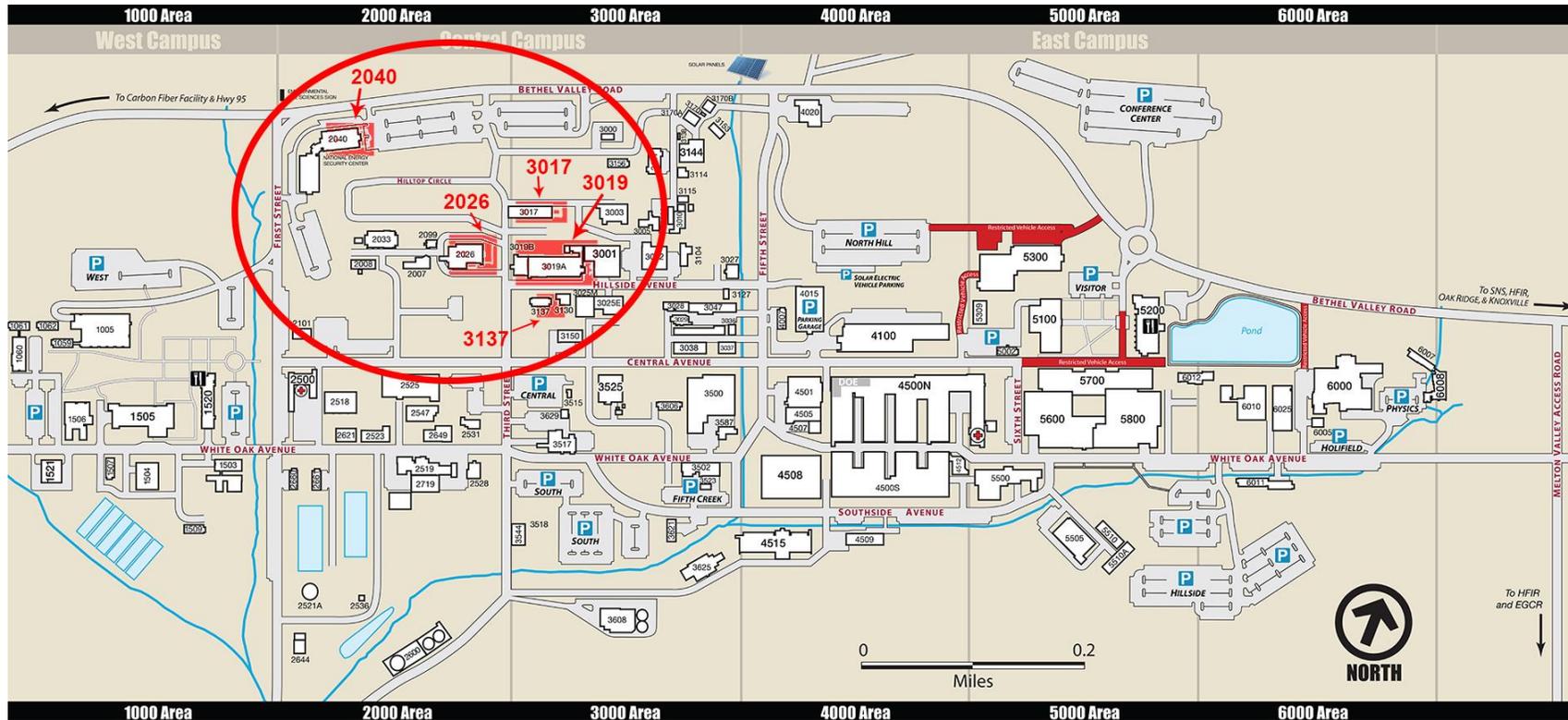


U-233 INVENTORY DISPOSITION PLAN

- Direct Disposition – no processing required
 - CEUSP direct disposition – 100% complete
 - ZPR plates direct disposition – 100% complete
 - Transfer high purity material – 90% complete
- Processing required to disposition
 - Oxide Powders – started October 2019
 - Metals
 - Monoliths
 - MSRE Traps
 - Miscellaneous



WHERE IS ISOTEK?



OAK RIDGE NATIONAL LABORATORY

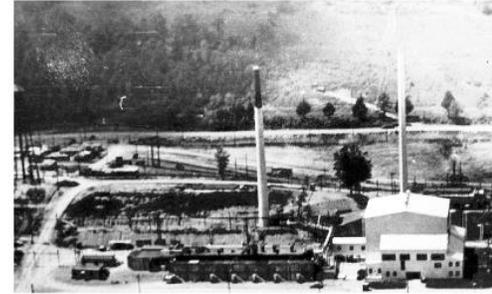
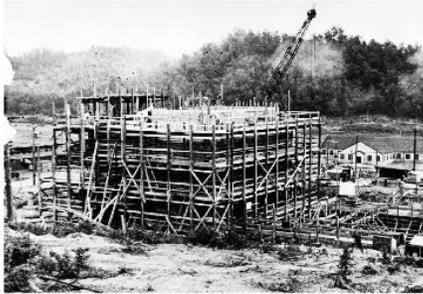
Main Campus

- 1505** Environmental Sciences Laboratory
- 1520** Joint Institute for Biological Sciences–BioEnergy Science Center
- 1521** West End Research Support Facility
- 2500** Fire Station
- 3001** Graphite Reactor
- 3144** Building Technologies Research and Integration Center
- 3525** Irradiated Fuels Examination Laboratory
- 4100** Chemical and Materials Sciences
- 4508** Metals Processing Laboratory
- 4500N** Laboratory Administration
- 4515** High Temperature Materials Laboratory
- 5100** National Institute for Computational Sciences
- 5200** Conference Center/Visitor Center/Cafeteria
- 5300** Multiprogram Research Center
- 5600** Center for Computational Sciences
- 5700** Research Office Building
- 5800** Engineering Technology Facility
- 6000** Holifield Radioactive Ion Beam Facility
- 6008** Joint Institute for Heavy Ion Research

-  Visitor Center
-  Parking
-  Cafeteria
-  Medical



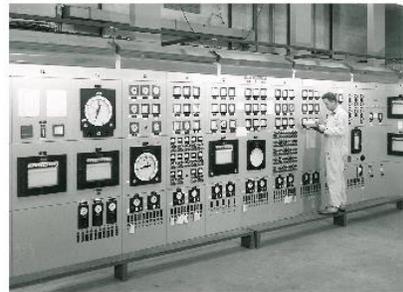
HISTORY OF BUILDING 3019



During World War II, Building 3019 was built to assist in the Manhattan Project.



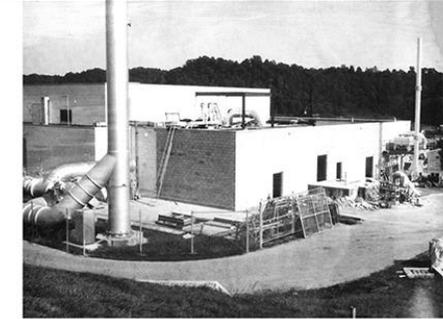
From 1943 - 1976, 3019 was used as a **Pilot Plant** to test radioactive processes before being used on a large scale at other nuclear facilities.



Now 3019 is the storage facility for the nation's inventory of U-233 and is the **oldest operating nuclear facility in the world.**

HISTORY OF BUILDING 2026

Building 2026 was constructed in 1964 as the **Radioactive Materials Analytical Laboratory**.



Serving in a technical support role, 2026 would **analyze samples from the Molten Salt Reactor Experiment and other reactor and nuclear programs through 2003.**



Currently, 2026 serves as the primary base of operations for the **downblending of U-233 in the Oak Ridge Oxide Processing campaign.**

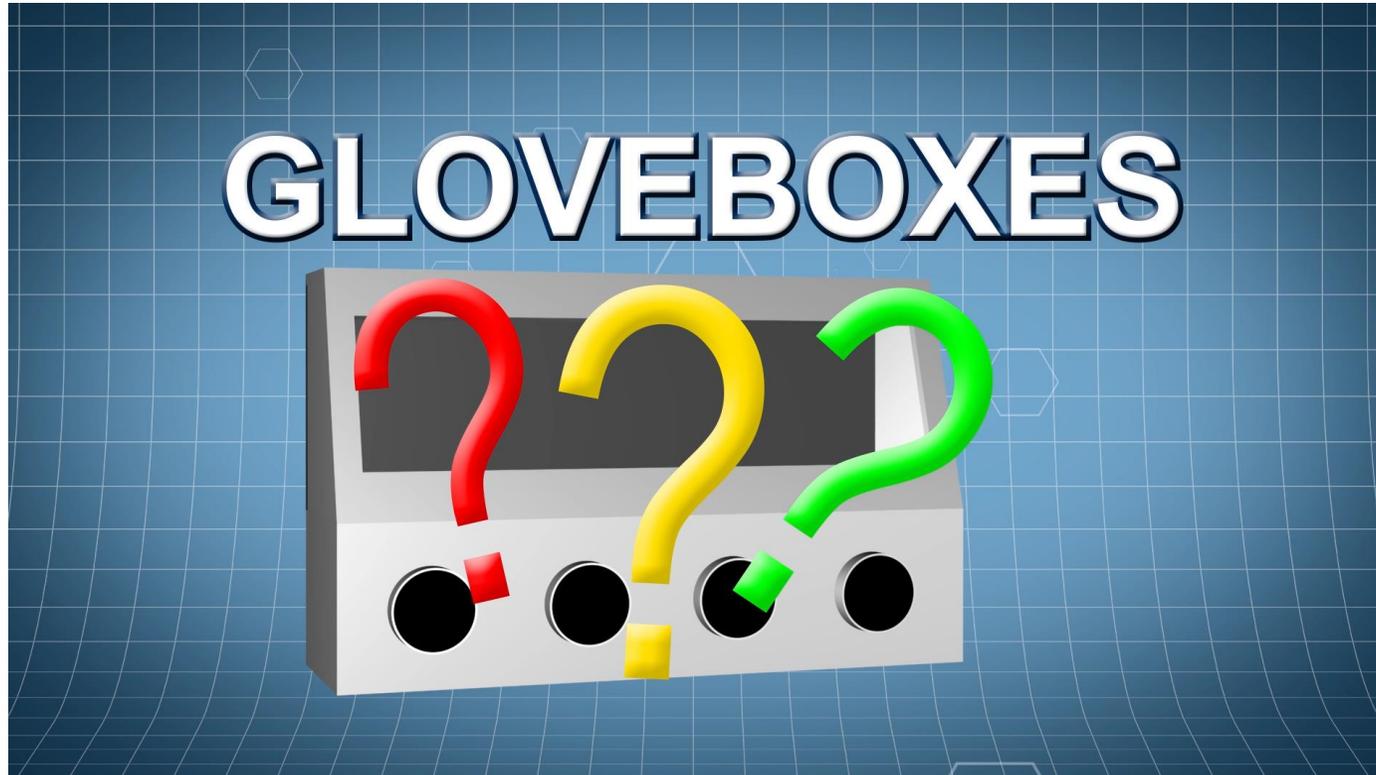
NEW LIFE FOR CANCER RESEARCH PARTNERSHIP

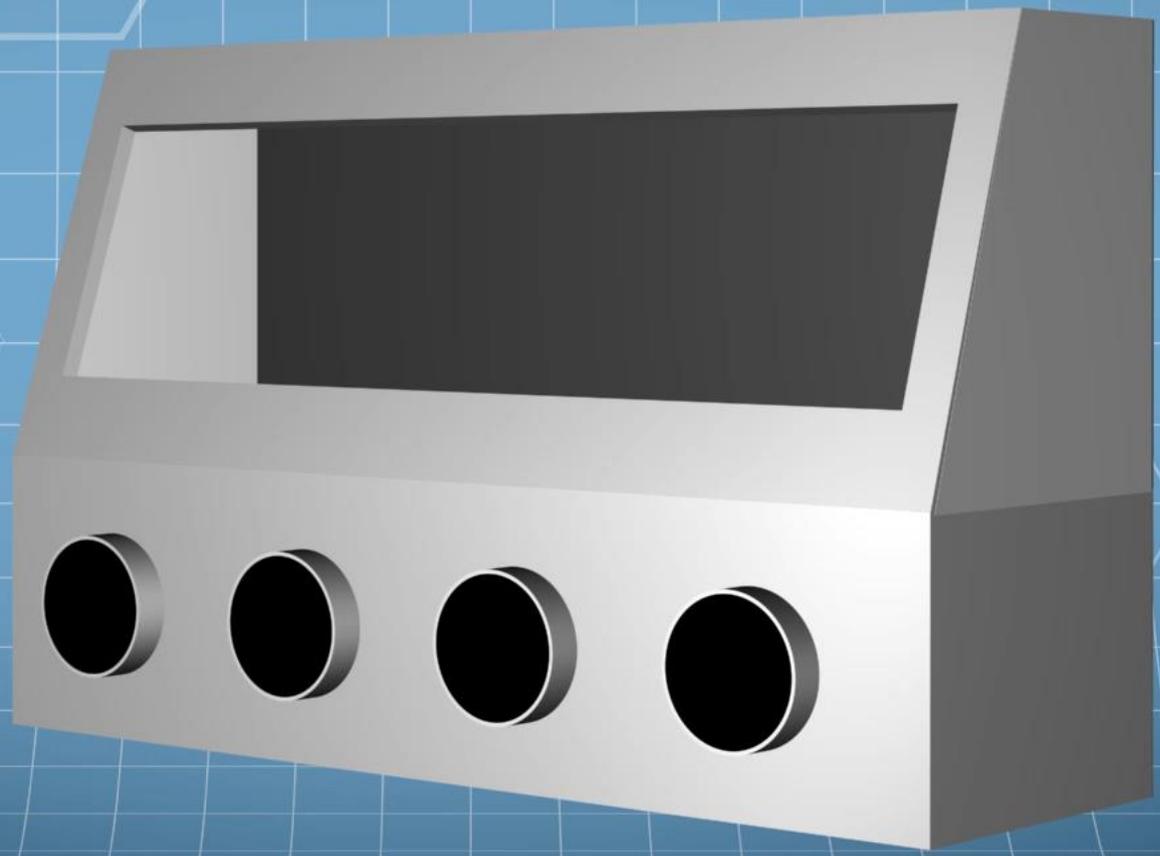


Innovative public-private partnership to provide rare isotopes for next generation cancer research and treatment



WHAT IS ISOTEK'S PART?





TARGETED ALPHA THERAPY



TerraPower™





TerraPower[®]



ISOTEK OPERATIONS

TRANSFERRING THE URANIUM OXIDE

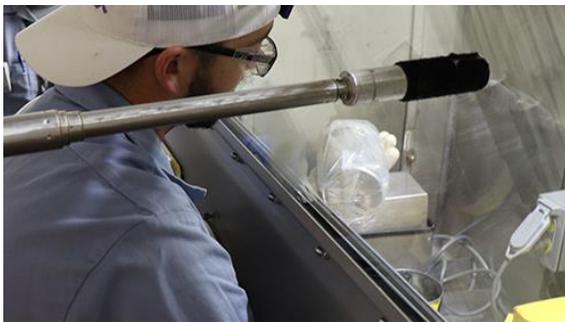
Canister is safely and securely transported from 3019 storage to 2026 gloveboxes for processing.



Picture not from actual canister transfer

GLOVEBOX 1

Canister is opened and divided into sample sizes for dissolution.



GLOVEBOX 2

Uranium oxide is dissolved in acid and pumped through resin columns to extract thorium.



Uranyl nitrate is safely disposed in a drum of grout for disposal as low level waste

A lower concentration acid is pumped to release thorium from resin column.



GLOVEBOX 3

Thorium solution is run through an evaporator to solidify thorium particles.



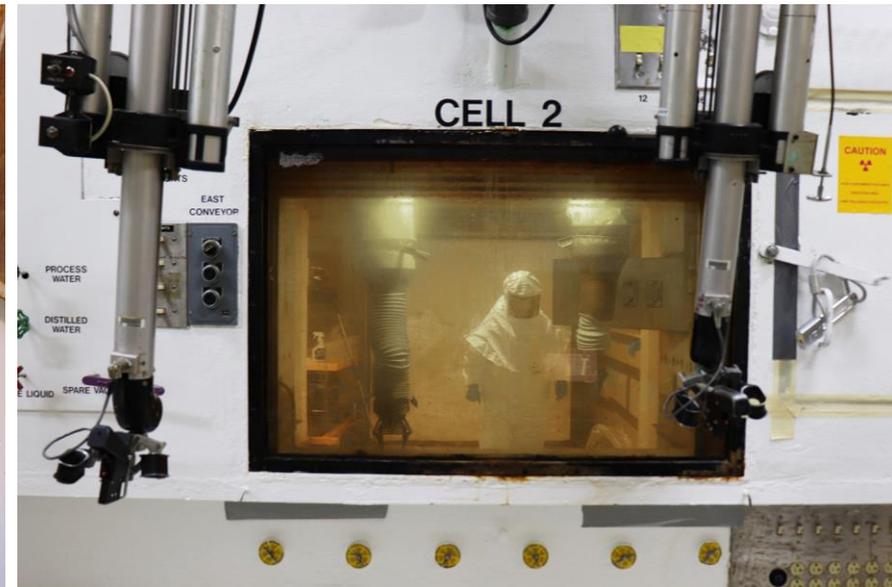
TYPE-A PACKING AND LOADING

Thorium product is packaged into special container and then put into lead barrel to be shipped to TerraPower.



HOT CELL PROCESSING

Isotek is also preparing the hot cells in Building 2026 for processing of the more highly radioactive U-233 canisters as well as extraction of the thorium.



LOCAL BUSINESS BENEFIT

Supplier	Products/Services	Hot Cell Components	Location
Air Components & Systems	Air compressors & air handling equipment	Air compressor	Knoxville, TN
Alloy Fabrication	Metal fabrication services	Division cell portals, cement silo and support	Clinton, TN
AVANTech	Design and fabrication services	DUN pump skid and sampler enclosure	Knoxville, TN
EnergySolutions	Transportation and transport equipment	21-300 casks and trailers	Oak Ridge, TN
Manufacturing Sciences Corporation (MCS)	Laboratory services/fabrication	DUN conversion services	Oak Ridge, TN
Materials & Chemistry Laboratory (MCL)	Laboratory services/chemical analysis	Key provider of radiochemical analysis services to support operations	Oak Ridge, TN
Pro2Serve	Staff augmentation & structural analysis services	Structural analysis of Building 2026 and hot cell components	Oak Ridge, TN





QUESTIONS ??