



Delivering gas centrifuge technology and stable isotopes

Enrichment Science and Engineering Division

The Enrichment Science and Engineering Division (ESED) serves the nation in two critical areas: advancing enrichment technologies, and exploring stable isotope production and applications. The division leverages an elite staff of scientists and engineers with the world-leading capabilities of Oak Ridge National Laboratory to deliver groundbreaking advancements with a variety of applications, from national security to life-saving medical treatments.

ESED is the national steward for the research, development, and demonstration of centrifuge technology. Researchers work with state-of-the-art systems, applying advanced theoretical and engineering analysis principles to design machines and manufacture prototypes using novel fabrication tools and techniques. Their research advances the physics and engineering understanding of gas centrifuge systems. Beyond advancing current technology, the division is exploring new ways to enrich stable and radioactive isotopes.

ORNL has extensive institutional knowledge in the area of stable isotopes, most recently producing ruthenium-96 in 2018 the first domestic enrichment of an isotope since 1998. ESED is continuing to expand the nation's stable isotope portfolio by advancing electromagnetic isotope separations technology and pursuing new enriched isotope production approaches. The division is also identifying new applications for stable isotopes.

Bringing enrichment science and stable isotope production under one organization, ESED is designed for innovation that will ensure ORNL meets the nation's need for these vital materials and technology.



“East Tennessee has a significant history in enrichment science and stable isotopes. ORNL’s establishment of this division will allow the Lab to continue addressing America’s needs in these areas and produce scientific advances that resonate for generations to come.”

Brian Anderson

Director, Enrichment Science and Engineering Division



Providing reliable domestic production of critical isotopes for national need

Isotope Processing and Manufacturing Division

The Isotope Processing and Manufacturing Division standardizes quality-controlled manufacturing processes for in-demand isotopes, reducing the United States' dependence on foreign suppliers.

ORNL produces, purifies, and ships more isotopes than any other place in the world – hundreds of isotopes used in medicine, research, industry and space exploration. Over the past decade, ORNL has developed the largest portfolio of radioisotope research, development and production for the Department of Energy's Isotope Program.

The Isotope Processing and Manufacturing Division was formed in June 2022 to streamline the routine manufacturing of isotopes into efficient, quality-controlled processes. Decades of world-class research and development have made routine manufacturing possible, and ORNL's unmatched experts and facilities ensure it's able to meet the nation's needs for isotopes now and in the future.

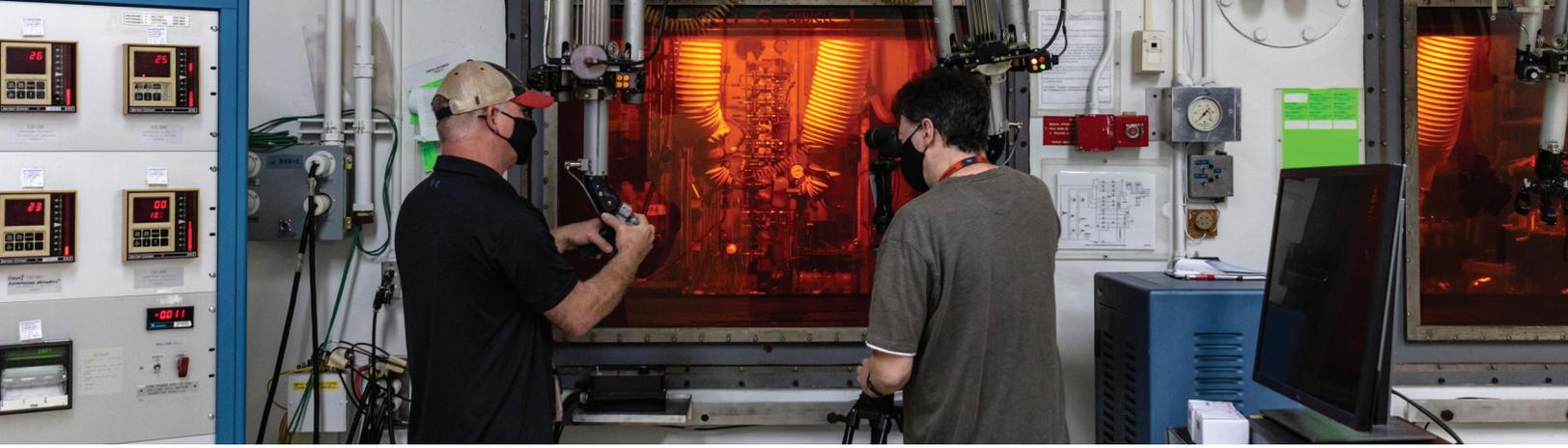
IPMD will work closely with research and development to continually improve manufacturing with new advances, once they've been tested and approved. This joint effort leverages ORNL's expertise in both production and R&D.



"We're making medical isotopes that are having a tremendous impact on improving people's health and well-being. When you receive letters from people whose lives were saved because of an isotope that we've made, that's indicative of the power, impact, and importance of our work."

Dr. Jim Placke

Director of Isotope Processing and Manufacturing Division (IPMD)



Meeting the nation's demands for nuclear science capabilities

Nonreactor Nuclear Facilities Division

ORNL has a unique complex of nuclear facilities to support the increasing demand for producing isotopes and developing nuclear fuels and materials. The Nonreactor Nuclear Facilities Division (NNFD) operates, maintains, and modernizes those facilities including infrastructure, staffing, and processes needed to support research and development.

The Lab's diverse research and development mission requires maintenance and regular updates to ORNL's nuclear facilities, which include hot and cold laboratories, glove boxes, high bays, and heavily shielded hot cells.

The Nonreactor Nuclear Facilities Division provides qualified staff to support this goal, protecting workers at the lab as well as the public. It oversees transportation of nuclear materials on site in support of the lab's missions. It provides safety support, through engineering designs for facility upgrades, evaluation of the methods used to implement research and development mission, Environmental, Safety, Health and Quality (ESH&Q) training, work control, and document control.

The Nonreactor Nuclear Facilities Division also develops strategic plans for the needed investments to keep the facilities going continuing the research and development necessary to meet the nation's nuclear materials and isotopes needs now and in the future.



"The ORNL facilities and their mission were conceived and constructed in an era of excellence that we still stand in awe of today. We seek to build on that legacy and continue the mission for generations to come."

Allen Smith

Director, Nonreactor Nuclear Facilities Division



Providing new options for science, medicine, industry, security

Radioisotope Science and Technology Division

The Radioisotope Science and Technology Division (RSTD) is a global leader in actinide science, delivering innovations in isotope production technology. Scientists at ORNL are continually improving radiochemical processing methods, guiding the lab in producing and rapidly delivering radioisotopes for science, medicine, industry, and security.

ORNL's historic expertise in nuclear materials processing and characterization and radioisotope production makes it a natural fit to research new uses for radioisotopes and develop better applications and processes.

ORNL's High Flux Isotope Reactor, shielded hot cells, and glove box laboratories make possible innovations in feedstock processing, target design and fabrication, safety assessments, target disassembly, and radiochemical science and engineering to purify products to meet sponsors' and customers' needs.

This includes radioisotopes needed for medical tests and treatments, research, and industrial applications. But it also applies to researching, developing, and deploying technology that enhances nuclear material and at-risk facilities, and expands national capabilities in radiation detection and nuclear forensics. For this work, scientists in the Radioisotope Science and Technology Division collaborate with the National Nuclear Security Administration, Department of Defense, Department of Homeland Security, Department of State, and other government agencies.



"Sometimes when you're a researcher, you do a lot of theoretical work — you do a calculation, and that's where it stops. It's really exciting to see the work you do actually makes something physical that you can see. We occasionally get letters from people overseas and elsewhere thanking us for supplying these materials to them. It makes you happy to be able to enable other people's work."

Susan Hogle

Director, Radioisotope Science and Technology Division