Isotope R&D and Production

Overview

The Office of Isotope R&D and Production (IRP) is championing the transformative potential of the Genesis Mission, Quantum Information Science (QIS), fusion energy, and critical materials management (CMM). This strategic alignment underscores a national commitment to asserting American energy dominance and ensuring unrivaled American leadership in critical and emerging technologies. IRP's dedicated efforts in isotope research and production are foundational to these initiatives, providing the essential materials that enable breakthroughs in areas such as advanced computing, next-generation energy systems, and secure supply chains.

IRP is strategically targeting growth related to isotope production and commercial availability, particularly in support of the Genesis Mission and the broader objective of American energy dominance, including responsiveness to relevant Executive Orders. Proactive engagement ensures that critical resources are available for developing advanced reactors and fuel cycles, enabling breakthroughs in QIS, and securing vital materials. Continued momentum in these areas has the potential to further accelerate U.S. progress and solidify global leadership.

IRP's core mission is to ensure a robust and secure domestic supply of isotopes vital for America's national security, scientific advancement, medical progress, and industrial competitiveness. As the nation's sole domestic provider for approximately 300 isotopes IRP is strategically reinforcing U.S. independence, fostering industry engagement, and fortifying infrastructure through dedicated research, robust operations, and the strategic transition of technology to the private sector. The FY 2027 budget request reflects a focused investment of $168.6 million, targeting high-impact isotope supply chain and advancing transformative technologies, from healthcare innovation to quantum computing.

Highlights of the FY 2027 Request

The IRP FY 2027 Request of $168.6 million, a decrease of $1.4 million below the FY 2026 Enacted level, reflects critical, forward-looking investments aligned with the Administration's vision for America's future. This request strategically integrates research, facility operations, and essential line-item construction projects to directly address high-impact critical isotope supply chains. These investments are pivotal for advancing transformative technologies across diverse sectors, including life-saving medical treatments, national security, semiconductor and microelectronics manufacturing, groundbreaking quantum computing, advanced energy systems like fission reactors and fusion machines, and next-generation power sources such as nuclear batteries and radioisotope power sources. These efforts directly support the Administration's Strategic Goals, particularly in asserting American energy dominance and ensuring unrivaled American leadership in critical and emerging technologies.

The FY 2027 IRP strategy is built on four foundational pillars. These pillars are designed to drive significant advancement and maximize impact:

R&D - Driving isotope innovation for national priorities: The FY 2027 Request reflects an $8.4 million decrease below the FY 2026 Enacted level. The IRP research portfolio strives to strategically deliver immediate and long-term advantages essential for national security and economic prosperity through research, development, demonstration and deployment of critical isotopes. IRP will prioritize core efforts that secure domestic supply chains for isotopes vital to national priorities, including advancements in cancer diagnosis and treatment, fusion energy, microelectronics, and quantum computing. High-priority research in artificial intelligence and machine learning to improve efficiencies and automation in isotope science and advanced manufacturing will benefit production capabilities. The Request maintains support for research to advance the production of isotopes for quantum computing and microelectronics, with a clear aim to strengthen the onshoring of manufacturing supply chains. As funding is available, strategic investments will continue to

advance and de-risk production and processing technologies, paving the way for future transitions to the private sector and fostering a vibrant commercial ecosystem**.**

Facility Operations - Securing domestic isotope production: The FY 2027 Request reflects an increase of $12.8 million above the FY 2026 Enacted level for direct investment in the Nation's self-reliance and energy security. In FY 2027, IRP will drive the ramp-up of new capabilities, significantly enhancing America's self-sufficiency in isotope production. A key focus will be on onshoring production for essential isotopes, thereby establishing new domestic production lines vital for national independence. Operations will continue to expand for a range of new capabilities, including the Stable Isotope Production Facility and multiple new electromagnetic ion separators. These strategic investments will support safe and reliable operations across production sites, empowering scientists and engineers to operate at needed capacity. Maintenance activities will be strategically prioritized based on critical needs to ensure continuous safe and reliable operations within available resources. Staffing will be maintained at the National Isotope Development Center (NIDC) to assess market needs and handle increasing interfaces with the stakeholder community. IRP will continue efforts to support priorities in energy dominance, and Project Genesis through growth in heavy water and helium-3 inventory and production of strontium-90, carbon-14, iridium-192, krypton-85, and americium-241, and californium-252.

Projects - Enhancing, expanding, and modernizing U.S. infrastructure: The FY 2027 Request reflects a decrease of $5.9M below the FY 2026 Enacted level and represents a targeted investment in enhancing, expanding, and modernizing critical U.S. infrastructure. Critical funding for the Radioisotope Processing Facility (RPF) will advance preliminary engineering design, a crucial step in establishing state-of-the-art radiochemical processing capabilities. Concurrently, the Stable Isotope Production and Research Center (SIPRC) will continue its rapid progress, establishing large-scale stable isotope enrichment capacity in the U.S. This is a monumental stride towards regaining a capability once lost, directly challenging foreign dominance, and mitigating U.S. dependence on sensitive foreign supply chains for vital isotopes. These efforts are foundational to building a secure, resilient, and independent domestic isotope supply.

Public Private Partnership - Strengthening industry interactions, collaborations, and partnerships: IRP investments will maximize output and enhance the reliability of production facilities through robust public-private partnerships. By fostering continuous engagement with stakeholders, the IRP actively cultivates new partnerships to support growth in the commercial isotope market. The IRP is proactively defining the needs and capabilities across federal and industrial facilities to establish clear lines of support for the efficient transition of isotopes into the commercial market. These partnerships are instrumental in strengthening existing capabilities, ensuring industry readiness to leverage from federal advancements, and paving a clear path for future commercial isotope production, thereby securing long-term national benefits.

Isotope R&D and Production
Funding

(dollars in thousands)

	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request	FY 2027 Request vs FY 2026 Enacted
Isotope R&D and Production				
Isotopes, Research	36,365	33,132	24,769	-8,363
Isotopes, Operations	80,371	77,368	90,203	+12,835
Subtotal, Isotope R&D and Production	**116,736**	**110,500**	**114,972**	**+4,472**
Construction				
20-SC-51 U.S. Stable Isotope Production and Research Center (SIPRC), ORNL	45,900	50,000	45,100	-4,900
24-SC-92 Clinical Alpha Radionuclide Producer (CARP), BNL	–	1,000	–	-1,000
24-SC-91 Radioisotope Processing Facility, ORNL	7,000	8,500	8,500	–
Subtotal, Construction	**52,900**	**59,500**	**53,600**	**-5,900**
Total, Isotope R&D and Production	**169,636**	**170,000**	**168,572**	**-1,428**

Basic and Applied R&D Coordination

IRP closely coordinates with various federal agencies, such as the National Aeronautics and Space Administration (NASA), the Department of Defense (DoD), the Office of the Director of National Intelligence (ODNI), the National Institute of Standards and Technology (NIST), the Federal Bureau of Investigations (FBI), the Department of Agriculture, the Department of Homeland Security (DHS), and the National Science Foundation (NSF), Food and Drug Administration (FDA). This collaboration ensures that critical isotopes are available for federal missions, industrial applications, and academic research. The IRP conducts a biennial Workshop on Federal Isotope Supply and Demand to anticipate and address evolving needs along with establishing an R&D path to meet those needs. In parallel, the IRP actively coordinates with industry stakeholders to understand market dynamics and support their evolving capabilities, ensuring a prepared and responsive domestic ecosystem for isotope production and processing.

The IRP leads the Interagency Group on He-3 to determine annual federal allocations from reserves. The IRP also collaborates with other DOE Offices on domestic supply chains of valuable isotopes, such as americium-241, He-3, heavy curium, strontium-90, promethium-147, and krypton-85.

Isotope R&D and Production

Description

Research

Research activities are the bedrock of IRP, driving both fundamental discoveries and applied solutions. IRP strategically funds core research at national laboratories and universities, fostering innovation in isotope production and related technologies. This encompasses stable and radioisotopes, competitive research opportunities, Office of Science initiatives, maintenance of core competencies in staff and equipment at university facilities, individual university research projects, and comprehensive workforce development. Core research focuses on identifying and developing new production pathways and enhancing the efficiency, reliability, and cost-effectiveness of existing processes. This work aims to ensure a stable, affordable, and accessible supply of critical isotopes for diverse applications, while strategically developing processes adaptable for future industrial scale-up

To position America atop the global isotope sector, IRP executes a world-leading research program focused on breakthrough isotope production, enrichment, and chemical separation technologies. It prioritizes the development of industrially adaptable processes for commercial scale-up. The program's isotope manufacturing and R&D activities yield significant collateral benefits through training and workforce development. These efforts cultivate future domestic expertise for industry and the national laboratories in nuclear medicine, accelerator science, nuclear engineering, nuclear physics, isotope enrichment, and radiochemistry – disciplines vital not only to isotope production and processing, but also to basic and applied nuclear and radiochemical science. Research and production activities develop and employ techniques and platform technologies in artificial intelligence (AI), machine learning (ML), autonomization, microelectronics, robotics, and advanced manufacturing, enhancing efficiency and exploring new frontiers.

IRP supports core research at Argonne National Laboratory (ANL), Brookhaven National Laboratory (BNL), Los Alamos National Laboratory (LANL), Oak Ridge National Laboratory (ORNL), and Pacific Northwest National Laboratory (PNNL) to conduct innovative research for novel or advanced production and chemical separation techniques for critical isotopes. Core research support is also provided to the University Isotope Network (UIN) institutions, which are essential for strengthening domestic supply chains and fostering national research competitiveness while playing a key role in workforce development. The UIN is currently comprised of the University of Washington (UW) Medical Cyclotron Facility, the University of Missouri Research Reactor (MURR), FRIB Isotope Harvesting at Michigan State University (MSU), University of Alabama-Birmingham (UAB), University of Wisconsin-Madison (UWM), and Texas A&M University (TAMU). These universities have unique capabilities: UW and TAMU operate multi-particle cyclotrons, highlighted by the development of full-scale production of the alpha-emitter astatine-211 for cutting-edge cancer therapy, and the UW cyclotron distributes a variety of isotopes and provides crucial target fabrication expertise for the UIN. MURR boasts the highest flux university research reactor in the United States and recognized expertise in current Good Manufacturing Practices (cGMP) protocols, making it invaluable for IRP's production and processing of critical isotopes such as lutetium-177 for cancer therapy research, gadolinium-153 for brachytherapy, nuclear medicine imaging, and Single-Photon Emission Computed Tomography (SPECT) myocardial perfusion imaging, and terbium-161 for cancer treatment. The UAB cyclotron features four beamlines and associated target stations to produce a variety of radioisotopes, as well as specialized hot cells for preparation of human-use and preclinical radiopharmaceuticals. At Michigan State University, the innovative FRIB Isotope Harvesting project repurposes unwanted waste from nuclear physics research into valuable research assets.

A key priority for IRP is fostering a strong national core competency in stable isotope enrichment. Enriched stable isotopes are foundational for numerous applications, including the production of all radioisotopes, which are vital in medicine, industry, and research. The production of each enriched stable isotope requires an intense

research campaign. The program provides core research funding for stable isotopes to ORNL and supports machine design optimized for production of isotopes of interest for quantum computing as part of the SC QIS Initiative. Similarly, support through the SC initiatives also promotes growth in radioisotope development. Participation in the Microelectronics initiative enables production of isotopes needed for semiconductors and microelectronics manufacturing, particularly for critical defense applications (e.g., krypton-85 for electronics testing, deuterium for performance).

The IRP's competitive research funding supports universities and national laboratories, specifically research to develop novel isotopes of interest to U.S. stakeholders and establish secure domestic isotope supply chains, with a strategic emphasis on developing processes and technologies that can be matured and transferred to the private sector for commercial production. For example, IRP is working to develop technology to detritiate legacy heavy water at Savannah River National Laboratory (SRNL). Other examples of competitive research topics include the production of isotopes for next-generation advanced fission reactors and fusion reactors, innovative medical isotopes, new sources of helium-3, rare isotopes for nuclear forensics, critical nuclear data measurements, radioisotope enrichment technology, advanced targetry, modular automated systems, and robotics. Support for AI/ML enables growth in areas to facilitate more effective techniques for highly cumbersome isotope production processes, and to promote modern solutions to increase efficiencies and opportunities.

Another high priority research area is the development of transformative medical isotopes for enhanced disease diagnosis and treatment, with the ultimate goal of reducing cancer mortality. There is escalating global interest in alpha and beta emitters for revolutionary cancer and infectious disease therapy and diagnostics. The IRP is often the sole global source for many of these isotopes or leading the way in innovative research and manufacturing to make them available.

IRP supports training and development opportunities for students and post-docs to foster a vibrant workforce for isotope production and to advance workforce capabilities.

IRP invests in the Nation's future nuclear chemistry and biomedical researchers through support for the Nuclear Chemistry Summer School (NCSS) program. The NCSS, also supported by SC's Basic Energy Sciences (BES) and Nuclear Physics (NP) programs, consists of an intensive six-week program of formal accredited lectures on the fundamentals of nuclear science, radiochemistry, and their applications in related fields, supplemented by laboratory practicums focusing on state-of-the-art instrumentation and technology used routinely in basic and applied nuclear science.

Facility Operations

IRP supports activities at National Laboratories related to reactor, accelerator, and enrichment facilities. This support encompasses expert staff for managing, operating, and maintaining facilities and equipment for isotope production and enrichment. Strategic investments ensure safe, cost-effective, and reliable operations. The program also supports equipment for chemical processing (e.g., hot cells and glove boxes), pre-operations of stable isotope equipment, inventory management and dispensing, advanced manufacturing capabilities, operations support and assembly, and the National Isotope Development Center (NIDC).

As a critical function of the Department, IRP strategically manages the irradiation of targets, using particle accelerators and nuclear research reactors across national laboratories and domestic universities. Following irradiation, these targets undergo specialized chemical processing within dedicated radiological or nuclear facilities, equipped with sophisticated equipment, to extract radioisotopes of critical interest. In addition to the direct production of these isotopes, the IRP also recovers radioisotopes from legacy waste streams, used nuclear fuel, and existing inventories, achieving the dual benefit of reducing waste volumes while generating valuable products.

Furthermore, IRP manages the national repository of stable isotopes, a legacy of the Manhattan Project's calutrons. The limited nature of this inventory increases the United States' reliance on foreign suppliers for crucial materials. The IRP is dedicated to developing modern stable isotope enrichment capabilities, revitalizing domestic manufacturing, replenishing critical inventories, and fostering U.S. economic resilience, prosperity, competitiveness, and self-reliance. IRP also serves as the steward of national isotope inventories beyond DOE's legacy repository, including helium-3 (He-3), vital for a multitude of applications including cryogenics, quantum information science, fusion energy research, and national security.

The IRP network of facilities produces a diverse range of isotopes:

- Accelerators: The Isotope Production Facility (IPF) at LANL, the Brookhaven Linac Isotope Producer (BLIP) facility at BNL, and the Low Energy Accelerator Facility (LEAF) at ANL are key assets. These proton and electron accelerators provide continuous year-round availability of medical radioisotopes. The IPF operates in conjunction with the National Nuclear Security Administration (NNSA) Los Alamos Neutron Science Center (LANSCE), while BLIP operates with the Relativistic Heavy Ion Collider, which will transition to the Electron Ion Collider. BNL also operates the MIRP cyclotron for specialized medical isotopes and isotopes for fundamental research. ANL's LEAF, the program's only electron accelerator, provides unique pathways for producing essential medical radioisotopes.

- Research Reactors: The IRP leverages the capabilities of three research reactors: the High Flux Isotope Reactor (HFIR) at ORNL, the Advanced Test Reactor (ATR) at INL, and the University of Missouri Research Reactor (MURR). These reactors contribute to isotope production, and related chemical processing and handling equipment is supported at each site.

- Chemical Processing: Processing capabilities are supported at PNNL for isotopes like strontium-90, radium-226, krypton-85, and lead-212. At INL, the ATR ensures a reliable domestic supply of cobalt-60. At the Y-12 National Security Complex, the IRP supports the preparation and packaging of lithium isotopes and uranium-235, while americium-241 is recovered from NNSA plutonium processes at LANL. Helium-3 is extracted from NNSA-owned tritium beds at the Savannah River Site, and the radioisotope separator at INL enriches radioisotopes for nuclear forensics.

- Enrichment Technologies: Individual electromagnetic ion separators are assembled and operated at ORNL. Thermal diffusion enrichment capabilities are operated at PNNL. IRP-supported research demonstrated the feasibility of new Electromagnetic Isotope Separation (EMIS) and gas centrifuge (GC) technologies and re-established a prototype general enriched stable isotope production capability in the U.S. The Stable Isotope Production Facility (SIPF) Major Item of Equipment (MIE) at ORNL established the first full-scale GC cascade to enrich stable isotopes. The implementation of SIPF is beginning transition to routine operations to produce enriched xenon-129 in FY 2026.

The NIDC, located at ORNL, manages IRP business operations, including sales, contract negotiations, marketing assessments, public outreach, quality control, packaging, and transportation. It facilitates regular and frequent interfaces between IRP and industrial, academic, and medical communities to ensure that strategies are evidence-based and informed by stakeholder interactions, including critical engagement to facilitate the readiness of industry to undertake future domestic isotope production and processing. In particular, the IRP biennially canvasses the broad federal community for isotope demands to align priorities with evidence-based program evaluations.

The IRP is the sole domestic supplier of over 300 isotopes for the Nation, supporting national security, medical, industry and R&D. Some examples of how these isotopes impact America:

- Cancer therapy and imaging diagnostics: actinium-225, actinium-227, astatine-211, cerium-134, scandium-47, scandium-44, holmium-166m, gadolinium-153, tungsten-188, lutetium-177, strontium-89, strontium-90, tin-117m, vanadium-48, manganese-52, manganese-54, gold-199, terbium-161, cobalt-55, and cobalt-60
- Cancer and infectious disease therapy and research: bismuth-213, lead-212, lead-203, astatine-211, copper-67, thorium-227, thorium-228, radium-223, and radium-224
- Pharmaceutical and agrochemical applications: carbon-14
- Feedstock for isotopes that treat prostate cancer: ytterbium-176, radium-226
- Nuclear forensics: neptunium-236
- Explosives detection and nuclear batteries: nickel-63
- Neutron detectors for homeland security applications and fusion research: lithium-6
- Cryogenics and radiation detection: helium-3
- Industrial radiography: iridium-192, selenium-75
- Nuclear reactor start-up, oil and gas exploration and production well logging: californium-252
- Quantum computing research, medical standards, and industrial sources: barium-133
- Microelectronics manufacturing and quality control: krypton-85
- Nuclear batteries and power sources: strontium-90, promethium-147, americium-241, and thulium-170
- Use as targets for discovery of new super heavy elements: berkelium-249, americium-243, uranium-238, plutonium-242, plutonium-244, californium-249, californium-251, einsteinium-254, and curium-248
- Heavy element chemistry research: fermium-257
- Oceanography modeling: silicon-32
- Quantum memory: ytterbium-171

Developing an economically and technically viable commercial market for an isotope can take decades. The IRP is proactively working to grow its R&D capabilities to de-risk and accelerate this transition. Through strategic research in production methodologies, advanced chemical separations, and innovative enrichment techniques, IRP is working to develop processes that are not only efficient but also readily adaptable for industrial scale-up. This commitment to early-stage process optimization and technological maturity is critical for fostering a seamless hand-off to the private sector, ensuring a seamless transition that does not disrupt isotope supply or hinder ongoing research. IRP remains dedicated to working closely with industry to commercialize promising technologies and promote the growth of independent domestic producers. Once domestic commercial production is established, IRP ceases production to avoid competition with the private sector, as was historically illustrated by strontium-82 for cardiac heart imaging and germanium-68 for medical diagnostics.

As a Mission Essential Function for the DOE Office of Science, IRP maintains operations of production facilities and management of national inventories to effectively mitigate disruptions in isotope supply chains during national emergencies. Revenue generated from isotope customer sales directly supports the production and distribution of isotopes, fostering sustainable program for continuity of operations.

Projects

IRP is strategically executing two line-item construction projects to strengthen U.S. isotope supply chains and reduce dependence on foreign countries. The Stable Isotope Production and Research Center (SIPRC) project will re-establish large-scale stable isotope enrichment in the United States and the Radioisotope Processing Facility (RPF) will address the critical need for modernized nuclear and radiochemistry capabilities.

Activities and Explanation of Changes

(dollars in thousands)

FY 2026 Enacted	FY 2027 Request	Explanation of Changes FY 2027 Request vs FY 2026 Enacted
Isotope R&D and Production **$170,000**	**$168,572**	**-$1,428**
Isotopes, Research $33,132	$24,769	-$8,363
Funding supports the highest priority R&D activities at national laboratories, focused on urgently establishing domestic supply chains to establish U.S. independence and mitigate disruptions caused by geopolitical events. Competitive research at domestic universities are prioritized based on alignment with Administration priorities and available funding. The UIN continues to produce high-priority research, “boutique” radioisotopes, and isotopes to address urgent domestic needs The recently completed FRIB Isotope Harvesting Project achieves routine operations. Funding continues efforts to develop isotopes for quantum computing and to strengthen the domestic supply chain for microelectronics manufacturing, and support advances in AI/ML to enhance the efficiency of isotope production processes. Funding supports the ramp up the recovery of heavy curium from the Mark 18-A targets.	The Request will strategically direct resources to maintain support for the most critical activities. While these investments will help secure immediate national needs, this R&D funding will provide the foundational groundwork for future industrial transition of isotope production and processing. Approximately 15% of total IRP funding will support essential research and development (R&D) at national laboratories and universities, focusing on high-priority needs like quantum computing isotopes, microelectrons supply chains and leveraging AI/ML for enhanced efficiency.	The Request will support strategic investments for IRP core mission capabilities. Funding will prioritize the foundational R&D essential for continuous, safe, and effective isotope production, and for securing critical supply chains against immediate disruptions.

(dollars in thousands)

FY 2026 Enacted	FY 2027 Request	Explanation of Changes FY 2027 Request vs FY 2026 Enacted
Isotopes, Operations $77,368	$90,203	+$12,835
The Request supports facility operations at all production facilities and processing sites with an emphasis on addressing gaps in high priority isotope supply chains. Prioritized investments are supporting targeted modernization and refurbishment activities to enhance operational safety, robustness, and reliability. The funding sustains support for the MIRP Facility, which produces and processes isotopes used for cancer treatments and fundamental research, and new units of EMIS to enrich stable isotopes in short supply as they transition to routine operations. Staffing is maintained at NIDC to manage growing interfaces with stakeholders.	The Request will support facility operations at all production and processing sites, with a primary emphasis on addressing critical isotope supply gain gaps. Prioritized investments will support growth of key new capabilities such as the Stable Isotope Production Facility and electromagnetic ion separators, enriching stable isotopes in short supply. Staffing for the National Isotope Development Center will remain fully supported to manage growing stakeholder interfaces, ensuring maximum impact on immediate national needs and fostering long-term innovation and industrial growth.	Funding will increase to support new production capabilities and bolster critical supply chains for isotope production, ensuring growing a stable and reliable supply of urgently needed materials. Maintenance activities will be strategically prioritized based on critical needs to ensure continuous safe and reliable operations within available resources.

Description

The Isotope Research & Development and Production Program (IRP) collaborates with federal agencies and industry to secure American isotope independence and mitigate disruptions across critical isotope supply chains. To support this, IRP invests in new capabilities through construction projects that support the Administration's strategy to ensure U.S. leadership in critical technologies. These new facilities will enable enhanced U.S. self-reliance through innovative research and development, increased processing capability, and expanded production of critical isotopes, including those not available elsewhere. Currently, IRP offers a catalog of 300 isotopes as the sole domestic supplier.

IRP strategically executes two line-item construction projects:

24-SC-91, Radioisotope Processing Facility (RPF)

The Radioisotope Processing Facility (RPF) at Oak Ridge National Laboratory (ORNL) is a pivotal investment to secure America's critical supply chains, mitigate dependence on geopolitical sensitive countries, and meeting U.S. demand for isotopes essential to national defense, space exploration, energy security, and next generation medical treatments. Expanding U.S. radioisotope chemical processing and development capacity is crucial to bolster domestic supply chains and unleash innovative R&D that underpins Administration priorities. The RPF is planned as a Hazard Category 2 nuclear facility, equipped to process the higher specific activity targets that are irradiated in a reactor, such as the High Flux Isotope Reactor (HFIR) at ORNL. Current chemical processing capabilities are aged and at capacity, limiting the ability of the U.S. to onshore isotope supply chains and meet U.S. demand. The RPF will address this lack of available radiochemical processing equipment and modernize U.S. capabilities. RPF's modular design further allows flexible reconfiguration to meet evolving radioisotope needs without costly facility modifications. The RPF's modernized, flexible infrastructure will provide significant opportunities for strategic public-private partnerships, enabling industry to access cutting-edge processing capabilities. This active engagement will accelerate industry's expansion within the domestic market, fostering a robust and resilient U.S. supply chain that is essential for long-term economic prosperity.

The RPF received CD-0, Approve Mission Need, approval on April 29, 2021, and CD-1, Approve Alternative Selection and Cost Range, approval on February 26, 2026. The total cost range is projected at $510,000,000 to $900,000,000. This range reflects enhanced understanding of design parameters and nuclear safety protocols achieved during the conceptual design. This, combined with evolving market costs associated with specialized radiochemical equipment, has led to adjustments in both budget and timeline to maintain optimal alignment with mission objectives. The project is assessing the impacts to estimated costs and schedule from available funding, inflation, and supply chain constraints since project initiation.

20-SC-51, U.S. Stable Isotope Production and Research Center (SIPRC)

The Stable Isotope Production and Research Center (SIPRC) at ORNL is a foundational project for asserting American leadership in critical and emerging technologies, including quantum information science and fusion energy. It will reestablish versatile, large-scale stable isotope enrichment capacity in the United States. Given that Russia is the major producer of most stable isotopes, and China is a rapidly emerging leader, SIPRC is strategic for national and economic security. Once constructed, SIPRC will provide a secure supply of stable isotopes that are catalysts for American industry, next-generation medicine, and groundbreaking research, directly supporting the Administration's vision for a secure and prosperous nation.

SIPRC received CD-1, Approve Alternative Selection and Cost Range, and Subproject 1 CD-3A, Approve Long Lead Procurement, approvals on November 4, 2021. The project received approval for Subproject 1 CD-3B, Approve Long Lead Procurement, on July 19, 2023. Subproject 1, Facility and EMIS, received approval for

CD-2, Approve Performance Baseline as well as CD-3, Approve Start of Construction, on March 15, 2024. The project received approval for Subproject 2 CD-3A, Approve Long Lead Procurement, on March 24, 2026. The Total Project Cost (TPC) point estimate is $325,000,000 with a preliminary TPC range of $187,000,000 to $338,000,000, approved at CD-1.

Activities and Explanation of Changes

(dollars in thousands)

FY 2026 Enacted	FY 2027 Request	Explanation of Changes FY 2027 Request vs FY 2026 Enacted
Construction **$59,500**	**$53,600**	**-$5,900**
24-SC-91, Radioisotope Processing Facility (RPF) $8,500	$8,500	$ —
Funding supports TEC of the RPF at ORNL. RPF will address a lack of available radiochemical processing infrastructure for reactor target processing which inhibits production of critical isotopes. RPF continues and mitigates U.S. dependence on foreign radioisotope supply chains.	The Request will support addressing radiochemical processing infrastructure for reactor target processing, modernize our production capabilities, and position the Department for strategic public private partnerships. This facility will mitigate U.S. dependence on foreign radioisotope supply chains.	Funding will support preliminary engineering design.
20-SC-51, U.S. Stable Isotope Production and Research Center (SIPRC) $50,000	$45,100	-$4,900
Funding continues design and construction of the U.S. SIPRC at ORNL, according to project plans, to provide large scale stable isotope production capacity for the Nation and mitigate U.S. dependence on foreign capabilities.	Funding will continue design and construction of the U.S. SIPRC at ORNL according to project plans. SIPRC will re-establish large-scale stable isotope production capacity for the Nation and mitigate U.S. dependence on foreign capabilities.	The funding decrease will prioritize construction activities through TEC funding as design activities come to a close.
24-SC-92, Clinical Alpha Radionuclide Producer (CARP) $1,000	$ —	-$1,000
CARP is currently on a strategic pause and funds are requested to be reprogrammed to higher priority activities.	No funding requested in FY 2027.	CARP is paused and funds are redirected to higher priority activities.

Isotope R&D and Production
Capital Summary

(dollars in thousands)

	Total	Prior Years	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request	FY 2027 Request vs FY 2026 Enacted
Capital Operating Expenses						
Capital Equipment	N/A	N/A	8,082	767	7,002	+6,235
Total, Capital Operating Expenses	**N/A**	**N/A**	**8,082**	**767**	**7,002**	**+6,235**

Isotope R&D and Production
Construction Projects Summary

(dollars in thousands)

	Total	Prior Years	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request	FY 2027 Request vs FY 2026 Enacted
24-SC-91, Radioisotope Processing Facility (RPF), ORNL						
Total Estimated Cost (TEC)	834,000	8,500	7,000	8,500	8,500	-
Other Project Cost (OPC)	65,406	14,600	-	-	-	-
Total Project Cost (TPC)	**899,406**	**23,100**	**7,000**	**8,500**	**8,500**	**-**
24-SC-92, Clinical Alpha Radionuclide Producer (CARP), BNL						
Total Estimated Cost (TEC)	2,000	1,000	-	1,000	-	-1,000
Other Project Cost (OPC)	2,085	2,085	-	-	-	-
Total Project Cost (TPC)	**4,085**	**3,085**	**-**	**1,000**	**-**	**-1,000**
20-SC-51, U.S. Stable Isotope Production and Research Center (SIPRC), ORNL						
Total Estimated Cost (TEC)	289,800	131,900	45,900	50,000	45,100	-4,900
Other Project Cost (OPC)	5,600	3,200	-	-	600	+600
Total Project Cost (TPC)	**295,400**	**135,100**	**45,900**	**50,000**	**45,700**	**-4,300**
Total, Construction						
Total Estimated Cost (TEC)	**1,125,800**	**141,400**	**52,900**	**59,500**	**53,600**	**-5,900**
Other Project Cost (OPC)	**73,091**	**19,885**	**-**	**-**	**600**	**+600**
Total Project Cost (TPC)	**1,198,891**	**161,285**	**52,900**	**59,500**	**54,200**	**-5,300**

Notes:

- *The Radioisotope Processing Facility (RPF) point estimate is $640,000,000; the estimated TPC is displayed at the upper TPC range of $899,406,000 because RPF is not yet baselined. The complete estimated TPC (based on upper TPC range) does not include $594,000 in OPC funding included in the Nuclear Physics program for prior years. The complete estimated cost of the TPC (upper range) for RPF, combining the Nuclear Physics and Isotope R&D and Production funding, is $900,000,000. This project is not baselined and the TPC estimates are currently being re-evaluated to consider available funding, supply chain challenges, and inflation since initiation.*

- *The preliminary TPC for the U.S. Stable Isotope Production and Research Center (SIPRC) of $295,400,000 does not include $29,600,000 ($24,000,000 TEC and $5,600,000 OPC) included in the Nuclear Physics program for prior years. The complete preliminary total for SIPRC, combining the Nuclear Physics and Isotope R&D and Production funding, is $325,000,000. For SIPRC, Subproject 1 is baselined; Subproject 2 and Subproject 3 are not yet baselined.*

- *The Clinical Alpha Radionuclide Producer (CARP) was put on a strategic hold in FY 2025. All remaining funds have been requested to be reprogrammed to higher priority program activities.*

Isotope R&D and Production
Scientific Employment

	FY 2025 Enacted	FY 2026 Enacted	FY 2027 Request	FY 2027 Request vs FY 2026 Enacted
Number of Permanent Ph.Ds (FTEs)	55	55	41	-14
Number of Postdoctoral Associates (FTEs)	27	27	16	-11
Number of Graduate Students (FTEs)	26	26	14	-12
Number of Other Scientific Employment (FTEs)	240	240	235	-5
Total Scientific Employment (FTEs)	**348**	**348**	**306**	**-42**

Note:
- *Other Scientific Employment (FTEs) includes technicians, engineers, computer professionals, and other support staff.*

24-SC-91, Radioisotope Processing Facility (RPF)
Oak Ridge National Laboratory, ORNL
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary

The FY 2027 Request for the Radioisotope Processing Facility (RPF) is $8,500,000 of Total Estimated Cost (TEC) funding. The CD-1 preliminary Total Project Cost (TPC) point estimate is planned at $640,000,000 with a TPC range of $510,000,000 to $900,000,000.

Significant Changes

This project data sheet (PDS) is an update of the FY 2026 PDS; this project is not a new start in FY 2027. The most recent DOE Order 413.3B approved CD is CD-1, Approve Alternative Selection and Cost Range, which was approved on February 26, 2026, 2021.

The FY 2027 Request will provide support for continuing limited preliminary engineering design for both the facility and the innovative modular hot cell approach. These design activities are driven by the strategic imperative to ensure the uninterrupted production of key radioisotopes while supporting the clean-out and planned decommissioning of legacy nuclear facilities. This project will strategically position the United States to decisively mitigate foreign isotope dependencies and will facilitate the development of mature processes for emerging isotopes, thereby bolstering the domestic industrial base and securing essential supply chains, including those for critical minerals. In FY 2025, the project cost and schedule increased due to impacts from supply chain constraints and advances in design maturity but remained stable since that time. The resulting cost range, schedule, and technical scope has been, and will continue to be thoroughly assessed and validated through multiple evidence-based independent peer reviews.

A Federal Project Director (FPD) with certification Level III has been assigned to RPF.

Critical Milestone History

Fiscal Year	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	CD-4
FY 2027	4/29/21	2Q FY 2026	2/26/26	3Q FY 2031	3Q FY 2031	3Q FY 2031	2Q FY 2040

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range; **Conceptual Design Complete** – Actual date the conceptual design was completed (if applicable); **CD-1** – Approve Alternative Selection and Cost Range; **CD-2** – Approve Performance Baseline; **Final Design Complete** – Estimated/Actual date the project design will be/was complete(d); **CD-3** – Approve Start of Construction; **D&D Complete** – Completion of D&D work; **CD-4** – Approve Start of Operations or Project Closeout.

Fiscal Year	Performance Baseline Validation	CD-3A	CD-3B
FY 2027	2Q FY 2030	1Q FY 2029	3Q FY 2030

CD-3A – Approve Long-Lead Procurements (Early Site Preparation)
CD-3B – Approve Long-Lead Procurements (Modular Hot Cell Fabrication)CD-

Project Cost History

This project has a preliminary point estimate of $640,000,000 and a corresponding TPC range of $510,000,000 to $900,000,000; the PDS is written to the upper limit of the TPC range as the project is not baselined. No construction, excluding approved long-lead procurement, will be performed until the project performance baseline has been validated and CD-3 has been approved.

(dollars in thousands)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, Total	TPC
FY 2026	79,000	755,000	834,000	66,000	66,000	900,000
FY 2027	79,000	755,000	834,000	66,000	66,000	900,000

Notes:
- *This project has not received CD-2 approval; therefore, funding estimates are preliminary.*
- *Since project is at CD-0, the funding estimates correlate to the upper end of the estimated TPC range.*

2. Project Scope and Justification

Scope

The scope of this project includes design and construction of a new 90,000 square foot Hazard Category 2 radioisotope processing facility, and the specialized equipment for chemically processing radioisotopes, with particular focus on irradiated reactor targets. RPF will be a purely technical facility (i.e., minimal office and staff amenities) dedicated to research and operations and located on the Oak Ridge National Laboratory (ORNL) main campus. The design is planned to support up to eight new radioisotope processing bays and be equipped with sufficient hot cells grouped to support new product lines and research and development activities intended to scale production to meet U.S. demand. Facility design concepts will include separate bays needed to support reconfigurable heavy shielding for transloading of irradiated targets and waste handling and storage of radioactive materials. The facility will be designed to incorporate other operations required to successfully produce isotopes such as staging and repair of manipulators and other equipment as well as the supporting infrastructure necessary for efficient operations such as cranes to assist in moving casks within the facility. Construction of the proposed facility will also integrate safety-by-design, quality-by-design, and safeguards-by-design standards to ensure safe and efficient future operations.

Justification

The RPF supports the nation's strategy to secure critical supply chains, mitigate dependence on geopolitically sensitive countries, and meet U.S. demand for isotopes essential to national defense, American energy dominance, and life-saving medical treatments. To bolster domestic supply chains and unleash innovative R&D, expanding U.S. radioisotope chemical processing and development capacity is crucial. The RPF is planned as a Hazard Category 2 nuclear facility, equipped to process the higher specific activity targets. Current radiochemical processing capabilities are aged and at capacity, constraining America's ability to

onshore critical supply chains and meet surging domestic demands. The RPF directly addresses this capability gap by providing a modernized state-of-the-art facility. Its innovative modular design ensures flexible reconfiguration to meet evolving national needs without costly modifications, guaranteeing long-term value and adaptability.

This modernized infrastructure, combined with its inherent flexibility, will also provide significant opportunities for strategic public-private partnerships. Such collaborations will enable industry to access cutting-edge processing capabilities, leverage national laboratory expertise, and reduce the high capital investment required for such complex operations. This active engagement will help accelerate industry's expansion within the domestic market, fostering robust and resilient U.S. supply chains essential for national and economic security.

The project is being conducted in accordance with the project management requirements in DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, and all appropriate project management requirements will be met.

Key Performance Parameters (KPPs)

Preliminary Key Performance Parameters (KPPs) are defined at CD-1 and may change as each subproject continues towards CD-2, Approve Performance Baseline. CD-1 approval was received February 26, 2026. At CD-2 approval, the KPPs will be baselined. The Threshold KPPs represent the minimum acceptable performance that the project must achieve. The Objective KPPs represent the desired project performance. Achievement of the Threshold KPPs will be a prerequisite for approval of CD-4, Project Completion.

Performance Measure	Threshold	Objective
Design/construct building	TBD	TBD
Instrumentation design/development	TBD	TBD

3. Financial Schedule

(dollars in thousands)

	Budget Authority (Appropriations)	Obligations	Costs	IRA Supp. Costs
Total Estimated Cost (TEC)				
Design (TEC)				
Prior Years	8,500	8,500	—	—
FY 2025	7,000	7,000	—	—
FY 2026	8,500	8,500	18,000	—
FY 2027	8,500	8,500	13,000	—
Outyears	46,500	46,500	48,000	—
Total, Design (TEC)	**79,000**	**79,000**	**79,000**	**—**
Construction (TEC)				
Outyears	755,000	755,000	755,000	—
Total, Construction (TEC)	**755,000**	**755,000**	**755,000**	**—**
Total Estimated Cost (TEC)				

(dollars in thousands)

	Budget Authority (Appropriations)	Obligations	Costs	IRA Supp. Costs
Total Estimated Cost (TEC)				
Prior Years	8,500	8,500	—	—
FY 2025	7,000	7,000	—	—
FY 2026	8,500	8,500	18,000	—
FY 2027	8,500	8,500	13,000	—
Outyears	801,500	801,500	803,000	—
Total, Total Estimated Cost (TEC)	**834,000**	**834,000**	**834,000**	**—**

(dollars in thousands)

	Budget Authority (Appropriations)	Obligations	Costs	IRA Supp. Costs
Other Project Cost (OPC)				
Prior Years	4,594	4,594	3,450	–
Prior Years - IRA Supp.	10,600	10,600	–	8,178
FY 2025	–	–	439	1,319
FY 2026	–	–	705	1,103
Outyears	50,806	50,806	50,806	–
Total, Other Project Cost (OPC)	**66,000**	**66,000**	**55,400**	**10,600**

(dollars in thousands)

	Budget Authority (Appropriations)	Obligations	Costs	IRA Supp. Costs
Total Project Cost (TPC)				
Prior Years	13,094	13,094	3,450	–
Prior Years - IRA Supp.	10,600	10,600	–	8,178
FY 2025	7,000	7,000	439	1,319
FY 2026	8,500	8,500	18,705	1,103
FY 2027	8,500	8,500	13,000	–
Outyears	852,306	852,306	853,806	–
Total, TPC	**900,000**	**900,000**	**889,400**	**10,600**

Note:

- *Since project is still at CD-0, the funding estimates in the tables above correlate to the upper end of the estimated TPC range.*

4. Details of Project Cost Estimate

(dollars in thousands)

	Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total Estimated Cost (TEC)			
Design	59,000	59,000	**N/A**
Design - Contingency	20,000	20,000	**N/A**
Total, Design (TEC)	**79,000**	**79,000**	**N/A**
Construction_No_Detail	500,000	500,000	**N/A**
Construction Contingency	255,000	255,000	**N/A**
Total, Construction (TEC)	**755,000**	**755,000**	**N/A**
Total, TEC	**834,000**	**834,000**	**N/A**
Contingency, TEC	*275,000*	*275,000*	***N/A***
Other Project Cost (OPC)			
Conceptual Design	15,194	15,194	**N/A**
Start-up	33,000	33,000	**N/A**
OPC - Contingency	17,806	17,806	**N/A**
Total, Except D&D (OPC)	**66,000**	**66,000**	**N/A**
Total, OPC	**66,000**	**66,000**	**N/A**
Contingency, OPC	*17,806*	*17,806*	***N/A***
Total, TPC	**900,000**	**900,000**	**N/A**
Total, Contingency (TEC+OPC)	***292,806***	***292,806***	***N/A***

Note:

- *Since project is at CD-0, the funding estimates correlate to the upper end of the estimated TPC range.*

5. Schedule of Appropriations Requests

(dollars in thousands)

Fiscal Year	Type	Prior Years	FY 2025	FY 2026	FY 2027	Outyears	Total
FY 2026	TEC	8,500	7,000	7,000	—	811,500	834,000
	OPC	15,194	—	—	—	50,806	66,000
	TPC	23,694	7,000	7,000	—	862,306	900,000
FY 2027	TEC	8,500	7,000	8,500	8,500	801,500	834,000
	OPC	15,194	—	—	—	50,806	66,000
	TPC	23,694	7,000	8,500	8,500	852,306	900,000

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy	2Q FY 2040
Expected Useful Life	—
Expected Future Start of D&D of this capital asset	—

Related Funding Requirements
(dollars in thousands)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	**Current Total Estimate**	**Previous Total Estimate**	**Current Total Estimate**
Operations	N/A	TBD	N/A	TBD
Utilities	N/A	TBD	N/A	TBD
Maintenance and Repair	N/A	TBD	N/A	TBD
Total, Operations and Maintenance	N/A	TBD	N/A	TBD

7. D&D Information

	Square Feet
New area being constructed by this project at ORNL	~90,000
Area of existing facility(ies) being replaced	0
Area of any additional D&D space to meet the "one-for-one" requirement	0

8. Acquisition Approach

The ORNL Management and Operating (M&O) contractor, UT Battelle, will perform the acquisition for this project, overseen by the DOE Oak Ridge National Laboratory Site Office. The M&O contractor will consider various acquisition approaches and project delivery methods and will be responsible for awarding and administering all subcontracts related to this project. SC will evaluate the M&O contractor's performance through the annual laboratory performance appraisal process.

SC and the M&O will draw from lessons learned from other SC projects and other similar facilities in planning and executing the project.

20-SC-51, U.S. Stable Isotope Production and Research Center (SIPRC)
Oak Ridge National Laboratory, ORNL
Project is for Design and Construction

1. Summary, Significant Changes, and Schedule and Cost History

Summary

The FY 2027 Request for the U.S. Stable Isotope Production and Research Center (SIPRC) is $45,100,000 of Total Estimated Cost (TEC) funding and $600,000 of Other Project Costs (OPC). The current Total Project Cost (TPC) point estimate is $325,000,000 with a preliminary TPC range of $187,000,000 to $338,000,000.

Significant Changes

This project data sheet (PDS) is an update of the FY 2026 PDS; the project is not a new start in FY 2027. The most recent DOE Order 413.3B approved Critical Decisions (CD) for SIPRC is CD-1, "Approve Alternative Selection and Cost Range", approved on November 4, 2021. Additionally, the most recent CD approvals for SIPRC Subproject 1 (SP1) are CD-3B, "Approve Long-Lead Procurements" approved on July 19, 2023; and CD-2/3, "Approve Performance Baseline and Approve Start of Construction" approved on March 15, 2024, which authorized the start of SP1 construction-related activities. The project received CD-3A approval for SP2 on March 24, 2026. CD-2/3 for SP3 anticipated in 2Q FY 2027 and SP2 in 3Q FY 2027.

The FY 2027 Request will support construction activities that include completing funding for conventional construction activities and procurement of electromagnetic isotope separation (EMIS) equipment, as well as supporting the start of construction activities for SP2 and SP3. OPC funding is included and supports pre-operational activities for SP1 as the EMIS equipment transitions to Operations in early FY 2028. To significantly increase IRP's stable isotope research capacity, the scope of Subproject 3 (SP3) changed from a test cascade infrastructure to single machine test stands. Single machine testing is foundational for advancing stable isotope process gas knowledge and significantly improves cascade design. The change is not expected to impact the total project costs or the completion date for SP1, however the schedule of SP2 and SP3 is expected to be extended by approximately one year due to the programmatic changes. Preliminary Key Performance Parameters have been modified to reflect the change in isotope for operational demonstration for SP2 and the change to single machine test stands in SP3. The technical approach, cost, and schedule of both SP2 and SP3 will be assessed through evidence-based peer review in FY 2026 and will be revalidated prior to SP2 and SP3 CD-2/3.

A Federal Project Director (FPD) with certification Level III and a Deputy Federal Project Director have been assigned to the SIPRC.

Critical Milestone History

	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	CD-4
SIPRC Project	1/4/19	2/26/21	11/4/21	3Q FY 2027	3Q FY 2027	3Q FY 2027	3Q FY 2033
SIPRC SP1 - Facility and EMIS	1/4/19	2/26/21	11/4/21	3/15/24	3/15/24	3/15/24	4Q FY2030
SIPRC SP2 - Gas Centrifuge Cascade	1/4/19	2/26/21	11/4/21	3Q FY 2027	3Q FY 2027	3Q FY 2027	3Q FY 2033

	CD-0	Conceptual Design Complete	CD-1	CD-2	Final Design Complete	CD-3	CD-4
SIPRC SP3 - Translational Research for Isotopic Gases (TRIG)	1/4/19	2/26/21	11/4/21	2Q FY 2027	2Q FY 2027	2Q FY 2027	2Q FY 2032

Notes:
- *Dates shown in the SIPRC Project row in table above correspond to the latest subproject date (broken out by subproject in rows below).*
- *The estimated schedules shown are preliminary.*

CD-0 – Approve Mission Need for a construction project with a conceptual scope and cost range; **Conceptual Design Complete** – Actual date the conceptual design was completed (if applicable); **CD-1** – Approve Alternative Selection and Cost Range; **CD-2** – Approve Performance Baseline; **Final Design Complete** – Estimated/Actual date the project design will be/was complete(d); **CD-3** – Approve Start of Construction; **D&D Complete** – Completion of D&D work; **CD-4** – Approve Start of Operations or Project Closeout.

	Performance Baseline Validation	CD-3A	CD-3B	CD-3C
SIPRC Project	3Q FY 2027	11/4/21	7/19/23	–
SIPRC SP1 - Facility and EMIS	3/15/24	11/4/21	7/19/23	–
SIPRC SP2 - Gas Centrifuge Cascade	3Q FY 2027	N/A	N/A	3/24/26
SIPRC SP3 - Translational Research for Isotopic Gases (TRIG)	2Q FY 2027	N/A	N/A	N/A

Note:
- *Dates shown in the SIPRC Project row in table above correspond to the latest subproject date (broken out by subproject below). Dates shown for CD-3C are anticipated.*

CD-3A for Subproject 1 – Approve Long-Lead Procurements (EMIS components and Facility Site Preparation)
CD-3B for Subproject 1 – Approve Long-Lead Procurements (Additional EMIS components)
CD-3C for Subproject 2 – Approve Long-Lead Procurements (Additional GC components)

Project Cost History

The overall SIPRC project is at CD-1, with a preliminary point estimate inclusive of SP1, SP2, and SP3, of $325,000,000 and Total Project Cost (TPC) range of $187,000,000 to $338,000,000. No construction, excluding for approved long-lead procurement, will be performed until the project performance baseline has been validated and CD-3 has been approved. SP1, Facility and EMIS, is at CD-2/3, with a baseline estimate of $231,500,000.

(dollars in thousands)

Fiscal Year	TEC, Design	TEC, Construction	TEC, Total	OPC, Except D&D	OPC, Total	TPC
FY 2026	30,300	283,500	313,800	11,200	11,200	325,000
FY 2027	30,300	283,500	313,800	11,200	11,200	325,000

2. Project Scope and Justification

Scope

The scope of this project includes the design and construction of an approximately 64,000 square feet facility, and the associated instrumentation and equipment needed to re-establish large-scale enriched stable isotope production in the United States. Multiple electromagnetic isotope separator systems (EMIS), a gas centrifuge cascade, and single machine test stands will be designed and installed in the new facility which will also include adequate space for prototype systems development and future additional machines. The laboratory considered the optimal number of production systems for each type of technology as part of the alternatives analysis for CD-1. SIPRC will be a technical facility (i.e., minimal office and staff amenities) located on the Oak Ridge National Laboratory (ORNL) main campus. Gas centrifuges and electromagnetic separators are based on existing designs leveraging prior projects and R&D supported by the Office of Isotope R&D and Production (IRP).

Justification

The Stable Isotope Production and Research Center (SIPRC) at Oak Ridge National Laboratory directly supports the Administration's strategy to secure critical supply chains and ensure unrivaled American leadership in critical and emerging technologies. This project will re-establish a domestic versatile, large-scale stable isotope enrichment capacity that directly addresses reliance on foreign suppliers. Given that Russia is the major producer of most stable isotopes, and China is a rapidly emerging leader, SIPRC is a strategic imperative for national and economic security. Once constructed, SIPRC will provide stable isotopes that are catalysts for American innovation across sectors vital to the Administration’s priorities, including medicine, quantum information science, fusion energy, and national security. The current domestic capacity is insufficient to meet the Nation’s growing demands and inventories are depleted. By launching an expanded national capability in gas centrifuge and electromagnetic isotope separation (EMIS) technologies, SIPRC will drive American competitiveness and self-reliance for decades to come.

The project is being conducted in accordance with the project management requirements in DOE Order 413.3B, *Program and Project Management for the Acquisition of Capital Assets*, and all appropriate project management requirements will be met.

Key Performance Parameters (KPPs)

Preliminary Key Performance Parameters (KPPs) are defined at CD-1 and may change as each subproject continues towards CD-2, “Approve Performance Baseline”. CD-1 approval was received November 4, 2021. SP1 KPPs are baselined; at SP2 and SP3 CD-2 approval, those KPPs will be baselined. The Threshold KPPs represent the minimum acceptable performance that the project must achieve. The Objective KPPs represent the desired project performance. Achievement of the Threshold KPPs will be a prerequisite for approval of CD-4, Project Completion.

Summary of preliminary KPPs is indicated below.

Performance Measure	Threshold	Objective
Design/construct building	SP1 – Facility and EMIS: Beneficial occupancy of the facility obtained.	SP1 – Facility and EMIS: Beneficial occupancy of the facility obtained.
Instrumentation design/development	SP1 – Facility and EMIS: Ninety percent (90 percent) of the EMIS machines complete a functional operability demonstration of individual EMIS machines running with gas for 4 hours.	SP1 – Facility and EMIS: One hundred percent (100 percent) of the EMIS machines complete a functional operability demonstration of individual EMIS machines running with gas for 4 hours.
	SP2 – Gas Centrifuge Cascade: a. The SIPRC project will complete the validation and verification (V&V) of the controls system with the completed documentation of the process. b. The SIPRC project will complete documented system leak tests with results meeting the requirements laid out in the systems requirements documents. c. The SIPRC project will complete a mechanical operability test of the completed production GCIS cascade.	SP2 – Gas Centrifuge Cascade: The SIPRC project will complete a Xenon gas test of the constructed cascade. Evidence of completion will be the report on the results of the gas test.
	SP3 – Translational Research for Isotopic Gases (TRIG): a. Construct 2 single machine test stands b. Complete the V&V of the control system with the completed documentation of the process. c. Complete documented system leak tests with results meeting the requirements laid out in the Systems Requirements Document(s).	SP3 – Translational Research for Isotopic Gases (TRIG): a. Construct 3 single machine test stands b. Complete the V&V of the control system with the completed documentation of the process. c. Complete documented system leak tests with results meeting the requirements laid out in the Systems Requirements Document(s).

3. Financial Schedule

(dollars in thousands)

	Budget Authority (Appropriations)	Obligations	Costs
Total Estimated Cost (TEC)			
Design (TEC)			
Prior Years	27,000	27,000	14,628
FY 2025	3,300	3,300	2,249
FY 2026	—	—	4,000
FY 2027	—	—	7,365
Outyears	—	—	2,058
Total, Design (TEC)	**30,300**	**30,300**	**30,300**
Construction (TEC)			
Prior Years	53,900	53,900	21,923
Prior Years - IRA Supp.	75,000	75,000	—
FY 2025	42,600	42,600	45,179
FY 2026	50,000	50,000	70,000
FY 2027	45,100	45,100	94,821
Outyears	16,900	16,900	51,577
Total, Construction (TEC)	**283,500**	**283,500**	**283,500**
Total Estimated Cost (TEC)			
Prior Years	80,900	80,900	36,551
Prior Years - IRA Supp.	75,000	75,000	—
FY 2025	45,900	45,900	47,428
FY 2026	50,000	50,000	74,000
FY 2027	45,100	45,100	102,186
Outyears	16,900	16,900	53,635
Total, Total Estimated Cost (TEC)	**313,800**	**313,800**	**313,800**

(dollars in thousands)

	Budget Authority (Appropriations)	Obligations	Costs
Other Project Cost (OPC)			
Prior Years	8,800	8,800	6,099
FY 2027	600	600	1,947
Outyears	1,800	1,800	3,154
Total, Other Project Cost (OPC)	**11,200**	**11,200**	**11,200**

(dollars in thousands)

	Budget Authority (Appropriations)	Obligations	Costs
Total Project Cost (TPC)			
Prior Years	89,700	89,700	42,650
Prior Years - IRA Supp.	75,000	75,000	–
FY 2025	45,900	45,900	47,428
FY 2026	50,000	50,000	74,000
FY 2027	45,700	45,700	104,133
Outyears	18,700	18,700	56,789
Total, TPC	**325,000**	**325,000**	**325,000**

4. Details of Project Cost Estimate

(dollars in thousands)

	Current Total Estimate	Previous Total Estimate	Original Validated Baseline
Total Estimated Cost (TEC)			
Design	26,800	26,800	**N/A**
Design - Contingency	3,500	3,500	**N/A**
Total, Design (TEC)	**30,300**	**30,300**	**N/A**
Construction_No_Detail	217,300	217,300	**N/A**
Construction Contingency	66,200	66,200	**N/A**
Total, Construction (TEC)	**283,500**	**283,500**	**N/A**
Total, TEC	**313,800**	**313,800**	**N/A**
Contingency, TEC	*69,700*	*69,700*	***N/A***
Other Project Cost (OPC)			
Conceptual Design	8,800	8,800	**N/A**
Start-up	1,700	1,700	**N/A**
OPC - Contingency	700	700	**N/A**
Total, Except D&D (OPC)	**11,200**	**11,200**	**N/A**
Total, OPC	**11,200**	**11,200**	**N/A**
Contingency, OPC	*700*	*700*	***N/A***
Total, TPC	**325,000**	**325,000**	**N/A**
Total, Contingency (TEC+OPC)	***70,400***	***70,400***	***N/A***

5. Schedule of Appropriations Requests[a]

(dollars in thousands)

Fiscal Year	Type	Prior Years	FY 2025	FY 2026	FY 2027	Outyears	Total
FY 2026	TEC	155,900	45,900	45,900	—	66,100	313,800
	OPC	8,800	—	—	—	2,400	11,200
	TPC	164,700	45,900	45,900	—	68,500	325,000
FY 2027	TEC	155,900	45,900	50,000	45,100	16,900	313,800
	OPC	8,800	—	—	600	1,800	11,200
	TPC	164,700	45,900	50,000	45,700	18,700	325,000

6. Related Operations and Maintenance Funding Requirements

Start of Operation or Beneficial Occupancy	3Q FY 2033
Expected Useful Life	30 years
Expected Future Start of D&D of this capital asset	3Q FY2063

Note: Start of Operations reflects the initiation of phased implementation of operations for the EMIS units.

Related Funding Requirements
(dollars in thousands)

	Annual Costs		Life Cycle Costs	
	Previous Total Estimate	Current Total Estimate	Previous Total Estimate	Current Total Estimate
Operations	33,295	33,295	1,106,807	1,106,807
Utilities	4,053	4,053	133,735	133,735
Maintenance and Repair	2,992	2,992	90,458	90,458
Total, Operations and Maintenance	40,340	40,340	1,331,000	1,331,000

Note: Life Cycle Costs includes escalation.

7. D&D Information

	Square Feet
New area being constructed by this project at ORNL	64,000
Area of existing facility(ies) being replaced	0
Area of any additional D&D space to meet the "one-for-one" requirement	0

The new area being constructed in this project is not replacing existing facilities. Any existing space that is freed up from consolidating activities into SIPRC will likely be repurposed.

[a] The project does not have CD-2 approval; FY 2025 schedules and costs are estimates consistent with the updated preliminary point estimate.

8. Acquisition Approach

The ORNL Management and Operating (M&O) contractor, UT Battelle, will perform the acquisition for this project, overseen by the DOE Oak Ridge National Laboratory Site Office. The M&O contractor will be responsible for awarding and administering all subcontracts related to this project. SC will evaluate the M&O contractor's performance through the annual laboratory performance appraisal process. SC and the M&O will draw from lessons learned from other SC projects and other similar facilities in planning and executing the project.

Isotope Production and Distribution Program Fund

Overview

The Department of Energy's (DOE) Isotope Production and Distribution Program Fund provides a vital financial mechanism (revolving fund) for the Office of Isotope R&D and Production (IRP). This fund is instrumental in driving a secure and reliable domestic supply of isotopes, which are essential materials for advancing American medicine, national security, industry, and strategic research. The overarching goal of IRP, enabled by this fund, is to establish the United States as the global leader in isotope innovation and to secure American isotope independence and mitigate disruptions across critical isotope supply chains in alignment with key Administration priorities.

The DOE Isotope Production and Distribution Program Fund relies on two key funding sources: direct appropriations to IRP and revenue from isotope sales. Together, these two funding sources allow the IRP to produce and sell radioactive and stable isotopes, byproducts, surplus materials, and related isotope services to federal agencies, universities, industry, and some international partners.

The National Isotope Development Center (NIDC), situated at the Oak Ridge National Laboratory, handles IRP's business operations. NIDC manages customer contracts, marketing, and coordinates isotope production. Isotope sales are priced to recover full costs, aligning with standard business practices, while supporting both R&D for and supply of isotopes for critical applications. The revolving fund allows for continuous implementation, independent of the federal budget cycle and fluctuating sales revenue, allowing IRP to maintain continuity of operations.

Annual appropriations support facility operations, research and development, and line-item projects. Customer revenues offset the costs of producing, dispensing, packaging, and shipping isotopes. About 95 percent of the revolving fund is dedicated to operations, R&D, and production, with approximately five percent available to cover changes in revenue and costs.

The revolving fund is capitalized through annual appropriations to cover the costs of facility operations, research and development (R&D), and line-item projects, and through revenues from customers to offset the costs of producing, dispensing, packaging, and shipping isotopes. Approximately 95 percent of the revolving funds are dedicated to operations, R&D, and production activities, with approximately 5-10 percent available to ensure operational stability and cover changes in revenue and costs.

In FY 2026, an estimated total of $258.0 million will be deposited into the revolving fund. This consists of the FY 2026 Enacted level of $170.0 million, plus anticipated collections by NIDC of $88 million. In FY 2026, IRP expects to sell over 135 different radioactive and stable isotopes to a broad range of research and commercial customers, including major pharmaceutical companies, industrial stakeholders, and researchers at hospitals, national laboratories, other federal agencies, universities, and private companies.

IRP supplies isotopes and related services to the Nation under the authority of the Atomic Energy Act of 1954, which outlines the U.S. Government's role in isotope distribution. The Isotope Production and Distribution Program Fund was established by the 1990 Energy and Water Development Appropriations Act (Public Law 101-101) and amended by the 1995 Energy and Water Development Appropriations Act (Public Law 103-316).

Highlights of the FY 2027 Request

In FY 2027, the Department anticipates continued demand growth in both radioactive and stable isotopes driven by the Administration's focus on groundbreaking advancements in fusion energy, quantum technologies, and next-generation cancer therapies. The IRP remains committed to strengthening U.S. independence from foreign isotope supply chains and is addressing high-risk areas to ensure that the U.S. has access to isotopes vital for scientific discovery, essential industrial applications, Administration priorities, and combating cancer.

The IRP's FY 2027 Request is $168.6 million, a decrease of $1.4 million below the FY 2026 Enacted level. In FY 2027, the revolving fund resources, including the IRP Request combined with anticipated collections by the NIDC, will be strategically deployed to advance the following program priorities:

- Enhancing, expanding and securing domestic isotope production
- Strengthening industry interactions, collaborations, and partnerships
- Driving isotope innovation through strategic research, development, demonstration, and deployment