

Isotopes for Threat Reduction

Isotope production at Los Alamos National Laboratory ensures the following:

- A safe and secure domestic supply of isotopes by limiting our dependence on foreign-supplied isotope shipment and delivery.
- Source and surrogate materials for use in testing, validation, and training.
- Radiotracers needed for environmental impact studies after radiation dispersal events for model validation and other related applications.
- Materials needed for nuclear forensic applications.
- Isotopes needed for membrane permeability studies.

Isotopes for Defense Programs

Los Alamos National Laboratory isotopes are used for fundamental property studies.

Isotopes are used to develop better ways to detect concealed nuclear materials in trucks and cargo containers.

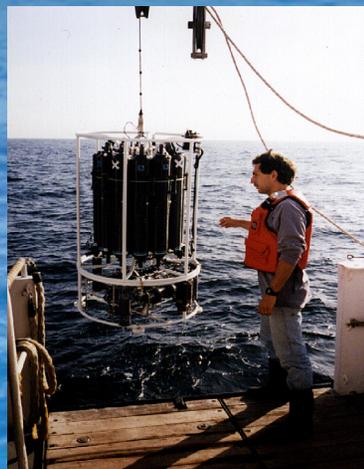


Isotopes for Environmental Science

Isotopes produced at Los Alamos National Laboratory are used as environmental tracers. For example:

- As-73 is needed to understand As contamination and transport.
- Na-22, Sr-87, and other solute reactive isotopes are needed to understand flowpaths for geochemical and hydrologic modeling.
- Al-26 is needed to understand the impacts of acid rain.
- Si-32 is needed for oceanographic tracing, which contributes to a better understanding of climate change and its effects.

Los Alamos National Laboratory can produce Si-32 needed for oceanographic tracing and to study the effects of climate change.



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For more information visit
<http://nuclear.lanl.gov/isotopes.shtml>

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Isotope Science and Production

35 years of experience in isotope production, processing, and applications.



Committed to the safe and reliable production of radioisotopes, products, and services.

Los Alamos National Laboratory



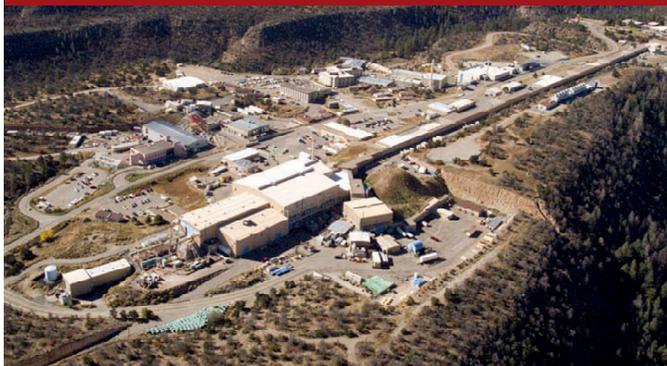
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Sponsored by the Department of Energy
National Isotope Program
<http://www.nuclear.energy.gov/isotopes/nelsotopes2a.html>

Our Capabilities

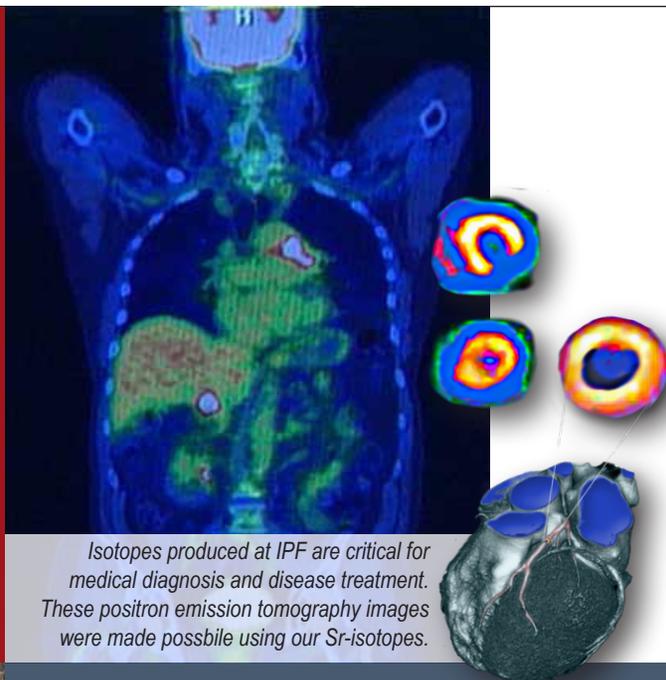
Los Alamos National Laboratory's Isotope Science and Production program is unique. Our capabilities include the following:

- Isotope Production Facility (IPF), located at the Los Alamos Neutron Science Center (LANSCC), uses up to 100 MeV at 250 μ A to produce isotopes via our 800-MeV accelerator.
- Dedicated processing facility with 13 hot cells.
- cGMP compliant processing.
- Plutonium facilities for Am-241 processing.
- Chemical metallurgy facilities and additional hot cells.
- LANSCC national user facilities, including the Lujan Center and Neutron Science facilities, for materials and isotope research.



IPF is located at the Los Alamos Neutron Science Center

- Los Alamos National Laboratory's many other synthetic, characterization, and counting facilities.
- On-site waste processing facilities.
- Expertise in targetry development, chemistry, bioscience, materials science, and nuclear physics.
- National and international university collaborations, including partnership with the University of New Mexico's New Mexico Center for Isotopes in Medicine (NMCIM).
- Isotope production upon request. Our current portfolio includes Sr-82, Ge-68, Cd-109, As-73/74, Lu-173, Gd-148, Y-88, and Na-22. We have the potential to produce many more.



Isotopes produced at IPF are critical for medical diagnosis and disease treatment. These positron emission tomography images were made possible using our Sr-isotopes.

Isotopes for Nuclear Medicine

We save lives

- Our nuclear medicine isotope production, including Sr-82 and Ge-68, are critical to ensuring a safe and reliable domestic supply of isotopes for medical diagnosis and treatment.
- We are developing new generator technologies, like Ge-68/Ge-68 and Se-72/As-72.
- We are conducting targeted radionuclide therapy research using, for example, Bi-213 and Ac-225, in collaboration with NMCIM.
- We are developing chelating agents for optimal radionuclide delivery, like our current capture-polymer studies and nanoparticle delivery-mechanism research.
- We can produce isotopes for dosimetry and toxicology research.

Isotopes for Fundamental Science

Space Research

- We're researching alternative power sources for longer-life space missions.
- We produce isotopes for use in irradiation studies that simulate electronic device exposure to cosmic radiation.

Nuclear Physics

Our isotopes are used, for example, in:

- Cross-section measurements to optimize isotope irradiations, modeling for targetry design, and
- MCNPX code development and application to other types of isotope production.

The IPF also provides unique opportunities for doing accelerator science research.

Astrophysics

- Production of off-stability isotopes for the study of s-processes.

Training Opportunities

- Radiochemistry training, including on all levels of isotope production and application, for students, postdocs, and visiting scientists.



We're researching the production of a less-hazardous radioisotope power source to replace Pu-238 in spacecrafts, such as the Mars Rover.

Courtesy NASA/JPL-Caltech