

Isotope Production and Research Facility

Radioisotope Development Laboratory



Oak Ridge National Laboratory (ORNL) produces, purifies and ships more isotopes than any other place in the world – more than 300 isotopes for medical, industrial, research and national security.

ORNL's Radioisotope Development Laboratory, Building 3047, was designed and constructed in 1962 for work with low-intermediate and high-level beta and gamma-emitting radioisotopes. The 16,000-square-foot hot cell facility has a steel frame and concrete block construction and is classified as a Hazard Category 3 Nuclear Facility.

The RDL now is used exclusively to produce actinium-227 for the US Department of Energy's Isotope Program. Ac-227 is produced at ORNL's High Flux Isotope Reactor by irradiating targets containing radium-226. The targets are both fabricated in the RDL and returned to the RDL for processing and purification of Ac-227. Four hot cells and a separate alpha cell are used.

ORNL has been producing Ac-227 since 2017 through a contract between the U.S. DOE Isotope Program and Bayer. Bayer uses the isotope for its FDA-approved cancer treatment Xofigo™.



Xofigo: Hope for prostate cancer patients

Bayer's Xofigo™, approved in 2013 by the U.S. Food and Drug Administration, attacks cancerous growths in the bones of prostate cancer patients whose cancer has metastasized.

Ac-227 decays into radium-223, an isotope chemically similar to calcium. When introduced into the body, it targets bone. Because it emits a high level of alpha radiation that travels only a short distance, it can target cancer cells growing on bone with little effect on surrounding healthy cells – a treatment known as targeted alpha therapy.

Specifications



4 high-level beta-gamma hot cells



1 alpha hot cell



7 laboratories for handling low-level materials



Decontamination room



Various service areas



Used solely for Ac-227 production



Nuclear Hazard Category 3 designation



Wesley Keeton

Group Leader, Bethel Valley Facility Management

keetonwk@ornl.gov
865-574-0609