

National Nuclear Security Administration
Mo-99 Stakeholders Meeting

Update on Licensing Reviews Supporting Domestic Molybdenum-99 Production

Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
May 4, 2017



Recent, Current, and Anticipated Reviews

- Construction permit and operating license applications
 - SHINE Medical Technologies (SHINE)
 - Construction permit issued February 2016
 - Operating license application expected 2017
 - Northwest Medical Isotopes (NWMI)
 - Construction permit application under review
- License amendment issued to Oregon State University (OSU)
- License amendment requests anticipated from University of Missouri Research Reactor Center (MURR) to support General Atomics project
- Additional license amendment requests anticipated from OSU and MURR in support of NWMI project
- Materials license issued to Niowave

Status of SHINE Review

- NRC issued construction permit in February 2016
- Operating license application anticipated in late 2017
- Construction expected to begin in late 2017
- SHINE proposes to produce ^{99}Mo from uranium fission
 - Irradiation Facility (8 irradiation units)
 - Radioisotope Production Facility (3 hot cell structures)
- ^{99}Mo recovered through irradiated target solution processing in Radioisotope Production Facility consisting of 3 hot cells
- Proposed site: Janesville, WI

Northwest Medical Isotopes

- NRC received two-part construction permit application
 - Environmental Report (February 2015)
 - Preliminary Safety Analysis Report (July 2015)
- NWMI proposes to fabricate low enriched uranium targets for irradiation at existing research reactors (MURR and OSU)
- ^{99}Mo recovered through processing of irradiated targets
- Proposed site: Columbia, MO

Status of NWMI Review

- Accepted part one of application for docketing (May 2015)
- Conducted Environmental site audit (September 2015)
- Issued environmental requests for additional information (November 2015, with follow-up requests January, March, and June 2016)
- Accepted part two of application for docketing (December 2015)
- Issued safety requests for additional information (March 2016, with follow-up requests September 2016, January 2017, and March 2017)
- Issued draft environmental impact statement (November 2016)
- Issuance of final environmental impact statement (May 2017, anticipated)
- Meetings with ACRS (scheduled for June, July, August, and October 2017)
- Completion of safety evaluation report (October 2017, anticipated)

Reactor License Amendments

- License amendment issued to OSU in 2016
 - Demonstration of ^{99}Mo production in small nuclear reactor with experimental uranium targets
 - Additional amendment expected to support target irradiation for NWMI
- Anticipated license amendment requests from MURR
 - Two-part request anticipated for irradiation of LEU targets in MURR and separation of ^{99}Mo from irradiated targets using General Atomics gaseous extraction technology
 - Additional amendment request expected to support target irradiation for NWMI

Materials and Medical Use Licenses

- Materials license issued to Niowave in 2015
 - Production of small amounts of ^{99}Mo through uranium fission using superconducting linacs for proof of concept
 - NRC staff considering amendment request to increase LEU possession limit
- NorthStar Medical Radioisotopes
 - Proposes to produce ^{99}Mo from enriched molybdenum target irradiation
 - Developed RadioGenix $^{99\text{m}}\text{Tc}$ generator system compatible with lower specific activity ^{99}Mo
 - NRC staff developing licensing guidance for medical use applicants and licensees that possess RadioGenix system

Oversight, Infrastructure, and Support Activities

- Developing construction and operation inspection programs
- Reviewing regulations and guidance
- Coordinating technical and licensing expertise through inter-office working group
- Maintaining communication with stakeholders
 - Federal government (Office of Science and Technology Policy, National Nuclear Security Administration, Department of Homeland Security)
 - State and local governments
 - Public
- Providing updates on public website:
 - <http://www.nrc.gov/reactors/medical-radioisotopes.html>