NWMI
NORTHWEST MEDICAL ISOTOPES

U.S. Nuclear Regulatory Commission
Pre Construction Permit Application Meeting

Public Presentation

April 2, 2015
11:00am – 12:00pm

Agenda

April 2, 2015

Public Session

11:00am Opening Remarks (5 minutes)
NRC

11:05am NWMI Introductions and Project Status (10 minutes)
NWMI

Facility Description (10 minutes)

Facility Licensing Approach (10 minutes)

Process Functions & Requirements and Facility Design Criteria (10 minutes)

Public Question and Answer Period (15 minutes)
NRC

NWMI
NORTHWEST MEDICAL ISOTOPES

NWMI INTRODUCTION AND PROJECT STATUS

April 2, 2015





NWMI Introductions and Organization

NWMI
NORTHWEST MEDICAL ISOTOPES

Carolyn Haass, Vice President
Steve Reese, Irradiations Logistics Manager
Marcus Voth, Technical Adviser
John Andrzejczak, Chief Engineer
Gary Dunford, Hot Cell Process Lead
David Smith, Target Fabrication Lead
Michael Corum, ISA/Shielding/Criticality Lead

Irradiation Services – University Reactors

MURR Matters...

OSU Oregon State University

Radioisotope Production Facility Partners

Engineering Design

MERRICK & COMPANY

AEM Consulting

Criticality, Shielding, and Safety Analysis

NSA Proven · Effective · Solutions

Licensing and Environmental Permitting

PORTAGE

Transportation

STS Secured Transportation Services

Technology Demonstration Partners

MURR Matters...

OSU Oregon State University

OAK RIDGE National Laboratory

MCI INC Materials and Chemistry Laboratory, Inc. "Linking Technology to Solutions"

NWMI Project Status

- Construction Permit Application
  - Received Exemption to Submit CP Application in 2 Parts (Oct 2013)
  - Part 1 complete and submitted
  - Part 2 will be submitted in 2nd Q 2015
- Facility preliminary design completed; initiating final design in 2nd Q 2015
- Proof of concept tests have/are continuing to be performed
- Prototypic target production initiated/OSU license amendment submitted and awaiting NRC approval
- Siting Decision Taken; Option formalized
- Network of irradiation suppliers complete
- Strategic Partnerships and Major Subcontractor development complete

NWMI
NORTHWEST MEDICAL ISOTOPES

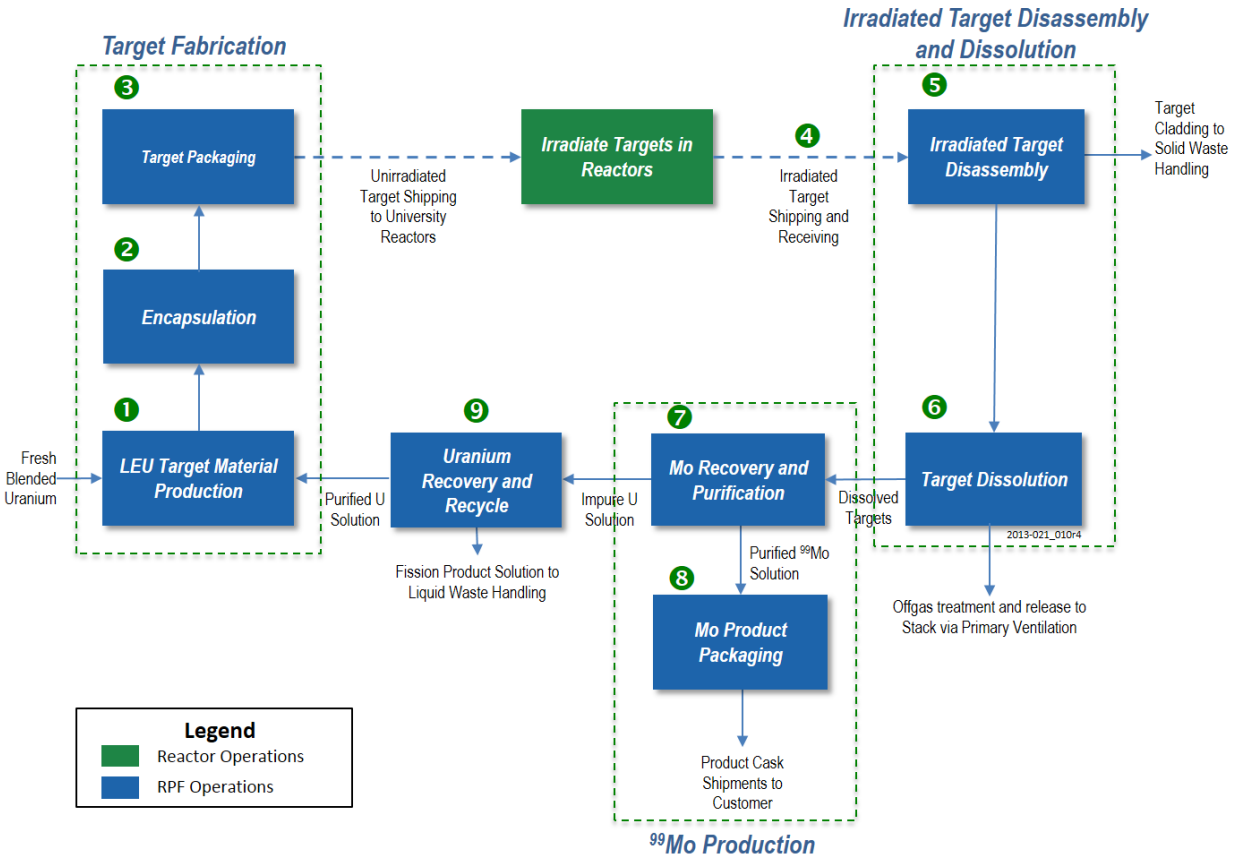
FACILITY DESCRIPTION

April 2, 2015





Process Block Flow Diagram



❶ LEU target material is fabricated (both fresh LEU and recycled U)

❷ LEU target material encapsulated using metal cladding → LEU Target

❸ LEU targets are packaged and shipped to university reactors for irradiation

❹ After irradiation, targets are shipped back to RPF

❺ Irradiated LEU targets disassembled

❻ Irradiated LEU targets dissolved into a solution for processing

❼ Dissolved LEU solution is processed to recover and purify ^{99}Mo

❽ Purified ^{99}Mo is packaged/shipped to a radiopharmaceutical distributor

❾ LEU solution is treated to recover U and is recycled back to Step 1

Facility Description

- 1st Level footprint ~52,000 ft^2
  - Target Fabrication Area
  - Hot Cell Processing areas (e.g., Dissolution, ^{99}Mo recovery, ^{235}U recovery)
  - Waste Management, Laboratory and Utility Areas
- 2nd Level foot print ~17,000 ft^2 (e.g., Utility, Ventilation, and Off-Gas Equipment)
- WM Out Building (~1,200 ft^2)
- Administration Building (outside of secured RPF area) ~10,000 ft^2
- High bay roof – 65 ft
- Mach area roof – 46 ft
- Top of exhaust stack – 75 ft
- Loading dock (back) roof – 20 ft
- Support & Admin (front) roof – 12 ft
- Depth below grade for tank farm/HIC storage – 15 ft

NWMI
NORTHWEST MEDICAL ISOTOPES

FACILITY LICENSING APPROACH

April 2, 2015



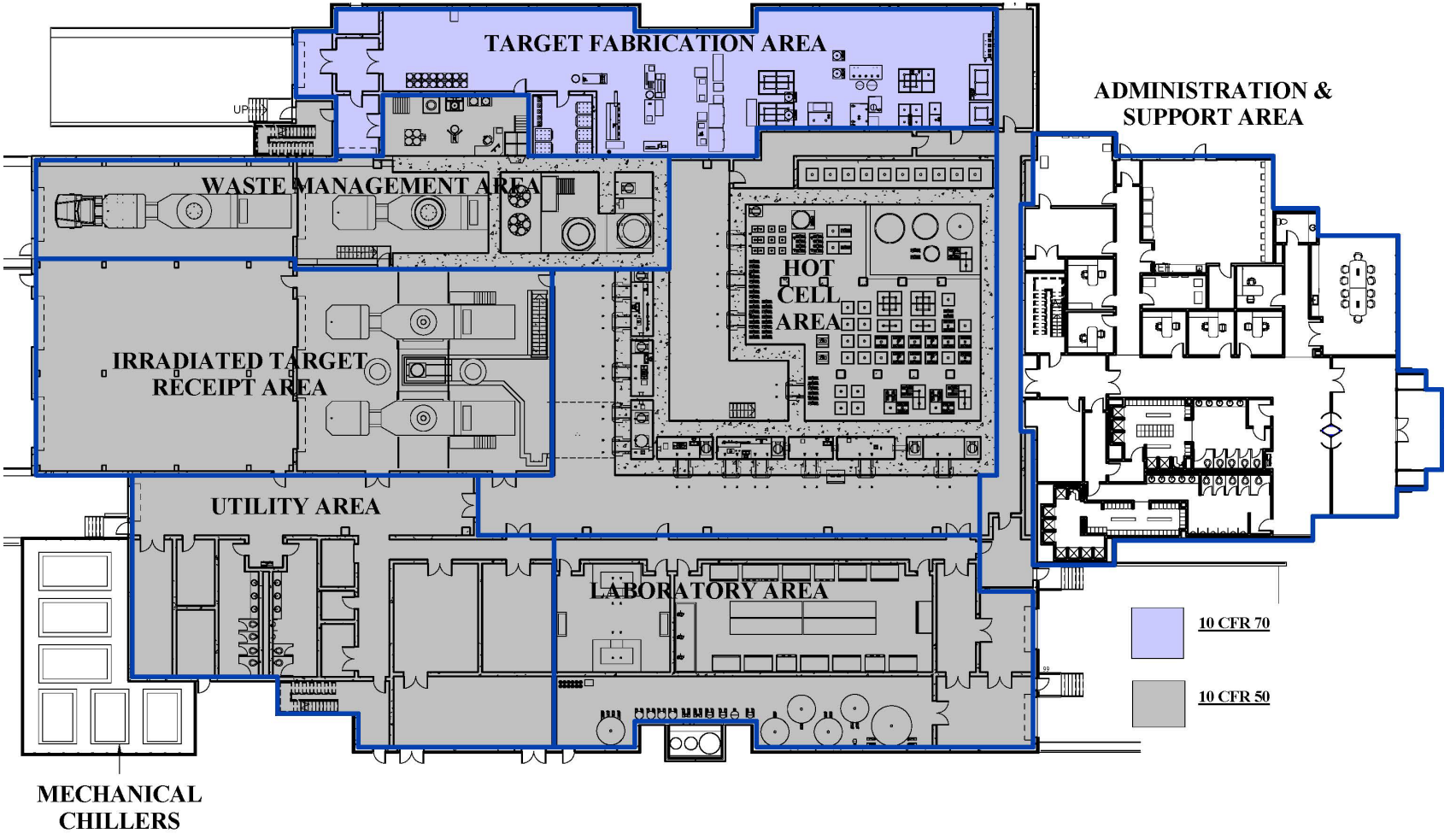


Licensing Approach

- NWMI will combine several license activities and submit one application that covers all applicable regulations for construction and operation of an RPF under 10 CFR 50
  - Process ^{99}Mo and recycle LEU under 10 CFR 50, *Domestic Licensing of Production and Utilization Facilities*
  - Target fabrication (ability to receive, possess, use, and transfer of SNM) under 10 CFR 70, *Domestic Licensing of SNM*
  - Ability to handle by-product material under 10 CFR 30, *Rules of General Applicability to Domestic Licensing of Byproduct Material*
- NWMI's understanding
  - NRC will approve and issue one license under 10 CFR 50; Activities under 10 CFR 70 and 10 CFR 30 will be part of 10 CFR 50 license (10 CFR 50.31, *Combining Applications*)
  - NRC will complete a single review process (10 CFR 50.32, *Elimination of Repetition*)
  - Only interact with one group within NRC (e.g., administrative, license reviews and approvals, inspections) (10 CFR 50.32, *Elimination of Repetition*)
  - Fees will only be assessed under 10 CFR 50
- Other Integrated License Activities to support NWMI's RPF
  - University Reactor(s) will amend their current operating license's to support production of ^{99}Mo
  - Required transportation casks will be amended by NWMI (if necessary)

Facility Licensing Layout

- ***10 CFR 50 Activities***
  - Irradiated Target receipt
  - Irradiated target disassembly
  - Target dissolution
  - ^{99}Mo separations, purification and packaging
  - LEU reclamation and purification
  - Waste management
  - Associated laboratory and support
- ***10 CFR 70 Activities***
  - Receipt of LEU (from DOE)
  - Production of LEU target material
  - Target fabrication and testing
  - Shipping/loading of fabricated targets
  - Associated laboratory and support areas
- ***10 CFR 30 Activities***
  - Handling of byproduct material



NWMI
NORTHWEST MEDICAL ISOTOPES

FACILITY ASSUMPTIONS AND CRITERIA

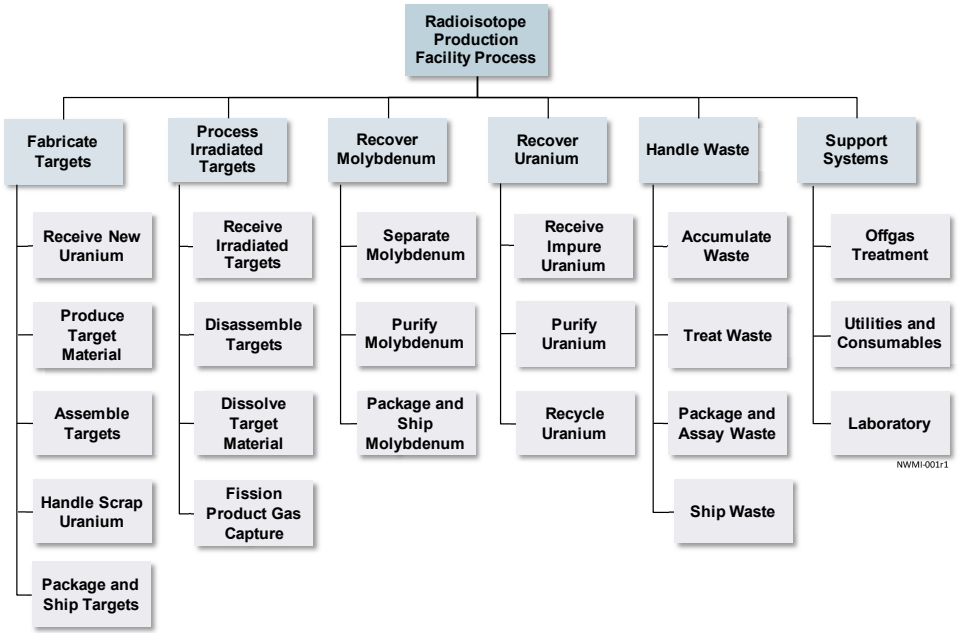
April 2, 2015





RPF Primary Assumptions and Criteria

- Single RPF using LEU
- Irradiated targets generated by multiple reactors; Utilize same target design
- Individual target batch processing time from EOB → 32 hr
- Uranium losses during process → < 3 %



- Recycling processed LEU for reuse as target material
- Fission product releases will comply with environmental release criteria
- Uranium processing and storage will meet all required Safeguards & Security Requirements
- Each unit process/function and sub process/function requirements have been identified
- Facility Design Criteria Document Complete
- Facility Process Functions & Requirements Document Complete