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Author(s):	Rosenberg, Nina Dale
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Los Alamos
NATIONAL LABORATORY

Australian Safeguards and Non-Proliferation Office Visit: Nuclear Nonproliferation and Security Program at LANL

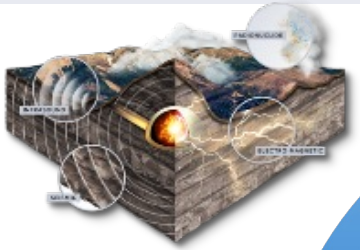
Nina Rosenberg, Program Director, Nuclear Nonproliferation and Security

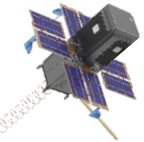
March 23, 2023

NNSA
National Nuclear Security Administration

Our national security mission is broader than nuclear deterrence

Threat Reduction: Anticipate persistent and emerging threats to global security; develop and deploy revolutionary tools to detect, deter, and respond proactively.





The Laboratory's nuclear nonproliferation and security portfolio is managed by the GS-NNS program office.

- NNSA's Defense Nuclear Nonproliferation office (DNN) makes up ~80% of our work.
- We also support State Dept activities closely aligned with our work for DNN and NASA programs.
- Our work is executed across the entire Laboratory, approximately half in the Global Security directorate and a third in the Weapons Program.

Our nuclear nonproliferation and security portfolio includes R&D, deployment activities, and policy support

Prevent Theft of Nuclear Materials and Sabotage of Nuclear Facilities

LANL experts under **International Nuclear Security (INS)** programs share their technical knowledge and experience within several INS functional, regional and country teams.

Topics include: Nuclear Material Accounting and Control, Unmanned Arial Systems, Capacity Building, Nuclear Security Culture, IAEA/WINS activities.

We provide tools and technical support for bilateral engagements, including assessments for INS partners, training, workshops, and technical exchanges.

Secure Vulnerable Radiological Materials

SINCE 1997

from over
1,500
industrial, educational, healthcare, and governmental facilities worldwide

45,000+
Radioactive sealed sources have been removed

containing more than
1.44 MILLION
curies

Los Alamos **Off-site Source Recovery Program (OSRP)** has the lead for domestic transuranic and large beta and gamma sources that do not have a commercial disposal pathway.

LANL OSRP has been working with subcontractors for about a decade to develop, test, fabricate and license additional **Type B containers** to address a shortage of containers certified to transport high-activity beta/gamma devices.

Deter and Detect Illicit Movement of Rad/Nuc Material

Our staff working on the **Nuclear Smuggling Detection and Deterrence** program provide technical support for the installation and maintenance of radiation detection systems at sites all over the world, as well as support testing and evaluation of new detection equipment and techniques.

Strengthen Global Nuclear Safeguards

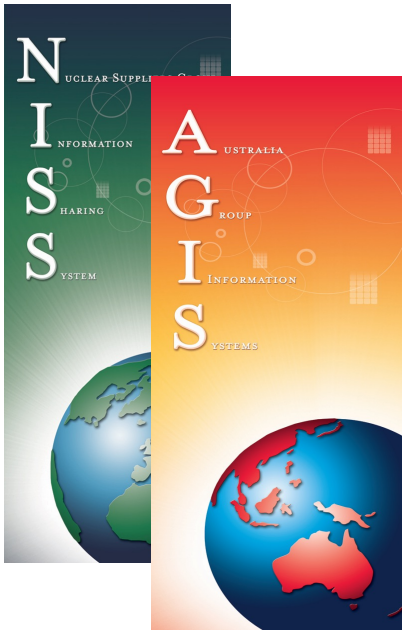
- The Laboratory invented or developed nearly every neutron nondestructive assay (NDA) instrument used by the IAEA today.
- Every new IAEA inspector since 1980 has come to Los Alamos for training

We continue to be at the forefront of international nuclear safeguards technologies and instrumentation development and related training.

Support international systems for strategic trade controls

- Manage information technology systems to support licensing, interdiction, and multilateral export control regime activities
- Build capacity of foreign partners to regulate strategic trade and to deter, detect, and interdict illicit transfers


Workshop with Malaysia



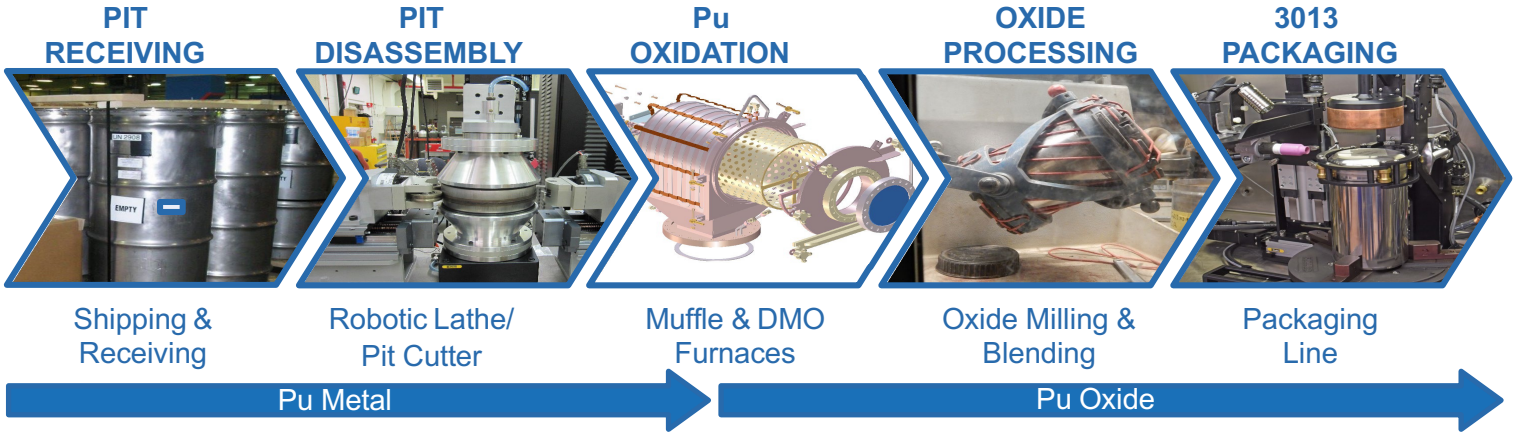
Advance Nuclear Verification Capabilities

- Arms Control - Historical focus on warhead verification; collaboration with international partners
- Compliance Verification - Deployment readiness with staff training, tool development, concept-of-operation planning, and mock deployment scenarios

Reduce Global HEU and Pu Inventories

ARIES = Advanced Recovery and Integrated Extraction System

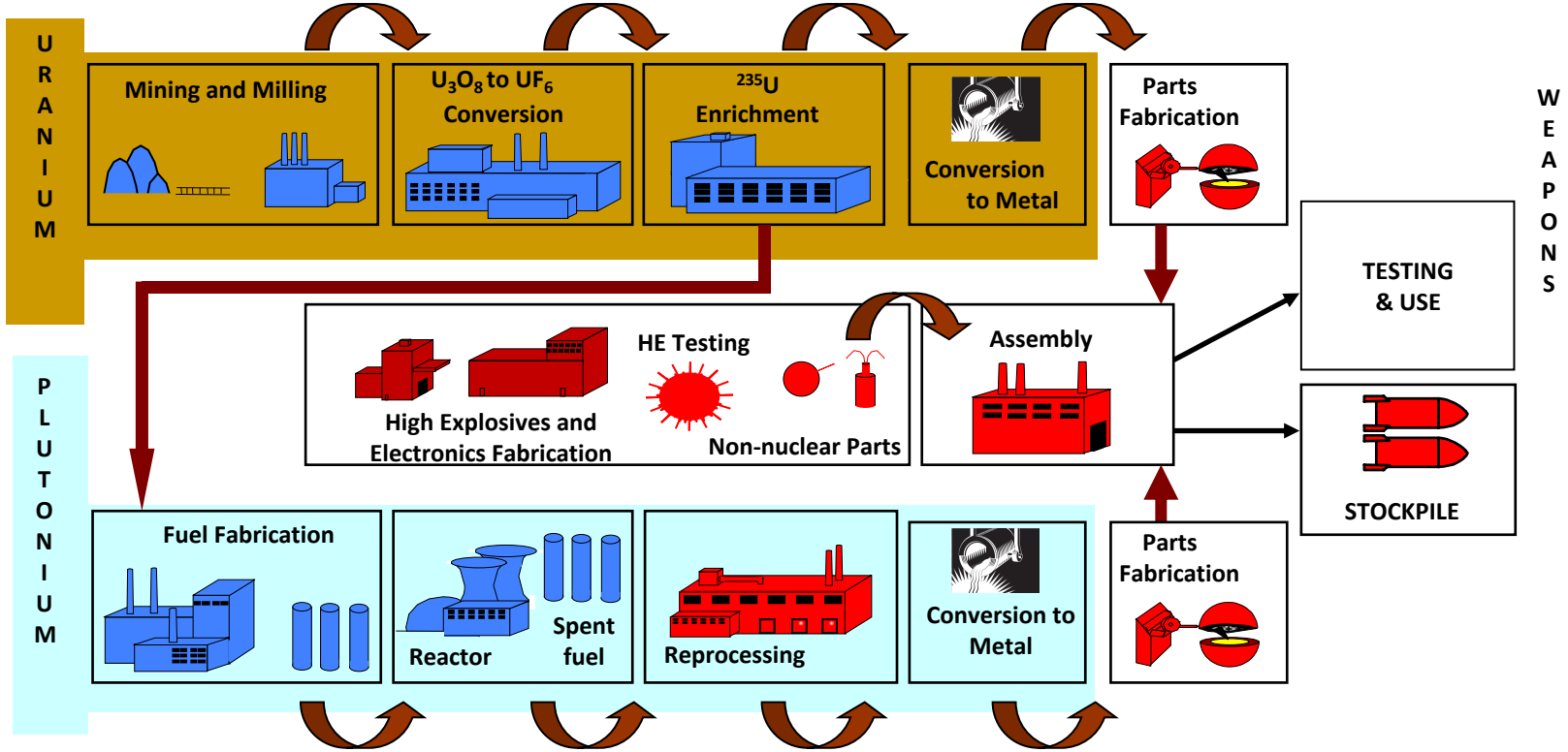
Pu



HEU

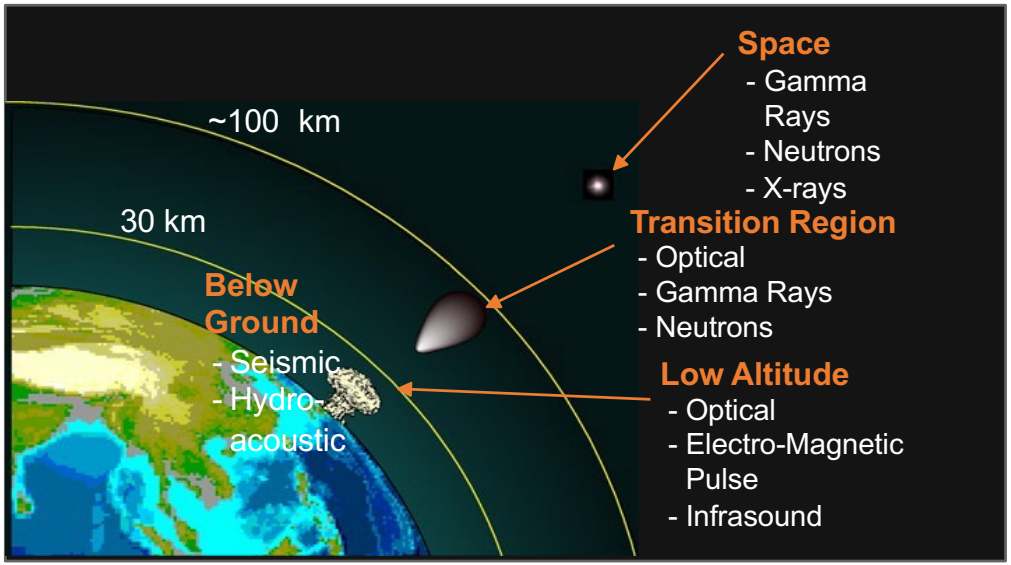
- We continue work on the **Mo-99** program to encourage the establishment of nonHEU-based production in the U.S. by developing technical solutions to improve the viability of commercial Mo-99 production.
- Los Alamos continues to support work to **convert civilian reactors** that use weapons-usable nuclear material to using materials that are not of proliferation concern. Our expertise in nuclear fuels and material science supports the development of new fuels and technologies to support conversion efforts.

Detect Special Nuclear Material Production, Weaponization

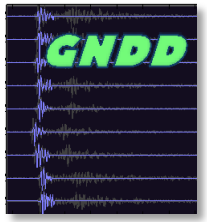


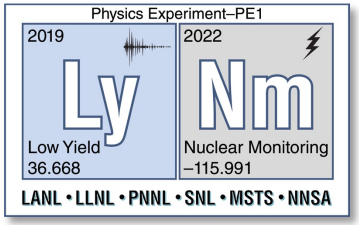
Support Treaty Monitoring of Nuclear Detonation Detection

Space-based



Ground-based





Science, Nonproliferation, Plutonium, and Mars

The **ChemCam** laser unit on the Mars Curiosity rover is based on Laser-Induced Breakdown Spectroscopy (LIBS), which started as an LDRD project to look for material within gloveboxes at LANL's Pu facility.

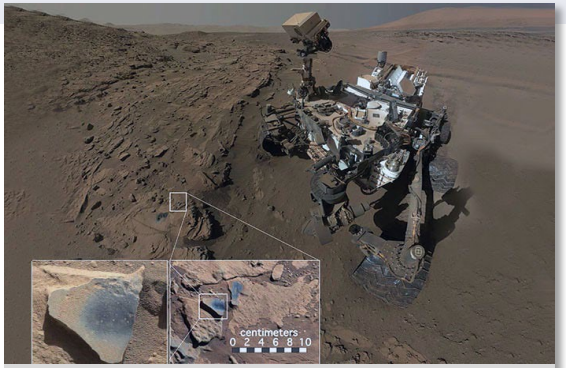
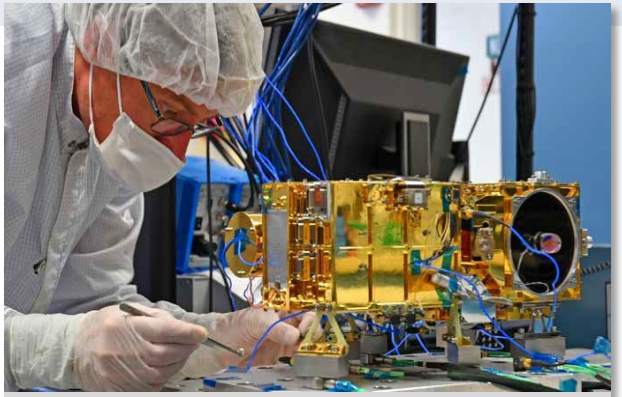


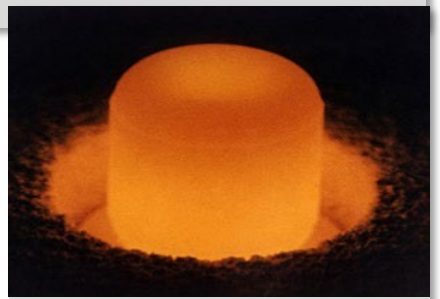
Image credit: NASA

ChemCam-enabled discoveries tell us about possible early Martian atmosphere



Next-generation **SuperCam** instrument on Mars 2020 mission

A **backpack LIBS unit** has been developed for environmental sampling



Mars missions are powered by Pu-238 heat sources produced at Los Alamos


Questions?