



EDEN

RADIOISOTOPES

Overview of Company

Who We Are

A new healthcare company, leveraging IP licensed from Sandia National Laboratories, with financial investment from the Yates Family

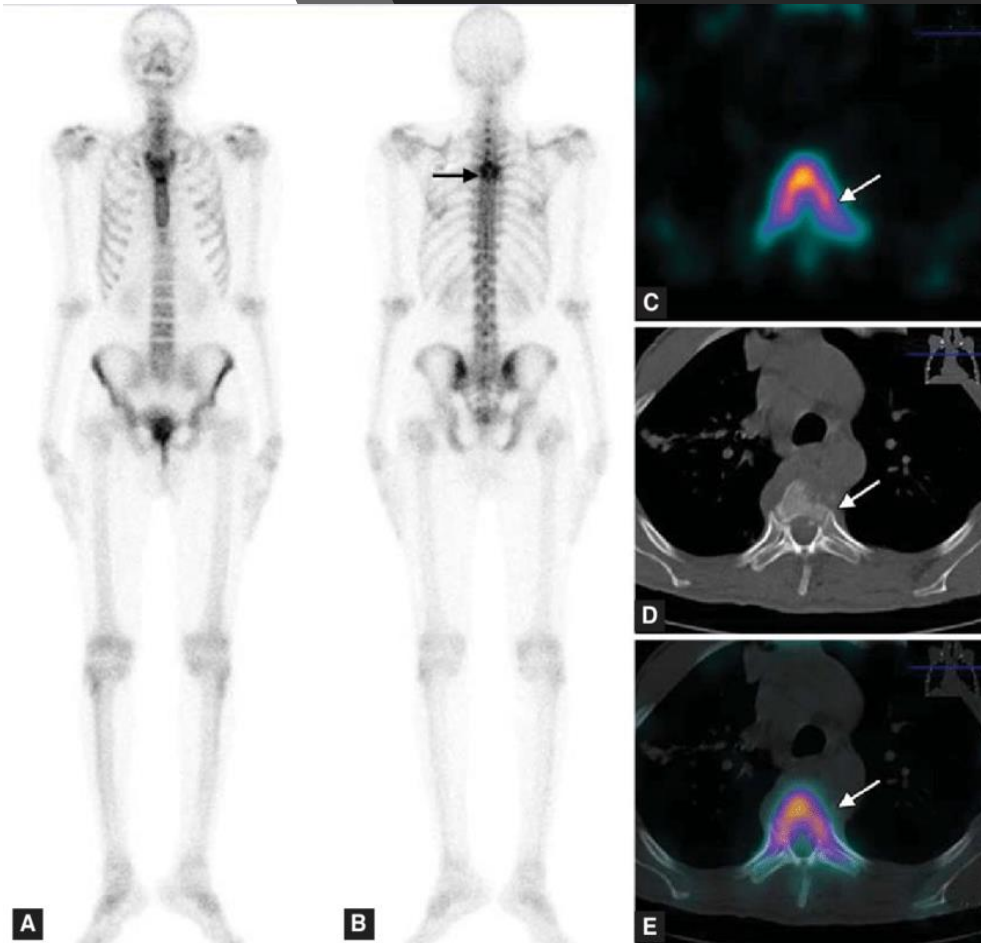


What We Do

Eden is a healthcare company, producing medical isotopes for the \$4.2B radiopharmaceutical molecular imaging industry



Why Molecular Imaging Is Critical For Patients



Molecular Imaging is unique, as other imaging modalities, such as X-ray, CT, MRI, Ultrasound typically will show anatomical structure of bone or soft tissue.



Molecular imaging, through use of a radiopharmaceutical, is the visualization, characterization & biological functional processes at cellular levels.

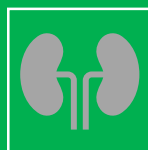


Molecular imaging is commonly employed in the diagnosis and treatment of numerous medical conditions, including heart disease and cancer.

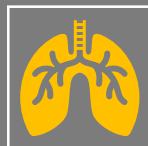
Eden's Product Line



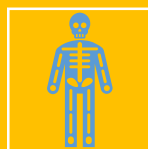
Molybdenum-99: Used as the 'parent' in a generator to produce technetium-99m, the most widely used isotope in diagnostic nuclear medicine.



Iodine-131: Widely used in treating thyroid cancer and in imaging the thyroid; also in diagnosis of abnormal renal (kidney) blood flow, and urinary tract obstruction.



Xenon-133: Used for pulmonary (lung) ventilation studies.

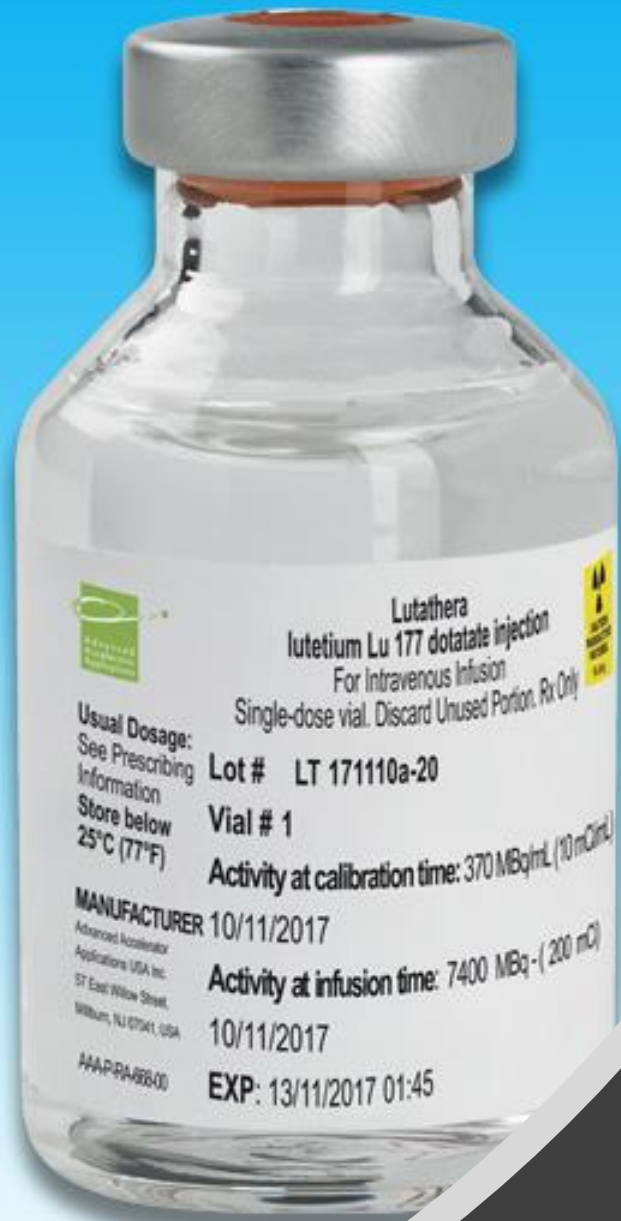


Lutetium-177: Lu-177 is increasingly important as it emits just enough gamma for imaging while the beta radiation does the therapy on small (e.g., neuroendocrine) tumors. Its half-life is long enough to allow sophisticated preparation for use.



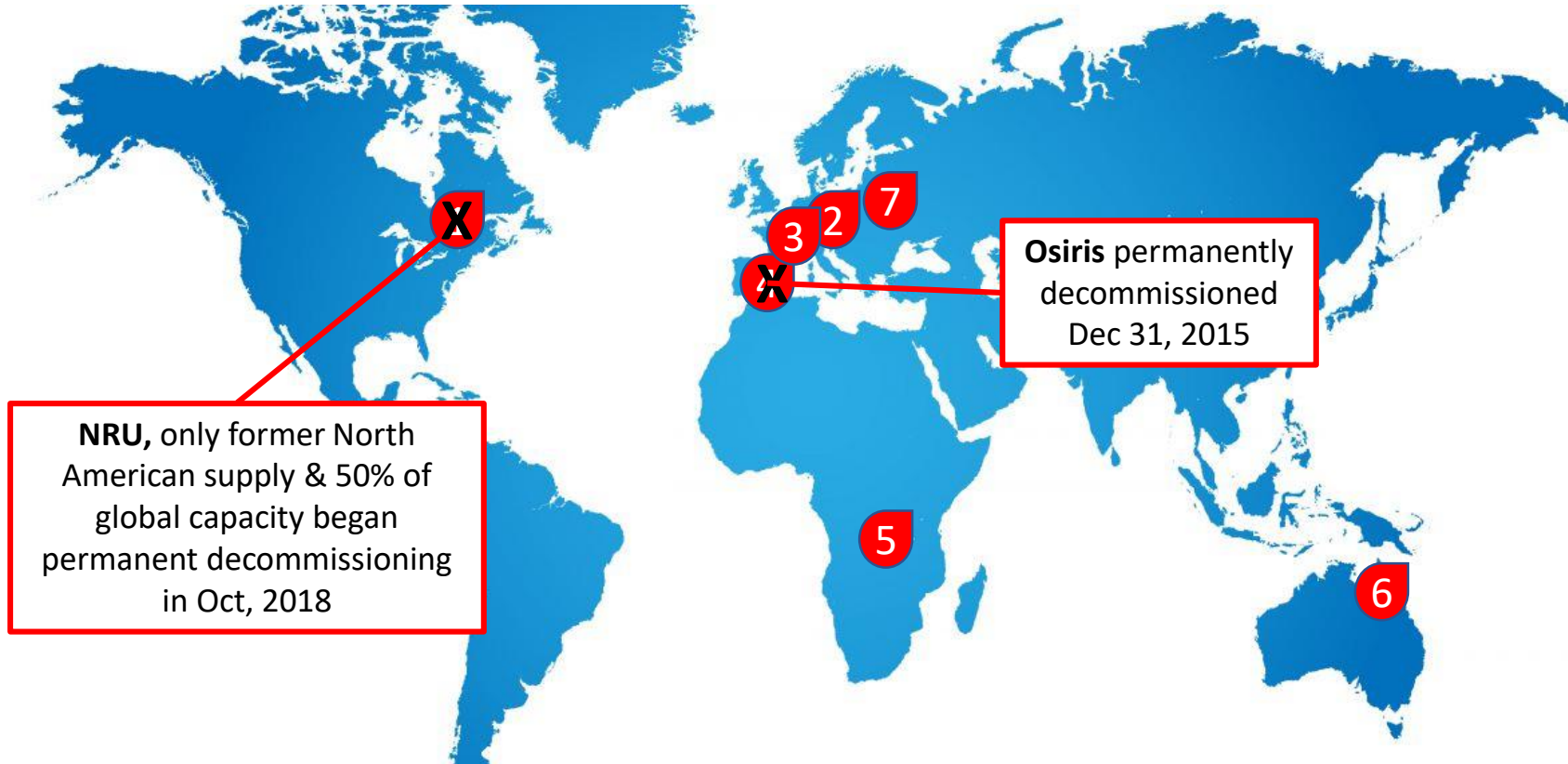
Eden's Mo-99, would be the primary material used to diagnose heart disease and a variety of cancers

*Technetium Tc-99m (Mo-99's usable form) accounts for over 35 million WW molecular imaging procedures annually or **~85% of all nuclear medicine procedures (SPECT and PET)***



Eden's Lutetium-177, would be the primary radiotherapy material used to treat a variety of cancers, such as prostate & neuroendocrine, along with several additional new cancer treatment options currently under clinical development

Why We Do It



Reactors which produce Molybdenum-99):

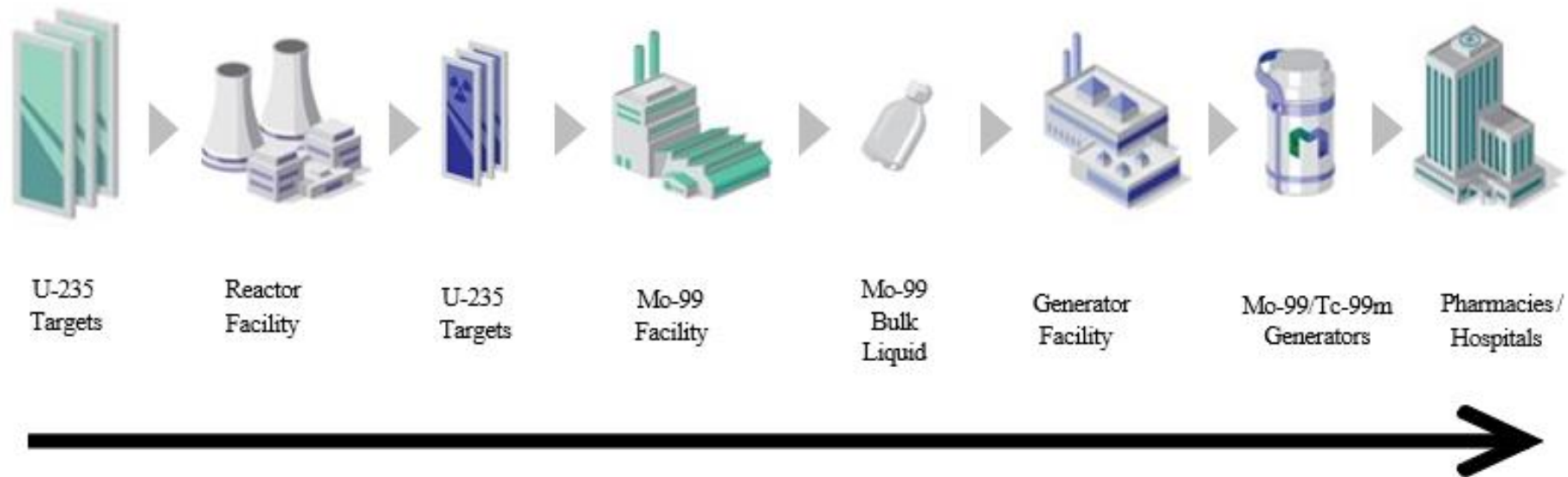
- ~~1. NRU – Canada~~
- 2. HFR - The Netherlands
- 3. BR2 – Belgium (Backup)
- ~~4. Osiris – France~~
- 5. Safari – South Africa
- 6. Opal – Australia
- 7. Maria – Poland (Backup)

There are currently *no suppliers* in North America for Molybdenum-99, yet the US represent more than 50% of all global usage

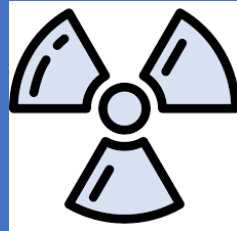
The global demand for Molybdenum-99 approximates demand, with any unplanned reactor outage causing shortages in the marketplace for patient doses

How Eden Serves the Radiopharmaceutical Industry

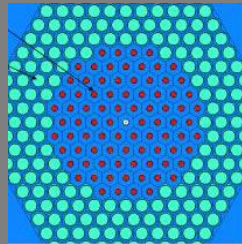
From Mo-99 Target to Patient in ~36 hrs.



Eden Radioisotopes



A new startup company, will build a small scale 2 Megawatt all LEU-target reactor and processing facility, solely dedicated to medical isotope production, with a year-round Moly production capacity to exceed the current entire global demand of 10,000 6-day Ci /wk, along with other medical isotopes.



*The GENESIS reactor design is a fully dedicated medical isotope reactor, utilizing an **all-LEU target/core**. This patented all-LEU target reactor technology, exclusively licensed from Sandia National Laboratories, will operate continuously year-round, at a fraction of the cost of other reactors.*

Genesis Design Features

Simple

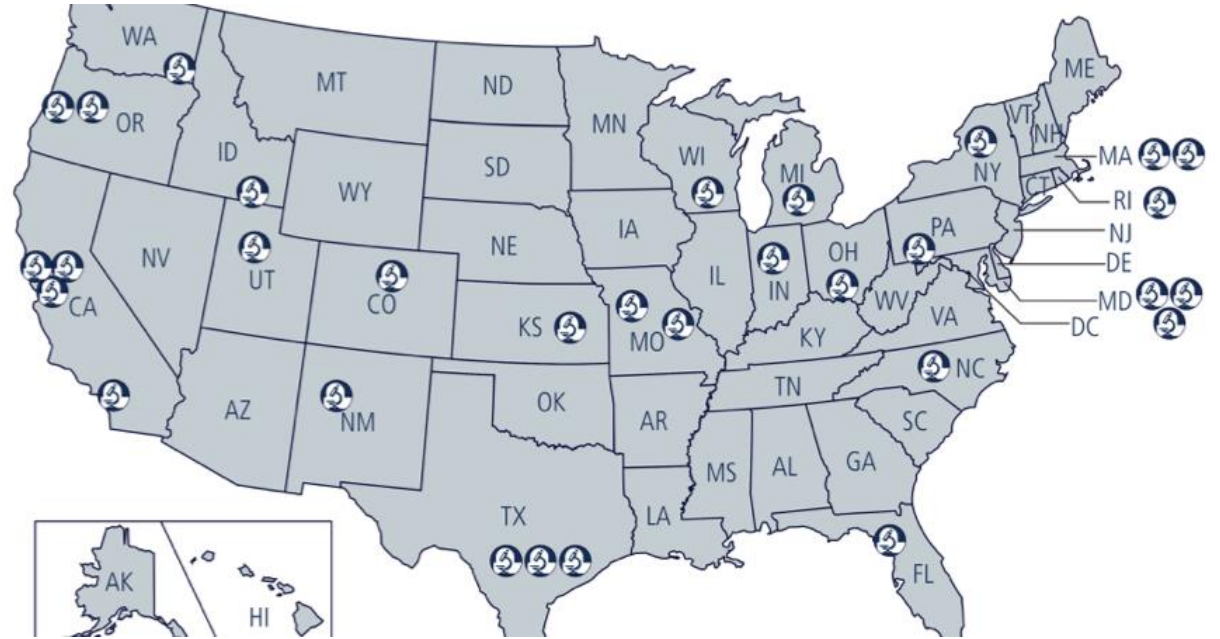
- Small, single purpose, medical isotope production
- Flexible core configuration & target irradiation
- All proven technology. Open pool system w/natural circulation cooling

Safe & Readily Licensable

- Annular hexagonal array of targets and drivers
- Targets & Drivers interchangeable (equivalent nuclear & thermal)
- Maintain design within domain of NRC familiarity
- Genesis benefits from extensive reactor development and operation experience from Sandia NL

Cost Effective

- Operates continuously 22/7/365, with 2 hrs/day for maintenance & target extraction/replacement
- Maximum ^{99}Mo production per unit reactor power
 - Why pay the cost of construction and operation of a 10 to 100 MW system when you only need 1.5 MW to satisfy WD
- Maximum ^{99}Mo production per unit LEU used



Research Reactors are common throughout the country

Regulatory Considerations

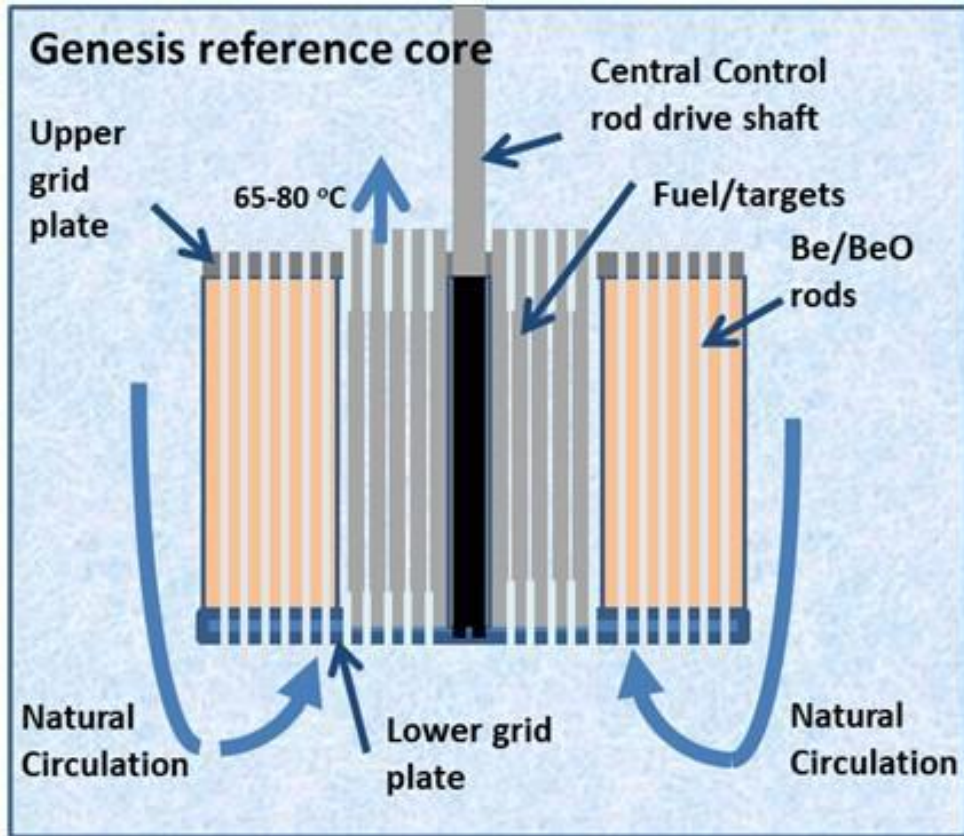
The regulatory scope with respect to radiopharmaceuticals is two-fold:

- 1) Regulations regarding the handling, use, and transport of nuclear materials
- 2) Regulations typically associated with drug safety, efficacy, and health authority approval.

Molecular Imaging is subject to significant regulatory oversight given the sensitive and restricted materials that are utilized and produced

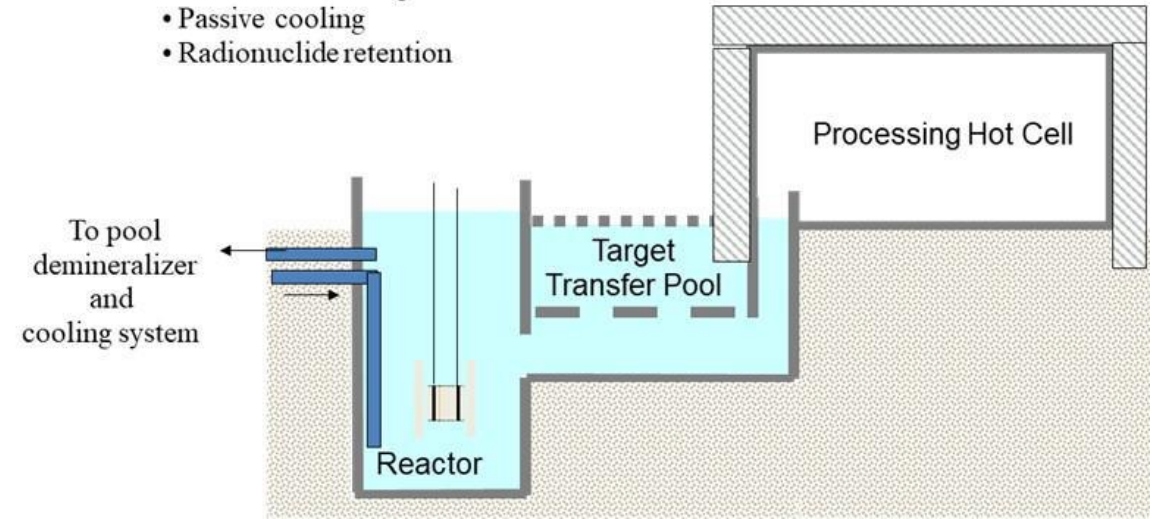
These groups include:

- Nuclear Regulatory Commission (NRC)
- Food and Drug Administration (FDA)
- European Union (EU), European Medicines Agency (EMA)
- Boards of Pharmacy
- US/EU Departments of Transportation (DOT)
- Occupational Safety and Health Administration (OSHA)
- Pharmaceuticals and Medical Devices Agency (PMDA)
- Environmental Protection Agency (EPA)
- US Department of Agriculture (USDA)
- Department of Homeland Security (DHS)
- Country Customs and Border Patrols



Swimming Pool Concept provides:

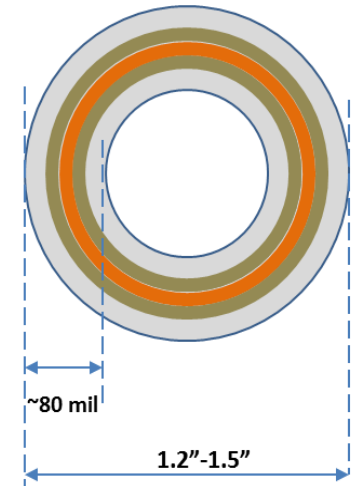
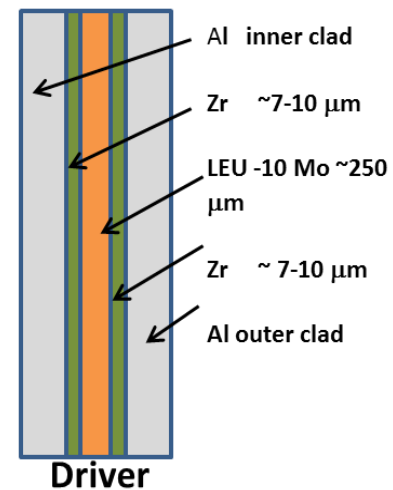
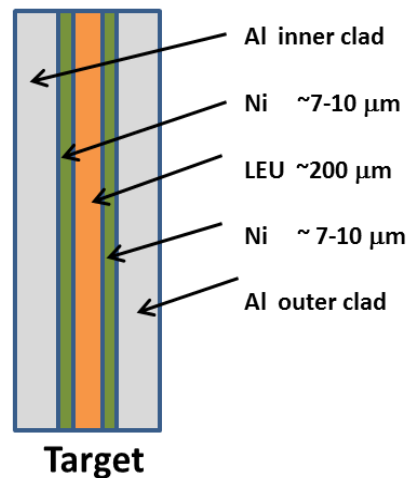
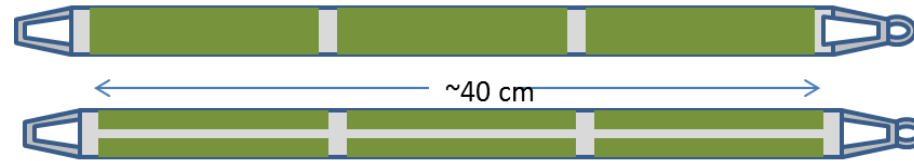
- Accessibility
- Radiation shielding
- Passive cooling
- Radionuclide retention



Eden Genesis Reactor & Process Facilities Interface

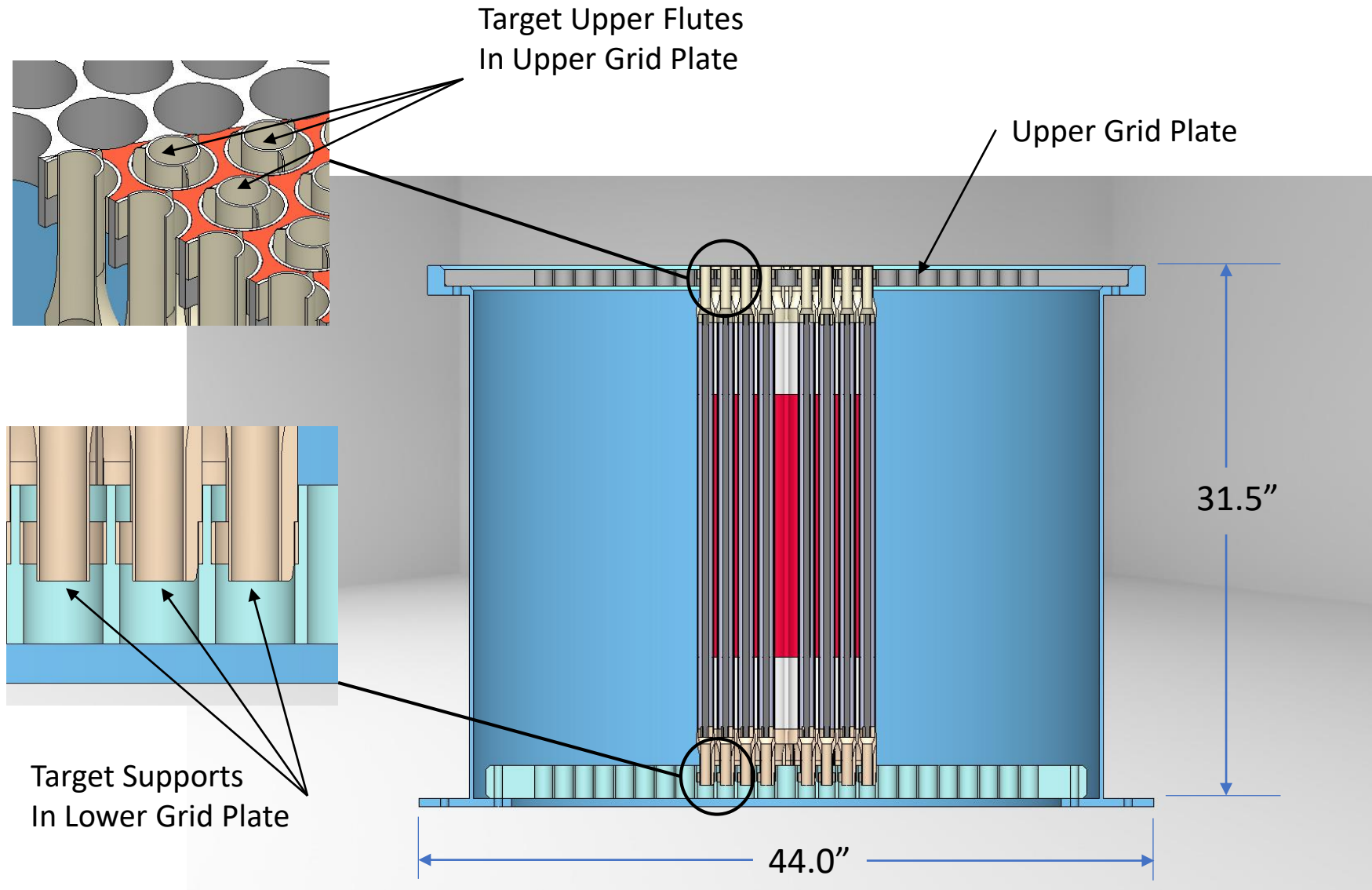
Genesis Reactor Target & Driver Design

- Based upon over a decade of research and testing performance of Argonne's Mo-99 target
- Driver elements, with a useful life of 6 months to a year, are used in addition to targets for early low market share to avoid non-productive reduction of target inventory.
- Goal following start of commercial production is to fabricate targets in-house

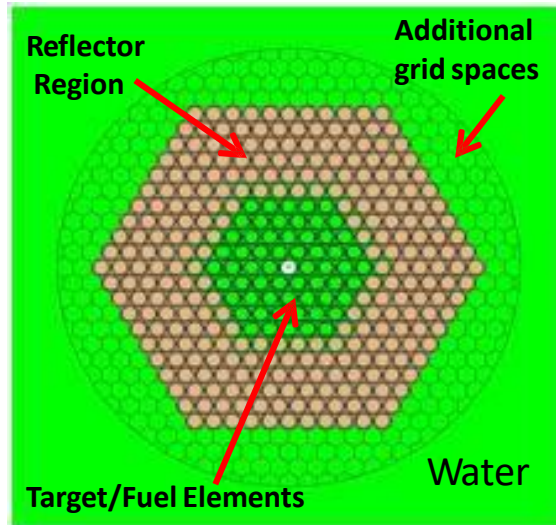


Nominal dimensions

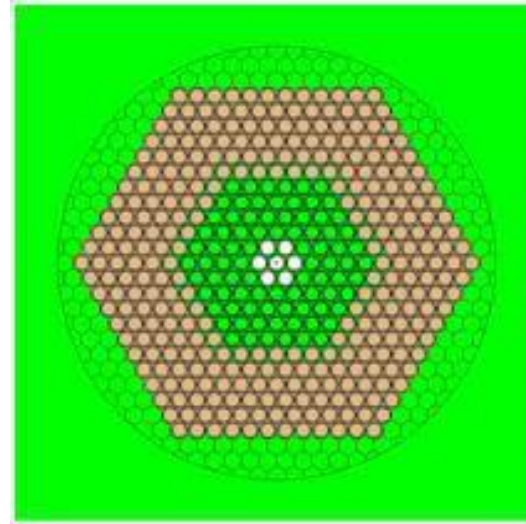
Genesis Reactor Core Cut-Away



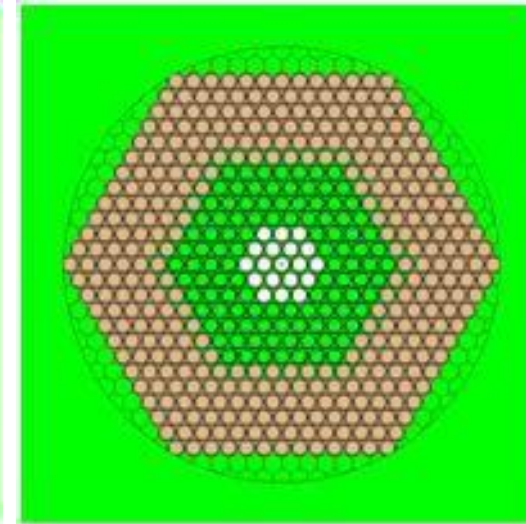
All-Target Core Flexible Configurations



60 element configuration, A
1.2 MW operation capability
Satisfies current USD
USD≈4500 6d Ci/week



84 element configuration, B
1.7 MW operation capability
Satisfies current WD
WD≈10,000 6d Ci/week



108 element configuration, C
2.0 MW operation capability
Satisfies future WD

For configuration A to meet USD: 60 each 20 kW targets* need be processed per week

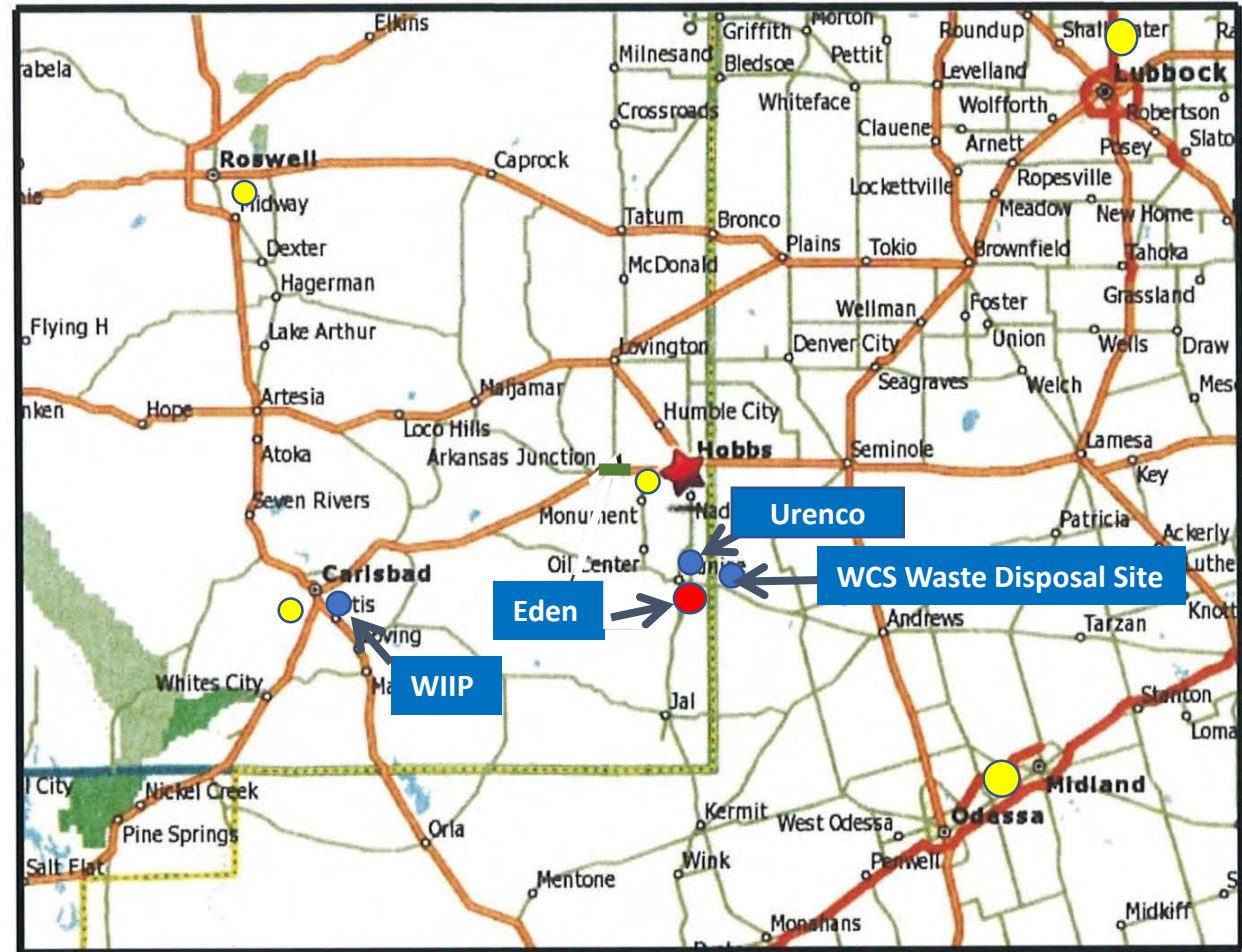
* 7-day irradiation, 24-hour shipment preparation time(SPT)

Why Lea County

Advantages of Lea County:

- Transportation logistics
- Nuclear-friendly community
- Ease of waste disposal
- Yates family support of SE NM
- Ability to contribute to and pull from an educated work force

●--Airport options for first leg to Dallas

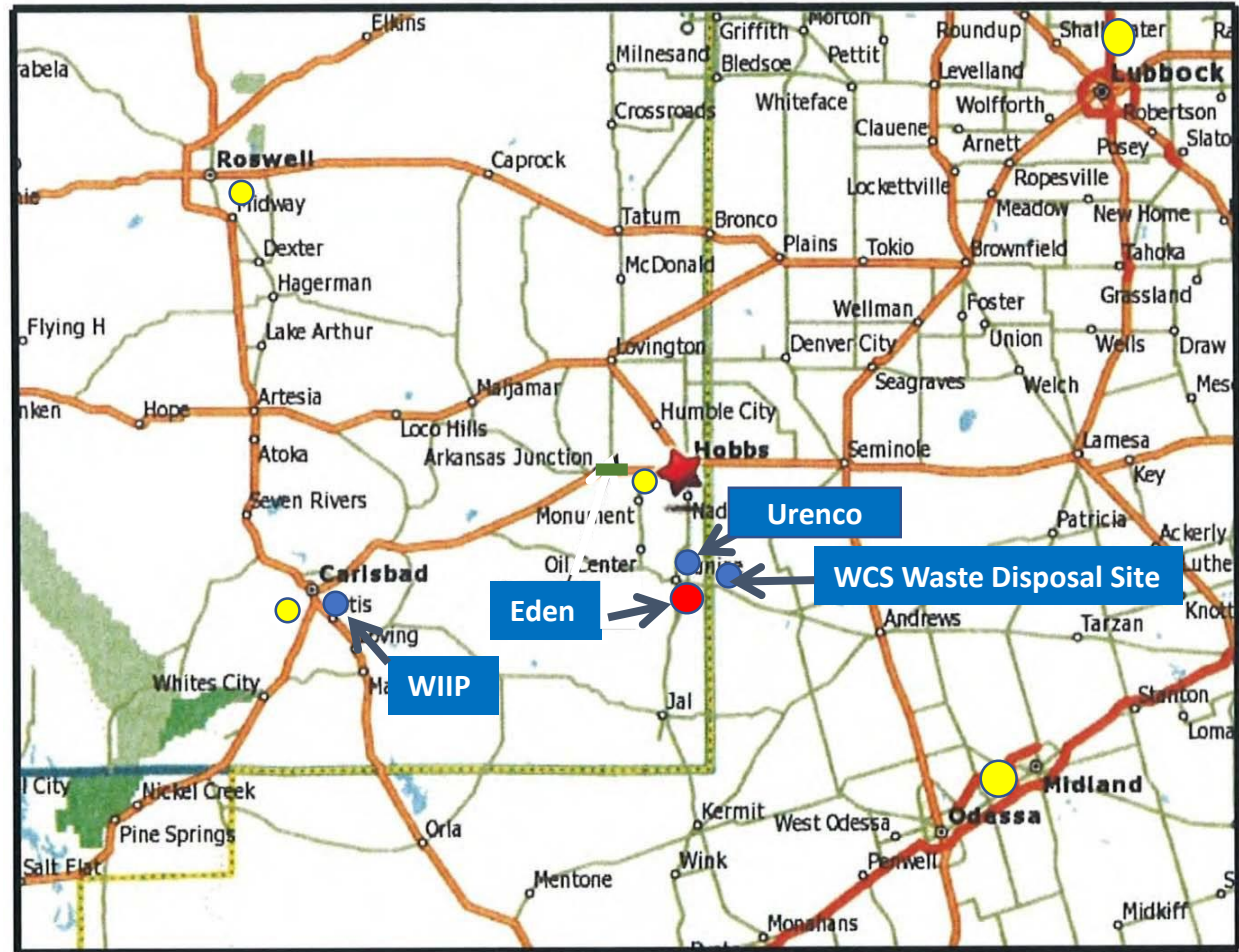


Why Eden

Benefits to New Mexico & Lea County:

- \$60 million manufacturing facility
- Several hundred building trade jobs created during facility construction
- Over 100 permanent jobs created at avg compensation of ~\$85,000
- Tax revenues from \$10M annual employee payroll & >\$100M in Sales

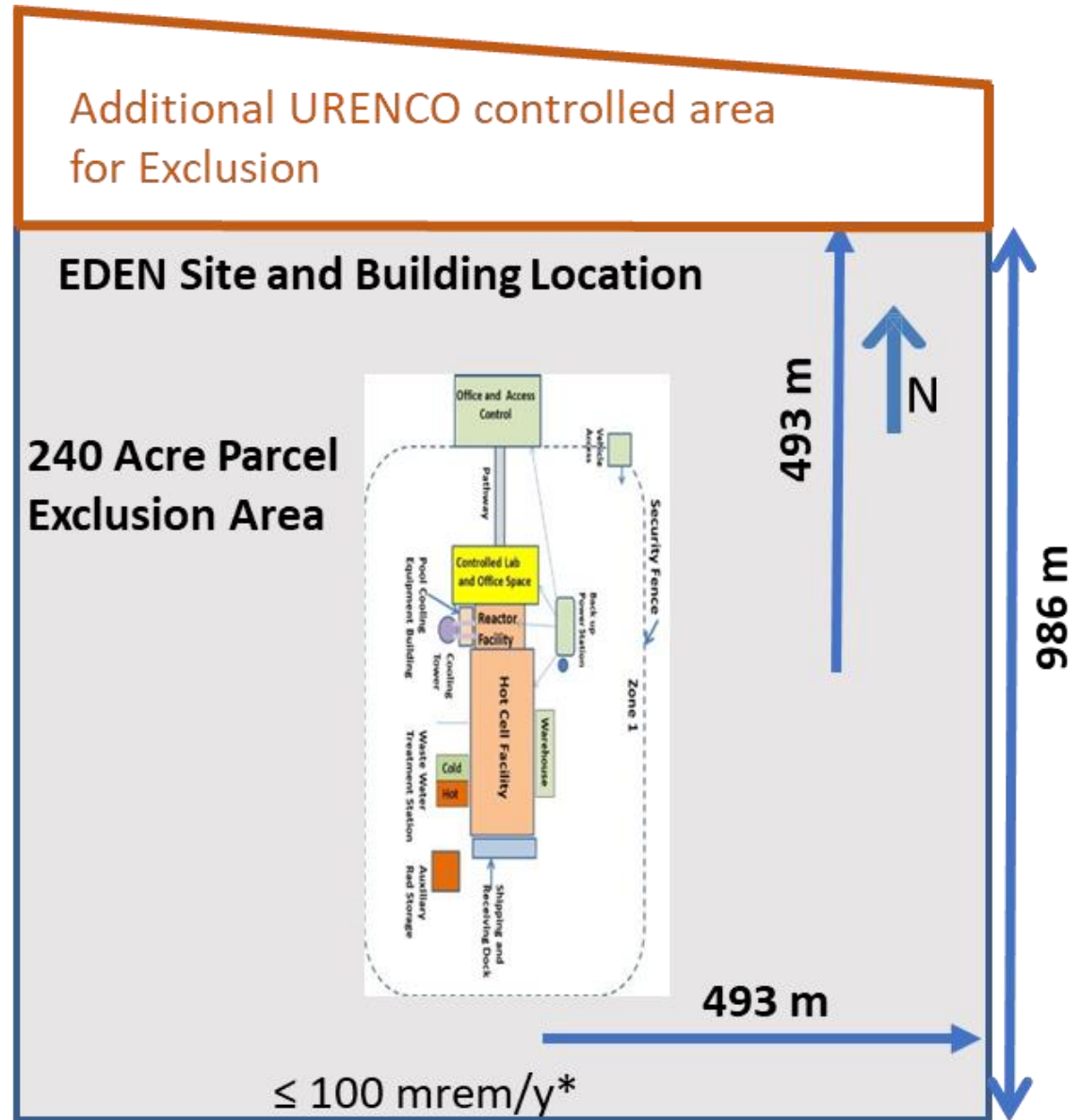
●--Airport options for first leg to Dallas



Property & Facility Configurations

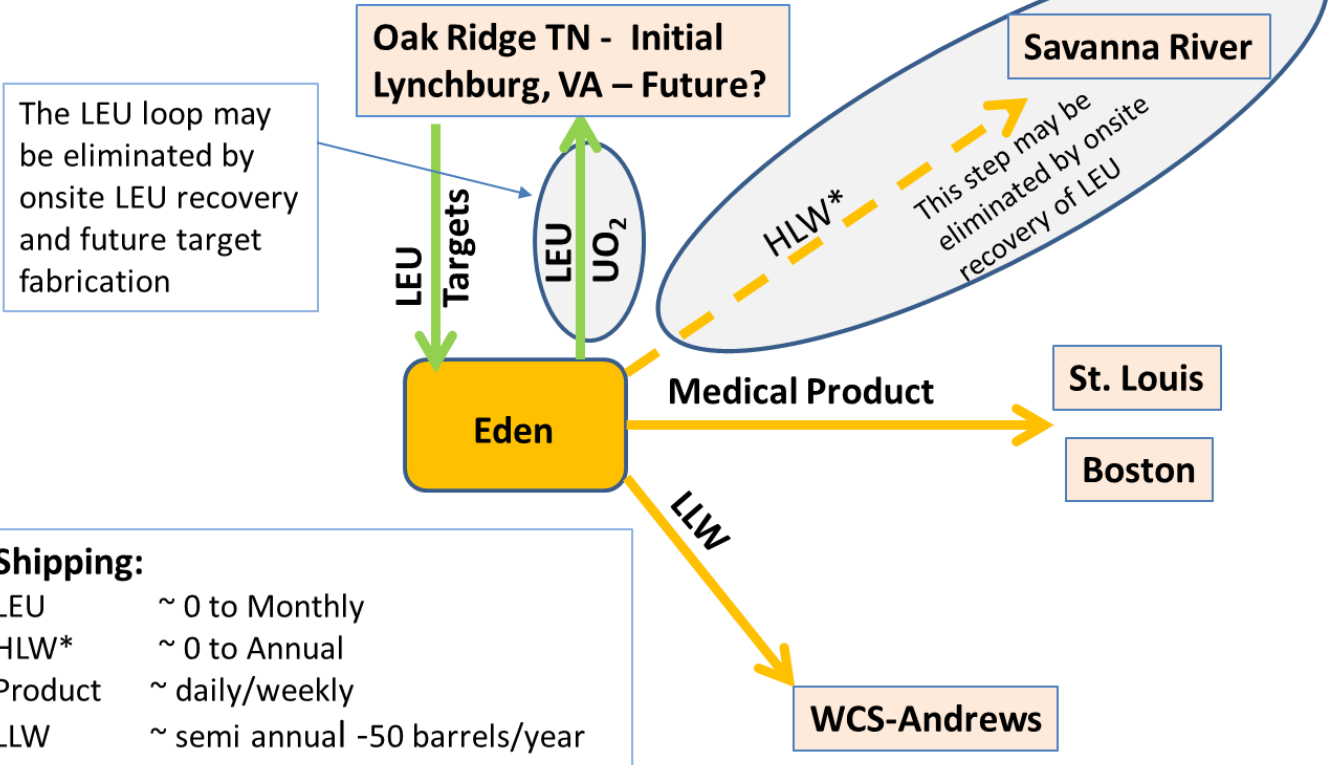
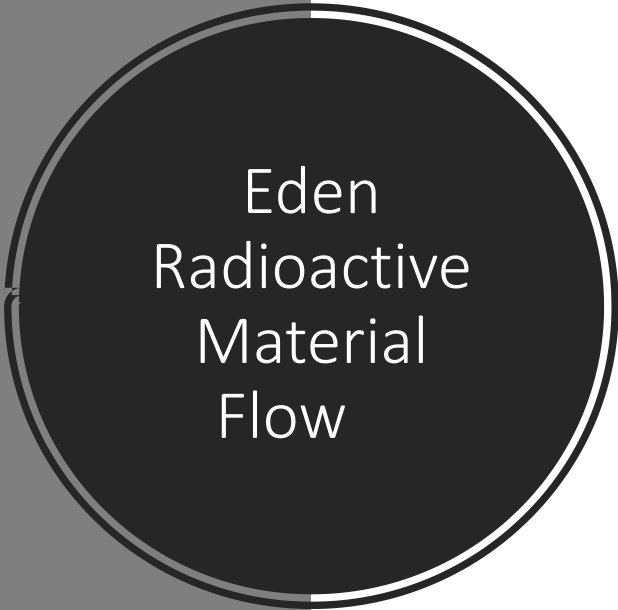
ER & PSAR to be submitted by end of 2019

Commercial Mo-99 production within 4 yrs



Eden Radioactive Material Flow

All radioactive materials leave the Site

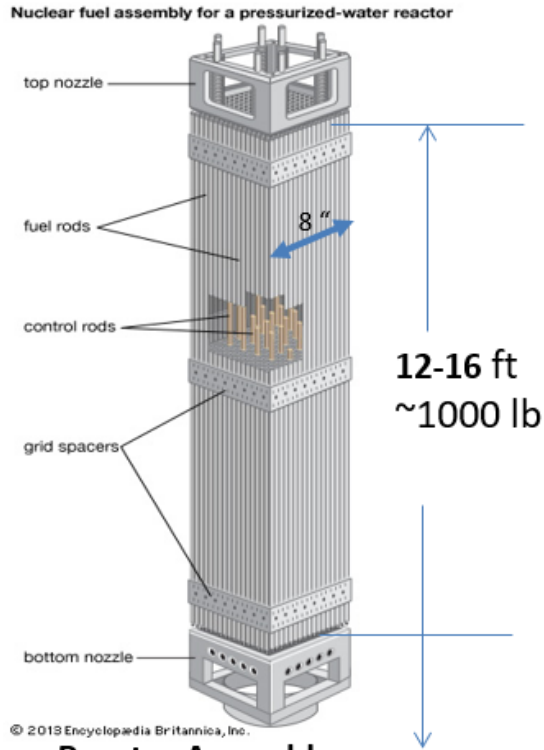


Shipping:

LEU	~ 0 to Monthly
HLW*	~ 0 to Annual
Product	~ daily/weekly
LLW	~ semi annual -50 barrels/year

- * Unprocessed irradiated Targets or Drivers
- Minimal to start
 - None at full operation

Waste Comparison Perspective




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Power Reactor Assembly
 190 Assemblies in reactor
 ~260 fuel rods/assembly
 17.6 MW per assembly for six years
 ~ 38,000 MWd of waste HLW

Eden Genesis Fuel Element
 60-80 elements in reactor
 10-30 kW per element
 Targets 7 -21 days
 0.07-0.21 MWd LLW
 Drivers* ~180 days
 < 1.8 - 5.4 MWd HLW
 * None under full production


Comparison to Eden of the WIPP Facility & Proposed Holtec Waste Storage/Disposal

HLW/Spent Fuel Storage **Holtec Facility**



Bundle of used fuel assemblies
Canister Storage cask

Dry Storage of Spent Fuel



Below Grade Storage

Each fuel assembly contains ~ 40,000 MWd HLW

LLW Storage

Eden Facility



55 gal drum
Holds 60 targets waste
Total ~12 MWd LLW



Conceptual, not detailed

WIPP Facility



Waste Isolation Pilot Plant
U.S. Department of Energy
2,130 feet below the surface

Surface Level
Dewey Lake Roadbed: 450 ft
Kutler Formation
Salinity Formation
Waste Repository Level: 2130 ft



Truck Fire 2/5/14

Drum Breach 2/14/14

Ventilation system:
425,000 ft³/minute
Constantly monitored
HEPA filtered

Panel 1
Panel 2
Panel 3
Panel 4
Panel 5
Panel 6
Panel 7
Panel 8
Panel 9A
Panel 10A

- Filled
- Emplacement in progress
- Mining Completed
- Future (planned)
- Proposed

Federal Laboratory
Consortium (FLC)
Mid-Continent Region
Technology Transfer
Competition

*2019 Excellence in
Technology Transfer
Award*



“... your nomination, Small Reactor to Help Solve Worldwide Medical Isotope Shortage, has been selected to receive the 2019 Award for Technology Transfer. Thank you for submitting this nomination. Your proposal stood out in a highly competitive category.”



The FLC, Mid-Continent Region, spans 14 states and over 100 federal laboratories & facilities and is the largest of the six FLC regions. Laboratories in the Mid-Continent Region perform cutting-edge research for agencies that include the Department of Defense (DOD), Department of Energy (DOE), and Department of Agriculture (USDA), to name a few.



FLC Objective - Technology transfer is the process by which existing knowledge, facilities, or capabilities developed under federal R&D funding are utilized to fulfill public and private needs.



Questions