Reprocessing Spent Nuclear Fuel

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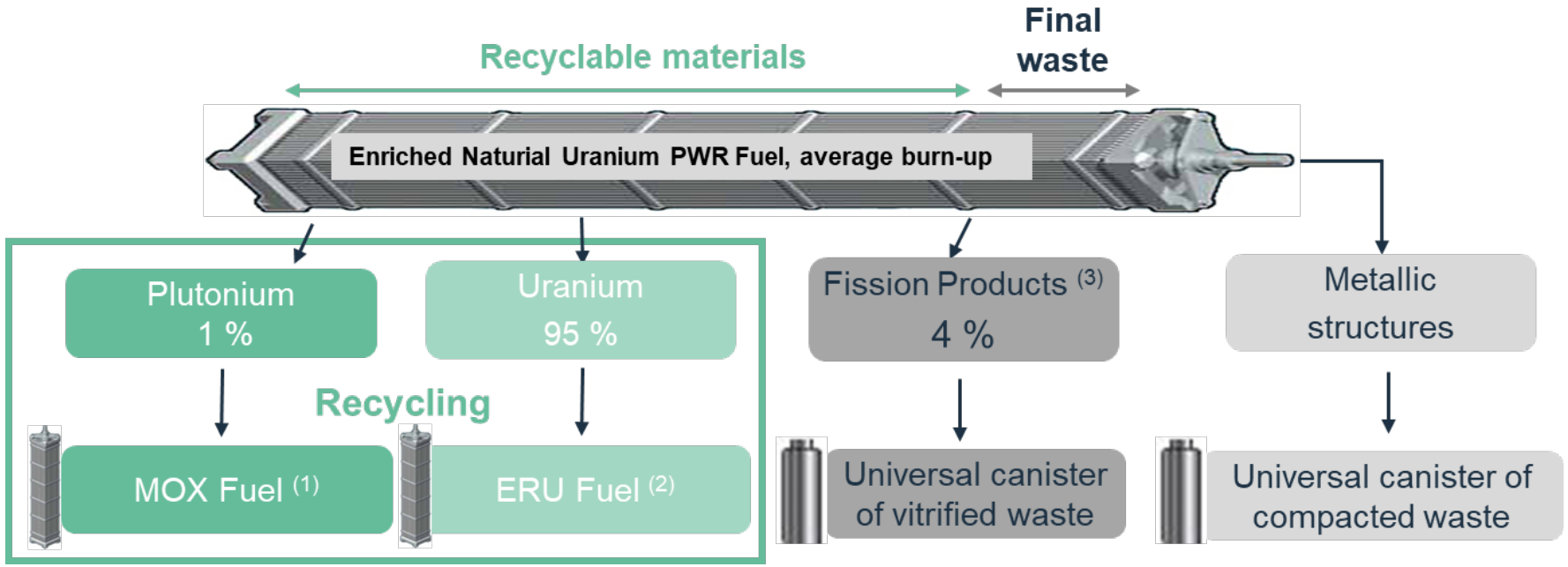
orano

01 Reprocessing Operations in France

96% of the Spent Fuel Can Be Recycled

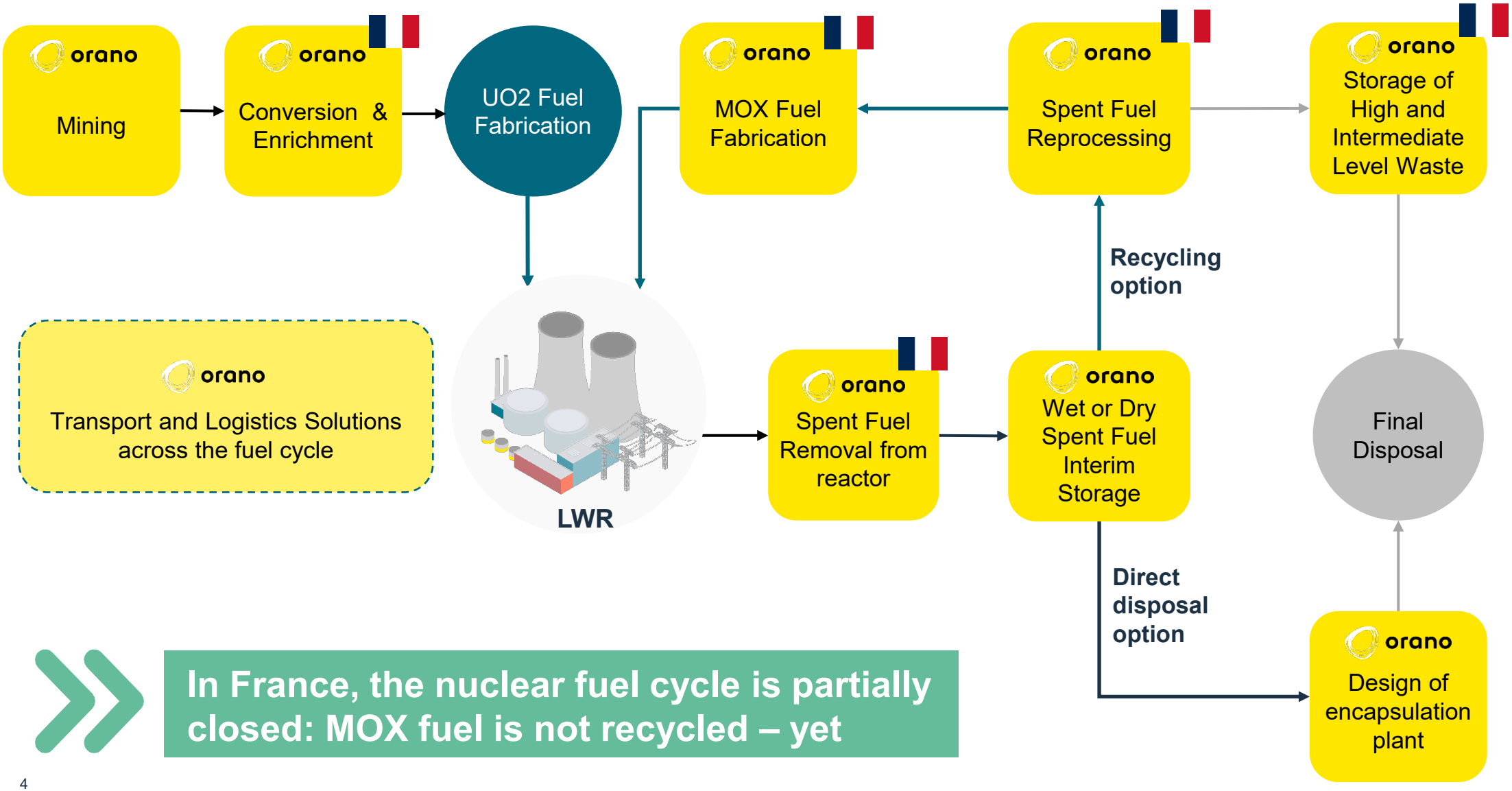


(1) MOX: Mixed oxide Uranium & Plutonium (2) Enriched Reprocessed Uranium (3) And minor actinides

- **In France:** Among 56 reactors in operation, **22 '900 MWe' are partially** loaded with **MOX**
- **Each year MOX fuel enable producing 10% of the country's nuclear electricity**.

One MOX fuel assembly contains enough energy to supply a **100,000 inhabitant**'s city with **electricity for one entire year**

Overview of Orano Nuclear Fuel Cycle Solutions and Ops in France



In France, the nuclear fuel cycle is partially closed: MOX fuel is not recycled – yet

Orano Recycling Platform: A Strategic Asset with 50 years of Experience, Shared Worldwide

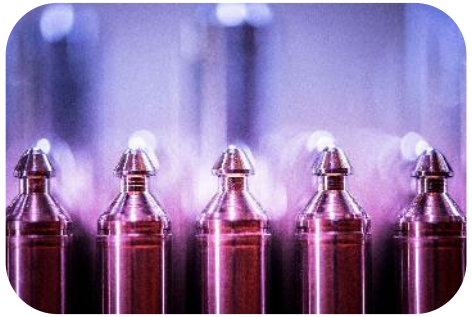
LA HAGUE REPROCESSING PLANT

FUEL REPROCESSING:

~35 000 tHM reprocessed for France

~10 700 tHM reprocessed for
8 other countries (Italy, Belgium, Germany, Netherlands, Spain, Switzerland, Japan, Australia)

MELOX FUEL FABRICATION PLANT



LWR MOX FABRICATION:

~ 3 200 tHM MOX fuel produced,
loaded in **43 reactors** worldwide

SAFE TRANSPORT BY TRAIN, TRUCK & SHIP

SPENT FUEL TRANSPORT:

Over 7250 spent fuel casks
transported for France

Over 4500 spent fuel casks
coming from abroad

- Involves **international transportation operations**, managed by Orano specialized in nuclear material logistics.
- **Wide range of domestic transport regulations** to be addressed.

Reprocessing Brings Many Benefits

Saving Natural Uranium Resource
20-25% in mono-recycling scheme with MOX and RepU

Reducing spent fuel storage requirements by 4x
(over 28,000 tHM in France)

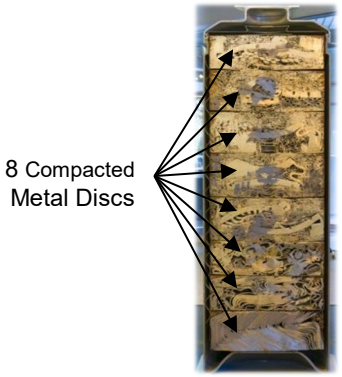
Reducing waste by factor 5
In volume including the footprint on final disposal site and **factor 10 in radiotoxicity**

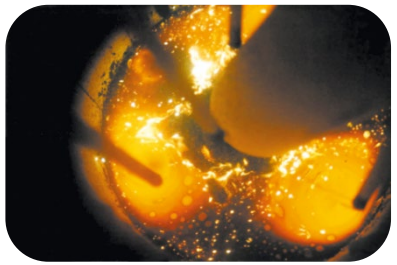
Easy to Transport
Orano has approved transport containers available for spent fuel assemblies being transported to La Hague.

Easy to Handle
Universal Canisters standard sizes and dimensions

Support Future Disposal Policy
Can accommodate any final repository:
Mined Deep Geological, Deep Borehole, etc.

Simplifies Final Disposal Site Design
Since there is no Uranium or Plutonium
No IAEA Nonproliferation Safeguards, No Nuclear Criticality Safety Design



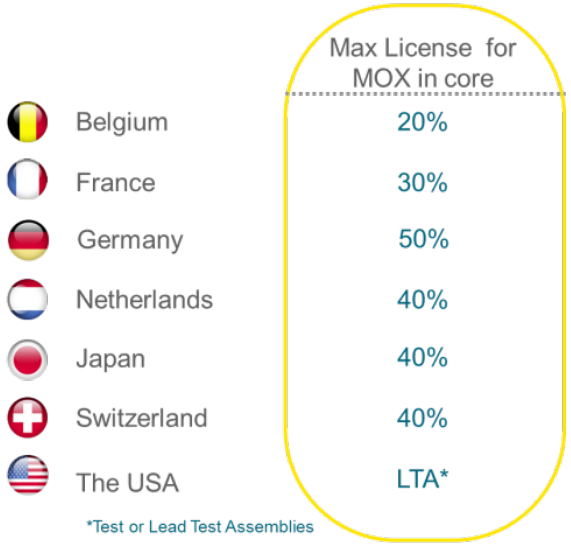


Waste from French reactors is stored safely in the La Hague Interim Storage Hall until the Deep Geological Repository Cigeo is opened

Foreign waste from reprocessing returned to country of origin for storage pending disposal.

MOX Fuel in LWR: A Strong Performance

- MOX Fuel has been used in more than 40 reactors both PWR and BWR
- With a perfect safety track record for more than 50 years
- MOX has been licensed by 7 national safety authorities
- MOX fuel is adapting to Utilities requirements
  - Baseload/Load Follow
  - Average discharged BU following trends of UOx's
  - MOX performance levels equivalent to UOx



Quantity loaded in core adapted to each utility specific requirements

France

- 56 reactors operated by one single operator
  - Among which 24 are licensed with MOX
- Standardized fuel management
- Load follow
- Mono-recycling strategy with Closed cycle perspectives
- Management of the domestic Pu stockpile

Netherlands

- 1 reactor
- Optimized burn-up
- Baseload
- Full recycling strategy
- MOX used to consume the whole Pu credit (no remaining materials when reactor ceased operation)

Switzerland

- 5 reactors operated by 4 operators
  - Among which 3 have been loaded with MOX
- Optimized burn-up
- Baseload
- MOX manufactured using both Pu

“Aval du Futur” Program

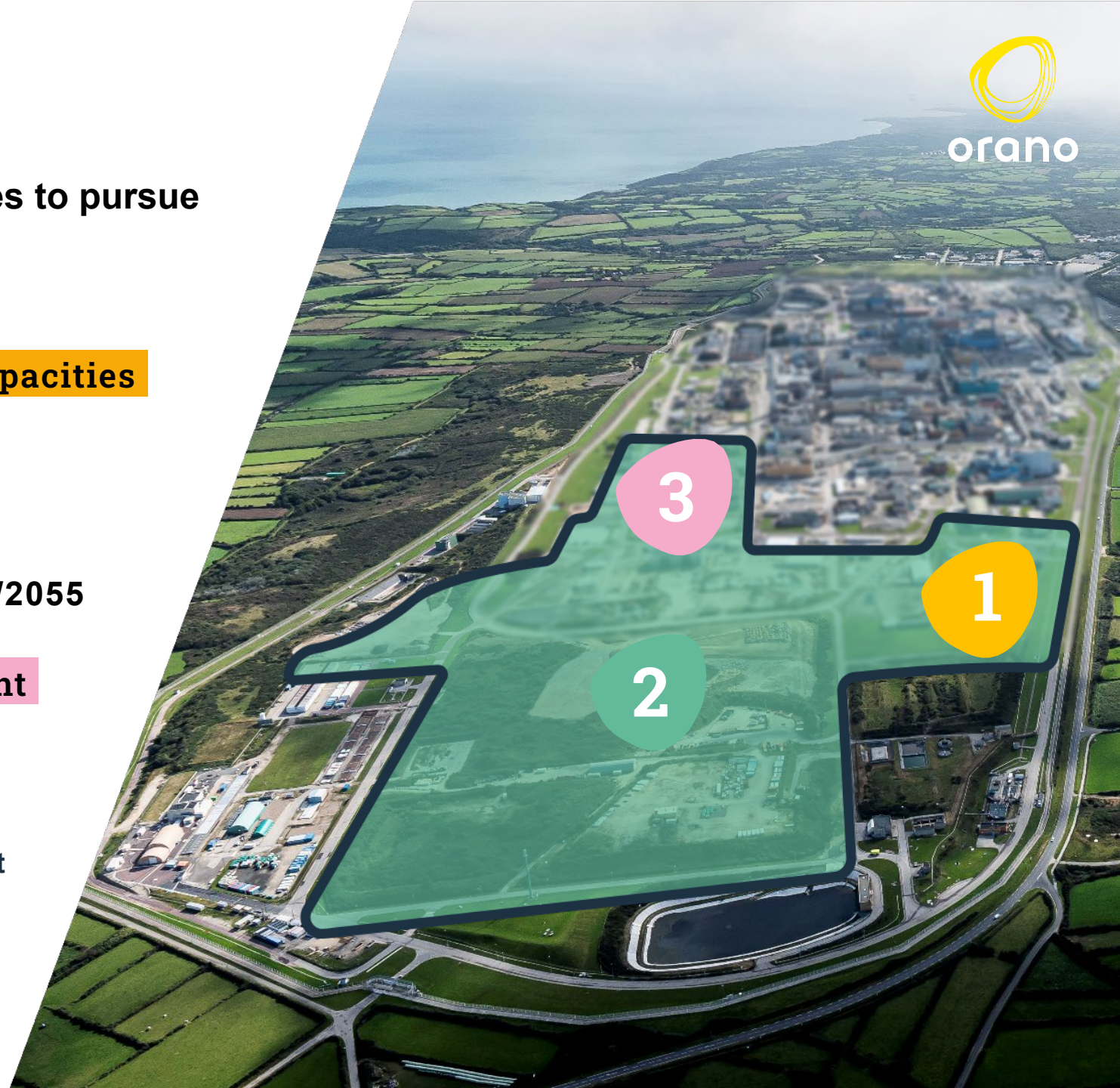
Design, build, commission new capacities to pursue reprocessing and recycling beyond 2100

1. **New unloading and wet storage capacities**
with an initial capacity of 6,500t:
to be commissioned in 2040

2. **Spent fuel reprocessing facility**
commissioning starting around **2050/2055**

3. **Modular MOX fuel fabrication plant**
commissioning starting **in 2040**

A 50-hectare area identified for the new plant, without leaving the existing perimeter of the La Hague site



02 Orano in the United States

Orano USA

Transport Cask for Used Fuel and GTCC

Waste Management Facility at INL

First Production Facility for Alpha Therapy Drugs

Manufacturing Facility for Dry Storage Systems

About Orano USA

Orano USA is a leading supplier of:

- **Nuclear fuel materials**
- **Used fuel management**
- **Radwaste treatment solutions**
- **Nuclear medicine with Orano Med**

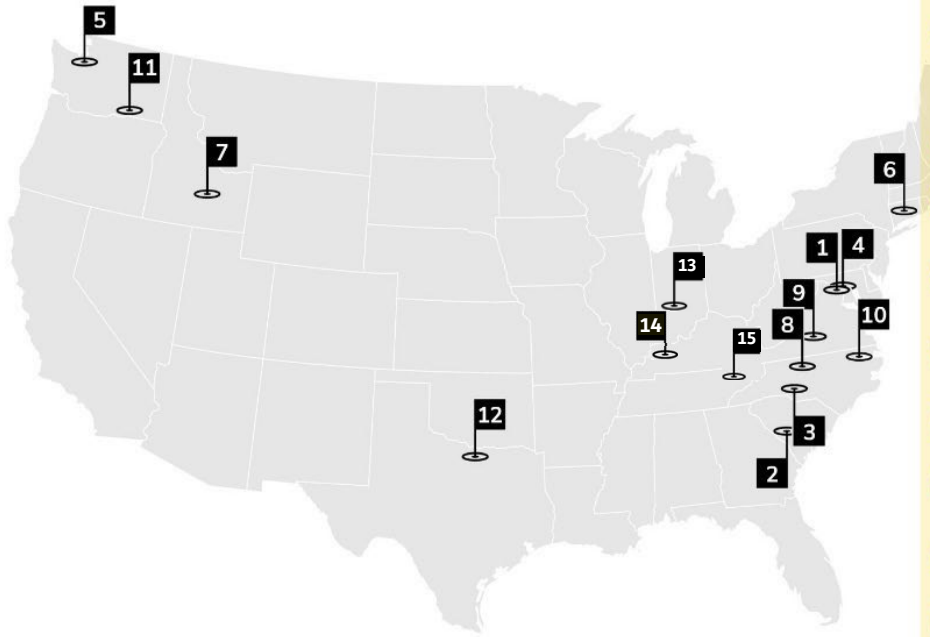
Workforce

450
U.S. employees

Main Services

Sales presence | Logistics | Engineering | Nuclear medicine

Sites



1 Bethesda MD
Headquarters

2 Aiken SC - Woodward Dr
Logistics
Offices

3 Charlotte NC - David Taylor Dr
Engineering

4 Columbia MD
Logistics

5 Federal Way WA
Engineering

6 Hudson MA
Engineering

7 Idaho Falls ID
Engineering

8 Kernersville NC
Industry

9 Lynchburg VA - Graves Mill Rd
Offices

10 Moyock NC
Industry

11 Pasco WA
Engineering

12 Plano TX
Nuclear medicine

13 Brownsburg IN
Nuclear medicine

14 Kevil KY
Industry

15 Oak Ridge TN
Industry

Orano USA has been present for 60 years and will be present for the next 60 years – at least

Orano Enrichment Project IKE: Future New U.S. Domestic Supply

IKE PROJECT
(Oak Ridge, TN)

3.7 **MSWUs nominal capacity**

Budget: ~$5 billion

Initial production, expected in 2031,
assuming that licensing, construction and LT customer commitments proceed smoothly

- Orano was selected by the U.S. Department of Energy to receive **$900M funding** for a new enriched-uranium production facility.
- Confirms U.S. authorities' confidence in Orano's **industrial expertise** and ability to deliver a **robust, secure, & competitive solution**. Same technology as Orano's GB2 and GB2X plants (ETC)
- Only industrial supplier chosen for **LEU and LEU+ enrichment services** among the three selected companies.
- Strengthens U.S. domestic fuel supply, **especially with Russian uranium imports banned** from 2028. And supports **growing electricity demand** from AI and data centers, requiring stable, low-cost, low-carbon power.
- The IKE project will **complement the ongoing expansion** of Orano's Georges Besse II enrichment plant in France, which is the **company's first major response** to rising global energy needs.

» **Next steps** include submitting the **license application** to the US Nuclear Regulatory Commission and securing sufficient **long-term customer commitments**. Plant construction is expected to begin in 2027.

IKE Meets U.S. Objectives

- National Security Presidential Memorandum (NSPM) America First Investment Policy, signed by President Trump on February 21, 2025, which states: *"Welcoming foreign investment and strengthening the United States' world-leading private and public capital markets will be a key part of America's Golden Age"*
- President's May 23, 2025 Executive Order, *Reinvigorating the Nuclear Industrial Base*
- Request for Information issued in January 2026 to States for hosting Nuclear Innovation Campuses: **Orano's commitment to partner with South Carolina**

IKE: Energy Security, Made in America

03 The Future of Reprocessing in the United States

Federal Liability For Stored Spent Nuclear Fuel (SNF) Keeps Growing…

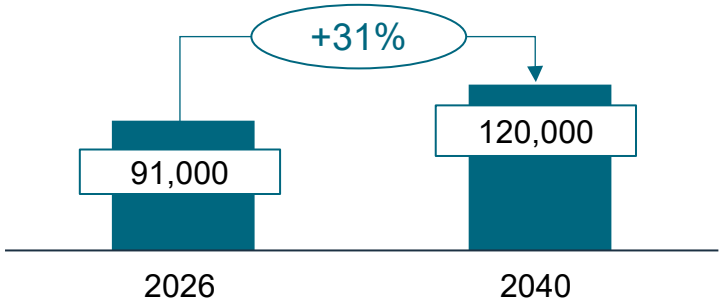
1982 — **The Nuclear Waste Policy Act of 1982 established the U.S. program for geologic disposal of spent nuclear fuel** and high-level radioactive waste.

1987 — **Yucca Mountain, Nevada, is designated as the sole site for the nation's first deep geologic repository**. DOE was legally supposed to begin accepting SNF to the planned Yucca Mountain Depository by 1998.

1990s-2000 — Utilities sue the federal government because it missed the 1998 deadline, as required by the NWPA. **Damages paid to utilities** (for storing waste themselves) **come from the Judgment Fund (DOJ) and cover storage costs**

2011 — **Political and legal opposition to the project has indefinitely delayed** the operation of the Yucca Mountain repository

As of 2026, 91,000 metric tons of SNF were stored in the United States, mostly at nuclear power plant sites at Independent Spent Fuel Storage Installations (ISFSI), increasing by **about 2,200 metric tons per year**, awaiting consolidated storage and/or permanent underground disposal.



~57,500 tHM spent fuel stored in Dry Fuel Storage: an increasing liability

Current back-end value chain in the U.S.:

Fuel irradiation in reactor → **Wet Storage** → **Pool to pad** → **Onsite Dry Storage** → **Transport to Interim Storage** → **Interim Storage Management** → Transport to Final Repository

Not currently performed in the U.S.

Political Barriers and the Lack of Financial Incentives Pose Challenges on Reprocessing…

Political Challenges

- **The Federal Government position on reprocessing can fluctuate over time. Currently, there is a positive momentum for reprocessing and recycling of spent nuclear fuel (Innovation Campus initiative)**
- **Congress will need to amend the *Nuclear Waste Policy Act*** to find a proper final disposal site and pave the way for reprocessing: accommodate alternative fuel cycle strategies alongside direct disposal
- **The Federal Government cannot impose views on State levels**
  - Long-term success for major projects depends on **constructive collaboration** between federal, state, and local authorities

Financial & Competitiveness Challenges

- As DOE has not delivered a permanent repository yet, utilities are compensated for on-site spent nuclear fuel storage costs, **limiting their financial incentive to pursue reprocessing**
- **Uranium prices remain low relative to the higher cost of MOX fuel fabrication**, as of now

Technical Challenges

- **Various burnups imply different MOX specifications and refuel cycles**
- Unlicensed reactors are unable to host MOX Fuel, and **licensing/adaptation demand important investment costs**

Paving the Way to Reprocessing Will Depend on Key Enablers

Establish a coherent and enabling federal framework

- **Update the *Nuclear Waste Policy Act*:**
  - **Find a final disposal site**
  - **Accommodate alternative fuel cycle strategies** alongside direct disposal
- **Promote recycling as a tool for sovereignty** (cf. EO *Reinvigorating the Nuclear Industrial Base*)
- **Secure stable programs and public funding**

Ensure public acceptance

- **Find and obtain the support from a community for a final disposal site**
- **Promote SNF recycling as a tool to enhance long-term energy security**
- **Demonstrate community benefits, including high-skilled employment and regional investment**

Incentivize utilities

- **Address the current cost recovery structure** (cf. *Indiana Michigan Power Co. v. United States*)
- **Build support through tax credits, grants and regulatory benefits**
- **Help utilities navigate through licensing and switching efforts to MOX Fuel**

Focus on the Future of Waste Management for A/SMRs

Contrary to existing reactors, where waste management can directly benefit from an existing recycling infrastructure, new reactors will require different solutions

- **Spent fuel from Water-cooled SMRs can benefit from existing technologies**

- **Other designs should be treated case by case by either new recycling or improved storage solutions:**
  - Voloxidation
  - Waste reduction (HLW volume / toxicity reduction + Zr recycling)
  - Suitable, improved final disposal solutions
  - Some technologies only have remote hopes of recycling

- **Orano's dual purpose-cask TN-Eagle will remain part of the solution for used fuel transportation and storage**
- **Improved treatment and storage solutions both require a good co-operation with safeguard programs**
- **Many opportunities for France / USA co-operation in R&D and at the industrial level**

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