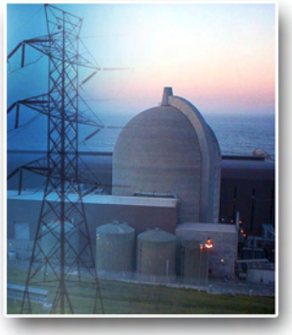
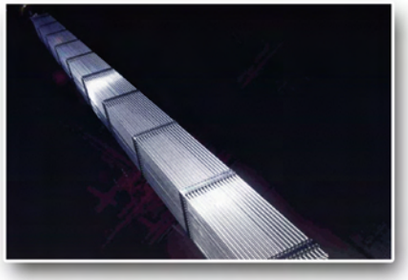
Spent Nuclear Fuel Management Options

ARGONNE NATIONAL LABORATORY

Commercial Reactor





Spent Nuclear Fuel

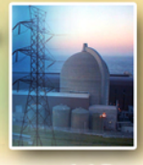
Once-Through Cycle

Uranium, 100% transuranics, and fission products → Spent nuclear fuel

Geologic Disposal Equivalent of 1 Yucca Mountain

Limited Recycle

Transuranics (neptunium, americium, and curium) and fission products → Spent nuclear fuel and waste forms

PUREX Separations → Plutonium/Uranium Mixed Oxide Fuel (MOX) →  Commercial Reactor → Spent MOX →

PUREX Separations → Uranium (future fuel or low-level waste)

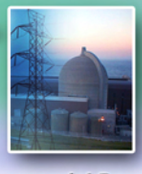
Geologic Disposal Equivalent of 0.9 Yucca Mountain

Full Recycle

Transuranics (0.1% from process losses) and fission products → Waste forms

Geologic Disposal Equivalent of 0.01 Yucca Mountain

Remaining transuranics

Advanced Separations (UREX+) → Advanced Fuels →  Commercial Reactor → Spent Fuel → Advanced Spent Fuel Treatment (Pyroprocessing) → Recycled Transuranic Fuels → Advanced Reactor

Advanced Separations (UREX+) → Uranium (future fuel or low-level waste)

Advanced Fuels ← Advanced Spent Fuel Treatment (Pyroprocessing)

Advanced Spent Fuel Treatment (Pyroprocessing) ← Advanced Reactor

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