

A series of thin, black, intersecting lines forming a complex, abstract geometric pattern in the upper left quadrant of the slide.

# CLOSING THE NUCLEAR FUEL CYCLE

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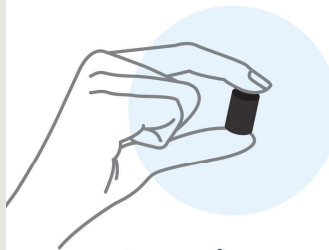
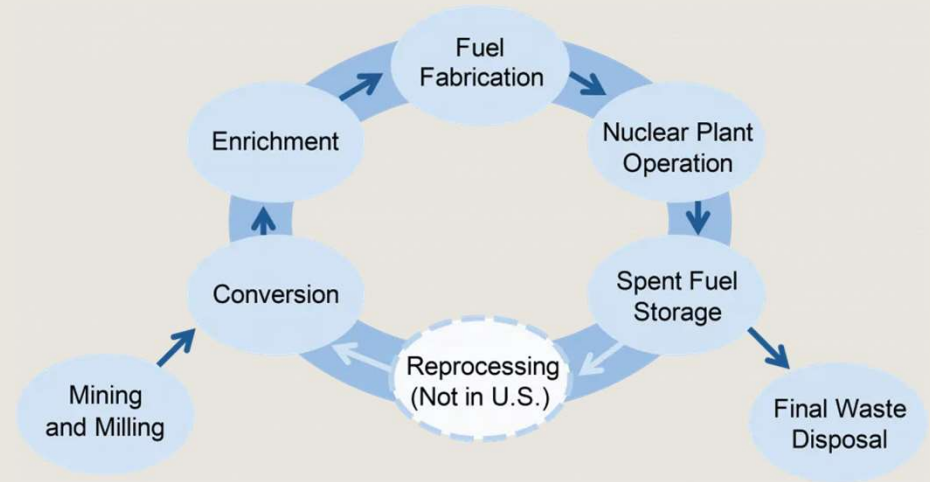
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## INTRODUCTION

- Very little energy is used in a single pass of a nuclear cycle
- No permanent waste solution
- No regulations to follow for recycling



**1 uranium pellet**  
(~1 inch tall)

*is equal to*



**17,000 cubic ft**  
of natural gas

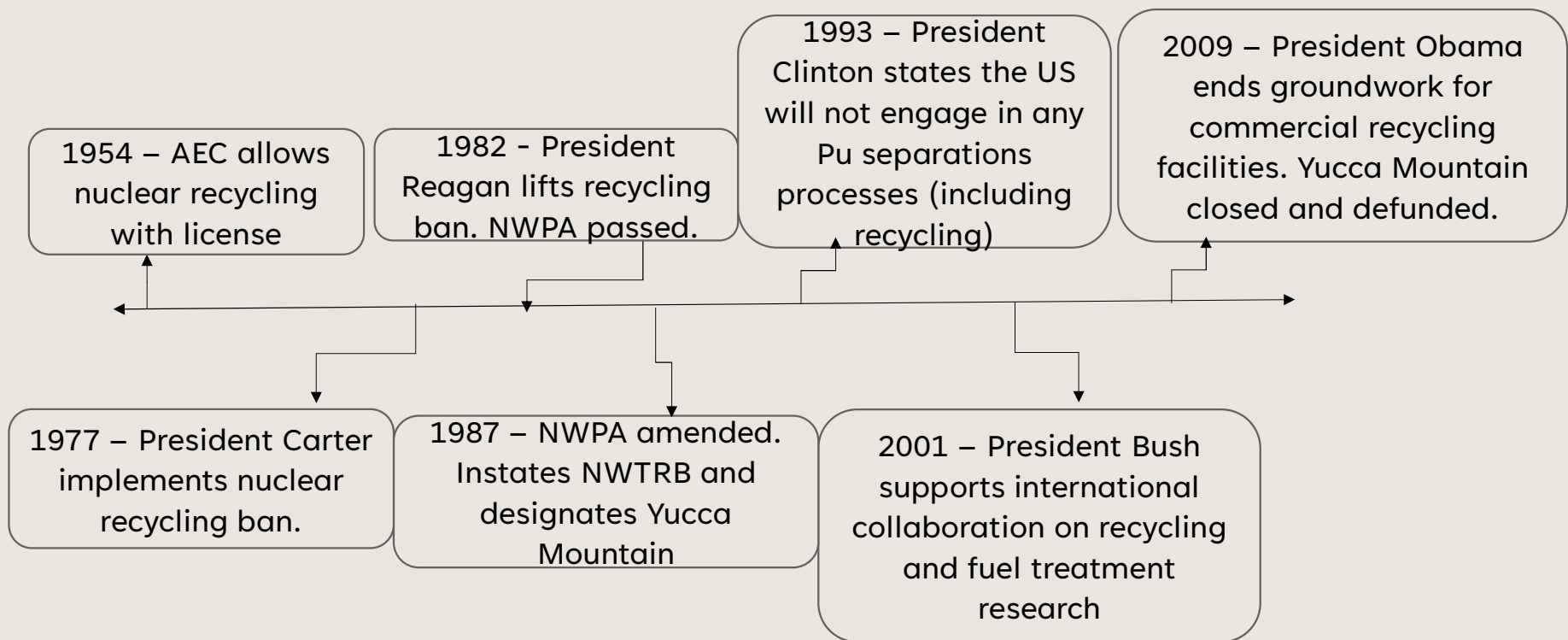


**120 gallons**  
of oil



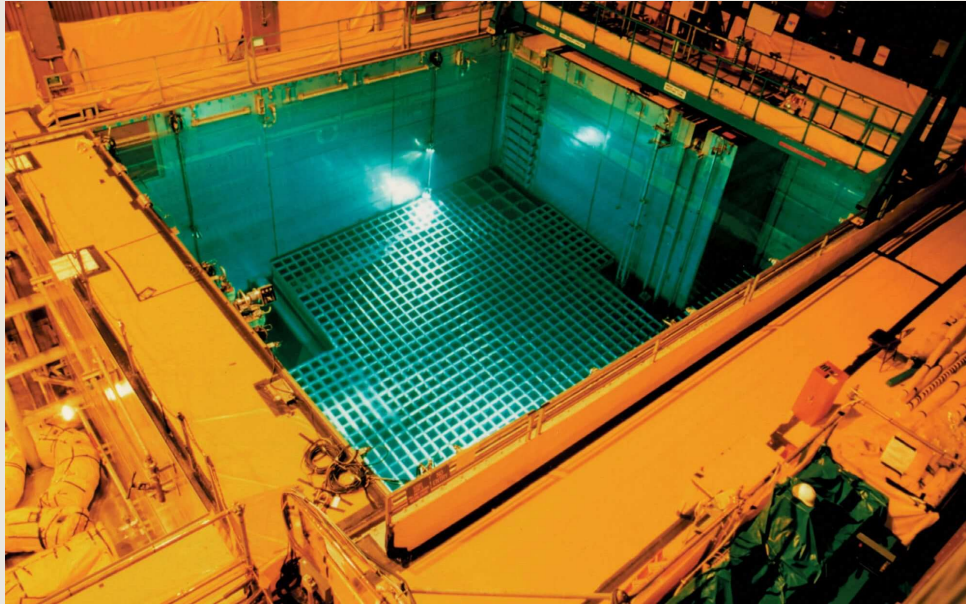
**1 ton**  
of coal

## TIMELINE



## ONCE THROUGH CYCLE

- Fuel used once
  - Untapped energy
- Stored in spent fuel pool
- Moved to dry cask storage
- Permanent storage



## SINGLE PASS RECYCLE

### PROCESS

- UNF undergoes chemical separation and fabrication
- Used a second time in fuel
- Disposed to repository

### CHALLENGES

- Proliferation
- Regulation
- No existing Repository

## MULTI-RECYCLE

### PROCESS

- UNF undergoes chemical separation and fabrication
  - Transmutation
- Reused
- Cooled
- Repeat as long as possible
- Disposed to repository

### CHALLENGES

- Proliferation
- Regulation
- No existing repository
- Expensive
- Untested
- Creates more LLW

## CHALLENGES

- Deep Geologic Repository necessary
- Public perception
- Policy for licensing does not exist
  - Chemical separation
  - Recycling
- Economics
- Transportation Infrastructure



## RECOMMENDATION

- Continue to use once-through fuel cycle as a national policy, but prepare for recycling
- Make progress on repository
- Goal: Multi-recycle and transmute, then dispose.

## ACTIONS

- Amend NWPA
  - NWTRB review all back-of-fuel-cycle operations
  - Create new agency
- Consent-Based Citing
- DOE continue funding recycling research
  - Electrochemical Pilot Plant
- Resume regulation creation (NRC)





QUESTIONS?