Reprocessing Used Nuclear Fuel Today and Tomorrow

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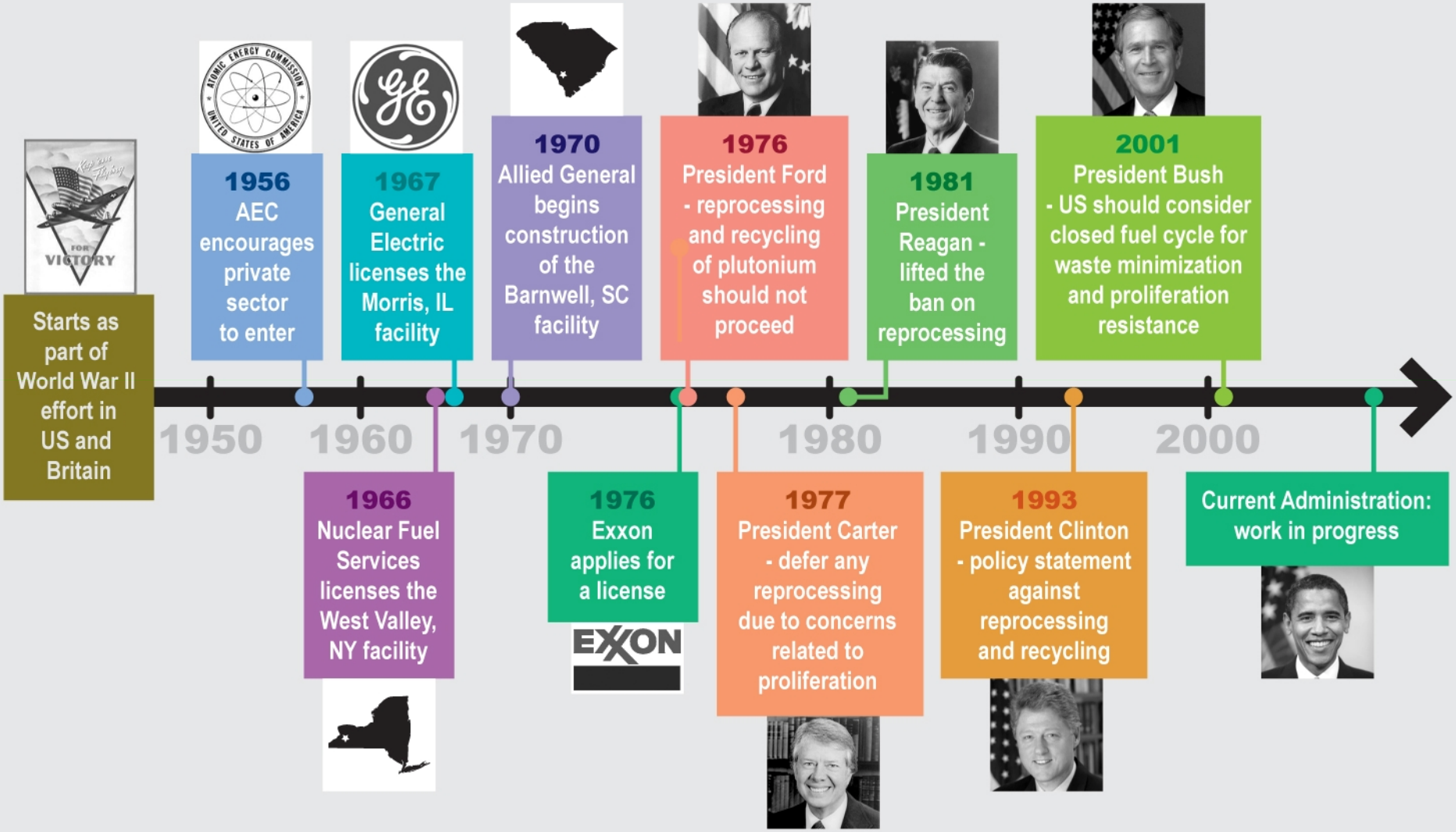
Outline

- History of Reprocessing
- Why Recycle Nuclear Fuel?
- Recycling Process Overview
- Future Trends in Recycling

History of Reprocessing



Reprocessing Worldwide

- Existing Commercial Facilities
  - France
    - La Hague/MELOX
  - Japan
    - Rokkasho Reprocessing Plant/JMOX (planned)
  - UK
    - Sellafield THORP/SMP
- Existing Non-Commercial Reprocessing Facilities
  - India
    - Tarapur
  - Russia
    - Mayak
    - Krasnojarsk

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Why Recycle?

- Reduces the volume and toxicity of waste with current technology
- Reduces the risk of proliferation by removing most of fissile material from used fuel and waste package, and can eliminate weapons-grade plutonium stockpiles
- Provides domestic source of fuel using current and future inventories of spent fuel

Recycling Process Overview

- Separates various components of the dissolved nuclear material
- Recovers various components for re-use
- Concentrates fission products and minor actinides to produce very stable waste form
- Utilizes transuranics as fuel, transmutes TRU as targets or stabilizes TRU as waste

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Future Trends in Recycling

- All current commercial facilities are using aqueous processing
- R&D is underway in multiple countries (US, France, Japan, Russia, etc.) to develop advanced separation technologies that further reduce the volume of high level waste and avoid separating pure plutonium
  - Future Technologies
    - Advanced Aqueous
    - Electrometallurgical
    - Fast neutron reactors to burn minor actinides

Conclusion

- Recycling can safely and securely help foster and sustain the nuclear renaissance
  - Sustainable management of the back-end of the fuel cycle
  - Conserves energy resources with no negative climate impact
  - Provides domestic source of fuel supply using current and future technology and fuel inventories
- Need regulatory certainty and performance-based rules that protect the worker, public and environment