



OKLO INC.

# **Safety Basis Development Approach for Oklo Fuel Recycling Facility**

Open Portion

July 24, 2024

# Meeting Purpose

Present the technical details of the Oklo fuel recycling facility

Present regulatory safety basis background

Discuss Oklo's approach to safety analysis for its fuel recycling facility

Obtain NRC staff feedback on the proposed approach to inform additional pre-application interactions



# Introduction

Oklo is developing sodium fast reactors (SFRs) partially because of their ability to reuse fuel.

Oklo is developing and seeking to license, build, and operate a first-of-a-kind (FOAK) commercial fuel recycling facility for creation of uranium/transuranic bearing fuel (U/TRU).

Oklo's goal is to implement an economical, vertically-integrated, front-end fuel source for our upcoming reactor fleet that also provides for recycling spent fuel from the back end of the existing reactor fleet.

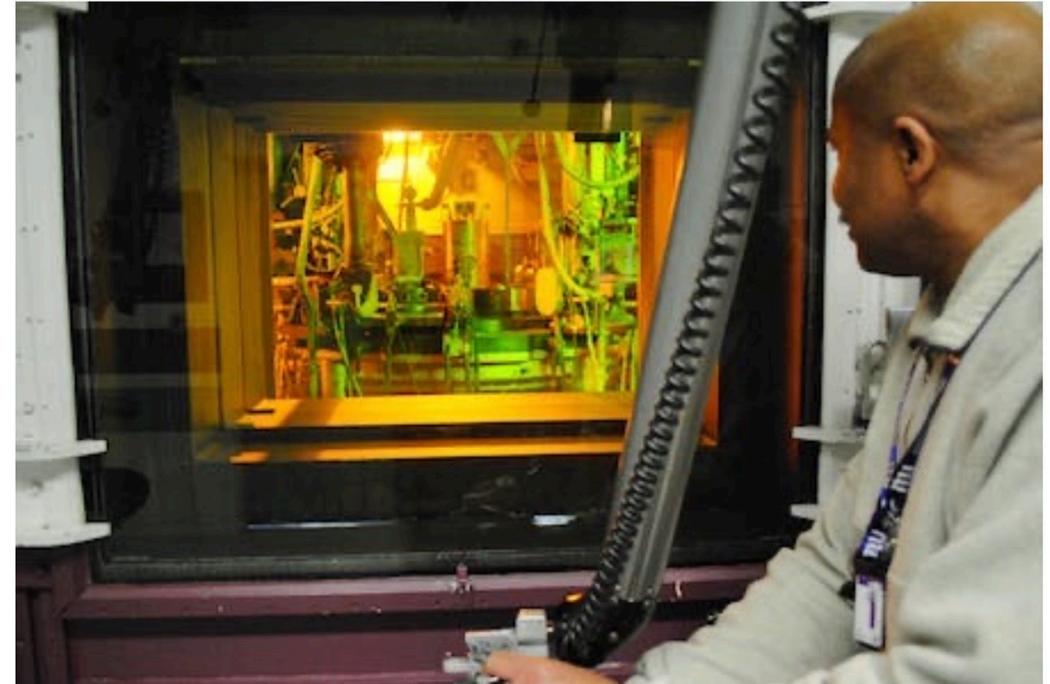


# Pyroprocessing

Oklo will be using pyroprocessing-based technology (as opposed to aqueous-based).

Employing electrorefining for used nuclear fuel reconditioning was technology originally developed by Argonne in the 1960s.

Electrorefining-based used fuel recycling is actively being used at INL (Fuel Conditioning Facility) to recover used EBR-II fuel.



FCF Operations (Credit: INL)



# Overview of parameters

An electrorefining-based pyroprocessing recycling facility looks considerably different from a PUREX reprocessing site.

~Has 1/4th the footprint (per throughput)

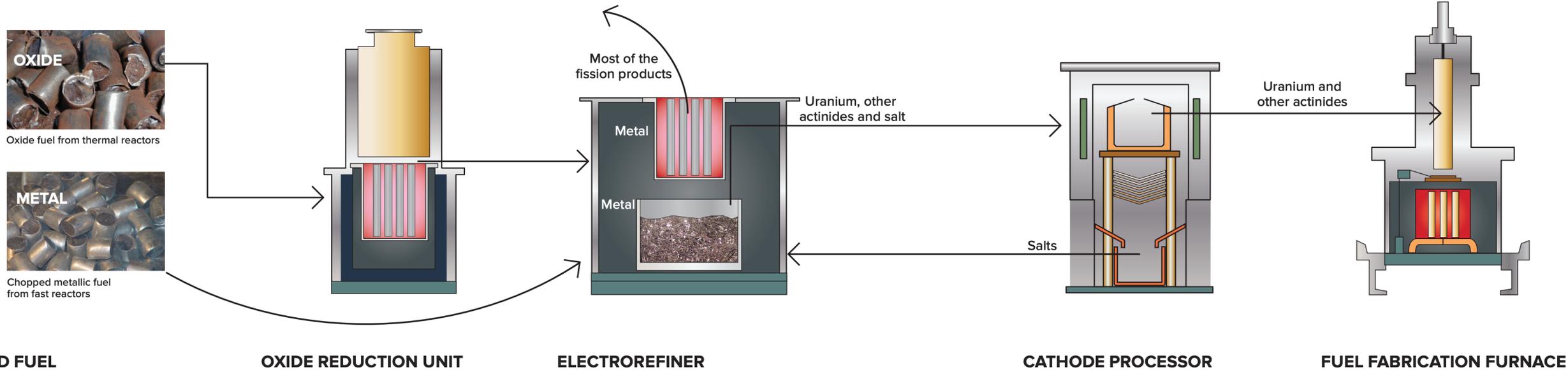
~Has 1/6th the staff (per throughput)

Uses smaller-batch operations

Has an absence of large-scale liquid waste streams



# Pyroprocessing



(Credit: ANL)



# Existing NRC guidance

In developing its safety analysis approach, Oklo considered NRC staff guidance including, but not limited to:

- SECY-09-0082, "Update on Reprocessing Regulatory Framework - Summary of Gap Analysis"
- SECY-11-0163, "Draft Regulatory Basis for Licensing and Regulating Reprocessing Facilities"
- NUREG-1520, "Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility"
- NUREG-1513, "Integrated Safety Analysis Guidance Document"
- NUREG/CR-6410, "Nuclear Fuel Cycle Facility Accident Analysis Handbook"



# Evaluation of safety analysis needs

Considerations in the development of the safety analysis approach included:  
(from the Draft Regulatory Basis in SECY-11-0163):

- licensed facilities must demonstrate adequate safety assurance and practices to limit risk to acceptable levels.
- analysis of risk should involve interactions between regulated activities, their potential hazards, the potential consequences if an unanticipated event occurs, and the probabilities of occurrence.
- safety analysis must appropriately analyze and address the potential hazards and complexities of the licensed activities.
- safety analysis must ensure that radiological and chemical hazards and accidents are identified and any associated risks to the public, workers, and the environment are adequately minimized



# Conclusion of open portion