



# MRPP Brief Overview

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*Changing the World's Energy Future*

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# MRPP (Zircex) Process Overview

## 1. Decladding Hydrochlorination

- Converts zirconium or aluminum cladding to volatile  $\text{ZrCl}_4$  or  $\text{Al}_2\text{Cl}_6$ .
- Fluidized bed removes heat of reaction

## 2. Stabilization of Declad Product

- Pyrohydrolysis with steam
- Conversion of  $\text{ZrCl}_4$  to  $\text{ZrO}_2$  or  $\text{Al}_2\text{Cl}_6$  to  $\text{Al}_2\text{O}_3$ , which are more stable waste forms

## 3. Oxidation

- $\text{NO}_2/\text{O}_2$  reaction gas mix
- Converts uranium to  $\text{UOx}$

## 4. Elutriation

- Fine  $\text{UOx}$  particles are significantly smaller than alumina bed material
- High velocity nitrogen flow transports  $\text{UOx}$  to a filter for capture and recovery



Surrogate metal sample



Metal after hydrochlorination



$\text{ZrO}_2$  waste



$\text{UOx}$  product sample

# MRPP Plans

- Near-term:
  - ATR fuel bench scale studies
  - Zr-clad fuel pilot studies
  - surrogate fission product testing
- Long-term:
  - ATR fuel pilot studies
  - Develop operational and design recommendations