



**Global Nuclear Fuel**

# NRC Meeting to Discuss Shipping Accident Tolerant Fuel in the GE Model No. 2000

December 17, 2018

# Agenda

## Non-Proprietary Discussion

- General Overview

## Proprietary Discussion

- Description of Global Nuclear Fuel's ATF Technologies
- Programmatic Timeline
- Description of the LTAs to be Transported
- Description of the GE2000 and High Performance Insert
- Licensing Strategy



# General Overview

- Overview of US Department of Energy (DOE) Accident Tolerant Fuel (ATF) Program
  - IronClad
  - ARMOR

# Description of GNF ATF LTAs

## GE IronClad Technology

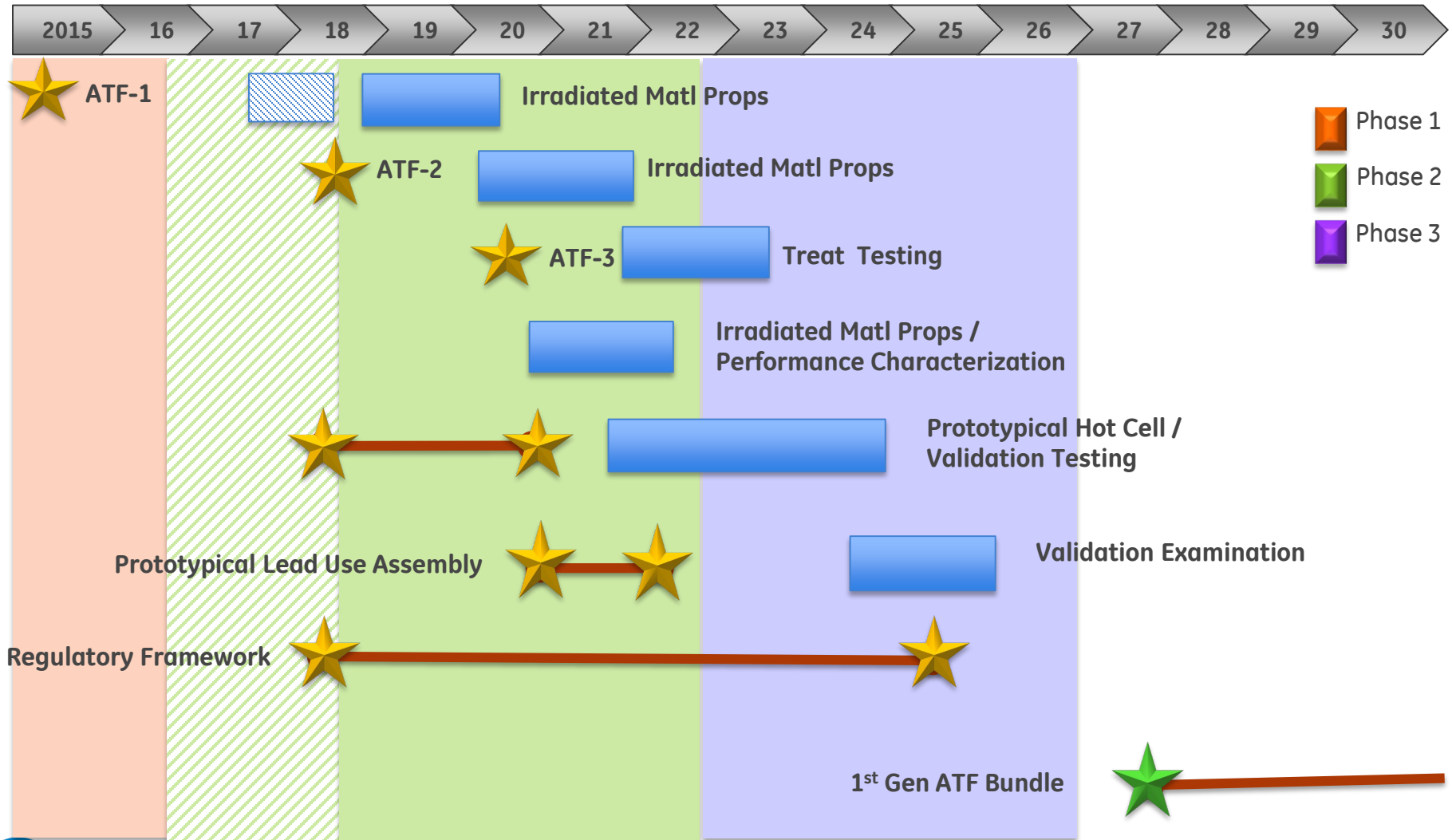
- GNF's specific cladding technology developed under DOE ATF program
- FeCrAl based material, readily manufactured
- Robust material related to fast reactor cladding
- Unfueled IronClad segmented rods installed in Hatch Unit 1 1Q18

## GNF ARMOR Technology

- Abrasion Resistant More Oxidation Resistant coating
- Fret resistant coatings
- Effective for oxidation resistance for AOO & DBA benefit potential and debris mitigation
- Four assemblies contain multiple segmented rods installed in Hatch Unit 1 1Q18



# Programmatic Timeline



# Description of Hatch 1 LTAs

- Installed 1Q18 with planned inspection and harvesting
- GNF2 fuel design
- Full-length test rods
- ARMOR – fueled rods
- IronClad – unfueled rods



# Description of Clinton LTAs

- Both ARMOR & IronClad
- GNF2 Fuel Design
- Segmented Lead Test Rods
- Both **Fueled** and **Unfueled**
- Similar to Hatch 1 LTAs



# Description of GE2000 and High Performance Insert





# Licensing Strategy

- Shipment of irradiated ATF fuel rods is similar to the previous NRC approved GE2000 (Docket 71-9228) contents in Rev. 26 of the Certificate of Compliance (CoC) [ML14245A208]
- Irradiated fuel rods is not part of the current NRC approved GE2000 CoC (Rev. 27) [ML18102B446]
- Current GE2000 licensing effort will focus on adding irradiated fuel rod content similar to the CoC Rev. 26

# GE Model No. 2000 CoC Rev. 26

## 5.(b) Contents

### (1) Type and form of material

- (i) Irradiated fuel rods, which may be cut or segmented.

### 5.(b) (2) Maximum quantity of material per package

Not to exceed 5,450 lbs, including fuel baskets, carrier racks, shoring, and secondary containers.

- (i) For the contents described in 5(b)(1)(i):

600 watts decay heat; and

Fissile contents not to exceed 1175 grams U-235 equivalent mass with initial enrichment not to exceed 5 weight percent in the fissile isotope; minimum pellet diameter of 0.3 inch, maximum burnup of 45 GWd/MTU, and minimum cooling time of 120 days; or

Fissile contents not to exceed 1750 grams U-235 equivalent mass with initial enrichment not to exceed 5 weight percent in the fissile isotope; minimum pellet diameter of 0.35 inch, maximum burnup of 38 GWd/MTU, and minimum cooling time of 120 days. Fuel rods must be contained in closed, 5-inch schedule 40 pipe, with a maximum of 437.5 grams U-235 equivalent per pipe; or

Fissile contents not to exceed 242 grams U-235 equivalent mass with initial enrichment not to exceed 5 weight percent in the fissile isotope; minimum pellet diameter of 0.3 inch, maximum burnup of 52 GWd/MTU, and minimum cooling time of 180 days.

# Licensing Strategy

- Periodic Meetings with NRC
- Amendment of GE2000 SAR
- Planned Submittal 2019
- Requested NRC Approval 2020