

Westinghouse BISON Accident Tolerant Fuel (ATF) Test Stand

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Westinghouse BISON ATF Test Stand

- Assess BISON capabilities for application to industry, using the Westinghouse Accident Tolerant Fuel (ATF) development program as a test case
 - Industry application of BISON to new fuel products
 - Apply the VERA framework (with initial BISON focus) to ATF
 - Provide industry feedback for further development
 - ATF development is a timely and highly relevant application to the US and global markets
- Collaborative effort for ATF development
 - Westinghouse
 - CASL
 - NEAMS



Assess BISON capabilities and extensibility on new fuel designs

Why Accident Tolerant Fuel – Industry Drivers



Development of Light Water Reactor Fuels with Enhanced Accident Tolerance

Report to Congress
June 2015

United States Department of Energy
Washington, DC 20585



- After March 2011 events at Fukushima, enhancing accident tolerance became a topic of serious discussion
- US Congress approved funding in FY2012 to DOE to start developing nuclear fuels and claddings with enhanced accident tolerance
- Lay out an aggressive 10 year schedule starting in 2012
- Insert Lead Test Assemblies in reactor by 2022

Vision is LWR fleet using fuels with enhanced accident tolerance

ATF Fuel Options Being Pursued

- Currently 6 cladding/pellet combinations are being considered
- Most *economic* benefits come from incorporating a new pellet design
- Most *safety* benefits come primarily from incorporating a new cladding design
- Westinghouse DOE ATF program includes both new cladding and new pellet designs

		Cladding Options		
		100% SiC composite	Zr _{coated}	Zr _{coated} + SiC _{wrapped}
Pellet Options	UN/U ₃ Si ₂	✓	✓	✓
	U ₃ Si ₂	✓	✓	✓

Currently Pursued
with DOE Funds

...but each ATF feature
has elements of both benefits



BISON ATF Test Stand Activities

- Install current BISON code on Westinghouse platform, including CASL environment (binford)
 - Develop process for regular code updates and testing
- Assess BISON analysis capabilities for ATF application
 - Identify gaps for development
- BISON analyses for reference Westinghouse fuel data
 - Extend analyses to ATF concepts
- BISON validation against ATF test reactor data
- BISON sensitivity analyses for ATF fabrication and operating parameters
- VERA/BISON assessment of lead test rod operation



**Test stand exercises BISON
and VERA/BISON coupling**

Questions

