U.S. DEPARTMENT OF ENERGY

Nuclear Fuels Storage & Transportation Planning Project
Office of Fuel Cycle Technologies
Nuclear Energy

The Used Nuclear Fuel-Storage, Transportation & Disposal Analysis Resource and Data System (UNF-ST&DARDS)

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UNF-ST&DARDS is an integrating (storage, transportation, and disposal) foundational resource with broad applicability

Automated best-estimate used nuclear fuel analyses from reactor power production through disposition

- **A comprehensive system for analysis of the used nuclear fuel (UNF) from the time it is discharged from the reactor to the time it is disposed of in a geologic repository**
- **Unified Database (UDB)**
  - The DOE Office of Nuclear Energy resource for UNF management and disposition
- **Characterizes the input to the waste management system**
  - Address issues regarding transportability of high burnup fuel
- **Broad applicability**
  - Fuel cycle decisions
  - Safeguards and security
  - Waste management
  - Safety

NFST NUCLEAR FUELS STORAGE & TRANSPORTATION

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Overview of Presentation

- **Background on UNF-ST&DARDS and Unified Database**
- **Discussion on data integration with analysis capabilities**
  - Data reference traceability
  - Linkage process to other tools (i.e., Next Generation Systems Analysis Model [NGSAM])
- **Cask-specific evaluations**
- **Visualization of results and information**
- **Conclusion**

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UNF-ST&DARDS currently includes five main types of data

- **Fuel assembly discharge information**
  - RW-859 data (discharge data through 12/30/2002) imported into the database plus additional information from volunteer sites
  - Fuel projections imported into database out to license expiration date
  - Characteristics information
- **Fuel assembly design data**
- **Reactor-specific operation data**
- **Cask-design and loading data**
- **Infrastructure and logistics-related data to support systems analyses**

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UNF-ST&DARDS integrates data with analysis capabilities

- **Unified**
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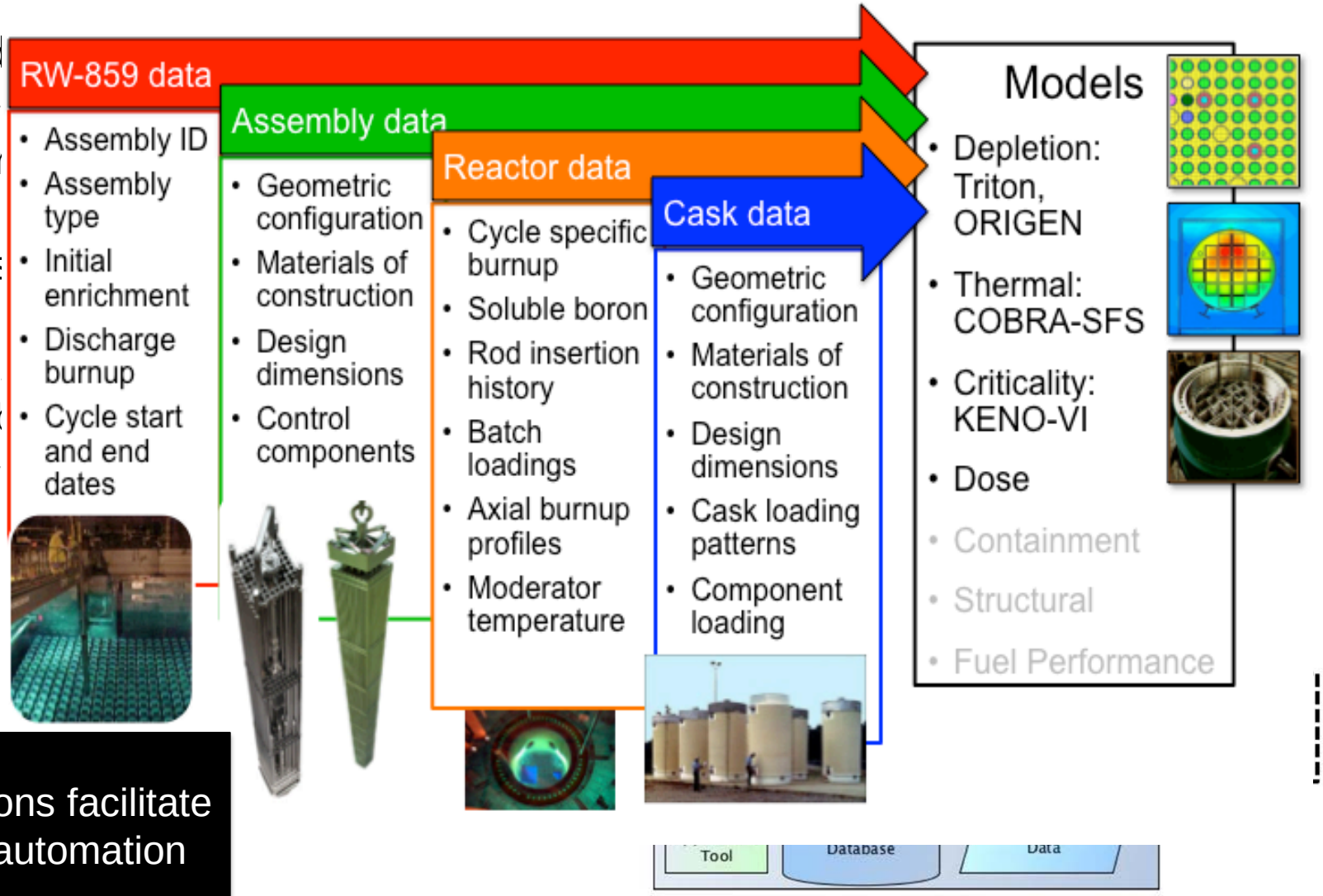

Data relations facilitate analysis automation

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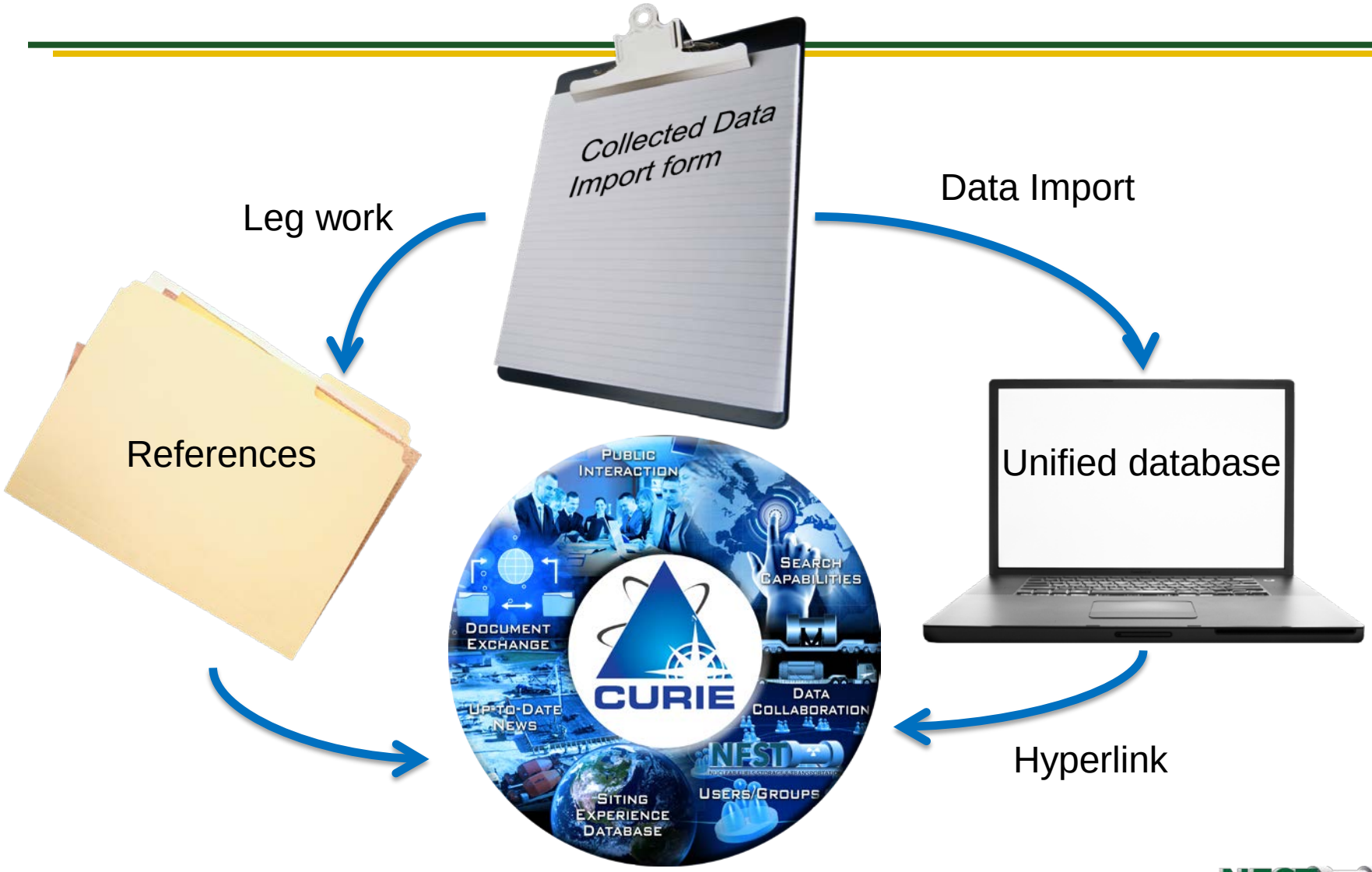
Reference traceability is integrated into the unified database



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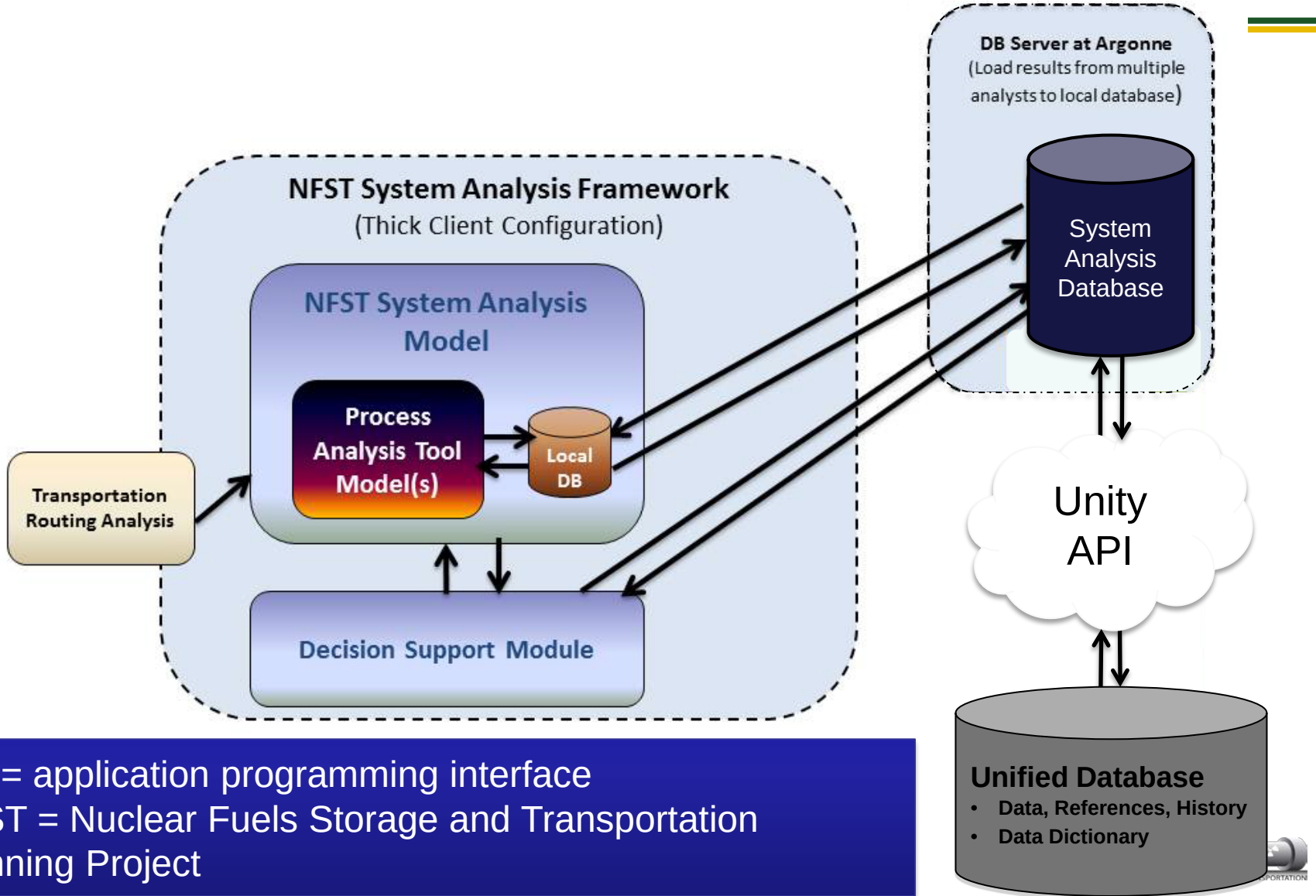
The unified database can be integrated with other tools through an API (NGSAM first tool)



API = application programming interface
NFST = Nuclear Fuels Storage and Transportation Planning Project

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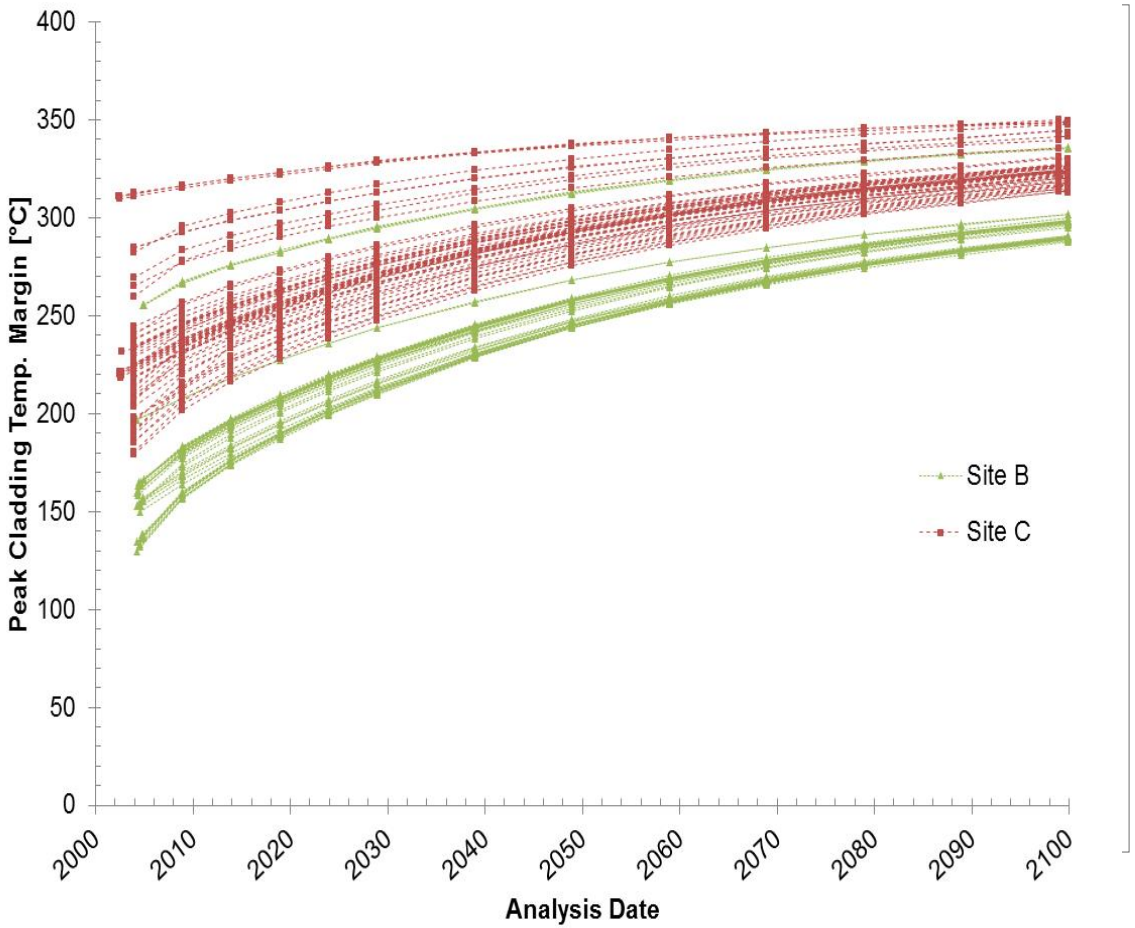
UNF-ST&DARDS performs cask-specific evaluations to assess actual system attributes over time

- Currently loaded casks can have significant amounts of uncredited margin
- Criticality safety margin
- Total cask decay heat margin
- Peak clad temperature margin from 400°C limit



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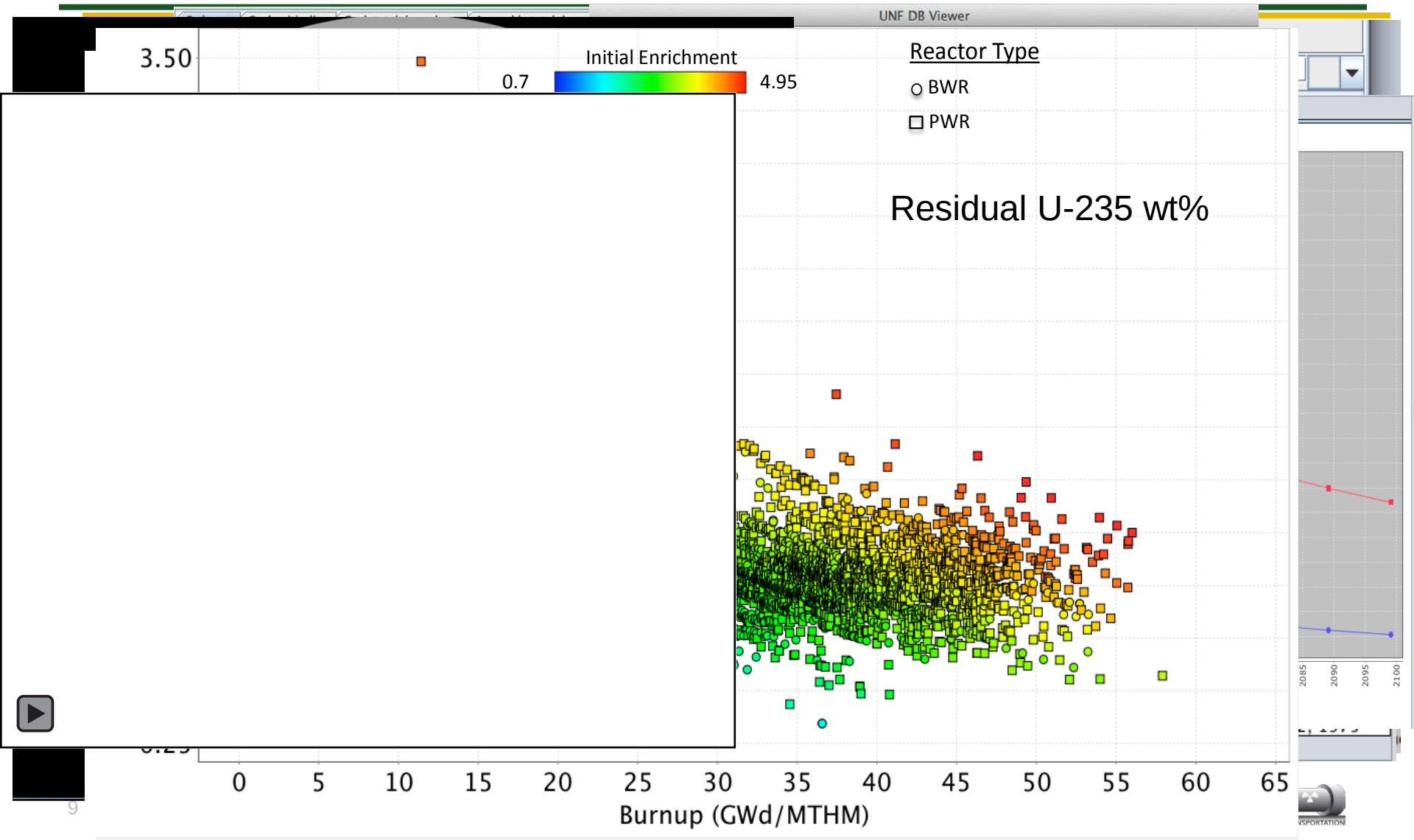
Interactive visualization capabilities facilitate data analysis and results interpretation



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UNF-ST&DARDS provides a comprehensive national UNF resource with broad applicability

- **Unified domestic UNF system database integrated with key analysis capabilities to support Department of Energy (DOE) objectives**
  - a controlled source of technical data for various waste management system analysis/evaluation tools as well as fuel cycle systems analyses and safeguards and security studies.
- **Foundation for tracking UNF characteristics from reactor power production through ultimate disposition**
- **Enables informed decision making relative to design, safety, and licensing of UNF systems and facilities**
  - Minimize/mitigate financial/dose/operational risk
- **Initial foundation developed; continuing to build/populate to fully realize benefits and potential**