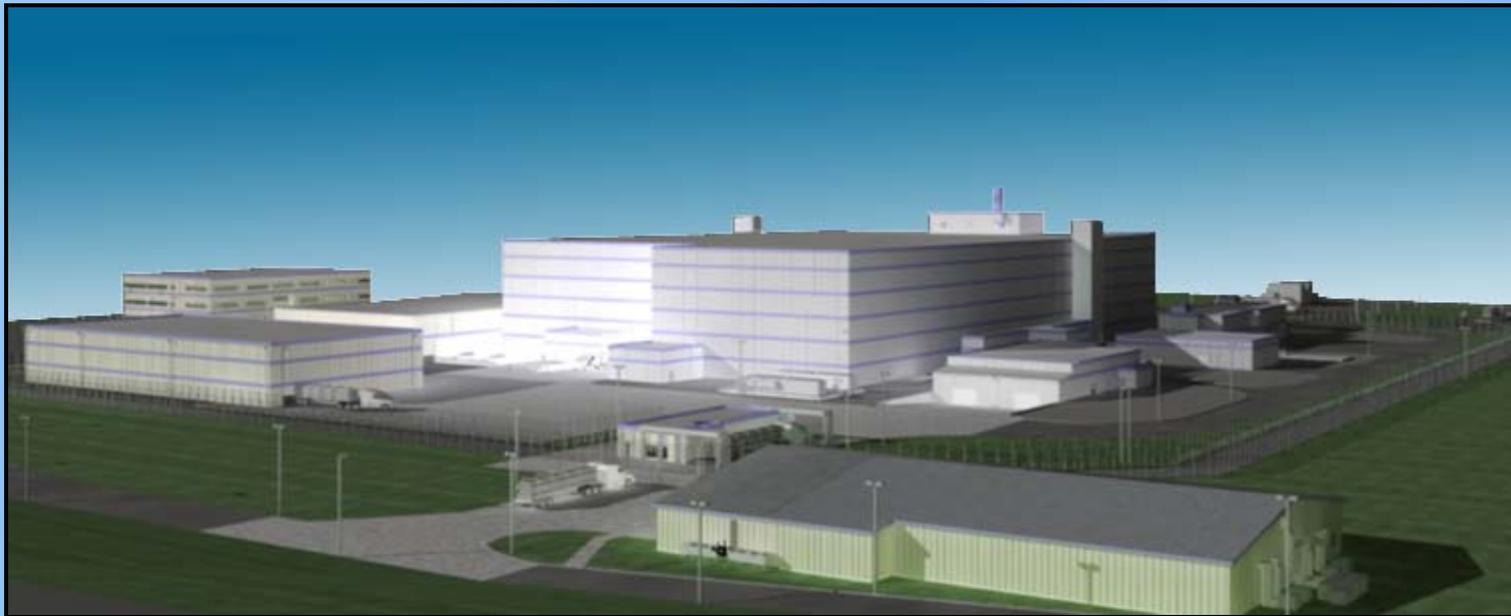


# DOE 2010 ISM Champions Workshop

## The Safety Component of Design for the MOX Fuel Fabrication Facility (MFFF)



ISA: Load Handling at MFFF

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## Presenter

- David Kennedy is a team member of the Nuclear Safety Group working on the MOX Project for Shaw AREVA MOX Services here at Savannah River Site (SRS). He is an employee of AREVA Federal Services and has been working on the MOX Project since 2004.
- Mr. Kennedy has twenty years of experience. Mr. Kennedy has authored Preliminary Hazards Analyses, Process Hazards Analyses, and Nuclear Safety Evaluations. His initial six years of employment focused on regulatory compliance and remediation at DOE sites including: Fernald, Hanford, INEL, and Rocky Flats.

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## Load Handling at MFFF

- The MFFF handles plutonium in the form of solutions, powders, pellets, fuel rods, and fuel assemblies.
- The load handling analysis centers around those events where the primary confinement barrier is breached (e.g., glovebox window is broken; container, fuel rod or the waste transfer line is breached) resulting in dispersal of a radioactive or hazardous material into the workplace or the environment.

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## Load Handling at MFFF (Cont'd)

- A load handling event could occur
  - when a lifted load is dropped or
  - when either the lifted load or the loading equipment impacts other nearby systems, structures or components.
- Load handling events are hypothesized to occur throughout the MFFF facility. Locations considered include:
  - Operations inside of a glovebox
  - Areas surrounding the glovebox/external impacts to the glovebox
  - Material handling and transfer events in the MFFF hallways, operational, and storage areas
  - Events occurring in AP process cells
  - Events external to the MFFF, and
  - Events involving the waste transfer line.

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# Overall Approach to Load Handling Safety Analysis

- Preliminary Hazards Analysis >
- Preliminary Accident Analysis >
- Process Hazards Analysis >
- Dose Consequence Analysis >
- Load Handling Nuclear Safety Evaluation

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# Load Handling NSE Preparation

- Preliminary Hazards Analysis used to identify hazards and Load Handling (LH) events
- Preliminary Accident Analysis initially documented event scenario consequences for Safety Assessment of Design Basis
- Process Hazards Analysis for process units evaluated LH events and suggested IROFS for ISA Phase
- Subsequent dose consequence calculation established maximum doses for LH events

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## Load Handling NSE Preparation (Cont'd)

- Define the safety strategy for LH events: Prevention or Mitigation or both
- Selected Items Relied on for Safety (IROFS) for LH events  
(active or passive engineered controls and administrative controls)
- IROFS Description
- Demonstrated IROFS reliability

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# IROFS Reliability Demonstration

Qualitative methods are used to establish that the identified IROFS are of sufficient reliability to satisfy the performance requirements of 10 CFR §70.61

Load Handling events are made highly unlikely through the application of the IROFS.

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# **IROFS Reliability Demonstration (Cont'd)**

The following criteria form the basis for the IROFS reliability demonstration:

- Application of single failure criterion
- Application of industry codes and standards
- Application of the MOX Project Quality Assurance Program
- Application of management measures

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## Summary

- The LH NSE incorporates the results of the PHA, the PrHA, and the dose consequence analysis to demonstrate that the performance requirements of 10 CFR §70.61 are satisfied.
- This demonstration includes identifying the safety strategy for each LH event scenario and the IROFS required implementing the strategy.
- IROFS designation has impact on design.

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