



U.S. Department of Energy



# Design Information Available at License Application

Presented to:

**NRC/DOE Technical Exchange and Management Meeting on  
Preclosure Safety Analysis and Supporting Information**

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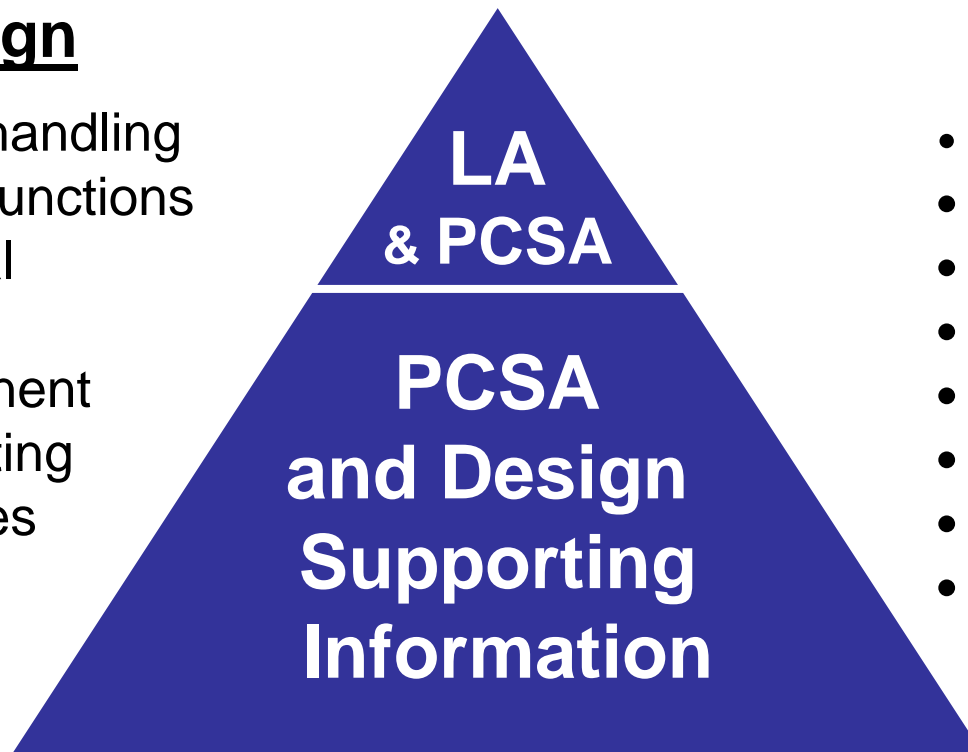
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**Las Vegas, NV**

# LA and PCSA Supported by Detailed Design and Analyses

## Design

- Waste handling
- Safety functions
- Physical
- System
- Component
- Supporting analyses



## PCSA

- Internal hazards
- External hazards
- Event sequences
- Consequences
- NSDBs
- Design requirements
- Reliability assessments
- Procedural safety controls

LA = License Application

NSDB = Nuclear Safety Design Bases

PCSA = Preclosure Safety Analysis



# Intended Changes to LA Content and Supporting Information

- **Greater development of design**
- **More detailed evaluation of design feasibility**
- **Greater design information available for PCSA**
- **More detailed safety evaluation**
- **Explicit handling of uncertainty and human error**
- **More detailed presentation of design and PCSA in Safety Analysis Report (SAR) / License Application**
- **More complete justification of safety case**



# LA will Present Design Information Used in the PCSA

- **Physical Design – Source Documents**
  - Project design criteria
  - Basis of design
  - Site plan and general arrangement drawings
  - Facility descriptions
  - Zone drawings (radiation, confinement, etc.)
  - Wall, slab, and structural steel drawings



# LA will Present Design Information Used in the PCSA

- **Physical Design – Source Documents (cont.)**
  - Typical embed, anchorage, and penetration details
  - Typical concrete and rebar details
  - Geo-technical data
  - Sliding and overturning assessment
  - Analytical models for structures
  - Soil-structure interaction analyses
  - In-structure response spectra



# LA will Present Design Information Used in the PCSA

- **System Design - Source Documents**
  - Project design criteria
  - Basis of design
  - System descriptions
  - Piping and instrumentation diagrams
  - Ventilation and instrumentation diagrams



# LA will Present Design Information Used in the PCSA

- **System Design - Source Documents (cont.)**
  - **Mechanical handling flow diagrams**
  - **Functional logic diagrams (automatic important to safety [ITS] functions)**
  - **Electrical single line diagrams (site and facility)**
  - **Waste package drawings**



# LA will Present Design Information Used in the PCSA

- **Component Design – Source Documents**
  - **Project design criteria**
  - **Basis of design**
  - **System descriptions**
  - **Mechanical equipment envelopes**
  - **Mechanical handling schematics ( ITS functions)**
  - **Sizing analyses**





# LA will Present the PCSA

- **External hazards analysis**
- **Site-specific suitability assessments**
- **Military-industrial hazards analysis**
- **Aircraft crash frequency analysis**
- **Internal hazards analysis**
- **Fire hazards analysis**
- **Mechanical system fault trees**
- **Electrical system fault trees**



# LA will Present the PCSA (cont.)

- **Overhead load handling assessments**
- **Seismic fragility assessment of structures**
- **Categorization of event sequences**
- **Consequence analyses**
- **Worker dose assessments**
- **Nuclear safety design bases**
- **ITS structures, systems, or components (SSCs) and Q-List**
- **Procedural safety controls**



# Safety Information is Contained in Physical, System and Component Design and PCSA Documents

- Location and arrangement of SSCs
- Materials
- Dimensions
- Waste package and transport, aging and disposal (TAD) canister characteristics
- ITS boundaries
- Seismic design boundaries
- Automatic versus manual actuation
- Fail position of components
- Local or remote control
- Interlocks
- Power sources
- Hazards assessment
- Event sequences
- Nuclear safety design bases
- ITS SSCs and Q-List
- Procedural safety controls
- Design assessment and validation



# LA will Demonstrate ITS SSCs Can Perform Their Safety Functions

- **Nuclear safety design bases and implementation**
- **Safety functions**
- **Description of required operation**
- **Design feasibility assessment**
- **Tables and figures**
  - **Functional requirements**
  - **Pertinent design information**
  - **Features demonstrating safety functions**



# ITS vs. non-ITS SSC Content in the License Application

Item	Non-ITS	ITS
Description	X	X
Design codes and standards	X	X
Operational processes and procedural needs	X	X
Safety functions	-	X
Procedural safety controls	-	X
Design criteria and design bases	-	X
Design methodologies	-	X
Consistency of materials with design methodologies	-	X
Design load combinations	-	X



# Opportunities for Improvement from Previous Interactions

- **Use of Codes and standards**
- **Thermal management**
- **Content of proposed technical specifications**
- **Structural analysis detail and presentation of results**



# Opportunities for Improvement from Previous Interactions (cont.)

- **Implementation of nuclear safety design bases**
- **Reliability analysis of active safety functions**
- **Capability of load hold-down devices**
- **Justification for selected non-ITS systems**



# License Application and Supporting Bases

