License Application Package Overview

MOX Fuel Fabrication Facility

27 September 2006

Enclosure 4

Agenda

- Purpose
- Background
- License Application Overview
- Development Strategy
- Chapter Reviews
- Configuration Management

Purpose

- Provide an overview of the License Application in support of the Nuclear Regulatory Commission (NRC) Docketing Review

Background

- Duke, Cogema, Stone and Webster (DCS) submitted Initial Construction Authorization Request; February 2001
- NRC issued:
  - Final Environmental Impact Statement; January 2005
  - Final Safety Evaluation Report; March 2005
  - Construction Authorization; March 2005
- DCS submitted License Application package; September 2006

License Application Overview

- License Application
- Integrated Safety Analysis Summary
- Classified Matter Protection Plan
- MFFF Fundamental Nuclear Material Control Plan
- Physical Protection Plan (classified)
- Training and Qualification Plan for Security Personnel (classified)
- Safeguards Contingency Response Plan (classified)
- Exemption Request – Decommissioning
- Exemption Request – Financial Protection
- Exemption Request - Radiation Labeling
- Evaluation Pursuant to 10 CFR 70.22 (i)(1)(i) – Emergency Plan Assessment

Strategy/Approach

- License Application/Integrated Safety Analysis Summary developed using
  - Regulatory requirements of 10 CFR 70
  - Regulatory guidance of NUREG-1718
- Final Safety Evaluation Report, Construction Authorization Request
  - Reviewed for inclusion in License Application / Integrated Safety Analysis Summary

Development Strategy

- Reviewed Construction Authorization Request
- Analyzed impacts from
  - Regulatory requirements
  - Regulatory guidance
  - Industry experience
  - Maturity of design
- Expanded design safety analysis to component level
- Developed documentation hierarchy

Construction Authorization Review

- CAR crosswalked to
  - License Application
  - Integrated Safety Analysis Summary
  - Integrated Safety Analysis
  - Project documents
  - No longer applicable
- Construction Authorization (CAMOX-001)

Regulatory Requirements

- 10 CFR 70, *Domestic Licensing of Special Nuclear Material*
  - 10 CFR 70.22, *Contents of applications*
  - 10 CFR 70.65, *Additional contents of applications*

Regulatory Guidance

- NUREG-1718, *Standard Review Plan for the Review of an Application for a Mixed Oxide (MOX) Fuel Fabrication Facility*
  - Provides guidance to NRC reviewers
  - DCS crosswalked each item to
    - License Application
    - Integrated Safety Analysis Summary
    - Integrated Safety Analysis
    - Project documents
    - Not Applicable

Regulatory Guidance

- NUREG-1821, *Final Safety Evaluation Report on the Construction Authorization Request for the Mixed Oxide Fuel Fabrication Facility*
  - NRC safety evaluation
  - DCS crosswalked FSER to
    - License Application
    - Integrated Safety Analysis Summary
    - Integrated Safety Analysis
    - Project documents
    - No longer applicable

Regulatory Guidance

- NUREG-1520, *Standard Review Plan for the Review of a License Application for a Fuel Cycle Facility*
  - Supplemental information
  - Potential current insights on latest NRC guidance to reviewers

Industry Experience

- NRC meetings and in-office reviews
- Part 70 License Applications, Integrated Safety Analysis Summaries
- Independent Assessments – internal and external
- Lessons learned

Design Maturity

- Construction Authorization Request based on conceptual design
- Integrated Safety Analysis developed based on a mature design
- Integrated Safety Analysis has greater detail

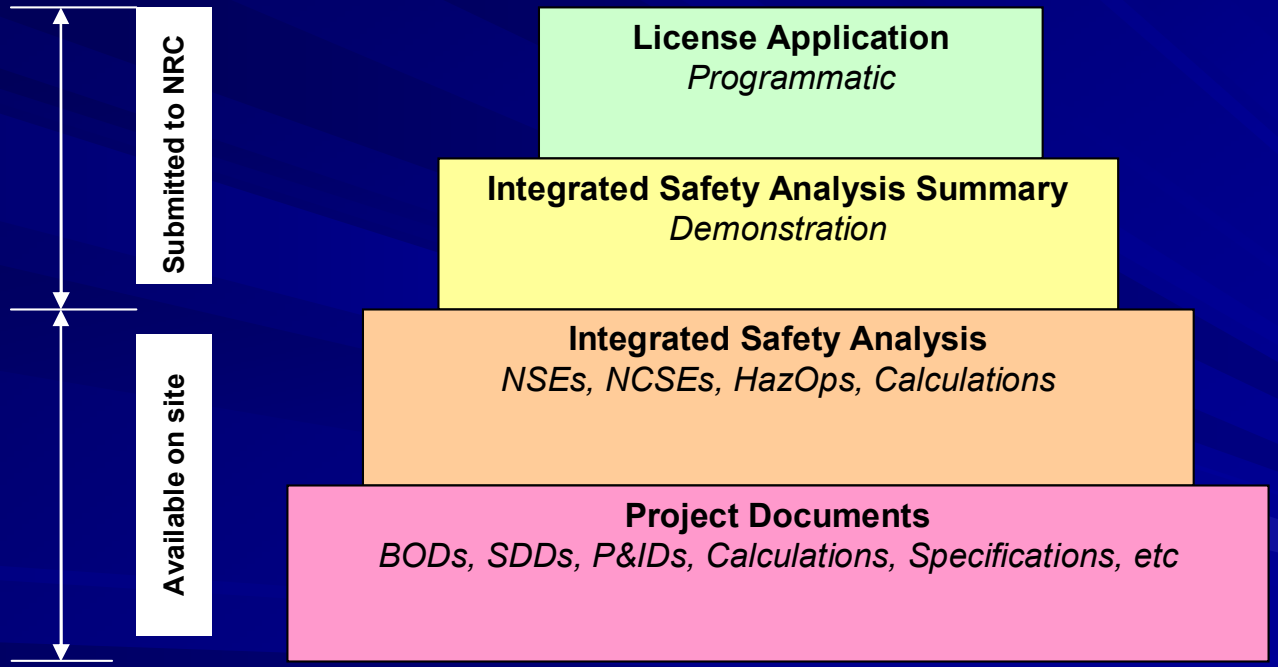
Design Maturity

- Construction Authorization Request defines Principal Systems, Structures and Components (PSSC) at system level
- License Application (LA) / Integrated Safety Analysis (ISA) defines Items Relied on for Safety (IROFS) at component level
- System level PSSC → component level IROFS

Design Maturity

- Updated safety strategy to reflect plant design
- Expanded safety related component definition to reflect updated safety strategy

Documentation Hierarchy



Documentation Hierarchy

- Written in the present tense
- Begins at receipt of approved license for possession and use of nuclear materials for the operation of the facility

Submittal – Licensing Application

- Basis
  - 10 CFR 70.22 *Contents of applications*
  - 10 CFR 70.65 *Additional contents of applications*
- Layout
  - NUREG-1718 *Standard Review Plan for the Review of an Application for a Mixed Oxide (MOX) Fuel Fabrication Facility*
  - Construction Authorization Request
- Programmatic versus demonstration

License Application

1 General Information
2 Financial Qualifications
3 Protection of Classified Matter
4 Organization and Administration
5 Integrated Safety Analysis
6 Nuclear Criticality Safety
7 Fire Protection
8 Chemical Safety
9 Radiation Safety
10 Environmental Protection
11 Plant Systems
12 Human Factors Engineering
13 Safeguards
14 Emergency Management
15 Management Measures

Chapter 1 – General Information

- Facility and Process Overview
- Institutional Information
  - Corporate
  - Type and period of license
  - Type, quantity, and form of licensed material
  - Proposed authorized uses
  - Special exemptions/authorizations
- General site description

Chapter 2 – Financial Qualifications

- Demonstrates DCS is financially qualified to safely operate MOX facility
- Project costs and sources of funds
  - Contract with Department of Energy (DOE) to reimburse DCS
- Contingency funds
  - US Government funded project
- Financial qualifications
  - US Government funded project
- Liability Insurance
  - DOE indemnity agreement

Chapter 3 – Protection of Classified Matter

- Classified Matter Protection Plan submitted under separate cover letter

Chapter 4 – Organization and Administration

- Functional organizational structure for the operational phase
- Key management functions
  - Responsibilities
  - Minimum qualifications

Chapter 5 – Safety Program and Integrated Safety Analysis

- 10 CFR 70.62, Safety Program and Integrated Safety Analysis
  - Process safety information
  - Integrated safety analysis (ISA)
  - Management measures
  - Control of facility and process changes
  - Records of failures

Chapter 5 – Safety Program and Integrated Safety Analysis

- Integrated safety analysis methods
  - Safety assessment phase (Construction Authorization Request)
  - Detailed ISA Phase – builds on safety assessment
    - Conducted process hazards analyses for each process unit
    - Updated or developed new calculations
    - Prepared Nuclear Safety Evaluations (NSE) and Nuclear Criticality Safety Evaluations (NCSE)
    - Performed design verification activities to ensure Items Relied on For Safety (IROFS) incorporated into design and operations
    - Identified IROFS safety limits/parameters and incorporated into plant operating procedures

Chapter 5 – Safety Program and Integrated Safety Analysis

- Likelihood Demonstration
  - Used qualitative approach
  - Applied industry codes and standards
  - Applied 10 CFR 50 Appendix B, NQA-1
  - Implemented management controls

Chapter 6 – Nuclear Criticality Safety

- Organization and Administration for Nuclear Criticality Safety (NCS)
- Management measures for NCS
- Nuclear incident monitoring system
- NCS technical practices
  - Nuclear criticality safety evaluations
  - Analytical methodology
  - Criticality control modes
- Margin of subcriticality and double contingency principle
- Regulatory guidance applicability

Chapter 7 – Fire Protection

- Organization and conduct of operations
- Administrative controls
- Fire protection features and systems
- Fire hazards analysis

Chapter 8 – Chemical Safety

- Chemical hazards that interact with licensed material
- Hazardous chemical produced from licensed material
- Chemical hazards impacting safety of licensed material (resulting in increased radiological risk)

Chapter 8 – Chemical Safety

- Chemical information
  - Chemicals used in Aqueous Polishing and MOX Process
- Chemical process information
  - Relevant events evaluated in Integrated Safety Analysis

Chapter 8 – Chemical Safety

- Chemical hazards analysis (ISA process)
  - Relevant events
  - Quantitative standards for chemical consequence levels
  - Chemical event release scenarios
  - Consequence analysis
- Chemical process safety interfaces

Chapter 9 – Radiation Safety

- Describes radiation protection program
  - Radiation safety design features
  - Operational radiological protection

Chapter 10 – Environmental Protection

- Environmental Protection Program
  - Radiation safety
  - Effluent monitoring
  - Environmental surveillances
  - Environmental permits

Chapter 11 – Plant Systems

- Summary of the major features and systems (additional detail provided in ISA Summary)
  - HVAC and confinement systems
  - Electrical power systems
  - Instrumentation and control systems
  - Material handling equipment
  - Fluid transport systems
  - Fluid systems
  - Heavy lift cranes

Chapter 12 – Human Factors Engineering

- Human factors engineering applied to
  - Personnel activities that are designated IROFS
    - System interfaces and supporting equipment
    - Systems that control the environment in which the personnel activities are performed
- Human factors engineering design review
  - Scope and goals
  - Team composition
  - Processes and procedures
  - Issue tracking

Chapter 13 – Safeguards and Security

- Information submitted separately
  - Physical Protection Plan
  - Training and Qualification Plan for Security Personnel
  - Fundamental Nuclear Material Control Plan
  - Safeguards Contingency Response Plan

Chapter 14 – Emergency Management

- Evaluation submitted separately

Chapter 15 – Management Measures

- Quality assurance program
- Configuration management
- Maintenance
- Training and qualification
- Plant procedures
- Audits and assessments
- Incident measures

Exemption Requests

- Decommissioning
- Financial Protection
- Radiation Labeling

Exemption Request – Decommissioning

- Requirement
  - 10 CFR § 70.38(d)-(k) and 10 CFR § 40.42 require that the licensee decommission the facility following cessation of principal activities under the license
- Exemption Request
  - From the requirements of 10 CFR § 70.38(d)-(k) and 10 CFR § 40.42
- Rationale / Basis
  - DOE is responsible for decommissioning the MFFF
  - Decommissioning exemption submitted under separate cover letter

Exemption Request – Financial Protection

- Requirement
  - 10 CFR §§ 140.20 and 140.13a require that the licensee enter into an indemnity agreement with the NRC (i.e., for Price Anderson coverage) and that the licensee provide $ 200 million in financial protection (e.g., via private insurance coverage)
- Exemption Request
  - From the requirements of 10 CFR §§ 140.20 and 140.13a
- Rationale / Basis
  - DOE has agreed to indemnify DCS
  - Eliminates need for application of NRC financial protection requirements
  - Financial protection exemption submitted under separate cover letter

Exemption Request - Radiation Labeling

- Requirement
  - Each container of licensed radioactive material be labeled with the radiation symbol and the words "CAUTION, RADIOACTIVE MATERIAL" or "DANGER, RADIOACTIVE MATERIAL"
- Exemption Request
  - In lieu of the requirements of 10 CFR § 20.1904(a), DCS would post signs incorporating the radiation symbol and with written warning
- Rationale / Basis
  - Nature of the MFFF operation (e.g., glovebox operations)
  - Intent of 10 CFR 20.1904(a) is met by posting areas that may house or temporarily store radioactive material
  - Based on in industry experience and practicality
  - Labeling exemption submitted under separate cover letter

Configuration Management

- Design changes are:
  - Reviewed for potential impacts to licensing basis
  - Provided to the NRC promptly or through planned update, as appropriate

Summary

- License Application meets 10 CFR 70
- Final Safety Evaluation Report, Construction Authorization Request, and NUREG 1718 crosswalked to License Application
- License Application is programmatic