Overview of DOE Authorization Activities

Jason Andrus

DOE Experience in Facility Authorization

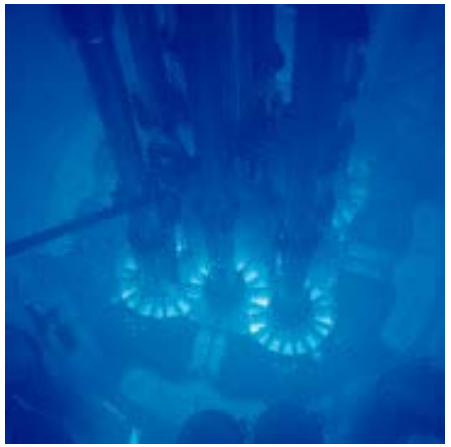
- DOE Nuclear Facilities (reactor and non-reactor) very diverse set of operations, hazards and equipment.
- Currently over 160 DOE nuclear facilities.
- DOE currently authorizes 6 reactors that operate at “non-zero” power levels.
  - Advanced Test Reactor (INL 250 MWth)
  - High Flux Isotope Reactor (ORNL 85 MWth)
  - Annular Core Research Reactor (SNL 2.4 MWth pulses to 30 GWth)
  - Transient Test Reactor (INL 120kWth steady state pulses to 19 GWth)
  - Advanced Test Reactor Critical (INL 5kWth)
  - Neutron Radiography Reactor (250kWth steady state)

Reactor Categorization within DOE Framework

- Category A (Power > 20 MWth) or Category B (Power ≤ 20 MWth)
- Minor specific difference in applicable requirements (Startup Activities)
- Generally understood there will be differences in hazard and allows for an appropriate graded approach to requirements.

ATRC

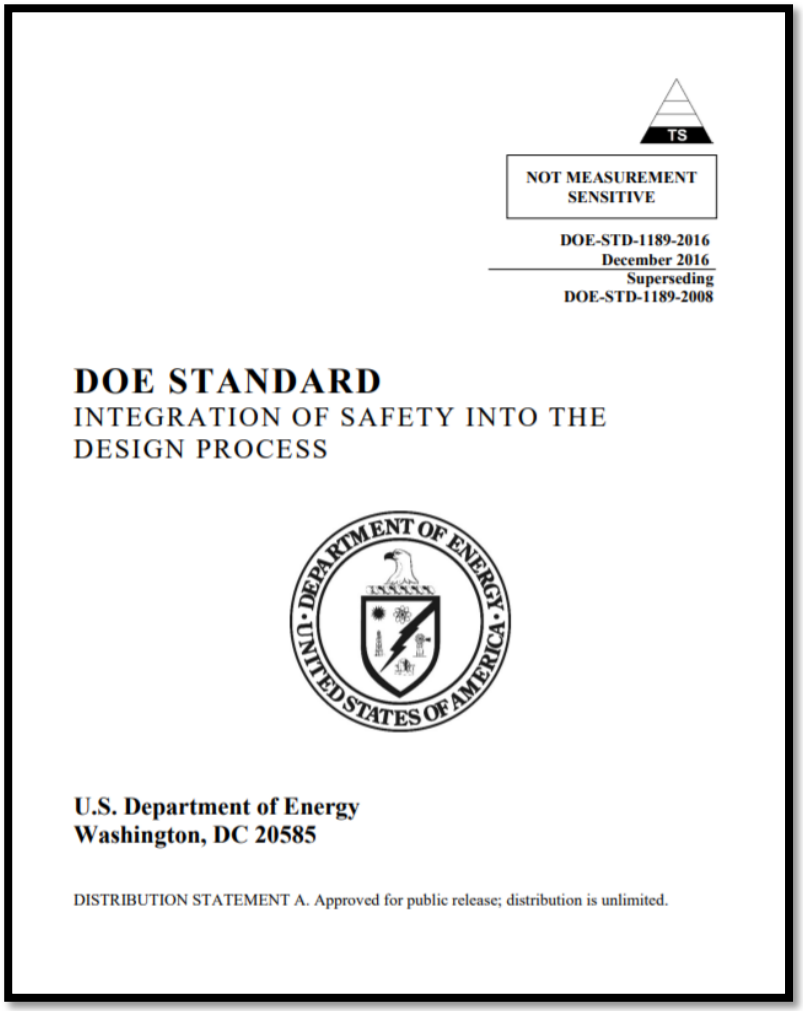
Geometry
Fuel
Power Levels
Temperatures and Pressures
Fission Product Inventories
Safety System Requirements and TSRs



ATR

DOE process for Authorizing New Design

- DOE capital asset acquisition project management guidelines (DOE O 413.3)
- Establishes requirements for safety integration into design and project authorization (DOE-STD-1189)
- Varied success in terms of implementation, trend is improving.
- Not a requirement for a non-DOE acquisition, however principles and concepts provide value for establishing regulatory certainty.



TS

NOT MEASUREMENT SENSITIVE

DOE-STD-1189-2016
December 2016
Superseding
DOE-STD-1189-2008

DOE STANDARD

INTEGRATION OF SAFETY INTO THE DESIGN PROCESS

U.S. Department of Energy
Washington, DC 20585

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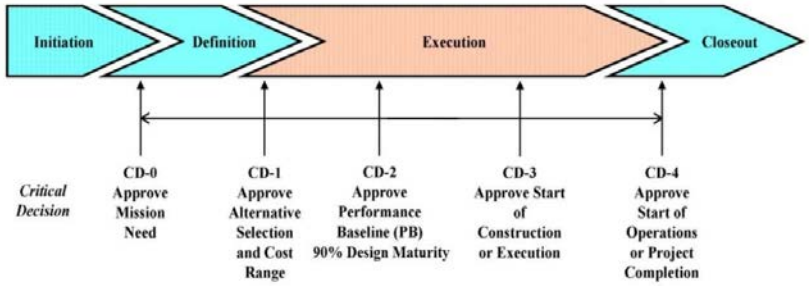
Safety Basis Deliverables under DOE-STD-1189-2016

- CD-0 – Pre-Conceptual Design Phase
  - Safety in Design Expectations (DOE)
- CD-1 Conceptual Design Phase
  - Safety Design Strategy*
  - Conceptual Design Report*
- *CD-2 Preliminary Design Phase*
  - *Preliminary Safety and Design Results**
- CD-3 Final Design Phase
  - Preliminary Safety Analysis Report*
- CD-4 Construction and Operation Phase
  - Final Safety Analysis Report*
  - Technical Safety Requirements*

- * Requires DOE SBAA approval typically via a Safety Evaluation Report



Use of Staged Approval to Establish Certainty

- Process outlined in DOE-STD-1189-2016 provides an opportunity to force a common understanding and agreement at key phases.

Conceptual Design

- **SDS** – Identification and agreement of Key Regulatory Requirements and Plant Safety Functions (GDC)(CD-1).
- **CSDR** – Identification of Plant Safety Functions and Key Systems to Meet Safety Functions and Specific Design Criteria (CD-1)

Preliminary and Final Design

- **PSDR/PDSA/PSAR** – Identification of detailed design parameters necessary to meet plant safety functions and confirmation that design meets general and specific design criteria. (Authorization to Construct)(CD-2/3)

Construction

- **FSAR/DSA** – Documentation of as built configuration and confirmation it meets identified PSAR requirements. Final set of technical specifications developed and approved. (CD-4)
- **Design Change Control and Review Process** – modified version of DOE Unreviewed Safety Question process (similar to 50.59)

Recent INL History

Facility Modifications with Large SAR Changes

- TREAT Restart
- NRAD LEU Conversion and Console Upgrade
- ATR Modifications

Newly Constructed and now Operating Facilities

- RH-LLW
- IMCL

Facilities in Design

- SPL (Preliminary Safety Analysis Report [PDSA] Approved by DOE)
- VTR (Safety Design Strategy Approval Pending)

Questions?