



Managing the Safety Basis

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Dr. Krahn is the head of the Safety Management and Operations Office, an organization with a mission to manage the Department of Energy/Environmental Management (EM) wide Integrated Safety Management System (ISMS) implementation oversight activities, DNFSB recommendations, and issues, operations safety and awareness programs, quality assurance programs, spent nuclear fuel & special nuclear material programs and various EM line management assessments.

Dr. Krahn has more than 30 years of technical and project management experience in positions of increasing responsibility in government, private industry and the military. His project management highlights include: management of the \$140 million complex overhaul of a nuclear submarine; management of the \$30 million nuclear work package for two submarines; producing the first-ever strategic plan for a federal agency; technical direction of the R&D program for two major DOE program offices; and the direction of the design and construction efforts for two major safety upgrades at DOE nuclear facilities.

In technical management, Dr. Krahn's highlights have included: providing technical direction and leadership for a federal agency providing safety oversight to the nuclear weapons complex; directing a \$25 million division in an engineering services company; leading the technical review of numerous technical issues at nuclear facilities; and providing senior technical consulting services to the U. S. nuclear industry.

He has worked in a range of technical disciplines. These have included: materials science and metallurgy; nuclear engineering; planning and scheduling of major nuclear projects; nuclear and conventional power plant maintenance engineering; nuclear facility design and construction; and safety analysis.

Dr. Krahn has a Doctorate, Public Administration, University of Southern California, a M.S., Materials Science, University of Virginia, and a B.S., Metallurgical Engineering, University of Wisconsin, 1978. He also has a Graduate Certificate, Nuclear Engineering, Bettis Reactor Engineering School, U.S. Department of Energy, 1980.

He received the Meritorious Service Medal, U. S. Navy (upon retirement from the Reserves, 2000), Meritorious Service Award, U. S. Defence Nuclear Facilities Safety Board (DNFSB, 1998), John W. Crawford Award for Technical Excellence, U. S. DNFSB (1996, Inaugural Awardee) and was selected to the U. S. Senior Executive Service (SES, 1993).



Verification of Readiness to Start Nuclear Operations

James A. Hutton

*Chief Nuclear Safety Advisor
Office of Environmental Management*

Mr. Hutton has a combination of 30 years civilian and military nuclear safety training and experience, and currently serves as Chief Nuclear Safety Advisor for the DOE Office of Environmental Management (EM). DOE specific experience includes participating in and leading EM Headquarters (EM HQ) oversight assessments and reviews at seven sites and various facilities, review of implementation of DSA and TSR nuclear safety requirements and controls, review of hazard categorization reports and DSA updates, review of Operational Readiness Review (ORR) Plans of Action and Implementation, led and participated in ORRs at DOE EM facilities. Prepared plans for EM HQ oversight of ORR's, conducted Operational Readiness assistance visits at various EM sites and facilities, reviewed implementation of DOE nuclear safety requirements prior to nuclear facility startup, and conducted EM HQ review of Startup Notification Reports for the EM complex. Represented EM HQ in the directives revision process for developing to DOE O 425.1D, Verification of Readiness to Startup or Restart of Nuclear Facilities.

Commercial nuclear power training and experience includes performing, supervising and managing commercial nuclear plant operations, engineering, procedure development, design, construction, startup, testing, maintenance, personnel qualification, training, refueling, emergency preparedness, chemistry, environmental compliance, licensing, safety and accident analysis, criticality safety, radiological protection, corrective action management, and radioactive waste packaging and shipping. NRC licensed Senior Reactor Operator. Commercial nuclear plant positions held included Shift Manager and Operations Manager, Licensing Director for eight reactors at five sites, and Plant General Manager for four reactors at three sites with overall responsibility for nuclear safety, reactor safety, personnel safety, protecting public health and safety, environmental and regulatory compliance and authorizing plant operation and startup. Served as Plant Operations Safety Review Committee Chairman at four commercial nuclear power plant sites as well as Nuclear Safety Review Board Member at six sites. Served as Fleet Operations Steering Committee member for Utilities Services Alliance plants. Prepared, reviewed and approved safety analysis, technical specifications, license amendments, safety analysis reports, and procedures. Performed assessments, provided oversight of contractor work, applied causal analysis methods, developed, implemented and provided oversight of corrective action processes. Attended INPO Shift Manager Professional Development Course and participated in INPO evaluations. Led and participated in operational safety assessments at various commercial nuclear power plants.

Military training and experience as a Naval Officer includes Naval Nuclear Power Training, qualifying to operate and supervising four different Naval Nuclear Propulsion Plants and qualifying for assignment as Chief Engineer of a nuclear powered ship.

Formal education and certifications include Bachelor of Science in Electrical Engineering from Lafayette College, Master of Business Administration from Villanova University, MIT Executive Education Certificate in Management and Leadership, Registered Professional Engineer in Pennsylvania, and NRC Licensed Senior Reactor Operator.



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Learning Objectives



- A. Explain DOE's approach to nuclear safety management through the use of 10 CFR 830.
- B. Discuss the Nuclear Executive's roles and responsibilities for complying with, maintaining, and revising the Authorization Bases.
- C. Explain the importance of configuration management to maintaining the Safety Basis and relate the USQ System to the proper implementation of configuration management.
- D. Identify and explain the key issues in successful implementation of a Worker Protection Program.



Overview of Nuclear Safety Management Regulations and Requirements for DOE Nuclear Facilities and Operations

10 CFR 830 Overview Discussion of Subpart B: Background



- PAAA amended AEA in 1988 to establish regulatory penalties
- Decision by DOE to enforce compliance with DOE nuclear safety requirements through the Code of Federal Regulations (FR/Vol. 65, No. 196/10-10-2000)
 - Codified DOE Directives related to nuclear safety
 - 3 CFRs established to allow DOE to impose civil and criminal penalties for non-compliance with nuclear safety requirements
 - 10 CFR Part 820, *Procedural Regulations for DOE Activities*
 - 10 CFR 830, *Nuclear Safety Management*
 - 10 CFR 835, *Occupational Radiation Protection*

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)



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- 10 CFR 820 provides for the enforcement of violations of DOE Nuclear Safety Requirements
 - Established 1993
- Establishes the enforcement policy and framework for DOE to assure compliance
- Civil and criminal penalties can be imposed on contractors under the PAAA
 - Applies to violations of nuclear safety requirements by:
 - Contractors
 - Subcontractors
 - Suppliers
 - Applies to work conducted outside of a nuclear facility

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)



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- 10 CFR 830 established DOE Nuclear Safety Regulations to:
 - Establish quality assurance requirements for contractors conducting activities, including providing items or services that affect, or may affect, nuclear safety of DOE nuclear facilities (Subpart A) (1994)
 - Establish safety basis requirements for hazard category 1, 2, and 3 DOE nuclear facilities (Subpart B) (Effective 2001, fully implemented in 2003)

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)



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- Key summary points:
 - QA requirements apply to **all** DOE nuclear facilities or activities that affect nuclear safety
 - Safety basis requirements apply only to Hazard Category 1, 2, and 3 DOE nuclear facilities
 - Focus of Safety Basis of Subpart B is on:
 - Documented Safety Analysis (DSA)
 - Technical Safety Requirements (TSRs)
 - Unreviewed Safety Question (USQ) Process

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)



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Safety Basis Requirements:

- Define the scope of work
- Identify and analyze the hazards
- Require Categorization per STD 1027 – preliminary per inventory – final per STD 1027 and airborne release fraction (ARF) considerations
- Require the establishment of hazard controls

Feedback and Improvement provided through:

- USQ Process
- Annual Updates

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)



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Requirements for the Documented Safety Analysis 10 CFR 830.204(b)

The DSA must address six items:

1. Describe the facility
2. Identify natural and manmade hazards
3. Evaluate normal, abnormal and accident conditions (consider beyond the design basis accident analyses)
4. Derive the hazard controls
5. Define the characteristics of safety management programs (QA, maintenance, radiation protection, fire protection, conduct of ops, etc.)
6. Define the criticality safety program: Ensures that operations with fissionable material remain subcritical, identifies criticality safety standards, describes how program meets safety standards

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)



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STD 1027 Categorization

(Implemented through unmitigated inventory thresholds)

<i>A DOE nuclear facility categorized as:</i>	<i>Has the potential for:</i>
Hazard category 1	Significant off-site consequences
Hazard category 2	Significant on-site consequences beyond localized consequences
Hazard category 3	Only local significant consequences
Below category 3	Only consequences less than those that provide a basis for categorization as a hazard category 1, 2, or 3 nuclear

10 CFR 830 Overview Discussion of Subpart B: Background(cont.)



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- Safety Basis Documentation
 - DSA
 - TSRs (Hazard Controls including Safety Management Programs)
 - Any DOE-imposed conditions of approval described in the Safety Evaluation Report (SER)
- The contractor:
 - Must keep the safety basis current (DSA and TSR changes rolled up into annual update)
 - Must incorporate any changes, conditions, or hazard controls directed by DOE

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)



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Compliance with “Safe Harbors”

- Methods that DOE has already determined to be acceptable for use.
- Standards or methods developed by DOE and NRC or defined in regulations promulgated by the Occupational, Safety and Health Administration (OSHA).
- The safe harbor methods are based on many years of experience with the types of facilities to which they may be applied.
- Contractors who use safe harbor methods in accordance with the provisions in Table 1 of Appendix A to Subpart B of Part 830-General Statement of Safety Basis Policy, do not need to obtain DOE approval prior to preparing a documented safety analysis.”

Preamble to the Interim Final Rule (Oct. 10, 2000)

10 CFR 830 Overview Discussion of Subpart B: Background (cont.)



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Compliance with “Safe Harbors”

- Should result in a contractor satisfying the regulatory requirements for a documented safety analysis.
- Contractor is responsible for meeting the requirements of the rule, even if it uses a safe harbor standard to prepare its documented safety analysis.”

Preamble to the Final Rule (Jan. 10, 2001)

NOTE: Not all safe harbors satisfy all of the Rule’s DSA requirements

Safe Harbor Applications



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1. A DOE reactor
2. A DOE nonreactor nuclear facility
3. A DOE nuclear facility with a limited operational life.
4. The deactivation or the transition surveillance and maintenance of a DOE nuclear facility.
5. The decommissioning of a DOE nuclear facility
6. A DOE environment restoration activity that involves either work not done within a permanent structure or the decommissioning of a facility with only low-level residual fixed radioactivity.

Safe Harbor Applications (cont.)



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7. A DOE Nuclear explosives facility and the nuclear explosive operations conducted therein.
8. A DOE hazard category 3 nonreactor nuclear facility
9. Transportation activities
10. Transportation and onsite transfer of nuclear explosives, nuclear components, Naval nuclear fuel elements. Category I and Category II special nuclear material, special assemblies

Safe Harbor Methodology



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- DOE-STD-3009-94, Change Notice 3, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses is main safe harbor methodology endorsed by DOE.*
- DOE-STD-3009 provides a DSA preparation method acceptable to DOE:
 - Provides the DSA Preparation Conceptual Basis and Process
 - Covers Hazard Analysis, including final Hazard Categorization
 - Method for Accident Analysis, including designation of safety-class structure, systems and components (SSCs), safety control (TSRs) as function of Evaluation Guideline (EG, Appendix A)
 - Describe application of Graded Approach to development of DSA

Safety Design Basis Documents



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- Safety Design Strategy (SDS) - roadmap for how important safety issues will be addressed in design and in tailoring the development of key safety documentation.
- Conceptual Safety Design Report (CSDR) - summarizes the hazards analysis efforts and safety-in-design decisions in the conceptual design, and any identified project risks associated with the selected strategies.
- Preliminary Safety Design Report (PSDR) updates the information in the CSDR, adding design detail.
- Preliminary Documented Safety Analysis (PDSA) demonstrates the adequacy of the design from the safety prospective to support construction of the facility.
- The DSA evolves from the PDSA and reflects the as-built design.
- The Technical Safety Requirements (TSRs) are developed, based upon the DSA.

Approval of Nuclear Facility Safety Documentation



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- DOE-STD-1104, *Review And Approval Of Nuclear Facility Safety Basis And Safety Design Basis Documents*
 - Addresses the review and approval of all the safety basis documents developed per DOE-STD-1189-2008.
 - Prepared to be consistent with 10 CFR Part 830 and its Implementation Guides
 - Should be used in conjunction with the Rule and its implementing guidance for safety basis documents
 - Consistent with DOE O 413.3A, Change 1, and DOE-STD-1189-2008 and used in conjunction with those documents, the Rule, and their implementing guidance for safety design basis documents.
 - Provides specific guidance on approval of safety documentation including preparation of the Safety Evaluation Report (SER)

New hazard category 1, 2, and 3 nuclear facilities (designed under DOE-STD-1189)



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- Safety documentation during the design process (up to final design)
 - Safety Design Strategy adequate?
 - Commitment to DOE safety design criteria of DOE O 420.1B?
 - Compliance with DOE-STD-1189 safety design process?
 - Have unresolved safety issues been identified and are they being dealt with via the risk management plan?
 - Is safety in design progress adequate to support proceeding into the next stage of design?

New hazard category 1, 2, and 3 nuclear facilities (designed under DOE-STD-1189) (cont.)



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- Preliminary Documented Safety Analysis (at end of final design)
 - If DOE safety design requirements have been satisfied through the processes described in DOE O 413.3A and associated guidance, the requirements and processes of DOE-STD-1189, and the safety design criteria and guidance of DOE O 420,1B, the contractor and DOE should have confidence that the resulting design will provide for adequate protection of the public, workers, and the environment.

Approval Bases for Safety Basis for New Facilities



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- A facility designed under DOE-STD-1189 and associated requirements should not require a *de nova* review.
- The safety in design process should result in a facility that provides for adequate protection of the public, workers, and environment
 - Focus on any changes and/or new information from approved PDSA
 - Consistency of completed facility with approved final design
 - Complete and correct (compliance with TSR Implementation Guide) derivation of TSRs from hazards analysis and hazard control selection and classification in DSA

Approval Bases for Safety Bases of Existing Nuclear Facilities



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Mostly dealing with facilities designed many years ago under different requirements and practices, so the issue is different than for new facilities:

- Compliance with 10 CFR 830 DSA safe harbor?
- Consistent with DSA requirements of 10 CFR 830?
- Case-by-case evaluation of adequate safety for public, workers, environment
 - Hazards analyses, hazard controls and classification, unmitigated and mitigated accident consequences and probability estimates
 - Consideration of adequacy of existing design and controls and the need for compensatory measures and/or upgrades
- Complete and correct (compliance with TSR Implementation Guide) derivation of TSRs from hazards analysis and hazard control selection and classification in DSA

Approval Bases for Major Modifications of Existing Facilities



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- Is modification correctly classified (major mod or not)?
 - Note that this should occur at the beginning of a proposed modification.
 - DOE-STD-1189 has criteria for a major mod decision.
 - If a major mod, prepare a Safety Design Strategy

Approval Bases for Major Modifications of Existing Facilities (cont.)



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- PDSA approval
 - Adequacy of hazards analyses and selection and classification of hazard controls
 - Compliance with safety design requirements of DOE O 420.1B
 - Compliance with safety classification requirements and guidance of DOE-STD-1189 Appendices A, B, C, and D
 - Cost/benefit considerations regarding existing facility design (e.g., seismic design categorization)
- DSA approval considerations
 - Consistency between PDSA and final design
 - Facility DSA and TSR integration

Safety Evaluation Report (SER)



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- Developed specifically to document acceptance of:
 - PDSA
 - DSA
 - TSRs
- Provides a good overall guide for performance of highly technical work by DOE staff

Review and Approval of the SER — Safety Basis Approval Authority Responsibilities



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- Ensures the timely and proper: Review of all safety basis documents; and preparation of a SER; and review and approval process represents all DOE entities with vested interest in the facility and considers commitments made to agencies outside DOE.
- Assigns a review team leader the responsibility of performing an independent review.
- Determines the final disposition of significant issues.
- Tracks and resolves conditions of approval.

Discussion of Key Issues for Safety Basis Documentation and Implementation



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- **Documentation**

- **DSA Quality:** is it clear and complete and are the hazards and accidents thoroughly analyzed?
- **TSR Derivation Adequacy:** are the controls adequate and links to DSA clearly identified?
- **Safety Management Program Documentation in the DSA and TSRs:** are SMP key elements credited in the DSA adequately described in DSA and properly linked to TSRs so that the safety basis can be maintained?
- **Resolution of SER Significant Issues:** are final dispositions of significant issues complete and documented?

Discussion of Key Issues for Safety Basis Documentation and Implementation (cont.)



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- **Implementation**

- **TSRs Implemented:** role of independent verification.
- **Flow-down of safety basis requirements to facility procedures:** are implementing procedures clearly linked to the safety basis?
- **Staff Training and Qualification:** are operations personnel adequately trained and qualified and is there a system engineer program in place?
- **Other Key Implementation Issues?**



Complying With, Maintaining, and Revising the Authorization Bases



Concept of the Authorization Basis

- DOE owned and contractor (or Gov't) operated hazardous nuclear facilities. DOE is ultimately responsible for the safety of its facilities.
- Broad conditions for authorizing operations
 - Regulations: DEAR clause for ISM, 10 CFR 830, 835, 851
 - Contract: ISM/DOE Orders, Standards, others, and flow down
- Facility-specific conditions for operations
 - Authorization Basis: AB Agreements – Cat 1 and Cat 2 nuclear facilities (safety and environment)
 - Safety Basis: DSA and TSR for Cat 1, 2, and 3 nuclear facilities (a subset of the coverage of the AB)

Authorization Basis and the Safety Basis



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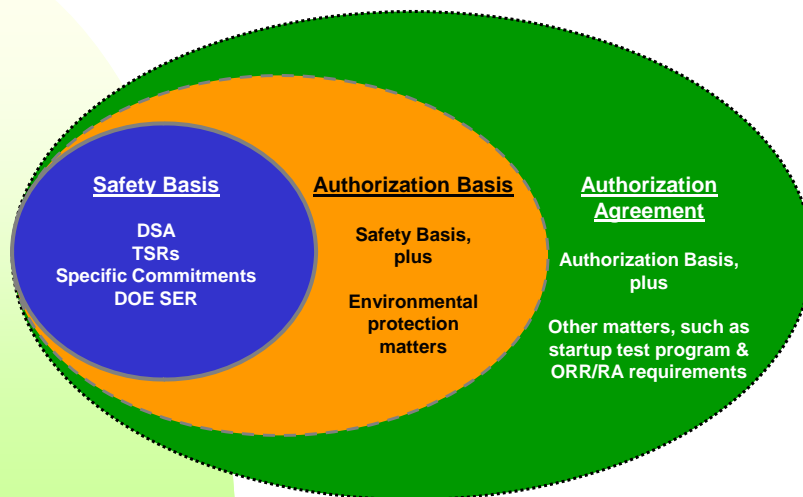


An **Authorization Basis** encompasses all the conditions for operations of a DOE facility, and includes both the Safety Basis and environmental requirements, such as compliance with EPA regulations and state agreements, etc.

Components of the Authorization Agreement



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Federal and Contractor Staffing Issues

- The contractor expertise needed to prepare authorization basis documentation and implementing documents is unique and not always readily available...Federal Focus needed.
- The Federal staff **available** to prepare an SER is **limited** and **on-site resources** may not have the expertise/experience needed **to be successful...ask for help early.**
- Additional contractor and/or Federal resources may be required — both part-time and permanent
- Approval Authority (**i.e., us - the Feds**) **needs to maintain control of the process and own** the results



Using Outside Resources to Support AB Issues

- Critical decisions may require expertise beyond “in-house” capability
- Outside resources in EM, NA and HS, Labs along with CTAs, are available on a part-time basis to support AB issues
- Lessons learned?

Group Discussion - Key Issues for Implementing, Maintaining and Revising the Authorization Basis



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- Safety Basis issues plus incorporation of environmental requirements into facility procedures
- Linking all requirements to implementing procedures
- Protection of assumptions in the DSA
- The USQ process
- Configuration management



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Unreviewed Safety Questions

What Constitutes a USQ?



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A situation where:

1. The probability of the occurrence or the consequences of an accident or the malfunction of equipment important to safety previously evaluated in the documented safety analysis could be increased;
2. The possibility of an accident or malfunction of a different type than any evaluated previously in the documented safety analysis could be created;
3. A margin of safety could be reduced; or
4. The documented safety analysis may not be bounding or may be otherwise inadequate.

Purpose of the USQ Process and Relationship to the Safety Basis



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- To authorize contractors at nuclear facilities to grant final approval to changes without DOE approval, provided that the changes can be accommodated within the existing safety basis
- Intended to provide the flexibility needed for day-to-day operations
 - Not for major modifications/upgrade projects
 - Not for technologies that are new to the facility – could introduce new failure mechanisms

Purpose of the USQ Process and Relationship to the Safety Basis (cont.)



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- Contractor may grant final approval to changes that do not involve a USQ
- To protect the integrity of the safety basis on a continuing basis
 - To determine which changes must be submitted to DOE for review and approval (positive USQDs)

USQ – Expectations and Requirements



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Requirements of the Rule (10 CFR 830.203)

- Must implement DOE-approved USQ procedure [that is, prepare a USQD] in situations where there is:
 - Temporary or permanent change in the facility as described in the existing documented safety analysis (DSA)
 - Temporary or permanent change in procedures as described in the existing DSA
 - Test or experiment NOT described in the existing DSA
 - Potential inadequacy of the DSA because the analysis may not be bounding or may be otherwise inadequate (PISA)
- Must obtain DOE approval **prior** to taking any action determined to involve a USQ

USQ – Expectations and Requirements (cont.)



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Requirements of the Rule (10 CFR 830.203)

- If a Potentially Inadequate Safety Analysis (PISA) is discovered, the Rule requires the contractor to:
 - Take action [initiate operational restrictions], as appropriate, to place or maintain the facility in a safe condition until an “evaluation of the safety of the situation” is completed
 - Notify DOE of the situation
 - Perform a USQD and notify DOE promptly of the results
 - Submit the “evaluation of the safety of the situation” to DOE prior to removing any operational restrictions initiated to meet this regulation
- Must submit to DOE an annual summary of the USQDs performed. This is a great opportunity for dialogue on the health of the safety basis

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USQ – Expectations and Requirements (cont.)



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- Candidate items for USQ “screening”
 - Changes to a requirement in the TSRs, or the addition of a new TSR requirement;
 - Changes that management has already decided will be submitted to DOE’s approval (e.g. major modifications);
 - The installation of an item that is an exact replacement (that is, same manufacturer, same model number, etc.); the installation of an item that is on the facility “Approved Equivalent Parts” list (DOE Approved document in QA Program).
- Candidate items for USQ screening
 - Changes for which common commercial practices would suffice; and
 - Changes to documents that are purely editorial and make no technical change.

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USQ – Expectations and Requirements (cont.)



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Categorical Exclusions

- Must be DOE Approved
 - Normally part of USQ process/procedure
- Appropriate uses to ease review nuclear
 - Better definition of “editorial” changes
 - Maintenance
- Can be misused
 - Overly broad
 - Feedback & improvement

USQ – Expectations and Requirements (cont.)



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Configuration Management and Its Relationship to the USQ Process

- **Change control is the key to CM**
- All other CM elements are secondary--to safety
- What is a change?
 - Not a change if “exact” replacement
 - A configuration change if an “Approved Equivalent” component, but not design change
 - Includes TEMPORARY AND PERMANENT hardware, software, and new operations (tests and experiments)

USQ – Expectations and Requirements (cont.)



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Configuration Management and Its Relationship to the USQ Process

- USQ process is intended to be part of an overall Change Control process
 - USQ process focuses on “Changes”
 - No Change; No Change Control; No USQ
- If at a nuclear facility, USQ process must consider:
 - All changes: hardware, documents, new activities
 - All structures, systems, or components (SSCs), not just safety-class or safety-significant SSCs
 - Nuclear hazards and other hazardous materials
 - Potential consequences to public, co-located workers, and facility workers

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USQ – Expectations and Requirements (cont.)



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Configuration Management and Its Relationship to the USQ Process

- USQD is not a substitute for safety analysis. Contractor determines if the change is actually “safe” as part of change control, prior to entering the USQ process
- The quality of the safety basis is directly related to the USQ process
- **USQ process is part of a healthy CM program**
- A CM program will involve more than just safety-related changes...The Mission

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USQs as Performance Indicators



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- The USQ process is intended to support the routine maintenance and configuration management of the facility
 - USQDs are a routine part of that process
 - The number of USQDs reflects the maintenance to equipment or procedural changes performed in the facility – **not necessarily a negative indication**
- The number of positive USQDs (USQs) may indicate that the USQ process is being used as the “Safety Analysis” for changes to equipment or procedures – a **“negative” indicator**
- A USQ is **NOT** a bad thing

USQ Practical Exercise



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Break into Groups

- This exercise will be completed in break-out groups
- Each group will select a spokesperson
- Instructions for the exercise are provided separately
- Each group has 30 minutes to complete the exercise
- Each group spokesperson will present their group’s conclusions to the entire class

The Role of the Maintenance Organization in Safety Management



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- Equipment maintenance is necessary to ensure continued operability of equipment important to safety
- Repair or replacement of equipment that is important to safety has the potential to degrade performance of the equipment which will impact the safety basis
- The maintenance organization must practice strict configuration control to maintain the safety basis

Considerations for Upgrade of Facility and Safety Systems



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- Over time, the infrastructure supporting equipment important to safety should be evaluated.
 - Although the equipment functions as designed, what if the roof were to fall on the equipment?
- Lessons learned?

Group Discussion — Key Issues for Maintaining a Configuration Management Program



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- Does the CM program at a facility incorporate the key elements of a successful CM program?
 - Program Management
 - SSC Requirements
 - Document Control
 - Change Control
 - QA requirements
 - Assessments of the CM Program



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Worker Safety and Health Programs

Worker Protection Priorities



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Balancing worker protection priorities between safety basis and worker requirements (10CFRS51) requirements

- Hazard Controls are clearly defined in the facility safety basis but not clearly defined in every worker activity.
- Examples of safety basis hazard controls for worker protection?
- Rad protection versus industrial safety?
- Examples of hazard controls for worker protection?
- Where does ISM fit?

ISM at the Worker Level



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Safety of non-routine work, or short-term tasks, is generally maintained through *work authorization system*

- Directed toward protection of workers, usually maintenance workers
- Job hazards analyses and job task analyses identify hazards and controls
- Collaborative review a “best practice”

DOE G 421.1-2, Section 5.4

Worker Safety and Health Programs



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- Compliance with OSHA standards. (29 CFR 1960.16)
- “Each agency head shall comply with all occupational safety and health standards issued under section 6 of the Act, or with alternate standards issued pursuant to this subpart.”
- 10 CFR 851 – final Rule 2/06
 - Worker Safety and Health Plans – 2/07
 - “Compliance” – 6/07

Worker Safety and Health Programs (cont.)



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- 10 CFR 851, Overall Structure
- General Provisions
 - Worker Safety and Health Program
 - Procedures for Investigation and Enforcement
 - Definitions, etc
 - Program Requirements
 - General requirements
 - Development, approval and implementation

Worker Safety and Health Programs (cont.)



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10 CFR 851, Overall Structure (cont.)

- Hazard identification and assessment
- Hazard prevention and abatement
- Safety and health standards
- Functional areas
- Training
- Variances
- The Enforcement Process

Appendix A – Functional Areas

Appendix B – Enforcement Policy

10 CFR 851—Subjects Covered



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LEADERSHIP TRAINING



- Functional Area Requirements
 - Construction Safety
 - Fire Protection (DOE 420.1, Facility Safety, applies)
 - Firearm Safety
 - Explosives Safety
 - Industrial Hygiene
 - Biological Safety
 - Pressure Safety
 - Motor Vehicle Safety
 - Electrical Safety

DOE O 440.1A, Worker Protection Management for DOE Federal and Contractor Employees



NUCLEAR EXECUTIVE
LEADERSHIP TRAINING



- Implementation Guides for DOE O 440.1A
 - DOE G 440.1-1, WORKER PROTECTION MANAGEMENT FOR DOE FEDERAL AND CONTRACTOR EMPLOYEES GUIDE
 - DOE G 440.1-2, CONSTRUCTION SAFETY MANAGEMENT
 - DOE G 440.1-3, OCCUPATIONAL EXPOSURE ASSESSMENT
 - DOE G 440.1-4, CONTRACTOR OCCUPATIONAL MEDICAL PROGRAM
 - DOE G 440.1-5, FIRE SAFETY

Occupational Safety and Health Programs Within DOE



NUCLEAR EXECUTIVE
LEADERSHIP TRAINING



- Keys for Successful Implementation
 - DOE and Contractor Personnel are trained and qualified on relationship to OSHA and DOE implementation requirements
 - Integration with “other safety programs”??



Work Control Process

- Who has work authorization authority (contractor) at your site/facility?
- What requirements are in place to ensure that job hazards are identified and appropriate controls implemented?
- What processes/procedures are in place to ensure that the worker understands the hazards and the controls?
- Some sites are using generic hazards analyses for routine tasks. Can this be effective?

Nuclear Executive Leadership Training

Managing the Safety Basis

Unreviewed Safety Question (USQ) Practical Exercise

August 3, 2010

Instructions

Setting: You and your group of senior managers are participating in an exit briefing following an independent review of one of your site facilities. A potential issue has been identified regarding implementation of the site's DOE-Approved USQ procedure.

Actions: Review the attached results from the review on this issue, discuss the identified issues and answer the following questions:

1. Does the potential exist for the contractor to screen out Proposed Activities (PA) which should have a Determination performed?
2. Do the site procedure and practices for USQ Screening and Determination comply with the requirements of 10 CFR 830 (Provided)?
3. Do the site procedure and practices for USQ Screening and Determination comply with DOE G 424.1, *Implementation Guide for Use in Addressing Unreviewed Safety Question Requirements* (Provided)?
4. Based upon the group's conclusions on these questions, present your position and path forward to the entire class on the identified issues.

Goal: USQ Screens and USQ Determinations are being performed in accordance with the site procedure.

Performance Objective:

Personnel responsible for the conduct of USQ process execution are knowledgeable of the procedure and requirements.

Acceptance Criteria: The conclusion of a USQ Process document is correct when:

1. The screen correctly concludes whether a USQD is not required.
2. The determination correctly concludes whether a USQ exists or not.
3. Inconsequential change for procedures, prior use, or categorical exclusion applications correctly concludes that the change meets the conditions of the USQ Process procedure or DOE/NNSA pre-approved categorical exclusion.

LOI 1: Conduct a detailed review of a representative set of USQs/Ds prepared at all Hazard Category 3 and above facilities to determine compliance with the site procedure.

Approach: The Assessment Team (AT) reviewed a randomly selected set facility Screens and Determinations and assessed their compliance with the site procedure.

Record Review: Thirty Screens out of a total of 201, which included all eight that went on to Determinations were reviewed. For the purpose of this review, the facility consists of a Hazard Category 2 facility, a Hazard Category 3 facility, and a Waste Container Staging Area (a Hazard Category 3 facility).

Interviews Conducted: None

Discussion of Results of Assessment:

For any proposed activity (PA), a description of the activity is required. The site procedure contains two primary steps, USQ Screening and USQ Determination. The procedure first asks if the PA is a change to TSRs. If that is so, the procedure says no further screening is necessary (because TSR changes must be approved by DOE). All PAs (including procedures) that have been judged not to be Inconsequential Changes must first undergo Screening. Inconsequential Changes must be so identified and annotated as such by two qualified USQ Screeners. The Screening criteria are the four included in 10 CFR 830.203 for entry into the USQ process:

- a. Change to the facility as described in the Safety Basis?
- b. Change to the procedures as described in the Safety Basis?
- c. Test or experiment not described in the Safety Basis?
- d. Analytical errors, omissions, or deficiencies in the Safety Basis?

If the answer to any of these questions is yes, a justification is required and a USQ Determination must be performed. Screens are signed by the Screening Originator and reviewed by a Screener Reviewer, both of whom must be qualified for those roles.

USQ Determinations, according to the site procedure, call for responses to the seven USQ questions, as described in DOE G 424.1. Justifications for the responses to the questions must be provided. The USQD must be signed by the Determination Originator (who must be qualified to perform Determinations) and also by a Qualified Reviewer.

Conclusions: The facility is complying with Nuclear Facility Unreviewed Safety Questions site procedure.

Best Practices: None identified.

Opportunities for Improvement: None identified.

Issues: None identified.

LOI 2: For personnel qualified to perform and review screens and determinations, review a sample of USQS/Ds to ascertain the USQ process is being accurately performed.

Approach: The Assessment Team (AT) reviewed a randomly selected set of facility Screens and Determinations and assessed their accuracy.

Record Review: Thirty screens out of a total of 201 which included all eight that went on to determinations, were reviewed. For each Screen and Determination a form was filled out that identified the USQ Number, Subject/Title, and an assessment indicating 1) Adequate Description, 2) Adequate Response to Questions, 3) Addresses Transient State, 4) Adequate Scope, and 5) Conclusion is Correct. A column for comments that describe an overall assessment of the USQS/USQD was completed for most.

Interviews Conducted: None

Discussion of Results of Assessment: Most descriptions of the proposed activities (PAs) did not convey a good understanding of the PA. By reading the justification provided for the responses (required when the answer to all four screening questions are negative), it was possible to get a better understanding of the PA, because the justifications generally include more detail on the PA.

Almost all PAs entering the USQ process were terminated at the screening stage (negative screen). A large percentage of the negative Screens were justified by a statement that the PA was not described in the Safety Basis, although some were also accompanied by an assertion, with some limited rationale that the proposed activity did not involve safety issues not enveloped by the Safety Basis. Transient states were generally not addressed in Screens. For almost all of the Screens it was not possible to determine whether the scope was adequate or whether the conclusion was correct. This was because insufficient information was provided in the Screen to make that determination, although a “gut feeling” on the part of an informed technical person might lead to the same conclusion as the Screen.

Two of the PAs that proceeded to a Determination were related USQS/Ds in prior years. The first 2008 Determination was a modification of the high activity drain service to add

a new tank and to isolate two tanks that had been part of the service. The second was a clarification of the first one to resolve a disagreement on the boundaries of the drain service by providing change pages to the SAR (DSA). The second Determination was essentially an edit of the first one accompanied by SAR page changes, and it is not clear why the issue entered the USQ process, or was not handled through a revision of the first Determination.

The description of the PA was adequate. However it was very broad in scope, encompassing all activities related to the isolation of the two tanks and the installation of the new tank, including all interim activities. The answers to the seven USQD questions went into some detail.

None of the Assessment Plan failure criteria for a USQ Document Adequacy Assessment were definitively tripped by the USQS/Ds that were reviewed. However because of the limited information provided through the implementation of the screening process, this cannot be definitively stated.

Conclusions: Most screenings performed at the facility employ the rationale that the PA is not described in the Safety Basis as the authoritative basis for screening a PA from proceeding to a Determination. Where that rationale is provided for the screen, it sometimes is accompanied by a safety rationale. However, without more information than is usually provided, it is difficult to agree or disagree (beyond a “gut feel”) that the conclusion is correct (no need for a Determination and therefore no need to get DOE approval for the PA). The requisite information to make the case one way or another would be provided through the seven USQ Determination questions. Most screens evaluated were judged to be inadequate, based on inadequate description, inadequate response to questions, inadequate addressal of transient states, inadequate scope, or inadequate quality).

Best Practices: None identified

Opportunities for Improvement:

1. Descriptions of proposed activities need to be more complete.
2. Screens (positive and negative) should be periodically evaluated for quality by an outside objective assessor.

Issues:

1. The screening criteria that include the phrase “as described in the Safety Basis” are being misused. While screening is a part of the USQ process, the phrase of “as described in the Safety Basis” is being interpreted to mean that if the item **is not** described in the Safety Basis it can be screened out from a Determination.
2. Items are screened out on the basis of whether they are described in the safety basis, and safety arguments in support of a negative screen are very brief. As a result the safety issues associated with the PA are not being dealt with in a documented fashion that can be independently concurred in through answering the seven USQ questions, supported by rationale.

LOI 3: Interview personnel responsible for executing the USQ process to verify their understanding is consistent with the requirements of the procedures. Interview questions are contained in the Assessment Plan.

Approach: Interviews were conducted of a range of personnel with responsibilities relating to management of change and to the USQ process. Pre-prepared questions of were used as a guide to the questioning. Where the responses related to observations Assessment Team had regarding document reviews, those issues were pursued with the interviewees.

Record Review: Facility Oversight Safety Committee (FOSC) Charter, FOSC meeting minutes, and the listing of personnel qualified to perform USQ screens and Determinations.

Interviews Conducted: Interviews were conducted of: the Facility Oversight Safety Committee (FOSC) Chair, Safety Basis Regulatory Authority (SBRA), the Lead Engineer, and three System Engineers. Five of these individuals are USQ qualified, either to do USQ Screens or for both Screens and Determinations. Also interviewed were the Manager of Operations and Maintenance and the Procedures Manager.

Discussion of Results of Assessment: All personnel interviewed were knowledgeable of the site procedure and its requirements and had undergone USQ training. Their responses to the Assessment Plan questions were mostly acceptable.

When asked what constituted equipment important to safety in the facility, most answers referred to those items “credited” in the SAR for preventing or mitigating accidents, and some referred only to Safety Class and Safety Significant SSCs. This perception supports the observation that USQ Screens are being misused, in that DOE G 424.1 indicates that even process equipment may be important to safety because their failure could result in a release of hazardous material. The site procedure is not contradictory to this DOE guidance; however it is not as explicit, which seems to have led to some lack of understanding of this point.

When queried on the safety assessments that are sometimes described in a screening explanation of all negative answers to the four screening questions, one interviewee said that a lot more thought went into the characterizations (generally that the safety envelop is not exceeded by a PA) than is reflected on the screening form. This was confirmed by others who asserted that most issues involved a healthy debate among the staff. These observations seem to indicate that the guidance that screens should only involve a simple yes or no answer and should not be evaluative (DOE G 424.1) is not sufficiently captured in the site procedure or is being inappropriately applied.

Personnel from both maintenance and operations are very aware of the need to involve engineering in items which could have safety basis implications. There is a perception that most, if not all, work orders/packages are routed to engineers and that the engineers check the package to determine if there is a cause to enter the USQ process. The fact that there is no Safety Class or Safety Significant system and only the building and ventilation system (passive boundary only) are design features tends to limit the number of packages which directly affect the safety basis. All work orders associated with design changes are

routed to engineering, some corrective maintenance is routed to engineering for approval, and some completed corrective and preventive maintenance packages are routed to engineering. Operations and maintenance assume engineering is reviewing the package with an eye on the need for entering the USQ process.

The procedures manager receives and processes procedures after they have gone through USQ review and does not play an active role in the process. The procedure manager is aware of the USQ process but receives procedure changes after USQ screeners have processed. For new procedures the USQ screen is accomplished as part of the review and approval process, which the manager is not directly involved in.

Conclusions: Personnel are knowledgeable of the site procedure and its requirements.

Best Practices: None identified.

Opportunities for Improvement:

1. Recommend that USQ screeners and evaluators read and review 10 CFR830.203 and DOE G 424.1 to supplement their understanding of the site procedure.
2. In training/qualification and requalification, the issues of what are items considered “important to safety” and writing a description of the proposed activity should be addressed.

Issues: None identified.



Verification of Readiness to Start Nuclear Operations

James Hutton
August 3, 2010

Outline



- Readiness Reviews
- Readiness Review Process
- Lessons Learned and Factors for Success
- DOE O 425.1D; Verification of Readiness to start up or restart nuclear facilities - what's new

Learning Objectives



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LEADERSHIP TRAINING



- Discuss requirements for a Readiness Review prior to start of Nuclear Operations.
- Discuss the preparations for conducting a successful Readiness Review and identify key indicators that a facility is not ready for one.
- Highlight updated requirements in DOE O 425.1D and DOE-STD-3006-2010

Readiness Review



NUCLEAR EXECUTIVE
LEADERSHIP TRAINING



- A disciplined, systematic, documented, performance-based examination of:
 - Facilities, Personnel, and Procedures
 - Management Control Systems/Safety Management Programs
- Verifies that a facility is ready to safely conduct nuclear operations within its approved Authorization Basis
 - Evaluates implementation of approved authorization agreement
 - It does not re-evaluate the adequacy of the approved documents
- May be an ORR or RA depending on circumstances.
 - Type of review determined by line and authorized in SNR
 - Scope defined in POA

Purpose of ORR or RA is Twofold:



NUCLEAR EXECUTIVE
LEADERSHIP TRAINING



1. Ensure readiness of facility and personnel to start and operate the facility within the bounds of acceptable risk:
 - Within the safety basis/Authorization Agreement
 - In compliance with applicable ES&H regulations
2. Ensure the facility/activity has adequate Safety management programs implemented and sufficient controls in place to start and continue nuclear operations within those bounds.

Determining the Level of Readiness Review



NUCLEAR EXECUTIVE
LEADERSHIP TRAINING



- Every startup of Nuclear Operations must be considered
- Local procedures determine process for making determination
- Resumption following short duration shutdown with existing operating procedures requires no RR
- ORR by both Contractor and DOE required for major startups
- RA required for all other startups
 - DOE RA required for major restarts and whenever specified by local procedures

When to have an ORR



NUCLEAR EXECUTIVE
LEADERSHIP TRAINING



- Initial startup of a newly constructed nuclear facility with a new Documented Safety Analysis (DSA) and associated Technical Safety Requirements (TSRs);
- Initial startup after conversion of an existing facility to a new nuclear mission with a new DSA and associated TSRs;
- Restart of a nuclear facility, activity, or operation that has upgraded its hazard categorization to Hazard Category 1, 2, or 3;
- Restart after a DOE management official directs the shutdown of a nuclear facility, activity, or operation for safety reasons;
- Restart of a nuclear facility, activity, or operation after violation of a Safety Limit
- Any situation deemed appropriate by DOE line management.

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When to have a Readiness Assessment (RA)



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- An RA is required for every startup for which an ORR is not specified and for which the use of routine operating procedures is not justified
- A DOE RA is also required:
 - Initial startup of a new Hazard Category 1 or 2 activity or Operation
 - Restart after an extended shutdown for a Hazard Category 1 or 2 nuclear facility, activity, or operation.
 - Startup or restart of a Hazard Category 1 or 2 nuclear facility, after substantial process, system, or facility modification.
 - Any situation deemed appropriate by DOE line management.
- DOE O425.1D specifies Procedures and processes for planning and conduct RA

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Flexibility Options of RA



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- Broad as an ORR” -or- “Narrow as a checklist”:
 - Utilize Appropriate Core Requirements;
 - POA must address all core requirements; provide basis for those excluded
 - Local procedures must provide specific processes for use of check list
- Authorization Authority – Contractor or DOE:
 - Discuss and justify in the SNR.
- Number and Timing of RA's:
 - Contractor only – DOE Monitor;
 - Contractor and DOE – in Parallel;
 - Contractor and DOE – in Series;
 - Proposal defined in SNR (STD 3006-2010).
- Processes and flexibility of RA must be included in local implementing procedures

Other Methods....



NUCLEAR EXECUTIVE
LEADERSHIP TRAINING



- None!
 - If a Review is needed, minimum RA requirements must be followed!
- If Startup Review is not needed...
 - Use Building/Process/Activity Standard Operational Procedures.
 - See order and Standard for required elements of the local operating procedures
- Contractor procedures must not be developed for the purpose of not accomplishing a properly scoped RA when required.

ORR Startup Authorization Authority



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LEADERSHIP TRAINING



Startup and Restart Authority	S-1	CSO	DOE Official
Initial startups of new hazard categories 1 and 2 facilities	✓		
Initial startups of new category 3 facilities		✓	
Initial startup after conversion or restart after upgrade to a Category 1 or 2 nuclear facility	✓		
Initial startup after conversion or restart after upgrade to a Category 3 nuclear facility		✓	
Restart after shutdown for safety reasons		✓	✓
Restart after shutdowns because of substantial modifications of hazard category 1 and 2 nuclear facilities		✓	
Restart after extended shutdown of Category 1 or 2 facility		✓	
Restart after shutdown due to operations outside safety basis		✓	✓
Startups or restarts for which ORR were required		✓	✓

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Role and Responsibilities



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Readiness Activity	Line	ORR Team
Develop and implement a plan to achieve readiness	✓	
Define need for review or exception – submit SNR	✓	
Develop and ORR/RA Plan of Action	✓	
Develop an Implementation Plan		✓
Achieve Readiness/Management Self-Assessment	✓	
Readiness to Proceed Memo	✓	
Conduct the review, develop ORR Report		✓
Corrective Action Plan and resolution of findings	✓	
Startup Authority authorizes start of operations	✓	

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Managing The Safety Basis – 2010

Startup Notification Report (SNR)



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- A periodic report by each responsible contractor to identify future nuclear facility restarts and new starts that:
 - specifies a recommendation for an ORR or RA and
 - proposes the Startup Authorization Authority(SAA);
 - describes the facility; and
 - Discusses background of start up in sufficient detail...
- Detailed Procedures in Contractor and local DOE/NNSA Directives.
- Provided to HQ for information and action if HQ is SAA for one or more listed startups

Plan of Action (POA)



NUCLEAR EXECUTIVE
LEADERSHIP TRAINING



- Presents “Geographic Scope” of Review:
 - Which facilities are involved?
 - Which systems (process & support) are involved?
 - What Safety Management Programs are involved
 - Which Personnel groups? Support groups?
- Presents “Content Scope” of Review:
 - Justification for excluded Core Requirements:
 - Subjects that are not applicable...
 - Safety Management Programs interface discussion...
 - Core Requirement Depth Discussion...

Plan of Action (cont)



NUCLEAR EXECUTIVE
LEADERSHIP TRAINING



- Specifies Prerequisites for start of Readiness Review
- Includes Proposed Team Leader
- Prepared by Contractor and DOE line management
 - A separate POA for the contractor and DOE Readiness Review
- Approved by SAA (both contractor and DOE POAs)
- Basis for the Team's Implementation Plan
- POA for both ORRs and RAs will contain same items

Readiness to Proceed Memorandum



NUCLEAR EXECUTIVE
LEADERSHIP TRAINING



- Line Management commitment to readiness to begin operations:
 - Appropriate to Contractor and Departmental reviews...
 - RTP from Contractor must include copy of Contractor RR report and corrective actions for prestart findings
- Site Office endorsement (Departmental review only):
 - Basis for judgment of Contractor readiness...
 - Department specific requirements and actions...
 - Method for verification of site office readiness to oversee contractor operations if no DOE RA is required.
- Short list of Open Items – “Manageable List”:
 - Defined path to closure...

RR Corrective Action Plans (CAP)



NUCLEAR EXECUTIVE
LEADERSHIP TRAINING



- Completion of all Contractor Corrective Action Plans less a “manageable list of open prestart items” is a prerequisite to the DOE/NNSA RR
- Content of CAP must include determination of systemic causes and action to resolve systemic issues
- Closure of RR findings:
 - Ensure the plan is implemented;
 - Verify adequate closure process;
 - Ensure Evidence for Closure.
- Items scheduled for closure past commencement of operations:
 - Is the delay of closure appropriate/safe?
 - Appropriate compensatory measures specified and implemented
 - Standard contains sample closure forms.

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Managing The Safety Basis – 2010

Exemptions



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LEADERSHIP TRAINING



- Appropriate in unique situations:
 - Short duration D&D; National priority activities,
- Compensatory measures required:
 - Ensure safety;
 - Defined requirements/completion/transition.
- Prepare in accordance with DOE O 251.1C
- Requires CTA concurrence
- CSO and HSS Must Review

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Managing The Safety Basis – 2010

Lessons Learned – Facility Issues



NUCLEAR EXECUTIVE
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- **Facility/Program Weaknesses**
 - TSR identification and compliance
 - USQ process implementation
 - Configuration management
 - Inadequate training programs
 - Radcon
 - Industrial safety
 - Startup programs
- **Procedural Weaknesses**
 - Integrated execution
 - Activity hazards analyses (AHAs)/operating procedures
 - Misclassification of skill-based work
- **Personnel**
 - Inadequate training
 - Inconsistent performance

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Lessons Learned – Conduct of Review Issues



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LEADERSHIP TRAINING



- Evolution planning between the facility and ORR team not supporting demonstration of comprehensive start-to-finish operations
- Frequent review delays and limited access to facility documentation and training limit the team's ability to adequately prepare for the review
- Staffing ORR teams from within the same field and/or line element challenge the notion of independence and limit the opportunity for knowledge transfer between programs & sites
- Managers provide inadequate support to permit team members to meet team expectations. Day jobs interfere with ability to concentrate on team responsibilities
- Lack of timely preparation of individual team member review results. Late submittal and lack of consistency of forms 1 & 2.

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Lessons Learned – Readiness Preparation Issues



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- Inadequate project planning to achieve readiness
- Ineffective Management Self Assessment Process
- Starting Readiness Reviews prior to achieving readiness - equipment not ready, procedures don't work, operators not trained
- Criteria and process for DOE field verification of contractor and oversight readiness lacking
- Corrective Action Plan development and finding closeout process lacking

Keys to Successfully Achieving Readiness



NUCLEAR EXECUTIVE
LEADERSHIP TRAINING



- Comprehensive project plan prepared when the project identified—DOE should participate
- Safety Basis Documentation—Early approval; timely implementation; comprehensive IVR
- Safety Management Programs—Robust and comprehensive to support facility
- Comprehensive operational practice
- Comprehensive and timely MSA
- DOE field oversight and Self-assessment

Keys to a Successful ORR/RA



NUCLEAR EXECUTIVE
LEADERSHIP TRAINING



- Early assignment of qualified ORR/RA Team Leader and Team Members
- Time for Team Leader and Team Members to prepare adequately
- Accomplishment pre-onsite review activities by the team
- Access to and involvement of the Site Office Manager is critical.
- FAC REP support in providing information and monitoring ORR progress
- Active involvement by management in the prompt resolution of issues

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Managing The Safety Basis – 2010

Changes to Readiness Review Order



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- With continual maturity in readiness prep and verification; require fewer ORRs
- Increase emphasis on RAs
- Increase clarification of expectations for RAs versus routine operating procedures
- Clarify expectations for RA whenever routine procedures are not adequate
- Increased emphasis regarding requirement for local implementing procedures, content of the procedures, and DOE concurrence in contractor procedures
- Update Standard to reflect changes

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Remember.....an RR Should be:



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- A disciplined, systematic, documented, examination of facilities and equipment, personnel, procedures, and management control systems to ensure that a facility will be operated safely within its approved safety basis.
- The readiness reviews are not intended to be tools of line management to achieve readiness. Rather, the readiness reviews provide an independent confirmation of readiness to start or restart operations.