



REVISION TO 10CFR 50.65 THE MAINTENANCE RULE

1999 UTILITY WORKING CONFERENCE

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BACKGROUND

- ! **March 1997, NRC staff described problems with rule language (...assessment “should” be taken into account...”)**

- ! **April 1997, Commission directs staff to consider clarifying (a)(3) and provide examples of weak programs found during baseline inspections (MRBI)**

- ! **August 1997, NRC staff provided three options for (a)(3): (1) no changes; (2) change “should” to “shall” only; (3) comprehensive (risk-based) change**
 - **staff recommended option (2)**

PROPOSED RULE CHANGE ISSUED FOR PUBLIC COMMENT (September 1998)

“Before performing maintenance activities on structures, systems or components within the scope of this section, (including but not limited to, surveillance testing, post-maintenance testing, corrective maintenance, performance/condition monitoring, and preventive maintenance), an assessment of the current plant configuration as well as expected changes to plant configuration that will result from the proposed maintenance activities shall be conducted to determine the overall effect on performance of safety functions. The results of this assessment shall be used to ensure that the plant is not placed in risk significant configurations or configurations that would degrade the performance of safety functions to an unacceptable level.”

REASONS FOR RULE CHANGES

- ! Industry increasing amount and frequency of maintenance at power
- ! Inadequacies found with (a)(3) assessments during baseline inspections
- ! Technical specifications generally not intended to allow multiple equipment out-of-service simultaneously
- ! (a)(3) assessment is a recommendation, therefore is not enforceable

PUBLIC COMMENT CATEGORIES

- ! Terms need to be defined (e.g., “risk significant configuration”)
- ! Assessments should only be required for SSCs that are *removed* from service
- ! (a)(4) requirement duplicates technical specification requirements (e.g., Configuration Risk Management Program - CRMP)
- ! (a)(4) assessments should not be required for non or low safety significant SSCs
- ! Regulatory Guide needs revision to include information on:
 - when assessments would not be required
 - type of assessments during shutdown conditions
 - documentation for assessments

STAFF RESPONSES TO PUBLIC COMMENTS

- ! (a)(4) language revised to clarify the use of assessments
- ! Assessments must be performed for all maintenance activities that could impact plant safety (e.g., transient initiators)
- ! Technical specifications were generally not intended to allow multiple equipment out-of-service simultaneously
- ! Requests for deletion of Technical Specification Configuration Risk Management Program (CRMP) will be processed after 50.65(a)(4) becomes effective
- ! Combinations of out-of-service low safety significant SSCs must be evaluated for the impact on plant safety

- ! Regulatory Guide 1.160 revision to incorporate implementation guidance for (a)(4) assessments, including shutdown and documentation

REVISED (a)(4) PROVISION

(after addressing public comments - April 1999)

Before performing maintenance activities (including but not limited to surveillances, post-maintenance testing, and corrective and preventive maintenance) on structures, systems, or components within the scope of this section, the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities.

MODIFIED (a)(4) PROVISION
(Approved by the Commission June 18, 1999)

Before performing maintenance activities (including but not limited to surveillance, post-maintenance testing, corrective and preventive maintenance), the licensee shall assess and manage the increase in risk that may result from the proposed maintenance activities. The scope of the assessment may be limited to structures, systems or components that a risk-informed evaluation process has shown to be significant to public health and safety.

DRAFT REGULATORY GUIDE DG-1082

“ASSESSING AND MANAGING RISK BEFORE MAINTENANCE ACTIVITIES AT NUCLEAR POWER PLANTS”

ASSESSMENTS FOR MAINTENANCE ACTIVITIES

- ! Review the current plant configuration and changes expected to the plant configuration from the proposed maintenance activities**
- ! Assessment method commensurate with complexity of the maintenance configuration**
- ! Make assessments scrutable and repeatable**
- ! Assure other regulatory requirements are satisfied**

ASSESSMENTS DURING POWEROPERATIONS

! Maintenance on a Single SSC

- Qualitative assessment by a licensed operator trained in Maintenance Rule implementation**
- TS allowed outage time**
- Operator awareness of the SSC's risk significance**
- Awareness of potential impacts of external conditions**
- Re-evaluate risk impact due to emergent failures**

ASSESSMENTS DURING POWER OPERATIONS (Continued)

! Maintenance on Two SSCs

- Qualitative assessment by a licensed operator trained in Maintenance Rule implementation**
- TS allowed outage time**
- Operator awareness of the SSC's risk significance**
- Qualitative or quantitative assessment**
- Use pre-analyzed configurations (e.g., two-dimensional matrix)**
- Awareness of potential impacts of external conditions**
- Re-evaluate risk impact due to emergent failures**
- Expert panel or risk analyst evaluation of configurations beyond the capability of assessment tool**

ASSESSMENTS DURING POWER OPERATIONS (Continued)

! Maintenance on More Than Two SSCs

- PRA insights**
- Use previously assessed configurations when available**
- Expert panel or risk analyst evaluation of configurations beyond the capability of the assessment tool**
- TS allowed outage times**
- Awareness of potential impacts of external conditions**
- Re-evaluate risk impact due to emergent failures**

METHODS COMMONLY USED TO EVALUATE RISK OF MAINTENANCE CONFIGURATIONS

- Technical Specifications and operator informed judgment**
- Two-dimensional matrix of pre-analyzed configurations**
- Pre-calculated set of configurations**
- Risk monitor**

ASSESSMENTS DURING SHUTDOWN CONDITIONS

- ! Quantitative assessment using shutdown PRA model when available**

- ! Otherwise, qualitative assessment of degradation of key safety functions**
 - decay heat removal**
 - reactor coolant inventory control**
 - electrical power availability**
 - reactivity control**
 - containment closure (primary and secondary)**

RISK-SIGNIFICANT CONFIGURATIONS

- ! Concurrent equipment outages whose incremental contribution to annual risk is substantial, or would significantly affect the performance of safety functions**
- ! Risk of maintenance activity depends on the configuration and its duration**
- ! Risk metrics* are (1) increase in core damage probability (delta CDP), and/or (2) large early release probability (delta LERP)**
- ! Configuration is risk significant when delta CDP (or LERP) exceeds a predetermined level allowed for a temporary condition**

* Reference: Regulatory Guide 1.177, Section 2.4

PRA MODEL USED FOR ASSESSMENTS

- ! Should reflect the as-built and as-operated plant**

- ! Should reflect actual plant performance**

- ! Process to periodically evaluate and update PRA**
 - Design modifications**

 - Changes in operational practices**

 - Changes in equipment reliability and unavailability**

ASSESSMENT SCOPE (optional)

- ! SSCs modeled in PSA**
- ! SSCs considered to be high safety-significant (HSS) by licensee's Expert Panel**
- ! Low Safety Significant SSCs**
 - Support systems**
 - Systems with interdependencies**

ASSESSMENT SCOPE (continued)

LSS SSCs (support and interdependent):

- ! LSS support systems for HSS SSCs
(ECCS room HVAC; SBO DG; certain 480VAC load centers)**
- ! LSS SSCs w/interdependencies w/other LSS SSCs
(instrument and service air)**
- ! LSS SSC failure could increase the likelihood of an initiating event
(Turbine-Gen. Aux. Systems; EHC; stator water cooling; lube oil)**
- ! LSS SSCs in low frequency cutset(s) that increase CDF (or LERF) significantly when multiple SSCs are out of service
(instrument and service air)**

EXAMPLES OF LSS SSCS NOT MODELED IN PSA THAT MIGHT BE EXCLUDED FROM SCOPE OF ASSESSMENTS:

- **Emergency DC Lighting**
- **Communication systems**
- **PASS Hydrogen Concentration Monitoring**
- **PASS Water Level Indication**
- **Annunciators**
- **Post Accident Hydrogen System**
- **Gaseous Waste Processing System**

MANAGING RISK

- ! Scrutable process to identify, assess, and control risk of maintenance activities**

- ! If a proposed configuration exceeds pre-determined allowable risk levels, a licensee should implement prudent actions:**
 - Senior plant management involvement prior to entering configuration**
 - Minimize duration of the maintenance activity by preplanning and pre-staging necessary equipment**
 - Compensatory actions and contingency plans implemented**
 - Site personnel at a heightened state of risk awareness**

INTERACTIONS WITH STAKEHOLDERS

- **REVISIONS TO SECTION 11 TO NUMARC 93-01**
- **TWO PUBLIC MEETING TO DISCUSS CHANGES**
- **AREAS UNDER DISCUSSION:**
 - **SCOPING CRITERIA**
 - **RISK METRICS**
 - **RISK SIGNIFICANCE OF SSCs FROM FIRES**
- **REVISIONS COMPLETED...FORWARDED TO NRC & INDUSTRY 7/23/99**
- **FINAL REVISION TO NRC FOR ENDORSEMENT BY 8/31/99**
- **MAINTENANCE RULE WORKSHOP 9/13-14/99**