Handouts from NRC - 7 Pages

PUBLIC MEETING - JULY 11, 2005
NFPA 805 REGULATORY GUIDE
ACRS COMMENTS

ACRS COMMENTS (Ref. June 14, 2005 letter; ML051650432)

SUMMARY: The approach to evaluating plant changes described in the regulatory guide and NEI 04-02 does not adequately support the Commission's policy of promoting the use of PRA methods. A risk-informed program should use methods and language consistent with Regulatory Guide 1.174.

(Note: The following discussion of ACRS comments applies to plant changes that do not screen out as being inconsequential with respect to risk. Screening and the threshold terminology and criteria will be discussed later)

1. **Issue:** The fire modeling approach to change evaluation must include a risk evaluation that assures that ΔCDF and ΔLERF meet the acceptance guidelines of RG 1.174.

   Status: Risk assessment is already required by NEI 04-02 Fig 5-1, however the text of NEI 04-02 notes that if it can be demonstrated by fire modeling that the SSD path is free of fire damage, no further risk assessment is required (Section 5.3.4.1, etc).

   Action: Receive stakeholder suggestions for resolution that will not pose undue burden or undermine the intent of the rule. Agree on scope, methodology, guidance and criteria for the risk assessment for changes evaluated using a fire modeling approach, consistent with RG 1.174. NEI to revise NEI 04-02 accordingly.

2. **Issue:** NRC should only endorse ΔCDF and ΔLERF calc methods that use a fire PRA.

   Status: Staff agrees in principle with comment, but NFPA 805 (and thus the Rule) does not require this. Participants in the development of NFPA 805 have confirmed that the standard intentionally does not require a full fire PRA for adoption of a performance-based fire protection program. In addition, RG 1.174 recognizes non-PRA methods, including qualitative approaches and traditional engineering, for evaluating ΔCDF and ΔLERF.

   Actions: Receive stakeholder suggestions for resolution. NRC will revise Reg Guide to strongly encourage licensees to develop a full fire PRA for an NFPA 805 program.

3. **Issue:** NRC should not endorse statements in NEI 04-02 that are inconsistent with the Commission's policy to promote the use of PRA.

   Status: Staff agrees

   Actions: (1) Identify ACRS concerns; (2) Receive stakeholder suggestions for resolution (3) Identify such statements in NEI 04-02; (4) NEI to revise NEI 04-02 or staff to add words to Reg Guide that we do not endorse such statements.

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4. **Issue:** Portions of NEI 04-02 that are endorsed should contain correct PRA methodology and language consistent with RG 1.174.

   Status: This comment was prompted by the guidance in Section 5.3.5.1 of NEI 04-02 that defines new acceptance criteria for risk evaluations without a detailed fire risk assessment. The proposed acceptance criteria do not comply with those of RG 1.174. It is not clear how an increase in ΔCDF and ΔLERF could be determined without a fire risk assessment.

   Other examples of deviations from RG 1.174 is the statement in 5.3.5.1 that, "If the fire-induced consequences do not disable the containment isolation function, then the ΔLERF criterion can be considered satisfied." and "If the CDF satisfies the LERF acceptance criteria, a specific assessment for LERF is not required."

   The footnote in Section 5.3.2 of NEI 04-02 notes that, "The quantitative evaluation can be a more detailed qualitative evaluation." This statement needs further clarification.

   Actions: Discuss and agree on changes to NEI 04-02 to address the ACRS concerns.

5. **Issue:** Need clear, consistent definition of LFS and MEFS (Note: this comment was in the DISCUSSION section of the ACRS letter)

   Status: This comment was prompted by the somewhat vague and qualitative language used to describe the input parameter set for the MEFS. Section D.2.4.4 of NEI 04-02 requires that the input parameter set to MEFS represent, "conditions that are *reasonable and conservative.*" These are considered qualitative judgements that PRA is designed to replace. They noted that MEFS and LFS are not defined rigorously and guidance regarding what is a sufficient margin is not provided.

   The ACRS made a similar comment regarding the guidance provided in Appendix C (Para C.3.3) of NFPA 805, e.g. "Thus, the LFS can be based on a maximum possible, though very unlikely, value for one input variable, or an unlikely combination of input variables." They also take issue with the statement, "The values used for LFS input should remain within the range of possibility, but can exceed that determined or judged to be likely or even probable."

   The Reg Guide "Discussion" currently, notes that the guidance contained within the appendices of NFPA 805 is acceptable to the extent that this guidance is specifically endorsed in "Regulatory Positions". Position C.4.2 states, "Appendix C to NFPA 805 and Appendix D to NEI 04-02 contain detailed discussions that are useful in determining what fire models to use and applying those fire models within their limitations."

   Action: Revise clarification of LFS and MEFS included in NEI 04-02.

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OTHER ISSUES

1. **Issue:** Reconcile draft Rule 10 CFR 50.46a to the Reg Guide
   a. 10 CFR 50.46a defines PRA quality; RG does not.
   b. 10 CFR 50.46a requires NRC approval for at least initial risk-informed plant change (although elsewhere it appears to allow self-approval option for all); RG does not require NRC approval except for specific changes (e.g., NFPA 850, Chapt 3 deviations)

   c. Note: 10 CFR 50.46a acknowledges and accepts "non-quantitative" risk assessment methods, especially for low or no risk changes; RG does also, but ACRS may not agree.

   Status: 10 CFR 50.46a is a draft proposed rule.
   a. It has not been determined that PRA quality for fire protection program must meet the same level of quality as other nuclear plant PRA applications. (NEI references ASME standard).
   b. Requirements for NRC approval are in accordance with 10 CFR 50.48(c) with guidance provided in the Reg Guide.
   c. See ACRS comment 2

   Actions: Determine is there are any other significant differences.
   a. Agree acceptable level of quality for fire PRAs and revise documents accordingly. The staff's level of endorsement of NUREG/CR-6850 guidance should be communicated in the guidance documents.
   b. None
   c. ACRS comment 2

2. **Issue:** Use consistent terminology for risk thresholds. 10 CFR 50.46a defines "inconsequential" increase in risk as $< 10^{-7}$ for CDF and $< 10^{-8}$ for LERF (refers to a future RG that will address inconsequential changes); In 10 CFR 50.46a, the threshold is used to determine which changes must be submitted for NRC approval.

   Status: RG does not address specifically; NEI 04-02 uses "negligible" (not defined) for screening from further risk evaluation, not for determining whether a change can be self-approved.

   Staff proposes using the term "inconsequential" to identify the level of risk for which a plant change may be screened (consistent with 10 CFR 50.46a terminology). A plant change that is screened due to inconsequential risk must still be evaluated for impact on defense-in-depth and safety margin. A threshold for inconsequential that is considered acceptable by the staff is 10^{-8} for ΔCDF and 10^{-9} for ΔLERF.

   Note that for a plant change that is not screened, the impact on risk, defense-in-depth, and safety margin must meet the guidelines of RG 1.174.

   Action: Revise RG and NEI 04-02 accordingly.

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3. **Issue:** Cumulative risk increases should be consistent with 10 CFR 50.46a. 10 CFR 50.46a specifies that cumulative changes be "inconsequential"; refers to a future RG for guidance, but suggests 10^{-7} for ΔCDF and 10^{-8} for ΔLERF; SOC for 10 CFR 50.69 notes that "small" as used in 10 CFR 50.69 means the acceptable regions of 1.174 (Regions II and III of Figures 3 and 4) and, like 1.174, is a function of the base CDF/LERF; SOC requests public comments for alternative criteria.

   Status: RG provides the following guidance for addressing the cumulative risk of multiple circuit analysis changes: (1) consider all circuit analysis changes during the transition and post-transition as a single change, (2) perform plant or procedure changes that make the change risk neutral or decreases risk, or (3) apply an AHJ approved threshold for individual changes.

   Staff proposes the same acceptance criteria for cumulative risk from multiple changes as that for a single inconsequential change, i.e., 10^{-8} for ΔCDF and 10^{-9} for ΔLERF.

   Action: Revise RG and NEI 04-02 accordingly.

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OTHER STAFF COMMENTS ON NEI 04-02

1. Section 5.1.3: Change "Draft Regulatory Guide DG-1122" to "Regulatory Guide 1.200"; change "(November 2002)" to "(February 2004 - for trial use)" Also add reference to NUREG/CR-6850 as a reference
2. Section 5.3.1, Para at top of page 43: ACRS wants this paragraph revised to make it consistent with RG 1.174 and 1.200 (see next two pages)
3. Appendix I, Attachment 2: Add "In general" at beginning of first sentence and "However" at beginning of second sentence. Add the following as lead-in to bulleted list: "The following are examples of changes that do not require NRC approval." Delete 6th bullet per earlier discussion with Liz (was deleted, as agreed, from Section 5.3.2, pg 46)
4. Section 5.3.1, first of 2 bullets at bottom of page 42: change "approved by the AHJ" to "accepted by the AHJ"
5. Figure 5-1: Discuss proposed Staff changes and agree on final configuration.
6. Section 5.3.3: Revise to be consistent with RG 1.174 and 1.200. Last para: This implies that "inconsequential" risk increases can be forgotten. This is not in accordance with RG 1.174 - all changes to risk must be tracked and the cumulative effect addressed.

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Comments on Paragraph, top of Page 43

The key difference in the change process under risk-informed, performance-based regulatory framework is the consideration of risk[1]. The evaluation of risk is limited to[2] the determination of whether an increase has occurred, and if so, whether the increase is within acceptable limits. While the risk impact of plant changes must be evaluated for all changes to a risk-informed fire protection program, the level of risk evaluation[3] should be commensurate with the level of risk associated with the change. A structured screening process[4] or graded approach[5] can meet the requirements of NFPA 805. This screening process[4] will be used to determine inconsequential increases in risk[6]. Potentially higher risk changes may require a quantitative evaluation spanning a spectrum from traditional [7]approaches, such as FIVE, through more recent developments, such as the Fire Protection Significance Determination Process, up to a fire probabilistic safety assessment (PSA) itself. The intent of this graded approach[5] is to provide analysis flexibility to

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[1]This statement is incorrect. In a fundamental sense, consideration of risk, that is, consideration of the impact of a change on the probability of adverse events and the consequence of those events on public safety, has always been an integral part of all proper change evaluation processes. This is true for changes to FPPs and all other changes to NPPs. The methods (deterministic event analyses, engineering evaluations, PRA, etc.) associated with assessing risk and the specific processes that employ these methods (license change amendment reviews, 50.59 safety evaluations, 86-10 evaluations, etc.) have undergone constant tailoring and evolution, but its all about risk.

[2]Bad phrasing. The consideration of risk isn't "limited" in some way. Agree with a key concept here, however, that once it is determined that a change is going to take risk in the safe direction (i.e., lower risk), it shouldn't be necessary to further assess the magnitude of the change of the risk.

[3]Unclear exactly what this means. There isn't an established hierarchical scheme ("levels") that relates to the methods and approaches (PRA, deterministic analysis, engineering evaluations, etc.), or the various degrees of rigor, that might be brought to bear in assessing risk.

[4]Confusing phrase. This causes confusion with the screening process for whether or not the PCE process itself needs to be entered (this paragraph is narrowly focused on the of risk component of the PCE process).

[5]Inappropriate terminology. The term "graded approach" has a specific usage in NRC space related to the application of certain requirements (e.g., quality assurance), but its usage in the area of NFPA 805, fire protection, risk assessment. or PRA methodology is undefined.

[6]Undefined term. NEI-04-02 doesn't provide a basis for determining "inconsequential increases in risk," therefore, this bit of guidance only results in the need for more guidance.

[7]Inappropriate terminology. The term "traditional," with respect to engineering methods and approaches, has a specific meaning in RG 1.174 that isn't consistent with the usage here.

address a wide range of issues and conditions. It also provides the mechanism to recognize and incorporate the diverse set of plant fire risk analyses in the industry[8]. In general, the Change... Evaluation process focuses on performing those Engineering Analyses needed to establish the acceptability of the change

[8]Goal, with no associated guidance. The specific features of a graded approach to implementing a risk assessment using PRA is never actually presented.

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Consistency with RG 1.174

Issue

1. *The "initial fire modeling" approach should not be used as an alternative to estimates of changes in core damage frequency (ΔCDF) and large early release frequency (ΔLERF). Identification of a success path does not necessarily assure that ΔCDF and ΔLERF are negligible (Section 5.3.4.1 of NEI 04-02).*

2. *The definitions of MEFS and LFS in NFPA 805 and NEI 04-02 are sometimes confusing and contradictory.*

Response

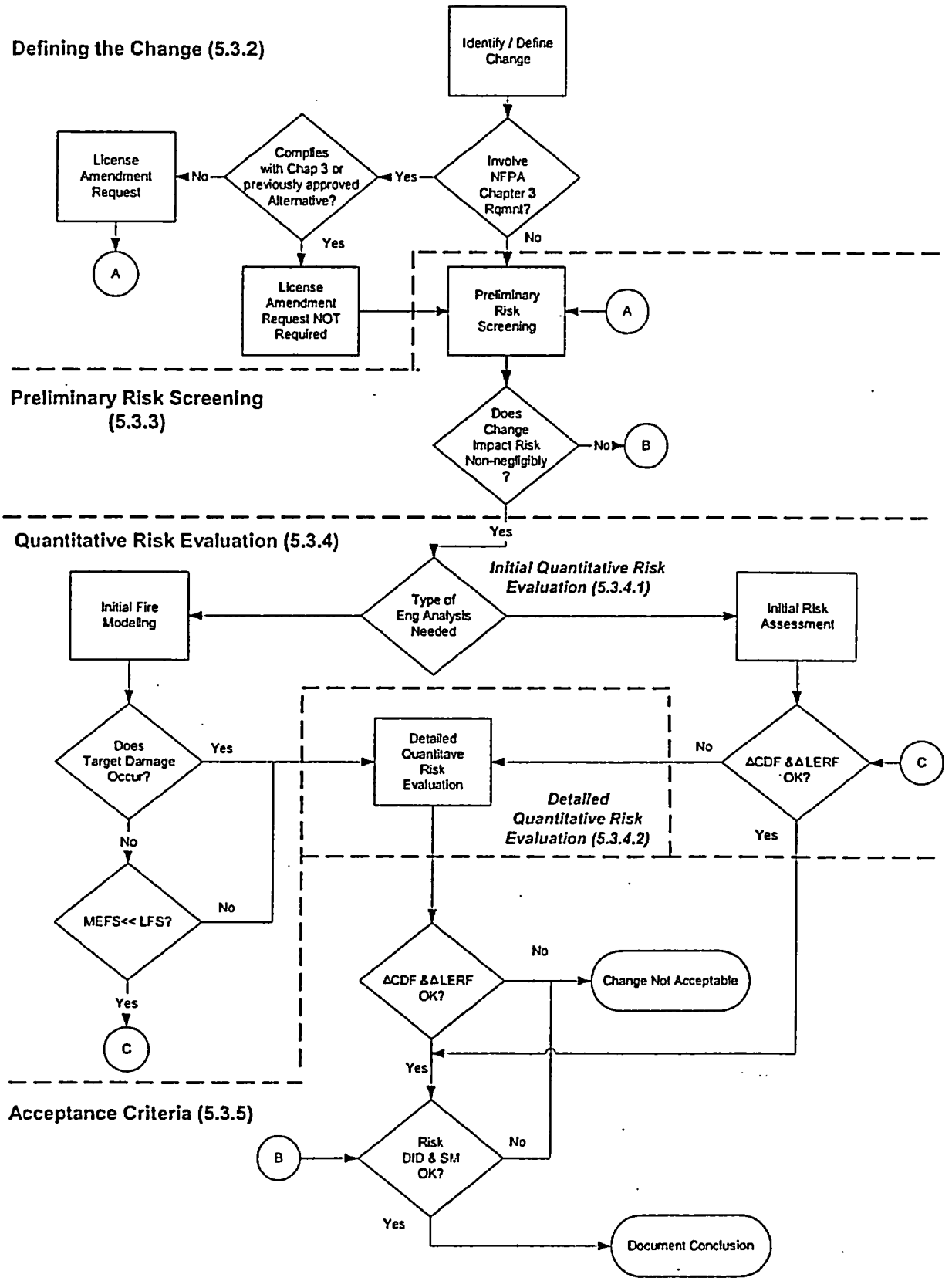
1. Proposed edits to Section 5.3.4.1 of NEI 04-02

   - Modify Figure 5-1 to indicate that initial fire modeling requires a ΔCDF / ΔLERF assessment. See attached.
   - Modify Section 5.3.4.1. Divide into 3 subsections:
     - 5.3.4 Quantitative Risk Evaluation
       - 5.3.4.1 Initial Quantitative Risk Evaluation
         - 5.3.4.1.1 Initial Fire Modeling Assessment
         - 5.3.4.1.2 Initial Risk Assessment
         - 5.3.4.1.3 Acceptability Determination for Initial Quantitative Risk Evaluation
       - 5.3.4.2 Detailed Quantitative Risk Evaluation

2. MEFS and LFS Treatment

From the transcripts it appears that the ACRS was reading from Appendix C of NFPA 805. The appendix material is not a part of the standard, has not been endorsed by the NRC in the Draft Regulatory Guide, nor is it used in NEI 04-02.

No changes proposed.


Defining the Change (5.3.2)
Identify / Define Change
Involve NFPA Chapter 3 Rqmnt?
Yes
No
Complies with Chap 3 or previously approved Alternative?
No
Yes
License Amendment Request
A
License Amendment Request NOT Required
Preliminary Risk Screening
A
Preliminary Risk Screening (5.3.3)
Does Change Impact Risk Non-negligibly ?
No
B
Yes
Quantitative Risk Evaluation (5.3.4)
Initial Quantitative Risk Evaluation (5.3.4.1)
Type of Eng Analysis Needed
Initial Fire Modeling
Initial Risk Assessment
Does Target Damage Occur?
Yes
No
Detailed Quantitave Risk Evaluation
No
ΔCDF &ΔLERF OK?
C
Detailed Quantitative Risk Evaluation (5.3.4.2)
Yes
MEFS<< LFS?
No
Yes
C
ΔCDF &ΔLERF OK?
No
Change Not Acceptable
Yes
Acceptance Criteria (5.3.5)
B
Risk DID & SM OK?
No
Yes
Document Conclusion

Consistency with RG 1.174

Issue

The staff should not endorse methods for evaluating ΔCDF and ΔLERF (Section 5.3.5.1 of NEI 04-02) that are not based on a fire probabilistic risk assessment (PRA).

Response

Proposed edit to Section 5.3.5.1 of NEI 04-02

Will eliminate the concept that "*If ΔCDF satisfies the ΔLERF acceptance criteria, a specific assessment for ΔLERF is not required*" and "*If the fire-induced consequences do not disable the containment isolation function, then the ΔLERF criterion can be considered satisfied*" by rewording as follows:

> If the core damage sequences leading to LERF are not impacted by the ΔCDF contribution and the ΔCDF satisfies the ΔLERF acceptance criteria, a simplified assessment for ΔLERF that is based on a conditional probability of containment failure of 1.0 could be used. Alternatively, a supplemental assessment can be performed to confirm that the core damage sequences leading to the ΔCDF contribution are not LERF sequences. If neither of these simplified approaches is successful, then a specific detailed treatment to determine ΔLERF is required.

Consistency with Commission's Policy Statement

Issue

NEI 04-02 contains many statements that are inconsistent with the Commission's policy of promoting the use of PRA methods. In the Regulatory Guide, the staff should make it clear that it does not endorse such statements.

Response

We are not aware of any instances where NEI 04-02 conflicts with the Commission's policy.

Methodology and Language

Issue

The staff should ensure that the parts of NEI 04-02 that it endorses use correct methodology and language.

Response

Other than the previously proposed changes, we are not aware of any instances where NEI 04-02 does not use the correct methodology and language.

Please provide specifics so that we may address them.