Summary of In-Office Review
Nuclear Criticality Safety and Integrated Safety Analysis Summary
Urenco Office - Washington D.C.
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PURPOSE

On January 14, 2005, the U.S. Nuclear Regulatory Commission (NRC) staff performed an in-office review with Louisiana Energy Services (LES) staff of nuclear criticality safety (NCS) and Integrated Safety Analysis (ISA) Summary issues related to LES' application for a uranium enrichment facility proposed to be located in Eunice, New Mexico.

Brian Smith (NRC) provided opening remarks. The purpose of the in-office review was to discuss NCS and ISA Summary issues. In general, the issues dealt with ensuring clarity of information in the ISA Summary and license application so that NRC could clearly conclude that LES meets the performance requirements, and thus safety, and that the regulatory requirements for issuing a materials license were satisfied. Detailed discussion of the issues was needed to achieve a common understanding so that a path forward for resolution of the issues could be agreed upon. Rod Krich (LES) provided opening remarks that mirrored those of Brian Smith. Melanie Galloway (NRC) provided an overview of the topics and related issues that had been provided to LES prior to the in-office review. A list of these topics is provided in Attachment 1.

DISCUSSION

The summary below presents each topic that was discussed during the in-office review.

1. Location of the Descriptions of Both the ISA Methods

NRC staff explained the need for a description of both the standard LES ISA method and the alternate LES ISA method for NCS "safe-by-design" components to be included in the license application (i.e., Safety Analysis Report (SAR)). Despite a lack of guidance for this requirement in NUREG-1520, the descriptions of the ISA methods in the license application is needed for NRC to understand LES' commitments to the methods and to meet the requirements of 10 CFR 70.65(a) as related to 10 CFR 70.22(a)(7) and (a)(8). In addition, NRC staff identified to LES staff the parts of the ISA Summary that needed to be in the license application.

LES staff proposed to provide a description of both ISA methods in the license application, with most of the information to be included in Chapter 3.0 of the SAR, while retaining that information in the ISA Summary. In addition, LES staff stated they would communicate with NRC staff to ensure that the correct information gets placed in the license application. LES staff confirmed that it will need to keep the two documents consistent in the future.

2a. Definition of the Term “Significant Margin” (Alternate LES ISA Method for NCS)

NRC staff explained the need to provide a definition of the term “significant margin” because the term is used by LES in the alternate ISA method for NCS as the basis for meeting highly unlikely for NCS, as required by 10 CFR 70.61.

LES staff proposed that it could provide a definition, in the description of the ISA method in the license application, for the term “significant margin” for the alternate ISA method for NCS in two parts. For favorable geometry components, the term will mean at least 10% margin for the physical value (e.g., radius, volume) between the operating and design values at 6 weight percent enrichment. For non-favorable geometry components, the term will mean k-effective plus 3 sigma less than 0.95, including conservatisms in the calculations (i.e., beyond the difference between 5 and 6 weight percent enrichment). In addition, LES staff stated that they would provide a qualitative, generic description of the conservatisms used in the calculations and confirm that these conservatisms apply in all cases.

2b. Demonstration of “Significant Margin” (Alternate LES ISA Method for NCS)

NRC staff explained the need for LES to demonstrate that the “significant margin” definition, as stated above, was met in order to meet highly unlikely for NCS. LES may demonstrate this by confirmation or by providing more information in the ISA Summary.

LES staff proposed that the demonstration for significant margin be incorporated by reference in the ISA Summary to information previously provided to NRC (i.e., Table 2 of the classified information). In addition, LES confirmed that all the “safe-by-design” components in Table 2 met the above proposed definition of “significant margin,” but LES staff decided to re-confirm this with Urenco. Also, LES staff proposed adding information that provides this demonstration of “significant margin” to the ISA Summary.

3. General IROFS and Definition (Standard ISA Method)

NRC staff explained the definition of Items Relied on for Safety (IROFS) from 10 CFR 70.4 and how IROFS are generally a human action or a physical device. NRC staff stated that their understanding of some of LES’ IROFS that were based on the “design of,” “use of,” and “verify” did not seem to meet that definition.

LES staff stated they would eliminate “design of” as an IROFS. In addition, LES staff proposed to provide in the description of the ISA methods the intent of “use of” as an IROFS (i.e., for routine and highly proceduralized tasks) and to re-evaluate the accident sequences in the ISA Summary that utilized this type of IROFS (e.g., index values). Also, LES staff proposed to provide in the description of the ISA methods the LES staff’s intent of “verify” as an IROFS (e.g., to verify uranic content) and to re-evaluate the accident sequences in the ISA Summary that utilized this type of IROFS (e.g., index values).

4. Frequency Index Numbers for Initiating Events/IROFS Failures (Standard ISA Method)

NRC staff explained that frequency index numbers for initiating events and IROFS failures that were assumed to be less than -1 needed to be justified in the ISA Summary because the LES ISA method required it. A specific example involving accident sequence TP7-4 was discussed

because this was the only NCS accident sequence with a -3 as the initiating event frequency (i.e., all others were -2 or -1).

LES staff proposed that it could provide a generic discussion of the justification of frequency numbers less than -1 in the descriptions of the ISA methods and would tie it back to the ISA method tables that would be included in the license application. In addition, for the specific example discussed, LES will provide in the ISA Summary additional justification for the index score of -3.

5. <u>"Sampling" as an Administrative IROFS (Standard ISA Method)</u>

NRC staff explained the need to better understand the IROFS involving "sampling" and "independent verification of sampling." Also, NRC staff stated that additional criteria other than time and location may need to be considered when using "dual independent sampling."

LES staff explained that the intent for "sampling" and "independent verification of sampling" was that there would be two samples taken independent of time and location, and that the current design is not detailed enough at this point to provide more specific information for each instance these IROFS are utilized in accident sequences. LES staff proposed putting in the license application the criteria for "sampling" with a certain number of criteria present when using "sampling" as an IROFS along with a commitment to update the accident sequences once additional design information is available.

6a. <u>Definition of "Independent Verification" (Standard ISA Method)</u>

NRC staff explained that following the current definition/description of "independent verification" (i.e., action taken following completion) in the license application, it was unclear how the independent verification action would prevent an accident. From NRC staff review, it appears that "independent verification" is being performed for an action that has already taken place rather than to ensure that the action does not take place.

LES staff explained that the definition of "independent verification" means different person and time and was consistent with the definition that was being used in the reactor analysis area. LES noted that independent verification would occur before completion of the required action. LES staff proposed putting in the license application a revised definition of 'independent verification' to reflect the LES intent in using the term.

6b. <u>Use of "Independent Verification" (Standard ISA Method)</u>

NRC staff explained that it was not clear how the index scores for independent verification IROFS could be additive when the independent verification IROFS did not appear to be independent of the preceding IROFS.

LES staff explained that "independent verification" had originally been used as an enhancement of an administrative IROFS, but LES staff determined that, because of NCS double contingency concerns, a separate IROFS was needed. LES staff proposed that it would re-evaluate accident sequences that used "independent verification" with the intent of using it as a means to enhance an administrative IROFS. NRC staff agreed that it was appropriate for "independent verification" to be used as an enhancement of an administrative IROFS. In addition, LES staff

proposed to re-evaluate initiating events that were used in accident sequences with "independent verification." In addition, because "Independent Verification" was used in non-NCS accident sequences, LES staff stated that they would evaluate those sequences for consistency with the revised definition and use.

7. Clarity of Accident Sequences (Standard ISA Method)

NRC staff discussed how resolution of the previous issues (i.e., items 3 - 6) would aid in improving the clarity of the accident sequences. In addition, NRC staff explained that certain accident sequences lacked clarity in terms of the timing of events in the accident sequence, the logic in describing the sequence, and the role of initial conditions and initiating events to start the sequence. NRC staff used a specific example, accident sequence PT1-1, to illustrate some of the clarity issues. NRC staff also pointed out that, in certain sequences, IROFS prevented conditions that had already occurred as defined by initial conditions.

During the discussion of accident sequence PT1-1, LES staff provided their interpretation of the accident sequence, including initial conditions, initiating event, failures and IROFS and then NRC staff provided their interpretation of the same items. The discussion led to the conclusion that LES may be able to demonstrate that the accident sequence is not credible. LES staff proposed to re-evaluate their accident sequences and if any could be shown to be not credible then justification for that determination would be placed in the ISA documentation. In addition, LES staff stated that if this or other accident sequences that are currently in the ISA Summary were removed, then they would provide justification in a formal correspondence with NRC.

CONCLUSION

The meeting was concluded with LES staff providing an issue-by-issue summary of their proposed resolution of the issues. LES agreed to get back to NRC the following week regarding a schedule for completing actions discussed.

Topics of Discussion NRC/LES NCS In-Office Review on 01/14/05

- **Both Standard and Alternate ISA Methods**

1. Location of Information
   Both the LES SAR ISA method and LES alternate ISA method for "safe-by-design" components need to be added to Chapter 3.0 of the license application (SAR).

- **Alternate ISA Method for 'Significant Margin' for NCS**

2a. Definition
   Provide a clear definition/criteria of "significant margin" for NCS aspects of 'safe-by-design' components.

2b. Demonstration
   Demonstration of "significant margin" to meet highly unlikely is needed in the ISA summary. NRC notes that the transport devices, storage arrays, dump trap, trap internals, and bench did not appear to have "significant margin" in the submitted classified information.

- **Standard ISA Method**

3. General IROFS and Definition
   Explain how the general LES IROFS meet the definition from 10 CFR 70.4, which is a human action or a physical device.

4. Frequency Index Numbers for Initiating Events and Failures of IROFS
   Explain the basis for assignment of frequency index numbers (FINs) better than (-1).

5. Sampling as an Administrative IROFS
   Define/explain what is meant by "sampling" and "independent verification of sampling."

6.a Definition of 'Independent Verification'
   Clarify the definition of "independent verification," which is performed after the human action being independently verified has been completed. By definition, this will not prevent an accident.

6.b Use of 'Independent Verification'
   Explain how the use of " independent verification" as a separate IROFS allows the index scores to be additive, when this IROFS is not independent of the other IROFS.

7. Clarity of Accident Sequences
   Accident sequences and IROFS need to be clear. Certain accident sequences require interpretation of what the accident sequence and IROFS mean. NRC will provide a table summarizing the LES accident sequences.