

## UNITED STATES NUCLEAR REGULATORY COMMISSION ADVISORY COMMITTEE ON REACTOR SAFEGUARDS WASHINGTON, DC 20555 - 0001

April 29, 2022

MEMORANDUM TO: Ronald G. Ballinger, Lead SHINE License Application Review Subcommittee Advisory Committee on Reactor Safeguards

Gregory Halnon Digitally signed by Gregory H. Halnon Date: 2022.04.29 11:12:31 -04'00'

SUBJECT:

FROM:

INPUT FOR ACRS REVIEW OF OPERATING LICENSE – SAFETY EVALUATION FOR CHAPTER 2, SITE CHARACTERISTICS

In response to the Subcommittee's request, I have reviewed the NRC staff's safety evaluation report (SER) with no open items for Chapter 2, "Site Characteristics." The following is my recommended course of action concerning further review of this chapter and the staff's associated SER.

Gregory H. Halnon, Member

Advisory Committee on Reactor Safeguards

## **Background**

Chapter 2 of the SER documents the staff's review of the site characteristics, including external accidents from offsite hazards, meteorology, seismic, and other external phenomena. The SER summarizes the staff's safety review of the SHINE operating license application in accordance with the requirements contained in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities." The staff review was guided using NUREG 1537, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Standard Review Plan and Acceptance Criteria." There were several well written Requests for Additional Information (RAIs) required to update the information and analyses in the chapter from the Construction Preliminary Safety Analysis Report. The RAIs were appropriately translated into the information contained in the chapter and closed the gaps necessary to complete the operating license version of the Final Safety Analysis Report (FSAR) for Chapter 2.

# SER Summary

Chapter 2 of the applicant's FSAR was found to be of sufficient detail to provide confidence in a comprehensive evaluation of site characteristics with the exceptions detailed below:

 There was more limited use of USDOC HMR-51 and Army Corp of Engineer guidance in the meteorological section than I expected given the extensive use during the post-Fukushima lessons learned evaluations performed by the commercial light water reactor (LWR) industry. Specifically, the nearby Byron Nuclear Plant extensively used HMR51/52 in flooding reevaluation post-Fukushima. Much of this reevaluation, being in the same meteorological regional area, has values different than in Chapter 2. However, the staff was able to provide confirmatory analyses and evaluations that provided confidence there was adequate consideration to flooding given the limiting events of Local Intense Precipitation (LIP), Probable Maximum Precipitation (PMP), and Probable Maximum Flooding (PMF). In conclusion on the meteorology sections, the information provided sufficient confidence in adequate margins; however, SHINE's limited use of well-established information on precipitation used extensively in the last decade during the flooding reevaluation effort by the existing industry is a missed opportunity for use of well-established operating experience.

- 2. There was one entry dealing with postulated storage of jet fuel at the Southern Wisconsin Regional Airport (SWRA) that may be incorrect. A public document, Minimum Standards for Commercial Aeronautical Activities for Southern Wisconsin Regional Airport, Rock County, Wisconsin, stated that the contractual minimum jet fuel storage volume at the SWRA was to be no less than 12,000 gallons. The evaluation performed in Chapter 2 for jet fuel storage, summarized in Table 2.2-15, used a value nominally smaller volume (11,726 gallons). However, given the margin afforded by other flammable liquids in the evaluations of fire and explosions, this oversight is inconsequential.
- 3. There were several questions that revealed a potential staff review that was less inquisitive than we expected. Although this facility enjoys large margins in many areas, some questions went unaddressed that, in future reviews of other technologies may be more relevant. Examples include the lack of questioning the container orientation for BLEVE concerns and potential missiles affecting site structures; questioning the 2-minute timeline for taking mitigative and protective actions in addition to control room evacuation upon detection (olfactory detection only, no instrumentation) for ammonia cloud concerns; minimum jet fuel storage at the SWRA inconsistencies; potential additional fuel storage before, during, and after an annual airshow at the airport; lack of mention of the Hughes Farm, the closest (adjacent to property) food producer and commercial workplace to the site; lack of evaluation of consequences and mitigation of aircraft impact causing large area fires in accordance with 10 CFR Part 50.54(hh)(1).

#### <u>Concerns</u>

One concern the staff should respond to is if the SHINE facility evaluation has complied appropriately with 10 CFR Part 50.54(hh)(1)(iv). SHINE stated they were not required to assess large area fires; however, this would be a consequence of an aircraft impact. Since an aircraft impact was identified as within the design basis (>E-6/year), it seems appropriate to establish not only the site's structural integrity (as was done) but also the consequences and mitigative measures required for such an accident. NUREG 1537 does not list it as an applicable standard, however the last revision of NUREG-1537 was in 1996, well before the events of 9/11/2001 and associated regulatory actions. I have no other concerns requiring a response with the information provided in Chapter 2, Site Characteristics as well as the accompanying staff SER.

#### Recommendation(s)

As lead reviewer for SHINE Chapter 2, I recommend that the staff provide additional information regarding applicability of 10 CFR Part 50.54(hh)(1). If it is required, then provide information as to the status of compliance will be necessary.

## <u>Reference</u>

- 1. US NRC, "Site Characteristics," Chapter 2, Staff Safety Evaluation Report, March 14, 2022 (ML22073A201).
- 2. Minimum Standards for Commercial Aeronautical Activities Southern Wisconsin Regional Airport, June 1, 2012.
- 3. US Code of Federal Regulations; 10 Code of Federal Regulations, Part 50.
- 4. NUREG 1537, Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, February 1996.
- 5. Byron Nuclear Generating Station; "Flood Hazard Reevaluation Report," Revision 0, February 24, 2014, (ML14079A423).

# SUBJECT: INPUT FOR ACRS REVIEW OF OPERATING LICENSE – SAFETY EVALUATION FOR CHAPTER 2, SITE CHARACTERISTICS

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