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

July 12, 2022

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

FROM: Vicki M. Bier, Member
Advisory Committee on Reactor Safeguards

Vicki M. Bier Digitally signed by Vicki M. Bier
Date: 2022.07.12 00:56:12 -04'00'

SUBJECT: INPUT FOR ACRS REVIEW OF OPERATING LICENSE – SAFETY EVALUATION FOR CHAPTER 11, "RADIATION PROTECTION PROGRAM AND WASTE MANAGEMENT"

In response to the Subcommittee's request, I have reviewed the Nuclear Regulatory Commission (NRC) staff's safety evaluation report (SER) with no open items for Chapter 11, "Radiation Protection Program and Waste Management." The following is my recommended course of action concerning further review of this chapter and the staff's associated safety evaluation.

Background

Chapter 11 of the SER documents the staff's review of the Radiation Protection Program and Waste Management section of the Final Safety Analysis Report (FSAR). It 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 20, "Standards for Protection Against Radiation," and other applicable regulatory requirements, as outlined in the SER.

The NRC staff evaluated the sufficiency of the SHINE radiation protection program and waste management plans as described in the SHINE FSAR Section 11. The SHINE plan discussed: radiation protection; radioactive waste management; and respiratory protection.

The radiation protection organization will be independent of the operations organization, to ensure that there are no conflicts with other major functions such as production, and to ensure organizational independence and objectivity. Radioactive sources include gaseous, liquid, and solid sources.

The waste management program has steps in place to minimize both waste generation and radiation exposure. Radioactive wastes are prepared for shipping offsite, to either of two receiving facilities, but can also be stored onsite for an extended period (up to five years). Officials from the city of Janesville have reviewed the plans for radioactive waste storage and found them acceptable. Some liquid waste could also be discharged directly to the local sewer

system, but this is expected not to be radioactive, and will be monitored for radioactivity prior to disposal. Gaseous releases are also anticipated, within the dose limits of 10 CFR Part 20.

Finally, the respiratory protection program aims to control airborne concentrations of radioactive material.

SER Summary

The staff concluded that the plans documented in Chapter 11 of the FSAR provide reasonable assurance of compliance with applicable regulations and meet the criteria for issuance of an operating license.

Concerns and Observations

It is good that two alternative receiving facilities for offsite waste shipment have been identified: Energy Solutions in Clive, Utah; and Waste Control Specialists in Andrews, Texas. This will help to ensure stability of the plans for offsite waste disposal.

While there are residences within a mile of the SHINE facility, there are no densely populated areas within two kilometers of the facility (according to Section 2 of the FSAR).

Some aspects of radiation protection and waste management interact with other chapters of the FSAR, such as Chapter 12 on conduct of operation.

Recommendation

As lead reviewer for SHINE Chapter 11, I have concluded that no additional input is needed from the staff or applicant on this chapter.

However, the Subcommittee's review of conduct of operation in Chapter 12 should address strategies for avoiding complacency, maintaining a questioning attitude, and ensuring that radiation protection staff are comfortable raising safety issues not only within the SHINE organization, but directly with NRC if necessary.

References

1. U. S. Nuclear Regulatory Commission, "Radiation Protection Program and Waste Management," Chapter 11, Staff Safety Evaluation Report, April 28, 2022 (ML22118A862).

2. SHINE Technologies, LLC, Application for Operating License Supplement 14, Revision to Final Safety Analysis Report, Chapter 9, Radiation Protection Program and Waste Management, June 26, 2022 (ML22034A625).

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