



UNITED STATES
NUCLEAR REGULATORY COMMISSION
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November 17, 2021

MEMORANDUM TO: Jacob I. Zimmerman, Chief
Fuel Facility Licensing Branch
Division of Fuel Management
Office of Nuclear Material Safety
and Safeguards

FROM: David H. Tiktinsky, Sr. Project Manager
Fuel Facility Licensing Branch
Division of Fuel Management
Office of Nuclear Material Safety
and Safeguards

SUBJECT: IN-OFFICE REVIEW SUMMARY – “TIGER TEAM” EVALUATION OF
PRE-APPLICATION DOCUMENTS FOR THE PROPOSED TRISO-X
FUEL FABRICATION FACILITY (ENTERPRISE PROJECT
IDENTIFIER L-2018-NEW-0004)

On September 21 and 22, 2021, U. S. Nuclear Regulatory Commission (NRC) staff conducted a Tiger Team in-office review of pre-application documents that will support a potential application for a TRISO-X fuel fabrication facility to be licensed under 10 CFR Part 70. I have enclosed a review summary for the in-office review.

In accordance with 10 CFR Section 2.390 of the NRC’s “Agency Rules of Practice and Procedure,” a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

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Enclosure:
In-Office Review Summary

cc: XEnergy@listmgr.nrc.gov

SUBJECT: IN-OFFICE REVIEW SUMMARY – “TIGER TEAM” EVALUATION OF PRE-APPLICATION DOCUMENTS FOR THE PROPOSED TRISO-X FUEL FABRICATION FACILITY (ENTERPRISE PROJECT IDENTIFIER L-2018-NEW-0004) DOCUMENT DATE: NOVEMBER 17, 2021

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DATE	11/ 4 /2021	11/04/2021	11/15/2021

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**SUMMARY OF “TIGER TEAM” IN-OFFICE REVIEW OF TRISO-X PRE-APPLICATION
DOCUMENTS FOR A PROPOSED TRISO-X FUEL FABRICATION FACILITY
September 21 and 22, 2021**

Participants:

U.S. Nuclear Regulatory Commission – S. Ani, J. Munson, A. Smith, and D. Tiktinsky

TRISO-X

- Jennifer Wheeler, Director of Regulatory Affairs
- Robert Maurer, ISA Program Manager
- Richard Montgomery, Senior NCS Engineer
- Travis Wilson, NCS Engineer
- Ralph Winiarski, NCS Lead for Paschal Solutions Inc. (under contract to TRISO-X)
- Gerard Couture, Safeguards Program Manager (remote)

Purpose

The purpose of the trip was for NRC staff to meet with TRISO-X staff and examine the application documents that are being prepared for submittal. The review focused on completeness and potential fatal flaws that could impact the licensing review. The visit is not a technical review of the application and no regulatory decisions were made. The review focused on criticality safety, material control and accounting, and the integrated safety analyses.

Discussion

Integrated Safety Analysis

The staff reviewed TRISO-X's proposed components of its integrated safety analysis (ISA) program and associated documents, including the draft license application, implementing procedures for the integrated safety analyses (ISA) program, select process hazards analyses, accident consequence evaluations for chemical and radiological scenarios, fire hazards analysis, risk assessment for radiological and chemical events, and the ISA Summary.

The staff discussed with TRISO-X the regulatory requirements for the ISA Program and ISA Summary and their relationship to the various documents needed to complete the review and issue a Part 70 license. During the visit, TRISO-X expressed an interest in applying guidance from NUREG-1520, “Standard Review Plan for Fuel Cycle Facilities Licenses,” in its application. Therefore, the staff discussed with TRISO-X its proposed incorporation of guidance from Chapters 3 and 11, specifically. The staff further pointed to other sources of information on the use of NUREG-1520, including recent safety evaluation reports, technical evaluation reports and requests for additional information.

Below is a list of documents reviewed.

Draft Documents Reviewed as part of the ISA evaluation

License Application
ISA Program

Enclosure

Coating and Overcoating Process Hazards Analysis
Chemical Accident Consequence Evaluation
Radiological Accident Consequence Evaluation
Radiological/Chemical Risk Assessment
Fire Hazards Analysis
ISA Summary

Criticality Safety

The NRC staff reviewed the applicant's criticality code validation report, nuclear criticality safety chapter of the license application, a sample of nuclear criticality safety evaluations, and various supporting technical documents. The NRC staff had several observations, but determined that the applicant is generally on track for submitting an application for a 10 CFR Part 70 license with respect to criticality safety.

Material Control and Accounting

The applicant is required by 10 CFR 70.22(b) to submit, as part of its application for a license, a full description of its program for control and accounting of special nuclear material that will be in their possession under the license to show how compliance with the applicable requirements of 10 CFR Part 74, "Material Control and Accounting of Special Nuclear Material," will be accomplished. Based on the anticipated enrichment levels and quantities of special nuclear material (SNM) for the proposed facility, the applicant would be subject to the applicable requirements in 10 CFR Part 74, Subpart B, "General Reporting and Recordkeeping Requirements," and Subpart D, "Special Nuclear Material of Moderate Strategic Significance." Specifically, 10 CFR 74.41(b)(1) requires the applicant to submit a fundamental nuclear material control plan (FNMCP) which describes how the applicable material control and accounting (MC&A) requirements will be met.

The NRC staff reviewed the applicant's draft FNMCP. The NRC staff noted that the draft FNMCP follows the format and content of draft guidance, NUREG-2159, "Acceptable Standard Format and Content for the Fundamental Nuclear Material Control Plan Required for Special Nuclear Material of Moderate Strategic Significance." At the time of the visit, Revision 1 of draft NUREG-2159 had not yet been published in the *Federal Register*, but NRC staff relayed that it would be published for public comment on September 23, 2021.

The NRC staff noted that in general, the draft FNMCP addresses the various elements of an MC&A program for a facility that possesses and uses SNM of moderate strategic significance, as described in draft NUREG-2159. The NRC staff noted that some sections would be strengthened by additional detail in the descriptions of the unique features of the proposed operation. For example, the SNM flow through the proposed facility, measurement points and systems, sampling points, and activities performed by the Quality Control Laboratory versus a contractor laboratory. The NRC staff noted that any questions regarding specific MC&A performance objectives or system capabilities required by Part 74 would be handled during the licensing process after the FNMCP is officially submitted for formal review.