

From: Holly Cruz (She/Her/Hers)
Sent: Monday, May 6, 2024 9:37 AM
To: Thomas Eiden
Cc: Michael Balazik
Subject: REPORT ON THE TERTIARY PRE-SUBMITTAL REGULATORY AUDIT OF THE ATOMIC ALCHEMY, INC PRELIMINARY SAFETY ANALYSIS REPORT (EPID L-2023-LRM-0024)

Dear Mr. Eiden:

Atomic Alchemy, Inc (AAI) began pre-application discussions with the U.S. Nuclear Regulatory Commission (NRC) staff on their Versatile Isotope Production Reactor (VIPR) in October 2019. Prior to submitting the VIPR construction permit preliminary safety analysis report (PSAR), AAI volunteered for this supplemental audit to ensure readiness of Chapters 3, Design of Structures, Systems and Components, and 7, Instrumentation and Control Systems, of the draft PSAR before it is formally submitted for the NRC staff's review. NRC staff previously provided feedback after initial audits were conducted in the fall of 2022 and spring of 2023, for AAI consideration (ML23086C032 and ML23194A200, respectively).

The audit plan, dated October 27, 2023, is provided in the NRC's Agencywide Documents Access and Management System at Accession No. ML23290A030. The audit was conducted from October 17, 2023, through March 3, 2024, via teleconference and documents provided in BOX.

Project No.: 99902080

ATOMIC ALCHEMY, INC

SUMMARY REPORT ON THE TERTIARY PRE-SUBMITTAL REGULATORY
AUDIT OF ATOMIC ALCHEMY, INC
PRELIMINARY SAFETY ANALYSIS REPORT

October 2023 – March 2024

1.0 BACKGROUND

Atomic Alchemy, Inc (AAI) began pre-application discussions with the U.S. Nuclear Regulatory Commission (NRC) staff on their Versatile Isotope Production Reactor (VIPR) in October 2019. Over the past several years, AAI has submitted topical reports and white papers that apply to the VIPR. As discussed in various teleconferences and in a meeting held on August 9, 2022, AAI plans to submit an application for a construction permit (CP), including a preliminary safety analysis report (PSAR), for the VIPR in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities." The staff plans to review the PSAR in accordance with NUREG-1537, Part 1, "Guidelines for Preparing and Reviewing Applications for the Licensing of Non-Power Reactors, Format and Content" (Agencywide Documents Access and Management System Accession No. ML042430055), or applicable guidance.

2.0 AUDIT REGULATORY BASES

The bases for the audit are the regulations in 10 CFR Part 50, Section 50.34(a), "Preliminary safety analysis report," and Section 50.35, "Issuance of construction permits."

3.0 AUDIT PURPOSE AND OBJECTIVES

The purpose of this audit was to provide the NRC staff with an opportunity to assess the readiness of Chapters 3, Design of Structures, Systems and Components, and 7, Instrumentation and Control Systems, of the draft PSAR before it is formally submitted for the NRC staff's review. NRC staff provided feedback after initial audits were conducted in the fall of 2022 and spring of 2023, for AAI consideration (ML23086C032 and ML23194A200, respectively). The audit will allow the NRC staff to (1) identify any required information that is missing from the application, (2) identify technical or regulatory issues that may complicate the acceptance or technical reviews of the application, and (3) become familiar with the content of the application, particularly in areas where AAI plans to propose new concepts or novel design features.

4.0 SCOPE OF THE AUDIT AND AUDIT ACTIVITIES

The audit was conducted October 17, 2023, through March 8, 2024, via teleconference, and documents provided in BOX. The NRC staff conducted the audit in accordance with the pre-application audit plan dated October 27, 2023 (ML23290A030). There were no deviations from the audit plan.

NRC staff audit team members included:

Michael Balazik Project Manager, Division of Advanced Reactors and Non-Power
Production and Utilization Facilities (DANU) Audit Lead (responsible for
technical review)

Holly Cruz Sr. Project Manager, DANU (responsible for audit logistics)

Duane Hardesty Sr. Project Manager, DANU

Michelle Sutherland Project Manager, DANU

Shao Lai Civil Engineer (Structural), DEX

Patrick Koch Civil Engineer (Structural), DEX

Zuhan Xi Geotechnical Engineer, DEX

Andrew Prinaris Structural Engineer, DEX

Norbert Carte Instrumentation and Controls, DEX

Dinesh Taneja Senior Electronics Engineer, DEX

The NRC staff audited parts of the following documents:

1. AAI PSAR Chapters 2, 3, and 7

The NRC staff did not acquire any documents during the audit.

5.0 SUMMARY OF OBSERVATIONS

The NRC staff's general audit observations are provided below. The main purpose of the audit was to identify issues which could challenge potential acceptance of the PSAR when submitted, as well as to identify highly challenging regulatory or technical issues which may need additional documentation. A detailed summary of NRC staff comments are provided for AAI reference in BOX, which may help to provide a more comprehensive submittal.

General Observations:

The NRC staff observed that Chapter 3 was missing information or lacked clarity in the following areas: geotechnical surveys, seismic and meteorological damage, and risk categorization. The staff's inability to review this information limits the effectiveness of the pre-application audit. As such, AAI plans to revise its PSAR to include this information.

6.0 EXIT BRIEFING

The NRC staff conducted an audit closeout meeting on March 8, 2024. At the exit briefing the staff reiterated the purpose of the audit and discussed the activities conducted.

7.0 REQUESTS FOR ADDITIONAL INFORMATION RESULTING FROM AUDIT

The staff provided AAI questions and feedback during the audit, which AAI could consider and use to revise the PSAR prior to submittal of the CP application.

8.0 OPEN ITEMS AND PROPOSED CLOSURE PATHS

Not applicable. There are no open items as a result of this audit.

Thanks,

Holly

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