



18-June-2021

Project Number: 99902080

US Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

**SUBJECT: PRINCIPAL DESIGN CRITERIA FOR ATOMIC ALCHEMY'S NON-POWER
PRODUCTION AND UTILIZATION FACILITY**

ENCLOSURES:

- 1) AAO-VIPR-21-PDC-00(NP), Atomic Alchemy Principal Design Criteria for the Atomic Alchemy Facility, Rev. 0
- 2) Basis for the Submittal of the Atomic Alchemy Principal Design Criteria as a Topical Report
- 3) Format of the Atomic Alchemy SAR

The purpose of this letter is Atomic Alchemy's voluntary submittal of its Principal Design Criteria (PDC) for its Non-power Production and Utilization Facility (NPUF) as a Topical Report (TR) for NRC review and approval, which can be found in Enclosure 1, in support of the preparation of Atomic Alchemy's NPUF construction permit application and operating license application, under Title 10 *Code of Federal Regulations* (CFR) Part 50. The bases for the exemption of Criterion B in section 4.2 of LIC-500 can be found in Enclosure 2.

Atomic Alchemy has also provided its preliminary Safety Analysis Report (SAR) formatting to assist the Staff's reviewers in Enclosure 3.

In order to help increase the efficiency of the licensing process, Atomic Alchemy discussed the concept of this topical report submittal of its principal design criteria with the NRC staff during a conference call on May 6th, 2021.

NUREG-1537 Part 2, SRP Section 3, and ISG to NUREG-1537 Part 2, Section 3.5a and 3.5b both require¹ a NPUF licensee to develop principal design criteria in its PSAR construction permit application.

The NRC staff suggests in NUREG-1537 Part 2, Section 3.5b, that meeting the minimum requirements for baseline design criteria of 10 CFR 70.64 would be acceptable for radioisotope production facilities under a 10 CFR Part 50 license. The staff, however, has not established minimum requirements for principal design criteria for a Non-Power Reactor (NPR). Therefore, Atomic Alchemy will use 10 CFR Part 50 Appendix A General Design Criteria (GDC) and 10 CFR 70.64(a) as a minimum basis for establishing its principal general design criteria to meet the regulatory requirements of 10 CFR 50.34(a)(3) for both its NPR reactors and its radioisotope production facility.

¹ Under the provisions of 10 CFR 50.34(a)(3), an application for a Construction Permit must include the principal design criteria for a proposed facility.

While the 10 CFR Part 50 Appendix A GDC's are not directly applicable to Atomic Alchemy NPUF design, they nevertheless present an established basis in providing the NRC with reasonable assurances of the safety of the design of the Atomic Alchemy facility and its compliance with the appropriate Title 10 regulations.

Some of the Atomic Alchemy principal design features are significantly different from those design features that were considered for nuclear power plants in the 10 CFR Part 50, Appendix A criterion. In those instances, either the means by which the Atomic Alchemy principal design complies with the intent of the general design criterion or the exception (if Atomic Alchemy believes that a strict adherence to the power plant principal design criteria or underlying Title 10 regulation is not warranted for its NPUF license application) to the GDC is indicated.

There are no commitments made in this submittal.

Atomic Alchemy's expectations of the NRC review of these principal design criteria are as follows:

- 1) The NRC accepts Atomic Alchemy's proposed principal design criteria as meeting the requirements of 10 CFR 50.34(a)(3)(i) for its forthcoming construction permit application and PSAR submittal.
- 2) The NRC accepts Atomic Alchemy's proposed principal design criteria as meeting the requirements of 10 CFR 70.64 for its forthcoming construction permit application and PSAR submittal.
- 3) The NRC agrees that the intended design approach and implementation of Atomic Alchemy's principal design criteria is acceptable.

If there are any questions or a need for additional information, please contact Mr. Michael Grochowski at regulatory@atomicalchemy.us.

Sincerely,



Thomas Eiden
CEO, Atomic Alchemy Inc.

TE/mjg

Digitally signed by Thomas
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Date: 2021.06.18 13:08:29 -06'00'

CC:

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Non-Power Production and Utilization Facilities Licensing Branch

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