



Enclosure 2 to AAL-2021-010

**Response to NRC's Additional Information Needed
Related to the Supplement 1 Submittal of the
Standard Review Plan Conformance for
Atomic Alchemy's Non-power Production and Utilization
Facility**

ATOMIC ALCHEMY INC.

January 21, 2022

NRC AIN NUMBER	ATOMIC ALCHEMY NUMBER	ATOMIC ALCHEMY RESPONSE
NRC AIN #1	AAL-021-010-01	Response Enclosed – See Page 3
NRC AIN #2	AAL-021-010-02	Response Enclosed – See Page 5

INTRODUCTION

The primary objective of the submitted Atomic Alchemy Conformance to the Standard Review Plan Topical report (hereafter referred to as the AASRP TR) is to provide the NRC with a preliminary component of Atomic Alchemy's overall regulatory GAP analysis. To determine the applicable light-water reactor (LWR)-based Title 10, Parts 1 through 171 regulations to evaluate, Atomic Alchemy chose to select them from NUREG-0800 SRP Acceptance Criterion.

Atomic Alchemy believes there are several layers of review and acceptance necessary in a Safety Evaluation (SE) for its AASRP TR as follows:

- a. A determination by the Staff of Title 10 regulations identified for each respective NUREG-0800 SRP Acceptance Criterion applicability to the corresponding NUREG-1537 Part 2 SRP Acceptance Criterion.
- b. A determination by the Staff of the NRC endorsed design approaches, methodology and implementation guidance presently described for each respective NUREG-0800 SRP Acceptance Criterion/Title 10 regulation applicability and their respective usage as a path forward to demonstrate compliance for corresponding NUREG-1537 Part 2 SRP Acceptance Criterion.

These two, higher-tiered elements of the review can be utilized by other non-power licensees¹ and will increase the efficiency and improve the license review process of not only Atomic Alchemy's application but for other non-power licensees who reference the SE.

The requested formal scope for the Staff's review will be provided in the cover letter only to this supplemental submittal.

¹ Atomic Alchemy acknowledges the scope and prescriptiveness of Title 10 regulations would still be a variable for each licensee.

NRC AIN #1**NRC Letter Date: September 28, 2021 (ADAMS Accession Package No. ML ML21271A002)****NRC Acceptance Review of Atomic Alchemy's Standard Review Plan Conformance Topical Report (TR)**

Background to the NRC Question: On the Topical Report Completeness Determination form the Staff included the following list requested by Atomic Alchemy in the "Petition for Review" (ADAMS) Accession No. ML21181A062, dated June 25, 2021:

"In the AASRP TR, Atomic Alchemy Inc. requests the NRC staff agreement to the following: (1) applicable Title 10 regulations as described in the AASRP TR; (2) acceptance of Atomic Alchemy's intended design approach and compliance with those regulations; (3) its conformance to NUREG-1537 Part 2 Acceptance Criterion with a sufficient level of detail acceptable to the NRC staff as described in the AASRP TR; (4) preliminary NRC Staff acceptance of Atomic Alchemy's compliance with 10 CFR 50.34(a) for the elements addressed in the AASRP TR."

AIN #1 addresses items 2 and 4 from the list.

Text of NRC Question: *"The NRC staff cannot provide a conclusion whether the intended design approach will comply (items 2 and 4) with regulations using the TR process. Applicants are expected to provide sufficient level of design information for the NRC staff to conduct independent evaluations to determine compliance with the regulations. The NRC staff's determination whether a facility design complies with regulations is normally performed as a result of a licensing action request."*

Atomic Alchemy Response AAL-021-010-01:

The requested formal scope for the Staff's review will be provided only in the cover letter to this supplemental submittal.

Atomic Alchemy realizes there was some misunderstanding by the Staff with respect to Item 2. As stated in the introduction section above, the broader requested scope would be a determination by the Staff that previously published, staff endorsed means and methods of compliance with NUREG-0800 SRP acceptance criteria (and by inference, compliance with the corresponding underlying Title 10 regulations) can be logically applied to the equivalent NUREG-1537 SRP acceptance criterion.

It is understood by Atomic Alchemy that the NRC cannot state a conclusion that Atomic Alchemy's design actually complies with the specified regulations pre-PSAR submittal without a detailed design review.

Atomic Alchemy accepts the NRC's position with respect to Item 4.

NRC AIN #2

NRC Letter Date: September 28, 2021 (ADAMS Accession Package No. ML ML21271A002)

NRC Acceptance Review of Atomic Alchemy's Standard Review Plan Conformance Topical Report (TR)

Background to the NRC Question: On the Topical Report Completeness Determination form the Staff included the following list requested by Atomic Alchemy in the "Petition for Review" (ADAMS) Accession No. ML21181A062, dated June 25, 2021:

"In the AASRP TR, Atomic Alchemy Inc. requests the NRC staff agreement to the following: (1) applicable Title 10 regulations as described in the AASRP TR; (2) acceptance of Atomic Alchemy's intended design approach and compliance with those regulations; (3) its conformance to NUREG-1537 Part 2 Acceptance Criterion with a sufficient level of detail acceptable to the NRC staff as described in the AASRP TR; (4) preliminary NRC Staff acceptance of Atomic Alchemy's compliance with 10 CFR 50.34(a) for the elements addressed in the AASRP TR."

AIN #2 addresses item 3 from this list.

Text of NRC Question: *"The standard review plan (SRP) and acceptance criteria for a non-power production and utilization facility (NPUF) is contained NUREG-1537, Part 2. The principal purpose of a SRP is to assure the quality and uniformity of NRC staff safety reviews, while improving the understanding of the NRC staff's review process. NUREG-1537, Part 1, provides guidance to applicants on the format and content of applications for an NPUF, while NUREG-1537, Part 2 is used by the NRC staff for reviewing and evaluating applications submitted for NPUFs. The guidance in NUREG-1537 is written to encompass different NPUF designs and technologies and therefore, not all the acceptance criterion in NUREG-1537 may apply to a specific NPUF design. Further, applicants are not required to conform with the guidance in NUREG-1537. For Atomic Alchemy's request regarding conformance to NUREG-1537, Part 2, acceptance criteria (item 3), the NRC staff is unclear on the review scope of "sufficient level of detail." With the limited design information in the TR and Atomic Alchemy not specifically identifying any acceptance criterion in NUREG-1537 that may apply to its planned NPUF, the NRC staff cannot make a conclusion on Atomic Alchemy's request on conformance to the acceptance criteria in NUREG-1537, Part 2, with a sufficient level of detail (item 3)."*

Atomic Alchemy Response AAL-021-010-02:

The requested formal scope for the Staff's review will be provided in the cover letter only to this supplemental submittal.

(Based on telecom on October 28, 2021, Atomic Alchemy believes that this question has been satisfactorily resolved.)

Atomic Alchemy specifically identifies each NUREG-1537 Part 2 SRP that it intends to apply to its design in a separate column for each of the corresponding NUREG-0800 SRP (this is the method Atomic Alchemy selected as a means to evaluate the related Title 10 regulations' GAP analysis and previously NRC endorsed methods of compliance). There is an assumption (however, Atomic Alchemy concedes that was not directly stated in the AASRP TR), that all of the acceptance criterion bullets for each NUREG-1537 SRP identified are therefore considered applicable to the Atomic Alchemy design. (During the development of the AASRP TR's table, in approximately 95% of the occurrences, all of the NUREG-1537 acceptance criterion bullets were determined to be applicable in those instances where the base NUREG-1537 SRP was determined to apply to an element of the Atomic Alchemy design).

The column adjacent to the NUREG-1537 SRP identified the collective Title 10 regulations, industry codes and standards, regulatory guides and GDCs² that have been previously determined by the NRC to be applicable for each NUREG-0800 SRP (the staff's concurrence on this applicability is requested). Atomic Alchemy then described these with a brief summary description of the level and scope of applicability (the Regulatory GAP analysis portion of the AASRP TR) and a brief description of its intended method compliance for each identified regulation.

As discussed in the telecom, a specific concurrence (or variance) for Atomic Alchemy's intended method of compliance for each regulation would be beyond the scope of the SE.

ATOMIC ALCHEMY SUMMARY:

The staff has stated that the TR process can be utilized for evaluating applicability of Title 10 regulations identified in the TR for NPUFs, (Regulatory GAP analysis) this satisfies Item 1 and Atomic Alchemy concurs.

Atomic Alchemy also accepts the NRC position with respect to Item 4 and will withdraw the expectation for the level of review and acceptance of the Atomic Alchemy design with respect to compliance with 10 CFR 50.34(a) from this submittal.

With respect to Item 2 and Item 3, Atomic Alchemy asserted that since LWR-based Title 10 regulations have already been well defined in NUREG-0800, they can be equivalently applied to the comparable LWR-based NUREG-1537 SRPs. Further, the Staff can provide its concurrence or variance with Atomic Alchemy Regulatory GAP Analysis of these selected regulations (as applied to the Atomic Alchemy NPUF) that have been sorted by corresponding NUREG-0800 SRPs.

Atomic Alchemy will clarify in the revised AASRP TR Introduction section, that for the TR identified NUREG-1537 Part 2 SRP, the scope of review should include all the respective acceptance criterion bullets.

With respect to Item 3, as discussed in the telecom on October 28, 2021, Atomic Alchemy acknowledges that specific applications of previously endorsed methods of compliance with specific applicable regulations would be beyond the scope of the SE for the AASRP TR. However, as agreed in the telecom, a "generalized" concurrence (or variance) of the use of previously NRC endorsed methods of compliance identified in NUREG-0800 as applied to NUREG-1537 acceptance criteria requirements could be provided in the SE.

² Atomic Alchemy derived its Principal Design Criteria from 10 CFR 50 Appendix A GDC and performed its respective regulatory GAP analysis for the Part 50 Appendix A GDC submitted to the NRC in Atomic Alchemy letter AAL-2021-004, TR AA0-VIPR-PDC-00 (NP), Agencywide Documents Access and Management System (ADAMS) Accession No. ML21169A044, dated June 18, 2021.