PUBLIC SUBMISSION

As of: 2/8/18 1:56 PM
Received: February 05, 2018
Status: Pending_Post
Tracking No. 1k2-91bx-smur
Comments Due: February 05, 2018
Submission Type: Web

Docket: NRC-2017-0236
Preparing to License Accident Tolerant Fuel

Comment On: NRC-2017-0236-0001
Preparing to License Accident Tolerant Fuel

Document: NRC-2017-0236-DRAFT-0007
Comment on FR Doc # N/A

Submitter Information

Name: Andrew Mauer
Submitter's Representative: Anya Barry
Organization: Nuclear Energy Institute

General Comment

See attached file(s)

Attachments

82 FR 60633
12/21/2017

02-05-18_NRC_NEI ATF Letter

02-05-18_NRC_NEI ATF Letter Comment Table Summary_Attachment

(7)

SUNSI Review Complete
Template = ADM – 013
E-RIDS= ADM-03
Add= Andrew Proffitt (JAP5)

ANDREW N. MAUER
Technical Advisor

1201 F Street, NW, Suite 1100
Washington, DC 20004
P: 202.739.8018
anm@nei.org
nei.org

NUCLEAR ENERGY INSTITUTE

February 5, 2018

Ms. May Ma
Office of Administration
Mail Stop: OWFN-2-A13
U.S. Nuclear Regulatory Commission
Washington, DC 20555–0001
Submitted via Regulations.gov

Subject: Submittal of NEI comments on draft Project Plan to Prepare the U.S. Nuclear Regulatory Commission to License and Regulate Accident Tolerant Fuel, *82 Federal Register 60633*, 12/21/2017 (Docket ID: NRC-2017-0236)

Project Number: 689

Dear Ms. Ma:

On behalf of the nuclear energy industry, the Nuclear Energy Institute (NEI)[1] appreciates the opportunity to provide comments on the U.S. Nuclear Regulatory Commission's (NRC) draft project plan to license and regulate Accident Tolerant Fuel (ATF). Industry very much recognizes and appreciates the NRC's commitment to develop the ATF project plan and continue the collaborative dialogue that has informed the NRC staff's efforts. The industry is committed to the pursuit and development of ATF on a timeline that supports phased deployment in a commercial reactor in the early to mid-2020s. This schedule is of key importance in the decisions our members will need to make when evaluating the ATF safety benefits against the costs of adopting this technology.

Based upon our review of the draft project plan, we do not believe it supports ATF deployment within industry's desired timeframe. The development of the ATF licensing framework provides the NRC with the opportunity to transform the fuel licensing regulatory infrastructure, by applying a graded approach tailored to each ATF concept. A more transformational shift in the NRC's fuel licensing approach is needed and our comments are intended to facilitate changes that would bring the project plan into alignment with such an

[1] The Nuclear Energy Institute (NEI) is the organization responsible for establishing unified industry policy on matters affecting the nuclear energy industry, including the regulatory aspects of generic operational and technical issues. NEI's members include entities licensed to operate commercial nuclear power plants in the United States, nuclear plant designers, major architect/engineering firms, fuel cycle facilities, nuclear materials licensees, and other organizations and entities involved in the nuclear energy industry.

approach. This will require a close collaboration and alignment between the industry, DOE, the national laboratories, and the NRC.

We support the NRC's assumption and recognition that independent testing is not required and would not provide a benefit for the NRC or industry. However, the project plan was constructed within the current regulatory infrastructure, and contains elements that are not warranted and would not enable deployment in a timeframe worthwhile for the industry to pursue. The lack of regulatory stability and predictability for the insertion of lead test assemblies and full reloads of ATF concepts severely limits industry's ability to innovate for enhanced safety and economic benefits. We believe that the near-term ATF concepts will be able to utilize the existing regulatory framework for current fuel products but the ~~current well-established regulatory~~ framework does not provide guidance for the longer-term ATF concepts creating regulatory unpredictability. Moreover, there is uncertainty in the time needed for NRC to develop independent computational models and tools. A truly transformational approach should be built on the considerable advances in modeling and simulation capability that have become available in recent years. NRC's memorandum of understanding with DOE[2], referenced in the project plan, establishes the opportunity for this to be accomplished.

Historically, the licensing of new fuels and cladding within the current regulatory infrastructure has taken upward of twenty years. These licensing timeframes are not reasonable for ATF, given the concomitant benefits of increased safety and fleet sustainment (economic benefits), and an expedited approach that enables deployment of innovative technologies is necessary to realize such benefits. The use of advanced modeling and simulation capabilities, which we did not have twenty years ago, will be essential. Advanced modeling and simulation could inform a graded approach to the regulatory requirements and facilitate ATF implementation by providing key support to utilities and vendors on design considerations, normal operation evaluations, and ATF fuel performance assessments. These advanced modeling and simulation capabilities can also provide support to the NRC for licensing reviews. By more closely aligning with DOE and national labs, the NRC can apply these modeling and simulation capabilities in a more efficient and effective independent regulatory review – one that is much more robust than the current approach of developing redundant modeling and simulation capabilities based on the same data sets. The use of these tools can reduce the time and cost needed to introduce innovative technologies into operating nuclear power plants. An independent confirmatory process needed for a thorough regulatory review would still be maintained, reducing the number of time-consuming and costly experiments and demonstrations, while addressing one of the major hurdles in getting ATF to market.

Additionally, a number of process improvements should be made to the project plan so that it provides for a more innovative graded approach to fuel licensing. Each ATF concept is unique and should be evaluated on its own merits rather than being binned into broad categories (i.e., revolutionary and evolutionary) with limited development timelines based on non-specific lead time durations. The implementation timeline for ATF concept categories would help organize the project plan and determine what types of activities are needed, but each ATF concept should be independently reviewed to determine its own specific implementation

[2]Addendum to Memorandum of Understanding between U.S. Nuclear Regulatory Commission and U.S. Department of Energy on Nuclear Safety Research of Advanced Technology Fuels, 10/26/2017, ML17130A815.

schedule with considerations for whether key policy discrepancies exist and where regulatory infrastructure may need to be developed to support that particular concept's implementation. These determinations can and should be started immediately in order to support the alignment of industry development schedules with regulatory licensing schedules using actual dates for each concept.

The implementation of these transformative changes will enable parallel progress for several ATF concepts using a graded approach tailored to each ATF concept while leveraging the modeling and simulation work now available to the NRC. Industry supports the framework of the NRC project plan as a living document that is updated by the NRC with stakeholder input. Therefore, industry is providing the attached comments which illustrate key differences between industry's and NRC's vision for how the ATF program will be implemented. NEI stands ready to work with NRC in furthering the dialogue to enhance the timely implementation of ATF and we look forward to routine dialogue with the NRC's steering committee going forward.

Thank you for your time and attention on this important matter. If you have any questions, please contact me.

Sincerely,

Andrew N. Mauer

Andrew Mauer

Attachment

c: Mirela Gavrilas, NRR, NRC
Andrew Proffitt, NRR, NRC

NEI Comments on Draft Project Plan to Prepare the U.S. Nuclear Regulatory Commission to License and Regulate Accident Tolerant Fuel

Affected Section	Comment/Basis	Recommendation
1. General (Assumptions)	In the draft project plan of 9/6/2017, there was a fourth assumption that NRC would be appropriately resourced (staffed) to support the ATF research plan. This statement does not appear in the updated plan.	Although not necessary for inclusion in the plan, the assumption of appropriate resourcing to support it is essential in achieving timely licensing of ATF to meet industry deployment objectives. There should be a mechanism in place for NRC to provide this assurance to all ATF stakeholders.
2. General (Assumptions) / pg 1	"Additionally, it is expected that all integral fuel behavior data will be provided to the NRC in a timely manner such that integral assessment of NRC codes can be performed." What is meant by "integral"? Is this data different from the data referenced in the preceding sentence?	Suggest revising the text as follows: "Additionally, it is expected that all reactor and test generated fuel behavior data will be provided to the NRC in a timely manner such that assessment of NRC codes versus test data can be performed."
3. General	The near-term ATF concepts that are contemplated have been previously approved by the NRC in other forms (doped fuel and alternative zirconium based claddings) using the current regulatory framework and existing NRC codes. The document implies that an extraordinary level of NRC effort (both from a review of regulations and from a code development perspective) is required to review these designs which is contradicted by past NRC approvals of similar designs. The document states on page 1 "The project plan does not cover existing licensing activities, as they follow existing processes for which schedules and regulatory approaches are well established."	Eliminate any discussion of near-term designs (existing cladding materials with new coatings) other than the general comments related to near-term designs in the first 4 pages of the document because these concepts should not require a multi-year implementation. Only the new physical, structural, or chemical aspects need to be assessed to ensure no detrimental impact occurs from their addition.
4. General	The plan should identify any NRC effort for changes beyond the specific ATF fuel and/or cladding changes.	The project plan needs to consider how each ATF concept ties into safety benefits for operating plants.

NEI Comments on Draft Project Plan to Prepare the U.S. Nuclear Regulatory Commission to License and Regulate Accident Tolerant Fuel

Affected Section	Comment/Basis	Recommendation
5. General	When discussing doped UO2 pellets, coated cladding, or more advanced pellet or cladding concepts, it should be clear that the specific material description is an example of the concept. For example, the second paragraph of pg 4 does not include doped UO2 pellets and its exclusion does not provide the right level of complexity of the issue.	Clearly denote that specific materials discussed are used as examples of the technology and do not define acceptable materials for pellet doping elements or cladding coatings, etc.
6. General	The various coated Zr technologies may considered as a variation of normal fuel material development for application to the current regulatory framework. Additionally, ferritic stainless steels (i.e. FeCrAl) are similar to conventional fuel in that metallic cladding and the cladding failure modes are expected to be similar. As such, a regulatory framework for FeCrAl cladding is expected to be similar to the existing framework and the framework would be modified appropriately for the new cladding's performance characteristics.	It is recommended that the NRC consider contemporary experience in approving new materials that are variations of normal (e.g. GNF-Ziron, NSF, etc.) to compare with the targeted review cycles for coated Zr ATF materials to evaluated how current regulatory process capability can support the requested review cycles.
7. General	The NRC project plan is not risk-informed. It starts off with this caveat: "The project plan does not cover existing licensing activities, as they follow existing processes for which schedules and regulatory approaches are well-established." The ATF project plan is above and beyond the existing licensing actions for conventional fuels.	For fuel concepts that are conventional cladding materials with an additional barrier (coatings) the licensing approach should use the existing licensing process to allow the new concepts to demonstrate their performance. We recommend that the NRC assure the degree of regulatory interest & concern is consistent with the amount of uncertainty and the potential consequence of performance uncertainty.

NEI Comments on Draft Project Plan to Prepare the U.S. Nuclear Regulatory Commission to License and Regulate Accident Tolerant Fuel

Affected Section	Comment/Basis	Recommendation
8. General	In the second paragraph the last 2 sentences were added to the description of "evolutionary" vs. "revolutionary" ATF concepts. The first sentence simply explains the meaning of the terms (for the purposes of the research plan) and is a useful clarification. However, the second sentence states that regulatory requirements do not vary between evolutionary and revolutionary (ATF) designs. It is not clear what this is intended to mean.	It is recommended that each ATF concept be evaluated on an implementation timeline specific to that concept's technical and licensing attributes considering whether that specific ATF concept has any key policy discrepancies and whether any regulatory infrastructure would need to be developed to support that particular concept's implementation. Similarly, the regulatory processes need to be evaluated for impacts to the metrics of CDF / LERF based on different isotopic releases for each ATF concept. NEI suggests enhancing the project plan to differentiate between the types of concepts while not prescribing the exact lead times for implementation for multiple concepts rather than being binned with associated long development timelines based on non-specific lead time durations.
9. General	An additional aspect to the licensing of ATF is a review of relevant regulatory infrastructure that may need to be updated to enable realization of the safety and economic benefits of ATF.	The industry has efforts underway to review potential regulatory changes based on expected safety benefits and will engage with the NRC steering committee later this year.
10. General	We suggest that the NRC consider reviewing "preliminary" applications that are based on atomic scale modeling and/or limited test reactor data with the understanding that data that verifies the atomic scale modeling will come later. This will avoid a situation where a significant amount of data is transmitted to the NRC at the conclusion of a test program while the NRC is also reviewing the corresponding models.	The NRC should consider reviewing "preliminary" applications that are based on atomic scale modeling with the recognition that data that verifies the atomic scale modeling will come later.

NEI Comments on Draft Project Plan to Prepare the U.S. Nuclear Regulatory Commission to License and Regulate Accident Tolerant Fuel

Affected Section	Comment/Basis	Recommendation
11. General	The document appears to address dry fuel storage Certificates of Compliance only and it omits wet storage of ATF in spent fuel pools. The project plan should include a review of regulatory requirements for storage of ATF in spent fuel pools and identify any changes necessary to allow storage of ATF in the spent fuel pool.	A review of regulations for the complete life cycle should be considered for each ATF concept as regulations beyond power operation may be impacted.
12. General	The project plan should provide a more innovative risk-informed approach to licensing. Each ATF concept is unique and should be evaluated on its own merits rather than being binned into broad categories (i.e., revolutionary and evolutionary) with limited development timelines based on non-specific lead time durations.	Industry development schedules and regulatory licensing schedules need to be aligned using actual dates for each concept yielding a critical path schedule with considerations for whether key policy discrepancies exist and where regulatory infrastructure may need to be developed to support that particular concept's implementation. This way the project plan can remain flexible and at a high enough level to be an effective guidance document providing individual timelines for each fuel concept based on that concept's specific features.

NEI Comments on Draft Project Plan to Prepare the U.S. Nuclear Regulatory Commission to License and Regulate Accident Tolerant Fuel

Affected Section	Comment/Basis	Recommendation
13. General	The project plan indicates that the NRC will: "Identify whether, and if so what, regulatory guidance needs to be generated to accommodate licensing ATF designs under the current regulatory framework." The current guidance is based on Zr/UO2. The lack of regulatory guidance for fuel systems that differ from these prescriptive perspectives creates regulatory unpredictability and instability as demonstrated with the ATF LTA issue. The NRC ATF plan does not address the need to update existing regulations or regulatory guides to a higher level path addressing key safety goals rather than the existing prescriptive path for a specific fuel design. This prescriptiveness of the fuel regulatory process severely limits innovation in fuel designs. Will NRC consider updating the current regulatory process as found in NUREG-0800 for more generic fuel reviews?	NRC needs to update existing prescriptive regulatory processes and guidance to improve regulatory stability and predictability for future fuel reviews. The industry has conducted initial reviews and has identified areas where we believe changes to regulatory guidance are needed. We stand ready to share the results of our initial reviews and provide input to the development of a prioritized schedule to move forward with the necessary updates.
14. General	It is extremely positive that three different offices of the NRC are coordinating to produce and execute this plan. The development and deployment of ATF technologies is very complex, so all regulatory aspects of the products, and equally important, their benefits, have to be covered in the licensing roadmap.	Continue and maintain the coordination between NRR, NMSS and RES. Incorporate the responsibilities of each NRC office into the plan.
15. General	The readability of the plan should be enhanced. The organization of the document is confusing, and the document does not contain a roadmap of its contents. The document appears to cover each major task twice. The first 14 pages give an overview of the major tasks, including summary tables of each major task. Then each major task is discussed a second time, but in more detail, in the remaining pages.	Near the beginning of the document, provide an overview of the document structure. Use labels and headings throughout the document to enable the reader to understand if he or she is in the overview portion of the document or in the detailed discussion portion of the document. Consider integrating the two sections so that each task is addressed only once.

NEI Comments on Draft Project Plan to Prepare the U.S. Nuclear Regulatory Commission to License and Regulate Accident Tolerant Fuel

Affected Section	Comment/Basis	Recommendation
16. General	Please clarify the intention of the sentence "The staff expenditures to support design-specific regulatory hurdles will begin with the receipt of an applicant's letter of intent (LOI) authorizing fee-based pre-application activities."	There is no need to delay until receipt of an applicant's letter of intent. Issues can be discovered early in the development timeline in parallel with any research or development activities thereby reducing the overall timeframe for implementation. The NRC should follow an off the fee based structure similar to advanced reactors for development activities.
17. General	The GNF NSF experience where the NRC agreed to an expanded Lead Use Channel program is viewed as a best practice for accelerating experience while minimizing concerns over performance uncertainty.	The NRC should look for opportunities to identify similar efficiency improvements and the industry will also provide suggestions.
18. General	The document would be enhanced by providing opportunities for more direct input from stakeholders.	The NRC should identify a more efficient approach to continued enhancement of the plan.
19. General	Has NRC constructed a timeline that integrates Tasks 1-4 with the anticipated availability of data from DOE and industry research efforts? Such a timeline would be beneficial in assessing the reasonableness and scheduler risks of this plan.	Using currently available information, construct a timeline that integrates Tasks 1-4 with the anticipated availability of data from DOE and industry research efforts.
20. General	The plan is not clear on the expected involvement of the NRC on the Phenomena Identification Ranking Table (PIRT) efforts, which are to be led by industry. The industry is responsible for completion of the PIRT process.	Further dialogue is needed on this subject.

NEI Comments on Draft Project Plan to Prepare the U.S. Nuclear Regulatory Commission to License and Regulate Accident Tolerant Fuel

Affected Section	Comment/Basis	Recommendation
21. General (Mostly Task 4)	The document places a lot of emphasis on the development of NRC codes to model all of the ATF designs. This effort is duplicative of the industry efforts to develop codes to address the ATF designs.	The industry does not see a value in Task 4 of the project plan. The NRC could, instead of developing codes to model the ATF designs, rely on the industry developed codes. The NRC could acquire the codes and supporting data from the industry and perform a detailed review, including sensitivity studies, as part of their review of the codes. This will result in both a cost and schedule savings to both the NRC and industry. The document would need to be extensively modified to reflect the use of industry versus NRC codes.
22. General, Table 2	The mapping of the ATF specific hazards to regulations could be done (or initiated) by the vendor advocating the fuel and cladding change.	The individual ATF concept timelines should be started immediately to support industry plans for deployment of ATF. There is no need to delay until receipt of an applicant's letter of intent. Issues can be discovered early in the development timeline and discussions initiated earlier to support an integrated schedule thereby reducing the overall timeframe for implementation.
23. General, Table 5	There are no tangible benefit to SPAR model upgrades (assuming that ATF provides the benefits perceived) until such time as applicants begin to try to credit 50.69.	Consideration of ATF combined with other risk informed applications should be considered as an added activity (f) in Table 5.
24. Table 1 – PRA Activities	Footnote 1 defines a batch as "50% or more" of the core. This is too high. Batches are often approximately 33-40% of the core. If this is a trigger, it will result in program delays.	Revise the definition to be a more realistic number. (e.g., ~30-40%)
25. Table 1 / pg 3	It is unclear who the MELCOR and MAAP meetings and PRA meetings are with.	EPRI could support these analyses with review and comment by the vendors.

NEI Comments on Draft Project Plan to Prepare the U.S. Nuclear Regulatory Commission to License and Regulate Accident Tolerant Fuel

Affected Section	Comment/Basis	Recommendation
26. Task 1	The proper design parameters, SAFDLs and accident limits for each ATF option need to be defined in order for this activity to be performed. The vendors should define the design and safety requirements and express what data is needed to support the requirements.	The key schedule driver to provide the basis to fully capture and realize ATF safety and economic benefits appears to be the development of advanced modeling and simulation along with expedited experimental data collection. The new ATF concepts should be implemented using the current design process. For example, the normal fuel engineering practice that includes full scale testing would be used to establish any update for the steady-state hydraulic models and obtain DNB data. The existing models and methods would then be calibrated to the new cladding material. Similarly, the application of transient and accident codes would only be a variation of the existing codes and methods driven by any new limits (e.g., establishing a new SAFDL that allows transient dryout for specified times as deriving from the materials and fuel performance work).
27. Task 1	Lead times identified in Table 2 have increased from the 9/6/2017 draft. These increases likely will impact industry timelines for ATF deployment.	We look forward to better understand the justification for the anticipated increased lead times and support further dialogue to identify potential approaches to reduce the projected lead times.
28. Task 2	The project plan should consider all aspects of licensing including transportation and deployment requirements.	

NEI Comments on Draft Project Plan to Prepare the U.S. Nuclear Regulatory Commission to License and Regulate Accident Tolerant Fuel

Affected Section	Comment/Basis	Recommendation
29. Task 2, Table 4, AND Task 2, Page 2, Unirradiated Fuel Transportation Package Reviews	The discussion of transportation packages does not address transportation of enriched uranium prior to its fabrication into fuel assemblies. Instead, the discussion is limited to transportation of fresh and used fuel assemblies. Also, the discussion does not address the potential need for critical experiment benchmarks for enrichments greater than 5 wt% or for uranium in forms other than those now in use.	Revise the discussion of transportation packages to include transportation of enriched uranium prior to its fabrication into fuel assemblies. Address transportation issues with uranium in various forms enriched to greater than 5 wt%. Address the potential need for critical experiment benchmarks for enrichments greater than 5 wt% or for uranium in forms other than those now in use.
30. Task 3, Page 3, Item 2	How does the anticipated schedule articulated in this section compare with industry's anticipated schedule?	Describe how the schedule articulated in this section compares with industry intentions based on publicly available information.
31. Task 3	The plan does not account for potential synergies between ATF concepts and other regulatory programs.	Please consider how ATF concepts may combine with other regulatory programs to impact plant operations.

NEI Comments on Draft Project Plan to Prepare the U.S. Nuclear Regulatory Commission to License and Regulate Accident Tolerant Fuel

Affected Section	Comment/Basis	Recommendation
32. Task 4	It is unclear what the NRC's basis for developing their own codes and methods. Will the industry need to wait on the NRC to finish their independent methods development?	Modeling and simulation capabilities advancements that exist today can shorten the licensing timeline considerably and support a more transformational shift in the NRC's licensing approach that is needed in order to license ATF and realize the safety and economic benefits from these advanced technologies while still maintaining the independent confirmatory process needed for a thorough regulatory review. This effort will require close collaboration and alignment between the industry, DOE, the national laboratories, and the NRC which is essential for ATF to be successful. Advanced modeling and simulation (e.g. RISMC, CASL, and NEAMS) can facilitate ATF implementation with key support to utilities and vendors on design considerations, normal operation evaluations, and ATF fuel performance assessments. Therefore, the development of new NRC codes and methods may not strengthen the safety case and result in costly schedule delays.
33. Task 4	As part of NRC's review of vendor methods, the NRC can develop sufficient knowledge of phenomena to make judgments of adequate protection without spending the time and resources to create yet another independent set of methods based upon the same benchmark data.	The use of the tools now available to the NRC through their collaborations with DOE and national laboratories can reduce the time and cost of introducing innovative technologies into operating nuclear plants by reducing the number of time-consuming and costly experiments and demonstrations. The time and resource savings addresses one of the major hurdles in getting ATF to market

NEI Comments on Draft Project Plan to Prepare the U.S. Nuclear Regulatory Commission to License and Regulate Accident Tolerant Fuel

Affected Section	Comment/Basis	Recommendation
34. Task 4	NRC states that a major assumption is that they "...will not perform independent confirmatory testing for specific ATF designs. It is expected that all necessary data needed to develop models will come from DOE, industry, or other organizations. Additionally, it is expected that all integral fuel behavior data will be provided to the NRC in a timely manner such that integral assessment of NRC codes can be performed." NRC is not required to have their own codes, only to maintain conflict of interest free confirmatory codes which could be done with DOE codes. The NRC codes are not designed to be easily updated and require substantial resources that will not be developed in a timely manner.	The insistence on doing this work independently will seriously jeopardize the ability to achieve the industry timelines for ATF deployment. Also, the assumptions used to justify the need to develop in-house codes are subject to challenge by industry.
35. Task 4	The project plan indicates that NRC will not perform independent confirmatory testing for specific ATF designs, but, DOE and NRC have an MOU that DOE has said that they perform tests that NRC requests.	The NRC should engage with industry and vendors regarding potential test plans to ensure any confirmatory tests are appropriately focused and based on the attributes of the proposed ATF concepts.
36. Task 4	In the attached detailed discussion of Task 4, NRC indicates that the current plan does NOT consider new regulatory initiatives such as changes to 50.69 or EP requirements. This limits the potential economic benefits that may be obtained from ATF in the near term.	The NRC project plan is recommended to be a living document. Industry has no recommendation at this time and instead suggests it be re-accessed at a future date.
37. Task 4 Analysis Capability Development / pg 10	"Where possible, the NRC will collaborate with DOE in each of these activities to reduce duplication of effort in accordance with the DOE-NRC Memorandum of Understanding[1]"	A parallel path for data should exist from the vendor to the DOE and NRC. The DOE path is information only for programmatic considerations.

NEI Comments on Draft Project Plan to Prepare the U.S. Nuclear Regulatory Commission to License and Regulate Accident Tolerant Fuel

Affected Section	Comment/Basis	Recommendation
38. Task 4 Analysis Capability Development / pg 10	"*Integral assessments* of each of the updated codes, which includes verification and validation against data, will be completed and documented. The duration of this task is intrinsically linked to the production and availability of data from on-going test programs, largely focused on integral effects."	Suggest revising the text as follows: "Assessments of each of the updated codes, which includes verification and validation against data, will be completed and documented. The duration of this task is intrinsically linked to the production and availability of data from on-going test programs, largely focused on reactor and test generated fuel behavior effects."
39. Task 4 Analysis Capability Development / pg 10	It is unclear what is intended by "and beyond DBA conditions" with respect to NRC licensing criteria?	Further discussion is needed. We recommend beyond design basis conditions be considered only if an ATF change resulted in a response change to a current regulation.
40. Task 4 Analysis Capability Development / pg 10	The plan mentions scoping studies. It is not clear who is responsible for performing the scoping studies. Per the plan, it is understood that the NRC is not going to conduct any tests.	Clarify the context and responsibility for performing scoping studies.
41. Task 4 (Page 10)	The last bullet on Page 10 states that the estimated lead times to develop codes to be able to analyze all currently proposed fuel/cladding types range from three to six years. This appears inconsistent with the Tables 6, 8, and 9, which show the lower end of the range to be 24 months for near-term concepts	The project plan should differentiate between the types of concepts to provide a high-level roadmap for the implementation of ATF concepts of that type. It should denote that this high-level timing is meant to be guidance and not a prescription of the exact time durations for implementation as each ATF concept would be evaluated on a timeline specific to that concept's technical and licensing attributes.
42. Task 4.a, page 2	NRC need not always extensively benchmark/validate all codes against experimental data. This is conventional thinking, and will take a lot of additional time and effort. Much international ATF R&D is in progress (China, Far East, Europe, Russia), and NRC should be willing to utilize that data also (not just ATR, TREAT, and Halden).	NRC should supplant fuel exam data with advanced modeling and simulation (CASL, NEAMS, etc.) using a wide variety of reliable data points for benchmarking.

Affected Section	Comment/Basis	Recommendation
43. Task 4.c: Analysis Capability Development – Neutronics	For the near-term cladding technologies (i.e., coated Zr & FeCrAl), steady state neutronics analysis of the reactor core is largely an effort for the fuel vendors to adequately introduce the nuclear properties (e.g., cross-sections) into the lattice physics methods to be applied. Validation will be performed via high fidelity methods (e.g., MCNP). Standard processes for lattice physics modeling of different materials are expected to be applicable. The need for an LTR to approve the application of the lattice physics methods may depend upon the methods applied and the specific material.	By more closely aligning with DOE and national labs, the NRC can leverage the modeling and simulation (M&S) capabilities of their partners in lieu of developing their own redundant modeling and simulation capabilities based on the same data sets. The near-term ATF concepts would be able to use existing vendor and NRC codes with minor modifications; however, the longer-term ATF concepts could benefit the most with a new advanced modeling paradigm that allows for accelerated implementation of innovative technologies. The NRC will need to develop confidence that these new advanced M&S tools can be used reliably in the regulatory process to evaluate fuel and system performance. We encourage the NRC to work collaboratively with DOE, EPRI, vendors, and industry, to develop confidence to support accelerating licensing with CASL, NEAMS, and RISMC capabilities without the need for separate NRC code development.