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X ENERGY, LLC – SAFETY EVALUATION OF XE-100 TOPICAL REPORT, "TRISO-X PEBBLE FUEL QUALIFICATION METHODOLOGY," REVISION 3 (EPID NO. L-2021-TOP-0011)

SPONSOR AND SUBMITTAL INFORMATION

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Brief Description of the Topical Report:

X-energy is developing a high-temperature gas-cooled reactor (HTGR) called the Xe-100, which uses TRI-structural ISOtropic (TRISO)-coated Uranium Oxycarbide (UCO) fuel in pebble form. One key aspect of the safety case for the design relates to the role of the TRISO fuel and its associated functional requirements. The topical report (TR) provides information intended to ultimately lead to the qualification of TRISO-coated particle fuel pebbles for use in the Xe-100 reactor. As described in the TR, X-energy states that the fuel qualification program is intended to cover the fuel specifications, implemented fabrication processes and associated quality controls, and demonstrated fuel performance under heated and irradiated conditions.

The TR provides context related to the role of the TRISO fuel in the Xe-100 design, identifies regulations and guidance that X-energy expects to be applicable to the TRISO fuel as used in the Xe-100 design, and provides historical context on data and experience on TRISO fuel. This background is then used to explain the activities that X-energy plans to perform to qualify the TRISO fuel for the Xe-100, including the top-level design and performance requirements.

Ultimately, the TR provides a methodology and plan for qualifying fuel for the Xe-100 design. The TR requests that the NRC staff find that "fuel design and performance requirements in Section 4 [of the TR] are adequate for establishing an acceptable design basis to support the licensing of the Xe-100 reactor" and "plans established in Section 6 [of the TR] for qualification of the UCO TRISO-coated particles in spheres are generally acceptable…."

While this safety evaluation (SE) documents the NRC staff's review of Revision 3 of the TR, this SE refers to RAI responses in multiple locations. For RAI responses that did not result in updates to the TR but nonetheless contained information that was used in this SE's findings, X-energy included the responses as an enclosure to Revision 3 of the TR.

REGULATORY EVALUATION

Regulatory Basis

For construction permit applications, Title 10 of the *Code of Federal Regulations* (10 CFR) paragraphs (a)(1)(ii)(D)(1) and (a)(1)(ii)(D)(2) of Section 50.34, "Contents of applications; technical information," apply to the Xe-100 design because the fuel is the primary means of fission product retention. Similar regulatory requirements exist for design certification applications, combined license applications, and standard design approvals (10 CFR 52.47(a)(2)(iv)(A) and (B), 10 CFR 52.79(a)(1)(vi)(A) and (B), and 10 CFR 52.137(a)(2)(iv)(A) and (B), respectively).

Also, 10 CFR 50.34(a)(3)(i) requires, in part, that an applicant for a construction permit to build a power reactor will provide principal design criteria (PDC) for the facility. These PDC should be informed by the general design criteria (GDC) in 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," Appendix A, "General Design Criteria for Nuclear Power Plants," as the GDC are considered to be generally applicable to other types of nuclear power units and are intended to provide guidance in establishing the principal design criteria. Although the GDC applies only to light-water reactor (LWR) designs, the NRC staff expects that non-LWR designs will have PDC that fulfill a similar role. Similar regulatory requirements exist for design certification applications, combined license applications, and standard design approvals (10 CFR 52.47(a)(3)(i), 10 CFR 52.79(a)(4)(i), and 10 CFR 52.137(a)(3)(i), respectively). The PDC establishes requirements for structures systems and components (SSCs) that are important to safety.

GDC 10, "Reactor design," in Appendix A to 10 CFR Part 50 states that the reactor core and associated coolant, control, and protection systems shall be designed with appropriate margin to assure that specified acceptable fuel design limits are not exceeded during any condition of normal operation, including the effects of anticipated operational occurrences. Examples of PDC for various advanced reactor designs can be found in Regulatory Guide (RG) 1.232, "Guidance for Developing Principal Design Criteria for Non-Light-Water Reactors," (ML17325A611) which provides guidance for developing PDC for non-LWR designs. Establishing fuel design limits and ensuring that these limits are not exceeded, represent a fundamental underpinning of the safety assessment of a nuclear power plant required by 10 CFR 50.34(a)(1).

Other GDC relate to fuel design and radionuclide limits during plant operation. The NRC staff anticipates that the TR will be used, in part, to fulfill requirements related to PDC developed by the applicant in support of the limits imposed by similar design criteria.

It is the NRC staff's understanding that the TR will form a portion of the basis for meeting these regulations. The NRC staff reviewed the TR, as described below, against these regulations in conjunction with the overall technical acceptability of the TR within the requested scope of the TR.

TECHNICAL EVALUATION

In the following NRC staff evaluation, a section, table, or figure number without an additional description refers to the TR. Additional descriptive information is provided if section, table, or figure numbers are referenced from other reports or sections of this SE.

Methodology Overview

The TR focuses on a subset of TRISO fuel qualifications for the Xe-100 design. TRISO fuel in the Xe-100 reactor is in pebble form, with dimensions and relevant operating parameters identified in Table 1. X-energy's design and safety philosophy relies partly on these parameters falling within the envelope of the previously reviewed and approved Electric Power Research Institute (EPRI) TRISO TR and associated SE (TR References 2 and 7, respectively). These philosophies are reflected in the functional containment approach proposed by X-energy for the Xe-100 design. A functional containment can be defined as a set of barriers taken together that effectively limit the physical transport and release of radionuclides to the environment across a full range of operating and accident conditions.

The TRISO particles form a key barrier to the release of radionuclides that form a substantial portion of the functional containment approach, as shown in Figure 4. Fuel qualifications for the TRISO particles, in this case, involve demonstrating that fuel particles maintain a substantial (here, specified as 99.999 percent) proportion of fission products within the particle under reactor operating conditions. In effect, the NRC staff understands that the goal of the TR is to provide a linkage demonstrating that the proposed fuel testing gives assurance that the as-manufactured fuel will meet the fuel performance goals provided in the TR under operating and accident conditions.

The methodology for qualifying fuel to specified standards involves identifying as-manufactured fuel quality requirements (effectively, a manufacturing envelope within which a substantial defined fraction of particles must fall, as well as a statistical means for evaluating whether the population of particles meets the specification based on samples from the manufacturing process) as well as in-service fuel performance requirements (a range of operating and/or accident conditions that the fuel must remain within to provide assurance of effective operation). Figure 5 provides an illustration of the iterative process that X-energy used to develop the manufactured fuel specification, and Table 3 provides preliminary full particle fuel performance release criteria for both defective and intact particles. The NRC staff notes that individual particle parameters are not directly provided, and this is discussed further below in the "Utilization of the Advanced Gas Reactor (AGR) UCO Compact Data" section of this SE. The parameters derived from Table 3 are then used as requirements for as-manufactured quality and in-service performance of coated-particle fuel.

The TR states that these parameters are then iterated on as shown in Figure 6. The qualification of fuel is not limited to just the TRISO particles, however. In addition to the diffusion releases of some fission products discussed later in this SE, fission products can also be released as a result of contamination of the fuel pebbles during manufacturing and some fission product release can occur from volatile elements that are not entirely failed. The overall, comprehensive fuel qualification plan is summarized in Section 6, but the TR makes up only a part of that comprehensive fuel qualification. This SE identifies areas where the TR does not fully address the entirety of the fuel qualification process via limitations and makes no findings on areas outside the scope of the TR (some of which are identified below in the "Portions of the TR Not Addressed by this SE" section of this SE).

Fuel Design and Performance Requirements

As described in the TR, the methodology is intended to demonstrate that the as-manufactured fuel (yet to be produced) will perform under operating and accident conditions in accordance with values derived from testing, which serve as inputs to calculated radionuclide release values that serve as design and acceptance criteria. At a high level, this process is shown in Figure 6. Final values for sub-steps in this process are not identified (and are inferred to be beyond the scope of the TR).

Preliminary fuel requirements related to quality, expected in-service failure fractions, and allowable releases are provided in Section 4. The TR states that "Production of high-quality TRISO-coated particle fuel is achieved through a combination of product specifications, QC methods, and manufacturing equipment specifications, each of which plays an important role." These and other specifications are generally identified as draft in the TR. These specifications yield a calculated fission product release value from intact particles, based on the information in Table 3 and Section 4.2.

Manufacturing defects and contamination from non-graphite sources are another source of fission product release and these are addressed in the TR. Table 17 provides a mean expected value for contamination and silicon carbide (SiC) defects that would contribute to the source term. The test program discussed in the TR and below in the "Role of Confirmatory Testing" section of this SE would provide indications of particle performance under operating and accident conditions, but this would only be of use for the particles themselves (as well as potentially the defect values for the tested particles). Based on the TR, the NRC staff understands that the values in Table 17 for contamination and SiC defects would effectively serve as inputs to the source term calculation and would be based on as-manufactured measured parameters. In addition, other physical parameters not directly related to thermal or nuclear performance (such as mechanical effects) are stated, as part of the response to RAI 4, to be outside the scope of the TR. Use of the methodology outlined in the TR therefore relies on a justification relating a measured manufactured value to a corresponding acceptable source value to be used in a future licensing application. In part, this represents **Limitation 1** on the TR.

Section 7 of the TR defines "fuel qualification" as:

- "Establishment of fuel product, equipment, and feedstock specifications;
- Implementation of a fuel fabrication process capable of consistently and reliably meeting the specifications at the required scale;
- Implementation of statistical [quality control/quality assurance] procedures to demonstrate that the product specifications have been met;
- Irradiation of statistically sufficient quantities of fuel with monitoring of in-pile performance and post-irradiation examination to demonstrate that normal operation performance requirements are met; and

- Post-irradiation heating tests (safety testing) of statistically sufficient quantities of irradiated fuel to demonstrate that accident condition performance requirements are met."

The NRC staff considers this definition, together with the supporting documentation provided in the TR, to represent a fuel qualification methodology. This methodology, which combines particle performance with other influences on fission product releases to derive an effective fuel performance, is a sound approach that captures the relevant influences on radionuclide release from TRISO-based fuel. Apart from the final two bullets (discussed further in the next paragraph), the NRC staff finds that the methodology is appropriate to develop a thermal and nuclear design basis for the X-energy TRISO fuel, but by itself, is not sufficient to qualify fuel, nor does it represent a design basis, which would be provided as part of a licensing basis for a full plant design or facility license application.

Demonstration of the final two bullets, as applicable to the X-energy limiting reactor parameters (yet to be finalized), represents a necessary step in qualifying the specific fuel to be used in the X-energy design. However, because the testing is only planned at this stage and has not been executed, the TR is only an intermediate step in qualifying the fuel. The testing is discussed further below in the "Role of Confirmatory Testing" section of this SE. Therefore, the NRC staff finds that this approach provides an acceptable foundational framework for qualifying fuel, with the final demonstration of fuel qualification requiring outstanding items to be provided as part of future design submittals (e.g., a final fuel design specification, the operating performance envelope of the Xe-100 and how the provided fuel fits within that envelope).

Other efforts, such as those identified in response to RAI 4, are necessary to demonstrate the performance under accident conditions (e.g., transient behavior). Further, as discussed above, parameters not related to thermal or nuclear parameters (such as mechanical effects) are stated to be outside the scope of the TR. These parameters have traditionally been considered within the scope of fuel qualification but are not identified in the list above. As such, the scope of the TR approval is limited to the plan to test TRISO fuel and the operational envelope outlined in the TR. Other aspects associated with fuel qualification, including how the final Xe-100 fuel meets the criteria outlined in the TR should be included as part of future licensing submittals that reference the TR for the Xe-100 design. This represents **Limitation 2** on the TR.

The NRC staff notes that the methodology highlights the role of uncertainties in both particle parameters (explicit as part of the statistical methodology for evaluating whether particles meet their requirements) and reactor operational values (which would be more fully captured as part of future submittals on the design and would identify how the fuel design falls within the operational envelope). Adequately assessing the uncertainty is important in ensuring that there is no gap between theoretical fuel performance and as-built fuel performance. The TR does not precisely identify the relationship between the manufacturing specification and the reactor design envelope. Therefore, a finding on the adequacy of this subject was judged to be outside the scope of the TR.

Utilization of the AGR UCO Compact Data

Section 5 provides an overview of the experience associated with coated TRISO particles. It covers the historical fabrication process as it has evolved over time and provides a detailed discussion of the failure mechanisms of particles, with some discussion on probable causes of those failure mechanisms. However, the TR does not seek to directly tie those failure mechanisms to specific reactor parameters – rather, failures are aggregated and grouped based on the operational envelope which the particles are subject to, with temperature being a primary parameter of interest. This analytical approach, in effect, affords an applicant the capability to calculate a failure fraction based on empirical results rather than directly modeling the particles. Subsequently, an applicant can use this approach to either directly determine radionuclide releases from the statistical population of particles subject to various reactor conditions or to validate analytical tools based on these empirical results. The NRC staff finds this approach to be acceptable for developing a baseline fuel qualification output based on the testing already performed and proposed as part of the TR. Further refinement of what is included in this analytical approach is anticipated to be the subject of future licensing submittals.

The final fuel form for the Xe-100 is TRISO particles in pebbles. As the TR notes, there is extensive experience historically with both compact- and pebble-based TRISO fuel, but the AGR program (which the TR references) testing was performed using cylindrical compacts. In order to confirm that the X-energy process for manufacturing pebbles performs similar to the AGR fuel form, X-energy states that it plans to test pebble fuel in a form with specifications corresponding to those planned for the Xe-100 design.

Although the TR provides top-level radionuclide requirements for the fuel in Table 2, and aggregate full particle specification requirements in Table 3, no specifications for what constitutes acceptable ranges for the particle parameters in the Xe-100 are provided (though AGR-2 values are provided in Tables 11 and 12). The TR references, but does not explicitly incorporate, the previously reviewed and approved EPRI TRISO TR and associated SE (TR References 2 and 7 respectively). The TR states "[w]hile the Xe-100 design has evaluated several fuel specifications that could be used safely in operation, the reference Xe-100 fuel particle chosen is the same as the 15.5%-enriched, 425-μm UCO-coated particle irradiated in the AGR-5/6/7 qualification/margin test."

In its response to RAI 1, X-energy states "the complete determination [of fuel quality and performance requirements] and underlining methodologies are beyond the scope of this report and will be addressed in future topical reports." With respect to the design performance envelope, the TR provides Figure 25, which falls within the performance envelope outlined in the aforementioned EPRI TRISO TR. These values are preliminary in this case. The TR also provides UCO kernel attributes and properties for AGR-2 fuel in Tables 11 - 13.

Because the TR is not clear on the fuel performance envelope for the final design and the particle specifications planned for use in the Xe-100 are not clearly defined in the TR, the NRC staff is imposing the limitations and conditions associated with the EPRI TRISO TR (as documented in TR Reference 7) as **Limitation 3**. In short, these relate to:

- the qualification of the fuel form as opposed to the particles themselves;
- the content and makeup of the TRISO particle as compared to the AGR program tested particles, as these tests are referenced by the EPRI TRISO TR;
- the performance envelope associated with the AGR test particles and;
- the disposition of short-lived fission products as part of the source term.

The NRC staff expects that the testing planned to be performed as discussed in the TR will resolve these limitations and conditions (with the possible exception of short-lived fission products, which should be addressed as part of a future licensing submittal). However, it is the responsibility of an applicant referencing the TR, to justify how the particle specification for a future application submittal either falls within an approved performance envelope (e.g., the reviewed and approved TRISO TR) or can be shown to be acceptable (e.g., by drawing parallels between known acceptable particles and tested particles that match the application fuel specification). Further discussion of the planned testing is provided below.

In general, the qualification approach in the TR relies on the AGR test program with a specific focus on the parameters and results contained in Tables 11, 12, and 13, and Figures 25, 30 and 33. The approach used in the TR conforms with the conclusions in the SE for the EPRI TRISO TR (TR Reference 7). In particular, the NRC staff agrees with the statements in Section 5.3.2.4, while noting that "[n]o full TRISO-coated particle failures have been observed at 1600°C or 1700°C" does not suggest that there are no releases from particles at those temperatures, as evidenced from the AGR testing and discussed in the TR and the EPRI TRISO TR (Reference 2). The NRC staff finds that the AGR testing forms a baseline that, when augmented by the confirmatory testing discussed below and in the TR, provides that an applicant referencing the TR with an empirical basis for the UCO TRISO fuel is to be used in subsequent design and licensing submittals.

Role of Confirmatory Testing

The qualification of TRISO fuel has generally been performed based on two linked types of tests: direct irradiation testing in a reactor and post-irradiation testing of fuel at higher temperatures in different environments to simulate post-accident conditions (sometimes referred to as "safety testing"). The AGR program testing that is referenced in the TR utilizes this approach. X-energy plans to provide further demonstration of adequate fuel performance through its own testing, as described in the TR.

While extensive testing has been performed on TRISO fuel in relatively inert environments (generally helium, as in the AGR tests), testing data for TRISO-based fuel subject to other environments that may present challenges during accident conditions is more limited. As a result, in order to provide additional assurance of an acceptable performance under a broader range of potential accident conditions, X-energy plans to perform additional post-irradiation safety testing **[[**

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Section 5.1.5.5 and Appendices B and C, discuss quality controls on the fuel form to be tested. The NRC staff understands that these quality controls will provide assurance that the tested fuel pebbles and particles will meet the acceptance criteria associated with intact fuel elements. The NRC staff finds that the use of the quality control and sampling means discussed in the TR, is acceptable. This acceptance is limited to the parameters of the fuel to be produced for testing. The NRC staff notes that these measures do not represent a commitment for the final Xe-100 design. Future licensing submittals referencing the TR should provide a set of specifications and demonstrate how fuel to be used in the reactor will meet these specifications. This is reflected in **Limitation 2**.

The TR requests the NRC staff's review and approval of the statement "[p]lans established in Section 6 for qualification of the UCO TRISO-coated particles in spheres are generally acceptable." In the response to RAI question 3, X-energy states that **[[**

] and that tests to be used by the Xe-100 code evaluations and models are based on the data that shows extremely limited failures at burnups of up to approximately 20 percent fissions per initial metal atom at 1800 degrees Celsius (°C) (3272 degrees Fahrenheit (°F)). The NRC staff has reviewed the TR using the information provided in the RAI responses in conjunction with the information in the TR to make the findings below.

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] Conditions for these planned tests are documented in Tables 19 and 20. As part of the response to RAI question 5, X-energy stated that the test process would involve following the procedures laid out in Figure 38. These procedures, described further in the TR, are consistent with the procedures used to gather data to qualify TRISO fuel (as was performed in the AGR program).

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The NRC staff finds that the results of the tests described in Tables 19, 20 and 21 can be used as part of the demonstration of fuel performance under the test conditions for the final design, subject to the limitations identified below. Because neither the final design parameters (including accident environments and temperatures) nor the results of the tests are available, a future licensing application referencing the TR, leveraging these test results, will need to provide a justification for how the reactor accident conditions are bounded by the test results (which, due to test uncertainties, may not precisely match the conditions outlined in the tables, hence the need to provide a justification).

In referencing previously performed testing, the TR states that "[t]he overall consistency of these data should adequately address the concern raised by the NRC staff about potential effects of neutron spectral differences between water-cooled [Materials Testing Reactors] and an actual operating modular HTGR." This conclusion appears reasonable, but the NRC staff makes no finding with respect to testing aside from the applicability of the AGR program testing and the testing planned to be performed as discussed in the TR. Based on the discussion in the TR, the NRC staff finds the proposed testing to be applicable to the currently described iteration of the Xe-100, and the results can be used as part of qualifying the Xe-100 fuel. The NRC staff makes no findings related to the results of those tests at this time because they are not yet performed and available.

The test plan provided appears to expand the scope of applicable data to the fuel form proposed to be tested. These proposed tests do not necessarily provide data in untested regimes but would provide assurance that the tested particles in the X-energy fuel form meet fuel design acceptance criteria (as applicable to the final design). The NRC staff expects that an applicant would demonstrate, as part of a future submittal, the similarity of this tested fuel and recognizes the proposed testing program as a valid means to satisfy how the final fuel form is qualified, provided that the tests return acceptable results. This does not represent a limitation in the TR but does represent an item to be addressed as part of a future licensing application.

The NRC staff notes that the tests performed are limited to the parameters of interest (e.g., temperature, burnup) documented in the TR. A final design submittal is expected to provide a full accounting of conditions that the fuel is subject to. These conditions may or may not affect the safety demonstration as described in the TR (for example, transient conditions for irradiated fuel). In the response to RAI question 4, X-energy acknowledges additional parameters of interest that may impact the fuel qualification and will be identified in other future TRs or submittals and will be presented to the NRC staff for evaluation. The NRC staff findings are limited to the areas and conditions identified in the TR. The NRC staff considers this a limitation on the TR associated with **Limitation 2**.

Diffusion of volatile metals has the potential to represent an important contributor to the source term for a fuel performance methodology as outlined in the TR (for the purposes of this discussion, volatile metals refers to those identified in Figure 33). The fuel qualification aspect of the TR focuses on intact particles, but these volatile metal radionuclides have the potential to diffuse through intact particles and contribute to the source term to be calculated by the fuel performance code. The NRC staff understands that this input is not necessarily within the scope of the TR as described, but the concept is adjacent and intertwined with the data output used by the tests described in the TR. Data from the testing may inform this input. As such, in addition to the manufacturing defects and contamination described above, applicants referencing the TR should explicitly consider diffusion radionuclides separate from the intact particle releases derived here. Combined with the discussion above in the “Fuel Design and Performance Requirements” section of this SE, this represents **Limitation 1** on the TR.

Portions of the TR Not Addressed by this SE

The focus of this SE is for the methodology intended to demonstrate that the fuel used in the Xe-100 is qualified to specified standards and release limits. As such, this SE does not make findings associated with a number of TR sections, which are viewed by the NRC staff as being provided for background and not related to the TR review objectives in Section 7. The sections of the TR not addressed by this SE include:

- Section 3.3, “NRC Guidance/References”

- Section 3.4, "Additional Guidance: ANS 53.1"
- Section 3.5, "US HTGR Precedents"
- Section 5.2, "TRISO-Coated Particle Fuel Performance in Spherical Fuel Elements" (to the extent that results themselves are not being relied on; discussion of some points highlighted in this section are in the above evaluation)
- Appendix A, "NRC Assessment of NGNP White Papers: Follow Up Items for Fuel Qualification"

Considerations related to fuel pebble mechanical effects and interactions with external influences were not discussed in the TR. Additionally, possible wear and tritium uptake were determined to be outside the scope of the TR, per the response to RAI question 4. The NRC staff anticipates that these would be the topic of future submittals and would be reviewed as relevant and appropriate at the time of the submittal.

LIMITATIONS

An applicant may reference the TR for use as applied to the applicant's facility only if the applicant demonstrates compliance with the following limitations:

1. Applicants referencing the TR should provide a justification for releases from defect particles, contamination in the fuel matrix, and diffusion of volatile radionuclides in addition to the intact particle failure fraction derived from the testing to be used in a future licensing application. In effect, this methodology forms a portion of the fuel qualification for the final reactor fuel form, but not the entirety of the fuel qualification process for the performance of the fuel (e.g., cover the aspects cited above or the more comprehensive list of fuel qualification areas in NUREG-2246).

2. This approval is limited to the plan to test TRISO fuel and the operational envelope (temperature, burnup, and environmental conditions) outlined in the TR. Applicants referencing the TR should provide a set of fuel specifications and demonstrate how fuel to be used in the reactor will meet these specifications. Future licensing submittals will be needed to qualify the fuel for the totality of the operational regime, including but not limited to transient accident conditions and mechanical effects to the extent that these are not incorporated within the scope of the TR.

3. An applicant referencing the TR is subject to the limitations and conditions associated with the approved EPRI TRISO TR (TR References 2 and 7).

CONCLUSION

Based on the above discussion, the NRC staff concludes that the fuel qualification program, as described in the TR and subject to the limitations in this SE, provides an acceptable framework for qualifying fuel for the Xe-100 reactor design. Specifically, the fuel design information developed as a result of the AGR program and augmented by the confirmatory testing proposed in the TR can be used with other design information to establish a set of parameters, performance requirements, and a design basis envelope for qualified fuel for the Xe-100 design. Further, the NRC staff concludes that the test plans identified in Section 6 provide for an acceptable pathway to demonstrate qualified performance of UCO TRISO for normal operation and steady-state accident heat-up conditions under the conditions described in Tables 19 and 20. Test results could be used in their entirety as part of a future licensing submittal to justify fuel performance under tested conditions.

As discussed in this SE, X-energy indicated that the detailed design of some aspects of the Xe-100 fuel design, and its relation to the final Xe-100 design parameters, is not complete at the present time. The NRC staff will make a final determination of the Xe-100 fuel design acceptability when the complete, detailed design, including applicable testing, is completed and reviewed by the NRC staff as part of future licensing activities referencing the TR.

REFERENCES

None.

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