

From: Beasley, Benjamin
Sent: Monday, January 10, 2022 1:39 PM
To: Darrell Gardner
Subject: Preliminary questions on the Hermes PSAR, email #1

Dear Mr. Gardner,

By letter dated September 29, 2021, Kairos submitted an application and PSAR for the Hermes test reactor. Based on the review of the PSAR, the NRC staff has developed preliminary questions to support the NRC staff's review of the application.

<u>PSAR Chapter</u>	<u>Request Number</u>	<u>Request / Question</u>
2.3 Meteorology	2.3-1	Please submit the representative hourly meteorological data referenced in Section 2.3.3 so that it can be docketed along with the application. This should be provided in a text file in Regulatory Guide 1.23 format by email, optical disk or other mode. Please coordinate with a project manager on the mode used.
	2.3-2	In Section 2.3.4 Kairos states that the short-term dispersion modelling uses ARCON96 with the atmospheric dispersion methodology as outlined in the KP-FHR mechanistic source term topical report. NRC staff requests that Kairos provide the site-specific inputs and assumptions used to run the ARCON96 model and provide the ARCON96 input and output files.
2.4 Hydrology	2.4-1	<p>FEMA flood insurance study (FIS) data:</p> <p>The Hermes test reactor site is approximately 3 miles upstream from the confluence of the Clinch River and Poplar Creek. In Table 2.4-2, Kairos provided FIS flood elevations at the confluence and applied those FIS flood elevations to the Hermes test reactor site. The NRC staff checked the FIS data and found there is no FIS data covering the Hermes site in the Poplar Creek watershed. In the PSAR, no illustration is provided for how the FIS flood elevations at the confluence are transferred to the Hermes site.</p> <p>Please provide information describing how the flood elevation shown in Table 2.4-2 was developed for the Hermes site.</p>
	2.4-2	<p>Dam Failure Information:</p> <p>In Section 2.4.2.2, Kairos references TVA evaluations of dam safety from 1991 and 2014. Are there more recent evaluations by TVA regarding the safety of Norris and Melton Hill dams? If so, please provide them.</p>
	2.4-3	<p>In the PSAR, the design basis flood appears to be supported by two references:</p> <ul style="list-style-type: none"> • Reference 2, "BARGE, Flood Hazard Evaluation for Y-12 (Bear Creek) and K-25 (Poplar Creek). 2015." • Reference 6, "Tennessee Valley Authority, Flood Analysis for Department of Energy Y-12, ORNL, and K-25 Plants, TVA. 1991." <p>The staff requests that Kairos submit those two references on the docket.</p>

2.5 Geology, Seismology, Geotechnical Engineering	2.5-1	Section 2.5.3 of the application relies on the information of Clinch River Early Site Permit application's earthquake catalog, which ends in 2013. An updated (2013 – 2021) earthquake catalog should be provided to demonstrate that the assumptions and conclusions in the CRN PSHA remain valid.
	2.5-2	For Section 2.5.4.3, how does Kairos intend to determine that the foundation rock shows no evidence of karstic dissolution?
	2.5-3	Geologic cross-section A-A' (Figure 2.5-2) appears to be missing the Mascot Dolomite, which is shown on the map (Figure 2.5-1) but not in the cross-section. Provide a new cross-section that includes all geologic units shown on the surface and encountered in the subsurface.
	2.5-4	Geologic cross-section B-B' (Figure 2.5-3) shows the Mascot Dolomite appearing to dip to the northwest. However, geologic maps of the site show all units at the site location dipping to the southeast (see Geologic Map of the Elverton Quadrangle, Tennessee Geological Survey, 2015). Please confirm the correct dip direction of the Mascot Dolomite and provide a new cross-section that shows the correct dip if needed.

Please review the questions for proprietary information and tell me of your conclusion. If there is no proprietary information, this email will be placed into ADAMS as a public document. If there is proprietary information, a non-public record will be created.

If Kairos would like clarification of the preliminary questions, please propose times to discuss them. If Kairos would like to discuss possible responses to the preliminary questions, a public meeting will be scheduled. If there is a need to discuss proprietary information, a portion or all of the meeting may be closed.

In some instances, preliminary questions may support future requests for additional information (RAIs). Kairos will be advised of the need for RAIs by separate correspondence.

If you have any questions or need clarifications on the preliminary questions, please do not hesitate to contact me.

Ben Beasley

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