Enclosure 1

Kairos Power Response to NRC Questions 2.5-1, 2.5-2, 2.5-3, and 2.5-4

(Non-Proprietary)

Kairos Power

Question Number: 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.

Kairos Power Response:

The possible changes in earthquake activity in the Hermes, and Clinch River Nuclear (CRN), site region during the 2013-2021 period relative to the CRN rates have not yet been finalized. The PSAR reflects an assumption that the Clinch River Early Site Permit application earthquake catalog is representative of the seismic activity to be expected at the Hermes site, based on proximity to CRN and the fact that recent seismic activity in the Central and Eastern United States (CEUS) since the 2012 Mineral Virginia earthquake event has not been significant.

Kairos Power is not requesting final approval of a seismic hazard design profile for Hermes as part of the PSAR. The information provided is sufficient to determine suitably of the site for the proposed use of a test reactor. The Hermes Operating License Application will report the seismic hazard with updated earthquake catalog recurrence rates.

Impact on Licensing Document:

This response has no impact on the content of PSAR Section 2.5.

References:

None

Kairos Power

Question Number: 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?

Kairos Power Response:

Boring data closest to the proposed Hermes reactor location indicates the top of the weathered rock is encountered at a depth of approximately 13.5 ft., and the top of sound rock at a depth of approximately 30 ft. The overburden soils and the weathered rock will be excavated. Below the weathered rock, sound bedrock recovered from the borings drilled shows no evidence of the weakening or weathering that is observed in the interface closer to the surface. The Hermes foundation will be deployed over an engineered crushed stone or lean concrete fill placed directly over sound rock. The excavation is planned to reach the approximately 30 ft depth, exposing the surface of the foundation rock to allow for inspection and surface preparation. These activities, boring data and foundation rock inspection following excavation, will allow the determination to be made that the foundation rock shows no evidence of karstic dissolution.

Impact on Licensing Document:

This response has no impact on the content of PSAR Section 2.5.

References:
None

Question Number: 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.

Kairos Power Response:

Figure 2.5-2 has been updated to add the Mascot Dolomite, consistent with Figure 2.5-1. Location of interfaces and dips are indicated as approximate.

Impact on Licensing Document:

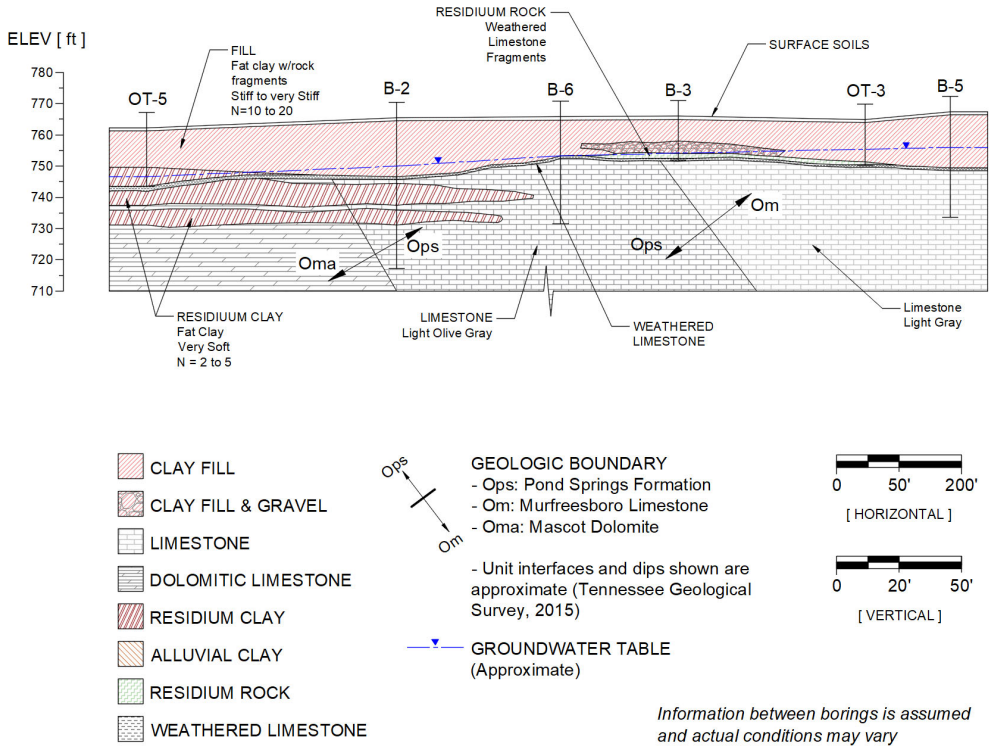
The PSAR Section 2.5 Figure 2.5-2, Subsurface Profile A-A’ has been deleted and replaced by the updated Figure 2.5-2 (attached). This change will be included in a future revision to the PSAR.

References:

None

UPDATED FIGURE 2.5-2 Subsurface Profile A-A'

PROFILE A-A'



- CLAY FILL
- CLAY FILL & GRAVEL
- LIMESTONE
- DOLOMITIC LIMESTONE
- RESIDIUM CLAY
- ALLUVIAL CLAY
- RESIDIUM ROCK
- WEATHERED LIMESTONE

Ops / Om — GEOLOGIC BOUNDARY
- Ops: Pond Springs Formation
- Om: Murfreesboro Limestone
- Oma: Mascot Dolomite

- Unit interfaces and dips shown are approximate (Tennessee Geological Survey, 2015)

GROUNDWATER TABLE (Approximate)

0 50' 200' [HORIZONTAL]

0 20' 50' [VERTICAL]

Information between borings is assumed and actual conditions may vary

Kairos Power

Question Number 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.

Kairos Power Response:

An update to Figure 2.5-3 is provided showing the dip of the interface consistent with the Elverton Quadrangle (Reference 1). Figure 2.5-3 has been updated to be consistent with Figure 2.5-1 and the Reference 1 geologic map. The location of interfaces and dips are indicated as approximate and consistent with Reference 1.

Impact on Licensing Document:

The PSAR Section 2.5 Figure 2.5-3, Subsurface Profile B-B’ has been deleted and replaced by the updated Figure 2.5-3 (attached). This change will be included in a future revision to the PSAR.

References:

1. PSAR Section 2.5.6 Reference 4, Limiszki, P., "Geologic Map of the Elverton Quadrangle, Tennessee," Tennessee Geologic Survey. 2015.

UPDATED FIGURE 2.5-3 Subsurface Profile B-B'