SUMMARY REPORT ON THE ENVIRONMENTAL AUDIT OF
KAIROS HERMES TEST REACTOR CONSTRUCTION PERMIT APPLICATION

## 1.0 Background

The U.S. Nuclear Regulatory Commission (NRC) is currently reviewing an application from Kairos Power, LLC (Kairos) for a construction permit (CP) for a test reactor to be located in Oak Ridge, Tennessee. As part of its review, the NRC is preparing an Environmental Impact Statement (EIS). An audit was conducted from February 28, 2022, to March 30, 2022, to support the environmental review of Kairos' CP application. This report presents a summary of the audit's objectives and activities, and information that was obtained as a result of audit activities.

### 1.1 Application Overview

By letter dated October 31, 2021 (Agencywide Documents Access and Management System (ADAMS) ML21306A131), Kairos submitted an Environmental Report (ER) in support of its Hermes CP application. By letters dated February 10, February 18, and March 1, 2022, Kairos provided supplemental information regarding its CP application, including the ER (ML22042A095, ML22049B555, and ML22060A272). References to the Kairos ER in this summary report include these revisions.

### 1.2 Project and Site Overview

The proposed action is for the NRC to issue a CP to Kairos authorizing construction of the Hermes reactor. In its CP application, Kairos proposes to build and operate the Hermes project to demonstrate key elements of the Kairos Power Fluoride Salt-Cooled, High Temperature Reactor technology for possible future commercial deployment. Operation of the Hermes reactor would not generate any power for sale or distribution. The technology is an advanced nuclear reactor technology that leverages TRI-structural ISOtropic (TRISO) particle fuel in pebble form combined with a low-pressure fluoride salt coolant. The proposed site is situated in the Heritage Center of the East Tennessee Technology Park, an industrial park established by the City of Oak Ridge, on land formerly owned by the U.S. Department of Energy (DOE) for the Oak Ridge Gaseous Diffusion Plant. The Kairos Hermes ER provides Kairos' analyses of the environmental impacts that could result from building, operating, and decommissioning the Hermes test reactor at the proposed site.

## 2.0 Audit Scope and Objectives

During the audit, the staff discussed environmental matters related to land use, ground and surface water, terrestrial and aquatic ecology, human health, postulated accidents, radiological and non-radiological waste, cultural resources, fuel cycle, transportation of radioactive material, alternatives to the proposed action, air quality and noise. The audit allowed the staff to better understand the site, environmental interfaces of the project, and modeling results in order to make appropriate environmental findings.

In its initial review of data and information within the corresponding context of the ER, the staff identified information needs that would promote a better understanding of the detailed analysis and bases underlying the construction permit application. These items were included in

Attachment 1 of the audit plan presented to Kairos in advance (ML22056A064). Audit activities consisted of document reviews, virtual meetings organized in advance and a few impromptu discussions as documented herein. These activities assisted the NRC and Kairos staff in resolving the information needs that were outlined in the plan. For items that the staff was not able to resolve through document reviews and audit discussions, Kairos submitted information to the Kairos Hermes docket, supplementing its CP application to provide the necessary information for the staff to make impact determinations in the EIS.

Table 1 of this report presents a list of the NRC staff participating in the audit and their associated EIS review areas. Table 2 presents a list of Kairos staff and its contractors who participated in the audit.

**Table 1. Review Areas with assigned team members Team Member**

| Team Member | Role / Review Area |
|---|---|
| Ken Erwin | Environmental Review Supervisor |
| Tami Dozier | Environmental Project Manager |
| Peyton Doub | Technical Lead for the EIS; Site and Technical Overview / Proposed Action / Land Use and Visual Resources; Ecological Resources / Non-Radiological Human Health; Noise; Alternatives |
| Don Palmrose | Radiological Human Health; Transportation of Radioactive Materials; Fuel Cycle and Radiological Waste Management; Postulated Accidents |
| Jennifer Davis | Historic and Cultural Resources |
| Joseph Giacinto | Water Resources and Hydrogeology; Climate Change |
| Laura Willingham | Air Quality |
| Daniel Mussatti | Socioeconomics; Environmental Justice; Non-radiological Waste Management; Cost-Benefit Discussion |
| Kevin Folk | Adjunct Team Member |

**Table 2. List of Audit Participants for Kairos Power, LLC and AECOM**

| Kairos Power, LLC | AECOM |
|---|---|
| Katie Dignan | Kevin Taylor |
| Darrell Gardner | Carol Freeman |
| Marty Bryan | Carlos Szembek |
| Austin Clark | Bob Paine |
| Wayne Massie | Evelyn Rogers |
| Brian Song | Kristen Beckhorn |
| Antonio Fernandez | Fang Wang |
| Lori Gross | Delia Halliman |
| Per Peterson | Jim Orr |
| Gus Merwin | Steve Dillard |
| Kieran Dolan | Larry Neal |
| Matt Denman | Anneliesa Barta |
| Peiwen Whysall | |
| Alan Kruizenga | |
| Jim Tompkins | |
| Ryan Latta | |
| Jianxin Liu | |
| Jordan Hagaman | |

## 3.0 Summary of Audit Activities and Issues Addressed

During the first week of the audit, an audit kickoff meeting and 15 breakout sessions were conducted virtually where the NRC and Kairos staff discussed the 78 information needs that had been provided to Kairos in the audit plan. For the remaining period of the audit, the staff continued to examine supporting documents and hold follow up discussions as needed. The staff determined that responses to several items would be needed on the docket and Kairos agreed to provide that information in supplemental submittals or as responses to Requests for Confirmatory Information (RCIs).

In order to appropriately document the staff's confirmation of information gathered during the audit which would not otherwise be available in the public domain, the staff prepared and issued to Kairos a set of 22 RCIs (ML22090A060). Kairos provided all agreed upon supplemental information requested by the staff within 30 days of audit closure.

Table 3 presents a tabulated summary of how the information needs presented to Kairos in the audit plan were addressed. In summary, 52 of the 78 audit items were closed through audit discussions and staff review of supporting material. Five items required information to be provided by Kairos in supplemental submittals. Twenty-one items were resolved through Kairos response to RCIs (1 audit item required two separate RCIs, resulting in Kairos responding to 22 separate RCIs.)

## 4.0 Audit Closeout Meeting

The NRC staff conducted a publicly noticed audit closeout meeting on March 30, 2022 (ML22088A212). At the closeout meeting the NRC staff reiterated the purpose of the audit, discussed the audit activities and the information still needed to close all audit items. Kairos shared their expected timeframe for providing the agreed upon submittals expected to close the remaining items. Conditional upon review of the information Kairos would be providing, the NRC staff stated that they did not anticipate the need for any additional information in order to complete their review; however, the staff stressed that the scoping comment period was still underway and should new information be received from the scoping process or from other means, additional information from Kairos could become necessary. The meeting presentation is available at ML22088A225.

Members of the public were provided an opportunity to comment during the meeting. Attendees asked questions related to the RCI process and other audit activities. Attendees expressed interest in the anticipated date for review deliverables. Table 4 presents the attendance list.

## 5.0 Post Audit Followup and Current Review Status

As summarized in Table 3, Kairos provided supplemental information to respond to RCIs and to close out those audit information needs requiring that particular information be submitted to the docket. By letter dated April 22, 2022, Kairos provided their response to the staff's RCIs (ML2215A204). On April 27, 2022, Kairos provided two submissions to address certain air quality, noise and water resource items requiring information on the docket (ML22117A215 and ML22117A218). The staff determined all information provided by Kairos to adequately close all information needed from the applicant to conduct their review.

The scoping comment period closed on April 19, 2022, and staff has completed its review of the public comments. To date, the staff has not identified any new information requiring additional

requests for information from Kairos. The draft EIS is currently on schedule to be issued on or before November 2022.

**Table 3: Summary of Audit Information Need Resolution**

| Info Need ID | Information Need | Resolution |
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| **Site and Technical Overview** | | |
| STO-1 | Briefly outline the ownership history of the site, and indicate what if any easements or encumbrances exist on the site property | Closed Through Audit Discussion |
| STO-2 | Show estimated, approximate routes for any new utilities that would be constructed, such as sewer lines and incoming electric distribution lines. Note that section 6.2.1 states that construction would include "the installation of water and sewer lines that connect the facility to the City of Oak Ridge water supply system." | Closed Through Audit Discussion |
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| **Cumulative Impacts** | | |
| CMLT-1 | Please provide rough bounding information on the location and land and water needs for the Fuel Fabrication Facility. | Closed Through Request for Confirmatory Information (RCI #18) ML22115A204 |
| CMLT-2 | Please provide a bounding estimate on the years of operation of the Fuel Fabrication Facility. | Closed Through Audit Discussion |
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| **Land Use and Visual Resources** | | |
| LU-1 | The ER does not provide information on the zoning of the site. Indicate the zoning established by the City of Oak Ridge for the site. The City zoning map indicates IND-2, but the zoning ordinance indicates that industrial facilities handling radioactive materials require IND-3 zoning. Clarification needed. | Closed Through Request for Confirmatory Information (RCI #1) ML22115A204 |
| LU-2 | Figure 3.7-3 on page 3-145 shows an undeveloped right-of-way-like extension of the site proceeding southwest from the site to the Clinch River arm of Watts Bar Reservoir. This extension of the site does not appear on other site maps. Clarification needed. | Closed Through Audit Discussion |
| LU-3 | Demonstrate that the proposed facilities would not penetrate the air spaces identified as having | Closed Through Request for |

| Info Need ID | Information Need | Resolution |
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| | to be free of flight obstructions for the proposed City of Oak Ridge Airport to the south. | Confirmatory Information (RCI #2) ML22115A204 |
| LU-4 | Page 3-77, figure 3.4-2: Should 2 percent Annual Chance Flood Hazard be 0.2 % percent Annual Chance Flood Hazard? | Closed Through Audit Discussion |
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| Air Quality and Noise | | |
| AQN-1 | Section 3.2.6, p.3-20 states that the nearest resident is approximately 0.7 mi north of the site; but section 4.2.2, p. 4-18 states that the nearest residence is 1.25 mi away. Clarification needed. | Closed Through Post Audit Submittal by Kairos (ML22117A218) |
| AQN-2 | Provide additional details as to how the noise attenuation data in table 4.2-3 were calculated. Did the calculations assume leaf-on or leaf-off conditions? | Closed Through Post Audit Submittal by Kairos (ML22117A218) |
| AQN-3 | Provide air emission estimates for each criteria pollutant for the construction phase and the operation phase of the project. Provide a description of the assumptions used to determine the estimates (i.e., hours use of differing equipment during construction). In addition, provide the total emission estimate for hazardous air pollutants for both the construction and operation phases of the project. | Closed Through Post Audit Submittal by Kairos (ML22117A218) |
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| Water Resources and Hydrogeology | | |
| HYD-01 | As no offsite disposal is planned, please describe any change in the site grade, drainage, or topography as a result of the onsite use of excess excavated soil that would have formerly occupied the space of subgrade building structures and foundations, measures or best practices to account for the potential exposure to contaminated soils and any anticipated coordination with DOE for soil excavation activities. | Closed Through Request for Confirmatory Information (RCI #3) ML22115A204 |
| HYD-02 | In section 4.13.3, the ER indicates that "Table 4.13-1 identifies recent past, present, and reasonably foreseeable future actions within the geographic extent of analysis that can be assessed to determine cumulative effects on the geologic environment." Yet, the geologic environment is not listed as a "Potentially Affected Resource(s)" in this table. Please | Closed Through Post Audit Submittal by Kairos (ML22117A218) |

| Info Need ID | Information Need | Resolution |
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| | explain how the Geologic Environment in section 4.13.3 was evaluated for recent, past, present and reasonably foreseeable future actions, including anticipated fuel fabrication facility that is planned to be built adjacent to the reactor given the lack of mention the Geologic Environment in table 4.13-1. | |
| HYD-03 | Clarify the apparent variability of subsurface stratigraphy between ER section 3.3.3.1, ER figure 3.3-3 and PSAR figure 2.5-3 in the area crossing the former K-33 site with respect to the clay profile, associated depths to bottom of clay and the position the Oma (Mascot Dolomite) stratigraphy. | Closed Through Audit Discussion |
| HYD-04 | Please define and clarify any implications of the "TVA Flowage Easements" shown in figure 3.4-2 adjacent to the reactor facility to anticipated land use, hydrological resources, and development. | Closed Through Audit Discussion |
| HYD-05 | Please explain what is meant by the "...final decision on the K-31/K-33 Area groundwater..." as described in section 3.4.1.2. | Closed Through Audit Discussion |
| HYD-06 | Section 3.5.5.3 indicates that the K-901 Holding Pond is shown in figure 2.2-1; however, there is no pond labeled as the K901 Holding Pond. | Closed Through Audit Discussion |
| HYD-07 | In section 3.7.2.5, please clarify what constitutes "wet weather" and the frequency of these periods when Rarity Ridge WWTP operates at peak capacity and explain the ability of the Rarity Ridge WWTP to treat the estimated 0.02 MGD of facility wastewater during these periods and any associated potential indirect or direct impacts. Also, please provide a reference for the statement "...the plant is under evaluation for future growth." and, in section 5.2, a reference for what measures that the "…city is currently working towards reducing inflow and infiltration coming into the plant." Describe any agreements with Rarity Ridge WWTP for accepting wastewater from the planned facility with respect to anticipated construction and operation dates of the proposed Kairos facility. | Closed Through Audit Discussion |
| HYD-08 | Clarify if the estimated facility water use is "44 gpm (0.06 MGD)" as described in ER section 3.4.2.3 or "0.07 million gallons per day" as described in ER section 4.4.2. | Closed Through Audit Discussion |

| Info Need ID | Information Need | Resolution |
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| HYD-09 | Describe the potential for new underground (wastewater, utility lines, etc.) utilities to act as groundwater sinks or sources as described in ER section 3.4.1.2 and any anticipated monitoring plan provisions. | Closed Through Audit Discussion |
| HYD-10 | Based on the discussion in ER section 3.4.2.3, please clarify the intended source of Fire Suppression System's water supply for infrequent use (3,170 gpm/4.56 MGD) including the make-up supply (793 gpm/1.14 MDG) and the approximate periods between refills with respect to the capacity of the municipal system. Please confirm that the fire protection system (ER section 2.4.1) and the fire suppression system (ER section 3.4.2.3) are one in the same and clarify any discrepancies between the slightly different refill rates listed in section 2.4.1 and section 3.4.2.3. | Closed Through Request for Confirmatory Information (RCI #4) ML22115A204 |
| HYD-11 | As described in ER section 3.4.1.2.1, "Historically, building basement dewatering significantly altered the mapped potentiometric surface in the areas of the ETTP." and related to dewatering discussion in ER section 4.3.2 and section 4.5.1.2, provide an approximate bounding estimate of dewatering rates during the duration of construction, plant operation and decommissioning. If dewatering is planned, please describe the anticipating dispositioning of the any water volumes including any anticipated DOE consultations to manage the water and, anticipated alterations to the groundwater flow field due to dewatering during operations. | Closed Through Request for Confirmatory Information (RCI #5) ML22115A204 |
| HYD-12 | Section 4.8.1.7 states that specific environmental monitoring of non-radiological constituents would be determined through the permitting process. Section 4.4.4 indicates that"..., no non-radiological groundwater monitoring activities are planned for the site." Please clarify permitting requirements for monitoring non-radiological constituents and any apparent inconsistencies between the statements in section 4.8.1.7 and section 4.4.4 and the disposition of DOE's continuing monitoring program for the K-31/K-33 area. | Closed Through Request for Confirmatory Information (RCI #6) ML22115A204 |
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| Ecological Resources | | |
| ECO-1 | Page 1-3 of ER states that an onsite field delineation of wetlands and other waters of the United States was conducted on the site. But the information presented in section 3.5.6 is referenced to a 1994 DOE study. Clarification needed. | Closed Through Audit Discussion |
| ECO-2 | Indicate the references(s) for the unreferenced descriptive information in sections 3.5.7.1 and 3.5.7.2. | Closed Through Audit Discussion |
| ECO-3 | Page 3-92, section 3.5.7.2.2 (Birds) states that a field survey was conducted of the site in June 2021. Provide a brief explanation of the procedures and observations of that survey. | Closed Through Audit Discussion |
| ECO-4 | Page 3-92, section 3.5.7.2.2 (Birds) states that a field survey was conducted of the site in June 2021. Also, table 1.4-2 states that a field survey identified no eagle nests in the vicinity of the site. Provide a copy of that survey. | Closed Through Audit Discussion |
| ECO-5 | Provide a copy of the IPaC search results forming the basis of section 3.5.11. Also, table 1.4-2 on page 1-8 states that the applicant has developed a biological assessment. If so, provide a copy of that biological assessment. | Closed Through Audit Discussion |
| ECO-6 | Page 3-101 section 3.5.11.4 states that bald eagles are not known to nest or forage on or adjacent to site. Provide basis for this statement. How can we know that bald eagles are not present in forests around perimeter of site? | Closed Through Audit Discussion |
| ECO-7 | Page 4-35, section 4.5.1.5 (Protected Species) states that no suitable [Indiana] bat trees … were observed in the undisturbed riparian corridor adjacent to the site. Indicate the basis for this statement. | Closed Through Audit Discussion |
| ECO-8 | Page 4-37, section 4.5.2.5 states that no federal or state-listed threatened, endangered or special status plant species have been observed on or in the immediate vicinity of the site. Provide the basis for this statement. Can you quantify what constitutes the "immediate area?" | Closed Through Audit Discussion |
| ECO-9 | Please explain why the temporary and permanent impact acreages for herbaceous/grassland impacts in table 4.5-1 total | Closed Through Audit Discussion |

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| | 88 ac when the table states that the total acreage of that habitat is only 72 ac. | |
| ECO-10 | Page 4-33, section 4.5.1.2 states that "Groundwater removed during construction for dewatering [of the reactor building excavation] will be properly managed as discussed in section 4.4.1.1.1, That section just states that Kairos would consult with DOE and follow DOE's recommendations. Please provide more details on how that water would be managed. | Closed Through Request for Confirmatory Information (RCI #7) ML22115A204 |
| ECO-11 | Roughly bound the quantity of groundwater that might have to be dewatered to excavate for construction of the reactor. | Closed Through Request for Confirmatory Information (RCI #8) ML22115A204 |
| ECO-12 | Page 4-33 section 4.5.1.2 states that stormwater would flow to a stormwater pond and then be discharged to Poplar Creek. Indicate the location of the proposed discharge. Page 2-15 states that Kairos assumes that the stormwater discharge would use an existing outfall. | Closed Through Audit Discussion |
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| **Cultural and Historical Resources** | | |
| HCUL-1 | Provide a knowledgeable expert to discuss the historic and cultural resource investigations conducted on or near the proposed project site, and historic and cultural resources described in section 3.6.2. Staff would also like to discuss potential impacts to historic and cultural resources from the proposed action as they are currently understood and as described in the ER. | Closed Through Audit Discussion |
| HCUL-2 | In ER table 1.4-1, there is a table entry for Tennessee Department of Transportation (TDOT) that states that there would be construction of a driveway connection to Hwy 58. Is this land previously disturbed and has it been surveyed for historic and cultural resources? | Closed Through Audit Discussion |
| HCUL-3 | In ER section 1.4, states that Kairos (in addition to the formal consultations listed in table 1.4-2), made informal contacts with the National Nuclear Security Administration, the Bureau of Indian Affairs, the Tennessee Department of Environment and Conservation, the TDOT, and the City of Oak Ridge. The stated purpose was to inform the agencies about the project and to | Closed Through Audit Discussion |

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| | coordinate project planning. Provide a summary of any interactions related to historic and cultural resources as well as any applicable correspondence. | |
| HCUL-4 | In ER table 1.4-2 Consultations Required for Construction and Operation and ER Section 3.6.4 - Did Kairos engage the Tennessee Historical Commission, Tennessee Division of Archaeology, Native American Nations, DOE, or the National Park Service while developing its application for this proposed action? If so, provide a summary of any interactions as well as any applicable correspondence. | Closed Through Audit Discussion |
| HCUL-5 | Provide a knowledgeable expert to discuss DOE-OREM's NEPA and NHPA section 106 consultation and review activities associated with the land transfer to Community Reuse Organization of East Tennessee. ER table 1.4-2 provides a list of statutes that guide required consultations. With respect to Native American Nations, the table lists the Native American Grave Protection and Repatriation Act as one of the applicable statutes. Additionally, in ER section 4.6.1, it states to minimize impacts to historic and cultural resources, Kairos would develop an Archaeological Monitoring and Discovery plan that would specify procedures for addressing and handling the unexpected discovery of human remains or archaeological material during construction. It states that if human remains are discovered, construction personnel will notify a representative of Kairos, and that representative will contact appropriate local law enforcement and the DOE historic preservation officer. DOE's 2011 EA (DOE/EA-1640), section 3.6.2.1, states that inadvertent discovery and notification provisions would be contained within lease and/or deed restrictions. Similarly, the 2017 Quitclaim Deed for the Former K-33 Site includes lease and/or deed restrictions regarding the protection of historic and/or archaeological resources. Since the lands are no longer considered Federal property, provide a summary response to confirm if federal land management requirements still apply as part of any existing lease and/or deed restrictions with respect to the inadvertent discovery and | Closed Through Request for Confirmatory Information (RCI #9 and RCI #10) ML22115A204 |

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| | protection of historic and cultural resources (such as ARPA and NAGPRA). Provide a summary response to describe any stipulations that Kairos Power must abide with. | |
| HCUL-6 | In ER section 4.6.1 - Provide a status update on the development of the Archaeological Monitoring and Discovery plan along with any training material that will be used with construction personnel regarding the identification of historic and cultural resources. Will this procedure be developed with input from the Tennessee Historical Commission, Tennessee Division of Archaeology, or DOE? Would the plant incorporate any existing DOE-OREM guidance? | Closed Through Request for Confirmatory Information (RCI #11) ML22115A204 |
| HCUL-7 | In ER section 3.6: DOE-OREM executed several Memorandum of Agreements (MOAs) with respect to the decontamination and decommissioning activities and mitigation of adverse effects to historic properties associated with the K-25 site and East Tennessee Technology Park (ETTP). In reviewing the 2012 final MOA, Execution Plan, and final Mitigation Plan for the interpretation of historical properties at ETTP (2012 MOA), and the July 31, 2019 amendment, is the Kairos Hermes project located outside the bounds of the K-25 Preservation Footprint Viewshed (see Stipulation 3 of 2019 Amendment)? | Closed Through Audit Discussion |
| HCUL-8 | In ER section 3.6.2 summarizes previous cultural resource investigations (archaeological and architectural) conducted on and in the vicinity of the ORR since the 1970. Did any of the referenced surveys occur within or overlap with the 185-acre proposed project area? Additionally, in DOE's Environmental Assessment prepared for the Transfer of Land and Facilities within the ETTP and Surrounding Area, Oak Ridge, Tennessee (DOE/EA-1640), it discusses the location of four National Register of Historic Places -eligible prehistoric archaeological sites in the EA study area. Staff would like to discuss where these sites are in relation to the proposed Kairos site. | Closed Through Audit Discussion |
| HCUL-9 | Please make available copies of references listed in section 3.6.5 of the ER in the reading room. | Closed Through Audit Discussion |

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| HCUL-10 | In ER section 4.6.1, it states that the nearest listed NRHP property is the K-25 Gaseous Diffusion Plant which is part of the Manhattan Project National Park. The ER states that "…given the intervening structures between the site and the K-25 Plant as well as the low profile of the proposed structures on the site, no visual or other indirect impacts occur." Please describe or discuss any architectural surveys conducted for the proposed project to assess indirect (i.e., visual) effects to other historic and cultural resources (i.e., historic properties) within the viewshed/indirect effects APE? | Closed Through Post Audit Submittal by Kairos (ML22117A215) |
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| Human Health: Non-Radiological | | |
| HHN-1 | Provide a quantitative bound on what constitutes the "insignificant volumes" of nonradioactive liquid chemical wastes to be generated, as stated on page 4-51. | Closed Through Audit Discussion |
| HHN-2 | Provide information on the type and height of perimeter fencing and signage to be built around the proposed facilities. | Closed Through Audit Discussion |
| HHN-3 | Provide subject matter expert(s) to discuss chemical hazards regarding the FLiBe salt to be used in the Hermes test reactor. Due to the hazardous nature of beryllium, especially concerning airborne particulates, the staff needs to understand how this beryllium-bearing material will be controlled and monitored for potential beryllium exposure. PSAR section 1.2.1 states "Flibe coolant, while chemically stable, contains potentially toxic constituents including beryllium. The reactor building and ventilation system function as a confinement to manage and control beryllium hazards..." PSAR section 4.4.1 states "In addition, the biological shield reduces radiation damage to plant equipment and also reduces the potential for Beryllium exposure to reactor personnel." PSAR section 9.2.2 states "In addition, the RBHVAC system ensures that chemical hazards (such as Beryllium) are within applicable limits." However, the ER has no similar discussion regarding occupational and public safety with respect to beryllium. | Closed Through Audit Discussion |

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| HHN-4 | Provide the basis for the statement in section 4.8.1.6 that "the facility design and practices would ensure compliance with storage requirements and limit exposures." What practices would be taken to "limit exposures"? | Closed Through Audit Discussion |
| HHN-5 | Section 4.8.1.7 states that specific environmental monitoring of non-radiological constituents would be determined through the permitting process. Please provide a brief description of what monitoring activities (if any) might be required in the permits. | Closed Through Audit Discussion |
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| **Human Health - Radiological** | | |
| HHR-1 | Provide a list of the specific radionuclides and annual radiological effluents amounts/concentrations applied as input parameter values in the NRCDose calculations. | Closed Through Request for Confirmatory Information (RCI #12) ML22115A204 |
| HHR-2 | Provide in a location accessible by the staff for audit review the NRCDose input and output files (i.e., for both XOQDOQ and GASPAR II) for staff inspection. | Closed Through Audit Discussion |
| HHR-3 | Provide subject matter expert(s) to discuss the details of the NRCDose calculations and results presented in section 4.8 of the ER and to explain why table 4.8-3 TEDE values do not include contributions from tritium. | Closed Through Audit Discussion |
| HHR-4 | Provide subject matter expert(s) to discuss the use of ORR Tower L meteorological data for NRCDOSE calculations. | Closed Through Audit Discussion |
| HHR-5 | Provide a subject matter expert(s) to discuss radiological liquid discharges, such as its sources, collection, and disposal. | Closed Through Audit Discussion |
| HHR-6 | Provide a subject matter expert(s) to discuss the radiological environmental monitoring of ER section 4.8.3, Radiological Monitoring. | Closed Through Audit Discussion |
| HHR-7 | Make available for staff review the following ER section 3.8 references (Note: if not listed below, then the references were accessible): 1) Ref # 12 - U.S. Department of Energy, "Environmental Baseline Survey Report for the Proposed Title Transfer of the Former K-33 Area at the East Tennessee Technology Park, Oak Ridge, Tennessee." DOE/OR/01-2658. September 2015. 2) Ref # 13 - U.S. Department of Energy, | Closed Through Audit Discussion |

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| | "Environmental Baseline Survey Report for the Proposed Title Transfer of the Former K-31 Area at the East Tennessee Technology Park, Oak Ridge, Tennessee." DOE/OR/01-2677. July 2015. 3) Ref # 16-16. Bureau of Labor and Statistics, Hours-based fatal injury rates by industry, occupation, and selected demographic characteristics, Website: [missing hyperlink to website] | |
| HHR-8 | Provide information and subject matter expert(s) to discuss the text in ER section 4.13.8 where the Kairos Power Nuclear Fuel Fabrication Facility is mentioned as a future project. | Closed Through Audit Discussion |
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| Fuel Cycle and Radiological Waste Management | | |
| FCRW-1 | Provide subject matter expert(s) to discuss Kairos's source for HALEU material and the related front end fuel cycle process with respect to table S-3. | Closed Through Audit Discussion |
| FCRW-2 | Provide subject matter expert(s) to discuss the statement in section 2.7.1: "A manufacturer has not been decided for the Hermes reactor" and the status of developing a Kairos-specific TRISO fuel fabrication process including sources of HALEU material. | Closed Through Audit Discussion |
| FCRW-3 | Provide subject matter expert(s) to discuss the use of the Continued Storage Generic Environmental Impact Statement, NUREG-2157 and, as presented in ER section 4.9.1.2, on the expected long-term storage performance of the TRISO coatings (e.g., "degradation rates for storage systems associated with continued storage of TRISO fuel") based on available supporting data of prior TRISO fuels (e.g., Fort St Vrain reactor and the German pebble bed research reactor). | Closed Through Audit Discussion |
| FCRW-4 | Provide information and subject matter expert(s) to discuss what is to be done with the spent TRISO fuel once the facility is decommissioned, such as to whether the facility footprint includes a place for a dry storage facility during or after the cessation of operations. | Closed Through Audit Discussion |
| FCRW-5 | Provide information and subject matter expert(s) to discuss the disposal of nitrate salt during decommissioning to include the quantity of | Closed Through Audit Discussion |

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| | material and the rational for disposing as either class A or B LLRW. | |
| FCRW-6 | Provide information and subject matter expert(s) to discuss the disposal of tritium-bearing material used to capture tritium gas by the Tritium Management System (ER section 2.6.1.2.3). | Closed Through Request for Confirmatory Information (RCI #13) ML22115A204 |
| FCRW-7 | Provide information and subject matter expert(s) to discuss the storage and disposal of solidified FLiBe salt with respect to: 1) possible off-gassing of florine (due to radiation decomposition) or the release of tritium during long-term storage, 2) the quantity to be disposed of during decommissioning, 3) how this waste could be class C LLRW per 10 CFR 61.55 since there is no limits established for tritium in class B or C wastes under table 2 of<br>10 CFR 61.55(a)(4), and 4) to confirm that the chemical form of this waste, outside of its radiological content, would meet all acceptance criteria for disposal at WCS (i.e., WCS would accept this waste stream). | Closed Through Request for Confirmatory Information (RCI #14) ML22115A204 |
| FCRW-8 | Provide subject matter expert(s) to discuss the justification for the statement in ER section 2.6.1.3 that "[t]he facility is not expected to need a gaseous radioactive waste system." given that is later noted releases will be controlled and a detailed radiological effluent release dose analysis is provided in ER section 4.8. | Closed Through Audit Discussion |
| FCRW-9 | Provide a subject matter expert(s) to discuss the estimated table 2.6-1 volume of dry active waste (i.e., LLRW) in comparison to the typical annual amount produced by a PWR as described in Rev 1 of NUREG-1437 section 3.11.1.1 on page 3-154 and to confirm how the approximately 8,800 ft3 per year was determined. | Closed Through Audit Discussion |
| | | |
| Transportation of Radioactive Material | | |
| TR-1 | Provide information and subject matter expert(s) to discuss the transportation of spent TRISO fuel including how TRISO fuel may or may not be bounded by previously analyzed scenarios related to LLWR fuel. | Closed Through Request for Confirmatory Information (RCI #15) ML22115A204 |
| TR-2 | Provide subject matter expert(s) to discuss non-radiological impacts that would result from an | Closed Through Audit Discussion |

| Info Need ID | Information Need | Resolution |
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| | accident involving the shipment of radioactive material including if or how the scenario would be bounded by previously analyzed scenarios for LLWR fuel. | |
| TR-3 | Provide expected radionuclide activity levels (especially for tritium) and disposal acceptance levels and subject matter expert(s) to discuss the shipment and disposal of this material at the various commercial LLRW disposal sites. | Closed Through Request for Confirmatory Information (RCI #16) ML22115A204 |
| TR-4 | Provide for staff review the following ER section 4.10.4 references: 1) Ref # 9 – Kairos Power LLC, 2021. Flibe Safety Data Sheet. Issued April 2, 2021. 2) Ref # 10 – SQM, 2014. Sodium Nitrate Safety Data Sheet. Issued January 2014. 3) Ref # 11 - SQM, 2015. Potassium Nitrate Safety Data Sheet. Issued March 2015 | Closed Through Audit Discussion |
| | | |
| Accidents | | |
| ACC-1 | Provide subject matter expert(s) to discuss the information and the results presented in section 4.11 of the ER, the related offsite accident consequences concerning the MHA, and the potential for mitigation. | Closed Through Request for Confirmatory Information (RCI #17) ML22115A204 |
| ACC-2 | Provide the MHA release source term that resulted in the dose consequences presented in ER table 4.11-1. | Closed Through Audit Discussion |
| | | |
| Alternatives | | |
| ALT-1 | Provide a map (or a description) showing the locations of Potential Sites 1.1 and 1.3 | Closed Through Request for Confirmatory Information (RCI #19) ML22115A204 |
| ALT-2 | Provide maps (preferably as overlays on aerial photographs or topographic maps) clearly indicating the shapes and sizes of the Proposed Eagle Rock Site and Proposed Eagle Rock Property (as shown on figure 5.4-3 on page 5-48). Indicate the approximate size of each. Can you indicate where in the Proposed Eagle Rock Site where the proposed test reactors would be built under this alternative, or can you indicate that they could be built anywhere within the site. | Closed Through Request for Confirmatory Information (RCI #20) ML22115A204 |

| Info Need ID | Information Need | Resolution |
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| ALT-3 | Section 5.4.1.4. Indicate how water needs of the proposed test reactor would be met, and how the wastewater would be treated, if the proposed test reactor were to be built at the Eagle Rock Site. | Closed Through Request for Confirmatory Information (RCI #21) ML22115A204 |
| ALT-4 | Provide a copy of the IPaC search results for the Eagle Rock site. | Closed Through Request for Confirmatory Information (RCI #22) ML22115A204 |
| ALT-5 | Referring to figure 5.4-5 "Vegetation Types of the Proposed Eagle Rock Site" - explain what is meant by the "Bird Point Survey Locations" and the "Vegetation Transect Locations". What surveys are these a part of? | Closed Through Audit Discussion |
| | | |

**Table 4. Attendee List for Environmental Audit Close Out Meeting, March 30, 2022**

| Name | Affiliation |
|---|---|
| Dozier, Tami | U.S. Nuclear Regulatory Agency (NRC) |
| Davis, Jennifer | NRC |
| Palmrose, Donald | NRC |
| Doub, Peyton | NRC |
| Glowacki, Brian | NRC |
| Willingham, Laura | NRC |
| Giacinto, Joseph | NRC |
| Miller, Ed | NRC |
| Wilkins, Lynnea | NRC |
| Marty Bryan | Kairos Power, LLC (Kairos) |
| Austin Clark | Kairos |
| Darrell Gardner | Kairos |
| Wayne Massie | Kairos |
| Peter Hastings | Kairos |
| Taylor, Kevin | AECOM |
| Freeman, Carol L B | AECOM |
| Bergman, Jana | member of the public |
| Matis, Lisa | Tetra Tech |
| Steven Pope | member of the public |
| Generette, Lloyd | U.S. Environmental Protection Agency |
| Michelle Byman | member of the public |
| Erin Wisler | member of the public |

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|---|---|
| Rani Franovich | The Breakthrough Institute |
| Adam Stein | The Breakthrough Institute |