

U.S. Nuclear Regulatory Commission Preliminary Questions on Kairos Power Regulatory Analysis Topical Report (KP-TR-004)

By letter dated November 23, 2020, Kairos Power LLC (Kairos) submitted for NRC staff review KP-TR-004-P, "Regulatory Analysis for the Kairos Power Fluoride Salt-Cooled High Temperature Reactor, Rev. 2" (ADAMS Accession No. ML20328A234). In this letter, Kairos stated that it has concluded that the regulatory requirements reflected in the report are sufficient to conduct the NRC review of a license application and to reach a conclusion of reasonable assurance of adequate protection of public health and safety. Kairos is requesting NRC review and approval of this topical report for use by future applicants for licenses under 10 CFR 50 and 10 CFR 52 related to the KP-FHR.

The NRC staff has completed an initial review of the topical report (TR) and developed a set of preliminary questions to improve its understanding of the information presented in the report.

The questions are intended to:

- Obtain clarification regarding material in the TR
- Promptly identify areas where additional information may be needed
- Facilitate discussions and continue effective communication

The NRC staff requests that Kairos propose times to discuss the attached preliminary questions in a public meeting. Based on the outcome of its discussions with Kairos on the topics identified below, the NRC staff may develop formal requests for additional information to complete its review of the topical report.

General comments:

1. As an observation on the text portion of the TR, we'd expect additional future discussion on some topics beyond what's presented in the TR, like reactor coolant pressure boundary (to flesh out what an exemption looks like), emergency planning zone (just a discussion on specifics to be considered as part of future submittals), and material control and accounting.
2. There are a couple of places where we agree with the applicability assessment, but the stated applicability is in the regulation title only (see 50.34a, 50.49). Note that the title by itself does not limit the plain meaning of the text of the regulation but can provide an indication of the Commission's intent. As a general comment, we plan for the review to be based on the stated applicability of the regulation itself, with regulatory titles seen as potential indicators of the Commission's intent.
3. The second sentence of footnote 3 in 10 CFR 52.47 is characterized as an "observation". We agree it does not represent a prescriptive requirement, given the language, but it does indicate how the related prescriptive requirement was typically applied in the past. Although the concept of a "substantial meltdown of the core" for a non- LWR design may differ dramatically from that normally described for an LWR design, the regulations still require an applicant to demonstrate how it will "mitigate the radiological consequences of accidents." Staff anticipates that applicants will consider the second sentence of the footnote as applicable in assessing accident consequences.

4. Regarding definitions, the staff position is that regardless of the reactor composition, the definition still applies. The definition does not by itself confer a regulatory requirement. So, for example, if no highly enriched uranium (HEU) is present, the definition of HEU applies, but no actions are necessary, and no requirements are imposed. This concept of applicability will come up regarding a number of regulations, especially as they pertain to definitions.
5. In numerous cases, the TR lists a regulation in a table of applicable regulations but then categorizes the regulation as "NA," which means "not applicable." What is Kairos intending to convey with "NA"? If the regulation is not applicable, it should be listed in a table of non-applicable regulations. If the regulation is applicable but Kairos intends to seek an exemption, then it should be listed in an exemption table. Also, no rationale is included for regulations categorized as "NA"
6. If a regulation is listed in the exemption table, then it was taken to be applicable in its entirety even if the discussion of the exemption is limited to a small part of the regulation. This approach is necessary because in most cases, a regulation listed in the exemption table is not listed in the tables of applicable regulations even if the exemption is only from a small part of the regulation (for example, 10 CFR 50.65 for the power reactor).
7. Is there any import to the distinction between "design" and "non-design" in the TR? We ask because making this distinction have meaning would involve additional review.
8. In some places, the TR acknowledges that materials requirements would apply to a CP, but in other places, the TR does not acknowledge this. A CP applicant may, in a single application, also apply for materials licenses. CP holders have historically applied for materials licenses during the construction period because the CP holder needs the materials licenses to conduct construction activities, to construct the reactor (for SSCs with radioactive materials, such as fission detectors), and to possess fresh fuel onsite prior to operation. Similarly, materials licenses might be needed to manufacture a reactor (for SSCs with radioactive materials).
9. Kairos should re-check the general listings in Table 1. For example, the applicability statement for Part 72 for the test reactor is inconsistent with the applicability tables later in the document.
10. TR Page 13 Says "SD – Standard Design" but a DC also involves a standard design. Page 13 should be revised to use the regulatory term "standard design approval."
11. In numerous cases (e.g. Part 25, 140, 170), Kairos lists applicability of only X.1 of the part, rather than the entire part (which is what we assumed in reading). This should be corrected, and we should discuss if our understanding is incorrect. This should be discussed as there is some question regarding desired level of detail in some areas.
12. NRC still needs to follow up on regulations related to implementation of the US/IAEA Safeguards Agreement (Part 75, 40.64(e), 50.78). No action to address these requirements is presently required, but the staff may have additional comments on their applicability.

Comments regarding specific regulations:

(bold items are ones that we expect might benefit from some level of discussion during the public meeting; others are more along the lines of observations, potentially to be corrected in a revision as applicable)

Part 20:

Regulation	Comments	Comment Applies to Power Reactor	Comment Applies to Test Reactor
10 CFR Part 20 (General, Power Reactor)	For the power reactor, the table for non-design regulations simply lists Part 20 as applicable. Does this mean every Part 20 regulation (in addition to the 4 listed in Table A-1) applies to Kairos? Also, the applicability listing appears to be incomplete. Consistent with the ML listing, DCs and SDs should be listed as applicable given the reference to Part 20 requirements in 52.47 and 52.137. Also, a CP holder (and possibly applicant) would be obtaining materials licenses under Parts 30, 40, and 70 and possessing materials during the construction period.	X	
10 CFR Part 20 (General, Test Reactor)	The applicability limitation to OLs does not reflect that a CP holder (and possibly applicant) would be obtaining materials licenses under Parts 30, 40, and 70 and possessing materials during the construction period.		X
10 CFR 20.1601	For the power reactor, why does the applicability list for 20.1601 not include CPs, DCs, and SDs, when these approvals are included for 20.1602 and 20.1701? For the test reactor, why does the applicability list for 20.1601 not include CPs when this approval is included for 20.1602 and 20.1701?	X	X
10 CFR Part 20, App. F	"Reserved" regulations are typically included in tables of inapplicable regulations.		X

Part 21

- For the power reactor, the applicability listing includes only the OL, COL, and ML. However, Part 21 also applies to CPs, DCs, SDs, and LWAs.
- **For the test reactor, the applicability should also include CPs. While 50.55(e) can be used to satisfy Part 21 obligations, the Part 21 obligations still apply. Also, Part 21, not 50.55(e), would apply to the CP applicant.**

Part 25

Part 25 applies more broadly than the licenses listed in general; how Part 25 would specifically apply to Kairos depends on the circumstances. This comment also applies to Part 95.

Part 26

NRC staff have not been applying Part 26 to test reactors in either the CP or OL stage of licensing.

Part 30

Regulation	Comments	Power Reactor	Test Reactor
10 CFR Part 30 (General)	The TR states that most non-design Part 30 regulations apply to the power reactor OL and COL, with two exceptions. However: <ul style="list-style-type: none">• Part 30 would also apply to the CP, and consideration should be given to possible applicability to an ML.• The list of exceptions does not appear to be complete (e.g., 10 CFR 30.12 also doesn't apply).	X	
10 CFR Part 30 (General)	Most Part 30 applicabilities do not include the CP, but Part 30 would also apply to the CP.		X
10 CFR 30.11	The applicability should be "CP, OL" (not "NA") because Kairos has the option of requesting an exemption.		X
10 CFR 30.36	The applicability should be "CP, OL"; there does not appear to be a basis for calling it NA.		X

Part 40

Regulation	Comments	Power Reactor	Test Reactor
10 CFR Part 40 (General, Power Reactor)	The TR states that most non-design Part 40 regulations apply to the power reactor OL and COL, with two exceptions. However: <ul style="list-style-type: none">• Part 40 would also apply to the CP, and consideration should be given to applicability to an ML (e.g., fission detectors).• The reference to 50.55 should be corrected to 40.55.• Regarding the following regulations identified as inapplicable to the power reactor, see the comments below on these regulations for the test reactor: 40.13, 40.22, 40.25, 40.36,• The list of exceptions does not appear to be complete. Give consideration to the test reactor comments.• The rationale for the exceptions is: "Non-design citations provide exemptions." But in many cases, it is not clear on its face that the regulation does not apply. The TR needs to offer better, more specific justifications.	X	
10 CFR Part 40 (General, Test Reactor)	Most Part 40 applicabilities do not include the CP, but Part 40 would also apply to the CP.		X
10 CFR 40.11	The inapplicability rationale is incorrect.		X

Regulation	Comments	Power Reactor	Test Reactor
10 CFR 40.13	Is there any thought given to scenarios where 40.13 could apply? Although staff agrees for the purposes of the reactor, 40.13 could apply to other activities.		X
10 CFR 40.22, 40.25	The rationale for inapplicability does not match the regulatory language. If the nonpower reactor licensee were using the specified materials, the regulations would be implicated.		X
10 CFR 40.26	This regulation is no longer in effect given 40.26(d).		X
10 CFR 40.31	Why wouldn't 40.31(i) apply? See comment on 40.36.		X
	40.31(m) is applicable.		X
10 CFR 40.36	40.36 does not exclude nonpower reactors, so the rationale for inapplicability is not a good one. Applicability depends on the quantities used.		X
10 CFR 40.52-40.53	These regulations do not apply.		X
10 CFR 40.56	Replace "SNM" with "source material" in the rationale for inapplicability. Also, why is 40.56 not listed as inapplicable for the power reactor?	X	X

Part 50

Regulation	Comments	Power Reactor	Test Reactor
10 CFR 50.1	This regulation is very general in nature and Part 50 includes requirements for every license, permit, certification, approval, and authorization under Parts 50 or 52. Therefore, the applicability should embrace all licenses/approvals/etc. under Parts 50 and 52 for the power reactor.	X	
10 CFR 50.2	TR omits definitions for "atomic energy," "Commission," "permanent fuel removal," "source term," and "TEDE.;" the treatment of "basic component" for the power and test reactors is not consistent; "Federal Government" should refer to "Federal Government funding for conversion"	X	X
10 CFR 50.3	For the power reactor, this regulation would apply to all Part 50 and Part 52 licenses/approvals/etc.	X	
10 CFR 50.4, 50.5, 50.7, 50.9	For clarity, LWA should be listed as applicable for the power reactor. Note that, per 50.10(d), a request for an LWA is considered to be part of the application for a CP or COL.	X	
10 CFR 50.12	For the power reactor, this regulation would apply to all Part 50/52 licenses/approvals/etc. because 50.12 pertains to exemptions from the regulations in Part 50. Note that 10 CFR 52.7 expressly provides: "The Commission's consideration of requests for exemptions from	X	

Regulation	Comments	Power Reactor	Test Reactor
	requirements of the regulations of other parts in this chapter, which are applicable by virtue of this part, shall be governed by the exemption requirements of those parts.”		
10 CFR 50.13	Change “10 CFR 50.10-10 CFR <u>30</u> .13” to “10 CFR 50.10-10 CFR <u>50</u> .13”		X
10 CFR 50.21	This is not applicable to the power reactor.	X	
10 CFR 50.22	This is not applicable to the test reactor.		X
10 CFR 50.23	For the power reactor, COL should be added because the regulation addresses COLs	X	
10 CFR 50.30	The applicability for the power reactor should be expanded because this regulation expressly applies to all Part 50/52 licenses/approvals/etc. except for LWAs and DCs.	X	
10 CFR 50.33	For the power reactor applicability, add OL and ESP. For the test reactor, add OL.	X	X
10 CFR 50.34 (General)	Part 52 directly (or indirectly) references 50.34(a)(1) and 50.34(f) for COLs. Why do the power reactor tables say that the other 50.34 paragraphs apply to COLs?	X	
10 CFR 50.34(a)	The applicability tables omit the intro paragraphs in 50.34(a) and 50.34(a)(1).	X	X
	For the power reactor, ESP should be added as applicable to the 50.34(a)(1) references consistent with the listing of COL. Basis: 10 CFR 52.17 and 52.79 require site characteristics for ESPs/COLs to comply with Part 100, and 10 CFR 100.21 requires compliance with 10 CFR 50.34(a)(1).	X	
	For the test reactor, the TR says that 50.34(a)(1)(ii)(A)-(E) are applicable, but 50.34(a)(1) states, "(1) Stationary power reactor applicants for a construction permit who apply on or after January 10, 1997, shall comply with paragraph (a)(1)(ii) of this section. All other applicants for a construction permit shall comply with paragraph (a)(1)(i) of this section."		X
	Page 87 of the TR lists the 50.34(a) subparagraphs as applicable to the nonpower reactor OL but these paragraphs are for CPs.		X
10 CFR 50.34(b)	Regardless of the technical argument, (b)(9) applies and an exemption would be needed. Staff can document this exemption using information from the application including the criteria in 50.12, as we agree this is not technically pertinent to the KP-FHR. 50.34(b)(9) is applicable with no qualifiers but points to a regulation that would not apply by its text. Our regulatory applicability white paper has a reference for this concept.	X	X
	For the power reactor, the one CP reference in (b)(11) does not apply to a CP for Kairos.	X	

Regulation	Comments	Power Reactor	Test Reactor
	Page 87 of the TR lists 50.34(b)(3) as applicable to the nonpower reactor CP but this paragraph is for OLs.		X
10 CFR 50.34(f)	<p>For the power reactor, numerous 50.34(f) paragraphs are said to apply to LWRs when the text of the regulation indicates otherwise. Note that 50.34(f) provides: “In addition, each applicant for a design certification, design approval, combined license, or manufacturing license under part 52 of this chapter shall demonstrate compliance with the technically relevant portions of the requirements in paragraphs (f)(1) through (3) of this section, except for paragraphs (f)(1)(xii), (f)(2)(ix), and (f)(3)(v).”</p> <p>Also, although the TMI items are not required for applications under 10 CFR Part 50, the Commission direction in the Staff Requirements Memorandum to SECY-15-0002 confirmed that its earlier directions for the 10 CFR Part 52 new power reactor applications should be applied consistently to 10 CFR Part 50 new power reactor applications. In addition, the Commission approved revising the regulations in 10 CFR Part 50 for new power reactor applications to more closely align with requirements in 10 CFR Part 52, incorporating the requirements identified by the staff in SECY-15-0002, including the TMI-related items. We do not believe the TMI items would apply to the Hermes test reactor.</p>	X	
10 CFR 50.34a	For the power reactor, the applicability of 50.34a(a) should be extended to all of the approvals/licenses referenced in 50.34a because they all reference 50.34a(a). Also, the applicability of 50.34(b) should be the same as 10 CFR 50.34a(a).	X	
	For the power reactor, 10 CFR 50.34a(c) does not apply to COLs.	X	
10 CFR 50.36	For both the power and test reactor, “10 CFR 50.36(a)” should be changed to “10 CFR 50.36(a)(1)”	X	X
	10 CFR 50.36(c)(1)(ii)(B) does not apply for the same reason as 50.36(c)(1)(i)(B)	X	X
	All of the applicable 50.36(c) paragraphs from (c)(1) to (c)(5) would apply to DCs and MLs.	X	
	10 CFR 50.36(c)(2)(iii) does not apply to Kairos	X	X
	Page 87 of the TR lists the 50.36(a) paragraphs as applicable to the nonpower reactor CP but these paragraphs are for OLs.		X
10 CFR 50.36b	OL and ESP need to be added to the applicabilities for the power reactor, and OL needs to be added for the test reactor.	X	X
10 CFR 50.37	ML and ESP need to be added to the applicabilities.	X	
10 CFR 50.38	This regulation applies to all licenses/permits, so ESP, CP, and ML need to be added.	X	

Regulation	Comments	Power Reactor	Test Reactor
10 CFR 50.39	ESP, LWA, and ML need to be added to the applicabilities.	X	
10 CFR 50.40	This regulation also applies to ESPs	X	
10 CFR 50.41	This regulation is not applicable to the power reactor, which would be licensed under AEA § 103.	X	
	Why isn't 50.41(b) applicable to the test reactor?		X
10 CFR 50.42	This regulation is also applicable to MLs and ESPs	X	
	This regulation is not applicable to the test reactor.		X
10 CFR 50.43	50.43(a-d) are also applicable to CPs, MLs, and ESPs	X	
	This regulation is not applicable to the test reactor.		X
10 CFR 50.47	The exemptions table for the power reactor lists 10 CFR 50.47 and then states: "Emergency Plans Kairos Power intends to implement alternate 50.160 rule for EP when approved through rulemaking OR will take exemption from Appendix E, similar to Tennessee Valley Authority Clinch River." In the second scenario, would Kairos also be requesting an exemption from 10 CFR 50.47?	X	
	The NRC staff does not understand the basis for applying any part of 10 CFR 50.47 to research and test reactors. NUREG-1537 does not indicate 50.47 is applicable to research and test reactors. How were the determinations of applicability for 10 CFR 50.47 arrived at?		X
10 CFR 50.48	The intro language for (a)(1) is not addressed in the tables.	X	
	50.48(a)(4) is also applicable to DCs and MLs.	X	
	For 50.48(c), the power and test reactor rationales for inapplicability differ. The test reactor's rationale is not correct because 50.48(c) can apply to certain reactors licensed after January 1, 1979.		X
	50.48(f) is not addressed for either the test reactor or the power reactor.	X	X
10 CFR 50.49	MLs are specifically called out in 50.49(a). This is a global comment for 50.49 applicabilities.	X	
	Notwithstanding the partial exemption being requested, 50.49(b) should be applicable to any entity that is subject to any part of 50.49.	X	
10 CFR 50.53	CP should be added to the applicability for both the power and test reactor. COL should be removed from the applicability for the power reactor; there is a Part 52 analogue for this regulation in 10 CFR 52.9	X	X
10 CFR 50.54	50.54(s) does not apply to COLs	X	
	50.54(y), (aa)-(cc), and (ee) appear to be applicable to nonpower reactors on their face, would be applicable in accordance with the appendix of applicable regulations in NUREG-1537, Part 1, and there is		X

Regulation	Comments	Power Reactor	Test Reactor
	no apparent reason not to apply them to a test reactor. But the TR states that these regulations are inapplicable to the test reactor.		
	50.54(gg) does not apply to OLs.	X	X
	Need to add 50.54(jj), which is applicable to OLs and COLs (for the power reactor) and OLs (for the test reactor).	X	X
10 CFR 50.55	50.55(e) also applies to MLs.	X	
	DCs are listed as applicable under 50.55(f), but 50.55 does not address DCs	X	
10 CFR 50.55a	The TR says that 50.55a(a)(2) is wholly inapplicable to the test reactor. But the TR says that (h)(3) applies, and (h)(3) refers to IEEE 603-1991, which is IBR'd in (a)(2)(iii)-(iv). These are inconsistent positions.		X
	The power reactor table gives a rationale for the inapplicability of 50.55a(h)(1-2) that is correct for (h)(2) but not (h)(1); paragraph (h)(1) is reserved. Also, the applicability listing for the test reactor needs to be corrected in both (h)(1) and (h)(2) (the rationale for the test reactor should be the same as the rationale for the power reactor, that the requirement only applies to certain CPs issued prior to May 13, 1999).	X	X
10 CFR 50.56 – 10 CFR 50.58	These regulations are not applicable to COLs	X	
10 CFR 50.64	The TR says that 50.64 is inapplicable because the test reactor will not use HEU. Regardless, 50.64(a) explicitly states, "(a) Applicability. The requirements of this section apply to all non-power reactors." Thus, the regulation is applicable but not using HEU means the regulation is satisfied.		X
10 CFR 50.68	50.68(a) also applies to CPs	X	
10 CFR 50.69	In a number of places, the 50.69 numbering is off (for example, there should be an Arabic numeral between (b) and (i)).	X	
10 CFR 50.70	This regulation also applies to MLs	X	
10 CFR 50.71	50.71(a) applies to MLs and ESPs.	X	
	50.71(c) and (d) are applicable to all Part 50/52 licenses/approvals.	X	
10 CFR 50.75	50.75(d) doesn't apply to a power reactor.	X	
	The intro language of 50.75(e)(1) applies but is not addressed in the power reactor applicability table.	X	
	50.75(e)(3) (not listed) is applicable to COLs.	X	

Regulation	Comments	Power Reactor	Test Reactor
10 CFR 50.80-50.81	For the power reactor, 50.80 and 50.81 apply to any license or permit, including CPs, ESPs, and MLs. For the test reactor, this regulation also applies to CPs	X	X
10 CFR 50.90, 50.92	For 50.90 & 50.92, ESP and ML need to be added.	X	
10 CFR 50.91	50.91 does not apply to CPs.	X	X
10 CFR 50.100	CP, ESP, ML, and SDA need to be added to the list of applicabilities for the power reactor. CP should be added for the test reactor.	X	X
10 CFR 50.101	CP and ML need to be added to the list of applicabilities for the power reactor, and CP should be added for the test reactor. Part 50 (and the AEA) allows a CP applicant to request materials licenses and have them combined with the CP. Also, SNM might be necessary for construction and manufacture (e.g., if the fission detectors use SNM).	X	X
10 CFR 50.102	50.102 does not apply to MLs because the regulation refers to operation of the facility, not its manufacture.	X	
10 CFR 50.103	CP, ESP, ML need to be added to the list of applicabilities for the power reactor, and CP needs to be added for the test reactor.	X	X
10 CFR 50.109	50.109 does not to nonpower reactors in accordance with a long-established Commission position. For example, in SRM-SECY-86-17, dated February 14, 1986, the Commission declined to apply the Backfit Rule in that rulemaking, stating, “[T]he backfit rule should not be applied to this amendment of the regulations which relates only to non-power reactors.”		X
	For 50.109(a), ML and SD need to be added. Note: ESPs and DCs are not within the definition of backfitting in 50.109(a), but 50.109(a) does establish the criteria that apply to information from an ESP/DC that is referenced by a COL holder.	X	
	50.109(b) is not applicable.	X	
	Delete DC/ESP and add ML and SDA for 50.109(c)-(d) applicabilities.	X	
	50.109(e) has the same applicability as 50.109(a)	X	
10 CFR 50.110	LWA should be added for both the power and test reactor. The Part 52 licenses/approvals/etc. should be removed for the power reactor. Although 50.110 is written in an open-ended fashion, 52.302 would be cited for Part 52 licenses/approvals/etc.	X	X
10 CFR 50.111	LWA should be added for both the power and test reactor. SDA and ML should be added for the power reactor. Although there is a parallel Part 52 provision, it specifically applies to <u>regulations</u> issued under Part 52, just as 50.111 applies to regulations under Part 50. Part 52 approvals are subject to Part 50 regulations.	X	X

Regulation	Comments	Power Reactor	Test Reactor
10 CFR 50.150	50.150(a) is also applicable to SDs and MLs, and the applicability for 50.150(b) should be changed to match the revised applicability for 50.150(a).	X	
	The applicability for 50.150(c)(3) should be DC, not SD	X	
	DC should be added to the applicability for 10 CFR 50.150(c)(5)	X	
10 CFR Part 50, Appendix C	This appendix does not apply to OLs	X	X
	Sections III and IV of Appendix C also apply to CPs		X
10 CFR Part 50, Appendix E	10 CFR Part 50 Appendix E, Section I also applies to CPs		X
	10 CFR Part 50 Appendix E, Section II applies to CPs, not OLs		X
	10 CFR Part 50 Appendix E, Sections III and IV apply to OLs, not CPs (see page 107 of TR).		X
	On page 117, the TR has several entries that say “10 CFR Appendix E” instead of “10 CFR 50 Appendix E.” On the same page, the TR says “IV 1” when “VI 1” was probably intended.		X
	The TR says Section IV.I applies to the test reactor, but this regulation applies to power reactors by its terms.		X
	Contrary to the TR, Section IV.E.8.a.(i) and portions of Sections IV.E.9.c and IV.E.9.d appear to apply to the power reactor on their face. In addition, the TR applicability listing for Section IV.F.2 does not appear to be consistent with the regulatory text. Kairos should note the RTR-specific “case-by-case” language and reference to RG 2.6 in Section I of Appendix E.	X	X
	NRC doesn’t understand the rationale given for why Section VI.1 and VI.3-4 don’t apply to the test reactor.		X
10 CFR Part 50, Appendix N	Part 50 Appendix N applies only to CPs and OLs under Part 50. Part 52 has its own Appendix N on the same topic, which is for COLs.	X	
10 CFR Part 50, Appendix S	The power reactor table of applicable regulations refers to Section “IV(a)(i)” instead of “IV(a)(1)(i).” The (1) should also be added for subparagraphs (ii), (iii), and (iv)	X	
	The power reactor table of applicable regulations says that Sections IV(a)(1)(iii), IV(a)(1)(iv), and IV(a)(2) apply to ESPs, when the introduction of Appendix S states, “Paragraphs IV.a.1.i, IV.a.1.ii, IV.4.b, and IV.4.c of this appendix apply to applicants for an early site permit under part 52.”	X	
	What, if any, portions of 10 CFR Part 50 Appendix S does Kairos believe applies to the test reactor?		X

Part 51

Regulation	Comments	Power Reactor	Test Reactor
10 CFR Part 51 (General)	The TR gives a general applicability statement for non-design regulations in Part 51. There is a general comment on this approach, and Kairos should consider this issue in light of the comments on the test reactor applicability. Also, ESP should be added to the applicability listing.	X	
10 CFR 51.11	This regulation is said to be applicable to the test reactor but is reserved.		X
10 CFR 51.22, 51.30, 51.32-35	These regulations for categorical exclusions and environmental assessments are said to apply to the test reactor. Part 51 requires an EIS to license a test reactor. Are these references intended for license amendments, exemptions, etc. associated with an already-issued CP or OL for the test reactor?		X
10 CFR 51.23	The continued storage rule does not apply to non-power reactors (79 FR at 56243).		X
10 CFR 51.31	For the power reactor (page 41), justifying this as a purely design measure means it should be limited to 50.31(b), (c) and given an applicability to DCs and MLs. For the test reactor (page 88), portions of the regulation would only be justified as purely design measures by their use for DCs and MLs, but the test reactor is not being licensed under Part 52. If 51.31 regulation is said to be applicable for license amendments, exemptions, etc. for the test reactor, then it belongs with the other environmental assessment regulations for the test reactor.	X	X
10 CFR 51.53	Parts of 51.53 apply to all OLs, not just power reactors.		X
10 CFR 51.60 & 51.66	The rationale for the inapplicability of these regulations should be that it is not applicable to materials licenses associated with the test reactor. Materials licenses can be requested with a CP and are included with the OL.		X
10 CFR 51.75	This regulation does not apply to OLs		X
10 CFR 51.77	This also applies to CPs		X
10 CFR 51.80-51.81	These regulations are not applicable to the materials licenses that would be needed for the test reactor.		X
10 CFR 51.85-51.86, 51.88	These regulations are not applicable.		X
10 CFR 51.97	This regulation is not applicable.		X
10 CFR 51.100-51.106, 51.116-51.118,	These regulations are said to be applicable but then also NA. In addition to the general comment on the NA approach, what is the basis for saying these particular regulations are NA. If the basis is that these are NRC actions, then the same rationale would apply to all EIS regulations, even those listed as applicable.		X

Regulation	Comments	Power Reactor	Test Reactor
51.120-51.122, 51.125, App. A			
10 CFR 51.107, 51.108	These regulations are not applicable to the test reactor.		X
10 CFR Part 51, App. B	Part 51, Appendix B, is only applicable to power reactors in license renewal.		X

Part 52

Regulation	Comments	Power Reactor	Test Reactor
10 CFR 52.0-52.7 & 52.9-52.11	DC needs to be added to the applicability of 52.0 to 52.7 and 52.9 to 52.11. ML needs to be added to the applicability of 10 CFR 52.1.	X	
10 CFR 52.17	The TR incorrectly states that 52.17 is not applicable to new plants. Section 52.17 does apply to new applications. The introductory sentence is merely saying that applications docketed before the specified 2007 date are subject to the rules that existed before then.	X	
10 CFR 52.24	CP and COL should be added to the list of applicabilities because 52.24(b) prescribes requirements for issuance of CPs and COLs referencing an ESP.	X	
10 CFR 52.26	CP and COL should be added to the list of applicabilities	X	
10 CFR 52.39	CP, OL, and COL should be added to the list of applicabilities	X	
10 CFR 52.43	COL and ML should be added to the list of applicabilities	X	
10 CFR 52.47	For the power reactor, the rationale given for the inapplicability of 52.47(a)(23) is incomplete. The rationale should start with "Applicable to LWRs only" (or something similar).	X	
10 CFR 52.55	CP, OL, and COL should be added to the list of applicabilities	X	
10 CFR 52.63	CP, OL, COL, and ML should be added to the list of applicabilities	X	
10 CFR 52.79	For the power reactor, the applicability of 52.79(a)(11), (31), (33)-(35), (39-40), (44), (45) and (47) should be limited to COL	X	
	10 CFR 52.79(a)(21)-(22) are omitted from the power reactor applicability tables. These paragraphs apply.	X	
	For the power reactor, the rationale given for the inapplicability of 52.79(a)(38) is incomplete. The rationale should start with "Applicable to LWRs only" (or something similar).	X	

Regulation	Comments	Power Reactor	Test Reactor
	For the test reactor, the rationale given for the inapplicability of 52.79(a)(24-37) is incorrect.		X
10 CFR 52.80	The applicability for 52.80 should be COL and LWA	X	
10 CFR 52.83, 52.85, 52.87	The applicability for 52.83, 52.85, and 52.87 should just be "COL." That 52.83 references the issue finality requirements for other approvals in the context of a COL application does not mean that 52.83 is imposing requirements for those referenced approvals.	X	
10 CFR 52.91	LWA should be added to the list of applicabilities	X	
10 CFR 52.93	CP should be added to the list of applicabilities	X	
10 CFR 52.133	CP and COL should be added to the list of applicabilities	X	
10 CFR 52.137	The introductory paragraph of 52.137 and of 52.137(a) are omitted. They apply to the power reactor.	X	
	For the power reactor, the rationale given for the inapplicability of 52.137(a)(23) is incomplete. The rationale should start with "Applicable to LWRs only" (or something similar) to provide the basis for inapplicability.	X	
10 CFR 52.147	CP, OL, COL, and ML should be added to the list of applicabilities	X	
10 CFR 52.157	For the power reactor, 52.157(f)(3), (f)(5), and (f)(7) are treated as inapplicable regulations, but this is inconsistent with the treatment of the corresponding regulations for DCs, COLs, and SDs. These corresponding regulations are treated as exemptions in Table A-4 on page 58.	X	
	For the power reactor, the rationale given for the inapplicability of 52.157(f)(23) is incomplete. The rationale should start with "Applicable to LWRs only" (or something similar).	X	
10 CFR 52.171	CP, OL, and COL should be added to the list of applicabilities	X	
10 CFR Part 52, App. B	The rationale given for the applicability of Appendix B is incorrect. The correction rationale is that Appendix B is for the System 80+ design.	X	X

Part 70

Regulation	Comments	Power Reactor	Test Reactor
Part 70 (General)	For the power reactor, the TR states that most non-design regulations apply with certain listed exceptions. However, 10 CFR 70.22(f), 70.39, 70.40, and 70.62 also appear not to apply. In addition, for the regulations that do apply, the applicability should be extended to MLs.	X	

Regulation	Comments	Power Reactor	Test Reactor
10 CFR 70.20a & 70.20b	For the test reactor, these general licenses should apply to CPs/OLs (indeed, they apply to everyone). Is there a reason to say they don't or could never apply?		X
10 CFR 70.22	For the test reactor, 70.22(f) is listed as applicable but would appear not to apply.		X
	Tables A-1 and D-1 say that 70.22(h) applies, but this regulation is specifically for formula quantities, and the regulation excludes material used for reactors licensed under Part 50.	X	X
	For the test reactor, 70.22(i)(4) was not listed and it would apply.		X
10 CFR 70.24	Table A-2 says that 10 CFR 70.24 does not apply to the power reactor because the regulation does not apply to reactor licensees meeting 10 CFR 50.68(b), but Kairos intends to request an exemption from 10 CFR 50.68(b).	X	
10 CFR 70.25	At the present stage of review, it isn't clear that 70.25 doesn't apply. Perhaps 70.25(a)(2) could be specified as an entry condition.	X	X
10 CFR 70.50	The TR says this regulation is inapplicable to the test reactor because of the exemption in 70.50(d) for licensees subject to the reporting requirements in 10 CFR 50.72. However, 10 CFR 50.72 only applies to operating power reactors. Even for the Kairos power reactor, 73.50 would apply for SNM possessed during the construction period.		X
10 CFR 70.59	There are some typos in the inapplicability rationale for this regulation.		X
10 CFR Part 70, Subpart H	For the test reactor, all of subpart H, not just 70.60, should be listed as inapplicable regulations.		X
10 CFR 70.81-70.82	For the test reactor, these regulations are incorrectly listed as being in Subpart H. Also, the applicability should be expanded to CPs		X
10 CFR 70.91-70.92, App. A	For the test reactor, the applicability should be expanded to CPs		X

Part 71

CP and ML should be added to the applicability list in the event a CP or ML holder would receive and possess licensed material during the construction period.

Part 73

Regulation	Comments	Power Reactor	Test Reactor
10 CFR Part 73 (General)	For the power reactor, the TR needs to account for the power reactor security requirements (73.55, etc.) possibly applying during construction.	X	

Regulation	Comments	Power Reactor	Test Reactor
	<p>The TR also needs to account for security being addressed in applications such as DCs, MLs, and SDs. Regarding DCs, MLs, and SDs, although these approvals do not have application content requirements that specifically cite to Part 73, Part 73 is explicitly listed in the standards for review (e.g., 52.48), and Part 52 DCs/SDAs have historically addressed security.</p> <p>For the power reactor, the TR states that most non-design regulations apply and then lists exceptions. There are several issues here:</p> <ul style="list-style-type: none"> Regarding applicability, SGI requirements could apply to any part 50/52 applicant/holder (except possibly LWAs), as explicitly recognized by the regs (e.g., 52.17(d) for ESPs). Also, there is a lack of clarity on which regulations apply. For example, 73.22 should apply to the power reactor, not 73.23. The only rationale provided for the exceptions is that they are excluded by the exemption in 10 CFR 73.6. However, the TR does not cite the specific 73.6 exemption(s) that is applicable, and the 73.6 exemption does not support the inapplicability of many of the regulations the TR states are inapplicable to the power reactor. 		
10 CFR 73.1-73.5	For the test reactor, the applicability should include CPs		X
10 CFR 73.6	The TR says 73.6 is “NA” for the test reactor, but this regulation does apply.		X
10 CFR 73.8	For the test reactor, the applicability should include CPs		X
10 CFR 73.28, 73.35, 73.37, 73.38	For the test reactor, 10 CFR 73.28, 73.35, 73.37, and 73.38 are listed as “NA.” Why would these regulations not be applicable?		X
10 CFR 73.46	The TR states that 73.46(c), (e), and (f) apply to the power reactor, but 73.46 is for Cat I SNM, whereas the TR states that Kairos will use Cat II or Cat III SNM.	X	
10 CFR 73.51	This regulation does not apply if Part 72 does not apply.	X	X
10 CFR 73.54	The applicability list should also include COLs.	X	
10 CFR 73.57, 73.59	For the test reactor, 73.57 and 73.59 could also be applicable at the CP stage, since applicants may have access to SGI prior to the OL being issued. The regulation in 73.57(a)(2) notes that only “written notice to the Commission of intent to file an application” is necessary to trigger fingerprinting for individuals who will have access to SGI. Kairos correctly identified 73.21 and 73.23 as applying to the CP.		X
10 CFR 73.67	For both the power and test reactors, CP should be added to the applicability list.	X	X

Regulation	Comments	Power Reactor	Test Reactor
10 CFR 73.70	73.70 does apply to power reactors consistent with 73.70's reference to 73.55. The exemption in 73.6 applies to the material, not to the reactor.	X	
10 CFR 73.72, 73.73	These regulations apply to both the power and test reactors because both reactors might use Cat II and Cat III SNM. Note that the exemption in 73.6 for licensees subject to 73.67(e) makes 73.72 applicable.	X	X
10 CFR 73.74	What is the basis for concluding that 73.74 does not apply to the power reactor and for labelling 73.74 as "NA" for the test reactor?	X	X

Part 74

Why would 10 CFR 74.33 apply to either the power or test reactor given its stated applicability?

For the power reactor, the stated rationale for the inapplicability of certain Part 74 regulations does not support inapplicability.

Part 81

For both the power and test reactor, Part 81 does not apply.

Part 100

The applicability listings for Part 100 are incomplete. The ESP regulations specifically reference Part 100 for site characteristics. Other applications (DCs, SDs, and MLs) include site parameters and Part 100 would apply to how these site parameters are derived.

Part 100 Appendix A is said to apply, but it applies to applications before the 1997 date specified in 100.23(a).

Part 140

For both the power and test reactor, Part 140 would apply to the CP when there is a license for SNM under 140.13.

Part 170

Part 170 applies regardless of license class (it applies to anyone in the US that meets the conditions set forth in the Part).