

From: Beasley, Benjamin
Sent: Friday, April 8, 2022 5:08 PM
To: Drew Peebles
Cc: Darrell Gardner; Martin Bryan; Hart, Michelle; Cuadrado de Jesus, Samuel; Helvenston, Edward
Subject: Questions on Radiation Protection and Radwaste for the General Audit

Drew,

Below are some questions on radiation protection and radioactive waste for the General Audit. We would like to schedule an audit meeting when you are ready to discuss these.

Regards,
 Ben

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|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11.1-1  | Although shielding design details are left to the operating license application, did Kairos develop isotopic values for the sources for preliminary shielding design, including the biological shield described in PSAR Section 4.4? For any other shielding?                                 |
| 11.1-2  | Although shielding design details are left to the operating license application, did Kairos develop preliminary shielding design information (materials, dimensions, shielding effectiveness factors, etc.) for the biological shield described in PSAR Section 4.4? For any other shielding? |
| 11.1-3  | Provide the screening effluent calculation for audit, including any supporting calculations.                                                                                                                                                                                                  |
| 11.1-3a | Which version of NRC Dose (GASPAR, XOQDOQ) was used?                                                                                                                                                                                                                                          |
| 11.1-3b | Which dose conversion factors were used?                                                                                                                                                                                                                                                      |
| 11.1-3c | Please describe other inputs and assumptions.                                                                                                                                                                                                                                                 |
| 11.1-4  | What is the basis for the stack parameter values in PSAR Table 11.1-2?                                                                                                                                                                                                                        |
| 11.1-4a | How was the tritium generation rate of 62,500 Ci/yr, which was used in the bounding gaseous effluent tritium emission rate, estimated?                                                                                                                                                        |

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| 11.1-4b | What is the basis for the assumed nominal stack height? Is this an effective release height accounting for topography?                                                                                                                                                                                                                                                                                      |
| 11.1-5  | Although the PSAR states that tritium is expected to be the dominant routine radionuclide release, what is the potential effect of the other radionuclides in effluents? Will the doses from all the radionuclides in effluents be calculated in detail for the operating license application?                                                                                                              |
| 11.1-6  | The screening analysis described in PSAR Section 11.1.5 evaluated the consequences of gaseous effluent. What is the basis for not evaluating potential liquid effluent releases? Will liquid effluent consequences be calculated in detail for the operating license application?                                                                                                                           |
| 11.2-1  | It is unclear from the description of the Primary Heat Transport System in PSAR Section 5.1, the Inventory Management System in PSAR Section 9.1.5, or the discussion in PSAR Section 11.2.2 whether there would be periodic replacement of Flibe during operation. Clarify if there is a process that would result in handling and storage of radioactive Flibe over the operational life of the facility. |
| 11.2-2  | Although radwaste system design details are left to the operating license application, did Kairos develop preliminary design information for the handling and storage of radioactive Flibe onsite?                                                                                                                                                                                                          |
| 11.2-3  | Clarify whether there is a plan to periodically replace the Flibe during facility operation.                                                                                                                                                                                                                                                                                                                |
| 11.2-3a | Could this be a major contributor to waste and difficult to deal with? If so, are there preliminary plans to address this need?                                                                                                                                                                                                                                                                             |
| 11.2-3b | Will the radioactive Flibe be disposed of as low-level waste?                                                                                                                                                                                                                                                                                                                                               |

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