Environmental Report Review Audit Information Needs [1]

Information Need Prefix Abbreviations

LU	Land Use
VR	Visual Resources
ECO	Ecology
ALT	Alternatives
SE	Socioeconomics & Environmental Justice
CA	Climatology & Air Quality
NO	Noise
WR	Water Resources
RH	Radiological Health
AC	Accidents
WM	Waste Management
TR	Transportation of RadMat
FC	Fuel Cycle

Status: (A) Closed item, (B) Information provided by ACU is under NRC staff review, (C) ACU to provide further information to the NRC staff

Item #	Reviewer(s)	Date Sent to ACU	ER Chapter or Topic	Info Need
LU-1	Doub	03/06/2023 (ML23061A132)	Land Use	Describe how installation, operation, and decommissioning of the MSRR will be compatible with other academic activities taking place in or contemplated for the SERC.
LU-1	Doub	03/06/2023 (ML23061A132)	Land Use	The PSAR states that the SERC site is zoned Commercial. Verify the zoning of the SERC site and describe how installation and operation of the MSRR will be consistent with the zoning. Will there be any need for a Zoning Variance or Special Exception?
LU-3	Doub	03/06/2023 (ML23061A132)	Land Use	Identify the land uses on the SERC site prior to the start of building the SERC facility and how those land uses have changed.
VR-1	Doub	03/06/2023 (ML23061A132)	Visual Resources	Explain the following statement from Section 19.4.2.1 of the PSAR: “The activities associated with the construction and installation of the MSRR require equipment, alter onsite conditions, and partially obstruct views of the existing landscape.” It seems as if installing the MSRR inside an existing building (the SERC) would not affect exterior visual conditions.
WR-1	Giacinto, Meyera	03/06/2023 (ML23061A132)	Hydrogeology & Water Resources	Provide an estimate of the reactor facility water demands ER, ER, pg. 19-4 (ER Section 19.1, 19.2.3, 19.3.5, 19.4.5).

[1] Additional information needs may be developed as remaining sections of the Environmental Assessment are developed or if responses to existing items require further clarification.

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WR-2	Giacinto, Meyer[a]	03/06/2023 (ML23061A132)	Hydrogeology & Water Resources	Confirm or clarify if the “SERC waste management plan” described in ER, pg. 19-10 is one in the same as the “written plan” as described in Section 11, “Radiation Protection Program and Waste Management,“ ER pg. 19-74 (ER Section 19.3.5, 19.4.5).
WR-3	Giacinto, Meyer[a]	03/06/2023 (ML23061A132)	Hydrogeology & Water Resources	Clarify or confirm that the statement on ER, pg. 19-10, “…liquid assumed to be radioactive and treated procedurally.” refers to the “written waste management plan” in ER, pg. 19-74, Section 11, “Radiation Protection Program and Waste Management,” and that the statement on ER, pg. 19-12 refers to those same procedures as described in Section 11 (ER Section 19.3.5, 19.4.5, 11).
WR-4	Giacinto, Meyer[a]	03/06/2023 (ML23061A132)	Hydrogeology & Water Resources	Clarify or confirm: a) that the “…waste-minimization framework” that “augments ACU’s existing program” refers to the most recent version of ACU’s Waste Minimization Program in ACU’s Waste Management Plan as the 2012 version is seems to be the only version accessible to NRC staff, b) provide access to a recent version of the “Spill Prevention Control and Countermeasure Plan” as the ACU 2012 version seems to be the only version publicly available, and b) any plans to modify these two plans to accommodate the proposed reactor facility (ER Section 19.3.5, 19.4.5, 11). Note that the Spill Prevention Control and Countermeasure Plan was to be updated “at least once every 5 years.” as noted in the 2012 document.
WR-5	Giacinto, Meyer[a]	03/06/2023 (ML23061A132)	Hydrogeology & Water Resources	Provide information on: a) the status related to an Industrial Pretreatment Program City of Abilene permitted user as applicable for wastewater disposal, ER, pg. 19-4 (ER Section 19.1, 19.2.1, 19.3.5, 19.4.5) needed for SERC MSRR operations given that “…effluents from the MSRR facility are monitored for radioactivity during normal operations…” (ER, pg. 11-3, Section 11.1.5); and b) the status of ACU’s stormwater pollution prevention plan (SWPPP) and any associated BMPs, permits or authorizations (ER Section 19.3.5, 19.4.5) associated with the City of Abilene’s development permitting requirements for operation of the SERC and MSRR facility.
WR-6	Giacinto, Meyer[a]	03/06/2023 (ML23061A132)	Hydrogeology & Water Resources	As described on ER, pg. 19-90, with respect to the proposed reactor facility, provide information including permit numbers, authorizing agencies or documented processes as applicable, regarding the “control systems” to “limit emissions” including the status of NPDES/TPDES permits and air emissions controls and, associated permitting authorities and any permitting conditions (ER Section 19.3.5, 19.4.5, 11).
WR-7	Giacinto, Meyer[a]	03/06/2023 (ML23061A132)	Hydrogeology & Water Resources	Provide the reference or document for describing "administrative controls implemented to ensure effluents meet applicable pre-treatment standards." and those associated with the City of Abilene’s industrial pre-treatment program as described in the ER (ER Sections 19.4.14.9, p. 19-87).
WR-8	Giacinto, Meyer[a]	03/06/2023 (ML23061A132)	Hydrogeology & Water Resources	Table 2.5-1 states that a 4.6 magnitude happened at a distance of 195.1 km. In section 19.4.12.1.7.1, the ER states that a “4.6 earthquake at a distance of 314 mi (195.1 km).” While section 13.1.8.1 states, “4.6 earthquake at a distance of 121 mi (195.1 km).” Please confirm that Chapter 19 should correctly state 121 miles and not 314 miles.
RH-1	Palmrose	03/06/2023 (ML23061A132)	Radiological Health	Provide a subject matter expert to discuss the quantity of radionuclides associated with the facility as shown in ER Table 19.4-4 and how they were determined (ER Section 19.2, 19.4.9, 19.4.14.9). The following information should be provided and discussed as noted in NUREG-1537, Part 1, Section 19.3.8, under Human Health: Information on radioactive and nonradioactive effluents released into the environment.
RH-2	Palmrose	03/06/2023 (ML23061A132)	Radiological Health	Provide an updated map of the vicinity for all sensitive receptors listed and discussed in Section 19.3.9.1 (ER Section 19.3.9).

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				The following information should be provided and discussed as noted in NUREG-1537, Part 1, Section 19.3.8, under Human Health: • Maps, in an appropriate scale, showing the distances from the proposed action to the following points or areas for radial sectors centered on the cardinal compass directions: − Nearest site boundary; − Nearest full-time resident; − Nearest drinking water intake (see NUREG-1537 Section 12.12.3.4 Water Resources); and − Nearest sensitive receptors (e.g., schools and hospitals).
RH-3	Palmrose	03/06/2023 (ML23061A132)	Radiological Health	Provide justification for and a subject matter expert (s) to discuss selecting the MEI at 820 ft from the MSRR when the nearest full-time resident is located 410 ft away based on campus maps showing nearby dormitories (ER Section 19.4.9). The following information should be provided and discussed as noted in NUREG-1537, Part 1, Section 19.4.8, under Human Health: 1. Calculated radiation dose rates, annual averaged airborne radioactivity concentrations, and annual averaged waterborne radioactivity concentrations at the site boundary, including a description of the methodology and assumptions; or Calculated annual total effective dose equivalent to a maximally exposed member of the public in the unrestricted area, including a description of the methodology and assumptions.
RH-4	Palmrose	03/06/2023 (ML23061A132)	Radiological Health	Provide subject matter expert(s) to discuss an estimated annual dose for the nearest full-time resident and/or MEI. The following information should be provided and discussed as noted in NUREG-1537, Part 1, Section 19.4.8, under Human Health: 1. Calculated radiation dose rates, annual averaged airborne radioactivity concentrations, and annual averaged waterborne radioactivity concentrations at the site boundary, including a description of the methodology and assumptions; or 2. Calculated annual total effective dose equivalent to a maximally exposed member of the public in the unrestricted area, including a description of the methodology and assumptions. As noted in ER Section 19.3.9.1: “The nearest full-time resident is approximately 410 ft (125 m) from the site boundary,” however, in ER Section 19.4.9.2.2 the following statement is made: “ the maximally-exposed individual from this simulated continuous release is located 820 ft (250 m) north…” This difference in receptor locations needs to be discussed and fully understood by the NRC staff.
RH-5	Palmrose	03/06/2023 (ML23061A132)	Radiological Health	Provide in a location accessible for audit review the CAP-88 input and output files for staff inspection (ER Section 19.4.9). The following information should be provided and discussed as noted in NUREG-1537, Part 1, Section 19.4.8, under Human Health: 1. Calculated radiation dose rates, annual averaged airborne radioactivity concentrations, and annual averaged waterborne radioactivity concentrations at the site boundary, including a description of the methodology and assumptions; or

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				2. Calculated annual total effective dose equivalent to a maximally exposed member of the public in the unrestricted area, including a description of the methodology and assumptions. Such as: • The selection of CAP-88 code; • The details of the CAP-88 calculations such as, but not limited to, source terms, meteorological data, receptor locations, and the results presented in Section 19.4.9.2 of the ER; and In Section 19.4.9.2.2, the ACU ER states that gaseous radionuclide releases are tritium from various sources and radionuclides from activation of salts. Most release locations are associated with the reactor building along with radiochemistry laboratory and fume hoods. Sources and locations are listed in Table 19.4-3 with specific radionuclides listed in ER Table 19.4-4. While the text principally mentions tritium, the gaseous effluent releases are dominated by Ar, N, Kr and Xe radioisotopes. There is also no breakdown as to the total yearly emissions from each location mentioned in ER Table 19.4-3.
RH-6	Palmrose	03/06/2023 (ML23061A132)	Radiological Health	Provide a subject matter expert(s) to discuss all of the potential exposure pathways for members of the public to be exposed to radiological gaseous effluent releases and provide a basis for excluding an exposure pathway, such as: (1) direct radiation from submersion in the gaseous effluent cloud and exposure to particulates deposited on the ground; (2) inhalation of gases and particulates; (3) ingestion of meat from animals eating grass affected by gases and particulates deposited on the ground; and (4) ingestion of foods (e.g., vegetables) affected by gases and particulates deposited on the ground. These exposure pathways contribute to members of the public calculated doses as noted in NUREG-1537, Part 1, Section 19.4.8, under Human Health: 1. Calculated radiation dose rates, annual averaged airborne radioactivity concentrations, and annual averaged waterborne radioactivity concentrations at the site boundary, including a description of the methodology and assumptions; or 2. Calculated annual total effective dose equivalent to a maximally exposed member of the public in the unrestricted area, including a description of the methodology and assumptions. The NRC staff believes that because there would not be any agricultural properties within the boundary of ACU campus or in the vicinity of the ACU campus such that doses at the site boundary and the MEI would not include contributions from the ingestion of milk, meat, or vegetables. However, the NRC staff needs to verify this is the case for the area around the MSRR.
RH-7	Palmrose	03/06/2023 (ML23061A132)	Radiological Health	Provide subject matter expert(s) to discuss potential radiation doses as a result of direct radiation from the MSRR. The NRC staff believes the following statement holds for the MSRR: “The MSRR reactor itself is in a heavily shielded area within the MSRR Reactor Building and below grade such that direct radiation dose rates in the vicinity of facility are expected to be generally undetectable and less than 1 mrem/yr.” The NRC staff needs to verify this is the case for the area around the MSRR.
RH-8	Palmrose	03/06/2023 (ML23061A132)		Provide a subject matter expert(s) to discuss the radiological environmental monitoring text of ER Section 19.4.9.3, Radiological Monitoring, and related PSAR Section 11.1.7, Environmental Monitoring.

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				The following information should be provided and discussed as noted in NUREG-1537, Part 1, Section 19.4.8, under Human Health: 1. For radiological effluent monitoring, provide a general description of the in-plant monitoring plan, including the number and location of sample points, type of measuring devices, and pathways sampled or measured For radiological environmental monitoring, provide a general description of the onsite and offsite monitoring plan, including the number and location of sample collection points, type of measuring devices, and pathways sampled or measured.
RH-9	Palmrose	03/06/2023 (ML23061A132)	Radiological Health	Provide subject matter expert(s) for human health cumulative impacts to discuss recent past, present, and reasonably foreseeable future radiological related actions within the geographic extent of analysis and references that can relied upon for such impacts. While references are listed in Section 19.4.14.13 and at least two are related to Section 19.4.14.8, neither are cited in the text.
WM-1	Palmrose	03/06/2023 (ML23061A132)	Waste Management	Provide a full description of and make available subject matter expert(s) to discuss waste management and disposal of radiological waste including radiological waste contaminated with transuranic radionuclides (ER Sections 19.2, 19.4.9, 19.4.10, 19.4.14.9). The following information should be provided and discussed as noted in NUREG-1537, Part 1, Section 19.2, under Waste Systems: • Descriptions of all (i.e., nonradioactive, radioactive, mixed, and hazardous waste materials) proposed or current waste systems, including quantities, composition, and frequency of waste generation; • Identification of all sources of radioactive liquid, solid, and gaseous waste material within the facility and nearby operating facilities; • Identification of the type and quantity of radionuclides and hazardous materials associated with the facility; • How radiological and hazardous materials would be stored, handled, and utilized; • The capacity of the onsite storage facilities to store target or reactor fuel materials, irradiated fuel, and radioisotope products, as applicable, and the storage time between removal from the reactor and transportation offsite And NUREG-1537, Part 1, Section 19.4.9, under Waste Management: • Description of the sources, types, and approximate quantities of solid, hazardous, radioactive, and mixed wastes expected from the proposed action; • Description of proposed waste management systems designed to collect, store, and process the waste; • Anticipated disposal plans for the waste (i.e., transfer to an offsite waste disposal facility, treatment facility, or storage onsite); and • Description of waste-minimization plan(s) to reduce or minimize the generation of waste The discussion should include a review of what information above is in the ER or available to the NRC staff via the electronic reading room (eRR), the quantity of radioactive waste on an annual basis with associated Class A, B, C and greater than Class C waste classifications. Identify and discuss supporting information in the PSAR, such as the description of proposed waste management systems designed to collect, store, and process the waste (e.g., Fuel Handling System and the Gas Management System/off-gas system [are these the same system? See PSAR Sec. 9.6]).

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				Note values for the overall quantity of liquid and solid radioactive waste was provided in the eRR without any further breakdown on waste classification, packaging and ultimate disposition.
WM-2	Palmrose	03/06/2023 (ML23061A132)	Waste Management	Provide a subject matter expert(s) to discuss the onsite storage and management of the liquid fueled molten salt removed from the reactor system for analysis, as leakage, as spent fuel salt during operations or upon cessation of operations, including storage location, capacity, monitoring, and ACU's responsibilities under the DOE's material take-back program, such as packaging and transportation of the spent fuel salt offsite under decommission activities (ER Sections 19.2, 19.4.9, 19.4.10). This discussion should include information in the PSAR and information obtained by the NRC or ACU staff on ORNL's experiences with respect to spent fuel salt management for the MSRE. For example, radionuclide gamma activity could be such that radiation decomposition of the Flibe would be of concern as seen in the long-term storage of MSRE spent fuel salts. Note, the NRC staff received 11 documents from a training course provided by ORNL concerning the MSRE project that can be shared with ACU staff.
WM-3	Palmrose	03/06/2023 (ML23061A132)	Waste Management	Provide subject matter expert(s) to discuss the handling of the expected small quantities of liquid radioactive wastes (ER Section 19.4.9.2.3). For example, a small volume of radioactive liquid effluent releases (i.e., water-based releases) could be discharged to the sewer lines in accordance with 10 CFR 20 Subpart K, specifically under 10 CFR 20.2003, "Disposal by Release Into Sanitary Sewerage" and the limits of Table 3 of Appendix B to 10 CFR Part 20. Additionally, discuss what, if any, city ordinance(s) are involved for permit(s) from the City of Abilene or other governmental entity that ACU would need for such sewage discharges into the City of Abilene wastewater treatment system.
WM-4	Palmrose	03/06/2023 (ML23061A132)	Waste Management	Provide subject matter expert(s) to discuss the generation of tritium, where tritium will collect (e.g., diffuse into structural material, absorption on charcoal bed and lines., etc.), discharge pathway (e.g., via the research bay ventilation system) and LLRW disposition of tritium-bearing material during operation and decommissioning. Note that if concentration of tritium is greater than the 40 Ci/m^3 limit for Class A low-level radioactive waste (LLRW) per 10 CFR 61.55(a)(4), the material would need to be disposed as Class B LLRW and that WCS should be able to accept such Class B LLRW.
TR-1	Palmrose	03/06/2023 (ML23061A132)	Transportation of RadMat	Provide a subject matter expert(s) to discuss in greater detail than in the ER the following: 1. Transportation mode (i.e., truck, plane, rail, or barge) and projected destinations of the radioactive waste for all waste classifications (i.e., LLRW Classes A, B, and C along with greater than Class C) and nonradioactive waste; 2. Estimated transportation distance from the originating site to the projected destinations of the radioactive waste and nonradioactive waste 3. Treatment and packaging for radioactive and nonradioactive wastes; 4. Calculated radiological dose to members of the public and workers from incident-free transportation scenarios; and 5. What past history from RTRs at Univ. of Texas, Texas A&M, Georgia Tech, and ORNL's MSRE can be applied to the MSRR (ER Section 19.4.11)? Note that there is no discussion of the transportation of waste in the ER even though on page 19-75, ACU states: "Impacts from waste transportation are discussed in Section 19.2.5." Rather, there is a very brief description of LLRW shipments to WCS with no impact assessment in Section 19.4.9.2.4 under human health. Additionally, since this involves transuranic-contaminated LLRW, the

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				NRC staff needs to know how ACU would package and ship this form of LLRW offsite either during the operational lifetime of the MSRR or during decommissioning.
TR-2	Palmrose	03/06/2023 (ML23061A132)	Transportation of RadMat	Provide a subject matter expert(s) to discuss over the life of the MSRR (1) the shipments of fresh uranium tetrafluoride fuel (mentioned ER Sections 19.2.2 and 19.4.9.1.4) as HALEU, (2) shipments of fresh LiF-BeF2 (Flibe) salt, and (3) shipments of spent fuel salt that would occur. This discussion would included the expected certified transport package to be used by DOE or by ACU, DOE's originating and designation sites, and the number of shipments. Note that the NRC staff believes ACU will obtain the necessary HALEU fuel from DOE's Lease and Take-Back program and that the spent fuel salt would be returned to DOE under this program. The NRC staff needs to verify the DOE program that will be providing ACU with the needed uranium tetrafluoride and taking ownership of the spent fuel salt.
AC-1	Palmrose	03/06/2023 (ML23061A132)	Accidents	Provide a subject matter expert(s) to discuss the postulated accidents discussion of ER Section 19.4.12 and PSAR Chapter 13. Specifically: 1. All potential material-at-risk within the NEXT facility including radioactive waste storage locations. 2. The MHA dose consequences presented in PSAR Section 13.2 referenced in ER Section 19.4.12. 3. Potential for external events given that the Abilene Regional Airport is noted in ER Section 19.4.9.2.2.2 as being one mile from the SERC. Note, DOE-STD--5506-2021, "Preparation of Safety Basis Documents for Transuranic (TRU) Waste Facilities," focuses on topics related to hazard and accident analysis and hazard controls for transuranic-contaminated waste (i.e., TRU waste) including identification and evaluation of TRU waste events, TRU waste source term analysis, TRU waste hazard controls selection and standardization, and associated appendices.
FC-1	Palmrose	03/06/2023 (ML23061A132)	Fuel Cycle	Provide a subject matter expert(s) to discuss: 1. The DOE program that will source the HALEU uranium tetrafluoride and take back the spent fuel salt (also see TR-2 Information Need); 2. The process described in PSAR Section 5.4, Fuel Salt Cleanup System, of mixing the uranium tetrafluoride with Flibe to form the liquid fuel molten salt (i.e., fuel fabrication); 3. What liquid fuel molten salt research activities, if any, ACU is considering with respect to removal of fission products and transuranics from the molten salt (this is in conjunction with Waste Management information needs concerning TRU waste), and 4. How the MSRR can be considered bounded by the Continued Storage GEIS, NUREG—2157. The NRC staff needs to verify this information to provide an accurate and complete description of the MSRR's fuel cycle in the EA.
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