Requests for Additional Information (RAIs)
Callaway Plant Unit 2 - Combined Operating License Application (COLA)
Accidents

RAI Number	Question Summary	Full Text
7.1-1	Provide updated DBA analyses and source terms for the Locked Rotor, Rod Ejection, and Steam System Piping Failure accidents that are consistent with the accidents reviewed in the EPR DCD and COLA FSAR.	Environmental Standard Review Plan NUREG-1555, Section 7.1, Design Basis Accidents, directs the staff to review the applicant's calculated dose consequences presented in the environmental report (ER). The only difference between the DBA evaluation conducted for the safety review and the DBA evaluation conducted for the environmental review is in the choice of the X/Q used to incorporate site characteristics in the evaluation. The safety review uses a X/Q that is exceeded no more than 5 percent of the time, while the environmental review used a median X/Q. Therefore, the accidents details for the environmental review should be the same as for the FSAR and the DCD. The Locked Rotor accident and the Rod Ejection accident are inconsistent with the corresponding accidents in the USEPR FSAR (DCD) submitted to the NRC on Dec. 11, 2007. 1) The Locked Rotor accident doses listed in Table 7.1-13 of the ER are for 8perc ent clad failure. The DCD does not present dose estimates for 8 percent clad failure. It presents dose estimates for 9.5 percent clad failure. Provide the doses and source terms for 9.5 percent clad failure. 2) The Rod Ejection accident doses listed in Table 7.1-13 of the ER are for 26 percent clad failure. The DCD does not present dose estimates for a rod ejection accident with 26 percent clad failure. It presents dose estimates for 36.7 percent clad failure. Provide the doses and source terms for 36.7 percent clad failure. 3) In addition, Table 7.1-13 includes a dose for a Steam System Piping Failure (Main Steam Line Break) accident with a 0.24 percent clad failure. a) What is the basis for this accident? It is not addressed in the EPR DCD. b) Provide doses and source terms for the Steam System Piping Failure accidents with 3.3 percent clad failure and the accident with 0.58% full-rod fuel melt that are listed in the DCD.
7-1	Provide electronic copies of input and output files for the MACCS2 computer code	The staff conducts calculations to confirm the severe accident and SAMA analyses presented in the ER and makes independent severe accident analysis calculations. Provide electronic copies of the MACCS2 input and output files for use in the staff's review.

Requests for Additional Information (RAIs)
Callaway Plant Unit 2 - Combined Operating License Application (COLA)
Accidents

RAI Number	Question Summary	Full Text
7.2-1	Provide a discussion of the rationale for the MACCS2 input values related to hot spot and normal relocation	The MACCS2 input file includes relocation criteria for hotspot and normal relocation that give doses that are well in excess of EPA protective action guides for relocation. Provide a discussion for the rationale for the input variables SRDOSHOT001, SRDOSNRM001, SRTIMHOT001, and SRTIMNRM001, which define the relocation criteria.
7.2-2	Explain what is meant by "The time window for the analysis is 24 hours following core damage."	The first paragraph of ER Section 7.2.1.3 contains the sentence referenced. What is the meaning of the statement? The MACCS2 analysis should cover at least five years following the accident. Are there no severe accident releases that extend beyond 24 hours? The DBA LOCA and fuel handling accidents have significant releases after 24 hours.
7.2-3	Provide recent population dose or population dose risk estimates for Callaway Unit 1, if available	NRC staff is required to discuss cumulative impacts of the proposed plant. The core damage frequency and population dose risk for Callaway Unit 1 are needed to assess the total dose risk for the Callaway site should the proposed plant become operational. The core damage frequency has been provided for Unit 1, but not the population dose.
7.2-4	Provide a logical basis for concluding that the groundwater pathway dose risk is small.	The last paragraph of ER Section 7.2.2. The conclusion in the next to last sentence does not follow information contained in the ER. Provide sufficient information to demonstrate that risks associated with groundwater releases from a US EPR severe accident would be lower than they are for the Callaway Unit 1. The logic should address both release frequency and source term. If the air pathway dose risk is reduced, does it necessarily follow that the groundwater pathway risk is also reduced?
7.3-1	Provide a justification for using estimated retrofit costs to determine whether a SAMDA is cost beneficial.	Staff is required to assess whether potential SAMDAs are cost beneficial. Many of the implementation cost estimates in the ER submitted with the design certification application are based on retrofitting the SAMDA in an existing plant. Discuss why these cost estimates are appropriate for use in determining whether or not a SAMDA is cost beneficial for an unbuilt plant that is still under design.

Requests for Additional Information (RAIs)
Callaway Plant Unit 2 - Combined Operating License Application (COLA)
Accidents

RAI Number	Question Summary	Full Text
7-2	Provide an evaluation of each of the 51 SAMDA candidates listed in Table 6.2 of the EPR design certification ER.	AREVA lists 51 SAMDA candidates that were deferred because they were not required for design certification. Most, but not all, of these candidates pertain to procedures and training. The ER for Callaway implicitly assumes that all 51 of the deferred candidates are related to procedures and training by not addressing any of the candidates. However, there are at least six candidates in the list of design certification list of 51 that are site specific and do not refer to procedures and training. Those SAMDA candidates should be addressed in the SAMDA review in the Callaway ER. The Callaway ER should address those candidates that specifically apply to multiunit sites. To be sure that no candidate is overlooked, the Callaway ER should address each candidate in the list.
7.3-2	Provide a schedule for completion of the plant operation and training procedures and a brief description of items to be considered in developing the procedures including risk insights.	The staff is required to address both SAMDAs and operation and training procedural alternatives in its SAMA review in the EIS. Provide a schedule for development of operational and training procedures, and provide a brief discussion of factors, including risk insights, to be considered in developing non-hardware alternatives.

RAI Number	Question Summary	Full Text
9.3-1	Provide the detailed alternative site screening process documentation that supports the selection of the alternatives sites listed in the ER.	ESRP 9.3 requires that *"the applicant has employed a practicable site-selection process with the principal objective of identifying candidate sites that would be among the best that could be reasonably found for the proposed plant"* and ultimately supportive of a determination that there are or are not obviously superior sites to the proposed site. From discussions during the site audit and alternative site tour it was not clear how the screening process as summarized in the ER was consistent with ESRP 9.3. Provide a detailed discussion of the alternative site screening process including a description of how the alternatives were ranked. The ER supplements[1] introduce new questions regarding both the screening process and the resultant set of alternative sites that were recommended by the applicant and characterized in detail. Specific questions are detailed in RAIs that follow.
9.3-2	Provide additional information and mapping of sites A-4, A-6, and C-4 to support their exclusion.	The exclusion of sites A-4, A-6, and C-4, based on being "outside of ROI and AmerenUE Service Area" (page 9-36 and Table 9.3-9) appears to be inconsistent with the expansion of search area defined on page 9-26 (ER supplements) since the ROI was expanded to include the entire State. Are these sites more accurately excluded because they are outside of the eligible "candidate area" or were they excluded before the expansion of the ROI/candidate area? If the latter, why should they be excluded if they are within the candidate area? All sites evaluated in the screening process must be legibly shown on one or more of the screening figures to support the needed interpretation of the text (ER supplements, page 9-26 and Table 9.3-9). Although not clearly discernable (note that AmerenUE needs to provide a legible figure) it appears that these sites are not outside the expanded candidate area on Alt Screening Slide - Original Siting Study Sites (Alternative Site Selection and Evaluation [1].pdf, provided 5/26/09). Are these excluded sites within the expanded candidate area? If so, include them in the site ranking evaluation in Table 9.3-8.
9.3-3	Were seismic factors used as an exclusionary criterion for defining the candidate area?	The minimum exclusionary criteria used to define the "Candidate area" also included a seismic exclusion area as defined in the Alternatives Presentation Slides, but this criterion is not listed in the ER supplements as part of the criteria for defining the candidate area listed on page 9-26 (ER supplements, page 9-26). How was the criterion defined quantitatively and/or qualitatively and applied to define the candidate area?

[1] Letter dated May 15, 2009, from Ron T. Lamb to U.S. Nuclear Regulatory Commission. "AmerenUE – Callaway Plant Unit 2 (NRC Docket No. 52-037) Environmental and Alternate Site Audit Information Needs Item Updates and Environmental Report Supplements". ALNRC 00025. Note that enclosures "O" and "P" were not included in the original submittal. Enclosure "O" was submitted on May 26, 2009 (email from Roger Wink), and enclosure "P" was submitted June 3, 2009 (email from Paula Johnson). The 2005 WET Report, that was not available for the May 15 submittal, was submitted on May 28, 2009 (email from Roger Wink).

RAI Number	Question Summary	Full Text
9.3-4	Should the Fred Weber site have been excluded due to the proximity of Highway 61?	Site A-1, was excluded based on need to relocate Highway 19. Should/would the Fred Weber site be excluded due to need to relocate or control State Highway 61 (ER supplements, Table 9.3-9)? Clarify how/why the allowable highway proximity at the Fred Weber site is different than that for the excluded site A-1 and why the Fred Weber site was not excluded.
9.3-5	How were seismic factors considered in screening?	Define how the exclusionary criterion - *Distance from areas with geological hazards such as active faults and seismic activity* - was quantitatively applied. Specifically, what distances and seismic activity were applied as exclusionary criteria (ER supplements, page 9-29 and page 9-30)?
9.3-6	Where are the original siting study sites located relative to the expanded ROI and candidate area?	Provide a legible copy and electronic file of the figure showing the locations of the original siting study sites against the expanded candidate area. The numerical site identifiers in the file "Alternative_ Site Selection and Evaluation [1].pdf" provided 5/26/09 cannot be discerned.
9.3-7	How was the criterion *Diversity of environment and geomorphology with respect to Callaway* defined and applied?	How was the criterion - *Diversity of environment and geomorphology with respect to Callaway* - quantitatively or qualitatively determined for each candidate site evaluated (ER supplements). Why is only Environmental Diversity indicted on Table 9.3-8? Why is environmental diversity a positive feature for a nuclear plant site and the lack of diversity a negative?
9.3-8	How were geologic factors applied in the site ranking process?	The ER, on page 9-30, indicates "*A general site ranking was provided for each candidate site as well as the proposed site for each of five categories: 1. Vibratory Ground Motion 2. Capable Tectonic Sources 3. Surface Faulting and Deformation 4. Geologic Hazards 5. Soil Stability*" (ER supplements, page 9-30). Where is this information included in the ER and how was it applied (no such criteria appear on Table 9.3-8)?
9.3-9	Is Table 9.3-8 mis-titled?	Since Brownfield sites are now included on Table 9.3-8, should the Table name [*Greenfield Site Comparison Matrix*] be revised to more accurately reflect the contents of the table (ER supplements, page 9-88)?
9.3-10	How were negative ranking values applied?	The ER text (page 9-39) lacks an explanation of the application of negative numerical values for some ranking criteria on Table 9.3-8 (ER supplements, page 9-88).
9.3-11	Why is the Chamois site listed as a candidate site when it ranks 11th among sites on Table 9.3-8?	Following the reference to Table 9.3-8, which provides the ranking of all evaluated sites, the ER supplements (page 9-39) states that the results show Fred Weber, Paynesville, Lamine, and Chamois "were most favorable with respect to the *initial siting criteria*" (ER supplements, page 9-39). No "*initial siting criteria*" have been so identified in the ER. Identify the "*initial siting criteria*" or clarify if the text should have used "… with respect to

RAI Number	Question Summary	Full Text
		the *avoidance and suitability criteria* discussed in the ER and tabulated on Table 9.3-8…". However, if the text intended to indicate that these are the highest scoring sites in the comparative evaluation on Table 9.3-8 (ER supplements, page 9-88), it is incorrect in that the rank order from highest to lowest of the five best sites is Callaway, Fred Weber, Lamine, Paynesville and 30543 Highway N. Chamois' weighted value ranks it 11th among the sites evaluated. Why has the Chamois site been included as a alternative site when it ranks much lower that many other sites and specifically the 30543 Highway N site, which ranks 5th among the candidate sites? Should the 30543 Highway N site be included as a candidate site and characterized in detail like the other candidate sites?
9.3-12	On Table 9.3-8 in the ER supplements, why have new criteria been added and the definitions of some ranking criteria been changed?	Two new avoidance and/or suitability criteria (Brownfield vs. Greenfield and Environmental Diversity) are included on Table 9.3-8 in the ER supplements that were not included in ER Rev 0. Additionally, in the ER supplements section 9.3, the definitions of some criteria have been altered (e.g., "Distance to 345 KV" is now "total length of transmission line needed"), the characteristics of some sites are now different (e.g., site C9 was 0 miles from a 345 KV line in Rev 0; it now requires 130 miles of transmission lines), and value ranges have changed. As a result, the scoring for some criteria for some sites has changed. To clarify the site screening record, explain the basis for these changes between ER Rev 0 and the ER supplements.
9.3-13	Provide detailed maps of the floodplains (100 & 500 year) for the Chamois site.	These environmental factors were used in the alternative site screening process and have specific regulatory authorities for their protection. The guidance of ESRP 9.3 (page 9.3-3) is that such data should be provided on maps of adequate scale and detail.

Requests for Additional Information (RAIs)
Callaway Plant Unit 2 - Combined Operating License Application (COLA)
Aquatic Ecology

RAI Number	Question Summary	Full Text
2.4.2-1	Provide access to the citations listed in Attachment 1.	Requested references (Attachment 1) are needed to verify statements made in the ER, and for project files documentation.
4.3.2-1	When available, provide the final mitigation plan that will address the potential impacts of construction and operation of Callaway Unit 2 to streams, ponds, and portions of the Missouri River adjacent to the Callaway site.	This information will be used to demonstrate that the potential impacts of construction and operation of Callaway Unit 2 to jurisdictional waters within or adjacent to the site discussed in Section 4.3.2 have been addressed and a plan for their mitigation has been developed in accordance with Federal and State regulatory requirements.
4.3.2-2	If it is determined that dredging is required at the barge slip location on the Missouri River, describe the process for handling the dredge spoils.	This information will be used to verify that if dredging is required at the barge slip, the disposal of dredged material will be consistent with Federal and State requirements (ER supplements, Section 4.3.2.2).
4.3.2-3	If available, provide data from any aquatic monitoring studies that have been conducted on ponds, streams, or the Missouri River near the existing intake and discharge since operation of Unit 1 began.	Because ER Rev 1 suggests that the aquatic impacts of the proposed Unit 2 would be similar to those observed for Unit 1, it would be helpful to review aquatic monitoring information collected during the operation of Unit 1 from the Missouri River, and streams and ponds within or adjacent to the Callaway site.
4.3.2-4	Provide data and discussion on the population trends of aquatic invasive species observed in the Missouri River near the existing discharge since the operation of Unit 1.	This information will be used to assess the potential aquatic impacts of invasive species under two-unit operation.
4.3.2-5	Describe any known instances of heat or cold shock episodes associated with the operation of Unit 1.	This information will be used to assess the potential impacts associated with the discharge of blowdown water from both units on the fish and biota into the Missouri River.
6.5.2-1	If available, provide abundance and distribution data for the Pallid sturgeon in water bodies on or near AmerenUE	This information will be used to support the Biological Assessment required by FWS under the ESA.

RAI Number	Question Summary	Full Text
	property since Unit 1 began operation.	
6.5.2-2	Provide description of gross sediment characteristics (e.g., presence of silt, sand, gravel, cobble) for the six aquatic sampling locations in the Missouri River near the existing discharge.	This information will be used to assess whether these locations could be used by representative fish species for spawning.

RAI Number	Question Summary	Full Text
2.5.3-1	Provide supporting data/information to: • Show that archaeology and historic and resulting reports have been completed and finalized. • Address the survey status of the collector wells system, access road, bridge, water supply pipeline, and transmission lines areas. • Provide access to all final reports for review.	Provide for docketing, all current survey reports so they can be referenced in the DEIS, and supply future reports from surveys of areas associated with transmission lines and the support system for collector wells; these also need to be docketed so that they can be referenced in the DEIS. Provide a written response for its plan of avoidance for the proposed settlement pond near Site (23CY256). Provide written assurance regarding cultural surveys of transmission pole footings in the flood plain - particularly looking for evidence of shipwrecks.
2.5.3-2	Provide all pertinent survey reports with regard to current State Historic and Preservation Officer (SHPO) survey standards.	Provide an updated and revised Cultural Resource Management Plan, including updated SHPO guidelines, a plan for inadvertent discovery of human remains, a plan for discovery of archaeological material, cemeteries, and ship-wrecks, a section on Native-American consultation, a section on Traditional Cultural Properties, a section on cultural resource surveys for new construction, and a section on avoidance plans. This will require SHPO concurrence. This document also needs to be docketed so that it can be referenced in the DEIS.
2.5.3-3	Provide copies of all relevant correspondence between applicant and SHPO, and/or tribes including SHPO comments on definitions of area of potential effects, and all related archaeological and architectural surveys and reports. Provide related archaeological and architectural surveys and reports.	Provide all correspondence (for docketing) with the SHPO, AmerenUE, and its contractors. Also provide summaries of meetings and phone logs with the SHPO, and describe the results of those meetings; all written correspondence between AmerenUE, their contractors, and Native American tribes (includes copies of the mailing lists and descriptions of how the mailing lists were compiled; copies of form letters sent to the tribes; copies of responses; copies of replies to responses; and written responses summarizing the consultation process, including phone calls). Provide two maps of the area of potential effects. The first map will consist of 7.5 min. topographic maps, boundaries for all archaeological sites, locations of all historic structures (Ray 1984), the construction footprint for Unit 2, and the AmerenUE property boundaries. The second map will be the same as previous map but without showing the archaeological or historic sites. Provide ArcView shapefiles for all the layers needed to make the two areas of potential effects maps. This is still ongoing because it includes archaeological surveys and reports that still need to be completed.

Requests for Additional Information (RAIs)
Callaway Plant Unit 2 - Combined Operating License Application (COLA)
Cultural Resources

RAI Number	Question Summary	Full Text
2.5.3-4	Describe all archaeological sites that have been recommended for Phase-II or Phase-III investigations and if any Traditional Cultural Properties have been identified, and provide avoidance or mitigation plans (MOAs or MOUs).	Provide written descriptions of the cultural sites that fall (partially or entirely) within the construction footprint of Unit 2 and the SHPO concurrence letter that approves the avoidance and mitigation plan for each, including sites 23CY359 and 23CY256. Provide written descriptions of all traditional cultural properties (TCPs) located within or adjacent to the construction footprint and their plan of avoidance.
2.5.3-5	Provide access to all consultation letters with Native American tribes and interested parties.	Consultation with Native American tribes is covered in RAI 2.5.3-3. Provide a written description indicating that interested parties were sought out during public meetings and contractor research and that no interested parties were identified.
4.1.3-1	Provide a description of the discovery process for the possible steamboat wreck sites and access to any references and discussion of the possibility of steamboat wreck sites in the project area for review.	Provide in a future survey report on the support system for collector wells a section on remote sensing (ground penetrating radar) looking for shipwrecks within construction corridors in floodplain areas.
4.1.3-2	Provide a description of how potential impacts resulting from preconstruction, construction, and operations on cultural and historic resources were analyzed, as well as if indirect effects were considered to cultural resources located outside the project's footprint including TCPs and above ground structures.	Provide copies of the written responses that explain preconstruction impacts that were included in the Cultural Resources binder made available during site audit. Provide a written description of why Unit 2 construction and operating impacts to cultural resources is considered small due to plans of avoidance and the updated Cultural Resources Management Plan. Provide a written response on transmission line maintenance activities and how these (operations) will not impact cultural resources.
9.3-1	Describe methods used to describe cultural resources impacts. Provide references used.	Provide a written response describing research conducted to provide reconnaissance-level information for cultural resources, including a list of database searches (Referenced in 9.3). Provide a written response describing how cultural resources were weighted in the alternative site selection process.
10.1-1	Describe how cumulative impacts to cultural resources were evaluated.	Provide a written response describing projects in the area that can result in cumulative impacts to cultural resources and how these will impact cultural resources.

Requests for Additional Information (RAIs)
Callaway Plant Unit 2 - Combined Operating License Application (COLA)
Hydrology

RAI Number	Question Summary	Full Text
2.3.1-1	Provide NPDES records with focus on total suspended solids.	This information will be used in the evaluation of hydrology and surface water quality.
2.3.3-1	Provide lab reports containing surface water chemical analyses, including those for mercury, with detection limits identified.	Table 2.3-33 shows that dissolved mercury was measured in the surface water testing program. However, the ER text states that mercury was not detected (ND) at or above the detection limit of 0.2 ug/L. Clarification of mercury levels is needed for the evaluation of surface water quality.
2.3.3-2	Supply the QA Plan and analytical procedures used for site characterization (Rizzo 2007. "QA Project Plan for Baseline Study: Surface Water and Groundwater Quality, Callaway Unit 2 Environmental Report Section 2.3.3, Revision 1." August 2007).	This information will be used to evaluate surface water quality.
6.1-1	Provide NPDES records for Unit 1 with data of collection locations.	This information will be used to evaluate thermal monitoring from the existing unit.

RAI Number	Question Summary	Full Text
5.4.2.1	Provide copies of all input and output files for XDCALC, LADTAP and GASPAR calculations used for either construction worker doses, doses to members of the general public from routine operation, or doses to biota.	Three computer codes, XDCALC, LADTAP, and GASPAR, are used to calculate the doses to members of the general public from routine operation of Unit 2, and doses to Unit 2 construction workers from routine operation of Unit 1. The input and output files from these computer codes will be used to perform a thorough review of the dose calculations.
4.5-1	Provide information on the potential for an onsite storage facility for spent nuclear fuel. If such a facility were put into operation during the Unit 2 construction period, it would be a radiation source that would need to be evaluated for construction worker doses.	Section 4.5 of the ER presented an analysis of radiation dose to construction workers at Unit 2 resulting from the routine operation of Unit 1. It included all sources of radiation that would contribute to the exposure, but did not reference the possibility of an on-site storage facility for spent nuclear fuel. If such a facility were put into operation during Unit 2 construction it would be a significant source of exposure. This RAI is intended to address this possibility, by inquiring whether there is any potential for a spent-fuel storage facility to be constructed onsite.

Requests for Additional Information (RAIs)
Callaway Plant Unit 2 - Combined Operating License Application (COLA)
Land Use

RAI Number	Question Summary	Full Text
2.2-1	Identify (map) and quantify (table) the prime farmland within the site boundaries and in the areas affected by project activities (e.g., transmission corridor; collector well-system; access routes). Provide an estimate of the quantity of prime farmland that will be affected by project activities.	Prime farmland as defined by U.S. Department of Agriculture Natural Resources Conservation Service at 7 CFR 657.5(a). Clarify the relationship of the numbers in Table 4.1.2 with the proposed project activities and with the figures illustrating the location of project activities.
4.1-1	Resolve the discrepancy between the conclusions concerning land use impacts on p.4-6 (section 4.1.1.1) and 4-7 (section 4.1.1.2).	One statement says that "land use impacts to the Callaway site and vicinity of the Callaway site from construction of the new unit would be MODERATE primarily due to the loss of wetlands and wetland buffers, and would require mitigation" (p 4-6); the other states that "impacts to land use in the vicinity of Callaway Plant Unit 2 would be SMALL and not require mitigation" (p 4-7).
4.1-2	Specify the land use changes that will result from the road construction and modification of access and parking described on p 4-5.	Further describe the proposed modification to the existing heavy haul road, new construction parking lot, rerouting of the exiting site perimeter road, construction of a new road going south from Hwy 94 to access the collector well system and their impacts on land use.
4.1-3	Provide an estimate of the volume of demolition material that will need to be disposed of, transportation needs, and land use consequences.	Provide an estimate of the volume of demolition material that will need to be disposed of, whether it will go into an onsite landfill or transported offsite. If transported offsite, provide an estimate of the number of truck trips needed and the route taken. If disposed onsite, discuss the land use consequences.
4.1-4	Verify the conclusion that no land use changes in the Callaway vicinity would be expected as a result of construction workforce related population changes.	The experience of Unit 1 construction was that a number of construction workers located mobile homes or RVs on property in the vicinity of the Callaway site, with some impact on sanitary waste disposal. Provide a rationale for why this would not occur with the proposed unit.
4.1-4	Quantify the land use impacts of widening the transmission line corridors.	Quantify the land use impacts of widening the transmission line corridor and placing the new transmission towers.
4.1-5	Provide the full citation for the source of Table 4.1-1 (Burns &McDonnell).	

Requests for Additional Information (RAIs)
Callaway Plant Unit 2 - Combined Operating License Application (COLA)
Meteorology/Air Quality

RAI Number	Question Summary	Full Text
2.7-1	Provide adequate justification for all conclusions related to meteorology and air quality.	In accordance with 10 CFR § 51.70(b)[2], the staff will have to include detailed justifications for conclusions reached in the EIS. Provide supporting quantitative data/information and the scientific rationale to explain the logic for conclusions reached in the ER (e.g., "impacts are small" or "on-site conditions are similar to those at other sites"). Details should be addressed, such as criteria for the decision, inputs used and methodologies, analysis of outputs, and statistical methods applied.
2.7-2	Provide electronic copies of input and /or output files for the dispersion model computer codes.	The staff conducts calculations to confirm the atmospheric dispersion model analyses (i.e., transport and dispersion diffusion model applications) presented in the ER and makes independent atmospheric dispersion model calculations to confirm the reasonability of the applicant's results. Provide electronic copies of all supporting data/information (e.g., input and output files, and assumptions) to support the applicant's dispersion model runs. For example, present the precise assumptions for source locations, elevations, buoyancy and/or momentum flux, nearby building dimensions, etc. Provide the detailed meteorological input files (as sequential hourly data and as joint frequency distributions of wind speed and wind direction by atmospheric stability class) in the format required for the NRC models (see RG 1.23).
2.7-3	Provide a discussion and specific references concerning whether the area is in attainment for NAAQS pollutants	Provide specific references that can support the statements that the area "is in attainment" with respect to National Ambient Air Quality Standards (NAAQS).
2.7-4	Provide details on the back-up meteorological tower (instruments, their QA/QC, and analysis methods)	Provide written details on the Callaway back-up meteorological tower and instruments (map or drawing showing nearby obstacles and list of distances to obstructions), period of record, types of instruments, types of data archived, QA/QC methods. Provide details on how the back-up met tower was used prior to 2007.
3.4-1	Provide more complete discussions and justifications of conclusions regarding the SACTI cooling tower runs.	Cooling towers (CT) and SACTI model: 1) Written justifications of use of specific met input data (e.g., tower levels) should be given. 2) For all CT effects, justify the reasons for the conclusions of "small" or "no impact" or "insignificant increases". Provide more support for the conclusions for the ESWS CTs, since those CTs may have relatively large impacts in the near-field. All conclusions need to be

[2] "The NRC staff will independently evaluate and be responsible for the reliability of all information used in the draft environmental impact statement."

RAI Number	Question Summary	Full Text
		supported by facts (tables and figures and analysis) 3) Provide details for conclusions regarding interactions of the cooling tower plumes.
2.7-5	Provide enhanced discussions to explain the conclusions regarding similarities between the on-site data and the NWS sites near Callaway; and provide improved table and figure captions plus enhanced discussions of Callaway meteorological data.	Provide written justification for conclusions regarding comparisons made with other meteorological observing sites in the area (such as Columbia, Kansas City, Jefferson City, and St. Louis) from 1970-2000. Specifically more justification is needed for conclusions drawn about whether the Callaway site is similar to the others. To the extent possible, the comparison should be done with concurrent data, from the same time period. Provide the rationale (e.g., statistical criteria) for deciding whether the Callaway data are indeed statistically similar to the offsite data and the limitations on that interpretation. Provide enhanced discussions and justifications for conclusions regarding the many pages of tables and figures of Callaway meteorological data. In most cases the wind speed and direction data are simply listed with no scientific interpretation. For example, even though the percentages of various wind direction sectors may be approximately the same for a few directions, the possibly unwarranted conclusion is reached that the dominant wind direction varies significantly from one level or time period to another. Provide more detailed captions to tables and figures so that the staff and other readers can understand what is being listed and plotted. Provide expanded discussions in the text, since currently the text is very brief and does not provide adequate justifications.
2.7-6	Provide justification for conclusions from dispersion modeling	Staff is required to present atmospheric dispersion relative concentrations and dosages and discuss whether the anticipated impacts are within NRC limits. Yet the text in ER Section 2.7.6.2 that discusses realistic (50^{th} percentile) impacts (calculated using proprietary dispersion models), is very short. Provide additional text, figures and/or tables summarizing model inputs, assumptions, and outputs (e.g., for specific receptors). Provide quantitative numbers and decision criteria justifying conclusions such as regarding "small impacts". Provide a description of the AEOLUS3 dispersion model, inputs to and assumptions for the modeling analysis based on COL FSAR Section 2.3.4.2.1. In addition, move the discussion regarding the determination of 50^{th} percentile realistic X/Q values from COL FSAR Section 2.3.4.2.2 to COL ER Section 2.7.6.

RAI Number	Question Summary	Full Text
8.2-1	Reconcile the planned 2017 operational date with Tables 8.2-3 and Tables 8.4-1 which indicate that the need for 1,600 MW is not reached until 2023/2024. If some part of the action will be a merchant plant, then address: 1) how the ROI would change, 2) how a changed ROI would/should affect the range of reasonable alternatives, 3) how the cost benefit analyses might be changed if tax exempt municipalities became part of the merchant plant sales. Revise the statement of Purpose and Need to reflect a regulated/merchant approach.	The ER currently proposes 1,600 MW of new baseload by 2017 but only demonstrates a need for ~900 MW within the defined ROI in that timeframe; the applicant indicated that its approach would be part-regulated, part-merchant plant for some period of time, but such is not described within the ER.

RAI Number	Question Summary	Full Text
10.4-1	Describe how Unit 2 would affect the fuel diversity of AmerenUE and the electric power generation in the service area of the proposed project.	One of the potential benefits of Unit 2 is diversification of the fuel used to generate electricity, which can enhance energy security. Staff needs either information about the existing and projected fuel mix to support this assessment, or information about the effect of the proposed unit on fuel diversity.
10.4-2	Describe the benefit of Unit 2 in terms of meeting a demand for electricity, including the timing of that demand satisfaction. This could include estimates of the monetary value of the electricity generated by proposed Unit 2.	Ensure that this information is consistent with the information provided in the Need for Power section and in section 10.4.1.3 regarding the characterization of future power need.
10.4.3	Describe the tax revenue benefits that would result from the proposed project, including those that would accrue during the construction phase of the project. Specify the type of tax and the recipient jurisdiction, when the tax payments would occur, and whether the estimated tax payments are in current or constant dollars.	Staff needs this information to describe the economic benefits of the proposed project to different jurisdictional units. The information can be presented in terms of annual payments and the number of years those payments would be anticipated to occur or in cumulative payments, with specification of the time period over which payments would be made.
10.4-4	Provide an estimate of the total new jobs created within the three-county area as a consequence of the proposed project.	Ensure this is consistent with the information provided in the Socioeconomic sections.
10.4.5	Provide a description of infrastructure improvements that would occur as a result of the proposed project.	Ensure that this is consistent with the information in the socioeconomic sections.
10.4-6	Provide project-specific projected internal costs and cost components for the construction of the proposed Unit 2 and the basis for those estimates. Specify whether costs are in current or	Provide more site-specific and current estimates of the materials consumed by NPP construction and the proposed unit's internal construction costs. Table 10.2.1 presents information for plants built in the 1970s, which were different from the proposed plant's design and construction practices, and are not for a 1600 MWe size plant.

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	constant dollars and provide references to the sources of the information.	
10.4-7	Provide details of estimated operations and decommissioning costs for the proposed unit, and provide the basis for the "selection" of the cost estimates. (p 10-27.)	Provide details of the cost components of estimated operations costs for the proposed unit, including fuel, waste disposal, and decommissioning costs, and provide a reference to the source of the information. Provide a basis for the "selection" of the cost estimates. (p 10-27.)

RAI Number	Question Summary	Full Text
4.6-1	Provide a description of controls and measures for public and occupational health, and noise associated with preconstruction and construction activities.	The ER Rev. 1 (ER supplements) does not describe specific types of measures and controls that would be used during preconstruction and construction activities that are protective of public and occupational health. Provide examples or controls that would be imposed to mitigate air emissions during construction activities; specific references to air quality and noise limit regulations; distance to nearest accessible area that could be impacted by noise (e.g., closest resident to the fence line); schedule for construction activities (e.g., will construction be 24/7?); and peak noise levels during construction activities.
5.3.4-1	Provide description of recreational activities that occur in the vicinity of the discharge into the Missouri River.	As part of the evaluation of impacts to members of the public, the opportunity for exposure to the public is evaluated. Recreational activities in the Missouri River are likely to be the pathway to exposure of thermophilic microorganisms. Describe the types of recreational activities that take place in the Missouri River in the vicinity of the thermal discharge.
5.3.4-2	What protection will be provided to workers during activities within the cooling towers to minimize exposure to thermophilic microorganisms?	Section 5.3.4.1 of the ER states that, "Potential health impacts to workers from routine maintenance activities associated with the towers will be controlled through the application of industrial hygiene practices including the use of appropriate personal protective equipment". What health impacts are of concern and types of personal protective equipment will be used? Discussion should include if similar procedures are used for Callaway Plant Unit 1 or another similar facility to Unit 2.
5.6.3-1	Provide a description of how the transmission system will comply with National Electricity Safety Code concerning steady-state currents.	For the modifications or upgrades of the transmission system for Callaway Plant Unit 2, provide information that demonstrates that the system will comply with National Electricity Safety Code concerning steady-state currents. Stating that the system will be compliant should be supported with information that conforms to NESC. Provide basis for how existing system meets NESC and how the modifications or upgrades to the transmission system will be similar to the existing system. Discussion should include ozone generation and electrostatic effects.
5.11-1	What are the cumulative nonradiological human health impacts from other actions in the vicinity?	ER Rev. 1 (ER supplements) does not address cumulative nonradiological human health impacts. Discuss cumulative nonradiological human health impacts of construction and operation, including etiological agents (formerly thermophilic organisms), noise, electrostatic effects (electric shock), and electromagnetic field effects. Discuss other activities, either existing or planned in the vicinity, that should be considered in cumulative impacts.
3.6.3-1	Describe the mixed waste minimization program.	Waste minimization programs are mentioned in the ER. Section 3.6.3.4 does not indicate if there is a waste minimization program for mixed waste. Please describe the activities

RAI Number	Question Summary	Full Text
		associated with minimizing mixed waste.
3.6.3-2	What is the quantity of hazardous waste materials for Callaway Plant Unit 2	In Section 3.6.3.5 and in Tables 3.6.1 and 3.6.4, the quantity of solid effluents is discussed. Clarify if the information is only for Unit 2, or for Units 1 and 2 combined. Information for Unit 2 and combined units is needed for the evaluation in the DEIS. In Table 3.6.1, clarify what is meant by "inhibitor" and "dispersant". If specific information is not available for Unit 2, give an example of the type of chemical used in either Unit 1 or with other plants of similar design. In Table 3.6.4, hazardous wastes are identified by waste code. Clarify how the code, representing typically several chemicals of varying effects, should be evaluated for impacts. Clarify the entry for Lab Chemicals – D005, year 2001, "(98.9)". Why is this the only value in the table in parentheses?

RAI Number	Question Summary	Full Text
2.5-1	Provide additional detail concerning the residential location of existing Callaway Unit 1 workers, including their location in municipalities (as well as counties).	Confirm that the "other" category of workers is not clustered in any concentrated geographic area.
2.5-2	Provide a map showing the location of all residents within the LPZ (or a 2 mi-radius) and identify the distance from the plant fenceline and construction footprint to the nearest residents.	This information is needed for calculations of impacts from site activities (noise and dust, for example). Information in the ER is inconsistent. Correct Table 2.5-6 if necessary. Ensure that the information is consistent with that provided in Table 5.4-3 and section 5.3.4.2.
2.5-3	Provide citations/sources for the source of information in all the tables in sections 2.5, 4.4, and 5.8 for which no citations are provided and provide dates of the information in the tables for which no date is specified.	For example, no citations/source is provided for tables: 2.5-1; 2.5-21; 2.5-22; 2.5-24; 2.5-26; 2.5-33; 2.5-34; 2.5-35; 2.5-40 [check reference]; 2.5-42; …. and other tables in sections 4.4, 5.8, and 10.4. For example, no date of information is provided for data in tables: 2.5-1; 2.5-15; 2.5-16; 2.5-21; 2.5-22; 2.5-23; 2.5-24 [FN is inconsistent]; 2.5-25; 2.5-26; 2.5-30; 2.5-31; 2.5-32; 2.5-33; 2.5-34; 2.5-35; 2.5-36….and other tables in sections 4.4, 5.8, and 10.4
2.5-4	Provide details concerning the best-fit equation used to project population to 2060 as shown in Tables 2.5-3 and 2.5-9.	The population projections provide the baseline for the demographic conditions in the various regions of analysis. Therefore staff needs a clear understanding of the method used to estimate population change over the analytic period.
2.5-5	Provide estimates of the number of residents in the facility for the criminally insane and the school for the deaf in Callaway County and clarify whether they are included in the estimates of transient populations or residential populations.	The staff needs clarification whether these populations are included in the transient population estimates or are counted as part of the residential population (i.e., reflected in Census data).
2.5-6	Provide the basis for assumptions regarding in-migrating work force numbers and resulting demand for housing units, including those within the municipalities in the three-county region.	Indicate the basis for the assumptions regarding in-migrating work force numbers and resulting demand for housing units in different geographic areas, including within the municipalities in the three-county region.

RAI Number	Question Summary	Full Text
2.5-7	Clarify the conclusions reached about the number of currently available housing units in the three-county region.	Provide the basis for translating the housing unit authorizations data provided on p. 2-355 and in Table 2.5-20 into housing stock.
2.5-8	Provide clarification of the assessed valuation and taxes paid by AmerenUE for Callaway Unit 1, disaggregated by tax type and jurisdiction, with description of the applicable tax rates.	This information should be consistent with the tax information provided in the Benefit-Cost request (BC-3) and should include all applicable taxes. Correct discrepancies in the text concerning tax payments and assessed valuation (e.g., on p. 2-365 in section 2.5.2.7.1 and p. 2-368 in section 2.5.2.7.3.2).
2.5-9	Provide estimates of the taxes that would be paid on Unit 2 by AmerenUE during both construction and operation to each applicable jurisdiction, and explain the basis for these estimates. For taxes paid during construction, provide estimates for each year of the construction period.	Ensure that this information is consistent with that provided in Section 10.4.
2.5-101	Provide a clear description of the tax revenues for the jurisdictions of interest, especially in Callaway County. Clarify the relationship between tables 2.5-28 and 2.5-29 and resolve inconsistencies.	As an example of the clarification needed, Table 2.5-28 indicates that the total property tax revenue for Callaway County in FY 2002 was $20.7 million. In Table 2.5-29, the total property tax revenue for Callaway County in FY 2002 is shown as $2.1 million.
2.5-11	Clarify the status of local land use plans in the incorporated towns, especially in Callaway County (for example, Fulton) and update the discussion of plans for development activity in the vicinity of the plant to include description/ discussion of the connector road being assessed by Missouri DOT (p. 2-369).	Although the counties do not have planning and zoning authority, the municipalities in Missouri do have this authority. Planning and zoning in the municipalities expected to receive the greatest population impacts from the proposed project are pertinent to the assessment of the distribution of in-migrating workers and the impacts of population growth. Confirm the accuracy of this statement on p. 2-377: "There are no plans by MODOT or Callaway County to develop roads within 5 miles (8 km) of the plant, with the exception of a one lane bridge on State Route 84 in Portland…." Clarify whether this bridge replacement has been completed.
2.2.1; 2.5.2; 4.4.2	Describe the Callaway County Connector project, including an explanation of the relationship of the	The Federal Highway Administration is preparing an Environmental Assessment (EA) for the Callaway County Connector project, supposedly with financial support from AmerenUE. However, the ER states that there are no planned modifications of the road system. Address

RAI Number	Question Summary	Full Text
	road to the construction and operation of the proposed Callaway Plant Unit 2, and how changes in the project schedule might affect the schedule or location of the road.	this apparent discrepancy and provide a detailed description of the proposed new Callaway County Connector road, including an explanation of the relationship of the road to the project and how changes in the project schedule might affect the schedule or location of the road.
2.5-12	Provide a description of the adequacy of the existing and projected capacity of the service providers in the three counties, with special emphasis on Callaway County. This could be statements by the service providers or comparisons to national standards or ratings. Provide additional information about non-profit organizations providing social services.	This information is needed to assess the consequences of population increases from construction and operation of Unit 2.
2.5-13	Clarify, either through description or with a combination of description and figures, the geographic location of the various jurisdictional units in Callaway County (school districts, water districts, fire districts, etc.) that would receive tax revenues from the proposed project.	Staff needs this information to understand the relationship between the jurisdictions receiving project-related revenues and those providing project-related services.
2.5-14	Provide additional description of the characteristics of the roads, and a copy of the traffic study used for the assessment.	Provide additional description of the highway access routes to the site in terms of the characteristics of the roads. Provide a copy of the traffic study used for the assessment.
2.5-15	Describe the change in RR access to the site since construction of Unit 1.	The loss of RR service to the Callaway site has important implications for the highway traffic to the site for Unit 2 compared to Unit 1.
2.5-16	Recalculate the minority and low income populations using state averages, correct the number of census blocks in the three county region, and provide an updated	This information is needed to identify and assess the potential for impacts on minority and low income populations in the 50-mile radius region.

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	map and tables reflecting these corrected calculations.	
2.5-17	Provide a description of the methods used, persons contacted, and information obtained concerning the characteristics of minority and low income populations and subsistence activities.	Staff needs this information to assess pathways to impacts from the proposed project on minority and low income populations.
4.4-1	Provide more detailed and updated information about the number and type of workers needed for the construction and operation of Unit 2, by year over the entire construction period and the distribution of workers across shifts. Ensure that the information about the construction schedule is consistent (section 1.2.7 and 4.4), and provide additional information about the characteristics of the workforce and the shift schedules that reflect expectations for THIS plant (i.e., not an"average" or "typical" plant).	Staff needs information (preferably in a table) indicating the different workforce types (e.g., construction, security, operations) over the entire construction phase by year (or quarter). Staff also needs a table showing, by year (or some smaller unit of time) for the entire construction phase: (1) the expected number of workers who would be at the site, including the workforce for Unit 1 (including outage workers) and the workforce for Unit 2; (2) the timing of work shifts for these workers; and (3) the number of workers on each shift. Information is also needed about any planned staggering of shifts to modify the number of workers arriving and leaving the site during a particular time period. Currently, information in the ER is not clear or consistent. Staff needs to understand the number and timing of any "operations" workers who will arrive on site during the construction phase (i.e., before Unit 2 becomes operational) in order to assess the impacts during the transition between construction and operations. Reference – tables 4.4-2 and 4.4-3.
4.4-2	Provide an estimate of the noise level from on-site construction activities at the nearest residence to the site.	
4.4-3	Provide an estimate of the noise impacts from vehicle (truck and car) traffic to and from the site during the construction period, including an estimate of the noise level on residents living along the site's access routes.	The site vicinity is primarily rural, nonindustrial, with generally low traffic levels, and with residences located proximate to access routes. Construction of Unit 2 will result in a large increase in truck traffic along these access routes. Staff needs information about the noise consequences of these activities, along with information about the number and timing of truck and vehicle trips to and from the site.
4.4-4	Provided verifiable calculation of traffic at peak construction, and clarify how the	Ensure that the calculation of traffic at peak construction reflects any modification in the estimated number of workers (see SE-18, above) and shift schedules, and clarify how the

RAI Number	Question Summary	Full Text
	expected truck traffic would contribute to traffic impacts.	expected truck traffic would contribute to traffic impacts.
4.4-5	Provide additional information about the basis for the assumptions underlying the estimates of in-migrating workers during both construction and operations, their residential locations, and their household size, including the number of school-age children. Provide any data or sources used as the basis for these assumptions.	An example of source information would be the letter from Fohey concerning the availability of craft workers in the surrounding area. Clarify how the workers are assumed to be distributed among: (1) in-migrants to the three-county region; (2) weekly or monthly commuters living during the week in the three-county region; (3) daily commuters from outside the three-county region; and (4) daily commuters from within the three-county region –i.e., local workers.
4.4-6	Provide additional detail (including the specific RIMS II multipliers used) concerning the calculation of indirect jobs and income during both the construction and operations phases.	Staff needs additional detail to evaluate the methods used and results of the economic analysis.
4.4-7	Provide additional detail concerning the expected expenditures for plant construction and operation other than wages that would occur in the 50-mile and three-county regions and their effect on local employment, income, and tax revenue.	Staff needs this information to assess benefits from the proposed project and assess the distributional relationship between benefits and costs.
4.4-8	Provide a more thorough discussion of the analytic process used to assess the potential for disproportionate adverse impacts on minority and low-income populations from project activities, including consideration of each of the various pathways.	Provide information about the source of information concerning minority and low income activities and characteristics that would potentially make them more susceptible to impacts from project activities.

RAI Number	Question Summary	Full Text
1.2-1	Provide an updated status of environmentally related authorizations required by Federal, State, regional, local, and affected Native American tribal agencies.	Based on AmerenUE's presentation on permitting during the site audit, the current version of Table 1.3-1 in the ER needs to be updated. Provide a revision to this table.

RAI Number	Question Summary	Full Text
7.4-1	Provide updated transportation accident impacts associated with accidents, injuries, and fatalities that account for underreporting in the Motor Carrier Management Information System.	In the ER, Rev. 0, Section 7.4, state-specific accident, injury, and fatality rate data from 1994 through 1996 were used to estimate the impacts from transportation accidents. The source of these data was Saricks and Tompkins, "State-Level Accident Rates of Surface Freight Transportation: A Reexamination," Report No. ANL/ESD/TM-150, 1999, which used data from the Motor Carrier Management Information System. The Federal Motor Carrier Safety Administration has evaluated the data in the Motor Carrier Management Information System. For 1994 through 1996, it found that accidents were underreported by about 39 percent, injuries were underreported by 20 percent, and fatalities were underreported by about 36 percent (Blower and Matteson, "Evaluation of the Motor Carrier Management Information System Crash File, Phase 1," Report No. UMTRI 2003-6, 2003). Therefore, the impacts associated with transportation accidents, injuries, and fatalities should be increased by factors 1.64, 1.20, and 1.57, respectively.
7.4-2	Provide updated transportation radiological accident impacts that correct release fraction error found in Table 7.4-5, page 7-70 of the ER, Rev. 0.	Table 7.4-5, page 7-70 of the ER, Rev. 0 lists the release fractions for irradiated fuel. For severity category 8 accidents involving corrosion products, the release fraction is listed as 2.0E-2. The reference for this release fraction is NUREG-1815, Table G-10, which is a secondary reference. The original reference is Sprung et al., "Reexamination of Spent Fuel Shipment Risk Estimates," Report No. NUREG/CR-6672, 2000, Table 7.31, p. 7-73. In Sprung et al., the release fraction for severity category 8 accidents involving corrosion products is listed as 2.0E-3, not 2.0E-2.
7.4-3	Provide updated tables that are consistent with the underlying data in the TRAGIS output.	The TRAGIS computer code was used by the applicant to provide estimates of distances and population densities along transportation routes. In reviewing data in the Transportation binder provided by the applicant, discrepancies between data in the ER, Tables 7.4-11, 7.4-7, and 7.4-6 and the TRAGIS output contained in the Transportation binder were noted.
7.4-4	Provide a reference citation for the data contained in Table 7.4-3, page 7-68 of the ER, Rev. 0.	Provide a reference citation for the data contained in Table 7.4-3, so that the radionuclide inventory presented in this table can be verified.
7.4-5	For RADWASTE, provide updated transportation accident impacts that are based on release fractions for RADWASTE.	In the ER, Rev. 0, Table 7.4-5, page 7-70, the radiological accident risks for RADWASTE are based on the release fractions from NUREG-1815, Table G-10, which is a secondary reference. The original reference is Sprung et al., "Reexamination of Spent Fuel Shipment Risk Estimates," Report No. NUREG/CR-6672, 2000. The release fractions from Sprung et al. are appropriate for spent nuclear fuel contained in Type B shipping containers. However, RADWASTE could be shipped in Type A shipping containers, which are not

RAI Number	Question Summary	Full Text
		designed to withstand the hypothetical accident conditions outlined in 10 CFR 71. In addition, the release fractions in Sprung et al. are specific to spent nuclear fuel and are not applicable to RADWASTE, which would not have the same physical configuration as would spent nuclear fuel, i.e., uranium dioxide pellets clad in zirconium tubes arranged in fuel assemblies. Therefore, using the release fractions from Sprung et al. for RADWASTE may be nonconservative, i.e., underestimate the impacts of transportation accidents, because RADWASTE will not perform as well as spent nuclear fuel during accidents.
7.4-6	Provide updated transportation impacts in the ER that are consistent with the RADTRAN computer code results contained in the Transportation binder provided by the applicant.	The RADTRAN computer code was used by the applicant to estimate radiological transportation accident risks. The ER, page 7-63, states that the result from the RADTRAN computer code is 3.20E-8 person-Sv for RADWASTE radiological transportation accidents. This value does not match the result in the RADTRAN computer code output provided by the applicant in the Transportation binder, which was 2.87E-8 person-Sv.
7.4-7	Provide updated transportation impacts in the ER that are consistent with the RADTRAN computer code results contained in the Transportation binder provided by the applicant.	The RADTRAN computer code was used by the applicant to estimate radiological transportation accident risks. Table 7.4-10, page 7-75 of the ER, Rev. 0 contains the radionuclide inventory for RADWASTE. However, the radionuclide inventory in this table does not match the radionuclide inventory in the RADTRAN computer code output provided by the applicant in the Transportation binder.
5.7.2-1	Provide updated tables in ER that are consistent with the underlying data in the TRAGIS computer code output.	The TRAGIS computer code was used by the applicant to provide estimates of distances and population densities along transportation routes. In reviewing data in the Transportation binder provided by the applicant, it was noted that Table 5.11-3, page 5-157 of the ER, Rev. 0 lists the suburban population density as 326.5 people/km^2, while the RADTRAN computer code output lists the suburban population density as 326.0 people/km^2.
7.4-8	Provide a reference citation for the data contained in Table 7.4-10, page 7-75 of the ER, Rev. 0.	Provide a reference citation for the data contained in Table 7.4-10, page 7-75 of the ER, Rev. 0. A reference citation is necessary to verify the radionuclide inventory presented in this table.
5.7.2-2	Provide a reference citation for the parameter persons/vehicle in Table 5.11-8, page 5-162 of the ER, Rev. 0.	Table 5.11-8, page 5-162 of the ER, Rev. 0 lists 1.6 and 1.5 persons/vehicle for shipments of new fuel, and spent fuel and radwaste, respectively. A reference citation is necessary to verify these parameter values.
5.7.2-3	Provide a reference citation for the parameter crew distance in Table 5.11-	Table 5.11-8, page 5-162 of the ER, Rev. 0 lists 3.1 meters and 5.45 meters for the crew distance for shipments of new fuel, and spent fuel and radwaste, respectively. A reference

RAI Number	Question Summary	Full Text
	8, page 5-162 of the ER, Rev. 0.	citation is necessary to verify these parameter values.
5.7.2-4	Provide updated estimates of the number of normalized shipments using a consistent value for the capacity factor.	In the Transportation binder provided by the applicant, a capacity factor of 92% was used to normalize shipments. In the ER, Rev. 0, page 3-26, a capacity factor of 95% was used.
ER 10-1	Provide estimates of the concrete and rebar required to construct a US EPR.	The reference "Application of Advanced Construction Technologies to New Nuclear Power Plants," (Sept. 24, 2004) was used as the reference for concrete and rebar in the ER, Rev. 0, Section 10.2.2. This reference was developed based on four reactor designs, the ABWR, ESBWR, AP1000, and ACR-700. However, a US EPR is the type of reactor that would be constructed at the Callaway site. In order to conduct a complete evaluation of the impacts of transporting construction materials, construction material estimates specific to a US EPR are necessary.
ER 10-2	Provide consistent estimates of the amount of concrete used to construct a US EPR.	From the data in Table 4.2-1, footnote "c", page 4-32 of the ER, Rev. 0, a volume of concrete of 402,000 yd^3 is estimated for concrete. (6700 yd^3/mo x 12 mo/yr x 5 yrs= 402,000 yd^3). In Section 10.2.2, page 10-15 of the ER, Rev. 0, 195,139 yd^3 of concrete is estimated for construction (12,239 yd^3 + 182,900 yd^3= 195,139 yd^3). Consistent values for the amount of concrete required for a US EPR are necessary to conduct a complete evaluation of the impacts of transporting construction materials.
ER 10-3	Provide the MoDOT and Rizzo Associates traffic references discussed during the cumulative impacts meeting on March 25, 2009.	The MoDOT and Rizzo Associates traffic studies are necessary to verify the transportation impacts in the ER.
ER 4-1	Provide an estimate of the amount of backfill that would be shipped to the site during construction.	According to Section 4.2.1.2, page 4-17 of the ER, Rev. 0, backfill would be shipped to the Callaway site during construction. However, an estimate of the amount of backfill is not provided in the ER. An estimate of the amount of backfill that would be shipped to the Callaway site during construction is necessary to conduct a complete evaluation of the impacts of transporting construction materials.

RAI Number	Question Summary	Full Text
2.4 -1	Provide the Terrestrial Ecology Information Needs response form binder (with all Information Needs responses for TE-1 through TE-18).	Written responses included in the binder reviewed during the site audit are needed to address gaps in the terrestrial ecology sections of the ER and to prepare the terrestrial ecology sections of the EIS.
2.4-2	Provide specified documents cited in the ER, including special-status species correspondences.	Special-status species correspondences with USFWS and MDC are needed to properly address which species and the level of detail to be included in the EIS. Provide copies of the following documents, which are generally unpublished reports by MACTEC, FWS, State of Missouri, or Union Electric: MDC 2007 Missouri Department of Conservation, Heritage Review Report, July 13, 2007 and USFWS 2007b Fish and wildlife resources potentially affected by Callaway Plant Unit 2. October 18, 2007. (Note: these are the agency consultation letters, also requested for Aquatic Ecology – see Attachment 1). MACTEC, 2008. Callaway Nuclear Power Plant Forest Pathology Report. MACTEC Engineering and Consulting, April 2008. Dailey, T.V. 2007. Wildlife Harvest and Population Status Report-Northern Bobwhite. Unpublished. Missouri Department of Conservation. Fuller, 1981. Callaway Nuclear Generating Plant Environmental Monitoring Program, Preoperational Vegetation Inventory. Union Electric Company, Environmental Services Department, September 30, 1981. Missouri Department of Conservation (MDC). 2000. Missouri Animals of Conservation Concern. Missouri Department of Conservation, Conservation Commission of the State of Missouri, 2000. Nelson, P.W. 2005. The Terrestrial Natural Communities of Missouri. Third Edition. Missouri Natural Areas Committee. Missouri Department of Natural Resources, Jefferson City, Missouri. Newbold, 2007. Reform Conservation Area 2006-07 Annual Report. Missouri Department of Conservation. Nigh, T.A. and W.A. Schroeder. 2002. Atlas of Missouri Ecoregions. Missouri Department of Conservation, Jefferson City, Missouri. [Only those parts concerning the site are needed.]

RAI Number	Question Summary	Full Text
		Union Electric Company, 1987. Callaway Terrestrial Monitoring Program: Update of the botanical database for ten terrestrial vegetation plots. Union Electric Company, Environmental Services Department, February 1987. U.S. Fish and Wildlife Service (FWS), 1982. Gray Bat Recovery Plan. Twin Cities, Minnesota. 21 pp. + Appendices. U.S. Fish and Wildlife Service, 1982. Applied Biology, Inc., documents from 1986, 1987, 1991, and 1993, Aerial Photographic Monitoring and Interpretation of Vegetation at Callaway prepared for Union Electric Company, St. Louis, Missouri Union Electric, documents from 1984 and 1985, Aerial Photographic Monitoring and Interpretation of Vegetation at Callaway, Environmental Services Department, Union Electric Company, St. Louis, Missouri.
2.4-2	Provide Preliminary Jurisdictional Determination Report and an enhanced conceptual discussion of wetland mitigation as soon as available.	The jurisdictional status and therefore the impacts and mitigation of wetlands on the site have not been confirmed because the Preliminary Jurisdictional Determination report has not been completed by AmerenUE contractor (MACTEC). The report (which is due to the US Army Corps of Engineers in May or June 2009) is needed upon its completion, and resolution is contingent upon the final jurisdictional determination by the Army Corps. Information from the report is needed to assess wetland impacts in the EIS.
5.2-1	Provide the Site Layout Corridor and Flood Plain Areas map 8600-x-89931, Rev. 12, or oath and affirmation of Molly Dozier Chute ground surface levels based on said map; and wetland delineation soils data.	Additional information is needed on ground surface levels in the Molly Dozier Chute to confirm no direct connection to the water table that could affect wetland hydrology during Collector Well operation.

Requests for Additional Information (RAIs)
Callaway Plant Unit 2 - Combined Operating License Application (COLA)
Transmission Lines

RAI Number	Question Summary	Full Text
3.7-1	Provide a map showing the distance from the "extended" transmission line to the nearest residence and, if necessary, provide updated statements regarding the proximity of residences to the transmission towers and the subsequent EMF and noise impacts.	Provide a map showing the distance from the "extended" transmission line to the nearest residence and, if necessary, revise the statement on p. 5-8 that "there are no residences in the immediate vicinity of the transmission towers…" and update the assessment about EMF and noise impacts.
3.7-2	Clarify and update the statement on p. 3-133 concerning corridor siting status and the impacts associated with construction of the transmission line required for Unit 2.	There are inconsistencies in the statements about the 6.7 mi extension of the transmission line in different sections of the ER.
3.7-3	Add labels in Figure 3.7-1 that match the description of the transmission lines/routes in the text.	
3.7-4	Describe design parameters of the power transmission system to be constructed for Unit 2 and provide an updated description of the transmission lines planned for this project.	Describe the actual design parameters of the power transmission system (switchyard, connecting circuits, transmission line) to be constructed for Unit 2 and complete sections 3.7.2.1 and 3.7.2.2 with information pertinent to the transmission line as planned for this project.
3.7-5	Clarify the statement that "all newly constructed transmission systems will be contained in AmerenUE owned property or on existing easements." (p. 3-135). This is inconsistent with the need to acquire new easements. Provide an updated description on corona effect and associated noise for the line as proposed to be constructed.	Clarify or correct the statement in section 3.7.3.1 that "the new portion of the Callaway-Loose Creek line would be constructed on the existing Callaway-Bland right-of-way. Therefore, all newly constructed transmission systems will be contained in AmerenUE owned property or on existing easements." (p. 3-135). This is inconsistent with previous statements about the need to acquire new easements. Based on this correction, provide information about the corona effect and associated noise for the line as proposed to be constructed.

Requests for Additional Information (RAIs)
Callaway Plant Unit 2 - Combined Operating License Application (COLA)
Transmission Lines

RAI Number	Question Summary	Full Text
3.7-6	Provide an estimate of the noise level due to the switchyard at the site boundary.	The estimate given is for "near the switchyard fence."
3.7-7	Provide a description of the transmission lines (towers and heights) as they are planned for this project.	The current information only states that the towers "will provide minimum clearances in accordance with the aforementioned standards…." And "The towers for the new Callaway-Loose Creek line Missouri River crossing may exceed the 200 ft….height above ground, thus navigation lights may be needed." (p. 3-136).
3.7-8	Provide a full reference for the citation "ANSI 2006b" on p. 3-136.	

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RAI Number	Question Summary	Full Text
2-1	Provide originals of all ER figures (both line drawings and photographs) in .jpeg, .png, or .tif format at a resolution of at least 300 dpi, sized correctly, with legends. The information in the figures must be legible in when reproduced black and white or grayscale. (Figures for wind roses need not be included.)	The objective of this request is to obtain the best possible figure files for use in the EISs—figures that reproduce clearly in both black-and-white and color, and that can be modified as necessary by our GIS experts and in-house graphic specialists. To this end, we make the following request: 1) Provide GIS data for the map figures, as specified in the GIS Data Request form. (If you don't know which form this is, contact your GIS expert.) 2) For non-GIS figures—i.e., those that are drawn or otherwise created by graphic designers, provide "original" files—e.g., native-platform vector files, working layered Photoshop files, Illustrator files, Cad files, Freehand files, etc. 3) In addition to the types of figure files requested in items 1 and 2, provide high-resolution (300 dpi) editable PDFs in both black-and-white and color for each figure – PDFs made from original art (i.e., not from a scanned hard copy). These are needed because the website version of the EIS will be in color, while hard copies printed by NRC are strictly in black-and-white.

RAI Number	Question Summary	Full Text
1.2.1.7-COE-1 4.3.1.5-COE-1	Reference to requirements in Section 10 of the Rivers and Harbors Act of 1899 should be included in the ER.	Page 1-11 of Section 1.2.1.7 should also reference Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403). In Section 4.3.1.5 (page 4-40) the need for a Section 10 permit from the U.S. Army Corps of Engineers (USACE) should be noted. The Missouri River is a navigable water of the U.S. Authorization will also be required under Section 10 of the Rivers and Harbors Act for any work or structure located in, over or under the Missouri River (including any dredging within the Missouri River, the extension of any laterals from the proposed Collector Well River Intake System underneath the Missouri River, and for any aerial transmission line crossings over the Missouri River). Wetlands are also waters of the U.S.
2.1-COE-1	Check and revise elevation statements in the ER to ensure that accurate and consistent information is presented throughout the report.	Section 2.1 (page 2-1) states that the proposed site elevation is 1530 ft above mean sea level. This is inconsistent with other data on the same page, page 2-42, and elsewhere in the document.
2.5.2.10.3-COE-1	A more complete description of road development plans is needed.	In Section 2.5.2.10.3 (page 2-360) it is stated that there are no plans by MoDOT or Callaway County to develop roads within 5 miles (8km) of the plant, with the exception that a one lane bridge on State Route 94 in Portland is scheduled to be replaced in the indefinite future. Please note that the Corps of Engineers participated in a scoping meeting for a potential new road project from Route 54 to AmerenUE's Callaway Plant (Callaway County Connector Project) on February 17, 2009. USACE personnel requested a written statement explaining the independent utility of this proposed federal action from AmerenUE's Callaway Unit 2 Project. A response letter from the Missouri Department of Transportation (MoDOT) dated March 6, 2009 reported that MoDOT and the Federal Highway Administration (FHWA) determined that each of the proposed federal actions demonstrate independent utility. NRC's official position regarding independent utility has not been established. The proposed Callaway County Connector Project will have to be described in the Cumulative Impacts part of the Environmental Impact Statement, however we do not have detailed information about plans. Please clarify the extent of AmerenUE's involvement with the Callaway County Connector Project, provide information regarding the potential association of this project with the proposed Callaway Plant Unit 2 COLA, and provide technical information about the proposed action itself.

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RAI Number	Question Summary	Full Text
3.1-COE-1	All the new roads that are under consideration in the area and are being referred to in the ER should be identified in this section and described in detail.	In Section 3.1 (page 3-3) it is stated that "new roads will provide direct routes to Callaway Plant Unit 2 for construction and will minimize disruption of Callaway Plant Unit 1 traffic patterns."
4.2.1.5-COE-1 4.3.1.3-COE-1	The stream impacts in the respective sections should be clarified and the figures explained more thoroughly to ensure that consistent and accurate information is presented in the ER.	In Section 4.2.1.5 (page 4-17) it is stated that construction-related impacts to aquatic resources include 10,359 linear ft (3,157 m) of intermittent streams which are tributaries of Logan Creek, Mud Creek, and Auxvasse Creek that drain storm water away from the Callaway Site, and in Section 4.3.1.3 (page 4-37) it is stated that construction of the proposed facilities would not be possible without permanently filling 6,938 linear feet of intermittent streams and approximately 10.4 acres of wetlands and ponds. In Section 4.3.2.1 (page 4-43) it is stated that construction-related impacts to aquatic resources include 6,938 linear feet of intermittent streams.
4.3.1.6-COE-1	Please note that the statement cited is not correct and that this section needs to be revised accordingly.	In Section 4.3.1.6 (page 4-42) it is indicated that USACE prefers and gives more credit for wetland creation. Restoration should generally be the first option considered because the likelihood of success is greater and the impacts to potentially ecologically important uplands are reduced compared to establishment and preservation. Restoration and enhancement are typically preferred over the construction of a wetland in an upland area. The amount of compensatory mitigation allowed is based on the amount of aquatic resource functions and values that will be replaced by the compensatory mitigation proposal.
4.3.1.6-COE-2	Please note that the statement cited is not correct and that this section needs to be revised accordingly.	In Section 4.3.1.6 (page 4-43) it is also stated that specific wetland mitigation efforts will be determined after Section 404 and Section 401 permits have been issued. The Corps of Engineers is not able to execute an individual Section 404 Department of the Army permit until an acceptable compensatory mitigation plan has been provided for our review and approval.
4.4.1.5-COE-1	A map and/or drawings in this section identifying the two proposed site access roads are needed.	In Section 4.4.1.5 (page 4-64) it is stated that there are no major highway development or improvement projects planned within the area to influence the capacity of the roadway system, and that the two new site access roads connecting Route 428 and Route 459 north of the plant will be built to reduce traffic impacts related to construction activities.

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RAI Number	Question Summary	Full Text
4.3.1.3-COE-2	Provide specific information in the Environmental Report addressing and documenting what steps were taken to avoid and minimize impacts to waters of the U.S. at the project site in the design.	The Environmental Impact Statement for AmerenUE's Callaway Unit 2 Project has to address avoidance and minimization of impacts to waters of the U.S. at the proposed site (within the proposed footprint) as well as addressing off site alternatives. In the Environmental Report, it is mentioned that the proposed Unit 2 Project was designed to avoid and minimize impacts at the proposed site, however, no specific information was provided in the Environmental Report addressing and documenting what steps were taken to avoid and minimize impacts to waters of the U.S. at the project site.

Reference: Letter, J. K. Pointer, Missouri State Regulatory Office, Kansas City District Corps of Engineers, to NRC, dated May 19, 2009, "Response to Request for Review of Environmental Report for AmerenUE's Propose Callaway Plant Unit 2 Project"

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ER Rev 1, Section 2

C. Gemming, MDC, personal communication, August 17, 2007.

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Camp, Dresser and McKee, Inc. (CDM). 1982. Water quality and aquatic biological preoperational monitoring program for the Callaway Nuclear Plant, Volume 2. Unpublished report. Milwaukee, WI.

MACTEC 2007. Standard Operating Procedures (SOP) for the Callaway Nuclear Plant Unit 2 Siting Study. Natural Resources Field Sampling and Analysis. November 30, 2007.

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MDC, 2007. Missouri Department of Conservation, Heritage Review Report, July 13, 2007.

Missouri Department of Natural Resources (MDNR). 2002. Semi-quantitative macroinvertebrate stream assessment. Unpublished report. Jefferson City, MO.

Poulton, B.C., A.L. Allert, K.R. Echols, and W.G. Brumbaugh. 2005. Validation of aquatic macroinvertebrate community endpoints for assessment of biological condition in the Lower Missouri River. Unpublished report. U.S. Geological Survey: Columbia Environmental Research Center. Columbia, MO.

Robinson, J.W. 1994. Missouri's commercial fishery harvest, 1992. Unpublished report. Missouri Department of Conservation, Jefferson City, MO.

V. Trevnichek, MDC, personal communication, April 8, 2008

Union Electric Company, 1976. Callaway Plant Environmental Report, Operating License Stage, Volume I.

U.S. Fish and Wildlife Service (USFWS), 2007b. Fish and wildlife resources potentially affected by Callaway Plant Unit 2. October 18, 2007.

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Scott, 2007. Letter from C.M. Scott of the U.S. Fish and Wildlife Service to S.P. Stumne of MACTEC Engineering and Consulting re: Ameren's Callaway Nuclear Plant Unit 2 COLA in Callaway County, Missouri, October 18, 2007

ER Revision 1, Section 5

Burns & McDonnell, 2007. Report on the Closed-Cycle Cooling and Makeup Water Supply Options for Future Units at the Callaway Nuclear Plant, Fulton, Missouri, March 2007.

MDNR, 2006. Missouri Water Quality Report (Section 305(b) Report), Missouri Department of Natural Resources, Water Protection Program, Published in April 1, 2007.

Burns & McDonnell, 2008. Phase II Hydrogeological Investigation Report, Collector Well Siting Study, June 2008.

Burns & McDonnell, 2008a. Modeling the Thermal Component of the Wastewater Discharge Plume from Units 1 and 2 of the Callaway Nuclear Power Plant, February, 2008.

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AmerenUE, 2006. Burns & Mcdonnell Cooling tower Blowdown Relocation, Phase 1 Report, June 2006.

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AmerenUE 2007a. Burns & McDonnell Closed Cycle Cooling and Makeup Water Supply Options for Future Units, February 2007.

MDNR 2005a. Table A-Criterial for Designated Uses, 10CSR20-7- Department of Natural Resources, Division 20- Clean Water Commission, November 20, 2005.

MDNR 2005b. 10CSR20-7-031- Water Quality Standards, Department of Natural Resources, Division 20-Clean Water Commission, November 30, 2005.