

Callaway2COLPEm Resource

From: Olson, Bruce
Sent: Tuesday, February 24, 2009 3:45 PM
To: David E Shafer
Cc: Arora, Surinder; Fringer, John; Last, George V; Simmons, Mary Ann; Callaway2COL Resource
Subject: Information Needs for Callaway DEIS Development and Site Audit--March 23-27, 2009

As agreed, the draft Information Needs Table for the Callaway Unit 2 environmental review in preparation for the site audit is attached.



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Logistically, we are considering travel on Sunday, March 22, 2009 so we can start meetings and discussions on Monday, March 23, 2009.

As we discussed earlier, it would be helpful to have access to all calculation packages two weeks in advance of the site audit. At any rate, this information will be needed for the site audit. Requested calculation packages include those related to meteorology and accidents (AEOLUS, DBA, XDCALC, MACCS2), hydrology (e.g. CORMIX), health physics (e.g. XDCALC, LADTAP-II, GASPAR-II), socioeconomics, and transportation (e.g. TRAGIS, RADTRAN). Access to this material after the site audit may be necessary too.

Finally, please be advised that we may be developing some additional information requests regarding other items, such as non-rad. human health information, but that will be communicated at a later date.

Thanks.....

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NRC/NRO/DSER/RAP1
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March 23-27, 2009
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Note: SME = Subject Matter Expert

Info needs #	ER Section	Information Needs
Acc-		Accidents
Acc-1	Table 2.7-52	Provide a subject matter expert (SME) who can explain: 1) the definitions of the exclusionary boundary and the low population zone, 2) the relationship of the EAB and LPZ distances for Unit 2 to the EAB and LPZ used for Unit 1, and 3) the distances for calculating the short-term X/Q values in ER Table 2.7-52.
Acc-2	Table 2.7-52	Provide an SME who can explain the process used to calculate the 50 percent X/Q values in Table 2.7-52.
Acc-3	2.7 7.1	Provide an SME who can explain the inconsistency in the meteorological data sets used for calculation of the X/Q for long-term dispersion (normal operations) and X/Qs for short-term dispersion (accidents).
Acc-4	2.7 7.1	Provide access to the AEOLUS, DBA and XDCALC calculation packages for staff review two weeks before site audit, if possible.
Acc-5	7.2.1	Provide an SME who can discuss the rationale for selecting 2005 meteorological data for severe accident analysis.
Acc-6	7.2.1	Provide SMEs who can discuss the selection of site-specific input to the MACCS2 code.
Acc-7	7.2.1.3	Provide an SME who can discuss the rationale for limiting the time window for severe accident analysis to 24 hrs (ER 7.2.1.3) and other input parameters.
Acc-8	7.2.1.4	Provide SMEs who can discuss the core damage frequencies listed in the ER including damage from both internally and externally initiated events.
Acc-9	7.2.1.4	Provide an SME who can discuss whether the core damage frequencies listed in the ER include damage during plant low-power operation and shutdown conditions as well as during normal operation.
Acc-10	7.2	Provide access to the MACCS2 calculation package for staff review, two weeks before site audit, if possible.
Acc-11	7.2.2	Provide for review a water ingestion dose estimate for each severe accident release category.
Acc-12	2	Provide access to electronic copies of hourly meteorological data for 2003 through 2007.
Acc-13	7.2	Provide for review electronic copies of hourly MACCS2 input and output files and copies of AEOLUS3 and XDCALC output data files.
Acc-14	7.2	Provide access to estimates of the average individual risk of early fatality and the risk of cancer fatality to area population for each release category.
Acc-15	7.2.2.2	Provide an SME who can discuss all of the surface water pathway impacts of severe accidents.
Acc-16	7.2.2.3	Provide an SME who can discuss all of the groundwater pathway impacts of severe accidents.
Acc-17	7.3	Provide SMEs who can discuss severe accident mitigation alternatives (SAMAs) including design alternatives and procedural and training alternatives.
Acc-18	7.3.1	Provide an SME who can discuss the SAMDA screening process.

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Acc-19	7.3.2	Provide SMEs who can discuss the rationale for assuming that the fire risk is the dominant contributor to risks from external events.
Acc-20	7.3.2	Provide SMEs who can discuss the evaluation of the minimum implementation cost of alternatives.
Acc-21	7.3	Provide SMEs who can discuss the schedule for and factors to be considered in developing non-hardware alternatives.
Acc-22	7.2	Provide estimates of the total core damage frequency and population risk estimates for Callaway Unit 1 for use in estimating cumulative risks for the site.
Acc-23	Section 7.1	Provide an SME who can discuss the apparent departures of design basis accident source term assumptions in Section 7.1 of the ER from the assumptions made in the design control document for corresponding accidents. Specifically, the SME should be prepared to discuss steam system piping failures, locked rotor accidents, and rod ejection accidents. Assumptions for other design basis accidents may also be discussed.
Alt-		Alternatives
Alt-1	9.2.3	Provide an SME to discuss the costs of the proposed project and energy alternatives such as: <ul style="list-style-type: none"> • The fixed charge rate for the utility or consortium of utilities • Fuel cost estimates at time of application for the proposed project and for other alternatives • The operation and maintenance cost estimates (fixed component and variable component) at time of application for the proposed project and each alternative • The escalation rates from date of application through facility lifetime (30-year life) for the components of operation and maintenance and fuel for the proposed project and each alternative • The discount rate for the proposed project and each alternative.
Alt-2	9.3	Provide an SME to discuss the viability of the Alternative sites for Callaway Unit 2. Specifically, clarify issues such as: <ul style="list-style-type: none"> • Constructability within the floodplain • Acquisition of private residential, industrial and/or commercial land • Removal of prime and unique farmland.
Alt-3	9.2	Provide an SME to discuss the viability of Energy Alternatives. Specifically, clarify issues such as: <ul style="list-style-type: none"> • Costs and impacts of natural gas line routing and capacity at the intertie location • Costs and impacts of coal rail line routing capacity at the intertie location.

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Alt-4	9.4.1	Provide an SME to discuss the viability of alternatives to the proposed heat dissipation system. For each viable alternative, address relevant information such as: <ul style="list-style-type: none"> • Land-use requirements • Water-use requirements • Operating and maintenance experience for similar units • Capital, maintenance, and operating costs • Effect on generating efficiency • Predicted thermal and physical effects (e.g., thermal plume and scouring) • Predicted atmospheric effects (e.g., fogging, icing, and drift) • Predicted operating noise levels • Predicted aesthetic effect (e.g., visual plumes) • Predicted recreational benefits.
AQ-		Aquatic Ecology
AQ-1	2.4.2.2.3	Provide access to all cited references (such as MDC 1999).
AQ-2	Tables 2.4-7 and 2.4-8	Identify which data are from the stream stations and which are from the Missouri River stations and provide an SME and supporting documentation to clarify Tables 2.4-7 and 2.4-8.
AQ-3	2.4.2.2.3.3	Provide an SME and supporting documentation to address the text and Table 2.4-7 regarding Channel Catfish.
AQ-4	Figure 4.3-	Provide an SME and supporting maps and documentation to clarify the actual location of collector wells (ER Figure 4.3-3).
AQ-5	5.3.2.2	Provide an SME and supporting data and information to explain the statement that “an absence of harm” has been observed for aquatic species associated with the Callaway Unit 1 cooling system discharges into the Missouri River (Section 5.3.2.2).
AQ-6	5.5.1.2, p. 5-86	The ER states that cooling water discharge characteristics for the planned Unit 2 (and expected impact to receiving water) is expected to be similar to those associated with the existing Unit 1. Provide an SME who can explain current NPDES-required toxicity testing and supporting documentation. If available, provide for review the results of whole-effluent testing required and conducted for Unit 1 under the existing NPDES permit for the past five years.
AQ-7	6.0	Provide a SME who can discuss the measurement and monitoring programs that have been conducted for Unit 1. Specific areas of interest include the programs that evaluated aquatic resources in the streams and Missouri River near the existing intake and outfall structures and summaries of thermal and chemical monitoring related to blowdown discharge. Provide access to annual monitoring reports or reports required by NPDES for the last five years, if available. (Environmental Measurements and Monitoring)
AQ-8	4.3.2	Provide access to any mitigation plan for the site and an SME to discuss the plan.
AQ-9	4.3.2	Provide an SME and supporting information to clarify the disposal of dredged materials at the site.

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CR-		Cultural Resources
CR-1	2.5.3 4.1.3	Provide an SME and supporting data/information to: <ul style="list-style-type: none"> • 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.
CR-2	2.5.3 4.1.3	Provide an SME to discuss pertinent survey reports with regard to current SHPO survey standards.
CR-3	2.5.3 4.1.3	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 an SME to discuss related archaeological and architectural surveys and reports.
CR-4	2.5.3 4.1.3	Provide an SME who can describe any archaeological sites that have been recommended for Phase II or Phase III investigations and if any Traditional Cultural Properties have been identified and if so provide avoidance or mitigation plans (MOAs or MOUs).
CR-5	2.5.3	Provide access to all consultation letters with Native American Tribes and Interested Parties.
CR-6	2.5.3	Provide an SME and provide supporting information that describes and lists all Tribes that were consulted and how each was selected.
CR-7	4.1.3 2.5.3	Provide an SME to describe 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.
CR-8	4.1.3 5.1.3	Provide an SME and provide supporting information regarding the plan for inadvertent discoveries (human remains and all other cultural sites).
CR-9	4.1.3,5.1.3	Provide an SME to describe 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.
H-		Hydrology
H-0	2.3, 4.2, 5.2, 5.3	Have available for review all references used to support statements made in the hydrology sections of the ER including calculation packages, model input files and modeling result summaries. Include relevant information on groundwater modeling used to assess performance of the water intake system and input files for CORMIX.
H-1	2.3	Provide an SME who can address the temperature variation within the Missouri River (such as the average-maximum and average-minimum temperature of this water body).
H-2	2.3	Provide an SME who can address sediment transport in surface water bodies and wetlands (such as quantities, locations where rates were measured, bed and suspended load fractions and gradation).
H-3	2.3, 4.2, 4.3	Provide an SME who can address the design basis flood (including its relationship to 100-year value) and the impacts of those floods on alluvial collector wells and plant operation.

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H-4	2.3	Provide an SME who can address the discharge area bathymetry in the channel (such as its seasonal characteristics, 3D distribution, and the discharge velocity and temperature differential characteristics).
H-5	2.3	Provide an SME who can address quantification of hydrologic budget data (such as monthly information to supplement annual information).
H-6	2.3, 3.3	Provide an SME who can address surface water usages (such that the rate of use by the plant under various operational conditions is defined).
H-7	2.3, 3.3	Provide an SME who can address plant water use (including monthly data and during period of low water availability).
H-8	2.3, 5.2, 6.3	Provide an SME who can address surface water chemical analysis as reported in the ER (including mercury baseline measurements).
H-9	2.3, 5.2, 6.3	Provide an SME who can address plant water discharges to surface water bodies including the magnitude and nature of the pollutant discharge in space and time.
H-10	3.4, 5.3	Provide an SME who can address heat dissipation systems (including system performance due to variations in hydrological variations).
H-11	3.3, 3.6,	Provide an SME who can address the nonradioactive effluent treatment facilities (with focus on the materials within the intake and discharge flow).
H-12	4.2	Provide an SME who can address Construction Phase water quality (and the baseline WQ data being used and the surface and groundwater quality related to interaction with exposed substrate material).
H-13	5.2	Provide an SME who can address groundwater levels expected during operation (relative to plant grade) and the factors that control groundwater levels.
H-14	5.2	Provide an SME who can address groundwater withdrawals during operation and the factors that can affect whether the rate of withdrawal is high, average, or low.
H-15	5.2	Provide an SME who can address possible simultaneous occurrence of low river discharge and low groundwater levels during operation (such that analysis of interactions might be considered).
H-16	5.2	Provide an SME who can address areal groundwater withdrawals by other users occurring during operation (with consideration of monthly withdrawals, in order to identify periods during which groundwater use by other users might interfere with the plant).
H-17	5.2	Provide an SME who can address the impact of Missouri River alluvium groundwater collector wells during operation (and their relationship to wetlands north of Bingell Island).
H-18	5.3	Provide an SME who can address numerical models for water discharge from outfall into receiving surface (including theory, assumptions, basis for parameter values and passage times).

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H-19	6.1	Provide an SME who can address thermal monitoring of discharge during phases of pre-application, pre-operational, and operation (such that bathymetry can be shown relative to sample locations at all thermal, hydrological, or aquatic biological monitoring stations).
H-20	6.3	Provide an SME who can address hydrological monitoring programs and its attendant sediment transport expectation during phases of pre-application, pre-operational, and operation (such that expected transported sediment can be quantified).
H-21	6.6	Provide an SME who can address chemical monitoring programs during phases of pre-application, pre-operation, and operation (such that details of the analytical procedure and its quality assurance program can be documented).
H-22	5.2, 5.3	Provide an SME who can discuss 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.
H-23	2.3, 5.2, 5.3	Provide an SME who can discuss Burns & McDonnell (2008). Phase II Hydrogeologic Investigation Report, Collector Well Siting Study, June 2008.
H-24	2.3, 5.2., 5.3	Provide SMEs who can discuss and provide all input assumptions and data for each of the models used in a) thermal plume analysis, b) groundwater modeling, c) water budget, and d) surface water runoff.
HP-		Health Physics - Radiological Health/Waste Systems/Decommissioning
HP-1	4.5	Provide an SME to discuss the models, assumptions and input data used to arrive at estimates of doses to construction workers (examples: GIS layer of site and compass sectors; locations of workers on the construction site receiving exposures).
HP-2	Table 5.4-6	Provide an SME to discuss the models, assumptions and input data used to arrive at estimates of doses to the general population (examples: location of milk goat, which was not mentioned in Table 5.4-6).
HP-3	5.4	Provide an SME to discuss the models, assumptions and input data used to arrive at estimates of doses to biota other than humans (examples: selection of surrogate species, calculation input values for the species and effluent concentrations).
HP-4	4.5, 5.4	Provide access to the Offsite Dose Calculation Manuals for Unit 1 and for Unit 2 for review.
HP-5	2.7, 4.5, 5.4	Provide access to electronic copies of input and output files for the following models: XDCALC, LADTAP-II, and GASPAR-II. Also provide an SME to discuss the input and output of the code calculations, and access to the calculation packages used to support dose calculations.
HP-6	2.7, 4.5	Provide information on the XDCALC computer code, including the software manual with instructions for input and description of output.
HP-7	6.0	Provide for review the annual reports of the Callaway Radiological Environmental Monitoring Program. The last five years of environmental monitoring reports at the Callaway site should be included.

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HP-8	5.4	Provide an SME to discuss the models, assumptions and input data used to arrive at estimates of radioactive releases through the liquid, gaseous and solid waste systems.
HP-9	3.5, 4.5, 5.4	Provide data on transit times for liquid effluent to receptors.
HP-10	1.3, 3.5	Provide a SME to discuss radioactive waste systems (example: waste minimization plans as specified in ESRP).
LU-1		Land Use
LU-2	Figure 2.2-7	Provide an SME who can discuss utility corridors near the site (re: Figure 2.2-7).
LU-3	4.1	Provide an SME who can discuss whether borrow pits will be created and/or expanded.
LU-4	2.2, 2.5, 4.1, 5.1	Provide an SME who can discuss historical use patterns on the Reform Conservation Area.
LU-5	4.1	Provide an SME to discuss the disposition of dredge spoils for any dredging to deepen the barge slip.
LU-6	4.1	Provide an SME to discuss potential for land use change from the development of RV/mobile home parks to house construction workers and the historical experience with land use changes that occurred in response to housing demand for workers associated with Unit 1 (both construction and operation).
LU-7	4.1, Figure 4.1-2	Provide an SME to discuss land use impacts from any modifications to the water supply/discharge system, including the collector well system (re: Figure 4.1-2 and prime farmland).
LU-8	4.1, 4.4	Provide an SME who can discuss modifications to the haul road and modifications to access roads and parking areas to accommodate construction traffic to and from the site (for example, on p. 4-67, the ER states that two new site access roads connecting Route 428 and Route 459 will be built).
Met-		Meteorology/Air Quality
Met-1	2.7, 4.0, 5.0	Provide an SME and supporting data/information to explain the logic for conclusions reached in the ER (e.g., "impacts are small" or "onsite conditions are similar to those at other regional sites"). Details should be addressed, such as criteria for the decision, inputs used and methodologies, analysis of outputs, and statistical methods applied.
Met-2	2.7, 5.4	Provide an SME and supporting data/information to explain why the meteorological analyses are done separately for the two measurement levels on the meteorological tower.
Met-3	2.7, 5.4	Provide an SME and supporting data/information (e.g., input and output files, and assumptions) to support all transport and dispersion model runs.
Met-4	2.7.1.1	Provide an SME and supporting data/information (such as detailed topographic maps) to explain the logic behind the statement that "drainage is expected to be minimal."
Met-5	2.7.1.2	Provide an SME to clarify statements such as "macro-scale diffusion" and "diffusion is worst."

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Met-6	2.7.2	Provide an SME and access to specific references (documents, dates, sampler locations, and sampler data and analysis, standard, and sampling results) that can support the statement that the area "is listed as being better than national standards" (ER Section 2.7.2 Regional Air Quality).
Met-7	2.7.4	Provide an SME and supporting data and information to explain: 1) details on the Callaway met tower and instruments (photo, period of record, types of instruments, types of data archived, QA/QC methods, and so on), 2) the use of only three years (2004-2006) of met data, 3) the use of "monthly <u>design</u> wet bulb temperature" (ER Section 2.7.4 Local Meteorology). Also, provide a tour of the meteorological tower and supporting structures.
Met-8	2.7.4.2	Provide an SME and supporting data and information to explain the phrase "heavy rains occur infrequently," to clarify the discussion of precip wind roses, and to discuss general conclusions that apply across the data (p. 2-496).
Met-9	2.7.4.3	Provide an SME and supporting data and information to clearly explain the method of estimating mixing depth and to explain what is meant by "temperature inversion" and how the persistence numbers are calculated (ER Section 2.7.4.3).
Met-10	2.7.4.4	Provide an SME and supporting data and information to explain the data, scientific interpretation, and logic in reaching conclusions regarding the dominant wind direction and similarities between the on-site data and the NWS sites near Callaway (including wind roses and the use of wind speed data to estimate the site roughness length) (ER Section 2.7.4.4 Wind Speed and Direction).
Met-11	2.7.4.6	Provide an SME and supporting data and information to discuss the stability method used (determined by the temperature difference between two levels (10 and 60 m) on a tower), the stability persistence for the 10 m separate from 60 m levels, and the conclusion that an inversion persists for a full day. Also, provide access to all hourly met data for this period (ER Section 2.7.4.6 Atmospheric Stability Persistence Summary).
Met-12	2.7.5	Provide access to a detailed topographic map and an SME to discuss the possible drainage wind effects at night (ER Section 2.7.5 Maximum Terrain Heights and Topographic Maps).
Met-13	2.7.6	<p>Provide an SME and supporting data and information to explain:</p> <ul style="list-style-type: none"> • Estimates of atmospheric dispersion factors • The use of the ABS code XDICALC • What is meant by "mixed mode release" including source locations, elevations, release rates, momentum and buoyancy flux, and nearby building dimensions • The logic behind the statement that "building wake credit was taken" • The logic behind decisions regarding nearest cow, gardens, etc. (all approximately 4 km) • The basis for concluding that the data from an earlier period "agree well" or are "very similar" to those from the 2004-2006 period (using standard statistical tests) • How the 50th percentile dispersion factors were calculated with AEOLUS3 (including the input and output files and model options chosen).

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Met 14	Tables 2.7-36 thru 37	Provide an SME and access to supporting data and information to explain these tables of wind speed and direction joint frequency distributions for stability relative to estimating inversion strength and stability (Tables 2.7-36 through 37, pages 2-540 through 2-554).
Met-15	5.3.3.1.1	Provide an SME and supporting data and information to discuss: <ul style="list-style-type: none"> • The version number and the exact citation for SACTI • How SACTI uses the two sets of met input files (from the 10 m and 90 m levels) • The effects that CTs have on cloud formation and precipitation • Low frequency combinations of conditions that might have a major environmental impact • The logic behind why the ESWS CTs are “not considered further in this analysis” • The rationale for concluding that “impacts from elevated plumes would be small” • The possibility of plume interaction (thermodynamics and kinematics) • The detailed outputs of SACTI and the logic behind conclusions of “small” or “no impact” or “insignificant increases” • Conclusions for the ESWS CTs particularly relative to near-field impacts • The high RH relative to ground level fog • The design wet bulb temperature for the cooling towers • The source of inputs in Tables 5.3-4 and 5.3-5. (Heat dissipation to atmosphere from CT plume).
Met-16	6.4	Provide access to a site plan/map that shows, by sector, the distance between meteorological tower and existing obstructions to airflow (including Callaway Unit 1 buildings, cooling tower, paved or improved surfaces, terrain features, trees, and other vegetation), and planned obstructions to airflow (including Callaway Unit 2 buildings, cooling towers, paved or improved surfaces).
Met-17	6.4	Provide an SME to discuss routine operation, maintenance, and calibration of the meteorological tower, instrumentation, data acquisition and recording equipment.
Met-18	6.4	Provide access to the Standard Operating Procedures, related records and documentation regarding, routine operation, maintenance, and calibration, data processing, validation, reporting and archival, and problem reports and corrective action for the meteorological monitoring program covering the period of record (POR) used in the COLA (i.e., 2004 thru 2007).
Met-19	6.4	Provide access to a table listing percent data recovery and data counts for each year and the composite POR for individual parameters, the joint recovery of wind speed and wind direction, and the joint recovery of wind speed, and direction, and atmospheric stability class (for each wind measurement level).
NP-		Need for Power

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NP-1	8.2.1	Provide an SME to discuss the status of the State's review of the IRP. Specifically, clarify issues such as: <ul style="list-style-type: none"> • Recent discussions with the PSC about revising the IRP • Expected schedule for IRP approvals • Current PSC issues with the IRP and their resolution.
NP-2	8.2.1	Provide an SME to discuss how Callaway Unit 2 is integrated into the NERC/SERC Long-Term Reliability Assessment.
NP-3	8.2.1	Provide an SME to discuss customers for the power to be generated; specifically, clarify issues such as: <ul style="list-style-type: none"> • Identification of expected customers (or firm power sales) for the power to be supplied by the proposed facility and any signed agreements for the purchase of the power • Estimation of forecasted power sales by the applicant in the relevant service area (Note: this information is likely to be business sensitive and/or proprietary information).
BC-		Benefit - Cost
BC-1	10.4	Provide an SME to discuss the projected costs and cost components/factors for the construction and operation of the project and the sources upon which these projections are based. Be prepared to explain how and why these costs compare to other proposed NPPs and what has been done to provide bounding estimates of these costs and whether they are expressed in current or constant dollars.
BC-2	10.4	Provide an SME to discuss projected current-dollar estimates of the annual tax benefits expected to be paid because of constructing and operating the new operating unit over the lifetime of the new plant. The discussion should include historic and expected property taxes paid to Callaway County (and other tax recipient counties), expected annual sales taxes paid to the State of Missouri, and any expected corporate taxes paid to jurisdictions affected by the plant.
BC-3	10.4	Provide an SME to explain and discuss how the Federal incentives provided by the Energy Policy Act of 2005 are expected to specifically mitigate projected construction and operations costs over the life of the proposed facility. The expert should quantify the anticipated amount of Federal incentives likely to apply to the proposed action from the following: <ul style="list-style-type: none"> • Production tax credit for the first advanced reactors brought on line in the United States • Federal risk insurance benefits expected as part of the Nuclear Power 2010 Partnership. The expert should also describe the expected impact of these incentives in terms of their role in making the project economically viable, and the impact on the proposed action in case Callaway Unit 2 does not qualify for some or all of the incentives.
BC-4	10.4	Provide an SME to discuss the important conclusions to be drawn from the summary in Table 10.4.1.
BC-5	10.4.1	Provide an SME to discuss the benefits of the project that might be non-quantifiable or non-monetary, and to discuss whether and how the forecasted benefits from electricity consumption have been independently verified.

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Info needs #	ER Section	Information Needs
NRHH		Non-Rad Human Health/Noise
NRHH-1	4.4.1 and 4.7	Provide an SME to discuss public and occupational health, and noise associated with pre-construction and construction activities. Discussion to include 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.
NRHH-2	5.3.4.1	If available, provide access to any correspondence with the Missouri Department of Health and Senior Services regarding public health concerns from thermophilic microorganisms (etiologic agents) from cooling waters.
NRHH-3	5.3.4.1	Provide an SME to discuss potential thermophilic microorganism impacts from cooling water discharge to the Missouri River. Discussion to include the proximity and types of recreational activities occurring near the cooling water discharge (ER Section 5.3.4.1).
NRHH-4	5.3.4.1	Provide an SME to discuss occupational health in association with operation and maintenance activities of cooling towers and protection of workers from thermophilic microorganisms. Discussion to include examples of personal protective equipment or activities implemented when working in and around the cooling towers (ER Section 5.3.4.1).
NRHH-5	5.6.3	Provide an SME to discuss the following associated with the transmission system: ozone, electrostatic effects (electric shock), and conformance with NESC concerning steady-state currents (ER Section 5.6.3).
NRHH-6	10.5	Provide an SME to discuss cumulative nonradiological human health impacts of construction and operation including etiologic agents (formerly thermophilic organisms), noise, electrostatic effects (electric shock), and electromagnetic field effects. Discuss other activities existing or planned in the area that should be considered in cumulative impacts (ER Section 10.5).
SE-		Socioeconomics/EJ
SE-1	2.5.1	Provide an SME to discuss the "baseline" population forecasting methods and assumptions.
SE-2	2.5.2 (p.2-368)	Provide an SME to discuss sources of tax information and budgets (e.g., 2-368).
SE-3	2.5.2	Provide an SME who can discuss the distribution of tax payments on Unit 1 in quantitative terms and their impacts on neighboring jurisdictions and service levels.
SE-4	2.5.2	Provide an SME who can discuss how the service levels in the various jurisdictions compare to national or state standards and to pertinent officials' assessments of adequacy.
SE-5	4.4, 5.8	Provide an SME who can discuss the residential patterns and commuting routes of workers on Unit 1, both historic construction and current operations workers.
SE-6	2.2.1, 4.1.1	Provide knowledgeable expert to discuss status of developing County Planning Commissions.

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Info needs #	ER Section	Information Needs
SE-7	2.5.4	Provide an SME to discuss the source of information about the characteristics and life-style attributes of minority populations in the region of interest (ROI) and nearby communities beyond census data.
SE-8	2.7.7, 3.7.3, 4.4.1, 5.3, 5.8	Provide an SME and supporting data and information to describe the results of the noise analysis, in terms of the noise levels at the site boundaries (in addition to the general rules about sound attenuation).
SE-9	4.4	Provide an SME to discuss the projected composition of the workforce during the construction phase, the distribution between construction, operations, and security personnel during the construction phase, and the shift schedules of these different groups (and the availability of data from the construction and operation of Unit 1 that might inform the analysis).
SE-10	4.4, 5.8	Provide an SME who can discuss the traffic analysis, including traffic from both workers and materials entering and exiting the site, the numbers of vehicles expected to be on each of the major access routes and their affect on traffic congestion, LOS, and to identify and discuss the impacts of this traffic on affected populations, including the impacts of the workforce onsite during outages.
SE-11	4.4	Provide an SME who can discuss the local populations that will be affected by the construction activities, particularly those within 10-15 miles of the site.
SE-12	4.4	Provide an SME to discuss the basis for the assumptions and calculations concerning the residential location and characteristics of the construction workforce and the impact of their employment on the local and area economy and employment, including the use of the RIMS II multipliers, assumptions about who would fill the indirect jobs, and consequences for area demographics. The discussion should cover where the workforce during construction is assumed to originate and where its members are assumed to reside, including those expected to be weekly commuters (i.e., residing in the ROI during the work week), including how this relates to the survey information referenced on p. 4-71. It should also include discussing the numbers of different types of workers over the construction period, including those estimated to reside currently in the ROI. If available, provide for review, a graph and tables showing the numbers of these different groups over time and the estimated number of people, families, and school age children estimated to be in the local communities and counties of the EIA due to the project.
SE-13	4.4.2.2 (pp.4-70-71)	Provide an SME to discuss when site-specific workforce estimates are expected to be available (ER p. 4-70-71).
SE-14	4.4.2.5	Provide an SME to discuss the assumptions about the residential location choices of the construction phase workforce including the basis of those assumptions and how they compare with information from the construction of Unit 1. In particular, discuss how many temporary and in-migrating workers would be distributed into the communities in Callaway County. Provide information about the sources of the assumptions/estimates of distribution of workers into the migration categories and of the total wages and wage rates presented in the ER (p. 4-73).

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Info needs #	ER Section	Information Needs
SE-15	4.4	Provide an SME to discuss how housing prices and availability, including temporary housing, were affected during the construction of Unit 1, particularly in Callaway County, and how they are likely to be affected by the construction of Unit 2, particularly in the residential neighborhoods and communities closest to the site.
SE-16	4.4, 5.8	Provide an SME who can discuss expenditures for plant construction and operation other than wages that would occur in the EIA, and their effect on local employment, income, and tax receipts.
SE-17	4.4, 5.8	Provide an SME to discuss how the increased demand due to project-related populations and activities, and tax revenues would affect impacts (e.g., schools in Boone County).
SE-18	4.6, 5.10	Provide an SME to discuss the analysis of potential pathways by which it was determined that minority and low-income populations would not be affected disproportionately by adverse impacts.
SE-19	5.8	Provide an SME to discuss when the estimated 363 operations phase workers for Unit 2 would arrive on site, including whether a majority of them would start work during the construction phase of the project, and how this would affect the assessment of operations-phase impacts.
SE-20	5.8	Provide an SME to discuss the challenges for area communities to adjust to the rapid decline in employment following the construction phase and how this affects the characterization of impacts of the operations phase.
SE-21	4.6, 5.10	Provide an SME to discuss the basis for the conclusions about the magnitude of impacts assigned to the EIA from employment, income, taxes, and housing, with particular attention to consistency between construction and operations phases.
ST-		Site and Technical Oversight
ST-1	1.3	Provide an SME to clarify the status of environmentally related authorizations required by Federal, State, regional, local, and affected Native American tribal agencies.
ST-2	2.2, 3.1	Make available aerial photographs and perspective drawings of the site (such as high-oblique aerial views that show the facility and the site boundary).
ST-3	4.1	Provide an SME and topographic maps to describe the construction zone and land to be cleared (including transmission line and transportation corridors).
ST-4	4.6	Provide SMEs to discuss the measures and control/operational procedures to limit potential impacts (such as noise, erosion, dust, traffic, waste, surface-water, and groundwater).
ST-5	5.10	Provide an SME to discuss possible buildup of radionuclides in the environment, such as in sediments.
T-		Transportation
T-1	5.11.2	Provide an SME and supporting data and information to support the decay heat generation rate of 5.450 kW. (Section 5.11.2)

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Info needs #	ER Section	Information Needs
T-2	3.8, 5.11, 7.4	Provide access to the Transportation Calculation Package for the calculations in ER Sections 3.8, 5.11, and 7.4 (including the basis for the number of shipments, the TRAGIS output files, RADTRAN 5.6 input and output files, spreadsheets used to perform the nonradiological transportation analyses, and reference citations for the data used in RADTRAN 5.6).
T-3	5.11	Provide an SME and supporting data and information to discuss the transportation calculations and provide references for the "RADTRAN Input from NRC Models" contained in Table 5.11-3, and "Additional RADTRAN Input Parameters" in Table 5.11-8.
T-4	7.4	Provide an SME and supporting data and information to discuss the transportation calculations in Section 7.4 and possible under-reporting due to the use of the Motor Carrier Management Information System.
T-5	7.4	Provide an SME to explain how release fractions are used in the transportation accident analyses and provide the assumptions to support the selection of these release fractions (for example, describe the release fraction for Category 8 accidents in Table 7.4-5 compared to the original source for this data (NUREG/CR-6672, Table 7.31, p. 7-73) (ER Section 7.4).
T-6	10.2.2	Provide an SME and supporting data and information to discuss assumptions for the pre-construction and construction material estimates (ER Section 10.2.2).
T-7	5.11, 7.4	Provide an SME and supporting data and information to clarify how the numbers of shipments of unirradiated fuel, irradiated fuel, and radioactive waste were estimated.
T-8	5.7.8, 5.11, 7.4	Provide an SME and supporting data and information to clarify how the numbers of shipments and impacts were normalized to the 1100 MW (e) reactor (ER Sections 5.7.8, 5.11 and 7.4).
T-9	4.4, 5.8	Provide an SME and supporting data to clarify how to partition the number of construction workers into the pre-construction and construction periods.
TE-		Terrestrial Ecology
TE-1	2.4.1.1	Provide an SME to describe USGS 2005 Land Use and Land Cover (LULC) mapping for the ecological investigation area and the 2006 National Agricultural Imagery Program (NAIP) aerial photo interpretation of existing land cover with field reconnaissance on the site, especially in habitat areas that may be utilized by important species. Also, provide sample items of LULC and NAIP materials used in mapping terrestrial habitats.
TE-2	2.4.1.2.1.3	Provide an SME and supporting references to support the statement that historically, Indiana bats have been observed in the vicinity. Provide access to Clawson (2003) and MDC (2007d). Provide access to any correspondence with federal or state agencies, regarding threatened or endangered species or critical habitats.
TE-3	2.4	References: Make available all cited references.
TE-4	2.4.1.1	Provide an SME to discuss the methods used to map and quantify habitat distribution onsite, methods and locations of wildlife and plant surveys, and methods used and expertise of persons identifying species sighted, heard, or trapped, especially threatened and endangered (T&E) species.

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Info needs #	ER Section	Information Needs
TE-5	2.4.1.2.4	Provide an SME and supporting data and information to discuss the Federally-listed running buffalo clover relative to suitable habitat in cover types known to be present at Callaway (e.g., forest-grassland interfaces and stream corridors). Provide access to a description of any survey efforts for state-listed plant species.
TE-6	2.4.1.4	Provide an SME and supporting data and information/references to support the statement "The only disease vector known to occur on the AmerenUE property is the deer tick (<i>Ixodes scapularis</i>) which has been known to transmit Lyme disease to humans."
TE-7	2.4.1.4	Provide an SME and supporting data and information/references to support the statement "No pest species are known to be widespread or cause serious problems at the AmerenUE property and surrounding ecological investigation area."
TE-8	2.4.2.1.1.4	Provide an SME and supporting data and information to discuss the jurisdictional status of wetlands and the status of whether the Army Corps or other stakeholder agencies concur with the findings of the wetland delineation.
TE-9	4.3.1.3	Provide an SME and supporting data and information/references to discuss all (local, state and federal) permitting aspects associated with construction impacts to wetlands, streams, and rivers, and any state or local guidance documents.
TE-10	4.3.1.3	Provide an SME and supporting data and information/references to discuss how collector well sites were determined to ensure adequate water supply while limiting potential environmental impacts, including possible location of all three collector wells on the land side of the levee to reduce wetland impacts.
TE-11	4.3.1.3	Provide an SME and supporting data and information/references to discuss the potential impacts to the Mollie Dosier Chute associated with culvert construction. For instance, was this area included in the preoperational sampling? Is there any reason to believe that T&E species might exist there?
TE-12	5.2.1.3	Provide an SME to describe how wetlands could be affected by hydrological changes caused by the Collector Well System. For example, what do groundwater model results predict in terms of water level changes below wetland areas and the associated effects?
TE-13	5.3.3.2.4	Provide an SME and access to additional information on bird collisions with cooling towers, construction cranes, and other tall structures, including both migratory and resident birds.
TE-14	5.3.3.2.1	Provide an SME to discuss the effects of salt deposition on vegetation. Provide access to a figure overlaying maximum salt deposition isopleths over terrestrial and wetland habitats.
TE-15	5.6.1.3	Provide an SME to discuss how vegetation management will be implemented on the site and transmission line rights-of-way, including herbicide application methods, herbicides to be used, and vegetation removal methods.
TE-16	6.5.1.1	Provide an SME and supporting data and information to discuss construction and operational monitoring related to terrestrial and wetland resources.
TE-17	4.1.2, 4.3	Provide an SME to clarify the status of transmission line route selection, whether important species surveys have been conducted in these routes, and the transmission line impacts to wildlife.

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Info needs #	ER Section	Information Needs
TE-18	10.5	Provide an SME to discuss cumulative impacts of preconstruction, construction and operation on ecologically important species on the site. Discuss what other activities are in the area or planned for the area that should be considered in cumulative impacts.
TL-		Transmission Lines
TL-1	2.2.2, 4.1.2	Provide an SME to clarify the status of the transmission line corridor construction described on p. 2-13 of the ER and its relationship to decisions regarding the transmission corridor extension/modifications associated with Unit 2, particularly about the timing of the Callaway-Loose Creek connection and its relationship to the transmission line modifications contemplated for Unit 2.
TL-2	2.2.2, 3.7, 4.1.2	Provide an SME to discuss all aspects of the transmission corridors and switchyards for Unit 2, including the siting process (what is meant by an "extension") and the attributes and management of the corridor, including, for example, seasonal access for maintenance and whether widening the corridor will affect the Reform Conservation area, and to review how the construction of a new corridor is addressed in different chapters of the ER, and to clarify what is meant on p. 3-133 by the statement that "The transmission corridor siting is currently undergoing evaluation by the Midwest Independent Transmission System Operator (MISO) and has not been established. Therefore, construction of the transmission line required for the Callaway Plant Unit 2, as well as all impacts, are considered independent from the Callaway Plant Unit 2 project..."
G-		General Information Needs To the extent not identified in the subject matter areas addressed above, provide the following general information.
G-1		Provide originals of all ER figures in .jpeg, .png, or .tif format at a resolution of at least 300 dpi, sized correctly, with legends, and legible in black and white. (Figures for wind roses need not be included.)
G-2		Provide SMEs and supporting information (including assumptions, calculation packages, and consultation letters) in appropriate disciplines to support all statements made and conclusions reached.
G-3		Make available all references cited in the ER.
G-4		Make available SMEs and supporting information used to support statements and conclusions in the ER.
G-5	Tables 10.1-1 and 10.1-2	Provide SMEs in appropriate disciplines to discuss contents of Tables 10.1-1 and 10.1-2 and assure consistency between the contents of the summary tables and the results of information needs discussions. It is anticipated that this will be addressed in specific breakout sessions for the individual disciplines.

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G-6		Provide large wall map(s) at the site audit that show key features related to the proposed project, including: <ul style="list-style-type: none"> • Proposed temporary and permanent facilities • Proposed construction laydown areas • Proposed intake pipeline • Proposed collector wells • Proposed discharge pipeline • Proposed transmission corridor(s) • Property boundaries • Points of interest (e.g., nearby residences, gas pipelines, nearby industries, including quarries/mines) • Proposed rail line spur • Proposed haul roads.
G-7		Provide access to all GIS and/or CAD data/databases used to support the ER analysis and results including existing and proposed conditions as appropriate. The data should generally include, but are not limited to: <ul style="list-style-type: none"> • All existing and proposed site infrastructure (roads, buildings, intake/discharge pipelines, transmission lines, utility right-of-ways/transmission corridors, power blocks, switchyards, pipeline corridors, cooling and retention ponds, dams, canals, rail lines, monitoring/instrument stations, etc.) • Location data (official property boundary, official unit point location, exclusion area boundary, and other relevant boundaries on-site or regionally) • All surface and groundwater hydrologic data (watershed/subbasin boundaries, stream/river channels, springs, sinkholes, flood boundaries, reservoir boundary, site stormwater drainage, levees, hydrogeologic study boundaries, aquifers, potentiometric contours, well locations, surface water monitoring sites, etc.) • All terrestrial and aquatic ecological data (wetlands, ponds, terrestrial and aquatic sampling sites, wildlife/habitat areas, land use/land cover, and threatened and endangered species locations) • Terrain and bathymetric data (LIDAR, contours, river cross sections, bathymetric point samples, etc.) • Socioeconomic data (sector data at various radii, census blocks with attribute data including low income and minority data, state/county park recreational area boundaries, trails, water trails, wildlife management units, traffic count data, commuter routes, etc.) • Geology and soils data (site and vicinity data, faults, folds, seismic activity, etc.) • Alternative (candidate) site data (point locations, proposed site boundary, proposed infrastructure, etc.).
G-8	4.0, 10.0	Provide SMEs to discuss pre-construction versus construction impacts associated with each subject area (e.g., land use, surface water), and provide estimated percentages of the preconstruction impacts relative to the total construction impacts described, as well as the basis for those estimates.