Callaway2COLPEm Resource

From: Wink, Roger C [RWink@ameren.com]
Sent: Tuesday, May 26, 2009 4:56 PM
To: Olson, Bruce; george.last@pnl.gov
Subject: Copy of the alternate site selection presentation
Attachments: Alternate_Site_Selection_and_Evaluation[1].pdf

Bruce/George: It is my understanding the CD that was sent to you with the supplement files was missing the presentation on the alternate site selection process. This presentation is attached. Note that we have verified this presentation was included in the formal submittal sent on May 15, 2009 so this presentation should be docketed in the not too distant future as the document control desk processes the supplement. We are also pursuing sending you copies of the met tower source data that was included as a stand alone CD in the supplement submittal. We overlooked the need to pull this data off the supplement CD when we copied the files to the information copy CDs that were sent to you. We will send this data via seperate email.

Regards.

Roger Wink

Hearing Identifier: CallawayPlant_Unit2_COL_Public
Email Number: 203

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Alternative Site Selection and Evaluation Process

Outline

- Regulatory Basis for Site Selection Process
- Proposed Site, Region of Interest, and Candidate Areas
- Threshold Criteria
- Site Selection Process
- Databases and Sources Consulted
- Greenfield Sites Evaluation, Brownfield Sites, Proposed Sites
- Evaluation of Candidate Sites
- Quantitative Weighted Comparison of Candidate Sites
- Conclusions

Regulatory Basis for Site Selection Process

Regulatory Basis - Site Selection Process

- Focuses on identifying and evaluating locations that represent a range of reasonable alternative sites for the proposed project
- Basic constraints and limitations applicable to the site-selection process provide a comprehensive basis and an objective rationale under which this selection process is performed
- **These constraints include: currently implemented rules, regulations, and laws**

Guidance

- NUREG-1555, Section 9.3(III):

"Recognize that there will be special cases in which the proposed site was not selected on the basis of a systematic site-selection process. Examples include plants proposed to be constructed on the site of an existing nuclear power plant previously found acceptable...

For such cases, the reviewer should analyze the applicant's site selection process only as it applies to candidate sites other than the proposed site, and the site-comparison process may be restricted to a site-by-site comparison of these candidates with the proposed site."

Guidance

- Documents used as both reference and guidance :
  - **Electric Power Research Institute (EPRI) "Siting Guide: Site Selection and Evaluation Criteria for an Early Site Permit Application, 1006878, 2002"**
  - **NRC Regulatory Guide 4.2, Revision 2 "Preparation of Environmental Reports For Nuclear Power Stations, Chapter 9 Alternative Sources and Sites," 1976**
  - **NRC Regulatory Guide 4.7 Revision 2 – "General Site Suitability Criteria for Nuclear Power Stations," April, 1998**
  - **NRC NUREG-1555, "Environmental Standard Review Plan, Office of Nuclear Reactor Regulation, Section 9.3 Site Selection Process," July, 2007**

Proposed Site, Region of Interest, and Candidate Areas

Proposed Site

- The nuclear site evaluated is the Callaway site.

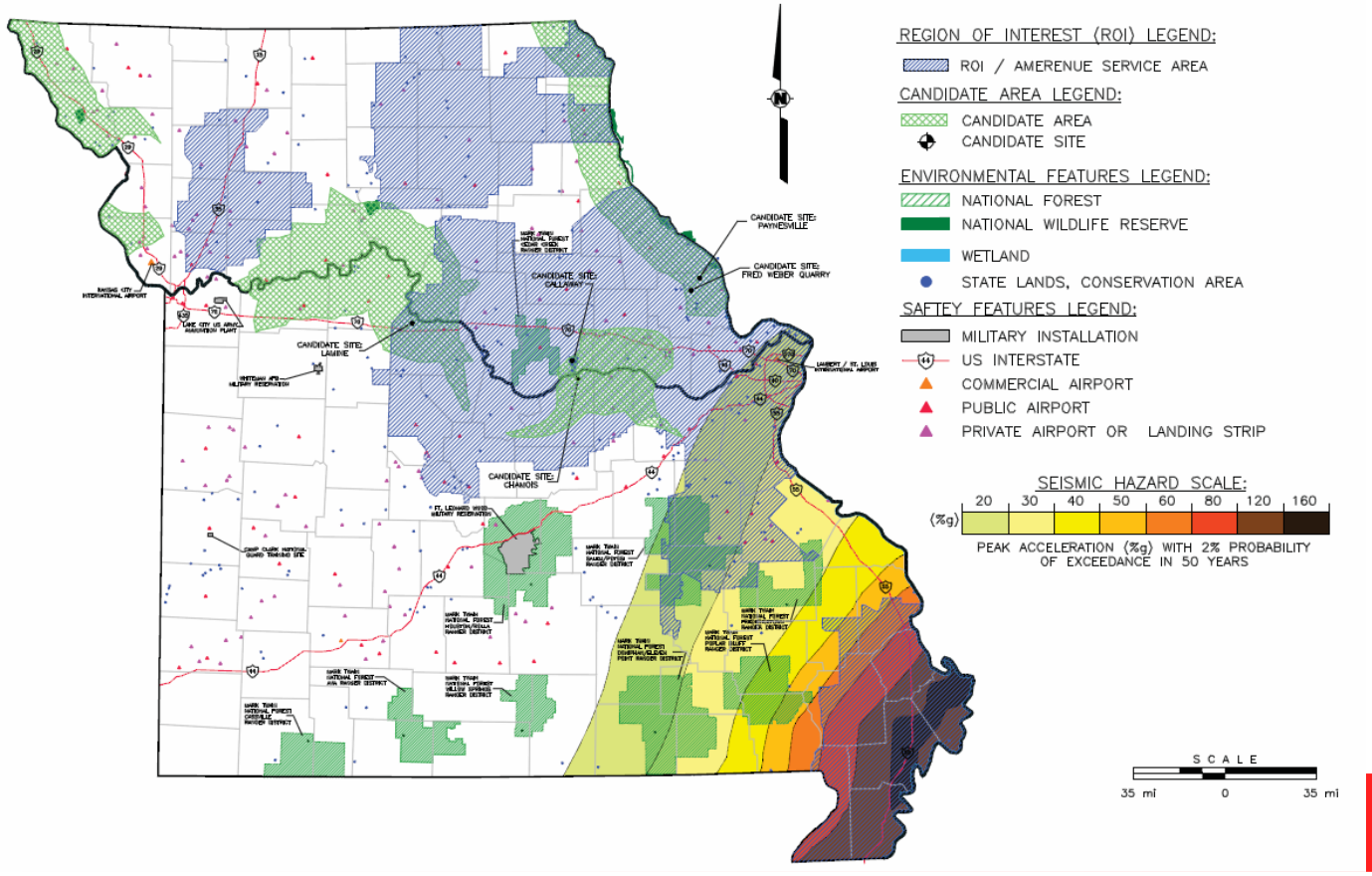
- This site was chosen because it is:
  - **Owned by AmerenUE**
  - **Known to have been approved by the NRC to be the site of more than one power plant**
  - **Within AmerenUE's service area**

Identification of Region of Interest (ROI)

- Purpose of plant: To serve the AmerenUE customer base as a dedicated baseload power generation asset
  - **This is required to meet existing and future load requirement necessary to ensure that AmerenUE will continue to provide reliable, quality, least-cost energy to its customers**

- Therefore, the **Region of Interest** is AmerenUE's service area.
- Service area includes most of the St. Louis metro, and portions of central, northwest, northeast, eastern and southeast Missouri.

Region of Interest and Candidate Areas for Site Selection



Selection of Region of Interest (ROI)

- The ROI is selected to contain areas that meet the threshold criteria of being:
  1. **Remote from population centers and population dense regions**
  2. **In close proximity to power demand load centers**
  3. **Reasonably close to existing transmission lines**
  4. **Suitable for providing sufficient cooling water sources**

Selection of Candidate Area – Exclusionary Criteria

- The ROI was evaluated with respect to the following three exclusionary criteria, to identify portions of the ROI to be excluded from consideration as a Candidate Area:

- **POPULATION: A 1O-mile buffer zone was established around population centers (metropolitan statistical units) of 25,000 or greater**
  - **As per guidance in Regulatory Guide 4.7 Rev. 2 that the low population zone (LPZ) be such that the distance to the nearest boundary of a densely populated center containing more than about 25,000 residents must be at least one and one-third times the distance from the reactor to the outer boundary of the LPZ**
  - **The buffer zone was selected to account for population growth and residential expansion over the years of the life of the plant.**

Selection of Candidate Area – Exclusionary Criteria

- Criteria continued:

- **SEISMIC: Regions of unsuitable potential seismic activity were established.**
- **WATER: A zone of 15 miles from the selected water bodies was established as the outer limit of a candidate area, in recognition that with increasing distance the environmental impacts of establishing both a water intake pipeline and a discharge line become greater.**

Site Selection Process – 4th Exclusionary Criterion

- Initially, AmerenUE considered distance from areas with significant flood potential as an exclusionary criterion
- AmerenUE had hoped to compare Callaway Unit 2, a disturbed (brownfield) site, to other brownfield sites
- However, only one brownfield site could be identified that met all four exclusionary criteria
- Therefore, this criterion was not applied to brownfield sites and was applied to greenfield sites

Threshold Criteria

Site Selection Threshold Criteria

- Major site characteristics (including those in 10 CFR 100 and NRC Regulatory Guide 4.7, Rev. 2 (1998)) evaluated across the Candidate Area.
- Non-seismic siting criteria in 10 CFR 100 include (among others):
  - **Presence of an exclusion area and a low population area as defined in 10 CFR 100**
  - **Population center distance of at least one and one-third times the distance from the reactor to the outer boundary of the low population zone**
  - **Suitable site atmospheric dispersion characteristics**
  - **Threats from physical characteristics of the site must pose no undue risk to the facility being considered**
  - **Potential hazards associated with nearby transportation routes, industrial and military facilities will pose no undue risk to the facility being considered**
  - **Sites should be located away from very densely populated centers**

Site Selection Threshold Criteria

- NUREG-1555 (July 2007 draft) establishes reasons that may be sufficient to exclude areas from the ROI as unsuitable including:
- **Proximity to major centers of population density**
- **Lack of existing infrastructure (e.g., roads)**
- **Lack of a suitable cooling water source**
- **Distance to transmission lines, substations, or load centers**
- **Unsuitable topographic features**
- **Potential to impact valuable agricultural, residential, or industrial areas**
- **Potential to impact dedicated land-use areas**
- **Conflict with land-use planning programs or other restrictions**

Summary of Process for Selecting Sites (to be described in detail below)

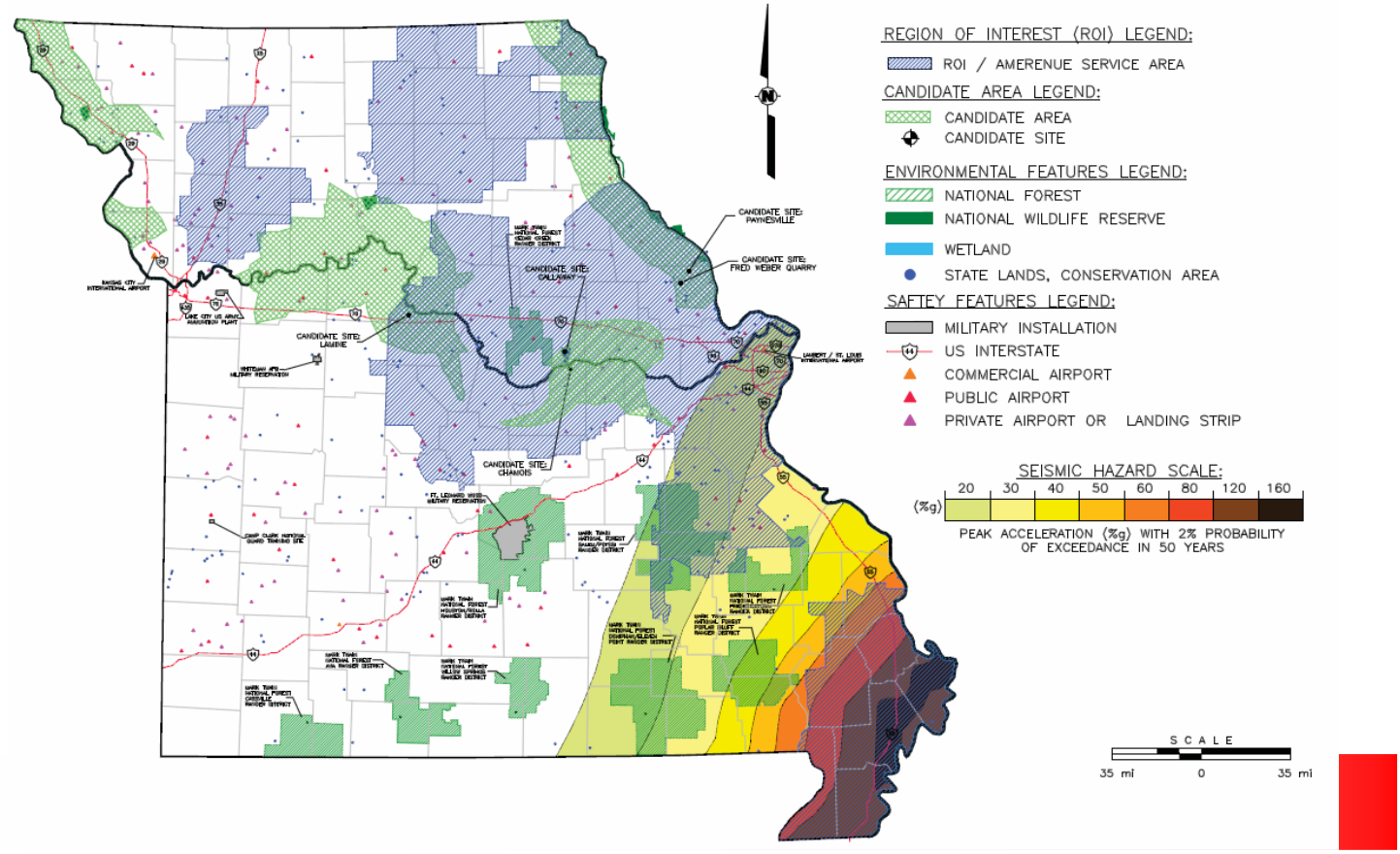
- Within the Candidate Areas, AmerenUE consulted several sources to obtain listings of potential sites
- After review of available sites within the Candidate Area, AmerenUE determined that there were 12 sites (9 greenfield sites, 2 brownfield sites, and the Callaway site) that met the threshold criteria for construction and operation of the Plant.
- AmerenUE then expanded its ROI to include any area in Missouri that met the minimal exclusionary criteria as defined in EPRI 2002 (population, seismic and water)
  - **This resulted in the inclusion of locations along the Missouri and Mississippi rivers.**
  - **The ROI was limited to the state of Missouri because AmerenUE services customers only in Missouri.**

Site Selection Process

Site Selection Process

- Methodology developed by EPRI (2002) under the auspices of the NRC was selected with some modification to conform to the needs of selecting alternate sites to an existing proposed site.
- The EPRI Siting Guide (2002) geological and seismic hazards assessment approach was used to perform a step one Geologic and Seismic Alternative Site Analysis.
- A review of available geological, seismological, and geophysical data was performed for the ROI and candidate areas.

Candidate Areas for Site Selection – Seismic Hazard



Databases and Sources Consulted

Databases and Sources Consulted

- To identify candidate sites, a number of resources were researched including:
  - **Original Siting Study (1971)**
  - **Federal Properties in Missouri**
  - **AmerenUE's list of generating facilities and owned real estate**
  - **Missouri Department of Natural Resources (MDNR) Brownfield/Voluntary Cleanup Program's List of brownfield sites**
  - **MDNR Division of Environmental Quality's Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri**

Databases and Sources Consulted

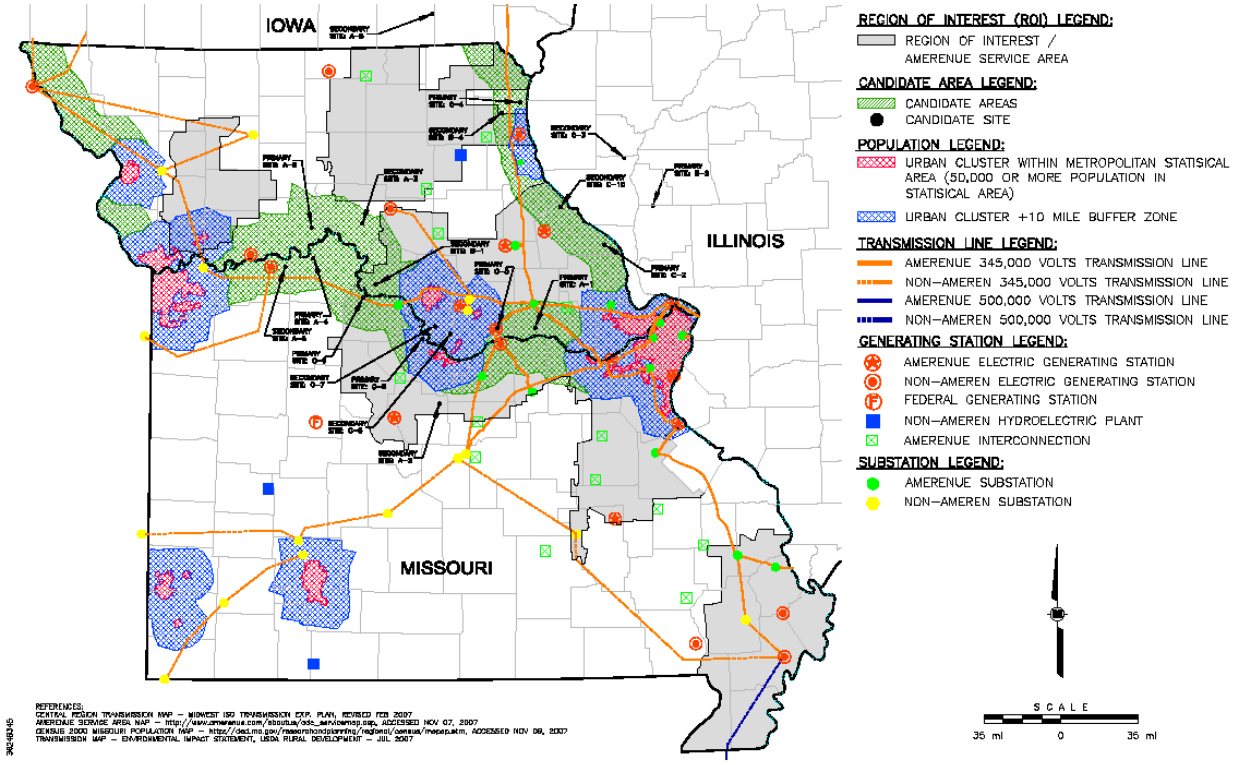
- Site research resources (continued):

- **Location One, a web-based commercial siting tool with an inventory of available industrial sites for sale**
- **LoopNet, a subscription-based database of available real estate properties**
- **An inventory of electric generating facilities in the state of Missouri**
- **Independent review of the original candidate areas**

Databases and Sources Consulted

- Original Siting Study (1971)
  - **Of the 9 primary properties, 3 remained potentially viable**
  - **Others were either outside of the ROI and AmerenUE service area, outside Missouri, located within an urban area plus 10 mile buffer zone, or now encroached by highways**
- Federal Properties in Missouri
  - **No federal properties are in the ROI**
- AmerenUE's list of generating facilities and owned real estate
  - **No property other than Callaway was within the ROI (other AmerenUE properties are within population zones or seismic exclusion zones)**

Locations of Original Siting Study Sites



Original Siting Study Site Exclusions

Site Location	Reason for Exclusion
A-1	Necessity to relocate Highway 19
A-4	Outside of ROI and AmerenUE service area
A-6	Outside of ROI and AmerenUE service area
B-2	Not located within the State of Missouri
C-4	Outside of ROI and AmerenUE service area
C-8	Located within urban cluster plus 10-mile buffer zone

Original Siting Study Site Exclusion Rationale

- Secondary Sites – excluded because they were originally found to be inferior to the primary sites.
- Outside of Missouri – excluded because of the tax and economic benefits received by the state in which the plant is located.
- Urban Cluster Plus 10-Mile Buffer Zone – excluded because of the large population in the area.
- Relocation of Highway – excluded because of the financial and economic costs associated with the highway relocation.
- Located outside of ROI – excluded because of the location in relation to AmerenUE's service area.

Databases and Sources Consulted

- LoopNet
  - **Nine properties were listed on LoopNet that could be Candidate Sites based on Exclusionary and Threshold Criteria**
- An inventory of electric generating facilities in the state of Missouri
  - **One site was identified (Chamois Power Plant)**
- Independent review of the original candidate areas
  - **One site was identified (Fred Weber Quarry)**

Databases and Sources Consulted Results

- None of the sites listed in the Missouri Department of Natural Resources (MDNR) Brownfield/Voluntary Cleanup Program's List of brownfield sites or the MDNR Division of Environmental Quality's Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites in Missouri were located within the candidate areas.
- None of the greenfield sites in the Location One database met the threshold criteria.

Greenfield Sites Evaluation
Brownfield Sites
Proposed Site

Greenfield Sites Evaluation

- The LoopNet database search identified a total of 9 available properties that met the threshold criteria of proximity to water and distance from population centers. All are greenfield sites and most have some development in the form of a farm, residence, or commercial recreational facility.
- Three sites identified in the Original Siting Study had similar characteristics and were included in the Greenfield Sites Evaluation
- AmerenUE evaluated these Greenfield Sites to identify the best with which to compare the proposed site
- This is consistent with NUREG-1555, Section 9.3(III)

Greenfield Site Selection Process

- The following steps were implemented:
- **Relevant avoidance and suitability criteria were selected to provide a basis for the evaluation of the potential sites**
- **Values were developed to allow each of the selection criteria to be applied to each site**
- **A weighting was applied to each of the selection criteria to reflect the importance of each criteria to a site suitability evaluation (regardless of the particular site)**
- **Available data were obtained about the 12 identified potential candidate sites**
- **Identified sites were compared with respect to avoidance and suitability criteria**

Avoidance and Suitability Criteria for Greenfield Site Selection Process

- Average population / sq. mile (within 10-mile and 50-mile radius)
- Distance from major water body
- Inside or Outside of Floodplain
- Total Length of Transmission Line Needed
- Distance to Load Center (St. Louis)
- Distance from significant public resources (national parks, etc.)
- Distance from major airports
- Distance to major highways

Avoidance and Suitability Criteria for Greenfield Site Selection Process (Cont.)

- Presence of minimum acreage (500 acres, as described in 10 CFR 100) to minimize further land acquisition and converted land use concerns; smaller sites were considered but ranked lower in value
- Brownfield v. Greenfield
- Environmental Diversity

Greenfield Site Evaluation Methodology

- Ranges: The data for each criterion were then grouped into ranges so as to prevent needing to differentially rank essentially similar data for different sites. The selected value ranges for each criterion are presented in the right column of the Greenfield Site Comparison Matrix.
  - **Ranges are expressed as a rating of from 1 (most negative) to 5 (most beneficial). For example, the criterion addressing distance from major water body was given value ranges of 5 = 0-4 miles; 3 = 5-9 miles; and 1 = 10-15 miles.**
- Ranking: Each criterion was also given a ranking in recognition of its importance in defining an optimal site for a plant. Criteria were given rankings ranging from 2 to 8.
- Weighted Value for Criterion: Finally, the criterion rating was multiplied by the criterion ranking to establish a weighted value for each criterion for each site.

Site Comparison Matrix

SITE LEGEND

Site Code	Site Name	Site Code	Site Name
C-2	Annada	R-6	Fayette
C-9	Lamine	R-7	14636 Z Hwy
R-1	Hwys 79 & 47	R-8	Eolia
R-2	Highway 94	R-9	Paynesville
R-3	30543 Hwy N	A-1	Callaway
R-4	Pheasant Hunting Farm	A-2	Fred Weber
R-5	Tower Road	A-3	Chamois

Criterion
Weighting Factor (see legend)

Pop. Per SQ Mi w/		Missouri River									Mississippi River					Value Range
		C9	R2	R3	R4	R5	R6	R7	A-1	A-3	C2	R1	R8	R9	A-2	
10 mi	Data (#/sq. mi)	48.9	25.6	14.7	61.5	31.9	23.9	9.2	31.5	30	24.6	60.7	13.9	30.1	15.1	5 = 0 - 24 #/sq mi
	Value	3	3	5	1	3	5	5	3	3	5	1	5	3	5	3 = 25 - 49 #/sq mi
8	Weighted Value	24	24	40	8	24	40	40	24	24	40	8	40	24	40	1 = 50 - 75 #/sq mi

Pop. Per SQ Mi w/		Missouri River									Mississippi River					Value Range
		C9	R2	R3	R4	R5	R6	R7	A-1	A-3	C2	R1	R8	R9	A-2	
50 mi	Data (#/sq. mi)	57.6	82.2	51.5	57	124.2	55.4	29.3	79.1	79	209.4	234.7	162.1	282.2	148.3	5 = 0 - 149 #/sq mi
	Value	5	5	5	5	5	5	5	5	5	3	3	3	3	5	3 = 150 - 299 #/sq mi
2	Weighted Value	10	10	10	10	10	10	10	10	10	6	6	6	6	10	1 = 300 - 450 #/sq mi

Dist To Major Water		Missouri River									Mississippi River					Value Range
		C9	R2	R3	R4	R5	R6	R7	A-1	A-3	C2	R1	R8	R9	A-2	
Source	Data (miles)	3	5	15	7.5	5	15	15	0	0	5	3	10	7.5	12.5	5 = 0 - 4 mi
	Value	5	3	1	3	3	1	1	5	5	3	5	1	3	1	3 = 5 - 9 mi
8	Weighted Value	40	24	8	24	24	8	8	40	40	24	40	8	24	8	1 = 10 - 15 mi

		Missouri River									Mississippi River					Value Range
		C9	R2	R3	R4	R5	R6	R7	A-1	A-3	C2	R1	R8	R9	A-2	
Within Floodplain	Data (In or Out)	Out	Out	Out	Out	Out	Out	Out	Out	In	Out	In	Out	Out	Out	5= Outside of Floodplain
	Value	5	5	5	5	5	5	5	5	-5	5	-5	5	5	5	Negative 5= Within Floodplain
8	Weighted Value	40	40	40	40	40	40	40	40	-40	40	-40	40	40	40	

Site Comparison Matrix

Criterion / Weighting Factor (see legend)		Missouri River									Mississippi River					Value Range
		C9	R2	R3	R4	R5	R6	R7	A-1	A-3	C2	R1	R8	R9	A-2	
Total Length of Transmission Line Needed	Data (miles)	130	23	144	130	64	130	149	6.7	1	103	85	78	83	72	5 = 0 - 50 mi
	Value	1	5	1	1	3	1	1	5	5	1	3	3	3	3	3 = 51-100 mi
8	Weighted Value	8	40	8	8	24	8	8	40	40	8	24	24	24	24	1 = 100-150 mi
		Missouri River									Mississippi River					Value Range
Dist to STL		C9	R2	R3	R4	R5	R6	R7	A-1	A-3	C2	R1	R8	R9	A-2	
	Data (miles)	150	85	160	145	60	145	190	77	83.4	50	40	60	56	52.8	5 = 0 - 64 mi
	Value	1	3	1	1	5	1	1	3	3	5	5	5	5	5	3 = 65 - 129 mi
3	Weighted Value	3	9	3	3	15	3	3	9	9	15	15	15	15	15	1 = 130 - 195 mi
		Missouri River									Mississippi River					Value Range
Dist to State and National Park, Land, or Conservation Areas		C9	R2	R3	R4	R5	R6	R7	A-1	A-3	C2	R1	R8	R9	A-2	
	Data (miles)	8.6	0.5	8.6	8.1	0.6	7.5	8.6	0	2	3	1.9	3.5	5.8	3.5	1 = 0 - 3 mi
	Value	5	1	5	5	1	5	5	1	1	1	1	3	3	3	3 = 3.1-6 mi
8	Weighted Value	40	8	40	40	8	40	40	8	8	8	8	24	24	24	5 = 6.1-9 mi
		Missouri River									Mississippi River					Value Range
Dist to Airport STL/KC		C9	R2	R3	R4	R5	R6	R7	A-1	A-3	C2	R1	R8	R9	A-2	
	Data (miles)	115 KC	70 STL	93 KC	112.5 KC	52 STL	115 KC	70 KC	70 STL	75 STL	48 STL	25 STL	80 STL	42.5 STL	40.3 STL	1 = < 10 mi
	Value	5	3	3	5	3	5	3	3	3	3	3	3	3	3	3 = 11 -100 mi
3	Weighted Value	15	9	9	15	9	15	9	9	9	9	9	9	9	9	5 = > 100 mi
		Missouri River									Mississippi River					Value Range
Dist to Major HWY		C9	R2	R3	R4	R5	R6	R7	A-1	A-3	C2	R1	R8	R9	A-2	
	Data (miles)	3 (I-70)	13 (I-70)	6 (I-70)	5 (Hwy40)	4 (I-70)	11 (Hwy40)	4 (Hwy55)	11 (I-70)	15 (Hwy50)	11 (Hwy61)	13 (Hwy61)	3 (Hwy61)	5 (Hwy 61)	1 (Hwy61)	1 = 1-4 mi
	Value	1	5	3	3	1	5	1	5	5	5	5	1	3	1	3 = 5-8 mi
3	Weighted Value	3	15	9	9	3	15	3	15	15	15	15	3	9	3	5 = >9 mi
		Missouri River									Mississippi River					Value Range
Acreage 500 AC		C9	R2	R3	R4	R5	R6	R7	A-1	A-3	C2	R1	R8	R9	A-2	
	Data (acres)	1,300	357	534	400	305	340	218	2,765	210	1,400	662	355	850	262	1 = < 400 acres
	Value	5	1	5	3	1	1	1	5	1	5	5	1	5	1	3 = 400 - 500 acres
8	Weighted Value	40	8	40	24	8	8	8	40	8	40	40	8	40	8	5 = > 500 acres

Site Comparison Matrix

Criterion / Weighting Factor (see legend)																
		Missouri River									Mississippi River					
Brownfield vs. Greenfield		C9	R2	R3	R4	R5	R6	R7	A-1	A-3	C2	R1	R8	R9	A-2	Value Range
	Data (BF or GF)	GF	GF	GF	GF	GF	GF	GF	BF	BF	GF	GF	GF	GF	BF	
	Value	-5	-5	-5	-5	-5	-5	-5	5	5	-5	-5	-5	-5	5	5= Brownfield
8	Weighted Value	-40	-40	-40	-40	-40	-40	-40	40	40	-40	-40	-40	-40	40	Negative 5= Greenfield
		Missouri River									Mississippi River					
Environmental Diversity		C9	R2	R3	R4	R5	R6	R7	A-1	A-3	C2	R1	R8	R9	A-2	Value Range
	Data (Yes or No)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	
	Value	0	-5	0	0	-5	0	0	0	-5	0	0	0	0	0	0= Environmentally Diverse
8	Weighted Value	0	-40	0	0	-40	0	0	0	-40	0	0	0	0	0	Negative 5= Not Environmentally Diverse
		Missouri River									Mississippi River					
		C9	R2	R3	R4	R5	R6	R7	A-1	A-3	C2	R1	R8	R9	A-2	
Value Range Total		31	24	29	27	20	29	23	45	26	31	21	25	31	37	
Weighted Total		183	107	167	141	85	147	129	275	123	165	85	137	175	221	

Weight [a]	Weighted Scale	Rationale Definition of "better" or "more important"
8	Population Per Square Mile (Within 10 Miles)	Fewer people for emergency evacuation
2	Population Per Square Mile (Within 50 Miles)	Fewer people impacted by aesthetics, etc.
8	Distance to Major Water Source (In Miles)	Closer - easier to obtain water
8	Within Floodplain (In or Out)	Out - smaller possibility of flooding
8	Total Length of Transmission Line Needed (In Miles)	Smaller - less env. impact to connect
3	Distance to Center of St. Louis (In Miles)	Closer to load center
8	Distance to Nearest Edge of Significant Areas (Parks, etc.)	Further to env. sensitive property
3	Distance to Airport (STL or KC)	Further - less impact to aviation routes
3	Distance to Major Highway	Further - less potential for disruption during emergency
8	Acreage	More - less need to acquire additional acreage
8	Brownfield v. Greenfield	Brownfield - previously disturbed land
8	Environmental Diversity	Environmentally diverse as compared with Proposed site - with respect to Geography and Geomorphology

[a] Higher number is more important criterion

Calculation

Value Range x Weight = Weighted Value

Note: This matrix reflects the original effort made to locate brownfield sites (previously disturbed sites) as potential sites

Note: The distance to the river for site R2 was extended because the nearshore environment is not immediately conducive to installing the collector well system.

Selection of Greenfield Candidate Sites - Conclusion

- The results of the greenfield site evaluations identified two sites as most favorable with respect to the initial siting criteria:
  - **Greenfield site (C-9) in Lamine, Cooper County, near the Missouri River**
  - **Greenfield site (R-9) near Paynesville, Lincoln County, near the Mississippi River**

Selection of Brownfield Sites

- Inventory of Electric Generating Facilities in the State of Missouri:
  - **A review was conducted of the Platts (2005) listing of generating facilities in Missouri.**
  - **One site, the Chamois Power Plant, met 3 of 4 exclusionary criteria as well as all the threshold criteria, and was selected for further investigation as an alternative site.**
  - **This site was selected because it has a similar industrial use and meets the threshold criteria with respect to proximity to water, seismic, and distance from population centers.**
  - **Alternative site evaluation indicated that this property is not significantly better than the Callaway site.**
  - **AmerenUE does not intend to further investigate the Chamois Power Plant.**

Selection of Brownfield Sites

- Independent Review of Candidate Areas.
  - **AmerenUE reviewed maps of the ROI to identify commercial or industrial properties that met the threshold criteria and were large enough to accommodate a NPP.**
  - **One potential site was identified, the Fred Weber Quarry in Lincoln County, MO.**
  - **The site was selected because it is an industrial site that meets the threshold criteria with respect to proximity to water, seismic and distance from population centers.**
  - **Alternative site evaluation indicated that this property is not significantly better than the Callaway site.**
  - **AmerenUE does not intend to further investigate the Fred Weber Quarry.**

Identification of Proposed Site

Original Siting Study:

- Conducted on behalf of Union Electric Co. (now AmerenUE) in 1971
- Selected greenfield site known as Reform, MO
- AmerenUE acquired property sufficient for 4 sites
- NRC Issued a Final Environmental Impact Statement (FEIS) related to the then proposed Callaway Plant Units 1 and 2
- The NRC licensed the applicant to construct two units at the Reform, MO site, now the site of Callaway Unit 1.

Candidate Site Criteria

- To be considered as a candidate site, a location must meet the following criteria as outlined in NUREG 1555, Section 9.3(III):
  - **Consumptive use of water should not cause significant adverse effects on other users**
  - **The proposed action should not jeopardize threatened, endangered, or candidate species or result in the destruction or adverse modification of critical habitat**
  - **There should not be any potential significant impacts to spawning grounds or nursery areas of important aquatic species**

Candidate Site Criteria

- NUREG 1555, Section 9.3(III) criteria (cont'd):
  - **Discharges of effluents into waterways should be in accordance with regulations and would not adversely impact efforts to meet water-quality objectives**
  - **There should be no preemption of or adverse impacts on land specially designated for environmental, recreational, or other special purposes**
  - **There would not be any potential significant impact on terrestrial and aquatic ecosystems, including wetlands, which are unique to the resource area**
  - **There are no other significant issues that preclude the use of the site**

Candidate Site Criteria

- In addition to meeting all applicable regulations and guidelines, the following factors influenced the decision to select and review sites:
  - **Suitability for the design parameters contemplated for the new plant design**
  - **Location compatibility with the applicant's current system and transmission capabilities**
  - **Licensing and regulatory potential expectation to minimize the schedule and financial risk for establishing new baseload generation**

Site Evaluation - Conclusion

- The alternative sites that are compared with the Callaway Plant Unit 2 site (the proposed site) include:
  - **Two brownfield sites: the Chamois Coal Power Plant site and the Fred Weber Quarry site**
  - **Two greenfield sites: the Lamine site and the Paynesville site**

Evaluation of Candidate Sites

Proposed and Alternative Site Evaluation

- Environmental impacts of the alternatives are assessed using the NRC three-level standard of significance:
  - **SMALL – effects are not detectable or minor**
  - **MODERATE – effects are sufficient to alter noticeably but not to destabilize important attributes of the resource**
  - **LARGE – effects are clearly noticeable and are sufficient to destabilize important attributes of the resource**

Proposed and Alternative Site Evaluation

- The alternative sites were compared to the proposed Callaway site based on information about the existing nuclear plant and the surrounding area, as well as existing environmental studies and Final Environmental Impact Statements issued by the Atomic Energy Commission and/or the U.S. NRC.
- The comparison is performed to determine if any alternative sites are environmentally preferable to the proposed site.

Proposed and Alternative Site Evaluation

The criteria by which the proposed and alternative sites were evaluated can broadly be broken down into the following categories of environmental impact:

- Land Use
- Air Quality
- Water
- Terrestrial Ecology and Sensitive Species
- Aquatic Ecology
- Socioeconomics
- Transportation
- Historic, Cultural, and Archeological Resources
- Environmental Justice
- Transmission Corridors

Chamois Generating Station Brownfield Site

- Located on the south bank of the Missouri River in Osage County, Missouri.
- Currently owned and operated by the Central Electric Power Cooperative as a 72 MWe coal burning steam power plant.
- It was assumed that the existing generating station would be decommissioned and replaced by the NPP.

Chamois Generating Station Brownfield Site

- **Farmland** – The USDA NRCS has mapped the soil in Osage County and classified the soil at the site as “Prime farmland if drained” and “All areas are prime farmland.”

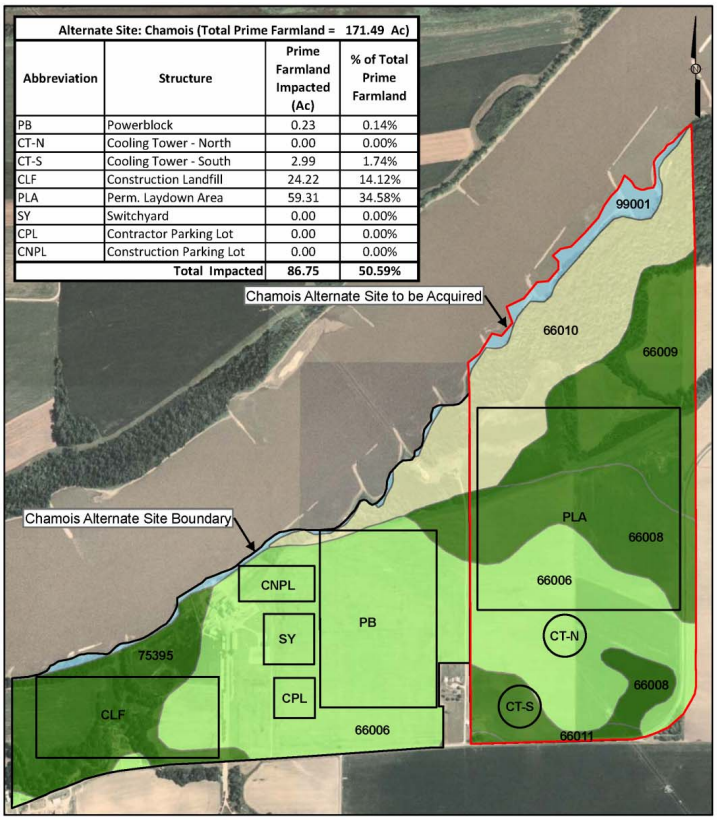
  There are no state zoning, land use, farmland preservation plans, regulations, county or local zoning ordinances that would restrict the use of the Chamois site for a NPP.

- **Land Use** – Due to the necessity to significantly change several hundred acres of the surrounding area’s land use (besides the Chamois Plant property itself) to accommodate the new nuclear site, the impact on land use in this area would be ***MODERATE*** to ***LARGE***.

Potential Impacts to Prime Farmlands from Development of Alternate Site – Chamois and Adjacent Property to be Acquired, Osage County, Missouri

Alternate Site: Chamois 210.0 ac (85.0 ha) Property to be Acquired : 252.3 ac (102.1 ha)	Prime Farmland Impacts Acre (hectare)	Percent of Alternate Site Impact (%)
Power Block	0.23 ac (0.09 ha)	0.05%
Cooling Tower North - (Property to be acquired)	NONE	0.00%
Cooling Tower South - (Property to be acquired)	2.99 ac (1.21 ha)	0.65%
Switchyard	NONE	0.00%
Permanent Laydown Area - (Property to be acquired)	59.31ac (24.00 ha)	12.83%
Construction Landfill	24.22 ac (9.80 ha)	5.24%
Contractor Parking Lot	NONE	0.00%
Construction Parking Lot	NONE	0.00%
Total Impacts	86.75 ac (35.12 ha)	18.77%

Alternate Site: Chamois (Total Prime Farmland = 171.49 Ac)			
Abbreviation	**Structure**	**Prime Farmland Impacted (Ac)**	**% of Total Prime Farmland**
PB	Powerblock	0.23	0.14%
CT-N	Cooling Tower - North	0.00	0.00%
CT-S	Cooling Tower - South	2.99	1.74%
CLF	Construction Landfill	24.22	14.12%
PLA	Perm. Laydown Area	59.31	34.58%
SY	Switchyard	0.00	0.00%
CPL	Contractor Parking Lot	0.00	0.00%
CNPL	Construction Parking Lot	0.00	0.00%
	Total Impacted	**86.75**	**50.59%**



LEGEND

- Not Prime Farmland
- Prime Farmland
- Prime Farmland, if drained
- Water

0 1,000 2,000 Feet

REFERENCE:
Soil Survey Geographic Database for Osage County, Missouri.
US Department of Agriculture (USDA), Natural Resources Conservation Service, June 2008.
2006 Missouri USDA NAIP Data.

Chamois Generating Station Brownfield Site

- **Air Quality** – Based on the design of the new reactor and the actions that will be taken to comply with permit requirements for emissions, it is expected that this unit at this location would have a ***SMALL*** (positive) impact on air quality. The positive impact of reduced NOx, particulates, and greenhouse gases would be ***SMALL***, but the local impact may be ***MODERATE***.

Chamois Generating Station Brownfield Site

- **Water** – Due to the proposed replacement of the existing Chamois Plant's water usage with a system similar to that described for Callaway Plant Unit 2, the large size of both the surface water and the groundwater resources, the current rural nature of the area, and resultant relatively low usage of these resources, the impacts to water resources are anticipated to be ***SMALL and not less than proposed site***.
- **Terrestrial Ecology and Sensitive Species** – Since the new NPP would replace the existing coal plant and the additional several hundred acres needed for the siting is largely already developed commercially or agriculturally, little or no wildlife habitat area would need to be cleared or developed. Thus, the impacts to the terrestrial ecosystem at the site would be ***SMALL and not less than proposed site***.

Chamois Generating Station Brownfield Site

- **Wetlands –** The U.S. Fish and Wildlife Service National Wetlands Inventory's Mokane East Map identifies three palustrine wetlands on the site and several more mapped palustrine wetland units in the site vicinity.
- Measures and controls would be implemented to mitigate potential impacts to wetlands
  - **Construction of wetlands in upland areas**
  - **Restoration or enhancement of degraded wetlands**
  - **Preservation of existing wetland areas**
- There are no Special State Concern Wetlands, Federally designated Wilderness Areas, Wildlife Preserves, Sanctuaries, Rouges, National Forests, Agricultural Preservation Lands, or Forest Legacy Lands known to be in the site vicinity.

Chamois Generating Station Brownfield Site

- **Aquatic Ecology** –
- **Due to the current use of the site and utilization of Best Management Practices, the construction impacts of a plant conversion project would be *SMALL* and temporary *(and not less than the proposed site).***
- **The thermal impact from cooling water discharge to the Missouri River would likely be *SMALL* due to permit restrictions (compliance with state regulations) *(and not less than the proposed site).***
- **Because of the levee and floodwall construction, however, the overall impacts to the aquatic ecology would be *MODERATE.***

Chamois Generating Station Brownfield Site

- **Socioeconomics** – (Osage County unemployment rate 4.6% in 2005; 9% below the poverty level) The effect of the proposed new facility on the population and demographics of Osage County, Mo is expected to be positive and ***SMALL***. Assuming that equitable accommodation would be made for employees of the Chamois Generating Station whose jobs would be lost, the effect of this new facility on socioeconomics would be positive and ***SMALL*** *(and not less than the proposed site)*.

Chamois Generating Station Brownfield Site

- **Transportation** – By implementing the appropriate measures, it is expected that there would be ***SMALL*** to ***MODERATE*** impacts on transportation during construction activities and a ***SMALL*** impact during operation of the facility (*and not less than proposed site*).
- **Historic, Cultural, & Archeological Resources** – Two historic properties are within 10 miles. The site is largely developed. It is assumed that no impacts to the identified potential resources would occur during construction or operation of a nuclear facility at this site. Therefore, the potential impacts would be classified as ***SMALL (****and not less than the proposed site****).***

Chamois Generating Station Brownfield Site

- **Environmental Justice** – The Chamois site is located in a largely rural area, and the likelihood of minority or disadvantaged communities being disproportionately and/or adversely affected by this plant is low. Furthermore, this site has been operating as a power generating facility for many years.
  - **It is anticipated that environmental justice impacts at this site would be *SMALL*** *(and not less than the proposed site)*
- **Transmission Corridors** – Although it will be necessary to build new infrastructure to accommodate the new output from the plant, the current transmission system could be used with limited or no modifications, so the impacts due to transmission corridors would be ***SMALL***.

Fred Weber Quarry Brownfield Site

- The site is approximately 262 acres located in the northwest corner of the intersection of State Highway 61 and County Road B in northern Lincoln County, Mo.
- The candidate site is located on an inactive limestone quarry owned by Fred Weber, Inc.
- It was assumed that the existing rock quarry operation would be closed and replaced by the NPP.

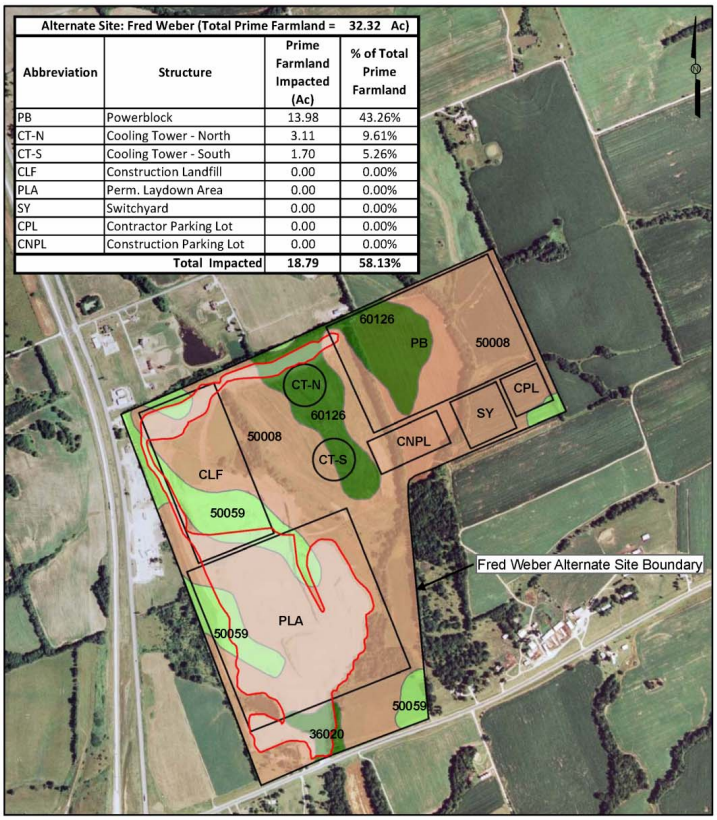
Fred Weber Quarry Brownfield Site

- **Farmland** – The US NRCS has mapped the soil in Lincoln County and although most of the soil at the site has been removed for rock quarrying, approximately half of the site remains classified as “Farmland of Statewide Importance” and the other half as “Prime Farmland.”
- There are no state zoning, land use, or farmland preservation plans, regulations, county or local zoning ordinances that would restrict the use of the Fred Weber site for a NPP.

Potential Impacts to Prime Farmlands from Development of
Alternate Site – Fred Weber Quarry, Lincoln County, Missouri

Alternate Site: Fred Weber Quarry 262.0 ac (106.0 ha)	Prime Farmland Impacts Acre (hectare)	Percent of Alternate Site Impact (%)
Power Block	13.98 ac (5.66 ha)	5.34%
Cooling Tower North	3.11 ac (1.26 ha)	1.19%
Cooling Tower South	1.70 ac (0.69 ha)	0.65%
Switchyard	NONE	0.00%
Permanent Laydown Area	NONE	0.00%
Construction Landfill	NONE	0.00%
Contractor Parking Lot	NONE	0.00%
Construction Parking Lot	NONE	0.00%
Total Impacts	18.79 ac (7.61 ha)	7.18%

Alternate Site: Fred Weber (Total Prime Farmland = 32.32 Ac)			
Abbreviation	**Structure**	**Prime Farmland Impacted (Ac)**	**% of Total Prime Farmland**
PB	Powerblock	13.98	43.26%
CT-N	Cooling Tower - North	3.11	9.61%
CT-S	Cooling Tower - South	1.70	5.26%
CLF	Construction Landfill	0.00	0.00%
PLA	Perm. Laydown Area	0.00	0.00%
SY	Switchyard	0.00	0.00%
CPL	Contractor Parking Lot	0.00	0.00%
CNPL	Construction Parking Lot	0.00	0.00%
	Total Impacted	**18.79**	**58.13%**



LEGEND

- Prime Farmland
- Prime Farmland, if drained
- Farmland of Statewide Importance
- Quarry Area (No Longer Farmland)

0 1,000 2,000 Feet

REFERENCE:
Soil Survey Geographic Database for Lincoln County, Missouri.
US Department of Agriculture (USDA), Natural Resources Conservation Service, June 2008.
2006 Missouri USDA NAIP Data.

Fred Weber Quarry Brownfield Site

- **Land Use** – A minimum of approximately 248 acres of additional land would need to be purchased for the operation of a new NPP at this site.
- Agricultural land along with several small businesses and residences would have to be cleared and the quarry operation would need to be replaced to make way for the power plant.
- Due to the necessity to change the land use of the site and surrounding areas, the impact on land use in this are would be ***MODERATE***.

Fred Weber Quarry Brownfield Site

- **Air Quality** – Construction and operation activities may result in increased air emissions. Emission-specific strategies, plans, and measures will be developed and implemented to limit and mitigate releases, ensuring compliance within the applicable regulatory limits.
- Based on the design of the new reactor and emission mitigation actions, it is expected that siting the unit at this location would have a ***SMALL*** temporary impact on air quality during construction.
- It is expected that the impact on air quality during operations would be ***SMALL*** *(and not less than the proposed site)*.

Fred Weber Quarry Brownfield Site

- **Water** – The site is located in an area identified as having relatively limited surface water and very limited groundwater resources and, as a result, water use is a concern during drought conditions. There are also concerns with water quality and resource protection.
- It is assumed that the water needs would be obtained from a Mississippi River/Mississippi Alluvial Aquifer by a collector well system. The site is approximately 12 miles west of the Mississippi River.

Fred Weber Quarry Brownfield Site

- **Water** continued –
- The impacts associated with the construction of an approximately 12 mile cooling water conveyance system are expected to be ***LARGE*** during construction and ***SMALL*** during operation *(and not less than the proposed site)*.
- Due to the ample supply of surface water resources of the Mississippi River, the current rural nature of the area, and resultant relatively low usage of these resources, impacts to water resources are anticipated to be ***SMALL*** *(and not less than the proposed site)*.

Fred Weber Quarry Brownfield Site

- **Wetlands** – The US Fish and Wildlife Service National Wetlands Inventory Mokane East Map identifies 7 palustrine wetland mapped units on the site, and 22 more palustrine mapped wetland units within a 1-mile radius of the approximate center of the site.
- Measures and controls would be implemented to mitigate potential impacts to wetlands
  - **Construction of wetlands in upland areas**
  - **Restoration or enhancement of degraded wetlands**
  - **Preservation of existing wetland areas**
- There are no Special State Concern Wetlands, Federally designated Wilderness Areas, Wildlife Preserves, Sanctuaries, Refuges, National Forests, Agricultural Preservation Lands, or Forest Legacy Lands known to be in the site vicinity.

Fred Weber Quarry Brownfield Site

- **Terrestrial Ecology and Sensitive Species** – No known state or federally listed species or sensitive habitats are known to be located in the immediate vicinity of the site.
- Because the new nuclear plant would replace the existing rock quarry and the additional several hundred acres needed for the siting are already developed, the impacts to the terrestrial ecosystem at the site would be ***SMALL*** and would occur predominantly during the construction of the plant *(and not less than the proposed site).*
- Construction Best Management Practices would be followed to minimize these impacts.

Fred Weber Quarry Brownfield Site

- **Aquatic Ecology and Sensitive Species** - No known state or federally listed aquatic species occur at the site; however, an exceptionally high number of state-listed species are associated with the streams of this ecological region.
- Because the majority of the site is already developed as a rock quarry, the rest is developed residentially and agriculturally, and construction Best Management Practices would be followed, the impacts of plant construction on the aquatic ecology would be ***SMALL*** and temporary. These potential impacts would primarily be related to runoff and siltation.
- The impacts of operation including the thermal impact that would result from cooling water discharge to the Mississippi River would likely be ***SMALL*** *(and not less than the proposed site)*.

Fred Weber Quarry Brownfield Site

- **Socioeconomics** – Lincoln County - 5.2% unemployment and 9.8% below poverty line. The Fred Weber site is currently being used as a rock quarry, and it is expected that the shift from the quarry operation to a NPP would contribute to the already significant population growth rate of the area; therefore, the effect of the proposed new facility on the population and demographics of Lincoln County, Mo is expected to be positive and ***SMALL***.
- **Environmental Justice** – The Fred Weber site is located in a largely rural area, and the likelihood of minority communities being disproportionately and adversely affected by this plant is low. Furthermore, this site has been operating as a commercial stone quarry facility for a number of years.
- It is anticipated that environmental justice impacts at this site would be ***SMALL***.

Fred Weber Quarry Brownfield Site

- **Transportation** – The site is located on State Highway 61 in the northwest corner of its intersection with County Road B and approximately 20 miles north of Highway 70.
- Impacts on local roads from the construction workforce would be temporary and would likely end after construction. However, a new operations workforce of some 850 people would present a continuing impact on the roads.
- It is expected that there would be ***MODERATE*** to ***LARGE*** impacts on transportation during construction activities and ***SMALL*** impacts during operation of the facility.

Fred Weber Quarry Brownfield Site

- **Historic, Cultural, and Archaeological Resources** – No known archaeological or National Register of Historic Places, State Historic Places, other historical resources, or Indian Reservations are located in the immediate vicinity or within a 1-mile radius of the site.
- It is assumed that no impacts to these resources would occur during construction or operation of a NPP at this site. Therefore, the impacts would be classified as ***SMALL***.

Fred Weber Quarry Brownfield Site

- **Transmission Corridors** – This site is not close to any existing 345 kV lines. It is assumed that two 42-mile 345 kV lines would be required to connect the new switchyard to the Sioux 345/138 kV substation and two 30-mile 345 kV lines would be required to connect to the Montgomery 345/161 kV substation.
- New 345 kV line extensions would total 144 miles at an estimated cost of $115.2 million.
- It will be necessary to build new infrastructure to accommodate the new output from the plant. The plant site is developed and the surrounding corridors are predominantly agricultural land.
- It is anticipated that the impacts due to transmission corridors would be ***LARGE***.

Lamine Greenfield Site

- The site is an approximately 1,300-acre property located in the town of Lamine, in Cooper County, Missouri.
- It was assumed that the power plant site would occupy at least 500 acres, the minimum area that would provide a regulatory required 0.5-mile radius exclusion zone.

Lamine Greenfield Site

- **Land Use** – The USDA NRCS has mapped the soil in Cooper County and has classified approximately half the site as “Farmland of statewide importance” and half as “prime farmland if drained.”
- There are no state zoning, land use, farmland preservation plans, regulations, county or local zoning ordinances that would restrict the use of the Lamine site for a NPP.
- Due to the use of several hundred acres of greenfield land, with no need to acquire residential property or other commercial property to accommodate a new nuclear site, the impact on land use in this area would be ***LARGE***.

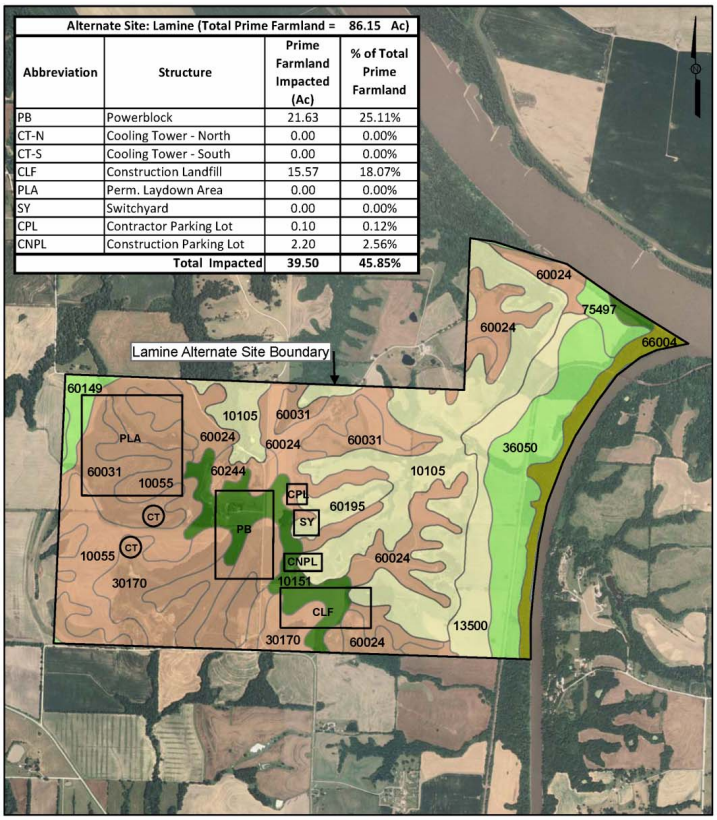
Lamine Greenfield Site

- **Air Quality** - Construction and operation activities may result in increased air emissions. Emission-specific strategies, plans, and measures will be developed and implemented to limit and mitigate releases, ensuring compliance within the applicable regulatory limits.
- Based on the design of the new reactor and emission mitigation actions, it is expected that siting the unit at this location would have a ***SMALL*** temporary impact on air quality during construction.
- It is expected that the impact on air quality during operations would be ***SMALL*** *(and not less than proposed site).*

Potential Impacts to Prime Farmlands from Development of Alternate Site – Lamine, Cooper County, Missouri

Alternate Site: Lamine 1,300.0 ac (526.0 ha)	Prime Farmland Impacts Acre (hectare)	Percent of Alternate Site Impact (%)
Power Block	21.63 ac (8.75 ha)	1.66%
Cooling Tower North	NONE	0.00%
Cooling Tower South	NONE	0.00%
Switchyard	NONE	0.00%
Permanent Laydown Area	NONE	0.00%
Construction Landfill	15.57 ac (6.30 ha)	1.20%
Contractor Parking Lot	0.10 ac (0.04 ha)	0.00%
Construction Parking Lot	2.20 ac (0.89 ha)	0.17%
Total Impacts	39.50 ac (15.98 ha)	3.03%

Alternate Site: Lamine (Total Prime Farmland = 86.15 Ac)			
Abbreviation	**Structure**	**Prime Farmland Impacted (Ac)**	**% of Total Prime Farmland**
PB	Powerblock	21.63	25.11%
CT-N	Cooling Tower - North	0.00	0.00%
CT-S	Cooling Tower - South	0.00	0.00%
CLF	Construction Landfill	15.57	18.07%
PLA	Perm. Laydown Area	0.00	0.00%
SY	Switchyard	0.00	0.00%
CPL	Contractor Parking Lot	0.10	0.12%
CNPL	Construction Parking Lot	2.20	2.56%
	Total Impacted	**39.50**	**45.85%**



LEGEND

- Not Prime Farmland
- Farmland of Statewide Importance
- Prime Farmland
- Prime Farmland, if drained
- Prime Farmland, if protected from flooding

0 2,000 4,000 Feet

REFERENCE:
Soil Survey Geographic Database for Osage County, Missouri.
US Department of Agriculture (USDA), Natural Resources Conservation Service, June 2008.
2006 Missouri USDA NAIP Data.

Lamine Greenfield Site

- **Water** – The site is located in an area identified as having the largest number of reservoirs and the greatest surface water storage in the state. Additionally, surface water quality in this region is generally good. It is assumed that the water needs could be obtained from the Missouri River/Missouri River Alluvial Aquifer by a collector well system. The site is located about 3-miles south of the Missouri River.

Lamine Greenfield Site

- **Water** continued- The impacts associated with the construction of an approximately 3-mile cooling water conveyance system are expected to be ***MODERATE*** during construction and ***SMALL*** during operation.
- Due to the anticipated ample supply of water resources of the Missouri River/Missouri River Alluvial Aquifer, the rural nature of the area, and relatively low usage of these resources, impacts to water resources are anticipated to be ***SMALL*** *(and not less than the proposed site)*.

Lamine Greenfield Site

- **Wetlands** – The US FWS National Wetlands Inventory Pilot Grove North Map identifies 80 palustrine wetland mapped units within 1-mile radius of the site centerpoint.
- Measures and controls would be implemented to mitigate potential impacts to wetlands
  - **Construction of wetlands in upland areas**
  - **Restoration or enhancement of degraded wetlands**
  - **Preservation of existing wetland areas**
- There are no Special State Concern Wetlands, Federally designated Wilderness Areas, Wildlife Preserves, Sanctuaries, Refuges, National Forests, Agricultural Preservation Lands, or Forest Legacy Lands known to be in the site vicinity.

Lamine Greenfield Site

- **Terrestrial Ecology and Sensitive Species** – No known state or federally listed species or sensitive habitats are known to be located in the immediate vicinity of the site.
- Because the new nuclear plant would be located at a previously undeveloped site, much of the pristine wildlife habitat area would need to be cleared and developed. The impacts to the terrestrial ecosystem at the site would therefore be ***LARGE*** and would occur predominantly during the construction of the plant.
- Construction Best Management Practices would be followed to minimize these impacts.

Lamine Greenfield Site

- **Aquatic Ecology and Sensitive Species** - An exceptionally high number of state-listed species are associated with the streams of this ecological region.
- The site is expected to use a Collector Well Intake System which avoids the potential for impingement or entrainment of fish in the Missouri River. However, it is likely that development of the site may impact wetlands in the area.
- Therefore, the impact of plant construction on the aquatic ecology is estimated to be ***MODERATE*** during construction and ***SMALL*** during operation.
- The impacts of operation including the thermal impact that would result from cooling water discharge to the Missouri River would likely be ***SMALL*** *(and not less than the proposed site).*

Lamine Greenfield Site

- **Socioeconomics** – (Cooper County 4.9% unemployment and 12.2% poverty level). Cooper County currently has a lower population growth rate than does Callaway County. Additionally, the 50-mile radius around the Lamine site has a lower household income and lower value of owner-occupied housing units than Callaway.
- Therefore, the effect of the proposed new facility on the population and demographics of Cooper County is expected to be ***MODERATE*** and ***BENEFICIAL*** due to the increase in jobs and taxes for the county.

Lamine Greenfield Site

- **Transportation** – The project is located on CC Highway at its intersection with Lamine Road 3 miles north of Highway 70.
- Significant traffic increases from the construction workforce would require that the local roads be improved to handle the influx of traffic.
- This would permanently change the rural nature of the immediate vicinity.
- Impacts on local roads from the construction workforce would be temporary and would likely end after construction. However, a new operations workforce of some 850 people would present a continuing impact on the roads.
- It is expected that there would be MODERATE to LARGE impacts on transportation during construction and a MODERATE impact during operation of the facility.

Lamine Greenfield Site

- **Historic, Cultural, and Archaeological Resources** – No known archaeological or National Register of Historic Places, State Historic Places, other historical resources, or Indian Reservations are located in the immediate vicinity or within a 1-mile radius of the site.
- It is assumed that no impacts to these resources would occur during construction or operation of a NPP at this site. Therefore, the impacts would be classified as ***SMALL*** *(and not less than the proposed site)*.

Lamine Greenfield Site

- **Environmental Justice** – The site is located in a largely rural area, and the likelihood of minority communities being disproportionately and adversely affected by this plant is low.
- However, there are 54,303 (12.9% of the population of the area) low income persons within 50 miles of the site, which is a greater proportion than that of the other alternative sites.
- Therefore, it is possible that environmental justice impacts at this site could be ***MODERATE***.

Lamine Greenfield Site

- **Transmission Corridors** – The site is located approximately 14 miles west of the AmerenUE Overton 345/161 kV substation and near the existing KCPL-owned Overton-Sibley 345 kV line.
- However, as there is potential for transmission service charges if this KCPL-owned line would be used in the interconnection of the proposed plant (since KCPL is an SPP member and not a MISO member), it is believed that this line should not be considered in the initial transmission development to allow similar comparisons with other alternatives.
- It is assumed that two new 14-mile 345 kV lines from the Lamine plant switchyard to the Overton substation would be required for primary connection.

Lamine Greenfield Site

- **Transmission Corridors** continued – A new 44-mile 345 kV line would be proposed to connect to the new Lamine switchyard to the existing Thomas Hill substation in Randolph County. A new 72-mile 345 kV line would be proposed to connect the new switchyard to a new Barnett 345 kV substation north of Eldon in Miller County and to the existing Mariosa Delta 345/161 kV substation east of Jefferson City.
- New 345 kV line extensions would total 144 miles (232 km) at an estimated cost of $115.2 million.
- It is anticipated that transmission corridor impacts at this site would be ***LARGE***.

Paynesville Greenfield Site

- The candidate site is an approximately 850-acre property located near the town of Elsberry, in Lincoln County, Missouri.
- It was assumed that the proposed nuclear plant site would occupy at least 500 acres, the minimum area that would provide a regulatory required 0.5-mile radius exclusion zone.

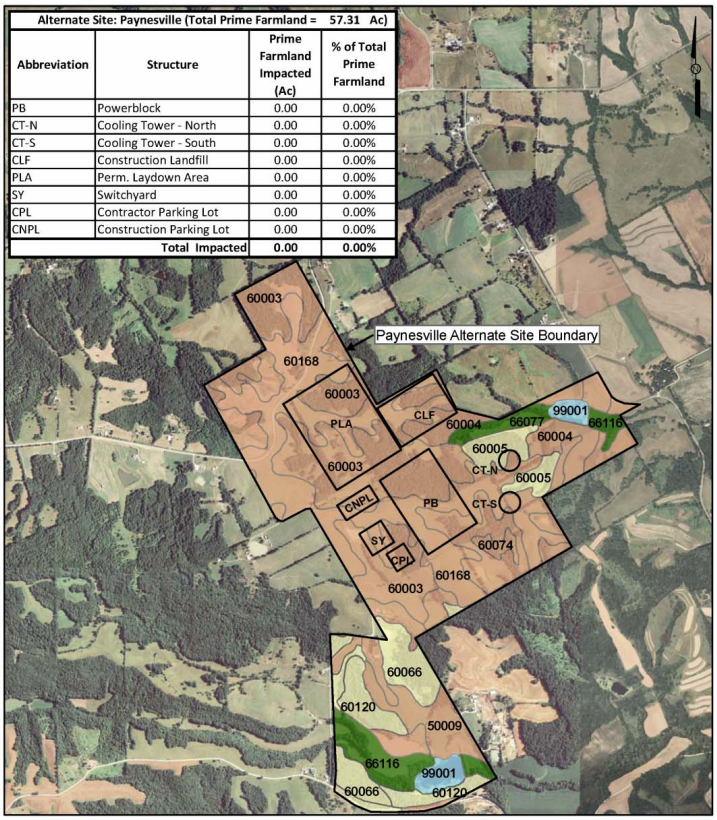
Paynesville Greenfield Site

- **Land Use** - The land that would need to be acquired is currently undeveloped although a farm is located on the property.
- The USDA NRCS has mapped the soil in Lincoln County and has classified approximately half of the site as "not prime farmland;' a quarter as "farmland of statewide importance;' and the remaining quarter as "all areas are prime farmland." The Plant could be constructed to avoid prime farmlands.
- There are no state zoning, land use, farmland preservation plans, regulations, county or local zoning ordinances that would restrict the use of the Paynesville site for a NPP.
- Due to the use of several hundred acres of greenfield land the impact on land use in this area would be ***LARGE***.

Potential Impacts to Prime Farmlands from Development of Alternate Site – Paynesville, Lincoln County, Missouri

Alternate Site: Paynesville 850.0 ac (343.9 ha)	Prime Farmland Impacts Acre (hectare)	Percent of Alternate Site Impact (%)
Power Block	NONE	0.00%
Cooling Tower North	NONE	0.00%
Cooling Tower South	NONE	0.00%
Switchyard	NONE	0.00%
Permanent Laydown Area	NONE	0.00%
Construction Landfill	NONE	0.00%
Contractor Parking Lot	NONE	0.00%
Construction Parking Lot	NONE	0.00%
Total Impacts	NONE	0.00%

Alternate Site: Paynesville (Total Prime Farmland =		57.31	Ac)
Abbreviation	**Structure**	**Prime Farmland Impacted (Ac)**	**% of Total Prime Farmland**
PB	Powerblock	0.00	0.00%
CT-N	Cooling Tower - North	0.00	0.00%
CT-S	Cooling Tower - South	0.00	0.00%
CLF	Construction Landfill	0.00	0.00%
PLA	Perm. Laydown Area	0.00	0.00%
SY	Switchyard	0.00	0.00%
CPL	Contractor Parking Lot	0.00	0.00%
CNPL	Construction Parking Lot	0.00	0.00%
	Total Impacted	**0.00**	**0.00%**



LEGEND

NO PRIME FARMLAND IMPACTED

0 2,000 4,000 Feet

- Not Prime Farmland
- Prime Farmland
- Farmland of Statewide Importance
- Water

REFERENCE:
Soil Survey Geographic Database for Lincoln County, Missouri.
US Department of Agriculture (USDA), Natural Resources Conservation Service, June 2008.
2006 Missouri USDA NAIP Data.

Paynesville Greenfield Site

- **Air Quality** - Construction and operation activities may result in increased air emissions. Emission-specific strategies, plans, and measures will be developed and implemented to limit and mitigate releases, ensuring compliance within the applicable regulatory limits.
- Based on the design of the new reactor and emission mitigation actions, it is expected that siting the unit at this location would have a ***SMALL*** temporary impact on air quality during construction.
- It is expected that the impact on air quality during operations would be ***SMALL (and not less than the proposed site)***.

Paynesville Greenfield Site

- **Water** – The site is located in an area identified as having relatively limited surface water and very limited groundwater resources and, as a result, water use is a concern during drought conditions. There are also concerns with water quality and resource protection.
- It is assumed that the water needs could be obtained from a Mississippi River/Mississippi River Alluvial Aquifer by a collector well system. The site is located about 7.5-miles west of the Mississippi River.

Paynesville Greenfield Site

- **Water** continued –
- The impacts associated with the construction of an approximately 7.5-mile cooling water conveyance system are expected to be ***LARGE*** during construction and ***SMALL*** during operation.
- Due to the anticipated ample supply of water resources from the Mississippi River/Mississippi River Alluvial Aquifer, the current rural nature of the area and resultant relatively low usage of these resources, impacts to water resources are anticipated to be ***SMALL (and not less than the proposed site)***.

Paynesville Greenfield Site

- **Wetlands** - The U.S. FWS National Wetlands Inventory Auburn Map identifies 15 palustrine mapped wetland units within a 1-mile radius of the approximate center of the site.
- Measures and controls would be implemented to mitigate potential impacts to wetlands
  - **Construction of wetlands in upland areas**
  - **Restoration or enhancement of degraded wetlands**
  - **Preservation of existing wetland areas**
- There are no Special State Concern Wetlands, Federally designated Wilderness Areas, Wildlife Preserves, Sanctuaries, Refuges, National Forests, Agricultural Preservation Lands, or Forest Legacy Lands known to be in the site vicinity.

Paynesville Greenfield Site

- **Terrestrial Ecology and Sensitive Species** – No known state or federally listed species or sensitive habitats are known to be located in the immediate vicinity of the site.
- Because the new nuclear plant would be located at a previously undeveloped site, much of the pristine wildlife habitat area would need to be cleared and developed. The impacts to the terrestrial ecosystem at the site would therefore be ***LARGE*** and would occur predominantly during the construction of the plant.
- Construction Best Management Practices would be followed to minimize these impacts.

Paynesville Greenfield Site

- **Aquatic Ecology and Sensitive Species** - An exceptionally high number of state-listed species are associated with the streams of this ecological region.
- The site is expected to use a Collector Well Intake System which avoids the potential for impingement or entrainment of fish in the Mississippi River. However, it is likely that development of the site may impact wetlands in the area.
- Therefore, the impact of plant construction on the aquatic ecology is estimated to be ***MODERATE*** during construction and ***SMALL*** during operation. The impacts of operation including the thermal impact that would result from cooling water discharge to the Mississippi River would likely be ***SMALL (and not less than the proposed site)***.

Paynesville Greenfield Site

- **Socioeconomics** - Lincoln County - 5.2% unemployment and 9.8% below poverty line. Lincoln County, Missouri, has experienced a much larger population growth rate than has Callaway County. The median household income and the value of owner-occupied housing units in Lincoln County are greater than that in Callaway County.
- Due to this site‘s proximity to the St. Louis, it is expected that the region can absorb the influx of construction workers as well as the permanent workforce with ample housing within a one-hour drive.
- Therefore, the effect of the proposed new facility on the population and demographics is expected to be ***MODERATE*** and ***BENEFICIAL***.

Paynesville Greenfield Site

- **Transportation** - The project site is located on Richards Road at its intersection with Highway F approximately 28 miles north of Highway 70.
- Impacts on local roads from the construction workforce would be temporary and would likely end after construction was finished. However, a new operations workforce of some 850 individuals would present a continuing impact to the roads.
- It is expected that there would be ***MODERATE*** to ***LARGE*** impacts on transportation during construction activities and ***SMALL*** impact during operation of the facility.

Paynesville Greenfield Site

- **Historic, Cultural, and Archaeological Resources** – No known archaeological or National Register of Historic Places, State Historic Places, other historical resources, or Indian Reservations are located in the immediate vicinity or within a 1-mile radius of the site.
- It is assumed that no impacts to these resources would occur during construction or operation of a NPP at this site. Therefore, the impacts would be classified as ***SMALL*** *(and not less than the proposed site)*.

Paynesville Greenfield Site

- **Environmental Justice** - The Paynesville site is located in a largely rural area, and the likelihood of minority communities being disproportionately and adversely affected by this plant is low. There are 101,324 low income persons within 50 miles of the site. This accounts for approximately 9.8 % of the population in the area, which is proportional to both the Chamois and Fred Weber candidate sites.
- Because the proportions of low income persons are not disproportionately larger in this area, it is anticipated that environmental justice impacts at this site would be ***SMALL*** *(and not less than the proposed site)*.

Paynesville Greenfield Site

- **Transmission Corridors** - This site is not close to any existing 345 kV lines. It is assumed that two 48-mile 345 kV lines would be required to connect the new Paynesville plant switchyard to the Sioux 345/138 kV substation and two 35-mile 345 kV lines would be required to connect to the Montgomery 345/161 kV substation.
- New 345 kV line extensions would total 166 miles at an estimated cost of $132.8 million. Thus it is anticipated that transmission corridor impacts at this site would be ***LARGE***.

Evaluation of the Existing Nuclear Site

- Co-locating the new reactor is preferable to both the brownfield alternative and the greenfield alternative.
- Co-location reduces the costs of development because the new reactor will be able to take advantage of the infrastructure that serves the existing reactor, including transmission corridor, discharge line, part of water intake line, and operations buildings, etc.
- Co-location permits use of same Emergency Response program.
- The surrounding communities are very familiar with an NPP.

Callaway Plant Unit 2

- The Callaway Plant Unit 2 site is the proposed site for locating the nuclear power plant.
- The Callaway Plant Unit 2 site is located northwest of the existing nuclear power plant, Callaway Plant Unit 1, within the Callaway site in Missouri near the Missouri River.

Callaway Plant Unit 2

- **Land Use** - Land use in the area surrounding the Callaway Plant Unit 2 site is predominantly rural. AmerenUE-owned land accessible by the public which is subject to use restrictions includes approximately 6,600 acres of the 7,371-acre Callaway site.
- This property, known as the Reform Conservation Area, is managed by the Missouri Department of Conservation (MDC). It is anticipated that construction and operation of the proposed project would not interfere with recreational uses of this area. Access in the immediate vicinity of the construction zone would be limited, but other parts of Reform would remain open.

Callaway Plant Unit 2

- **Land Use** continued - No comprehensive land use or zoning plans exist covering the rural portions of Callaway County including the Callaway site and vicinity.
- The impacts to land use at this site would be expected to be ***SMALL*** because the new reactor would be placed near the existing Callaway Plant Unit 1 location largely on land that is already disturbed. Construction of the collector wells would be on undisturbed land currently used for farming. AmerenUE has purchased this property.

Callaway Plant Unit 2

- **Air Quality** - Construction and operation activities may result in increased air emissions. Emission-specific strategies, plans, and measures will be developed and implemented to limit and mitigate releases, ensuring compliance within the applicable regulatory limits.
- Based on the design of the new reactor and emission mitigation actions, it is expected that siting the unit at this location would have a ***SMALL*** temporary impact on air quality during construction.
- It is expected that the impact on air quality during operations would be ***SMALL***.

Callaway Plant Unit 2

- **Water** - At the Callaway site, a collector well intake system will be installed along the Missouri River to supply makeup cooling water for Callaway Plant Units 1 and 2.
- The proposed collector wells will be distributed along the north bank of the Missouri River. It is expected that 80 to 90% of the water will be derived from surface water recharge to the aquifer, while 10 to 20% will be derived from upgradient sources of groundwater.
- The impacts to water resources are expected to be ***SMALL*** and would be less than or similar to impacts due to the existing reactor at the site.

Callaway Plant Unit 2

- **Water** continued –
- Due to the large size of both the surface water and groundwater resources, the current rural nature of the area and the resultant low usage of these resources, impacts to water resources at the site from construction and operation of the new reactor unit are anticipated to be ***SMALL***.

Callaway Plant Unit 2

- **Wetlands** - The U.S. FWS National Wetlands Inventory Mokane East Map identifies 36 palustrine wetland mapped units within an approximate O.5-mile radius of the site.
- Measures and controls would be implemented to mitigate potential impacts to wetlands
  - **Construction of wetlands in upland areas**
  - **Restoration or enhancement of degraded wetlands**
  - **Preservation of existing wetland areas**
- There are no Special State Concern Wetlands, Federally designated Wilderness Areas, Wildlife Preserves, Sanctuaries, Refuges, National Forests, Agricultural Preservation Lands, or Forest Legacy Lands known to be in the site vicinity.

Callaway Plant Unit 2

- **Terrestrial Ecology and Sensitive Species** - Because the new nuclear plant would be located adjacent to an operating power generating facility, and the additional acreage needed for the siting of the proposed nuclear plant is already disturbed land, little or no additional pristine wildlife habitat area would need to be cleared and developed.
- The impacts to the terrestrial ecosystem at the site would therefore be ***SMALL*** and would predominantly occur during the construction of the plant. Construction Best Management Practices would be followed to minimize these impacts.
- The impacts of operation to terrestrial species would be ***SMALL***.

Callaway Plant Unit 2

- **Aquatic Ecology and Sensitive Species** - Because the majority of the site is already developed as a nuclear power plant the impacts of Callaway Plant Unit 2 construction on the aquatic ecology would be ***SMALL*** and temporary. These potential impacts would primarily be related to runoff and siltation which would be controlled or avoided by Construction Best Management Practices.
- The impacts of operation including the thermal impact that would result from cooling water discharge to the Mississippi River would likely be ***SMALL*** due to permit restrictions to meet state requirements.

Callaway Plant Unit 2

- **Aquatic Ecology and Sensitive Species** continued –
- The site is expected to use a Collector Well Intake System which avoids the potential for impingement or entrainment of fish in the Missouri River. However, it is likely that development of the site may impact wetlands in the area. Therefore, the impact of plant construction on the aquatic ecology is estimated to be ***MODERATE*** during construction and ***SMALL*** during operation.
- The impacts of operation would likely be ***SMALL*** due to distance from the river and compliance with permit restrictions.

Callaway Plant Unit 2

- **Socioeconomics** - Although construction and operation of a new reactor would create both temporary and permanent jobs, the percent of the population employed by the new plant (and therefore the effect of the new reactor operation on the area's population) is expected to be ***SMALL*** and ***BENEFICIAL***.
- The additional jobs and local tax revenues generated by the construction and operation of Callaway Plant Unit 2 is expected to have a ***BENEFICIAL*** effect on the local economy.

Callaway Plant Unit 2

- **Transportation** - Callaway County is bisected in the east/west direction by Highway 70 and in the north/south direction by U.S. Route 54.
- It has been calculated that the existing road system can handle both the construction and the operational work force burden.
- Impacts on local roads would be temporary and would likely end after construction was finished. It is estimated that there would be ***SMALL*** to ***MODERATE*** impacts on transportation during construction activities and a ***SMALL*** impact during operation of the facility.

Callaway Plant Unit 2

- **Historic, Cultural, and Archaeological Resources -** It is anticipated that historic and cultural impacts would be ***SMALL*** because the site is largely already disturbed and surveys have not indicated the presence of cultural resources in new areas to be disturbed.

Callaway Plant Unit 2

- **Environmental Justice** - The Callaway Plant Unit 2 site is located in a largely rural area, and the likelihood of minority communities being disproportionately and adversely affected by this plant is low. There are 45,036 (7.4% of the population of the area) low income population within 50 miles of the site. This is lower than the Lamine, Fred Weber, and Paynesville candidate sites, and is on par with the Chamois candidate site.
- Therefore, it is anticipated that environmental justice impacts at this site would be ***SMALL***.

Callaway Plant Unit 2

- **Transmission Corridors** - Additions and modifications to the transmission system needed to connect the new reactor unit to the power grid:
  - **One new 345 kV, 16 breaker, breaker-and-a-half switchyard to transmit power from Callaway Plant Unit 2**
  - **Two new 345 kV, 2,090 MVA (normal rating) circuits connecting the new Callaway Plant Unit 2 switchyard to the existing Callaway Plant Unit 1 switchyard**
  - **An extension of the Loose Creek 345 kV transmission line from a tie point on the Loose Creek transmission line near Chamois to the Callaway Plant Unit 1 switchyard resulting in approximately 6.7 miles of new transmission line**

Callaway Plant Unit 2

- **Transmission Corridors** continued –
- Due to the rural nature of the areas that would be transected by these transmission lines, and the use of environmental mitigation measures during construction, impacts are expected to be ***SMALL***.

Quantitative Weighted Comparison of Candidate Sites

Quantitative Weighted Comparison of Candidate Sites

- The objective of the Alternative Sites evaluation is to verify that there are no “environmentally preferable” or “obviously superior” sites on which to build and operate Callaway Plant Unit 2.
- This evaluation was conducted using accepted criteria and methodology referenced earlier in this presentation to determine the impact of development of the proposed facility at 4 sites plus the proposed site.
- Evaluation of the candidate sites was conducted to assess whether any of the identified sites were obviously superior to the proposed site.

Quantitative Weighted Comparison of Candidate Sites

- Quantitative values were applied to data ranges for each of the selection criteria.
- A weighting was applied to each of the selection criteria to reflect the importance of each criterion to the suitability of the site. Suitability is defined as the imposition of the least negative impacts while still effectively fulfilling the purpose of the proposed unit.

Quantitative Weighted Comparison of Candidate Sites

- Weighted factors of 2, 3, 5 and 8 were applied to the following evaluation criterion.
  - **Population per square mile within a 10 mile radius**
  - **Population per square mile within a 50 mile radius**
  - **Distance from the major water source**
  - **Total length of transmission line needed**
  - **Distance from the load center**
  - **Distance from significant public resources**
  - **Distance from major airports**

Quantitative Comparison of Candidate Sites (cont.)

- Distance from major highways
- Presence of minimum acreage (500 acres, as described in 10 CFR 100)
- Brownfield v. Greenfield
- Environmental Diversity

Quantitative Weighted Comparison of Candidate Sites

- Weights were assigned according to the effects of the given criterion on the suitability of the site in correlation to or resulting from the construction and operation of an NPP.
- Effects were categorized as Primary, Secondary and Tertiary, reflective of their correlation to the construction and operation of the proposed facility and to the degree by which the impacts were identifiable and measurable.

Quantitative Weighted Comparison of Candidate Sites

- Primary effects, such as wetlands lost due to plant construction, are highly identifiable, measurable and have a direct and immediate correlation to the construction of the proposed facility.
- Secondary effects, such as the socioeconomic and environmental effects of increased commuter populations, are identifiable with various degrees of measurability, and are said to have a related effect from (less than absolute correlation to) the construction and operation of the proposed facility.
- Tertiary effects, such as economic and environmental effects of impacts on aviation routes, are most difficult to identify and to measure, and have a small correlation to the construction and operation of the proposed facility.

Quantitative Weighted Comparison of Candidate Sites

Criterion							
Weighting Factor (see legend)							
		Chamois Generating Station	**Fred Weber Quarry**	**Lamine**	**Paynesville**	**Callaway**	**Value Range**
Land Use	Data	Moderate Negative Impact	Moderate Negative Impact	Large Negative Impact	Large Negative Impact	Small Negative Impact	5= Large Beneficial Impact
	Value	-3	-3	-5	-5	-1	3= Moderate Beneficial Impact
8	Weighted Value	-24	-24	-40	-40	-8	1= Small Beneficial Impact
							-1= Small Negative Impact
Air Quality (from Construction)	Data	Small Negative Impact	Small Negative Impact	Small Negative Impact	Small Negative Impact	Small Negative Impact	-3= Moderate Negative Impact
	Value	-1	-1	-1	-1	-1	-5= Large Negative Impact
5	Weighted Value	-5	-5	-5	-5	-5	
Air Quality (from Operation)	Data	Small Beneficial Impact	Small Negative Impact	Small Negative Impact	Small Negative Impact	Small Negative Impact	
	Value	1	-1	-1	-1	-1	
5	Weighted Value	5	-5	-5	-5	-5	
Water (from Construction)	Data	Small Negative Impact	Large Negative Impact	Moderate Negative Impact	Large Negative Impact	Small Negative Impact	
	Value	-1	-5	-3	-5	-1	
5	Weighted Value	-5	-25	-15	-25	-5	

The largest Weighted Values indicate the least negative impact.

Quantitative Weighted Comparison of Candidate Sites

Criterion							
Weighting Factor (see legend)							
		Chamois Generating Station	**Fred Weber Quarry**	**Lamine**	**Paynesville**	**Callaway**	**Value Range**
Water (from Operation)	Data	Small Negative Impact	Small Negative Impact	Small Negative Impact	Small Negative Impact	Small Negative Impact	
	Value	-1	-1	-1	-1	-1	
5	Weighted Value	-5	-5	-5	-5	-5	
Terrestrial Ecology and Sensitive Species	Data	Small Negative Impact	Small Negative Impact	Large Negative Impact	Large Negative Impact	Small Negative Impact	
	Value	-1	-1	-5	-5	-1	
5	Weighted Value	-5	-5	-25	-25	-5	
Aquatic Ecology and Sensitive Species (from Construction)	Data	Small Negative Impact	Small Negative Impact	Moderate Negative Impact	Moderate Negative Impact	Small Negative Impact	
	Value	-1	-1	-3	-3	-1	
5	Weighted Value	-5	-5	-15	-15	-5	

Quantitative Weighted Comparison of Candidate Sites

Criterion							
Weighting Factor (see legend)							
		Chamois Generating Station	**Fred Weber Quarry**	**Lamine**	**Paynesville**	**Callaway**	**Value Range**
Aquatic Ecology and Sensitive Species (from Operation)	Data	Moderate Negative Impact	Small Negative Impact	Small Negative Impact	Small Negative Impact	Small Negative Impact	
	Value	-3	-1	-1	-1	-1	
5	Weighted Value	-15	-5	-5	-5	-5	
Socioeconomics	Data	Small Negative Impact	Small Negative Impact	Moderate Beneficial Impact	Moderate Beneficial Impact	Small Beneficial Impact	
	Value	-1	-1	3	3	1	
8	Weighted Value	-8	-8	24	24	8	
Transportation (from Construction)	Data	Small Negative Impact	Moderate Negative Impact	Moderate Negative Impact	Moderate Negative Impact	Small Negative Impact	
	Value	-1	-3	-3	-3	-1	
5	Weighted Value	-5	-15	-15	-15	-5	
Transportation (from Operation)	Data	Small Negative Impact	Small Negative Impact	Moderate Negative Impact	Small Negative Impact	Small Negative Impact	
	Value	-1	-1	-3	-1	-1	
5	Weighted Value	-5	-5	-15	-5	-5	

Quantitative Weighted Comparison of Candidate Sites

Criterion							
Weighting Factor (see legend)							
		Chamois Generating Station	Fred Weber Quarry	Lamine	Paynesville	Callaway	Value Range
Historic, Cultural, and Archaeological Resources	Data	Small Negative Impact	Small Negative Impact	Small Negative Impact	Small Negative Impact	Small Negative Impact	
	Value	-1	-1	-1	-1	-1	
5	Weighted Value	-5	-5	-5	-5	-5	
Environmental Justice	Data	Small Negative Impact	Small Negative Impact	Moderate Negative Impact	Small Negative Impact	Small Negative Impact	
	Value	-1	-1	-3	-1	-1	
8	Weighted Value	-8	-8	-24	-8	-8	
Transmission Corridors	Data	Small Negative Impact	Large Negative Impact	Large Negative Impact	Large Negative Impact	Small Negative Impact	
	Value	-1	-5	-5	-5	-1	
8	Weighted Value	-8	-40	-40	-40	-8	

Quantitative Weighted Comparison of Candidate Sites

Criterion							
Weighting Factor (see legend)							
		Chamois Generating Station	Fred Weber Quarry	Lamine	Paynesville	Callaway	Value Range
Value Range Total		-16	-26	-32	-30	-12	
Weighted Total		-98	-160	-190	-174	-66	
Weight[a]	Weighted Scale			Rationale			
				Definition of "better" or "more important"			
8	Land Use			Less natural land use to be disturbed			
5	Air Quality			Less disturbance of air quality			
5	Water			Less disturbance of water quality			
5	Terrestrial Ecology and Sensitive Species			Less disturbance to species and their habitats			
5	Aquatic Ecology and Sensitive Species			Less disturbance to species and their habitats			
8	Socioeconomics			Less (or better) disruption to housing, schools, etc			
5	Transportation			Less disruption to highways, etc			
5	Historic, Cultural, and Archaeological Resources			Less disruption to resources			
8	Environmental Justice			Less disruption to low-income and minority populations			
8	Transmission Corridors			Less impact on corridors			
[a]Higher number is more important criterion							
Calculation: Value Range x Weight = Weighted Value							

Conclusions

Conclusions of Site Evaluation

- The advantages of the Callaway Plant Unit 2 site over the alternative sites are summarized as follows:
- **Water use by the new unit at the Callaway Plant Unit 2 site would be no greater than water use at the alternative sites**
- **Impacts of development on endangered species are not greater for the proposed site than for the alternative sites**
- **No Federal, State, or affected Native American tribal lands are affected by the proposed site**

Conclusions of Site Evaluation

- Advantages continued:
- **The Callaway site does not contain spawning and/or nesting grounds for any threatened or endangered species. Thus, the impacts on spawning or nesting areas are not greater than impacts at the alternative sites**
- **The impacts from effluent discharge at the proposed site would be no greater than impacts at the alternative sites**

Conclusion of Site Evaluation

- The siting of the new unit at the Callaway site would not require changes to any Federal or State land use plans or county zoning ordinances.
- Co-locating the new unit with the existing nuclear facility on land that is already largely disturbed and industrial in current use would have lesser land use effect than at the alternative sites. Therefore, land impacts at the proposed site would be no greater than the impacts at the alternative sites.

Conclusion of Site Evaluation

- Potential impacts of a new nuclear facility on terrestrial and aquatic environments at the Callaway site would be no greater than the impacts at the alternative sites.
- The Callaway site is in a generally rural setting and has a population density that meets the population criteria of 10 CFR 100.
- No alternative sites are environmentally preferable, and therefore cannot be considered obviously superior, to the proposed site.
- Development of a greenfield or brownfield site would offer no advantages and would increase both the severity of environmental impacts and the cost of the new facility.

Conclusion of Site Evaluation

- The existing facility currently operates under an NRC license, and the proposed location has previously been found acceptable under the requirements for that license.
- Operational experience at the Callaway site has shown that the environmental impacts are SMALL, and operation of a new unit at the site should have essentially the same or less environmental impacts.

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