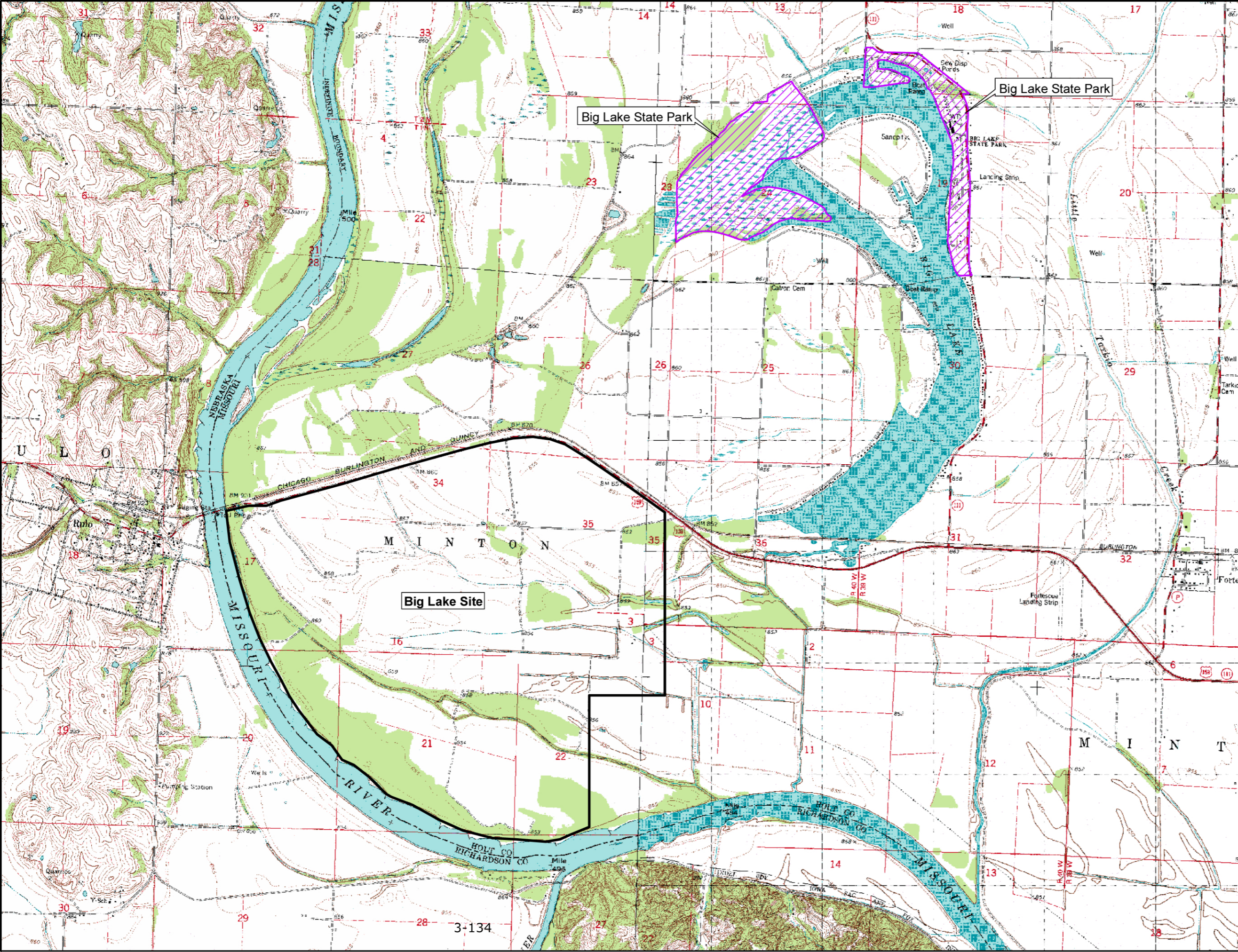


Figure 3-45. Public Lands Big Lake Area



Legend

- Big Lake Facility Boundary
- State Park

Big Lake and Rulo (NE)
7.5 Minute Quadrangles

1 : 32,000

0 0.25 0.5 1 Miles

Figure 3-46.
Big Lake Site and
Big Lake State Park

Source(s): Missouri Department of Natural Resources, U.S. Geological Survey, and URS Corporation

of fish and wildlife habitat. The area is open for bird watching, hiking and hunting (USACE 2004b, 2004c).

3.8.1.2.2 Visual Resources

Proposed Action

The current views in the vicinity of the proposed Norborne Plant are of a broad, flat floodplain of rich cropland, with bluffs on both sides. The nearest community is Norborne, about three miles away, with a population of about 800. There are a few residences within one to two miles of the proposed plant.

Big Lake Site

Views in the vicinity of the Big Lake Site are similar to Norborne. The nearest communities are Big Lake, about two miles east of the site, with a population of about 127; and Rulo, Nebraska, located on the Missouri River bluff about a mile from the site. The 2000 census population of Rulo was 226.

3.8.2 Environmental Consequences

3.8.2.1 Identification of Issues

The following issues related to impacts on public land, recreation and visual resources were identified through the scoping and EIS development processes:

- Potential negative visual impacts on Big Lake and Squaw Creek NWR area (Big Lake Site)
- Potential negative impacts to Big Lake State Park, Squaw Creek NWR, Bob Brown's CA, and other public lands
- Visual intrusion of plant, transmission lines and substations
- Potential impacts on hunting and fishing
- Potential negative impacts on tourism and promotion of Loess Hills

- Potential negative effects of plant lighting to the night environment (light pollution)
- Potential health effects of light pollution from plant on cattle health, human immune response, and crop growth

3.8.2.2 Significance Criteria

The effects of the Proposed Action and alternatives would be considered significant if the following were to occur:

- Direct impact to a public land, or indirect impact that would substantially adversely affect the function or value of the public land
- Introduction of substantial dominant visual changes in the landscape of a community
- Visual intrusion into an area or view of unique scenic quality

3.8.2.3 Impact Assessment Methods

Proposed Action

The Proposed Action and Alternatives were assessed in terms of impacts to the functions of the public lands and recreation areas in the area of influence. Impacts from emissions are discussed in *Section 3.1.2.4.1, Impact Assessment*. The facility would not impact the recreation facilities described above that are located within communities. Public lands within 20 miles of the proposed plant consist of state CAs and portions of the Big Muddy NFWR, most of which are associated with the Missouri River floodplain. The CAs are primarily used for hunting and the primary purpose of the Big Muddy NFWR is to restore natural values of the Missouri River and floodplain. The construction of the facility is expected to have minimal impact on the functions of these public lands.

The visual impact of the plant would be greatest for those few residences within a mile or two of the plant. For them, the plant would be a visual intrusion into the rural landscape, both during the day and at night when it is lit.

No assessment of health effects of light pollution was done as no relevant information was found. Studies on health effects of light generally focus on the effects of using lighting to continue daytime indoor activities. The effects of light from a power plant would be small by comparison. No information was found indicating adverse health effects on wildlife or livestock from power plant lights. Stack lighting is determined by the Federal Aviation Administration (FAA) requirements (AECI, 2005f). Since the plant is operated 24 hours, lighting is required at night, for safety and productivity.

Alternate Site

The scoping comments that expressed concern about impacts on public lands were directed at the Big Lake Site. The area has public lands of special value to northwest Missouri, and a power plant is perceived by some as incompatible. For example, Big Lake Marsh, a 150-acre marsh in Big Lake State Park, is one of only three marshes in Missouri that have been designated as Outstanding State Resource Waters. It is the largest of the three. McCormack Loess Mounds NA preserves an important remnant of native vegetation and geology. Big Lake State Park is an important recreational area. In scoping, the USFWS expressed concerns about the impacts of a plant to Squaw Creek NWR, a major refuge for migratory birds and bald eagles that was established more than 70 years ago.

Big Lake State Park is about two miles from the site, and the land between it and the site is mostly flat and treeless. The plant would be an intrusion in the rural setting. The visual character of the Rulo Bridge on the Missouri River at US 159, a National Historic Register site, would be impacted by the presence of the plant, which would be located adjacent to the bridge. The plant would be a large visual intrusion to the community of Rulo, which essentially faces into the plant site. It would also be an intrusion for the community of Big Lake.

3.8.2.4 Actions Incorporated Into the Proposed Action to Reduce or Prevent Impacts

Measures to reduce or eliminate impacts on recreation, public lands, and visual resources would be implemented as part of the Proposed Action, as follows:

- The plant would be sited at the edge of the floodplain, with the bluff behind it, which reduces the visual impact
- The plant and railroad corridor would be sited in an area that is sparsely populated, and with no nearby public lands. The closest to the plant site is a small CA 5 miles away.
- The transmission corridor was located to maximize distance from residences and from public lands as much as practicable.

3.8.2.4.1 Impact Assessment

Proposed Action

No significant adverse impacts on recreation, public lands, or visual resources would be anticipated under the Proposed Action. There would be some adverse visual impacts to residences within a mile or two of the facility both during the day and at night, from the lights, and within about a half-mile of transmission lines during the day.

Big Lake Alternate Site

Because there are public lands much closer to the site, impacts would be greater; public perceptions of negative impacts on public lands due to the presence of a power plant are greater for the Big Lake Site, based on scoping comments. Impacts on residences are greater because of two communities near the site. There would be a visual impact on a National Historic Register site.

IGCC Alternative

With IGCC, the impacts would be the same as for the Proposed Action.

No Action Alternative

The Proposed Action would not be constructed under the No Action Alternative. There would be no impacts on recreation, public land, or visual resources.

3.8.2.4.2 Mitigation and Residual Impacts

No significant impacts would result from the implementation of the Proposed Action with the actions incorporated to reduce or prevent impacts and there would be no residual significant impacts.

3.9 VEGETATION

This section describes the affected environment and environmental consequences related to vegetation. Special status species are discussed in *Section 3.12, Threatened, Endangered, Proposed, and Other Special Status Species*.

3.9.1 Affected Environment

3.9.1.1 Region of Influence

The region of influence for the analysis of impacts to vegetation consists of an area 0.5 mile around the proposed power plant site and associated facilities, and within the proposed rail and transmission route corridors.

3.9.1.2 Existing Conditions

Prior to Euro-American settlement and subsequent extensive modification of native vegetation, the general study area would have been characterized by a mosaic pattern of tall grass prairie uplands, interspersed with relatively small areas of deciduous forests along the stream valleys and adjacent slopes. The slope forest zone would have supported a plant community consisting of various species of oaks, hickories, elms, and ashes, as well as basswood, hackberry, black walnut, and redbud. The understory of this community would have included a variety of shade tolerant herbaceous and woody plants. (AECI, 2006m).

Little of the original native plant communities in Missouri remain, particularly in areas where the natural resources have substantial economic value (for example, forests and prime farmland).

Within the proposed plant site, native vegetation has been replaced by crops. The railroad corridor is also in crop and pasture land, with a few small patches of trees, the largest one located at the junction of Wakenda Creek and the

West Fork of Wakenda Creek. The nearest designated natural area is Van Meter Forest, about 25 miles to the east. Conditions are similar at the alternate site.

The transmission route corridor is also almost entirely in cropland and pasture, with wooded areas at major stream crossings.

3.9.2 Environmental Consequences

3.9.2.1 Identification of Issues

Impacts to any high quality native plant communities are the major issue.

3.9.2.2 Significance Criteria

Substantive adverse impacts to high quality native plant communities would be considered significant.

3.9.2.3 Impact Assessment Methods

The vegetative community of the Norborne Plant Site was noted during a habitat assessment on August 2, 2006. Wooded fence rows separate the crop fields. A forested riparian corridor occurs intermittently along the Missouri River in the vicinity of the well field. Narrow wooded riparian corridors are present along the banks of the West Fork of Wakenda Creek and Wakenda Creek.

A desktop survey of the transmission corridor routes was conducted.

While no high quality native plant communities were noted, the wooded areas may provide habitat for some special status species. This is addressed in *Section 3.12, Threatened, Endangered, Proposed, and Other Special Status Species*.

3.9.2.4 Actions Incorporated Into the Proposed Action to Reduce or Prevent Impacts

3.9.2.4.1 Impact Assessment

No areas of high quality native vegetation were identified. Actions to reduce or prevent impacts to wooded areas that may provide habitat for special status species are addressed in *Section 3.12, Threatened, Endangered, Proposed, and Other Special Status Species*.

Conclusions are the same for the Alternate Site and IGCC Alternative. The No Action Alternative would have no impacts on vegetation.

3.9.2.4.2 Mitigation and Residual Impacts

No significant impacts would result from the implementation of the Proposed Action and there would be no residual significant impacts.

3.10 WETLANDS, RIPARIAN AREAS, AND WATERS OF THE UNITED STATES

Wetlands

This section describes the affected environment and environmental consequences relating to wetlands, riparian areas, and Waters of the United States. For the purpose of this EIS, the wetland definition adopted by the EPA and the USACE for administering Section 404 of the CWA was used. According to this definition, wetlands are:

“those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.”⁶⁸

In accordance with this definition, a given area is designated as under the wetland regulatory jurisdiction of the USACE if the hydrology results in inundated or saturated soils during the growing season, hydric soils are

⁶⁸ (33 CFR 328.3(a)[7])

present, and the dominant vegetation is hydrophytic (USACE 1987). Exceptions to these criteria may be allowed in disturbed conditions.

The jurisdictional authority for wetland protection is derived from several sources, beginning with the CWA of 1972 (CWA). Section 404 of the CWA authorizes the USACE to grant permits for activities in wetlands or other jurisdictional Waters of the United States, and it gives the USACE authority to enforce against violations. Executive Order 11990 directs federal agencies to take action to minimize the destruction, loss, or degradation of wetlands. USDA/RD regulations require compliance with this order. Delineations of the wetlands within the Norborne Plant Site and the well field that could be directly impacted have been prepared and are included as *Appendix G, Report of Wetlands Delineation*. This section summarizes the results of the delineations.

Wetland Delineation Methods

Delineation procedures were based on diagnostic environmental indicators of wetland vegetation, wetland soils, and wetland hydrology. These procedures are proscribed in the USACE Wetland Delineation Manual (1987).

Wetlands and Waters of the United States were delineated in a field investigation conducted in August 2006, for the entire proposed facility property, shown in Figure 2-76. (see Appendix G for full report). Wetlands in the vicinity of the well field were delineated in March 2006.

It is important to note that the USFWS wetland classification system requires that a positive indicator of wetlands be present for only one of the three parameters, while the USACE 1987 Manual requires that positive indicators for each of the three parameters be present to classify an area as a wetland.

Waters of the United States

This section describes the affected environment and environmental consequences related to Waters of the United States.

Federal regulatory definitions of other Waters of the United States are sufficiently broad to cover virtually any perennial or intermittent stream or channel (33 CFR 328.3).

These definitions can be interpreted to include all stream channels in this Project vicinity where there is evidence of flowing water.

Delineation procedures for Waters of the United States are based on environmental indicators of surface water flow.

The jurisdictional authority for protection of Waters of the United States is derived from those sources cited for wetland protection.

Memorandum of Agreement Between the U.S. Army and the U.S. EPA

In 1990 the U.S. Army and the U.S. EPA signed a Memorandum of Agreement that articulates the policies and procedures to be used in the determination of the type and level of mitigation necessary to demonstrate compliance with the Clean Water Act Section 404(b)(1) Guidelines. The three major components are:

- **Avoidance** of impacts to wetlands and waters of the United States if there is a practicable alternative.
- **Minimization** of impacts if there are impacts that are not avoidable.
- **Compensatory Mitigation.**

During the screening phase of site evaluation, discussed in Section 2.2 Alternatives Evaluation, potential wetland impact was one of the evaluation criteria (Table 2-9 for the plant site; Tables 2-21 and 2-23 for the transmission corridors; narrative with figures for railroad corridors, Section 2.2.11.2 Norborne Site). All of the potential plant sites, rail corridors and transmission lines under consideration would have some impacts on wetlands, based on NWI maps. Total avoidance would not be practicable.

Other avoidance, minimization and mitigation measures are discussed below in the impacts section.

3.10.1 Affected Environment

The following sections describe the current wetland and riparian area conditions; this provides a baseline for the assessment of impacts and environmental consequences.

3.10.1.1 Region of Influence

The region of influence for assessing impacts on wetlands includes the property within the facility boundary, plus the well field and water line, and the rail connector right-of-way. The transmission line corridors were generally assessed. Detailed investigations would be done when the alignment is selected. It is anticipated that most wetlands in the transmission corridor can be spanned.

3.10.2 Environmental Consequences

3.10.2.1 Identification of Issues

The following issues were identified during scoping and in the EIS development process:

- Degradation of wetlands
- Hydrologic effects on wetlands
- Impacts on properties in the Wetlands Reserve Program

3.10.2.2 Significance Criteria

The effects of the Proposed Action and alternatives would be considered significant if there is any substantial unmitigated impact on wetlands or riparian zones.

Because "Waters of the United States" are part of a specifically defined regulatory program, the effects of the Proposed Action and alternatives would be considered significant if there would be substantive impacts on the resources associated with the functions of the Waters of the United States.

3.10.2.3 Impact Assessment Methods

Wetlands were delineated using the methods described in *Section 3.10, Wetlands, Riparian Areas, and Waters of the United States*. For the Norborne Plant Site and associated facilities, well field and water line, the total area of impact was calculated. The areas delineated included the south rail connector to the BNSF line and most of the south rail connector to the NS line. Rail corridors that are located outside the facility boundaries where wetlands were delineated, plus the transmission line corridors were compared based on NWI

mapped wetlands within the route corridors. Waters of the United States were delineated using the methods described in *Section 3.10, Wetlands, Riparian Areas, and Waters of the United States*, for the Norborne Plant Site and associated facilities, well field and water line.

For the property within the plant boundary, potential jurisdictional wetlands and Waters of the United States are shown in Figure 3-47. The figure shows 3.5 acres of Waters of the United States, including 2.9 acres of potential jurisdictional wetlands.

For the well field site, potential jurisdictional areas are shown in Figure 3-48. The figure shows 0.06 acres of Waters of the United States and 0.24 acres of potential jurisdictional wetland (palustrine emergent).

Thus the total jurisdictional Waters of the United States delineated are 3.56 acres and the total potential jurisdictional wetlands delineated are 3.14 acres for the plant and well field sites. The USACE is currently evaluating whether or not all the mapped wetlands are jurisdictional.

NWI mapped wetlands within the south and north rail connector route corridors were discussed on *Section 2.2.11.2, Norborne Site*. The actual rail right of way would be about 150 to 200 feet. The south rail connector was delineated with the plant area; the north rail connector area has not been delineated. Wetlands within rail corridors that have not been delineated would be delineated when the final alignment is selected. As discussed in Section 2.2.11.2, the north rail connector would follow the valley of Wakenda Creek. There are NWI-mapped wooded (forested) wetland along Wakenda Creek. The U.S. EPA has identified forested wetlands as a priority habitat type in Missouri. While the actual wetlands existing in the Wakenda Creek drainage are likely to be less than the NWI-mapped wetlands, the NWI-mapped wetlands can be considered an upper bound of actual wetland areas and can be used for conservative upper-end estimates of impacts. USDA/RD has identified a preliminary alignment within the north rail corridor that avoids to the extent practicable the NWI-mapped wetlands in the corridor (Appendix N). The total acreage impact based on NWI-mapped wetlands, and using the Appendix N alignment is 3.7 acres of wooded wetlands. AECL would conduct field delineations of wetlands prior to final alignment selection. The final alignment will, to the extent practicable, avoid wetlands. Appropriate mitigation will be conducted for any wetlands that cannot be avoided.

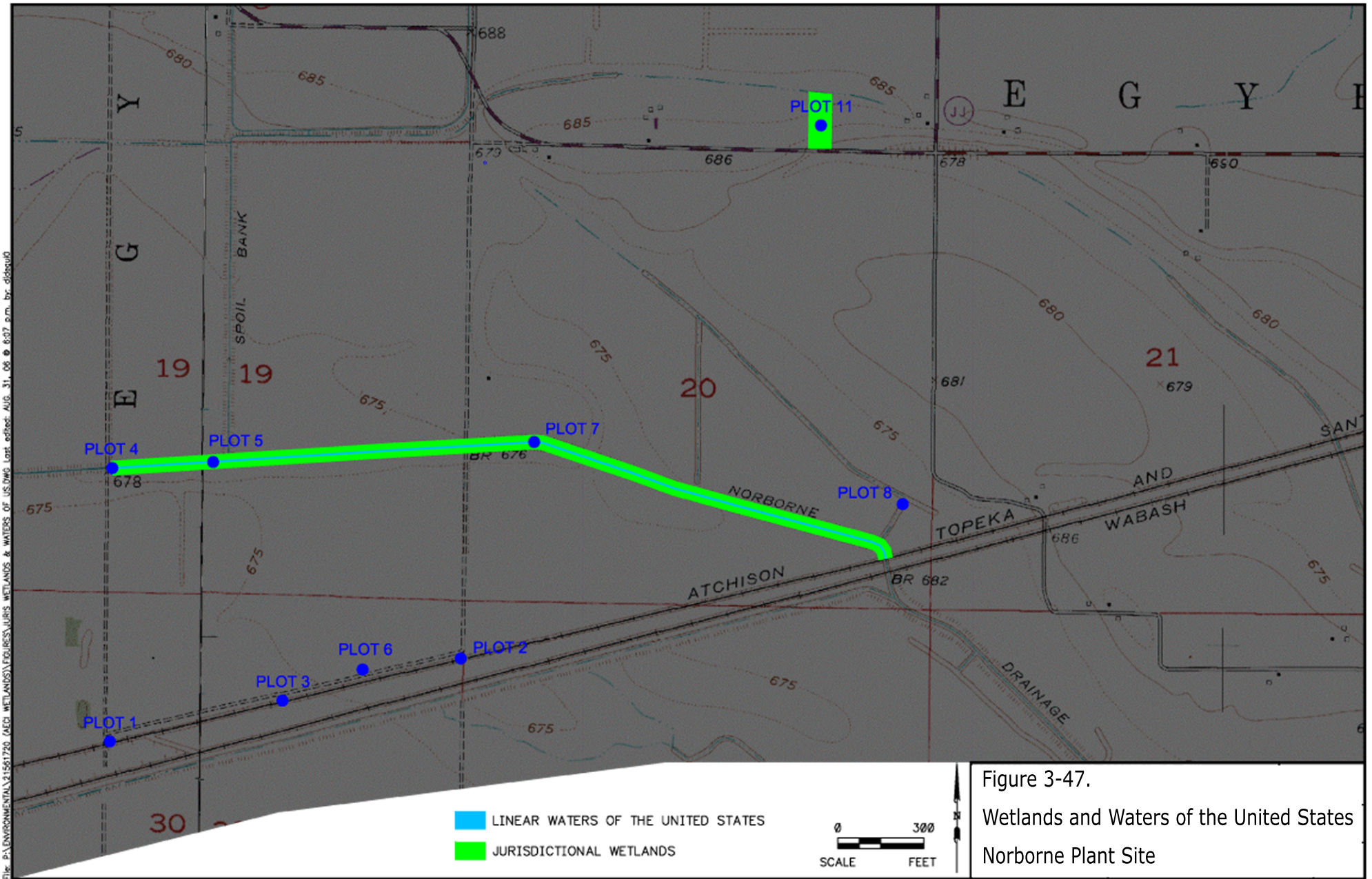


Figure 3-47.
Wetlands and Waters of the United States
Norborne Plant Site



Source: AECI, 2006r

Figure 3-48.
Wetlands and Waters of the United States
Well Field Site

It is expected that all wetlands in the transmission route can be spanned; except any wooded wetlands would be impacted because they would need to be cleared. Delineations would be done as needed when the final alignment is selected. USDA/RD has identified preliminary alignments within the transmission line corridors that avoid to the extent practicable the NWI-mapped wooded wetlands in the corridor (Appendix N). The total acreage impact based on NWI-mapped wetlands, and using the Appendix N alignment is 14.9 acres of wooded wetlands. AECI will conduct field delineations of wetlands prior to final alignment selection. The final alignment will, to the extent practicable, avoid wetlands. Appropriate mitigation will be conducted for any wetlands that cannot be avoided.

3.10.2.4 Actions Incorporated Into the Proposed Action to Reduce or Prevent Impacts

- The wetland and Waters of the United States in the well field area would be avoided and protected from impact by site activities
- Wooded wetlands in the rail corridors and transmission lines, if present, will be avoided to the extent practicable by placement of the alignments
- Wetlands other than wooded wetlands in the transmission corridor would be spanned to the extent practicable

3.10.2.4.1 Impact Assessment

With actions incorporated into the Proposed Action, jurisdictional wetland impacts at the Norborne Plant would not be more than be 2.9 acres and Waters of the United States would not be more than 3.5 acres.

Impacts from those parts of the rail connectors not included in the delineation for the plant site and from transmission lines would be determined when the final alignments are selected, but, based on NWI maps the impacts are expected to be low, perhaps less than an acre for the rail connectors; and most wetlands can be spanned by transmission lines.

With the IGCC Alternative, impacts would be the same. For the Big Lake site, wetlands were not delineated, but, based on NWI maps and the similar setting, the impact on wetland acreage would be expected to be similar to the Proposed Action. Some effects may be greater because of the connectivity

between the river, the alluvial aquifer, and many of the floodplain wetlands in close proximity to the site and Big Lake State Park. The No Action Alternative would result in no impacts.

3.10.2.4.2 Mitigation and Residual Impacts

Mitigation, would be determined through the CWA Section 401 Water Quality Certification Process with MDNR. Mitigation ratios would be based on the State of Missouri Aquatic Resource Mitigation Guidelines for emergent wetlands (1.0 to 3.0) and wooded wetlands (2.0 to 4.0) and would be negotiated between MDNR and AECL.

If adopted, the following measure could reduce impacts such that the work could potentially be done under a Nationwide permit:

- AECL would commit to avoiding impacts to the wetland identified within the proposed plant boundary except as needed for the south rail connector, such that impacts would be less than 0.5 acres.

3.11 FISHERIES AND WILDLIFE

3.11.1 Affected Environment

3.11.1.1 Region of Influence

The region of influence for the Proposed Action is the Norborne Plant Site, well field, landfill area, rail connector route corridors, Missouri River near the discharge location, and transmission line route corridors.

3.11.1.2 Existing Conditions

Wildlife observed during site visits for biological habitat assessment on August 2, 2006 included American robins (*Turdus migratorius*), mourning doves (*Zenaida macroura*), and squirrels (*Sciurus sp.*). The majority of these species were observed along the section roads and wooded fence rows throughout the project site. A small flock of mallard ducks (*Anas platyrhynchos*) was observed in the marsh north of County Road 638. Other common mammal species, such as white-tailed deer (*Odocoileus virginianus*), cottontail rabbits (*Sylvilagus floridanus*), opossum (*Didelphis virginiana*),

raccoons (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and coyote (*Canis latrans*) also likely inhabit the areas surrounding the proposed plant.

There was no flow in Wakenda Creek during the August 2, 2006 site visit, although there was ponded water. As discussed in *Section 3.4, Surface Water*, extremely low flow during dry conditions is a typical characteristic of prairie streams. This characteristic, combined with agricultural impacts results in relatively low species diversity and low aquatic habitat quality for many prairie streams. The portions of both Wakenda Creek and the West Fork of Wakenda Creek within the north rail connector route corridor are classified by MDNR as either P (streams that maintain permanent flow even in drought periods) or C (streams that may cease flow in dry periods but maintain permanent pools which support aquatic life).⁶⁹ Water quality standards for protection of aquatic life are applicable to both Wakenda and the West Fork.

3.11.1.2.1 Migratory Birds

The more than 800 species of migratory birds that spend some time in the U.S. are protected by a number of laws and an executive order; the primary protective law is the Migratory Bird Treaty Act (MBTA), discussed in *Section 2.2.3.3.5, Advantages and Disadvantages of Wind Energy*. The USFWS has the legal mandate and the trust responsibility to maintain healthy migratory bird populations for the benefit of the American public. The complete list of migratory bird species, hundreds of which may visit the project area, is included in 10 CFR 10.13 and is also available on the USFWS web site. No project in Missouri can avoid the Mississippi Flyway, a major migration route that extends from Alaska to Central America (USFWS, undated2).

There are two locations in the general area of the project that have been designated important bird areas (IBAs) by the American Bird Conservancy (ABC): Swan Lake NWR and Squaw Creek NWR (NG, 2002). The ABC considers these sites to be of international significance, and that the loss or degradation of any one would have a lasting negative impact on bird populations. To be considered an IBA, sites must be in at least one of the following categories (NG, 2002):

- The site contains a significant population of a federally listed threatened or endangered species.

⁶⁹ 10 CSR 20-7.031

- The site contains significant populations of species listed in the Partners in Flight Watch list. This is a list of species of conservation concern prepared by biologists as an early warning mechanism for wildlife managers.
- Sites that contain significant populations of species with restricted ranges.
- Sites that contain large populations of migratory birds during some time of the year.

Swan Lake NWR is located about 34 miles northwest of the Norborne Plant site. The Norborne to Thomas Hill transmission line would come within about 3.5 miles of the refuge, but there are two other transmission lines that are closer, including one that lies between the propose route and the refuge (Figure 2-68). The 10,795 acre Swan Lake Refuge was created in 1937 and has been designated as a regional site under the Western Hemisphere Shorebird Reserve Network. It is a large wintering area for the eastern prairie population of Canada geese and populations of Mississippi flyway ducks. Peak fall migration of ducks exceeds 100,000 birds. There are more than 100 overwintering bald eagles on the refuge. The Refuge is within the Grand River floodplain and includes farmland that has been converted into wetlands for migratory birds (USFWS, undated3).

The 7,350-acre Squaw Creek NWR was established in 1935 as a resting, feeding, and breeding ground for migratory birds and other wildlife. It lies about 7.5 miles east of the Big Lake Alternate Site, and the transmission corridor for the Big Lake site would pass immediately south of the southern refuge boundary. It is a large wintering area for bald eagles and snow geese (USFWS, undated4).

3.11.2 Environmental Consequences

3.11.2.1 Identification of Issues

The following issues were identified during scoping and in the EIS development process:

- Displacement of wildlife
- Overall impacts on fish and wildlife

- Impacts on fish and wildlife at Squaw Creek NWR
- Potential impacts of transmission lines and power plant stack on migratory birds, including raptors
- Impacts on fish in the Missouri River from discharge water temperatures
- Impacts on aquatic habitats that could affect fish or wildlife

3.11.2.2 Significance Criteria

Impacts would be considered significant if any of the following were to occur:

- Unpermitted violation of any protection provision of statutes and regulations pertaining to fish and wildlife
- Any unmitigated loss of aquatic habitat greater than 0.5 acre or long-term adverse effects on native fish species

3.11.2.3 Impact Assessment Methods

Information gathered from the field assessment, in addition to published sources (aerial photographs, maps, resource agency information), was used to assess the presence of wildlife and habitat.

Some common types of wildlife would be displaced by construction of the plant, landfill, rail connectors and transmission lines. Wakenda Creek would be affected by construction of the north rail connector, and the Missouri River would be affected by discharge, but with implementation of CWA requirements as described in *Section 3.4.1.3.4, Currently Impacted Waters*, any adverse impacts to aquatic life in these streams is expected to be minimal.

There are many threats to migratory birds, habitat loss being the greatest. Many birds are also killed directly. In the U.S. alone, cats may kill hundreds of millions of song birds a year (USFWS, 2002a). Collisions are another cause of avian death (USFWS, 2002a):

Building window strikes may account for 97 to 976 million bird deaths each year. Communication towers conservatively kill 4 to 5 million annually (probably closer to 40 to 50 million; a nationwide cumulative impacts study should help resolve this question). Strikes at high tension transmission and distribution power lines very conservatively kill tens of thousands of birds annually. Taking into account the millions of miles of bulk transmission and distribution lines in the U.S., and extrapolating from European studies, actual mortality could be as high as 174 million deaths annually....Cars may kill 60 million birds a year, private and commercial aircraft far fewer, while wind turbine rotors kill an estimated 33,000 birds annually.

With the current project, migratory birds could be impacted by the stack, especially when it is lit at night, and by impacts with transmission lines. Pulsating lights on towers appear to be safer for birds than steady lights (ABC, 2004). Impacts are likely to be greater in areas known to be used by large numbers of migratory birds such as Swan Lake and Squaw Creek NWRs.

3.11.2.4 Actions Incorporated Into the Proposed Action to Reduce or Prevent Impacts

The Proposed Action includes the following measures to reduce or prevent potential adverse environmental impacts to fisheries and wildlife:

- A SWPPP would be implemented to prevent impacts to stream and other water bodies from storm water runoff during construction.
- NPDES permit requirements for protection of aquatic resources, including temperature requirements, would be met at discharge locations.
- Water needs would be met using groundwater, thus avoiding impacts associated with cooling water intake structures, which can cause adverse impact by pulling large numbers of fish and shellfish or their eggs into a power plant's or factory's cooling system, or by trapping fish against intake screens (EPA, 2006p).
- Conductor markers or other materials would be installed on transmission lines at river crossings for visibility and could be installed at other locations if required (AECI, 2006t).

- The proposed plant site is not close to IBAs.

3.11.2.4.1 Impact Assessment

Proposed Action

Construction of the plant and associated features would displace some individuals of common wildlife species, but this is a small impact. Aquatic species would be protected by implementation of CWA requirements.

There are likely to be some impacts to migratory birds, mostly from collisions with transmission lines; but collisions with the power plant stack could also cause impacts.

Big Lake Alternate Site

Construction and operation of a power plant at the Big Lake Site, which is close to the Squaw Creek NWR, and the presence of a transmission line adjacent to the Squaw Creek NWR, could potentially cause significant impacts to the large populations of migratory birds that use the refuge. These impacts could be caused by collisions with the plant stack or other buildings or by collisions with transmission lines. These impacts could potentially result in violations of the MBTA and the Executive Order on Protection of Migratory Birds.

IGCC Alternative

Impacts with the IGCC Alternative would be the same as those from the Proposed Action.

No Action Alternative

The Proposed Action would not be constructed under the No Action Alternative. There would be no impacts on fisheries or wildlife.

3.11.2.4.2 Mitigation and Residual Impacts

If adopted, the following would contribute to reductions in impacts from the Proposed Action:

- Implementation of the Avian Protection Plan Guidelines (APLIC, 2005), including the suggested practices for mitigating bird collisions with power lines and for raptor protection on power lines.

3.12 THREATENED, ENDANGERED, PROPOSED, AND OTHER SPECIAL STATUS SPECIES

3.12.1 Affected Environment

3.12.1.1 Region of Influence

The region of influence for the Proposed Action is the Norborne Plant Site, well field, landfill area, rail connector route corridors, Missouri River near the discharge location, and transmission line route corridors.

3.12.1.2 Existing Conditions

A habitat assessment was conducted on August 2, 2006 to determine if appropriate habitat for threatened or endangered plant or animal species exists at the Norborne Site. The general characteristics of the Norborne Site, the vegetative community, and the wildlife present were noted during the habitat assessment; photographs of representative areas were taken. In addition to the plant site assessment, corridors for the railroad connectors for the Norborne Site, the water supply line and the collector well area were also assessed. The report of the assessment is included as *Appendix H, Fish, Wildlife and Vegetation Resources Inventory*, and the result are summarized in this section (AECI, 2006q).

A desktop survey of the possible transmission line routes was conducted to determine if there would be any potential impact to threatened or endangered species. The routes were analyzed using Gap Analysis Program (GAP) data analysis as to how many acres of the certain types of potential habitat were crossed. Additionally, aerial photographs were analyzed to identify any other potential impacts, especially in regard to stream/creek crossings (AECI, 2006q).

3.12.1.2.1 Protected Species

According to the USFWS and MDC databases, seven state or federally threatened or endangered species are known or likely to occur within Carroll County (AECI, 2006q). These are listed in Table 3-16.

Table 3-16. Protected Species Known or Likely to Occur in Carroll County, Missouri

Common Name	Scientific Name	Federal Status	State Status
Lake Sturgeon	<i>Acipenser fulvescens</i>	None	Endangered
American Bittern	<i>Botaurus lentiginosus</i>	None	Endangered
Northern Harrier	<i>Circus cyaneus</i>	None	Endangered
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened	Endangered
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered
Flathead Chub	<i>Platygobio gracilis</i>	None	Endangered
Pallid Sturgeon	<i>Scaphirhynchus albus</i>	Endangered	Endangered

Sources: USFWS and MDC Heritage Databases

The proposed transmission route corridor connecting the Norborne Site to the Thomas Hill Substation runs through Carroll, Chariton, and Randolph Counties. The nine state or federally listed threatened or endangered species found in these counties are shown in Table 3-17.

Table 3-17. Protected Species Known or Likely to Occur in Carroll, Chariton, and Randolph Counties, Missouri

Common Name	Scientific Name	Federal Status	State Status
Lake Sturgeon	<i>Acipenser fulvescens</i>	None	Endangered
American Bittern	<i>Botaurus lentiginosus</i>	None	Endangered
Northern Harrier	<i>Circus cyaneus</i>	None	Endangered
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened	Endangered
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered
Flathead Chub	<i>Platygobio gracilis</i>	None	Endangered
Pallid Sturgeon	<i>Scaphirhynchus albus</i>	Endangered	Endangered
Eastern Massasauga	<i>Sistrurus catenatus catenatus</i>	Candidate	Endangered
Interior Least Tern	<i>Sterna antillarum athalassos</i>	Endangered	Endangered

Sources: USFWS and MDC Heritage Databases

The proposed transmission route corridor connecting the Norborne Site to the Dresden or Sedalia Substation, then on to the Mt. Hulda Substation crosses

through Carroll, Lafayette, Saline, Pettis and Benton Counties. The eighteen state or federally listed threatened or endangered species found in those counties are listed in Table 3-18.

Table 3-18. Protected Species Known or Likely to Occur in Carroll, Lafayette, Saline, Pettis, Johnson, and Benton Counties, Missouri

Common Name	Scientific Name	Federal Status	State Status
Lake Sturgeon	<i>Acipenser fulvescens</i>	None	Endangered
American Bittern	<i>Botaurus lentiginosus</i>	None	Endangered
Northern Harrier	<i>Circus cyaneus</i>	None	Endangered
Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened	Endangered
Indiana Bat	<i>Myotis sodalis</i>	Endangered	Endangered
Flathead Chub	<i>Platygobio gracilis</i>	None	Endangered
Pallid Sturgeon	<i>Scaphirhynchus albus</i>	Endangered	Endangered
King Rail	<i>Rallus elegans</i>	None	Endangered
Mead's Milkweed	<i>Asclepias meadii</i>	Threatened	Endangered
Barn Owl	<i>Tyto alba</i>	None	Endangered
Black-tailed Jackrabbit	<i>Lepus californicus</i>	None	Endangered
Topeka Shiner	<i>Notropis topeka</i>	Endangered	Endangered
Greater Prairie-chicken	<i>Tympanuchus cupido</i>	None	Endangered
Niangua Darter	<i>Etheostoma nianguae</i>	Threatened	Endangered
Gray Bat	<i>Myotis grisescens</i>	Endangered	Endangered
Eastern Massasauga	<i>Sistrurus catenatus catenatus</i>	Candidate	Endangered
Cave Crayfish	<i>Cambarus aculabrum</i>	Endangered	None
Running Buffalo Clover	<i>Trifolium stolonifereum</i>	Endangered	None

Sources: USFWS and MDC Heritage Databases

Indiana bats (*Myotis sodalis*) and Gray bats (*Myotis grisescens*) forage in riparian forest and over open water. Summer habitat includes mature riparian forests and adjacent upland forests. Snags and cavity trees with a diameter at breast height (dbh) of greater than 9 inches and full forest canopy with open understory are preferred. During the winter, Indiana bats hibernate in limestone caves, while the Gray bat utilizes caves year-round.

No cave habitats are present in the vicinity of the proposed Norborne Plant Site, well field, water supply pipeline corridor, railroad connector corridors, or transmission line corridors. Additionally, the lack of karst features along the potential transmission line corridors prevents impacts to the Cave crayfish (*Cambarus aculabrum*) which lives exclusively in caves.

The lake sturgeon (*Acipenser fulvescens*), pallid sturgeon (*Scaphirhynchus albus*), and flathead chub (*Platygobio gracilis*) occur in large rivers, such as the Missouri River, with consolidated bottoms of sand and gravel. The flathead chub is also found in smaller, gravel-bottomed creeks. These slower creeks are the preferred habitat for the Topeka shiner (*Notropis topeka*) and the Niangua darter (*Etheostoma nianguae*).

There are two protected birds of prey potentially occurring within the Project Site: bald eagles and northern harriers. Bald eagles (*Haliaeetus leucocephalus*) typically roost and nest in large trees along large rivers and flood plains. The fish and waterfowl that are common along large streams also provide ample hunting opportunities. It is possible that bald eagles may be seasonally present along the Missouri River or some of the larger creeks and streams. The northern harrier (*Circus cyaneus*) is generally a migratory bird that can be found in Missouri between February and November. The harriers inhabit open fields, prairies, native grass plantings, and shallow marshes, with their primary habitat being grassland. They are carnivorous with a vast majority of their prey being made up of other birds and mammals. Open fields with good ground cover is the optimal hunting habitat for the harriers.

Greater prairie-chickens (*Tympanuchus cupido*) have historically occupied grasslands bordered by oak woodlands, savannas and wetlands in Missouri, but now are restricted to cropland and nearby prairies mainly in the Osage Plains located in west-central Missouri. They generally forage for broad-leaved grasses, grass-like plants, cultivated grains and insects. The black-tailed jackrabbit (*Lepus californicus*) also inhabits the native grasslands with adjacent crop fields, preferably legumes. These jackrabbits breed year-round, but mostly during the late-winter to mid-summer months.

The American bittern is a potential inhabitant of Carroll County, however, it is undocumented in Carroll County at this time. It is known to occur in Lafayette and Saline Counties. The species occur in marshes and shallow wetlands and are generally rare summer residents, uncommon transients, or accidental winter residents in Missouri. The king rail (*Rallus elegans*) is a marsh bird usually inhabiting wetlands dominated by sedges, preferably those associated with riverine floodplain systems. They are migratory birds, spending their breeding and rearing season from March to June in Missouri. There are known occurrences of king rails in Saline County, however, the birds are not commonly found in Missouri; most known occurrences have been in CAs and NWRs.

The eastern massasaugas (*Sistrurus catenatus catenatus*) are rattlesnakes that are native to natural marsh and moist prairie habitats in Northern Missouri. Their numbers have been greatly reduced to only three small populations in the state. The largest of these populations is located in Swan Lake NWR, located in the northwest corner of Chariton County. The massasauga's activity level is dependant upon the weather, and they hibernate during the winter.

Mead's milkweed (*Asclepias meadii*) was also widespread across the Midwest but is now restricted to small areas in the Osage Plains of west-central Missouri, and a small mountainous area in the Ozarks. The primary habitats of this species of milkweed are the grasslands and native prairies.

Running buffalo clover (*Trifolium stolonifereum*) is a perennial plant flowering from mid-April to June and is easily propagated from cuttings. The clover needs partial shade and periodic disturbances such as mowing or grazing. It may occur in partial shade in mowed lawn areas, especially along major streams and rivers. Historically found in several counties in Missouri, it has been extirpated from much of its range. Several attempts at establishing new populations of running buffalo clover have been attempted, including introduction into Benton County in the following watersheds: Meramec River, St. Francis River from headwaters to Wappapello Dam, and Gasconade River from Big Piney River to Missouri River.

3.12.1.3 Significance Criteria

An impact would be considered significant if it resulted in adverse impact to any threatened or endangered species or to critical habitat of any threatened or endangered species.

3.12.2 Environmental Consequences

3.12.2.1 Identification of Issues

Since threatened and endangered species are protected by law, the issue is impact to any threatened or endangered species or to their critical habitat. Those species identified in the scoping process are included in this evaluation.

3.12.2.2 Impact Assessment Methods

Site conditions were assessed based on information from resource agencies on protected species.

Land use at and in the vicinity of the Norborne Plant Site is primarily agricultural and consists mostly of soybean and corn crop fields separated by wooded fence rows. A wheat field, wetland marsh, woodland, and grass pasture were observed in the northern portion of the site, north of County Road 638. The proposed footprint of the Norborne plant is located south of County Road 638 and would avoid impacting the marsh, forested area, and grass pasture. Construction of the Norborne Plant would impact vegetation along the wooded fence rows that separate the crop fields. No other vegetative communities are anticipated to be impacted by construction of the Norborne Plant.

No potential protected species habitat was identified within the proposed Norborne Plant Site during a site survey that occurred in August 2006.

The proposed water pipeline follows existing county roads and would impact vegetation within crop fields and wooded fence rows separating the crop fields.

A forested riparian corridor occurs intermittently along the Missouri River in the vicinity of the well field site. The well would be constructed within crop fields adjacent to the Missouri River where there is a break in the forested riparian corridor. Construction of the lateral collector well at the proposed location would avoid impacting the forested riparian corridor along the Missouri River, which is considered potential roosting and nesting habitat for the bald eagle.

Construction of the railroad connector along Wakenda Creek would likely result in a relatively small impact to riparian habitat in the area.

The majority of the transmission line route between the Norborne Plant Site and Thomas Hill crosses previously disturbed agricultural areas and would predominantly impact crop fields and wooded fence row habitats. Additionally, the area around the Thomas Hill Substation contains several acres of "non-agricultural use land" that has been previously disturbed during construction of the Thomas Hill power plant. This route passes within 3.5 miles of the Swan Lake NWR. This refuge is home to the largest of three populations of

eastern massasauga rattlesnake in the state. This route also crosses the Grand River in the vicinity of the Swan Lake NWR. At the point of this route's crossing, the Grand River appears to be surrounded by riparian forest which is contiguous with the Swan Lake NWR and considered potential roosting and nesting habitat for the bald eagle. The forest is not considered potential habitat for the eastern massasauga rattlesnake, based on comments from USFWS on the draft EIS.

The majority of the transmission line route between the Norborne Plant Site and the Sedalia/Mt. Hulda Substations crosses previously disturbed agricultural areas and would predominantly impact crop fields and wooded fence row habitats. The habitat near the route at the crossing of the Missouri river may be suitable for bald eagles to roost or nest. The area surrounding the Mt. Hulda substation is comprised of woody habitat that could possibly provide habitat to wildlife. It is possible that the USFWS or the MDC may require preconstruction surveys to determine if protected species are present within or along the proposed corridor. MDC BMPs would be followed during construction, as applicable, to prevent negative impacts to protected species (USFWS, 2006b).

3.12.2.3 Actions Incorporated Into the Proposed Action to Reduce or Prevent Impacts

The Proposed Action includes the following measures to reduce or prevent potential adverse impacts on protected species:

- In accordance with the MDC's BMPs for the bald eagle, construction of the lateral collector well and water supply pipeline would avoid clearing trees greater than 12 inches in diameter at breast height along the edge of the Missouri River between November 15 and July 15. These measures would be implemented to avoid impacting any over-wintering and nesting bald eagles that may be within the project area.
- MDC's BMPs, for Construction Projects Affecting Missouri Rivers and Streams would be implemented during construction of any creek crossing to avoid potential impacts to Wakenda Creek. Where required by the USFWS or the MDC the clearing of mature trees along Wakenda Creek and in any other specific areas considered to be potential habitat along the proposed route for the railroad and transmission corridors would occur

between November 1 and March 1 to avoid impacting any potential Indiana bat roosting sites in the project area.

- The transmission line would be constructed to span all streams, creeks and rivers, eliminating impacts to aquatic species of concern such as the lake sturgeon (*Acipenser fulvescens*), pallid sturgeon (*Scaphirhynchus albus*), flathead chub (*Platygobio gracilis*), Topeka shiner (*Notropis topeka*) or the Niangua darter (*Etheostoma nianguae*).
- The collection well would draw water from the aquifer as described in *Section 3.3, Groundwater*, and therefore would not affect the Missouri River; thus, impacts to aquatic species within the Missouri River would be avoided.
- In accordance with the MDC's BMPs Practices for the bald eagle, construction of the transmission line between the Norborne Plant and Sedalia would avoid clearing trees greater than 12 inches in diameter at breast height along the edge of the Missouri River and the Grand River between November 15 and July 15. These measures would be implemented to avoid impacting any over-wintering and nesting bald eagles that may be within the project area. It is possible that the USFWS or the MDC may require preconstruction surveys to determine if protected species are present within or along the proposed corridor. These measures will be implemented whether or not the bald eagle is listed, as it will still be protected under the Bald Eagle Protection Act.
- At the Blackwater River crossing of the Norborne to Sedalia transmission line: although there would be no impacts to the waterway itself, there is a potential for impacting habitat on both sides of the creek. MDC's BMPs would be followed as applicable during construction to avoid negative impacts on protected species.
- Prior to any construction, the proposed transmission line routes would be evaluated for suitable habitat for Mead's milkweed to determine if surveys are needed. Surveys will be conducted if needed.
- A survey of the project area would be conducted early in the bald eagle nesting season to ensure construction would not remove or disturb a new nest or nesting pair of eagles. If a nest is found, AECI will contact the Fish and Wildlife's Missouri Ecological Services Office.

3.12.2.3.1 Impact Assessment

Proposed Action

Construction and operation of the Norborne Plant is not expected to result in impacts to threatened or endangered species or to their critical habitats. No impacts to protected species are anticipated because the Norborne plant is located within previously disturbed crop fields and wooded fence rows. With implementation of the actions to prevent or reduce impacts, impacts on threatened or endangered species from other proposed project components are not expected.

Big Lake Alternate Site

Most impacts would be similar for the Big Lake Site, with additional impacts related to the presence of Big Lake and Squaw Creek NWR. According to the USFWS, the Squaw Creek NWR has some of the largest concentrations of wintering bald eagles in the Midwest, and bald eagles have historically nested at Big Lake (AECI, 2005d). The proximity of a new power plant and transmission line to these areas could potentially result in significant impacts primarily from collisions with transmission lines.

IGCC Alternative

With IGCC, the impacts would be the same as for the Proposed Action.

No Action Alternative

The Proposed Action would not be constructed under the No Action Alternative. There would be no impacts on threatened or endangered species.

3.12.2.3.2 Mitigation and Residual Impacts

No significant impacts are expected, with implementation of proposed actions to reduced or prevent impacts.

3.13 CULTURAL RESOURCES

Cultural resources are sites, features, structures, or objects that may have significant archaeological and historic values. Additionally, they are properties

that may play a significant traditional role in a community's historically based beliefs, customs, and practices. Cultural resources encompass a wide range of sites and buildings from prehistoric campsites to farmsteads constructed in the recent past. Sections 106 and 110 of the National Historic Preservation Act⁷⁰ provide the framework for federal review and protection of cultural resources, and ensure that they are considered during federal project planning and execution. The implementing regulations for the Section 106 process⁷¹ have been developed by the Advisory Council on Historic Preservation (ACHP). The Secretary of the Interior maintains a National Register of Historic Places (NRHP) and sets forth significance criteria for inclusion in the register.⁷² Cultural resources may be considered "historic properties" for the purpose of consideration by a federal undertaking if they meet NRHP criteria. The implementing regulations define an undertaking as "a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with federal financial assistance; those requiring a federal permit, license or approval; and those subject to state or local regulation administered pursuant to a delegation or approval by a federal agency." Historic properties may be those that are formally placed in the NRHP by the Secretary of the Interior, those that meet the criteria and are determined eligible for inclusion, and those that are yet undiscovered but may meet eligibility criteria.

3.13.1 Affected Environment

3.13.1.1 Region of Influence

The region of influence includes all areas directly impacted by construction. This includes the area within the facility boundary, the well field and pipeline, the discharge line, the rail connectors, and the transmission line routes. For cultural resources for which visual impact are important, the area in the vicinity of the plant is also part of the region of influence. The transmission line macro corridors were considered the region of influence for potential visual impacts on cultural resources for which visual intrusion could be important. For the rail connector, only the route itself is considered.

⁷⁰ Public Law (P.L.) 89-655

⁷¹ 36 CFR Part 800

⁷² 36 CFR Part 60

3.13.1.2 Existing Conditions

Phase I cultural resources survey and Phase II testing investigation of cultural resources was conducted within the proposed facility boundaries. A records review and literature search were conducted for the proposed transmission line corridor. The study followed the MDNR "Guidelines for Cultural Resource Contract Reports and Professional Qualifications". The project actions included discussion of the project with MDNR/Historic Preservation Program staff, a records and literature review, and an intensive pedestrian field investigation of the project area (AECI, 2006m). The detailed reports, which include a description of investigation and assessment methodology, are included in *Appendix I, Phases 1 and 2 Cultural Resources Survey*.

Environmental conditions in the project area exhibit few characteristics that would suggest potential for prehistoric occupation. The area is located within a large presettlement prairie zone, meaning that prior to Euro-American settlement in this area in the 19th century, the proposed Norborne facility area was a grassland. These areas have very low potential for prehistoric occupation. When prehistoric sites are encountered in presettlement prairie zones, they are usually very old, before the time when this area became a prairie, about 9,000 years ago (AECI, 2006m).

3.13.1.2.1 NRHP-Listed Properties near Proposed Action

There are six NRHP-listed properties in Carroll County: four buildings in Carrollton, the county seat, located about 10 miles east of the village of Norborne; an archaeological site near Miami, about 20 miles east of Norborne; and one building in Norborne, which is about 2.5 miles southeast of the site. The property in Norborne, which is the closest to the proposed plant site, is the Farmers Bank Building at 114 South Pine Street. There are six NRHP-listed sites in Ray County, all of which are in the town of Richmond, located about 12 miles west of the site. There are no NRHP-listed sites along or near the proposed railroad corridors for the Proposed Action (NPS, 2006a). There are no NRHP-listed sites along or near any of the proposed transmission corridors for the Proposed Action (AECI, 2006l).

3.13.1.2.2 Results of Records and Literature Review

The records and literature review produced no evidence of the presence of previously reported significant cultural resource within or adjacent to the

proposed project boundaries. There are no Archaeological Survey of Missouri (ASM) sites within or adjacent to the project boundaries. There are no MDNR Historic/Architecture sites within the project boundaries.

3.13.1.2.3 Phase I Survey and Phase II Testing

The Phase I survey field component of the present study involved pedestrian coverage of the entire project area by qualified personnel. Subsurface investigations at the Phase I level included bank profiling, shovel tests, and mechanical post hole augering. Where evidence of presence of a cultural resource was defined, the location was noted on a U.S.G.S. quadrangle and a sketch and description of the site area was field prepared. Where features or structures were encountered, photographs were taken. The field procedures incorporated in the pedestrian survey were directed toward two major goals: The first was the inventory of all potentially significant cultural resources within the project zone and the second was an attempt to recover sufficient information to allow interpretation of NRHP potential of the sites that have been identified within the proposed project zone. Figure 3-49 shows the sites evaluated. All existing farmsteads within the project area were surveyed (labeled Farmstead 1 through Farmstead 5). In an addendum to the original report, a sixth farmstead was evaluated. It is located in the southeast corner of Section 17, outside of the facility boundary. The archaeological sites that were assessed are labeled 23CA1161 through 23CA1169 on Figure 3-49. Locations 23CA1161, -62, -63, -65, and -66 were historic scatters of farmstead debris. Materials found at these sites were mostly rusted metal fragments, limestone fragments, ceramic fragments. Some glass and/or concrete was found at some of the sites and a windmill blade was found at one. Locations 23CA1164, -67, -68, and -69 were prehistoric scatters with some chert fragments and fire-cracked stone. Phase II testing was done at the prehistoric sites, some of which also held historic scatters. In Phase II, test units were excavated to depths ranging from 50 to 100 centimeters (cm) (approximately 20 to 40 inches). Additional chert fragments and fire-cracked stone were found, plus a charcoal fragment at one location. Two or three test units were excavated per location, except that at 23CA1169, an upland site with a stream that had greatest potential for meaningful data, eight test units were excavated.

3.13.1.2.4 Big Lake Site

There are four NRHP-listed sites in Holt County. Three are buildings, one near Oregon, one in Mound City, and one in Forest City, all of which are more than 10 miles from the Alternate Big Lake Site. The fourth NRHP-listed site is the Rulo Bridge, which carries US 159 over the Mississippi River just north of the Big Lake site (NPS, 2006a).

No NRHP-listed sites are located within the transmission route corridor between the Big Lake Site and Fairport, nor between Fairport and Orrick/Missouri City/Eckles Road. Of three sites in Andrew County, the closest to the route corridor is the J.F. Roberts Octagonal Barn, located at the junction of Missouri Route B and Missouri Route 48, about 3 miles north of the route corridor. In DeKalb County, the Absolom Riggs House at SR 1 near Weatherby is probably within a mile of the route corridor. The next closest in DeKalb County is the DeKalb County Courthouse in Maysville, several miles from the route corridor. All three of the NRHP-listed properties in Daviess County are in Gallatin, which is outside the project area. In Caldwell County, the NRHP-listed site shown only as "Far West" is about two miles west of the route corridor. All the NRHP-listed sites in Ray County are outside the transmission corridor project area (NPS, 2006a).

3.13.2 Environmental Consequences

3.13.2.1 Identification of Issues

Significance of cultural resources is interpreted from the NRHP eligibility criteria:⁷³

The quality of significance in American History, architecture, archaeology, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association, and:

- a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
- b) that are associated with the lives of persons significant in our past;
or

⁷³ 36 CFR Part 60.6

- c) that embody the distinctive characteristics of type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant distinguishing entity whose components may lack individual distinction; or
- d) that have yielded, or may be likely to yield, information important in prehistory or history.

The following specific issues were identified during scoping:

- Concerns about destruction of Civil War redoubts and trenches that might exist in the transmission corridor.
- Concerns about potential for archaeological sites within and near site area.
- Concerns about transmission lines and the historic quality of farms.

3.13.2.2 Significance Criteria

An impact could be considered significant if it adversely impacted a NRHP-listed property, or one that is eligible for the NRHP, unless measures would be incorporated into the Proposed Action to reduce or prevent the impacts.

3.13.2.3 Impact Assessment Methods

Impact assessment methods were described above.

3.13.2.4 Actions Incorporated Into the Proposed Action to Reduce or Prevent Impacts

A Phase I survey, and if necessary, Phase II testing of the railroad corridors, well field, and water line would be conducted prior to construction activities in these areas.

3.13.2.4.1 Impact Assessment

Proposed Action

Proposed Norborne Facility

The records and literature review produced no evidence of the presence of previously reported possibly significant cultural resources within the project area. There are no NRHP) properties currently listed within or near the project boundaries. No NRHP property is threatened directly or indirectly by the Proposed Action. There are no ASM sites within or near the project. There are no Missouri Historic - Architecture sites within the project boundaries. None of the archaeological sites found during the Phase I survey and Phase II testing were found to be eligible for NRHP status. The types of historic scatters found were typical of many that exist throughout Missouri. For the prehistoric sites, there was too little data to be considered possibly significant in terms of the National Register criteria. No possibly significant cultural resources would be threatened by the project as it is currently planned (AECI, 2006m). The State Historic Preservation Officer's (SHPO) letters of concurrence are included in *Appendix J, State Historic Preservation officer's Letter of Concurrence*.

After the initial survey was completed and submitted to the SHPO, the farmstead at the very southeast corner of Section 17, outside of the facility boundaries, was assessed. The investigator recommended that the property not be considered eligible for the NRHP (AECI, 2006m).

Transmission and Rail Corridors

A records and literature review for the proposed transmission macro corridor as described in *Section 2.2.12.4, Norborne Site*, found no sites within the macro corridor on or eligible for the NRHP. There were five recorded archaeological sites within the macro corridor from Norborne to Thomas Hill and two from Norborne to Sedalia for which NRHP status has not yet been determined (AECI, 2006l).

There are no NRHP-listed sites within the route corridors for the proposed rail connectors. No cultural resources or previous cultural resource investigations were identified within the route corridors for the proposed rail connectors (AECI, 2006o).

When the final transmission and railroad alignments have been established, they would be assessed by qualified personnel and recommendations would be made to the SHPO. No action would be taken without concurrence from the SHPO.

Big Lake Alternate Site

If the Big Lake Site were selected, the potential visual impact of the plant on the NRHP-listed Rulo Bridge on US 159 would need to be assessed. The bridge is located immediately north of the site. The potential impact of the transmission line on the Absolom Riggs House near Weatherby would also need to be assessed.

IGCC Alternative

Impacts would be the same for the IGCC alternative as for the Proposed Action.

No Action Alternative

Under the No Action Alternative, the Project would not be constructed and there would be no change or disturbance of cultural resources within the project area.

3.13.2.4.2 Mitigation and Residual Impacts

No mitigation measures have been assessed because no impacts are anticipated.

3.14 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

3.14.1 Affected Environment

The general area of both the Proposed Action and the Alternate Site is shown in Figure 3-1.

3.14.1.1 Region of Influence

The socioeconomic region of influence for the Proposed Action is Carroll County, where the plant site is located, plus the adjacent counties of Lafayette and Ray. This area is referred to as the primary study area. These counties have towns within 25 miles of the plant site that are located along the highways between the site and Kansas City. The proposed Norborne plant site and primary study area are shown in Figure 3-1. The Kansas City Metropolitan Statistical Area (MSA) has a population of over 1,700,000 people (as of 2000) and consists of four counties in Kansas and seven counties in Missouri. Lafayette and Ray are included in the Missouri counties of the Kansas City MSA. Communities in close proximity to the Norborne Site include Norborne, Richmond, Lexington, and Carrollton (AECI, 2006n).

3.14.1.2 Existing Conditions

3.14.1.2.1 Population-Proposed Action

Table 3-19 presents data showing the trends in total population for the three counties surrounding and adjacent to the Norborne site and for the Kansas City MSA. Carroll County, as well as Norborne and Carrollton, experienced decreases in population during both the 1990 to 2000 and 2000 to 2005 time periods. However, Lafayette and Ray counties both experienced increases in population from 1990 to 2005. The town of Lexington lost population during 1990 to 2000, and only regained about 60 percent of that loss during 2000 to 2005. However, Richmond in Ray County decreased in population slightly from 2000 to 2005, in contrast to an increase from 1990-2000. As would be expected, the Kansas City MSA experienced increases in population during both time frames. Table 3-20 presents the population projections for the rural counties of Carroll, Lafayette, and Ray. The projections indicate that recent trends are expected to continue: Carroll County population is expected to decrease and Lafayette and Ray county populations are expected to increase. In relative terms, Lafayette County has always had the largest population of the three counties and Carroll County has always had the smallest (AECI, 2006n).

Table 3-19. Population Trends

County/City	Population 1990	Population 2000	Population 2005	% Change	
				1990 - 2000	2000- 2005
Carroll	10,748	10,285	10,193	-4.3	-0.9
Norborne	856	805	788	-5.9	-2.1
Carrollton	4,406	4,122	3,990	-6.4	-3.2
Lafayette	31,107	32,960	33,108	5.9	0.4
Lexington	4,860	4,453	4,684	-8.4	5.2
Ray	21,971	23,354	24,101	6.3	3.2
Richmond	5,738	6,116	6,043	6.6	-1.2
Kansas City MSA	1,582,875	1,776,062	1,947,694*	12.2	9.7

Source: US Census Bureau 2006; * the 2005 population estimate includes the populations of Franklin County, Linn County, Bates County, and Caldwell County, in addition to the counties mentioned at the beginning of Section 2 as the Kansas City MSA boundary was extended as of 2003

Table 3-20. Population Projections

County/City	2010	2015	2020
Carroll	9,364	9,054	8,779
Lafayette	35,114	36,228	37,291
Ray	24,868	25,725	26,499

Source: Missouri Office of Administration 2006

Ethnic Characteristics

Table 3-21 summarizes the ethnic characteristics for the three counties, towns within the counties, and the Kansas City MSA. The study area is very homogenous in terms of ethnicity. White residents comprise at least 91 percent of the population of all towns and counties in the study area. The Kansas City MSA had the greatest cultural diversity. Carroll County had the least diversity, with 97 percent white residents. The majority of the other counties and towns had at least some representation in all six ethnic categories, excluding Richmond, which had zero percent Asian/Native Hawaiian/Other Pacific Islander population. According to the 2000 Census Block Data for the blocks within and bordering the proposed Norborne Site, the entire population within this area was classified as white (AECI, 2006n).

Table 3-21. Ethnic Characteristics

County (Town)	White	Black or African American	Hispanic	American Indian or Alaska Native	Asian/ Native Hawaiian/Other Pacific Islander	Other
Carroll ¹	96.9	1.7	0.7	0.3	0.1	0.3
Norborne	95.2	3.6	1.0	1.2	0.0	0.0
Carrollton	94.9	3.1	1.1	0.3	0.2	0.3
Lafayette ¹	95.5	2.3	1.2	0.3	0.2	0.6
Lexington	91.0	6.0	2.2	0.2	0.5	1.1
Ray ¹	96.5	1.5	1.1	0.4	0.2	0.5
Richmond	94.3	3.7	1.0	0.3	0.0	0.4
Kansas City MSA ²	81.0	13.1	4.0	0.4	1.5	0.1

Source: ¹US Census Bureau 2006b; ²Metro Dataline 2000; *percents may add to more or less than 100 percent due to rounding

3.14.1.2.2 Housing—Proposed Action

Housing demand tends to be high during a major construction project. The increased demand for housing affects not only the supply but the value of housing. The data in this section deals with the supply, value, and age of the housing in the primary study area.

Medium- to Long-Term Housing

The data indicates that medium- to long-term (three months or longer) temporary housing is potentially available to the majority of construction workers who may relocate to the area for extended periods of time. Table 3-22 provides information on the quantity of various types of available housing units, as well as the median value, rental occupancy rate, and median monthly rents for each county. Table 3-23 provides the median age range, occupancy rate, and approximate quantity of vacant units for each County (AECI, 2006n).

Table 3-22. Housing Demographics

	Single Family (1-4 Units) (No.)	Multi-Family (5 + Units) (No.)	Mobile or Other (No.)	Median Value (\$)	Renter Occupied Units (%)	Median Rent (\$/Mo)
Carroll ¹	4,159	194	544	\$48,900	26%	\$323
Lafayette ¹	11,575	405	1,727	\$74,400	25%	\$426
Ray ¹	8,441	187	743	\$81,000	21%	\$455
Kansas City MSA ²	613,874	103,990	17,050	\$111,999	32%	\$628

Source: ¹US Census Bureau 2006b; ²US Census Bureau 2005

Table 3-23. Housing Age and Vacancy

	Median Unit Age Range (Yrs)	Occupancy Rate (%)	Vacant Units (No.)
Carroll ¹	40 – 50	85%	818
Lafayette ¹	30 – 40	92%	1,214
Ray ¹	20 – 30	93%	694
Kansas City MSA ²	30 – 40	93%	51,444

Source: ¹US Census Bureau 2006b; ²US Census Bureau 2005

Short-Term Housing

Short-term housing includes lodging facilities that can be rented on a daily, weekly or monthly basis for periods of up to three months. While every style of lodging (single-family residential, multifamily residential, mobile homes, and other) can be rented for short-term periods, certain styles are typically not included in this category. Short-term lodging for construction laborers typically includes hotels, motels, recreational vehicle (RV) parks, and to a lesser extent, multi-family residential, mobile homes, and bed and breakfasts. The socioeconomic study upon which this summary discussion is based assumed that up to 10 percent of construction laborers would seek short-term housing. Due to the wide availability of short-term lodging options in the Kansas City MSA, the area was not included in the short-term housing survey. Internet resources and telephone contacts were used to identify the availability of hotels, motels, bed and breakfasts, and RV parks in the study

area. Table 3-24 provides information regarding the potential quantity of short-term housing available in the primary study area (AECI, 2006n).

Table 3-24. Short-Term Housing Availability

	Hotel / Motel Rooms ¹ (No.)	RV Parks ¹ (No. of Spaces)	Multi-Family, Mobile or Other ² (No.)*	Bed and Breakfast Rooms (No.) ¹
Carroll	75	0	74	0
Lafayette	140	110	213	29
Ray	259	58	93	0

Source: ¹Internet research and telephone contacts; ²US Census Bureau 2006b
 *Assumes 10 percent of total units for this classification.

3.14.1.2.3 Economy—Proposed Action

The following sections provide an overview of the employment and income characteristics for the primary study area and the Kansas City MSA.

Labor Force Trends

Labor force trends are summarized in Table 3-25. As shown in the table, the labor force in the Kansas City MSA grew from 2000 to 2005, while the labor force in Carroll and Lafayette Counties shrank and, in Ray County, changed little. Due to the comparatively remote nature of the primary study area, coupled with decreasing levels of employment opportunity and increased transportation costs, the historical trend of out-migration from the primary study area toward the Kansas City MSA is expected to continue (AECI, 2006n).

Table 3-25. Labor Force Trends

	2000	2005	Change (%)
Carroll	5,043	4,909	-2.66
Lafayette	17,614	17,288	-1.85
Ray	12,135	12,158	0.19
Kansas City MSA	1,002,820	1,037,655	3.47

Source: US Bureau of Labor Statistics

Employment by Industry

In Carroll County in 1990, the industry category Agriculture, Forestry, Fishing, Hunting and Mining was the single largest in with 749 employed. Employment in that category decreased by 20 percent between 1990 and 2000. In 2000 in Carroll County, more people were employed in the category of Education, Health and Social Services (923) than any other single category. In Carroll County, this category grew by 28 percent from 1990 to 2000. The second largest employment category in Carroll County in 2000 was Manufacturing, with 806 employed. This category grew by 40 percent between 1990 and 2000.

In Lafayette County, the largest employment category in both 1990 and 2000 was Education, Health, and Social Services, with about 2,300 employed in 1990, and about 3,200 in 2000. In Lafayette County the category Agriculture, Forestry, Fishing, Hunting and Mining declined by 46 percent from 1990 to 2000, with 618 employed in 2000.

The largest employment category in Ray County in both 1990 and 2000 was Manufacturing, with a little over 2,000 employed in both 1990 and 2000. In Ray County, employment in the categories Finance, Insurance, Real Estate, and Rental and Leasing; Professional, Scientific, Management, Administrative, and Waste Management Services; and Arts, Entertainment, Recreation, Accommodation, and Food Services all grew by 36 to 50 percent between 1990 and 2000, with a total employment of about 3,000 persons in 2000 (AECI, 2006n).

Income Levels

The median household income levels in 1999 (from the 2000 census) for Carroll, Lafayette, and Ray counties were \$30,643, \$38,235, and \$41,886, respectively. The median household income for the State of Missouri was \$37,934. The percent of families living below the government poverty level in 1999 were 10, 7, and 9 for Carroll, Lafayette, and Ray Counties, compared with about nine percent for both the State of Missouri and the U.S. The median household income for Norborne (2000 census) was \$25,208, and 11 percent of families lived below the government poverty level. The racial composition of the town was 95 percent white residents, four percent black residents, and one percent American Indian or Alaska Native. The U.S. population in 2000 was 75 percent white, and Missouri was 85 percent. One

percent of the population of Norborne in 1999 was Hispanic/Latino⁷⁴ (USCB, 2006b).

3.14.1.2.4 Government Revenue—Proposed Action

The total intergovernmental revenue and general revenue for Carroll County, Lafayette County, Ray County, and the State of Missouri for 2001-2002 are presented in Table 3-26. In comparison with the other counties, Lafayette County had the most total revenue and intergovernmental revenue in 2001-2002 while Carroll County had the least. Carroll County also had the least revenue from property taxes and charges and miscellaneous general revenue while Lafayette County had the greatest revenue from property taxes. Ray County had the greatest revenue from charges and miscellaneous general revenue (AECI, 2006n).

Table 3-26. Selected Government Finances

County/ State	Total Revenue (\$000)	Total Intergovernmental Revenue (\$000)	General Revenue from Own Sources (\$000)				Utility Revenue (\$000)
			Total	Taxes		Charges and Miscellaneous General Revenue Total	
				Total	Property		
Carroll	22,023	11,046	9,628	7,473	5,826	2,155	1,349
Lafayette	69,997	30,492	28,567	19,748	14,388	8,819	10,938
Ray	62,986	21,854	37,360	14,162	10,358	23,198	3,772
Missouri	16,310,154	5,284,764	9,898,104	6,394,500	3,859,356	3,503,604	1,239,563

Source: Compendium of Government Finances 2002

3.14.1.2.5 Alternate Site

Study Area

The study area includes Holt County, Andrew County, Buchanan County, and Nodaway County. St. Joseph, in Buchanan County, the largest municipality in the secondary study area, is located approximately 43 miles from the Alternate Big Lake Site.

Population

The 2000 population for Holt, Andrew, Buchanan, and Nodaway counties is presented in Table 3-27. Buchanan County has the largest population of the

⁷⁴ The Census Bureau does not consider Hispanic/Latino a race.

three counties; the City of St. Joseph is in Buchanan County and represented approximately 86 percent of the total county population in 2000.

Table 3-27. Alternate Study Area Populations

County	Population 2000
Holt	5,351
Mound City	1,193
Andrew	16,492
Savannah	4,762
Buchanan	85,998
St. Joseph	73,990
Nodaway	21,912
Maryville	10,581

Source: US Census Bureau 2006b

Economy

Holt County experienced a large increase in total labor force with a 10.2 percent jump between 2000 and 2005. Andrew County experienced a significant decrease in labor force of 6.8 percent from 2000 to 2005. A breakdown of the subject area's labor force statistics is shown in Table 3-28. All three counties have a large majority of their labor force employed in the category of education, health, and social services.

Table 3-28. Alternate Site Labor Force

County	2000	2005	Change (%)
Holt	8,948	9,864	10.2
Andrew	2,744	2,557	-6.8
Buchanan	42,954	46,008	7.1

Source: US Bureau of Labor Statistics

Short Term Housing

Internet resources and telephone contacts were used to identify the availability of hotels, motels, bed and breakfasts, and RV parks in the study area. St. Joseph, in Buchanan County, has 14 hotels, 3 bed and breakfast facilities, and 6 RV parks.

3.14.2 Environmental Consequences

3.14.2.1 Identification of Issues

Several socioeconomic issues were identified during the EIS scoping process, including the following:

- Creation of jobs for local residents
- Impacts on the quality of life
- Benefits to the local area
- Compensation for property
- Economic impact on hunting/fishing/other recreational activities
- Economic impact on parks/refuge/conservation areas
- Any benefits to community from taxes
- Economic effects—types of businesses
- Impact of transmission lines on developing areas
- Potential economic benefits
- Potential impacts on property values
- Availability of housing
- Concern about decline in population after plant is built
- Potential for additional students from construction

3.14.2.2 Significance Criteria

The significance criteria listed below were used to determine the severity of socioeconomic impacts; an impact would be considered significant if any of the following were to occur:

- There would be substantial changes to quality of life, either due to economic impacts or to loss of aesthetic or recreational resources.
- A disproportionate effect to low income or minority populations would occur.

3.14.2.3 Impact Assessment Methods

3.14.2.3.1 Economic Impact—Proposed Action

The construction and operation of the proposed plant would provide direct income to those who work there, and indirect benefits as a result of the expenditures by those workers. The local government of Carroll County would receive direct financial benefits from AECl through payments in lieu of taxes. These economic benefits are described below.

Public Finance

Rather than pay property taxes strictly on the basis of location, AECl entered into an economic development agreement with Carroll County under which AECl would make payments in lieu of taxes to the county on an annual basis for 24 consecutive years. The authority under which this agreement was negotiated is known as a Chapter 100 Agreement. This legally binding agreement allows the county to negotiate a payment in lieu of taxes in order to attract new development and sustain or grow the local economy. The use of a Chapter 100 agreement allows the county complete control over the distribution of these revenues, meaning the county can distribute the funds to the various jurisdictions as they see fit. These payments would start two years before the start of construction to help the communities prepare for the project. Table 3-29 presents the schedule of these payments as proposed and agreed to by Carroll County. However, there is a case currently pending before the Missouri Supreme Court relative to Chapter 100 financing for projects such as the Proposed Action. The payments in lieu of taxes to Carroll County are on hold pending the outcome of this case. Depending on the actual Supreme Court ruling, the details of this agreement with Carroll County may be modified.

The original agreement stipulated the 24 consecutive annual payments to Carroll County would begin in 2006 and total \$14,500,000. This series of

payments is shown in Table 3-29 and was used in the socioeconomic assessment. However, due to a state litigation on another utility project with a similar economic development agreement the viability of the agreement between AECl and Carroll County was put into question. Therefore, the original agreement was held in abeyance pending the outcome of that litigation. The litigation was resolved favorably earlier this year, but the resulting delay and the fact that project cost estimates had increased made it necessary to revisit the economic development agreement with the county. As of June 2007, AECl was in discussions with Carroll County to amend and restate the agreement such that payments to the county would be increased due to increased construction costs. Under a revised agreement, grants would be on a sliding scale that would increase payments if construction costs increase further, but with a floor at the previous levels (AECl, 2007e).

Table 3-29. Payment in Lieu of Taxes

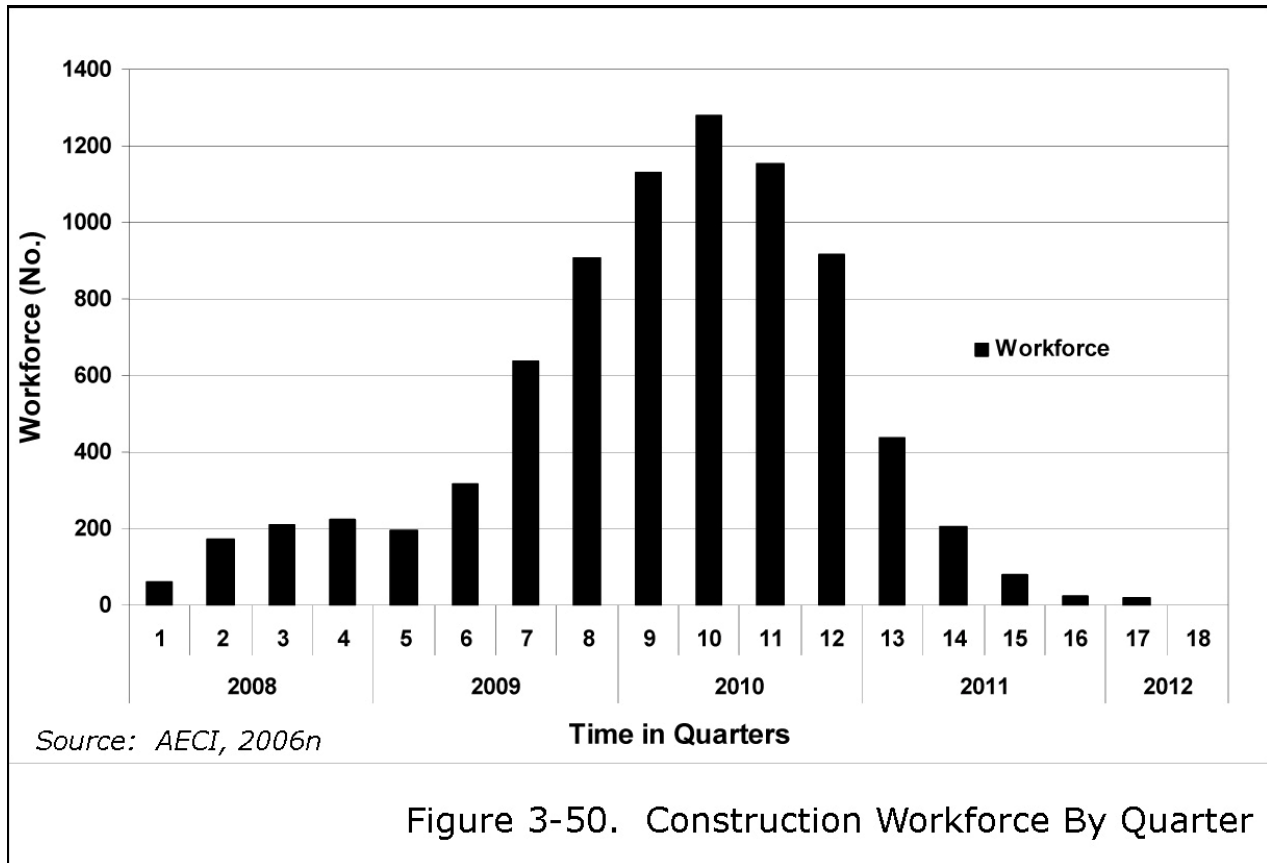
Year	Payment Amount	Year	Payment Amount
2006	\$500,000	2018	\$500,000
2007	\$500,000	2019	\$500,000
2008	\$500,000	2020	\$750,000
2009	\$500,000	2021	\$750,000
2010	\$500,000	2022	\$750,000
2011	\$500,000	2023	\$750,000
2012	\$500,000	2024	\$750,000
2013	\$500,000	2025	\$750,000
2014	\$500,000	2026	\$750,000
2015	\$500,000	2027	\$750,000
2016	\$500,000	2028	\$750,000
2017	\$500,000	2029	\$750,000

Source: AECl, 2006n

3.14.2.3.2 Construction—Proposed Action

Income Impacts

Figure 3-50 shows the expected construction work force by quarters.



The direct construction income level would create additional indirect and residual (spin-off) income when the workers spend the money they earn on goods and services within the community. Also, since the majority of construction workers are non-regional, they would not permanently relocate to the community. For this reason, there is less demand for secondary (non-base) market and community services; thus, not more than 20 percent of their gross income would be spent in the primary study area. Data obtained from the Bureau of Economic Analysis provides the regional income multiplier for each of the three counties in the primary study area and the Kansas City MSA (Table 3-30). The multiplier effect in the local counties is lower than that for the metropolitan area because people in the local counties make a lot of expenditures outside their county of residence, including in Kansas City.

Table 3-30. Regional Income Multipliers for Construction

Municipality	2008	2009	2010	2011	2012
Kansas City Area	173	706	997	340	16
Richmond, MO	15	62	88	90	74
Norborne, MO	11	47	66	85	77
Carrollton, MO	11	47	66	69	57
Lexington, MO	10	40	57	58	47
Marshall, MO	13	51	72	65	50
Chillicothe, MO	8	34	48	43	33
Total	243	987	1,394	751	354

*numbers include weekly commuters as they require short-term housing during construction of the project

The average income for the 1,281 construction workers present at the site during peak construction activity is estimated to be \$88,343 excluding benefits, per diems, bonuses, overtime and travel pay. This direct income should produce additional indirect income over the construction life of the project. Much of this short-term indirect income can be expected to result from direct income spent on lodging and food in the community. Based on the residential distribution models used to determine the likely distribution of construction workers, the direct and indirect income for the local counties and the Kansas City area are presented in Table 3-31.

Table 3-31. Projected Income from Construction

Area	Peak Construction Employment	Projected Construction Worker Income (Annual Dollars)	Projected Indirect Income Impact (Annual Dollars) ¹	Total Income Impact (Annual Dollars) ²
Local Counties	272	\$24,029,296	\$7,929,667	\$31,958,963
Kansas City Area	1,009	\$89,138,087	\$73,895,474	\$163,033,561
Total	1,281	\$113,167,383	\$81,825,141	\$194,992,524

Source: ¹Bureau of Economic Analysis, 2003 RIMS II Multipliers

Note: ²Value is given in 2006 dollars.

The impacts presented in Table 3-31 represent the impacts which would occur during peak construction activity and would be relatively short-term in nature. The income impacts would follow a similar profile as the construction

workforce profile presented in Figure 3-50, with the majority of impacts occurring between the 7th and 12th quarters of the construction phase.

Property Value Impacts

Due to the large number of factors that affect the real estate market, it is not possible to exactly quantify the effects of this project on property values, especially for specific parcels. However, in general it is expected that residential property values in the immediate vicinity of the proposed power plant could be adversely affected in the short term. There would likely be some devaluation of such properties within one mile of the plant site for a short term of three to five years during construction. Residential property values should begin recovering as construction of the plant reaches its peak and the construction laborers reach their peak, thereby increasing demand for short-term local housing in Norborne and the surrounding region. The recovery of property values in Norborne and the surrounding region should continue as plant construction nears completion and the need for additional residences to house permanent staff escalates. It can also be noted that most of the land in the vicinity of the project is cultivated agricultural land. The project would not affect the use of agricultural land in the area and therefore is not expected to adversely affect its value.

The construction and operation of the proposed rail connectors could likely adversely affect property values immediately adjacent to the rail line. Some local land owners would view the rail line as a nuisance and the rail line could limit or hinder land owner access to agricultural fields. While any residential properties immediately adjacent to the rail line may suffer diminished property values in the long term, it is also likely that landowners in the area would acclimate to the rail line and property values in the general vicinity would recover with time.

Housing Impacts

The peak construction employment level would result in a measurable impact on the availability of temporary housing in the primary study area. *Section 3.14.1.2.2, Housing-Proposed Action*, estimated the availability of housing in the study area. A peak employment level of 1,281 workers is expected during the construction phase. Non-regional construction workers are expected to account for 384 of the peak construction workforce. Many of these non-regional workers would seek temporary housing for varying time periods

based on their individual roles in the project. During construction, workers would likely share housing to cut costs and thus, more than one worker per residence is expected. Based on the model used to determine the likely distribution of construction workers, housing demand for the communities in the study area is presented in Table 3-32. The demand for short-term housing in the vicinity of the proposed plant site would exceed the current supply in the vicinity because there are no motels or trailer parks in Norborne. If no short-term housing is provided in the area for the workers, they would need to seek housing farther away, such as in Richmond or Carrollton, or elsewhere, including the unincorporated parts of the county. The demand for rental housing or trailers would temporarily put upward pressure on such housing in the vicinity of the plant.

Table 3-32. Project Housing Demand From Construction

Community	2008	2009	2010	2011	2012
Kansas City MSA	73	296	418	143	6
Richmond	9	38	53	18	1
Norborne	8	32	45	15	1
Carrollton	7	28	40	14	1
Lexington	6	24	34	12	0
Marshall	7	29	41	14	1
Chillicothe	5	19	27	9	0
Total	115	466	658	225	10

Numbers include weekly commuters; the sum of the communities for any given year may be slightly different than the total due to rounding.

3.14.2.3.3 Operation—Proposed Action

The Norborne Plant would have a permanent operating work force of approximately 139 people, 70 of which are expected to be newcomers (i.e. non-locals).

Income Impacts

When completed in 2012, Local residents (those from within the primary study area) would not add to the demand for local services or infrastructure; however, their income would contribute to the local economy. Likewise, commuters from outside the primary study area would contribute little to demand other than for transportation, but would contribute to their local

economy. This direct income would produce additional indirect income for the life of the project. Data obtained from the Bureau of Economic Analysis provides the regional income multiplier for the three counties in the primary study area (Table 3-33). The average annual wage for the operational employees is estimated at \$59,000 excluding benefits, bonuses, and overtime. Table 3-34 shows the projected direct and indirect income that is expected from the operation of the project. This income would continue for the life of the project.

Table 3-33. Income Multipliers for Operation

County	Regional Income Multiplier (Dollars)
Carroll	1.3876
Lafayette	1.3582
Ray	1.4370
County Average	1.3943

Source: Bureau of Economic Analysis, 2003 RIMS II Multipliers

Table 3-34. Projected Income from Operations.

Operational Employment	Projected Operational Worker Income (Annual Dollars)	Projected Indirect Income Impact (Annual Dollars) ¹	Total Income Impact (Annual Dollars) ²
139	\$8,201,000	\$3,233,654	\$11,434,793

Source: ¹Bureau of Economic Analysis, 2003 RIMS II Multipliers

Note: ²Value is given in 2006 dollars.

Housing Impacts

In addition to plant operating workers, another 33 non-local workers are expected to locate in the study area due to indirect employment opportunities. Local area residents would not have an impact on housing availability. Additionally, commuters from the Kansas City MSA would not impact housing availability. *Section 3.14.1.2.2, Housing-Proposed Action*, of this report estimated the availability of housing in the study area. Based on the likely distribution of operating workers, housing demand for each of the three counties in the study area is presented in Table 3-35. Permanent operating personnel would be hired beginning in 2010. The demand for permanent housing is currently low compared to the supply of housing in the

three-county area. Workers would also have the option of building new housing. The local real estate market in these counties may benefit from a slight increase in demand.

Table 3-35. Projected Housing Demand from Operation.

Community	2010	2011	2012
Kansas City MSA	0	0	0
Richmond	4	19	23
Norborne	4	19	23
Carrollton	3	14	17
Lexington	3	12	14
Marshall	3	13	15
Chillicothe	2	8	10
Total	18	85	103

Note: the sum of the communities for any given year may be slightly different than the total due to rounding

3.14.2.4 Actions Incorporated Into the Proposed Action to Reduce or Prevent Impacts

- AECI would provide payment-in-kind in lieu of taxes to Carroll County to cover additional costs associated with construction and operation of the plant, such as road repair or services
- AECI would provide its own fire protection and emergency service

3.14.2.4.1 Impact Assessment

Proposed Action

As detailed above, no significant impacts are expected to result from the Proposed Action. Overall economic impacts are expected to be positive. No economic impacts are anticipated on hunting, fishing, or other recreational activities; or on parks, refuges, or conservation areas.

Big Lake Alternate Site

With construction of the proposed plant at the Big Lake Site, there would be potential for disproportionate adverse impacts on low income or minority communities, which would be inconsistent with the Executive Order on

Environmental Justice. The population of Rulo, Nebraska (population 226), located a mile from the site, directly across the river, is 24 percent Indian or Native Alaskan, according to the 2000 census. The median household income is \$21,719, 20 percent of families live below the government poverty level, and 28 percent of individuals live below the poverty level. These poverty percentages are well above those for the State of Missouri and the U.S. In addition to the town of Rulo, the Iowa Indian Reservation is located across the river from the plant site, to the south (Rulo is not in the reservation). Construction of the plant in close proximity to an Indian reservation and a community with a high percentage of Indian residents as well as a high percent of low income residents has the potential for Environmental Justice Impacts.

IGCC Alternative

With IGCC, the impacts would be the same as for the Proposed Action.

No Action Alternative

The Proposed Action would not be constructed under the No Action Alternative. There would be no socioeconomic impacts.

3.14.2.4.2 Mitigation and Residual Impacts

No significant impacts would result from the implementation of the Proposed Action with the actions incorporated to reduce or prevent impacts and there would be no residual significant impacts.

3.15 PUBLIC SAFETY AND SERVICES

3.15.1 Affected Environment

3.15.1.1 Region of Influence

The region of influence for assessing impacts on public safety and services for the Proposed Action is defined as Carroll, Lafayette and Ray Counties, except that for assessment of electric and magnetic field (EMF) effects, the transmission line route corridors are also within the region of influence.

3.15.1.2 Existing Conditions

3.15.1.2.1 Traffic and Transportation

Automobiles are the main form of transportation in the project area. Figure 3-1 shows the roadways in the area. In Carroll County, US Route 65 (US 65) and Missouri Route 10 are the primary state-maintained roads serving the area. US 65 traverses the county north-south, provides Carroll County's only direct access to I-70, and is the only Missouri River crossing in the county. Missouri Route 10/210 connects northeast Kansas City to Richmond, Norborne, and Carrollton.

In Lafayette County, US 24 in the north and I-70 in the south are the primary transportation routes. US 24 shares the Missouri River Bridge with US 65 between Lafayette and Carroll Counties.

In Ray County, Missouri Route 13 (north-south) and Missouri Route 210 and 10 (east-west) are the primary transportation routes. Missouri Route 13 is the only Missouri River crossing in the county. Table 3-36 summarizes average daily total vehicle and truck traffic for these highways and for major Interstate highways in the MSA.

Table 3-36. Average Daily Traffic Volumes

County / Route	Average Daily Traffic (Total Vehicles)	Average Daily Traffic (Truck Traffic)
Kansas City MSA		
I-70	103,203	12,949
I-35	76,506	9,607
I-29	63,214	10,316
Carroll		
State Highway 65	3,556	513
State Highway 10	2,112	331
Lafayette		
US Highway 24	2,670	241
I-70	28,456	9,825
Ray		
State Highway 13	4,226	214
State Highway 210/10	6,797	3,508

Source: Missouri Department of Transportation, 2004 Traffic Volume Map

In the vicinity of the Norborne site, MO Route DD connects Richmond to Norborne about 0.5 miles south of the proposed site. The north-south MO Route JJ connects to MO Route DD approximately 2 miles west of Norborne. There are also several county roads in the area. See Figure 3-43 for locations of state and county routes near the proposed Norborne Plant.

3.15.1.2.2 Airports

As shown in the figures related to the transmission line alternative discussions in *Section 2.2.12, Transmission Routing Alternatives*, there are a number of airports and airstrips within the transmission line study areas. Whiteman Air Force Base (AFB) is in the study area for the Norborne to Sedalia transmission line. As shown in Figures 2-74 and 2-76, the proposed transmission route corridor is far from Whiteman AFB. All airports shown are closer to existing transmission lines than they would be to the proposed lines. The FAA has specific requirements for clearance for different types of airports to prevent interference with structures such as transmission lines.⁷⁵

3.15.1.2.3 Electric and Magnetic Fields

As described in *Section 2.2.12.4, Norborne Site*, AECI determined that two 345-kV transmission lines and related new and upgraded substation facilities would be required to provide adequate outlet capacity for the plant. First, a line from the Norborne Substation (located east of the proposed plant site) to the Thomas Hill Substation in Randolph County (approximately 60 miles) would be built. A second 345-kV line would be built from Norborne to Central Electric Power Cooperative's (Central) Sedalia Substation in Pettis County (approximately 50 miles) and then to the Mt. Hulda Substation in Benton County (approximately 24 miles).⁷⁶ Transformers (345/161-kV) and related switching, safety and control equipment would be added to one or both of these substations.

⁷⁵ 14 CFR 77

⁷⁶ As discussed in *Section 2.2.12.4 Norborne Site*, the Dresden Substation is being evaluated as an alternative to the Sedalia Substation.

3.15.2 Environmental Consequences

3.15.2.1 Identification of Issues

Public safety and service issues raised during scoping related to this Project include the following:

Traffic and Transportation

- Potential impacts on traffic flow and safety from transportation of plant components, equipment, and construction materials to the site
- Effect of increased traffic created by the commuting workforce
- Concerns about conflicts between oversized farm harvest equipment and construction traffic
- Concerns about flooding on Missouri Routes 10 and D.
- Concern about roads not built to level of traffic and weight
- Potential hazards of transmission lines to aircraft and airports

Community Services

- Increased demand for police and fire protection, and emergency medical services.
- Potential impacts to response time for emergency vehicles because of trains crossing rural roads

Health and Safety

- Hazards to children walking to school or playing
- Safety measures required to protect community
- Potential for adverse effects from EMFs

3.15.2.2 Significance Criteria

Impacts on public safety and services would be considered significant if any of the following were to occur:

Traffic and Transportation

- Traffic associated with the Proposed Action substantially degrades the level of service on Missouri Route 10 or substantive reductions in traffic safety occur
- Substantive hazards to airports and air traffic occur
- Substantive adverse effects occur to public or worker health and safety

Community Services

- Substantive deterioration of public services occurs
- The benefits of payments in lieu of taxes to the county would be inadequate to deal with added demand on local infrastructure.

Health and Safety

- Substantial increases in exposure to EMFs occur

3.15.2.3 Impact Assessment Methods

Impact assessment methods are directly tied to applicable regulations or standards and vary according to the individual issue. For EMFs, residences and businesses within 200 feet of the proposed centerline were identified. Impacts related to increased construction traffic (both for equipment deliveries and commuting workers) were assessed based on existing and projected traffic and roadway capacities.

For the handling and storage of hazardous materials or other waste, potential impacts were estimated by identifying if (during construction and operation) site contractors would comply with federal, state, and local regulations. Impact assessment methods also showed if facility construction and operation

would place demands on local or regional public services, such as police or fire protection.

3.15.2.4 Actions Incorporated Into the Proposed Action to Reduce or Prevent Impacts

The Proposed Action includes the following measures to reduce or prevent potential adverse environmental impacts to public safety and services:

Traffic and Transportation

- Coordination with the Missouri Department of Transportation (MoDOT)
- Proper design of plant facilities
- Adherence to FAA regulations for clearance for airports
- Delivery of oversized construction materials by rail rather than on highways
- AECI would work with Egypt Township Road District to make improvements to other existing roads to minimize impacts to local traffic. There are no homes within that mile of the road being closed.

Community Services

- Onsite fire protection
- Emergency Plans
- Onsite security

Health and Safety

- Preparation of Health and Safety Plan and Procedures including the following:
 - safety responsibilities of the site manager
 - use of safety equipment for workers
 - worker training

- Proper hazardous materials and waste handling and disposal
- SPCC Plans
- Maximizing distance of residence and businesses to the proposed transmission route corridor centerline to the extent practicable

3.15.2.4.1 Impact Assessment

Proposed Action

Traffic and Transportation

Construction

The plant site would be located on Missouri Route DD, approximately three miles west of Norborne. During construction, the site could be accessed via Missouri Route DD from the east through Norborne, or from the west through Richmond on Missouri Route 10. Commuters may also use I-70 from the south, and cross the Missouri River at Lexington on Missouri Route 13. These commuters could then take Missouri Route J to Hardin and continue north to Missouri Route DD to access the site from the west, or they could take Missouri Route 10 to Norborne and Missouri Route DD to access the site from the east.

Construction of the plant would require closing a half-mile of County Road 300 between Section 17 and Section 8 on the east end.⁷⁷ This roadway segment is within the proposed facility boundary.

According to a 2004 MoDOT Traffic Volume Map, Missouri Route 10 in the vicinity of the site location was used by approximately 1,942 vehicles per day on an annual average basis. The Traffic Volume Map also indicated Missouri Route 10 experienced an estimated 3 percent growth in average daily traffic over 2002 (1.5 percent per year) in this area. In order to estimate the amount of baseline daily traffic during 2010, when construction employment is estimated to peak, an annual growth rate of 1.5 percent was used. In 2010, the estimated annual average daily traffic on Missouri Route 10 in the area of the site would be 2,163 vehicles, excluding construction traffic related

⁷⁷ This road is shown as County Road 638 on most drawings, and is also referenced as County Road 638.

to the project. Individuals would likely carpool to and from the jobsite. According to the MoDOT Traffic Volume Map, Missouri Route DD in the vicinity of the site location was used in 2004 by approximately 470 vehicles per day on an annual average basis. The Traffic Volume Map also indicated Missouri Route DD in this area experienced an estimated 3-percent growth in traffic over the 2002 estimated average daily traffic. In order to estimate the amount of baseline daily traffic during 2010, when construction employment is estimated to peak, an annual growth rate of 1.5-percent was used. In 2010, the estimated average daily traffic on Missouri Route DD in the area of the site would be 524 vehicles, excluding construction traffic related to the project.

A peak employment level of 1,281 workers is expected. This study assumes that a nominal level of car pooling would occur, estimating that each construction worker vehicle would contain 1.5 workers. Using this assumption, approximately 854 additional vehicles per day would converge on the site at the peak of construction. Because the vehicles would travel to the site for work at the beginning of each day and away from the site at the end, the total daily traffic in the site area would be approximately 1,708 vehicles during peak construction. Because the majority of the workers would be coming from the Kansas City MSA, the majority of the construction-related traffic would be in the opposite direction of the normal flow. Typical roadways of similar classification to Missouri Route DD and Missouri Route 10 have a design capacity greater than five thousand vehicles per day and ten thousand vehicles per day, respectively. The majority of transportation system impacts would be of relatively short duration as they would follow a similar profile as the construction employment pattern presented in Figure 3-50.

The anticipated average additional daily traffic volume on the roads to the site is presented in Table 3-37. The table shows the worst case, if all the traffic were on these roads. As described above, traffic is more likely to be split between the east and west, which would reduce the percentage increase shown by roughly half. Despite the relatively high increase over pre-project traffic levels, the peak traffic volume would still be well below the design capacity of the roads, as shown in Table 3-37. AECI and the contractor could manage traffic patterns to some extent to reduce impacts on any one town. Even with the combined 2009 projected traffic volumes and the estimated daily construction worker traffic, the maximum usages of Missouri Route DD and Missouri Route 10 would both be far below their design capacities. During

the construction phase of this project, additional traffic flows would occur as equipment and construction supplies are delivered to the site.

Table 3-37. Projected Traffic From Construction (Worst Case)

Route	(A) 2009 Projected Traffic Volume without Project (Vehicles/Day)	(B) Estimated Daily Construction Worker Traffic (Vehicles/Day)	Maximum Traffic Impact (% Change)	Design Capacity (Vehicles/Day)	Total Projected Traffic [(A)+(B)], as a Percent of Design Capacity
Missouri Route DD	524	1,708	+326	7-10,000	22-32
Missouri Route 10	2,163	1,708	+79	10-15,000	26-39

Source: AECl, 2006n

At the time of this study, final construction delivery plans have not been issued; however, the majority of bulk supplies and heavy equipment would be delivered to the site by rail, on the south rail connector. MO DD would be crossed by the railroad connector, although AECl is considering elevating MO DD at the rail line, which would eliminate any traffic interruptions.

The north rail connector, which would be used mainly for coal delivery, would cross these county roads:

- County Road 603
- County Road 605
- County Road 620
- County Road 624
- County Road 630
- County Road 634

Upgrades, if needed, and additional maintenance to roadways would be the responsibility of the state for state roads and the county for county roads.

While flooding is a possibility, and the local roads were apparently flooded in 1993 (based on available maps, UMC, 2006) the state roads in the vicinity of the plant are above the 100-year flood elevation.

Oversize farm equipment on roadways may cause delays if there is other traffic on the road; the increased traffic would increase this impact.

Operation

The Norborne Plant would have a permanent operating work force of approximately 139 people. The facility would be staffed 24 hours each day;

however, during the night, the staff would be smaller than daytime operation staff. A final operating plan has not been developed for this project; the socioeconomic study upon which this summary discussion is based assumed that approximately 60 workers would be present during each of the two day shifts, and approximately 19 would be present during the night shift. The study also assumed that no carpooling would occur, due to the widely varied anticipated distribution of permanent residences selected by the workers. Each worker would travel along the anticipated route twice each day. Depending on their location, the operating work force may travel along Missouri Route 10 and Missouri Route DD from the east or west in their daily commute from home to the plant and back. Table 3-38 shows the maximum potential traffic impacts on area roads from operating workers. The actual change on any one portion of the roads may be only one half to one third of the maximum shown. The traffic-related impacts at the site would peak during shift change.

During operation, the project would also receive an average of three coal deliveries each week. These deliveries would create an average of six new instances of trains crossing local roads; three full trains and three empty trains. Traffic delays during these instances would be infrequent and of relatively short duration. AECl is considering elevating Missouri Route JJ at the rail line, which would eliminate any such traffic delays.

Table 3-38. Project Traffic, Operation

Route	(A) 2012 Projected Traffic Volume without Project (Vehicles/Day)	(B) Estimated Daily Operating Worker Traffic (Vehicles/Day)	Maximum Traffic Impact (% Change)	Design Capacity (Vehicles/Day)	Total Projected Traffic [(A)+(B)], as a Percent of Design Capacity
Missouri Route DD	529	278	+53	7-10,000	8-11
Missouri Route 10	2,188	278	+13	10-15,000	16-25

Source: AECl, 2006n

Community Services

The Proposed Action includes all necessary utilities at the plant site (except potable water supply), including security, fire suppression, other water

supply, wastewater disposal, and emergency medical care. Individuals trained in cardio pulmonary resuscitation (CPR) and emergency medical procedures would be on site. Hazardous waste material would be removed by a licensed contractor and properly disposed in an approved landfill. Therefore, construction and operation of the power plant and ancillary facilities would not place significant additional demands on or deteriorate county public services.

Delays at rail crossing from the south rail connector would be expected to be minimal because the trains would be relatively short. Delays at crossings for the coal trains (north connector) would be up to about two minutes long.

Health and Safety

Children at Play and Walking to School

There is likely to be increased traffic through Norborne on Missouri Route DD, especially during construction, although the great majority of the traffic is expected to be coming from the Kansas City area, and therefore would not be traveling through Norborne. The school district may need to evaluate whether additional oversight at crossings before and after school would be needed.

Electric and Magnetic Fields

Electric fields in the home, on average, range from 0 to 10 volts per meter. They can be hundreds, thousands, or even millions of times weaker than those encountered outdoors near power lines. Electric fields directly beneath power lines may vary from a few volts per meter for some overhead distribution lines to several thousands of volts per meter for extra high voltage power lines. Electric fields from power lines rapidly become weaker with distance and can be greatly reduced by walls and roofs of buildings (NIEHS, 2002).

Magnetic fields are not blocked by most materials. Magnetic fields encountered in homes vary greatly. Magnetic field strength (magnitude) does not depend on how large, complex, powerful, or noisy the source is. Magnetic fields near large appliances are often weaker than those near small devices. Copy machines, power saws, hair dryers, can openers, mixers, electric ranges, sewing machines, and vacuum cleaners are among some of the higher sources. Magnetic fields rapidly become weaker with distance from the

source (NIEHS, 2002). Typical magnetic field exposures for common environments are listed in Figure 3-51.

Magnetic fields measured in milligauss (mG)		
Environment	Median* exposure	Top 5th percentile
OFFICE BUILDING		
Support staff	0.6	3.7
Professional	0.5	2.6
Maintenance	0.6	3.8
Visitor	0.6	2.1
SCHOOL		
Teacher	0.6	3.3
Student	0.5	2.9
Custodian	1.0	4.9
Administrative staff	1.3	6.9
HOSPITAL		
Patient	0.6	3.6
Medical staff	0.8	5.6
Visitor	0.6	2.4
Maintenance	0.6	5.9
MACHINE SHOP		
Machinist	0.4	6.0
Welder	1.1	24.6
Engineer	1.0	5.1
Assembler	0.5	6.4
Office staff	0.7	4.7
GROCERY STORE		
Cashier	2.7	11.9
Butcher	2.4	12.8
Office staff	2.1	7.1
Customer	1.1	7.7
*The median of four measurements. For this table, the median is the average of the two middle measurements. Source: National Institute for Occupational Safety and Health.		
Figure 3-51. Magnetic Field Exposures in Common Environments		

No federal regulations have been established specifying environmental limits on the strengths of electric and magnetic fields (EMF) from power lines. However, the federal government continues to conduct and encourage research necessary for an appropriate policy on the EMF issue. In the face of the present uncertainty, several states have opted for design-driven regulations ensuring that fields from new lines are generally similar to those from existing lines. Some states (Florida, Minnesota, New Jersey, New York, and Montana) have set specific environmental limits on one or both fields in this regard. These limits are, however, not based on any specific health effects. Most regulatory agencies believe that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines. No regulations have been established in Missouri.

The largest evaluation to date of effects of EMFs was led by two U.S. government institutions, the National Institute of Environmental Health Sciences (NIEHS) of the National Institutes of Health and the U.S. Department of Energy (DOE), with input from a wide range of public and private agencies. This evaluation, known as the Electric and Magnetic Fields Research and Public Information Dissemination (EMF RAPID) Program, was a six-year project with the goal of providing scientific evidence to determine whether exposure to power-frequency EMF involves a potential risk to human health (NIEHS, 2002). The NIEHS web site reports the following:

In 1999, at the conclusion of the EMF RAPID Program, the NIEHS reported to the U.S. Congress that the overall scientific evidence for human health risk from EMF exposure is weak. No consistent pattern of biological effects from exposure to EMF had emerged from laboratory studies with animals or with cells. However, epidemiological studies (studies of disease incidence in human populations) had shown a fairly consistent pattern that associated potential EMF exposure with a small increased risk for leukemia in children and chronic lymphocytic leukemia in adults. Since 1999, several other assessments have been completed that show weak scientific support for an association between childhood leukemia and exposure to power-frequency EMF. These more recent reviews, however, do not support a link between EMF exposures and adult leukemias. For both childhood and adult leukemias, interpretation of the epidemiological findings has been difficult

due to the absence of supporting laboratory evidence or a scientific explanation linking EMF exposures with leukemia.

In its 1999 report to Congress, the National Institute of Environmental Health Sciences suggested that the power industry continue its current practice of siting power lines to reduce EMF exposures.

We are not sure which aspects of the magnetic field exposure, if any, to reduce. Future research may reveal that EMF reduction measures based on today's limited understanding are inadequate or irrelevant. No action should be taken to reduce EMF exposure if it increases the risk of a known safety hazard.

Before the present health-based concern developed, measures to reduce field effects from power line operations were mostly aimed at the electric field component, whose effects can manifest as radio noise, audible noise, and nuisance shocks. The present focus is on the magnetic field because only this type of field can penetrate building materials to potentially produce the types of health impacts that are of concern. It is important to note when considering the effects of magnetic fields from power lines that an individual in a home could be exposed for short periods to much stronger fields while using some common household appliances (NIEHS, 2002). Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. High-level magnetic field exposures regularly occur in areas other than the power line environment.

In general, the strongest EMF around the outside of a substation comes from the power lines entering and leaving the substation. The strength of the EMF from equipment within the substations, such as transformers, reactors, and capacitor banks, decreases rapidly with increasing distance. Beyond the substation fence or wall, the EMF produced by the substation equipment is typically indistinguishable from background levels (NIEHS, 2002).

Typical EMF levels for power transmission lines are shown in Figure 3-52. While magnetic field levels are high directly below the line, they dissipate rapidly with distance. Interpolating from the 230- and 500-kV, a 345-kV line would be expected to create a mean magnetic field of about 2.5 mG at a distance of 200 feet. A comparison with Figure 3-51 shows that this level is within the exposure range for common environments. For all the

Typical EMF Levels for Power Transmission Lines*

115 kV



Electric Field (kV/m)	1.0	0.5	0.07	0.01	0.003
Mean Magnetic Field (mG)	29.7	6.5	1.7	0.4	0.2

230 kV



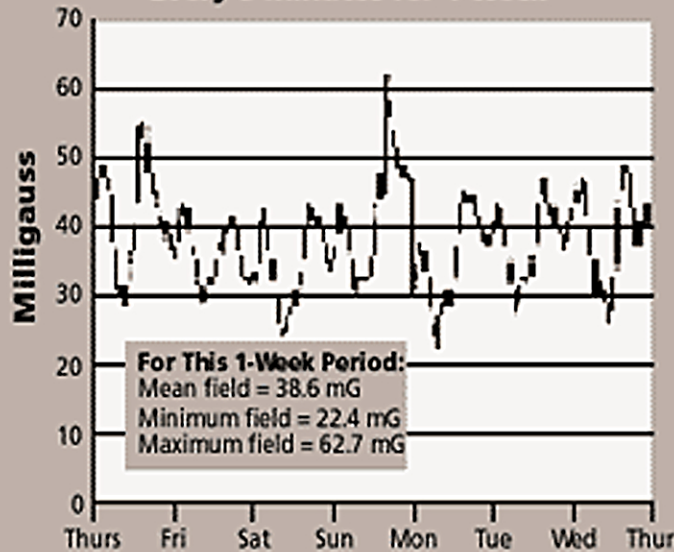
Electric Field (kV/m)	2.0	1.5	0.3	0.05	0.01
Mean Magnetic Field (mG)	57.5	19.5	7.1	1.8	0.8

500 kV



Electric Field (kV/m)	7.0	3.0	1.0	0.3	0.1
Mean Magnetic Field (mG)	86.7	29.4	12.6	3.2	1.4

Magnetic Field from a 500-kV Transmission Line Measured on the Right-of-Way Every 5 Minutes for 1 Week



Electric fields from power lines are relatively stable because line voltage doesn't change very much. Magnetic fields on most lines fluctuate greatly as current changes in response to changing loads. Magnetic fields must be described statistically in terms of averages, maximums, etc. The magnetic fields above are means calculated for 321 power lines for 1990 annual mean loads. During peak loads (about 1% of the time), magnetic fields are about twice as strong as the mean levels above. The graph on the left is an example of how the magnetic field varied during one week for one 500-kV transmission line.

*These are typical EMFs at 1 m (3.3 ft) above ground for various distances from power lines in the Pacific Northwest. They are for general information. For information about a specific line, contact the utility that operates the line.

Source: Bonneville Power Administration, 1994.

Figure 3-52. Typical EMF Levels from Power Transmission Lines

transmission lines proposed for this project, there are two residences within 200 feet of the power lines.

IGCC Alternative

Impacts would be the same for the IGCC alternative as for the Proposed Action.

No Action Alternative

The Proposed Action would not be constructed under the No Action Alternative. There would be no public safety or services impacts.

3.15.2.4.2 Mitigation and Residual Impacts

No significant impacts would result from the implementation of the Proposed Action with the actions incorporated to reduce or prevent impacts. As a result, no additional measures to mitigate significant impacts have been identified for public safety and services and there would be no residual significant impacts.

3.16 NOISE

This section briefly summarizes the existing noise environment at and in the vicinity of the proposed power plant site, and assesses potential noise impacts associated with the Proposed Action and alternatives. AECI conducted a detailed noise assessment, which is included as *Appendix K, Noise Analysis*.

3.16.1 Affected Environment

Noise-sensitive receptors are those that that may be subject to stress or significant interference from noise. They often include residential dwellings, hotels, motels, hospitals, nursing homes, educational facilities, and libraries. Industrial, commercial, agricultural and undeveloped land uses generally are not considered sensitive to ambient noise.

No noise regulations were identified that are applicable to the AECI facility for the State of Missouri, Carroll County, Egypt Township, or the City of Norborne (AECI, 2006s). Noise would be subject to the applicable requirements of USDA/RD Missouri Instruction 1940-G, and U.S. Department of Housing and

Urban Development (HUD) requirements as noted in this section (AECI, 2005f).⁷⁸

3.16.1.1 Region of Influence

The region of influence is based on the location of noise sensitive receptors relative to the plant, the rail and transmission corridors.

3.16.1.2 Existing Conditions

Acoustical Terminology

Noise is often considered unwanted sound. However, human response to sound is complex and is influenced by a variety of acoustic and non-acoustic factors. Acoustic factors generally include the sound's amplitude, duration, frequency content, and fluctuations. Non-acoustic factors typically include the listener's ability to become accustomed to the sound, the listener's attitude towards the noise and the noise source, the listener's view of the necessity of the noise, and the predictability of the noise. As such, response to noise is highly individualized (AECI, 2006s).

Amplitude and frequency physically characterize sound energy. Sound amplitude is measured in decibels (dB), which are based on a logarithmic scale. The reference sound pressure corresponds to the typical threshold of human hearing. A 3 dB change in a continuous broadband noise is generally considered "just barely perceptible" to the average listener. Similarly, a 5 or 6 dB change is generally considered "clearly noticeable" and a 10 dB change is generally considered a doubling (or halving) of the apparent loudness.

Frequency is measured in hertz (Hz), which is the number of cycles per second. The typical human ear can hear frequencies ranging from approximately 20 to 20,000 Hz. Normally, the human ear is most sensitive to sounds in the middle frequencies (1,000 to 8,000 Hz) and is less sensitive to sounds in the low and high frequencies. As such, the A-weighting scale was developed to simulate the frequency response of the human ear to sounds at typical environmental levels. The A-weighting scale emphasizes sounds in the middle frequencies and de-emphasizes sounds in the low and high frequencies. Any sound level to which the A-weighting scale has been applied is expressed in A-weighted decibels or dBA.

⁷⁸ 24CFR51

There are also objective factors to consider when determining the sound and how people may be affected by the sound. A noise spectrum that contains audible pure tones is typically more annoying than a spectrum with the same overall level but without the tones. It has been shown that, when noise complaints were received from a power plant when registering sound levels under 45 dBA, the noise had some tonal components. Low frequency sound may also affect people subject to the noise. Pulsation may occur when the sound level is 75 to 80 dBA in the 31.5 Hz octave band at residential locations (AECI, 2006s).

Noise in the environment is constantly fluctuating, for example, when a car drives by, a dog barks, or a plane passes overhead. Therefore, sound metrics have been developed to quantify fluctuating environmental sound levels. These metrics include the exceedance sound levels. The exceedance sound level, L_x , is the sound level exceeded "x" percent of the sampling period and is referred to as a statistical sound level. The most common L_x values are L_{eq} , L_{90} , L_{50} , and L_{10} . L_{eq} is the equivalent level of a constant sound over a specific time period that has the same sound energy as the actual sound over the same period. L_{90} is the sound level exceeded 90 percent of the sampling period. L_{90} represents the sound level without the influence of loud, transient noise sources and is often referred to as the residual or background sound level. L_{50} is the sound level exceeded 50 percent of the sampling period. L_{10} represents the occasional louder sounds and is often referred to as the intrusive sound level. The variation between the L_{90} , L_{50} , and L_{10} sound levels can provide an indication of the variability of the acoustical environment. If the acoustical environment is perfectly steady, all values are identical. A large variation between the values indicates highly fluctuating sound levels. For instance, measurements near a roadway with frequent passing vehicles may cause a large variation in the statistical sound levels. For this report, L_{eq} is used. L_{eq} represents the time-weighted average noise level during the measurement period. For example, an $L_{eq}(h)$ noise level represents the average sound pressure level experienced in one hour.

In addition to the generally acceptable increase of 5 dBA, the noise levels at residences near the plant site would be compared to the HUD standards. HUD has adopted environmental standards, criteria, and guidelines for determining acceptability of federally assisted projects and proposed mitigation measures that achieve the goal of a suitable living environment.

Table 3-39 summarizes HUD site acceptability standards based on external sound levels.

Table 3-39. HUD Site Acceptability Standards

Rating	Outdoor (dBA)
Acceptable	Not exceeding 65
Normally Unacceptable	65 to 75
Unacceptable	Above 75

Source: Title 24, Code of Federal Regulations, Part 51.103(c), Exterior Standards.

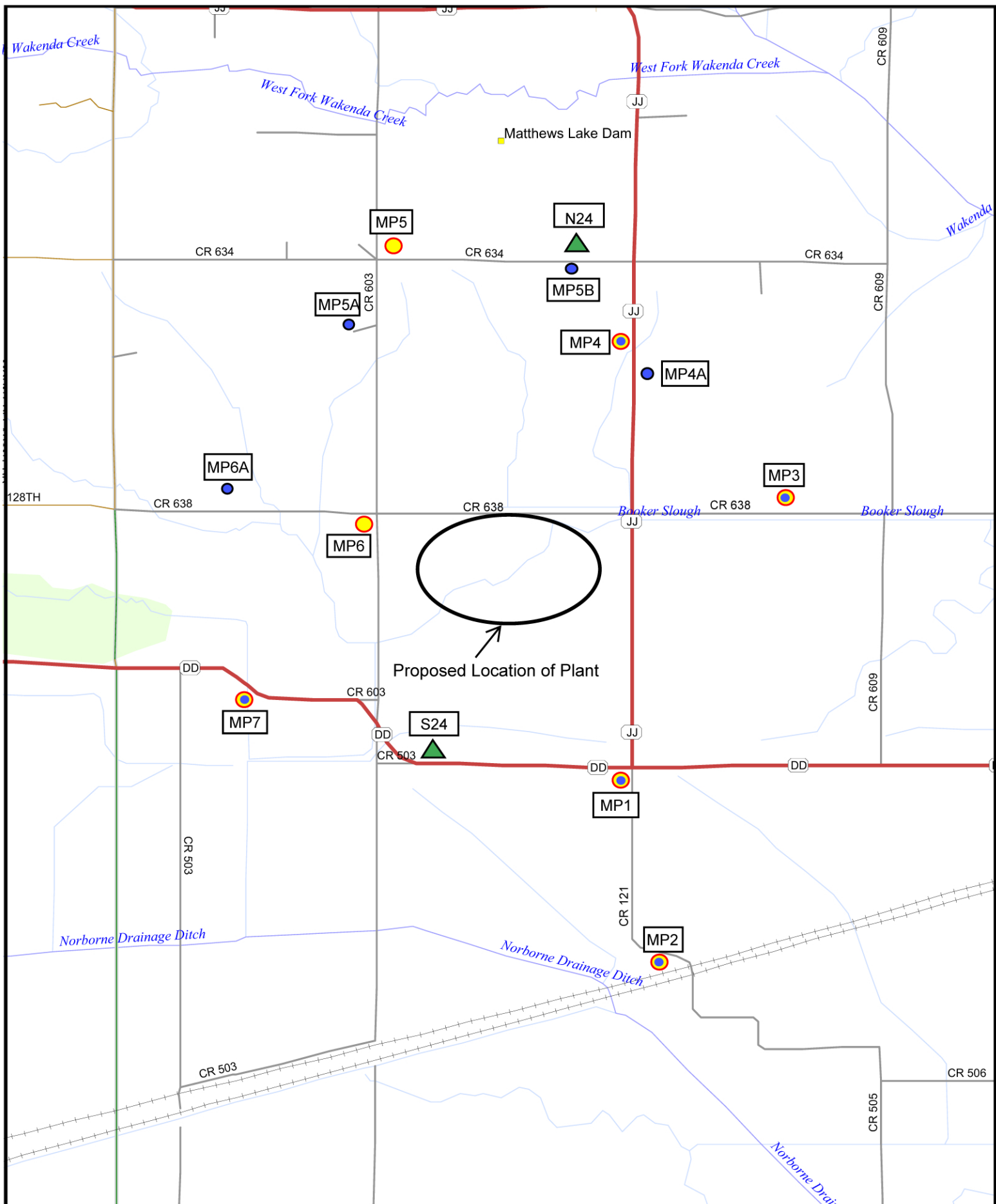
Noise Survey

An ambient noise survey was conducted in August 2006 for the surrounding community of the proposed facility. The noise assessment study is included in *Appendix K, Noise Analysis*, and summarized here. Measurements were taken during several time periods near the closest sensitive noise receivers (residences) to determine the existing sound levels in the area. In addition, two 24-hour measurements were taken north and south of the site to continuously monitor the noise levels in the area. Weather conditions were favorable for monitoring (AECI, 2006s).

Sound level measurements were made at seven locations around the proposed property boundary of the facility (Figure 3-53). These locations were selected because they were deemed to be representative of existing environmental conditions, they are near sensitive sound receptors, and they were accessible. Measurements were made in decibels (dB) at 16, 31.5, 63, 125, 250, 500, 1,000, 2,000, 4,000, and 8,000 Hertz (Hz) using a Larson-Davis Model 824 Type I sound level meter.

In addition to these measurement point locations, the closest residences in the area were identified and analyzed. These residences are also shown on Figure 3-53.

Figure 3-54 displays the average existing noise levels in 5-dB contours based on the field measurements. The noise levels in the area decrease with



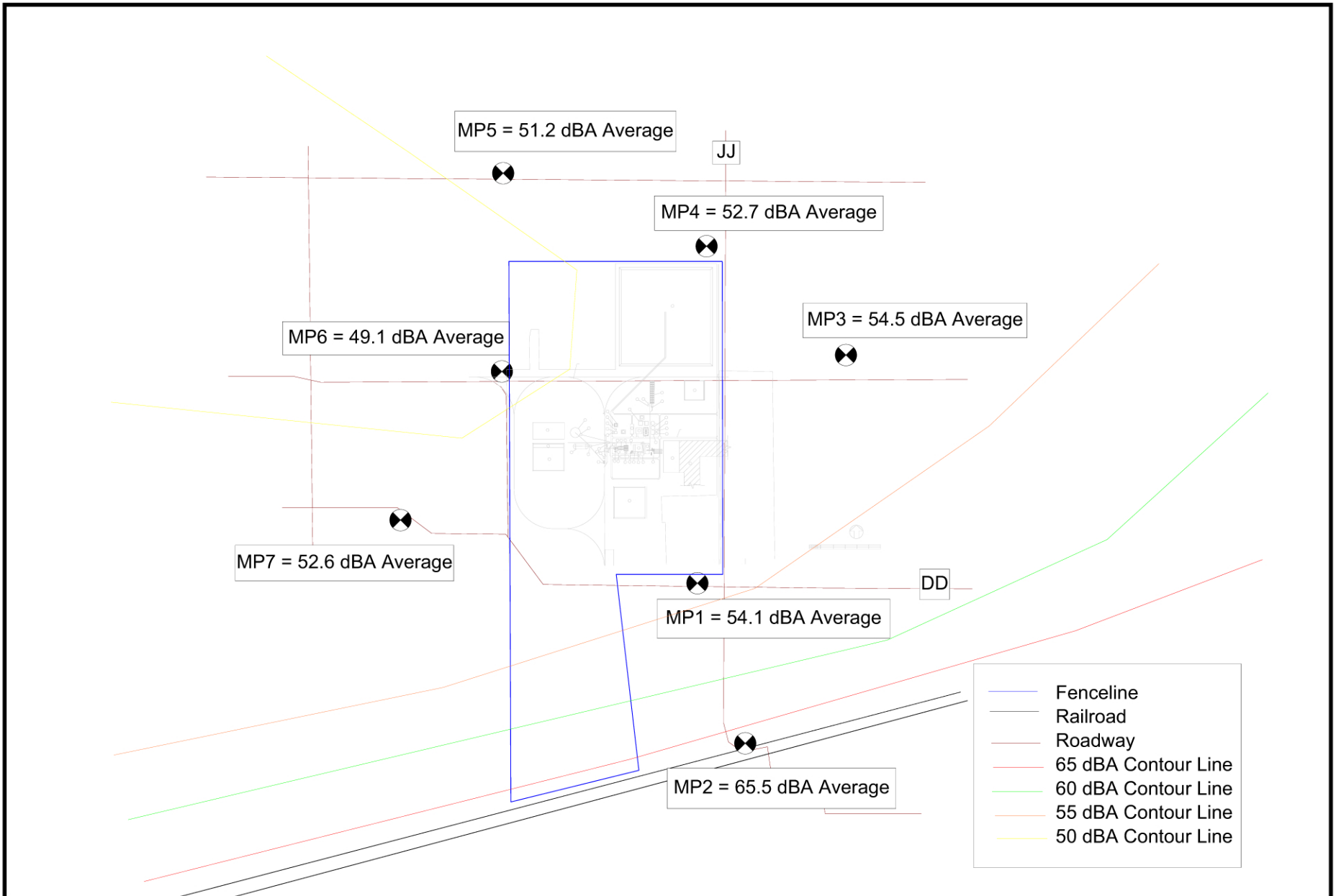
LEGEND

- Measurement Point Location
- Sensitive Noise Receiver
- ▲ 24-Hour Measurement Point Location

3-208



Figure 3-53. Measurement Point Locations and Sensitive Noise Receptors



⊗ Measurement Point Location

3-209

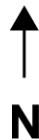


Figure 3-54. Existing Sound Level Contours

distance from the major highways (Missouri Routes DD and JJ) and the railroad.

3.16.2 Environmental Consequences

3.16.2.1 Identification of Issues

The following issues were identified during scoping and the EIS development process:

- Construction noise, including traffic
- Limit noise to business hours
- Concern that flat terrain would cause sounds to travel long distances, particularly in Big Lake area
- Operational noise levels
- Effects of noise on wildlife

3.16.2.2 Significance Criteria

Noise impacts would be considered significant if any sensitive receptor experienced increases in noise above what are generally considered to be standard acceptable increases as defined in applicable regulations.

3.16.2.3 Impact Assessment Methods

In order to evaluate the sound predicted from the proposed facility, all noise sources proposed for the new facility were modeled. Using industry-accepted sound modeling software, the expected project sound levels at the identified sensitive receptors were calculated. The program used for this project was the Computer Aided Design for Noise Abatement (CadnaA), Version 3.5.115, published by DataKustik, Ltd., Munich, Germany.

The primary noise sources on-site that are part of the project are the fans associated with the operation of the facility. The induced draft (ID) fans (centrifugal), forced draft (FD) fans (axial), and cooling tower fans are all major contributors to the overall sound levels expected as a result of the AECI facility. Each of these sources are itemized in the Appendix K documentation.

The main steam boiler and steam turbine generator would also contribute substantially to the overall sound level from the project. Road traffic associated with the facility would be limited to operating personnel and supply or maintenance trucks that would enter the site on an infrequent basis. Therefore, the increase in traffic and associated sound is expected to be minimal.

Sound pressure levels were predicted for all measurement points and the nearby residences, using the CadnaA noise modeling software. Existing background measurements were combined with expected sound levels from the proposed plant equipment for the project to determine total sound levels at each measurement location when the power plant would be operational.

Impacts to Sensitive Noise Receptors

During normal operation without train activity, three receivers (MP4, MP4A, and MP1) are expected to possibly experience a greater than 5 dB increase; with the greatest increase up to 7 dB. With ID fan enclosures that attenuate the fans by 10 dB, none of the sensitive noise receivers would experience an increase in noise levels over 5 dB.

The closest sensitive noise receiver to the proposed facility is located at MP1. Sound levels at the MP1 residence are expected to be up to 51dBA from the facility (without attenuation of the ID Fans) or 48 dBA with attenuation. Existing sound levels at this measurement point vary from 51 to 56 dBA which is near or exceeding the project sound from the operation of the new facility. Therefore, no significant increase (around 5 dBA) in sound levels at this residence is expected. The second closest residence is MP4A. Without attenuation on the ID fans, it is expected that the sound levels would increase up to 7 dB during normal operation. (Existing levels range from 45 to 59 dBA with the new facility contributing 51 dBA to the overall measurement.) With sound level enclosures on the ID fans, no increase over 5 dB is expected at any of the nearby sensitive noise receivers.

With train operation, the overall daily Leq sound level is not expected to increase significantly from normal daily operation of the facility. The speed of the train would be low, with actual speeds around 10 to 15 miles per hour, which would greatly reduce the train noise. Existing trains already operate at high speeds along the NS and BNSF rails to the south approximately 1 mile away, which contribute to the existing noise levels substantially to the south

of the site. Noise from the train activities would not increase noise above the operational noise levels that are averaged over the day and night assuming only two trains per day and one train per night in any one day for either alternative. During the period that a train may be traveling at slightly higher speeds (30 mph) to the facility from the main line(s), instantaneous noise levels are not expected to increase over the normal operation noise at any of the receptors by more than about 4 dB near the facility. As such, it is not expected that the train activities would significantly increase noise levels at the nearby residences. A few more residences may be impacted by trains on the north rail connector as it is a longer distance to the main line. Railroad noise would be subject to standards established by the Federal Railroad Administration.⁷⁹

Only MP2 would experience noise levels above the HUD guideline for outside activity (65 dBA), and it already experiencing noise levels above this limit due to its proximity to the existing rail line.

Construction Noise

Construction of the proposed AECI facility would take several years. During this time, several noise emitting sources would be on-site. To estimate the sound produced during the construction of the facility, a program developed by the Federal Highway Administration (FHWA) and the Department of Transportation (DOT) for highway road construction projects was used: Roadway Construction Noise Model (RCNM), Version 1.0. Since highway road construction uses much of the same equipment as power plant construction, and because this is one of the few tools available to estimate noise from construction activities, this program is appropriate for modeling noise from construction of the AECI facility.

The closest receivers to the site in each direction were modeled. Equipment assumed to be on-site during construction was selected from the RCNM. The equipment included in the model and the percent of operation during the day is shown in Table 3-40.

⁷⁹ 40 CFR 201

Table 3-40. Construction Equipment, Noise Levels and Percent Usage for Construction of Facility

Description	Usage (%)	Equipment Noise Level
		L _{max} (dBA)
Vibratory Pile Driver	20	100.8
Backhoe	40	77.6
Compactor (ground)	20	83.2
Concrete Mixer Truck	40	78.8
Crane	16	80.6
Grader	40	85
Dump Truck	40	76.5
Flat Bed Truck	40	74.3
Front End Loader	40	79.1
Pneumatic Tools	50	85.2
Rivet Buster/chipping gun	20	79.1
Welder / Torch	40	74
Man Lift	20	74.7

Overall, construction noise impacts at the nearby residences would not exceed 7 dB for a daily average except at one receiver during one time period. Instantaneous noise levels are expected to increase for sporadic short periods above 10 dB over the existing noise levels. The average (L_{eq}) noise level and the L_{max} noise levels at each residence due to the construction activities would be below the HUD standard for outside areas in a residential area (65 dBA).

In addition to the construction proposed on-site, construction of the transmission lines that would connect the power plant to the grid would also create some noise in the vicinity of the transmission line route. The initial step of construction would involve clearing the right-of-way for the transmission line. In any one area, this could take up to a week, depending on the amount of clearing that needs to be done. The second and third steps involve digging holes for the transmission line poles and pouring concrete to hold the poles. This work should not take more than a couple of days in any one area. The amount of noise disturbance should be minimal during the transmission line construction. Work would only be performed during daylight hours, with no expected noise disturbance during the nighttime.

3.16.2.4 Actions Incorporated Into the Proposed Action to Reduce or Prevent Impacts

The following actions would be incorporated into the Proposed Action to reduce or prevent impacts:

- Construction activities producing high noise levels such as pile driving would be limited to daylight hours.
- All operational equipment would be specified and designed so as not to exceed the noise limits as required by HUD. This may require adding noise barriers or using specialized equipment.

3.16.2.4.1 Impact Assessment

Because of the low density of population and distance from towns and cities, noise from the plant and trains would be noticeable to only a few residences. The train noise would be infrequent, but noticeable to residents near the rail line. Attenuation of operational noise may be needed to protect nearby sensitive receptors and, if required, would be implemented in accordance with applicable regulations.

No studies were conducted to assess impacts on wildlife. However, the wildlife that would be expected in the area are typically also found in the suburbs of major metropolitan areas, where noise levels are often higher than those expected at this site.

3.16.2.4.2 Mitigation and Residual Impacts

With implementation of the actions incorporated into the Proposed Action, no further mitigation is needed.

3.17 WASTE MANAGEMENT

This section discusses the wastes that would be generated from construction and operation of the Proposed Action, and the handling and disposal of those wastes.

3.17.1 Affected Environment

3.17.1.1 Region of Influence

The region of influence is the immediate vicinity of the Proposed Action.

3.17.1.2 Existing Conditions

The major wastes that would be generated during plant operation are ash and FGD waste, which would be disposed of in an on-site landfill. Other waste generated during construction and operation, except any regulated hazardous waste that may be generated, would be picked up by a licensed waste hauler and taken to a permitted sanitary landfill. The three closest landfills to the Project Site are Courtney Ridge and Lee's Summit in Jackson County, and Central Missouri in Pettis County (MDNR, 2006g). Any regulated hazardous waste (none has yet been identified) would need to be taken to an out of state permitted facility.

3.17.2 Environmental Consequences

3.17.2.1 Identification of Issues

Some of the issues related to waste management that were identified during scoping are addressed in the *Section 3.3, Groundwater* and in *Section 3.4, Surface Water*, since concerns are often related to impacts on these resources. Other issues identified were:

- How would waste affect surrounding communities and lake (reference to Big Lake)?
- How would waste ash be controlled to prevent it from becoming airborne?
- Concerns about potentially toxic waste in landfill.
- Concern that there is inconsistency with state and federal law regarding whether or not fly ash should be considered a hazardous waste.
- Concern about appropriate disposal of ash to prevent adverse human health or ecological impacts.

3.17.2.2 Significance Criteria

The effects of the Proposed Action and alternatives would be considered significant if the following were to occur:

- Handling or disposal of waste that is in violation of any state, federal or local laws, regulations or ordinances, or that poses an unacceptable health risk to humans or ecological receptors.

3.17.2.3 Impact Assessment Methods

AECI's plans for handling and disposal of wastes to be generated were reviewed for consistency with applicable requirements.

The construction contractor and all subcontractors would be specifically required to comply with all state, federal or local laws, regulations or ordinances regarding generation, handling, and disposal of wastes (AECI, 2005f).

During plant operation, AECI would also be required to comply with all laws, regulations, and ordinances related to waste generation, handling and disposal.

The major wastes that would be generated during operation would be fly ash and FGD waste. They would be collected and transported to the on-site landfill as described in *Section 2.4.8 Ash and Flue Gas Desulfurization (FGD) Waste Handling*. The landfill would be designed and constructed in accordance with the Rules of the MDNR, Division 80, Solid Waste Management, Chapter 11, Utility Waste Landfill. Missouri's classification of fly ash, bottom ash, and FGD waste as solid waste is consistent with federal regulations, which specifically classifies these materials as solid waste and exempt from classification as hazardous waste⁸⁰. These waste are also not considered toxic wastes as defined in the Toxic Substances Control Act.

The solid waste disposal facility would be designed for a 50-year plant life. The 142-acre landfill would be divided into 20-25 acre cells, each with its own liner and leachate collection system. Two cells would be constructed initially, each with a perimeter dike to prevent inflow of storm water. Within each cell, leachate would be collected through a sand or a comparable synthetic net

⁸⁰ 40 CFR 261.4(b)(4)

filter and directed to a leachate collection pond. Missouri regulations require dust control as needed for safety purposes and to prevent a nuisance to the surrounding area. During heavy rainfall periods where dust suppression is not required, wastewater could be pumped to the plant wastewater treatment system for use in other systems.

The final cover for the landfill would include a soil liner with a hydraulic conductivity of less than 1×10^{-5} cm/sec geomembrane liner with soil cover and topsoil to support grass. The maximum slope would be 4H:1V (horizontal: vertical) (AECI, 2005f). Missouri regulations require restoration of borrow areas used for cover.

In accordance with the permit that MDNR would issue for the landfill, it would be used only for disposal of plant wastes generated at the site excluding trash and refuse.

3.17.2.4 Actions Incorporated Into the Proposed Action to Reduce or Prevent Impacts

Measures to prevent adverse impacts from waste handling and disposal would be implemented as part of the Proposed Action, through compliance with Missouri regulation on waste disposal, including those applicable to operation of the landfill as described above.

3.17.2.4.1 Impact Assessment

Proposed Action

No significant impacts are expected regarding waste handling and disposal as part of the construction or operation associated with the Proposed Action.

Big Lake Alternate Site

Impacts would be similar for the Big Lake Alternate Site.

IGCC Alternative

IGCC has some advantages over SCPC technology regarding waste management. The largest solid waste stream produced by an IGCC unit is slag, an inert glassy material that is potentially marketable for uses such as

roofing shingles and grit blast material. With IGCC, sulfur removed from the syngas can be processed into elemental sulfur or sulfuric acid, both of which are potentially marketable (AECI, 2005b).

No Action Alternative

The Proposed Action would not be constructed under the No Action Alternative. There would be no impacts on waste management.

3.17.2.4.2 Mitigation and Residual Impacts

No significant impacts would result from the implementation of the Proposed Action with the actions incorporated to reduce or prevent impacts and there would be no residual significant impacts.

3.18 SUMMARY OF IMPACTS FROM PROPOSED ACTION

Table 3-41 summarizes the impacts from the Proposed Action by each of the resources discussed in this section. For each resource the table also includes the responsible regulatory agency or agencies and the permits required, if any. The table summarizes, by resource, the actions incorporated into the Proposed Action to reduce impacts, and also summarizes mitigation measures that could further reduce impacts, where applicable.

Table 3-41. Summary of Impacts from Proposed Action

Resource	Impact	Regulatory Agency and Permits Required	Actions Incorporated into the Proposal to Reduce Impacts	Mitigation
Air	<p>Power plant operation would result in the release of various pollutants, but there would be no significant impacts from the operation with implementation of the pollution control measures and devices included in the Proposed Action. The analysis indicates no exceedances of any National Ambient Air Quality Standards or maximum allowable Prevention of Significant Deterioration (PSD) increments; no discernable impairment to visibility in nearby Class I areas, and no threat to the surrounding community from mercury emissions.</p> <p>Construction activities in all locations would result in release of particulates and exhaust gases, but effects would be short term and would occur over a small area at one given time, resulting in a minor level of impact.</p> <p>Dust control measures included in the Proposed Action would help limit impacts to less than significant levels.</p> <p><u>Conclusion: No significant impacts are expected with implementation of proposed actions to reduce or prevent adverse impacts.</u></p>	Missouri Department of Natural Resources (MDNR), PSD permit.	<ul style="list-style-type: none"> • Use of operating techniques that reduce emissions: <ul style="list-style-type: none"> - Low sulfur coal. - Combustion techniques that reduce emissions. • Air pollution emissions control equipment: <ul style="list-style-type: none"> - Selective catalytic reduction (SCR) to control NO_x emissions. - Scrubber to control SO₂ emissions. - A particulate control device (baghouse) to control particulate matter emissions. • Use of best available control technology (BACT) to control potential fugitive emissions from materials handling operations. 	<p><u>While achievement of mercury emissions limits is a requirement and is therefore part of the Proposed Action, the specific means of achievement have not been identified. AECI would install a system for injection of activated carbon to control mercury emissions, but may not use it if standards can be met without it.</u></p>

Table 3-41. Summary of Impacts from Proposed Action

Resource	Impact	Regulatory Agency and Permits Required	Actions Incorporated into the Proposal to Reduce Impacts	Mitigation
Geology and Soils	<p>There would be no significant impacts on any area of regional geological importance (none is present). Groundwater withdrawal would not result in formation of sinkholes. Loess soils found in parts of the Project are highly erodible and care must be taken in implementation of erosion control measures to avoid impact.</p> <p><u>Conclusion:</u> No significant impacts are expected with implementation of proposed actions to reduce or prevent adverse impacts.</p>	MDNR; see surface water impacts summary for permits.	<ul style="list-style-type: none"> Both permanent and temporary erosion control measures in areas where soil will be disturbed (silt fences, straw bale checks, riprap, revegetation). 	None needed beyond incorporated actions.

Table 3-41. Summary of Impacts from Proposed Action

Resource	Impact	Regulatory Agency and Permits Required	Actions Incorporated into the Proposal to Reduce Impacts	Mitigation
Groundwater	<p>Pumping of an average of 5,600 gpm from the Missouri River aquifer will result in depression of groundwater in the vicinity of the well field. Aquifer testing and groundwater modeling indicate negligible impact on other groundwater users.</p> <p>Construction dewatering of a deep excavation for a coal car unloading system will result in a short-term depression of groundwater levels at the proposed plant site, which may result in short-term negative impacts to nearby groundwater users. AECI will provide alternate water supply for wells with adverse impacts, if necessary.</p> <p>During operation, solid waste disposal activities and use of chemicals and fuels have potential for impact, but would be avoided by implementation of environmental regulations.</p> <p><u>Conclusion:</u> No significant impacts are expected with implementation of proposed actions to reduce or prevent adverse impacts.</p>	<p>MDNR. Well construction permits would be required for production wells and monitoring wells. AECI must file with the state as a major water user.</p> <p>USEPA. A Spill Prevention, Control and Countermeasure (SPCC) Plan would be required.</p>	<p><i>Groundwater Withdrawal</i></p> <ul style="list-style-type: none"> • Construction of the wells at a location and pumping rate such that the expected impacts on other existing wells are negligible. • If additional testing and assessment indicate that other wells may be overly adversely impacted by construction dewatering, AECI will contact the owners prior to initiating construction dewatering activities and will work with them to arrive at appropriate solutions that AECI will implement. <p><i>Potential Contamination of Groundwater</i></p> <ul style="list-style-type: none"> • The fuel oil unloading, piping, and storage system would be provided with containment and leak detection as required by 40 CFR 112, Oil Pollution Prevention. • The utility waste landfill leachate collection pond would be sized to retain the flow from a 50-year, 24-hour rainfall over the largest open active area of the landfill expected during the lifetime of the landfill. The pond would have a double liner system with a leak detection and removal system. • The plant would have a coal pile runoff treatment area with concrete-lined ditches and a concrete-lined basin and a wetland treatment area with a low permeability liner. • The SPCC Plan would address containment and control of liquids that have the potential to contaminate groundwater. 	<p>None identified; but AECI is committed to mitigation if serious adverse impacts occur from groundwater withdrawal.</p>

Table 3-41. Summary of Impacts from Proposed Action

Resource	Impact	Regulatory Agency and Permits Required	Actions Incorporated into the Proposal to Reduce Impacts	Mitigation
Groundwater (continued)			<ul style="list-style-type: none"> • An oily water system would be provided for potentially oily runoff. • Water from chemical cleaning would be collected and treated. • All runoff water that may be contaminated would be collected and. • A two-foot layer of clay would be provided beneath the coal piles to prevent leaching into the ground. • Ash and flue gas desulfurization (FGD) waste would be disposed of in a landfill designed and permitted to prevent contamination of groundwater. The landfill would be lined and would have a leachate collection system. It would be divided into 20 to 25 cells, only two of which would be operated initially. • Cells would be closed as they are filled to prevent infiltration of storm water. A final cover for the landfill would have a geomembrane liner, soil and a vegetative cover. A groundwater monitoring system would be included. 	

Table 3-41. Summary of Impacts from Proposed Action

Resource	Impact	Regulatory Agency and Permits Required	Actions Incorporated into the Proposal to Reduce Impacts	Mitigation
Surface Water	<p>Large area of disturbed soil during construction creates potential for impacts to streams and other surface water bodies, but the impact would be avoided by implementation of storm water controls through the storm water permit and pollution prevention plan that will be required. During operation, use of chemicals and fuels has potential for impact, but would be avoided by implementation of environmental regulations. Waste ponds and similar facilities have potential for release during major floods.</p> <p><u>Conclusion:</u> No significant impacts are expected with implementation of proposed actions to reduce or prevent adverse impacts and suggested mitigation measures.</p>	<p>MDNR. A storm water construction permit and storm water pollution prevention plan (SWPPP) would be required.</p> <p>USEPA. A SPCC Plan would be required.</p>	<p><i>Potential Hydrologic Impacts</i></p> <ul style="list-style-type: none"> • Use of groundwater at the Missouri River would prevent impacts from surface water withdrawals. <p><i>Potential Contamination of Surface Water</i></p> <ul style="list-style-type: none"> • A SWPPP would be implemented to prevent impacts to stream and other water bodies from storm water runoff during construction. • The plant would have a coal pile runoff treatment area. • The fuel oil unloading, piping, and storage system would be provided with containment and leak detection. • The utility waste landfill leachate collection pond would be sized to retain the flow from a 50-year, 24-hour rainfall over the largest open active area of the landfill expected during the lifetime of the landfill. • An oily water system would be provided for potentially oily runoff. • Discharge water temperature would be at or below the maximum allowable at the plant site, before it is discharged. • An SPCC Plan would be provided as required for containment and control of liquids that have the potential to contaminate surface water. • Water from chemical cleaning would be collected and treated. • All runoff water that may be contaminated would be collected and treated. 	<p>If adopted, the following would contribute to reductions in impacts from the Proposed Action:</p> <ul style="list-style-type: none"> • Implementing Missouri's guidance for best management practices (BMPs) for erosion, sediment, and storm water (MDNR, 1999). • Requiring the top elevation of all berms for wastewater storage ponds to be above the 100-year flood elevation.

Table 3-41. Summary of Impacts from Proposed Action

Resource	Impact	Regulatory Agency and Permits Required	Actions Incorporated into the Proposal to Reduce Impacts	Mitigation
Floodplains	<p>The Norborne Plant Site, south rail connector, and well field are all located in the 100-year floodplain of the Missouri River. The plant site is located at the edge of the floodplain, about six miles from the river, where 100-year flood depths would be around two feet. Part of the north rail connector is located in the floodplain of Wakenda Creek. Transmission line corridors cross several floodplains that cannot be spanned, and supports will need to be placed in floodplains. For the plant at least, an analysis would need to be done to demonstrate that the construction, along with other projects in the floodplain, would not cause a rise in flood elevation of more than one foot upstream of the site.</p> <p><u>Conclusion:</u> No significant impacts are expected with implementation of proposed actions to reduce or prevent adverse impacts.</p>	<p>Carroll County/Federal Emergency Management Agency (FEMA). Floodplain development permit; certification of permissible rise.</p>	<ul style="list-style-type: none"> • The plant would be located at the very edge of the floodplain, approximately 6 miles from the river at the nearest point, where flood depths are shallow, which would reduce impacts. Only the necessary features would be raised out of the floodplain, minimizing requirement for fill in the floodplain. • The proposed site has low natural floodplain values: the vegetation is cropland and the hydrology has been modified by a levee and drainage channels; therefore impacts to natural floodplain values are low. • In accordance with Missouri regulation, the landfill would not be constructed in a floodplain. 	<p>None needed beyond incorporated actions.</p>
Farmland	<p>The site is located in agricultural land, almost all of which is classified as prime farmland or prime farmland if drained. The site would occupy about 1,750 acres of farmland, approximately 750 of which would be leased back for agricultural use. Avoidance of center-pivot irrigation systems can be achieved by placement of supports.</p> <p><u>Conclusion:</u> No significant impacts are expected with implementation of proposed actions to reduce or prevent adverse impacts.</p>	<p>Natural Resources Conservation Service (NRCS).</p>	<ul style="list-style-type: none"> • Transmission line supports would be placed so as not to interfere with center-pivot irrigation systems to the extent practicable. These systems have been identified and transmission route corridors have been expanded in those areas to allow flexibility to make adjustments to avoid interference. • Approximately 750 acres of farmland acquired for the Proposed Action would be leased back for farming. • Topsoil removed from the plant site would be stockpiled and re-used. • Drainage and erosion features on adjacent property, if impacted, would be repaired. 	<p>None needed beyond incorporated actions.</p>

Table 3-41. Summary of Impacts from Proposed Action

Resource	Impact	Regulatory Agency and Permits Required	Actions Incorporated into the Proposal to Reduce Impacts	Mitigation
Land Use	<p>Essentially all land impacted is agricultural. Existing surrounding land use is all zoned agricultural and is expected to remain so.</p> <p><u>Conclusion:</u> No significant impacts are expected with implementation of proposed actions to reduce or prevent adverse impacts.</p>	Carroll County.	<ul style="list-style-type: none"> • The proposed power plant site, substation, and landfill would be fenced to prevent conflicts with livestock and other agricultural activity. • Easements and rights-of-way from appropriate owners/agencies would be acquired prior to Project construction. 	None needed beyond incorporated actions.
Public Lands, Recreation, and Visual Resources	<p>There are no public lands or recreation areas close to the Proposed Action. No significant adverse impacts on recreation, public lands, or visual resources would be anticipated under the Proposed Action. There would be some adverse visual impacts to residences within a mile or two of the facility both during the day and at night from the lights; and within about a half-mile of transmission lines.</p> <p><u>Conclusion:</u> No significant impacts are expected with implementation of proposed actions to reduce or prevent adverse impacts.</p>	Missouri Department of Conservation (MDC), U.S. Fish and Wildlife Service (USFWS).	<ul style="list-style-type: none"> • The plant is sited at the edge of the floodplain, with the bluff behind it, which reduces the visual impact. • The plant and railroad corridor are sited in an area that is sparsely populated, and with no nearby public lands. The closest to the plant site is a small conservation area 5 miles away. • The transmission corridor was located to maximize distance from residences and from public lands as much as practicable. 	None needed beyond incorporated actions.
Vegetation	<p>No areas of high quality native vegetation were identified within the proposed plant site. There will be some impact to riparian corridors with construction of the north rail connector, and there is some potential for impact at major stream crossings of transmission lines, particularly at the Grand River.</p> <p><u>Conclusion:</u> No significant impacts are expected.</p>	MDC.	None required.	None required.

Table 3-41. Summary of Impacts from Proposed Action

Resource	Impact	Regulatory Agency and Permits Required	Actions Incorporated into the Proposal to Reduce Impacts	Mitigation
Wetlands	<p>A total of 3.56 acres of jurisdictional Waters of the United States and 3.14 acres of potential wetlands were identified on the plant site and utility landfill site and within the well field. A Section 404 permit may be required if these areas will be disturbed, however, it appears probable that the wetland areas can be avoided. Delineation of the rail connectors will be required when the alignments are finalized, but no more than about one acre of impact is expected. Transmission lines can generally span wetlands and thus avoid impact, except for wooded wetlands, which must be cleared. A delineation of any impacted wetlands along the transmission corridor would be required after the final alignment is selected.</p> <p><u>Conclusion:</u> No significant impacts are expected with implementation of proposed actions to reduce or prevent adverse impacts, and implementation of mitigation that may be required under the Section 404 permit.</p>	U.S. Army Corps of Engineers (USACE), MDNR. Permits: Clean Water Act, Section 404 (USACE); Clean Water Action, Section 401 (MDNR).	<ul style="list-style-type: none"> • The wetland and Waters of the United States in the well field area would be avoided and protected from impact by site activities. • Wetlands other than wooded wetlands in the transmission corridor would be spanned to the extent practicable. 	<p>Mitigation, if needed, would be determined through the Section 404 permitting process with the USACE and would be included in the Final EIS.</p> <ul style="list-style-type: none"> • If adopted, the following measure could reduce impacts such that the work could potentially be done under a Nationwide permit: • AECI would commit to avoiding impact to the wetland identified within the plant site except as needed for the south rail connector, such that impacts would be less than 0.5 acres.

Table 3-41. Summary of Impacts from Proposed Action

Resource	Impact	Regulatory Agency and Permits Required	Actions Incorporated into the Proposal to Reduce Impacts	Mitigation
<p>Fisheries and Wildlife</p>	<p>There is potential to impact migratory birds, which are protected under the Migratory Bird Treaty Act and an executive order, primarily by collisions with transmission lines, and to a lesser extent the power plant stack and taller structures, especially when these structures are lit at night.</p> <p><u>Conclusion:</u> No significant impacts are expected with implementation of proposed actions to reduce or prevent adverse impacts, and implementation of suggested mitigation.</p>	<p>MDNR, USFWS. Permits: SWPP and NPDES (MDNR).</p>	<ul style="list-style-type: none"> • A SWPPP would be implemented to prevent impacts to streams and other water bodies (including impacts to aquatic life) from storm water runoff during construction. • NPDES permit requirements for protection of aquatic resources, including temperature requirements, would be met at discharge locations. • Water needs will be met using groundwater, which will avoid impacts associated with cooling water intake structures, which can cause adverse impact by pulling large numbers of fish and shellfish or their eggs into a power plant's or factory's cooling system, or by trapping fish against intake screens. <p>The proposed plant site is not close to any identified important bird areas (IBAs).</p>	<p>If adopted, the following would contribute to reductions in impacts from the Proposed Action: implementation of the Avian Protection Plan Guidelines (APLIC, 2005), including the suggested practices for mitigating bird collisions with power lines and for raptor protection on power lines.</p>
<p>Threatened, Endangered, Proposed, and Other Special Status Species</p>	<p>There is some potential for habitat for bald eagles, Indiana bats, and the eastern massasauga rattlesnake on certain wooded parts of the project area (but not at the plant site).</p> <p><u>Conclusion:</u> No significant impacts are expected with implementation of proposed actions to reduce or prevent adverse impacts.</p>	<p>MDC, USFWS.</p>	<ul style="list-style-type: none"> • In accordance with the MDC's BMPs for the bald eagle, construction of the lateral collector well and water supply pipeline would avoid clearing trees greater than 12 inches in diameter at breast height along the edge of the Missouri River between November 15 and July 15. These measures would be implemented to avoid impacting any over-wintering and nesting bald eagles that may be within the project area. • BMPs for stream crossings and for protection of Indiana bat habitat would be followed for railroad construction along Wakenda Creek and other locations, as applicable. 	<p><u>None needed beyond incorporated actions.</u></p>

Table 3-41. Summary of Impacts from Proposed Action

Resource	Impact	Regulatory Agency and Permits Required	Actions Incorporated into the Proposal to Reduce Impacts	Mitigation
Threatened, Endangered, Proposed, and Other Special Status Species (continued)			<ul style="list-style-type: none"> • The transmission line will be constructed to span all streams, creeks and rivers, eliminating impacts to aquatic species of concern. • The collection well will draw water from the aquifer, and therefore would not affect the Missouri River; thus, impacts to aquatic species within the Missouri River will be avoided. • MDC's BMPs for the bald eagle and eastern massasauga rattlesnake would be followed at the Grand River transmission line crossing, as applicable. • At the Blackwater River crossing of the Norborne to Sedalia transmission line: although there would be no impacts to the waterway itself, there is a potential for impacting habitat on both sides of the creek. MDC's BMPs will be followed during construction to prevent negative impacts to protected species, as applicable. • <u>Prior to any construction, the proposed transmission line routes would be evaluated for suitable habitat for Mead's milkweed to determine if surveys are needed. Surveys will be conducted if needed.</u> • <u>A survey of the project area would be conducted early in the bald eagle nesting season to ensure construction would not remove or disturb a new nest or nesting pair of eagles. If a nest is found, AECI will contact the Fish and Wildlife's Missouri Ecological Services Office.</u> 	

Table 3-41. Summary of Impacts from Proposed Action

Resource	Impact	Regulatory Agency and Permits Required	Actions Incorporated into the Proposal to Reduce Impacts	Mitigation
Cultural Resources	<p>Phase I and Phase II efforts were completed for the area within the facility boundary, and desktop studies were done for the rail corridors and transmission lines. Additional investigation would be required when final rail and transmission alignments are selected. No significant resources were identified.</p> <p><u>Conclusion:</u> No significant impacts.</p>	MDNR State Historic Preservation Officer (SHPO). No permit, but concurrence from SHPO is needed.	A Phase I survey, and if necessary, Phase II testing of the railroad corridors, well field, and water would be conducted prior to construction activities in these areas.	None needed beyond incorporated actions.
Socio-economic and Environmental Justice	<p><i>Socioeconomics.</i> The anticipated benefits in jobs and payments in lieu of taxes are expected to outweigh small negative impacts from additional traffic and pressure on social resources.</p> <p><i>Environmental Justice.</i> No low income or minority populations will be disproportionately adversely impacted.</p> <p><u>Conclusion:</u> No significant impacts are expected with implementation of proposed actions to reduce or prevent adverse impacts.</p>	Carroll County	<ul style="list-style-type: none"> • AECI would provide payment-in-kind in lieu of taxes to Carroll County to cover additional costs associated with construction and operation of the plant, such as road repair or services. • AECI will provide its own fire protection and emergency service. 	None needed beyond incorporated actions.

Table 3-41. Summary of Impacts from Proposed Action

Resource	Impact	Regulatory Agency and Permits Required	Actions Incorporated into the Proposal to Reduce Impacts	Mitigation
Public Safety and Services	<p>There would be little impact on public safety and services. There would be some delays at new at-grade rail crossings. There was concern about electric and magnetic fields (EMF) expressed in comments, but there are no documented health impacts. Transmission line corridors were placed away from residences as much as practicable; there are only two residences within 200 feet of the transmission route centerline.</p> <p><u>Conclusion:</u> No significant impacts are expected with implementation of proposed actions to reduce or prevent adverse impacts.</p>	<p>Carroll County, Missouri Department of Transportation (MoDOT), Federal Aviation Administration (FAA).</p>	<p><i>Traffic and Transportation</i></p> <ul style="list-style-type: none"> • Coordination with the MoDOT • Proper design of plant facilities. • Adherence to FAA regulations for clearance for airports. • Delivery of oversized construction materials by rail rather than on highways. • AECI will work with Egypt Township Road District to make improvement to other existing roads to minimize impacts to local traffic. There are no homes within the segment of a county road that would be closed. <p><i>Community Services</i></p> <ul style="list-style-type: none"> • Onsite fire protection. • Emergency Plans. • Onsite security. 	<p>None needed beyond incorporated actions.</p>
Public Safety and Services (continued)			<p><i>Health and Safety</i></p> <ul style="list-style-type: none"> • Preparation of Health and Safety Plan and Procedures including the following: <ul style="list-style-type: none"> - Safety responsibilities of the site manager. - Use of safety equipment for workers. - Worker training. • Proper hazardous materials and waste handling and disposal. • SPCC Plans. • Maximizing distance of residence and businesses to the proposed transmission route corridor centerline to the extent practicable. 	

Table 3-41. Summary of Impacts from Proposed Action

Resource	Impact	Regulatory Agency and Permits Required	Actions Incorporated into the Proposal to Reduce Impacts	Mitigation
Noise	<p>Noise from construction (especially pile driving) and operation will affect a few isolated residences near the plant and rail lines. Noise reduction will be implemented as required by governing regulations applicable to the proposed plant and rail lines.</p> <p><u>Conclusion:</u> No significant impacts are expected with implementation of proposed actions to reduce or prevent adverse impacts.</p>	<p>Department of Housing and Urban Development (HUD) (through USDA/RD regulations), Federal Railroad Administration (FRA).</p>	<ul style="list-style-type: none"> • Construction activities producing high noise levels such as pile driving will be limited to daylight hours. • All operational equipment will be specified and designed so as not to exceed the noise limits as required by HUD or the FRA. For the plant, this may require adding noise barriers or using specialized equipment. 	<p>None needed beyond incorporated actions.</p>
Waste Management	<p>Typical construction wastes will be generated. These wastes and non-hazardous wastes generated from operations, except for ash and flue gas desulfurization (FGD) waste, will be temporarily contained on site, then removed by a licensed waste hauler and disposed of in a licensed off-site landfill. Ash and FGD waste will be disposed of in a permitted on-site utility waste landfill.</p> <p><u>Conclusion:</u> No significant impacts are expected with implementation of applicable state laws and regulations regarding waste management.</p>	<p>MDNR. Permit: Utility Waste Landfill.</p>	<p>Measures to prevent adverse impacts from waste handling and disposal would be implemented as part of the Proposed Action, through compliance with Missouri regulation on waste disposal, including those applicable to operation of the landfill as described above.</p>	<p>None needed beyond incorporated actions.</p>