4.0 ENVIRONMENTAL CONSEQUENCES

This section analyzes the potential impacts of Western's Federal action and Basin Electric's proposed Project and compares these impacts with the No Action Alternative. Under the No Action Alternative, Western would not approve an interconnection agreement to its transmission system, and RUS would not provide financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that Basin's proposed Project would not be built and the environmental impacts, both positive and negative, associated with construction and operation would not occur. It is noted that Basin Electric could decide to pursue interconnection with another transmission system, or the cooperative could explore other options to meet the underlying power demand, as discussed in Chapter 2.

If the interconnection agreement is approved and financing is provided, it is anticipated that Basin Electric would construct Deer Creek Station, a 300-MW combined-cycle natural gas-fired generation facility in Brookings County, South Dakota. Western would also need to make certain modifications within the existing White Substation in this case.

White Substation Impacts. The necessary improvements at the interconnection point at the White Substation would occur inside the developed area of the existing substation on Federal property. The site consists of a previously leveled and graded area covered with aggregate and having existing electrical equipment and bus work, inside a chain-link security fence. The layer of aggregate allows rapid drainage away from the surface and reduces "step and touch" electrocution hazard, but it also acts to reduce or eliminate vegetation within the substation. The substation is located in a rural area and is near two residences (approximately 3/4 mile away). There would be no substantive adverse impacts associated with the installation of additional equipment to allow the interconnection.

There would be minor, short-term impacts associated with the construction of the interconnection related to ground disturbance, primarily erosion/runoff, noise, and dust. These impacts are associated with construction activities that would occur primarily within the boundaries of the substation, would have negligible impacts to surrounding properties, and would be similar to impacts from local farming practices that occur in the area. Western's environmental quality protection construction standards (Western 2003) and BMPs would be employed to minimize erosion, sediment runoff, construction noise, and fugitive dust. The duration of the construction would be during approximately 3-6 months and would occur simultaneously with construction activities at the Deer Creek Station proposed Project. During operation, there would be negligible to minor noise impacts with the addition of the new transformer.

Because the impacts associated with the interconnection would occur within the boundaries of Western's White Substation, would be temporary and minor in severity, and could be effectively mitigated, the resultant impacts would be negligible to all environmental resources. No significant impacts would result from substation improvements. The remainder of the impact analysis in this chapter is devoted to the anticipated environmental impacts that would be associated with Basin Electric's proposed Project.

Basin Electric's Proposed Project. There are two alternative sites proposed for construction of the Deer Creek Station, White Site 1 and White Site 2. For White Site 1, the associated facilities would include an interconnection at the existing White Substation, a natural gas pipeline, and water supply wells. The White Substation is adjacent to White Site 1 and the impacts of a short transmission line connecting the two are included in the analysis of on-site impacts of the facility. For non-potable process water at the proposed Project, there were initially two water well supply sites considered for White Site 1, but Water Well Supply Site A did not provide a reliable ground water pumping rate. Therefore, the impacts of Water Well Supply Site B are emphasized in this analysis. White Site 1 would receive potable water from the rural water distribution line immediately adjacent to the county road that provides access to the site. White Site 1 also includes a natural gas pipeline route, designated the White Site 1 Natural Gas Pipeline Route. For White Site 2, the associated facilities would include a new on-site substation and transmission line interconnection with Western's system one mile to the east, a Rural Water Pipeline Extension west to 481st Avenue, and a natural gas pipeline route, designated the White Site 2 Natural Gas Pipeline Route. The two natural gas pipeline routes are discussed in sections where the pipeline would contribute to the total impacts of the proposed Project, such as water quality; the pipeline is not specifically discussed in sections where impacts of the pipeline would be *de minimis*, such as in air resources.

Basin Electric would comply with all Federal, State, and local laws and regulations that are applicable to its project. In addition, Basin Electric would incorporate BMPs and standard mitigation measures into its project to reduce and minimize the potential for adverse environmental impacts. Standard mitigation measures for air quality, water resources, geological resources, biological resources, land use, public health, visual resources, and noise to be used in the proposed Project are listed in appendix F.

4.1 AIR RESOURCES

Under the Clean Air Act (CAA) and its amendments, the EPA has established NAAQS for pollutants considered harmful to public health and the environment. The EPA has set NAAQS for seven principal, or "criteria", pollutants: NO_x, sulfur dioxide (SO_2), CO, ozone (O_3), particulate matter (PM) with an aerodynamic diameter less than 10 micrometers (PM_{10}), PM with an aerodynamic diameter less than 2.5

micrometers ($PM_{2.5}$), and lead (Pb). This section considers the potential for the proposed Project to comply with the NAAQS, as well as the potential to emit GHGs and HAP.

4.1.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no effects to air quality in the area associated with the No Action Alternative.

4.1.2 Proposed Project

The proposed Project sites are located southeast of White, South Dakota (population 530). The air quality analysis is applicable to either White Site 1 or White Site 2. For the purposes of this document, significance in air impacts is defined as:

- a violation of the NAAQS
- a violation of the National Emission Standards for Hazardous Air Pollutants (NESHAPs)

At this time, information on the effects of GHG emissions at a particular geographic location is incomplete or unavailable and a significance criterion has not been developed. With respect to GHG emissions, Western has identified the areas where information does not yet exist and relies on available information where it does exist. In accordance with this regulation, Western: (1) recognizes that information regarding impacts from GHGs is incomplete or unavailable, (2) recognizes that with the absence of this relevant information, it is unable to use available information to determine whether there are significant adverse impacts on the human environment, (3) has provided the relevant information regarding GHG emissions within the Final EIS, and (4) has discussed and evaluated the impacts of GHGs based upon theoretical approaches and generally accepted methods.

4.1.2.1 Construction and Growth-Related Emissions

Construction over a one and one-half year period on the proposed Project would have the potential for short-term adverse effects on air quality in the immediate area around the site. Diesel fumes from construction vehicles, delivery vehicles, and gas and water pipeline installation vehicles, and dust from site preparation and construction vehicle operation could affect local air quality during certain meteorological conditions. However, these instances would be limited in time and area of effect.

Emissions associated with the increase in vehicle miles traveled and emissions directly associated with the construction activities (e.g., grading, bulldozing, cranes, etc.) would increase overall air-shed emissions during the construction phase. The presence of temporary workers during the construction phase would likely cause a short-term demand for services in the area, including rental lodging, hotels, and restaurants. However, the construction phase would be temporary and would not contribute to permanent growth-related emissions in the area. Therefore, since the construction period would be short-term, the primarily transient work force would not contribute substantially to long-term growth-associated emissions. Following the construction phase, there would be approximately 30 permanent employees at the Deer Creek Station, many of which would be from the local community. These permanent jobs would not be expected to result in any substantive residential construction or construction-related emissions.

No significant industrial growth would be expected to accompany the proposed Project. Support services such as maintenance, cleaning, painting, and other related services already support existing industrial facilities in east-central South Dakota. Operating the Deer Creek Station would not be expected to trigger expansion of the existing support services industry in the area. The majority of growth-related emissions associated with the proposed Project would be expected to be related to the increased workforce (e.g., vehicle emissions associated with commuting). With respect to permanent employee vehicle emissions, it is anticipated that most workers would commute an average of 25 miles to the facility (First District Association of Local Governments 2009). Using emission factors summarized by EPA (1995), increased vehicle emissions associated with permanent employees at the proposed Deer Creek Station would be expected to be approximately 7.6 tons per year (tpy) CO, 1.4 tpy NO_x, and 1.0 tpy VOC. These emissions would be a tiny percentage of the emissions from the power plant facility and would not have the potential to violate the NAAQS.

4.1.2.2 NAAQS Emissions During Operation

As part of the air quality permitting process, the AMS/EPA Regulatory Model (AERMOD) was used to estimate downwind concentrations from single or multiple sources using meteorological data. AERMOD is the current EPA model used for modeling most industrial sources in Prevention of Significant Deterioration (PSD) permit applications and is an appropriate model for this type of facility. The PSD Permit Application was submitted in May 2009 (Sargent & Lundy 2009). The maximum predicted concentrations from the modeling analysis are less than the modeling and monitoring significance levels for each pollutant and averaging period (table 4-1). Therefore, the proposed Project would have insignificant impacts on the ambient air quality. Since the modeled maximum impacts are below their respective NAAQS significance levels, additional air quality modeling that compares impacts with NAAQS and PSD Increments was not required for the proposed Project.

Table 4-1: Air Quality Modeling Results and Standards (μg/m^3)*

Pollutant	Averaging Period	Maximum Modeled Impact	Modeling Significance	Monitoring Significance	NAAQS	PSD Increment
CO	1-hour	518	2000		40,000	
	8-hour	236	500	575	10,000	
NO_x	Annual	0.71	1	14	100	25
PM_{10}	24-hour	3.57	5	10	150	30
	Annual	0.12	1		50	17
$PM_{2.5}$	24-hour	26.6[1]			35	
	Annual	9.8[1]			15	

*Includes background concentration. Data source: Deer Creek PSD Application, May 29, 2009

4.1.2.3 Air Quality Impacts on Soils and Vegetation

Potential effects of NO_x and CO associated with the proposed Project on the nearby vegetation and soil were examined. Natural vegetation in Brookings and Deuel counties is tallgrass prairie and native vegetation is dominated by tall and mid grasses and forbs. Crops cultivated in the area include corn, soybeans, and small grains.

The potential effects of the air emissions to vegetation within the immediate vicinity of Deer Creek were evaluated by comparing modeled ambient air quality impacts to scientific research examining the effects of pollution on vegetation. Evaluations of impacts on sensitive vegetation were performed by comparing the predicted impacts attributable to the proposed Project with the screening levels developed by EPA (Smith and Levenson 1980). The screening procedure compares the maximum ambient concentrations associated with a proposed emissions source to the applicable screening concentrations. Maximum ambient air concentrations associated with the proposed Project were estimated using Class II ambient air quality impact modeling. Modeled ambient air quality impacts were compared to the EPA screening values. Concentrations in excess of any of the screening concentrations would indicate that the source might have adverse impacts on plants, soils, or animals. All potential impacts would be well below the screening levels. Most of the designated vegetation screening levels are equivalent to, or less stringent than, the NAAQS or PSD increments. Therefore, satisfaction of NAAQS and PSD increments also provides assurance that ambient air quality impacts would be below the sensitive vegetation screening levels.

Fugitive dust would pose a potential impact to local plant communities during construction, operation, and future maintenance. Fugitive dust is defined as dust that is not emitted from a definable point source. Construction equipment, travel on existing and newly constructed gravel access roads, and soil

disturbance are all sources of fugitive dust. Fugitive dust can interfere with plant growth by obstructing stomata, thus reducing gas exchange with the environment, and reducing light interception. Fugitive dust associated with the proposed Project during construction activities would be negligible compared to that generated by farming activities in the surrounding areas, or wind pick-up from tilled fields. Dust impacts from construction and operation of the proposed Project would not be expected to be significant compared to other sources in the same area. Fugitive dust impacts were considered in the PSD permit application (Sargent & Lundy 2009) and would be addressed in the construction Storm Water Pollution Prevention Plan (SWPPP) prepared for the proposed Project. In order to minimize dust from Project activities, the following would be implemented for dust control, including the following:

- Limiting vehicle speeds on unpaved roads by posting signs along the construction route, clearly indicating the speed limit, placed so they are visible to vehicles entering and leaving the site of operations
- Applying an environmentally safe chemical soil stabilizer or chemical dust suppressant to the surface of unpaved roads, as needed, near residences along the primary construction traffic route
- Addition of road paving near the plant and at key intersections

4.1.2.4 Greenhouse Gases

No specific Federal, State, or regional GHG regulations apply to the proposed Project at this time, nor are there established standards to guide assessment of GHG emissions. CO_2 represents approximately 84 percent of all GHG emissions in the U.S. It is generated whenever a carbon-based fuel such as coal, wood, natural gas, or fuel oil is burned. It is the primary GHG emitted from fossil-fired utility boilers, with approximately 41 percent of U.S. man-made carbon emissions (primarily CO_2) coming from power plant sources (EPA 2009a). Other important sources are automobile and truck exhaust, industrial combustion sources, and residential heating sources. The operation of the 300-MW Deer Creek Station would release an estimated 1.02 million tons of CO_2 equivalent (0.93 million metric tons) into the atmosphere each year (table 4-2). Construction emissions were not estimated but would be a small fraction of the annual emissions from the plant. This may be compared to the total U.S. emissions of 7,150 million metric tons of CO2 equivalent in 2007 (EPA 2009a). The proposed Project would contribute an estimated three one-thousandths of one percent (0.00003) of world CO_2 emissions from global anthropogenic emissions (EIA 2008). As a further means of comparison, the projected annual emissions from the Project are 0.3 percent of the estimated 288 million tons of CO_2 emitted from wildfires during the period 2002-2006 (Wiedinmyer and Neff 2007). Using EPA's emissions equivalency calculator, the projected CO_2 emissions from the Project would be roughly equivalent to the annual CO_2 emissions from 168,191 passenger cars (EPA 2009c).

Western concludes that the proposed plant's emissions of CO_2 and other GHGs would have an undetermined effect on local, regional, or global climate change. Because numerous models produce widely divergent results, and there is insufficient information, Western is unable to identify the specific impacts of the proposed plant's CO_2 emissions on human health and the environment. Lack of sufficient information and the use of widely diverging models are evident in the IPCC report where it states in the Key Uncertainty section, "Difficulties remain in reliably simulating and attributing observed temperature changes to natural or human causes at smaller than continental scales. At these smaller scales, factors such as land use change and pollution also complicate the detection of anthropogenic warming influence on physical and biological systems. The same section also states, "Models differ considerably in their estimates of the strength of different feedbacks in the climate system, particularly cloud feedbacks, oceanic heat uptake, and carbon cycle feedbacks, although progress has been made in these areas." The lack of information and differences in predictive models have made it difficult for scientists and other experts to link a direct cause and effect of anthropogenic impacts of climate change on a global scale, much less on a local scale. As a result, Western believes that any attempt to analyze and predict the local or regional impacts of the proposed plant's CO_2 emissions on human health and the environment cannot be done in any way that produces reliable results.

However, Western did provide comparisons of the projected CO_2 emission rate from the proposed Project to other technologies, existing regional levels, and regulatory levels. Western believes the discussion provided in this section provides the relevant information regarding CO_2 and climate change issues of pubic interest.

Table 4-2: Estimated GHG Emissions from Operation of the Proposed Project

Emission Unit	Size	hr/yr	CO_2 Emission Factor	CH_4 Emission Factor	N_2O Emission Factor	Reference	CO_{2eq} lb/hr	CO_{2eq} tpy
Combustion Turbine	1434 MMBtu/hr	8,760	110 lb/MMBtu	0.0086 lb/MMBtu	0.003 lb/MMBtu	AP42 chapter 3.1 dated 4/00	159,333	697,877
HRSG and Duct Burner	610.4 MMBtu/hr	8,760	120 lb/MMBtu	0.0023 lb/MMBtu	0.0022 lb/MMBtu	AP42 chapter 1.4 dated 7/98	73,694	322,779
Heater	25 MMBtu/hr	150	120 lb/MMBtu	0.0023 lb/MMBtu	0.0022 lb/MMBtu	AP42 chapter 1.4 dated 7/98	3,018	226
Diesel Generator	22.53 MMBtu/hr	150	164 lb/MMBtu			AP42 chapter 3.3 dated 10/96	3,695	277
Diesel Fire Pump	577 hp	150	1.15 lb/hp hr			AP42 chapter 3.3 dated 10/96	664	50
							Total: 1,021,430 tons CO_{2eq}	

Source: EPA 1995 and updates

4.1.2.5 Hazardous Air Pollutants

Section 112 of the CAA requires EPA to list categories and subcategories of major sources of hazardous air pollutants (HAPs), and to establish NESHAPs for each source category. The NESHAP regulations, codified under 40 CFR Parts 61 and 63 and incorporated in to the South Dakota Air Pollution Control Program at Chapter 74:36:08, are designed to regulate specific categories of stationary sources with the potential to emit one or more HAPs.

Each combustion source at the proposed Project would emit some level of HAPs. Emissions of HAPs were estimated based on fuel characteristics, heat input to each combustion source, and the applicable AP-42 emissions factors (EPA 1995). Based on emission calculations, total potential HAP emissions from all sources at the Deer Creek Station would be less than 25 tpy (table 4-3). Formaldehyde is the individual HAP constituent that would be emitted in the greatest quantity. Based on emission calculations, potential formaldehyde emissions from all emission sources would be 4.51 tpy. Emissions of other HAPs are much less than those of formaldehyde and minimal in quantity and impact (table 4-3). Because the facility does not have the potential to emit any single HAP at a rate greater than 10 tpy, or any combination of HAP at a rate of 25 tpy or more, the proposed Project does not meet the definition of a major source of HAP emissions and the NESHAP regulations do not apply to emission sources at the proposed Project. In summary, all construction and operation air emissions from the proposed Project would meet the NAAQS. Emissions of HAPs would be minimal in quantity and in impact.

4.1.3 Cumulative Air Quality Effects

The air quality modeling took into account current ambient air conditions; therefore, the impacts of past contributors to air quality impacts in the area have been considered. The receptor grid for the modeling extended 10 km (6 miles) from the facility fence line, and the visibility analysis extended 50 km (30 miles) to include Pipestone National Monument and several state parks. A coal-fired power plant previously proposed for northeastern South Dakota has been formally cancelled. The proposed Project meets the NAAQS and the air quality modeling took into account the cancelled Big Stone II project, in addition to the Deer Creek Station proposed Project. On an individual or cumulative basis, neither the proposed Project nor Big Stone II would violate the NAAQS. Accordingly, the proposed Project, in combination with the Big Stone II Project (since cancelled), would not significantly affect regional air quality on a cumulative basis.

Table 4-3: Estimated HAP Emissions from the Proposed Project

Pollutant	Combustion Turbines		Duct Firing		Diesel-Fired Water Pump		Inlet Air Heater		Diesel Generator		Total	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
1,3-Butidiene					1.74E-04	1.30E-05					1.74E-04	1.30E-05
2-Methylnaphthalene*							6.00E-07	4.50E-08			6.00E-07	4.50E-08
Acenaphthene					6.32E-06	4.74E-07			1.05E-04	7.91E-06	1.11E-04	8.38E-06
Acenaphthylene					2.25E-05	1.69E-06			2.08E-04	1.56E-05	2.31E-04	1.73E-05
Acetaldehyde	5.74E-02	2.51E-01			3.41E-03	2.56E-04			5.68E-04	4.26E-05	6.14E-02	2.51E-01
Acrolein	9.18E-03	4.02E-02			4.12E-04	3.09E-05			1.78E-04	1.33E-05	9.77E-03	4.02E-02
Anthracene					8.32E-06	6.24E-07			2.77E-05	2.08E-06	3.60E-05	2.70E-06
Arsenic			1.20E-04	1.44E-04			5.00E-06	3.75E-07			1.25E-04	1.44E-04
Benzene	1.72E-02	7.54E-02	1.26E-03	1.51E-03	4.15E-03	3.11E-04	5.25E-05	3.94E-06	1.75E-02	1.31E-03	4.02E-02	7.85E-02
Benzo(a)anthracene					7.48E-06	5.61E-07			1.40E-05	1.05E-06	2.15E-05	1.61E-06
Benzo(a)pyrene					8.37E-07	6.27E-08			5.79E-06	4.34E-07	6.63E-06	4.97E-07
Benzo(b)fluoranthene					4.41E-07	3.31E-08			2.50E-05	1.88E-06	2.54E-05	1.91E-06
Benzo(g,h,i)perylene					2.18E-06	1.63E-07			1.25E-05	9.40E-07	1.47E-05	1.10E-06
Benzo(k)fluoranthene					6.90E-07	5.17E-08			4.91E-06	3.68E-07	5.60E-06	4.20E-07
Beryllium			7.18E-06	8.61E-06			3.00E-07	2.25E-08			7.48E-06	8.63E-06
Cadmium			6.58E-04	7.89E-04			2.75E-05	2.06E-06			6.86E-04	7.91E-04
Chromium			8.37E-04	1.00E-03			3.50E-05	2.63E-06			8.72E-04	1.00E-03
Chrysene					1.57E-06	1.18E-07			3.45E-05	2.59E-06	3.61E-05	2.71E-06
Cobalt			5.02E-05	6.03E-05			2.10E-06	1.58E-07			5.23E-05	6.05E-05
Dibenz(a,h)anthracene					2.59E-06	1.95E-07			7.80E-06	5.85E-07	1.04E-05	7.80E-07
Dichlorobenzene			7.18E-04	8.61E-04			3.00E-05	2.25E-06			7.48E-04	8.63E-04
Ethylbenzene	4.59E-02	2.01E-01	0.00E+00	0.00E+00							4.59E-02	2.01E-01
Fluoranthene*			1.26E-03	1.51E-03	3.39E-05	2.54E-06	7.50E-08	5.63E-09	9.08E-05	6.81E-06	1.38E-03	1.52E-03
Fluorene*					1.30E-04	9.75E-06	7.00E-08	5.25E-09	2.88E-04	2.16E-05	4.18E-04	3.14E-05
Formaldehyde	1.02E+00	4.46E+00	4.49E-02	5.38E-02	5.25E-03	3.94E-04	1.88E-03	1.41E-04	1.78E-03	1.33E-04	1.07E+00	**4.51**
Hexane			1.08E+00	1.29E+00			4.50E-02	3.38E-03			1.13E+00	1.29E+00
Indeno(1,2,3-cd)pyrene					1.67E-06	1.25E-07			9.33E-06	7.00E-07	1.10E-05	8.25E-07
Lead			2.99E-04	3.59E-04			1.25E-05	9.38E-07			3.12E-04	3.60E-04
Manganese			2.27E-04	2.73E-04			9.50E-06	7.13E-07			2.37E-04	2.74E-04
Mercury			1.55E-04	1.87E-04			6.50E-06	4.88E-07			1.62E-04	1.87E-04
Napthalene	1.86E-03	8.17E-03			3.77E-04	2.83E-05	1.53E-05	1.14E-06	2.93E-03	2.20E-04	5.18E-03	8.42E-03

Pollutant	Combustion Turbines		Duct Firing		Diesel-Fired Water Pump		Inlet Air Heater		Diesel Generator		Total	
	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
Nickel			1.26E-03	1.51E-03							1.26E-03	1.51E-03
Phenananthrene*			4.49E-02	5.38E-02	1.31E-04	9.81E-06	4.25E-07	3.19E-08	9.19E-04	6.89E-05	4.60E-02	5.39E-02
Propylene					1.15E-02	8.61E-04					1.15E-02	8.61E-04
Pyrene*			2.03E-03	2.44E-03	2.13E-05	1.60E-06	1.25E-07	9.38E-09	8.36E-05	6.27E-06	2.14E-03	2.45E-03
Selenium			1.44E-05	1.72E-05			6.00E-07	4.50E-08			1.50E-05	1.72E-05
Toluene	1.86E-01	8.17E-01	2.03E-03	2.44E-03	1.82E-03	1.37E-04	8.50E-05	6.38E-06	6.33E-03	4.75E-04	1.96E-01	8.20E-01
Xylene	9.18E-02	4.02E-01			1.27E-03	9.51E-05			4.35E-03	3.26E-04	9.74E-02	4.02E-01
Total HAP Emissions	**1.43**	**6.26**	**1.13**	**1.35**	**0.03**	**0.0021**	**0.05**	**0.0035**	**0.03**	**0.0025**	**2.72**	**7.67**

Source: Deer Creek PSD Application, May 29, 2009

4.2 GEOLOGY, SOILS AND FARMLAND

4.2.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no effects to geology, soils, and farmland in the area associated with the No Action Alternative.

4.2.2 Proposed Project

Impacts to geology, soils, or farmland would be considered significant if:

- A loss of unique geologic, mineral, or soil resources not available in other locations occurred
- More than one percent of the prime farmland within a county is taken out of production as a result of the proposed Project

The geologic resources at White Sites 1 and 2 are Quaternary Period glacial deposits of sand, gravel, and alluvial material. These geological features are common in the area, and there are no unique geological features at the two sites or along the pipeline or transmission corridors. If sources of gravel and fill are required during the proposed Project, the areas would be identified and documented. Sand and gravel deposits are uncommon within the soils that are found on White Site 1, White Site 2, and associated facilities. However, there are gravel quarries in the area, and the potential for gravel deposits would have to be confirmed by a site-specific investigation.

Prime farmland soils exist in the proposed Project area and would be affected by construction. Impacts to agriculture would include the removal of farmland, primarily for plant construction at either White Site 1 or 2 (about 100 acres in either alternative). This land would no longer be available for agricultural use for the life of the proposed Project. Cultivated croplands disturbed by construction and not permanently impacted by the proposed Project would be available for continued agricultural uses. This includes virtually all land affected by natural gas and water pipeline construction, transmission lines, or the Water Well Supply Site. A 200-foot-by-200-foot area for the Water Well Supply Site would be fenced. Permanently converted acreage would represent a very small percentage of the total 462,579 acres of farmland in Brookings County and 317,164 acres in Deuel County. This loss of farmland would not significantly affect the overall agricultural production in the county. The total value of agricultural products sold in 2007 was $186.7 million in Brookings County and $105.1 million in Deuel County. It is

estimated that the loss in agriculture revenue in Brookings County as a result of the proposed Project would comprise a negligible percentage of these totals. In addition, the loss would be offset by new full-time jobs, payments to landowners for the property and easements, and general societal benefits of additional electrical resources.

Almost all land removed from agricultural production as a result of the proposed Project would be prime farmland. Virtually all well-drained level land in the region that would be suitable for a power plant site is prime farmland. Most impacts would be a result of plant construction at either White Site 1 or White Site 2. At White Site 1, although the plant footprint would be 40 acres, approximately 100 acres would be fenced and not available for cropland use. This property is currently in agricultural production and contains soils classified as prime or statewide important farmland, except for about five percent of the northeast corner of the site. At White Site 2, the plant and substation footprint would be 46 acres. Approximately 100 acres would be fenced and not available for cropland use. Table 4-4 and table 4-5 list the soils on White Site 1 and White Site 2, respectively.

Table 4-4: Soil and Farmland Impacts, White Site 1

Soil Symbol	Soil Name	Farmland Classification
BoE	Buse-Langhei complex, 15 to 40 percent slopes	not prime or important farmland
DoB	Doland loam, 2 to 6 percent slopes	all areas are prime farmland
EsA	Estelline silt loam, 0 to 2 percent slopes	all areas are prime farmland
Mu	McIntosh-Lamoure silty clay loams, 0 to 2 percent slopes	prime farmland if drained
StB	Strayhoss-Maddock complex, 2 to 6 percent slopes	prime farmland if irrigated
VaB	Venagro-Svea loams, 1 to 6 percent slopes	all areas are prime farmland
VnC	Vienna-Buse complex, 6 to 9 percent slopes	farmland of statewide importance

Source: USDA 2009

Table 4-5: Soil and Farmland Impacts, White Site 2

Soil Symbol	Soil Name	Farmland Classification
BbA	Barnes clay loam, 0 to 2 percent slopes	all areas are prime farmland
BbB	Barnes clay loam, 2 to 6 percent slopes	all areas are prime farmland
Hb	Hamerly-Badger complex, 0 to 2 percent slopes	prime farmland if drained
Mu	McIntosh-Lamoure silty clay loams, 0 to 2 percent slopes	prime farmland if drained

Source: USDA 2009

The natural gas and water pipelines, transmission facilities, and water well supply sites would involve prime farmland but would not permanently remove farmland from production, except for a 200- by 200- foot area of the water well supply site or the immediate area of transmission structures. Soils disturbed within the natural gas and water pipeline corridors would be contained within a 75-foot wide construction easement where equipment would be used to construct the trench and bury the facility. The actual disturbance area would be less than the 75-foot wide easement along much of the corridor. Permanent impact would be limited to the width of the trench. Typical construction diagrams for trenching and directional drilling are provided in appendix G. During actual trench construction, topsoil would be removed separately, stockpiled until the pipeline is installed, and the topsoil replaced at the top of the fill to minimize productivity impacts. Outside of the immediate trench construction area, some temporary soil compaction would be expected from trucks and construction equipment. There would be little permanent impact to the soils along the path of the White Site 1 Natural Gas Pipeline Route, White Site 2 Natural Gas Pipeline Route, White Site 1 Transmission Line, White Site 2 Transmission Line, or Rural Water Pipeline Extension.

A Farmland Conversion Impact Rating Form (Form AD-1006) was completed in coordination with the NRCS. Less than one percent of the 441,708 acres of prime and important farmlands in Brookings County would be impacted.

4.2.3 Cumulative Effects

Past, present, and reasonably foreseeable future actions that have the potential to cumulatively impact the geological and soil resources found in the Big Sioux Basin and Prairie Coteau include past sod-busting and gravel mining, as well as past and present wind farm construction to the east and west of White Site 1 and 2. However, wind farm construction does not generally remove farmland from production, and the construction of the plant site, when added to the area of other proposed activities, would remove a tiny fraction (much less than one percent) of farmland from production in the area. There is little suburbanization or other pressure to convert farmland to non-farm usage in the area. No unique geologic, soil, or mineral resources would be affected by the proposed Project. Thus, on an individual or cumulative basis, the proposed Project would not significantly affect soil or geological resources.

4.3 WATER QUALITY, FLOODPLAIN, AND GROUNDWATER RESOURCES

4.3.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no water quality, floodplain, or groundwater impacts associated with the No Action Alternative.

4.3.2 Proposed Project

Construction of the proposed Project at either White Site 1 or White Site 2 would have similar impacts to water resources, although the construction of a facility at White Site 1 would involve a water supply well and water pipeline, while construction at White Site 2 would involve a water tap and pipeline to connect to an existing municipal water supply service. Impacts to water resources would be considered significant if:

- The Proposed Project would cause an increase in susceptibility to on- or off-site flooding due to altered surface drainage patterns or stream channel morphology
- Withdrawal levels would cause established users to curtail operations
- Erosion would result in long-term impacts to water quality
- The proposed Project would violate the terms and conditions of the SWPPP, SDDENR section 401 CWA certification, section 404 CWA permit provisions, or the Brookings or Deuel County Erosion and Sediment Control Plans
- Groundwater withdrawal from construction dewatering or wells would affect current users of designated Well Head Protection Areas or stream water levels near the water supply well site

4.3.2.1 White Site 1

The construction and operation of various proposed Project components at White Site 1 would potentially result in both construction- and operation-related impacts to water resources. This includes construction of the power generation facility, access roads, and transmission line construction. In addition, well water used in plant processes would be tested to ensure that it meets water quality standards and discharged into a tributary to Deer Creek. On-site collected stormwater would also be discharged into a Deer Creek tributary. There would not be a water intake, as the cooling water would come from groundwater wells.

4.3.2.1.1 Surface Water

The excavation and exposure of soil on White Site 1 could cause sediment runoff during rain events. It is unlikely that construction within cultivated fields would contribute to additional sediment runoff because such areas periodically consist of exposed soils. Thus, impacts from the proposed Project would primarily be limited to areas that are currently uncultivated. In all disturbance areas, BMPs would be used to prevent sediment from leaving the construction site. The operating area of the proposed Project would be graded so that stormwater would be directed to drainage ditches and swales and then to an on-site stormwater detention pond. The plant site would consist of paved areas, aggregate covered areas, and mowed grass. The water would meet the water quality discharge criteria established in the NPDES permit issued by the SDDENR. The pond would only be discharged after the collection water met the water quality limits imposed by the FPDES permit issued by SDDENR. The water treatment reject water would flow off site in the same system of drainages as the stormwater pond discharge.

Water quality would be affected by the acreage of disturbance and its location during construction and operation of the proposed Project. BMPs such as silt fences, erosion control blankets, and straw waddles would be installed to ensure that sediment or fill material does not impact nearby waterways. Proper implementation of a SWPPP and adherence to local and State regulations involving sediment-laden runoff would ensure that construction activities that remove vegetation and disturb soils would not have a significant impact to water quality. Once construction ceases the site would be stabilized by grass or aggregate surfaces before any erosion and sediment controls are removed.

Other impacts to surface water are possible if spills of chemicals were to occur during construction activities. In order to mitigate the impact of possible chemical spills, spill prevention and control would be required, and specific measures described in the SWPPP. Spill plan measures would include spill containment materials at all construction sites and site crews trained in spill response and clean up. The proposed Project would adhere to regulations and permits governing storm-water pollution prevention for sediment control, including those governed by the NPDES.

There is a receiving stream on the White Site 1 property that could potentially receive runoff. This stream is a tributary of Deer Creek. With effective use of BMPs, minimal impacts to water quality are expected. A silt fence and sediment barriers would be placed where disturbance takes place and vegetation would be established before any erosion control measures are removed. A vegetated barrier with a buffer zone of 25 feet would be in place to help catch and treat any runoff that takes place in close proximity to the stream.

4.3.2.1.2 Floodplains

According to FEMA's 100-year flood zone maps, there are no 100-year flood zones in the White Site 1 property.

4.3.2.1.3 Groundwater

White Site 1 does not overlie Brookings County Well Head Protection Areas. However, groundwater impacts are possible if there is construction dewatering. This may be needed if localized pockets of saturated subsurface soils or groundwater are encountered during construction. A Dewatering Permit from the SDDENR would be required before construction dewatering can occur. During dewatering operations, any water extracted would be dealt with appropriately to protect water quality. Any impacts or effects to groundwater would be small, and localized water table depressions would not remain after completion of construction. The impacts to groundwater are thus expected to be temporary and unlikely to affect water wells.

4.3.2.2 Water Well Supply Site B and Water Pipeline

4.3.2.2.1 Surface Water

Deer Creek flows through the Water Well Supply Site B property and could potentially receive sediment-laden runoff. Silt fence and sediment barriers would be placed along the water pipeline route where disturbance would take place and vegetation would be re-established before any erosion control measures are removed. A vegetated barrier with a buffer zone would be in place to help catch and treat any runoff that takes place in close proximity to the stream that parallels 484th Avenue between 207th Street and White Site 1. With the use of BMPs, minimal impacts to water quality from the well drilling activity would be expected.

Also, a bridge over Deer Creek on 484th Avenue adjacent to Water Well Supply Site B would be improved for use by heavy loads by placement of a jumper bridge over the existing bridge. No work in streams would be required; however, BMPs would be used to avoid runoff impacts to waterways.

4.3.2.2.2 Floodplains

According to FEMA's 100-year flood zone maps, the floodplain of Deer Creek includes the southern portion of Water Well Supply Site B. Approximately 45.5 acres of the 160-acre site, or about 30 percent, is within the limits of the 100-year floodplain. A production test water well site with adequate aquifer recharge has been located immediately to the west of 484th Avenue just to the south of 207th Street. It is within the 100-year floodplain of Deer Creek. Total impacts to the floodplain would include an

approximately 200-foot-by-200-foot area for two individual wellheads, a monitoring well, and an 8-foot by 10 foot control building. The access road, wells, and control building would be contoured to an elevation one foot above the 100-year flood elevation. Consistent with the requirements of the National Flood Insurance Program, the building would be watertight and utilities would be made capable of resisting flood damage. Because all other available water well supply sites are located within the Deer Creek floodplain, there is no practicable alternative to locating this facility within the floodplain if White Site 1 is chosen for implementation.

4.3.2.2.3 Groundwater

Zone A areas protect public water supply wells. Zone B areas delineate aquifers that are potential sources of future groundwater development. Water Well Supply Site B is in zone "B" of the Brookings County Well Head Protection Area and is not in a public water supply Zone A area. A water well would be a permitted use in the Zone B area.

Groundwater pumping in a designated Zone B area would occur for the two production wells needed for the power plant. Each well would be capable of pumping 125 gallons per minute (gpm) through a 10-inch diameter casing. Each well is capable of meeting the water use requirements of the proposed Project. Only one well would be in service at a time. The second well is needed to provide an alternative water supply when a well is out of service for maintenance. For the Big Sioux Aquifer, the cone of influence based on this pumping rate is estimated to vary between 21 and 135 feet. The estimated annual average use is estimated to be six million gallons or 18 acre-feet. The wells would be installed approximately 280 feet from Deer Creek but in the Deer Creek floodplain. The wells would be located within the 200-foot-by-200-foot well site area. A total of five monitoring wells would be installed on a temporary basis to confirm impacts to the aquifer. One monitoring well would be installed within 50 feet of each of the two production wells to determine the effects of the pumping on the nearby aquifer. In addition, three additional monitoring wells would be installed to monitor the impacts of the production wells on Deer Creek. One well would be installed across the road between the production well and Deer Creek. The other two temporary monitoring wells would be installed south of the production wells, between the wells and Deer Creek. The temporary wells would be removed if monitoring shows that the temporary wells are not within the production well's cone of influence.

Pump tests indicate an abundant water supply for power plant consumptive uses (emission control and cooling water), and the productive nature of the wells indicates a low potential to affect nearby groundwater resources. Basin Electric performed a site-specific aquifer hydrologic assessment study to

identify the aquifer characteristics. The aquifer thickness at the drilling site was found to be 43 feet. The aquifer was pumped at 30 gallons per minute for six consecutive hours, during which the water elevation decreased by two feet. Within two minutes of the end of pumping, the water elevation had returned to its original level (Banner Associates 2009). There are no current competing users for the groundwater resource in the immediate vicinity of White Site 1.

4.3.2.3 White Site 2

The construction and operation of various proposed Project components at White Site 2 would potentially result in both construction- and operation-related impacts to water resources. This includes construction of the power generation facility, access roads, Rural Water Supply Line, and White Site 2 Transmission Line construction. In addition, there would be a water discharge point on a tributary to Deer Creek for process water. The water would be tested and treated prior to discharge to ensure that it meets water quality standards. There would not be a water intake, as the cooling water would come from the rural water supply.

4.3.2.3.1 Surface Water

Within the White Site 2 site, there is a stream that could potentially receive runoff. Because sediment and erosion control measures would be required, only minimal impacts to water quality would be expected. Silt fence and sediment barriers would be placed along the route where disturbance takes place and vegetation would be established before any erosion control measures are removed. A vegetated barrier of 25 feet with a buffer zone would be in place to treat any runoff that takes place in close proximity to the stream. White Site 2 would have a larger amount of permanent surface changes and potential surface runoff than White Site 1 due to the additional construction of the necessary substation. Along the White Site 2 Transmission Line, impacts would be minimal with the proper placement of BMPs along the route. Along the Rural Water Pipeline Extension west to 481st Avenue, impacts would be minimal with the proper placement of BMPs.

4.3.2.3.2 Floodplains

According to FEMA's 100-year flood zone maps, there are no 100-year flood zones within White Site 2, the Rural Water Pipeline Extension, or White Site 2 Transmission Corridor.

4.3.2.3.3 Groundwater

White Site 2 does not overlie established Brookings County Well Head Protection Areas. Use of rural water supply would not result in new groundwater impacts; however, there could be water withdrawal impacts at the source of the water.

Groundwater impacts are also possible if there is construction dewatering. This may be needed if localized pockets of saturated subsurface soils or groundwater are encountered during construction. A Dewatering Permit from the SDDENR is required before construction dewatering can occur.

During dewatering operations, any water extracted would be dealt with appropriately to protect water quality. Any impacts or effects to groundwater would be small, and localized water table depressions would not remain after completion of construction. The impacts to groundwater are thus expected to be temporary and unlikely to affect water wells.

4.3.2.4 White Site 1 Natural Gas Pipeline

4.3.2.4.1 Surface Water

Within the White Site 1 Natural Gas Pipeline Route, the pipeline would be trenched except where wetlands over 0.5 acres occur. In the case of these larger wetlands, the pipeline would be directionally drilled. Every effort would be taken to minimize the potential for sediment-laden runoff to enter streams or roadside ditches. With appropriate use of BMPs, minimal impacts are expected. Silt fence and sediment barriers would be placed along the route where disturbance takes place and vegetation would be established before any erosion control measures are removed (70 percent native perennial vegetative cover). In addition, construction would take place in the fall when conditions are likely to be driest; potential runoff would be less during re-contouring and seeding. Construction work would take place adjacent to county and township roads, thus limiting disturbance of additional property in accessing the project site.

4.3.2.4.2 Floodplains

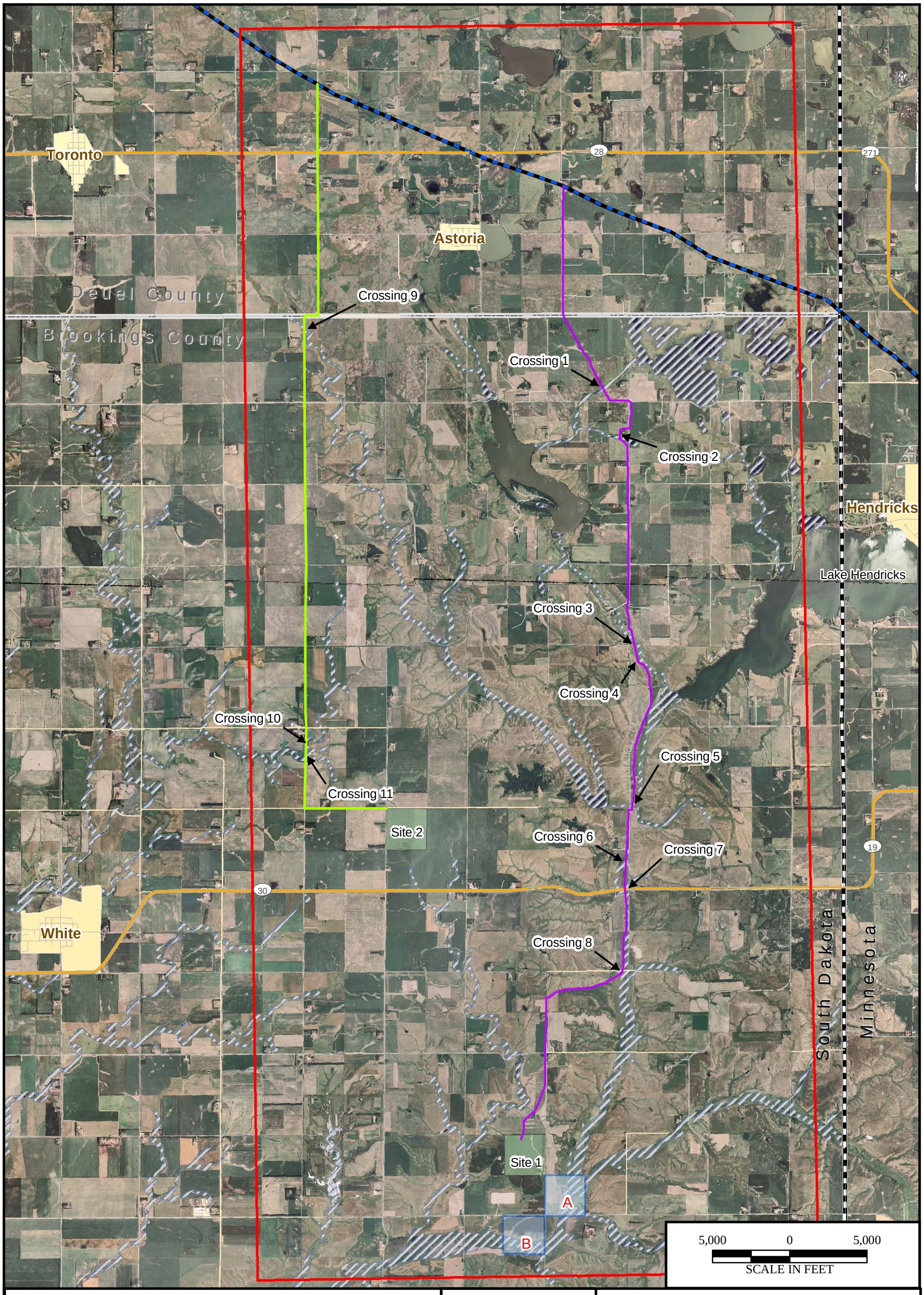
According to FEMA's 100-year flood zone maps, the White Site 1 Natural Gas Pipeline Route crosses and runs parallel to 100-year flood zones at several locations. The pipeline makes eight crossings of 100-year flood zones. The central region of the pipeline route crosses an extensive section of floodplain because it runs parallel to Deer Creek and the Lac Qui Parle River along 485th Avenue to the south of Lake Hendricks. The approximate lengths (in feet) of each floodplain crossing are listed in order from

north to south in table 4-6. The White Site 1 Natural Gas Pipeline Route crosses a total of approximately 4,607 linear feet of 100-year flood zone areas.

Table 4-6: Gas Pipeline FEMA Floodplain Crossings

Floodplain Name	Approximate Linear Feet of Pipeline Crossing
White Site 1 Natural Gas Pipeline Route	
Crossing 1	275
Crossing 2	395
Crossing 3	396
Crossing 4	134
Crossing 5	169
Crossing 6	378
Crossing 7	638
Crossing 8	2,222
Total Linear Feet Crossed	**4,607**
White Site 2 Natural Gas Pipeline Route	
Crossing 9	377
Crossing 10	436
Crossing 11	644
Total Linear Feet Crossed	**1,457**

The location of the White Site 1 Natural Gas Pipeline Route in relation to floodplains is indicated in figure 4-1. The pipeline would be buried and would not create permanent floodplain obstructions. Accordingly, natural and beneficial floodplain values would only be affected during a brief construction period and periodically during the operation period when repairs or maintenance activities are needed. BMPs would be used to prevent sediment-laden runoff during the construction period, and disturbed areas would revegetate quickly. The White Site 1 Natural Gas Pipeline Route follows roadways in order to minimize the potential for impacts to environmental resources. The crossings of floodplains, with the exception of a section paralleling Deer Creek along 485th Avenue, are perpendicular to the streams, thus minimizing disturbance within the floodplain. In order for a pipeline to be routed to White Site 1, floodplain crossings are necessary (table 4-6). There are no pipeline routes that would completely avoid floodplains, given the locations that existing pipelines would need to be tapped, the alternative site locations, and the drainage patterns in the region. As a result of these considerations, there is no practicable alternative to construction of a natural gas pipeline in the floodplain crossings.



Source: USDA NAIP County Mosaic, Brookings and Deuel counties, North Dakota; FEMA; ESRI; Basin Electric Power Cooperative

Figure 4-1

Floodplain Crossings
Deer Creek Station EIS

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Underground lines would be buried at depths adequate enough to avoid future erosion that could expose them. There would be no increased flooding from construction and operation of the White Site 1 Natural Gas Pipeline.

4.3.2.4.3 Groundwater

The White Site 1 Natural Gas Pipeline Route makes four crossings above Well Head Protection Areas. The approximate lengths (in feet) of each crossing, listed in order from north to south, and the approximate total length crossed, are presented in table 4-7. The crossings total 29,262 linear feet. Most of this distance (70 percent) is in the extensive valley from Lake Hendricks south to White Site 1 along 485th Avenue (figure 4-2). All crossings of the White Site 1 Natural Gas Pipeline Route are of the Zone B Well Head Protection Area. Necessary utilities such as a natural gas pipeline are allowed in Zone B areas.

Table 4-7: Gas Pipeline Well Head Protection Area Crossings in Approximate Linear Feet

Crossing Number	Approximate Linear Feet of Pipeline Crossing
White Site 1 Natural Gas Pipeline Route	
Crossing 1	1,343
Crossing 2	2,462
Crossing 3	4,827
Crossing 4	20,630
Total Linear Feet Crossed	**29,262**
White Site 2 Natural Gas Pipeline Route	
Crossing 5	410
Crossing 6	1,908
Crossing 7	576
Crossing 8	356
Crossing 9	4,200
Crossing 10	1,388
Total Linear Feet Crossed	**8,838**

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Crossing 5
Crossing 6
Toronto
28
271
Crossing 7
Crossing 8
Astoria
Crossing 9
Deuel County
Brookings County
Crossing 1
Crossing 2
Hendricks
Crossing 3
Crossing 10
Crossing 4
Site 2
19
30
White
South Dakota
Minnesota
Site 1
A
B

5,000 0 5,000
SCALE IN FEET

LEGEND

- White Site 1 Pipeline
- White Site 2 Pipeline
- Study Area
- Well Sites A and B
- Aquifer
- Aquifer Crossings
- White Site 1 and 2 Boundaries
- Northern Border Pipeline
- State Boundary
- County Boundary

Source: USDA NAIP County Mosaic, Brookings and Deuel counties, North Dakota; FEMA; ESRI; Basin Electric Power Cooperative

NORTH

Figure 4-2

Well Head Protection Area Crossings
Deer Creek Station EIS

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Other impacts to groundwater are possible if chemical spills occur during construction activities. Two previous chemical spills are known to have occurred along the White Site 1 Natural Gas Pipeline Route in Brookings County. In 2003, a spill of atrazine occurred at 485th Avenue and 198th Street; and in 1999, an acid cleaner spill occurred at 484th Avenue and 197th Street. According to the SDDENR (2009), both spills have been remediated and the cases closed. The equipment and materials used for pipeline construction would include very few chemicals of concern, and in small quantities. Fuel, oil, and hydraulic fluid would be the most common, and spills of these materials are easily remediated by on-site crews and clean-up materials. In order to mitigate the impact of possible chemical spills, spill prevention and control would be required. Spill plan measures would include spill containment materials at all construction sites and site crews trained in spill response and clean up.

4.3.2.5 White Site 2 Natural Gas Pipeline

4.3.2.5.1 Surface Water

Within the White Site 2 Natural Gas Pipeline Route, the pipeline would be trenched. If stream crossings involve wetlands of more than 0.5 acre, the pipeline would be directionally drilled to go under and avoid disturbing streams. BMPs would be used to minimize any sediment-laden runoff from entering any streams or roadside ditches. With appropriate use of BMPs, minimal impacts would be expected. Silt fence and sediment barriers would be placed along the route where disturbance takes place and vegetation would be established before any erosion control measures are removed (70 percent native perennial vegetative cover).

4.3.2.5.2 Floodplains

According to FEMA's 100-year flood zone maps, the White Site 2 Natural Gas Pipeline Route crosses or runs parallel to 100-year flood zones. The White Site 2 Natural Gas Pipeline Route makes four crossings of 100-year flood zones. The approximate lengths (in feet) of each crossing, listed in order from north to south, are presented in table 4-5. The White Site 2 Natural Gas Pipeline Route crosses a total of approximately 1,457 linear feet of 100-year flood zone areas.

The location of the White Site 2 Natural Gas Pipeline Route in relation to floodplains is indicated in figure 4-1. The pipeline would be buried and would not create permanent floodplain obstructions. Accordingly, natural and beneficial floodplain values would only be affected during a brief construction period and periodically during the operation period when repairs or maintenance activities are needed. The White Site 2 Natural Gas Pipeline Route follows roadways in order to minimize the potential for impacts to environmental resources. The crossings of floodplains are perpendicular to the streams, thus

minimizing disturbance within the floodplain. In order for a pipeline to be routed to White Site 2, floodplain crossings are necessary (table 4-6). There are no pipeline routes that would completely avoid floodplains, given the locations that existing pipelines would need to be tapped, the alternative site locations, and the drainage patterns in the region. As a result of these considerations, there is no practicable alternative to construction of a natural gas pipeline in the floodplain crossings.

4.3.2.5.3 Groundwater

The White Site 2 Natural Gas Pipeline Route makes six crossings above the local Well Head Protection Area. The approximate lengths (in feet) of each crossing, listed in order from north to south, and the approximate total length crossed are listed in table 4-7. The location of the aquifer crossings are indicated in figure 4-2. The White Site 2 Natural Gas Pipeline Route overlies a total of approximately 8,838 feet of established Well Head Protection Area. The White Site 2 Natural Gas Pipeline Route makes two crossings over a Zone A Well Protection Area in the northwest region of the proposed Project area. This is the Astoria water well supply area. The crossings are approximately 447 and 358 feet, for a total of approximately 805 feet crossed. These crossings are on the very western edge of the Zone A area. Zone A areas are highly protected from potential contaminants; thus, extra measures of protection must be in place during construction and operation of the pipeline. The SDDENR recommends avoiding the crossing of established "A" Zones; however, the potential for a buried natural gas pipeline to cause groundwater impacts is minimal, and the pipeline has been routed to minimize impacts by choosing a route that only minimally affects two small areas on the edge of the Wellhead Protection area. Public utilities designed to prevent contamination from ground water are permitted in Zone A areas. The primary potential for impact would be from inadvertent chemical spills. Should White Site 2 be chosen and this pipeline route implemented, adherence to BMPs and SPCC plans would be required.

Other impacts to groundwater would be possible if spills of chemicals occur during construction activities. The equipment and materials used for pipeline construction would include very few chemicals of concern, and in small quantities. Fuel, oil, and hydraulic fluid spills have the potential to occur, however these materials are easily remediated by on-site crews and ready clean-up materials. In order to mitigate the impact of possible chemical spills, spill prevention and control would be required. Spill plan measures would include spill containment materials at all construction sites and site crews trained in spill response and clean up.

4.3.3 Cumulative Effects

Other past, present, and reasonably foreseeable future actions have affected water quality and floodplains in the Big Sioux and Lac Qui Parle watersheds. These include cropland erosion and agricultural nutrients

from fertilizer and livestock waste. Of special concern for cumulative impacts is the Lake Hendricks watershed, along the White Site 1 Natural Gas Pipeline Route. Although pipeline construction would not by itself generate additional nutrient loading for the watershed, the addition of sediment would worsen the impaired status of the reservoir. Accordingly, adherence to construction BMPs would be required for pipeline construction. Appropriate use of BMPs during construction would adequately mitigate for potential erosion and sediment problems and ensure that this proposed Project does not cumulatively contribute to the impairment of Lake Hendricks. Construction of the White Wind Farm and the wind farm to the south of Deer Creek, together with past agricultural development, has the potential to cumulatively affect Deer Creek. In this watershed, use of appropriate BMPs during construction would mitigate for potential erosion and sediment problems and ensure that the proposed Project does not cumulatively contribute to erosion and sedimentation in this watershed.

Past road construction and culverts have cumulatively affected floodplains in the proposed Project area. Although natural and beneficial floodplain values have likely been impacted by cultivated cropland, no important levees, large dams, or stream channelization activities have been constructed in floodplains. However, agricultural improvements such as small stock watering dams have likely contributed to cumulative effects on floodplains. Additional impacts to floodplains from the proposed Project would be temporary. No permanent obstructions, other than the building in Water Well Supply Site B, would be placed in floodplains.

Water Well Supply Site B along Deer Creek is in an aquifer recharged by rainfall and Deer Creek; it is associated with the Big Sioux aquifer and is in an established Well Head Protection Area. However, the well is far enough away from other domestic wells and city water sources that it would not create a cone of influence that would impact other domestic or municipal water supplies. There are no other known efforts to withdraw water from the aquifer along Deer Creek in the vicinity of the proposed Project. Accordingly, the potential for adverse cumulative effects due to groundwater pumping is low. Monitoring wells would be installed to confirm if there are any groundwater pumping impacts and action taken to reduce or mitigate impacts if they occurred.

4.4 WETLANDS AND STREAMS

4.4.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts

associated with construction and operation of the proposed Project would not occur. There would be no wetland or stream impacts associated with the No Action Alternative.

4.4.2 Proposed Project

Based on NWI information, the potential wetland impacts of the proposed Project at White Site 1 and White Site 2 are provided in Table 4-8 below. The acreage of wetlands shown on the NWI maps and wetlands actually delineated are not the same; however, the NWI acreage comparison provides a preliminary assessment of impacts between White Site 1 and White Site 2.

Table 4-8. Approximate Wetland Impacts Based in NWI Information

Project Location	White Site 1 (acres)	White Site 2 (acres)	No Action Alternative
Facility Layout Impacts	0.0	0.02	0.0
Substation Impacts	NA	0.21	0.0
Transmission Line Corridor Impacts*	0.0	1.70	0.0
Natural Gas Pipeline Corridor (75' ROW)*	1.75	0.61	0.0
Water Well Supply Site/Water Pipeline (60' ROW)*	0.0	0.05	0.0
Total Potential Impacts	**1.75**	**2.59**	**0.0**

* Temporary Impacts

Actual wetland delineation data is more accurate, and is provided for the Applicant's preferred site and associated facilities. Wetlands and surface waters associated with the preferred site were delineated from October 29 through November 6, 2008, and from May 4 through 8, 2009, (EDAW 2009a, EDAW 2009b, EDAW 2009c; EDAW 2008). Based on the wetlands delineated for the preferred site and associated facilities, the NWI data understate the actual amount of wetlands present.

It is likely that many of the wetlands and surface waters found in the proposed Project area would be considered by USACE as jurisdictional under section 404 of the Clean Water Act. Isolated wetlands, those without a significant nexus to a water of the United States, may be considered non-jurisdictional by the USACE. However, impacts to isolated wetlands are still considered in this EIS. EO 11990 requires Federal agencies to avoid direct or indirect support of new construction in wetlands, whether jurisdictional or isolated, wherever there is a practicable alternative. EO 11990 would apply for the proposed Project. Impacts to wetlands would be considered significant if:

- The proposed Project would cause a permanent loss or degradation of wetlands or streams in violation of the terms and conditions of a Nationwide or Individual USACE section 404 permit

- The proposed Project would create long-term adverse unmitigated impacts associated with wetland modification or destruction
- Stream channel morphology or surface drainage patterns are altered to the extent that existing vegetation communities and habitats are degraded or productivity is reduced

The proposed Project is located in the watersheds of the Big Sioux and Lac Qui Parle rivers. The surface waters associated with the proposed Project include Deer Creek, multiple unnamed tributaries to Deer Creek and the Lac Qui Parle River, Oak Lake, Lake Hendricks, and Black Slough. The majority of wetlands found in the proposed Project area are associated with these water features. A jurisdictional wetland exhibits a predominance of hydrophytic vegetation, wetland hydrology, hydric soil, and connectivity to a water of the United States. A jurisdictional stream is defined as a waterway with an ordinary high water mark (OHWM). A few OHWM indicators include a bed and bank, a change in plant community, shelving, and water staining. A section 404 permit from the USACE is required prior to the start of any activity which would physically alter or discharge dredged or fill materials into a jurisdictional water of the United States, including wetlands. Wetlands could be temporarily impacted by placement of the pipeline by trench construction. However, larger wetlands would be directionally drilled underneath, resulting in no impacts. It is likely that all wetland impacts from pipeline construction would qualify for NWP 12 for utility lines. The wetlands in the pipeline corridor are generally in good condition, although impacted by agriculture and grazing. The majority of wetlands are classified as palustrine emergent and contain reed canarygrass, prairie cordgrass, yellow bristlegrass, and sedge species. Most reed canarygrass varieties are considered naturalized in the U.S. and are considered invasive.

Directional boring and open-cut trenching techniques would be employed where natural gas pipelines and water pipelines require a stream or wetland crossing. Directional boring would be the preferred construction method for large wetland complexes. Open-cut trenching methods may be used in other areas and in areas that are dry at the time of construction. Decisions on which method to use at each location would be made based on the conditions present at the time of construction, and would be made in consultation with the USFWS and USACE. During construction, buffers of 25 feet in width would be established around surface waters and wetlands to minimize sedimentation and runoff or spill of petroleum products. Wetlands that are temporarily impacted during construction would be restored to pre-construction conditions upon completion of construction activities. The final layout of the proposed Project would be designed to minimize impacts to identified wetlands and streams, but given the numerous wetlands in the proposed Project area, it is not possible to avoid all of them. It is not anticipated that impacts from the proposed Project would require habitat creation or restoration.

4.4.2.1 White Site 1 Alternative

Based on the NWI, no wetlands were associated with White Site 1; however, the actual delineation found wetlands at White Site 1 associated with an intermittent drainage. Four palustrine emergent (PEM) wetlands were delineated within this drainage along the eastern portion of White Site 1. The total area of these wetlands is approximately 3.24 acres, of which 0.04 acres would be impacted by proposed Project facilities. Deer Creek is a tributary to the Big Sioux River, which is classified by the USACE as a traditional navigable water. Because the four PEM wetlands are associated with an unnamed drainage which empties downstream into Deer Creek, these wetlands are likely jurisdictional waters. Vegetation is dominated by reed canarygrass, yellow bristlegrass, barnyardgrass, and prairie cordgrass. This is common wetland vegetation for the area, and the wetlands are not considered high quality. This PEM swale is located on the eastern half of the site and would be impacted by the construction of a permanent access road and site infrastructure. A narrow PEM swale, containing concentrated storm water, crosses the south end of the White Site 1 transmission corridor. Potential temporary impacts within this transmission line corridor are 0.22 acres. These wetlands are dominated by reed canarygrass, prairie cordgrass, yellow bristlegrass, and sedge species. This swale would be avoided by placement of transmission structures outside of the wetland. White Site 1 road improvements along 484th Avenue have the potential to cause temporary impacts to Deer Creek. A bridge over Deer Creek on 484th Avenue would be temporarily improved for use by heavy loads. The paving work on 484th Avenue north of 207th Street would be 20 feet from a wetland. No work in streams or wetlands would be required; however, BMPs would be used to avoid runoff impacts such as sedimentation. Gravel surfaces at approaches to intersections along the designated access routes would be considered for paving for a minimum distance of 300 feet to eliminate wash boarding and rutting that occur from deceleration, acceleration, and turning movements. The intersection segments would be paved to the extent necessary to provide the adequate tapers and radii for semi-trailer movements, which may require local ditch grading and location adjustment. Any additional grading outside of existing ditches would require biological surveys. If construction in wetlands is necessary, potential impacts may include soil compaction and erosion, hydrophytic vegetation removal and trampling, and the alteration of hydrologic regimes, including reduced floodwater absorption. These impacts would be avoided by minimizing the construction footprint, use of pads for heavy equipment, and restoration to pre-construction contours.

4.4.2.1.1 Water Well Supply Site B and Water Pipeline

The proposed groundwater well installation is located in a crop field to the west of 484th Avenue and would not directly impact wetland communities. The construction areas surrounding the wells would be restored to pre-existing conditions upon completion. Water Well Supply Site B is located 100 feet from a

wetland complex associated with Deer Creek. A total of 26.60 acres of PEM wetlands are located on the Water Well Supply Site property; however, none of the wetlands would be directly impacted by the proposed Project. Wetland vegetation includes bog yellowcress, creeping foxtail, barnyardgrass, and reed canarygrass. This is a higher quality wetland than found on White Site 1. Consistently withdrawing water from a groundwater-sourced aquifer near surface water features has the potential for temporary and permanent impacts to the wetlands. However, testing indicated that this well is a productive source, thus minimizing the potential for a large cone of depression affecting nearby surface water features. During well installation and commissioning, monitoring wells adjacent to wetlands and waterways would be monitored to address any surface hydrology issues as a result of groundwater pumping. If issues were found to exist, an alternate water source would be investigated and developed. Drawdown of Deer Creek or adjacent wetlands as a result of groundwater pumping would be avoided.

Construction within the proposed water pipeline corridor that extends from the Water Well Supply Site B to White Site 1 would cross one PEM wetland, located southeast of White Site 1. The potential temporary impacts are 2.49 acres. In addition, the water pipeline would cross the PEM swale at White Site 1 described in section 4.4.2.1 above. Both wetland complexes would be temporarily impacted by the construction of this site infrastructure. Additionally, trench blocks would be installed adjacent to areas where the pipeline enters and exits a wetland to prevent hydrology and wetland morphology from changing as a result of pipeline installation. The pipeline area would be restored to pre-construction contours and the top 6 to 12 inches of the trench would be refilled with topsoil, in accordance with the stipulations of NWP 12. The pipeline has been routed to minimize construction beneath wetlands and other surface drainageways wherever feasible.

4.4.2.2 White Site 2 Alternative

According to NWI data, approximately 0.23 acres of permanent wetland impacts would occur due to facility construction and substation construction. An additional 1.7 acres of temporary impacts would occur within the White Site 2 Transmission Line corridor and 0.05 acres of temporary impacts would occur due to construction along the Rural Water Pipeline Extension corridor. Based on the ratio of delineated wetlands versus NWI wetlands noted for White Site 1, likely wetland impacts would be greater than indicated by NWI data. The layout of White Site 2 has been completed in conceptual design only. The PEM wetlands are mostly under cultivation, lack vegetation, and would be considered prairie potholes. However, the scattered nature of wetlands on the site makes it probable that some wetlands may be impacted if construction were to occur at this site. If construction in uncultivated wetlands cannot be avoided, potential impacts may include soil compaction and erosion, hydrophytic vegetation removal and trampling, and the alteration of hydrologic regimes, including reduced floodwater absorption. These

impacts would be avoided by minimizing the construction footprint, use of pads for heavy equipment, and restoration to pre-construction contours.

4.4.2.3 White Site 1 Natural Gas Pipeline Route

According to NWI data, construction on the White Site 1 Natural Gas Pipeline Route would temporarily impact 1.75 acres of wetlands. However, more detailed field delineation indicates that approximately 6.60 acres of PEM, palustrine forested (PFO), and palustrine unconsolidated bottom (PUB) wetlands would be temporarily impacted within the White Site 1 Natural Gas Pipeline Route. Of this, 94 percent of the impacts would be to the PEM type. Major areas of wetland crossing are along two tributaries to Oak Lake, north and west of Lake Hendricks, and south of the 197th Street and 485th Avenue intersection (appendix B). These large wetlands would be considered high quality. Larger wetland complexes, such as those found south of 197th Street and west of 485th Avenue (NW ¼ Section 7, T112N R47W), would be directionally bored. This construction technique would minimize impacts to wetlands and waterways located within the White Site 1 Natural Gas Pipeline Route. Surface waters and wetlands without flowing or standing water at the time construction is initiated would be constructed using open-cut trenching. Additionally, trench blocks would be installed adjacent to areas where the pipeline enters and exits a wetland to prevent hydrology and wetland morphology from changing as a result of pipeline installation. At the wetland boundaries, the pipeline would be surrounded by clay or other low permeability material to stop the flow of any water that may have become channelized along the pipeline. During the routing process, the presence of wetlands and surface waters was considered in order to avoid these sensitive resources to the greatest extent feasible. Trenching would be done in the fall when it is the driest. Also, construction next to the roads should restrict any disturbance to the margins of wetlands crossed, and allows access and work from the raised roadbed.

4.4.2.4 White Site 2 Natural Gas Pipeline Route

NWI data indicates the presence of numerous small isolated PEM wetlands along stream channels within the White Site 2 Natural Gas Pipeline Route. According to NWI data, approximately 0.59 acres of PEM wetlands and 0.02 acres of PUB wetlands would be temporarily impacted within a 75-foot corridor within the White Site 2 Natural Gas Pipeline Route. Based on the ratio of delineated wetlands noted for White Site 1, it is likely that wetland impacts would be greater than indicated by NWI data. There are eight surface water drainages in the potential ROW. The northern portions of the pipeline corridor contain several prairie potholes that have not been cultivated; these would be considered high-quality wetlands. Wetlands were not delineated and actual acreage was not calculated. The pipeline would be installed via open-cut trenching in most cases, but directional boring would be used in the case of extensive wetlands. Open-cut construction would be used in areas without flowing or standing water at the time construction

is initiated. Any wetlands or surface waters that are temporarily impacted during project construction would be restored to pre-construction condition. Construction would abide by the stipulations in NWP 12, Utility Line Activities.

4.4.3 Cumulative Effects

Other past, present, and reasonably foreseeable future activities in the proposed Project area with potential to affect wetlands in the Big Sioux ecoregion are ongoing farming operations, including past sod busting, the White Wind Farm to the north, the MinnDakota and Buffalo Ridge wind farms to the south, and a proposed wind farm to the west of the proposed Project site. The wind farms have been designed to minimize impacts to wetlands and streams. For example, the White Wind Farm has projected permanent wetland impacts of only 0.075 acres. In addition, there are fewer "prairie pothole" type wetlands in the Big Sioux ecoregion as compared to the Prairie Coteau ecoregion traversed by the gas pipeline route. Construction of the gas pipeline would result in temporary impacts to some wetland communities. The disturbed pipeline area would be restored upon completion of construction and no long-term loss or degradation of wetlands and surface waters would occur. Existing wetland and stream vegetation communities would not be degraded or productivity reduced. No unique or unusual wetland communities were identified on White Site 1 or 2 or on Water Well Supply Site B. The proposed Project is not expected to result in significant cumulative impacts to wetland or stream resources.

4.5 BIOLOGICAL RESOURCES

4.5.1 Vegetation

4.5.1.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no vegetation impacts associated with the No Action Alternative.

4.5.1.2 Proposed Project

Impacts to vegetation would be considered significant if:

- The proposed Project results in long-term loss of unique native vegetation communities, such as native prairie

- The proposed Project results in the long-term loss of riparian vegetation outside of the ROW corridor of the natural gas and water pipelines
- The proposed Project results in a permanent expansion of noxious weeds to a new location, covering more than one acre, or noxious weeds would expand to the degree that it would adversely affect the health and populations of native vegetation communities

Construction, operation, and maintenance of various proposed Project components including the plant site, groundwater well site, access roads, water pipeline, transmission corridor, and natural gas pipeline would result in impacts to both vegetation communities and noxious weeds. Construction of access roads and staging areas would result in both permanent and temporary loss of vegetation. Cleared areas through shelterbelts would be approximately 50 feet in width for pipeline or waterline construction and 100 feet in width for a road crossing. Construction activities generally result in vegetation removal, increased trampling of vegetation, erosion, soil compaction, and sedimentation. any of which could result in adverse effects to vegetation communities. Compacted soils can inhibit germination and root growth for native plant species. If soil compaction is severe on areas where there were formerly native plants, desired native plants may have difficulty becoming reestablished and could be replaced by new or weedy plant species. Ground disturbance may also result in propagation of noxious weeds, particularly in areas that have existing weed infestations.

Noxious weeds can be spread from unwashed construction equipment, vehicles transporting noxious weed-inoculated soil or plant materials into un-infested areas, or from transfer of topsoil inoculated with noxious weeds. Ground disturbance can also allow invasives to become established, as seeds may blow in from nearby infested areas. Noxious weeds typically are fast growing and can displace native species or inhibit reestablishment of native grasses, forbs, and shrubs. Mitigation measures to avoid the introduction or spread of noxious weeds would include requiring that construction equipment and vehicles are washed and free of soil and debris before entering the construction area. Additionally, a vegetation restoration plan and an integrated weed management plan would be implemented post-construction to mitigate impacts to vegetation communities in all portions of the proposed Project.

Alteration of existing drainages and drainage patterns pre- and post-construction may alter water availability for vegetation communities including wetlands. Species that are considered noxious and invasive weeds require less water and take advantage of disturbed bare ground. Proposed Project operations would require workers to travel to and within the general area, increasing the opportunity for the spread of noxious weeds.

White Site 1 Alternative

Construction of the plant would permanently impact approximately 40 acres of cultivated cropland at White Site 1. Temporary impacts to vegetation from construction may occur within the 100-acre site. Since the site is predominantly cultivated cropland (90 percent), impacts to native grassland and woodland communities are expected to be minor. Woodland and wetland habitats would be avoided to the greatest extent feasible during construction. A five-acre forested shelterbelt is located on the east edge of the proposed Project site. The 100-foot wide corridor containing temporary and permanent impacts resulting from the installation of the waterline and access road infrastructure at White Site 1 would impact less than one acre of the forested shelterbelt, equaling 20 percent of the shelterbelt. There is no native prairie on the site.

Within the 0.75 mile, 13.6-acre transmission corridor to the White substation, 40 percent of the vegetation is cultivated cropland, 55 percent is pastureland, and 5 percent is developed land. Temporary impacts would result from construction of any necessary access roads needed to build the transmission line. Permanent impacts to vegetation would be limited to the footprint of transmission structure, and the footprint of access roads, if needed. The transmission ROW (except for cropland) would be revegetated to pre-existing conditions once construction is complete. A noxious weed management plan would be implemented to minimize the spread of noxious weeds within the ROW and adjacent properties. White Site 1 road improvements along 484th Avenue would take place within the existing road ROW and would have only occasional and temporary impacts to mowed grass along the roadway from equipment usage.

Water Well Supply Site B and Water Pipeline

Approximately 40 percent of Water Well Supply Site B is cultivated cropland and 15 percent is used for pastureland. Wetlands and waterways are found throughout the southern half of the site. These areas will be avoided during the final site layout process. Construction of the well facilities would result in the permanent impact of an approximate 200-foot-by-200-foot vegetated area that is entirely cultivated cropland. Wetland communities and other vegetation communities outside of the 200-foot-by-200-foot well facilities may be temporarily or permanently impacted by groundwater pumping. Woodland and wetland habitats would be avoided during construction. Temporary impacts would occur along the approximate 1.25 mile water supply pipeline along 484th Avenue. The water supply pipeline would be located off the County Road ROW in private land that is predominantly pasture.

White Site 2 Alternative

Approximately 90 percent of White Site 2 is cultivated cropland with the remainder being woodland. Approximately 46 acres would be permanently impacted by construction. Temporary impacts may also

occur within the 100-acre site. The facility footprint, including the future substation, would be sited to avoid impacts to the woodland on the site.

Within the transmission corridor, 90 percent of the vegetation is cultivated cropland. Temporary impacts would result from construction of any necessary access roads needed to build the transmission line. Permanent impacts to vegetation would be limited to the transmission structure footprints and maintenance access roads, if needed. The transmission ROW that is not to be returned to cultivation would be revegetated using a seed mix approved by NRCS and Western once construction is complete. A noxious weed management plan would be implemented to minimize the spread of noxious weeds within the ROW and adjacent properties. Final siting of the transmission line would seek to minimize placing structures through shelterbelts, in wetland habitats, and in native prairie habitat. Construction of the Rural Water Pipeline Extension would be within or adjacent to the road ROW and would have similar temporary vegetation impacts.

White Site 1 Natural Gas Pipeline Route

Impacts within the estimated 387-acre Natural Gas Pipeline Route construction ROW would be temporary. Approximately 184 acres of cultivated cropland (47 percent) and 130 acres of pastureland (34 percent) are the primary vegetation types that would be temporarily impacted during construction. Additional vegetation communities in the ROW that would be impacted include 12 acres of forested areas or shelterbelts (3 percent), 9 acres of native prairie communities (2 percent), 17 acres of mixed grassed prairie (native and non-native) (4 percent) , and 35 acres of wetlands (10 percent). Native prairie communities are located in isolated areas along the ROW, including near 204th Street and along 485th Avenue north of Lake Hendricks. These areas would be reseeded with native prairie seed. Two locations to be crossed by the White Site 1 Natural Gas Pipeline Route were determined to contain native prairie forb and native warm season grass communities. These include one hillside on the south side of 204th Avenue (NE ¼ Section 18, T111N, R47W) as well as one hillside on the east side of 485th Avenue, immediately northwest of Lake Hendricks (NW ¼ Section 29, T112N, R47W). Both locations of native prairie to be crossed are where the pipeline route leaves the road ROW and proceeds cross-country. Estimated distance of the pipeline through the native prairie at 204th Street would be 578 feet, and distance through the prairie near Lake Hendricks would be 2,042 feet. The natural gas pipeline ROW would be revegetated once construction is complete. Within the small areas of native prairie, the existing topsoil with its bank of native seed would be carefully salvaged and replaced in a timely manner, and augmented with native grass seed to minimize invasion of noxious or undesirable weed species. A noxious weed management plan would be implemented to minimize the spread of noxious weeds within the ROW and adjacent properties.

White Site 2 Natural Gas Pipeline Route

Within the White Site 2 Natural Gas Pipeline Route, 40 percent of the vegetation is cultivated cropland and 55 percent is pastureland. These combined areas would be temporarily impacted within the construction ROW. Forested shelterbelts are also present but only comprise five percent of the alternative gas construction ROW. The cleared area through shelterbelts would be a maximum of 75 feet in width. The White Site 2 Natural Gas Pipeline construction ROW outside of cultivated areas would be revegetated with grass once construction is complete. A noxious weed management plan would be implemented to minimize the spread of noxious weeds within the ROW and adjacent properties.

4.5.1.3 Cumulative Effects

Past, present, and reasonably foreseeable future actions that have affected vegetation in the area are the ongoing agricultural development and past sod busting in the Big Sioux and Prairie Coteau ecoregions, as well as the wind farm developments in the area, the White Wind Farm to the north, the MinnDakota and Buffalo Ridge wind farms to the south, and the proposed wind project to the west. The footprint of the proposed Project is small in comparison to these developments. The impacts to native prairie along the gas pipeline ROW would be temporary and would be restored. Therefore, the proposed Project would not result in the long-term loss of unique natural communities. Riparian vegetation would be preserved during construction and operation of the natural gas pipeline. The potential for noxious weed expansion would be reduced by revegetation with native species seed mixes. As a result, the individual and cumulative impacts of the proposed Project on vegetation would not be significant.

4.5.2 Wildlife

4.5.2.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no wildlife impacts associated with the No Action Alternative.

4.5.2.2 Proposed Project

The mix of wetland, riparian, prairie, and woodland areas, along with agricultural land uses, provides a wide range of habitats for the numerous wildlife species that occur within the proposed Project area. The wildlife species discussed within this section are those not listed under a State or Federal designation for protection. Impacts to wildlife resources would be considered significant if the proposed Project would

have a negative impact on the biological viability of a local, regional, or national population of wildlife species. Some general impacts to wildlife resulting from the construction and operation of a generation facility and associated infrastructure are discussed below. Impacts to wildlife can be direct, indirect, permanent or temporary and may be separated, when necessary, into construction and operation impacts.

Terrestrial habitats include tall grass prairie, mixed-grass prairie, cool-seasonal and invasive grass areas, cultivated cropland, pastureland, woodland areas, and wetlands. The proposed Project area is located in areas of mostly open, rolling hills with limited forest cover in the form of shelterbelts; therefore, minimal fragmentation of woodland shelterbelt areas would result. The power plant, water well site, and transmission line cross mostly cultivated cropland. Wildlife species would temporarily avoid areas during construction, which would result in the temporary or permanent alteration of movement patterns, depending on the species and project feature.

Construction activities that remove vegetation and disturb soil could cause the mortality of small, less-mobile, ground-dwelling wildlife species such as the thirteen-lined ground squirrel, prairie vole, eastern cottontail, and amphibians and reptiles. These species would also be temporarily displaced during construction activities, but would likely return upon completion of construction and restoration of disturbed habitats. Other mobile species, such as ring-necked pheasant, some migratory bird species, raccoon, coyote, and whitetail deer may leave and avoid the construction areas, but would be expected to return within a year with the restoration of suitable habitat to areas such as the natural gas pipelines, water pipelines, and transmission ROWs. Some wildlife would likely avoid the permanently disturbed areas, depending on the nature of the facility and the amount of human activity in the area. Due to the abundance and diversity of available habitat for wildlife in the area, construction and operation of the proposed Project would not be expected to have permanent impacts on local or regional species populations.

Open cut trenching to install the pipelines may be used at streams and wetland areas that do not have suitable habitat for listed species. Trenching would produce temporary impacts to aquatic life. The areas within the immediate drainage of the streams would only be subjected to minimal temporary impacts during construction and there would be no permanent impacts. As a result, wildlife inhabiting the aquatic and adjacent habitats would be minimally impacted during construction and operation. Directional drilling would be utilized in wetland areas whose areal extent is great or where other physical constraints exist to placement of the pipeline by trenching methods. Riparian and wetland areas as well as shelterbelts would be preserved whenever possible because they provide crucial nesting and roosting habitat for avian species, as well as cover and forage for big game, upland game birds, and a variety of

other wildlife species in the area. If construction occurs between March 15 and July 15, avian nesting surveys would be conducted by a qualified specialist in order to avoid bird nests. If special status or migratory species were found nesting, USFWS would be consulted to identify measures, such as avoidance buffers, to minimize impacts and avoid the take of breeding birds.

Waterfowl nesting areas would be subjected to temporary impacts during pipeline installation in wetland areas as well as through activities near streams and associated riparian areas. There are areas of suitable nesting habitat for migratory and resident raptors within or in proximity to the proposed Project area. In general, disturbance of birds would be greatest during the spring-to-early summer breeding season as well as spring and fall migrations. Most facility construction would occur during the fall to take advantage of dry conditions and to avoid impacts to nesting species; however, if construction were to occur during the avian breeding season, nesting bird surveys would be conducted prior to any ground-disturbing activities. The USFWS would be consulted to identify measures to minimize impacts and avoid, minimize, or mitigate disturbance or take of nesting avian species at locations with suitable habitat within the proposed Project area. The majority of the avian species found within the proposed Project area are protected under the MBTA.

Sedimentation in aquatic ecosystems can adversely impact feeding, resting, and breeding habitats. For pipeline construction, directional boring would be used beneath extensive wetland complexes. Open-cut trenching methods may be used in other areas and in areas that are dry at the time of construction. Decisions about which method to use at each location would be based on site conditions at the time of construction. In anticipation of trenching, the appropriate permits under section 404 would be acquired, such as NWP 12. Streams that are temporarily impacted during construction would be restored to pre-construction contours upon completion of construction activities. These techniques would minimize or avoid impacts to environmentally sensitive areas. Impacts to the existing invertebrate, fish, amphibian, and reptile species would be temporary and are anticipated to be negligible as a direct result of planned construction or operation of the proposed Project. Potential temporary or permanent impacts to the aquatic communities may occur as a result of unforeseen environmental events (e.g., flooding, tornadoes, or excessive snowmelts). Unforeseen events could exceed the effective capabilities of recommended BMPs, or equipment could malfunction and fail during the construction process. During construction that is near surface waters and wetlands but does not involve trenching or boring, 25-foot buffers would be established around surface waters and wetlands to minimize potential sedimentation and runoff and protect against spill of petroleum products. Buffers would be marked by the installation of silt fence. Areas of permanent impact, including paved roads, graveled parking lots, and other operational areas, would enable increased precipitation runoff that may carry higher concentrations of total dissolved solids

and hydrocarbons. Areas within the proposed Project site would be engineered to reduce indirect effects from storm water runoff to aquatic habitats near the site. The operating area of the proposed Project would be graded so that stormwater would be directed to drainage ditches and swales and then to an on-site stormwater detention pond. Operation of the proposed Project may result in temporary impacts to surface water, groundwater, or wetlands through unforeseen equipment malfunctions leading to amplification in the impacts of runoff. These potential impacts would be minimized through proper design of facilities, use of BMPs, and good housekeeping practices in chemical usage.

White Site 1 Alternative

Wildlife species such as small birds and mammals that may forage in the agricultural portion of this area would relocate to other nearby agriculture fields during construction and operation. However, impacts to these species would be minimal as there is abundant similar habitat nearby. Plant construction may result in the loss of some areas that are not currently cultivated cropland. These areas are of greater value to wildlife as habitat and include a forested shelterbelt that comprises five percent of the acreage of White Site 1. This is located on the east side of the proposed Project site. The temporary and permanent impacts resulting from the installation of the waterline and access road infrastructure at White Site 1 (about a 100-foot wide corridor) would impact less than one acre of the forested shelterbelt. Avian species that may use the woodland areas for nesting, foraging, or stopover habitat as well as ground-dwelling mammals would be minimally impacted as a result of this portion of the proposed Project construction. Of the 3.2 acres of PEM wetlands on White Site 1, a portion would be affected by access road and water pipeline construction; impacts would be less than the one-half acre NWP thresholds for road crossings or utility line crossings. The PEM swale is located on the eastern half of the site and would be impacted by the construction of a permanent access road and site infrastructure. The PEM swale was previously periodically maintained by mowing for agricultural purposes and provides very little wildlife habitat.

One inactive raptor nest was located in 2009 in the southeast corner of White Site 1, on the southern end of the forested shelterbelt, outside of the area to be impacted by construction. One great horned owl nest was located in 2009 approximately 0.35 miles east of White Site 1 in a narrow forested shelterbelt surrounded by an abandoned farmstead. SDGFP would be consulted if any active raptor nests were discovered within 0.25 miles of any of the proposed Project facilities during construction. Because only two nests may potentially be impacted, the biological viability of raptors or owls would not be affected by activities at White Site 1.

Impacts to wildlife other than birds during construction on White Site 1 are also expected to be minimal, because the cropland, pastureland, and shelterbelt habitats within disturbance areas crossed are common; no long-term impacts to local, State, or national populations are likely. Operation of the generation facility may cause some species of wildlife to avoid the facility site due to increased human activity and noise associated with the facility. All of the species disturbed are likely to be common and would relocate in abundant suitable habitat elsewhere.

Water Well Supply Site B and Water Pipeline

Construction on Water Well Supply Site B would permanently impact a portion of the cultivated cropland in the area necessary for the footprint of the pumping structure and construction and maintenance of the access road to the location. An estimated 200-foot-by-200-foot area would be required for construction and operation. Wildlife habitat in these locations is minimal due to the current land use as cultivated cropland and small total acreage required. Construction of the water supply line to the generation facility is anticipated to parallel the county road along 484th Avenue. The pipeline ROW would predominantly be across pastureland that provides marginal wildlife habitat. The construction of the water supply line would cause temporary disturbance to soil and vegetation and displacement of wildlife species using this area. Temporary impacts would occur within the well construction area; these impacts would all be within a cultivated field.

Water Well Supply Site B is located near a wetland complex associated with Deer Creek, as well as Deer Creek itself. Consistently withdrawing water from a groundwater-sourced aquifer near surface water features has the potential for temporary and permanent impacts to the hydrological dynamics of the immediate area and therefore the aquatic habitat, aquatic species, ecologically connected terrestrial habitat, and terrestrial wildlife that use these habitats throughout the year. However, testing indicated that this well is a productive source, thus minimizing the potential for a large cone of depression affecting nearby surface water features (Banner Associates 2009). As a precaution, temporary monitoring wells would be located between the two production wells and Deer Creek. If the cone of influence does not extend to these monitoring wells, it would be assumed that there is no impact to Deer Creek. If impacts were noted at the monitoring wells, Basin Electric would develop a mitigation plan for any hydrologic and biological impacts to Deer Creek.

White Site 2 Alternative

Approximately 90 percent of the land use within the White Site 2 area is cultivated cropland. Additionally, an estimated 90 percent of the land use within the White Site 2 Transmission Corridor is cultivated cropland. About 10 percent of the land within White Site 2 is a forested shelterbelt, which

would be avoided by power plant and substation construction. Wildlife habitats found at White Site 2 include those described for White Site 1 in regard to the cultivated cropland areas. The total area impacted and potential impacts for White Site 2 are similar to the cultivated cropland areas for White Site 1. However, White Site 2 would have a larger total percentage of permanent surface changes and subsequent potential surface runoff due to the additional construction of the necessary substation. Potential temporary impacts to wildlife and wildlife habitat are expected to be similar to those discussed above for White Site 1. However, the addition of the substation would result in six acres of additional permanent impacts. The construction of the Rural Water Pipeline Extension planned for White Site 2 would require the temporary removal of approximately 0.05 acres (according to analysis of NWI data) of wetland vegetation and, depending on the final routing, permanent removal of less than one acre of woody areas along the pipeline corridor. These activities would cause temporary disturbance or displacement of wildlife species during construction as well as permanent displacement of some species during operation. Some mortality of small, ground-dwelling animals may occur during construction, but impacts are not expected to affect local or regional species populations. As a result, wildlife inhabiting the aquatic, semi-aquatic, and wetland habitats would be minimally impacted during construction and operation.

White Site 1 and White Site 2 Transmission Corridor

The proposed Project area occurs at the border between the Central and Mississippi flyways; some of the waterfowl species that may occur in the proposed Project area are listed in appendix C. The presence of overhead transmission lines may increase the collision and electrocution risks for avian species and bats, especially near wetlands and riparian areas (APLIC 2006). The proposed Project would be built following USFWS and Avian Power Line Interaction Committee (APLIC) guidelines to minimize bird risks. The transmission line, including structures, would be placed outside of wetland and riparian habitat to minimize habitat loss and the displacement of amphibians, reptiles, small mammal, and avian species that may use the transmission ROW.

Construction and operation of the 0.75-mile long transmission line for White Site 1 would be primarily within cultivated cropland (40 percent), pastureland (55 percent), and developed land (five percent). The 0.50-mile long transmission line for White Site 2 would cross cultivated cropland for its entire length. Habitat loss to species in the area would be minimal due to the current land uses. The potential for localized, permanent habitat loss and possibly the direct mortality of less mobile ground-dwelling species within the corridor exist in locations where transmission structures are located in areas not used for cultivated cropland. Foraging and resting areas in pastureland would be temporarily altered by access roads and human disturbance during construction and operation. The area affected would be little more

than the width of a vehicle track and would most likely occur in the fall, during non-nesting and dry weather. Permanent impacts from transmission lines associated with the proposed Project are not expected to be significant to local, regional, or national species populations.

White Site 1 Natural Gas Pipeline Route

Approximately 35,800 linear feet (6.8 miles) of the White Site 1 Natural Gas Pipeline would be constructed parallel to existing local roadways, and 33,500 linear feet (6.4 miles) would be constructed cross-country. Although construction is adjacent to existing road ROW, the pipeline would require new easements immediately adjacent to the road easements. Because the pipeline is adjacent to habitat that has already been fragmented by roadways, the impacts to wildlife habitat would be less than for those portions routed cross-country. Native vegetation has been previously disturbed along most of the proposed ROW length through cultivation, introduction of livestock, and encroachment of non-native grass species. Two locations to be crossed by the White Site 1 Natural Gas Pipeline Route were determined to contain native prairie forb and native warm season grass communities. These include one hillside on the south side of 204th Avenue (NE ¼ Section 18, T111N, R47W) as well as one hillside on the east side of 485th Avenue, immediately northwest of Lake Hendricks (NW ¼ Section 29, T112N, R47W). Both locations of native prairie to be crossed are where the pipeline route leaves the road ROW and proceeds cross-country. Impacts in these areas are expected to be temporary, with direct impacts to small mammals and avian species including loss of habitat and noise disturbance during construction. Mammals, amphibians, reptiles, and bird species may also experience temporary impacts as a result of trenching during construction. Trenching activities may result in localized permanent impacts to individual small, ground-dwelling wildlife species that may occur in the area. Following construction activities, the area would be revegetated following an approved protocol and wildlife would move back into the area.

One inactive raptor nest of an unknown species was located in 2009 approximately 0.47 mile southwest of the proposed construction ROW in a shelterbelt just east of 484th Avenue and north of 197th Street (EDAW 2009b). If construction were to occur during the avian breeding season, loss of habitat and human disturbance could result in temporary or permanent impacts to individuals and populations of avian species. Most facility construction would occur during the fall to avoid impacts to nesting species; however, if construction were to occur during the avian breeding season, pre-construction surveys would be conducted prior to any ground-disturbing activities. Basin Electric, Western, and RUS would consult with the USFWS prior to construction during this time period to determine measures to avoid impacts to migratory bird species. Some segments of the pipeline would be constructed using directional boring, also resulting in minimized impacts to associated common wildlife and aquatic habitat. Aquatic, wetland,

and terrestrial habitats that would be open-cut trenched would be restored to pre-construction conditions to mitigate long-term impacts to habitats and wildlife species found in these areas. Because only one nest would be involved, the biological viability of raptors protected under the MBTA would not be affected by activities along the White Site 1 Natural Gas Pipeline Route.

Impacts to wildlife other than birds during construction along the White Site 1 Natural Gas Pipeline Route are also expected to be minimal, because the cropland, pastureland, and shelterbelt habitats crossed are common, with no long-term impacts to local, State, or national populations. The native prairie habitat crossed in two locations would only be temporarily impacted. Species utilizing this habitat would likely temporarily relocate and return as restoration progresses. As a result of these considerations, the construction and operation of the White Site 1 Natural Gas Pipeline would not likely have permanent significant impacts on the terrestrial or aquatic wildlife populations along the proposed route.

White Site 2 Natural Gas Pipeline

Habitats found within the alternate gas pipeline corridor are similar to those found within the proposed corridor; therefore, construction and operation of the White Site 2 Natural Gas Pipeline, although shorter than the proposed pipeline, is expected to have similar impacts on wildlife populations.

4.5.2.3 Cumulative Impacts

Past, present, and reasonably foreseeable future actions that have affected wildlife populations in the area include the extensive agricultural development of the past, and the more recent wind farm developments. More recent developments such as the wind farms have sought to minimize impacts to wetlands, native prairie, and woodland habitats. Most of the permanent impacts of the proposed Project would take place on existing agricultural lands with minimal potential for adverse cumulative impacts to wildlife. Because of the avoidance measures and construction methods that have been incorporated into the proposed Project, only temporary impacts are expected to wetlands or native prairie. Minor impacts to shelterbelts would occur where they are adjacent to existing ROWs. Construction at either White Site 1 or White Site 2 would not affect the biological viability of wildlife species. Construction and operation of White Site 2 would result in fewer impacts to wildlife and fisheries resources compared to White Site 1. However, regardless of the site chosen, the proposed Project would not contribute to significant adverse cumulative wildlife impacts.

4.5.3 Special Status Species

Species that have special State or Federal status are discussed in this section, including species listed as endangered or threatened under the ESA, species that are candidates for Federal listing, species listed as endangered or threatened on State endangered species lists, and species protected by the BGEPA.

4.5.3.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no special status species impacts associated with the No Action Alternative.

4.5.3.2 Proposed Project

Impacts to species with State or Federal status or their designated critical habitat would be considered significant if:

- The proposed Project would cause or be likely to cause an adverse affect on a federally-listed threatened or endangered species, designated critical habitat, or candidate species for Federal-listing
- The proposed Project would affect the biological viability of a State-listed threatened or endangered species
- The proposed Project would affect the biological viability of a species protected under the MBTA or the BGEPA.

4.5.3.2.1 Federal Species

For compliance with section 7 of the ESA, a separate Biological Assessment is being developed. The following is a summary of impacts to federally listed species, as well as impacts to the bald eagle, which is protected under other laws.

According to the USFWS letter of April 7, 2009, species with Federal status that have the potential to occur in the proposed Project area include the federally-endangered American burying beetle and Topeka shiner, the federally-threatened western prairie fringed orchid; and the Dakota skipper, a candidate for Federal listing. USFWS also stated that the proposed Project is "east of the migration corridor where 95 percent of whooping cranes have been documented; thus, the likelihood of occurrence at the proposed Project site is very low. Only rarely have individuals been pushed off-course by weather events and

occurred in habitats near, or even further east than, the proposed Project site." The USFWS county list also does not list the whooping crane as occurring in Brookings or Deuel counties (USFWS 2009).

The Topeka shiner has been documented in Deer Creek and associated tributaries that are found in the Project area. The American burying beetle and western prairie fringed orchid have not been known to occur in eastern South Dakota in recent decades. However, the western prairie fringed orchid is known to occur in southwest Minnesota (section 3.4.4). Representatives of Basin Electric, USACE, SDGFP, USFWS, and Western met on May 5, 2009, to discuss biological resource issues and permitting for the proposed Project. It was determined through this informal consultation that suitable habitat for the American burying beetle does not occur in the proposed Project area and that surveys for the species are not required (Schriner 2009). It was determined that federally listed species with the potential to be impacted by the construction and operation of the proposed Project are the Topeka shiner and western prairie fringed orchid, and also that the candidate species Dakota skipper has the potential to be impacted.

Topeka shiner habitat surveys were completed in September 2009. The only streams determined to have potential habitat were three locations along Deer Creek and one tributary. However, no project facilities are proposed that would involve pipeline construction through or under Deer Creek. Standard BMPs would prevent any substantive impacts to the waterways and there would be no significant impacts as a result of construction and operation. Water Well Supply Site B, which would provide process water for the proposed Project, is located in the floodplain to the north of Deer Creek. A test well has been installed and pump test results suggest that there would be no impact to Deer Creek at the water withdrawal levels to be used by the proposed Project. However, monitoring wells would be placed between the water well and Deer Creek to monitor the cone of influence for groundwater withdrawal and ensure that no impacts to water levels in Deer Creek occur. If it is determined that hydrological impacts to Deer Creek are occurring, additional consultation would be initiated with USFWS.

Habitat evaluations of the vegetation communities within the Project area were completed in July 2009 to determine if suitable habitat was present to support populations of the western prairie fringed orchid. No suitable habitat capable of supporting populations of the western prairie fringed orchid was located within the proposed Project area (Larson 2009). Construction and operational activities would result in no temporary or permanent impacts to this species on a local or regional level. The proposed Project would have no effect on the western prairie fringed orchid.

Habitat evaluations within the proposed Project area were conducted in June 2009 to determine if suitable habitat was present for the Dakota skipper. Three locations in the vicinity of the proposed

Project were determined to contain prairie forb and native warm season grass communities capable of supporting Dakota skipper populations. One location was to the southeast of White Site 1 near 207th Street (SW ¼ Section 30, T111N, R47W) and in an area that would not be impacted by construction or operation of the Project. The remaining two locations are along the White Site 1 Natural Gas Pipeline Route and include a north- and east-facing hillside on the south side of 204th Street (NE ¼ Section 18, T111N, R47W) as well as a west-, south-, and east-facing hill on the east side of 485th Avenue, immediately northwest of Lake Hendricks (NW ¼ Section 29, T112N, R47W). The White Site 1 Natural Gas Pipeline Route traverses 578 feet of native prairie at 204th Street and 2,042 feet of native prairie at 485th Avenue. Presence/absence surveys for Dakota skippers were completed during the short flight period of this species during summer 2009. Dakota skippers were found at the location southeast of White Site 1 but not at either location along the pipeline corridor (Skadsen 2009). Dakota skipper habitat is uncommon in the general area of the proposed Project and natural gas pipeline corridors.

Construction and operation of the power plant, transmission corridor, or proposed water well supply location would not directly impact known Dakota skipper populations. Although the Dakota skipper was not observed within the White Site 1 Natural Gas Pipeline Route, suitable habitat for this species exists in two locations along the ROW. Therefore, it is possible that the Dakota skipper and its habitat could be impacted during project construction. The current proposed Project layout would result in temporary impacts to suitable habitat within the pipeline ROW. These impacts would be minimized through the implementation of BMPs during and after construction, the restoration of native prairie communities within the ROW, and the implementation of a noxious weed management plan. To ensure that impacts are avoided, pipeline construction would not take place in the two locations of Dakota skipper suitable habitat during the growth and blooming period for the nectar source of the adult butterfly (May-July), which includes the summer breeding period of the butterfly.

The bald eagle is federally protected under the MBTA and BGEPA. One bald eagle was observed in October 2008 near the Lac Qui Parle River, which feeds into Lake Hendricks. Although bald eagles are found in the general area, no bald eagle nests have been identified near proposed Project facilities (EDAW 2009a). Therefore, no adverse impacts to the bald eagle would be expected. Other migratory birds in the area would be temporarily affected during construction, but because large-scale habitat changes are not part of the proposed Project, minimal habitat impacts are anticipated. In addition, construction of gas pipelines would be scheduled during the late summer and fall, after nesting season.

4.5.3.2.2 State-listed Species

State-listed species with the potential to occur in the Project area include the northern redbelly dace, banded killifish, blacknose shiner, sturgeon chub, osprey, eastern hognose snake, lined snake, and northern red-bellied snake. The eastern hognose snake and lined snake could potentially occur at White Site 1 around the shelterbelts on the eastern side of the site and could feed in the wetland and surface waters of the proposed Project site. Construction would be designed to avoid these areas. If present on site, some individuals could be temporarily affected if construction activities disturbed these areas, but they would more likely relocate to nearby areas during the construction period. Permanent impacts to the state-listed northern redbelly dace, banded killifish, blacknose shiner, sturgeon chub, and northern redbellied snake would be avoided by use of BMPs where construction would take place in the Deer Creek watershed.

4.5.3.3 Cumulative Impacts

Past, present, and reasonably foreseeable future actions with the potential to cumulatively affect aquatic species include agricultural development along with soil and nutrient enrichment of the watersheds, county road construction, especially involving bridges and culverts, and wind farm construction, which involves access road culverts. Because no permanent stream or wetland impacts are anticipated due to the use of BMPs and directional drilling where necessary, the Deer Creek Station Project, when combined with other actions also affecting aquatic resources, would not cumulatively contribute to impacts on the Topeka shiner or other aquatic species in the area.

Past, present, and reasonably foreseeable future actions with the potential to affect terrestrial species like the western prairie fringed orchid and Dakota skipper include agricultural development of prairie habitats, county road maintenance, and wind farm development. These past actions have tended to fragment prairie habitat and are responsible for the remaining habitat “islands” in the area. Impacts to native prairie and prairie forb habitats would be mitigated by the Deer Creek Station Project and associated facilities, so the proposed Project would not cumulatively contribute to impacts on terrestrial species.

Bird species protected under the MBTA or BGEPA would be minimally affected by construction and operation activities of the proposed Project. Because no major habitat changes would be caused by the project, the project would not contribute to significant adverse cumulative effects on any bird species.

4.6 SOCIOECONOMIC RESOURCES

4.6.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no socioeconomic impacts associated with the No Action Alternative.

4.6.2 Proposed Project

Under the proposed Project, socio-economic impacts would be considered significant if:

- In-migration of the proposed Project work force would induce population growth that would strain government and community facilities and services
- In-migration of the proposed Project work force would result in insufficient existing housing within the study area for both workers and their families
- In-migration of the proposed Project work force would change the economic base of the study area

Potential socioeconomic impacts could come from population growth associated with the construction of the power generation station. This growth could affect the local economy, the regional housing supply, and local government services. It is estimated that the proposed Project would require 360 workers at the peak of construction and 30 permanent employees once the plant has been completed. Since it is not uncommon for workers in the region to commute an hour or more to work, it can generally be assumed that workers would be spread out over the region (First District Association of Local Governments 2009).

There would be short-term impacts on local housing, but they would be minimal. Of the estimated 360 workers needed during the construction phase, 252 are expected to come from out-of-state based on an area labor study. While these workers have the potential to strain the available affordable rental housing in the region, the First District Association of Local Governments (2009) found that there are 740 affordable rental units, units with rent below $500 a month, within the counties from which workers in Brookings County typically commute. In addition to affordable rental housing, there are also 500 available camper sites within the region. Many workers may decide to use these camper sites as a housing option. The 30 permanent employees needed in the operation and maintenance of the plant once

it is completed would also find sufficient available housing and their presence would have no long-term housing impacts on the region.

Since it is possible that about 252 construction workers would be coming from outside the immediate area, it is likely that there will be short-term positive economic impacts. Lodging, food, retail and other services would likely benefit from the construction of the proposed Project. In addition to services directly related to the workers, services related to the construction of the proposed Project would also benefit. Local material suppliers, mechanics, and business support services would benefit the most from construction.

Local governments could also have both short- and long- term benefits from tax revenue collected during construction and operation. Taxes collected from retail sales and property taxes are especially important since South Dakota has no corporate income tax, personal income tax, personal property tax, business inventory tax, or inheritance tax. The retail and lodging needs of the construction workers would produce a temporary increase in taxes collected. Once the proposed Project is completed, property taxes collected from the plant would benefit local and State governments. Property owners would also benefit from payments for ROW easements associated with the proposed Project natural gas pipelines and transmission lines.

Since construction workers would only be on site from July 2010 to August 2012, it is unlikely that the proposed Project would have any long-term negative impacts on local government services. During construction, government resources such as educational resources, law enforcement, fire protection, and health services would be needed by the workers and their families.

During construction, there would be no significant impact to the education resources within the proposed Project area. At the peak of construction, with 360 workers on site, it has been estimated that there would be 72 worker-related students based on the national average of 0.2 children per household. The three school districts in the proposed Project area can absorb 277 new students before they reach peak enrollment. The educational resources would be sufficient to meet the needs of the workers and their families during construction, and would be sufficient to meet the needs of the 30 permanent employees once the plant is completed.

At the present time, Brookings County has 14 law enforcement officers and 17 retired volunteers that make up the senior patrol. Fire protection in the study area is primarily provided by volunteer departments with 131 volunteer fire fighters. The City of Brookings has a paid fire chief, assistant, and secretary. Surveys collected from both law enforcement and fire services in the study area for the First

District report indicated that the law enforcement and fire protection services in the proposed Project area would be adequate to handle the temporary influx of workers.

There are five major health providers in the proposed Project area. These are Brookings Avera Clinic, Brookings Sanford Clinic, Brookings Health System, White Family Clinic, and Elkton/Avera Clinic. In addition to these, there are a number of clinics and other health services in the region to handle health needs. Ambulance and emergency services are provided by the cities of Brookings, Elkton, White, and Aurora. Surveys collected from health officials in the study area for the First District report indicated that the health services in the proposed Project area would be adequate to handle the temporary influx on workers.

4.6.3 Cumulative Effects

The development of wind farms, together with the development of Deer Creek Station, would yield additional employment opportunities in the local project vicinity. These employment opportunities would affect housing demand and would contribute positively to the economy of the area. For every 20 wind turbines, about five construction jobs and three permanent operation and maintenance jobs are created. These low numbers suggest that the cumulative effects of the wind farms and the Deer Creek Station Project would not strain local government services and would generally be a positive impact from a socioeconomic standpoint.

4.7 ENVIRONMENTAL JUSTICE

Environmental justice impacts would be considered significant if the proposed Project had a disproportionate impact on minority or low-income residents. Minority or low-income communities are not present in the proposed Project area, and under the No Action Alternative as well as the proposed Project, no minority or low income communities would be disproportionately affected.

4.8 LAND USE

4.8.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no land use impacts associated with the No Action Alternative.

4.8.2 Proposed Project

Impacts to land use under the action alternatives would be considered significant if:

- The proposed Project would conflict with applicable land use plans or regulations that were not resolved with the regulatory agency
- The proposed Project would conflict with existing land uses in the study area to the point where other land uses could not continue
- The loss of agricultural farmland would affect the overall agricultural production in the county

The proposed Project would involve the fencing of 100 acres of land currently used for crop production for the utility facilities. Of this, 40 acres would contain long-term facilities, and the remainder would be maintained as part of the plant site and would not be used for crop production. Similarly, 100 acres of agricultural land would be fenced for utility facilities at White Site 2. Of this, 46 acres would contain long-term facilities, and the remainder of the fenced portion would be maintained as part of the plant site. Coordination with Brookings County and Deuel County is ongoing to ensure that the proposed Project does not conflict with land use plans identified in the Comprehensive Land Use Plan for Brookings County (BCPC 2000) or the Comprehensive Land Use Plan for Deuel County (DCPC 2004a). The proposed Project would be permitted, constructed, and operated in accordance with all applicable land use regulations, including the Brookings County Zoning Regulation and the Deuel County Zoning Ordinance.

Land use impacts would include both permanent land use changes as well as temporary land use disturbances during construction. The primary land use impact would be the conversion of agricultural land to utility-related uses. Because of the large amount of acreage of agricultural land in the area, these impacts are not expected to be significant. In addition to agricultural land, there are also several existing utility-related land uses in and around the study area, including a substation, transmission lines and several existing and planned wind farms. Construction of the proposed Project would be compatible with these existing land uses.

Impacts to agriculture as a result of the proposed Project would include the removal of farmland, primarily for plant construction at either White Site 1 or 2. Permanently converted acreage of 100 acres at either site would represent a very small percentage (0.02 percent) of the total farmland in Brookings or Deuel County. This loss of farmland would not significantly affect the overall agricultural production in the county. The total value of agricultural products sold in 2007 was $186.7 million in Brookings County and $105.1 million in Deuel County. The loss in agricultural revenue in Brookings County as a result of the proposed Project would likely be immeasurable and would comprise a very small percentage of total

county agricultural revenue values. These losses would be offset by revenue from about 30 new permanent jobs associated with power generation.

Temporary land use disturbances during construction could potentially impact cultivated cropland, native prairie, or pastureland. Any crop damage or loss to landowners during construction would be compensated by Basin Electric. Disturbed areas that contain grassland or pastureland would be restored and reseeded following established BMPs. The following impacts would be anticipated for each component of the proposed Project.

4.8.2.1 White Site 1 Alternative

Approximately 100 acres of existing agricultural land would be fenced for plant construction at White Site 1, which would include the plant site and an access road from 484th Avenue. Of this, 60 acres of the property would be temporarily disturbed during construction but returned to agricultural uses after construction is complete. A transmission line of 0.75 miles in length would include about 13.6 acres within a 150-foot ROW. Only a very small area of land immediately around the transmission line structures would be permanently impacted. In addition, maintenance access roads for the transmission lines would be a permanent impact. The ROW of the gas and water pipelines and the transmission lines would be available to the underlying land owner for nearly all uses, which greatly limits the level of potential impacts to land use. Some restrictions on permanent structures would be associated with the transmission lines, and the structure locations would take land permanently out of its existing use.

4.8.2.2 Water Well Supply Site B and Water Pipeline

Most of the land use impacts at Water Well Supply Site B would be temporary disturbances during construction. These temporary impacts would include disturbance of the area around two production well sites (a 200-foot by 200-foot area), as well as the area where the water pipeline would be buried. The water pipeline would be buried adjacent to 484th Avenue for a distance of 1.25 miles. Permanent impacts would result from construction of the well site and access road on cultivated cropland. In addition, two temporary and three permanent monitoring wells would be placed between the two production wells and Deer Creek.

4.8.2.3 White Site 2 Alternative

Permanent land use impacts for the power generation facility at White Site 2 would be similar for White Site 1. However, the total permanent land use impacts for this alternative are anticipated to be greater as compared to White Site 1, because the facility would require the construction of a substation about six acres in size in addition to the plant. Construction of the plant at White Site 2 would also require a Rural

Water Pipeline Extension of 6,000 linear feet from 481st Avenue to White Site 2. The pipeline would be constructed along an unimproved roadway, resulting in a new permanent ROW of about 14 acres. Potential impacts to adjacent agricultural land would be temporary during construction. A transmission line of 0.5 miles in length with a 150-foot ROW of 9.1 acres would also be constructed in association with White Site 2, resulting in temporary land use disturbances during construction and small areas of permanent impacts around the structures. The Rural Water Pipeline Extension would not affect land use.

4.8.2.4 White Site 1 Natural Gas Pipeline Route

The 13.2-mile long White Site 1 Natural Gas Pipeline would be constructed parallel to improved roadways for approximately 6.8 miles, and along new alignments not near existing roadway for 6.4 miles. Land use impacts along the route would include new permanent 75-foot wide ROW of 120 acres of mostly agricultural land during construction. For about half its length, the White Site 1 Natural Gas Pipeline would deviate from the road due to environmental constraints, property access issues, or other construction parameters. In these areas, the pipeline would have temporary impacts on agricultural land. At the point where the proposed pipeline would connect to the Northern Border pipeline, a branch would be made into the existing pipeline. The interconnection site would consist of valves, metering equipment, and instrumentation within a fenced secure area that would be approximately 50 feet by 70 feet. Additional pressure regulators and pipeline connection features would be situated immediately adjacent to the interconnection site in a separate fenced secure area that would be approximately 50 feet by 70 feet. The proposed Project would not impact any of the USFWS administered easements identified within the study area.

4.8.2.5 White Site 2 Natural Gas Pipeline Route

The White Site 2 Natural Gas Pipeline Route would be approximately 10 miles in length and would require a 75-foot ROW; the total disturbance area would be approximately 90 acres. The ROW would be constructed adjacent to improved roadways in an agricultural setting. Land use impacts include temporary disturbances to agricultural land during construction.

4.8.3 Cumulative Effects

Other past, present, and reasonably foreseeable future actions in the region that have affected land use include wind farm developments. There has been little recent development in new residences or roads. The predominantly agricultural landscape of the area has undergone changes in recent years as wind farms have been constructed. However, wind farms allow agricultural activity to continue with minimal reduction in cultivated land area. The proposed Project would have a similarly small impact to the predominantly agricultural land uses and would not contribute to a major shift in land use or loss of

agricultural productivity in the area. As a result, the proposed Project is not expected to create significant adverse land use impacts, on an individual or cumulative basis.

4.9 TRANSPORTATION

4.9.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no transportation impacts associated with the No Action Alternative.

4.9.2 Proposed Project

Impacts to transportation under the action alternatives would be considered significant if:

- Congestion occurs at intersections in the proposed Project area that increases traffic delays to unacceptable levels (Level of Service D or E as defined in the *Transportation Research Board, 2000*)
- Existing roads are damaged and not restored to original condition or better
- Dust from traffic on gravel roads becomes a nuisance to local residents

Construction and operation of the proposed Project would temporarily introduce construction traffic, delivery trucks, and special heavy truck deliveries to rural county and township roads. Construction traffic would originate from I-29 to the west and use US 14 or (SD 30 to within a few miles of White Site 1. Traffic from I-29 would pass just to the south of the town of White on SD 30 and just to the north of the city of Brookings on US 14.

4.9.2.1 White Site 1

Access to White Site 1 requires travel of six or more miles on county or township roads. The primary construction traffic route from SD 30 would be south on 478th Avenue at the town of White for three miles, then east on 207th Street for six miles, then north on 484th Avenue for less than one mile to the plant site. The roadway designated as 207th Street is gravel for its entire length in the proposed Project area, as is 484th Avenue.

Construction traffic routes from US 14 could involve heading north six miles on 484th Avenue. However, since 484th Avenue is gravel for its entire length, construction traffic from US 14 would be routed on an alternate paved road to the west, 482nd Avenue.

Because of the amount of construction that would occur during both construction and normal operation, 484th Avenue from north of 207th Street to the plant entrance would be paved. The total roadway to be paved by Basin Electric is 0.75 mile. The paved roadway section would consist of four inches asphalt surface course on a minimum of six inches of aggregate base underlain by reinforcement fabric. Gravel surfaces at approaches to intersections along the designated primary access routes would be paved for a minimum distance of 300 feet to eliminate wash boarding and rutting that occur from deceleration, acceleration, and turning movements. The existing gravel surfaces to be paved would be cored to ascertain if additional base would be required. If necessary, the gravel areas may be over-excavated to accommodate the minimum base requirements. Other county and township roads would be monitored and any damage from construction traffic would be repaired and restored to original condition or better. A dust control treatment program would be implemented in areas that have residences nearby.

4.9.2.2 White Site 2

White Site 2 is located on 482nd Avenue just to the north of SD 30 and construction of a facility at the site would have the smallest impact on county and township roads, requiring just one mile of driving for construction traffic from SD 30. If White Site 2 were chosen, it is likely that wetting agents would be used to control construction traffic dust. Construction traffic for the Rural Water Pipeline Extension would use the adjacent roadways. The condition of county and township roads would be monitored and any damage from construction traffic repaired and restored to original condition or better.

4.9.2.3 Natural Gas Pipeline and Transmission Line Construction

Natural gas pipeline and transmission line construction traffic would utilize I-29, SD 30, and SD 28 to reach the vicinity of construction, and then use county or township roads adjacent to the construction corridor. The White Site 1 Natural Gas Pipeline Route would primarily use 485th Avenue in Brookings County and 484th Avenue in Deuel County. The White Site 2 Natural Gas Pipeline Route would use 481st Avenue in Brookings County and 481st Avenue in Deuel County. While pipeline construction is underway, roads would be closed for short time periods while construction equipment is being loaded or unloaded or equipment crosses roadways. Construction would occur mainly on the pipeline ROW and not obstruct roads.

4.9.3 Construction Traffic Generation and Distribution

The proposed Project is expected to require up to 360 workers on site at the peak of construction. The majority of the workers are expected to originate from Brookings with others to be in adjacent communities. The distribution of the 360 project-generated trips is tabulated below, based upon the assumption that 250 workers will live within the 12-mile study area defined by the Public Utility

Commission (PUC). The other 110 workers are anticipated to originate from outside of the study area. Worker distribution estimates were made based upon the existing available housing stock within each municipality (table 4-8) and assume that no car-pooling occurs. This would be a worst-case scenario, since most construction companies encourage car-pooling arrangements and some provide vehicles.

Table 4-8: Geographic Distribution of Construction Work Force

City/Town	Workers
***Astoria**	3
***Aurora**	9
***Brookings**	218
***Bushnell**	1
***Elkton**	12
***White**	7
Clear Lake	1
DeSmet	2
Flandreau	3
Lake Benton, MN	1
Lake Norden	1
Madison	4
Pipestone, MN	6
Sioux Falls	64
Watertown	28
Total	**360**

* Municipality within the PUC 12-mile defined study area

Based on the assumed geographic distribution of the construction work force, temporary traffic is conservatively estimated to increase on the regional roadway network (table 4-9). These values are based on single vehicular occupancy for all workers, and no consideration for regular absenteeism. This provides a worst-case scenario for traffic flow on local roads. As noted in section 4.9.6 of this EIS, even with the addition of the construction traffic all intersections will remain in good operating condition.

Table 4-9: Projected Roadway Assignment of Construction Traffic

Route	Traffic Increase (One-Way Trips)
I-29 north of Brookings	29
I-29 south of Brookings	71
US Highway 14 east of I-29	221
US Highway 14 east of 484th Avenue	19
US Highway 14 at Aurora	9
SD Highway 30 from I-29 east	11
Total	**360**

4.9.4 Equipment and Materials Shipment

Construction materials and equipment would be shipped and delivered to the site by either rail or truck. Rail shipments would be offloaded in Aurora and trucked over the roadway network to the proposed Project site. Shipments trucked directly would travel on Interstate I-29, US 14, and the local road network. Shipments coming from both north and south would likely travel over I-29 prior to leaving the interstate at Exit 132 to travel east on US 14 prior to entering the local road network.

4.9.5 Heavy Haul

Construction of the proposed Project is expected to require between 20-to-25 heavy haul loads delivered to the site, which would require transportation equipment of gross weights and dimensional characteristics in excess of standard over-the-road units. Basin Electric has initiated discussion of the heavy equipment deliveries with a specialty-hauling firm to ascertain the loads and potential routes to the site. The firm has delivered transformers to proximate facilities using 483rd Avenue and turning onto 207th Street. However, the firm expressed their preference for not using this route due to the turn and grades. Instead, the heavy equipment company would likely use 484th Avenue directly from US 14 and place a temporary 'jumper' bridge over the Deer Creek bridge structure, which may require some minor grading at the approaches. This would require closure of 484th Avenue for the period of grading and installation of the temporary bridge. This closure would be expected to last for approximately one day. The jumper bridge would be in place until all heavy haul loads are delivered.

4.9.6 Capacity Analysis

Capacity as defined in the *Highway Capacity Manual* (HCM) (Transportation Research Board 2000) is the maximum rate of flow for a roadway segment or intersection under prevailing conditions. A volume to capacity ratio (v/c) greater than 1.0 is an indication of congestion and increased potential accident rates at the location in question. By observation, the local roadway grid network provides adequate capacity to meet current and projected traffic demands that would result from the proposed Project.

Approximately 90 percent of the work force is expected to access the site from US 14 to 482nd Avenue. Capacity at this intersection was evaluated under current base conditions, and with projected peak construction traffic. Base condition peak hour traffic on US 14 in proximity to the intersection was developed from the 2008 South Dakota traffic flow maps. Additional construction traffic was then added based on the volume and geographic distribution as previously discussed.

Intersection traffic operations are evaluated using levels of service (LOS), which are ranges of average delay per vehicle entering the intersection within a 15-minute analysis period (Transportation Research

Board 2000). Under the HCM methodology, the average delay for each vehicle approaching the intersection is calculated based on available gaps in conflicting traffic streams. The range in delay, in terms of seconds per vehicle for each LOS, is listed in table 4-10 below:

Table 4-10: LOS Criteria for Stop Controlled Intersections

LOS	Average Delay (sec/veh)
A	< 10
B	10 - 20
C	20 - 35
D	35 - 55
E	55 - 80
F	> 80

Overall delay is calculated as the weighted average for each approach based on the ratio of approach volumes to the total traffic volume at the intersection. Under No Action, the HCM calculates the average delay at the U.S. 14-482nd Avenue intersection would be 0.9 seconds during the morning peak period. Under the proposed Project with an estimated 331 additional vehicles entering the intersection during the peak construction period, the average delay would be an estimated 6.1 seconds. Both of these delay values translate to acceptable LOS A based on the HCM criteria listed above. In the evening peak hour, the average delay would be 0.4 seconds under No Action and 7.4 seconds under the proposed Project, which also translates into LOS A.

4.9.7 Traffic Assignment and Routing

The vast majority of the traffic increase would be noticed on US 14 from I-29 east to the proposed Project site turnoff road. An estimated 331 construction workers would travel to the proposed Project site on US 14 east of Brookings, 19 would come from Elkton and points east in Minnesota, and 11 would come from the north over SD 30.

Construction traffic would be routed to the site via signage from US Highway 14 south of the site and SD Highway 30 to the north. From the east and west along US Highway 14, traffic would be routed north along 482nd Avenue to 207th Street, then east on 207th Street, and then north on 484th Avenue to the site. This would keep north-south traffic on the 482nd Avenue paved surface, and minimize traffic on the load-posted Deer Creek bridges on 207th Street east of 484th Avenue. Where traffic turns northbound onto 484th Avenue from eastbound 207th Street, there is a "Y" intersection where westbound traffic on 207th turns northbound on 484th by cutting the corner. Those entering onto northbound 484th from westbound 207th currently have the priority movement, as the northbound traffic on 484th has a stop sign. During

construction at White Site 1, it would be advisable to place a yield sign for the traffic moving from westbound 207th onto northbound 484th and remove the stop sign on 484th. This would be a new traffic control situation at this intersection, so the following actions would need to occur:

- Remove the stop sign on northbound 484th Avenue at the 207th Street intersection
- Install a yield sign for westbound 207th Street traffic at 484th Avenue
- Install a changeable message board on westbound 207th Street approximately 100 yards prior to 484th Avenue intersection for a period of 60 days to advise motorists of the new intersection traffic controls
- Install a new construction traffic warning sign along westbound 207th at the intersection with 484th Street

From the north, along SD 30, traffic would be routed down 478th Avenue to 207th Street east to 484th Avenue, and north to the site. These changes would be implemented in cooperation with county and township road departments.

In addition to daily construction traffic, the proposed Project is expected to receive approximately 1,000 truck deliveries during the life of the proposed Project, which may include semi-trailer combinations. Delivery traffic would be routed similarly to regular construction traffic, to minimize traffic on the gravel surface of 484th Avenue south of 207th Street and over the Deer Creek bridges on 207th Street and 484th Avenue.

In addition to construction of the energy conversion facility there would be a crew working to build the necessary gas pipeline between White Site 1 and north of SD 30, primarily along 485th Avenue. The gas pipeline would be built between late July and September 2010 (to avoid impacts to Dakota skipper habitat and minimize impact to aquatic and wetland habitat) and the construction crew would consist of an estimated 70 workers. These workers would be in the area for approximately three months and should finish construction of the gas pipeline several months prior to peak construction of the power plant. It is reasonable to assume that all 70 of these workers would travel to the proposed Project site from the north via SD 30 beginning at I-29 exit 140, as the existing gas line is 13.2 miles north of the proposed Project site.

4.9.8 Mitigation

Gravel surfaces at approaches to intersections along the designated primary access routes would be paved for a minimum distance of 300 feet to eliminate wash boarding and rutting that occur from deceleration, acceleration, and turning movements. The intersection segments would be paved to the extent necessary to provide the adequate tapers and radii for semi-trailer movements, which may require local ditch

grading and location adjustment. Any additional grading outside of areas not previously surveyed or outside of existing ditches would require biological and cultural surveys. The 0.75-mile segment of 484th Avenue from 207th Street north to the project entrance is recommended to be paved, as this roadway will serve not only all construction traffic, but also the traffic generated by regular operations of the plant following its completion. In an effort to control dust along the gravel section of 207th Street, an appropriate treatment program would be developed in coordination with the county and township.

The recommended improved paved roadway section would consist of four inches of asphalt surface course on a minimum of six inches of aggregate base underlain by a reinforcement fabric separator. The existing gravel surface could be used as the aggregate base course, but should be inspected and measured to assure the minimum six inches is available. If necessary, the gravel areas may be over-excavated to accommodate the minimum base requirements prior to placement of the reinforcement fabric. In addition to its primary function as a separator, the fabric also provides strength if placed properly.

Since the local roadways and bridge structures that would be used fall under several different jurisdictions (Brookings County, Alton Township, Sherman Township, and Richland Township), a multi-party agreement would be developed which clearly defines limits of maintenance responsibility throughout the proposed Project. The condition of county and township roads would be monitored and any damage from construction traffic repaired and restored to original condition or better.

4.9.9 Cumulative Effects

The primary transportation and traffic impacts associated with the proposed Project would be associated with construction activity over a period of three years, 2010 – 2012. There is a proposal to construct 105 wind turbines in an area of approximately 35,000 acres to the north and west of the proposed Project site. This activity is likely to occur within the next few years as the economy improves and funding can be obtained. This would bring additional construction traffic to US 14 and SD 30 and the connecting local roads in the region. The 105 wind turbine sites are spread out over a large area and there would not be a continuous stream of construction traffic going to one site. This means that the traffic on local roads will vary over the construction period of approximately eight months. No other major construction activities have been identified for that time period. Because of the dispersed nature of the wind turbine construction, there would not likely be cumulatively significant traffic increases on any one road segment and, if there were, it would be a very temporary situation.

On an individual or cumulative basis, the proposed Project would not cause traffic delays to unacceptable levels D or E. Existing roads would be improved within the area to accommodate the proposed Project

and wind turbine development. Road improvements would decrease the potential for nuisance dust; however, dust would be monitored and suppression measures incorporated into the proposed Project construction and operation plans. As a result of these measures, no significant adverse transportation impacts would occur.

4.10 VISUAL RESOURCES

4.10.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no visual impacts associated with the No Action Alternative.

4.10.2 Proposed Project

Potential thresholds for scenic quality would include visibility from designated scenic roadways, or scenic overlays designated in zoning ordinances. The following criteria were used to identify potentially significant changes to the scenic integrity of the landscape as viewed from sensitive viewpoints, such as transportation routes or residential areas:

- A high visual contrast with the surrounding landscape is introduced
- Creation of a new source of substantial light or glare, which would adversely affect day or nighttime views in the area

4.10.2.1 Impacts Common to Both Site Alternatives

The proposed Project would introduce new or different elements into the predominantly gently rolling terrain of eastern South Dakota and would alter the existing forms, lines, colors and texture that characterize the existing landscape. The proposed Project's components were categorized as low (or level with the horizon line), moderate (less than 100 vertical feet), and tall (over 100 vertical feet) to aid in assessing visual impacts. In this area, the proposed Project could generally be seen from four miles, and the visual impact assessment area includes this distance. However, lights would generally be noticeable from a one-mile radius, and that radius is used for assessment of impacts from lighting.

Temporary impacts to the visual resources of the proposed Project area would include increased off-site vehicular traffic from maintenance and employee vehicles along major roads in and around the area during the construction phase. Site clearing and associated dust, borrow pit excavation, commissioning

(steam blowout), and well drilling would also contribute to the visual impacts on the existing landscape. The presence of one or more large cranes would represent the most visible equipment or facilities used during the construction phase. In general, construction activities would create high visual contrasts during a short period of time in areas within four miles of the site, depending on the phase of construction and the location of the viewer. However, in many cases, construction projects become a focal point of interest of local residents. This high interest in the proposed Project may offset temporary visual impacts during the construction phase.

Most of the proposed Project's components would lie level with or slightly above the horizon once constructed. These components, whose blocky, angular forms and smooth-textured, engineered appearance contrast with the forms, lines, colors, and textures of the existing landscape character, include the following:

- Internal paved roads
- Local road modifications and primary access points
- Stormwater channels
- Onsite parking
- Water and natural gas supply system, including underground pipelines
- Evaporation pond
- Security fencing
- Water well control building and associated transformer
- Pitless water well unit
- Off- and on-site signage

Contrasting components with moderate height include the following:

- Air-cooled condenser (100 feet)
- Turbine building (93 feet)
- Administration building (22 feet)
- Ammonia storage tanks (18 feet)
- Water and wastewater treatment buildings (34 feet)
- Transformers (10 feet)
- Switchyard (75 feet)
- Water storage tanks (48 feet)

The tallest structures and equipment associated with the generation site include the following:

- Exhaust stack (150 feet)
- Transmission line structures (85 feet)

Most buildings on the generation facility site would feature light blue or white metal siding and a blue or white metal roof. Most storage tanks would be painted white. The HRSG and associated structures would be constructed with a light gray/silver metal. The transmission structures and associated switchyard equipment would be constructed using light gray/blue galvanized steel.

Several effects to visual resources would result from the introduction of the generation facility once constructed. The transmission structures and HRSG equipment would introduce prominent vertical lines perpendicular to the landscape that would create a moderate to strong contrast with the horizontal to generally horizontal plane of the surrounding landscape. The air-cooled condenser and turbine building would introduce large, angular block forms to the horizontal landscape. The light blue metal siding of the majority of buildings would introduce a color contrast to the landscape, because there may be a glare from the buildings when sunlight is reflected off the metal siding.

The FAA does not require notification for the construction of facilities that are less than 200 feet in height, so it is not anticipated that FAA would require fitting of either daytime or nighttime indicator lights for the Deer Creek Station. However, there would be some general facility lighting that would be installed to provide safe and effective operation of the facility at all hours.

General facility lighting would introduce a new visual element to the landscape. During daylight hours, the lights may be visible, but they would not be intrusive to viewers in the proposed Project area and are unlikely to create a high visual impact. The lights would be most noticeable during nighttime hours from residential properties within one mile of the generation site. There is one occupied residence about one mile away from White Site 1 and one occupied residence within 0.5 miles of White Site 2. These residences would likely be able to see the facility, although the residence at White Site 2 would be closer and not as screened by topography and vegetation. Although visual resources from some vantage points would be affected because of the facility lighting, impacts at the community level are expected to be insignificant because it is a sparsely populated rural area. No designated natural areas, parks, or historic sites are nearby, and therefore lights would not have the potential to affect the character of any scenic resources. Lights would be designed with shielding or cutoff optics to avoid unnecessary lighting of the surrounding area.

The degree of contrast between the generation facility and the surrounding landscape would depend on the distance of the facility from an individual viewpoint. The strong vertical lines of the transmission structures and the HRSG, together with the angular block forms of the air cooled condenser and turbine building, would dominate the landscape in the immediate foreground (up to 0.5 mile) of unobstructed views from individual viewpoints located on county and township roads and residences. As indicated above, this would affect one residence at each site and only casual viewers on rural roadways. The most potential drive-by viewers would be traffic on SD 30. The contrasts would be moderate in middle-ground views up to four miles, because the tallest structures would still be visible, but these structures would not be the dominant features on the landscape. Some structures of moderate height and most structures of low height would be screened by rolling topography and standing crops from some views. The textures of most structures on the generation site would be indiscernible from distances of more than four miles. However, the form and color of the largest structures (transmission structures, HRSG, air-cooled condenser, turbine building) may still be visible depending on atmospheric conditions, and may create a low to moderate contrast with the surrounding landscape.

4.10.2.2 Impacts Unique to Each Site Alternative

Impacts on visual resources for each site alternative were determined by considering photo simulations of post-construction views from select key observation points (KOPs) in the proposed Project area (EDAW 2009d). Figure 4-3 shows a map of where the photos for the simulations were taken.

4.10.2.3 White Site 1

The turbine building, transmission structures, and HRSG would be highly visible in views to the north, west, and south from the county and township roads near the generation facility site (figure 4-4). These tall, vertical structures would create a high degree of contrast with the surrounding landscape. The existing 345-kV transmission line can be clearly seen on the horizon.

In addition to the visual impacts of the generation facility, another new visual feature introduced to the landscape would be a transmission line. However, this would be adjacent to other nearby transmission lines already existing in the area and connecting to White Substation. The additional visual contrast would be minimal.

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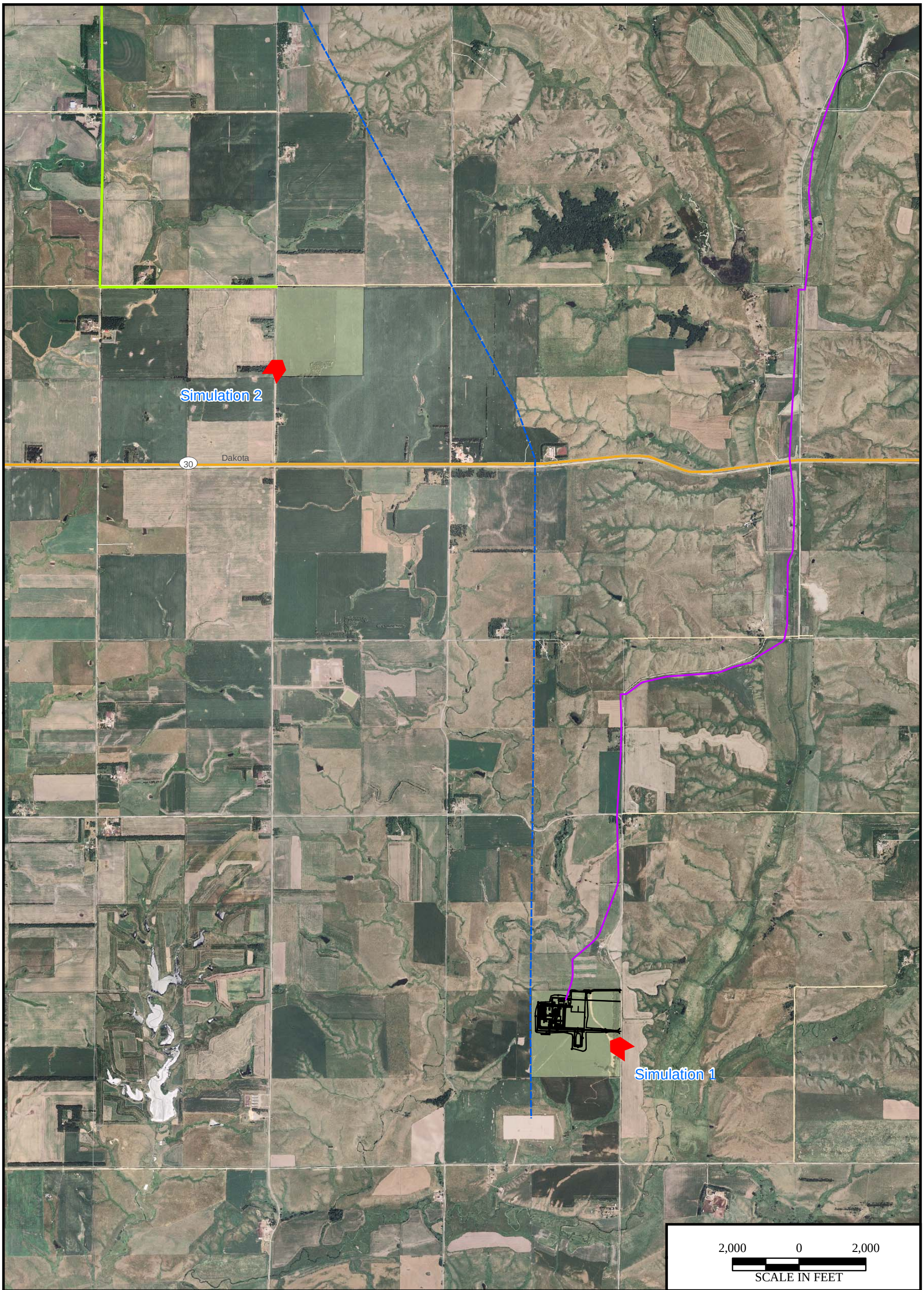

LEGEND

- White Site 1 Pipeline
- White Site 2 Pipeline
- White Site 1 Plant Layout
- White Site 1 and 2 Boundaries
- Photo Simulation Point
- 345-kV Transmission Line

Source: USDA NAIP County Mosaic, Brookings and Deuel counties, North Dakota; ESRI; Basin Electric Power Cooperative

NORTH

Figure 4-3

Locations of Photo Simulations
Deer Creek Station EIS

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Figure 4-4 Photo Simulations: White Site I (Simulation 1)

When viewed from longer distances of up to four miles, the visual impacts of the generation site would be further reduced from moderate to low, due to dozens of turbines from the existing wind farm southeast of the site. The turbines would appear almost twice as tall as the HRSG on the generation site when viewed from distances of more than four miles, creating a situation where the visual impacts of the generation site would be insignificant. The White Site 1 Natural Gas Pipeline and the water well supply site and pipeline would not be visible except during construction. Small markers indicating the presence of the pipeline facilities would be placed at road crossings. The pipelines would not have long-term visual impacts. The visual impacts from White Site 1 would affect few people based on the distance of White Site 1 to SD 30 (approximately 3.5 miles to the north) and the sparsely populated area surrounding the site. During the period of plant operation, the shelterbelt along the eastern side of the plant site would be maintained to provide visual screening.

4.10.2.4 White Site 2

White Site 2 is approximately 0.5 mile north of SD 30 and would therefore be seen by more travelers and residents of the area than would see White Site 1. The ADT on SD 30 is approximately 700 vehicles. Unlike White Site 1, White Site 2 would require an on-site substation to be constructed (figure 4-5). This substation, the turbine building, and the HRSG create a high degree of visual contrast with the surrounding landscape. In views toward the north and east from the county and township roads adjacent to the site, the existing 345-kV transmission line and existing wind turbines are not visually dominant features on the landscape and the visual impacts created by the structures of the generation facility would not be lessened. However, given the site's close proximity to SD 30, a greater number of viewers would see the generation site if White Site 2 were selected.

In addition to the visual impacts of the generation facility, another new visual feature introduced to the landscape would be a transmission line and substation. The substation would be to the south of the generation facility and would likely be perceived by viewers as part of the same industrial facility. In addition, the White Site 2 transmission line would be adjacent to other nearby transmission lines already existing in the area. The additional visual contrast would be minimal.

The White Site 2 Natural Gas Pipeline and the Rural Water Transmission Line would not be visible except during construction. Natural gas pipeline markers would be installed and maintained over the buried pipeline at road crossings and other locations to reduce the risk of inadvertent damage or interference. The markers would identify the owner of the pipeline and convey emergency information in accordance with applicable regulations, including 49 CFR Part 195 safety requirements. The pipelines would not have long-term visual impacts.

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Figure 4-5 Photo Simulations: White Site II (Simulation 2)

4.10.3 Cumulative Effects

Cumulative visual impacts at White Site 1 would be created by the addition of several turbines of the White Wind Farm, which would be visible in the view in the future. These turbines would be the tallest and most visible objects on the landscape, with a ground-to-nacelle height of approximately 300 feet. The presence of the 345-kV transmission line, together with the future presence of the wind turbines of the White Wind Farm, create a situation where the visual impacts of White Site 1 would be reduced from a high degree of contrast to a moderate degree of contrast. The angular block form and light blue color of the turbine building would create some degree of visual contrast, but its impacts would be lessened when compared to a site that was completely free from industrial or utility development.

Cumulative visual impacts at White Site 2 would be created by several proposed turbines from the White Wind Farm to the west and south from SD 30. The presence of these turbines would lessen the visual contrast and thus lessen the visual impacts of the structures on the generation site.

On an individual or cumulative basis, the proposed Project would not significantly affect scenic roadways or scenic resources of the area. Both White Site 1 and White Site 2 would introduce adverse visual impacts once constructed, especially when viewed from distances within 0.5 mile. White Site 2 would be seen by a greater number of viewers along SD 30 and would introduce an on-site substation to the proposed Project site. Both sites would be equipped with lights for nighttime operation, but the lights from White Site 2 would affect a greater number of viewers along SD 30. Overall, White Site 1 would introduce fewer structures on the existing landscape, would be located in an area with existing (or soon to be existing) visual disturbances, would affect fewer people, and would therefore have less of a visual impact on the landscape. Wind farm construction in the area has reduced the potential cumulative visual impacts of the proposed Project.

4.11 NOISE

4.11.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no noise impacts associated with the No Action Alternative.

4.11.2 Proposed Project

The land in the vicinity of the proposed Project is generally used for agricultural and residential purposes. Because the area is windy, background noise levels are high, ranging from 54 to 70 dBA. Wind is a pervasive component of noise in the area. There are minimal human-generated noise sources in the area, with vehicular traffic and farming equipment being the primary sources of human-generated noise in the surrounding area. Background noise levels vary by time of day. Implementation of the proposed Project may have a significant noise impact if it would result in any of the following:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies
- A permanent increase of more than 6 dBA measured at the property line of a sensitive receiver; a 6 dBA noise level increase is considered clearly noticeable, while a 10 dBA increase is a doubling of the sound level
- A substantial temporary or periodic increase in ambient noise levels in the proposed Project vicinity above levels existing without the proposed Project over the long term

Potential noise impacts resulting from implementation of the proposed Project include increased noise levels near sensitive noise receivers such as residences. An analysis was completed to ensure that the proposed Project is located and designed appropriately from a noise perspective and to evaluate the noise impact on the surrounding community. The analysis focused on the nature and magnitude of the change in the noise environment associated with implementation of the proposed Project.

4.11.2.1 Construction Noise

The proposed Project has the potential to cause a localized and temporary increase in ambient noise levels near roadways used for transporting equipment and materials; and around the construction of pipelines, transmission lines, and the electrical generating facility. There would also be an increase in traffic in the area during the construction of the facility, pipeline and transmission line, which would also temporarily increase noise levels in the area. The actual noise levels generated by construction would vary on a daily and hourly basis, depending on the activity that is occurring, and the types and number of pieces of equipment that are operating. The U.S. EPA has compiled data regarding the noise generating characteristics of specific types of construction equipment and typical construction activities. This data is presented in table 4-11 and table 4-12.

Table 4-11: Noise Ranges of Typical Construction Equipment

Equipment	Noise Levels (Leq, dBA) at 50 feet[1]
Back Hoe	73-95
Compressors	75-87
Concrete Mixers	75-88
Concrete Pumps	81-85
Cranes (moveable)	75-88
Cranes (derrick)	86-89
Front Loader	73-86
Generators	71-83
Jackhammers	81-98
Paver	85-88
Pile Driving (peaks)	95-107
Pneumatic Impact Equipment	83-88
Pumps	68-72
Saws	72-82
Scraper/Grader	80-93
Tractor	77-98
Trucks	82-95
Vibrator	68-82

[1]Machinery equipped with noise control devices or other noise-reducing design features do not generate the same level of noise emissions as shown in this table.
Source: Bolt, Beranek, and Newman 1971

Table 4-12: Typical Outdoor Construction Noise Levels

Construction Phase	Noise Level at 50 feet (L_{eq}, dBA)	Noise Level at 50 feet with Mufflers (L_{eq}, dBA)
Ground Clearing	84	82
Excavation, Grading	89	86
Foundations	78	77
Structural	85	83
External Finishing	89	86

Source: Bolt, Beranek, and Newman 1971

It is generally accepted that the noise levels diminish rapidly with distance from the construction site at a rate of approximately six dBA per doubling of distance. For example, a noise level of 84 dBA measured at 50 feet from the noise source to the receptor would reduce to 78 dBA at 100 feet from the source to the receptor, and reduce to 72 dBA at 200 feet from the source to the receptor.

Once construction is near completion, a short-term occurrence of loud steam blows would impact nearby neighbors. The steam blows would be necessary to remove debris in the steam turbine prior to initial startup of the units. The steam blows would occur during the daytime for approximately two to four weeks depending on the number of blows that are required to meet the cleanliness requirements of the steam turbine vendor. The typical sequence time is five minutes per blow and 30 - 60 minutes between blows to re-fill the drums, heat the water and repressurize. The steam blows would be expected to generate a noise level near 115 dBA at three feet from the steam vents. This noise level would be approximately 55 dBA at the nearest residence when it occurs. Because this is a short-term event, this noise level would not significantly impact the nearby residences.

Traffic noise would be expected during construction, and may be most noticeable to residences during early morning and late afternoon. However, this would be short-term in duration.

4.11.3 Operational Noise

In order to evaluate expected noise levels from the operation of the proposed Project, noise generation from individual sources (such as the combustion turbines, steam turbines, cooling systems, and various other lesser sources) was modeled. The industry-accepted noise modeling software, Computer Aided Design for Noise Abatement (CadnaA), was used during modeling. Equipment sound power levels are used in the model to predict sound pressure levels at nearby locations. Even though all equipment may not be operating at the same time (i.e. – some equipment may only operate during start-up) all equipment that emits sound was included in the model and assumed to operate at the same time. This provides a conservative estimate of the noise from the proposed Project. Table 4-13 displays the noise-emitting sources that were modeled and their corresponding sound power levels.

In the model, attenuation was included for sound propagation over vegetation, terrain, barriers, and shielding. The atmospheric conditions were assumed to be calm and the temperature and relative humidity were set to 50 degrees Fahrenheit and 70 percent, respectively (based on program defaults).

Table 4-13: Modeled Overall Sound Power Levels

Unit	Overall Sound Power Level, dBA
CT Inlet Ducting	86.5
CT Inlet Filter Face	98.7
CT Accessories	103.4
CT Inlet Plenum	102.2
CT Turbine Compartment	110.2
CT Exhaust Diffuser	110.2
CT Load Compartment	104.4
CT Generator	107
CT Compt Vent Fans	103.8
CT Exhaust Enclosure Vent Fans	102.2
CT Exhaust Expansion Joint (inside gas)	145.3
Step-Up Transformer	93.7
Auxiliary Transformer	87.5
Steam Turbine Generator	92.4
Steam Turbine	92.5
STG Building Fans	81.9
ST Generator Slip Ring House	92.5
Steam Trunk Main Start Up	103.1
Steam Trunk Duct 2a Start Up	101.1
Steam Trunk Duct 2b Start Up	100.1
Steam Trunk Duct 3 Start Up	96.2
Steam Trunk Duct 4 Start Up	93.1
H1 HRSG Inlet Duct	111.2
H2 HRSG Module 1-3	102.2
H3 HRSG Module 4-7	97.2
Stack Exit	110.0
Boiler Feedwater Pump	109.9
Air Cooled Condenser (total fan assembly)	99.8
FIN FAN Cooler	98.5

Receptors were placed in the model at locations that correspond to the locations where ambient measurements were taken, including at the closest sensitive noise receivers. Modeled plant operational noise levels, associated solely with the operation of the proposed Project, were logarithmically added to minimum noise levels for each measurement point. The predicted and overall operational sound levels for the modeled receptors are shown in table 4-14.

Table 4-14: Estimated Operational Noise Levels

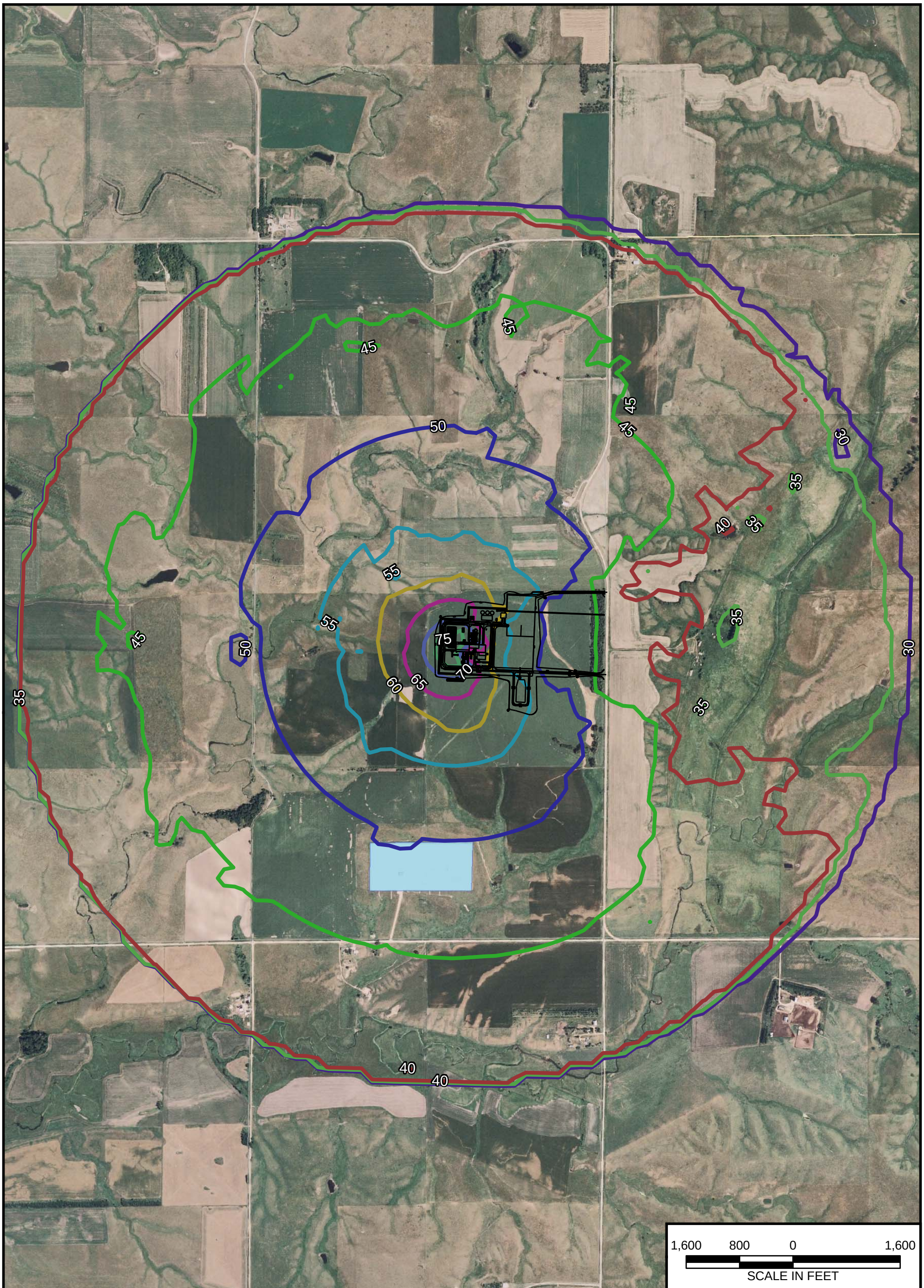
Measurement Point	Minimum Measured Noise Level (L_{eq}, dBA)	Modeled Plant Noise Level (L_{eq}, dBA)	Estimated Total Operational Noise Level (L_{eq}, dBA)
MP1*	43	45	47
MP2	48	51	53
MP3*	52	41	52
MP4*	42	43	45
MP5*	49	45	50
MP6*	39	44	45
MP7	42	54	54

*Represents sensitive noise receiver (residence)

Figure 4-6 displays the sound contour levels in 5-dBA increments for the area surrounding White Site 1.

The maximum increase in noise levels at the sensitive noise receivers is projected to increase by no more than six dBA over the background noise levels. This noise level is considered noticeable, but is not considered a significant increase in the sound level at the receiver.

The Department of Housing and Urban Development (HUD) has development guideline noise levels for HUD housing. This level is 65 dBA L_{dn}, where L_{dn} is a day-night average noise level in which a 10 dB penalty is applied to the nighttime noise levels. Essentially, the nighttime noise level should be below 55 dBA and the daytime noise level should be below 65 dBA. Since the greatest contribution to noise levels in the area at any residence is modeled to be at 45 dBA, the proposed Project would be within the HUD guideline noise levels. Because distances between residences and the White Site 2 Alternative are closer than the White Site 1 Alternative, noise impacts to residences from White Site 2 would be slightly higher than for White Site 1, but still predicted to be within HUD guidelines.



LEGEND

White Site 1 plant Layout

White Substation

Predicted Noise Level Contours

30 dBA 50 dBA 70 dBA

35 dBA 55 dBA 75 dBA

40 dBA 60 dBA

45 dBA 65 dBA

Source: USDA NAIP County Mosaic, Brookings and Deuel counties, North Dakota; FEMA; ESRI; Basin Electric Power Cooperative

NORTH

Figure 4-6

Sound Contour Levels
White Site 1
Deer Creek Station EIS

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4.11.4 Cumulative Effects

The White Substation and the Xcel Energy Brookings County substation just to the east will contribute to ambient noise in the vicinity of White Site 1, especially to the residences located within one mile of White Site 1 to the south. Due to the unique sound profile of transformers, the substations may be audible under certain meteorological conditions. However, cumulative noise levels associated with the substations and the proposed Project are expected to be similar to the already predicted noise levels.

Given the high background noise in the area, these sources would not likely be noticeable on most days. Additionally, an existing wind farm is located approximately three miles east of the proposed Project site and a proposed wind farm may be constructed approximately 0.5 mile to the west of the proposed Project. Noise associated with the existing wind farm is not expected to contribute to ambient noise near the proposed site; however, noise associated with the proposed wind farm may contribute to the ambient noise near the proposed site. Temporary cumulative noise impacts are possible from the construction of wind farms in the area. The current noise standard for the White Wind Farm is 50 dBA at the property line of existing residences, businesses, and public buildings. Noise from wind farms is a swishing or lashing noise and is different in character from those generated by a combustion turbine. Multiple wind turbines operating at the same time would create the swishing sound at different times. These non-synchronized sounds would blend together to create a more constant sound to an observer at most distances from the wind turbines. It is expected that the hum of the White Wind Farm and either White Site 1 or White Site 2 would blend in with the existing ambient noise and should not affect the aforementioned noise impacts. The proposed Project, on an individual or cumulative basis, would not exceed noise standards, cause a permanent increase of noise at the property line, or cause noise levels to substantially increase above current levels. Significant noise impacts would not be a result of the proposed Project.

4.12 PUBLIC HEALTH AND SAFETY

4.12.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no public health and safety impacts associated with the No Action Alternative.

4.12.2 Proposed Project

Public services in the area are designed to handle current issues. A significant impact to public health and safety would occur if the proposed Project resulted in:

- Violation of local, State, or Federal regulations regarding the handling, transport, containment, or disposal of regulated and hazardous materials
- Interference with emergency response capabilities or resources
- Violation of OSHA standards and failure to secure the site against unauthorized public access

4.12.2.1 Construction and Operational Personnel

Potential health and safety hazards are generally greater during the construction phase of the proposed Project. These risks are due to heavy equipment operation, overhead materials and cranes, and use of construction tools. Construction personnel are at a higher risk than the general public during this phase of the proposed Project, but the risk is temporary. Construction-related hazards can be effectively mitigated by complying with all applicable Federal and State occupational safety and health standards. Adherence to these standards, and applicable National Electrical Safety Code regulations and utility design and safety standards, would protect construction workers from unacceptable risks.

Basin Electric would develop a Health and Safety Plan to address public and worker safety during the construction and operation of the proposed Project. The Health and Safety Plan would identify requirements for minimum construction or operation distances from residences or businesses, as well as requirements for temporary fencing around staging, excavation, and laydown areas during construction. The Health and Safety Plan would identify measures to be taken during operation to limit public access to proposed Project facilities (i.e. permanent fencing around the generation facility, locked gates at access road entrances). Potential safety risks would be greater during the construction phase of the proposed Project. The Applicant's Health and Safety Plan would include provisions for worker protection as is required under OSHA with emphasis on CFR 1926 – *Safety and Health Regulations for Construction.*

All construction sites would be managed to prevent harm to the general public. During construction, all employees, contractors, and sub-contractors would be required to conform to OSHA safety procedures. Adequate training would be mandatory for all construction workers on site. Heavy equipment would be in compliance with OSHA requirements for safety devices such as back-up warnings, seat belts, and rollover protection. Personal safety equipment such as hard hats, ear and eye protection, and safety boots would be required for all workers on site. Accidents and injuries would be reported to the designated safety officer at each site.

There would be a risk of accidental fire during construction and operation of the proposed Project. Risk of accidental fire during construction would occur from human activities such as refueling, cigarette smoking, and use of vehicles and construction equipment in dry, grassy areas. The health and safety plan would address these risks, and the risks would be reduced to acceptable levels by restrictions or procedures regarding these activities. A risk of fire would be present during operation of the generating facility due to the use of natural gas and the storage of chemicals within the facility. Implementation of industry-approved design measures for all facility components would ensure that the risk of an incident causing injury or property damage would remain acceptably low. The proposed Project would have a built-in fire suppression system. However, if needed, fire services would be provided by the local volunteer fire department. The closest volunteer fire service is located in White. Other fire services are available in Brookings, Volga, Estelline, and Aurora, South Dakota.

Construction and operation of the proposed Project would involve the use and storage of regulated and hazardous materials. During construction, diesel fuel, gasoline, and lubricating oils from heavy equipment and vehicles could be accidentally leaked or spilled. Hydraulic fluid, paints, and solvents would likely be used during the construction phase as well. To reduce the potential for a release of regulated or hazardous materials during the construction phase of the proposed Project, work would be planned and performed in accordance with OSHA standards and protocols addressing the use of potentially hazardous materials and applicable Federal and State environmental regulations. If a hazardous release occurred, cleanup, management, and disposal of contaminated soils would be conducted according to EPA and State standards. Conformance to these standards and procedures should reduce the potential for significant impacts resulting from the release of hazardous materials during the construction phase. Personnel would be trained in spill containment, and would have clean-up materials immediately available for use. Natural gas, a flammable fuel source, would be used during operation of the generating facility. Diesel fuel and ammonia tanks would also be stored on-site. These materials could be directly harmful to wildlife if they are leaked or spilled, and could affect aquatic habitat if water sources are contaminated. These materials are also flammable and present a fire hazard if not properly stored. Storage for these materials would be designed to code and accepted practice, thus reducing the risk from having these materials on site.

Typical hazardous substances that would exist on-site are listed in table 4-15.

Table 4-15: Potentially Hazardous Chemicals to Be Used at Deer Creek Station

Equipment	Purpose	Product	Storage Vessel	Storage Volume	Use Rate	Estimated Annual Use Rate
SCR	NO_x Control (Main Stack)	Anhydrous Ammonia	Metal Tank	2000 Gallon, 1700 of useable space	40 lb/hr	15,000 gal
Emergency Diesel Generator	Emergency Electrical Generation	Low Sulfur Diesel	Metal Tank	3000 Gallon, 2500 useable Gallon	105 gal/hr	52,500 gal
Emergency Diesel Fire Pump	Emergency Fire Protection	Low Sulfur Diesel	Metal Tank	700 Gallon	29 gal/hr	14,500 gal
Condensate and Boiler Feedwater Treatment	pH Adjustment	Aqueous Ammonia	Totes	300 Gallon	1.25 gal/hr	3700 gal
Condensate and Boiler Feedwater Treatment	Oxygen Scavenging	Carbohydrazide	Drums	55 Gallon	0.15 gal/hr	450 gal
Condensate and Boiler Feedwater Treatment	Boiler pH Control and Buffering	Phosphate	Pails	25 lb	0.05 lb/hr	150 gal
Makeup Water Treatment		Sulfuric Acid	Totes			
Makeup Water Treatment		Caustic	Totes			
Makeup Water Treatment		Sodium Hypoclorite	Totes			
Makeup Water Treatment	Anti-Scalant	GE Betz Hypersperse or equal	Totes			
Makeup Water Treatment	Softener	Sodium Bisulfite Sodium Chloride				
Makeup Water Treatment	RO Cleaning Agent	Citric Acid				
HRSG	HRSG blanketing	Nitrogen	330 cubic foot cylinder(s) or 40,000 cubic foot tube trailer	11,880 cubic ft (three 12-packs of cylinders) to 40,000 cubic ft	Normal is zero.	10,000 cubic ft (one complete HRSG fill)
Gas Turbine	Gas Turbine Generator Purge	CO_2	330 cubic foot cylinder(s)	11,880 cubic ft (three 12-packs of cylinders)	Normal is zero	8,000 cubic ft (one complete generator purge)
Gas Turbine	Gas Turbine Fire Protection	CO_2	Metal tank	104,000 cubic ft	Normal is zero	Normal is zero
Gas Turbine	Gas Turbine Generator Cooling	Hydrogen	330 cubic foot cylinder(s) or 40,000 cubic foot tube trailer	11,880 cubic ft (three 12-packs of cylinders) to 40,000 cubic ft	300 cubic ft/day	118000 cubic ft (one complete generator fill plus daily use)

Source: Basin Electric Power Cooperative

4.12.2.2 General Public

The general public would not be allowed to enter any construction areas associated with the proposed Project. The major risk to the general public would be from increased traffic volume on the roadways in the proposed Project area as a result of commuting construction workers and transportation of equipment

and materials. Additionally, local gravel roads and bridges would need to be upgraded by improving the roadway gravel thickness and leveling to accommodate the increased volume and loads associated with construction. A bridge on 484th Avenue would be spanned with a temporary bridge structure to accommodate the heavy haul loads. The temporary bridge structure span would be removed after the heavy haul loads are delivered (section 4.9). During upgrades, short-term road closures may be necessary, which could interfere with emergency equipment. The Applicant would develop and implement appropriate traffic management and road improvement plans as needed during construction. All oversized and heavy equipment vehicle operators would be required to observe all applicable rules and regulations for safe transport of oversize loads on public highways and local roadways.

The proposed Project involves the construction of a short transmission line to connect the generation facility with a nearby substation. The proposed transmission line for White Site 1 would be 0.75 mile in length, and the proposed transmission line for White Site 2 would be 0.5 mile in length. Electromagnetic fields (EMF) are often raised as a public concern with electric transmission lines and substations. EMF exists around all electrical devices, and most of the exposure to EMF comes from common household appliances. Levels of EMF from the proposed transmission lines would be low and would fall off rapidly with distance from the line. A large number of scientific studies involving physics, epidemiology, and cell biology have studied the potential for human health risks for over 30 years, with inconclusive results. There are no Federal standards for EMF exposure from transmission lines; however, some states, including Minnesota, have standards. The Minnesota standard is eight kV/m for electric fields, but there is no standard for magnetic fields. Magnetic field limits for states with standards such as Florida and New York are in the 200 milligauss range. A typical electric field from a high-voltage transmission line (such as 500 kV lines) at maximum load would be about one kV/m at 100 feet. Magnetic fields from 500 kV lines are typically less than 13 milligauss at 100 feet (NIEHS 2002). Levels from 345-kV lines, such as would be used in the proposed Project, are lower than levels from 500-kV lines. EMF fields from substations are rarely measurable above background levels when measured beyond the substation fence. These levels suggest that there is no potential for an exposure level from the proposed Project that would have effects to public health.

Because conformance to OSHA, EPA, and State regulations would be required, facility operation and maintenance procedures, as well as contingency planning, would be established to prevent or mitigate impacts from possible release of regulated or hazardous materials during operation of the proposed Project. The facility would develop and implement release prevention and emergency response plans and would train all personnel on the plans. Conformance to Federal and State regulations, as well as

prevention and emergency response plans, should reduce the potential for significant impacts resulting from the release of regulated or hazardous materials during the operational phase of the proposed Project.

4.12.3 Cumulative Effects

Past, present, and reasonably foreseeable future actions in the area with public safety implications are the use of agricultural chemicals, the presence of electric transmission systems in the area, and wind turbine construction and operation. The proposed Project would not add to risks from use of agricultural chemicals. The proposed Project would add to risks from electric utility development in the area, although the amount of risk would only be from a new 0.5 to 0.75-mile transmission line. The new transmission line, as well as the new wind turbines, would be expected to be in compliance with Federal, State, and local regulations for regulated and hazardous materials usage. The proposed Project would create a small potential for increase in accident rates for transportation facilities. The proposed Project, together with the existing and proposed wind farm developments, would comply with all Federal, State, and local regulations for construction and operation safety and the public would not be allowed in active construction areas. Therefore, the construction of the proposed Project would not be expected to significantly increase cumulative public health and safety risks.

4.13 INTENTIONAL DESTRUCTION

Security measures summarized in this section are in accordance with Security Guidelines (www.esisac.com) published by the North American Electric Reliability Corporation (NERC 2001).

4.13.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no security impacts associated with the No Action Alternative.

4.13.2 Proposed Project

The proposed Project, which would be located adjacent to the existing White Substation, is a combined-cycle power generation facility designed to nominally produce 300 MW of electricity. Its small physical size, use of natural gas as fuel, and remote location make it a relatively undesirable target for aggressors, and the threat of damage from terrorists or activists is considered negligible. The loss of 300 MW supply to the regional grid could be tolerated by the system, resulting in little to no loss of power service to customers. Few residents or population concentrations are located within close proximity of the proposed

site. Theft of recyclable metals and equipment, and random vandalism, are likely to pose the most serious security issues. Since the generation plant would be manned, theft issues should be minimal. Materials thefts are more common at unmanned substations, and vandalism often takes the form of shooting insulators on transmission lines.

Fences, gates, or barriers, coupled with the use of keying systems, access card systems, or security personnel at entry points, would restrict access to the facility at White Site 1, White Site 2, and Water Well Supply Site B. Use of these physical obstructions and warning signage effectively deter and delay intruders. Personnel identification and control measures such as photo IDs, visitor passes, and contractor IDs help quickly identify unauthorized persons within the facility.

In addition to physical security, the proposed Project would be protected against cyber threats (i.e. hackers attacking computer control systems and information). Access to control systems would be managed to protect critical assets and information as well as maintain the reliability of the electric infrastructure. This includes logical access (user password protection) to computers and networks and physical access to computer rooms. Policies and procedures would be established to manage authorization and authentication as well as monitor both logical and physical access. Firewalls would be implemented and proactively maintained. Intrusion detection systems would be implemented and cyber risks regularly evaluated.

4.14 CULTURAL RESOURCES

Existing information on cultural resources was collected within a one-mile radius of an area bordered by the NBPL on the north, the White Site 1 Natural Gas Pipeline Route on the east, the White Site 2 Natural Gas Pipeline Route on the west, and 205th Street on the south. This includes the area of all proposed facilities including the two alternative sites, road improvements, gas pipelines, water pipelines, water well sites, and transmission lines. Gravel surfaces at approaches to intersections would be paved to the extent necessary to provide the adequate tapers and radii for semi-trailer movements, which may require local ditch grading and location adjustment. Any additional grading outside of existing ditches would require cultural surveys. Surveys in the study area for wind farms and other area and linear projects have recorded 53 archaeological sites, of which 50 are prehistoric sites, two are Euro-American sites, and one site is listed as a faunal site which is likely prehistoric but could be Euro-American. The areas covered by these previous surveys appear to indicate that the study area for this proposed Project has a moderate to high potential for containing additional cultural resources.

Out of the 53 prehistoric sites, five have been recommended as eligible for the NRHP, 34 have been determined not eligible for the NRHP and the remaining 14 sites are considered unevaluated.

4.14.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no cultural resources impacts associated with the No Action Alternative.

4.14.2 Criteria for Determining Effect

A project results in an impact on a historic property when the undertaking may alter characteristics of the property that may qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. All qualifying characteristics need to be considered, even those that may have been identified subsequent to the original evaluation of the property's eligibility for the NRHP. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative as described in 36 CFR section 800.9(b) (1). For example, an adverse effect can result from the introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's historic features as described in 36 CFR section 800.9(b) (2), or result in isolation of the property from or alternation of the character of the property's setting when that character contributes to the property's qualifications for the NRHP. Adverse effects to cultural resources are minimized through application of the section 106 process.

Impacts to historic properties can be indirect such as increased human activity associated with construction related to the proposed Project. Constraints on construction zones and staging areas would mitigate potential disturbance of known and unknown cultural resources.

4.14.3 Proposed Project

White Site 1, Water Well Supply Site B, the White Site 1 Natural Gas Pipeline Route, White Site 1 transmission line corridor, and White Site 1 Water Pipeline were further evaluated for cultural resources through two pedestrian surveys. Representatives from the Sisseton, Lower Sioux, and Wahpekute tribes were present for the pedestrian surveys and they focused on identifying Traditional Cultural Properties (TCPs). No cultural resources were identified on White Site 1 or Water Well Supply Site B (Ferry and Peterson 2009). Sites investigated along the White Site 1 Natural Gas Pipeline Route were abandoned

farmsteads and prehistoric artifact scatters. No NRHP-eligible sites were found on the property to be used for White Site 1, Water Well Supply Site B, the White Site 1 Natural Gas Pipeline or the White Site 1 transmission line (Thomas 2009).

Based on files research, no sites are known to exist on White Site 2, the White Site 2 Transmission Line, or Rural Water Pipeline Extension. However, six sites would be potentially impacted by the White Site 2 Natural Gas Pipeline Route. Should the White Site 2 Natural Gas Pipeline Route be selected, these sites would be evaluated for NRHP eligibility and further coordination with consulting parties would occur.

4.14.4 Cumulative Effects

The proposed Project would not affect any NRHP-eligible cultural resources and therefore would not have the potential to contribute to any past, present, or reasonably foreseeable future effects on cultural resources.

4.15 RECREATION

4.15.1 No Action

Under the No Action Alternative, Western would not approve an interconnection request with the Applicant and/or RUS would not approve financing. For the purpose of impact analysis and comparison in this EIS, it is assumed that the proposed Project would not be built and that the environmental impacts associated with construction and operation of the proposed Project would not occur. There would be no recreation impacts associated with the No Action Alternative.

4.15.2 Proposed Project

Impacts to recreational resources would be considered significant if:

- The proposed Project would directly impact acres normally used for recreational opportunities (i.e. WIAs, WPAs, or GPAs)
- The proposed Project would directly impact State parks or natural areas

4.15.2.1 White Site 1

The only recreational activity potentially affected is use of private lands in the area for activities such as hunting. Neighboring parcels of land might experience temporary effects in the movement or numbers of game species on these lands during construction of the facility, but it is expected that game species will return upon completion of facility construction. Game populations are not expected to be affected by the construction and operation of the facility. Construction and operation of White Site 1 will not affect

recreational opportunities such as fishing or boating. Overhead transmission is already present to the west and south of the site, and a new line is not expected to significantly affect game species populations. Fishing, boating, and other recreational opportunities within the proposed Project area will be unaffected by the construction and operation of a new transmission line at White Site 1.

4.15.2.2 Water Well Supply Site B and Water Pipeline

Construction and operation of a water supply well and associated supply line on private land would potentially affect use of private lands for recreation such as hunting. Neighboring parcels of land might experience temporary effects in the movement or numbers of game species on these lands during construction of the facility, but it is expected that game species will return upon completion of facility construction. Game populations are not expected to be affected by the construction and operation of the facility.

4.15.2.3 White Site 2

The construction of a generation facility and overhead transmission line at White Site 2 would have similar impacts to recreation as White Site 1 and is not expected to affect recreational opportunities in the area. The on-site substation required for White Site 2 would have no impact on recreational opportunities in the proposed Project area. Fishing, boating, and other recreational opportunities within the proposed Project area will be unaffected by the construction and operation of the White Site 2 Transmission Line. Construction of the Rural Water Pipeline Extension would cause temporary disturbance to soil and vegetation in the immediate area. Some game species may temporarily leave the area during construction, but would be expected to return upon completion and reseeding.

4.15.2.4 White Site 1 Natural Gas Pipeline Route

There is one WIA along the White Site 1 Natural Gas Pipeline Route north of White Site 1. WIAs are primarily designed to give the public access to private land for hunting purposes. Construction of the preferred gas pipeline may temporarily impede access to the WIA since the pipeline would be constructed along the road. Operation of the preferred gas pipeline is not expected to permanently impact the WIA, or any game species populations living on or near this property. About half of the Natural Gas Pipeline Route would be parallel and adjacent to nearby roadways, and about half would be cross-country construction. Areas along local roadways have been previously disturbed, and impacts to recreational opportunities are not expected. In areas where the gas pipeline crosses open pastureland or cultivated cropland, only temporary impacts are expected during construction.

4.15.2.5 White Site 2 Natural Gas Pipeline Route

There are no WIAs or public lands along the White Site 2 Natural Gas Pipeline Route. Therefore, impacts to private properties would be similar to those with the White Site 1 Natural Gas Pipeline Route.

4.15.3 Cumulative Effects

There are no known past actions that have adversely affected recreation in the area. Reasonably foreseeable future actions that could affect recreation include the ongoing wind farm development in the area. None of these facilities are directly affecting recreation lands. The proposed Project, in conjunction with wind farm development, would not individually or cumulatively cause significant effects on recreation.

4.16 GLOBAL CHANGE IMPACTS ON THE REGION

Impacts of the proposed Project on GHG emissions are described in section 4.1. This section considers impacts of global change on the northern Great Plains region and the proposed Project itself. The Great Plains is characterized by strong seasonal climate variations. In the last few decades, average temperatures have increased throughout the region, with the largest changes occurring in the winter months and over the northern states. Relatively cold days are becoming less frequent and relatively hot days more frequent. Precipitation has also increased over much of the area.

In the future, the U.S. Global Change Research Program projects that temperatures will continue to increase. Summer changes are projected to be greater than those in winter. Conditions are anticipated to become wetter in the northern Great Plains, including more frequent heavy downpours resulting in more flooding, rising temperatures and more frequent heat waves, longer growing seasons, and shifts in vegetation hardiness zones. Ecosystem disruptions causing changes in habitat, water, and food supply would cause some species to decline, cause shifts in the range of native species, or encourage invasions of non-native species. Some species would be better adapted to a warmer climate. A warmer climate would affect air quality, and would generally mean more ground level O_3, causing more respiratory problems. Because of increased wetness, aquifers may be under less stress in the eastern South Dakota area than further to the south and west. Strong storms are projected to be more frequent in the northern Great Plains. Farming practices in the eastern South Dakota region will likely need to emphasize increasing the amount of crop residue left on the soil for erosion protection (USGCRP 2009). These future climate conditions may result in changes to the population and agricultural practices of eastern South Dakota, but are not likely to affect the operation of the Deer Creek Station, nor would these changes significantly affect the regional power demands which it is designed to serve.

4.17 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

NEPA requires that an EIS describe "any adverse environmental effects which cannot be avoided should the proposal be implemented." Unavoidable impacts are those that would remain after implementation of mitigation measures. Construction and operation of the proposed Project at White Site 1 would unavoidably convert 40 acres of land from agricultural uses to utility uses. Construction and operation of the proposed Project at White Site 2 would unavoidably convert 46 acres of land from agricultural uses to utility uses. This permanently converted acreage would represent an insignificant portion (much less than 1 percent) of the 418,115 acres of cropland in Brookings County. The introduction of a new industrial facility, along with transmission lines, would permanently change the visual landscape of the county. Wind farm construction in the area has already introduced visual contrast to the natural landscape, and the introduction of a power plant facility would likely be less noticeable because of the existing visual intrusions. Other unavoidable impacts would occur due to air emissions from natural gas combustion, and increased traffic from construction and operational personnel. As indicated in the air emission and transportation analyses, these impacts would be minor and would not significantly affect the environmental quality of the area. There would be unavoidable impacts from groundwater pumping should White Site 1 be chosen. However, indications are that this would be a productive well site subject to quick recharge from surrounding aquifers. Other environmental impacts of the proposed Project, such as water and natural gas pipeline construction, would produce impacts that are temporary in nature, and restoration of the natural landscape would occur following these temporary impacts. These relatively minor impacts to environmental resources would be offset by the societal benefit of a new source of electricity. It is not possible to quantify this benefit, as individuals would weigh the tradeoffs differently, and assign widely variable values to each resource.

4.18 SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

NEPA legislation requires that an EIS describe "the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity." Short-term uses include the life span of the power plant and its associated facilities. As indicated in the discussion under the individual resources, the small footprint of the power plant and the limited emissions indicate that operation of the facility would not likely affect regional natural resources to any significant degree. However, the proposed Project would require short-term development of 40 or 46 acres of land, depending on the plant site, for the footprint of the power plant. Additional land would be needed for transmission lines, roadways, a water well site, and a natural gas pipeline for White Site 1; and transmission lines, roadways, a water pipeline, and a natural gas pipeline for White Site 2. Human

communities would be positively affected by new jobs and income in the short term, and there would likely be few negative effects on public services or infrastructure.

Long-term uses refer to the time period following restoration and rehabilitation, during which the environment continues to be impacted. If the facility were re-used after its life as a power facility, development of the industrial facilities at the power plant footprint would be permanent, and topsoil would be lost at the building footprint and within the paved road footprint. If the facility was decommissioned and all facilities removed, natural resources in the vicinity, such as wildlife and groundwater, would be expected to recover quickly. It is unlikely that the natural resources or human communities in Brookings and Deuel Counties would be adversely affected in the long-term by the construction and operation of the proposed Project.

4.19 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

NEPA legislation requires that an EIS describe "any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented." Irreversible resource commitments involve damage to a resource that is not recoverable for use by future generations. The small size of the facility and its small emissions levels means that there would be minimal irreversible damage to regional natural resources. This would primarily involve the soil and agricultural property taken for the plant itself, and restoration after the life of the power plant would reduce these potential irreversible impacts. Irretrievable resource commitments are permanent losses of nonrenewable resources such as fossil fuels. Natural gas, energy, and non-recyclable materials used in construction and operation would represent irretrievable commitments of non-renewable resources that would not be available for use in other projects.

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