WESTERN AREA POWER ADMINISTRATION

Draft Environmental Impact Statement

Modification of the Groton Generation Station Interconnection Agreement

DOE/EIS-0435

U.S. DEPARTMENT OF ENERGY

Western AREA POWER ADMINISTRATION

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Back of Cover -- Page Intentionally Blank

COVER SHEET

Lead Federal Agency: U.S. Department of Energy, Western Area Power Administration
Title: Modification of the Groton Generation Station Interconnection Agreement Draft Environmental Impact Statement (DOE/EIS-0435)

Location: Brown County, South Dakota

Contacts:

For additional information on this Draft Environmental Impact Statement (EIS), contact:

Ms. Erika Walters
Western Area Power Administration
P.O. Box 281213
Lakewood, CO 80228
Telephone: (800) 336-7288
Fax: (720) 962-7279
E-mail: walters@wapa.gov

For general information on the DOE Office of National Environment Policy Act process, write or call:

Ms. Carol M. Borgstrom, Director
Office of NEPA Policy and Compliance
Environment, Safety and Health, GC-20
U.S. Department of Energy
Washington, DC 20585-0119
Telephone: (202) 586-4600 or
(800) 472-2756

Abstract: In response to a request from Basin Electric Power Cooperative (Basin Electric), Western Area Power Administration (Western) proposes to modify its interconnection agreement with Basin Electric for the Groton Generation Station to eliminate Western's 50-megawatts (MW) annual average operating limit. The Groton Generation Station is located about 5 miles south of Groton, South Dakota. Basin Electric needs to eliminate the operating limit to help serve increased load demand for electric power in the eastern portion of its service area. Western's proposed action and the no action alternative are analyzed in this Draft EIS. Elimination of the operating limit under Western's proposed action would allow Basin Electric to produce an estimated additional 305,760 megawatt-hours (MWh) per year. With elimination of the operating limit, the Groton Generation Station could emit more nitrous oxides, carbon monoxide and other air pollutants, but not above the limits established in the current Title V air quality operating permit for the generating station. Additional water and some chemicals would be used for air quality control and facility maintenance. Elimination of the operating limit would not require any modifications to the generating station, or require any new state or local approvals or permits. Under the no action alternative, the generating station would continue to operate with the 50 MW annual average operating limit, where output of the facility would be capped at 438,000 MWh per year.

Comments on this Draft EIS should be sent to Ms. Erika Walters at the Western address above. Comments must be postmarked no later than the expiration of the 45 day comment period announced in the U.S. Environmental Protection Agency's Notice of Availability for this Draft EIS.

Back of Page -- Intentionally Left Blank

TABLE OF CONTENTS

Back of Page -- Intentionally Left Blank

Executive Summary

This executive summary is included in the beginning of the Draft Environmental Impact Statement (EIS) for the Modification of the Groton Generation Station Interconnection Agreement, and is also intended to serve as a stand-alone document to provide a summary of the information contained within the full text version of the Draft EIS. For additional information on the topics contained within this summary please see the Draft EIS.

Introduction

Basin Electric Power Cooperative (Basin Electric) is a regional wholesale electric generation and transmission cooperative owned and controlled by its member cooperatives. Basin Electric serves approximately 2.8 million customers covering 540,000 square miles in portions of nine states. Basin Electric currently owns and operates the Groton Generation Station in Brown County, South Dakota. The Groton Generation Station is located within Basin Electric's eastern service area that comprises western Nebraska, northwestern and central Iowa, portions of southern Minnesota, all of South Dakota, portions of eastern Montana, and western and central North Dakota.

Western Area Power Administration (Western) and Basin Electric have entered into a Large Generator Interconnection Agreement (LGIA) per Western's Open Access Transmission Service Tariff (Tariff). Basin Electric currently operates the generating station with a condition in the LGIA with Western that limits the output of the generating station to 50 MW on an average annualized basis.

Basin Electric has requested to modify the LGIA with Western to eliminate the 50 MW annual average operating limit on its generating station (up to the limits imposed by the current Title V air quality control operating permit), so it can produce power above the 50 MW limit on an average annualized basis.

Western's Purpose and Need

The National Environmental Policy Act (NEPA) requires Federal agencies to consider the environmental effects of their decisions. Preparation of an EIS is one part of the agency decision-making processes. The purpose and need for Western's decision is discussed below.

In response to Basin Electric's request, Western needs to decide whether or not to modify its LGIA with Basin Electric to eliminate the operating limit of the existing generation station, up to the limits imposed by its current Title V air quality control operating permit.

In response to the Need for Agency Action, Western must adhere to the following guidelines:

- **Providing Transmission Service**. Under Western's Tariff, Western offers capacity on its transmission system to deliver electricity when capacity is available. The Tariff complies with the Federal Energy Regulatory Commission's Final Orders which are intended to ensure non-discriminatory transmission system access. Western submitted revisions to its non-jurisdictional Tariff in January 2005 as to certain terms and for

inclusion of the Large Generator Interconnection Procedures and a LGIA. In March 2007, Western submitted another revision for certain terms and to incorporate the Small Generator Interconnection Procedures and a Small Generator Interconnection Agreement. Final approval for both filings was received from the Federal Energy Regulatory Commission in September 2007. In September 2009 Western submitted yet another set of revisions to address Federal Energy Regulatory Commission Order 890 requirements along with revisions to existing terms.

- **Protecting Transmission System Reliability and Service to Existing Customers**. Western must ensure that existing reliability and service are not degraded. Western's Large Generator Interconnection Procedures provide for transmission and system studies to ensure that system reliability and service to existing customers are not adversely affected by new interconnections. These studies also identify system upgrades or additions necessary to accommodate the proposed Project and ensure that they are in the project scope.

Basin Electric's Purpose and Need

Construction of the Groton Generation Station was initially required to meet the growing need for power of Basin Electric's membership in its service territory. Basin Electric has reevaluated this need and has currently established the need for an additional peaking resource to serve projected additional member load growth. Even though the most rural areas are experiencing a loss in population, many areas served by Basin Electric are experiencing population growth. Basin Electric has established the need to lift the current 50 MW annual average limit to serve member load growth during increasingly heavy electrical use times in every consumer class, primarily during summer months and in anticipation of growth in commercial load throughout Basin Electric's service area. The Groton Generation Station was also established on the basis of an ongoing need to address reliability and to supply low-cost power to Basin Electric members. Eliminating the 50 MW annual average operating limit at Groton Generation Station would help Basin Electric meet the increased intermediate demand for electric power in the eastern portion of its nine-state service area.

Public Involvement

A Notice of Intent for the Groton Generation Station EIS was published in the *Federal Register* (FR) on September 21, 2009 (74 FR 48067). Western mailed scoping meeting notices directly to Federal and state agencies, Native American Tribes, and special interest groups to gain information regarding environmental impact that could potentially occur as a result of eliminating the operating limit for the Groton Generation Station. Additionally, Western announced the scoping meeting by placing display advertisements in 2 local newspapers in the affected region.

A public scoping meeting was held in Groton, South Dakota, on October 7, 2009. Display boards included the Groton Generating Station location, the NEPA process and schedule, and an operation limit table. Several handouts, including the scoping process description, and fact sheets were available at the meetings. The comment period was open until October 23, 2009, and no comments were received.

Western initially contacted potentially interested Native American Tribes by letter on September 17, 2009, about the proposal to eliminate the operating limit. No comments were received regarding sites of religious or cultural importance to the area. In addition, Western sought comments from the South Dakota Public Utility Commission and the South Dakota Department of Environment and Natural Resources, and no comments were received.

Proposed Federal Action

Western proposes to modify its LGIA with Basin Electric to eliminate the 50 MW annual average operating limit. Western's proposed action would only result in a modification to the LGIA for the Groton Generation Station. The elimination of the 50 MW annual average operating limit would not require any modifications to the Groton Generation Station or Western's Groton Substation, or any new permits or authorizations from local, state, or Federal agencies. The elimination of the 50 MW annual average operating limit would give Basin Electric greater operational flexibility in meeting its objectives and allow Basin Electric to produce an estimated additional 305,760 megawatt-hours (MWh) per year, up to the limits imposed by the current Title V air quality control operating permit.

No other changes to Western's LGIA or the interconnection configuration with the Groton Generation Station would be required.

No Action Alternative

Elimination of the 50 MW annual average operating limit would require Western's approval and modification of the LGIA. If Western does not approve the elimination of the operating limit, the Groton Generating Station would continue to operate with the limit in place. Under the No Action Alternative, Western would not approve the modification to the LGIA to eliminate the operating limit. The Groton Generating Station would continue to operate with the 50-MW annual average operating limit.

Alternatives Considered but Eliminated

Western considered whether the EIS should address an operation alternative that involved operating the Groton Generation Station above the limits set by the current Title V air quality operating permit. Under the proposed action, the Groton Generation Station could only operate up to the existing limits in the Title V air quality operating permit, which is based on emission limits of 238 tons for both nitrogen oxides (NO_X) and carbon monoxide (CO) per year. The Groton Generation Station has a theoretical maximum capacity of 100 MW, however, with the limitation of 238 tons of both NO_X and CO emissions per year, the Groton Generation Station cannot operate at 100 MW capacity for every hour of the year without exceeding the Title V air quality operating permit.

Based on the current Title V air quality operating permit, which establishes emission limits for NO_X and CO, the Groton Generation Station could not operate for all hours of the year at any load. Basin Electric requested an interconnection for 120 MW for each generating unit at the Groton Generation Station. However, even at full output of 100 percent load, the generating station would not exceed the limits provided by Western, because optimum generation conditions only exist for a small portion of the year. Basin Electric could increase the output of the generating station to be closer to the limits of the interconnection request if it applied for and received a Prevention of Significant Deterioration (PSD) Permit per Chapter 74:36:09 of the South Dakota Air Quality Rules. Basin Electric currently has no plans to apply for a PSD permit.

Western determined that the EIS will not fully analyze generation output above levels currently authorized by the Title V air permit because it is outside the scope of Western's decision, Western does not have Congressional authority to participate in the operation of Groton Generation Station, and it is speculative that Basin Electric would apply for a PSD permit. In the future, should Basin Electric apply for a PSD permit, then request Western to eliminate the operating limit imposed by the current Title V air quality operating permit, Western would address the request under the environmental review requirements in place at the time a request is made.

Summary of Potential Impacts of Groton Generation Station with and without Operating Limit

Resource	**Operation without Western's Operating Limit (Proposed Action)**	**Operation with Western's Operating Limit (No Action Alternative)**
Air Quality	Air quality operating permit conditions would apply. NO_X and CO emissions would not each exceed 238 tons/yr. Units may operate more on an annual basis without the 50 MW annual average limitation. The pound per hour emission rates and limits would not change.	Air quality operating permit conditions would apply. NO_X and CO emissions would each be less than 238 tons/yr, because Western's 50 MW annual average operating limit would be reached first. The pound per hour emission rates and limits would not change.
Greenhouse Gas Emissions and Climate Change	More CO_2 could be emitted. Operation could release up to 318,192 metric tons CO_2 per year (based on the 2008 CO_2 emission rate). Because numerous models produce widely divergent results, and there is insufficient information, Western is unable to identify the specific impacts of the station's CO_2 emissions on human health and the environment.	Generating station would continue to emit CO_2 up to 187,333 metric tons per year (based on the 2008 CO_2 emission rate). Because numerous models produce widely divergent results, and there is insufficient information, Western is unable to identify the specific impacts of the station's CO_2 emissions on human health and the environment.
Water Resources	Water use would increase to a maximum of 57 acre-feet/yr, but would not deplete available water supplies. Water supplier has adequate capacity to meet generating station's water supply needs.	Water use would remain at a maximum of 33.6 acre-feet/yr. Water use would not deplete available water supplies.
Aesthetics	Additional exhaust stack plumes would be possible, but would be limited due to more operation during warmer days during the summer, when plumes are less likely to form. There are no highly sensitive viewer	There would be no change in facility operations and effects to views in the area would not change.

Resource	Operation without Western's Operating Limit (Proposed Action)	Operation with Western's Operating Limit (No Action Alternative)
	locations within viewing distances of the generating station. The overall change in ambient lighting conditions at the generating station, as viewed from nearby locations, would not be substantial	
Transportation	Additional deliveries of chemicals and necessities for maintenance would not increase congestion, impaired emergency access, or reduce levels of service.	Deliveries would continue to be infrequent and would not interfere with any local traffic patterns, cause major traffic delays or road damage, or change traffic patterns.
Noise	Even with increased output, significant noise impacts would not occur since operation of the facility would not increase noise levels above limits established for the nearest sensitive receptor, expose persons to excessive groundborne vibration or ground borne noise levels where they live, work or recreate, or result in a substantial permanent increase in ambient noise levels.	There would be no change in facility operations. Noise levels would not change.
Human Health and Safety	The frequency of maintenance activities would increase, increasing the use of chemical materials, lubricating oils, and insulating mineral oils. However, increased use would not require any changes to control measures and plans, or require the installation of additional chemical storage facilities or vessels. Considering the control measures and plans in place, it is unlikely increased operations would cause significant impacts to human health and safety.	There would be no change in facility operations and effects to the risk of accidental spills from the transport, storage, use, and disposal of chemical materials and waste would not change. Considering the control measures and plans in place, it is unlikely current operations would cause significant impacts to human health and safety.
Intentional Destructive Acts	The risk to workers or the public from damage to generating station facilities as a result of accidental or intentional actions by outside parties is low because public access is controlled, the site is monitored, and an emergency response plan and site security plan exists for the Groton Generation Station.	The risk to workers or the public from damage to generating station facilities as a result of accidental or intentional actions by outside parties is low because public access is controlled, the site is be monitored, and an emergency response plan and site security plan exists for the Groton Generation Station.

Major Conclusions

Eliminating Western's operating limit would not result in any significant environmental impacts.

Areas of Controversy

No areas of controversy were identified during the scoping process.

Issues to be Resolved

There are currently no issues to be resolved.

Back of Page -- Intentionally Left Blank

List of Figures

List of Tables

List of Acronyms

Basin Electric	Basin Electric Power Cooperative
BACT	Best Available Control Technology
CEQ	Council on Environmental Quality
CO	Carbon Monoxide
CO_2	Carbon dioxide
Corps	Army Corps of Engineers
dBA	Decibels on the A-weighted scale
L_X	dBA that may be exceeded X percent of the time within an hour
DOE	U.S. Department of Energy
EIA	Energy Information Administration
EPA	U.S. Environmental Protection Agency
^{o}F	Degrees Fahrenheit
FR	Federal Register
GE	General Electric
GHG	Greenhouse gas
IPCC	Intergovernmental Panel on Climate Change
LGIA	Large Generator Interconnection Agreement
MW	Megawatts
MWh	Megawatt-hours
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_2	Nitrogen dioxide
NO_X	Nitrogen oxides
NSPS	New Source Performance Standards
NSTC	National Science and Technology Council
ppm	Parts per million
PSD	Prevention of Significant Deterioration
SDDENR	South Dakota Department of Environment and Natural Resources
SDPUC	South Dakota Public Utilities Commission
SO_2	Sulfur dioxide
VOCs	Volatile Organic Compounds
Tariff	Open Access Transmission Service Tariff
WEB	WEB Water Development Association
Western	Western Area Power Administration

Back of Page -- Intentionally Left Blank

1.0 Introduction

Western Area Power Administration (Western) is a Federal power-marketing agency within the U.S. Department of Energy (DOE) that sells and delivers Federal electric power to municipalities, public utilities, Federal and state agencies, and Native American tribes in 15 western and central states. The Groton Generation Station is located within Western's Upper Great Plains Region, which operates and maintains nearly 90 substations and more than 8,000 miles of Federal transmission lines in Minnesota, South Dakota, North Dakota, Montana, Nebraska, and Iowa.

Basin Electric Power Cooperative (Basin Electric) is a consumer-owned, regional cooperative headquartered in Bismarck, North Dakota. Basin Electric owns 2,827.5 megawatts (MW) and operates a total of 3,767 MW of electric generating capacity of which 953 MW is for participants of the Missouri Basin Power Project (a group of six consumer-owned utilities, including the Missouri River Energy Services and Heartland Consumers Power District), and 80 MW is jointly owned by Basin Electric and its Class A member, Corn Belt Power Cooperative, Humboldt, Iowa. Basin Electric has purchased a total of 672.1 MW of electric generation capacity/energy, including 270.1 total MW of renewable energy, of which 225.8 MW are wind energy, and 44 MW are waste-heat energy (known as recovered energy generation), and 375 kilowatts are from a bio-gas facility in South Dakota. Basin Electric's purchased power portfolio also includes 62 MW of nuclear energy. Basin Electric also owns 1,880 miles and maintains 1,965 miles of high-voltage transmission lines; 56 switchyards and substations, and 101 telecommunication installations.

Basin Electric currently owns and operates the Groton Generation Station in Brown County, South Dakota (See Figure 1-1, Location Map and Figure 1-2, Topographical Map). The Groton Generation Station is located within Basin Electric's eastern service area that comprises western Nebraska, northwestern and central Iowa, portions of southern Minnesota, all of South Dakota, portions of eastern Montana, and western and central North Dakota. Western and Basin Electric have entered into a Large Generator Interconnection Agreement (LGIA) per Western's Open Access Transmission Service Tariff (Tariff, Western, 2009a). Groton Generation Station has two generating units. Each unit is powered by a General Electric (GE) LMS100® simple cycle gas turbine rated at 100 MW at design conditions. Unit 1 went into commercial operation on July 1, 2006, and Unit 2 went into commercial operation on July 1, 2008. Basin Electric currently operates the generating station with a condition in the LGIA with Western that limits the output of the generating station to 50 MW on an average annualized basis.

Basin Electric proposes to modify the LGIA with Western to eliminate the 50 MW annual average operating limit on its generating station, so it can produce power above the 50 MW limit, up to the limits imposed by its current Title V air quality control operating permit, on an average annualized basis. Basin Electric needs to eliminate the operating limit to help serve increased load demand for electric power in the eastern portion of its service area. The need for additional generating capacity is driven by the increasing electrical power usage of the Basin Electric membership consumers.

Figure 1-1, Location Map

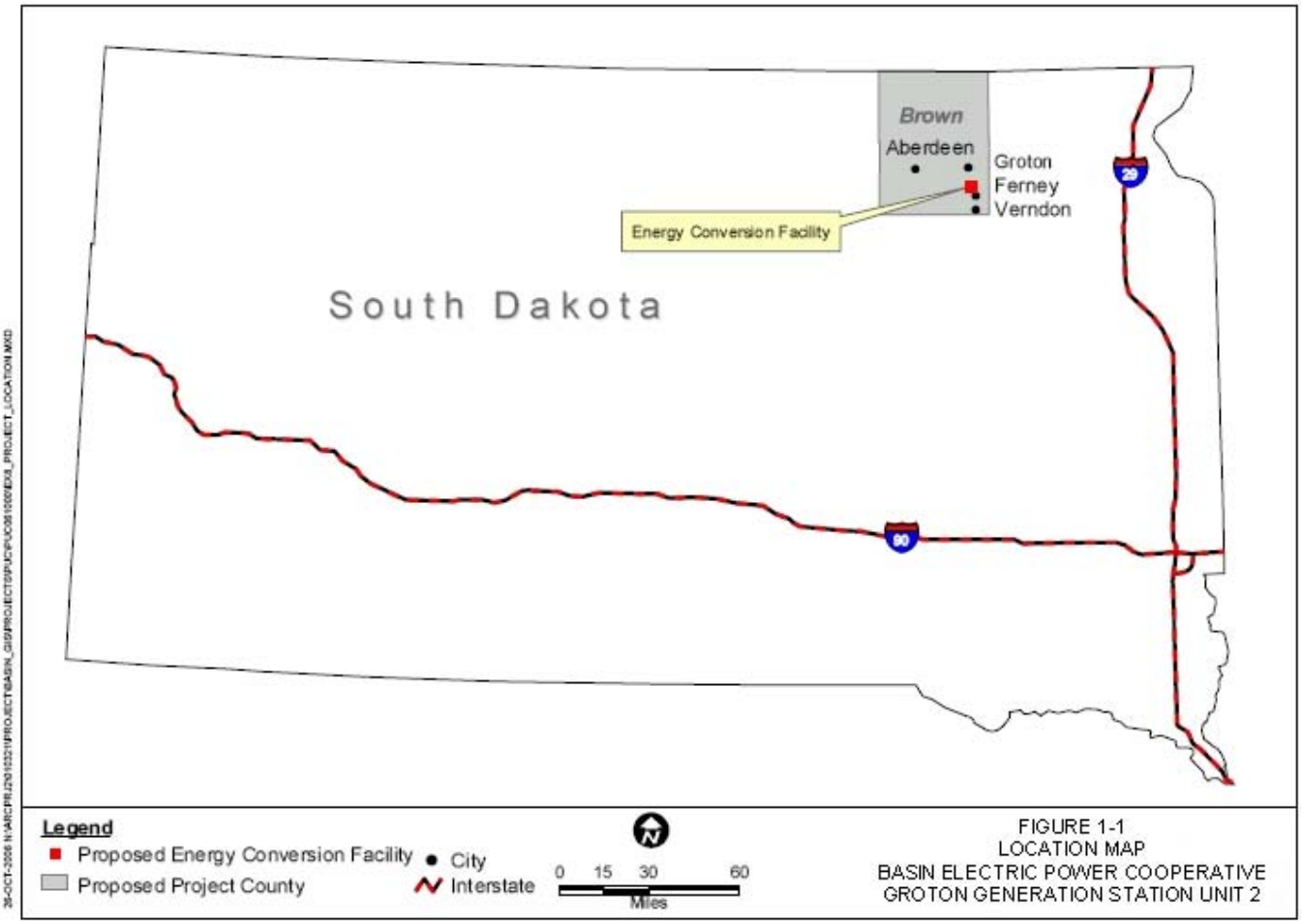
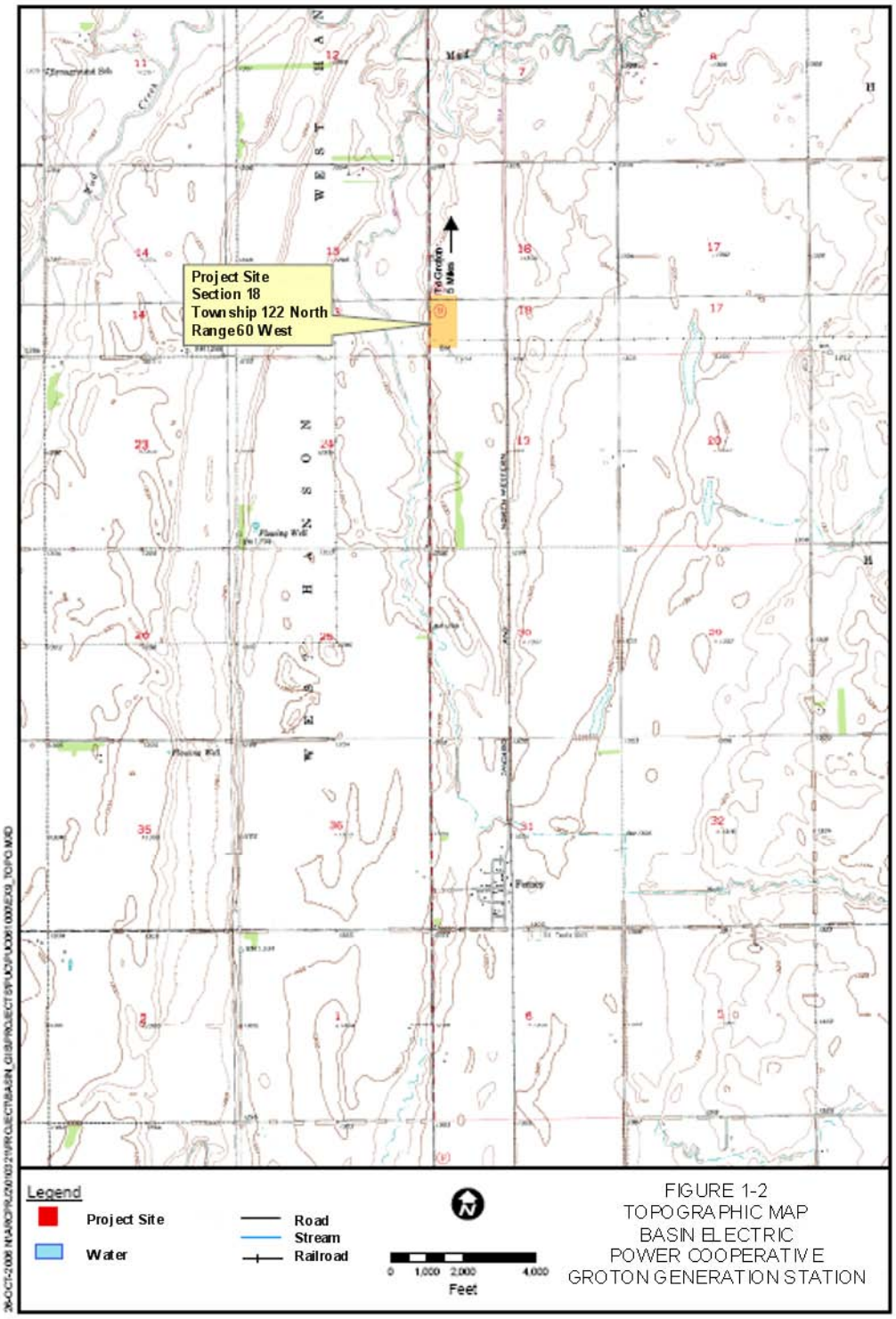


Figure 1-2, Topographical Map



Between 1999 and 2006, Basin Electric's total system peak demand increased 752 MW from 1,195 MW to 1,947 MW, or approximately 107 MW per year. In 2007, Basin Electric prepared a forecast showing load and capability surpluses/deficits through the year 2021. The forecast predicts that, by 2014, there will be a deficit of 800-900 MW for the eastern portion of their service area.

The interconnection of each generating unit with Western's transmission system was addressed in separate environmental assessments; East Side Peaking Project, South Dakota Environmental Assessment, DOE/EA-1524 (Western, 2005) and Groton Generating Station Unit 2 Project Amended Environmental Assessment, DOE/EA-1524-S1 (Western, 2007). Based on these environmental assessments, which included the 50 MW annual average operating limit provision, Western issued separate findings of no significant impact, with determinations that the preparation of an EIS was not required, on July 25, 2005, and June 20, 2008, respectively.

1.1 Western's Purpose and Need For Agency Action

NEPA requires Federal agencies to consider the environmental effects of their decisions. Preparation of an EIS provides the framework for the agency decision-making processes. The purpose and need for Western's decision is discussed below.

In response to Basin Electric's request, Western needs to decide whether or not to modify its LGIA with Basin Electric to eliminate the operating limit.

In response to the Need for Agency Action, Western must adhere to the following guidelines:

- **Providing Transmission Service**. Under Western's Tariff, Western offers capacity on its transmission system to deliver electricity when capacity is available. The Tariff complies with the Federal Energy Regulatory Commission's Final Orders which are intended to ensure non-discriminatory transmission system access. Western submitted revisions to its non-jurisdictional Tariff in January 2005 as to certain terms and for inclusion of the Large Generator Interconnection Procedures and a LGIA. In March 2007, Western submitted another revision for certain terms and to incorporate the Small Generator Interconnection Procedures and a Small Generator Interconnection Agreement. Final approval for both filings was received from the Federal Energy Regulatory Commission in September 2007. In September 2009 Western submitted yet another set of revisions to address Federal Energy Regulatory Commission Order 890 requirements along with revisions to existing terms.

- **Protecting Transmission System Reliability and Service to Existing Customers**. Western must ensure that existing reliability and service are not degraded. Western's Large Generator Interconnection Procedures provide for transmission and system studies to ensure that system reliability and service to existing customers are not adversely affected by new interconnections. These studies also identify system upgrades or additions necessary to accommodate the proposed project and ensure that they are in the project scope.

1.2 Basin Electric's Purpose and Need

Basin Electric was formed in 1961 by 67 member cooperatives after the U.S. Department of the Interior announced that the Federal hydropower system would not be able to meet additional energy requirements of the region's rural electric cooperatives and other preference consumers or the U.S. Bureau of Reclamation (Reclamation) beyond the winter of 1965. Basin Electric was formed as a wholesale power supplier to plan, design, construct, and operate generating facilities necessary to meet the growing electrical demands of its member systems.

Construction of the Groton Generation Station was initially required to meet the growing need for power of Basin Electric's membership in its service territory. Basin Electric has reevaluated this need and has currently established the need for an additional peaking resource to serve projected additional member load growth. Even though the most rural areas are experiencing a loss in population, many areas served by Basin Electric are experiencing population growth. Basin Electric has established the need to lift the current 50 MW annual average limit to serve member load growth during increasingly heavy electrical use times in every consumer class, primarily during summer months and in anticipation of growth in commercial load throughout Basin Electric's service area. The Groton Generation Station was also established on the basis of an ongoing need to address reliability and to supply low-cost power to Basin Electric members. Eliminating the 50 MW annual average operating limit at Groton Generation Station would help Basin Electric meet the increased intermediate demand for electric power in the eastern portion of its nine-state service area. With the 50 MW annual average operating limit at the Groton Generation Station and with two 100 MW units in operation, the resulting capacity factor for the station with this limit is approximately 25 percent. With current system operations, Basin Electric sees a need to operate the Groton Station beyond the current 25 percent capacity factor limitation to help serve increased load demand for electric power in the eastern portion of its service area.

1.3 Authorizing Actions

The Groton Generation Station operates under authorization from the South Dakota Public Utilities Commission (SDPUC), a Title V air quality operating permit (SDDENR, 2010) from the South Dakota Department of Environment and Natural Resources (SDDENR), and approved zoning changes granted by the Brown County Board of County Supervisors. If Western decides to eliminate the operating limit, no additional authorizations or permits would be required to increase the output of the generating station.

1.4 Agency Consultation and Public Involvement

Public participation is an integral part of the EIS process and is conducted to help determine issues to be addressed and identify significant issues related to the Proposed Action.

A Notice of Intent for the Groton Generation Station EIS was published in the *Federal Register* on September 21, 2009 (74 FR 48067). Western mailed scoping meeting notices directly to Federal and state agencies, Native American Tribes, and special interest groups to gain information regarding environmental impact that could potentially occur as a result of eliminating the operating limit for the Groton Generation Station. Additionally, Western announced the scoping meeting by placing display advertisements in two local newspapers in the affected region. The display advertisements were published once per week for three weeks in the Groton Independent, and once per week for two weeks in the Aberdeen American News.

1.4.1 Scoping Process

A public scoping meeting was held in Groton, South Dakota, on October 7, 2009. The scoping meeting was conducted in an open house format. Western provided information and gave attendees the opportunity to ask resource specialists questions and to express their concerns about the proposed elimination of the operating limit. Display boards included the Groton Generating Station location, the NEPA process and schedule, and an operation limit table. Several handouts, including the scoping process description, and fact sheets were available at the meetings. The comment period was open until October 23, 2009, and no comments were received.

1.4.2 Consultations

Western initially contacted potentially interested Native American Tribes by letter on September 17, 2009, about the proposal to eliminate the operating limit. No comments were received regarding sites of religious or cultural importance to the area. In addition, Western sought comments from the SDPUC and the SDDENR, and no comments were received.

2.0 Proposed Federal Action and Alternatives

This chapter describes Western's proposed Federal action associated with the operation of Basin Electric's Groton Generating Station, alternatives to its proposed Federal action, and changes to the operation of the Groton Generating Station if Western decides to eliminate the 50 MW annual average operating limit.

The last section of this chapter contains a summary of the environmental impacts of implementing the proposed Federal action and the no action alternative based on the impact analysis in Chapter 4. The summary includes the potential adverse impacts to each resource or environmental component.

2.1 Proposed Federal Action

The proposed Federal action evaluated in this EIS is based on Western's purpose and need for agency action as described in Section 1.1. Western and Basin Electric have executed a LGIA under Western's Tariff that limits the output of the Groton Generation Station to 50 MW on an average annualized basis. Western proposes to modify its LGIA with Basin Electric to eliminate the 50 MW annual average operating limit. Western's proposed action would only result in a modification to the LGIA for the Groton Generation Station. The elimination of the 50 MW annual average operating limit would not require any modifications to the Groton Generation Station or Western's Groton Substation, or any new permits or authorizations from local, state, or Federal agencies. The elimination of the 50 MW annual average operating limit would give Basin Electric greater operational flexibility in meeting its objectives as described in Section 1.2, and allow Basin Electric to produce an estimated additional 305,760 MWh per year, up to the limits imposed by its current Title V air quality control operating permit.

No other changes to Western's LGIA or the interconnection configuration with the Groton Generation Station would be required.

2.2 No Action Alternative

Elimination of the 50 MW annual average operating limit would require Western's approval and modification of the LGIA. If Western does not approve the elimination of the operating limit, the Groton Generating Station would continue to operate with the limit in place. Under the No Action Alternative, Western would not approve the modification to the LGIA to eliminate the operating limit. The Groton Generating Station would continue to operate with the 50 MW annual average operating limit. A comparison of the operating parameters, including fuel and water use, under Western's proposed Federal action and the No Action alternative is provided in Table 2.1.

Table 2.1 - Annual Operating Parameters under Proposed Federal Action and No Action Alternative

Parameter	With 50-MW Operating Limit – No Action Alt.	W/O Operating Limit -- Proposed Federal Action	Full Output (Would require PSD Modification)[1]
Station Capacity Factor	25 percent[2]	42.5 percent[3]	100 percent
Output – Station	438,000 MWh[4]	743,760 MWh[5]	1,752,000 MWh[6]
Output per Unit	219,000 MWh	371,880 MWh	876,000 MWh
Annual Station Output-Based Emission Rate[7]	1.09 lb/MWh	0.64 lb/MWh	< 0.64lb/MWh
Annual Unit Output-Based Emission Rate[7]	2.17 lb/MWh	1.28 lb/MWh	< 1.28 lb/MWh
Unit No.1 Water Use[8]	2,190,000 gal/yr	3,679,200 gal/yr	8,760,000 gal/yr
Unit No. 2 Water Use[9]	5,475,000 gal/yr	9,198,000 gal/yr	21,900,000 gal/yr
Station Combined Water Use[10]	7,665,000 gal/yr	12,877,200 gal/yr	30,660,000 gal/yr
Unit No.2 Produces All output[10]	10, 950,000 gal/yr	18,593,750 gal/year	N/A
Natural Gas Consumption[11]	3,412 million cubic ft	5,795 million cubic ft	13,650 million cubic ft
Station GHG Emissions[12]	205,860 tons CO_2/yr	349,563 tons CO_2/yr	411,720 tons CO_2/yr
Station NO_X Emissions[13]	238 tons/yr	238 tons/yr	BACT[13]
Station CO Emissions[13]	238 tons/yr	238 tons/yr	BACT[14]

[1] Provided for comparison purposes only. Operation beyond permit limits would be subject to Prevention of Significant Deterioration (PSD) review and installation of Best Available Control Technology (BACT).

[2] Based on 50 MW annual average operating limit required by Western.

[3] Based on Title V air quality operating permit of 238 ton limits for each CO and NO_X, and worst-case air analysis resulting in 7,438 combined hours per year (or 3,718.8 hours per year for the generating station) per air permit application.

[4] Based on 25 percent capacity factor or 50 MW annual average output (50MW *8,760 hours per year).

[5] Based on 42.5 percent capacity factor (200 MW*3718.8 hours per year).

[6] Based on 100 percent capacity factor (200 MW capacity*8,760 hours per year). Provided for comparison purposes only; emission limits dictate actual generating station output.

[7] Emission rates in pounds per MWh based on 238 tons/yr emission limits for each NO_X and CO per current Title V air quality operating permit.

[8] Based on 10 gallons/MWh times unit output per year (12.5 capacity factor per unit).

[9] Based on 25 gallons/MWh times unit output per year (12.5 capacity factor per unit).

[10] Combined water use reflects water use by each unit at 100 percent load. Unit No. 2 uses more water for NO_X control, so if only Unit No. 2 was used, its water use would reflect maximum use by the generating station.

[11] Each unit is rated at 786.5 million British thermal units per hour. Natural gas is 1009.5 million British thermal units per thousand cubic feet; natural gas consumption equals the number of operating hours times the heat rate divided by the energy value of natural gas.

[12] Based on actual 2008 emission data, 42,540 tons CO_2 were produced while generating 90,608 MWh; 0.47 tons CO_2/MWh.

[13] NO_X and CO emissions limited to 238 tons/yr each per current Title V air quality operating permit. Emissions would be less with less hours of operation. The 2009 emission inventory is provided in Appendix A.

[14] NO_X and CO emissions limited to 238 tons/yr each per current Title V air quality operating permit. Operation beyond permit limits would be subject to PSD review and installation of BACT.

2.3 Alternatives Considered but Eliminated

Under Western's Proposed Federal Action, Basin Electric would operate the Groton Generation Station in accordance with its current Title V air quality operating permit, which established emission limits for both nitrogen oxides (NO_X) and carbon monoxide (CO) of 238 tons per year each. Based on the current permit, the Groton Generation Station could not operate for all hours of the year at any load. Basin Electric requested an interconnection for 120 MW for each generating unit at the Groton Generation Station. However, even at full output at 100 percent load, the generating station would not exceed the interconnection limits provided by Western, because optimum generation conditions only exist for a small portion of the year. Basin Electric could increase the output of the generating station to be closer to the limits of the interconnection request if it applied for and received a PSD Permit per Chapter 74:36:09 of the South Dakota Air Quality Rules. Basin Electric currently has no plans to apply for a PSD permit.

Western considered whether the EIS should address an operation alternative that involved operating the Groton Generation Station at the output limits set by GE, which are higher than the limits set by the current Title V air quality operating permit. If Basin Electric wanted to operate the generation station above the limits set by the current Title V air quality operating permit (limits of 238 tons per year each for NO_X and CO), the generation station would be subject to PSD requirements. PSD review requires a full BACT analysis. Western has determined that the EIS will not fully analyze this alternative for the following interrelated reasons:

- This alternative falls outside of Western's purpose and need (see Section 1.1). An analysis of a different operation alternative is unreasonable because such an alternative does not fall within Western's authority.

- Western's decision is limited to whether to eliminate the operating limit in its LGIA with Basin Electric. Western has no control over the Basin Electric's decision to operate within the limits of the current Title V air permit. Western's sole decision is whether to modify its LGIA with Basin Electric. Thus, consideration of additional operation alternatives would be speculative.

- Absent specific legislation, Western has no Congressional authority to participate in operation of the Groton Generation Station. Western's mission is to market and deliver reliable, cost-based hydroelectric power within a 15-state region of the central and western United States. Western provides transmission service and processes applicants' interconnection requests under its Tariff. Western's statutory authorization and Congressional directives are limited to marketing and delivering power. Western has no authority to participate in the operation of a generating facility.

- Assuming that Basin Electric would apply for a PSD permit is speculative and as such it would be inappropriate for Western to consider alternatives to generation that have not been proposed. For example, addressing operation alternatives would require Western, a Federal agency that operates no generation facilities, to evaluate the impacts of a hypothetical operation scenario. Both the scenario and its impacts would be speculative.

In the future, should Basin Electric apply for a PSD permit, then request Western to eliminate the operating limit imposed by the current Title V air quality operating permit, Western would address the request under the environmental review requirements in place at the time a request is made.

2.4 Generating Station Description

This section describes the existing Groton Generation Station and its operation as it relates to both the proposed Federal action and the no action alternative. The existing Groton Generation Station includes two generating units. Each 100-MW unit is powered by a GE LMS100® simple cycle gas turbine (see Figure 2.4-1, GE LMS 100® Gas Turbine). Unit 1 went into commercial operation on July 1, 2006, and Unit 2 went into commercial operation on July 1, 2008. In each turbine, combustion air flows through an inlet air filter and associated air inlet ductwork, is compressed in the gas turbine compressor section, and then flows to the turbine's combustor. Natural Gas fuel is injected along with the compressed air into the combustor and then ignited. The hot combustion gases expand through the power turbine section of the turbine, causing the shaft to rotate and drive the electric generator and turbine compressor. Both units are capable of operating at all loads from 3 percent to 100 percent of rated capacity, but would normally operate between 50 and 100 percent of rated capacity. Currently, the combined yearly output of the turbines is less than 50 MW on an average annualized basis with Western's operating limit.

Thermal energy comes from the combustion of natural gas, which is converted into mechanical energy required to drive the combustion turbine compressors and electric generators. Each turbine system consists of a stationary combustion turbine generator, supporting systems, and associated auxiliary equipment. The gas turbines are equipped with the following required accessories to provide safe and reliable operation:

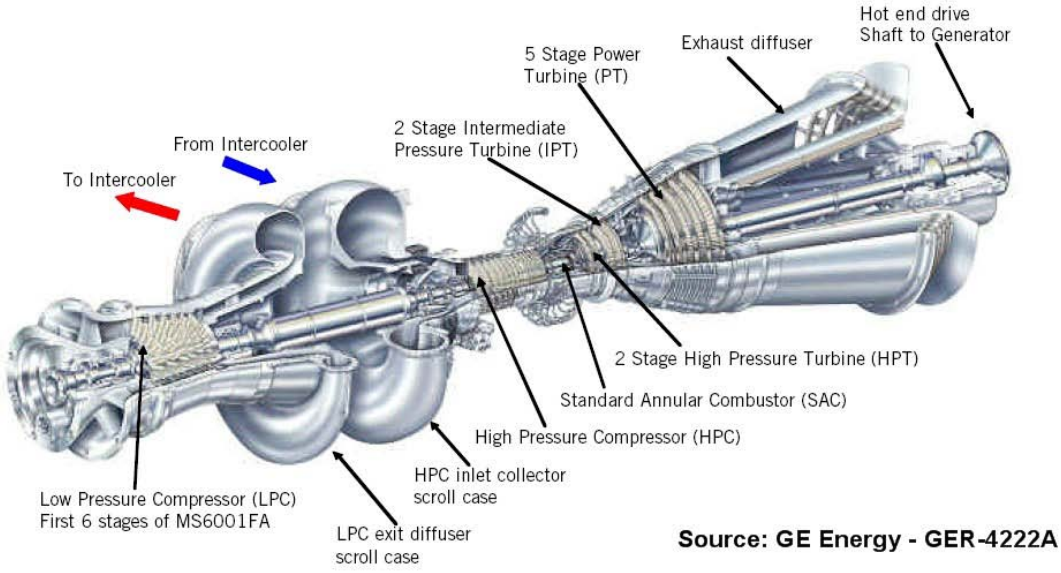
- Inlet air filters
- Inlet air evaporative coolers
- GE LMS100® Wet Intercooler System
- Metal acoustical enclosure
- Redundant lube oil cooler
- Water injection for Nitrogen Oxide (NOx) control
- Compressor wash system
- Fire detection and protection system

A GE LMS100® simple cycle gas turbine system is designed to be more energy efficient than a typical simple cycle gas turbine system. Over the course of a 3,000 hour peaking season, an LMS100® turbine running at full capacity avoids the emission of 45,000 metric tons of CO_2 emissions when compared with the a typical simple cycle gas turbine system, which such avoidance being equivalent to the CO_2 emitted annually by over 8,500 passenger cars on the U.S. roads (GE, 2009).

2.4.1 Maintenance

Maintenance on the turbine follows a 50,000-hour cycle. Preventive maintenance for the engine primarily consists of annual borescope inspections, requiring one shift of downtime. At approximately 25,000 hours of operation, the hot section and the combustor need to be refurbished, accomplished at the site in about 2-3 days downtime. At around 50,000 hours of operation, the entire engine needs to be overhauled. This can be accomplished by installing a leased engine while the original engine is being overhauled. Total downtime is about 2-3 days to install the leased engine and another 2-3 days to install the original engine. The shop overhaul is estimated to take 60 days. Other facility maintenance, being routine in nature, is on the fin-fan cooling tower fans and the coolant circulating pumps (Western, 2005).

Figure 2.4-1, GE LMS 100 Gas Turbine



2.4.2 Safety and Security

A comprehensive occupational health and safety program is in place to protect workers during operation of the Groton Generating Station. The health and safety program meets Federal, state, and local health requirements. It includes regular employee education and training in safe working practices; communication of hazards in accordance with Federal, state, and local standards; accident incident evaluations; administrative health and safety procedures; emergency response; fire protection and fire response; and reporting and recordkeeping of safety performance data. Operations personnel have been provided with written safety guidance. A first aid station containing basic first aid equipment is presently established at several locations around the generation station. First aid training is required for operations personnel.

If an accident occurred, the Avera Clinic of Groton, located 6 miles north of the generation station at 8 East Highway 12 in Groton, or the Avera St. Luke's Hospital about 25 miles west of the generating generation at 303 South State Street in Aberdeen, would provide medical services. These facilities have adequate capacity to accommodate the generation station during operation. Avera St. Luke's CareFlight and Aberdeen Flying Service, 4430 East Highway 12, Aberdeen, provide helicopter transport. The Aberdeen Ambulance Service and the Aberdeen Fire and Rescue provide local response to calls for service in an emergency (SDDPS, 2009).

2.4.3 Waste Management

Waste management is the process whereby all wastes produced at the Groton Generating Station are properly collected, treated if necessary, and disposed of. Waste management would not be altered with the implementation of the proposed Federal action or the no action alternative. Generation station wastes include process and sanitary wastewater, nonhazardous waste, both liquid and solid. All non-contact cooling water is collected in an on-site storage pond, where it evaporates into the atmosphere. Contaminated industrial wastewater and sewage is collected in underground storage vessels and then transferred to trucks and removed from the site for treatment at authorized disposal facilities. Water quality-related design considerations are associated with site run-off during operation and are controlled and managed by a water treatment system under the terms and conditions of a South Dakota Storm Water Management and Control Permit for the facility.

Generation station wastes include oily rags, scrap metal and plastic, insulation material, defective or broken electrical materials, empty containers, and other solid wastes, including the typical refuse generated by workers. Solid wastes are trucked offsite for recycling or disposal.

Safety showers and eyewashes are provided adjacent to, or in the vicinity of, chemical storage and use areas. Plant personnel use approved personal protective equipment during chemical spill containment and cleanup activities. Personnel are properly trained in the handling of these chemicals and instructed in the procedures to follow in case of a chemical spill or accidental release. Adequate supplies of absorbent material are stored onsite for spill cleanup.

2.4.4 Operation for Air Quality Control

Based on the design parameters for Unit No. 1 and Unit No. 2 and the Title V air quality operating permit conditions, Table 2.4-1 and the discussion below describe the emission controls and limits for criteria pollutants that apply to the Groton Generating Station for both the proposed Federal action and the no action alternative.

Table 2.4-1, Emission Limits for the Groton Generation Station

Design Parameter	Unit 1	Unit 2
Nameplate Capacity (MW)	100	100
Max Operating Firing Rate (mmBTU per hour)	787	787
Long-term Emissions Limit for NO_X and CO (tons per year)	238 each on Combined Plant	
Gallons Water per MWh	10	25

Particulate Matter

Particulate emissions from the GE LMS100® result from the incomplete combustion of noncombustible trace constituents in the fuel. The particulate emissions are negligible, however, because the GE LMS100® is fired exclusively on natural gas, which contains only trace quantities of noncombustible material. In addition, combustion turbines typically operate at 99 percent or greater combustion efficiency at full load. The Clean Air Act Standards of Performance for Stationary Gas Turbines (40 CFR 60 Subpart GG) does not establish a limit for particulate emissions. Firing of natural gas in the GE LMS100® is considered the most stringent level of control for Particulate Matter. In accordance with the Title V air quality operating permit, Basin Electric shall not allow the emission of total suspended particulate in excess 0.3 pounds per million Btu heat input.

Sulfur Dioxide

SO_2 is formed in the gas turbine combustion process and is completely dependent on the sulfur content of the fuel, since virtually all fuel sulfur is converted to SO_2. Pipeline-quality natural gas is a relatively clean fuel with a negligible amount of sulfur. The firing of only pipeline-quality natural gas in simple-cycle combustion turbines is the most stringent method demonstrated for controlling SO_2 emissions. Since the GE LMS100® is fired exclusively on pipeline-quality natural gas; this level of control is considered the most stringent for SO_2 emissions. Basin Electric is required to sample and report on the sulfur content of the natural gas twice per year per requirements in the Title V air quality operating permit. Basin Electric is not allowed to burn any fuel which contains sulfur in excess of 0.8 percent by weight per the operating permit.

Carbon Monoxide

Carbon monoxide, or CO, is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes about 56 percent of all CO emissions nationwide. Electricity generation produced about 640,776 tons in 2005 (EPA, 2010).

CO emissions from turbines are a function of oxygen availability or excess air, flame temperature, residence time at flame temperature, combustion zone design, and turbulence. Combustion turbines are designed for maximum conversion of fuel to energy at full load conditions, resulting in comparatively low levels of incomplete combustion, and consequently low CO emissions when they are fired at full load. At lower loads, however, the fuel-to-energy conversion can be less efficient, resulting in incomplete combustion and formation of CO. Catalytic oxidation removes CO from the turbine exhaust gas rather than limiting pollutant formation at its source. The oxidation of CO to CO_2 and water uses the excess air in the turbine exhaust and the catalyst lowers the activation energy for the oxidation reaction to proceed. The turbine manufacturer has provided a guarantee that the operation of the GE LMS100® with the supplied catalyst, under specified conditions, will limit CO emissions to be within New Source Performance Standards (NSPS) requirements. The Title V air quality operating permit limits CO emissions to 238 tons per 12-month rolling period.

Volatile Organic Compounds

VOCs are formed during the combustion process as a result of the incomplete oxidation of the carbon contained in the fuel. Commonly classified VOC pollutants can encompass a wide spectrum and may include some hazardous air pollutants. With natural gas combustion, some of the VOCs are unreacted trace constituents of the gas, while others are formed in the combustion of the heavier hydrocarbons. VOC formation is limited by ensuring complete and efficient combustion of the fuel in the combustion turbine. Maximized operating loads, high combustion temperatures, adequate excess air, and sufficient air/fuel mixing during combustion minimizes VOC emissions. Catalytic oxidation is the post-combustion method for controlling VOC emissions in the GE LMS100®. The oxidation catalyst promotes the oxidation of VOC to CO_2 and water. No reagent injection is necessary for the reaction to occur. The temperature of the flue gas as it passes through the catalyst and the VOC species present in the flue gas are the two factors that affect VOC oxidation. Higher temperatures promote more efficient oxidation of VOCs.

Nitrogen Oxides

Nitrogen oxides are the number-one pollutant in terms of quantity of emissions from the combustion of natural gas in the simple-cycle turbine. NO_x are formed in the gas turbine combustion process by the dissociation of nitrogen and oxygen. Reactions after this dissociation result in seven known oxides of nitrogen. Of these, nitric oxide and nitrogen dioxide (NO_2) are the pollutants of interest and are referred to as NO_x. Nitrogen oxides are formed in turbine combustors by two mechanisms: (1) from the burning of fuel containing nitrogen, and (2) through the thermal oxidation of atmospheric nitrogen found in the combustion air. The GE LMS100® is fueled by natural gas that contains little or no fuel that contains nitrogen. Therefore, the majority of NO_x emissions are a result of thermal oxidation.

The primary factors that influence the amount of NO_X generated are the turbine combustor design, the type of fuel burned, ambient conditions, operating cycles, and the power output level as a percentage of the rated full power output of the turbine (USEPA, 1993). NO_x emissions from the turbines are controlled by wet injection. The wet injection control reduces the formation of thermal NO_x with the injection of water or steam directly into the primary combustion zone with the fuel. The injected water creates a heat sink that lowers the flame temperature and reduces the thermal NO_x formation. The water-to-fuel ratio is the most important factor that affects the performance of wet controls. NO_x emissions decrease with higher water-to-fuel ratios (USEPA, 1993). The turbine manufacturer has provided a guarantee, based on the NSPS, that the operation of Unit No. 1 and Unit No. 2 will limit NO_X emissions to be within NSPS requirements. See Table 2.4-1, Emission Limits for Groton Generation Station.

Nitrogen Dioxide (NO_2) is one of a group of highly reactive gasses known as "oxides of nitrogen", or "nitrogen oxides" (NO_X). Other nitrogen oxides include nitrous acid and nitric acid. While EPA's National Ambient Air Quality Standard covers this entire group of NOx, NO_2 is the component of greatest interest and the indicator for the larger group of nitrogen oxides. NO_2 forms quickly from emissions from cars, trucks and buses, power plants, and off-road equipment. In addition to contributing to the formation of ground-level ozone, and fine particle pollution, NO_2 is linked with a number of adverse effects on the respiratory system (EPA, 2010a).

Emission Monitoring

For each combustion turbine, a separate continuous emissions monitoring system is used to sample, analyze, and record fuel gas flow rate, NO_2 and CO concentration levels, and percentage of oxygen in the exhaust gas from the stacks. The monitoring system's sensors transmit data to a data acquisition system that stores the data and generates emission reports in accordance with Title V air quality operating permit requirements. The data acquisition system also includes alarm features that send signals to the generating station's Distributive Control System when the emissions approach or exceed pre-selected limits. 2009 Emissions data for the Groton Generation Station is provided in Appendix A.

2.5 Operation without Western's Operating Limit under the Proposed Federal Action

2.5.1 Generation Station Output

The capacity factor with Western's 50 MW annual average operating limit is 25 percent, equivalent to an output limit of 438,000 MWh per year. Under optimal operating conditions, each unit is capable of producing 876,000 MWh per year or 1.752 million MWh for both units, based on 8,760 hours of continuous operation. However, based on operating restrictions imposed with the Groton Generation Station's current Title V air quality operating permit, the combined air emission limits for Unit No. 1 and No. 2 are 238 tons per year each for NO_X and CO. Based on the long-term emission limits of 238 tons per year each for NO_X and CO, the output of the Groton Generation Station without the operating limit required by Western would be limited to an approximate 42.5 percent capacity factor at 100 percent load. These emission limits required by the current Title V air quality operating permit would not be exceeded with elimination of Western's operating limit.

2.5.2 Fuel Use

The combustion turbines at the Groton Generation Station are designed to burn natural gas. The maximum natural gas requirement, experienced during low ambient temperature operation, is approximately 787 million British thermal units per hour. The Northern Border Pipeline supplies natural gas to the Groton Generation Station via an approximately 11.5-mile-long gas supply pipeline. No modifications to the gas supply line would be required if Western eliminates its operating limit. Based on design data, gas consumption would increase from 3,412 million cubic feet to 5,795 million cubic feet with elimination of the operating limit, but within the limits imposed by the current Title V air quality operating permit.

2.5.3 Water Supply and Use

WEB Water Development Association (WEB) in Aberdeen, South Dakota, provides all of the water for the Groton Generating Station from an existing 12-inch rural water distribution pipeline that is adjacent to the site. Water provided by WEB is conveyed from the water distribution pipeline to an on-site 170,000 gallon water storage tank via a 6-inch diameter service line. Most of the water is treated by a mobile demineralization unit and pumped to an adjacent 200,000 gallon water storage tank for use by the combustion turbines for air quality control and combustion turbine cooling. WEB also provides water for fire protection, service water, potable water, safety showers, and sanitary uses.

Unit No. 1 is designed to use 10 gallons of water per MWh and Unit No. 2 is designed to use 25 gallons per MWh to meet NO_X emission limits. Actual water use is tied to emissions monitoring and operating conditions. Based on Western's operating limit and assuming a 12.5 percent

capacity factor per unit or 219,000 MWh per year (438,000 MWh per year/2), Unit No. 1 would use 2,190,000 gallons of water per year. Unit No. 2 would use 5,475,000 gallons per year. However, actual water use would vary depending on load conditions and the number of hours each unit was used during a year. With elimination of Western's operating limit, up to 1,489,200 additional gallons of water could be used for Unit No. 1 and 3,723,000 additional gallons of water for Unit No. 2, assuming each unit was operated at 100 percent load for 3,718.8 hours per year. Basin Electric does have the option to operate only one unit. If Basin Electric only operated Unit No. 2 for 7,437.6 hours (up to the emission limits required by the Title V air quality operating permit), 18,593,750 gallons of water would be used. This represents the maximum amount of water that could be used by the generating station.

Sixty-five percent, or 130,000 gallons of the water stored in the demineralization tank is reserve in the event of any delays in treating the raw water delivered to the generation station. The mobile demineralization unit is capable of treating 400,000 gallons of water per visit. Based on current annual water use of 7,665,000 gallons per year with the operating limit, the mobile demineralization unit could visit the generating station 19 times per year to ensure an adequate supply of demineralized water is available. With elimination of Western's operating limit and additional water use, the mobile demineralization unit could visit the generation station 13 additional times per year.

2.6 Environmental Impact Comparison of the Proposed Action and No Action Alternative

This section contains a summary table of the environmental impacts of implementing the proposed Federal action and the no action alternative based on the impact analysis in Chapter 4. The summary includes the potential adverse impacts to each resource or environmental component.

Table 2.6-1, Summary of Environmental Impacts

Resource	**Operation without Western's Operating Limit (Proposed Action)**	**Operation with Western's Operating Limit (No Action Alternative)**
Air Quality	Air quality operating permit conditions would apply. NO_X and CO emissions would not each exceed 238 tons/yr. Units may operate more on an annual basis without the 50 MW annual average limitation. The pound per hour emission rates and limits would not change.	Air quality operating permit conditions would apply. NO_X and CO emissions each would be less than 238 tons/yr, because Western's 50 MW annual average limit would be reached first. The pound per hour emission rates and limits would not change.

Greenhouse Gas Emissions and Climate Change	More CO_2 could be emitted. Operation could release up to 318,192 metric tons CO_2 per year (based on 2008 CO_2 emission rate). Because numerous models produce widely divergent results, and there is insufficient information, Western is unable to identify the specific impacts of the station's CO_2 emissions on human health and the environment.	Generating station would continue to emit CO_2 up to 187,333 metric tons per year (based on 2008 CO_2 emission rate). Because numerous models produce widely divergent results, and there is insufficient information, Western is unable to identify the specific impacts of the station's CO_2 emissions on human health and the environment.
Water Resources	Water use would increase to a maximum of 57 acre-feet/yr, but would not deplete available water supplies. Water supplier has adequate capacity to meet generating station's water supply needs.	Water use would remain at a maximum of 33.6 acre-feet/yr. Water use would not deplete available water supplies.
Aesthetics	Additional exhaust stack plumes would be possible, but would be limited due to more operation during warmer days during the summer, when plumes are less likely to form. There are no highly sensitive viewer locations within viewing distances of the generating station. The overall change in ambient lighting conditions at the generating station, as viewed from nearby locations, would not be substantial.	There would be no change in facility operations and effects to views in the area would not change.
Transportation	Additional deliveries of chemicals and necessities for maintenance would not increase congestion, impaired emergency access, or reduce levels of service.	Deliveries would continue to be infrequent and would not interfere with any local traffic patterns, cause major traffic delays or road damage, or change traffic patterns.

Noise	Even with increased output, significant noise impacts would not occur since operation of the facility would not increase noise levels above limits established for the nearest sensitive receptor, expose persons to excessive ground borne vibration or groundborne noise levels where they live, work or recreate, or result in a substantial permanent increase in ambient noise levels.	There would be no change in facility operations. Noise levels would not change.
Human Health and Safety	The frequency of maintenance activities would increase, increasing the use of chemical materials, lubricating oils, and insulating mineral oils. However, increased use would not require any changes to control measures and plans, or require the installation of additional chemical storage facilities or vessels. Considering the control measures and plans in place, it is unlikely increased operations would cause significant impacts to human health and safety.	There would be no change in facility operations and effects to the risk of accidental spills from the transport, storage, use, and disposal of chemical materials and waste would not change. Considering the control measures and plans in place, it is unlikely current operations would cause significant impacts to human health and safety.
Intentional Destructive Acts	The risk to workers or the public from damage to generating station facilities as a result of accidental or intentional actions by outside parties is low because public access is controlled, the site is monitored, and an emergency response plan and site security plan exists for the Groton Generation Station.	The risk to workers or the public from damage to generating station facilities as a result of accidental or intentional actions by outside parties is low because public access is controlled, the site is monitored, and an emergency response plan and site security plan exists for the Groton Generation Station.

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3.0 Affected Environment

The construction of the Groton Generation Station was previously addressed in the East Side Peaking Project Environmental Assessment (DOE/EA-1524, Western, 2005), which addressed the installation of Unit No.1, and the Groton Generation Station Unit 2 Project Amended Environmental Assessment (DOE/EA-1524-S1, Western, 2007), which addressed the installation of Unit No. 2. This chapter describes the affected environment related to the operation of the Groton Generation Station where an increase in the output of the generating station could cause potential direct, indirect, and cumulative environmental impacts. Several environmental resources would not be affected if Western's proposed Federal action is implemented, including land use, floodplains, wetlands, cultural resources, threatened and endangered species, fish and wildlife resources, vegetation, geology, topography, soils, and socioeconomic conditions and community resources. Resources that would be affected by an elimination of the operating limit include air quality, climate, water resources, aesthetics, transportation, noise, and human health and safety. The affected environment area or region of influence that could be affected with an increase in generating station output varies for each affected resource as described for each resource below.

3.1 Air Quality

The regions of influence for climatology and air quality include the state of South Dakota and are related to the region of influence previously established for the air quality permitting process.

3.1.1 Climate

The semiarid climate of the project region is characterized by cold, dry winters and moderately hot, moister summers. Annually, temperatures in nearby Aberdeen, South Dakota have ranged from minus 52 degrees Fahrenheit (°F) (February 12, 1916) to 115° F (July 06, 1936). The annual mean temperature for Aberdeen is 43.3° F. According to the High Plains Regional Climate Center the highest mean monthly temperature occurs in July and is 72.4° F, while the lowest occurs in January and is 10.6° F (HPRCC, 2009). The area is subject to these large variations in annual temperature because it is in the center of the North American land mass. Arctic air moves into the region from the north and northwest during the winter, causing periods of extreme cold that alternate with milder temperatures. Summer temperatures are usually warm, but hot spells and cool days can be expected. Table 3.1-1 lists the mean monthly and annual temperatures and precipitation for Aberdeen. The annual average total precipitation is 21.6 inches, with the highest levels of precipitation occurring from May through July (HPRCC, 2009). The driest months are December, January, and February.

TABLE 3.1-1, GROTON GENERATION STATION MEAN MONTHLY AND ANNUAL TEMERATURE AND PRECIPITATION (ABERDEEN, SOUTH DAKOTA)

Month	Temperature (°F)	Precipitation (inches)
January	10.6	0.68
February	15.6	0.69
March	28.9	1.32
April	45.0	2.26
May	56.9	2.95
June	66.4	3.68
July	72.4	2.84
August	70.2	2.38
September	59.9	1.84
October	57.1	1.50
November	30.2	0.84
December	16.8	0.60
Annual	43.3	21.6

Source: High Plains Regional Climate Center, Aberdeen Meteorological Monitoring Station retrieved from: http://www.hprcc.unl.edu/data/historical/index.php?state=sd&action=select_state&submit=Select+State.

3.1.2 Greenhouse Gas Emissions and Climate Change

Climate change refers to changes in many climatic factors such as temperature, precipitation, or wind lasting for an extended period. There continues to be a degree of uncertainty surrounding the contemporary causes of climate change, but it may result from:

- Natural factors such as solar and orbital variations
- Natural processes within the climate system (e.g., ocean circulation changes)
- Human activities that change the atmosphere's composition (e.g., land use changes, burning fossil fuels) and the land surface

A large number of scientists believe that global warming is occurring and causing climate change. They also believe GHGs are major contributors to global warming and climate change. Assessments by the Intergovernmental Panel on Climate Change (IPCC) suggest that the Earth's climate has warmed between 0.6 and 0.9 degrees Celsius over the past century and that human activity affecting the atmosphere is "very likely" an important driving factor.[2] The IPCC's Fourth Assessment Report (Summary for Policymakers) states, "Most of the observed increase in

[2] According to the IPCC "very likely" indicates that there is a 90 percent chance that this is the case.

globally averaged temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations." It goes on to state, "The observed widespread warming of the atmosphere and ocean, together with ice mass loss, support the conclusion that it is extremely unlikely that global climate change of the past 50 years can be explained without external forcing, and very likely that it is not due to known natural causes alone."

GHGs are gases that trap heat in the earth's atmosphere by absorbing and re-emitting solar radiation. GHGs such as water vapor and carbon dioxide (CO_2) occur naturally and are emitted to the atmosphere through natural processes and human activities. The IPCC estimates that water vapor is responsible for 60 to 80 percent of the world's greenhouse effect (IPCC, 2001). Other GHGs (e.g., fluorinated gases) are created and emitted solely through human activities. The principal anthropogenic[3] GHGs and their origins are:

- CO_2 enters the atmosphere through the burning of solid waste, wood, and fossil fuels (oil, natural gas, and coal) and also as a result of other chemical reactions (e.g., manufacture of cement). CO_2 is removed from the atmosphere or "sequestered" naturally by plants, dissolved in the oceans, or stored below the earth's surface.

- Methane is emitted during the production and transport of coal, natural gas, and oil. Methane is also emitted from livestock, agricultural processes, and organic waste decay.

- Nitrous oxide is emitted during the combustion of fossil fuels and solid wastes, as well as during agricultural and industrial activities.

- Fluorocarbon gases such as perfluorocarbons, hydrofluorocarbons, and sulfur hexafluoride are some of the strongest known GHGs . They are emitted from a variety of industrial processes.

According to the IPCC Fourth Assessment Report (IPCC, 2007) most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations. The GHG emissions related to human activities increased 70 percent from 1970 to 2004, according to the report.

At present, the U.S. emits approximately one-fourth of the world's GHGs (National Center for Public Policy, 2008). The nation's CO_2 emissions from energy consumption were estimated by the Energy Information Administration (EIA) to be about 5.9 billion metric tons[4] in 2006.

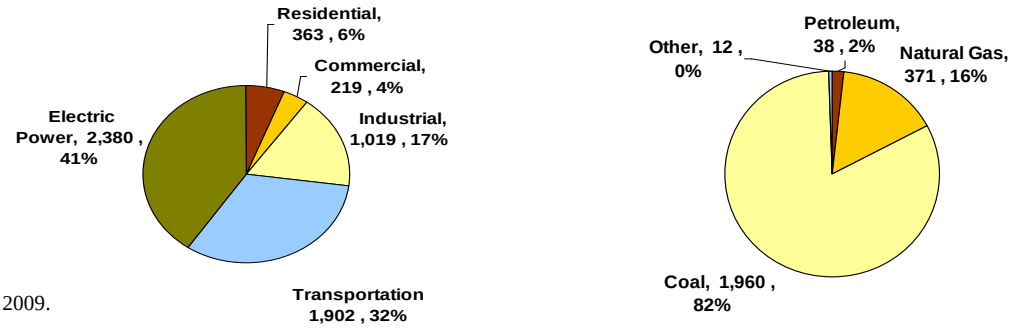
[3]Anthropogenic means those effects, processes, materials or objects that are derived from human activities, as opposed to those occurring in natural environments without human influences. A substantial increase in anthropogenic GHG emissions coincides with the Industrial Revolution.

[4] A metric ton equals approximately 2,204.6 pounds. A ton equals 2,000 pounds.

Another 0.3 billion metric tons of CO_2 equivalent emissions came from energy-related GHGs other than CO_2. Total GHGs for the U.S. related to energy and non-energy sources were estimated to be over 7.1 billion metric tons in 2006 (EIA, 2007). CO_2 emissions from energy consumption are projected to rise to 6.4 billion metric tons by 2030 (EIA, 2009). Further, worldwide, CO_2 emissions are projected to increase substantially, primarily as a result of increased development in China and India. Petroleum use, primarily due to transportation, is the largest fuel source of CO_2 emissions from energy consumption in the U.S., estimated by EIA to be approximately 2.436 billion metric tons, or 42 percent of the total, in 2008 (EIA, 2009). EIA estimates that 2,359.1 million metric tons of CO_2 were emitted in 2008 in the electric power sector in the U.S. (EIA, 2009). For the Groton Generation Station, 25.49 thousand metric tons of CO_2 were produced in 2009 (See Appendix A).

Electricity generation and transportation are the biggest sources of energy-related GHGs in the U.S. Figure 3.1-1 below shows the 2008 EIA estimates of CO_2 emissions for the U.S. by sector and fuel source (EIA, 2009).

Figure 3.1-1, 2008 CO_2 Emissions in Millions of Metric Tons



Source: EIA, 2009.

As the figure shows, the electric power sector emitted approximately 40 percent of total CO_2 emissions in the U.S. in 2008. Of the total electric power sector emissions, gas-fired generation contributed to approximately 16 percent of that total. CO_2 emissions, as well as other GHG emissions, would likely continue to grow if it were not for domestic and international regulatory and legislative efforts.

On April 2, 2007, in *Massachusetts v. EPA*, 549 U.S. 497 (2007), the Supreme Court found that greenhouse gases are air pollutants covered by the Clean Air Act. The Court held that the U.S. Environmental Protection Agency's (EPA) Administrator must determine whether or not emissions of greenhouse gases from new motor vehicles cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, the Administrator is required to follow the language of section 202(a) of the Clean Air Act. The Supreme Court decision resulted from a petition for rulemaking under section 202(a) filed by more than a dozen environmental, renewable energy, and other organizations.

On April 17, 2009, the EPA Administrator signed proposed endangerment and cause or contribute findings for greenhouse gases under Section 202(a) of the Clean Air Act. EPA held a

60-day public comment period, which ended June 23, 2009, and received over 380,000 public comments. These included both written comments as well as testimony at two public hearings in Arlington, Virginia and Seattle, Washington.

On December 7, 2009, the EPA Administrator signed two distinct findings regarding greenhouse gases under section 202(a) of the Clean Air Act:

- **Endangerment Finding:** The EPA Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases -- carbon dioxide (CO_2), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride -- in the atmosphere threaten the public health and welfare of current and future generations.

- **Cause or Contribute Finding:** The EPA Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare.

These findings do not themselves impose any requirements on industry or other entities. However, this action is a prerequisite to finalizing the EPA's proposed greenhouse gas emission standards for light-duty vehicles, (http://www.epa.gov/oms/climate/regulations.htm), which were jointly proposed by EPA and the U.S. Department of Transportation's National Highway Safety Administration on September 15, 2009 (EPA, 2009).

The Clean Air Act requires EPA to set National Ambient Air Quality Standards (http://www.epa.gov/air/criteria.html) for six common air pollutants. These commonly found air pollutants (also known as "criteria pollutants") are found all over the United States. They are particle pollution (often referred to as particulate matter), ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. These pollutants can harm your health and the environment, and cause property damage. Of the six pollutants, particle pollution and ground-level ozone are the most widespread health threats. EPA calls these pollutants "criteria" air pollutants because it regulates them by developing human health-based and/or environmentally-based criteria (science-based guidelines) for setting permissible levels. The set of limits based on human health is called primary standards. Another set of limits intended to prevent environmental and property damage is called secondary standards (EPA, 2010b).

3.1.3 Regulated Air Emissions

The Groton Generation Station is located in Brown County, which is classified as an attainment area for all regulated pollutants by the U.S. Environmental Protection Agency (EPA). The title "attainment area" indicates that all National Ambient Air Quality Standards (NAAQS) are being met. Table 3.1-2 lists the NAAQS that are applicable to the area which includes the Groton Generation Station (Title 40 CFR Part 50).

No published concentrations for nitrogen dioxide (NO_2), sulfur dioxide (SO_2), carbon monoxide (CO), Volatile Organic Compounds (VOCs), or lead near the Groton Generation Station are available because there are no

nearby monitoring stations for these criteria pollutants. Data for particulate matter with an aerodynamic diameter of ten microns or less (PM_{10}) are, however, available for 2000 and 2001 from a monitoring station at 111 2nd Avenue SE in Aberdeen, South Dakota (Table 3.1-3). PM_{10} data from another station, at 500 South Phillips in Sioux Falls, South Dakota, were available for 1998 through 2001. The data are presented in Table 3.1-4. The Sioux Falls station is not as representative of the local conditions at the Groton site since it is located in a more populated area and is farther away. Data from both stations were used to approximate concentrations that may be found in the area since no other monitoring stations are nearby.

Table 3.1-2, National Ambient Air Quality Standards

	Primary Standards		Secondary Standards	
Pollutant	**Level**	**Averaging Time**	**Level**	**Averaging Time**
Carbon Monoxide	9 ppm (10 mg/m3)	8-hour (1)	None	
	35 ppm (40 mg/m3)	1-hour (1)		
Lead	0.15 µg/m3 (2)	Rolling 3-Month Average	Same as Primary	
	1.5 µg/m3	Quarterly Average	Same as Primary	
Nitrogen Dioxide	0.053 ppm (100 µg/m3)	Annual (Arithmetic Mean)	Same as Primary	
Particulate Matter (PM10)	150 µg/m3	24-hour (3)	Same as Primary	
Particulate Matter. (PM2.5)	15.0 µg/m3	Annual (4) (Arithmetic Mean)	Same as Primary	
	35 µg/m3	24-hour (5)	Same as Primary	
Ozone	0.075 ppm (2008 std)	8-hour (6)	Same as Primary	
	0.08 ppm (1997 std)	8-hour (7)	Same as Primary	
	0.12 ppm	1-hour (8)	Same as Primary	
Sulfur Dioxide	0.03 ppm	Annual (Arithmetic Mean)	0.5 ppm (1300 µg/m3)	3-hour (1)
	0.14 ppm	24-hour (1)		

(1) Not to be exceeded more than once per year.
(2) Final rule signed October 15, 2008.
(3) Not to be exceeded more than once per year on average over 3 years.
(4) To attain this standard, the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m3.
(5) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 µg/m3 (effective December 17, 2006).
(6) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.075 ppm. (effective May 27, 2008)
(7) (a) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.
(b) The 1997 standard-and the implementation rules for that standard-will remain in place for implementation purposes as EPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
(8) (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is $\leq$ 1.
(b) As of June 15, 2005 EPA has revoked the 1-hour ozone standard in all areas except the fourteen 8-hour ozone nonattainment Early Action Compact (EAC) Areas. For one of the 14 EAC areas (Denver, CO), the 1-hour standard was revoked on November 20, 2008. For the other 13 EAC areas, the 1-hour standard was revoked on April 15, 2009.

Source: EPA National Ambient Air Quality Standards. Retrieved from: http://www.epa.gov/air/criteria.html

TABLE 3.1-3, GROTON GENERATION STATION PM_{10} MONITORED VALUES from ABERDEEN MONITORING STATION

Year	Number of Data Collection Days per Year	1st Max 24-hour Value (µg/m3)	2nd Max 24-hour Value (µg/m3)	Annual Mean (µg/m3)
2000	100	56	50	19.7
2001	61	56	53	20.4

Source: South Dakota Department of Environment and natural Resources, Aberdeen Air Quality Monitoring Site retrieved from: http://denr.sd.gov/des/aq/airprogr/aspx/
Note: µg/m3 Micrograms per cubic meter

TABLE 3.1-4, GROTON GENERATION STATION PM_{10} MONITORED VALUES from SIOUX FALLS MONITORING STATION

Year	**Number of Data Collection Days per Year**	**1st Max 24-hour Value (µg/m^3)**	**2nd Max 24-hour Value (µg/m^3)**	**Annual Mean (µg/m^3)**
1998	98	54	52	21.9
1999	112	74	43	22
2000	110	50	50	19.6
2001	60	60	54	22.6

Source: South Dakota Department of Environment and Natural Resources, Aberdeen Air Quality Monitoring Site retrieved from: http://denr.sd.gov/des/aq/airprogr.aspx
Note: µg/m^3 Micrograms per cubic meter

In accordance with the Title V air quality operating permit for the Groton Generation Station (Permit No. 28.0802-03**)**, Basin Electric has installed, certified, operated, and maintained a NO_2 and a CO monitoring system on Unit No. 1 and Unit No. 2. The continuous emission monitoring systems has measured and recorded the emissions at all times, including periods of startup, shutdown, and malfunctions. The results of continuous monitoring for NO_2 and CO are provided in Appendix A, Air Emissions Inventory for 2009.

3.2 Water Resources

The region of influence for water resources is limited to the water conveyance system used by the Groton Generation Station, including the water intake area, the source of water for the WEB. WEB in Aberdeen, South Dakota, provides all of the water for the Groton Generation Station from an existing 12-inch rural water distribution pipeline that is adjacent to the site. Water provided by WEB is conveyed from the water distribution pipeline to an on-site water storage tank via a 6-inch pipeline. This water is treated by a mobile demineralization unit and

pumped to an adjacent water storage tank for use by the combustion turbines for air quality control. The Groton Generation Station does not use groundwater, and it is a zero-discharge facility, discharging no waste water to surface water or groundwater sources. No contact cooling water is discharged to an on-site storage pond, where it evaporates.

The water intake and pumping plant for the WEB is located on Lake Oahe, south of Mobridge, South Dakota (WEB, 2009).

3.3 Aesthetics

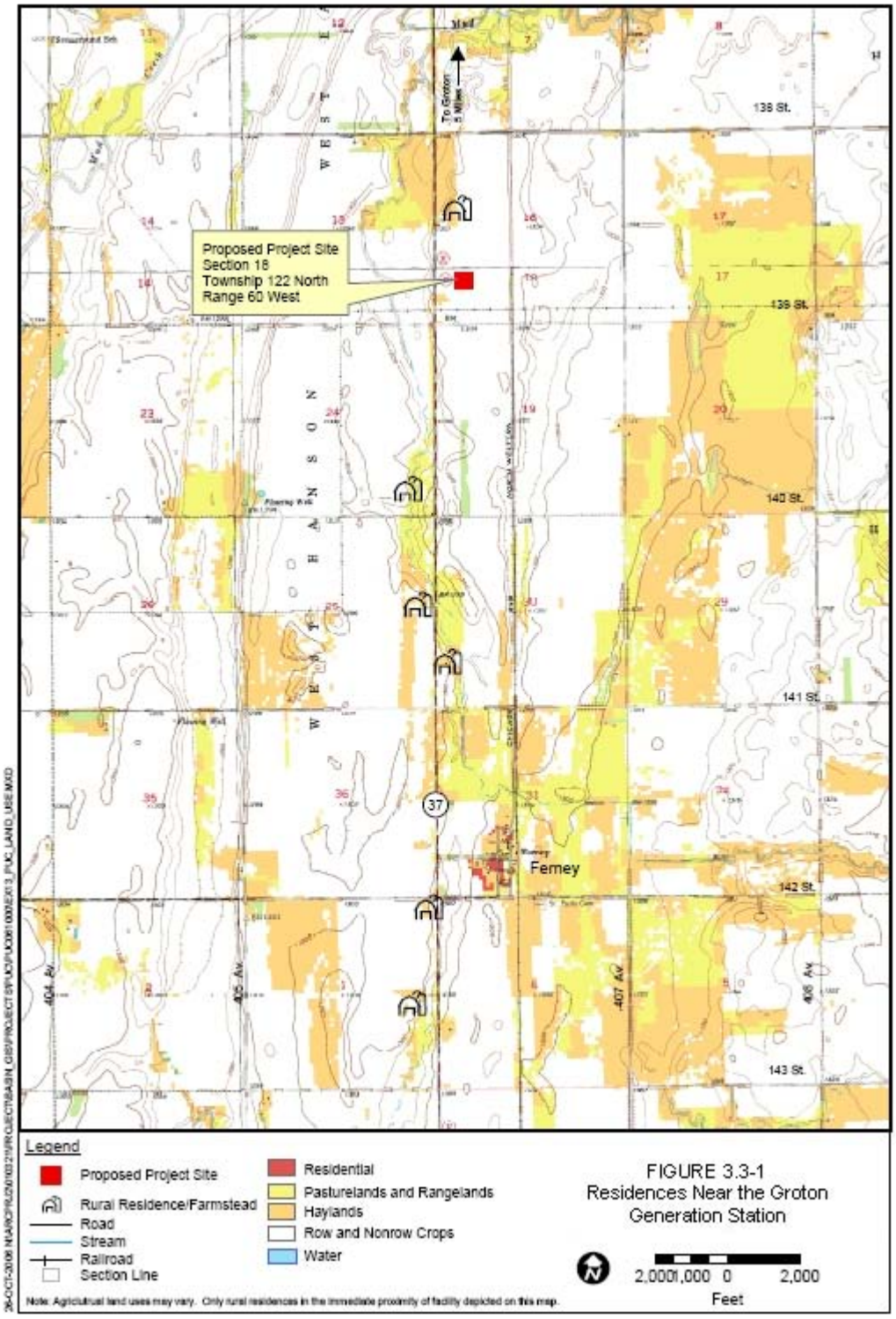
The region of influence for aesthetics includes South Dakota State Highway 37 within 5 miles of the Groton Generation Station, including the residences along State Route 37 (see Figure 3.3-1, Residences in Proximity of the Groton Generation Station).

The Groton site is located five miles south of the town of Groton, South Dakota. The site is located in relatively level terrain adjacent to Western's Groton 115-kV substation and a Basin Electric 345-kV substation. An existing 345-kV transmission line owned by Basin Electric and 115-kV transmission lines owned and operated by Western currently pass near the generating station.

The original prairie landscape exists in an altered agricultural state. Linear features of highways, paved roads, gravel roads, two-track roads, electric transmission lines, and fencing transect each project area. Evidence of a buried gas pipeline also transects the project area in a general northwest to southeast direction. Vegetation in these areas consists primarily of mixed grass-pasture land and planted corn, oats, and soybeans. The land is primarily used agriculturally for crops and livestock grazing.

Depending on climatic conditions, a plume from the generating station exhaust stacks is visible during colder days. Visible plumes from power plants form when the mass of water in an exhaust plume exceeds the saturation point of the exhaust gases. The saturation point of air is directly related to its temperature with warm air having a higher saturation point (being able to carry more water in a vapor state) than cold air. When the saturation point is reached, water will condense out of vapor state to a liquid state, forming fine water droplets. These water droplets are visible in an exhaust plume.

Figure 3.3-1, Residences in Proximity of the Groton Generation Station



3.4 Transportation

The region of influence for transportation resources is defined as a 15 mile radius around the Groton Generation Station, the same region of influence that was addressed in the EAs addressing the construction of the generating facility.

3.4.1 Highways

As shown in Figure 1-2, Topographical Map, the Groton Generation Station site is immediately adjacent to South Dakota State Highway 37, and access to the site is directly from this highway. State Route 37 intersects with U.S. Route 12 five miles north of the site at Groton, South Dakota.

3.4.2 Roads

Gravel roads located on Public Land Survey System section lines are common in the area.

3.4.3 Railroad Lines

An abandoned segment of railroad is located adjacent and east of the Groton Generation Station.

There are no other railroad lines (active or abandoned) within five miles of the Groton Generation Station.

3.4.4 Airports

The Aberdeen Regional Airport is located 16 miles northwest of the Groton Generation Station. No major international or regional airports exist within 15 miles of the proposed site.

3.5 Noise

The region of influence for noise includes an area within a one half-mile radius of the Groton Generation Station.

3.5.1 Ambient Noise

The region of influence is predominantly rural. Topography near the generating station is mostly open, gently rolling agricultural land with scattered woodlands. As a result, existing ambient noise levels in the vicinity of the Groton Generation Station are generally low because the land is used for agriculture. The region of influence consists of large tracts of pasture, crops, rangeland, and undeveloped grassland, with unpaved and infrequently traveled roads, typically constructed along section lines. Sources of noise in the region of influence include wind, livestock, insects, wildlife, farm equipment, light vehicular traffic, farm truck traffic, and adjacent substations. Elevated levels of noise occur in the portion of the project area near transportation corridors and are generally associated with automobile and truck traffic and farm equipment. One residence is located 1,700 feet north of the Groton Generation Station, adjacent to State Highway 37. Evergreen and deciduous trees are planted along the southern side of the house. The other

nearest residences in the area are outside the region of influence and are 4,400 to the northwest and 5,700 feet to the southeast.

Sound or noise levels are measured in A-weighted decibels (dBA), a unit of sound pressure adjusted to the range of human hearing, with an intensity greater than the ambient or background sound pressures. Noise in the environment is constantly fluctuating, such as when a car drives by, a dog barks, or a plane passes overhead. Therefore, noise metrics have been developed to quantify fluctuating environmental noise levels. These metrics include the exceedance sound levels. The exceedance sound level, L_x, is the sound level exceeded "x" percent of the sampling period and is referred to as a statistical sound level. The most common L_x values are L_{ave}, L_{90}, L_{50}, and L_{10}. L_{ave} is the level of a constant sound over a specific time period that has the same sound energy as the actual sound over the same period. L_{90} is the sound level exceeded 90 percent of the sampling period. L_{90} represents the sound level without the influence of loud, transient noise sources and is therefore often referred to as the residual or background sound level. L_{50} is the sound level exceeded 50 percent of the sampling period. L_{10} represents the occasional louder noises and is often referred to as the intrusive sound level. The variation between the L_{90}, L_{50}, and L_{10} sound levels can provide an indication of the variability of the acoustical environment. If the acoustical environment is perfectly steady, all values are identical. A large variation between the values indicates the environment experiences highly fluctuating sound levels (Burns & McDonnell, 2008). The "equivalent continuous sound level", the L_{eq} , is known as the essential averaged parameter. The L_{eq} is the level that, had it been a steady level during the measurement period, would represent the amount of energy present in the measured, fluctuating sound pressure level. The L_{eq} is measured directly with an integrating sound level meter. L_{eq} is a measure of the averaged energy in a varying sound level. It is not a direct measure of annoyance. Extensive research, however, has shown the L_{eq} to correlate well with annoyance. However, a noise level acceptable on a Wednesday afternoon may be distressing early on Sunday. Corrections for time of day may, therefore, be applied (Brüel & Kjær, 2000).

Burns & McDonnell Engineering Company Inc. (Burns and McDonnell), was contracted by Basin Electric as a third party independent contractor to conduct an operational noise assessment study for the Groton Generation Station. The objective of this noise assessment was to verify that the noise levels emanating from the Groton Generation Station were below the noise limits set by the SDPUC for the facility. These limits were set for the nearest occupied residence to the Groton Generation Station and are 60 dBA (L_{10}) daytime and 55 dBA (L_{10}) nighttime. Background sound level measurements were performed by Burns and McDonnell in August 2006 at a point 100 feet from the nearest residence; 1,700 feet north of the Groton Generation Station (see Figure 3.5-1, Noise Measurement Point Location (MPR1), Groton Generation Station). The dBA-weighted L_{eq} and L_{10} levels were 42 dBA and 44 dBA, respectively.

Figure 3.5-1, Noise Measurement Point Location (MPR1), Groton Generation Station

3.6 Human Health, Safety, and Security

The region of influence for human health and safety encompasses an area within a 1-mile radius of the Groton Generation Station.

A records review of the state database conducted for the East Side Peaking Project EA did not identify any potentially affected schools and health facilities within a 0.5 mile range of the proposed turbine location. A records review conducted for this EIS did not identify any sensitive receptors within a one mile radius of the Groton Generation Station. The closest school is Groton High School, about 5.5 miles away, and the closest medical facility is 6 miles away, both in Groton.

The Groton Generation Station uses chemical materials during operation. Most of the materials used are required for facility operations and maintenance, such as lubrication of equipment or mineral oil use in transformers and electrical switches. The generating station complies with applicable laws and regulations for the storage of these materials to minimize the potential for a release of chemical materials and has an emergency response plan to address public health concerns regarding chemical materials storage and use.

A list of the chemicals used at the generation station and their storage locations is provided in Table 3.6-1. The type and quantities of lubricating and mineral oils used and stored at the Groton Generation Station is provided in Table 3.6-2.

Groton Generation Station operation requires transportation of chemical materials as materials are used for operation and maintenance activities. Transportation of chemical materials meets applicable requirements of the South Dakota Department of Transportation, the Environmental Protection Agency, and the South Dakota Department of Environment and Natural Resources.

The Groton Generating Station is fenced, and access is controlled by an automatic gate with a keypad entry station. The station is manned during the day and remotely controlled from Basin Electric's control room at its Leland Olds Station.

Also within the region of influence are Western's Groton Substation and the Basin Electric 345-kV substation. Each of these facilities stores and uses chemicals for substation operation and maintenance. Each substation meets applicable laws and regulations for the storage of materials to minimize the potential for a release of chemical materials and has an emergency response plan to address public health concerns regarding chemical materials storage and use.

Table 3.6-1, Chemicals Used at the Groton Generation Station

Chemical	Use	Quantity	Storage Location	State
Cleaning chemicals/detergents	Periodic cleaning of combustion turbine	55 gallons	Chemical storage tote or drums at a protected temporary storage location on site	Liquid
Laboratory reagents	Water/wastewater laboratory analysis	130 pounds	Laboratory chemical storage cabinets (stored in original chemical storage containers/bags)	Liquid and Granular Solid
Propylene Glycol	Anti-icing system	2,000 gallons (contained within equipment)	Anti-icing equipment	Liquid
Acetylene	Welding gas	435 cubic feet	Maintenance / Warehouse Building	Gas
Oxygen	Welding gas	562 cubic feet	Maintenance / Warehouse Building	Gas
Propane	Torch gas	None	Maintenance / Warehouse Building	Gas
Cleaning Chemicals	Cleaning	Varies (less than 25 gallons liquids or 100 pounds solids for each chemical)	Admin / Control Building, Maintenance / Warehouse Building	Liquid or Solid
Paint	Touchup of painted surfaces	Varies (less than 25 gallons liquids)	Maintenance / Warehouse Building	Liquid

Table 3.6-2, Lubricating and Mineral Oils Used at Groton Generation Station[1]

Container Name	Container Type	Substance	Capacity (Gallons)
Unit 1 Main Mineral Lube Oil	Single Walled Steel AST	Mineral Oil	8,270
Unit 1 Synthetic Lube Oil	Single Walled Steel AST	Jet II Mobil Oil	175
Unit 1 Hydraulic Starting Lube Oil Tank	Single Walled Steel AST	DTE Mobil Light Oil	40
Unit 1 Clutch/Generator Mineral Lube Oil Tank	Single Walled Steel AST	Mineral Oil	3,000
Unit 2 Main Mineral Lube Oil	Single Walled Steel AST	Mineral Oil	8,270
Unit 2 Synthetic Lube Oil	Single Walled Steel AST	Jet II Mobil Oil	175
Unit 2 Hydraulic Starting Lube Oil Tank	Single Walled Steel AST	DTE Mobil Light Oil	40
Unit 2 Clutch/Generator Mineral Lube Oil Tank	Single Walled Steel AST	Mineral Oil	3,000
55 Gallon Lube Oil Drums -20 maximum	Steel	Misc Lube Oils	1,100 max
Unit 1 Main Generator Step up Transformer	Electric transformer	Mineral Oil	9,470
Unit 1 Auxiliary 1 Transformer	Electric transformer	Mineral Oil	516
Unit 1 Auxiliary 2 Transformer	Electric transformer	Mineral Oil	516
Unit 2 Main Generator Step-Up Transformer	Electric transformer	Mineral Oil	9,470
Unit 2 Auxiliary 1 Transformer	Electric transformer	Mineral Oil	516
Unit 2 Auxiliary 2 Transformer	Electric transformer	Mineral Oil	516
Unit 1 Turbine Lubrication System	Lubrication System	Mineral Oil	Included in Unit 1 Main Step-Up Transformer
Unit 2 Turbine Lubrication System	Lubrication System	Mineral Oil	Included in Unit 2 Main Step-Up Transformer
Mobile Storage Tank 1	Mobil Fuel Tank	Diesel Fuel	100
Mobile Storage Tank 2	Mobil Fuel Tank	Gasoline	50

[1] Source: Spill Prevention Control and Countermeasure Plan for the Groton Generation Station, Basin Electric Rural Cooperative, Bismarck, North Dakota.

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4.0 Environmental Consequences

Chapter 4 presents the analysis of impacts related to the operation of the Groton Generation Station where an increase in the output of the generating station could cause potential direct, indirect, and cumulative environmental impacts. Direct impacts are caused by an action and occur at the same time and place as the action. Indirect impacts are reasonably foreseeable impacts caused by an action that occur later in time or farther in distance. Long-term impacts would persist throughout the life of a project; short-term impacts would be limited in time and duration.

Several environmental resources would not be affected if Western's proposed Federal action is implemented, including land use, floodplains, wetlands, cultural resources, threatened and endangered species, fish and wildlife resources, vegetation, geology, topography, soils, and socioeconomic conditions and community resources. This chapter focuses on resources that would be affected by an elimination of the operating limit and includes air quality, climate, water resources, aesthetics, transportation, noise, and human health and safety. After the recent decisions made by the U.S. Court of Appeals, DOE National Environmental Policy Act (NEPA) documents are now required to include an evaluation that explicitly considers "intentional destructive acts," (i.e., acts of sabotage or terrorism) and the potential environmental consequences of such acts (DOE, 2006). This additional discussion is included in Section 4.7.4.

Issues identified that pertain to Federal, state, and local regulations are listed as part of the introduction to each resource. The methodology used to assess impacts from the proposed Project is described for each resource. In addition, significance criteria were developed and presented for each resource to provide a basis from which the significance of impacts was judged.

Additionally, impacts that would result from implementing the No Action Alternative are described in this chapter for each resource. Finally, cumulative impacts of the proposed Project are also addressed in this chapter. Council on Environmental Quality (CEQ) regulations define cumulative impacts as those that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions, regardless of the agency or person that undertakes these actions.

4.1 Air Quality

4.1.1 Identification of Issues

The following was identified as an important element of the air quality impact analysis:

- Emissions from the proposed Project must comply with the NAAQS.

4.1.2 Impact Assessment Methods

Since the Groton Generation Station is operating under an existing Title V air quality operating permit and would continue to do so with implementation of Western's proposed action, no new air quality analysis was completed for this EIS. The air quality analyses completed for the air permitting for the Groton Generation Station has been incorporated into this EIS. These analyses are still valid since they reflect information that Basin Electric provided to the SDDENR for the operating permit issued for the generating facility.

4.1.3 Significance Criteria

A significant impact on air quality may result if the following were to occur:

- Predicted concentrations of Criteria Air Pollutants would exceed state and/or Federal ambient air quality standards.

4.1.4 Operation without Western's Operating Limit under Western's Proposed Action

The Groton Generating Station is subject to South Dakota's Air Pollution Control Program, Article 74:36, which contain 18 separate chapters relating to air quality. The Groton Generating Station was permitted for two GE LMS100® natural gas combustion turbines in March 2009 (SDDENR Permit No. 28.0802-03). Dispersion modeling was used to estimate the air quality impact of potential emissions of NO_X and CO from both combustion turbine generators at the Groton Generation Station. The dispersion modeling followed the guidance outlined in the EPA's *Guideline on Air Quality Models (Revised)* (EPA 2005). Modeling was conducted to demonstrate that potential air pollution emission impacts from the two generators were below National Ambient Air Quality Standards (NAAQS) and South Dakota Ambient Air Quality Standards, in accordance with South Dakota Air Regulation §74:36:05:06, *Standard for Issuance of Operating Permit*. See Table 4.1-1, Groton Generation Station GE LMS 100® Gas Turbine Emissions Summary for Criteria Pollutants, for emissions summary for criteria pollutants generated from both units at the Groton Generation Station. Basin Electric operates the Groton Generation Station with emission limits on the two combustion turbines of 238 tons per rolling 12 month average of NO_X and 238 tons per rolling 12 month average of CO, keeping the facility below the major source threshold of 250 tons per year with respect to PSD, but above the South Dakota Title

Carbon monoxide can cause harmful health effects by reducing oxygen delivery to the body's organs (like the heart and brain) and tissues. The health threat from lower levels of CO is most serious for those who suffer from heart disease, like angina, clogged arteries, or congestive heart failure. For a person with heart disease, a single exposure to CO at low levels may cause chest pain and reduce that person's ability to exercise; repeated exposures may contribute to other cardiovascular effects (EPA, 2010b).

NO_2: Current scientific evidence links short-term NO_2 exposures, ranging from 30 minutes to 24 hours, with adverse respiratory effects including airway inflammation in healthy people and increased respiratory symptoms in people with asthma. Also, studies show a connection between breathing elevated short-term NO_2 concentrations, and increased visits to emergency departments and hospital admissions for respiratory issues, especially asthma (EPA, 2010d).

V Operating Permit major source threshold of 100 tons per year, for CO and for NO_X. With the elimination of Western's operating limit, the turbines would operate under permitted conditions and would not exceed the emissions thresholds outlined in the Title V air quality operating permit, nor would they contribute to a violation of the NAAQS. The short-term emission rates that were used for most of the modeling averaging periods would not change as a result of Western's elimination of the output limit. All modeling was based on the limits in the Title V air quality operating permit, therefore, air quality impacts would remain the same as the no action alternative. Additional details of the dispersion modeling results are included in the Air Quality Operating Permit Application (Basin Electric, 2007) submitted to the SDDENR.

Since the conditions of the Title V air quality operating permit would not change with the implementation of Western's proposed action, operation of the Groton Generation Station would not cause emissions of criteria pollutants above concentrations that would exceed Federal and state air quality standards. Therefore, implementation of Western's proposed action would not cause significant impacts to air quality.

Table 4.1-1
Groton Generation Station
(2) GE LMS 100 Turbine Emissions Summary for Criteria Pollutants

Emission Unit:	**(2) GE LMS100 Natural Gas Combustion Turbine Generators**		
Fuel Flow:	**786.5 MMBtu/hr**		
Control Equipment	**Dry Low NO_X**		
Criteria Pollutants	Emission Factor[A] (lb/MMBtu)[C]	Emission Rate[B] (lb/hr)[D]	Emission Rate (tons/yr)[E]
TSP	6.60E-03	5.19	19.3
PM_{10}	6.60E-03	5.19	19.3
SO_2	3.40E-03	2.67	9.94
NO_X	NA	64.0	238
CO	NA	43.6	238[(F)]
VOCs	NA	12.3	45.6
Lead	4.90E-07	3.85E-04	1.43E-02

Notes:

NA Not applicable

A The emission factors for TSP, PM_{10}, and SO_2 were obtained from AP-42, Table 3.1-2a (dated 4/00). An emission factor for lead was not available from AP-42, 3.1-2a, and was obtained from AP-42, Table 1.4-2 (dated 7/98). (The emission factor for lead was calculated by dividing 0.0005 lb/ 10^6scf by 1,020 MMBtu10^6scf). NO_X, CO and VOCs emissions are based on annual average conditions (approximately 40°F, at 100 percent load) with manufacturer "Guarantee" information.

B The NO_X. CO and VOCs emission rates were provided by the manufacturer in units of lb/MMBtu and converted to pounds per hour or tons per year based on fuel now data at 78°F under 100 percent load conditions. A safety factor was applied to the NO_X and CO emission rates to account for variable temperature conditions, creating maximum emissions. NO_X, CO and VOCs emission rates in this table are based on annual average conditions (approximately 40°F. at 100 percent load) with manufacturer "Guarantee" information. Calculations are provided in Appendix B to the air permit application.

C lb/MMBtu => pounds per million British thermal units.

D lb/hr => pounds per hour.

E tons/yr => tons per year; assuming operation of 7,438 combined hours per year for two turbines.

F 238 tons/yr is the permitted CO emission rate in Permit Number 28.0802-03. Basin Electric does not wish to change this value. However, it should be noted that an emission rate of 43.6 lb/hr CO for 7,438 hours/yr will not emit 238 tons/yr.

See http://puc.sd.gov/commission/dockets/electric/2007/el07-002/appendixd.pdf.

4.1.5 Operation with Western's Operating Limit under No Action Alternative

Under the No Action alternative, the output of the Groton Generation Station would continue to be limited to 50 MW on an average annualized basis, equivalent to an output limit of 438,000 MWh per year. Worst-case air quality dispersion modeling was conducted for the Air Quality Operating Permit Application (Basin Electric, 2006) and included analyses that addressed operation under different load and temperature scenarios. These emission scenarios covered the combination of ambient temperatures of -30° F, 0° F, 40° F, 59° F, 78° F, and 92° F and equipment loads of 50 percent, 75 percent, and 100 percent. All scenarios were based on operation equivalent to a 42.5 percent capacity factor. With Western's operating limit, operation at 100 percent load would be equivalent to a 25 percent capacity factor. Although the air quality dispersion modeling was conducted for the higher capacity factor, the emission impact would be within the limits imposed by the Title V air quality operating permit and NAAQS. The pound per hour emission rates would not be affected with Western's operating limit; however, the annual ton per year emissions would be reduced with Western's 50 MW annual average operating limit.

Since the conditions of the Title V air quality operating permit would be met under the No Action alternative, operation of the Groton Generation Station with Western's operating limit would not cause emissions of criteria pollutants above concentrations that would exceed Federal and state air quality standards. Therefore, implementation of the No Action alternative would not cause significant impacts to air quality.

4.2 Greenhouse Gas Emissions and Climate Change

4.2.1 Identification of Issues

The following was identified as an important element for Greenhouse Gas Emissions and Climate Change:

- Carbon dioxide (CO_2) emissions are recognized as a specific concern to the public.

4.2.1 Impact Assessment Methods

Because there is incomplete information on, and there are no regulatory standards for CO_2, Western analyzed the impacts associated with these emissions in accordance with the NEPA regulations at 40 CFR 1502.22, which states: "When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking". With respect to CO_2 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 CO_2 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 CO_2 within this Draft EIS, and (4) has discussed and evaluated the impacts of CO_2 based upon theoretical approaches and generally accepted methods.

There are differing views on the procedure for addressing climate change under the NEPA. Draft guidance issued in 1997 by the CEQ provides some suggestions as to how Federal agencies should address climate change. In the guidance, CEQ recognizes that individual projects will likely have only marginal impacts on global climate change and that it is the programmatic NEPA documents where an analysis of global climate change would be most useful. However, CEQ concludes that climate change is "reasonably foreseeable" and that NEPA documents should consider two aspects of climate change: (1) the potential for Federal action to influence global climatic change and (2) the potential for global climatic change to affect Federal actions. The discussion of GHG emissions in NEPA documents has evolved over time due to several factors, including heightened public awareness, advances in the science of global warming, litigation, advances in technologies, and potential legislation and regulation (DOE, 2007). The lack of certainty regarding the impacts of source-specific emissions has made it difficult to estimate the impact of specific proposed projects with definitive conclusions (i.e., "a coal plant emitting X tons of CO_2 per year would result in a Y degree increase in global temperatures."). However, current DOE NEPA documents do include the following elements:

- Discussion of global climate change – When GHG emissions are relatively small, the discussion is typically limited to reasons why no further analysis is necessary. In cases where potential emissions are significant, discussions usually include findings and potential consequences mentioned in various studies by governmental agencies (i.e., EPA, the Intergovernmental Panel on Climate Change (IPCC), DOE, etc.).

- Quantification of GHGs – Emissions in the form of annual emission rates are typically provided.

- Consideration of cumulative impacts – The extent of cumulative impacts generally depends on the type of proposal and amount of potential GHG emissions. Some of the elements include the following: (1) total emissions over the project lifetime, (2) life cycle analyses, (3) incremental emissions to existing similar source base (i.e., proposed plant emissions addition to emissions from all fossil plants), and (4) potential to induce other actions.

- Exploration of reasonable alternatives – Primarily occurs at the project definition and scoping stage.

- Consideration of potential mitigation – includes exploring current and future GHG reduction options such as carbon capture and sequestration.

4.2.3 Significance Criteria

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 ` impacts of climate change on a global scale, much less on a local scale. As a result, a significance criterion was not established for impacts associated with greenhouse gas emissions.

4.2.4 Operation without Western's Operating Limit under Western's Proposed Action

There is a growing body of evidence indicating that GHGs are contributing to climate change. In November 2007, the IPCC published "Climate Change 2007 Synthesis Report" (IPCC, 2007), also known as the Fourth Assessment Report on Climate Change. The report concluded that climate change is occurring and human activity is likely the primary contributor. In this report and previous reports, the IPCC has predicted that global warming could lead to more heat waves, droughts, fires, and coastal flooding, as well as, decreased snowpack, more severe hurricanes, increased spread of infectious diseases, and more heart and respiratory ailments. In May 2008, a report by the Committee on Environment and Natural Resources of the National Science and Technology Council (NSTC) published a report titled "Scientific Assessment of the Effects of Global Change on the United States" (NSTC, 2008), which integrated and evaluated the findings of the U.S. Climate Change Science Program and the findings from the IPCC assessments. The NSTC report concluded that there is a strong human influence on climate change, and while the lines of evidence vary in their degree of certainty, they provide a compelling and scientifically sound explanation. The NSTC report further concluded that while GHGs are but one of many factors that affect climate, they are very likely the single largest cause of the recent warming. The IPCC report finds that, "most of the observed increase in global average temperatures since the mid-20th century is very likely (i.e., more than 90 percent likely) due to the observed increase in anthropogenic greenhouse gas concentrations." (IPCC, 2007) Correspondingly, the IPCC report finds, "It is extremely unlikely (<5 percent) that the global pattern of warming during the past half century can be explained without external forcing, and very unlikely that it is due to known natural external causes alone. The warming occurred in both the ocean and the atmosphere and took place at a time when natural external forcing factors would likely have produced cooling." As discussed in Section 3.1.2, EPA's Administrator signed two distinct findings regarding greenhouse gases under Section 202(a) of the Clean Air Act. The key effects that support EPA's determination that greenhouse gases in the atmosphere endanger the welfare of current and future generations include (see: http://www.epa.gov/climatechange/endangerment/downloads/EndangermentFinding_EnvironmentalEffects.pdf):

Sea Level Rise

- The global sea level gradually rose in the 20th century and continues to rise.
- The most serious potential adverse effects are the increased risk of storm surge and flooding in coastal areas from sea level rise and more intense storms. Observed sea

level rise is already increasing the risk of storm surge and flooding in some coastal areas.

- The U.S. East Coast and Gulf Coast are particularly vulnerable to sea level rise because the land is relatively low with respect to mean sea level and also is sinking in many places.

Water and Implications for Water Use

- Rising temperatures will decrease the size of snow packs in the western United States, affecting seasonal water supplies, relied on by humans and wildlife.

- Climate change will likely put more pressure on already stressed water resources in some areas of the United States.

Agriculture and Forestry

- There is a potential for a net benefit in the near term for certain crops, but there is significant uncertainty about whether this benefit will last, given the potential adverse impacts of climate change on crop yield, such as the increasing risk of extreme weather events. Other aspects of this sector may be adversely affected by climate change, including livestock management and irrigation requirements, and there is a risk of adverse effect on a large segment of the total crop market.

- Climate change has very likely already increased the size and number of wildfires, insect outbreaks, and tree mortality in the interior West, the Southwest, and Alaska, and will continue to do so.

Energy and Infrastructure

- Climate change is likely to affect U.S. energy use (e.g., heating and cooling requirements), energy production (e.g., effects on hydropower), physical infrastructures, and institutional infrastructures.

Ecosystems

- Changes in climate will cause some species to shift north and to higher elevations, which may fundamentally rearrange U.S. ecosystems, and in combination with other stresses such as development, habitat fragmentation, invasive species, could have negative consequences on biodiversity and the benefits that healthy ecosystems provide to humans and the environment.

- Climate change effects outside of the United States may exacerbate problems that raise humanitarian, trade, and national security issues for the United States.

While this scientific evidence has moved many governments around the world to take action to curb GHG emissions, the difficultly in measuring the source-specific, incremental impact of anthropogenic sources on climate change has made it impossible for these governments to establish a single regulatory threshold to apply to new electric power generation.

There are no specific Federal, state, or regional GHG regulations that apply to the Groton Generation Station at this time, nor are there established standards to guide assessment of GHG emissions. Western has provided estimates in this EIS that reflect a comparison of GHG emissions from the Groton Generation Station with other estimated GHG emission sources.

The projected carbon emissions from the Groton Generation Station would be 0.43 metric ton CO_2/MWh based on 2008 actual emission data. Based on this emission factor, the operation of the proposed Groton Generation Station without Western's operating limit would release an estimated 318,192 metric tons of CO_2 into the atmosphere each year. According to and based on Energy Information Administration (EIA) information, this amount would represent about 0.00108 percent of global anthropogenic emissions produced in 2006. Using EPA's emissions equivalency calculator, the projected CO_2 emissions from the Groton Generation Station would be roughly equivalent to the annual CO_2 emissions from 60,840 passenger cars, or 35,792,126 gallons of gasoline consumed (EPA, 2009a). Based on a comparison of the CO_2 emissions from various fossil fuel-fired power generation technologies conducted for the Big Stone II Power Plant and Transmission Project EIS, U.S. coal-fired generation averaged 1.18 tons CO_2/MWh in 2005 (Western, 2009). Based on this average, a 200 MW coal-fired generation unit with a 42.5 percent capacity factor would release an estimated 796,179 metric tons of CO_2 each year. This estimate does not take into account advances in coal combustion efficiencies nor carbon capture and sequestration.

On a state level, CO_2 emissions in 2005 for South Dakota were reported to be approximately 3.3 million metric tons from electric power sources (EIA, 2009). Carbon emissions from the Groton Generation Station would be about 9.64 percent of the South Dakota CO_2 emissions produced in 2005.

The Groton Generation Station without Western's operating limit could emit more CO_2, which could 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 Groton Generation Station's CO_2 emissions on human health and the environment. This 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 station's CO_2 emissions on human health and the environment cannot be done in any way that produces reliable results.

4.2.5 Operation with Western's Operating Limit under No Action Alternative

The Groton Generation Station with Western's operating limit could continue to emit CO_2 up to 187,333 metric tons per year (based on the 2008 CO_2 emission rate), which could have an undetermined effect on local, regional, or global climate change. However, as with the Proposed Federal action, Western believes that any attempt to analyze and predict the local or regional impacts of the generating station's CO_2 on human health and the environment cannot be done in any way that produces reliable results due to the lack of information and differences in methods.

4.3 Water Resources

4.3.1 Identification of Issues

Impacts to water resources may occur from increasing the output of the Groton Generation Station. A related concern is that available quantities of surface water could be reduced with increased consumptive use of surface water from Lake Oahe. These effects could then reduce the availability of water resources for other beneficial uses.

4.3.2 Impact Assessment Methods

Since no new water conveyance systems would be needed to support increased water consumption without Western's operating limit, the analysis for water resources was limited to an examination of water use and supply for the Groton Generation Station. This included an examination of available water supply for the Groton Generation Station as well as other water association uses.

4.3.3 Significance Criteria

A significant impact on surface water may result if any of the following were to occur from operation of the Groton Generation Station:

- Water use leads to depletion that adversely affects existing or proposed uses of a water source.

- Conflicts with existing or planned public utilities and services, water conveyance facilities and/or utility right-of-ways occur.

4.3.4 Operation without Western's Operating Limit under Western's Proposed Action

WEB provides all of the water for the Groton Generation Station. With elimination of the operating limit, water use by the generating station would increase from a maximum of 10,950,000 gallons per year (based on output from Unit No.2, which uses more water), or 33.6 acre-feet per year, to a maximum of 18,593,750 gallons per year, or 57 acre-feet per year[5], assuming the generating station would run up to the limits prescribed in the Title V air quality operating permit. To put the water consumption in context, it is estimated that a family of four uses approximately 1 acre-foot of water per year. Therefore, Groton Generation Station's expected annual water usage of 12,877,200 gallons per year (based on running both units up to the 42.5 capacity factor), or 39.5 acre feet per year, is equivalent to the consumption of approximately 40 families.

The WEB project was authorized by the U.S. Congress (PL 96-355) on September 20, 1980, as part of a settlement of the Oahe Irrigation Project. Congress reauthorized the WEB Project (PL 97-237), and on September 22, 1983, President Ronald Reagan signed WEB into law. WEB water is pumped from the intake and pumping plant located on Lake Oahe south of Mobridge, South Dakota. WEB's water treatment plant in Selby, South Dakota, was expanded from 9 to 14 million gallons per day in 2008. With this expansion, the maximum annual water use at the Groton Generation Station represents one and one-third days capacity of the treatment plant.

Lake Oahe has 3,201,000 acre feet dedicated to flood control and multiple uses, and 13,461,000 acre feet of carryover for multiple uses (Corps, 2009). Based on WEB's daily treatment capacity of 14 million gallons, WEB's annual treatment capacity is 5.11 billion gallons, or 15,682 acre-feet, representing 0.094 percent of available water from Lake Oahe under the Missouri River's proposed 2009-2010 operating plan.

As a peaking unit, much of the Groton Generation Station's operation is expected to be at partial load while following the system electrical demand. With the capacity to supply 14 million gallons per day of water, WEB is expected to have adequate capacity to meet the Groton Generating Station's water supply needs. The water supply system has been designed to provide 75 gallons per minute, or about 121 acre-feet per year. Based on the water supply system in place, WEB has available water to serve the Groton Generation Station in excess of project needs. Existing WEB water supplies are sufficient to provide the estimated Groton Generation Station's use of 57 acre-feet per year for maximum permitted operation.

Therefore, Groton Generation Station's water use without Western's operating limit would not deplete available water supplies leading to significant impacts. In addition, since no new water conveyance system would be needed to supply water without Western's operating limit, there would be no impacts to existing or planned public utilities and services, water conveyance facilities and/or utility right-of-ways.

[5] One acre foot equal 325,851 gallons

4.3.5 Operation with Western's Operating Limit under No Action Alternative

With the No Action alternative, water use by the generating station would remain at a maximum of 10,950,000 gallons per year, or 33.6 acre-feet per year, less than the water consumption for operation with elimination of the operating limit under the Proposed Action. Thus, Groton Generation Station's water use with Western's operating limit would not deplete available water supplies leading to significant impacts. In addition, since water conveyance systems needed to supply water with Western's operating limit are in place, there would be no impacts to existing or planned public utilities and services, water conveyance facilities and/or utility right-of-ways.

4.4 Aesthetics

4.4.1 Identification of Issues

Increased operation of the Groton Generating Station may increase the incidents of exhaust stack plumes and create additional needs for lighting at night.

4.4.2 Impact Assessment Methods

4.4.3 Significance Criteria

A significant impact on visual resources may result if any of the following were to occur from operation of the proposed Project:

- Substantial degradation of the foreground character or scenic quality of a visually important landscape

- Substantial dominant visual changes in the landscape that are seen by highly sensitive viewer locations such as community enhancement areas (community gateways, roadside parks, viewpoints, and historic markers) or locations with special scenic, historic, recreational, cultural, archaeological, and/or natural qualities that have been recognized as such through legislation or some other official declaration

4.4.4 Operation without Western's Operating Limit under Western's Proposed Action

Visible plumes from the exhaust stacks of the Groton Generation Station form when the mass of water in the exhaust plume in each unit exceeds the saturation point of the exhaust gases. The saturation point of air is directly related to its temperature with warm air having a higher saturation point (being able to carry more water in a vapor state) than cold air. When the saturation point is reached, water condenses out of vapor state to a liquid state, forming fine water droplets. These water droplets are visible in the exhaust plumes under low temperature and high humidity conditions.

With elimination of the operating limit, the generating station would operate up to 3,718.8 hours per year compared with 2,190 hours with the operating limit. The amount of time the generation station would produce more plumes from the exhaust stacks would be limited because, as a peaking facility, the Groton Generating Station would operate more often on warmer days during the summer when electric loads are the greatest. Coincidentally, these hot summer days are the times at which plumes are the least likely to form. Also, Basin Electric's experience with the operation of the Groton Generation Station has demonstrated that the high velocity and temperature of the stack exhaust result in a quick dispersion of stack plumes, minimizing the size of visible plumes that would be created above the stacks. Based on this and the likelihood of more operation time in the summer, additional hours of operation without Western's operating limit would not cause a substantial degradation of the scenic quality in the area due to additional visible plumes from the generating station. In addition, there are no highly sensitive viewer locations within viewing distance of the Groton Generation Station. This, coupled with the lack of any visually important landscapes in the region of influence for visual resources, means the elimination of the operating limit would not cause any significant impacts to aesthetics in the area.

Because the Groton Generation Station is a peaking facility, its effects on visual conditions during hours of darkness are limited. Some night lighting is required for operational safety and security. There is some additional visible lighting associated with the generating station's stacks and open site areas. High illumination areas not occupied on a regular basis have switches or motion detectors to light these areas only when occupied. At times when lights are turned on, the lighting is not highly visible offsite and does not produce offsite glare effects. The offsite visibility and potential glare of the lighting is restricted to non-glare fixtures and placement of lights to direct illumination into only those areas where it is needed. With increased hours of operation with elimination of Western's operating limit, the overall change in ambient lighting conditions at the generating station, as viewed from nearby locations, would not be substantial.

4.4.5 Operation with Western's Operating Limit under No Action Alternative

Under the No Action alternative, there would be no change in facility operations and effects to views in the area would not change.

4.5 Transportation

4.5.1 Identification of Issues

The primary issues associated with transportation are congestion, travel impediments, and adequate emergency access. Railways would not be used for Groton Generation Station operations. Transportation of the primary fuel for the generating station is through a natural gas pipeline.

4.5.2 Impact Assessment Methods

Impacts to transportation were assessed by comparing projected additional travel demand due to increased hours of operation to existing daily traffic counts. Potential traffic impacts during plant operation have been considered and analyzed. Significance criteria were developed based on the EAs developed for the construction of Units 1 and 2 and previous Western environmental documents. During operations, the Groton Generation Station generates no more than four vehicle trips per day during the daytime (three daily employees with an 8:00 AM – 4:00 PM shift, and an operator with a 7:00 AM – 7:00 PM shift). A quantitative traffic analysis was not conducted for the long-term operations of the Groton Generation Station because traffic increases without the operating limit would generate a very low volume of trips.

4.5.3 Significance Criteria

A significant impact on transportation may result if any of the following were to occur from increased operation of the generating station:

- Increases in traffic that exceed a level of service established by the local or state transportation management agency
- Creation of road dust and/or severe road damage at levels that create hazardous situations for motorists and pedestrians
- Cause long term major traffic delays for a substantial number of motorists
- Changes in traffic patterns that result in hazardous situations for motorists or pedestrians

4.5.4 Operation without Western's Operating Limit under Western's Proposed Action

During operations, a limited number of service vehicles, delivery trucks, and employee vehicles would use existing paved roadways. One or two additional deliveries per month would be required to provide chemicals, and other necessities for maintaining plant operations with elimination of Western's operating limit. The demineralization unit would be required to treat water at the generation station about 13 additional times per year. U.S. Route 37 road is adequate to accommodate these additional trips without resulting in congestion, impaired emergency access, or reduced levels of service. Deliveries would be infrequent and would not interfere with any local traffic patterns, cause major traffic delays or road damage, or change traffic patterns. Therefore, there would be no significant impacts to the transportation infrastructure from operation of the Groton Generation Station without the operating limit.

Vendors are used to transport chemical materials and wastes. Over-the-road hazards associated with the transport of chemical materials and wastes would continue to be minimized by adherence with the applicable U.S. Department of Transportation and SDDOT regulations, and are expected to be less than significant.

4.5.5 Operation with Western's Operating Limit under No Action Alternative

During operations, a limited number of service vehicles, delivery trucks, and employee vehicles would continue to use existing paved roadways. There would be no increases in deliveries or employee vehicles. Deliveries would continue to be infrequent and would not interfere with any local traffic patterns, cause major traffic delays or road damage, or change traffic patterns. Therefore, there would be no significant impacts to the transportation infrastructure from operating the Groton Generation Station with Western's operating limit.

4.6 Noise

4.6.1 Identification of Issues

Issues related to noise include:

- Daytime noise levels above 60 decibels on the A-weighted scale (dBA) and nighttime levels above 50 dBA for residential receptors (dBA that may be exceeded 50 percent of the time within an hour (L_{50})

- An increase in noise levels greater than 5 dBA

4.6.2 Impact Assessment Methods

Burns and McDonnell was contracted by Basin Electric as a third party independent contractor to conduct an operational noise assessment study for the Groton Generation Station. The objective of this noise assessment was to verify that the noise levels emanating from the Groton Generation Station were below the noise limits set by the SDPUC for the facility. These limits were set for the nearest occupied residence to the Groton Generation Station and are 60 dBA(L_{10}) daytime and 55 dBA(L_{10}) nighttime.

4.6.3 Significance Criteria

A significant impact on noise may result if any of the following were to occur from operation of the Groton Generation Station:

- Exceeding local, state or Federal noise regulations or guidelines at sensitive receptors, such as residences, hospitals, or schools

- Substantial permanent increase in ambient noise levels at the nearest sensitive receptors within the project vicinity that would not be compatible with public health and welfare[6]

[6] Noise will have no effect on public health and well being due to interference with speech or other activities and will not result in undue, long-term annoyance as long as the yearly average L_{dn} is below 55 dB (von Gierke, 1975).

4.6.4 Operation without Western's Operating Limit under Western's Proposed Action

Daytime measurements were taken by Burns and McDonnell personnel on August 4, 2008, at 6:00 P.M., with additional daytime measurements taken on August 5 between 6:00 A.M. and 1:00 P.M. Nighttime measurements were taken from 10:00 P.M. on August 4 through 5:00 A.M. on August 5, 2008. Burns & McDonnell personnel conducted operational noise level surveys while the facility was operating at roughly 200 MW (full-load, 100 MW per turbine). Sound levels were measured at a point just south of the nearest sensitive receptor to the Groton Generation Station, a residence located 1,700 feet north of the generating station. One-minute measurement samples were taken in which steady-state sound levels were achieved. The measured daytime dBA-weighted Leq and L_{10} levels are given in Table 4.5-1, Measured Daytime Noise Levels at Nearest Residence to the Groton Generation Station, and the measured nighttime dBA-weighted L_{eq} and L_{10} levels are given in Table 4.5-2, Measured Nighttime Noise Levels at Nearest Residence to the Groton Generation Station. The limits for each timeframe are included in the appropriate table for reference. None of the values exceeded the limits established by the SDPUC, and all values were below levels necessary to create vibrations. Also, noise levels during operation did not exceed the ambient noise levels at the nearest sensitive receptor (42 dBA-weighted L_{eq} and 44 dBA-weighted L_{10}) beyond levels that would not be compatible with health and welfare. Ambient noise measurements were not taken during the early morning hours, which may explain a larger differential between the ambient noise levels and noise levels produced during facility operation. Overall, the noise increases during operation are not substantial and in most cases are not at levels that would be perceived.

Based on the operation noise assessment, even with increased output without Western's operating limit, significant noise impacts would not occur since operation of the facility would not increase noise levels that would exceed noise limits established for the nearest sensitive receptor, or result in a substantial permanent increase in ambient noise levels.

4.6.5 Operation with Western's Operating Limit under No Action Alternative

Based on the operation noise assessment, operation with Western's operating limit would not cause significant noise impacts since operation of the facility would not increase noise levels that would exceed noise limits established for the nearest sensitive receptor, or result in a substantial permanent increase in ambient noise levels.

Table 4.5-1, Measured Daytime Noise Levels at Nearest Residence

Time	L_{eq} (dBA)	L_{10} (dBA)	L_{10} Limit (dBA)	Comments
6:10 A.M.	52	53	60	Birds, light insects
6:14 A.M.	53	54	60	Birds, light insects
6:20 A.M.	54	55	60	Birds, light insects
6:22 A.M.	52	53	60	Birds, light insects
10:17 A.M.	49	53	60	Birds insects, and 1 car
10:18 A.M.	45	48	60	Birds and insects
10:19 A.M.	48	51	60	Birds, insects, and 1 truck
10:20 A.M.	47	50	60	Birds and insects
1:48 P.M.	42	45	60	Birds and insects
1:49 P.M.	43	46	60	Birds, insects, and 1 car
1:50 P.M.	42	43	60	Birds and insects
1:51 P.M.	41	41	60	Birds, insects, and 1 truck
6:02 P.M.	44	47	60	Insects and birds
6:03 P.M.	46	50	60	Insects, birds and 1 truck
6:04 P.M.	46	51	60	Insects, birds and 1 car
6:05 P.M.	44	48	60	Insects, birds and 1 car

Table 4.5-2, Measured Nighttime Noise Levels at Nearest Residence

Time	L_{eq} (dBA)	L_{10} (dBA)	L_{10} Limit (dBA)	Comments
9:51 P.M.	50	52	55	Insects and 2 cars
9:51 P.M.	46	47	55	Insects
9:53 P.M.	46	47	55	Insects
9:54 P.M.	46	47	55	Insects
11:55 P.M.	43	44	55	Insects
11:56 P.M.	45	46	55	Insects
11:57 P.M.	44	44	55	Insects
11:58 P.M.	44	44	55	Insects
2:07 A.M.	47	47	55	Insects
2:08 A.M.	47	48	55	Insects
2:09 A.M.	47	47	55	Insects
2:10 A.M.	48	48	55	Insects
4:15 A.M.	44	44	55	Insects
4:16 A.M.	45	45	55	Insects
4:17 A.M.	47	47	55	Insects
4:18 A.M.	47	47	55	Insects

4.7 Human Health, Safety, and Security

4.7.1 Identification of Issues

Issues related to human health and safety include the transport, storage, use, and disposal of chemical materials and wastes.

4.7.2 Impact Assessment Methods

Since no new chemicals or oil facilities, controls, or plans would be needed to support increased generating station output without Western's operating limit, the analysis for human health and safety was limited to an examination of the control measures and plans in place for the Groton Generation Station.

DOE's guidance document, "Recommendations for Analyzing Accidents under the National Environmental Policy Act, July 2002" (DOE 2002) was used to evaluate and discuss issues that consider "intentional destructive acts," the potential environmental consequences of such acts, and identification of "reasonably foreseeable accidents."

4.7.3 Significance Criteria

A significant impact on public health may result if any of the following were to occur from operation of the Groton Generation Station:

- Interference with emergency response capabilities or resources
- Creation of worker health hazard(s) beyond limits set by health and safety regulatory agencies or that endangers human life and/or property

A significant impact may result from chemical materials use or creation of solid wastes if any of the following were to occur during operation of the Groton Generation Station:

- Improper disposal of solid or sanitary waste generated by the generating station that would pose a threat to the public health and environment in the project vicinity
- Spills or releases of hazardous materials, hazardous substances or oil in excess of reportable quantities within the project area that would pose a threat to public health and the environment in the project vicinity
- Impaired implementation of or physically interfere with an adopted emergency hazardous materials spills response plan or emergency evacuation plan

4.7.4 Operation without Western's Operating Limit under Western's Proposed Action

During operation of the Groton Generation Station, public health and safety could potentially be affected by spills or leaks in storage containers for fuel, lubricants, fluids, and chemicals (see Tables 3.6-1 and 3.6-2). The risk of accidental spills is reduced by compliance with existing regulations applicable to the transport, storage, use, and disposal of chemical materials and wastes. Adequate control measures are in place to prevent off-site releases of chemical materials or wastes during operation of the generating station. The elimination of the operating limit would increase the frequency of maintenance activities, increasing the use of chemical materials,

lubricating oils, and insulating mineral oils. However, the elimination of Western's operating limit would not require any changes to control measures and plans, require additional use of chemical materials, or require the installation of additional chemical storage facilities or vessels. The storage, handling, and use of all chemicals would continue to be conducted in accordance with applicable regulations. Chemicals are stored in appropriate chemical storage facilities. Bulk chemicals are stored in storage tanks, and most other chemicals are stored in returnable delivery containers. Chemical storage and chemical feed areas are designed to contain leaks and spills. Concrete containment pits and drain piping design allow a full-tank capacity spill without overflowing the containment area. For multiple tanks located within the same containment area, the capacity of the largest single tank determines the volume of the containment area and drain piping. Drain piping for reactive chemicals is trapped and isolated from other drains to eliminate noxious or toxic vapors.

Over-the-road hazards associated with the transport of hazardous materials and wastes would continue to be minimized by adherence with the applicable U.S. Department of Transportation and SDDOT regulations. Standard operating procedures for the transfer, storage, and use of chemical materials, including both fuels and non-fuel substances, are in place. Transfers of chemical materials are limited to specific locations and follow specific procedures to prevent leaks and spills from contaminating the environment. Storage locations for chemical materials and oils have adequate secondary containment and spill prevention measures as described in the SPCC Plan for the facility.

Considering the control measures and plans in place, it is unlikely that any of the circumstances that would cause significant impacts, as discussed above, would occur to human health and safety from elimination of Western's operating limit.

Intentional Destructive Acts

As with any U.S. energy infrastructure, the Groton Generating Station could potentially be the target of terrorist attacks or sabotage. If a fire, explosion, or chemical release occurred at the proposed plant as the result of a terrorist attack, such events could cause injury and/or death of workers. The risk to workers or the public from damage to generating station facilities as a result of accidental or intentional actions by outside parties is low because public access is controlled, the site is monitored, and an emergency response plan and site security plan exists for the Groton Generation Station.

4.7.5 Operation with Western's Operating Limit under No Action Alternative

Under the No Action alternative, there would be no change in facility operations and effects to the risk of accidental spills from the transport, storage, use, and disposal of chemical materials and waste would not change. Considering the control measures and plans in place, it is unlikely that any of the circumstances that would cause significant impacts, as discussed above, would occur to human health and safety.

4.8 Cumulative Impacts Analysis

CEQ regulations for NEPA define "cumulative impact" as "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7). Guidance from the CEQ states that cumulative effects analysis should be conducted within the context of physical resource, ecosystem, and human community thresholds (CEQ, 1997), which are characterized as follows:

- Cumulative effects are caused by the aggregate of past, present, and reasonably foreseeable future actions.
- Cumulative effects are the total effect, including both direct and indirect effects, on a given physical resource, ecosystem, and human community of all actions taken, no matter who has taken the action.
- Cumulative effects are analyzed in terms of the specific physical resource, ecosystem, and human community being affected. Environmental effects are often evaluated from the perspective of the proposed Project.
- It is not practical to analyze the cumulative effects of an action on the universe; the list of environmental effects must focus on those that are truly meaningful.
- Cumulative effects on a given physical resource, ecosystem, and human community are rarely aligned with political or administrative boundaries.
- Cumulative effects may result from the accumulation of similar effects or the synergistic interaction of different effects.
- Cumulative effects may last for many years beyond the life of the action that caused the effects.
- Each affected physical resource, ecosystem, and human community must be analyzed in terms of its capacity to accommodate additional effects, based on its own time and space parameters.

4.8.1 Cumulative Impact Analysis Methods

The cumulative impacts analysis places the impacts from operating the Groton Generation Station without Western's operating limit into a broader context that takes into account the range of impacts from actions taking place over a given space (geographic region of influence) and time (temporal parameters). The geographic region of influence is specific to each resource and is generally the same as presented for each resource in Chapters 3.0 and 4.0. Based on the regions of influence related to the operation of the Groton Generation Station, the cumulative impact analysis only focuses on cumulative air, climate and water resource impacts. The regions of influence for the other resources addressed in the EIS are limited in their geographic context,

and/or the incremental impact of increased output from the Groton Generation Station is minuscule compared to the context of other past, present, and reasonable foreseeable projects. For example, Section 4.6 addresses noise impacts from the proposed elimination of the operating limit. Noise impacts from the Groton Generation Station would not affect the closest, sensitive noise receptor, and there are no other past and present projects that generate noise impacts within the region of influence for noise outside of ambient noise conditions. Also, there are no reasonable foreseeable projects within the region of influence for noise.

The cumulative effects on air and water resources are identified by adding the impacts of operating the Groton Generating Station without the Western operating limit to past, present, and reasonably foreseeable future actions defined in this section. This includes projects or activities that have already occurred, are ongoing, are funded for future implementation, or are included in firm near-term plans. Significance criteria of cumulative impacts for each resource are the same as presented in sections 4.1.3, Air Quality, and 4.3.3., Water Resources.

4.8.2 Projects and Activities Considered

Past, present and reasonably foreseeable future projects and activities that occur or may occur in the future within the geographic regions of influence for air and water resources are described in this section. The CEQ guidelines suggest that agencies should focus on "the current aggregate effects of past actions without delving into the historical details of individual past actions" (CEQ, 2005).

The region of influence for the air quality analysis is the state of South Dakota. For a list of the past and present projects within the state of South Dakota, Western relied on the SDDENR's list of facilities that have received a Title V air quality operating permit within the state of South Dakota. This list is available at http://denr.sd.gov/des/aq/aatitleV_c.aspx (SDDENR, 2010). The list is provided in Appendix B and includes power generation facilities, ethanol plants, and industrial facilities, including pipeline pumping stations and landfills.

Reasonably foreseeable projects for the air quality analysis were defined based on proposed projects being tracked by the SDDENR and the SDPUC. The SDDENR lists the Basin NextGen Project and the Big Stone II Project. Western has determined that these two projects are not reasonably foreseeable since Basin Electric has put the NextGen Project on hold and the Big Stone II participants have announced that they will not construct the project at this time. Therefore, only the Hyperion and Basin Deer Creek Projects are reasonably foreseeable and included in the analysis for air quality. Basin Electric is proposing to construct and operate a 300-MW natural gas-fired combined cycle power generating facility (Basin Electric, 2010). The new facility, known as the Deer Creek Station, would be located approximately six miles southeast of White, South Dakota, in Brookings County. Basin Electric has begun submitting applications for environmental permits for the facility. Hyperion is a Dallas-based oil company that is considering plans for building a new energy center that consists of an oil refinery and power plant. Hyperion officials have indicated that an area in Union County is one of several potential locations they are considering and have started submitting applications for environmental permits for that site (Hyperion, 2010).

Based on a review of the 2008 and 2009 Electric Dockets at the SDPUC (SDPUC, 2009), there are no current applications for Facility Permits other than the Basin Electric Deer Creek Project. Basin Electric has submitted applications for interconnection to Western for two additional simple gas turbines at the Groton Generation Station. System studies addressing these applications are pending and Basin Electric currently has no plans to install additional units. Therefore, the installation of additional turbines at the Groton Generation Station is not reasonably foreseeable.

The region of influence for the water resource analysis includes Lake Oahe on the Missouri River since WEB withdraws water from Lake Oahe for domestic and industrial uses. Based on work completed by Reclamation for the Red River Valley Water Supply Project (see http://www.rrvwsp.com/products.htm for project information), current average annual Missouri River depletions equal 15,391,000 acre-feet. Reclamation updated the Missouri River monthly depletions from Missouri River reaches for the period of record, 1929 - 2002, and gave this information to the Army Corps of Engineers (Corps) (Reclamation 2005b). Reclamation applied these depletions to the historic natural flow record to determine present level depleted streamflows. Table 4.8-1, Current Missouri River Depletions, shows average annual depletions (at a 2002 level of Missouri River basin development) for the period of record (1929 - 2002) at relevant locations.

Table 4.8-1, Current Missouri River Depletions (Reclamation 2005b).

Missouri River Reach	Average Annual Depletions in ac-ft
Total Above Gavins Point Dam	7,556,000
Fort Peck Dam to Garrison Dam	(3,882,000) [1]
Garrison Dam to Oahe Dam	(398,000) [1]
Total Below Gavins Point Dam	7,835,000
Total Missouri River Depletion	**15,391,000**

[1] These depletions are included in the total above Gavins Point Dam

The Corps (2004a) identified approximately 1,600 water intakes on the Missouri River. Of these, 302 intakes and intake facilities are used by American Indian tribes. Intakes on the Missouri River are primarily for municipal, industrial, and individual water supplies, fossil and nuclear-fueled power plant cooling, and irrigation withdrawals. Ninety-four percent of the population served from the Missouri River is located downstream of Gavins Point Dam. In addition, 73 percent of the generation by thermal power plants using the Missouri River is located below Gavins Point Dam.

On Lake Oahe, there are 218 water supply intakes including eight municipal intakes, two industrial intakes, 179 irrigation intakes, 21 domestic intakes, and eight public intakes (Corps 2004a). Of the 218 intakes, 14 water supply intakes serve the Standing Rock Reservation. These consist of two municipal intakes, nine irrigation intakes, one domestic intake, and two public intakes. Nine water supply intakes service the Cheyenne River Reservation, including one municipal intake, three irrigation intakes, and five domestic intakes. The municipal water supply facilities serve a population of approximately 48,050 persons (Corps, 2004a).

Depletion on the Missouri River system also occurs from natural causes, such as evaporation. The Corps (2004b) estimates the total average annual water loss due to evaporation on all Missouri Reservoirs at 3,055,000 acre-feet. The average annual water loss in Lake Oahe due to evaporation on this reservoir is 932,000 acre-ft. (Corps, 2004b).

For the Red River Valley Water Supply Project, Reclamation analyzed future depletion projects that were reasonably foreseeable by 2050, which is the project's planning horizon. Future depletions total an additional 155,000 acre-ft/year from the Missouri River Basin. These future depletions are specified in Appendix C (Reclamation, 2005).

4.8.3 Cumulative Impacts

Air Quality

Air emissions from other facilities in South Dakota are typically low enough to remain under the 100 tons per year threshold such that the plants can be permitted as synthetic minor sources, or like the Groton Generation Station, air emissions are low enough to remain under the threshold requiring a PSD review under PSD and Title V regulations. Exceptions include the Big Stone plant, and the proposed Deer Creek and Hyperion projects. Regardless, emitted pollutants include NO_x, CO, hydrocarbons, and SO_2 and are subject to limitations in the Title V permits. Facility air permits include specific limits on emission of pollutants and/or operational limits to ensure emissions remain below permit requirements. The closest facility to the Groton Generation Station with emitted pollutants is the James Valley Ethanol LLC dBA POET Biorefining facility, about 6 miles north, northwest of the generating station. Due to this distance and the permit limitations, it is unlikely that air emission impacts from the Groton Generation Station would be additive in a manner that would exceed significance criteria. Since the distance from the Groton Generation Station to the other existing and proposed facilities in South Dakota would be greater, it is even more unlikely that air emission impacts from the Groton Generation Station would be additive in a manner that would exceed significance criteria.

Greenhouse Gas

Since CO_2 is relatively stable in the atmosphere and generally mixed well in the troposphere and stratosphere, the impacts of CO_2 emissions are essentially independent of where the emissions occur and, due to the relatively small fraction of emissions projected to be generated by the Groton Generation Station without Western's operating limit when compared to regional or global emission levels, it is expected that CO_2 emissions from the generating station would have only a negligible impact on both local and global ambient concentrations of CO_2.

The compounding of numerous minor or insignificant events can have a cumulative impact over a period of time. Thus, a continued increase in global CO_2 could contribute to global events. Global events can then lead to localized impacts. In order to estimate a localized impact resulting from increased emissions, modeling to determine ground-level or atmospheric concentrations of CO_2 resulting from the action would need to be performed, and there would need to be a standard to which results could be compared. Currently, there are no Federal standards for CO_2.

Western concludes that the Groton Generation Station, as well as other sources in the state of South Dakota, would emit CO_2, which could 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 regional CO_2 emissions on human health and the environment. 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 when added to other past, present, and reasonably foreseeable future actions cannot be done in any way that produces reliable results. Therefore, climate is excluded from the cumulative effects analysis.

Water Resources

A depletion study was not conducted addressing water depletions for the Groton Generation Station, considering the size of the depletion for the Groton Generation Station (maximum water use of 57 acre-feet per year) compared to the size of existing Missouri River System depletions. (15,391,000 acre-feet per year). However, it is recognized that existing and future depletions of water from the Missouri River, including WEB withdrawals for the Groton Generation Station, would affect the amount of water flowing through the Missouri River mainstream system. Depletions could also reduce reservoir elevations in Lake Sakakawea and in Lake Oahe. The total System multiple use storage capacity is 39.0 million acre-feet (Corps, 2004b). The purpose of this storage capacity is to carry the System through critical dry periods. The balancing of reservoirs and flow in the Missouri River will continue to be independent of specific water supply projects and more in line with the Corps' need to balance competing interests as outlined in its Master Manual.

The purpose of the Corps (2004b) Master Manual is to meet water supply requirements to the extent reasonably possible. The Corps obtains necessary data and adjusts the System to assure that water is supplied (Reclamation, 2005).

Based on the small amount of the Groton Generation Station depletion and the water management of the Missouri River System in accordance with the Master Manual, the water resource use by the Groton Generation Station would not incrementally contribute to cumulative water resource impacts that exceed the significance criterion for water use.

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5.0 Other Required Considerations

5.1 Unavoidable Adverse Impacts

The operation of the Groton Generation Station without Western's operating limit would result in some unavoidable adverse impacts. The generation of additional energy using gas turbines would cause unavoidable emissions of air pollutants that can be considered an adverse impact. However, these additional emissions would be below applicable ambient air quality standards and in accordance with the Title V air quality operating permit. Operation of the generating station without Western's operating limit would result in the generation of additional quantities of solid and liquid wastes. Additional generation station output without the operating limit would result in the depletion of addition water from Lake Oahe, but at a fraction of the total water available for municipal and industrial use. Additionally, depending on the time of the year that the generating station is used, additional exhaust stack visual plumes would be evident during the colder times of the year that are more conducive to plume formation. None of these unavoidable adverse impacts would be significant.

5.2 Irreversible and Irretrievable Commitments of Resources

This section describes the irreversible and irretrievable commitments of resources associated with operating the Groton Generation Station without Western's operating limit. A commitment of resources is irreversible when its primary or secondary impacts limit the future options for a resource. An irretrievable commitment refers to the use or consumption of a resource that is neither renewable nor recoverable for use by future generations.

There are no irreversible commitments of resources for operating the Groton Generation Station without Western's operating limit. This is due to prior commitment of resources for the construction of the generating station.

Resources irretrievably committed for operation without Western's operating limit would be an annual consumption of more natural gas, up to 2.383 billion cubic feet of natural gas; annual consumption of more water, up to a maximum of 7,643,750 gallons, or 23.4 acre feet of water per year; and relatively minor quantities of fuel for maintenance vehicles, operating supplies, and miscellaneous chemicals, including catalysts for water treatment and CO control.

5.3 Relationship between Short-Term Uses of the Environment and the Maintenance of Long-Term Productivity

NEPA regulations require 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. Long-term uses refer to the time period following restoration and rehabilitation, during which the environment continues to be impacted. Most short-term uses of resources were committed with the

construction of the Groton Generation Station and would not change with elimination of Western's operating limit. The short term use of water and chemicals would contribute to the maintenance of long-term productivity by lowering NO_X and CO emissions from the generating station.

Elimination of the operating limit could shorten the life of the facility, since the generating station could operate more often. 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 were decommissioned and all facilities removed, natural resources in the vicinity, such as wildlife and land use, would be expected to recover quickly. It is unlikely that the natural resources or human communities in Brown County would be adversely affected in the long-term by the operation of the Groton Generation Station.

6.0 List of Agencies, Organizations, and Persons to Whom Notification of Availability or Copies of the Draft EIS were Sent

Federal Agencies and Representatives

U.S. Department of Agriculture Rural Utilities Service	Mark Plank	Washington	DC
U.S. Environmental Protection Agency, Office of Federal Activities		Washington	DC
U.S. Environmental Protection Agency Region 8	Larry Svoboda	Denver	CO
U.S. Environmental Protection Agency	Dana Allen	Denver	CO
United States Senate	John Thune	Washington	DC
United States Senate	Tim Johnson	Washington	DC
United States House of Representatives	Stephanie H. Sandlin	Washington	DC

Regional, State, and Local Government

Brown County Board of County Commissioners	Tom Fischbach, Chair	Aberdeen	SD
Brown County Planning and Zoning Commission	Gary Vetter, Director	Aberdeen	SD
South Dakota Department of Environment and Natural Resources	Joe Nadenicek, Staff Attorney	Pierre	SD
South Dakota Department of Transportation	Toby Wolf, Regional Operations Engineer	Aberdeen	SD
South Dakota Public Utilities Commission	Patricia Van Gerpen, Executive Director	Pierre	SD
Office of the Governor, South Dakota	Mike Rounds, Governor	Pierre	SD
City of Groton City Council	Gary Heitmann, President	Groton	SD

Native American Tribes and Related Bodies

Flandreau Santee Sioux	Josh Weston	Flandreau	SD
Lower Sioux Indian Community of Minnesota	Jean Stacy	Morton	MN
Prairie Island Indian Community of Minnesota	Marlys Opsahl	Welch	MN
Santee Sioux Tribe of Nebraska	Roger Trudell	Niobrara	NE
Sisseton-Wahpeton Oyate	Mike Selvage	Agency Village	SD
Spirit Lake Tribe	Myra Pearson	Fort Totten	ND
Upper Sioux Indian Community of Minnesota	Kevin Jensvold	Granite Falls	MN
Yankton Sioux Tribe	Robert Cournoyer	Marty	SD

News Media and Libraries

Groton Daily Independent	LaVanne Helmer	Groton	SD
Aberdeen American News		Aberdeen	SD
Alexander Mitchell Public Library		Aberdeen	SD

Organizations and Institutions

Basin Electric Power Cooperative	Cris Miller, Project Manager	Bismarck	ND
South Dakota Clean Water Action		Sioux Falls	SD
Sierra Club North Star Chapter		Minneapolis	MN

7.0 List of Preparers

The National Environmental Policy Act (NEPA)requires the Environmental Impact Statement (EIS) be prepared using an interdisciplinary approach. The NEPA evaluation integrates all aspects of the environment, including the natural sciences, social sciences, and environmental design arts. Table 7-1 lists the preparers and reviewers who participated in preparing this Draft EIS.

Table 7-1, List of Preparers and Reviewers for the Draft EIS

Name	Education/Experience	Project Role
Western Area Power Administration – Lead Agency		
Erika Walters	B.S., Biochemistry and Biology M.B.A. 5 years experience	NEPA Document Manager; Technical reviewer
Matthew Blevins	B.S. Chemistry M.S. Environmental Engineering 14 years experience	Technical and NEPA compliance review of the EIS
Matt Marsh	B.S. Soil Science M.S. Land Rehabilitation 17 years experience	Upper Great Plains Region NEPA Specialist
Dave Swanson	B.A. Biological Sciences 32 years experience	Air Quality, Climate, Water Resources, Noise, Human Safety, Health and Security, Cumulative Impacts
Stephen Tromly	B.S. Resource Conservation M.A. Anthropology with emphasis in Physical Archaeology 18 years experience	Native American Coordination

Back of Page -- Intentionally Left Blank

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Back of Page -- Intentionally Left Blank

9.0 Index

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V

W

Appendices

Appendix A – Groton Generation Station 2009 Operational Report, Air Emission Inventory

BASIN ELECTRIC POWER COOPERATIVE

1717 EAST INTERSTATE AVENUE
BISMARCK, NORTH DAKOTA 58501-0564
PHONE: 701/223-0441
FAX: 701/224-5336

February 23, 2010

Mr. Brian Gustafson
Department of Environment and Natural Resources
Joe Foss Building
523 East Capitol
Pierre, SD 57501-3181

Dear Mr. Gustafson:

Enclosed are the annual certification and annual emissions inventory for the Groton Generating Station Units 1 and 2.

If you have any questions, please contact me.

Sincerely,

Jerry Menge
Air Quality Program Coordinator

/gmj
Enclosure

cc: Tony Skonhovd w/enc.

2009 Operational Report
Air Emission Inventory
SD Environment and Natural Resources

Facility Name: Basin Electric Power Cooperative - Groton Generating Station
Facility Site Location: Groton
Permit Number: 28.0802-03

Facility Contact: Jerry Menge
Phone #: (701) 223-0441
Email Address: jmenge@bepc.com

Responsible Official: Mike Fluharty
Responsible Official's Title: Vice President of Operations

Permitted Units

Unit #1. General Electric, model # LMS100, simple cycle combustion turbine fired with natural gas.
Unit #2. General Electric, model # LMS100, simple cycle combustion turbine fired with natural gas.

2009 Operation

Unit #1

1. Amount of Natural Gas burned in 2009?	245.044	million cubic feet (MMCF)
2. Number of hours Unit #1 operated?	344.8	hours

Unit #2

1. Amount of Natural Gas burned in 2009?	223.219	million cubic feet (MMCF)
2. Number of hours Unit #2 operated?	320.3	hours

General Information

1. Heat Content of Natural Gas	1013.7	MMBtus / MMCF

2009 Emission Calculations

Total Particulate Matter

Permitted Unit	Fuel Type	Operating Parameter		Emission Factor		Emission Factor Citation	2009 Air Emissions		Equation
Unit #1									
	natural gas	245.044	MMcf	7.6	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	0.93	tons / year	1
Unit #2									
	natural gas	223.219	MMcf	7.6	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	0.85	tons / year	1
						Total Particulate Matter	**1.78**	**tons / year**	
	Equations Used								
	1. (Operating Parameter) x (Emission Factor) / (2000 pounds per ton)								

Total PM10

Permitted Unit	Fuel Type	Operating Parameter		Emission Factor		Emission Factor Citation	2009 Air Emissions		Equation
Unit #1									
	natural gas	245.044	MMcf	7.6	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	0.93	tons / year	1
Unit #2									
	natural gas	223.219	MMcf	7.6	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	0.85	tons / year	1
						Total PM10	**1.78**	**tons / year**	
	Equations Used								
	1. (Operating Parameter) x (Emission Factor) / (2000 pounds per ton)								

Total PM2.5

Permitted Unit	Fuel Type	Operating Parameter		Emission Factor		Emission Factor Citation	2009 Air Emissions		Equation
Unit #1									
	natural gas	245.044	MMcf	7.6	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	0.93	tons / year	1
Unit #2									
	natural gas	223.219	MMcf	7.6	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	0.85	tons / year	1
						Total PM2.5	**1.78**	tons / year	

Equations Used

1. (Operating Parameter) x (Emission Factor) / (2000 pounds per ton)

Sulfur Dioxide

Permitted Unit	Fuel Type	Operating Parameter		Emission Factor		Emission Factor Citation	2009 Air Emissions		Equation
Unit #1									
	natural gas	245.044	MMcf	0.6	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	0.07	tons / year	1
Unit #2									
	natural gas	223.219	MMcf	0.6	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	0.07	tons / year	1
						Total Sulfur Dioxide	**0.14**	tons / year	

Equations Used

1. (Operating Parameter) x (Emission Factor) / (2000 pounds per ton)

Nitrogen Oxide

Permitted Unit	Fuel Type	Operating Parameter		Emission Factor		Emission Factor Citation	2009 Air Emissions		Equation
Unit #1									
	natural gas	245.044	MMcf	111.68	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	13.68	tons / year	1
Unit #2									
	natural gas	223.219	MMcf	100	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	11.16	tons / year	1
						Total Nitrogen Oxide	**24.84**	tons / year	

Equations Used

1. (Operating Parameter) x (Emission Factor) / (2000 pounds per ton)

Volatile Organic Compounds

Permitted Unit	Fuel Type	Operating Parameter		Emission Factor		Emission Factor Citation	2009 Air Emissions		Equation
Unit #1									
	natural gas	245.044	MMcf	5.5	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	0.67	tons / year	1
Unit #2									
	natural gas	223.219	MMcf	5.5	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	0.61	tons / year	1
						Total Volatile Organic Compounds	**1.29**	tons / year	

Equations Used

1. (Operating Parameter) x (Emission Factor) / (2000 pounds per ton)

Organic Hazardous Air Pollutants

Permitted Unit	Fuel Type	Operating Parameter		Emission Factor		Emission Factor Citation	2009 Air Emissions		Equation
Unit #1									
	natural gas	245.044	MMcf	1.882	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	0.23	tons / year	1
Unit #2									
	natural gas	223.219	MMcf	1.882	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	0.21	tons / year	1
						Total Organic Hazardous Air Pollutants	**0.44**	tons / year	

Equations Used

1. (Operating Parameter) x (Emission Factor) / (2000 pounds per ton)

Metal Hazardous Air Pollutants

Permitted Unit	Fuel Type	Operating Parameter		Emission Factor		Emission Factor Citation	2009 Air Emissions		Equation
Unit #1									
	natural gas	245.044	MMcf		pounds/hour	AP42 does not state for NG	0.00	tons / year	1
Unit #2									
	natural gas	223.219	MMcf		pounds/hour	AP42 does not state for NG	0.00	tons / year	1
						Total Metal Hazardous Air Pollutants	**0.00**	tons / year	

Equations Used

1. (Operating Parameter) x (Emission Factor) / (2000 pounds per ton)

Carbon Monoxide

Permitted Unit	Fuel Type	Operating Parameter		Emission Factor		Emission Factor Citation	2009 Air Emissions		Equation
Unit #1									
	natural gas	245.044	MMcf	84	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	10.29	tons / year	1
Unit #2									
	natural gas	223.219	MMcf	84	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	9.38	tons / year	1
						Total Carbon Monoxide	19.67	tons / year	
	Equations Used								
	1. (Operating Parameter) x (Emission Factor) / (2000 pounds per ton)								

Carbon Dioxide

Permitted Unit	Fuel Type	Operating Parameter		Emission Factor		Emission Factor Citation	2009 Air Emissions		Equation
Unit #1									
	natural gas	245.044	MMcf	120000	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	14702.64	tons / year	1
Unit #2									
	natural gas	223.219	MMcf	120000	pounds / MMcf	AP-42, 1.4-3 - 1.4-6, 7/98	13393.14	tons / year	1
						Total Carbon Dioxide	28095.78	tons / year	
	Equations Used								
	1. (Operating Parameter) x (Emission Factor) / (2000 pounds per ton)								

2009 Summary of Air Emissions

TSP	1.78	tons per year
PM10	1.78	tons per year
PM2.5	1.78	tons per year
SO2	0.14	tons per year
NOx	24.84	tons per year
VOC	1.29	tons per year
Organic HAP	0.44	tons per year
Metal HAP	0.00	tons per year
CO	19.67	tons per year
CO2	28,095.78	tons per year

The department only charges air emission fees for Total Particulate Matter (TSP), Sulfur Dioxide (SO2), Nitrogen Oxides (NOx), Volatile Organic Compounds (VOC), and Non-Organic Hazardous Air Pollutants (HAP). Therefore, the following amount is the total that will be used to calculate the air emission fees.

Air Emission Fee Total	**28.05**	**tons per year**

FY2011 Air Emission Fees:

Air emission fee is based on $/ton fee plus an administrative fee:

$/ton fee =	6.1		Administrative fee is based on the following:
		$100.00	- actual emission less than 50 tons per year
		$500.00	- actual emissions less than 100 tons per year
		$1,000.00	- actual emissions >= 100 tons per year
$/ton fee =		$171.12	
Administrative Fee =		$100.00	
FY2010 Air Emission Fee =		$271.12	

Responsible Official: Mike Fulbright

Date: 2/23/10

ANNUAL COMPLIANCE CERTIFICATION REPORT
BASIN ELECTRIC POWER COOPERATIVE

Responsible Official:	Mike Fluharty, Vice President of Operations
Mailing Address:	1717 East Interstate Avenue Bismarck, North Dakota 58501
Phone Number:	(701) 233-0441
Location:	5 miles South of Groton Groton, South Dakota 58503
Permit Number:	28.0802-03
Permit Expiration Date:	May 31, 2010
Reminder:	Permit renewal application due December 3, 2009 (Applications Sent: September 30, 2009)

Description of Source

Title V air quality operating permit.

List of Emission Points and Control Equipment

1. General Electric, model # LMS100, simple cycle combustion turbine fired with natural gas. The unit has a maximum operating rate of 787 million Btus per hour heat input.

2. General Electric, model # LMS100, simple cycle combustion turbine fired with natural gas. The unit has a maximum operating rate of 787 million Btus per hour heat input.

Permit Conditions

The left column contains a "Yes" or "No" check box to identify if you are in compliance with the permit condition listed in the right column. Please check the appropriate box in the left column and complete the information requested in the right column. By checking the "Yes" box, the owner or operator is in continuous compliance. A checked "No" box means the owner or operator is in compliance intermittently or out of compliance.

In Compliance	
	Chapter 2.0 – Permit Fees
☑ Yes ☐ No	**Permit Condition 2.2** – To be in compliance, the owner or operator must have submitted the operational report to the department by March 1, 2009. Date submitted: 2/12/09
☐ Yes ☑ No	**Permit Condition 2.3** – To be in compliance, the owner or operator must have submitted the annual air fee by July 31, 2009. Date submitted: 8/26/09
	Chapter 5.0 – Record Keeping and Reporting
☑ Yes ☐ No	**Permit Condition 5.1** – To be in compliance, records and reports must be maintained for five years from the date of sample, measurement, report, or application.
☑ Yes ☐ No	**Permit Condition 5.4** – To be in compliance, the owner or operator must monitor the sulfur and nitrogen content of natural gas fired in Unit #1 and Unit #2 twice per year during the first and third quarters of the calendar year. Date test during 1st quarter: 4/01/09 Date test during 2nd quarter: 10/01/09
☑ Yes ☐ No	**Permit Condition 5.5** – To be in compliance, the owner or operator must maintain records of the occurrence and duration of any startup, shutdown, or malfunction, any malfunction of the water injection system, and any periods during which the continuous emission monitoring system is inoperable.
☑ Yes ☐ No	**Permit Condition 5.6** – To be in compliance, the owner or operator must calculate and record the amount of nitrogen oxide and carbon monoxide emissions, in tons, emitted into the ambient air from Unit #1 and Unit #2 and record the number of hours Unit #1 and Unit #2 operated during the month and during the 12-month rolling period for that month.
☑ Yes ☐ No	**Permit Condition 5.7** – To be in compliance, the owner or operator must calculate and record the amount of natural gas burned in Unit #1 and Unit #2, and the number of hours Unit #1 and Unit #2 operated from January 1 to December 31 of each year.

In Compliance	
☑ Yes ☐ No	**Permit Condition 5.8** – To be in compliance, the owner or operator must have postmarked notification of construction of Unit #2 to the department within 30 days after the start of construction. Date submitted: 5/07/07
☑ Yes ☐ No	**Permit Condition 5.9** – To be in compliance, the owner or operator must have postmarked notification of startup to the department within 15 days of initial startup of Unit #2. Date submitted: 05/21/08
☑ Yes ☐ No	**Permit Condition 5.10** – To be in compliance, the owner or operator must submit a quarterly report related to the operations of Unit #1 and Unit #2. 1st quarter date submitted: 4/22/09 2nd quarter date submitted: 8/27/09 3rd quarter date submitted: 10/22/09 4th quarter date submitted: 1/21/10
☑ Yes ☐ No	**Permit Condition 5.11** – To be in compliance, the owner or operator must have submitted an annual compliance certification letter to this department by March 1, 2009. Date submitted: 2/12/09
☑ Yes ☐ No	**Chapter 6.0 – Control of Regulated Air Pollutants** **Permit Condition 6.1** – To be in compliance, the visible emissions from all permitted units in 2009 must be less than 20 percent opacity. This provision does not apply when the presence of uncombined water is the only reason for failure to meet the requirement. Describe how compliance was determined (i.e., daily or monthly visible observations, state inspection, continuous monitoring): Visible emissions are monitored by site personnel certified in smoke reading.

In Compliance	
☑ Yes ☐ No	**Permit Condition 5.8** – To be in compliance, the owner or operator must have postmarked notification of construction of Unit #2 to the department within 30 days after the start of construction. Date submitted: ____5/07/07_____
☑ Yes ☐ No	**Permit Condition 5.9** – To be in compliance, the owner or operator must have postmarked notification of startup to the department within 15 days of initial startup of Unit #2. Date submitted: _____05/21/08_____
☑ Yes ☐ No	**Permit Condition 5.10** – To be in compliance, the owner or operator must submit a quarterly report related to the operations of Unit #1 and Unit #2. 1st quarter date submitted: _____4/22/09_____ 2nd quarter date submitted: ____8/27/09_____ 3rd quarter date submitted: ____10/22/09_____ 4th quarter date submitted: ____1/21/10_____
☑ Yes ☐ No	**Permit Condition 5.11** – To be in compliance, the owner or operator must have submitted an annual compliance certification letter to this department by March 1, 2009. Date submitted: _____2/12/09_____
	Chapter 6.0 – Control of Regulated Air Pollutants
☑ Yes ☐ No	**Permit Condition 6.1** – To be in compliance, the visible emissions from all permitted units in 2009 must be less than 20 percent opacity. This provision does not apply when the presence of uncombined water is the only reason for failure to meet the requirement. Describe how compliance was determined (i.e., daily or monthly visible observations, state inspection, continuous monitoring): __Visible emissions are monitored by site personnel certified in smoke reading._____

In Compliance	
☑ Yes ☐ No	**Permit Condition 6.3** – To be in compliance, the owner or operator must not exceed the particulate matter limit established in Table #2 of the permit. Describe how compliance was determined (i.e., stack performance test, statement of basis, continuous monitoring): Performance Testing which was completed by General Electric the contracting service and turbine supplier.
☑ Yes ☐ No	**Permit Condition 6.4** – To be in compliance, the owner or operator must not burn fuel in Unit #1or Unit #2 with a sulfur content greater than 0.8 percent by weight.
☑ Yes ☐ No	**Permit Condition 6.5** – To be in compliance, the owner or operator shall not shall emit nitrogen oxide from Unit #1 and Unit #2 in excess of 75 parts per million at 15 percent oxygen on a dry basis. Describe how compliance was determined (i.e., stack performance test, statement of basis, continuous monitoring): This is monitored with CEMS systems on both Units.
☑ Yes ☐ No	**Permit Condition 6.6** – To be in compliance, the owner or operator shall not exceed the carbon monoxide and nitrogen oxide emission limits established in Table #3 of the permit. Describe how compliance was determined (i.e., stack performance test, statement of basis, continuous monitoring): This is monitored with CEMS systems on both Units
	Chapter 7.0 – Performance Tests
☑ Yes ☐ No	**Permit Condition 7.7** – To be in compliance, the owner or operator shall certify the nitrogen oxide and carbon monoxide continuous emission monitoring systems installed on Unit #2 no later than 90 days after initial startup of Unit #2.

Appendix B – State of South Dakota Title V Air Quality Operating Permits

Permit #	Facility	Location	County
28.0502-04	Heartland Grain Fuels Limited Partnership	Huron	Beadle
28.0801-04	NorthWestern Energy (Huron)	Huron	Beadle
28.0701-04	NuStar Pipe Line Operating Partnership LP former Kaneb	Wolsey	Beadle
28.3302-04	Trussbilt	Huron	Beadle
28.0501-12	Broin Enterprises Inc	Scotland	Bon Homme
28.0501-06	South Dakota Soybean Processors	Volga	Brookings
28.0502-06	Valero Renewable Fuels Company LLC	Aurora/Brrokings County	Brookings
28.2201-06	South Dakota State University	Brookings	Brookings
28.9901-06	3M Company	Brookings	Brookings
28.9905-06	Daktronics, Inc.	Brookings	Brookings
28.1101-03	Brown County Solid Waste Landfill	ABERDEEN	Brown
28.0101-03	Avera Saint Lukes Hospital	Aberdeen	Brown
28.0501-03	James Valley Ethanol LLC dba POET Biorefining	Groton	Brown
28.0801-03	NorthWestern Energy (Aberdeen)	Aberdeen	Brown
28.3301-03	3M Company	Aberdeen	Brown
28.0505-03	Heartland Grain Fuels Limited Partnership	Aberdeen	Brown
28.9905-03	NuStar Pipe Line Operating Partnership LP former Kaneb	Aberdeen	Brown
28.0802-03	Basin Electric Power Cooperative - Groton Generating Station	Groton	Brown
28.3303-03	Molded Fiber Glass Companies	Aberdeen	Brown
28.1101-15	American Colloid Company	Belle Fourche	Butte
28.0701-15	Williston Basin	North of Belle Fourche	Butte
28.0801-18	NorthWestern Energy (Clark)	Clark	Clark
28.0701-18	TransCanada Northern Border Inc - CS10	Crocker	Clark
28.0801-19	Basin Electric Power Cooperative	Vermillion	Clay
28.2201-19	University of South Dakota	Vermillion	Clay
28.0501-05	Glacial Lakes Energy	Watertown	Codington
28.0701-05	Magellan Pipeline Company LP	Watertown	Codington
28.0801-05	Western Minnesota Municipal Power Agency - Watertown Power Plant	Watertown	Codington
28.1101-05	Watertown Regional Landfill	Watertown	Codington

28.3305-05	Benchmark Foam Inc	Watertown	Codington
28.1107-21	Pacer Corporation White Bear Mica Plant	Custer	Custer
28.1101-08	Mitchell Regional Landfill	Mitchell	Davison
28.0701-08	NuStar Pipe Line Operating Partnership LP former Kaneb	Mitchell	Davison
28.0501-08	Prairie Ethanol, LLC dba POET Biorefining - Mitchell	Mitchell	Davison
28.3301-22	Dakota Foundry Inc	WEBSTER	Day
28.0701-23	TransCanada Northern Border Inc - CS11	SD I-29, Exit 157	Deuel
28.0701-26	TransCanada Northern Border Inc - CS9	NE 1/4 NE 1/4 Section 28 T124N R 66W	Edmunds
28.0502-26	Aberdeen Energy, LLC	Mina, SD	Edmunds
28.0102-27	VA Black Hills Health Care System, Hot Springs Medical Cente	Hot Springs	Fall River
28.0801-28	NorthWestern Energy (Faulkton)	Faulkton	Faulk
28.0502-29	Northern Lights Ethanol	Big Stone City	Grant
28.0801-29	Otter Tail Power Company	Big Stone City	Grant
28.1101-36	Pierre Regional Landfill	Pierre	Hughes
28.0801-38	NorthWestern Energy (Highmore)	Highmore	Hyde
28.0801-42	Otter Tail Power Company	Lake Preston	Kingsbury
28.0501-43	Dakota Ethanol LLC	Wentworth	Lake
28.0801-43	Madison Generation Plant	MADISON	Lake
28.1155-09	Wharf Resources (USA) Inc	Lead	Lawrence
28.4402-09	Spearfish Forest Products, Inc.	Spearfish	Lawrence
28.0501-44	POET Biorefining - Hudson	Hudson	Lincoln
28.4401-44	ShowPlace Wood Products Inc	Harrisburg	Lincoln
28.0502-44	Siouxland Energy and Livestock Cooperative Transload Facility	Hudson	Lincoln
28.0105-01	Sioux Falls Water Reclamation Facility	Sioux Falls	Minnehaha
28.0201-01	John Morrell & Company	Sioux Falls	Minnehaha
28.0303-01	Earthgrains Baking Companies, Inc.	Sioux Falls	Minnehaha
28.0701-01	Magellan Pipeline Company LP	Sioux Falls	Minnehaha
28.0703-01	NuStar Pipe Line Operating Partnership LP former Kaneb	Sioux Falls	Minnehaha
28.1101-01	Sioux Falls Regional Sanitary Landfill	Sioux Falls	Minnehaha
28.4401-01	Norcraft Companies LLC dba StarMark Cabinetry Inc	Sioux Falls	Minnehaha
28.4402-01	Dakota Kitchen and Bath Inc	Sioux Falls	Minnehaha
28.3306-01	Design Tanks LLC	Sioux Falls	Minnehaha
28.9906-01	Midwest Railcar Repair Inc	Corson, SD	Minnehaha

28.9907-01	CCL Label Inc	Sioux Falls	Minnehaha
SD-0000264	Northern States Power Company	Sioux Falls	Minnehaha
28.3309-01	The Bergquist Company	Brandon	Minnehaha
28.0504-01	Buffalo Ridge Energy, LLC	Sherman	Minnehaha
28.0106-01	Sanford USD Medical Center	Sioux Falls	Minnehaha
28.0803-04	NorthWestern Energy (Mobile B)	Portable	PORTABLE
28.0802-28	Northwestern Energy - Portable #3	HURON	PORTABLE
28.0101-02	Rapid City Regional Hospital	Rapid City	Pennington
28.0801-02	Black Hills Corporation (Ben French)	Rapid City	Pennington
28.1101-02	Rapid City Regional Landfill	Rapid City	Pennington
28.1121-02	GCC Dacotah	Rapid City	Pennington
28.1143-02	Pete Lien and Sons Inc	Rapid City	Pennington
28.1150-02	Hills Materials Company	Rapid City	Pennington
28.4401-02	Rushmore Forest Products Inc	Hill City	Pennington
28.4428-02	Countertops Inc	Rapid City	Pennington
28.0601-02	Simon Contractors of South Dakota	Rapid City	Pennington
28.0702-02	Rocky Mountain Pipeline System LLC	Rapid City	Pennington
28.0802-02	Black Hills Corporation (Lange)	Rapid City	Pennington
28.4429-02	Fuels Reduction Services LLC	Portable	Pennington
28.0301-54	Associated Milk Producers Inc Cass Clay Division	Hoven	Potter
28.0501-55	Tri-State Financial LLC dba North Country Ethanol Co	Rosholt	Roberts
28.4401-55	Woodland Cabinetry	Sisseton	Roberts
28.0801-57	NorthWestern Energy (Redfield)	Redfield	Spink
28.0503-57	Redfield Energy LLC	REDFIELD	Spink
28.0801-58	Fort Pierre Power and Light Plant	Fort Pierre	Stanley
28.0501-61	POET Biorefining - Chancellor	Chancellor	Turner
28.0502-61	NuGen Marion Energy LLC	MARION	Turner
28.0503-61	Summit Green Energy, LLC - Genesis I	Parker	Turner
28.0801-07	NorthWestern Energy (Yankton)	Yankton	Yankton
28.3306-07	Sapa Extrusions Inc.	Yankton	Yankton
28.0701-07	NuStar Pipe Line Operating Partnership LP former Kaneb	Yankton	Yankton
28.9906-07	Kolberg-Pioneer Inc	Yankton	Yankton

Appendix C – Future Missouri River System Water Supply Depletions

DEIS Appendix B.2 – Missouri River Depletion

Table B.2.3. Future Missouri River Depletions for Water Supply and Irrigation Projects.

Project	Depletions - Maximum Use to 2050 (acre-feet per year)	River Reach
Municipal Water Supply Projects		
Mni Wiconi	12,474	Oahe to Big Bend
Perkins	645	Garrison to Oahe
Mid-Dakota	5,977	Garrison to Oahe
Crow Creek	675	Oahe to Big Bend
Lewis and Clark	21,963	Ft. Randall to Gavins Point
Ft. Peck RCWS	750	Above Ft. Peck
Ft. Peck Reservation	750	Above Ft. Peck
North Central RWS	7,633	Above Ft. Peck
Helena	14,284	Above Ft. Peck
Mni Wicasa	5,155	Garrison to Oahe
Northwest Area Water Supply	9,810	Ft. Peck to Garrison
Pikitanoi	34,496	St. Joe to Kansas City
Dewey/Ziebach	5,084	Garrison to Oahe
Blackfeet	9,248	Above Ft. Peck
Omaha	2,369	Sioux City to Omaha
Winnebago	848	Sioux City to Omaha
Prairie Bend	4,851	St. Joe to Kansas City
Crow Reservation	7,482	Ft. Peck to Garrison
Santee	7,777	Gavins Point to Sioux City
Kickapoo	999	Nebraska City to St. Joes
Irrigation Projects		
Lake Andes	1,000	Big Bend to Ft. Randall
Rocky Boy's	800	Above Ft. Peck
Chester	40,000	Above Ft. Peck
Tiber projects	40,000	Above Ft. Peck
Temporary Irrigation Projects	400	Above Ft. Peck
Standing Rock	2,380	Ft. Peck to Garrison
Turtle Lake	13,700	Ft. Peck to Garrison
McClusky Canal	10,000	Ft. Peck to Garrison

Table B.2.4. Future Depletions by Reach in the Missouri River Basin.

River Reach	Municipal Supply (acre-feet/year)	Irrigation (acre-feet/year)	Total (acre-feet/year)
Above Ft. Peck	11,000	81,000	92,000
Ft. Peck to Garrison	5,000	26,000	31,000
Garrison to Oahe	5,000	0	5,000
Oahe to Big Bend	4,000	0	4,000
Big Bend to Ft. Randall	0	1,000	1,000
Ft. Randall to Gavins Point	7,000	0	7,000
Gavins Point to Sioux City	2,000	0	2,000
Sioux City to Omaha	1,000	0	1,000
Omaha to Nebraska City	0	0	0
Nebraska City to St. Joe	300	0	300
St. Joe to Kansas City	12,000	0	12,000
Kansas City to Boonville	0	0	0
TOTAL	**47,300**	**108,000**	**155,300**

Source: Appendix B2 – Missouri River Depletions, Draft Environmental Impact Statement for the Red River Valley Water Supply Project, Dakotas Area Office, and Bureau-of-Reclamation.