ALTERNATIVE EVALUATION/SITE SELECTION STUDY

Mooreland Unit 4 Combined-Cycle Power Plant
Woodward County, Oklahoma

Western Farmers Electric Cooperative

USDA Rural Utilities Service

April 2013

Alternative Evaluation/Site Selection Study

for the

Mooreland Unit 4
Combined-Cycle Power Plant
Woodward County, Oklahoma

prepared for

Western Farmers Electric Cooperative

and

USDA Rural Utilities Service

April 2013

Project No. 56880

prepared by

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ACRONYM LIST

CAIR	Clean Air Interstate Rule
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CSAPR	Cross-State Air Pollution Rule
DSM	Demand side management
EA	environmental assessment
EC	Electric Cooperative
EPA	U.S. Environmental Protection Agency
EPC	Engineering, Procurement and Construction
GRDA	Grand River Dam Authority
GWh	gigawatt-hour
HRSG	heat recovery steam generator
kV	kilovolt
LFS	load forecast study
MGS	Mooreland Generating Station
MW	megawatt
NEPA	National Environmental Policy Act
NMDC	New Mexico distribution cooperatives
NO_x	nitrogen oxide
OPDES	Oklahoma Pollutant Discharge Elimination System
ODEQ	Oklahoma Department of Environmental Quality
OGE	Oklahoma Gas and Electric
PPA	Power Purchase Agreement
RUS	Rural Utilities Service
SPP	Southwest Power Pool
USC	United States Code
WFEC	Western Farmers Electric Cooperative

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EXECUTIVE SUMMARY

Western Farmers Electric Cooperative (WFEC) is a generation and transmission (G&T) cooperative headquartered in Anadarko, Oklahoma. Based on WFEC's 2010 Load Forecast Study (LFS), a capacity balance analysis shows that WFEC will have a capacity deficit of 134 megawatts (MW) in 2017 increasing to over 200 MWs in 2020. WFEC proposes to develop a new 300-MW gas-fired combustion turbine/combined-cycle generation unit at an existing generation site in northwestern Oklahoma with an in-service date of March 2017. The new unit could operate in peaking or intermediate load modes to support future load growth and augment WFEC wind resources.

This Alternatives Evaluation/Site Selection Study documents the purpose and need for the project and identifies the various options WFEC has considered in order to meet the projected load growth. These options considered included load management, renewable energy sources, distributed generation, re-powering existing units, participation in other company's projects, purchased power, and new fossil-fueled generation alternatives (i.e., gas, oil, and coal). Alternative project sites were also considered; WFEC has identified a preferred site for the new generation unit.

PROFILE OF WFEC

WFEC provides electric service to 19 member cooperatives, Altus Air Force Base and several communities in an approximately 50,000 square mile area of Oklahoma and small portions of Texas and Kansas. These member cooperatives provide electrical service directly to approximately 270,000 consumer members, including businesses, farms, and households. Starting in 2017 WFEC will provide electric service to four additional member cooperatives in New Mexico. The addition of the New Mexico members will raise the number of member cooperatives to 23 and servicing an additional 42,000 customers.

The existing generation facilities WFEC owns and operates include three generating facilities located at Mooreland, Anadarko, and Hugo with a total power generation capacity of 1,269 MW. When including contracted purchased power, WFEC has a capability of providing 1,825 MW as of June 2012. The Hugo Plant is a 450-MW coal-fired generating unit located near Fort Towson, Oklahoma. The Mooreland Plant consists of three gas-fired steam units with a combined output of 322 MW. The Anadarko Plant consists of three combined-cycle gas units with a combined output of 282 MW, three gas fired steam units with a combined output of 70 MW, and the recently completed three (3) simple cycle combustion turbines rated at a combined 145 MW.

WFEC has established power purchase agreements (PPAs) with the Southwest Power Administration (260 MW), WFEC Genco LLC (51 MW plus 40 MW from Shell Energy through 2016), PowerSecure (30 MW), and the Grand River Dam Authority (GRDA) (up to 200 MW by 2013). WFEC has enabled the development of several wind farms in Oklahoma through long-term purchase agreements. WFEC currently has PPAs with four wind farm facilities:

- Blue Canyon Wind Farm, near Lawton, in southwest Oklahoma – 74 MW
- Buffalo Bear Wind Farm, near Buffalo, in northwest Oklahoma – 19 MW
- Red Hills Wind Farm, near Elk City, in western Oklahoma – 123 MW
- Rocky Ridge Wind Project in western Oklahoma (Spring 2012) – 150 MW

PURPOSE AND NEED

The result of WFEC's most recent load study indicates that a capacity deficit of over 134 MW will occur by 2017. New peaking/intermediate generation capacity in this time frame will provide WFEC with the capacity and energy necessary to serve its members' needs and support the varying loads from the wind contracts.

In March 2012, WFEC signed a Purchase Power Agreement (PPA) for up to 280 MWs of capacity and energy beginning in 2014 and continuing through 2035. This Agreement was approved by RUS in July 2012, but final implementation depends on receiving "Firm Transmission" rights from the Southwest Power Pool (SPP). Until firm transmission rights from SPP have been secured for the PPA, WFEC is continuing the development of the combined cycle unit to be able to ensure power will be available to our members in 2017 in the event transmission rights are not granted. If transmission rights are granted to allow the utilization of the PPA, WFEC will delay or cancel the combined cycle project; if transmission rights are not granted WFEC will proceed with the development and construction of the new combined cycle unit. WFEC has the option to cancel the PPA if the transmission rights are not approved by July 1, 2013.

CAPACITY ALTERNATIVES

A review of the alternative ways WFEC could meet their needs was conducted. Options evaluated included load management, the use of renewable energy resources, distributed energy, fossil fuel generation, the repowering or uprating of existing units, participation in another company's generation project, and the purchase of power (including nuclear power). A new combined cycle unit was determined to be the most economical alternative for WFEC.

ALTERNATIVE SITES SELECTION

A Siting and Planning Definition Report was conducted to determine the best location for the new unit. Eight potential sites in Oklahoma were identified. As discussed in the Report, the evaluation resulted in an existing power plant site, the Mooreland site, being selected as the preferred site. Section 5.0 of this Study provides further information on the Siting Alternatives and Planning Definition Report.

The alternative that is the best solution to meet WFEC's projected load growth is to construct approximately 300 MW of generation at the existing Mooreland Generating Station. Interconnections would be accomplished via a new 345-kilovolt (kV) substation located adjacent to the existing plant site. A new Oklahoma Gas and Electric (OGE) 345-kV transmission line (OGE currently obtaining rights-of-way) would connect the new substation to the existing SPP grid. This alternative is WFEC's proposed action.

WFEC plans to request financing assistance for the project through a guaranteed Federal Financing Bank loan, if available. As a result, the project represents a major federal action that must be reviewed under the 1969 National Environmental Policy Act (NEPA). The Rural Utilities Service (RUS) will be the lead agency for the environmental review of the proposed project.

RUS is required by its NEPA regulations to evaluate the environmental impacts of the project and prepare an environmental assessment (EA) and decision documentation for its proposed action. This Alternatives Report is the first step in the NEPA process. It is intended to provide agencies and other interested parties with enough background project information so that they can provide feedback to RUS and the applicants regarding issues that should be addressed in the EA.

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1.0 INTRODUCTION

Western Farmers Electric Cooperative (WFEC) is proposing to develop a new, gas-fired, combined-cycle generation unit. The new unit would be an approximately 300-MW net generating unit, capable of operating in peaking and intermediate load mode, to be in-service by early 2017. The projected cost of the project is approximately $571 million (including owner's costs and interest during construction).

This document summarizes two separate studies: an alternatives evaluation analysis and a site selection study. Chapter 2 provides a profile of WFEC. Chapters 3 and 4 provide an explanation of the purpose and need for new capacity, and a discussion of the proposed project alternatives that were considered. These capacity alternatives included power purchases, load management, energy conservation, and various alternative electric generation technologies. The review of electric generation alternatives includes descriptions of each technology, along with its general advantages and disadvantages.

A summary of the siting study completed by WFEC is presented in Section 5. Section 6 provides a list of the references used in compiling the report.

* * * * *

2.0 PROFILE OF WFEC

WFEC is a generation and transmission cooperative that currently provides essential electric service to 19 member-owner cooperatives, Altus Air Force Base, and other power users. In the future, WFEC will also provide electric service to four new member-owners from New Mexico. WFEC is the major source of electric power supply for more than two-thirds of the geographical region of Oklahoma, as well as small portions of Texas, Kansas and a portion of southeastern New Mexico with the addition of the 4 New Mexico cooperatives (Figure 2-1). These member cooperatives provide electrical service directly to approximately 312,000 consumer-members, including businesses, farms, and households. The 23 member cooperatives are listed in Table 2-1.

Figure 2-1 WFEC Member Systems' Service Area

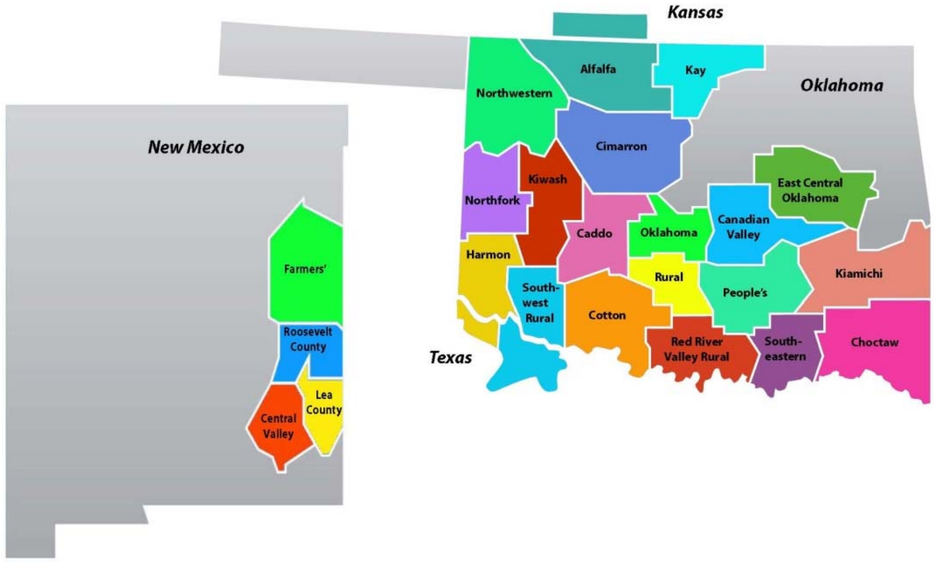


Table 2-1 WFEC Member Electric Cooperatives (EC)

Alfalfa EC, Inc.	Farmers EC, Inc.	Oklahoma EC, Inc.
Caddo EC, Inc.	Harmon Electric Association, Inc.	People's EC
Canadian Valley EC, Inc.	Kay EC, Inc.	Red River Valley Rural Electric Association, Inc.
Central Valley EC	Kiamichi EC, Inc.	Roosevelt County Electric
Choctaw EC, Inc.	Kiwash EC, Inc.	Rural EC, Inc.
Cimarron EC, Inc.	Lea County EC, Inc.	Southeastern EC, Inc.
Cotton EC. Inc.	Northfork EC, Inc.	Southwest Rural Electric Association, Inc.
East Central Oklahoma EC	Northwestern EC, Inc.	

Source: WFEC, October 2011.

WFEC recently, (October, 2010), expanded its service area to include four New Mexico cooperatives and will be providing service to these cooperatives in June 2017. Immediate and short-term generation requirements of the New Mexico Distribution Cooperatives (NMDCs) will continue to be provided from their existing supply contracts. WFEC is responsible for providing the increasing power and energy needs of the cooperatives as the existing supply contracts diminish and becomes fully responsible for all the power and energy needs of the new members in 2026.

The addition of new members will add both size and diversity and allow WFEC's fixed power costs to be spread among more members. Also, with the new members being located in a different time zone, it will help shift peak hours through geographic and time diversity. Opportunities for developing more efficient generation resources will also be available as WFEC becomes responsible for providing increasing power and energy needs for these loads.

* * * * *

3.0 PURPOSE AND NEED FOR THE PROJECT

WFEC's objective is to provide safe, adequate, and reliable power to its members at the lowest reasonable cost. From a system planning perspective, the adequacy and reliability provisions of the objective require WFEC to secure capacity resources sufficient to meet the system peak demand for electricity and to maintain an additional reserve margin should unforeseen events such as uncertainties in extreme weather, forced outages for generators, and uncertainty in load projections result in higher system demand or lower than anticipated availability of capacity resources.

WFEC needs to add new generation capacity to their current mix of generation resources to serve the growing loads within the service territories of their member cooperatives. WFEC's last Load Forecast Study (LFS) was completed in 2012 and was submitted to RUS and approved on March 7, 2013.

3.1 DEMAND FORECAST

Table 3-1 presents the annual capacity needed by WFEC to satisfy forecast capacity requirements and maintain a 13.64 percent reserve margin as required by Southwest Power Pool (SPP). The demand forecast for WFEC from 2011 through 2043 is shown in Figure 3-1. WFEC is expected to encounter a capacity shortfall in 2013, when approximately 33 MW of additional capacity will be required to maintain the target reserve margin; this increases to approximately 333 MW in 2017 and 606 MW in 2022. The need for additional capacity increases to approximately 1,555 MW by 2043. As seen in Figure 3-1, the forecasted need for power on the WFEC system does not increase in a linear trend, which is the normal pattern. Rather, starting in 2013 through 2022 load increases are greater but also erratic due to growth in the oil field, the addition of the New Mexico cooperatives, and then drops with the loss of the People's Electric Cooperative loads. The need for additional capacity increases from a 1,588 MW in 2012 to 2,434 MWs in 2026, before the need grows steadily again until the end of the planning period. This pattern introduces complexity to the planning decision. On the one hand, the planning approach requires the installation of a relatively large block of capacity in the 2017-2022 time frame so that the needs between 2017 and 2025 can be met. On the other hand, installing large base load facility early in the expansion plan means that not all capacity will be needed and utilized once the reduction in system load occurs in 2026. This forecasted load pattern and resulting need for power pattern justifies the decision to look at alternatively sized capacity additions.

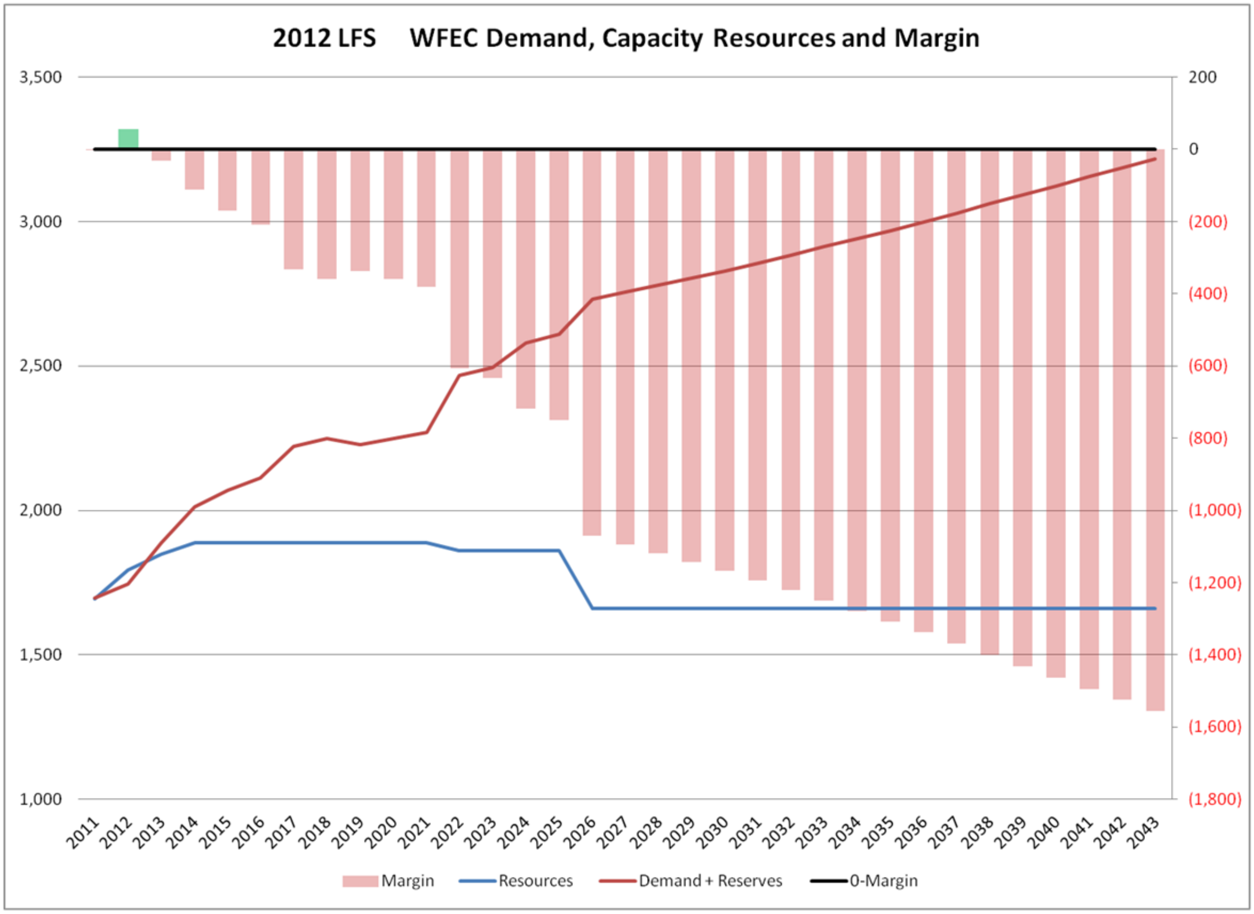
Table 3-1 WFEC Capacity Balance and Projected Reserve Margin

Year	Capacity Resources							Demand (Load) from 2012 LFS			Reserves			Demand + Reserves	Excess/ Deficit Margin
	Owned	Hydro	Genco PPA[1]	GRDA	DG[2]	LCEC Wartsilia	Total Capacity	NMDC from WFEC	WFEC (OK)	Total with 2012 LFS	Reserves @ 13.64%	Reserves by Others @ 13.64%	Reserves by WFEC		
2008	1175	279	40				1,494		1429	1429	195	(38)	157	1586	(92)
2009	1320	279	40		30		1,669		1445	1445	197	(38)	159	1604	65
2010	1320	260	40	60	30		1,710		1449	1449	198	(44)	154	1603	107
2011	1320	260	40	75	30		1,725		1472	1472	201	(46)	155	1627	98
2012	1320	260	40	175			1795	46	1542	1588	217	(66)	151	1739	56
2013	1320	260	40	200	28		1,848	46	1670	1716	234	(69)	165	1881	(33)
2014	1320	260	40	200	28	41.5	1,890	87	1740	1827	249	(75)	174	2001	(112)
2015	1320	260	40	200	28	41.5	1,890	91	1787	1878	256	(75)	181	2059	(169)
2016	1320	260	40	200	28	41.5	1,890	91	1823	1914	261	(75)	186	2099	(210)
2017	1320	260		200	28	41.5	1,890	161	1850	2011	274	(63)	211	2222	(333)
2018	1320	260		200	28	41.5	1,890	161	1873	2034	277	(63)	214	2248	(359)
2019	1320	260		200	28	41.5	1,890	161	1853	2014	275	(63)	212	2226	(337)
2020	1320	260		200	28	41.5	1,890	161	1874	2035	278	(63)	215	2250	(360)
2021	1320	260	40	200	28	41.5	1,890	161	1892	2053	280	(63)	217	2271	(381)
2022	1320	260	40	200		41.5	1,862	367	1860	2227	304	(63)	241	2468	(606)
2023	1320	260	40	200		41.5	1,862	372	1879	2251	307	(63)	244	2495	(633)
2024	1320	260	40	200		41.5	1,862	428	1899	2326	317	(63)	254	2581	(719)
2025	1320	260	40	200		41.5	1,862	433	1919	2352	321	(63)	258	2610	(749)
2026	1320	260	40			41.5	1,662	539	1895	2434	332	(35)	297	2731	(1,069)
2027	1320	260	40			41.5	1,662	544	1912	2456	335	(35)	300	2756	(1,094)
2028	1320	260	40			41.5	1,662	550	1928	2478	338	(35)	303	2780	(1,119)
2029	1320	260	40			41.5	1,662	555	1945	2500	341	(35)	306	2805	(1,144)

2030	1320	260	40			41.5	1,662	560	1961	2521	344	(35)	309	2830	(1,168)
2031	1320	260	40			41.5	1,662	565	1978	2543	347	(35)	312	2854	(1,193)
2032	1320	260	40			41.5	1,662	570	1998	2568	350	(35)	315	2883	(1,222)
2033	1320	260	40			41.5	1,662	576	2018	2593	354	(35)	319	2912	(1,250)
2034	1320	260	40			41.5	1,662	581	2038	2619	357	(35)	322	2940	(1,279)
2035	1320	260	40			41.5	1,662	586	2058	2644	361	(35)	326	2969	(1,308)
2036	1320	260	40			41.5	1,662	591	2078	2669	364	(35)	329	2998	(1,336)
2037	1320	260	40			41.5	1,662	597	2100	2697	368	(35)	333	3029	(1,368)
2038	1320	260	40			41.5	1,662	602	2122	2725	372	(35)	337	3061	(1,399)
2039	1320	260	40			41.5	1,662	608	2145	2752	375	(35)	340	3092	(1,431)
2040	1320	260	40			41.5	1,662	613	2167	2780	379	(35)	344	3124	(1,462)
2041	1320	260	40			41.5	1,662	618	2189	2808	383	(35)	348	3155	(1,494)
2042	1320	260	40			41.5	1,662	623	2211	2835	387	(35)	352	3186	(1,524)
2043	1320	260	40			41.5	1,662	628	2233	2862	390	(35)	355	3217	(1,555)

[1]PPA – power purchase agreements
[2]DG – distributed generation

Figure 3-1 WFEC Demand and Margin 2012 LFS 2011 – 2043



3.2 PLANNING HISTORY

WFEC is required to submit regular LFS and Construction Work Plans to RUS for approval in order to justify improvements to its system. In addition, WFEC, as a member of the SPP, establishes appropriate reserve margins as required by the pool.

In 2008, multiple expansion planning scenarios and studies were performed. A number of these studies were related to updated fuel and forecast assumption. Many additional scenarios related to potential carbon dioxide (CO_2) legislation were evaluated, as was the possible expansion of WFEC to include a number of additional distribution cooperatives, plus a number of possible power purchase alternatives. A high level evaluation was completed in which the economics of adding 100 MW and 200 MW of renewable energy to the WFEC system were evaluated. As a result of this evaluation, WFEC initiated a Renewable Energy Request for Proposal; which led to a power purchase agreement for approximately 123 MW of wind generation.

Also in mid-2008, WFEC continued to evaluate its alternatives to a Hugo 2 coal unit, based on the escalating capital costs and possible CO_2 legislation. This evaluation led to the 2010 Siting and Planning Definition Report which determined the need for this project. According to the LFS, additional capacity would be required beginning in 2017 and the total demand would reach 1,311 MW by the end of the study period in 2043. The results of the base case expansion plan study indicated that the addition of an approximately 300-MW combined-cycle unit at the existing Mooreland site was part of the least cost plan for WFEC. With the new 2012 LFS approximately 360 MWs is needed by 2017. The proposed one-on-one combined cycle can provide this amount with additional duct firing which was also considered in the capacity studies and was essentially equal to the unfired one-on-one combined cycle unit in cost comparisons.

3.3 EXISTING RESOURCES

WFEC operates a wide variety of owned and contracted electrical generation resources to serve the energy requirements of its members. In addition, WFEC has established power purchase agreements with several neighboring utility power generation facilities to purchase available economical electric resources. Figure 3-2 shows the breakdown of annual energy sources for 2012. The total capacity of WFEC's owned and contracted generating resources are presented in Table 3-2 and discussed in the following sections.

Figure 3-2 Annual Energy from WFEC Existing Resources

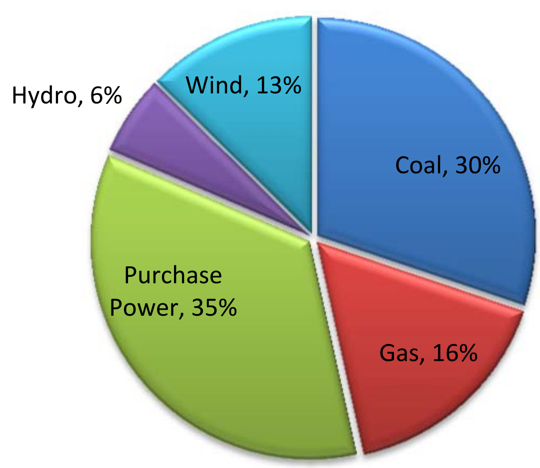


Table 3-2 WFEC Existing Generation Resources

Unit	Capacity	% Share	Fuel	Unit Type
Owner				
Anadarko				
1 & 2	13 MW each (26 MW total)	100	Gas	Steam
3	44 MW	100	Gas	Steam
4, 5, &6	94 MW each (282 MW total)	100	Gas	Combined-cycle
9, 10, & 11	48.3 MW each (145 MW total)	100	Gas	Simple-cycle
WFEC Genco LLC[2]	51 MW	100	Gas	Simple-cycle
Hugo	450 MW	100	Coal	Steam
Mooreland				
1	50 MW	100	Gas	Steam
2	132 MW	100	Gas	Steam
3	140 MW	100	Gas	Steam
TOTAL	**1,320 MW**			
Contract				
Unit	**Capacity**	**Expiration Date**	**Fuel**	**Unit Type**
Blue Canyon Wind Farm	74 MW[1]	2022	Wind	Renewable
Buffalo Bear Wind Farm	19 MW[1]	2032	Wind	Renewable
Red Hills Wind Farm	123 MW[1]	2029	Wind	Renewable
Rocky Ridge Wind Farm	150 MW[1]	2037	Wind	Renewable
GRDA (increases from 175 to 200 in 2013)	200 MW	2026	Multiple	Multiple
Southwest Power Administration	260 MW	Continuous roll-over	Hydro	Peaking
Shell-Genco	40 MW	2017	Gas	Simple-cycle
PowerSecure	28 MW	2017	Gas	Internal combustion
TOTAL	**1,848 MW**			

[1] Peak Output – No capacity
[2] Increases to 91 MW in 2021

3.3.1 Existing Generation Resources

Currently, WFEC operates one coal-based power plant – the Hugo Power Plant (450 MW). WFEC's natural gas-based generating plants include the Mooreland Power Plant (322 MW) and the Anadarko Power Plant (497 MW).

3.3.2 Existing Purchase Contracts

Part of the member power requirements are provided by a PPA with the Southwestern Power Administration. This agreement allows for 260 MW of firm hydro capacity for peaking, but is limited to 312 gigawatt-hours (GWh) energy per year and 52 GWh energy in any one month. This contract has been extended with the same capacity and energy restriction through 2028 (pending RUS approval). In addition, Southwestern Power Administration also provides supplemental power to WFEC beyond the agreement whenever this is available. Historically, this energy has been on the order of 300 GWh.

WFEC has a long-term PPA with Grand River Dam Authority (GRDA) for varying amounts of capacity and energy through May 2026. This contract uses the existing grandfathered transmission for delivery and provides a low-cost system firm purchase from GRDA's portfolio of generator assets, thus further diversifying WFEC's own resource mix. By using the grandfathered transmission, significant transmission upgrades were avoided that other PPAs might have required.

WFEC has rights to 51 MW of capacity and energy through May 2021 with WFEC Genco LLC, a subsidiary of WFEC EnergyCo which is a subsidiary of WFEC. After June 2021, WFEC has the rights to all 91 MW of capacity and energy for the life of the units. Shell Energy North America has the rights to 40 MW of capacity energy through May 2021, currently WFEC has a PPA with Shell Energy North America for these 40 MW for the months of January, February, June, July, August, September, and December of each year through February 2017 (this agreement may be extended). Prior to June 2021, WFEC can permanently recall 10 MW blocks up to the remaining 40 MW of capacity and energy from Shell North America at any time during the duration of the contract.

WFEC has a PPA with PowerSecure through 2017 for 30 MW of capacity and energy on the customer side of the meter for distributed generation.

WFEC has several PPAs for wind energy; these are with Blue Canyon Windpower LLC for 74 MW through 2022, Buffalo Bear for 19 MW through 2032, Red Hills for 123 MW through 2029, and Rocky Ridge for 150 MW through 2037. This energy is taken as generated and blended into the WFEC generation mix.

3.3.3 Existing Demand Side Management Resources

Demand Side Management (DSM) refers to utility activities undertaken to modify the pattern of consumers' electricity usage. DSM programs can include tariff pricing mechanisms, load management techniques, and increased end-use efficiency. Nationally, energy savings attributed to DSM activities declined over the period 1995-1999 from 57,421 to 50,563 million kilowatt-hours (U.S. Energy Information Administration 2011). The downward trend in DSM activity during that period is attributable to a number of factors including the higher efficiency of new generation, relatively low interest rates, the general increase in the efficiency of appliances and dwellings, and the passage of the 1992 Energy Policy Act, which reduced the willingness of utilities to implement programs not clearly cost effective (Black & Veatch 2001). In 1999, approximately 86 percent (43,704 million kilowatt-hours) of the energy savings achieved through DSM programs were attributable to investor-owned utilities while just over one percent (578 million kilowatt-hours) was attributable to electric cooperatives (U.S. Energy Information Administration 1999).

As software and energy management systems continue to evolve, DSM projects have expanded to residential, commercial and industrial customers. From 2000 to 2010, the actual peak load reduction for the country grew 45 percent from 22,901 MW to 33,283 MW (U.S. Energy Information Administration 2011). Home Area Networks, electric vehicles and decoupled utility structures should continue to drive innovation in DSM technologies and strategies. Costs of DSM programs have also increased dramatically. The combined annual expenses of labor, administrative, equipment, incentives, marketing, monitoring and evaluation totaled $4.16 billion in 2010 across the country, representing a 11 percent compound annual growth.

No strict load management programs are currently being implemented by WFEC. However, the member cooperatives are working toward the implementation of Individual load management programs as indicated below. This will reduce peak demand and will eventually reduce WFEC's peak demand which at this time cannot be clearly quantified. Programs that are in place at WFEC are:

1. Curtailable Load through Rate Design – Through this program 10 MW of coincidence load can be controlled at WFEC's peak; this is available to all coops.
2. "Time of Use" rates are being developed by Oklahoma Electric Cooperative and Cotton Electric Cooperative to control peak load energy use.
3. Geothermal Heat Pump program to reduce peak loads is used by Caddo Electric Cooperative, Kay Electric Cooperative, Kiamichi Electric Cooperative, Kiwash Electric Cooperative, Southwest Rural Electric and Oklahoma Electric Cooperative.

4. Efficiency Improvement through Rebate Program – This program is designed to improve the appliance efficiency of the existing customer by offering cash incentive to replace old, less efficient appliances with the new higher efficiency ones. Currently this program is available for water heaters and heat pumps whether they are replacements or new. Choctaw Electric Cooperative and Southwest Rural Electric are working on programs for implementation of LED lighting to reduce demand.
5. Peak Alert Program – As a power supplier, WFEC issues peak alerts on a possible peak day by noon to members, and in turn members call up their customers to "shave" (reduce) their loads. WFEC estimates this sheddable load to be 40-60 MW on peak. Caddo Electric Cooperative utilizes dispersed generation that runs at peak times to reduce WFEC load, Kay Electric Cooperative can turn off electric water heaters to control load and the municipalities of Anadarko and Anthony have self-generation that will operate at peak times to shed load. All WFEC member cooperatives participate in this program.
6. Distributive Generation and Dispersed Generation – Generation on the customer side of the meter – 28 MW. Caddo Electric Cooperative and Cotton Electric Cooperative participate in this program; others member cooperatives are looking into using a portion of this program.

A good way to control energy use is for consumers to be aware of how much energy they use each month and how it is being consumed in their home and on the farm. This involves learning how to read their meter, keeping track of their energy use, and using their meter as a tool to locate problems. In this way, consumers can budget their energy use just like they budget for groceries and other household items. WFEC and its member cooperatives have partnered with Oklahoma State University to develop a comprehensive online energy audit for the home.

3.3.4 Incremental Upgrades

Incremental upgrades include projects to increase the output from existing facilities; these increases generally relate to improvements to heat rates or plant efficiency. There are no incremental capacity upgrades considered that would meet the need for additional capacity. Under the U.S. Environmental Protection Agency's (EPA's) current regulatory interpretations, incremental upgrades can be subject to New Source Review.

3.3.5 Power Pool Member Resources

Because lack of reliability has a huge potential cost, WFEC belongs to the Southwest Power Pool (SPP) a regional organization of utilities dedicated to preserving reliability. By not having adequate generating resources during forced outage situations, a utility could be required to purchase expensive emergency power that could be well above their generation costs, or curtail power to customers resulting in potential blackouts and loss of business for commercial and industrial customers, if power is not available. Therefore, each utility in the SPP is required to maintain 12 percent available reserves for its current daily load in service at all times which can be shared by all utilities during an emergency. The SPP is a North American Electric Reliability Council - recognized reliability coordinator (a regional transmission organization) providing regional reliability coordination services to its members. As a reliability coordinator, SPP is responsible for reliability of the electric transmission system of its members and has the authority to direct actions required to maintain adequate regional generation capacity, adequate system voltage levels, and transmission system loading within specified limits. SPP currently consists of 64 members in nine states and covers a geographic area of 370,000 square miles containing a population of over 15.5 million people. SPP’s current membership consists of 12 generation and transmission cooperatives, 11 municipal systems, 4 state agencies, 10 power marketers, 14 investor-owned utilities, 6 independent transmission companies, and 7 independent power producers/wholesale generation (SPP 2011). SPP’s current generation capacity is 63,007 MW, with a mix of 40 percent coal, 42 percent gas / oil, 4 percent hydro, 4 percent wind, and 10 percent other.

SPP anticipates consistent growth in demand and energy consumption over the next 10 years. Adequate generation capacity will be available over the short term to meet native network load needs with committed generation resources meeting minimum capacity margins. Capacity margins are used to measure the amount of "extra" generating capacity that electric companies maintain to meet emergency demand situations. Beyond the short term, adequate capacity margins will be highly dependent on the capability of the market to provide the necessary generation resources. SPP is a summer-peaking region with projected annual peak demand and energy growth rates of 2.4 and 2.2 percent respectively, over the next 10 years. These demand growth rates are consistent with the 10-year historical growth rates of SPP.

Energy requirements for the region used in 2010 were 227,000 GWhs and were projected to increase at 1.2 percent annually through 2011. Based on this growth rate, the expected energy requirement for 2011 will be 229,972 GWh.

3.3.6 Transmission System Constraints

WFEC currently has a transmission system that covers approximately 75 percent of the state of Oklahoma and small areas in Texas and Kansas. The system is made up of 3,581 miles of transmission lines in Oklahoma, 98 miles in Texas, and 10 miles in Kansas. The transmission network makes up a fairly welllooped 69-kV system over most of the region, with 138-kV bulk transmission supporting the 69 kV at strategic points through 20 (138/69 kV) auto transformers.

Interconnection with neighboring utilities and the entire SPP regional Transmission System through the open access rules (FERC Orders 888 and 889) and the SPP Tariff support the system during contingencies. SPP monitors the entire regional transmission system and is responsible for maintaining the integrity of the transmission system; WFEC pays for and receives the rights to utilize the transmission system as a part of its participation in the SPP.

WFEC has 280 substations and 15 low-voltage metering points serving members. High side voltage is 69 kV on 146 substations and 138 kV on 134 substations. The average load per station is approximately 5.46 MW and the average transformer capacity is 10.6 megavolt ampere. Total transformer capacity on substations is 3.1 gigavolt amperes. Oklahoma Gas and Electric (OGE) and Public Service of Oklahoma serve 47 of WFEC's total substations.

3.4 NEED SUMMARY

The result of WFEC's most recent load study indicates that a capacity deficit of over 33 MW will occur by 2013 and 333 MW by 2017. New peaking/intermediate generation capacity in this time frame will provide WFEC with the capacity and energy necessary to serve its members' needs. The system surpluses (i.e. when system resources exceed the capacity requirements), and the periods of deficits (i.e. when system resources do not satisfy the projected capacity requirements) are presented in Table 3-3.

Table 3-3 Forecast Margin/Deficit Capacity

Year	Megawatts	Year	Megawatts
2011	(3)	2019	(337)
2012	56	2020	(360)
2013	(33)	2021	(381)
2014	(112)	2022	(606)
2015	(169)	2023	(633)
2016	(210)	2024	(719)
2017	(333)	2025	(749)
2018	(359)	2026	(1,069)

Source: WFEC 2012

* * * * *

4.0 CAPACITY ALTERNATIVES

WFEC conducted an expansion planning analysis for the 2008/2011 through 2043 time frame to consider a number of possible expansion plan scenarios. A capacity expansion planning study involves identifying the time frame in which additional capacity resources are needed on a power system and then evaluating alternative technologies to determine what options meet the system requirements in an economical manner and are otherwise consistent with utility objectives. Developing a projection of when additional resources are needed requires an inventory of existing capacity resources, as further adjusted by committed capacity additions and planned retirements. The capacity resources can then be compared to the projected peak demand to determine the need for capacity on the system, also called the capacity balance. In the analysis, individual capacity expansion plans were developed around the following conventional additions (in 2017): a 1x1 combined cycle plant (with and without supplemental firing), a 2x1 combined cycle plant without supplemental firing, a 300-MW share of a large coal unit (which could be self-build or a power purchase), a 300-MW power purchase from a nuclear facility assumed to be available in 2020 (bridge purchases until 2020 were assumed for this last plan as a 300-MW nuclear option would not be economical if combined with a previous base load addition), and the conversion of the simple cycle units to 1x1 combined cycle configurations supplemented by 1x1 combined cycle unit at a new site (units with and without supplemental firing were considered).

4.1 COAL

Coal is the most abundant fuel resource in the United States. The U.S. Department of Energy has identified coal reserves underground in this country to provide energy for the next 200 to 300 years. While coal presents a generating resource that has a low and predictable production cost, WFEC's immediate need for additional capacity could not be met by a new coal-fired generating resource. According to the expansion planning study, there has been a very large increase in the capital cost for coal generation facilities over the past three to five years attributed primarily to the growing development of coal fired generation in developing nations resulting in higher global commodity costs technologies, and more stringent environmental regulations. As such, the rate impact of adding a capital intensive unit could significantly increase WFEC's rate base. In addition, it is becoming increasingly difficult to finance new coal units through traditional means, since RUS has not been permitted to fund baseload facilities which has included new coal units. This position is a reflection of the political and environmental issues that any new coal unit would face. There has also been mounting concern over greenhouse gas emissions and climate change resulting in a strong political move away from coal.

On April 13, 2012 (77 Federal Register 22392), the US EPA proposed Standards of Performance for Greenhouse Gas Emissions for Electric Utility Generating Units (New Source Performance Standard, Subpart TTTT). As proposed, with limited exceptions, any electrical generating unit with a nameplate capacity of 25 MW or more that commences construction after April 13, 2012 will be limited to 454 kilograms of CO_2 per gross output in megawatt-hours (MW-hr) (454 kilograms per megawatt-hour (kg/MW-hr) or 1,000 lb/MW-hr) on a 12-operating month annual average basis. Any new coal-fired power plant would have to install carbon capture and sequestration (CCS) in order to meet this limit. As of now, CCS is not commercially available for a power plant of this size, nor is it economically feasible.

Another more recent concern is the new Cross-State Air Pollution Rule (CSAPR) finalized in July 2011. This rule requires 27 states to significantly improve air quality by reducing power plant emissions that contribute to ozone and/or fine particle pollution in other states. In a separate but related regulatory action, EPA also finalized a supplemental rulemaking in December 2011 to require five states - Iowa, Michigan, Missouri, Oklahoma, and Wisconsin - to make summertime nitrogen oxide (NO_x) reductions under the CSAPR ozone-season control program. With the inclusion of these states, a total of 28 states would be required to reduce ozone-season annual sulfur dioxide emissions, annual NO_x emissions and or ozone season NO_x emissions to assist in attaining the 1997 ozone and fine particle and 2006 fine particle National Ambient Air Quality Standards. On February 7, 2012, EPA issued two sets of minor adjustments to the CSAPR. The adjustments provide flexibility to states by increasing budgets in 17 states (including Oklahoma) and easing limits on market-based compliance options. On Dec. 30, 2011, The United States Court of Appeals for D.C. Circuit issued its ruling to stay the CSAPR pending judicial review. In the schedule for the hearings, the US Court of Appeals stated that the hearings would be wrapped by March 16, 2012. If the schedule extends further, the stay may be lifted.

On August 21, 2012, the U.S. Court of Appeals for the D.C. Circuit vacated Cross State Air Pollution Rule (CSAPR). The ruling leaves CSAPR’s predecessor, the Clean Air Interstate Rule, in place. EPA may request a rehearing and, if denied, appeal to the Supreme Count. However, more likely EPA will reevaluate and using its current modeling, taking into account current state attainment designations, determine a new SIP (State Implementation Plan) call, requesting the states to implement a NO_x budget specific to that state. CAIR was struck down by the courts several years ago but remains in place while a replacement is written.

The uncertainty with this rule and all of the other impending rules Mercury and Toxics Standard,) makes it extremely difficult to plan and build a new coal plant, let alone make plans to implement pollution controls or other compliance methods for existing coal plants. As a result, coal is not considered to be a viable alternative to this project.

4.2 NUCLEAR

It is considered likely that new nuclear power facilities will be constructed in the United States in the next decade, though new capacity would not likely become available until after the 2017 time frame. Nuclear power is a highly capital intensive and complex technology and there is a high cost of uncertainty and risk in building or investing in a new nuclear facility. In addition, it remains uncertain as to whether the political environment would curb or encourage this baseload option. Currently, there are no power purchase opportunities for nuclear power for WFEC nor are any new nuclear facilities being planned in the region.

4.3 RENEWABLE ENERGY SOURCES

WFEC exists for the sole purpose of providing all the energy demanded by its member-owners reliably and at the lowest cost possible. Therefore, absent specific requirements from our members, renewable resources can generally only be incorporated into WFEC's generation mix when they are the lowest cost alternative. Every quarter, WFEC provides its members the opportunity to purchase energy from renewable resources. To date, the demand for renewable resources has been very limited; WFEC has been able to supply this energy through its PPAs with renewable generation resources.

Wind energy has developed rapidly during the past decade due in part to Federal production tax credits and grants. Fuel costs are non-existent and the only costs are the capital costs associated with the initial installation of the equipment, including the transmission lines, and maintenance costs. WFEC is currently purchasing approximately 366 MW produced from four wind farms in Oklahoma.

Solar is a resource similar to wind in that it is intermittent, and requires large land areas and advanced storage technologies to provide an peaking/intermediate resource. However, solar technology is not as advanced and capital costs are higher than wind energy costs. Solar is not a viable alternative for this project.

Biomass is the renewable resource of highest potential in the WFEC service area. Conventional steam-electric generation is capable of using biomass fuels to provide some or all of the energy requirements. WFEC does not intend to design the proposed new generation facility to utilize biomass fuels for a portion of the heating requirements for the following reasons:

- Other existing units in the WFEC system are better suited to biomass co-firing than the proposed unit.

- Availability of biomass fuels is seasonal and subject to frequent interruptions and variability in both quality and quantity.
- The use of biomass fuels is best suited to combustion processes such as circulating fluidized bed or stoker firing. These combustion processes are not typically available above a single unit size of 250 MW, and have a lower efficiency than some other combustion processes.

Hydroelectric resources can be more dependable, but are commonly used to supplement generation when water is available and there is a peak demand. There are several hydroelectric generating sources in Oklahoma operated by the GRDA, the U.S. Army Corps of Engineers, and the Oklahoma Municipal Power Authority. These entities have taken advantage of the limited sites for hydro in the state. Few areas that would offer a suitable location for new hydroelectric facilities remain. WFEC currently has a PPA with Southwest Power Administration (SPA) for 260 MW of hydroelectric power. WFEC has participated in discussions with a developer who wants to develop a large hydroelectric pump storage facility in Oklahoma; prospects for this being completed are low and the costs are high.

In general, renewable technologies hold promise for certain applications and in certain locations; however, the available renewable energy sources are not compatible with the need for this project.

While WFEC pursues renewable resources and utilizes such alternatives when they present an economic resource to serve the system's needs, for the current projected needs of WFEC, renewable energy technologies do not yet provide a reliable generation source for meeting the current needs for the projected capacity requirements of the WFEC system. Renewable energy technologies remain dependent on uncontrollable factors (i.e. the wind and sun) and require relatively large land areas per MW of capacity.

4.4 DISTRIBUTED GENERATION

Fuel cells, micro-turbines, internal combustion engines and battery energy storage systems were briefly considered to meet WFEC's needs. Fuel cells are not currently economical on a commercial electric generation basis. Micro-turbines, while increasingly becoming an element of resource planning strategy, are not cost effective as a primary source of meeting overall customer requirements. Micro-turbines will continue to provide an option for niche power requirements where lack of transmission access, footprint limitations, and low load factor situations exist. Internal combustion engines (i.e. diesels) are used throughout the country for smaller generation needs. A large engine could produce approximately 15 MW of power, which means that over 19 such engines would need to be distributed throughout the service territory to replace the planned centralized generation of Mooreland 4. This source would have the disadvantage of higher fuel prices and greater emissions of some pollutants. For these reasons, none of the distributed generation alternatives are appropriate for WFEC's proposed plant.

4.5 NATURAL GAS

Natural gas-fired generation was evaluated and determined to be the preferred option to satisfy WFEC's immediate need for additional peaking/intermediate capacity. Natural gas-fired generation can be developed by using internal combustion, such as either simple-cycle or combined-cycle combustion turbine technology, or by using external combustion such as direct firing in a boiler.

Direct firing in a boiler was rejected due to the current and projected cost of natural gas. Direct firing technology also does not offer a higher efficiency than other fuels using the same type of process.

Simple-cycle combustion turbine technology offers the lowest capital cost of the natural gas-fired generation alternatives; however, it also has a lower overall efficiency than the combined-cycle alternatives discussed below. Simple-cycle combustion turbine technology is primarily used to meet peak electrical demands.

Combined-cycle plants provide a higher level of efficiency than simple-cycle plants. The basic principle of the combined-cycle plant is to utilize the natural gas to produce power in a gas turbine which can be converted to electric power by a coupled generator; the hot exhaust gases from the gas turbine are then used to produce steam in a Heat Recovery Steam Generator (HRSG) that creates electric power with a coupled steam turbine and generator. The use of both gas and steam turbine cycles in a single plant to produce electricity results in high conversion efficiencies and low pollutant emissions. The gas turbine cycle is one of the most efficient cycles for the conversion of gas fuels to mechanical power or electricity. Modern combined-cycle plants utilizing the steam produced by the HRSG increases the efficiencies up to and, in some cases, exceeding 58 percent. Gas turbine manufacturers are continuing to develop high temperature materials and improved cooling to raise the firing temperature of the turbines and further increase the efficiency. Because of the high efficiency and relatively low capital cost of this type of resource, it is the best alternative to supply WFEC's need for peaking/intermediate capacity.

4.6 REPOWERING/UPRATING OF EXISTING GENERATING UNITS

Repowering and uprating of existing generation units owned or operated by WFEC is not practical or feasible to satisfy the current need for additional capacity. WFEC will be evaluating each operating unit for uprating or repowering for potential additional capacity. There are no repowering or uprating opportunities on the WFEC system that have the potential to both satisfy the current need for this amount of additional capacity and to replace this needed generation in the time frame needed.

4.7 PARTICIPATION IN ANOTHER COMPANY'S GENERATION PROJECT

There are no projects known to WFEC where participation was an option and adequate generating capacity was available.

4.8 PURCHASED POWER

WFEC continuously evaluates the power market for cost effective opportunities to meet the power supply obligations to its members. Historically, WFEC did rely on long-term power purchase contracts as part of its resource mix. However, as wholesale electricity markets have become more deregulated, transmission constraints have increased, and prices have become more volatile, purchase power agreements have become increasingly less viable.

As stated earlier, WFEC's mission is to provide the lowest cost reliable power supply with as much stability as possible to its member owners. WFEC has experienced situations where power supplied under long-term contracts has not been reliable. Furthermore, "long-term" in this market is less than 10 years and costs are high. In 2009 WFEC was able to enter into a PPA with GRDA for a 16 year contract for capacity and energy from the GRDA system resources at a blended energy rate. This PPA term matched up with the timetable of two members potentially leaving WFEC. If additional purchase power options become available, WFEC will evaluate them for economics and potential implementation.

WFEC has and continues to evaluate power markets for opportunities to supplement its generation portfolio. A Request for Proposals was issued in January 2013 to evaluate potential PPAs. Eight responses, including 16 offers were received; however, none of the offers met the requirements of the RFP. Specifically, the offers received were either not a good match for WFEC's capacity and timing needs, or were unable to meet the requirement of having the necessary transmission approvals in place to deliver power to WFEC.

4.9 CAPACITY ALTERNATIVES SUMMARY

As part of its planning to meet the increasing capacity and energy demand on its system, WFEC has evaluated numerous supply alternatives. As a member-owned cooperative with contractual obligations to meet its member's requirements, certain alternates have very limited applicability. There are currently no options (such as renewables, repowering existing units, distributed and central station generation, and load management) in WFEC's service territory that would provide the needed capacity as a reliable and economical alternative to the proposed project. None of the options discussed above can meet the required timeframe for an in-service date of 2017. The alternative that best meets WFEC's growing loads, the required timeframe, and lower costs is a natural gas-fired combined-cycle generating unit.

* * * * *

5.0 ALTERNATIVE SITES SELECTION

This section describes the site selection process that WFEC conducted in determining a proposed location for a new, approximately 300-MW natural gas-based electric generating facility in Oklahoma to meet the needed capacity by 2017.

The primary purpose of the site selection study was to identify a proposed site for locating the new unit. Ultimately, the proposed site will be one that both can accommodate a new, 300-MW natural gas-based generation unit and best meets the following general criteria:

- Satisfies the requirements and guidelines of the RUS
- Minimizes adverse environmental and social impacts
- Possesses the necessary physical attributes such as size and topography
- Provides access to adequate fuel and water supplies, and transmission facilities
- Allows for economical construction and operation of the proposed generating station

The identification and assessment of potential generation site areas for the project were based on the following three steps.

1. Identification and screening of potential sites.
2. Evaluation of alternative sites.
3. Selection of the preferred site.

5.1 IDENTIFICATION AND SCREENING OF POTENTIAL SITES

A Geographic Information System (GIS) analysis was used to indicate the general locations in the WFEC service area in Oklahoma that could be optimal for a natural gas unit location, based on the presence of essential highway transportation access, transmission line resources, natural gas pipeline capacity, and possible surface water resources. WFEC initially identified 17 greenfield siting areas within Oklahoma using GIS-based information, plus a review of multiple maps and other information. Specific areas were then evaluated to determine the positive and negative attributes of developing a natural gas power plant.

Following the initial evaluation, prospective areas were reviewed using aerial maps, United States Geological Survey maps, and an Oklahoma Atlas. Five of the sites were removed due to being within 100 kilometers of a Class 1 area for air quality purposes. Black & Veatch civil engineering /site development staff conducted a desktop exercise of evaluating maps of the remaining 12 sites and identified the 6 sites that had the best apparent map-based opportunities for development of a generation facility, the review at this stage was a search for critical flaws or particular weaknesses in the sites related to such mapped items as terrain characteristics, access, floodplains, and proximity to residential areas. . Two existing WFEC generation sites were added for a total of eight candidate sites (Figure 5-1). A field reconnaissance was made to each of the candidate sites and observations were made to define the land use, terrain characteristics, ecological factors, road access, pipeline crossings, transmission lines, residences, businesses, cultural areas, traffic issues, socio-economic issues, and water ways. The following sections provide brief descriptions of each candidate site...

5.1.1 Mooreland Site

The Mooreland site, located at the existing Mooreland Generating station, was determined to have ample space, existing infrastructure, and access to resources. WFEC owns adequate land for the additional power generation units at the site with available space to the north of the existing plant buildings and north of the rail line as well as additional future space to accommodate up to two additional units. WFEC owns water rights to meet the needs of the existing and new facilities and excess capacity or room for expansion for water discharge arrangements. Fuel for the new unit is available from a WFEC-owned natural gas line. One major benefit for this site is a connection with a new transmission line being constructed by OGE. This transmission connection would provide additional operational flexibility for the existing plant as well as for serving the new unit. The new OGE transmission line is currently proposed to cross the Mooreland site on the northwest side; with an in service date of 2014. No known environmental permitting limitations are expected based upon past studies and existing permits at the site. Road access would be from U.S. Highway 412.

5.1.2 Hugo Site

The Hugo site, also located at an existing operating facility (Hugo Generating Station), has excess space, existing water and power transmission infrastructure, and easy access. The Hugo site was established to potentially accommodate multiple coal units, but only Unit 1 has been built. As a result, adequate land for building the additional power generation unit and sufficient water rights are available. Access to the site would be from an existing access road on the east side of the facility via U.S. Highway 70. One concern with the site is the 40-mile distance to a major natural gas pipeline and the extension would constitute a single source gas pipeline system. Construction of this new gas pipeline could present permitting obstacles at considerable cost. In addition, development of a natural gas facility could potentially complicate air permitting already completed for a proposed new coal unit or any future coal-fired units at the site.

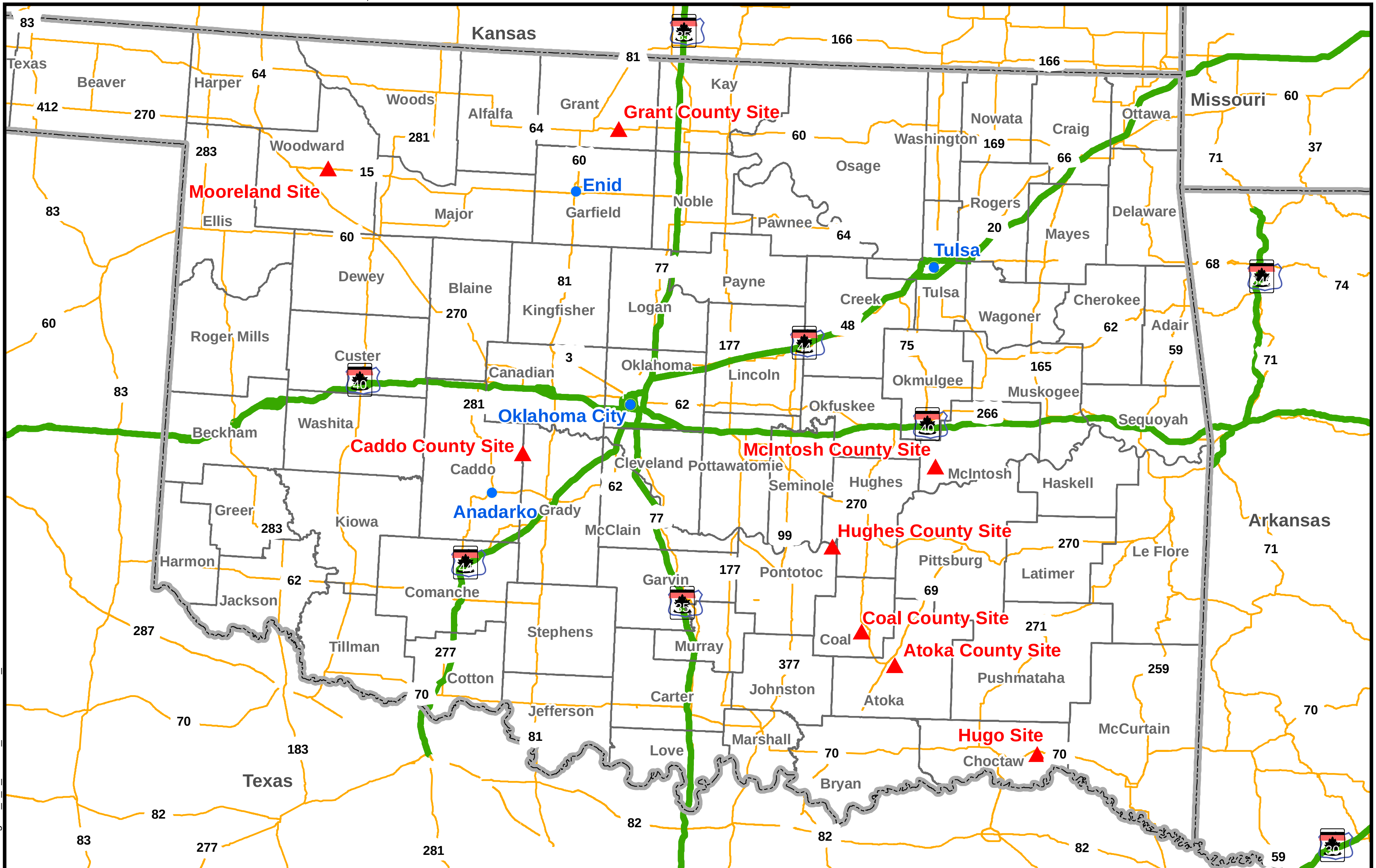


Figure 5-1
Candidate Sites Location

Western Farmers
Electric Cooperative

LEGEND

- Candidate Sites Location
- State Boundaries
- County Boundaries
- Cities
- U.S. Highway
- Interstate Highway

0 20 40
Miles

Burns & McDonnell
SINCE 1898

Source: ESRI & Burns & McDonnell

V:\WFEC\56880\GIS\DataFiles\ArcDocs\Figure_6_1_WFEC_Canidate Site_Locations.mxd Date Saved: 9/14/2011

5.1.3 Atoka County Site

This site is located in southeastern Oklahoma, approximately 55 miles northwest of the Hugo site near Atoka Oklahoma. The Atoka Reservoir provides a potential surface water source for the water needs of the new unit. The site is accessible via U.S. Highway 69. A proposed natural gas pipeline is located nearby, but may not be available for use at the time needed. Transmission lines are also located nearby to the east. The general terrain is slightly rolling ranch land.

5.1.4 Coal County Site

Coal County is located in southeastern Oklahoma and adjacent to Atoka County. The site is located approximate one mile southwest of Coalgate, Oklahoma and approximately 12 miles northwest of the Atoka site. Major roads in the area include State Highway 31 and State Highway 3; however, access to the site is partially by dirt roads with apparent oil/gas field traffic in the area. The terrain is relatively flat. Surface water was not located in the area and groundwater use appeared to be limited, based on the isolated water supply stations used for fuel development activities in the area. A proposed natural gas pipeline is located nearby, but may not be available for use at the time needed. Transmission lines are also located nearby to the west.

5.1.5 Hughes County Site

The Hughes County site is located approximately 26 miles north of the Coal County site, near Allen, Oklahoma, which is about 75 miles southeast of Oklahoma City and about 50 miles south of Interstate 40. Many flat, large fields were observed near transmission lines and a gas pipeline. Some field irrigation pivots were noted in the area; indicating groundwater supply potential. Nearest surface water was Lake Holdenville (10 miles north) and Lake Konawa (17 miles west).

5.1.6 Caddo County Site

The Caddo County site is about 15 miles northeast of Anadarko, near the Caddo and Grady County line. Some challenges with terrain, water quality, water discharge, and limited current road access are associated with this site. The site area is approximately 6 miles south of State Highway 37 via N2750 Road. The terrain in the area has many rock outcroppings. Nearest surface water is Lake Chickasha which has known water quality issues making surface water potential limited. A transmission line crosses the area from southwest to northeast and a gas pipeline crosses the area from southeast to northwest.

5.1.7 McIntosh County Site

The McIntosh County site is located near Hanna, Oklahoma, just off the Indian Nation Turnpike, and about 90 miles north of Hugo and 12 miles south of Interstate 40. The surrounding area consists of large flat ranch areas with generally rolling terrain. A proposed gas pipeline for this area may not be available to WFEC at the time needed. Field irrigation pivots were observed in the area indicating a potential groundwater supply, but surface water sources did not appear promising. The nearest surface water is Eufaula Reservoir, approximately 12 miles east of the site.

5.1.8 Grant County Site

The Grant County site, near Lamont, Oklahoma, is located about 15 miles west of Interstate 35, 23 miles south of the Kansas border, and about 20 miles northeast of Enid, Oklahoma. Access to the area is via State Highway 79 or U.S. Highway 60. The area is at the intersection of a pipeline and transmission line, and is fairly flat, with agricultural fields along dirt roads. Water drainage problems from locally heavy rains and surface water supply are potential issues. There are no major surface waters near the area.

5.2 EVALUATION OF ALTERNATIVE SITES

A scoring system was utilized to evaluate and rank the candidate sites. This system evaluated the siting categories considered important for site selection and the categories were divided into two groups; environmental and technical. These two groups were each assigned a total percentage weight of 50 percent in the base case scoring system. The environmental and technical scoring groups were further divided into categories. To account for the different levels of concern, a weight was assigned to each category to reflect the priority it would be given during the site evaluation process. If weighting factors were not applied, all categories would be assumed to have the same level of importance in the evaluation process. Although all categories need to be considered during the siting process because they have the capacity to influence potentially affected resources, design, and cost, certain categories have the capacity to influence the project in a greater manner. Therefore, all categories are not equal in terms of importance to the project, and thus were not weighted equally. The associated percentage weights of these categories are listed in Table 5-1.

The siting categories were further divided into specific factors and applied to all the sites. The associated percentage weights of these factors are listed in Table 5-2. A weighting system was also applied to the factors to assign a relative level of importance within the category. Each site was then evaluated for each category by assigning a score (1 to 10), based on criteria established for each factor (1 being the worst and 10 the best). Each score was then multiplied by the category's percentage weight and summed to determine a total score. The maximum possible weighted total score was 10.0. The candidate sites were then ranked based on the overall scores and the highest scoring area received a score of 8.46 (Table 5-3).

Table 5-1 Siting Categories

Environmental (50%)				Technical (50%)	
Siting Category	**%**	**Siting Category**	**%**	**Siting Category**	**%**
Air Quality	15	Socioeconomic	6	Water Resources	15
Land Use	11	Site Ecology	5	Natural Gas System	15
Environmental Linear Facilities	8	Visual Impacts	3	Transmission System	15
		Cultural Resources	2	Site Cost Differential	5

Because other possible weighting options for the technical and environmental factors could be reasonable, a sensitivity assessment was done to identify those sites ranked highest over a range of various weightings. Two additional scoring systems were applied:

- A 30 percent weighting for environmental criteria and a 70 percent weighting for technical criteria
- A 70 percent weighting for environmental criteria and a 30 percent weighting for technical criteria

The principal purpose of conducting the sensitivity assessment was to identify the relative strengths and weaknesses of the sites by noting any changes in site rankings for the different weighting cases. Sites that are relatively good environmentally will rank higher for the case that emphasizes the environmental scores, while sites that have relatively smaller differential site development or technical factors will rank higher in the case that emphasizes the technical scores. Sites that have no or few environmental problems and that have relatively lower differential site development costs will rank high for all sensitivity cases. If the top few ranked sites maintain those positions for the base and all sensitivity analyses, then those sites represent the most suitable candidate sites regardless of whether the emphasis is on environmental or technical factors. If the top ranked sites significantly change positions during the sensitivity analyses, the relative weighting between the technical factors and environmental concerns become important in the selection of candidate sites. In that event, the most important factors will be determined on the basis of project team judgments with regard to preliminary estimates of differential project costs and development schedules. Each site-specific characteristic can influence the total site development of a proposed power generation facility. As noted in Table 5-4, the different weighting systems did not have a major impact on the ranking of the highest scoring areas.

Table 5-2 Environmental and Technical Weight Factors

Environmental Factors			
Air Quality (15%)		**Environmental Linear Facilities (8%)**	
Air permitability	15	Routing of new transmission lines	3
Land Use (11%)		Routing of new gas line	5
Proximity to residential development	2	**Ecology (5%)**	
Displacement of residences	2	Terrestrial-endangered species	1
Impact on agricultural areas	1	Terrestrial-habitat quality	1
Land use compatibility	1	Aquatic – wetlands	1
Site ownership	1	Aquatic – endangered species	1
Number of landowners	2	Aquatic – habitat quality	1
Floodplains	1	**Visual Impacts (3%)**	1
Proximity to airports	1	Visibility from scenic, recreational or cultural areas	1
Socioeconomic (6%)	**%**	Visibility from urban areas	1
Noise impacts	2	Visibility from highways or roads	1
Impact of Project traffic	1	**Cultural Resources (2%)**	
Impact on sensitive areas	1	Archaeological or historic resources	1
Environmental justice	2	Sensitive buildings	1
Technical Factors			
Water Resources (15%)	**%**	**Transmission Lines Access (15%)**	
Availability of sufficient surface water	8	Interstate transmission system access	15
Availability of gray water or alternative water supply	2	**Site Costs (5%)**	
Sufficiency of receiving stream	5	Differential site development costs	5
Natural Gas System (15%)			
Availability of natural gas pipeline	15		

Table 5-3 Candidate Site Scoring

Evaluation Criteria	Weighting Factor, %								
Parcel ID Numbers		Mooreland Woodward County	Hugo Choctaw County	#4 Atoka County	#5 Coal County	#7 Hughes County	#9 Caddo County	#12 McIntosh County	#16 Grant County
Environmental Criteria (Total weight = 50%)									
1.0 Socioeconomic (6%)									
1.1 Noise impacts	2	4	8	8	8	8	6	8	8
1.2 Impact of project traffic	1	10	10	1	1	1	1	5	1
1.3 Impact of sensitive areas	1	10	10	10	10	10	10	10	10
1.4 Environmental Justice	2	10	10	10	10	10	10	10	10
Weighted Group Total - Percent	6	0.48	0.56	0.47	0.47	0.47	0.43	0.51	0.47
2.0 Land Use (11%)									
2.1 Proximity to residential development	2	7	7	10	10	10	10	10	10
2.2 Displacement of residences	2	10	10	10	10	10	10	10	10
2.3 Impact on agricultural areas	1	10	10	5	10	5	5	5	5
2.4 Land use compatibility	1	10	10	8	10	8	8	8	8
2.5 Site Ownership	1	10	10	5	5	5	5	5	5
2.6 Number of landowners	2	10	10	5	5	5	5	5	5
2.7 Floodplains	1	10	10	10	10	10	10	10	5
2.8 Proximity to airports	1	5	10	10	10	10	10	10	5
Weighted Group Total - Percent	11	0.99	1.04	0.88	0.95	0.88	0.88	0.88	0.78
3.0 Visual Impacts (3%)									
3.1 Visibility from scenic, recreational, or cultural ar	1	10	7	10	10	10	10	10	10
3.2 Visibility from urban areas	1	3	3	10	10	10	10	10	10
3.3 Visibility from highways or roads	1	2	2	5	5	7	7	7	10
Weighted Group Total - Percent	3	0.15	0.12	0.25	0.25	0.27	0.27	0.27	0.30
4.0 Air Quality (15%)									
4.1 Air Permitability	15	10	8	10	10	10	10	10	10
Weighted Group Total - Percent	15	1.50	1.20	1.50	1.50	1.50	1.50	1.50	1.50
5.0 Ecology (5%)									
5.1 Terrestrial - endangered species	1	10	5	5	5	5	10	5	10
5.2 Terrestrial - habitat quality	1	7	7	7	7	7	7	7	7
5.3 Aquatic - wetlands	1	10	6	10	10	10	10	10	10
5.4 Aquatic - Endangered Species	1	10	10	10	10	10	10	10	10
5.5 Aquatic - Habitat Quality	1	10	10	10	10	10	10	10	10
Weighted Group Total - Percent	5	0.47	0.38	0.42	0.42	0.42	0.47	0.42	0.47
6.0 Cultural Resources (2%)									
6.1 Archaeological or historic resources	1	10	10	10	10	10	10	10	10
6.2 Sensitive buildings	1	5	5	10	10	10	10	10	10
Weighted Group Total - Percent	2	0.15	0.15	0.20	0.20	0.20	0.20	0.20	0.20
7.0 Environmental Linear Facilities (8%)									
7.1 Routing of new transmission lines	3	10	10	10	10	10	10	10	10
7.2 Routing of new natural gas line	5	10	7	7	10	10	7	7	7
Weighted Group Total - Percent	8	0.80	0.65	0.65	0.80	0.80	0.65	0.65	0.65
Weighted Environmental Total	5	**4.54**	**4.10**	**4.37**	**4.59**	**4.54**	**4.40**	**4.43**	**4.37**
Technical Criteria (Total weight = 50%)		Mooreland	Hugo	Atoka	Coal	Hughes	Caddo	McIntosh	Grant
8.0 Water Resources (15%)									
8.1 Availability of sufficient water	8	10	10	5	1	5	5	5	5
8.2 Availability of Gray Water for Plant Water Supply	2	1	1	1	1	1	1	1	1
8.3 Sufficiency of receiving stream	5	10	10	5	5	5	1	5	5
Weighted Group Total - Percent	15	1.32	1.32	0.67	0.35	0.67	0.47	0.67	0.67
9.0 Natural Gas System (15%)									
9.1 Availability of gas pipeline	15	10	1	5	7	7	5	3	5
Weighted Group Total - Percent	15	1.50	0.15	0.75	1.05	1.05	0.75	0.45	0.75
10.0 Transmission Lines access (15%)									
10.1 Cost of transmission system upgrade	15	4	10	7	7	7	7	7	7
Weighted Group Total - Percent	15	0.60	1.50	1.05	1.05	1.05	1.05	1.05	1.05
11.0 Site Cost (5%)									
11.1 Differential site development cost	5	10	5	9	10	8	6	8	10
Weighted Group Total - Percent	5	0.50	0.24	0.47	0.48	0.38	0.30	0.42	0.48
Weighted Technical Total	5	3.92	3.21	2.94	2.93	3.15	2.57	2.59	2.95
Weighted Total for Base Case (50/50)		8.46	7.31	7.31	7.52	7.69	6.97	7.02	7.32

Table 5-4 Sensitivity Evaluation

Candidate Site	50/50 Score	Rank	30/70 Score	Rank	70/30 Score	Rank
Mooreland	8.46	1	8.21	1	8.71	1
#7 Hughes County	7.69	2	7.13	2	8.25	2
#5 Coal County	7.52	3	6.86	4	8.18	3
#16 Grant County	7.32	4	6.08	8	7.89	4
#4 Atoka County	7.31	5	6.74	5	7.88	5
Hugo	7.31	6	6.95	3	7.67	6
#12 McIntosh County	7.02	7	6.28	6	7.76	7
#9 Caddo County	6.97	8	6.24	7	7.70	8

5.3 SELECTION OF PREFERRED SITE

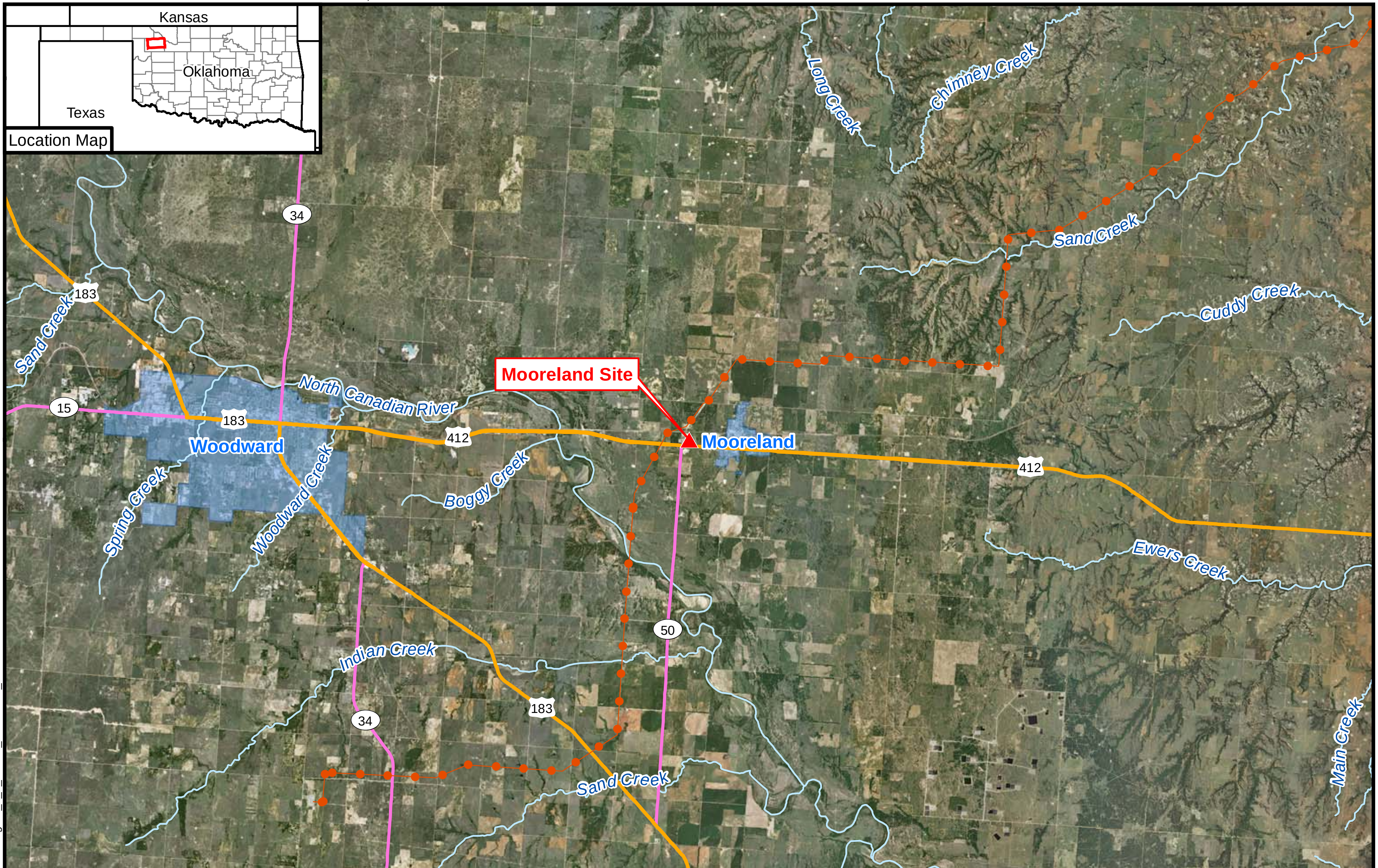
In summary, the existing Mooreland facility received the highest overall score because it was an existing facility providing existing infrastructure, and the site was well known and well characterized. However, the site needs a new extension transmission line. This site is considered to be the preferred site.

5.4 SITE DESCRIPTION

The Mooreland Site is located in Woodward County, Oklahoma, and located 1.2 miles west of Mooreland, Oklahoma, to the north of U.S. Highway 412. Access to the plant is from N2120 Road. The Mooreland site is located approximately 75 miles west of Enid, 9 miles east of Woodward, and 40 miles southwest of Alva, Oklahoma (Figure 5-2). The area surrounding the plant is primarily commercial to the east and southwest and agricultural with sparse residential use to the north, south, and west.

5.5 PROJECT DESCRIPTION

Design of the project has not been completed. The following sections generically describe the major components of the proposed electric generating facility, the proposed air quality emission controls, transmission requirements, fuel use and waste disposal, water supply and wastewater disposal, the operating characteristics of the proposed unit, the expected noise levels construction and operation, and transportation system to be utilized during construction and operation. The project schedule, project costs and employment requirements are also presented.



LEGEND

- Mooreland Site Location
- Proposed OG&E Woodward - Thistle Route
- Municipal Boundaries
- U.S. Highways
- Major Roads
- Streams

N

0 1.5 3
Miles

Burns & McDonnell
SINCE 1898

Figure 5-2
Mooreland Site Location

Western Farmers
Electric Cooperative

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Source: ESRI & Burns & McDonnell

5.5.1 Facility Equipment and Layout

The project's major components will include an F class gas turbine, HRSG, steam turbine generator, and cooling tower. This is a modern combined cycle plant design that will use the most recent commercially available gas turbine, HRSG, steam turbine generator, and cooling tower technology.

The unit will be designed to burn pipeline-quality natural gas from the same supply currently supplying the Mooreland Generating Station (MGS). A new separate fuel yard will be constructed on the north boundary of the plant site to supply the new unit. The new fuel yard will include installations of new gas compressors to bring the operating pressure to that necessary for an F-class turbine.

The gas turbine will burn the natural gas to convert the thermal energy from combustion into mechanical energy to drive an electric generator. Waste heat from the gas turbine exhaust will flow into the HRSG to produce steam. Superheated steam at design pressure and temperature from the HRSG superheater outlet enters the high pressure steam turbine. Steam exiting the high-pressure steam turbine section will be reheated in the HRSG and returned to the intermediate and low pressure sections of the steam turbine for improved cycle efficiency. Steam flows through the steam turbine, converting steam pressure and temperature energy to mechanical energy and turning the generator to produce electricity. When the steam reaches the lowest practical pressure (i.e., significantly below atmospheric pressure, which results in higher cycle efficiency), it leaves the steam turbine and enters the condenser. The condenser removes heat from the exhaust steam and condenses it for return to the condensate system. Heat entering the condenser will be transferred through the condenser tubes into the circulating water system, which will be returned to the mechanical draft wet cooling tower where the heat is transferred to the atmosphere.

After the steam is condensed, condensate pumps and boiler feedwater pumps will return the water to the HRSG through high and low pressure economizers.

Makeup water will be required because water and steam will be lost in the HRSG, turbine, cooling tower and other equipment and systems. The makeup water will be delivered to the plant site by the current well water system and treated on site using softening, reverse osmosis, and demineralizer systems.

The location of the equipment on the proposed project site is presented in Figure 5-3.

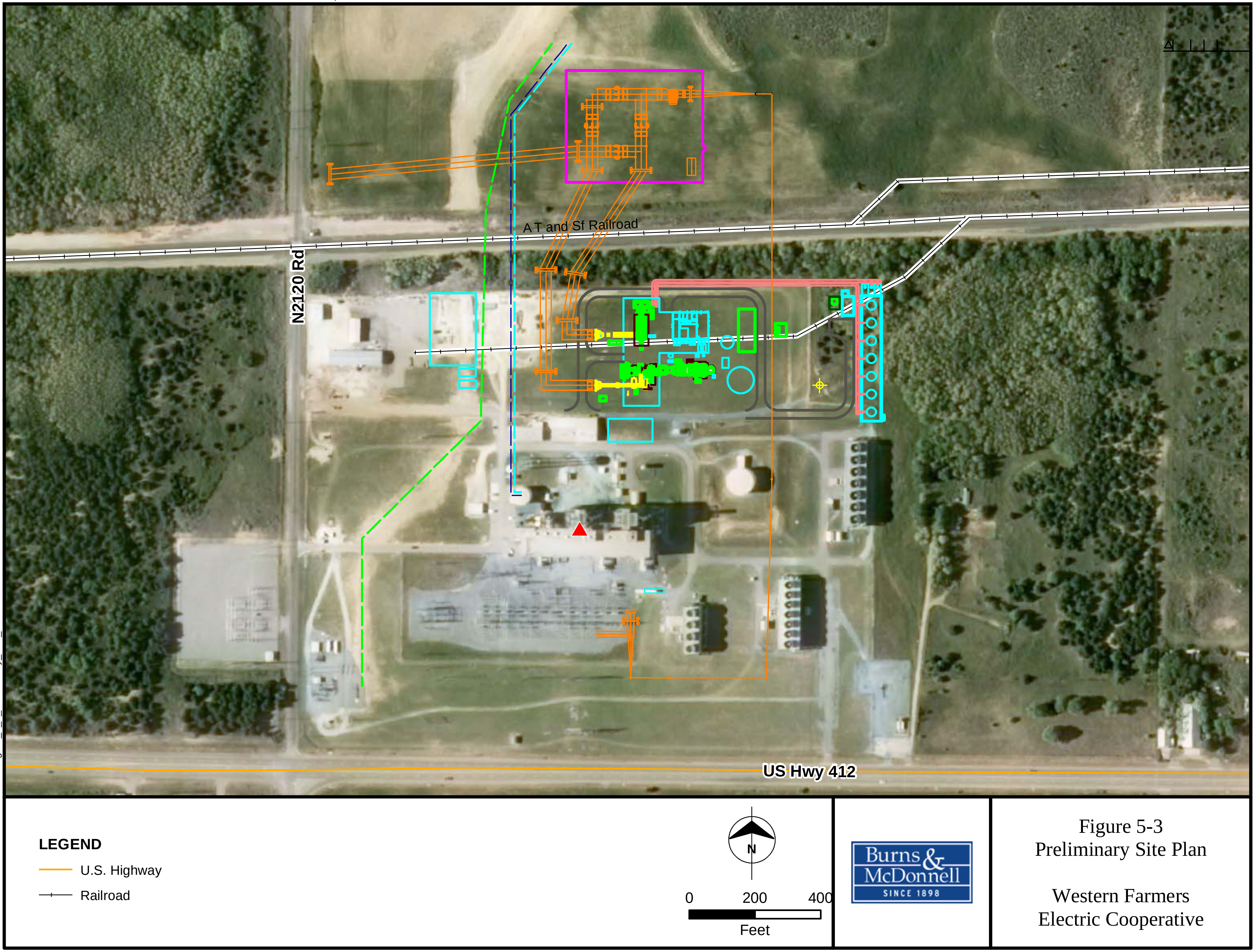

Figure 5-3
Preliminary Site Plan

Western Farmers
Electric Cooperative

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Source: ESRI & Burns & McDonnell

5.5.2 Emissions Controls

The following combination of air quality control technologies form the basis of the project preliminary plant design:

1. Gas turbine using Dry Low NO_x burners.
2. Selective catalytic reduction for further NO_x reduction with 5 parts per million ammonia slip.
3. Potential carbon monoxide (CO) catalytic reduction for further CO reduction.
4. Inlet air filters to control particulate matter (particles less than 10 micrometers in diameter) level at the exhaust.
5. Inherent low sulfur fuel in natural gas at 1 grain/100 standard cubic feet.

A monitoring system for airborne emissions will be installed in the stack. This system will be a Continuous Emissions Monitoring System as required pursuant to 40 Code of Federal Regulations (CFR), Parts 60 and 75, Transmission Requirements.

The project gas turbine generator and steam turbine generator output will be connected through generator step-up transformers to a new 345-kV substation/switchyard located north of the Burlington Northern Santa Fe railroad tracks, north of the plant site. A new OGE 345-kV transmission line will connect the new substation to an existing 345-kV grid. The new substation/switchyard will also transform voltage and interconnect with the existing MGS 138-kV switchyard for connection to the 138-kV grid.

The project startup source will be provided through auxiliary transformers for the unit connected to the new substation/switchyard. The auxiliary transformers will be supplied as two winding transformers with 4.16 kV on the low side winding. The 4.16-kV system will be used for all motors 251 horsepower and larger. There will also be a backup 4.16-kV supply interconnection directly from the existing MGS system to the new project system.

5.5.3 Fuel

Natural gas will be the fuel for the new unit. WFEC owns and operates a 110 mile 16-inch natural gas pipeline between the Mooreland Plant and the Anadarko Plant. This pipeline has interconnections with eight (8) intrastate or interstate gas pipelines which gives a flexibility of sources for our fuel. ACES Power Marketing performs the acquisition for our natural gas and uses a mixture of long term, short term and daily gas purchases to provide for the daily gas requirements of all of WFEC’s natural gas fired generation. There is a current fuel yard at the southwest corner of the site, which supplies gas to the three existing MGS units. However, since the new unit will be on the north end of the site, a long run of natural gas pipeline would need to be routed to the new unit. Moreover, the current fuel gas equipment does not have enough capacity to support the new unit. Therefore, a new fuel yard with new fuel gas equipment will be constructed near the new unit and tied in directly to the new 16-inch pipeline. The project will require significantly higher fuel gas pressure compared to the three existing natural gas-fired boilers, so gas compressors will be added to boost the gas pressure. An electric fuel gas heater will be furnished to heat the fuel gas above dew point during startup. Fuel gas conditioning equipment, such as fuel gas filter/separator, will also be used.

5.5.4 Water Supply and Wastewater Disposal

The primary source of raw water will be supplied from the onsite and offsite well system and piping network already in place. In addition to the current wells, it is anticipated that three new wells will be added offsite. Another 7,000 feet of new 18-inch polyvinyl chloride pipeline parallel to the current main header will be added to offset friction loss due to increased peak water flow. Interconnections will also be added between the new line and current header to allow portions to be isolated for repair and maintenance.

The well water is then directed to the existing pretreatment facilities. Well water will be chlorinated before transferring to the new raw water storage tank for cooling tower makeup and service water. Service water is used for utility hoses around the plants and supply to the cycle makeup treatment system.

Potable-quality water for drinking fountains, washrooms, showers, and toilet facilities will also be supplied from the well water. Well water will be treated adequately before being supplied to the potable water users.

A cycle makeup treatment system will be installed to provide high purity makeup to the steam-condensate-feedwater cycle. The cycle makeup treatment system capacity will be designed to provide makeup at a rate equal to 2 percent of the steaming rate plus evaporative cooler usage. This system will consist of two x 100 percent capacity reverse osmosis trains followed by two x 100 percent capacity mixed bed ion exchange polishers. Demineralized water will be stored in a 250,000 gallon Demineralized Water Storage Tank.

A new fire protection header will be added to supply the new fire water demand for the project. A new electric motor driven pump will be added to complement the current diesel generator fire pump, located near the existing Fire/Service Water Tank. The current diesel fire pump has a capacity of 2,500 gallons per minute and 125 pounds per square inch gauge. Fire protection water will come from the existing 700,000 gallon Fire/Service Water Tank.

Cooling tower blowdown will be discharged to the North Canadian River via a new weir structure and tied into the current wastewater line. The wastewater will likely require dechlorination before discharge.

Process blowdown from the HRSG drums will be directed to a blowdown tank, which will then be quenched and sent to cooling tower basin. The blowdown tank will also be designed to receive drains from the steam piping and valves and HRSG drains.

Water collected from floor drains and containment areas around equipment, that may contain small amounts of oil, will be directed through a new oil/water separator. The water discharged from the oil/water separator will be returned to the cooling tower makeup line. Sample drains and lab drains will be returned to a neutralization tank.

Storm water runoff from non-process equipment areas, such as parking lots and building roofs, will be discharged through natural drainage.

Sanitary waste from showers, wash basins, and toilet facilities, will be collected and discharged to a new septic system near the proposed site for the new unit.

5.5.5 Operating Characteristics

The project is expected to be operated at intermediate load with turndown at night and on weekends. Daily on/off cycling of the plant is anticipated during the months of March, April, May, September, October, and November.

During the summer months, the plant is anticipated to operate at maximum for 16 hours (this 16 hours includes both full unfired capability and duct fired capability depending on the needs of that day) during the day, and turned down to minimum load at night for the remaining 8 hours, with all routine start-up and shutdown operations being executed from a central control room via a distributed control system.

Plant automation will be designed for secure and safe operation of all equipment. Maintenance support will be supplied by on-site staff as required for routine maintenance activities and will be shared with other MGS units. Maintenance support for major shutdown work (gas turbine and steam turbine overhauls, etc.) is expected to be contracted.

The project will share operational and maintenance staff with the three other units at MGS. The existing staff will be expanded by 9 people to accommodate the new unit addition. By sharing staff, both units will benefit from added flexibility and will be able to operate with fewer on-site staff per unit.

The plant is expected to typically operate at an intermediate load with a 70 percent capacity factor, during the summer peak period it is expected that duct firing would be used 4-6 hours per day 5 or 6 days per week; in other periods of the year duct firing could be expected to be used to serve members needs and chase wind up to 10 hours per week. Plant operations are monitored for staff safety, meeting environmental requirements, and providing reliable and efficient operations while striving to achieve power output objectives, limiting emissions, and minimizing fuel and other consumables.

5.5.6 Transportation

Existing roads will be used for construction access to the site. No upgrades to off-site roads are anticipated. Construction traffic will include all craft labor, construction management staff, contractors, contractor equipment, vendors, and material and equipment deliveries. In addition to road vehicular traffic, the existing rail facilities will be utilized occasionally for delivery of large equipment. The frequency of the daily auto traffic will be proportionate to on-site labor projections.

In addition to the normal vehicle auto traffic, deliveries of construction materials can average between 15 and 25 large trucks a day. Special deliveries, for such items as structural steel and concrete, may occasionally exceed 50 deliveries on a given day. However, truck deliveries during the day under normal conditions should not coincide with the early morning or late afternoon labor vehicle traffic.

Traffic impacts associated with the additional site construction traffic will most likely occur around the starting and quitting times of the construction craft labor when vehicle traffic will be at its peak. The amount of added traffic will also be dependent on the phase of construction. It will start moderately and continue to increase until the peak period of construction. Additional traffic caused by material deliveries will be of lesser impact as they are typically intermittently spread throughout the day. There will be exceptions when truck traffic will significantly increase for a given day due to a special construction process. Permits and/or fees may be required for new driveways or access roads off of county roads, impacts to arterial roads, and for upgrading portions of county road rock-gravel to pavement. The Oklahoma Department of Transportation will be contacted for guidance on the permits, fees, and upgrades for the local roads.

5.5.7 Project Cost, Permits, and Schedule

The current capital cost estimate during construction is approximately $571 million. The initial project engineering will occur in 2014 and procurement and construction would span from February 2015 to March 2017. The estimated commercial operation date is March 2017. Table 5-5 reflects the major milestones for the project. A list of potential permits, approval, and authorizing actions for the project are shown in Table 5-6.

Table 5-5 Project Milestones

Activity	Date
Engineering/Procurement	
Engineering, Procurement and Construction (EPC) Bid Issue	June 2013
Award EPC Contract	February 2014
Construction Period – 24 Months	
Start Construction	February 2015
Start Major Equipment Erection	July 2015
Start BOP Mechanical and Electrical Construction	November 2015
Energize Startup Power/Startup Commissioning	Jun 2016
Commercial Operation	March 2017

5.5.8 Project Work Elements

The following sequence provides the anticipated order of construction:

- site preparation
- underground utilities installation
- start foundation installation
- start building steel erection
- start boiler erection
- start air quality control equipment erection
- start turbine erection
- start balance of plant mechanical erection
- start electrical construction
- perform plant startup and initial operation activities
- commercial operation

The construction activities will be sequenced according to an overall project schedule.

Table 5-6 Federal, State, Local Permits, Approvals, and Authorizing Actions

ISSUING AGENCY	PERMIT/APPROVAL NAME	NATURE OF PERMIT	AUTHORITY
Federal Government			
Federal Aviation Administration	Notice of Proposed Construction or Alteration	Structure location and height relative to air traffic corridors	49 United States Code (USC) 1501; 13 CFR §77, Objects affecting navigable air space
U.S. Environmental Protection Agency	Title IV Acid Rain Permit	This permit requires monitoring and reporting so as to comply with sulfur dioxide allowances	40 CFR §72
U.S. Army Corps of Engineers	Section 404 Permit (Clean Water Act) Nationwide Permit/Individual Permit	Controls discharge of dredged or fill materials in wetlands and other waters of the United States	Section 404 of the Clean Water Act (33 CFR §323.1)
U.S. Fish and Wildlife Service	Threatened and Endangered Species Clearance	Clearance from the agency that federally listed protected species and/or their habitat will not be impacted	Endangered Species Act (16 USC §1531 et seq.)
State Government			
Oklahoma Department of Environmental Quality (ODEQ)	Wetland or Dredge and Fill Approval (Section 401 Water Quality Certification)	Review of potential adverse water quality impacts potentially associated with discharges of dredged or fill materials in wetlands and other waters of the United States	Section 401 of the Clean Water Act
ODEQ	Oklahoma Pollutant Discharge System (OPDES) Storm Water Discharges associated with Construction Activities	Apply for coverage under General Permit to authorize storm water discharges to Oklahoma surface waters associated with the construction of the Project	Section 402 of the Clean Water Act
ODEQ	OPDES Storm Water Discharges associated with Facility Operation and Stormwater Pollution Prevention Plan	Apply for coverage under General Permit to authorize stormwater discharges to Oklahoma surface waters associated with the operation of the Project	Section 402 of the Clean Water Act
ODEQ	OPDES Oklahoma State	Apply for coverage under Individual	Section 402 of the Clean

ISSUING AGENCY	PERMIT/APPROVAL NAME	NATURE OF PERMIT	AUTHORITY
	Construction and Operating Permit	Permit to authorize construction of treatment works and industrial and storm water discharges to Oklahoma surface waters associated with the Project	Water Act
ODEQ	General Wastewater Discharge Permit for Hydrostatic Test Projects No. OKG270000	Permit for discharging waters associated with hydrostatic testing of pipelines and storage tanks	Section 402 of the Clean Water Act
ODEQ	Prevention of Significant Deterioration (PSD) Permit	Permit to construct, install and operate a major emission source in Oklahoma. Typically consist of Best Achievable Control Technology, Air Dispersion Analysis, and Air Quality Related Values Analysis.	40 CFR §52.21
ODEQ	Title V Operating Permit	Permit for operation of major equipment or major facilities that may directly or indirectly cause or contribute to air pollution	
Oklahoma Department of Wildlife Conservation	Threatened & Endangered Species Clearance	Clearance from the agency that state-listed protected species and/or their habitat will not be impacted by the project	State Endangered Species Program
Oklahoma Historical Society State Historic Preservation Office	Section 106 of the National Historic Preservation Act Consultation with Tribal Historic Preservation Officer	Consult with project applicants and state agencies regarding impacts on cultural resources that are either listed or eligible for listing on the National Register of Historic Places	National Historic Preservation Act
Local Government			
Woodward County	Building Permit Transportation Fee	Permit to construction buildings Fee for impacts to arterial roads	To Be Determined

5.5.9 Employment

Based on similar type projects, the construction force will consist of mostly pipefitters, electricians, iron workers, and carpenters. A maximum of 200 to 225 people could be working during the peak construction period at the facility. All construction activity is expected to be completed within 24 months. The operational staff will be an additional 9 (as stated earlier in this report) employees beyond that currently employed at the Mooreland Generating Station.

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