

Application of Wisconsin Electric Power Company, as an Electric and Steam Heating Public Utility, for Authority to Convert Valley Power Plant to Use Natural Gas for Fuel. Valley Power Plant is Located in the City and County of Milwaukee, Wisconsin

I. Introduction

Pursuant to §196.49, Wis. Stats., and § PSC 112 and § PSC 140, Wis. Adm. Code, Wisconsin Electric Power Company, D/B/A We Energies, (“Wisconsin Electric” or “the Company”) requests authorization to make all necessary modifications at its Valley Power Plant (“Valley”) to facilitate the use of natural gas as its fuel source (“Valley Gas Conversion Project” or “Project”).

Valley, located at 1035 West Canal Street, Milwaukee, Wisconsin, is a cogeneration facility providing electricity to the grid and steam heat to nearly 450 customers in Downtown Milwaukee, among which are some of the city’s most prominent companies and institutions.

Valley is a pulverized coal fired facility with four boilers supplying two turbine generators capable of producing 140 MW (Net Summer Rating) each and up to 1.25M lbs. of steam per hour.

II. Reason for the Project

Wisconsin Electric proposes to convert Valley from coal as the fuel source to natural gas. This Project will reduce the costs attributable to the electric utility while minimally increasing the costs to the steam utility.

Valley is a coal fired cogeneration power plant that provides electrical energy to the electric transmission grid and is the sole source of steam for the Downtown Milwaukee Steam System. Over the past 15 years Valley has implemented multiple environmental upgrades which have significantly reduced emissions at the plant. Valley currently operates within all state and federal requirements. The Company anticipates that future air quality regulations will require additional environmental controls to be added to the plant if coal continues as the fuel source. Alternatives to additional controls include converting the plant to burn natural gas, or retirement. The most likely scenario would be the conversion to natural gas. In the past, absent environmental drivers, it has been more economical to retain Valley as a coal fired facility. As a result of the shift in the economics of coal and gas, it is economic to convert Valley to natural gas at this time.

As a coal-fired power plant, Valley is subject to various federal environmental regulations, some of which will become more stringent over the next few years. In particular, the federal Mercury and Air Toxics Standards Rule for Power Plants (MATS)¹ has a compliance deadline of April 16, 2015, subject to the permitting authorities’ discretion to grant up to a one year extension. In addition, the 1-hour National Ambient Air Quality Standard (“NAAQS”) for sulfur dioxide (SO₂) will likely require that Valley reduce its SO₂ emissions. While the exact compliance date for the SO₂ NAAQS is not certain, EPA’s initial implementation schedule would have required compliance with the NAAQS standard at Valley in 2017. The compliance

¹MATS is officially, the federal National Emission Standards for Hazardous Air Pollutants (NESHAP) from Coal and Oil-Fired Electric Utility Steam Generating Units (EGU), 40 CFR Part 63, Subpart UUUUU (EGU NESHAP)

date, however, will now be extended while EPA undertakes rulemaking on SO₂ NAAQS implementation. Wisconsin Electric believes it is unlikely that EPA will grant waivers to provide sources with additional time to comply with the emission reductions required to meet the SO₂ NAAQS - particularly since the standard has been in place since 2010. In addition, EPA revisions to the existing ozone standard are anticipated, which would likely require further reductions in NO_x emissions from Valley.

III. Description of the Project

The Valley Gas Conversion Project consists of the removal, installation and modification of fuel burning equipment which will allow natural gas to replace coal as the fuel for the boilers. It will also include the removal, installation and modification of plant auxiliary systems which will allow the plant to reliably supply steam to the Downtown Milwaukee Steam System while operating at significantly reduced electrical output. This will substantially reduce the uneconomic dispatch cost associated with the operation of Valley.

The Valley Gas Conversion Project will include the removal of the eight coal burners and the installation of six to eight natural gas burners for each of the four Valley boilers, installation of the associated natural gas piping and valves internal to the plant, and piping and valves between the plant and the Wisconsin Gas metering station. Also included is the installation of Flue Gas Recirculation fans to reduce NO_x emissions and, since the baghouse is no longer required, the ID fan discharge will be run directly to the chimney. Boiler to steam system let down valves will be added to improve the reliability of the steam supply to the Downtown Milwaukee Steam System when only one turbine generator is in operation. The control system will be modified to ensure the reliable operation of the new systems.

Project Scope. The scope of the Project includes the following:

- Removal of coal burners and associated coal piping from existing 4 boilers.
- De-energize, decommission and layup retired coal and ash systems including coal conveyors, coal silos, coal mills, coal feeders, bottom ash removal system, and flyash removal system.
- Installation of new gas burners in each of the 4 boilers.
- Installation of a natural gas header and associated valves to supply fuel to the new gas burners.
- Installation of new flue gas recirculation fans (FGR) and associated ductwork and electrical for use in the control of emissions from the boilers. One fan will be installed per boiler for a total of 4 fans.
- Seal boiler where existing burners, sootblowers and bottom seal equipment is being removed.
- Installation of boiler let down valves to reliably support steam supply to the District Heating System under single STG operation.
- Update control system to integrate new equipment into plant distributed control system (DCS).

IV. Schedule

The Project is being submitted at this time to maintain an orderly procurement, manufacturing and construction schedule as outlined below. Control valves and FGR fans have long lead times. Commission approval is requested by January 1, 2014, in order to meet the project schedule. Construction outages are planned to fall outside of the normal steam heating season.

<u>Activity</u>	<u>Start</u>	<u>Finish</u>
<i>Design Engineering and Procurement</i>	Aug 2012	Mar 2014
<i>Construction</i>		
Permitting	Apr 2013	Jan 2014
Full Notice to Proceed	Jan 2014	Jan 2014
Mobilize	Apr 2014	Apr 2014
Unit 1 Pre-outage work	May 2014	Aug 2014
Unit 1 Outage	Aug 2014	Oct 2014
Unit 2 Pre-outage work	May 2015	Aug 2015
Unit 2 Outage	Aug 2015	Oct 2015

V. Project Cost and Financing

Wisconsin Electric estimates that the cost to convert Valley from burning coal to natural gas to be \$62,000,000. In addition to the \$62 million in project costs we are also requesting approval of a \$7 million contribution in aid of construction for new natural gas infrastructure required to serve the plant load. The total gross project cost for which the company requests authorization is \$79,864,000.

Capital	Plant Account	Total	Electric	Steam
Structures and Improvements	311	9,000	8,300	700
Boiler Plant Equipment	312	46,200	42,400	3,800
Accessory Electric Equipment	315	5,600	5,200	400
Miscellaneous Power Plant Equipment	316	1,200	1,100	100
Allowance		7,000	6,440	560
Sub-total w/o AFUDC		69,000	63,440	5,560
AFUDC (100% of CWIP)		10,864	9,994	870
Total Capital		79,864	73,434	6,430
Expense		-	-	-
Total Gross Project Cost		79,864	73,434	6,430

Note: Dollars in thousands

The total Gross Project Cost includes \$ 2.6 million for removal of existing equipment that is in conflict with equipment required for the conversion to natural gas. The cost of the Project will be met from internal sources and/or from the issuance and sale of securities. The Company is requesting authorization to collect AFUDC based on 100% of CWIP at a rate of 9.09%.

VI. Description and Cost of Property Being Retired

The facilities to be retired consist primarily of the coal and ash handling equipment, the majority of which will be retired in place. The gross book cost of equipment to be retired follows:

<u>Plant Account</u>	<u>Description</u>	<u>Gross Book Cost</u>
312	Boiler Plant Equipment	\$33,010,000

Since the majority of the equipment will be retired in place, no salvage amount has been calculated.

VII. Effect of the Project on Cost of Operation and Reliability of Service

Wisconsin Electric believes that the proposed Valley Gas Conversion Project is the most advantageous means of discharging its obligation as a public utility. Conversion of Valley Power Plant from coal to natural gas fuel reduces costs attributable to the electric utility while minimally increasing costs to the steam utility. The shift in the economics of coal and gas makes it economic to undertake this Project at this time. The Project will not provide facilities in excess of present and probable future requirements.

VIII. Alternatives

The four alternatives for Valley are:

- 1) Valley conversion to gas (the proposed Project and Base for economic comparisons)
- 2) Continue operating Valley with coal and

2A) Install Dry Sorbent Injection (DSI) system to meet MATS air quality standards or

2B) Install full Air Quality Control System (AQCS, including SCR and SO₂ scrubber)

Note: 2B assumes current trend of more stringent air quality standards continues and is therefore a more likely scenario than 2A which assumes no changes to today's air quality standards through 2042 (end of study).

- 3) Retire Valley, build new transmission facilities to maintain electric system reliability and build new gas-fired package boilers to supply steam only.
- 4) Valley conversion to gas with minimal electric output. This option adds equipment at Valley to allow for steam production without the simultaneous production of electric power.

The key drivers of the economic analysis are:

- Capital costs for gas conversion, AQCS and package boiler alternatives.

- Transmission costs for package boiler alternative.
- Amount of uneconomic dispatch for gas conversion compared to coal plus environmental upgrades (either DSI or full AQCS).
- Non-fuel O&M including labor costs for all alternatives.
- Replacement electric capacity costs for package boiler alternative due to 280 MW Valley retirement.

The economic analysis includes steam production costs for the Downtown Steam System for each alternative. The analysis also includes electric production costs for the Company's fleet to serve Wisconsin Electric load and capacity sales revenue and new construction costs to maintain adequate electric reserve margins.

Summary of Economic Analysis Results

<u>Alternative</u>	<u>Diff from Base (\$ in millions)</u>
1 - Gas Conversion (Proposed project)	Base
2A - Coal with DSI only	\$ +60 M
2B - Coal with AQCS	\$ +540 M
3 - Package Boilers	\$+680 M
4- Gas Conversion with minimal electric output	\$+70 M

The results show, using net present value of revenue requirements:

- The proposed Valley Gas Conversion Project is the least cost alternative.
- The proposed Valley Gas Conversion Project is \$540 million less costly than the more likely coal with AQCS alternative (2B).
- The proposed Valley Gas Conversion Project is \$680 million less costly than retiring Valley and building new transmission and steam production facilities (alternative 3).
- The proposed Valley Gas Conversion Project is \$70 million less costly (not including transmission improvements) than converting Valley to Gas and adding equipment to allow for minimal electric output.

A detailed description of the economic analysis is included in Appendix B to the Application.

Valley Conversion to Gas (Alternative 1 – Proposed Project)

The analysis of the proposed Project assumes:

- The Project is complete before 2016 at the estimated capital cost.
- Non-fuel O&M for Valley on gas is significantly reduced compared to Valley on coal.
- Uneconomic dispatch on gas is reduced due to lower dispatch minimums compared to coal.

- Unit capacity rating remains at 280 MW of capacity.

The proposed Project is described in detail in Section II of the Application.

Valley Continues on Coal with DSI (Alternative 2A)

Valley must convert to gas, retire or install dry sorbent injection (DSI) before the MATS compliance deadline of April 16, 2015 or, with a one-year extension, April 16, 2016. This alternative assumes:

- Valley continues to burn coal and DSI control systems are installed. The DSI system is estimated to cost \$8 million.
- No additional air quality controls are required through 2042. As discussed above, this is considered a less likely future regulatory scenario than assumed for Alternative 2B.
- Relatively flat non-fuel O&M costs.
- No change in uneconomic dispatch costs.
- There are ongoing capital costs to maintain the plant for an additional 25 years of operation.

Net Present Value Revenue Requirement of this alternative is \$ 60 million higher (more costly) than Base.

Valley Continues on Coal with DSI and full AQCS (Alternative 2B)

This alternative starts like alternative 2A with coal and DSI, but in 2018 the plant adds full AQCS (SO₂ scrubber and SCR) to meet one-hour SO₂ NAAQS and other limits. The capital cost of the AQCS is estimated at \$350 million. The Net Present Value Revenue Requirement of this alternative is 540 million higher (more costly) than Base.

Build Steam-Only Package Boilers, Build New Transmission and Retire Valley (Alternative 3)

This alternative replaces the Valley plant with steam from package boilers and electric supply and voltage support from new transmission facilities. Since Valley cannot be retired before new transmission facilities are in-service, the estimated switchover to package boilers is about 2018 assuming 4-5 years to plan, permit and construct new transmission facilities. The Valley plant would continue to operate on coal after the MATS deadline until retirement in 2018 so DSI would also need to be installed. Five 350,000 pounds of steam per hour package boilers would be installed at the Valley site at a cost of \$102 Million. Preliminary transmission studies indicate about \$132 million in new transmission facilities to maintain electric system reliability are needed if Valley retires. Wisconsin Electric would pay 44% or \$58 million while the rest of ATC would pay the remaining \$74 million of the new transmission facilities. (The non-Wisconsin Electric portion of the transmission costs have not been included in the economic analysis). Another large cost is the lost capacity revenue from retiring the 280 MW Valley Plant and the need to add 280 MW of new capacity to Wisconsin Electric's portfolio in the long run. The Net Present Value Revenue Requirement of this alternative is \$680 million higher (more costly) than Base.

Valley Conversion to Gas – Minimize Electric Output (Alternative 4)

A variation of the proposed Project would add equipment to Valley to allow full steam production without production of electric power in order to minimize uneconomic dispatch. Valley must remain able to generate up to 280 MW when needed. Primary equipment changes include: new steam pressure reducing valve system, modifications so units can run without a steam turbine and condenser and additional auxiliary power supply. Capital cost is about \$50 million more than Alternative 1A (proposed project). This alternative does eliminate uneconomic dispatch costs. However, significantly reducing the number of hours Valley generates power raises electric reliability concerns (see Appendix C, Transmission Study, for further discussion of Valley electric reliability concerns). New transmission facility costs for this alternative were not studied in detail, but at least an additional \$40 million in new transmission facilities would be incurred. Under this alternative, generating power at Valley for enough hours in the year to avoid new transmission begins to look like the Proposed Project but with an additional \$50 million capital cost. Therefore the Minimize Electric Output (Alternative 1B) is not cost-effective and is not a viable alternative to the Proposed Project.

Net Present Value Revenue Requirement of this alternative is more than \$70 million plus the cost of new transmission facilities higher (more costly) than Base.

Alternatives Reviewed But Not Comprehensively Evaluated

Replace Valley Plant with a new combined cycle plant – A 2010 study performed by HDR estimates the cost to install combined cycle in place of Valley Power Plant at roughly \$700 million. Current combined cycle plants can turn down to 30%-50% of full load which would mean a minimum load at a new Valley Combined Cycle Plant of between 200-300 MW. Currently Valley runs minimum load of 30-80 MW and we anticipate on gas minimum load will be between 5-30 MW. The combined cycle plant costs ten times more to build than the proposed gas conversion and would have over ten times the amount of uneconomic generation. Consequently, we did not evaluate this alternative in further detail.

Convert Steam Customers to individual steam supplies – In 2002, Wisconsin Electric had a study performed to evaluate what the cost would be to our steam customers if they self-generated steam. Based on that study, the estimated average cost of self-generated steam, escalated to 2012, is about \$19/mlb as compared to today's actual cost of about \$11/mlb. The analysis did not include costs for upgrading the gas distribution system nor did it include costs for "difficult" installations. This represents a significant cost increase to our steam customers and consequently was not pursued any further.

The full economic analysis including detailed accounting of steam and electric expenses, fuel price assumptions, financial assumptions, capital and O&M costs, steam generation, electricity generation and other revenue and expense streams is included in Appendix B to this document.

IX. Environmental Review Information

Environmental Screening. Projects of this type are normally categorized as Type II actions under § PSC 4.10(3), Wis. Adm. Code which may require the preparation of an Environmental Assessment or an Environmental Impact Statement. All construction activities associated with this project will be limited to the existing site, utilizing existing power plant access roads. No new access or temporary staging areas are required. Existing site boundary fencing will be maintained throughout construction and all construction traffic will enter via the west plant entrance off Canal Street. Other than the new gas service facilities (the subject of a companion gas application), all new equipment installation will be inside the existing plant. Any modifications external to the plant will be minor. Existing facilities, including laydown areas, parking, and construction trailer siting will be utilized by this project. A complete Environmental Screening Report is included as Appendix A of this application.

Flood Hazard Exposure/Impact. A flood hazard figure is included as Exhibit 5 to Attachment A. This figure depicts that no portions of the proposed project occur within the mapped 1% flood zone, 100-year floodplain, or Zone A.

Archaeological and Historic Resources. There are no known archaeological, burial or historic sites coincident with the proposed project; therefore, no impacts to these resources are anticipated. Additionally, due to disturbances associated with the original construction of Valley Power Plant, the Company does not anticipate any impacts to previously identified archaeological resources.

Threatened or Endangered Species. A formal Endangered Resources Review was completed by the DNR. Although several listed species were identified to occur within, or within 1 mile of the project area, due to the exact location and nature of the proposed work, in addition to lack of vegetation/habitat and the implementation of strict and specific erosion and siltation control measures, no impacts to any of the identified, listed plant, fish, crustacean, bird or snake species are expected.

Entities Affected. The entities affected by the proposed project include the Wisconsin Department of Natural Resources and the City of Milwaukee. All necessary permits and approvals will be obtained from these entities prior to start of construction or as otherwise required.

Following the Company's announcement of this project to the media, in October 2012 We Energies provided tours of Valley Power Plant to nearby residents, local businesses and steam customers. The tours were held on two separate days and provided guests with the opportunity to learn more about the current operations of the plant as well as the proposed conversion to natural gas.