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ARKANSAS PUBLIC SERVICE COMMISSION FILED

IN THE MATTER OF SOUTHWESTERN)
 ELECTRIC POWER COMPANY'S PETITION)
 FOR A DECLARATORY ORDER FINDING)
 THAT INSTALLATION OF ENVIRONMENTAL)
 CONTROLS AT THE FLINT CREEK POWER)
 PLANT IS IN THE PUBLIC INTEREST)

DOCKET NO. 12-008-U
 ORDER NO. 14

ORDER

On February 8, 2012, Southwestern Electric Power Company (SWEPCO) filed in this Docket a *Petition for Declaratory Order* (Petition) seeking a declaratory ruling by the Arkansas Public Service Commission (Commission) that the installation by SWEPCO of environmental controls at its Flint Creek Power Plant¹ ("Flint Creek" or "the Plant") is in the public interest. SWEPCO's Petition was supported by the Direct Testimonies and Exhibits of SWEPCO witnesses Sandra S. Bennett, John Hendricks, Christian Beam, Scott C. Weaver, Paul Hassink, Shawna Jones and Judah Rose.

SWEPCO and Arkansas Electric Cooperative Corporation (AECC) each own a 50% share of Flint Creek. Flint Creek provides baseload capacity and energy to over 600,000 Arkansas customers served by SWEPCO and AECC, and is the least cost source of electricity in SWEPCO's generation fleet. Petition at ¶ 9.

SWEPCO states that United States Environmental Protection Agency (EPA) regulations will require the installation of certain environmental controls at Flint Creek as a condition of continued operation. Otherwise, SWEPCO states that the baseload generating capacity provided by the Plant will have to be replaced to enable SWEPCO to

¹ Flint Creek is a single-unit 528 MW baseload coal-fired steam electric generating plant located near Gentry, Arkansas. The Plant began commercial operation in 1978. Petition at ¶ 8.

meet customer demand for electricity and Southwest Power Pool, Inc. Regional Transmission Organization (SPP) reserve margin requirements. *Id.* at ¶ 4.

More specifically, SWEPCO states that Flint Creek will be required to meet more stringent air emissions limits in order to comply with the following EPA environmental regulations:

The Regional Haze Rule is designed to reduce pollution from 26 industrial sectors that cause visibility impairment in federally designated Class 1 areas, which includes national parks and wilderness areas. It applies to emission sources built or under construction between 1962 and 1977. Flint Creek falls within the industrial sectors regulated by the Regional Haze Rule, and was under construction during the relevant timeframe. The rule requires facilities subject to its provisions to meet more stringent emission limitations for sulfur dioxide (SO₂), nitrogen oxide (NO_x) and particulate matter, which are necessary to improve visibility in Class 1 areas. To meet these requirements and continue to operate such emission sources must use the Best Available Retrofit Technology (BART).

The Mercury and Air Toxics Standards (MATS) require the reduction of: 1) emissions of mercury; 2) other hazardous air pollutants (HAPs) in the form of toxic metals such as arsenic, lead, cadmium and selenium; 3) various acid gases including hydrochloric acid; and 4) many organic HAPs.

Id. at ¶ 10.

The Arkansas Department of Environmental Quality (ADEQ) implements the state's obligations under the EPA's Regional Haze Rule through development of a State Implementation Plan (SIP) that must be approved by the EPA. The SIP developed by ADEQ was incorporated into the rules and regulations of the Arkansas Pollution Control

and Ecology Commission (APC&EC) as Chapter 15 of Regulation 19, and had an effective compliance deadline of October 15, 2013. However, in March 2010, the APC&EC amended Regulation 19 to require compliance with BART as “expeditiously as practicable” but in no event later than five years after EPA approval of the Arkansas Regional Haze SIP. *Id.* at ¶ 11.

On November 16, 2011, the EPA disapproved portions of the Arkansas SIP and directed that a revised SIP be developed based on a BART analysis of each facility subject to the Regional Haze Rule. SWEPCO expects that the BART analysis, development of the revised SIP, and review and approval by EPA will extend into 2013 and compliance will be required in 2017 or perhaps 2018. *Id.*

The MATS Rule was issued by the EPA in March 2011, and became final on December 16, 2011. The Clean Air Act requires that compliance be achieved within a three-year period after publication of the final MATS Rule in the Federal Register. That publication occurred on April 16, 2012; therefore compliance is required by April 16, 2015. However, there is a provision for a one-year extension upon approval of the permitting authority. Assuming a one year extension is granted, compliance must be achieved by April 16, 2016. *Id.* at ¶ 12. For reasons of economic and engineering efficiency, SWEPCO states that the equipment needed to meet the requirements of the Regional Haze Rule may be installed at the same time as the MATs Rule controls are required. *Id.* at ¶ 11.

Compliance with the SO₂ limits of the Regional Haze Rule will require that Flint Creek be retrofitted with a Dry Flue Gas Desulfurization (DFGD) system, commonly called a scrubber. The DFGD system selected by the project engineers will include a pulse jet fabric filter, commonly called a bag house. The installation of low NO_x burners

and overfire air (OFA) will be required to meet the NO_x limits of the Regional Haze Rule. In addition, support equipment must be installed for the delivery of lime, the chemical reagent used to remove SO₂ in the scrubber, and the disposal of the byproduct of the SO₂ removal. *Id.* at ¶ 13.

Compliance with the mercury limitations of the MATS Rule will primarily be achieved through installation of an activated carbon injection (ACI) system. Additional reductions in mercury emissions, as well as reductions in acid gases and other hazardous organics, will be achieved as a co-benefit of the installation of the bag house that is a component of the DFGD system. Support equipment also will be required for the delivery of activated carbon, and the disposal of the byproduct of mercury removal. *Id.* at ¶ 14.

SWEPCO states that it conducted a comprehensive economic analysis of the cost of retrofitting Flint Creek with the required environmental controls compared to the cost of various natural gas-fired electric generation alternatives. SWEPCO also retained ICF International (ICF) to conduct an independent economic analysis of the cost of the natural gas alternatives compared to the cost of coal-fired generation from Flint Creek after the installation of environmental controls. The analyses conducted by SWEPCO and ICF evaluated a broad range of assumptions regarding commodity prices, emission allowances and the impact of future greenhouse gas regulations. In each scenario considered by SWEPCO, and in all but one scenario considered by ICF, extending the life of the Flint Creek plant was shown to be more economic than the natural gas alternatives. *Id.* at ¶ 5. Therefore, SWEPCO concludes that it would be in the best interest of its customers to extend the life of Flint Creek by installing the required environmental controls. *Id.* at ¶ 6.

SWEPCO's economic analysis examined three alternatives for replacement capacity in the event Flint Creek is retired: 1) converting Flint Creek to a natural gas-fired plant; 2) replacing Flint Creek with a new natural gas combined cycle plant constructed on-site; and 3) replacing Flint Creek with a new natural gas combined cycle plant located elsewhere within the SPP footprint. SWEPCO/ICF evaluated each of these alternatives using a range of assumptions regarding prices for natural gas, coal, emissions allowances and the impact of CO₂ regulation. *Id.* at ¶ 20.

In order to address the full life-cycle cost of extending the life of Flint Creek, the analysis considered environmental regulations that are expected to be implemented beyond the timeframe for compliance with the Regional Haze Rule and the MATS Rule. Specifically, the impact and cost of complying with the Cross State Air Pollution Rule; Coal Combustion Residuals Rule; Section 316(b) of the Clean Water Act; and stricter National Ambient Air Quality Standards were included as part of the analysis. The analysis also evaluated the possibility that EPA might, in the future, impose stricter NO_x emission limits that would require installation of Selective Catalytic Reduction (SCR) equipment. *Id.* at ¶ 21.

The cumulative present worth of the incremental revenue requirements for each alternative under the various assumptions was determined, and compared to the cumulative present worth of the incremental revenue requirement of installing the environmental controls at Flint Creek. In each case considered by SWEPCO, retrofitting Flint Creek with environmental controls was determined to be the least cost alternative as compared to the natural gas alternatives, with the cost savings ranging from \$102 million to \$381 million on a cumulative present worth basis. *Id.* at ¶ 22.

ICF conducted an independent economic analysis of the cost of installing environmental controls at Flint Creek as compared to the cost of natural gas alternatives. In all but one of the scenarios evaluated by ICF, retrofitting Flint Creek was the least cost alternative. The cost savings in those scenarios favoring retrofitting Flint Creek with environmental controls ranged from \$43 million to \$1.13 billion. In one scenario, one natural gas alternative was favored by \$22 million. *Id.* at ¶ 23.

Based on the economic analyses discussed above, SWEPCO concludes that it would be in the best interest of its customers to extend the life of Flint Creek by installing the required environmental controls. However, SWEPCO notes that the investment involved is significant – approximately \$408 million. *Id.* at ¶¶ 17, 24.

If the Commission agrees with SWEPCO's conclusion, SWEPCO states that it will proceed with installation of the environmental controls using a phased approach that has been successfully employed by SWEPCO's parent, American Electric Power Company (AEP), on past projects. The process begins with a feasibility study, and then progresses to a preliminary engineering and design stage. Next, detailed engineering, design, and initial site construction activities are completed. Full scale construction, startup, and commissioning are then accomplished. A detailed review, followed by financial authorization, is required before the project can proceed from one phase to the next. This phased approach will provide structured control of the project scope, schedule and costs. *Id.* at ¶ 15.

The construction required for installation of the environmental controls will take approximately 30 months. SWEPCO plans on commencing site construction activities on or about January 1, 2014. This schedule will permit construction of the facilities to be completed and placed in service by June 30, 2016. This schedule will require that Flint

Creek be taken out of service for approximately three months, because compliance with the MATS Rule is required by the first quarter of 2016 and the Plant cannot continue to operate until compliance is achieved. *Id.* at ¶ 16.

The estimated cost of the project is \$408 million, excluding Allowance for Funds Used During Construction (AFUDC) and company overhead, but does include a contingency factor of 10%. SWEPCO and AECC will share the total cost on a 50/50 basis consistent with their ownership ratio. SWEPCO's total capital cost, including AFUDC and company overheads, is estimated to be \$252 million. This cost estimate includes the installation of the DFGD system, low NOx burners with OFA, ACI, continuous monitoring systems, landfill development work, and other associated upgrades to existing Flint Creek equipment, including unit controls modernization, balanced draft modifications, boiler cleaning equipment, and steam coil upgrades. *Id.* at ¶ 17.

Installation of the environmental controls will create an incremental base revenue requirement for the first full year of operation in 2017 of approximately \$48.7 million based on SWEPCO's total capital cost, including AFUDC and overhead, of \$252 million. The base revenue requirement allocated to the Arkansas jurisdiction will be approximately \$9.8 million. This increase equates to a 3.8% increase in total revenues including base revenue requirement and fuel for all customer classes for the first full year of commercial operation of the facilities in 2017. *Id.* at ¶ 18.

Assuming new rates become effective with the first full year of service in 2017, the estimated incremental effect of adding the new environmental control to SWEPCO's rate base would be a projected increase in base rates of \$2.97 per month for an Arkansas residential customer using 1,000 kWh, which equates to a 3.85% increase in the total residential bill including fuel. *Id.* at ¶ 19.

SWEPCO states that at this time it is not seeking a determination of value for ratemaking purposes, nor is it seeking authorization for the recovery of costs incurred in connection with the installation of environmental controls at Flint Creek. *Id.* at ¶ 25.

Procedural History

The parties to this proceeding are SWEPCO, AECC, the Sierra Club (Sierra), the Attorney General of Arkansas (AG) and the General Staff (Staff) of the Commission. Nucor Steel Arkansas and Nucor-Yamato Steel Company (collectively Nucor) were granted Limited Appearance status pursuant to Rule 3.04(c) of the Commission's *Rules of Practice and Procedure*. As described below, two evidentiary hearings were conducted in this proceeding with a Phase One evidentiary hearing conducted on October 9-10, 2012, and a Phase Two evidentiary hearing conducted on March 28, 2013.

Phase One Proceeding:

In support of its Petition SWEPCO filed: (1) the Direct Testimonies and Exhibits of SWEPCO witnesses Sandra S. Bennett, John C. Hendricks, Christian T. Beam, Scott C. Weaver, Joseph Paul Hassink, Shawna G. Jones and Judah L. Rose on February 9, and 22, 2012 (Document Nos. 4-8, 10, 13, and 16-17); (2) the Supplemental and/or Revised Direct Testimonies and Exhibits of SWEPCO witness Rose on June 7 and 8, 2012 (Document Nos. 59-61); (3) the Rebuttal Testimonies and Exhibits of SWEPCO witnesses Weaver, Hassink, Bennett, Rose, Hendricks, Karl R. Bletzacker, Charles D. Matthews, Kevin J. Munson, and C. Richard Ross on July 30, 2012 (Document Nos. 133-142); and (4) the Sur-Surrebuttal Testimonies and Exhibits of SWEPCO witnesses Bennett, Hassink, Hendricks, Munson, Weaver and Rose on September 21, 2012 (Document Nos. 159-165).

AECC, in support of SWEPCO's Petition, filed: (1) the Direct Testimonies and Exhibits of AECC witnesses Curtis Warner, Andrew Lachowsky and Forrest Kessinger on April 2 and 11, 2012 (Document Nos. 44-46 and 56); (2) the Rebuttal Testimony and Exhibits of AECC witness Lachowsky on July 30, 2012 (Document Nos. 131 and 132); and (3) the Sur-Surrebuttal Testimonies and Exhibits of AECC witnesses Warner, Lachowsky, and Rickey Bittle on September 21, 2012 (Document Nos. 154-158).

In response, Staff filed the Direct Testimony and Exhibits of Staff witness Richard S. Hahn on June 29, 2012 (Document Nos. 76, 78, 82-83, and 129-130) as well the Surrebuttal Testimony and Exhibits of Mr. Hahn on August 24, 2012 (Document Nos. 145-146).

The AG filed the Direct Testimony and Exhibits of AG witness Kevin Woodruff on June 29 and July 2, 2012 (Document Nos. 74, 75 and 91) as well as the Surrebuttal Testimony and Exhibits of Mr. Woodruff on August 24, 2012 (Document Nos. 144, 149 and 150).

Sierra filed the Direct Testimony and Exhibits of Sierra witness Paul Chernick on June 29, 2012 (Document Nos. 89, 90 and 102), as well as Mr. Chernick's Surrebuttal Testimony and Exhibits on August 24, 2012 and October 3, 2012 (Document Nos. 147, 148, 167 and 168).

A Limited Appearance Statement was filed by Nucor on September 28, 2012 (Document No. 166).

The scope of the first hearing conducted on October 9-10, 2012, covered the testimonies and exhibits identified above. At the conclusion of the first hearing the Commission issued Order No. 8 on October 12, 2012, directing SWEPCO and AECC to file post-hearing Supplemental Testimony to address or clarify certain specific issues

which arose during the first hearing. The other Parties were invited to file Supplemental Rebuttal Testimony in response to SWEPCO's and AECC's post-hearing Supplemental Testimony.

By Order No. 9, issued on October 17, 2012, the Commission amended the post-hearing procedural schedule established by Order No. 8 directing that: (1) SWEPCO file its post-hearing bifurcated Part One Supplemental Testimony on October 22, 2012, and its Part Two Supplemental Testimony on October 29, 2012; (2) directing AECC to file its post-hearing Supplemental Testimony on October 29, 2012; (3) directing that Staff and Intervenor post-hearing Supplemental Rebuttal Testimony be filed on November 9, 2012; and (4) directing that post-hearing written Closing Arguments be filed by November 16, 2012.

In response to Order No. 9, SWEPCO filed the Supplemental Direct Testimonies and Exhibits of SWEPCO witnesses Bennett, Jones, and Weaver on October 22 and 29, 2012 (Document Nos. 178-180, 185-186). Also, AECC filed the Supplemental Direct Testimony and Exhibits of AECC witness Kessinger on October 29, 2012.

Also pursuant to Order No. 9, Staff, the AG and Sierra filed on November 9, 2012, the Supplemental Rebuttal Testimonies and Exhibits of Staff witness Hahn (Document No. 187), AG witness Woodruff (Document No. 188), and Sierra Witness Chernick (Document Nos. 189 and 190).

Phase One briefs were filed on November 16, 2012, by SWEPCO (Document No. 194), AECC (Document No. 192), Staff (Document No. 193), the AG (Document No. 191), and Sierra (Document No. 195).

Phase Two Proceeding:

On December 14, 2012, a *Joint Motion to Reopen Record* (Joint Motion) was filed by SWEPCO, AECC and the AG (Document No. 196) requesting that the Commission “reopen the record in this docket for the purpose of receiving additional evidence which the parties believe will more fully develop the record and assist the Commission in reaching a decision in this case....” Joint Motion at 1. In support of the Joint Motion, SWEPCO and AECC state:

[I]n response to issues raised during the October 9, 2012, hearing and in the post-hearing closing arguments filed on November 16, 2012, their senior management have had extensive discussions about the alternatives to providing the generation output of the Flint Creek power Plant (the “Plant”) if the Commission denies the pending petition for a declaratory order finding that installation of environmental controls at the Plant is in the public interest. As a result of the discussions of the issues raised during and after the hearing, management of SWEPCO and AECC have identified additional issues and information that they feel need to be presented to the Commission for its consideration.

Id.

Staff filed on December 14, 2012, its Response to the Joint Motion stating that Staff does not object to the Joint Motion. Also, on the same date, Sierra filed its Response urging the Commission to deny the Joint Motion.

By Order No. 10, issued on January 2, 2013, the Commission granted the Joint Motion finding that “the public interest will be served by reopening the record of this proceeding” and established a Phase Two procedural schedule for such purposes. Order No. 10 at 2-3. The Phase Two procedural schedule was modified by Order No. 11 issued on February 13, 2013.

Pursuant to Order No. 10, SWEPCO filed on January 11, 2013 the Phase Two Direct Testimonies and exhibits of SWEPCO witnesses Venita McCellon-Allen

(Document No. 201), Mike Malone (Document No. 202), and Lanny Nickell (Document No. 204). AECC filed the Phase Two Direct Testimony of AECC witness Duane Highley (Document No. 203).

Pursuant to Order No. 11, Staff, the AG and Sierra filed on March 14, 2013, the Phase Two Rebuttal Testimonies and Exhibits of Staff witness Hahn (Document Nos. 210-214), AG witness William N. D'Onofrio (Document No. 208), and Sierra witness Chernick (Document No. 209).

As scheduled by Order No. 11, the Phase Two evidentiary hearing was conducted by the Commission on March 28, 2013. The scope of the second hearing was limited to all testimony and exhibits filed since the Phase One hearing. As directed by Order No. 13, issued on April 3, 2013, Phase Two briefs were filed on April 19, 2013, by SWEPCO and AECC jointly, Sierra, and the Staff. The AG elected not to file a Phase Two brief.

Public Comments:

Written public comments regarding the proposed Flint Creek environmental upgrades were submitted by approximately 1,002 members of the public with approximately 737 of those generally supportive of the upgrades and approximately 242 generally opposed to the upgrades.² Also, during the Phase One and Phase Two public hearings oral public comments were presented by 54 members of the public with 37 of those generally supportive of the upgrade and 17 generally opposed to the upgrade. Although public comments cannot be considered as evidence upon which the Commission may base its final decision in this proceeding, the Commission takes into

² Twenty-three comments were either not relevant to this proceeding, or were unclear whether the commentator supports or opposes the upgrades, or were submitted anonymously.

consideration such public comments as it considers and determines what course of action is necessary to best protect the overall public interest.

Positions of the Parties:

At the close of the Phase One hearing all non-applicant parties opposed the declaratory order requested by SWEPCO and AECC. The AG stated that the Commission should deny the declaratory order “without prejudice, pending consideration of a full range of alternatives designed to meet the utilities’ clearly defined needs.” The AG stated in Phase One that the Commission simply “does not have the necessary information” upon which to issue the requested declaratory order. However, the AG stated that the Commission “could issue a narrow declaratory judgment stating that in consideration of the time demands ... that it is prudent to proceed with the planning, but require the utilities to explore other options.” Post-Hearing Brief of the Attorney General at 6-7, Document No. 191, November 16, 2012.

Sierra stated at the end of Phase One that the evidentiary record showed that SWEPCO “has not satisfied its burden of establishing that retrofit of Flint Creek is in the public interest.” More specifically, Sierra asserted that the record “shows that there are less expensive ways to provide power to SWEPCO’s ratepayers, and SWEPCO has not shown that Flint Creek is needed for reliability of the transmission system.” Post-Hearing Brief of the Sierra Club at 23, Document No. 195, November 16, 2012.

Staff stated at the end of Phase One that using SWEPCO’s “own models and assumptions, there are alternatives to the Flint Creek retrofit that are at an economic break-even[,] ... [however] when Staff’s broader decision framework is employed, there are two options that represent a potentially better outcome than the proposed ... retrofit at Flint Creek.” Staff asserted that SWEPCO and AECC “have failed to carry their

burden of proof that the Flint Creek retrofit is the most economic resource and is in the public interest.” Therefore, Staff urged the Commission to deny the requested declaratory order. Written Closing Arguments of the General Staff at 9, Document No. 193, November 16, 2012.

At the conclusion of the Phase Two hearing, however, the AG and Staff modified their positions based upon the post-Phase One supplemental testimonies presented by SWEPCO and AECC. In the AG’s final testimony in this proceeding, presented by AG witness William N. D’Onofrio, Mr. D’Onofrio testifies as follows:

I believe ... [SWEPCO] and AECC have presented important additional information regarding the economic impacts of the Flint Creek Plant, as well as the potential rate consequences of shutting down the plant. In my opinion they have demonstrated that the plant provides important economic benefits to Northwest Arkansas and that absent the continued operation of the plant that region will be adversely affected. ... After reviewing the record to date, and in light of the uncertainties involved with estimating future costs, I have reached the conclusion that proceeding with the Flint Creek retrofit is a reasonable course of action and is more likely than not to be in the public interest.

Tr.2 at 653.

In his final Phase Two Reply Testimony, Staff witness Hahn, based on the supplemental testimonies and analyses provided by SWEPCO, AECC and SPP, provides the following final conclusions and recommendations on behalf of Staff:

- The time frame for complying with the EPA MATS regulations and the time requirements for acquiring or planning, designing, and constructing the alternatives to retrofitting Flint Creek constrain the potential viability of the various alternatives;
- Based upon my analysis of information provided by SWEPCO from the SPP, significant reliability problems will likely exist if Flint Creek is retired. Analysis of this same information indicates that there will likely also be reliability issues, albeit substantially fewer of them, even if Flint Creek is retrofitted and not retired;

- The Applicants state that they will not convert Flint Creek to natural gas and will retire the unit if the Commission does not approve the retrofit. According to Applicants, retrofitting Flint Creek is the only option which can be completed within the required time frame. SPP concludes that without Flint Creek generation, the Northwest Arkansas transmission system is subject to conditions of unacceptable instability that would result in customer power outages if not addressed.³⁰ Given the Applicants' positions on these points and, based upon my assessment of the MATS compliance deadline; the results of the reliability analyses; the time required to acquire or to plan, design, and construct the other alternatives; and the need for a generating resource in Northwest Arkansas, authorizing the retrofit of Flint Creek appears to be the available option that enables compliance with the MATS regulation within the prescribed 2016 compliance deadline and supports reliability in Northwest Arkansas; and
- The Commission should direct the Applicants to perform an expedited solutions study to the reliability issues that exist, even if Flint Creek is retrofitted.

Tr.2 at 680-681, 699-700, 741-742.

After the Phase Two hearing, Sierra's position in opposition to the Flint Creek retrofit option is unchanged and, therefore, Sierra urges the Commission to deny SWEPCO's request for a declaratory order supporting the retrofit option. Tr.2 at 80.

Discussion³

Three major contested issues evolved from the Phase One and Phase Two hearings: 1) the economic analysis of the environmental controls retrofit option compared to other electric power options; 2) the option that best addresses the reliability needs of Northwest Arkansas; and 3) the timeframe in which environmental controls must be installed if Flint Creek is to continue operating beyond the first quarter of 2016.

³ Hereafter, citations to the Phase One Hearing Transcript are shown as "Tr." and citations to the Phase Two Hearing Transcript are shown as "Tr.2."

Before discussing these three major contested issues, however, it is important to note the Phase Two Direct Testimony of SWEPCO President and Chief Operating Officer Venita McCellon-Allen and AECC President and Chief Executive Officer Duane Highley regarding the future of Flint Creek if the Commission concludes that the Flint Creek environmental controls option is not in the public interest. Both Ms. McCellon-Allen and Mr. Highley testify that their respective companies will retire Flint Creek if the environmental retrofit option is not approved by the Commission. Phase Two Tr. at 299, 411-412. Ms. McCellon-Allen and Mr. Highley provide extensive testimony in support of their decision to retire and abandon Flint Creek if the environmental controls retrofit option is rejected by the Commission. *Id.* at 299-323, 411-417. A summary of the factors given by Ms. McCellon-Allen and Mr. Highley in support of their decision to retire/abandon Flint Creek under such circumstances follows:

- Engineering studies and economic modeling demonstrate that converting Flint Creek from coal to natural gas is an inefficient and uneconomic means for providing generation to customers.
- If Flint Creek is converted to natural gas it will have an estimated heat rate of 11,00 Btu per kWh or higher (31.0% efficient), compared to a modern natural gas-fired combined cycle facility that will have a heat rate of approximately 7175 Btu per kWh (approximately 47.6% efficient).
- Converting Flint Creek to natural gas will require 53% more natural gas than a modern NGCC plant per kWh of generation. This difference in efficiency directly translates into approximately 53% higher fuel cost as compared to a modern NGCC.

- If converted to natural gas, Flint Creek will not be competitive in the emerging Southwest Power Pool energy market. If dispatched purely on economic merit it would operate with an average annual capacity factor of only 10% to 15%.
- Economically, a conversion to natural gas would make Flint Creek an ill-suited peaking unit that would only be operated during periods of very high demand.
- Operationally, if the plant is converted to natural gas it could not serve as a true peaking unit because it would not have the ability to immediately start up in response to high customer demand the way a true peaking unit would.
- Conversion of Flint Creek to burn natural gas would require construction of one or more expensive gas pipelines and associated infrastructure.

Tr.2 at 304-308 and 339-401.

1. The Economic Analysis:

A. Capital Costs to Construct:

SWEPCO witness Christian Beam explains that, since 2004, SWEPCO's parent company, American Electric Power ("AEP"), has implemented a three-phase approach addressing project feasibility, engineering, and construction to environmental control projects on nearly 10,800 MW of coal-fired generation. Tr. at 468. He testifies that, at the height of construction activity in 2007, *Engineering News-Record* identified AEP's overall construction program as the largest in the utility industry and the second largest in the nation. *Id.* Mr. Beam testifies that, if approved, the Flint Creek retrofit project

will be executed using this same three-phase approach, and will benefit from years of valuable lessons learned and best practices. *Id.*

To install the environmental controls at Flint Creek, SWEPCO witness Scott Weaver estimates SWEPCO's share of the project cost to be \$218 million, excluding AFUDC. As for the three alternative options: Converting Flint Creek from coal-fueled to natural gas-fueled; Replacing Flint Creek with a Brownfield (on-site) combined cycle natural gas plant; and Replacing Flint Creek with a Greenfield (off-site) combined cycle natural gas plant, Mr. Weaver estimates SWEPCO's share of the construction cost, excluding AFUDC, is \$96 million, \$402 million, and \$432 million, respectively. Tr. at 596-597. SWEPCO's estimate does not include costs to meet the Coal Combustion Residuals (CCR) Rule and for Selective Catalytic Reduction (SCR) technology, which SWEPCO says are not required until 2017 and 2020, respectively, but which are included in SWEPCO's modeling of life-cycle costs. In Table 6 of his Direct Testimony, Mr. Weaver estimates that SWEPCO's share of the capital cost for SCR and CCR technology is \$97 million excluding AFUDC. Tr. at 596.

AECC witness Andrew Lachowsky estimates AECC's share of the capital costs for installing environmental controls at Flint Creek to be \$297 million, \$7 million of which will be expended after 2016. Mr. Lachowsky's estimate also assumes installing the SCR technology in 2016 instead of 2020. Tr. at 1487. In comparison, Mr. Lachowsky estimates that it will cost AECC \$275 million for their 259 MW share of a Brownfield combined cycle natural gas-fired plant. Tr. at 1487. According to Mr. Lachowsky, AECC's analysis shows that under expected conditions, adding the environmental controls at Flint Creek and continuing to maintain Flint Creek will provide benefits to AECC's members through at least 2043. Tr. at 1488. Stated otherwise, Mr. Lachowsky

testifies that failure to add the environmental controls at Flint Creek, thus forcing the early retirement of Flint Creek in 2016, will result in added costs and increased cost volatility for AECC's members through at least 2043. Tr. at 1489.

Staff witness Richard Hahn reviewed SWEPCO's estimate of the capital costs for environmental control equipment and testifies that the estimate is comparable to what has been spent for other coal-fueled plant environmental retrofit projects. Tr. at 2283. Mr. Hahn also agrees that SWEPCO's choice of environmental control technologies for Flint Creek is reasonable, but recommends that the SCR system be installed in 2016 instead of 2020 to comply with the Regional Haze Rule. Tr. at 2265 and 2279. The AG did not take issue with SWEPCO's capital cost estimates. Sierra witness Paul Chernick testifies as to his belief that SWEPCO's estimates are unreliable and rather low for some of the environmental control components. Tr. at 1873 & 1875.

SWEPCO witness Christian Beam testifies that SWEPCO developed its initial cost estimate for the environmental controls using past experience and actual cost data from similar projects. Tr. at 487-488. Based upon AEP's experience executing similar projects, Mr. Beam testifies as to his belief that the range of accuracy of SWEPCO's estimate is -15% to +20% and that SWEPCO has taken several steps to ensure its accuracy. Mr. Beam testifies that SWEPCO built in a 10% contingency and has also accounted for the escalation of labor and material costs in its estimate (*Id.* at 488-489) and that SWEPCO will employ AEP's phased strategy for the design, engineering, procurement, construction, and startup/commissioning of the project which will contribute to a more reliable, safe, timely, and cost effective project at completion. Tr. at 492. In his Sur-Surrebuttal testimony, SWEPCO witness Kevin Munson testifies that SWEPCO's refined cost estimate using a site-specific, bottom-up budgetary estimate

solicited from Sargent and Lundy and Alstom Power Service⁴ is within 5% of their initial cost estimate. Tr. at 508. Finally, SWEPCO witness Sandra Bennett testifies that SWEPCO supports employing a Commission approved Independent Monitor that would provide construction progress reports to the Commission and Staff. Tr. at 147.

SWEPCO witness Shawna Jones testifies that the cost to install the Flint Creek environmental controls will increase SWEPCO's base revenue requirement for the first full year of operation in 2017 by \$48.7 million, based on SWEPCO's capital cost estimate of \$252 million including AFUDC. SWEPCO's Arkansas customers will be allocated approximately \$9.8 million of the \$48.7 million. Tr. at 440. Ms. Jones estimates that the new rates will be in place in 2017, and will increase base rates by approximately \$2.97 per month for an Arkansas residential customer using 1,000 kWh, which is a 3.85% increase in the total residential bill including fuel. Tr. at 440. Ms. Jones similarly estimates that base rates will increase in 2017 for the Commercial/Small Industrial, Large Industrial, Municipal, and Lighting rate classes by \$0.002261, \$0.002080, \$0.002340, and \$0.001323 per kWh, respectively. Tr. Ex. at 88.

AECC witness Forrest Kessinger estimates the rate impact on the retail members of AECC's seventeen retail cooperatives for: (1) the environmental control option with SCR technology, (2) the environmental control option without SCR technology, (3) the Flint Creek natural gas conversion option, and (4) the Brownfield natural gas plant option. Tr.2 at 365 *et. seq.*

For the environmental control option without SCR technology, Mr. Kessinger estimates a rate increase of \$1.60 per month, for the typical residential cooperative

⁴ Sargent and Lundy is a comprehensive consulting, engineering, design and analysis firm that has designed electric power generation and power delivery projects worldwide. www.sargentlundy.com. Alstom Power Service is a world-wide manufacturer and provider of environmental pollution control systems for clean coal-fueled electric generation plants. www.alstom.com.

customer using 1,000 kWh per month. *Id.* at 365. He estimates that the Flint Creek natural gas conversion option and the Brownfield natural gas plant option will produce an average monthly rate impact of \$2.22 and \$2.10, respectively, for a residential customer using 1,000 kWh per month. *Id.* at 367-368. Mr. Kessinger also estimates that the small commercial class and large commercial class customers will experience a rate increase of \$0.0016 per kWh. *Id.* at 370, 375. Under the Flint Creek natural gas conversion option, both small and large commercial customers will see a rate increase of \$0.0022 per kWh according to Mr. Kessinger. *Id.* at 373, 378. For the Brownfield natural gas plant option, Mr. Kessinger estimates that both small and large commercial customers will see a rate increase of \$0.0021 per kWh. *Id.* at 372, 377.

B. Life Cycle Cost:

SWEPCO witness Sandra Bennett testifies that SWEPCO conducted a comprehensive economic analysis of the life cycle cost of retrofitting Flint Creek with the required environmental controls compared to the cost of the Flint Creek conversion to natural gas, and the Brownfield and Greenfield natural gas alternatives. Tr. at 139.

Staff witness Richard Hahn agrees that SWEPCO has chosen reasonable alternatives, but stated his belief in Phase One that additional alternatives exist that SWEPCO should consider, such as the purchase of an existing natural gas combined cycle plant coupled with the deployment of additional wind resources. Tr. at 2265, 2280-2281. AG witness Kevin Woodruff concluded in Phase One that the environmental retrofit could turn out to be the least costly option, but agreed with Staff witness Hahn that SWEPCO should evaluate other reasonable options before a decision is made. Tr. at 2039, 2182. Sierra witness Paul Chernick asserts that the inputs SWEPCO used for its economic analysis of the Flint Creek retrofit project compared to

the natural gas alternatives considered are not reasonable. Specifically, Mr. Chernick testifies that SWEPCO's "forecast of natural gas prices are too high, its estimate of the cost of replacement combined-cycle capacity is excessive, additional efficiency savings are available, retirement of Flint Creek is unlikely to require either additional transmission into Northwest Arkansas or massively uneconomic operation of local generation, and the cost of the project remains uncertain and subject to increase." Tr. 1930-31. Therefore, Mr. Chernick states that SWEPCO has failed to "demonstrate that the Flint Creek retrofit project is in the public interest ... or that the project is the least-cost option for ratepayers." *Id.*

To compare the lifecycle cost of project alternatives, SWEPCO witness Scott Weaver testifies that SWEPCO used the Strategist electric utility planning model to simulate the operation of the entire AEP West system of resources, which includes SWEPCO and its sister company, Public Service Company of Oklahoma (PSO), over a 30-year period from 2011 to 2040. SWEPCO's modeling assumed across all options that certain specific generation units in its fleet located in Louisiana and Texas would retire or would be retrofitted with environmental controls by 2016, and that new capacity would be added in certain years. Tr. at 585-588. The Strategist modeling assumed that the incremental fixed investment costs associated with the environmental retrofit project would be recovered over a 15-year period, in order to reflect SWEPCO's intent to propose accelerated cost recovery in a future proceeding. Tr. at 611-612. The modeling assumed that the fixed costs of the other Options would be recovered over a 25-year or 30-year period reflecting the typical life-cycle for those options. Tr. at 611.

SWEPCO compared the potential life-cycle costs of the environmental retrofit to the natural gas alternatives by developing a cumulative present worth (CPW) value for

each option. The life-cycle cost analysis attempts to quantify all costs over the asset life, including the capital construction cost plus on-going costs, such as fuel costs and fixed and variable O&M costs. All of these costs were estimated annually, and the annual costs were then discounted to 2011 dollars to reflect a cumulative present worth for each option. Tr. at 585-588. SWEPCO also evaluated the options under four different “sensitivity pricing” scenarios in which different assumptions were made about natural gas and coal prices and CO₂ regulation. Tr. at 600.

SWEPCO witness Weaver testifies that the environmental retrofit option has a lower cumulative cost compared to the three natural gas alternatives under the base case and under the four sensitivity scenarios. Tr. at 622-623. Mr. Weaver testifies that SWEPCO’s modeling indicates that the SWEPCO system-wide cost for operating its entire fleet over a 30-year period including the environmental retrofit option is \$19,108 billion, while the cost including the gas conversion option, Brownfield option and the Greenfield option system-wide cost is \$19,334 billion, \$19,255 billion and \$19,382 billion, respectively. Tr. Ex. at 114.

Staff witness Richard Hahn testifies that Staff performed its own analysis to compare the costs of SWEPCO’s project alternatives based on the 25-year levelized cost of each option, rather than on the cumulative present worth produced by SWEPCO’s Strategist modeling. Staff’s analysis also used different forecasts for key planning parameters, such as natural gas prices, which Mr. Hahn testifies more accurately reflects the current outlook. Tr. at 2297 *et. seq.* According to Mr. Hahn, Staff’s analysis shows that the levelized costs of the options range between \$70.35 and \$80.58 per MWh. Considering the uncertainty in forecasting such parameters as natural gas over 25 years,

Mr. Hahn concludes that the small cost difference between the environmental retrofit option and the natural gas alternatives is a virtual economic breakeven. Tr. at 2307.

To better compare SWEPCO's options to Staff's options, Staff requested that SWEPCO use its Strategist model to evaluate various project alternatives using Staff's recommended key planning parameters. Tr. at 2309.

After the Phase One hearing the Commission issued Order No. 8 directing SWEPCO and AECC to file Supplemental Direct Testimony quantifying the rate impact of the four options using Staff's recommended input assumptions. Staff witness Hahn testifies that SWEPCO's responsive analysis using Staff's input assumptions reflect that purchasing an existing combined cycle natural gas plant would cost \$212 million to \$337 million less on a cumulative present worth basis than the retrofit option over thirty years. Tr. at 2375. Mr. Hahn explains that even after SWEPCO modified six of his recommended input assumptions, SWEPCO's modified analysis reflects that purchasing an existing combined cycle gas plant is \$12 million less costly than retrofitting Flint Creek. *Id.* at 2376. Because this difference is small relative to the values being projected over 30 years, Mr. Hahn testifies that "the results of SWEPCO's latest economic analysis, using all of its own assumptions, supports the conclusions in ... [his] Direct Testimony that the retrofit option is essentially at economic break-even with acquiring an existing ... [combined cycle gas plant]. *Id.*

Also in response to Order No. 8, SWEPCO witness Shawna Jones provides estimated rate impacts for 2017, the first full year of operation, using Staff witness Hahn's three scenarios (as shown in Figure 1-S of Mr. Hahn's Surrebuttal Testimony. *See* Attachment A hereto) an individual using 1,000 kWh will pay approximately \$98.23 (Flint Creek retrofit option) and \$100.41 (Greenfield gas plant option) under Hahn's

Scenario 1; approximately \$95.26 (Gas plant purchase with wind PPA option) and \$97.48 (Flint Creek retrofit option) under Hahn's Scenario 2; and approximately \$98.29 (Flint Creek retrofit option) and \$99.18 (Flint Creek gas conversion with wind PPA) under Hahn's Scenario 3. Tr.2 at 118 *et. seq.* After reviewing SWEPCO's analysis, Staff witness Hahn concludes that the rate impacts of all options for the first year and through the 20-year period are virtually identical. Tr.2 at 671. Thus, Mr. Hahn testifies that SWEPCO's rate impact analysis confirms his Surrebuttal Testimony conclusion in Phase One that there are other options that are equally economic to the proposed Flint Creek retrofit option. *Id.* Regarding AECC's rate impact analysis, Mr. Hahn testified in Phase One that had AECC evaluated the acquisition of an existing gas-fired plant and the incremental wind PPA options, which they did not, AECC's analysis would likely have shown that the acquisition of an existing gas-fired plant would have rate impacts similar to, and even lower than, the Flint Creek retrofit option. *Id.* at 675.

2. Reliability Issues:

SWEPCO witnesses Bennett, Matthews, and Hassink testify that the following reliability and transmission issues constrain SWEPCO's ability to pursue any option other than retrofitting Flint Creek, within the time available:

The Fayetteville-Springdale-Rogers Metropolitan Statistical Area (MSA) is the 19th fastest growing MSA according to the 2010 U. S. Census; the Cities of Fayetteville, Rogers, and Springdale grew 26.8%, 44.1% and 52.4%, respectively, from 2000 to 2010. Tr. at 156. SWEPCO also serves the City of Bentonville, which comprises 8% of the Northwest Arkansas load. *Id.* at 160. In addition, the City of Siloam Springs, Arkansas Valley Electric Cooperative Corp., Carroll Electric Cooperative Corp., Ozarks Electric Cooperative Corp., Oklahoma Gas and Electric Co., Empire District Electric Co., and

Grand River Dam Authority rely on SWEPCO's electric transmission and generation facilities. *Id.* at 423-424.

SWEPCO and AECC each serve roughly equal shares of the total Northwest Arkansas load. *Id.* at 157. When SPP's 12% reserve capacity margin is included, this load currently requires approximately 1,400 MW of generation reserves. *Id.* at 160.

Within Northwest Arkansas, SWEPCO operates 828 MW of generation, including the 528 Flint Creek plant and the 300 MW Mattison plant, which provides gas-fired peaking power. *Id.* at 158. Beaver Dam (operated by the Southwestern Power Administration) also provides 128.8 MW of generating capacity, but it is not available to SWEPCO. *Id.* at 424. Flint Creek comprises over half of the total generating capacity within this area and provides the only baseload capacity of any of the generation plants in the area. *Id.* at 158, 424.

SWEPCO added the Mattison plant in 2007 in response to reliability concerns. *Id.* at 158, 160. SWEPCO also sought approval in a series of seven dockets between 2005 and 2012 for projects to expand transmission facilities to meet load growth and reliability concerns. *Id.* at 160. SWEPCO experienced new record peak demands (on a SWEPCO-wide basis) in three of the last four years, during which time the peak load grew by almost 12%. *Id.* at 162. SWEPCO has requested voluntary load shedding from customers and has interrupted customers who are on interruptible rates during recent peak load events. *Id.* at 162-163.

SWEPCO witnesses describe Northwest Arkansas as a load pocket with almost all power flows from the West. *Id.* at 185-186. Reliability in this load pocket⁵ is dependent

⁵ A load pocket is an area where "load exceeds, or can exceed, total supply" (Tr. 149) which "even with existing generation, requires the import of [additional] energy [sources]" (Tr. 185) or more generally

on the two existing 345 kV transmission lines plus Flint Creek. *Id.* at 186. The loss of any two of these three critical facilities would require immediate load shedding to maintain reliability, and a new 345 kV line would be needed to prevent potential power blackouts without Flint Creek during high load conditions. *Id.* at 187.

In particular, SWEPCO witness Joseph Hassink testifies that certain transmission upgrades would be required in order to implement SWEPCO's "Option 4" scenario, in which Flint Creek would be retired and replaced by a Greenfield combined-cycle natural gas plant. *Id.* at 349. These upgrades would include a new 70 mile 345 kV transmission line from Ft. Smith to Chamber Springs to satisfy NERC reliability standards; a new 100 MVAR Static VAR Compensator to partially offset the loss of the 270 MVAR currently provided by Flint Creek; and the installation of conventional capacitor banks and reactors to provide the remaining 170 MVAR of reactive support. *Id.* at 352. He reiterates that this is not SWEPCO's preferred option and that, without a transmission upgrade in service in time for retirement of Flint Creek, an outage of a single 345 kV line would require a significant amount of preemptive load shedding. *Id.* at 352-354.

SWEPCO Witness Charles Matthews explains that there are essentially three options for meeting the electric capacity obligations of an area: locate sufficient generation capacity within the area; build sufficient transmission to transmit energy to the area; or provide some combination of both. *Id.* at 424. Mr. Matthews further explains that it is important to locate baseload generation plants such as Flint Creek close to load centers in order to support reliability and reduce costs, and that relying

defined as "an area where there is insufficient transmission capability to reliably supply 100% of the electric load without relying on generation capacity that is physically located within that area." www.uspowergen.com/2008/02/27/what-is-a-load-pocket/

instead on transmission and more distant located baseload generation plants would reduce voltage stability and voltage regulation, causing customer service issues such as blinking lights and possibly equipment damage. *Id.* at 424-426. According to Mr. Matthews, while a transmission-only solution could meet minimum NERC reliability standards, it would not provide the same quality of electric service that has been provided through Flint Creek. *Id.* at 426.

AEEC witness Andrew Lachowsky testifies that the reliability risks described by SWEPCO witness Hassink especially concern AECC because AECC's peak load exceeds its electric generation capacity in Northwest Arkansas. *Id.* at 1471. Mr. Lachowsky testifies in response to Commission questioning that AECC is "transmission dependent." *Id.* at 1641. He notes that, on August 3, 2011, AECC had to rely on transmission from generation outside of Northwest Arkansas to serve 260 MW of its 657 MW Northwest Arkansas peak load; and without Flint Creek, it would have needed more than 524 MW of generation imported from outside of Northwest Arkansas. *Id.* at 1471.

Sierra witness Paul Chernick testifies that SWEPCO has exaggerated the effects of the Northwest Arkansas load pocket on the cost of retiring Flint Creek, and that if a major new transmission project is needed due to retirement of Flint Creek, then it also probably is needed even with Flint Creek in operation. *Id.* at 1837-1838. He provides the following additional criticisms:

- SWEPCO presents the 345kV line from Fort Smith to Chamber Springs as a proxy for transmission investment needed to maintain reliability in the absence of Flint Creek, but it did not develop an actual transmission solution;

- SWEPCO's modeling did not reflect a rearrangement of generation dispatch that could reasonably occur to address contingencies;
- SWEPCO's modeling overstates the number of days with high loads leading to problems;
- SWEPCO's modeling ignored the similarity between load flows during forced outage of Flint Creek and retirement of that unit; and
- SWEPCO did not properly take into account in its modeling the reduction of exports within the region that would accompany retirement of Flint Creek.

Id. at 1842, 1845 and 1947.

In his Rebuttal Testimony, SWEPCO witness Hassink rejects the suggestion by Sierra witness Chernick that additional transmission upgrades to deliver electric power to the Northwest Arkansas area will probably be needed even if Flint Creek remains in operation. *Id.* at 363. Mr. Hassink testifies that, although the Ft. Smith to Chamber Springs 345 kV project represents a reasonable, robust, low-cost solution to serve the need that would be required by retirement of Flint Creek, no amount of rearranged dispatch or transmission loading relief (TLR) could resolve the deficit of power caused by retirement of Flint Creek. *Id.* at 365-366. Mr. Hassink notes that Mr. Chernick, in his analysis, fails to address deficiencies in transfer capacity and reactive power support that would be negatively impacted by the permanent loss of Flint Creek. *Id.*

Mr. Hassink also testifies that, because the three major reliability facilities (Flint Creek and the two 345 kV lines) each support roughly 500 MW of power for a load pocket of approximately 1300 MW of demand, almost 1000 MW of power is currently imported at peak times. *Id.* at 371. Loss of Flint Creek would thus require an additional

500 MW supply and after a first contingency, SWEPCO would have to reduce load in anticipation of a second contingency. *Id.* at 371. He characterizes Mr. Chernick's suggestion that new transmission infrastructure could replace the need for Flint Creek as an inadequate, "Band-Aid" solution that should be avoided. *Id.* at 370.

SWEPCO witness Bennett testifies that Northwest Arkansas reliability should not be at risk of interruption by one wind storm, tornado, or ice storm (to which Mr. Chernick responded that a storm of such magnitude would also typically reduce the load needing to be served at the time). *Id.* at 180-181 and 1950. Ms. Bennett maintains that transmission improvements are needed as longer-term enhancements to the system, not as a replacement for baseload power. *Id.* at 180-181. She testifies that SWEPCO plans maintenance outages for Flint Creek during off-peak times, during which times it runs the Mattison plant (*Id.* at 187) and Mr. Matthews testifies that when there are forced outages at Flint Creek, "we worry." *Id.* at 429.

AECC witness Rickey Bittle testifies that the transmission system in Northwest Arkansas was designed based on the assumption that Flint Creek generation would be present. *Id.* at 1656. In his view, the idea that new transmission would replace Flint Creek reflects a lack of understanding of fundamental properties of the transmission system and its actual operation. *Id.* at 1656. He testifies particularly to the need to supply reactive power, or "vars." *Id.* at 1657. He testifies that vars are not transportable for long distances, so the power system is designed for vars to be supplied locally, either by active or passive means. *Id.* at 1657. He testifies that, in a load pocket like Northwest Arkansas, the continuously active var supply provided by base load generation close to the point of consumption - rather than the less precise and flexible var control provided by capacitors - is the proper means of var support, and its absence would likely lead to a

power supply failure. *Id.* at 1658-1662. Regarding re-dispatch as a means of maintaining reliability, Mr. Bittle testifies that radial transmission lines cannot be relieved by transmission dispatch and that overreliance on transmission generally increases the likelihood of interrupting load during high-load periods, which should not be a planned strategy for meeting load. *Id.* at 1663-1664. In summary, according to Mr. Bittle, the idea that baseload generation can be removed from Northwest Arkansas and replaced only by transmission is not only inaccurate but also represents poor long-term planning. *Id.* at 1665.

During Phase Two, Mr. Lanny Nickell, Vice President of Engineering for SPP, presented the results of computer modeling that analyzed voltage stability for Northwest Arkansas. Tr.2 at 207. Mr. Nickell testifies that SPP's modeling examined whether thermal and voltage limits set by NERC reliability standards and SPP criteria could be met in Northwest Arkansas without Flint Creek. *Id.* at 209. According to Mr. Nickell, assuming expected transmission upgrades and load conditions at a projected 2014 summer peak of 1,345 MW, severe thermal overloads and voltage decreases will occur without Flint Creek and with a double contingency, i.e., the loss of two major transmission lines, the threat of cascading transmission outages and voltage collapse will increase. *Id.* at 209-210. Mr. Nickell testifies that NERC requires that the transmission system must remain stable and must operate within certain thermal and voltage limits after the loss of two or more critical Bulk Electric System ("BES") elements. *Id.* at 212. He testifies that SPP believes that, without Flint Creek, a 345 kV new transmission line would be needed and he estimated that it would take 5-7 years to plan and construct, in part due to Northwest Arkansas's current transmission-dependence and geographic challenges. *Id.* at 215-218. This estimate included 1-3 years

for the SPP ITP process and 4 years for a new transmission to be placed in service. *Id.* at 218. Mr. Nickell testifies that SPP would have to establish load curtailment, load shedding and/or mitigation plans, for periods in which Flint Creek might be unavailable prior to a new transmission line being placed in service, or in which an existing 345 kV line would be unavailable due to planned and unplanned outages, or in the event of a simultaneous outage of two 345 kV lines. *Id.* at 219-223.

Sierra witness Chernick responds that the peak load of 1,345 MW modeled by SPP in 2014 is historically high and that the other loads tested were very unrealistic; that the analysis did not take into account changes in dispatch after the first contingency that could prevent a second contingency; and that the base case model of the SPP system assumes that Flint Creek is in operation and thus does not dispatch enough generation from the north and east when Flint Creek is assumed to be absent. *Id.* at 452-457. Mr. Chernick adds that SWEPCO could relatively easily and quickly implement control devices such as load-tap transformers, phase-shifters, and capacitors, and Special Protection Systems to limit effects of outage on particular system elements. *Id.* at 457. According to Mr. Chernick, as an alternative, SWEPCO could place the Ft. Smith-Chamber Springs 345 kV line in-service by 2017, if it were to seek simultaneous review for the project by SPP and the Commission. *Id.* at 450.

On cross-examination by Sierra during the Phase Two hearing, Mr. Nickell testifies that SPP did not evaluate the effectiveness both in terms of reliability and in terms of cost effectiveness of the Fort Smith-Chamber Springs facility as a solution to the reliability concerns which SPP identified, nor did SWEPCO ask SPP to include that facility in its evaluation. *Id.* at 225-226. Mr. Nickell also testifies that SPP did not include in its modeling two new transmission facilities that are expected to be in place

between 2014 and 2016, because the 2014 model was available, having been thoroughly reviewed and validated by SPP stakeholders as a reasonable and realistic representation of what the grid will look like in 2014 given the projects that would have been constructed by that time. Mr. Nickell explains that a later model was not available and that development of a later model would take three months to be complete. *Id.* at 226-230. However, Mr. Nickell testifies that the two planned post-2014 transmission upgrade projects would not solve the existing reliability issues with Flint Creek out of service. *Id.* at 248.

Mr. Nickell further testifies that the 1,345 MW peak load projection for 2014 represents approximately 2% annual growth above the actual 2012 peak of 1,313 MW and that the higher load projections used in the SPP modeling, which Sierra witness Chernick criticizes, are irrelevant because thermal overloads and low voltages problems will occur at 1,345 MW. *Id.* at 233 and 236-237. He also notes that generation located to the east is baseload generation controlled by Entergy, not SPP, and is, therefore, not available to replace Flint Creek at peak times, and that it is controlled by Entergy, not SPP. *Id.* at 238.

Mr. Nickell further testifies that an emergency where two facilities necessary for reliability are lost is no different than if only one facility is lost because there simply is no re-dispatch solution that the area that can effectively solve the needs that would arise after a signal one-facility loss. *Id.* at 244. He acknowledges that it is unlikely that a single weather event would cause the two existing 345 kV lines, which are several miles apart, to both go down, but he testifies that it SPP is still required to plan for such an event. *Id.* at 253-256. Also, while capacitors could be added for voltage control more quickly than a new transmission line, Mr. Nickell testifies that this course of action

would not solve the thermal overload of transmission facilities in the area which is the primary concern of SPP. *Id.* at 257-262.

While Staff witness Hahn agrees that retiring the Flint Creek Plant without replacing it with some source of local generation would not be a good idea, he notes that he had not seen a NERC reliability study that established the need to maintain baseload generation within Northwest Arkansas but that if Flint Creek was retired it would “need to be replaced with something. *Id.* at 2459, 2513. Later, in his Phase Two testimony, Mr. Hahn testifies that based upon his analysis of information provided by SWEPCO from the SPP, significant reliability problems will likely exist if Flint Creek is retired and that there will likely also be reliability issues, albeit substantially fewer of them, even if Flint Creek is retrofitted and not retired. Tr.2 at 680.

Staff witness Hahn also criticizes SPP’s modeling for including unrealistically high loads, omitting transmission upgrades that are expected to be online by 2016, failing to explore other transmission solutions, and failing to explore the adequacy of transmission and reliability with Flint Creek in service. *Id.* at 776-781.

However, Mr. Hahn testifies in Phase Two that he performed his own Northwest Arkansas reliability analysis, which also indicates that, without Flint Creek and two 345 KV lines, there were several thermal overloads and violations of voltage criteria. *Id.* at 783. Although he does not agree with SPP’s modeling approach, Mr. Hahn testifies that his modeling results are generally consistent with SPP’s modeling results. *Id.* Given the time available for compliance with the EPA MATS rule, Mr. Hahn testifies that the evident reliability risks appear to favor the environmental controls retrofit of Flint Creek. *Id.* at 775. Because Mr. Hahn’s analysis indicates that reliability issues remain even if Flint Creek remains in service, he also recommends that SWEPCO and AECC

should be directed to work with SPP to conduct a solutions study to address the Northwest Arkansas load pocket. *Id.* at 786.

In his Phase One testimony AG witness Woodruff opined that, based upon the evidence of record at that time, the Commission cannot yet conclude that baseload generation is needed in Northwest Arkansas to provide reliable service. Tr. at 2185. In the AG's Phase Two testimony and after the submission of additional testimony by SWEPCO, AG witness D'Onofrio testifies that, in his opinion, SWEPCO and AECC have "demonstrated that the plant provides important economic benefits to Northwest Arkansas and that absent the continued operation of the plant that region will be adversely affected. ... After reviewing the record to date, and in light of the uncertainties involved with estimating future costs, I have reached the conclusion that proceeding with the Flint Creek retrofit is a reasonable course of action and is more likely than not to be in the public interest." Tr.2 at 653.

3. Timeframe for the Project:

The timeframe available for installation of the environmental controls at Flint Creek is an issue of disagreement primarily between Sierra and SWEPCO. SWEPCO witness Sandra Bennett testifies that Flint Creek must meet the new EPA standards by April 2015, but with a mitigating solution in progress at Flint Creek, SWEPCO could petition the State for an extension of time to April 2016 for compliance, after which time SWEPCO would have to cease operations at Flint Creek if the retrofit was not complete and operational. Tr. at 188-189. Ms. Bennett testifies that, if Flint Creek is retired, alternative solutions involving construction of new generation cannot be accomplished by that time, due in part to the requirement for SWEPCO to comply with the Louisiana Public Service Commission's (LPSC) electric power resource planning rules. Tr. at 213

and 218-219. SWEPCO witness Hassink also testifies that alternative solutions involving new transmission lines face a 4-7 year time constraint. Tr. at 372.

Sierra witness Chernick testifies that, if Flint Creek is required for reliability, it could operate at least until April 2017, under an announced EPA enforcement policy, and longer if SWEPCO is diligently pursuing the extension of time. Tr.2 at 433-434, 440. Mr. Chernick and Staff witness Hahn also question the degree to which the LPSC resource planning rules would constrain project timing. *Id.* at 442-444, 772-773. Also, Mr. Chernick suggests that necessary transmission planning processes could run simultaneously and that new transmission could be brought online sooner than 4-7 years. *Id.* at 450.

However, SWEPCO President and CEO Venita McCellon-Allen testifies that the EPA policy relied upon by Sierra to suggest that SWEPCO could operate Flint Creek beyond April of 2016 is an enforcement policy that lies within the sole case-by-case discretion of the EPA acting in response to an entity in non-compliance. *Id.* at 332. She testifies that SWEPCO and SWEPCO's parent company, AEP, will not knowingly and intentionally operate in non-compliance with an air permit or federal law. *Id.* at 335. She also testifies that the EPA enforcement policy statement includes explicit language stating that it does not create an enforceable right to an extension of time and that EPA reserves the right to act at variance with the policies and to change them at any time without public notice. *Id.* at 350. She also testifies that simultaneous review of transmission alternatives by SPP and by the Commission, as suggested by Mr. Chernick, is not practical because the need for a transmission line must be established first through the SPP process prior to the initiation of the nine-month CECPN process before the Commission. *Id.* at 347-348.

Findings and Ruling of the Commission

Having carefully considered and weighed all of the evidence presented by the Parties in this proceeding, the Commission finds that there is substantial evidence of record, from both a cost and reliability perspective, which supports the installation of the required EPA environmental controls at Flint Creek so that Flint Creek can continue to be operated as a baseload electric generation plant in the Northwest Arkansas area. Given that the life-cycle cost estimates of the NGCC plant alternatives evaluated are similar to that of retrofitting Flint Creek, the determinative factor in this case is the issue of power supply reliability in Northwest Arkansas. The Commission also finds that there is substantial evidence of record that the installation by SWEPCO of the required EPA environmental controls at Flint Creek is the most timely and most reliable power supply solution for Northwest Arkansas. The Commission also finds that the Northwest Arkansas reliability issues will only be exacerbated by the retirement of Flint Creek and that the retention of Flint Creek will continue to provide a cost-effective and necessary reliable source of needed baseload electric power in Northwest Arkansas.

The Commission also finds that SWEPCO correctly characterizes the available timeframe in which the Flint Creek retrofit must be accomplished, in that it is reasonable to predict that implementation of a major transmission alternative(s) to serve the Northwest Arkansas load pocket could take up to seven years. SWEPCO and AEEC have demonstrated by substantial evidence that the reliability issues which have existed in Northwest Arkansas since 2007 militate against retiring the largest and most reliable source of baseload electric power within the area under the existing time constraints. The reliability concerns in the Northwest Arkansas load pocket favor and support the Flint Creek retrofit option as the most effective option for the area.

The Commission's determination that substantial evidence supports the Flint Creek retrofit for the Northwest Arkansas area is also based, in part, upon the following additional factors:

1. SWEPCO's assertions that AEP and SWEPCO have extensive experience in the successful planning, execution, and installation of similar environmental control projects at other AEP coal-fired electric generation plants;
2. The only environmental controls comprehended by this order are those as described by SWEPCO as a specific part of the Flint Creek retrofit project for which SWEPCO seeks a declaratory ruling in this proceeding and which are included in the Strategist modeling used to generate the cost comparisons among the Flint Creek retrofit option and the alternative gas-fired plant options, and which are included in SWEPCO's estimated monthly rate impacts on SWEPCO's retail customers as calculated by and reflected in SWEPCO's relevant testimony in this proceeding;
3. The Commission's determination in this proceeding does not extend to any other environmental control projects, generation options, or transmission options discussed in this proceeding;
4. The Commission specifically reserves for consideration and determination in a future SWEPCO proceeding all ratemaking issues associated with the installation of the Flint Creek environmental controls; therefore nothing in this order shall be considered as a finding for ratemaking purposes, including but not limited to the project costs as estimated in this proceeding by SWEPCO;

5. SWEPCO will continue to bear the burden of proof regarding the prudence of its installation of the Flint Creek retrofit project in the event of any material deviation or changed circumstances regarding such project, including but not limited to the project costs as estimated in this proceeding by SWEPCO; and
6. SWEPCO and AECC will continue to work with SPP to conduct an appropriate solutions study to timely address reliability issues in the Northwest Arkansas load pocket.

Also, as recommended by SWEPCO witness Sandra Bennett (Tr. 147) and as supported by Staff (Written Closing Argument of the General Staff at 8-9, Document No. 193, November 16, 2012), the Commission finds that the employment of an Independent Monitor (IM) by the Commission to monitor the Flint Creek environmental retrofit project on behalf of the Commission is in the public interest. SWEPCO shall be responsible for paying the IM. The IM will be expected to monitor, evaluate and explain in quarterly reports to be filed in this Docket:

- Any differences between budgeted costs and actual costs;
- Additions or changes in contract/project scope;
- Delays and/or suspensions of work;
- Labor rates and labor productivity;
- Commodity material costs;
- Performance of the general contractor and sub-contractors;
- Changes in state or federal rules or regulations affecting the project;
- Changes related to permitting requirements;

- Changes in contracts or facilities related to supporting infrastructure including water, gas, substation upgrades, transmission interconnections, and transmission upgrade costs; and
- Any other changes that impact the cost or timing of installation of environmental controls and/or operation of the plant.

Accordingly, the Commission orders and directs as follows:

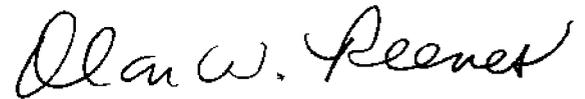
1. SWEPCO's *Petition for Declaratory Order* is granted as limited and conditioned herein;
2. SWEPCO shall file written notice in this Docket when construction commences;
3. SWEPCO shall file written notice in this Docket prior to any period of time in which the Flint Creek Plant is to be out of service due to the retrofit project including an estimate of the time of the outage and a description of measures and the cost of those measures to provide reliable service during the planned outage;
4. SWEPCO shall comply with Rule 7.01(b) and Rule 7.01(c) of the Commission's *Rules of Practice and Procedure* by filing the required completion or delay of construction reports in this Docket.

BY ORDER OF THE COMMISSION,

This 10th day of July, 2013.



Colette D. Honorable, Chairman



Olan W. Reeves, Commissioner



Elana C. Wills, Commissioner



Kristi Rhude, Secretary of the Commission

Scenario	Results	Retrofit Flint Creek	Convert Flint Creek to natural gas-fueled	New Brownfield NGCC plant	New Greenfield NCGG plant
SWEPCO Direct	NPV Costs (\$M)	\$19,108	\$19,344	\$19,255	\$19,381
	Change from lowest	\$0	\$236	\$147	\$273
	Ranking	1	3	2	4

Scenario	Results	Retrofit Flint Creek	Convert Flint Creek to natural gas-fueled plus wind	New Brownfield NGCC plant plus wind	Purchase existing NGCC plant plus wind	15-year PPA plus wind
Staff's Direct Testimony	SWEPCO Capital Cost (\$M)	\$319.3	\$110.2	\$377.8	\$250.0	N/A
	Levelized \$/MWH	\$75.77	\$75.23	\$80.58	\$70.35	N/A
	Change from lowest	\$5.42	\$4.88	\$10.23	\$0.00	N/A
	Ranking	2	2	3	1	N/A

SWEPCO's Response to Staff Data Request No. 010-1 (Revised CO2 allowance)	Strategist NPV Costs (\$M)	\$21,107	\$20,923	\$20,880	\$20,623	N/A
	Less CO2 Allowance Allocation	-\$1,775	-\$1,670	-\$1,675	-\$1,670	N/A
	NW AR Transmission Costs (\$M)	\$0	\$0	\$0	\$42	N/A
	NPV Costs (\$M)	\$19,331	\$19,252	\$19,206	\$18,994	N/A
	Change from lowest	\$337	\$258	\$212	\$0	N/A
	Ranking	4	3	2	1	N/A

SWEPCO's Rebuttal Testimony	NPV Costs (\$M)	\$19,136	\$19,367	\$19,227	\$19,124	\$19,166
	Change from lowest	\$12	\$243	\$103	\$0	\$42
	Ranking	1	4	3	1	2

Hahn's Figure 1-S at Tr. 2375.