

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY OF )  
OKLAHOMA FOR COMMISSION AUTHORIZATION )  
OF A PLAN AND COST RECOVERY OF ACTIONS )  
OF PSO TO BE IN COMPLIANCE WITH CERTAIN )  
ENVIRONMENTAL RULES PROMULGATED BY )  
THE UNITED STATES ENVIRONMENTAL )  
PROTECTION AGENCY; SUCH ACTIVITIES TO )  
INCLUDE, BUT NOT BE LIMITED TO, CAPITAL )  
EXPENDITURES FOR EQUIPMENT AND )  
FACILITIES; CONSTRUCTION OR PURCHASE OF )  
AN ELECTRIC GENERATING FACILITY OR ENTER )  
INTO A LONG-TERM PURCHASE POWER )  
CONTRACT (AND POSSIBLE EARNINGS ON THE )  
CONTRACT); CHANGE IN DEPRECIATION RATES )  
AND/OR ESTABLISHMENT AND RECOVERY OF A )  
REGULATORY ASSET; AND FOR SUCH OTHER )  
RELIEF AS THE COMMISSION DEEMS PSO IS )  
ENTITLED )

CAUSE PUD 201200054

**FILED**  
JAN 08 2013

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CORPORATION COMMISSION  
OF OKLAHOMA

RESPONSIVE TESTIMONY

OF

SCOTT NORWOOD

ON BEHALF OF

OKLAHOMA INDUSTRIAL ENERGY CONSUMERS

JANUARY 8, 2013

## RESPONSIVE TESTIMONY OF SCOTT NORWOOD

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### EXHIBITS:

- SN-1 Background and Experience of Scott Norwood
- SN-2 AEP Press Release Announcing EPA Settlement
- SN-3 EPA Settlement Agreement (OIEC 3-4)
- SN-4 Basis for PSO’s Decision Not to Seek Stay of RH FIP (OIEC 4-5)
- SN-5 Approval Date of EPA Settlement is Uncertain (OIEC 9-5)
- SN-6 Estimated Percentage Cost Difference Due to EPA Settlement
- SN-7 Timing and Costs of Emerging Environmental Regulations are Unknown (OIEC 7-4)
- SN-8 Basis for PSO Carbon Price Forecasts (OIEC 3-15 and OIEC 9-7)
- SN-9 OCC Approved Service Lives for Northeastern Coal Units (OIEC 3-13)
- SN-10 Service Life used for Flint Creek Environmental Compliance Analysis (OIEC 10-6)
- SN-11 Estimated Monthly Cost Savings Due to Stay of RH FIP
- SN-12 Estimated Annual Cost Savings Due to Adoption of Original RH SIP

**EXHIBITS (Continued):**

- SN-13 PSO Did Not Conduct a High Gas Price Sensitivity Before Entering into the EPA Settlement (OIEC 10-17)
- SN-14 Results of PSO's High Gas Price Sensitivity Analysis (AG 1-4 Supplemental)
- SN-15 Basis for PSO's Gas Price Forecast for Years after 2030 (OIEC 12-10)
- SN-16 PSO has Never Experienced No Demand Growth over a 15-year Period (OIEC 4-1)
- SN-17 PSO Did Not Conduct a Peak Demand Growth Sensitivity Analysis (OIEC 4-2)
- SN-18 Basis for PSO's Assumption Regarding Excess Capacity Sales (OIEC 4-14)
- SN-19 Historical Non-fuel O&M Costs for Northeastern Coal Units (OIEC 12-4)
- SN-20 Non-fuel O&M Costs for SWEPCO's Turk Coal Plant (OIEC 12-2)
- SN-21 Estimated Impact of Forecasted Non-fuel O&M Cost Increase for Northeastern Units
- SN-22 Basis for Discount Rate Used for PSO's Analysis of EPA Settlement (OIEC 10-5)
- SN-23 Estimated Impact of Adjusted Discount Rate and Present Value Calculation
- SN-24 PSO has not Quantified Long-term Rate Impacts of the EPA Settlement (OIEC 16-18)
- SN-25 PSO Analysis of Impacts of Environmental Compliance Options (OIEC 5-18 and OIEC 9-16)
- SN-26 PSO did not Provide its Environmental Compliance Impact Analysis to Parties to the EPA Settlement (OIEC 15-21)
- SN-27 Estimated Impact of EPA Settlement on SO2 Emissions
- SN-28 Estimated Impact of EPA Settlement on Natural Gas Usage (OIEC 5-23)
- SN-29 Estimated Impact of \$1/MMBtu Increase in Natural Gas Prices
- SN-30 PSO's EPA Settlement Impact Analysis was not Provided to the Parties (OIEC 15-5 and OIEC 15-6)

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**I. INTRODUCTION**

**Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.**

A. My name is Scott Norwood. My business address is P.O. Box 30197, Austin, Texas 78755.

**Q. WHAT IS YOUR OCCUPATION?**

A. I am a consultant specializing in the areas of energy planning, procurement and regulation, and President of Norwood Energy Consulting, L.L.C.

**Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.**

A. I am an electrical engineer with over 30 years of experience in the electric utility industry. After graduating from the University of Texas in 1980, I began my career as a power plant engineer for the City of Austin’s Electric Utility Department. In January 1984, I joined the staff of the Public Utility Commission of Texas (“PUC” or “Commission”) where I served as Manager of Power Plant Engineering and was responsible for addressing resource planning, fuel and purchased power cost issues which came before the Commission. In 1986 I joined GDS Associates, a Marietta, Georgia based consulting engineering firm. I was elected a Principal of GDS in 1990, and directed the firm’s Deregulation Services Department until January 2004, when I left to

1 form Norwood Energy Consulting, LLC. The focus of my current consulting practice is  
2 energy planning, procurement and regulation. My resume is attached as Exhibit SN-1.

3  
4 **Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS CASE?**

5 A. I am testifying on behalf of Oklahoma Industrial Energy Consumers ("OIEC").

6  
7 **Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE CORPORATION**  
8 **COMMISSION OF OKLAHOMA?**

9 A. Yes. I have testified in numerous past base rate and fuel proceedings before the  
10 Oklahoma Corporation Commission ("OCC" or "Commission"), including a number of  
11 past cases involving Public Service Company of Oklahoma ("PSO"). My Exhibit SN-1  
12 provides a list of my past testimony in Oklahoma and other jurisdictions. I have also  
13 participated on behalf of OIEC in past Commission proceedings involving environmental  
14 compliance issues, including OCC Cause No. PUD 201100077 and recent public  
15 hearings involving the 2012 Integrated Resource Plans filed by PSO and Oklahoma Gas  
16 and Electric Company ("OG&E"). Through my participation in these past projects, I  
17 have become very familiar with the operations of power supply resources on PSO's  
18 system. I am also familiar with the environmental compliance activities of AEP's  
19 operating companies in Arkansas, Texas and Virginia as a result of my review of  
20 regulatory filings in those jurisdictions. In addition, I have submitted testimony on utility  
21 regulatory matters in past proceedings before the Federal Energy Regulatory Commission  
22 ("FERC"), and before state regulatory commissions in Arkansas, Georgia, Iowa, Illinois,

1 Louisiana, Michigan, Missouri, New Jersey, Texas, Virginia, Washington, and  
2 Wisconsin.

3  
4 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS CASE?**

5 A. The purpose of my testimony is to present my findings and recommendations regarding  
6 PSO's request for pre-approval of its plan for capital expenditures for environmental  
7 compliance as set forth under terms of its settlement agreement with the United States  
8 Environmental Protection Agency ("EPA"), the State of Oklahoma and the Sierra Club  
9 (hereinafter referred to as the "EPA Settlement" or "Settlement".) dated October 17,  
10 2012, and initially announced by PSO on April 24, 2012.

11  
12 **Q. WHAT IS OIEC'S INTEREST IN THIS CASE?**

13 A. OIEC's members are among the largest users of electricity on PSO's system, and  
14 therefore are very sensitive to any electric rate increases proposed by PSO. OIEC's  
15 interest in this case is to respond to PSO's request for pre-approval of its plan to  
16 implement an EPA Settlement plan providing for compliance of its Northeastern coal  
17 units with the Mercury and Air Toxics Standard ("MATS") and Regional Haze ("RH")  
18 rules.

19  
20 **Q. HAVE YOU PREPARED ANY EXHIBITS TO SUPPORT YOUR TESTIMONY?**

21 A. Yes. I have prepared 30 exhibits in support of my testimony.  
22  
23



1

**Table 1**

PSO's August 2012 Environmental Compliance Analysis  
Coal Retrofit Cost/(Savings) vs EPA Settlement  
(\$Millions)

	2011-2040 <u>Cum NPV</u>	2011-2040 <u>Nominal Cost</u>
<u>Late-2011 Analysis</u>		
Base Fuel/25 Yr Coal	(\$482)	(\$2,027)
Avg All 5 Scenarios	(\$273)	(\$1,185)
<u>August 2012 Update</u>		
Base Fuel/25 Yr Coal	(\$278)	(\$1,860)
Avg All 7 Scenarios	(\$97)	(\$995)
High Fuel Prices	(\$601)	(\$3,580)

Sources are PSO witness Weaver's Substituted Exhibits SCW-7 and SCW-8, PSO's witness Fate's Exhibit SLF-2, and PSO's response to AG 1-4.

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• PSO's economic analysis of the EPA Settlement is unreasonably biased in favor of the Settlement and includes more than \$3.7 billion in highly speculative carbon taxes and other environmental compliance costs for the Coal Retrofit option to meet future regulations that do not, and may never, exist. After adjustments to correct this and other analytical flaws, the nominal cost of the EPA Settlement is estimated to be approximately \$3.7 billion higher (\$894 million higher on a present value basis) than the Coal Retrofit alternative under PSO's adjusted base case analysis.

• PSO's support for the EPA Settlement appears to be primarily based on speculative concerns regarding the potential cost impact of future EPA regulations which may never exist. The Company has not demonstrated why speculative concerns regarding future actions by the EPA should outweigh the \$1.9 billion to \$3.7 million estimated cost advantage of the Coal Retrofit option over the EPA Settlement.

1           • By requiring the premature retirement of the Northeastern coal units, the  
2 proposed EPA Settlement would virtually eliminate the existing fuel diversity on PSO's  
3 system, thereby creating significantly higher future cost risk for customers when  
4 compared to the Coal Retrofit option.

5  
6           • PSO has not determined whether the proposed EPA Settlement would result in  
7 any increase in the production of Oklahoma natural gas in the future. According to  
8 PSO's current forecast, under the Settlement the volume of natural gas usage by PSO in  
9 the year 2040 is actually expected to be approximately *4% lower* than gas usage in 2012.

10  
11           • The proposed EPA Settlement is expected to result in more loss of jobs, lower  
12 local tax revenues, higher SO2 emissions, and significantly higher electricity costs when  
13 compared to the Coal Retrofit compliance alternative.

14  
15           • The long-term rate impact of the EPA Settlement would disproportionately  
16 impact high energy users such as industrial and large commercial customers, since  
17 virtually all of the forecasted cost increase under the Settlement occurs in fuel costs.

18  
19 Based on the above findings and other findings discussed further in my testimony, I  
20 recommend that the Commission:

21  
22           • Deny PSO's request for pre-approval of a capital expenditure plan to  
23 implement the EPA Settlement because the forecasted cost of the Settlement is much  
24 higher than the Coal Retrofit alternative, because the final terms of the Settlement have  
25 not been approved, and because the environmental regulations addressed by the  
26 Settlement remain subject to legal appeal and potentially modification or vacature; and

27  
28           • Deny PSO's request for approval of the Calpine power purchase agreement  
29 ("PPA") because this purchase contract is not reasonable or necessary unless and until the  
30 Commission approves PSO's request to implement the EPA Settlement.

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**III. SUMMARY OF PSO'S APPLICATION**

**Q. WHAT IS PSO REQUESTING IN THIS CASE?**

A. PSO is seeking Commission pre-approval of its Plan for capital expenditures for environmental compliance as set forth under terms of the Company's EPA Settlement agreement. (Fate direct testimony, page 5) The Company is seeking approval of accelerated (2016-26) recovery of existing and future capital investments at its Northeastern coal units so that they are fully depreciated by 2026. PSO is seeking approval of a 260 MW 15-year PPA with Calpine. Finally, PSO seeks approval of its proposals to recover a return on equity ("ROE") adder of approx. \$5 million/yr. for its Calpine PPA and to recover all costs of this contract through a Base Load Purchased Power ("BLPP") Rider.

**Q. WHEN WAS THE EPA SETTLEMENT REACHED?**

A. American Electric Power ("AEP") announced that an agreement in principle between PSO, EPA, the State of Oklahoma, the Oklahoma Attorney General and Sierra Club had been reached in an April 24, 2012 press release. (See Exhibit SN-2.) A Settlement Term Sheet setting forth primary terms of the agreement was signed by PSO, EPA and the State of Oklahoma on July 19, 2012. (See PSO witness Ground's Exhibit HLG-1.) The EPA Settlement was executed by PSO, the State of Oklahoma, and the Sierra Club on October 17, 2012. (See Exhibit SN-3.)

1 Q. WERE ANY PSO RATEPAYER ORGANIZATIONS INCLUDED AS PARTIES  
2 TO THE EPA SETTLEMENT?

3 A. No.

4

5 Q. WAS OIEC INVITED TO PARTICIPATE IN NEGOTIATIONS OF THE EPA  
6 SETTLEMENT OR CONSULTED IN ANY WAY BEFORE THE SETTLEMENT  
7 WAS ANNOUNCED ON APRIL 24, 2012?

8 A. No. Only after the Settlement was announced, and over the next several months, was  
9 OIEC able to meet with PSO, ODEQ, the Secretary of the Environment and other state  
10 officials to express its concerns regarding the cost impacts and risk of the proposed  
11 Settlement to customers. To my knowledge, no PSO ratepayer organizations were  
12 invited to participate in the settlement negotiations or otherwise consulted by PSO before  
13 the Settlement was announced on April 24, 2012.

14

15 Q. HAS OIEC PREVIOUSLY EXPRESSED ITS CONCERNS REGARDING THE  
16 COST AND RISK OF RETIREMENT AND REPLACEMENT OF EXISTING  
17 COAL UNITS WITH NATURAL GAS AS PROPOSED BY PSO UNDER THE  
18 EPA SETTLEMENT?

19 A. Yes. OIEC actively participated in Cause No. PUD 201100077, the Commission's  
20 Notice of Inquiry ("NOI") to examine the impact of current and potential federal  
21 environmental regulations on Oklahoma's electric utilities and natural gas usage in  
22 Oklahoma. In comments filed on July 11, 2011, OIEC expressed its concerns regarding  
23 the significant rate impact of environmental compliance options and urged that the

1 Commission withhold any final decisions regarding proposed utility compliance plans  
2 that involved replacement of existing coal units with natural gas-fired generation until  
3 regulations were final and costs of each plan were carefully evaluated:

4  
5 OIEC urges the Commission to take great care in its evaluation of the economic  
6 impacts on ratepayers of the various options to comply with pending EPA  
7 regulations. Any action by utilities to comply with pending EPA regulations  
8 should be delayed until the final form and resolution of pending regulations is  
9 known. The Commission should not base any final decisions regarding the  
10 appropriate environmental compliance strategy for Oklahoma upon studies that  
11 assume the implementation of potential regulations, such as carbon taxes, that are  
12 not presently required by law. The cost of compliance with new federal  
13 environmental regulations will be significant, no matter what future course of  
14 action is taken. Because there is presently significant uncertainty in the timing,  
15 terms and costs of pending EPA regulations of air emissions, it is essential to  
16 conduct thorough analysis of all compliance options over a period of time which  
17 reasonably reflects the remaining operating life of coal plants which are likely to  
18 be most influenced by such regulations. This analysis should consider  
19 uncertainty in peak demand, alternative fuel prices, renewable energy resources,  
20 carbon taxes, and other factors unique to the Oklahoma market in deciding the  
21 compliance strategy which is most cost effective for Oklahoma ratepayers.  
22

23 It appears that much of the economic justification for converting or replacing  
24 Oklahoma's existing coal-fired generating plants with gas-fired generating  
25 facilities is originating from the belief that coal-fired power plants cannot operate  
26 for more than 40 years, that carbon taxes are certain to be implemented in the near  
27 future, and that natural gas prices will remain at their currently historically low  
28 level for the foreseeable future. OG&E's and PSO's economic analyses indicate  
29 that only through use of such extreme assumptions can the estimated costs of  
30 natural gas conversion or natural gas replacement alternatives become  
31 economically competitive with the alternative of retrofitting Oklahoma's existing  
32 coal-fired generating plants with scrubbers and continuing to operate such units.  
33

34 History has demonstrated that coal-fired power plants are physically capable of  
35 operating for 60 years or more, that natural gas prices are inherently volatile, and  
36 that utility systems that maintain a diverse set of energy resources are most likely  
37 to be able to protect customers against periods in which gas prices surge.  
38 Converting Oklahoma's coal-fired units to burn natural gas would eliminate the

1 fuel diversity that presently exists among Oklahoma's electric utilities and would  
2 jeopardize the history of relatively low electricity costs in the state that has been  
3 important in attracting and retaining industry. Based on OIEC's review of  
4 OG&E's and PSO's Integrated Resource Plans, it appears that adopting such a  
5 strategy would be shortsighted and potentially economically devastating to  
6 Oklahoma industry.  
7

8 **Q. WHAT SPECIFIC REGULATIONS ARE ADDRESSED BY PSO'S**  
9 **SETTLEMENT WITH EPA?**

10 A. The EPA Settlement addresses PSO's compliance obligations for the Company's  
11 Northeastern Units 3 and 4 under the existing RH and MATS rules. The EPA Settlement  
12 explicitly notes that the agreement does not impact PSO's obligations to comply with  
13 other existing or proposed EPA regulations.  
14

15 **Q. DOES THE EPA SETTLEMENT APPLY TO PSO'S OKLAUNION COAL-FIRED**  
16 **PLANT?**

17 A. No. PSO indicates that the Oklaunion plant is not subject to the RH rule and already  
18 includes a scrubber; and, therefore, is not significantly impacted by MATS. (Fate direct  
19 testimony, page 12.)  
20

21 **Q. WHAT ARE THE BASIC TERMS OF THE EPA SETTLEMENT?**

22 A. The EPA Settlement is attached for reference as Exhibit SN-3. The major provisions of  
23 the Settlement include:

- 24 1) PSO will retire one of the Northeastern coal units by April 16, 2016;

1           2) PSO will retrofit the other Northeastern coal unit with Dry-Sorbent Injection  
2           ("DSI") Activated Carbon Injection ("ACI") and a fabric filter baghouse by April 16,  
3           2016;

4           3) Beginning in 2021, PSO will reduce the annual capacity factor of the remaining  
5           Northeastern coal unit to no more than 70% in years 2021 and 2022, to no more than 60%  
6           in years 2023 and 2024, and to no more than 50% in years 2025 and 2026; and

7           4) PSO will retire the remaining Northeastern coal unit by no later than  
8           December 31, 2025 if lower cost alternatives are available, and otherwise retire the unit  
9           by no later than December 31, 2026.

10  
11   **Q.   WHAT WERE THE PRIMARY ALTERNATIVES TO THE EPA SETTLEMENT**  
12   **EVALUATED BY PSO?**

13   A.   PSO indicates that there were three primary alternatives to the EPA Settlement for  
14   meeting RH and MATS rule requirements:

15  
16           1) Retrofitting both Northeastern coal units in 2016, including the installation of  
17           scrubbers for SO2 control and ACI systems for mercury control;

18  
19           2) Retiring both Northeastern coal units in 2016 and replacing them with natural  
20           gas-fired combined cycle generating units; or

21  
22           3) Retiring one Northeastern coal unit in 2016 and retrofitting the other  
23           Northeastern coal unit with a scrubber and ACI.

24           (Fate direct testimony, page 18.)  
25

1 Alternative 1 above, which my testimony refers to as the “Coal Retrofit” option,  
2 essentially represents the RH FIP ordered by EPA on December 28, 2011. The EPA  
3 Settlement essentially represents Alternative 3 above, with the SO2 control technology  
4 changed from a scrubber to DSI system, plus the addition of ACI and a baghouse, and the  
5 agreement to retire the retrofitted unit no later than 2026.

6  
7 **Q. WHAT WERE THE PRIMARY FACTORS CONSIDERED BY PSO IN**  
8 **SELECTING THE EPA SETTLEMENT OVER OTHER COMPLIANCE**  
9 **ALTERNATIVES?**

10 A. PSO witness Fate states that PSO’s primary considerations in selecting its proposed  
11 environmental compliance plan include:

- 12  
13 1) Ability to meet RH and MACT compliance deadlines without jeopardizing  
14 reliability (Fate direct testimony, page 9);  
15  
16 2) Long-term cost and customer impacts (Fate direct testimony, page 12);  
17  
18 3) Impact on PSO employees (Fate direct testimony, page 12);  
19  
20 4) Impact on local communities and school districts (Fate direct testimony,  
21 page 12);  
22  
23 5) Consistency with Oklahoma Energy Plan goals (Fate direct testimony,  
24 page 13); and  
25  
26 6) Flexibility to deal with risk and uncertainty related to compliance costs,  
27 future fuel prices, and environmental regulations (Fate direct testimony,  
28 page 13).  
29

1 **Q. HAS PSO ADDRESSED THE EXTENT TO WHICH THE EPA SETTLEMENT**  
2 **MEETS EACH OF THE ABOVE FACTORS IN ITS TESTIMONY?**

3 A. Yes. The following sections of my testimony address PSO's analysis of the EPA  
4 Settlement and the extent to which the Settlement and other compliance alternatives  
5 evaluated by the Company meet the above objectives.

6  
7 **Q. WHAT STANDARD HAVE YOU APPLIED IN EVALUATING PSO'S REQUEST**  
8 **FOR PRE-APPROVAL OF ITS CAPITAL EXPENDITURE PLAN FOR**  
9 **IMPLEMENTING THE EPA SETTLEMENT?**

10 A. PSO's request for approval of its capital expenditure plan for implementing the EPA  
11 Settlement is made under 17 O.S. § 286(B). This statute specifies the requirements for  
12 such applications as follows:

13  
14 B. An electric utility subject to rate regulation by the Corporation Commission  
15 may file an application seeking Commission authorization of a plan by the utility  
16 to make capital expenditures for equipment or facilities necessary to comply with  
17 the federal Clean Air Act (CAA), the Clean Water Act (CWA), the  
18 Comprehensive Environmental Response, Compensation, and Liability Act  
19 (CERCLA), the Emergency Planning & Community Right-to-Know Act  
20 (EPCRA), the Endangered Species Act (ESA), the National Environmental Policy  
21 Act (NEPA), the Occupational Safety and Health Act (OSHA), the Oil Pollution  
22 Act (OPA), the Pollution Prevention Act (PPA), the Resource Conservation and  
23 Recovery Act (RCRA), the Safe Drinking Water Act (SDWA), the Toxic  
24 Substances Control Act (TSCA), all as amended, and, as the Commission may  
25 deem appropriate, federal, state, local or tribal environmental requirements which  
26 apply to generation facilities. If approved by the Commission, after notice and  
27 hearing, the equipment or facilities specified in the approved utility plan are  
28 conclusively presumed used and useful.

29  
30

1 Based on the above, it is my understanding that the key issues that must be determined by  
2 the Commission in addressing PSO's request for pre-approval of its capital expenditure  
3 plan for the EPA Settlement are:

4  
5 1) Is the EPA Settlement plan necessary to comply with CAA regulations?

6  
7 2) Are costs of the proposed plan reasonable and beneficial to customers as  
8 required to meet the traditional "used and useful" standard?

9  
10 **Q. WHAT ISSUES MUST BE ADDRESSED IN DECIDING WHETHER THE EPA  
11 SETTLEMENT IS NECESSARY TO MEET EPA REQUIREMENTS?**

12 A. PSO has acknowledged that the current MATS and RH FIP requirements can be met  
13 either by retrofitting both coal units, retiring and replacing both coal units, or a combined  
14 approach such as the EPA Settlement. The most important issue which must be  
15 evaluated in determining the necessity of the EPA Settlement is whether the Settlement  
16 Terms, and EPA regulations addressed by the Settlement, are sufficiently certain to  
17 justify an approval under 17 O.S. § 286(B) that the proposed plan is necessary to meet  
18 applicable environmental regulations. This issue has heightened importance due to the  
19 Tenth Circuit stay of the RH FIP. The second important issue to be addressed is whether  
20 the proposed EPA Settlement is the most cost effective option for achieving  
21 environmental compliance.

1 IV. TIMING OF EPA SETTLEMENT

2 Q. WHY DID PSO ENTER INTO THE EPA SETTLEMENT AT THIS TIME?

3 A. The Company indicates that its concerns regarding the ability to meet compliance  
4 deadlines under MATS and RH, and its desire to find a comprehensive compliance  
5 solution that addressed the uncertainty which existed regarding these environmental  
6 regulations, were primary factors underlying its decision to enter into the EPA  
7 Settlement. (Fate direct testimony, pages 9-10.) The Company also indicates that the  
8 Settlement allows PSO to reduce the level of capital investments for compliance on coal  
9 units that might eventually be forced out of service prematurely by future EPA  
10 regulations. (Fate direct testimony, page 14.)

11  
12 Q. IS THE LEVEL OF CAPITAL INVESTMENT UNDER THE EPA SETTLEMENT  
13 LOWER THAN UNDER COAL RETROFIT ALTERNATIVES?

14 A. No. As summarized in Table 2, the level of capital investment for retrofit of  
15 Northeastern Unit 3, plus the capital cost of new gas-fired replacement generating  
16 capacity and capacity payments for long-term PPAs to replace the coal units that are  
17 prematurely retired under the EPA Settlement, is approximately \$1 billion higher than  
18 the capital costs that PSO would otherwise incur to retrofit and continue operating the  
19 Northeastern coal units.

1

**Table 2**

Estimated Capital Investment/Capacity Costs  
EPA Settlement vs. Coal Retrofit Option (\$Millions)

	<u>EPA Settlement</u>	<u>Coal Retrofit</u>
Environmental Retrofit	\$285	\$936
Replacement Capacity	\$1,197	\$0
Calpine PPA Capacity	<u>\$467</u>	<u>\$0</u>
Total Capital/Capacity	\$1,949	\$936

Sources are Weaver Table 8 and Hamlet Exhibit RWH-1

2

3

4 **Q. WHAT ARE THE CURRENT COMPLIANCE DEADLINES FOR THE RH AND**  
5 **MATS RULES?**

6 A. Although the MATS rule remains under appeal, the current deadline for compliance with  
7 MATS is April of 2015, with provision for a one-year extension to April of 2016, which  
8 has been granted to PSO. (See Ground direct testimony, page 16.) The deadline for  
9 compliance with RH for Oklahoma was originally January of 2017; however in response  
10 to appeals by OG&E and others, the RH rule has been stayed by the Tenth Circuit. If the  
11 Tenth Circuit grants the Petitions to Review, the RH FIP may never go into effect. If the  
12 Tenth Circuit upholds the RH FIP, it is unclear when it would become effective.

13

14 **Q. DOES THE EPA SETTLEMENT ELIMINATE UNCERTAINTY THAT EXISTS**  
15 **REGARDING THE RH AND MATS RULES?**

16 A. No. The Settlement, if ultimately approved, simply provides a specific plan and  
17 timeframe for PSO to comply with *existing* RH and MATS regulations.

1

2 **Q. COULD THE MATS OR RH RULES BE MODIFIED OR VACATED AS A**  
3 **RESULT OF THE PENDING LEGAL APPEALS?**

4 A. Yes. Past experience with other EPA rules indicates that there is potential for these rules  
5 to be changed or vacated by legal action. Recent examples include the Clean Air  
6 Mercury Rule (CAMR), which was issued by the U.S. EPA in May 2005. The rule  
7 instituted a cap-and-trade program to limit emissions of mercury from coal-fired power  
8 plants, which was scheduled to go into effect beginning in January of 2010. However,  
9 the CAMR was appealed by various entities, and vacated by the U.S. Court of Appeals  
10 for the District of Columbia Circuit in February 2008. Also, the Cross State Air  
11 Pollution Rule (“CSAPR”), which was issued on July 6, 2011 in order to regulate  
12 interstate transport of air emissions, was appealed and vacated by the District of  
13 Columbia Circuit Court of Appeals in August 2012. These instances indicate that the  
14 pending appeals of the MATS and RH rules could also result in modifications, delay or  
15 vacature of these rules, especially since the RH FIP has been stayed, as was the CSAPR.

16

17 **Q. DOES THE EPA SETTLEMENT PROTECT PSO AND ITS CUSTOMERS IF**  
18 **THE MATS OR RH RULES ARE VACATED OR MODIFIED?**

19 A. No. The EPA Settlement does not include a regulatory out provision to protect customers  
20 in the event that the RH or MATS rules are delayed, modified or vacated. While the  
21 Settlement requires the retirement of one of the Northeastern coal units in April of 2016,  
22 and therefore alleviates regulatory risk regarding that unit, PSO remains fully obligated to  
23 comply with any future changes to the RH and MATS rules that might increase

1 environmental compliance costs. Moreover, the Settlement does not appear to provide  
2 any opportunity for the Company or its customers to benefit from any future extensions  
3 of the MATS or RH compliance deadlines, or other modifications or vacatures that might  
4 reduce compliance costs.

5  
6 **Q. DOES THE EPA SETTLEMENT EXEMPT PSO FROM ANY OTHER NEW OR**  
7 **EXISTING EPA REGULATIONS?**

8 A. No. Paragraph 2 of the EPA Settlement Term Sheet, which is attached as Exhibit HLG-1  
9 of PSO witness Ground's direct testimony, specifies that the amended Regional Haze  
10 Agreement ("RHA") resulting from the Settlement does not excuse PSO from any new  
11 regulations that are implemented in the future:

12  
13 Nothing in the RHA shall relieve PSO from its obligations to comply with all  
14 applicable federal, state, and local laws and regulations, including laws,  
15 regulations, and compliance deadlines that become applicable after the date of  
16 entry of the RHA.  
17

18 **Q. WHAT ARE THE POTENTIAL RISKS ARISING FROM PSO'S DECISION TO**  
19 **ENTER INTO THE EPA SETTLEMENT BEFORE LEGAL APPEALS TO THE**  
20 **RH AND MATS RULES ARE DECIDED?**

21 A. The primary risk is that the EPA Settlement locks PSO into a compliance plan and  
22 schedule that could result in significantly higher costs to customers. For example, in  
23 response to the legal appeals filed by OIEC, the State of Oklahoma and OG&E, on June  
24 22, 2012, the Tenth Circuit granted a stay of the effectiveness of the EPA's RH FIP for  
25 Oklahoma. It is my understanding that, should the Court uphold the rule, the RH

1 compliance deadlines will be extended to reflect the time during which the stay remained  
2 in effect. Unfortunately for PSO's customers, the Company decided not to join OIEC,  
3 the State of Oklahoma, and OG&E in their successful efforts to obtain a stay of the RH  
4 FIP, because the Company determined that the revised RHA under the EPA Settlement  
5 will supersede the RH FIP. (See Exhibit SN-4, OIEC 4-5.)  
6

7 **Q. WHAT IS THE ESTIMATED COST IMPACT OF THE STAY OF THE RH FIP?**

8 A. The stay of the RH FIP will delay the RH compliance deadline for adding scrubbers, and  
9 therefore will defer scrubber capital and O&M costs that otherwise would have been  
10 incurred as long as the stay remains in effect. The estimated cost savings arising from the  
11 stay of the RH FIP total approximately \$12 million per month. (See Exhibit SN-11.)  
12 This benefit of the stay of the RH FIP was not included in PSO's economic analyses of  
13 the Coal Retrofit option, which overstates the cost of the retrofit alternative. Moreover,  
14 should the Tenth Circuit vacate the RH FIP and the RH SIP ultimately be reinstated, PSO  
15 could continue operating the Northeastern units without having to invest nearly \$1 billion  
16 to retrofit scrubbers on these units. Obviously, the adoption of Oklahoma's original SIP  
17 would be by far the best outcome for PSO's customers, since it could save approximately  
18 \$400 million per year in capital, fuel and operations and maintenance costs, while at the  
19 same time preserving fuel diversity benefits of the Northeastern units. (See Exhibit SN-  
20 12.)  
21

22 **Q. IS IT POSSIBLE THAT THE TENTH CIRCUIT COULD ORDER THAT THE**  
23 **RH FIP BE MODIFIED OR VACATED?**

1 A. Yes. It is my understanding that in their Motions for Stay, the petitioners set out the  
2 standards for granting a stay, including the standard that the petitioners have a likelihood  
3 of succeeding on appeal. The Tenth Circuit found that the standards for granting a stay  
4 had been met, without discussing those standards. *See* Order filed on June 22, 2012 in  
5 Case Nos. 12-9526 and 12-9527.

6

7 **Q. HAS PSO PROVIDED ANY EVIDENCE TO DEMONSTRATE THAT**  
8 **ENTERING INTO THE EPA SETTLEMENT WOULD BE BENEFICIAL TO**  
9 **CUSTOMERS OR NECESSARY TO MEET RH OR MATS COMPLIANCE**  
10 **DEADLINES?**

11 A. No. As discussed in the following sections of my testimony, PSO's economic analysis  
12 indicates that the EPA Settlement has a significantly higher long-term cost than the Coal  
13 Retrofit compliance alternative under most scenarios evaluated by PSO. Moreover, most  
14 other considerations (e.g., fuel diversity, price risk and local economic impacts) also  
15 favor the Coal Retrofit alternative.

16

17 **Q. IS THE EPA SETTLEMENT SUBJECT TO FINAL APPROVAL OF THE ODEQ,**  
18 **EPA AND DOJ?**

19 A. Yes. There is a lengthy final approval process for the EPA Settlement, which is outlined  
20 in paragraphs 1 through 11 of the proposed Settlement. (See Exhibit SN-3.)

21

22 **Q. DOES PSO KNOW WHEN THIS APPROVAL PROCESS WILL BE**  
23 **COMPLETED?**

1 A. No. (See Exhibit SN-5, OIEC 9-5.) However, it appears very likely that final approval  
2 of the proposed EPA Settlement will not be obtained until well after this case is  
3 concluded since the approval process includes multiple notice periods, provision for  
4 public comments and possibly hearings.

5

6 **Q. IS THE EPA SETTLEMENT SUBJECT TO MODIFICATION AS A RESULT OF**  
7 **THIS APPROVAL PROCESS?**

8 A. It is my understanding that the proposed Settlement could be modified as part of the final  
9 approval process.

10

11 **Q. ARE THE TERMS OF THE EPA SETTLEMENT OR THE RH AND MATS**  
12 **REGULATIONS SUFFICIENTLY CERTAIN TO MAKE A DETERMINATION**  
13 **AT THIS TIME REGARDING THE NECESSITY OR BENEFITS OF THE**  
14 **SETTLEMENT?**

15 A. No. Until the Settlement is finally approved and legal appeals regarding the RH FIP and  
16 MATS rule have been finally resolved, it is not possible to know with reasonable  
17 certainty whether the EPA Settlement is necessary to meet RH or MATS requirements in  
18 order to conclusively establish the used and usefulness of capital expenditures to  
19 implement the Settlement under 17 O.S. § 286(B). Moreover, as discussed in the next  
20 section of my testimony, PSO's own analysis indicates that the costs to customers under  
21 the EPA Settlement is far higher than the Coal Retrofit alternative.

22

1 Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING THE TIMING OF  
2 PSO'S DECISION TO ENTER INTO THE EPA SETTLEMENT.

3 A. PSO's decision to enter into the EPA Settlement before legal challenges to the MATS  
4 rule and RH FIP were concluded, and without provisions for modifying the Settlement if  
5 such rules were significantly modified or vacated, was premature. This decision has  
6 resulted in a lost opportunity for PSO to significantly reduce compliance costs due to the  
7 Tenth Circuit's stay of the RH FIP or due to any other future changes to the RH or MATS  
8 rules which may occur. In addition, the proposed Settlement is subject to a multi-step  
9 final approval process, and potential modification or rejection, and this approval process  
10 is not likely to be completed until after this case is concluded.

11

12 V. FUEL DIVERSITY

13

14 Q. WHAT IS THE CURRENT FUEL MIX OF THE PSO SYSTEM?

15 A. The energy (MWh) mix of PSO's system during 2011 is summarized below in Table 3:

16

17

**Table 3**

PSO 2011 Energy Supply Mix

Natural Gas	34.1%
Coal	36.3%
Purchased Power	17.1%
Wind Energy	12.5%
Total	100.0%

Source: PSO SchA-1, Cause No. PUD 201200168.

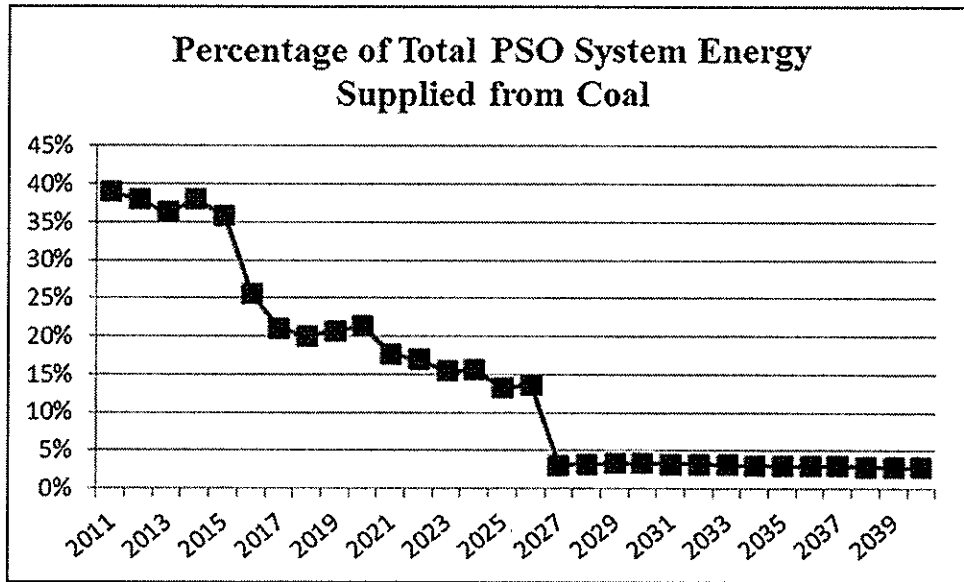
18

1 Q. HOW WOULD THE FUEL DIVERSITY OF PSO'S SYSTEM BE IMPACTED BY  
2 THE PROPOSED EPA SETTLEMENT?

3 A. As shown below in Figure 1, by 2017, the first year following retirement of Northeastern  
4 Unit 4 under the EPA Settlement, coal fired generation is forecasted to drop from the  
5 current level of approximately 40% to approximately 20% of PSO's total system energy  
6 supply. By 2027, the first year after the second Northeastern unit is required to retire,  
7 PSO forecasts that coal-fired generation will represent only approximately 3% of the total  
8 system energy supply, while natural gas-fired generation and PSO market energy  
9 purchases (which are predominantly influenced by the price of natural gas) will increase  
10 to approximately 73% of total system energy.

11  
12

Figure 1



13  
14

15 Q. WHY IS THE DECLINE IN FUEL DIVERSITY UNDER THE PROPOSED EPA  
16 SETTLEMENT SUCH AN IMPORTANT ISSUE?

1 A. At present, coal-fired generation is the only real hedge against rising natural gas prices on  
2 PSO's system. Virtually all of PSO's current gas and long-term purchased power  
3 contracts have prices based on gas market price indexes, and therefore are subject to  
4 future gas price increases. Once the Northeastern coal units are retired, and until natural  
5 gas suppliers are willing to offer long-term contracts with attractive fixed pricing, there  
6 will be little or no prospect for PSO to economically restore the fuel diversity that  
7 presently exists on its system. This is because the cost of firm replacement power  
8 supplied from renewable energy resources is presently very high, and because it is no  
9 longer economically feasible to construct new coal-fired plants. For these reasons, the  
10 loss of fuel diversity arising from the premature retirement of PSO's Northeastern coal  
11 units under the EPA Settlement will place PSO's customers at significant risk should gas  
12 prices increase in the future.

13

14 **Q. HAS PSO PREVIOUSLY RECOGNIZED THE IMPORTANT ROLE THAT**  
15 **COAL UNITS PLAY IN MAINTAINING LOW ENERGY COSTS AND FUEL**  
16 **DIVERSITY ON ITS SYSTEM?**

17 A. Yes. For example, page 19 of PSO's 2011 Fuel Supply Portfolio and Risk Management  
18 Plan addresses the Company's strategy of maintaining a diverse fuel supply and  
19 maximizing generation supplied from its low-cost coal units:

20

21 By investing in and using generating plants that use different fuel sources, PSO  
22 has created a flexible portfolio of coal, natural gas, fuel oil and purchased power  
23 resources, including wind, which helps manage overall variable costs due to the  
24 potential price volatility of any one particular fuel source. PSO's ability to  
25 mitigate the potential impact of price volatility of its overall fuel cost has been

1 primarily attributable to effective management of its fuel mix, through maximum  
2 use of its coal generation, increased flexibility in fuel supply and transportation  
3 contracts, periodic use of fuel oil, and the use of purchased power when it  
4 economically displaces PSO's own generation.

5  
6 Typically, PSO meets its generation requirements by first using its lower-cost coal  
7 units (and generation from SWEPCO's coal and lignite units when available to  
8 PSO) to achieve the overall lowest reasonable fuel cost . . .

9  
10  
11 As shown in Table 4, PSO's strategy of maximizing coal-fired generation on its system  
12 has produced estimated fuel cost savings of approximately \$1.9 billion over the last six  
13 years.

14 **Table 4**

PSO Coal and Natural Gas Fuel Costs

	Coal	Gas	Coal	Est. Coal
	<u>\$/MMBtu</u>	<u>\$/MMBtu</u>	<u>MMBtu</u>	<u>Savings</u>
2006	\$1.31	\$6.43	75,807,897	\$388,136,433
2007	\$1.33	\$6.46	70,565,603	\$362,001,543
2008	\$1.40	\$7.93	70,991,586	\$463,575,057
2009	\$1.34	\$3.99	72,629,099	\$192,467,112
2010	\$1.26	\$4.71	67,218,910	\$231,905,240
2011	\$1.30	\$4.48	77,396,955	<u>\$246,122,317</u>
Total Savings				\$1,884,207,701

Source: PSO Annual Fuel Prudence filings with OCC.

15  
16 **Q. HAS AEP RECOGNIZED THE IMPORTANCE OF FUEL DIVERSITY WHEN**  
17 **EVALUATING ENVIRONMENTAL COMPLIANCE OPTIONS FOR COAL**  
18 **UNITS IN OTHER JURISDICTIONS?**

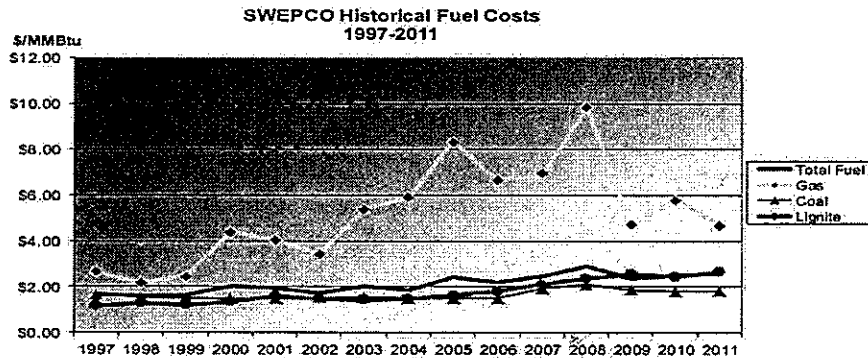
1 A. Yes. For example, AEP witness Sandra Bennett addressed the importance of maintaining  
2 fuel diversity in her June, 2012 rebuttal testimony supporting retrofit of the Flint Creek  
3 coal plant in APSC Docket No. 12-008-U as follows:  
4

1 expected at that time.

2 **VIII. HISTORICAL FUEL PRICES, PROJECT FUEL PRICES AND**  
3 **FUEL DIVERSITY**

4 Q. PLEASE COMPARE THE HISTORICAL PRICES OF SOLID  
5 FUEL AND NATURAL GAS?

6 A. The price of solid fuel has been extremely stable over the years, while  
7 the price of natural gas has been extremely volatile. The chart below  
8 depicts the pricing of the commodities for the period of 1997 through  
9 2011:



10 Natural gas prices have demonstrated much more volatility over  
11 the last 15 years ranging from \$2.18MMBTU in 1998 to \$9.84MMBTU  
12 in 2008. In contrast, SWEPCO's total fuel costs have remained stable  
13 providing less risk and more benefit to SWEPCO customers, as a result  
14 of the stability in coal and lignite costs. While we continually monitor  
15 the price of all fuels, we also believe that maintaining low rates for our

1 Q. WHAT IS THE POTENTIAL UPSIDE COST EXPOSURE TO PSO'S  
2 CUSTOMERS DUE TO THE LOSS OF FUEL DIVERSITY UNDER THE EPA  
3 SETTLEMENT?

4 A. Due to the required premature retirement of the Northeastern coal units under the EPA  
5 Settlement, each \$1/MMBtu increase in the price of natural gas would increase fuel costs  
6 on the PSO system by approximately \$1 billion over the first 25 years of the Settlement.  
7 (See Exhibit SN-29.) This heightened fuel cost risk under the proposed EPA Settlement  
8 would be particularly impactful on high load factor commercial and industrial users.

9

10 Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING THE IMPACT  
11 OF THE EPA SETTLEMENT UPON FUEL DIVERSITY OF PSO'S SYSTEM.

12 A. There will be a significant permanent loss of fuel diversity on PSO's system due to the  
13 premature retirement of the Northeastern coal units as required by the EPA Settlement.  
14 This loss, which is not reflected in PSO's economic analysis of the Settlement, should be  
15 considered as an important factor in determining the reasonableness of the proposed  
16 Settlement.

17

18 VI. PSO'S ECONOMIC ANALYSIS

19 Q. WHAT INFORMATION HAS PSO PROVIDED TO DEMONSTRATE THAT ITS  
20 PROPOSED ENVIRONMENTAL COMPLIANCE PLAN REPRESENTS THE  
21 LOWEST REASONABLE COST ALTERNATIVE?

22 A. PSO has included the results of long-term production cost studies conducted in late-2011  
23 before its decision to enter into the EPA Settlement, along with updated studies

1 performed in August 2012. The studies from late-2011 are addressed primarily by PSO  
2 witness Fate and summarized in his Exhibit SLF-2, as well as PSO witness Weaver's  
3 Exhibits SCW-6 and SCW-7. The updated studies performed in August 2012, after the  
4 EPA Settlement terms had been negotiated, are addressed by PSO witness Weaver and  
5 summarized in his Exhibit SCW-8.

6  
7 **A. LATE-2011 COST ANALYSIS**

8  
9 **Q. WHAT IS THE RELEVANCE OF PSO'S LATE-2011 COST STUDIES OF**  
10 **ENVIRONMENTAL COMPLIANCE OPTIONS?**

11 A. The late-2011 studies reflect the information PSO had on relative costs of environmental  
12 compliance alternatives before entering into the EPA Settlement in April of 2012. PSO  
13 indicates that this is the information that the Company presented to the State of  
14 Oklahoma, the Oklahoma Attorney General ("AG") and other parties in seeking their  
15 support of the EPA Settlement. (See Exhibit SN-30, OIEC 15-5 and 15-6.) To this  
16 extent, the Late-2011 cost analysis is highly relevant in determining whether or not it was  
17 reasonable for PSO to enter into the EPA Settlement and whether other parties to the  
18 Settlement were provided with information that reasonably reflected the true cost of the  
19 Settlement and of retiring and replacing the Northeastern coal-fired units.

20  
21 **Q. WHAT DO THE RESULTS OF PSO'S LATE-2011 COST STUDIES INDICATE**  
22 **WITH REGARD TO THE EPA SETTLEMENT AND OTHER COMPLIANCE**  
23 **ALTERNATIVES?**

1 A. Table 5 below summarizes the results of PSO's late-2011 cost studies, as presented in  
 2 PSO witness Fate's Substituted Exhibit SLF-2. These results represent the cumulative  
 3 present value cost or savings of each compliance alternative in comparison to the EPA  
 4 Settlement plan, stated in 2011 dollars. Negative values, noted by parentheses, indicate  
 5 that the alternative has a lower cost than the EPA Settlement, while positive values  
 6 indicate the alternative has a higher cost than the EPA plan. As shown, PSO's analysis  
 7 indicates that the EPA Settlement option has the third highest cost of the four compliance  
 8 alternatives evaluated by PSO, and has a higher cost than the Coal Retrofit option in all  
 9 scenarios evaluated by PSO.

11 **Table 5**

PSO's Late-2011 Environmental Compliance Analysis  
 2011-2040 Cum Present Value Cost/(Savings) vs EPA Settlement  
 (\$Millions)

<u>Scenario</u>	<u>Coal Retrofit</u>	<u>Retire Both</u>	<u>Retrofit 1/Retire 1</u>	<u>EPA Settlement</u>
Base Fuel/15 Yr Coal	(\$124)	\$297	(\$165)	\$0
Low Fuel/15 Yr Coal	(\$10)	\$27	(\$131)	\$0
Base Fuel/25 Yr Coal	(\$482)	\$297	(\$358)	\$0
Low Fuel/25 Yr Coal	(\$333)	\$27	(\$306)	\$0
Early CO2/25 Yr Coal	(\$415)	-	-	<u>\$0</u>
Avg All Scenarios	(\$273)	\$162	(\$240)	\$0
Avg Cost Ranking	1	4	2	3

Source is PSO witness Fate's Exhibit SLF-2.

12

13

1 Q. DO THE RESULTS IN TABLE 5 REFLECT THE ACTUAL COST IMPACT TO  
 2 CUSTOMERS OF THE EPA SETTLEMENT?

3 A. No. The amounts presented in Table 5 reflect the present value of the forecasted total  
 4 cost difference between the EPA Settlement and other alternatives over the 2011-2040  
 5 period, discounted to the year 2011. However, the actual cost impact of the EPA  
 6 Settlement on customers is much larger than the amounts presented in PSO's testimony  
 7 as summarized in Table 5 above. For example, as summarized below in Table 6, the total  
 8 nominal cost increase of the EPA Settlement over costs for the Coal Retrofit alternative is  
 9 forecasted by PSO to be approximately \$2 billion over the 2011-2040 period.

11 **Table 6**

PSO's Late-2011 Environmental Compliance Analysis  
 2011-2040 Total Nominal Cost/(Savings) vs EPA Settlement  
 (\$Millions)

<u>Scenario</u>	<u>Coal Retrofit</u>	<u>Retire Both</u>	<u>Retrofit 1/Retire 1</u>	<u>EPA Settlement</u>
Base Fuel/15 Yr Coal	(\$497)	\$322	(\$812)	\$0
Low Fuel/15 Yr Coal	(\$117)	(\$403)	(\$642)	\$0
Base Fuel/25 Yr Coal	(\$2,027)	\$322	(\$1,687)	\$0
Low Fuel/25 Yr Coal	(\$1,419)	(\$403)	(\$1,396)	\$0
Early CO2/25 Yr Coal	<u>(\$1,867)</u>	-	-	<u>\$0</u>
Avg All Scenarios	(\$1,185)	(\$41)	(\$1,134)	\$0
Avg Cost Ranking	1	3	2	4

Source is Substituted Exhibit SCW-7, provided in PSO's updated response to OIEC 3-2.

12

13

1 Q. WHAT DO THE ABOVE RESULTS INDICATE ABOUT THE COAL RETROFIT  
2 ALTERNATIVE?

3 A. As discussed later in my testimony, PSO's cost studies were conducted in a manner that  
4 unreasonably favors the EPA Settlement option, and which completely ignores the value  
5 of fuel diversity provided by the Coal Retrofit compliance alternative. However, even  
6 without considering the fuel diversity benefit and ignoring other flaws in PSO's analysis,  
7 the results presented in Tables 5 and 6 indicate that the Coal Retrofit alternative was  
8 expected to have a far lower cost than the EPA Settlement over a wide range of scenarios.

9

10 Q. WHAT DO THE ABOVE RESULTS INDICATE ABOUT THE OTHER  
11 COMPLIANCE ALTERNATIVES EVALUATED BY PSO?

12 A. The results presented in Tables 5 and 6 indicate that the "Retire Both Units" option is by  
13 far the most costly alternative in all cases. This indicates that the immediate retirement of  
14 both Northeastern coal units is not an economically viable compliance option. The  
15 results further indicate that the "Retrofit 1/Retire 1" alternative is forecasted to have a  
16 lower cost than the proposed EPA Settlement in all scenarios. This cost advantage of the  
17 Retrofit 1/Retire 1 option over the EPA Settlement appears to be due to the fact that this  
18 alternative assumes that the Northeastern coal unit which is retrofitted will be operated  
19 for either 50 or 60 years (i.e., through 2030 or 2040), whereas under the EPA Settlement,  
20 the Northeastern coal unit that is retrofitted is subject to operating limits after 2020 and  
21 then required to retire in 2026.

22

1 Q. WHICH ALTERNATIVE TO THE EPA SETTLEMENT REPRESENTS THE  
2 LEAST COST ALTERNATIVE FOR CUSTOMERS?

3 A. PSO's Late-2011 cost analysis indicates that the Coal Retrofit option is the least cost  
4 alternative to the EPA Settlement on both a present value and nominal cost basis.  
5 Moreover the Coal Retrofit option also provides the greatest fuel diversity value of any  
6 compliance option, which is not reflected in PSO's cost analyses.

7

8 B. UPDATED AUGUST 2012 COST ANALYSIS

9

10 Q. WHY DID PSO UPDATE ITS ECONOMIC ANALYSIS OF THE EPA  
11 SETTLEMENT IN AUGUST 2012?

12 A. PSO updated its economic analysis in August of 2012 to reflect increases in the  
13 Company's capital cost estimate for retrofit of the Northeastern coal units, to include a  
14 higher construction overhead rate, to increase the discount rate to reflect a higher  
15 assumed return on equity of 11.15%, and to reflect certain other updates as described on  
16 page 49 of PSO witness Weaver's direct testimony. These revisions to PSO's Late-2011  
17 economic analysis generally had the effect of increasing the cost of the Coal Retrofit  
18 option, thereby somewhat reducing the economic advantage that this option has over the  
19 EPA Settlement under most scenarios.

20

21 Q. DOES PSO'S UPDATED AUGUST 2012 COST ANALYSIS CONFIRM THAT  
22 THE COAL RETROFIT OPTION IS A LOWER COST ALTERNATIVE TO THE  
23 EPA SETTLEMENT?

1 A. Yes. As summarized in Table 7, PSO's updated August 2012 cost analysis indicates that  
 2 the Coal Retrofit option maintains an average cost advantage over all cases of  
 3 approximately \$97 million on a cumulative present value basis and of approximately  
 4 \$994 million on a nominal basis over the EPA Settlement. Under PSO's updated base  
 5 case analysis for the case assuming the Northeastern units operate until 2040, the  
 6 forecasted nominal cost advantage of the Coal Retrofit option over the EPA Settlement is  
 7 \$1.86 billion.

8 **Table 7**

PSO's August 2012 Environmental Compliance Analysis  
 Coal Retrofit Cost/(Savings) vs EPA Settlement  
 (\$Millions)

<u>Scenario</u>	<u>2011-2040 Cum NPV</u>	<u>2011-2040 Nominal Cost</u>
Base Fuel/15 Yr Coal	\$203	\$553
Low Fuel/15 Yr Coal	\$294	\$779
High Fuel/15 Yr Coal	\$58	\$195
Base Fuel/25 Yr Coal	(\$278)	(\$1,860)
Low Fuel/25 Yr Coal	(\$157)	(\$1,388)
High Fuel/25 Yr Coal	(\$601)	(\$3,580)
Early CO2/25 Yr Coal	<u>(\$196)</u>	<u>(\$1,661)</u>
Avg All Scenarios	(\$97)	(\$995)

Sources are PSO witness Weaver's Substituted Exhibit SCW-8 and  
 PSO's response to AG 1-4.

9  
 10  
 11  
 12

Although the updated cost analysis indicates that the EPA Settlement would have a lower  
 cost than the Coal Retrofit option in cases that assume that the Northeastern coal units

1 would have a remaining useful life of 15 years after the retrofits were made, this  
2 assumption is inconsistent with actual experience on PSO's system and appears to be  
3 based primarily on speculation by the Company that EPA will introduce new regulations  
4 in the future that will force the premature retirement of the Northeastern coal units. In  
5 addition, PSO failed to consider the major risks associated with higher gas prices, higher  
6 loads, or lower carbon prices in its cost analysis, as it has done in other environmental  
7 compliance studies. PSO compounded these problems by ignoring the fuel diversity  
8 benefit provided by the Coal Retrofit option.

9  
10 **Q. ARE THE RESULTS OF PSO'S LATE-2011 AND AUGUST 2012 COST STUDIES**  
11 **GENERALLY CONSISTENT WITH OTHER RECENT AEP**  
12 **ENVIRONMENTAL COMPLIANCE STUDIES?**

13 A. Yes. As discussed later in my testimony, an AEP environmental compliance analysis  
14 performed in the same late-2011 timeframe for SWEPCO's Flint Creek coal plant in  
15 Arkansas, also indicates that the Coal Retrofit option was the least cost compliance  
16 alternative across a wide range of scenarios evaluated by AEP. In that pending Arkansas  
17 case, SWEPCO is seeking approval to retrofit the Flint Creek unit with scrubbers,  
18 arguing that the retrofit option represents the least cost and lowest risk alternative for  
19 meeting requirements of the RH and MATS rules. Paragraph 5 of SWEPCO's  
20 application for approval to retrofit the Flint Creek coal plant, which was filed with the  
21 APSC on February 8, 2012 describes the results of the Company's economic analysis of  
22 the Coal Retrofit option as follows:

1 SWEPCO conducted a comprehensive economic analysis of the cost of retrofitting  
2 Flint Creek with the required environmental controls compared to the cost of various  
3 natural gas alternatives. SWEPCO also retained ICF International (“ICF”) to conduct  
4 an independent economic analysis of the cost of natural gas alternatives compared to  
5 the cost of coal-fired generation from Flint Creek after the installation of  
6 environmental controls. The analyses conducted by SWEPCO and ICF evaluated a  
7 broad range of assumptions regarding commodity prices, emission allowances and  
8 the impact of future greenhouse gas regulation. In each scenario considered by  
9 SWEPCO, and in all but one scenario considered by ICF, extending the life of the  
10 coal-fired Flint Creek Power Plant was more economic than the natural gas  
11 alternatives.  
12

13 **Q. HOW DOES PSO JUSTIFY ITS DECISION TO ENTER INTO THE EPA  
14 SETTLEMENT WHEN ITS COST STUDIES INDICATE THAT THE COAL  
15 RETROFIT OPTION IS A MUCH LOWER COST ALTERNATIVE?**

16 A. PSO argues that “there was not a material cost difference” between the EPA Settlement  
17 and other compliance alternatives. (See Fate direct testimony, page 15.) The Company  
18 further asserts that, because there is not a material difference in the compliance costs, it  
19 selected the EPA Settlement because it offered lower environmental risk while better  
20 meeting Oklahoma Energy Plan goals.  
21

22 **C. MATERIALITY OF COAL RETROFIT COST ADVANTAGE**

23  
24 **Q. DO YOU AGREE WITH PSO’S ASSERTION THAT THE COST DIFFERENCES  
25 BETWEEN THE EPA SETTLEMENT AND THE COAL RETROFIT  
26 ALTERNATIVE ARE NOT MATERIAL?**

1 A. No; I disagree with PSO's conclusion that the cost differences are immaterial. As noted  
2 in Tables 5 and 6 of my testimony, at the time it decided to enter into the EPA  
3 Settlement, PSO's base case forecast of the cost advantage of the Coal Retrofit option  
4 over the EPA Settlement was \$482 million on a cumulative present value basis and over  
5 \$2.0 billion on a nominal basis. The Company asserts that the \$482 million cost  
6 advantage of the Coal Retrofit option represents only 3.3% of total system costs, which it  
7 views to be immaterial. However, these forecasted benefits of the Coal Retrofit option  
8 are significant in comparison to savings provided by other projects. Moreover, even if  
9 there were no forecasted economic advantage of the Coal Retrofit option over the EPA  
10 Settlement, the Coal Retrofit option should be favored due to the significant fuel diversity  
11 benefit that the Northeastern units provide to the PSO system.

12

13 **Q. HOW DOES THE ESTIMATED PERCENTAGE COST ADVANTAGE FOR**  
14 **RETROFIT OF THE NORTHEASTERN COAL UNITS COMPARE TO**  
15 **SWEPCO'S ESTIMATE OF THE RETROFIT COST ADVANTAGE FOR THE**  
16 **FLINT CREEK COAL PLANT?**

17 A. As shown in Table 8 below, the forecasted 3.3% base case cost advantage of the Coal  
18 Retrofit option over the EPA Settlement for PSO's Northeastern coal units is  
19 approximately 3 times the forecasted cost advantage of the scrubber retrofit option for  
20 Flint Creek (0.8% to 1.4%).

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22

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**Table 8**

SWEPCO Base Case Estimate of Flint Creek Scrubber Retrofit Cost Advantage  
Over Coal Replacement Options (2011-2040 Cum NPV, \$Millions)

<u>Alternative</u>	<u>Coal Retrofit Advantage</u>	<u>Total System Cost</u>	<u>Retrofit Advantage, %</u>
Convert to New Gas Unit	\$227	19,334	1.2%
Replace with Brownfield NGCC	\$148	19,255	0.8%
Replace with New NGCC	\$274	19,382	1.4%

Sources are SWEPCO witness Scott Weaver's direct testimony, Exhibits SCW-6 and SCW-6A, as filed in APSC Docket No. 12-008-U.

3

4

5 **Q. DID SWEPCO INDICATE THAT THE FLINT CREEK SCRUBBER RETROFIT**  
6 **COST ADVANTAGE OVER GAS REPLACEMENT ALTERNATIVES WAS NOT**  
7 **MATERIAL?**

8 A. No. SWEPCO witness Weaver, who also sponsors PSO's cost analysis of environmental  
9 compliance options for the Northeastern units, described the results of his cost analysis of  
10 the scrubber retrofit option for Flint Creek in his testimony in APSC Docket No. 12-008-  
11 U as follows:

12

13 Based even on modeling results that were predicated on more "gas-friendly"  
14 earlier CO2/carbon (FleetTransition-CSAPR: Early Carbon) and lower natural gas  
15 and attendant energy pricing (Fleet Transition-CSAPR: LOWER Band) scenarios,  
16 it would continue to strongly support the Flint Creek Retrofit alternative. In  
17 general terms, assessing the full suite of modeled CPW differences between

1 “Option #1” through “Option #4” in Exhibit SCW-6 – that are inclusive of these  
2 hugely impactful discrete risk elements – it would indicate that a specific solution  
3 that would call for the retrofit of the Flint Creek unit would represent the best  
4 option for SWEPCO and its customers.  
5

6 (Direct Testimony of Scott Weaver, page 53, APSC Docket No. 12-008-U.)  
7

8 **Q. HAS PSO PROPERLY CALCULATED THE PERCENTAGE DIFFERENCES**  
9 **BETWEEN THE EPA SETTLEMENT AND COAL RETROFIT OPTIONS?**

10 A. No. PSO calculated the percentage differences between the EPA Settlement and the  
11 Coal Retrofit alternative by dividing the difference in the cumulative net present value of  
12 each plan by the total cumulative present value of production costs included in the  
13 Company’s cost analysis. The problem with this approach is that a large portion of the  
14 costs included in PSO’s analysis do not change from case to case. For example, under  
15 the Company’s updated base case economic analysis, the forecasted retrofit option  
16 benefit of \$482 million is divided by total estimated production costs of \$14.82 billion, to  
17 arrive at a percentage benefit of 3.3% over the EPA Settlement option. (See Fate Exhibit  
18 SLF-2 Substituted.) However, the \$14.82 billion total system production cost used for  
19 this calculation includes a number of major costs that do not change from plan to plan,  
20 including:  
21

- 22 1) \$2.71 billion (present value) in system production costs incurred during  
23 the 2011-2015 period before the retrofits are implemented;
- 24
- 25 2) \$1.21 billion in base O&M costs that are the same in both plans;
- 26

- 1                   3) \$236 million in fuel costs for the Oklaunion plant that is the same in both  
2                   plans;  
3  
4                   4) Approximately \$2.48 billion in costs incurred for the 504 MW Exelon PPA  
5                   which are incurred in both case;  
6  
7                   5) An estimated \$1.16 billion of costs for wind generation resources and  
8                   contracts that are the same in both cases; and  
9  
10                  6) An estimated \$1.3 billion for other incurred fuel costs that are not impacted by  
11                  the changes between the EPA Settlement and Coal Retrofit cases.  
12

13 **Q.    HOW DO THESE COSTS AFFECT THE PERCENTAGE COST DIFFERENCE**  
14 **BETWEEN THE EPA SETTLEMENT AND THE COAL RETROFIT OPTION?**

15 A.    Costs that are the same in both plans should not be included in the denominator used for  
16        calculating the percentage change associated with the Coal Retrofit option or other plans,  
17        since they have no relation to the environmental compliance changes in these plans.  
18        Including such costs is analogous to including fuel costs in total system costs when  
19        calculating the percentage impact of an increase in base rates – this only serves to mask  
20        the true level of increase in the costs that are changing.  
21

22 **Q.    WHAT IS THE PERCENTAGE CHANGE IN COSTS DUE TO THE EPA**  
23 **SETTLEMENT IF PROPERLY CALCULATED TO EXCLUDE SUCH**  
24 **COMMON COSTS?**

25 A.    If the \$5.7 billion of common costs which are the same in both plans are properly  
26        excluded, the base case cost advantage of the Coal Retrofit option over the EPA  
27        Settlement is 8.4%, which is more than double the percentage difference suggested by

1 PSO's analysis. (See Exhibit SN-6.) This percentage cost advantage of the Northeastern  
2 Coal Retrofit option is approximately 7 times higher than SWEPCO's forecasted  
3 percentage cost advantage for the Flint Creek scrubber retrofit option, and therefore  
4 represents a material cost advantage for the Northeastern unit Coal Retrofit option.

5  
6 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING PSO'S COST**  
7 **ANALYSIS OF THE EPA SETTLEMENT AND NORTHEASTERN COAL UNIT**  
8 **RETROFIT OPTIONS.**

9 A. PSO's cost analysis indicates that the Coal Retrofit option is a far lower cost option than  
10 the EPA Settlement over a wide range of scenarios. Although the Company characterizes  
11 estimated \$2.0 billion cost advantage of the Coal Retrofit option over the EPA Settlement  
12 as "immaterial," this conclusion is unfounded, and also ignores the significant fuel  
13 diversity benefit provided by retrofit and continued operations of the Northeastern units.  
14 Moreover, as explained in the next section of my testimony, PSO's cost studies of the  
15 EPA Settlement and Coal Retrofit option appear to be unreasonably biased against the  
16 Coal Retrofit option and in favor of the EPA Settlement option, and therefore  
17 significantly understate the cost advantage of the Coal Retrofit option.

18  
19 **VII. FLAWS IN PSO'S ANALYSIS**

20 **Q. WHAT ARE THE PRIMARY FLAWS IN PSO'S ECONOMIC ANALYSIS OF**  
21 **THE EPA SETTLEMENT AND THE COAL RETROFIT COMPLIANCE**  
22 **ALTERNATIVE?**

1 A. There are six primary flaws in PSO's cost analysis which serve to understate the cost of  
2 the EPA Settlement, and therefore understate the significant cost advantage of the  
3 Northeastern retrofit compliance alternative:

4  
5 1) PSO's analysis includes speculative costs for compliance with  
6 environmental regulations which do not exist, may never exist, or which are not final,  
7 including more than \$3.7 billion in speculative carbon taxes in the Coal Retrofit case;

8  
9 2) PSO's base case analysis assumes that unspecified future EPA regulations  
10 will limit the service life of the Northeastern coal units to 50 years, although actual  
11 experience on the AEP system, the Commission's Final Orders in Cause Nos. PUD  
12 200600285 and 200800144, and previous AEP studies indicate that the Northeastern coal  
13 units are capable of operating for 60 years or more;

14  
15 3) PSO apparently did not evaluate the potential impact of higher gas prices  
16 on costs under the EPA Settlement or other compliance options before entering into the  
17 EPA Settlement;

18  
19 4) PSO's analysis did not include the value of excess capacity that is  
20 forecasted to exist in the early years of the Coal Retrofit compliance alternative;

21  
22 5) PSO's analysis includes unsupported incremental O&M costs for the  
23 Northeastern coal units which appear to be excessive; and

24  
25 6) PSO's analysis understates the present value of the cost advantage of the  
26 Coal Retrofit compliance option by using an unreasonably high discount rate, and by  
27 discounting costs back to 2011.

28

1 Q. WHAT ARE THE ESTIMATED IMPACTS OF THE ABOVE FLAWS ON THE  
2 RESULTS OF PSO'S ANALYSIS?

3 A. As summarized in Table 9, after adjustments for the above flaws (except for high fuel  
4 price risk), the estimated base case cost advantage of the Coal Retrofit option over the  
5 EPA Settlement increases to approximately \$3.7billion on a nominal basis, and to  
6 approximately \$894 million on a present value basis.

7

8

**Table 9**

PSO's Updated August 2012 Environmental Compliance Analysis  
Estimated Cost/(Savings) of Coal Retrofit Option vs EPA Settlement  
with Adjustments to PSO Analysis (\$Millions)

	2011-2040 <u>Cum NPV</u>	2011-2040 <u>Nominal Cost</u>
PSO Base Case	(\$278)	(\$1,860)
<u>Adjustments:</u>		
No CO2 Taxes	(\$251)	(\$1,251)
Excess Capacity Value	(\$93)	(\$148)
Incremental O&M	(\$192)	(\$455)
2013 NPV/Discount Rate	<u>(\$80)</u>	<u>\$0</u>
Adjusted Base Case	(\$894)	(\$3,714)
High Fuel Risk	(\$323)	(\$1,720)

9

Sources are PSO witness Weaver's Substituted Exhibit SCW-8 and PSO's  
response to AG 1-4.

10

11 Q. COULD YOU ELABORATE ON EACH OF THESE FLAWS IN PSO'S  
12 ECONOMIC ANALYSIS?

1 A. Yes. I have addressed the fuel diversity issue separately earlier in my testimony due to  
2 the critical importance of this issue. The other problems underlying PSO's cost analysis  
3 are discussed below.

4  
5 A. **SPECULATIVE ENVIRONMENTAL COMPLIANCE COSTS**

6  
7 Q. **WHAT IS YOUR CONCERN REGARDING THE TREATMENT OF**  
8 **ENVIRONMENTAL COSTS IN PSO'S ECONOMIC ANALYSIS?**

9 A. PSO has explicitly included compliance costs for "future" regulations in its cost analysis  
10 of the EPA Settlement and Coal Retrofit options. For example, the Company has  
11 included approximately \$3.7 billion in carbon taxes in the base case analysis of the Coal  
12 Retrofit option, even though there are presently no carbon regulations which apply to  
13 existing coal units such as the Northeastern units, and whether there will ever be a carbon  
14 tax is pure speculation. PSO's base case analysis also includes approximately \$80  
15 million in capital costs for assumed retrofits to comply with the Coal Combustion  
16 Residuals ("CCR") Rule which does not presently exist. PSO's inclusion of these  
17 forecasted costs in its base case analysis treats highly speculative future costs as if they  
18 are certain to occur, thereby unreasonably biasing the results against the Coal Retrofit  
19 option and in favor of the EPA Settlement. It is important to recognize that, even with  
20 this extraordinary bias in favor of the EPA Settlement, PSO's base case economic  
21 analysis forecasts that the Coal Retrofit option will provide a \$1.9 billion nominal cost  
22 advantage over the EPA Settlement.

23

1 Q. DOES PSO RECOGNIZE THAT THE TIMING AND LEVEL OF CARBON  
2 TAXES AND OTHER ENVIRONMENTAL COMPLIANCE COSTS ARE  
3 HIGHLY SPECULATIVE AT THIS TIME?

4 A. Yes. On pages 18-23 of his direct testimony, PSO witness Ground describes seven  
5 “proposed and emerging” regulations that he argues could result in additional compliance  
6 costs for the Northeastern Units. However, in response to OIEC Data Request No.7-4,  
7 Mr. Ground acknowledged that it is not possible to estimate either the cost impacts or  
8 timing of such regulations until the rules are finally promulgated:

9

10 It is not possible at this time to give specific effective dates or exact details of  
11 required provisions, though general time frames are outlined in Mr. Ground’s  
12 testimony. The ultimate cost impacts of the proposed rules or emerging  
13 environmental rules cannot be estimated until final promulgation.

14

15 (See Exhibit SN-7, OIEC 7-4.)

16

17 The uncertainty regarding the future applicability of carbon regulations to existing coal-  
18 fired plants such as the Northeastern units was further addressed by SWEPCO witness  
19 John Hendricks on pages 5-6 of his Sur-Surrebuttal testimony in APSC Docket No. 12-  
20 008-U:

21

22 Q. STAFF WITNESS HAHN (AT 10) MENTIONS THAT THERE ARE  
23 CONCERTED EFFORTS TO PLACE RESTRICTIONS ON THE EMISSION  
24 OF CARBON. HOW DO YOU RESPOND TO THIS POSITION?

25 A. As outlined in my direct testimony, New Source Performance Standards (NSPS)  
26 to regulate carbon dioxide have only been proposed for new sources. The EPA  
27 publicly stated on April 5, 2012 that the agency has no plans to address existing  
28 sources.

29

30 *As the Administrator and I said repeatedly when we announced this proposal last*  
31 *week, this standard only applies to new sources – that is, power plants that will be*  
32 *constructed in the future. This standard would never apply to existing power plants.*  
33 *And we have no plans to address existing power plants.1*

1 --Gina McCarthy, Assistant Administrator, Office of Air and Radiation  
2

3 The application of GHG NSPS to existing sources is therefore not anticipated  
4 near-term. If this type of regulation were imposed at some future date, it is  
5 uncertain what form such standards would take but some form of energy  
6 efficiency requirements would be one likely possibility. Regulation that would  
7 require cost prohibitive or technically unfeasible retrofits, such as carbon capture  
8 and sequestration, at the Flint Creek Plant would also impact approximately 40%  
9 of the electricity generation capacity in the United States that is also coal-fired  
10 and therefore is not a likely possibility.  
11

12 **Q. DID PSO PROVIDE WORKPAPERS SUPPORTING THE REASONABLENESS**  
13 **OF ITS CARBON PRICE FORECAST?**

14 A. No. In response to OIEC's request for workpapers supporting its carbon price forecast,  
15 PSO provided a brief narrative description of its rationale for the forecast, which  
16 indicates that the Company's forecast that carbon taxes will be implemented in 2022 is  
17 essentially a guess which reflects "the earliest reasonable projection as to when such  
18 legislation *could* become effective" and which ignores the prospect that PSO may be  
19 granted free allowances as suggested in past unsuccessful carbon legislative proposals.  
20 (See Exhibit SN-8, OIEC 3-15 and OIEC 9-7.)  
21

22 **Q. IS PSO'S FORECAST OF CARBON PRICES SUFFICIENTLY CERTAIN TO BE**  
23 **USED FOR THE BASE CASE ECONOMIC ANALYSIS OF THE EPA**  
24 **SETTLEMENT AND COAL RETROFIT COMPLIANCE OPTIONS?**

25 A. No. As recognized by PSO witness Ground, the costs and timing of any future carbon  
26 regulations are impossible to forecast with accuracy at this point. The appropriate  
27 method of evaluating uncertainty in carbon and other environmental control costs was  
28 addressed by SWEPCO witness Thomas Brice on page 66 of his direct testimony in

1 Public Utility Commission of Texas Docket No. 33891, which discussed the Company's  
2 evaluation of proposals leading to the selection of the new Turk coal-fired plant:

3  
4 The RFP Evaluation Team treated CO2 and mercury emission control related  
5 costs as a sensitivity analysis (that is, as a risk-related item) because the timing  
6 and extent of the future emission controls are subject to great uncertainty. In the  
7 parlance of ratemaking, they are not known and measureable. Therefore, the  
8 impacts were considered from a risk perspective rather than making the control-  
9 related costs part of the direct price and economic evaluation.  
10

11 **Q. HOW SHOULD THE IMPACT OF REGULATIONS WHICH DO NOT EXIST BE**  
12 **CONSIDERED IN EVALUATING THE EPA SETTLEMENT?**

13 A. Landmark decisions, such as the EPA Settlement or retrofit of the Northeastern coal  
14 units, should not be decided based on speculative assumptions regarding costs of  
15 regulations which may never exist. If carbon costs are going to be considered at all in  
16 evaluating the EPA Settlement, they should not be considered in the base case economic  
17 analysis, as if they are certain to occur, but instead should be evaluated in sensitivity  
18 analyses along with other factors, such as gas price and load forecast uncertainty. At a  
19 minimum, PSO should have evaluated a "No Carbon" scenario to identify the impact of  
20 its speculative base case assumption regarding carbon taxes, as SWEPCO witness  
21 Weaver did in the pending Flint Creek retrofit case before the APSC.  
22

23 **Q. HOW WOULD THE RESULTS OF PSO'S BASE CASE ECONOMIC ANALYSIS**  
24 **OF THE EPA SETTLEMENT CHANGE IF CARBON TAXES WERE REMOVED**  
25 **FROM THE ANALYSIS?**

1 A. If carbon taxes are removed from PSO's base case analysis, the average cost advantage of  
2 the Coal Retrofit option over the EPA Settlement under the base case scenarios increases  
3 to approximately \$529 million on a present value basis and to \$3.12 billion on a nominal  
4 basis.

5

6 **B. COAL PLANT SERVICE LIFE**

7

8 **Q. PLEASE EXPLAIN THE PROBLEM CONCERNING PSO'S ASSUMPTIONS**  
9 **REGARDING THE SERVICE LIFE OF THE NORTHEASTERN COAL UNITS?**

10 A. PSO's base case economic analysis of the Coal Retrofit compliance option assumes that  
11 the Northeastern coal units will be retired after approximately 50 years of service. This  
12 assumption, which conflicts with actual experience on the AEP system, with AEP's  
13 current planning assumptions for other similar coal units, and with previous Commission  
14 orders, has the effect of unreasonably overstating costs of the "Coal Retrofit" option. As  
15 shown in Table 6 of my testimony, the nominal cost advantage of the Coal Retrofit option  
16 over the EPA Settlement increases by approximately \$1.5 billion when the assumed  
17 service life for the Northeastern coal units is changed from 50 to 60 years.

18

19 **Q. HAS THE COMMISSION PREVIOUSLY DETERMINED THAT THE SERVICE**  
20 **LIVES OF PSO'S COAL UNITS IS AT LEAST 60 YEARS?**

21 A. Yes. On page 79 of its October 9, 2007 Final Order in Cause No. PUD 200600285, the  
22 Commission explained that the actual life span of PSO's coal units is "60 years or more,  
23 according to PSO's own personnel":

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**Production Plant Life Spans (Depreciation Expense)**

In a depreciation study, rates are set to recover the original cost of an asset over its expected useful life. If the expected remaining life is set too short, the resulting depreciation rates will be higher than necessary, and current ratepayers will be forced to bear costs now that should borne by future generations of ratepayers. For its coal plants, PSO selected a life span of 42 years. The actual life span for these units, however, is 60 years or more, according to PSO's own personnel. Numerous examples of the expected 60-year life span for the coal units can be found in PSO's responses to AG 10-10, AG 10-44 and OIEC 11 - 17. Further, the 60-year life span for coal units is used by AEP in other states. In prefiled testimony in another jurisdiction, Mr. Mazzone states that the "AEP System experience is proving that unit useful lives of 60 years and greater are reasonable and necessary ." Moreover, at least one AEP unit is currently operating beyond the 60-year life expectancy. According to the testimony of Mr. Mazzone, the Appalachian Power Company's Glen Lyn Unit 5 is presently operating in its 61st year. The impact of this change reduces annual depreciation expense by \$7,055,000 .

The Commission reaffirmed its position that a 60 year service life was reasonable and appropriate for PSO's coal units in its Final Order in Cause No. PUD 200800144. (See Exhibit SN-9, OIEC 3-13.)

**Q. DOES PSO NOW DISPUTE THAT THE NORTHEASTERN UNITS ARE CAPABLE OF OPERATING FOR 60 YEARS OR MORE?**

A. No. PSO witness Weaver addresses the coal plant service life on page 45 of his direct testimony as follows:

1 It was deemed reasonable to assume that the expected service life of either  
2 Northeastern Unit 3 or 4 could achieve a period approaching or exceeding 60  
3 years; or through the 2040 Strategist study period. Hence, a 25-year post-retrofit  
4 service period was viewed as a very plausible operational and cost recovery  
5 timeframe for purposes of performing these sensitivity analytics. However,  
6 consideration had also been given by PSO management to the prospect that any  
7 further environmental regulation in the future could portend some additional  
8 operational risk to coal generation. Therefore, the base case disposition options  
9 were assumed to reflect a 15-year post-retrofit recovery period that would,  
10 instead, approach the unit's 50 year service lives.  
11

12 In essence, Mr. Weaver's testimony indicates that PSO's decision to assume a 50-year  
13 service life for its base case economic analyses of the Coal Retrofit compliance option  
14 was based upon the "prospect" that some unspecified future environmental regulation  
15 might create additional operational risk for the Northeastern coal units. Again, such  
16 highly speculative assumptions should not be reflected in base case analysis of a  
17 landmark financial decision such as the EPA Settlement.  
18

19 **Q. WHAT WAS THE ASSUMED SERVICE LIFE FOR FLINT CREEK USED BY**  
20 **MR. WEAVER IN SWEPCO'S BASE CASE ANALYSIS SUPPORTING THE**  
21 **COAL RETROFIT ENVIRONMENTAL COMPLIANCE OPTION IN APSC**  
22 **DOCKET NO. 12-008-U?**

23 A. Mr. Weaver used a service life of 62 years for SWEPCO's base case analysis of  
24 environmental compliance options for the Flint Creek unit. (See Exhibit SN-10, OIEC  
25 10-6).  
26

1 Q. DID SWEPCO EXPRESS ANY CONCERNS THAT FUTURE  
2 ENVIRONMENTAL REGULATIONS MIGHT PREVENT FLINT CREEK  
3 FROM OPERATING FOR 60 YEARS IN ITS TESTIMONY IN APSC DOCKET  
4 NO. 12-008-U?

5 A. No. In his direct testimony, SWEPCO witness Judah Rose testified that the 62 year  
6 service life SWEPCO used to evaluate environmental compliance options for Flint Creek  
7 was supported by industry experience and economics:

8

9 In addition to the quantitative PVRR analysis performed using ICF's IMP model,  
10 ICF compared Flint Creek with other U.S. coal plants. This comparison found  
11 Flint Creek to be younger and larger than the U.S. coal power plant fleet average.  
12 This favors longer than average remaining useful life for the Flint Creek and a  
13 higher suitability for retrofit. ICF also reviewed the history of retrofits of similar  
14 equipment and found many similarly aged and situated units retrofitting the same  
15 environmental controls. Lastly, ICF reviewed announced retirements of coal  
16 power plants and found that retiring coal plants are generally smaller and older  
17 than Flint Creek on average, and hence, Flint Creek differs from coal plants that  
18 are being retired. Thus, this review reinforces the conclusion that the coal retrofit  
19 is the most appropriate option.

20

21

22 (See page 53 of direct testimony of SWEPCO witness Judah Rose in APSC Docket No.

23 12-008-U.)

24

25 Q. IS THERE OTHER EVIDENCE THAT A 60 YEAR SERVICE LIFE IS  
26 APPROPRIATE FOR THE BASE CASE ANALYSIS OF THE EPA  
27 SETTLEMENT AND NORTHEASTERN RETROFIT OPTION?

1 A. Yes. In fact, the average service life of 24 other coal units on the AEP system that have  
2 either been retired or are scheduled for retirement over the next 10 years is 59 years. (See  
3 PSO's Confidential Response to OIEC 3-11.)  
4

5 **Q. WHAT SERVICE LIFE SHOULD BE ASSUMED FOR EVALUATING THE**  
6 **COST EFFECTIVENESS OF ENVIRONMENTAL COMPLIANCE OPTIONS**  
7 **FOR PSO'S NORTHEASTERN UNITS?**

8 A. Based on actual experience on the AEP system, and consistent with past Commission  
9 orders and SWEPCO's recent analysis of the Flint Creek plant, a service life of at least 60  
10 years is appropriate for the base case economic analysis of Coal Retrofit option for the  
11 Northeastern units. This assumption is consistent with PSO's analysis of Coal Retrofit  
12 Option 1A, which assumes retrofit of both Northeastern Units in 2016 with operations of  
13 the units thereafter through 2040. It would be unduly speculative and inappropriate to  
14 assume a shorter service life for the Northeastern units based upon unspecified future  
15 regulations that may never exist.  
16

17 **Q. WHAT IS THE ESTIMATED COST ADVANTAGE OF THE COAL RETROFIT**  
18 **OPTION OVER THE EPA SETTLEMENT IF A 60 YEAR SERVICE LIFE IS**  
19 **USED FOR THE BASE CASE ANALYSIS OF THE NORTHEASTERN UNITS?**

20 A. As summarized in Table 10, PSO's analysis indicates that the average cost advantage of  
21 the Coal Retrofit option over the EPA Settlement is approximately \$308 million on a  
22 present value basis and \$2.12 billion on a nominal basis in the case which assumes a 60-  
23 year service life for the Northeastern coal units.

1

2

**Table 10**

PSO's Updated August 2012 Environmental Compliance Cost Analysis  
Difference Between EPA Settlement and Retrofit Both Units Option  
With 60 Year Service Life (\$Millions)

<u>Scenario</u>	<u>2011-2040 Cum NPV</u>	<u>2011-2040 Nominal Cost</u>
Base Fuel/25 Yr Coal	-\$278	-\$1,860
Low Fuel/25 Yr Coal	-\$157	-\$1,388
High Fuel/25 Yr Coal	-\$601	-\$3,580
Early CO2/25 Yr Coal	<u>-\$196</u>	<u>-\$1,661</u>
Avg All Scenarios	-\$308	-\$2,122

Sources are PSO witness Weaver's Substituted Exhibit SCW-8 and PSO's response to AG 1-4.

3

4

5 **C. RISK OF HIGHER GAS PRICES**

6

7 **Q. WHAT IS THE ISSUE REGARDING PSO'S FAILURE TO EVALUATE RISK**  
8 **OF HIGHER GAS PRICES IN ITS ECONOMIC ANALYSIS OF THE EPA**  
9 **SETTLEMENT?**

10 **A.** PSO witness Weaver testifies on page 37 of his direct testimony that gas prices are one of  
11 the "key drivers" of the environmental compliance analysis. However, surprisingly,  
12 PSO apparently did not evaluate a high gas price sensitivity case before entering into the  
13 EPA Settlement. The Company claims that its "Early Carbon" sensitivity analysis served  
14 as a proxy for a High Gas price sensitivity analysis. (See Exhibit SN-13, OIEC 10-17.)

15

1 **Q. DOES PSO'S EARLY CARBON SENSITIVITY PROVIDE A REASONABLE**  
2 **ESTIMATE OF THE IMPACT OF HIGHER GAS PRICES ON THE EPA**  
3 **SETTLEMENT AND OTHER COMPLIANCE ALTERNATIVES?**

4 **A.** No. As shown in Table 11 below, the forecasted gas prices under the Early Carbon  
5 sensitivity are essentially the same as PSO's Base Case gas prices.

6

7

**Table 11**

PSO Natural Gas Price Forecasts for EPA Settlement Analysis  
Nominal, \$/MMBtu

	<u>Low</u>	<u>Base</u>	<u>Early Carbon</u>
2016	\$5.27	\$5.99	\$5.52
2017	\$5.39	\$6.13	\$5.99
2018	\$5.56	\$6.32	\$6.42
2019	\$5.68	\$6.46	\$6.60
2020	\$5.73	\$6.52	\$6.73
2021	\$5.94	\$6.75	\$6.78
2022	\$6.22	\$7.07	\$7.06
2023	\$6.39	\$7.26	\$7.22
2024	\$6.61	\$7.51	\$7.35
2025	\$6.82	\$7.75	\$7.51
2026	\$6.91	\$7.85	\$7.75
2027	\$7.08	\$8.04	\$7.85
2028	\$7.23	\$8.22	\$8.04
2029	\$7.40	\$8.41	\$8.22
2030	\$7.50	\$8.52	\$8.41
2035	\$8.03	\$9.14	\$9.01
2040	\$8.61	\$9.79	\$9.66

8

Source is PSO's response to OIEC 6-10.

9 **Q. ARE THERE OTHER REASONS WHY PSO SHOULD HAVE EVALUATED A**  
10 **HIGH GAS PRICE SENSITIVITY BEFORE ENTERING INTO THE EPA**  
11 **SETTLEMENT?**

1 A. Yes. As shown in Table 12 below, other independent forecasts of natural gas prices,  
 2 including the forecast of SWEPCO's consultant ICF and the U.S. Energy Information  
 3 Administration's ("EIA") most recent long-term forecast, predict much higher gas prices  
 4 in the 2030-2040 period, with ICF's base forecast being nearly \$8/MMBtu higher than  
 5 PSO's base gas price forecast in 2040.

6 **Table 12**

Comparison of PSO Gas Price Forecasts to Other  
 Independent Forecasts, (Nominal \$/MMBtu)

	PSO <u>Base</u>	EIA 2012 <u>Base</u>	ICF <u>Base</u>	PSO <u>High</u>
2026	\$7.85	\$7.56	\$8.95	\$9.26
2027	\$8.04	\$7.93	\$9.37	\$9.49
2028	\$8.22	\$8.22	\$9.82	\$9.78
2029	\$8.41	\$8.57	\$10.29	\$10.08
2030	\$8.52	\$8.95	\$10.79	\$10.48
2031	\$8.64	\$9.35	\$11.33	\$10.90
2032	\$8.76	\$9.81	\$11.91	\$11.33
2033	\$8.88	\$10.19	\$12.51	\$11.78
2034	\$9.01	\$10.94	\$13.15	\$12.25
2035	\$9.14	\$11.67	\$13.82	\$12.73
2036	\$9.26	\$12.45	\$14.47	\$13.24
2037	\$9.39	\$13.28	\$15.16	\$13.76
2038	\$9.52	\$14.17	\$15.87	\$14.31
2039	\$9.66	\$15.11	\$16.62	\$14.88
2040	\$9.79	\$16.12	\$17.69	\$15.47

Sources for PSO forecasts are OIEC 6-10 and AG 1-4. Source of ICF forecast  
 is Exhibit 5 of SWEPCO witness Judah Rose's direct testimony in APSC  
 Docket No.12-008-U. Source of EIA forecast is: [www.eia.gov/forecasts/aeo](http://www.eia.gov/forecasts/aeo).

7  
 8 **Q. WHY IS PSO'S GAS PRICE FORECAST LOWER THAN EIA AND OTHER**  
 9 **INDEPENDENT FORECASTS IN YEARS AFTER 2030?**

1 A. PSO's gas price forecast only extended through the year 2030, and thereafter the  
2 Company simply applied a 1.4% annual escalator (based on the forecasted increase from  
3 year 2029 to 2030) to forecast gas prices for the last 10 years of its EPA cost analysis.  
4 (See Exhibit SN-15, OIEC 12-10.)

5  
6 **Q. DID PSO SUBSEQUENTLY CONDUCT A HIGH GAS PRICE SENSITIVITY IN**  
7 **THIS CASE?**

8 A. Yes. In response to Attorney General Data Request No. 1-4, which was provided to the  
9 parties on December 3, 2012, PSO provided the results of a high gas price sensitivity  
10 analysis it conducted using the same high gas price forecast that was used for the high gas  
11 price sensitivity analysis of the Flint Creek environmental compliance options in APSC  
12 Docket No. 12-008-U. This new analysis indicates that the Coal Retrofit option cost  
13 advantage over the EPA Settlement more than doubles from \$278 million in the Base  
14 Case to approximately \$601 million in the High Gas price case, on a present value basis.  
15 (See Exhibit SN-14, Supplemental Response to AG 1-4.) Moreover, the nominal cost  
16 advantage of the Coal Retrofit alternative over the EPA Settlement increases from  
17 approximately \$1.86 billion in the Base Case to \$3.58 billion in the High Gas case.  
18 These results demonstrate the fuel diversity value that would be provided by the retrofit  
19 and continued operation of the Northeastern coal units.

20

21

1 Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING PSO'S FAILURE  
2 TO CONDUCT A HIGH GAS PRICE SENSITIVITY IN CONJUNCTION WITH  
3 ITS ANALYSIS OF THE EPA SETTLEMENT.

4 A. Although PSO recognized that natural gas prices are a key driver of its economic analysis  
5 of the EPA Settlement, it failed to evaluate a high gas price sensitivity before entering  
6 into the EPA Settlement. This omission was imprudent, and served to unreasonably bias  
7 the Company's environmental compliance cost analysis in favor of the EPA Settlement  
8 and against the Coal Retrofit alternative.

9

10 D. VALUE OF PSO EXCESS CAPACITY

11

12 Q. WHAT IS YOUR CONCERN REGARDING PSO'S TREATMENT OF EXCESS  
13 CAPACITY?

14 A. For its economic analysis of the EPA Settlement, PSO assumed that it would only have to  
15 replace 260 MW of the 470 MW of capacity that would be lost when Northeastern Unit 4  
16 is retired in 2016 as required under the Settlement. This assumption has the effect of  
17 significantly lowering the cost of the EPA Settlement case by reducing the amount of  
18 new replacement capacity required in this case. At the same time, PSO has assumed that  
19 the approximately 200 MW of excess capacity which is forecasted to exist on its system  
20 has no value under the Coal Retrofit case, thereby increasing costs under this case.

21

22 Q. WHAT IS THE VALUE OF EXCESS CAPACITY THAT IS FORECASTED TO  
23 EXIST IN THE COAL RETROFIT CASE?

1 A. The excess capacity in the Coal Retrofit case provides additional value to the PSO system  
2 in two ways. First, if PSO's actual peak demand growth is higher than forecasted, this  
3 capacity can help supply PSO's capacity and reserve requirements at no additional cost.  
4 If higher demand growth should occur, PSO would have to purchase additional capacity  
5 (i.e., in addition to the Calpine PPA) to meet its peak demand requirements under the  
6 EPA Settlement case. In addition, if PSO's peak demand forecast proves to be accurate,  
7 the Company could sell some or all of the excess capacity and use the revenues to lower  
8 production costs of its system under the Coal Retrofit case. PSO's Late-2011  
9 environmental compliance analysis indicates that the value of excess capacity in the Coal  
10 Retrofit case would increase the cost advantage of this case over the EPA Settlement by  
11 approximately \$147.6 million; however the Company has ignored this advantage of the  
12 retrofit option. (See PSO's response to OIEC 2-4.)

13  
14 **Q. IS THERE RISK THAT PSO'S PEAK DEMAND COULD BE HIGHER THAN**  
15 **FORECASTED BY THE COMPANY?**

16 A. Yes. For example, PSO's peak demand increased by 621 MW from 2002 to 2011;  
17 however, under PSO's base case peak demand forecast, the Company's peak demand in  
18 the year 2031 would be approximately *150 MW lower than* the actual peak demand in the  
19 summer of 2012. (See Weaver, Exhibit SCW-1.) PSO has never had a period in which  
20 its system peak demand decreased over a 15-year period as predicted by the Company's  
21 base case demand forecast. (See Exhibit SN-16, OIEC 4-1.) Thus the Company's peak  
22 demand forecast reflects an unprecedented low level of demand growth.

23

1 **Q. HOW MUCH WOULD PSO'S PEAK DEMAND HAVE TO INCREASE TO**  
2 **ELIMINATE THE FORECASTED EXCESS CAPACITY BENEFIT FOR THE**  
3 **EPA SETTLEMENT REFLECTED IN PSO'S ANALYSIS?**

4 A. If PSO's peak demand in 2016 is 100 MW lower than the peak demand experienced last  
5 summer (4,424 MW) the assumed excess capacity in the Coal Retrofit case will be  
6 eliminated and PSO would be required to acquire additional generating capacity to  
7 replace the full 470 MW of coal-fired generation that is retired in 2016 under the EPA  
8 Settlement. This would eliminate the forecasted \$147.6 million cost advantage that  
9 PSO's base case analysis attributes to the EPA Settlement due to its unprecedented and  
10 extraordinarily low peak demand forecast.

11  
12 **Q. DID PSO CONDUCT ANY SENSITIVITY ANALYSES TO ASSESS THE**  
13 **IMPACT OF HIGHER PEAK DEMAND GROWTH ON COSTS UNDER THE**  
14 **EPA SETTLEMENT?**

15 A. No. (See Exhibit SN-17, OIEC 4-2.) Although PSO witness Weaver indicates that the  
16 Company's peak demand and energy forecast is one of the two most critical input  
17 parameters which influence the environmental compliance analysis for the Northeastern  
18 coal units, for some reason the Company chose not to evaluate the impact of higher  
19 demand growth on the EPA Settlement plan costs. (See Weaver direct testimony, page  
20 33.)

21  
22 **Q. HOW WOULD HIGHER PEAK DEMAND GROWTH IMPACT COSTS UNDER**  
23 **THE EPA SETTLEMENT?**

1 A. A higher level of peak demand growth would effectively accelerate the date upon which  
2 PSO must acquire new generating capacity to replace the capacity and energy lost when  
3 the Northeastern coal units are retired in 2016 and 2026 under the EPA Settlement. This  
4 change (i.e., higher peak demand growth) would significantly increase costs under the  
5 EPA Settlement over the level forecasted by PSO in this case and therefore further  
6 increase the forecasted cost advantage of the Coal Retrofit alternative.  
7

8 **Q. IS IT POSSIBLE THAT PSO COULD SELL ANY EXCESS CAPACITY THAT**  
9 **EXISTS UNDER THE COAL RETROFIT SCENARIO?**

10 A. Yes. PSO indicates that it assumed it would not be able to sell excess capacity that  
11 exists in the Coal Retrofit because there is no existing SPP-administered capacity market.  
12 (See Exhibit SN-18, OIEC 4-14.) However, this ignores the fact that SPP could  
13 implement a capacity market in the future, as well as the fact that PSO could sell some or  
14 all of any excess capacity that exists through bilateral transactions with other SPP parties,  
15 just as it proposes in this case to purchase 260 MW of capacity from Calpine. By  
16 ignoring these potential capacity sales alternatives, PSO has unreasonably understated the  
17 value of excess capacity which would exist in the Coal Retrofit case under the  
18 Company's extraordinarily low demand forecast.  
19

20 **Q. HOW SHOULD THE VALUE OF EXCESS CAPACITY BE REFLECTED IN**  
21 **PSO'S COST ANALYSIS OF ENVIRONMENTAL COMPLIANCE OPTIONS?**

22 A. If PSO is going to rely upon excess capacity on its system to replace a portion of the  
23 capacity from the Northeastern Unit 4 that is retired in 2016 under the EPA Settlement

1 option, it should also reflect the value of that same excess capacity in the Coal Retrofit  
2 compliance case. To ignore the value of the excess capacity understates the cost  
3 advantage of the Coal Retrofit option over the EPA Settlement by approximately \$147.6  
4 million on nominal cost basis (\$92.9 million present value).

5  
6 **E. COAL UNIT O&M COSTS**

7  
8 **Q. WHAT IS YOUR CONCERN REGARDING THE LEVEL OF FORECASTED  
9 INCREMENTAL O&M COSTS FOR COAL UNITS INCLUDED IN PSO'S  
10 ECONOMIC ANALYSES?**

11 A. PSO's economic analysis of the Coal Retrofit compliance option includes approximately  
12 \$604 million per year of non-fuel O&M costs for the Northeastern coal units. This level  
13 of O&M is more than two times the average annual level of non-fuel O&M costs incurred  
14 at the Northeastern coal units over the last five years (\$28.7 million per year). (See  
15 Exhibit SN-19, OIEC 12-4.) My concern is that PSO has not provided detailed  
16 workpapers which support the apparent high forecasted incremental O&M costs for the  
17 Northeastern coal units included in its economic analysis of the Coal Retrofit compliance  
18 option.

19  
20 **Q. IS IT POSSIBLE THAT THE NON-FUEL O&M COSTS OF THE  
21 NORTHEASTERN UNITS WOULD MORE THAN DOUBLE AS A RESULT OF  
22 THE ENVIRONMENTAL CONTROLS THAT ARE BEING ADDED TO THE  
23 UNITS?**

1 A. It is possible; however, the forecasted costs seem very high when compared to other coal  
2 units on PSO's system which are equipped with scrubbers. For example, the non-fuel  
3 O&M forecast for SWEPCO's new Turk coal plant, which includes a scrubber, is  
4 approximately \$20 million per year for SWEPCO's 440 MW (73.3%) ownership share of  
5 the unit. (See Exhibit SN-20, OIEC 12-2.) Increasing this amount to reflect the 930 MW  
6 of the Northeastern units, and ignoring O&M cost efficiencies that are normally  
7 recognized at multiple unit sites, suggests that the non-fuel O&M cost for the  
8 Northeastern units should be in the range of approximately \$42.3 million per year.

9

10 **Q. HOW WOULD THE RESULTS OF PSO'S ECONOMIC ANALYSIS OF THE**  
11 **EPA SETTLEMENT AND COAL RETROFIT OPTIONS BE IMPACTED IF THE**  
12 **FORECASTED O&M COSTS WERE REDUCED TO THE LEVEL BASED ON**  
13 **O&M COSTS OF SWEPCO'S NEW TURK PLANT?**

14 A. Adjusting the forecasted incremental O&M costs for coal units included in PSO's  
15 economic analysis to reflect the level of non-fuel O&M costs of the Turk plant would  
16 increase the base case cost advantage of the Coal Retrofit alternative by approximately  
17 \$455 million on a nominal cost basis (\$191.9 million present value). (See Exhibit SN-  
18 21.)

19

20 **F. PRESENT VALUE CALCULATION**

21

22 **Q. WHAT IS THE PROBLEM WITH PSO'S CALCULATION OF THE PRESENT**  
23 **VALUE OF COSTS OF EACH ENVIRONMENTAL COMPLIANCE OPTION?**

1 A. PSO's calculation of the present value of environmental compliance cost alternatives  
2 discounts costs back to 2011. While this may have been appropriate back in late-2011  
3 when the Company first began studying compliance options for its Northeastern coal  
4 units, it does not make sense to consider costs discounted to 2011 when deciding an issue  
5 in 2013. Moreover, when it conducted its updated August 2012 analysis, PSO increased  
6 its discount rate for calculating the present value of each compliance plan from 8.1% to  
7 8.38%. This change primarily results from the Company changing the underlying return  
8 on equity ("ROE") component of its Weighted Average Cost of Capital from 10.15% to  
9 11.15%. (See Exhibit SN-22, OIEC 10-5.) The proposed 11.15% ROE underlying the  
10 8.38% discount rate used for PSO's updated August 2012 economic analysis is relatively  
11 high when compared to the Company's current Commission approved ROE of 10.15%.

12

13 **Q. HOW WOULD PSO'S AUGUST 2012 ENVIRONMENTAL COMPLIANCE**  
14 **ANALYSIS BE IMPACTED IF THE PRESENT VALUE CALCULATIONS**  
15 **WERE ADJUSTED TO USE THE COMPANY'S CURRENT APPROVED ROE**  
16 **OF 10.15% AND DISCOUNTED TO 2013?**

17 A. Adjusting PSO's present value calculation as suggested increases the base case cost  
18 advantage of the Coal Retrofit option over the EPA Settlement by approximately \$80  
19 million on a present value basis. (See Exhibit SN-23.)

20

21 **VIII. CUSTOMER RATE IMPACTS**

22 **Q. HAS PSO QUANTIFIED THE LONG-TERM RATE IMPACTS OF ITS**  
23 **PROPOSED ENVIRONMENTAL COMPLIANCE PLAN?**

1 A. No. Although PSO witness Fate indicates that long-term costs and customer impacts  
2 were a critical factor in PSO's decision making process; the Company indicates that it has  
3 not calculated the forecasted revenue requirements or rate impacts of the EPA Settlement  
4 or other compliance alternatives beyond the first year of the plan. (See Exhibit SN-24,  
5 OIEC 16-18.)

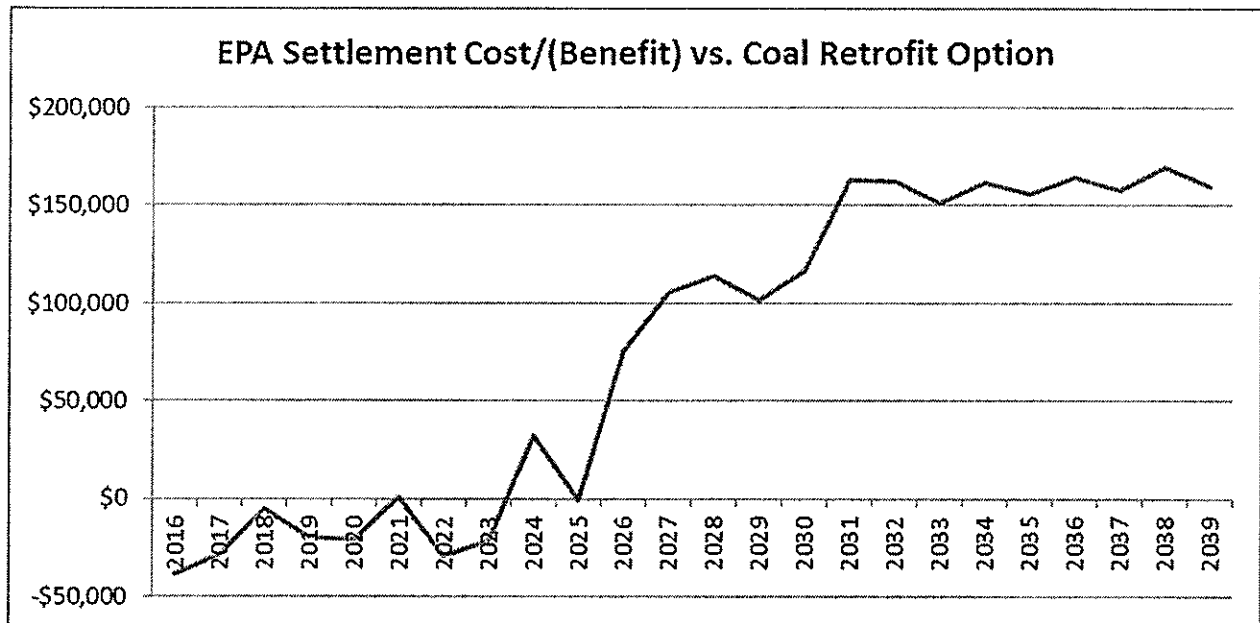
6  
7 **Q. IS IT APPROPRIATE TO EVALUATE THE RATE IMPACT OF THE EPA**  
8 **SETTLEMENT BASED SOLELY ON AN ESTIMATE OF THE FIRST YEAR**  
9 **IMPACT?**

10 A. No. As shown by Figure 2 below, most, if not all, of the approximately \$2 billion  
11 nominal cost difference between the EPA Settlement and the Coal Retrofit Option occurs  
12 when the second Northeastern coal unit is retired in 2026. Unfortunately, PSO has not  
13 calculated the rate impact of these cost increases in future years, but instead has focused  
14 only on the first year rate impact. Again, the figures below represent PSO's base case  
15 economic analysis, which understates the true impact of the EPA Settlement for the  
16 reasons discussed earlier in my testimony. For example, the modest first year advantage  
17 of the EPA Settlement over the Coal Retrofit option forecasted by PSO would be almost  
18 entirely eliminated by properly accounting for the value of excess capacity and removing  
19 excessive non-fuel O&M costs assumed by PSO in the Coal Retrofit case.

20  
21  
22  
23

1

Figure 2



2

3

4 **Q. ARE THERE OTHER PROBLEMS WITH PSO'S FIRST YEAR RATE IMPACT**  
5 **ANALYSIS?**

6 A. Yes. As explained in the direct testimony of OIEC witness Mark Garrett, the first year  
7 rate impact analysis provided by PSO witness Jones in Exhibit SGJ-1 of her direct  
8 testimony greatly understates the actual customer rate impact of the EPA Settlement by  
9 using forecasted 2016 costs as the basis for calculating the rate increase, and due to other  
10 flaws in Ms. Jones analysis.

11

12 **Q. WHAT IS YOUR CONCERN REGARDING PSO'S FAILURE TO EVALUATE**  
13 **LONG-TERM RATE IMPACTS OF THE EPA SETTLEMENT?**

14 A. OIEC was not included in the negotiations of the EPA Settlement and did not obtain  
15 PSO's preliminary cost analysis of the Settlement until May of 2012, well after the  
16 Settlement had been reached. Moreover, there were no ratepayer organizations included

1 in the EPA Settlement negotiations and it is apparent that parties to the Settlement, such  
2 as Sierra Club, were more concerned with minimizing environmental impacts than with  
3 minimizing rate impacts to PSO's customers. Ratemaking is a relatively complex  
4 endeavor, and I am concerned that with PSO emphasizing only the first year impacts of  
5 the Settlement, and with other parties to the Settlement focused primarily on  
6 environmental impacts, that the Settling parties did not understand the magnitude of the  
7 cost impact of the EPA Settlement on customers, particularly after the second  
8 Northeastern coal unit is retired in 2026. In fact, it is not clear that the Settling parties  
9 (other than PSO) understood that PSO's own base case analysis indicates that the  
10 nominal costs of the Coal Retrofit option are approximately \$2 billion lower than costs  
11 under the EPA Settlement, and that the true cost advantage of the Coal Retrofit option is  
12 at least double that amount if reasonable adjustments are made to remove highly  
13 speculative carbon costs and to correct other problems with PSO's base case analysis. If  
14 PSO had included ratepayers in the negotiations, it would have been possible to allow all  
15 impacted parties to thoroughly review the economics and rate impacts of the Settlement,  
16 and perhaps structure a better deal for customers, before the agreement was executed.  
17 Unfortunately, customers such as OIEC had no input to the EPA Settlement.

18  
19 **Q. DO YOU HAVE OTHER CONCERNS REGARDING THE RATE IMPACT OF**  
20 **THE EPA SETTLEMENT?**

21 A. Yes. As discussed further by Mr. Garrett, virtually all of the cost difference between the  
22 EPA Settlement and the Coal Retrofit option occurs in fuel cost increases under the EPA  
23 Settlement. From a ratemaking perspective, increases in fuel expenses generally

1 disproportionately impact high load factor customers, such as industrial and large  
2 commercial facilities. For this reason, information on the total system cost impact is not  
3 sufficient to measure the rate impact on individual customer classes.  
4

5 **IX. OTHER CONSIDERATIONS**

6 **Q. WHAT OTHER FACTORS DID PSO CONSIDER IN REACHING ITS**  
7 **DECISION TO SELECT THE EPA SETTLEMENT OVER THE COAL**  
8 **RETROFIT ALTERNATIVE?**

9 A. PSO witness Fate indicates that the Company considered a number of local, regional and  
10 statewide concerns in reaching its decision to select the EPA Settlement, including the  
11 potential impact of the Settlement and other compliance options on system reliability and  
12 regional emissions. (See Fate direct testimony, pages 12-18.)  
13

14 **Q. DID PSO CONDUCT AN ANALYSIS OF THE IMPACT OF EACH**  
15 **COMPLIANCE OPTION ON EMPLOYMENT AND OTHER LOCAL AND**  
16 **REGIONAL FACTORS ADDRESSED IN PSO WITNESS FATE'S DIRECT**  
17 **TESTIMONY?**

18 A. Yes. PSO prepared an analysis ranking the performance of the EPA Settlement and other  
19 environmental compliance options which was completed in in April of 2011. (See  
20 Exhibit SN-25, OIEC 5-18 and OIEC 9-16.)  
21

22 **Q. WAS THIS ANALYSIS PROVIDED TO PARTIES TO THE EPA**  
23 **SETTLEMENT?**

1 A. No. (See Exhibit SN-26, OIEC 15-21.)

2

3 **Q. DID THIS PSO ANALYSIS INDICATE THAT THE EPA SETTLEMENT**  
4 **PROVIDES ANY ADVANTAGES OVER THE COAL RETROFIT OPTION**  
5 **WHEN LOCAL AND REGIONAL IMPACTS OF THE SETTLEMENT WERE**  
6 **CONSIDERED?**

7 A. No. The general conclusions of this analysis appear to support the Coal Retrofit option,  
8 as summarized below:

9 Overall, analysis indicates no clear economic winner. However, several options  
10 generally appear to be more attractive than the others. The high degree of future  
11 uncertainty would support the selection of an alternative that does not fully  
12 commit to one fuel source or technology over another.

13

14 All scenarios exceed 4% retail rate CAGR willingness-to-pay assumption.  
15 Willingness-to-pay assumption may be too low as most competitors will be in a  
16 similar or worse rate impact and pricing situation.

17

18 Scenarios which result in a loss of fuel diversity may require some long-term  
19 fixed price natural gas contracts as a hedge against fuel price and supply  
20 availability.

21

22 The two scenarios which assume continued operation of one of both of the  
23 Northeastern units are low cost options on a year one rate impact and long-term  
24 CPWRR basis.

25

26

27 **Q. HOW DOES THE ANALYSIS DESCRIBE BENEFITS OF THE COAL**  
28 **RETROFIT OPTION?**

29 A. The analysis describes advantages of the Coal Retrofit option as follows:

30

1           **Scenario 1 – Retrofit Both Units with Full Emissions Controls** – An attractive  
2           option for shareholders and customers. Its success is dependent on Corporate  
3           ability to fund and overcoming likely opposition from in-state NG interests.  
4

5           Customer Impact – Lowest year one impact and CPWRR of any scenario.  
6           Maintains current fuel diversity.  
7

8           Political & Regulatory Risk – Keeping coal as the status quo in the state will not  
9           be politically attractive, but the lower cost profile and maintaining fuel diversity  
10          will be embraced by customer groups.  
11

12          Employee Impact – Increases plant workforce by an estimated 45 positions to  
13          operate and maintain new environmental controls.  
14

15          Community Impact – Significant tax base increase will benefit local community.  
16

17   **Q. DOES THE ANALYSIS ADDRESS THE EPA SETTLEMENT OPTION?**

18   A. Not directly. The analysis was conducted approximately one year before the EPA  
19   Settlement was announced. However, the analysis addresses the Fuel Switch Both Units  
20   to Natural Gas, option, which reflects the ultimate outcome of the EPA Settlement, as  
21   follows:  
22

23          **Scenario 2 – Fuel Switch Both Units to Natural Gas** – A fairly high cost option  
24          for customers with little reward for shareholders.  
25

26          Customer Impact – High year one impact and CPWRR. Loss of fuel diversity.  
27

28          Political & Regulatory Risk – Loss of fuel diversity would be unattractive to  
29          customer groups and IPP's would argue that their assets could lower overall costs.  
30

31          Employee Impact – Substantial loss of workforce at the plant (64%).

1  
2 Community Impact – Minimal capital improvements to increase tax base and  
3 reduced outage labor force.  
4

5 **Q. DOES THE EPA SETTLEMENT BETTER MEET OKLAHOMA FIRST**  
6 **ENERGY PLAN GOALS AS CLAIMED BY PSO WITNESS FATE?**

7 A. It is unclear whether the EPA Settlement provides a distinct advantage over the Coal  
8 Retrofit option in terms of meeting stated goals of the Oklahoma First Energy Plan,  
9 which are summarized below:

10  
11 **Oklahoma First Energy Plan**

12  
13 Creating the Oklahoma First Energy Plan to make such a future possible began  
14 with the development of set criteria. A wide spectrum of groups representing  
15 Oklahoma’s energy economy, including both producers and consumers of energy,  
16 was asked to provide input as to what an ideal energy plan for Oklahoma would  
17 look like, keeping the following questions in mind:

- 18  
19
- Does the plan grow Oklahoma’s economy?
  - Does it create Oklahoma jobs?
  - Does it protect and improve Oklahoma’s environment?
  - Does it protect and improve the health of Oklahoma’s citizens?
  - Factoring in questions 3 and 4, does it provide reliable and affordable energy for Oklahomans?
  - Does it focus on Oklahoma’s unique human and natural resources?
  - Where are the opportunities to create leverage and synergy from our resource base?
- 25  
26  
27  
28

1 By mandating the early retirement of the Northeastern coal units, the EPA Settlement will  
2 likely result in additional gas-fired generation on PSO's system in the future, thereby  
3 increasing the prospect for increased natural gas production in Oklahoma, which is a goal  
4 of the Oklahoma Energy Plan. However, as forecasted by PSO's base case analysis, the  
5 cost of this energy will be approximately \$3.7 billion higher than cost of coal-fired  
6 energy and this significantly higher cost of the energy under the EPA Settlement could  
7 adversely impact Oklahoma industry and the economy, which seems contrary to the  
8 stated economic goals of the Oklahoma First Energy Plan. Moreover, the EPA  
9 Settlement is expected to result in few jobs and nearly double the level of SO2 emissions  
10 that are forecasted to occur under the Coal Retrofit alternative. (See Exhibit SN-27.) For  
11 these reasons, on balance, the EPA Settlement appears to provide little, if any, significant  
12 advantage in meeting goals of the Oklahoma First Energy Plan.

13  
14 **Q. HAS PSO QUANTIFIED ANY INCREASE IN OKLAHOMA NATURAL GAS**  
15 **PRODUCTION THAT WOULD RESULT FROM THE EPA SETTLEMENT?**

16 **A.** No. Although the EPA Settlement may increase usage of natural gas produced in  
17 Oklahoma, it is not possible to determine the exact impact of the Settlement on  
18 Oklahoma natural gas production, since much of the replacement energy for the retired  
19 coal units is expected to be supplied from SPP and bilateral market energy purchases  
20 which may be produced from coal or from gas produced in other regions.

21  
22 **Q. IS THE EPA SETTLEMENT EXPECTED TO SIGNIFICANTLY INCREASE**  
23 **THE VOLUME OF NATURAL GAS USED BY PSO IN THE FUTURE?**

1 A. No. According to PSO's base case forecast, the total level of gas-burned on PSO's  
2 system in 2040 is expected to be approximately *4% lower* than the volume of gas used by  
3 PSO in 2012. (See Exhibit SN-28, OIEC 5-23.)  
4

5 **Q. PLEASE SUMMARIZE YOUR CONCLUSIONS REGARDING PSO'S CLAIM**  
6 **THAT OTHER CONSIDERATIONS SUPPORT THE EPA SETTLEMENT**  
7 **OPTION?**

8 A. PSO's own internal analysis suggests that the Coal Retrofit alternative is superior to the  
9 EPA Settlement in terms of the expected impacts on jobs, local and regional economic  
10 impacts, lower SO2 emissions, and the Oklahoma First Energy Plan goal of providing  
11 affordable energy for Oklahomans. PSO did not provide this analysis of the impacts of  
12 the EPA Settlement and Coal Retrofit option to Parties to the EPA Settlement. While the  
13 EPA Settlement may result in increased production of Oklahoma natural gas in the  
14 future, PSO has not quantified any increase in Oklahoma gas production due to the  
15 Settlement.  
16

17 **X. EVALUATION OF CALPINE PPA**  
18

19 **Q. WHAT ARE THE ISSUES REGARDING PSO'S PROPOSED PPA WITH**  
20 **CALPINE?**

21 A. PSO is seeking approval to recover costs of a 260 MW 15-year PPA with Calpine,  
22 including an ROE adder of approximately \$5 million per year, through its proposed  
23 BLPP Rider. The primary issues with regard to this proposal are whether the Calpine  
24 PPA is necessary and justified if the EPA Settlement is found to be unreasonable, and

1 whether the ROE adder and proposed BLPP Rider are reasonable. OIEC witness Mark  
2 Garrett addresses PSO's ROE adder and BLPP Rider proposals in his direct testimony.

3  
4 **Q. WOULD THE CALPINE PPA BE REQUIRED IF THE EPA SETTLEMENT IS**  
5 **NOT IMPLEMENTED?**

6 A. No. PSO's base case forecast indicates that the Company would have excess capacity  
7 until at least 2022 without the Calpine PPA if the EPA Settlement is not implemented.  
8 Therefore, this contract is only needed in the event that Northeastern Unit 4 is retired in  
9 2016 as required under the EPA Settlement.

10  
11 **Q. ARE THE PRICES OF CAPACITY AND ENERGY AVAILABLE FOR**  
12 **PURCHASE BY PSO UNDER THE PROPOSED CALPINE PPA REASONABLE?**

13 A. The pricing terms of the Calpine PPA generally appear to reflect current market  
14 conditions and are reasonable, assuming PSO actually needed 260 MW of gas-fired  
15 generating capacity in 2016.

16  
17 **Q. WHAT ARE YOUR CONCLUSIONS REGARDING PSO'S REQUEST FOR**  
18 **APPROVAL OF THE CALPINE PPA?**

19 A. As explained earlier in my testimony, the EPA Settlement has a far higher cost and risk to  
20 ratepayers than the Coal Retrofit compliance alternative and therefore should not be  
21 approved. Based on my primary recommendation that the Commission disallow PSO's  
22 request for approval of the EPA Settlement, the Calpine PPA is not needed and should

1           also not be approved. OIEC witness Garret addresses other aspects of PSO's request  
2           regarding the proposed Calpine PPA in his direct testimony.

3

4   **Q.    DOES THIS CONCLUDE YOUR RESPONSIVE TESTIMONY?**

5   **A.    Yes.**

**Exhibit SN-1**

## **RESUME OF DON SCOTT NORWOOD**

### **Norwood Energy Consulting, L.L.C.**

P. O. Box 30197  
Austin, Texas 78755-3197  
(512) 343-9077

#### **SUMMARY**

Scott Norwood is an energy consultant with over 30 years of experience in electric utility regulatory consulting, resource planning and energy procurement. His clients include government agencies, publicly-owned utilities, public service commissions, municipalities and various electric consumer interests. Mr. Norwood has presented expert testimony on electric restructuring, resource planning and ratemaking issues in regulatory proceedings in Arkansas, Georgia, Iowa, Illinois, Michigan, Missouri, New Jersey, Oklahoma, South Dakota, Texas, Virginia, Washington and Wisconsin.

Prior to founding Norwood Energy Consulting in January of 2004, Mr. Norwood was employed for 18 years by GDS Associates, Inc., a Marietta, Georgia based energy consulting firm. Mr. Norwood was a Principal of GDS and directed the firm's Deregulated Services Department which provided a range of consulting services including merchant plant due diligence studies, deregulated market price forecasts, power supply planning and procurement projects, electric restructuring policy analyses, and studies of power plant dispatch and production costs.

Before joining GDS, Mr. Norwood was employed by the Public Utility Commission of Texas as Manager of Power Plant Engineering from 1984 through 1986. He began his career in 1980 as Staff Electrical Engineer with the City of Austin's Electric Utility Department where he was in charge of electrical maintenance and design projects at three gas-fired power plants.

Mr. Norwood is a graduate of the college of electrical engineering of the University of Texas.

#### **EXPERIENCE**

##### **Energy Planning and Procurement Services**

*Dell Computer Corporation* – Negotiated retail power supply agreement for Dell's Round Rock, Texas facilities producing annual savings in excess of \$2 million.

*Texas Association of School Boards Electric Aggregation Program* – Serve as TASB's consultant in the development, marketing and administration of a retail electric aggregation program consisting of 2,500 Texas schools with a total load

of over 300 MW. Program produced annual savings of more than \$30 million in its first year.

*Oklahoma Industrial Energy Consumers* - Analyzed and drafted comments addressing integrated resource plan filings by Public Service Company of Oklahoma and Oklahoma Gas and Electric Company.

*S.C. Johnson* - Analyzed and presented testimony addressing Wisconsin Electric Power Company's \$4.1 billion CPCN application to construct three coal-fired generating units in southeast Wisconsin.

*Oklahoma Industrial Energy Consumers* - Analyzed wind energy project ownership proposals by Oklahoma Gas and Electric Company and presented testimony addressing project economics and operational impacts.

*City of Chicago, Illinois Attorney General, Illinois Citizens' Utility Board* - Analyzed Commonwealth Edison's proposed divestiture of the Kincaid and State Line power plants to SEI and Dominion Resources.

*Georgia Public Service Commission* - Analyzed and presented testimony on Georgia Power Company's integrated resource plan in a certification proceeding for an eight unit, 640 MW combustion turbine facility.

*South Dakota Public Service Commission* - Evaluated integrated resource plan and power plant certification filing of Black Hills Power & Light Company.

*Shell Leasing Co.* - Evaluated market value of 540 MW western coal-fired power plant.

*Community Energy Electric Aggregation Program* – Served as Community Energy's consultant in the development, marketing and start-up of a retail electric aggregation program consisting of major charitable organizations and their donors in Texas.

*Austin Energy* – Conducted competitive solicitation for peaking capacity. Developed request for proposal, administered solicitation and evaluated bids.

*Austin Energy* - Provided technical assistance in the evaluation of the economic viability of the City of Austin's ownership interest in the South Texas Project.

*Austin Energy* - Assisted with regional production cost modeling analysis to assess production cost savings associated with various public power merger and power pool alternatives.

*Sam Rayburn G&T Electric Cooperative* - Conducted competitive solicitation for peaking capacity. Developed request for proposal, administered solicitation and evaluated bids.

*Rio Grande Electric Cooperative, Inc.* - Directed preparation of power supply solicitation and conducted economic and technical analysis of offers.

## **Electric Restructuring Analyses**

*Electric Power Research Institute* - Evaluated regional resource planning and power market dispatch impacts on rail transportation and coal supply procurement strategies and costs.

*Arkansas House of Representatives* – Critiqued proposed electric restructuring legislation and identified suggested amendments to provide increased protections for small consumers.

*Virginia Legislative Committee on Electric Utility Restructuring* – Presented report on status of stranded cost recovery for Virginia’s electric utilities.

*Georgia Public Service Commission* – Developed models and a modeling process for preparing initial estimates of stranded costs for major electric utilities serving the state of Georgia.

*City of Houston* – Evaluated and recommended adjustments to Reliant Energy’s stranded cost proposal before the Public Utility Commission of Texas.

*Oklahoma Attorney General* – Evaluated and advised the Attorney General on technical, economic and regulatory policy issues arising from various electric restructuring proposals considered by the Oklahoma Electric Restructuring Advisory Committee.

*State of Hawaii Department of Business, Economics and Tourism* – Evaluated electric restructuring proposals and developed models to assess the potential savings from deregulation of the Oahu power market.

*Virginia Attorney General* - Served as the Attorney General’s consultant and expert witness in the evaluation of electric restructuring legislation, restructuring rulemakings and utility proposals addressing retail pilot programs, stranded costs, rate unbundling, functional separation plans, and competitive metering.

*Western Public Power Producers, Inc.* - Evaluated operational, cost and regional competitive impacts of the proposed merger of Southwestern Public Service Company and Public Service Company of Colorado.

*Iowa Department of Justice, Consumer Advocate Division* - Analyzed stranded investment and fuel recover issues resulting from a market-based pricing proposal submitted by MidAmerican Energy Company.

*Cullen Weston Pines & Bach/Citizens’ Utility Board* - Evaluated estimated costs

and benefits of the proposed merger of Wisconsin Energy Corporation and Northern States Power Company (Primergy).

*City of El Paso* - Evaluated merger synergies and plant valuation issues related to the proposed acquisition and merger of El Paso Electric Company and Central & Southwest Company.

*Rio Grande Electric Cooperative, Inc.* - Analyzed stranded generation investment issues for Central Power & Light Company.

## **Regulatory Consulting**

*Oklahoma Industrial Energy Consumers* - Assisted client with technical and economic analysis of proposed EPA regulations and compliance plans involving control of air emissions and potential conversion of coal-to-gas conversion options.

*New York Public Service Commission* - Conducted inter-company statistical benchmarking analysis of Consolidated Edison Company to provide the New York Public Service Commission with guidance in determining areas that should be reviewed in detailed management audit of the company.

*Oklahoma Industrial Energy Consumers* - Analyzed and presented testimony on affiliate energy trading transactions by AEP in ERCOT.

*Georgia Public Service Commission* - Presented testimony before the Georgia Public Service Commission in Docket 3840-U, providing recommendations on nuclear O&M levels for Hatch and Vogtle and recommending that a nuclear performance standard be implemented in the State of Georgia.

*Oklahoma Industrial Energy Consumers* - Analyzed and presented testimony addressing power production and coal plant dispatch issues in fuel prudence cases involving Oklahoma Gas and Electric Company.

*Georgia Public Service Commission* - Analyzed and provided recommendations regarding the reasonableness of nuclear O&M costs, fossil O&M costs and coal inventory levels reported in GPC's 1990 Surveillance Filing.

*New York Public Service Commission* - Conducted inter-company statistical benchmarking analysis of Rochester Gas & Electric Company to provide the New York Public Service Commission with guidance in determining areas which should be reviewed in detailed management audit of the company.

*Oklahoma Attorney General* – Analyzed and presented testimony regarding fuel and purchased power, depreciation and other expense items in Oklahoma Gas & Electric Company's 2001 rate case before the Oklahoma Corporation Commission.

*City of Houston* - Analyzed and presented testimony regarding fossil plant O&M expense levels in Houston Lighting & Power Company's rate case before the Public Utility Commission of Texas.

*City of El Paso* - Analyzed and presented testimony regarding regulatory and technical issues related to the Central & Southwest/El Paso Electric Company merger and rate proceedings before the PUCT, including analysis of merger synergy studies, fossil O&M and purchased power margins.

*Residential Ratepayer Consortium* - Analyzed Fermi 2 replacement power and operating performance issues in 1994 and 1995 fuel reconciliation proceedings for Detroit Edison Company before the Michigan Public Service Commission.

*Residential Ratepayer Consortium* - Analyzed and prepared testimony addressing coal plant outage rate projections in the Consumer's Power Company fuel proceeding before the Michigan Public Service Commission.

*City of El Paso* - Analyzed and developed testimony regarding Palo Verde operations and maintenance expenses in El Paso Electric Company's 1991 rate case before the Public Utility Commission of Texas.

*City of Houston* - Analyzed and developed testimony regarding the operations and maintenance expenses and performance standards for the South Texas Nuclear Project, and operations and maintenance expenses for the Limestone and Parish coal-fired power plants in HL&P's 1991 rate case before the PUCT.

*City of El Paso* - Analyzed and developed testimony regarding Palo Verde operations and maintenance expenses in El Paso Electric Company's 1990 rate case before the Public Utility Commission of Texas. Recommendations were adopted.

## **Power Plant Management**

*City of Austin Electric Utility Department* - Analyzed the 1994 Operating Budget for the South Texas Nuclear Project (STNP) and assisted in the development of long-term performance and expense projections and divestiture strategies for Austin's ownership interest in the STNP.

*City of Austin Electric Utility Department* - Analyzed and provided recommendations regarding the 1991 capital and O&M budgets for the South Texas Nuclear Project.

*Sam Rayburn G&T Electric Cooperative* - Developed and conducted operational monitoring program relative to minority owner's interest in Nelson 6 Coal Station operated by Gulf States Utilities.

*KAMO Electric Cooperative, City of Brownsville and Oklahoma Municipal Power Agency* - Directed an operational audit of the Oklaunion coal-fired power plant.

*Sam Rayburn G&T Electric Cooperative* - Conducted a management/technical assessment of the Big Cajun II coal-fired power plant in conjunction with ownership feasibility studies for the project.

*Kamo Electric Power Cooperative* - Developed and conducted operational monitoring program for client's minority interest in GRDA Unit 2 Coal Fired Station.

*Northeast Texas Electric Cooperative* - Developed and conducted operational monitoring program concerning NTEC's interest in Pirkey Coal Station operated by Southwestern Electric Power Company and Dolet Hills Station operated by Central Louisiana Electric Company.

*Corn Belt Electric Cooperative/Central Iowa Power Cooperative* - Perform operational monitoring and budget analysis on behalf of co-owners of the Duane Arnold Energy Center.

## **PRESENTATIONS**

*Quantifying Impacts of Electric Restructuring: Dynamic Analysis of Power Markets*, 1997 NARUC Winter Meetings, Committee on Finance and Technology.

*Quantifying Costs and Benefits of Electric Utility Deregulation: Dynamic Analysis of Regional Power Markets*, International Association for Energy Economics, 1996 Annual North American Conference.

*Railroad Rates and Utility Dispatch Case Studies*, 1996 EPRI Fuel Supply Seminar.

*Quantifying Potentially Stranded Costs: Modeling and Policy Issues*, 1996 NASUCA Annual Meeting.

**TESTIMONY OF DON SCOTT NORWOOD  
SINCE 2002**

<b>DATE</b>	<b>REGULATORY AGENCY/COURT</b>	<b>DOCKET/CASE</b>	<b>UTILITY APPLICANT</b>	<b>ISSUES</b>
05/29/02	Texas Public Utility Commission	23320	ERCOT (Direct)	Proposed Rates and Reasonableness Standard set in PURA §39.151(e); ERCOT's Functional Accounting
06/11/02	Oklahoma Corporation Commission	PUD 200100455	Oklahoma Gas and Electric (Direct)	Proposed Revenue Requirement; Reasonableness of CUP Rider, TIR Rider, and Rate Moratorium Proposals; Modifications to Rider for Off-System Sales and
08/15/02	Oklahoma Corporation Commission	PUD 200100455	Oklahoma Gas and Electric (Surrebutal)	Review and Reconciliation of Off-System Sales Margin Credit Calculations
10/03/02	Texas State Office of Administrative Hearings	473-02-3169	West Texas Utilities Company (Direct)	Reasonableness of Final Fuel Reconciliation
11/07/02	Texas State Office of Administrative Hearings	473-02-3169	West Texas Utilities Company (2nd Supplemental)	Reasonableness of Final Fuel Reconciliation
12/03/02	Texas Public Utility Commission	26933	Reliant Energy Retail Services, LLC (Direct)	Reasonableness of Proposed Adjustments to PTB Fuel Factor
12/31/02	Texas Public Utility Commission	26195	Texas Genco and CenterPoint Energy (Direct)	Reasonableness of Estimated Costs and Benefits under a Joint Operating Agreement
01/27/03	Texas Public Utility Commission	26186	Southern Western Public Service Company (Direct)	Reasonableness of Reconcilable Fuel and Purchased Power Expenses for 24 month Reconciliation Period
02/10/03	Texas Public Utility Commission	27320	Reliant Energy Retail Services, LLC (Direct)	Reasonableness of Proposed Increase to PTB Fuel Factor and the Reasonableness of Rate Case Expenses
04/09/03	Texas Public Utility Commission	27035	Central Power and Light Company (Direct)	Reasonableness of CPL's Request to Reconcile Fuel Costs
04/10/03	Texas Public Utility Commission	26194	El Paso Electric Company (Direct)	Reasonableness of EPE's Request to Reconcile Fuel Costs
06/26/03	Texas Public Utility Commission	27956	Reliant Energy, and Retail Services, LLC (Direct)	Reasonableness of Reliant's Proposal to Increase PTB Fuel Factors
07/07/03	Public Service Commission of Wisconsin	05-CE-130	Wisconsin Electric Power Company (Direct)	Reasonableness of Input Assumptions and Results of Economic Analysis of ERGS
07/18/03	Texas Public Utility Commission	27576	Texas-New Mexico Power Company (Direct)*	Reasonableness of TNMP's Application for Final Reconciliation of Fuel Costs
08/19/03	Texas Public Utility Commission	26000	West Texas Utilities Company (Remand Direct)	Reasonableness of WTU's Application to Reconcile Eligible Fuel Expenses and Fuel Factor Revenues
08/26/03	Public Service Commission of Wisconsin	05-CE-130	Wisconsin Electric Power Company (Rebutal)	Reasonableness of FES Economic Analysis of ERGS
08/26/03	Public Service Commission of Wisconsin	05-CE-130	Wisconsin Electric Power Company (Surrebutal)	Reasonableness of Input Assumptions and Results of Economic Analysis of ERGS
09/05/03	State Corporation Commission of Virginia	PU-2003-00285	Virginia Electric and Power Company (Direct)	Reasonableness of VEP's natural gas, coal, and purchased energy price forecasts underlying the Company's Fuel Factor Proposal
10/28/03	Texas Public Utility Commission	26195	Texas Genco and CenterPoint Energy (Refiled Direct)	Reasonableness of Estimated Costs and Benefits under a Joint Operating Agreement
11/05/03	Texas Public Utility Commission	26045	Southwestern Public Service Company (Direct)	Reasonableness of SWERC's Application for Reconciliation of Fuel Costs Analysis and Recommendations regarding DECO's proposed 2004 PSCR Plan applications and PSCR factor
12/12/03	Michigan Public Service Commission	U-13808	The Detroit Edison Company (Direct)	Request for Approval of McClain PPA
02/27/04	Oklahoma Corporation Commission	PUD 200400004	Oklahoma Gas and Electric (Direct)	Rebutal Testimony Addressing DECO's proposed 2004 PSCR Plan applications and PSCR factor
03/26/04	Michigan Public Service Commission	U-13808	The Detroit Edison Company (Direct)	Request for Approval of McClain PPA
03/29/04	Texas Public Utility Commission	29206	Texas New Mexico Power Company	Reasonableness of TNMP's Application for Final True-up of Stranded Costs
06/01/04	Texas Public Utility Commission	29526	CenterPoint, TGN, Reliant	Reasonableness of Applicants' Application for Final True-up of Stranded Costs
07/19/04	State of Wisconsin Division of Hearings and Appeals	3-SE-01-41-0005-0019	Wisconsin Electric Power Company	Authority for construction of ERGS facilities in Lake Michigan lakbed. Comparison of environmental, social, capital and operating costs of proposed ERGS SPC units to IGCC alternatives
07/24/04	State of Wisconsin Division of Hearings and Appeals	IH-04-03	Wisconsin Electric Power Company	Authority for construction of ERGS facilities in Lake Michigan lakbed. Comparison of environmental, social, capital and operating costs of proposed ERGS SPC units to IGCC alternatives

**TESTIMONY OF DON SCOTT NORWOOD  
SINCE 2002**

<b>DATE</b>	<b>REGULATORY AGENCY/COURT</b>	<b>DOCKET/CASE</b>	<b>UTILITY APPLICANT</b>	<b>ISSUES</b>
8/9/04	State of Wisconsin Division of Hearings and Appeals	3-SE-01-41-0005-0019	Wisconsin Electric Power Company	WEPCCO's failure to conduct a practicable alternatives analysis for wetlands impact of the ERGS. Reasonableness of Applicants' request for interest on claimed stranded costs. Reasonableness of Applicants' request for interest on claimed stranded costs. Reasonableness of Applicants' request for interest on claimed stranded costs. contribution of capacity auction true-up to return on stranded costs. Level and cost of capacity included in TCC's summer on-peak block energy purchases
8/18/04	Texas Public Utility Commission	29526	CenterPoint, TGN, Reliant	
09/02/04	Texas Public Utility Commission	29526	CenterPoint, TGN, Reliant	
9/10/04	Texas Public Utility Commission	27035	AEP TCC	

**Exhibit SN-2**

4/24/2012

## PSO, STATE REACH AGREEMENT WITH EPA ON EMISSIONS REDUCTION PLANS

Public Service Company of Oklahoma (PSO), a unit of American Electric Power (NYSE: AEP), has entered into an agreement in principle with the U.S. Environmental Protection Agency, the State of Oklahoma and the Sierra Club that establishes a framework for PSO to comply with EPA regulations affecting PSO's two coal-fired generating units at its Northeastern Station in Oologah, Oklahoma.

Specifically, the agreement addresses PSO's future obligations under the EPA's Regional Haze rule (RHR) and EPA's Mercury and Air Toxics Standard (MATS). Under the agreement, PSO would meet specified emissions rates at both Northeastern coal units, install certain emissions control equipment on one of the Northeastern coal units in 2015, and retire the other unit in 2016. The coal unit with the emissions controls would be retired in the 2025-26 timeframe.

The agreement also will result in PSO withdrawing its lawsuit against the EPA regarding the Regional Haze rule.

"This landmark agreement outlines a clear and cost-effective path for compliance by PSO's Oklahoma coal-fired generating units with the EPA's new rules," said Stuart Solomon, PSO's president and chief operating officer. "It allows PSO to implement a compliance plan that resolves the Company's most significant environmental issues, provides a manageable transition for our generation fleet, and assures continued reliability for our customers."

The agreement is the result of extensive negotiations concerning compliance with the EPA's MATS rule and its "Federal Implementation Plan" for the RHR, both issued in December 2011.

"There are many people I'd like to thank for their essential role in reaching this agreement, including Governor Mary Fallin, Attorney General Scott Pruitt, Oklahoma Secretary of Environment Gary Sherrer, Secretary of Energy Mike Ming, Oklahoma Department of Environmental Quality director Steve Thompson, the EPA and the Sierra Club," said Solomon. "All provided great leadership in taking a positive and cooperative approach to improving Oklahoma's environment and also providing a sensible approach to environmental compliance for PSO and our customers."

The parties to the agreement will work together to develop definitive settlement documents in the next 30-60 days. The settlement will then be subject to public review and comment.

PSO will file with the Oklahoma Corporation Commission (OCC) an environmental compliance plan that reflects the agreement. The OCC must approve costs associated with the plan before PSO can recover those costs from customers.

Source: <https://www.psoklahoma.com/info/news/ViewRelease.aspx?releaseID=1241>

**Exhibit SN-3**

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY OF )  
OKLAHOMA FOR COMMISSION AUTHORIZATION )  
OF A PLAN AND COST RECOVERY OF ACTIONS )  
OF PSO TO BE IN COMPLIANCE WITH CERTAIN )  
ENVIRONMENTAL RULES PROMULGATED BY )  
THE UNITED STATES ENVIRONMENTAL ) CAUSE PUD 2 01200054  
PROTECTION AGENCY; SUCH ACTIVITIES TO )  
INCLUDE, BUT NOT BE LIMITED TO, CAPITAL )  
EXPENDITURES FOR EQUIPMENT AND )  
FACILITIES; CONSTRUCTION OR PURCHASE OF )  
AN ELECTRIC GENERATING FACILITY OR ENTER )  
INTO A LONG-TERM PURCHASE POWER )  
CONTRACT (AND POSSIBLE EARNINGS ON THE )  
CONTRACT); CHANGE IN DEPRECIATION RATES )  
AND/OR ESTABLISHMENT AND RECOVERY OF A )  
REGULATORY ASSET; AND FOR SUCH OTHER )  
RELIEF AS THE COMMISSION DEEMS PSO IS )  
ENTITLED. )

PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS -THIRD SET OF DATA  
REQUESTS

**Question 4:**

What is the anticipated timeframe for completion and execution by all parties of the EPA Settlement Agreement?

**Response No. 4:**

It is anticipated that EPA will execute the Settlement Agreement following the close of the comment period and review of the comments received. All other parties have already signed the final Settlement Agreement. In addition, PSO and Sierra Club have executed a separate agreement that includes additional commitments. Copies of the partially executed final EPA Settlement Agreement and the fully executed PSO-Sierra Club Agreement are attached in OIEC 3-4 Attachments 1 and 2.

Prepared By: Howard L. Ground

Title: Manager, State Governmental and  
Environmental Affairs

## SETTLEMENT AGREEMENT

This Settlement Agreement (“Agreement”) is entered into by Public Service Company of Oklahoma (“PSO”), the Secretary of the Environment on behalf of the State of Oklahoma (“Secretary”), the Oklahoma Department of Environmental Quality (“ODEQ”), the United States Environmental Protection Agency (“EPA”), and the Sierra Club. PSO, the Secretary, ODEQ, EPA, and the Sierra Club are hereinafter collectively referred to as “the Parties” for purposes of this Agreement.

### RECITALS

- A. On December 28, 2011, EPA issued a final rule entitled, “Approval and Promulgation of Implementation Plans; Oklahoma; Federal Implementation Plan for Interstate Transport of Pollution Affecting Visibility and Best Available Retrofit Technology Determinations,” 76 Fed. Reg. 81,728 (Dec. 28, 2011) (the “Final Rule”).
- B. The Final Rule partially approved and partially disapproved Oklahoma’s state implementation plan (“SIP”) submitted under the “visibility” and “interstate transport” provisions of the Clean Air Act (“CAA”), 42 U.S.C. § 7410, 7491, and 7492. The Final Rule included a federal implementation plan (“FIP”) establishing Best Available Retrofit Technology (“BART”) emission limitations on sulfur dioxide (“SO<sub>2</sub>”) for Units 3 and 4 of PSO’s Northeastern plant (“PSO’s Units”) to address the visibility and interstate transport provisions of the CAA.
- C. PSO desires to develop and implement a comprehensive strategy to comply with its obligations with respect to the visibility and interstate transport provisions of the CAA as well as its other obligations with respect to the CAA in a coordinated manner.
- D. PSO intends to install low NO<sub>x</sub> combustion technologies on both of its Units, retire one of its Units, and install and operate on its other Unit a dry sorbent injection system and baghouse in order to achieve emissions rates that comply with the terms of this Agreement and with its obligations with respect to the visibility provisions of the CAA.
- E. PSO intends to retire one of its Units and install and operate on its other Unit a dry sorbent injection system, a baghouse, and activated carbon injection to achieve emissions rates that comply with the Mercury & Air Toxics Standard that became effective April 16, 2012, 40 C.F.R. § 63.9984 (“the MATS Rule”). Properly designed and operated air pollution control systems consisting of dry sorbent injection system, baghouse, and activated carbon injection can achieve the MATS Rule emission limits. An EPA letter to the ODEQ and PSO dated July 18, 2012, expresses EPA’s support of PSO’s comprehensive strategy to use the technologies described in the Regional Haze Agreement referenced in Attachment A to this Agreement to achieve the emission limitations prescribed by the MATS Rule. The letter is attached to this Agreement as Attachment B.

- F. On February 24, 2011, PSO timely filed a Petition for Review, challenging the issuance of the Final Rule in *Public Service Company of Oklahoma v. U.S. Environmental Protection Agency, et al.*, No. 12-9524. On March 26, 2012, Sierra Club filed a timely motion to intervene. The motion was granted March 27, 2012.
- G. The CAA and EPA's regulations require States to develop SIPs to implement the CAA's provisions, including the CAA's visibility and interstate transport provisions. See 42 U.S.C. §§ 7410(a)(2)(D)(i)(II), (J), 7491(b)(2); 40 C.F.R. § 50.300(a). ODEQ is the administrative agency in the State of Oklahoma responsible for developing and proposing such SIPs. See 27A O.S. §§ 2-5-105(3), (20), 1-3-101(B)(8), 2-3-101(B)(2). The Secretary, as the Governor's designee for the State of Oklahoma, is responsible for submitting SIPs to EPA for review. See 40 C.F.R. Part 51, Appendix V, Section 2.1(a); 40 C.F.R. § 51.103(a). Because this Agreement requires ODEQ to develop and propose and the Secretary to submit SIP revisions to EPA under the visibility and interstate transport provisions of the CAA, and ODEQ and the Secretary prefer to regulate PSO under such SIP revisions rather than EPA's FIP, ODEQ and the Secretary have an interest in and are essential parties to this Settlement Agreement.
- H. The Parties have negotiated in good faith and have determined that the settlement reflected in this Agreement is in the public interest. If approved and implemented as set forth herein, this Agreement will resolve PSO's Petition for Review.
- I. This Agreement will not impact any other provisions of the Final Rule, and/or any other applicable federal, state, and local laws and regulations. No other claims will be affected by the resolution of the issues related to PSO's Units as set forth herein.

#### AGREEMENT

1. PSO, Sierra Club, and EPA agree that within ten (10) days after this Agreement is executed by the Parties (i.e., signed), but before finalization pursuant to Paragraph 16 of this Agreement, they will jointly move the Court for an order holding in abeyance PSO's Petition for Review pending implementation of the terms of the Agreement.
2. Within thirty (30) days of the effective date of this Agreement, PSO shall submit to ODEQ final and complete versions of all information and documentation (including technical supporting documentation for PSO's Units) necessary for the development of the SIP revisions referenced in Paragraphs 3 and 4.
3. No later than one hundred-twenty (120) days after PSO provides ODEQ with the information and documentation required in Paragraph 2, ODEQ will develop and propose a SIP revision under the visibility provisions of the CAA, 42 U.S.C. § 7491, and EPA's regional haze regulations, 40 C.F.R. § 51.308, that addresses PSO's Units ("Regional Haze SIP revision") in accordance with the provisions of Attachment A.
4. No later than one hundred-twenty (120) days after PSO provides ODEQ with the information and documentation required in Paragraph 2, ODEQ will develop and propose

a SIP revision under the interstate transport provisions of the CAA, 42 U.S.C. § 7410(a)(2)(D)(i)(II), that addresses PSO's Units ("Interstate Transport SIP revision") in accordance with the provisions of Attachment A.

5. No later than one hundred-twenty (120) days after PSO provides ODEQ with the information and documentation required in Paragraph 2, the Secretary shall provide the proposed SIP revisions required in Paragraphs 3 and 4 to EPA and request parallel processing of the SIP revisions from EPA pursuant to 40 C.F.R. Part 51, App. V, Section 2.3.
6. If ODEQ determines, at any time subsequent to PSO's submittal of all information and documentation for PSO's Units as required in Paragraph 2, that additional information and/or documentation is necessary in order to develop the SIP revisions referenced in Paragraphs 3 and 4, ODEQ shall provide PSO with a written request for such additional information and/or documentation with a copy to all Parties. The deadlines associated with the obligations under Paragraphs 3-5 of this Agreement shall be tolled during the period of time between the issuance of the written request and ODEQ's receipt of the requested information and/or documentation.
7. After the opportunity for public hearing and the close of Oklahoma's notice-and-comment period for the Regional Haze and Interstate Transport SIP revisions, but no later than ninety (90) days after the Secretary submits the request for parallel processing referenced in Paragraph 5, ODEQ will consider and if appropriate adopt the Regional Haze and Interstate Transport SIP revisions referred to in Paragraphs 3 and 4. If adopted, the Secretary will submit to EPA those SIP revisions.
8. The Regional Haze and Interstate Transport SIP revisions adopted and submitted to EPA under Paragraph 7 will include the provisions described in Attachment A to this Agreement unless the Parties, by written mutual agreement, amend the provisions described in Attachment A. If the Regional Haze and Interstate Transport SIP revisions adopted and submitted to EPA by the Secretary do not include the provisions described in Attachment A to this Agreement, PSO may file a motion to dissolve the stay of PSO's petition for review and request that a briefing schedule be set. PSO may also pursue any opportunities for administrative or judicial review of the Regional Haze and Interstate Transport SIP revisions adopted by ODEQ and submitted by the Secretary.
9. Within sixty (60) days of EPA's receipt of the final Regional Haze and Interstate Transport SIP revisions EPA will determine whether the revisions meet the requirements of the CAA consistent with 42 U.S.C. § 7410(k)(1)(B) ("completeness finding").
10. EPA will take final action on the Regional Haze and the Interstate Transport SIP revisions as soon as possible, but no later than six (6) months from the date of the completeness finding referred to in Paragraph 9 consistent with 42 U.S.C. § 7410(k)(2).
11. If EPA promulgates a final action approving the provisions of the Regional Haze and Interstate Transport SIP revisions included in Attachment A, as adopted and submitted to

EPA by Oklahoma, PSO, the Sierra Club, and EPA will promptly file a joint stipulation of dismissal of PSO's Petition for Review. The Parties agree that they will not challenge that portion of any final action issued by EPA that fully approves the Regional Haze and Interstate Transport SIP revisions as adopted and submitted to EPA by the Secretary that contain the provisions in Attachment A affecting PSO's Units.

12. Separately from the SIP process, PSO will report biannually to EPA (beginning in 2017 for the period 2015-2016, and every second year thereafter through the end of 2025 or 2026, whenever the last Northeastern unit is retired) on the energy produced by PSO's units and the sources of energy secured under PSO's long-term purchased power contracts. The initial report will include similar information for calendar years 2013-2014. Requests for proposals ("RFPs") for long-term purchase power contracts issued between 2013 and the date the reporting obligation ends will specifically seek bids for energy supplied by natural gas and renewable resources. The biannual reports will include copies of any RFPs issued during the reporting period, and a summary of the capacity or energy secured through any long-term power purchase agreements executed during the reporting period, including the unit(s) providing the purchased power, the amount of capacity or energy secured under the agreement, and the term of each agreement.
13. The Parties may, by written mutual agreement, extend the dates in Paragraphs 2-5, 7, and 9-10 by which actions must be taken to fulfill the Parties' respective obligations under this Agreement.
14. Nothing in the Regional Haze and Interstate Transport SIP revisions as adopted and submitted to EPA by Oklahoma or in this Agreement shall relieve PSO from its obligations to comply with all applicable federal, state, and local laws and regulations, including laws, regulations, and compliance deadlines that become applicable after the date of any revisions to Oklahoma's Regional Haze SIP that may be approved by EPA. Such laws and regulations include, but are not limited to, any EPA rule imposing requirements relevant to interstate transport under 42 U.S.C. § 7410(a)(2)(D) and the MATS Rule. Nothing in Oklahoma's Regional Haze SIP revision, including the BART determination for PSO's Units, should be construed to provide any relief from the emissions limits or deadlines specified in such regulations, including, but not limited to, deadlines for the installation of pollution controls required by any such regulations.
15. If EPA does not take final action approving those aspects of the Regional Haze and Interstate Transport SIP revisions that contain the provisions of Attachment A, as adopted and submitted to EPA by Oklahoma, PSO may file a motion to dissolve the stay of PSO's Petition for Review, and to request that a briefing schedule be set. EPA does not waive or limit any defense relating to such litigation. This shall be the only remedy for EPA's failure to fulfill its obligations under this Agreement. PSO and Sierra Club agree that contempt of court is not an available remedy under this Agreement.
16. The Parties agree and acknowledge that before this Agreement is final, EPA must provide notice in the Federal Register and an opportunity for public comment pursuant to CAA

section 113(g), 42 U.S.C. § 7413(g). EPA shall promptly submit said notice of this Agreement to the Federal Register after this Agreement is executed by the Parties (i.e., signed). After this Agreement has undergone an opportunity for notice and comment, the Administrator or the Attorney General, as appropriate, shall promptly consider any such written comments in determining whether to withdraw or withhold their consent to the Agreement, in accordance with section 113(g) of the CAA.

If the United States elects not to withdraw or withhold its consent to this Agreement, EPA shall provide written notice to the Parties as expeditiously as possible. This Agreement shall become final and effective on the date that EPA provides such written notice to the Parties. If EPA does not provide such written notice within sixty (60) days after the notice of the Agreement is published in the Federal Register, the sole remedy shall be the right to file a motion to dissolve the stay of the Petition for Review, and to request that a briefing schedule be set. EPA does not waive or limit any defense relating to such litigation. PSO and Sierra Club agree that contempt of court is not an available remedy under this Agreement.

17. No provision of this Agreement shall be interpreted as or constitute a commitment or requirement that the United States or any of its departments or agencies obligate or pay funds in contravention of the Anti-Deficiency Act, 31 U.S.C. § 1341 *et seq.*, or in violation of any other statute, law, or regulation.
18. Nothing in this Agreement shall be construed to limit or modify the discretion accorded to EPA, ODEQ, or the Secretary by statute, or by general principles of administrative law.
19. Nothing in this Agreement shall be construed to limit or modify the rights of PSO or Sierra Club to seek reconsideration or judicial review of any altered, amended or revised provisions of any final action that ODEQ or EPA may take that differ in any material respect from the provisions described in Attachment A (or as amended by mutual written agreement of the Parties pursuant to Paragraph 8).
20. The undersigned hereby certify that they are duly authorized to bind the Party on whose behalf this Agreement is executed to the terms of this Agreement.
21. The provisions of this Agreement shall apply to and be binding on the Parties, their successors and assigns.
22. This Agreement may be signed in counterparts, and such counterpart signatures shall be given full force and effect.

**FOR PETITIONER PSO:**

**Dated:** 10-17-12

  
\_\_\_\_\_  
**J. Stuart Solomon, President**  
**Public Service Company of Oklahoma**

FOR STATE OF OKLAHOMA:  
SECRETARY OF THE ENVIRONMENT FOR  
THE STATE OF OKLAHOMA

Dated: 10/1/12

Gary L. Sherrer

FOR OKLAHOMA DEPARTMENT OF  
ENVIRONMENTAL QUALITY:

Dated: 9-28-12

Steven A. Thompson

FOR U.S. ENVIRONMENTAL PROTECTION  
AGENCY:

IGNACIA S. MORENO  
Assistant Attorney General  
Environment and Natural Resources Division


Dated: \_\_\_\_\_

By: \_\_\_\_\_

STEPHANIE J. TALBERT  
Environmental Defense Section  
Environment and Natural Resources Division  
U.S. Department of Justice  
P.O. BOX 7611  
Washington, DC 20044  
(202) 514-2617  
Fax: (202) 514-8865  
Stephanie.Talbert@usdoj.gov

FOR INTERVENOR SIERRA CLUB:

Dated: 10/16/12

  
\_\_\_\_\_

ATTACHMENT A

1. Oklahoma, through the Secretary, will submit to EPA a Regional Haze SIP revision that addresses PSO's Units and includes, among other things, the following elements:
  - a. Oklahoma's SIP revision will include a Regional Haze Agreement ("RHA") entered into by ODEQ and PSO to effectuate the BART determination.
  - b. The RHA will require that by no later than December 31, 2013, PSO will complete installation of low NOx combustion technologies and achieve a nitrogen oxide ("NOx") emission rate of 0.23 lb/MMBtu on a 30-day rolling average at each of PSO's Units.
  - c. The RHA will require that beginning on January 31, 2014, PSO will comply with a new SO<sub>2</sub> emission rate at each of PSO's Units of 0.65 lb/MMBtu on a 30-day rolling average, and beginning on December 31, 2014, PSO will comply with a new SO<sub>2</sub> emission rate of 0.60 lb/MMBtu on a 12-month rolling average at each of PSO's Units. PSO will maintain those emission rates until controls are installed at one unit as provided in subparagraph (e), and the other unit is retired as provided in subparagraph (d). The RHA will include an alternative operating scenario that addresses potential service disruption of coal supplies during the time period between January 31, 2014 through April 16, 2016.
  - d. The RHA will require that PSO seek all necessary regulatory approvals, and will retire one of the coal-fired generating units at Northeastern Station by April 16, 2016.
  - e. The RHA will require that PSO seek all necessary regulatory approvals, and install and operate a dry-sorbent injection system, activated carbon injection system, and a fabric filter baghouse, and secure further NOx emission reductions by April 16, 2016 on the coal-fired generating unit at Northeastern Station that will continue to operate. After completion of the installation of the pollution controls required by this subparagraph, PSO will achieve a 0.15 lb/MMBtu emission rate for NOx on a 30-day rolling average basis, and a 0.40 lb/MMBtu emission rate for SO<sub>2</sub> on a 30-day rolling average basis.
  - f. The RHA will require that during the first year of operation of the controls required under the RHA, PSO will develop and propose a monitoring program to test various operating profiles and other measures, to determine whether increased SO<sub>2</sub> removal efficiencies can be achieved during normal operations. Pursuant to the terms of the RHA, PSO will submit the monitoring program to EPA and ODEQ for review and will implement the monitoring program during the second and third years of operation of the dry sorbent injection system. PSO will evaluate and report the results of the monitoring program to EPA and ODEQ, and if that evaluation demonstrates that the technology is capable of sustainably

achieving an emission rate of less than 0.37 lbs/MMBtu on a 30-day rolling average basis without (i) altering the unit's fuel supply, (ii) incurring additional capital costs, (iii) increasing operating expenses by more than a negligible amount, and/or (iv) adversely impacting overall unit operations, ODEQ will propose to revise the emission rate in the RHA by 60 percent of the difference between 0.40 and the demonstrated emission rate. Upon adoption after notice and opportunity for hearing, Oklahoma, through the Secretary, will submit a Regional Haze SIP revision to EPA for approval. If the demonstrated emission rate is 0.37 lbs/MMBtu or greater, no adjustment will be made to the RHA, and the emission rate from the operating Northeastern coal-fired generating unit in the RHA will remain 0.40 lbs/MMBtu.

- g. The RHA will require that beginning in calendar year 2021, the Annual Capacity Factor (calculated for each calendar year as a percentage of MWH based on a rated capacity of 470 MW times 8760 hours) for the operating coal-fired generating unit at Northeastern Station will be reduced as follows:
    - i. to no more than 70 percent in calendar years 2021 and 2022;
    - ii. to no more than 60 percent in calendar years 2023 and 2024; and
    - iii. to no more than 50 percent in calendar years 2025 and 2026.
  - h. The RHA will require that no later than December 31, 2026, PSO will retire the remaining operating coal-fired generating unit at Northeastern Station. However, in calendar year 2021, the RHA will require PSO to evaluate whether the projected generation from that unit can be replaced at lower or equal total projected costs from natural gas or renewable resources. Pursuant to the RHA, PSO will provide a copy of the evaluation to EPA and ODEQ. If power is available from such resources at a lower projected total cost (including consideration of PSO's need to recover its remaining investment in the units), then the operating unit will retire no later than December 31, 2025.
2. Oklahoma, through the Secretary, will submit to EPA an Interstate Transport SIP revision that addresses PSO's Units and includes, among other things, the following elements:
- a. An enforceable mechanism that addresses SO<sub>2</sub> reductions from sources other than those operated by PSO, to the extent necessary to achieve the anticipated visibility benefits from the 2018 regional modeling; and
  - b. A provision requiring that the enforceable mechanism referred to in Paragraph 2(a) of this Attachment A be implemented if the SO<sub>2</sub> emission rate for the controlled unit at Northeastern is not reduced to 0.30 lbs/MMBtu or less as a result of the Paragraph 1(f) of this Attachment A.

## **SETTLEMENT AGREEMENT**

WHEREAS, Public Service Company of Oklahoma ("PSO") owns and operates certain facilities in Oklahoma that are affected by regulatory requirements under the Regional Haze Program provisions of the Clean Air Act ("CAA") and EPA's implementing regulations at 40 CF Part 51, Subpart P and 40 CFR Part 51, Appendix Y (incorporated by reference in the regulations promulgated by ODEQ at OAC 252:100-8-72); and

WHEREAS, the State of Oklahoma developed and submitted a Regional Haze State Implementation Plan ("RH SIP") to the Environmental Protection Agency ("EPA") seeking approval of the RH SIP; and

WHEREAS, EPA approved portions of the RH SIP but disapproved the portions of the RH SIP related to sulfur dioxide (SO<sub>2</sub>) emissions and issued a Federal Implementation Plan ("FIP") that includes a Best Available Retrofit Technology ("BART") determination for SO<sub>2</sub> emissions from Northeastern Units 3 and 4 (the "PSO Units"); and

Whereas, PSO filed a timely Petition for Review in the Tenth Circuit Court of Appeals, challenging the issuance of the FIP in *Public Service Company of Oklahoma v. EPA*, Case No 12-9524, and Sierra Club intervened in that action; and

WHEREAS, PSO, Sierra Club, EPA, the Oklahoma Department of Environmental Quality ("ODEQ"), and the Oklahoma Secretary of the Environment on behalf of the State of Oklahoma (the "Secretary") have negotiated in good faith and developed a comprehensive proposal that would result in timely actions to reduce emissions of SO<sub>2</sub>, nitrogen oxides ("NOx"), and hazardous air pollutants from the PSO Units, and have executed a settlement agreement setting forth the provisions of a revised BART determination for the PSO Units, and a process for developing, submitting and seeking approval of Regional Haze and Interstate Transport SIP Revisions (the "Revised RH SIP") which is attached hereto as Exhibit A (the "Revised RH SIP Agreement") which requires control measures and technologies that are also capable of achieving the emission limitations set forth in the Mercury and Air Toxics Standards Rule that became effective on April 16, 2012, 40 CFR §63.9984 ("MATS"); and

WHEREAS, PSO and Sierra Club (the "Parties") have negotiated certain additional covenants not reflected in the Revised RH SIP Agreement that are an important part of the consideration for the agreements reflected therein, and which the Parties desire to set forth in this agreement (the "Agreement");

NOW THEREFORE, without any admission of fact or law, and without conceding any jurisdictional or other claims or defenses, and without any findings with respect to the merits of any allegations of either Party in any pending matter, the Parties hereby agree as follows:

## **I. APPLICABILITY**

1. Upon execution of this Agreement by the Parties, the provisions of this Agreement shall apply to and be binding on the Parties, their successors, and assigns.

## **II. IMPLEMENTATION OF THE REVISED RH SIP AGREEMENT**

2. The Revised RH SIP Agreement is attached hereto as Exhibit A and incorporated by reference.
3. Sierra Club and PSO will support adoption of a Revised RH SIP that includes the provisions of Attachment A to the Revised RH SIP Agreement (or any amended provisions adopted by mutual agreement of the parties pursuant to Paragraph 8 of the Revised RH SIP Agreement) in public comments submitted to ODEQ urging the Secretary to promptly submit the Revised RH SIP to EPA for approval.
4. Sierra Club and PSO will support approval of a Revised RH SIP that includes the provisions of Attachment A to the Revised RH SIP Agreement (or any amended provisions adopted by mutual agreement of the parties pursuant to Paragraph 8 of the Revised RH SIP Agreement) in comments submitted to EPA urging EPA to promptly approve the Revised RH SIP.

## **III. ADDITIONAL COVENANTS**

5. If EPA promulgates a final action approving, unconditionally and in full, a Revised RH SIP that includes the provisions of Attachment A to the Revised RH SIP Agreement (or any amended provisions adopted by mutual agreement of the parties pursuant to Paragraph 8 of the Revised RH SIP Agreement), and PSO is in compliance at all times with the provisions of that final action and the MATS Rule (including any extensions applicable to PSO's Units), Sierra Club covenants not to sue PSO or its parents, subsidiaries or affiliates with respect to the stringency, terms, or timing of any applicable requirement to limit or reduce emissions of SO<sub>2</sub>, NO<sub>x</sub>, or hazardous air pollutants at PSO's Units based on any requirements under the final action required by the Revised RH SIP Agreement or the MATS Rule.
6. If EPA promulgates a final action approving, unconditionally and in full, a Revised RH SIP that includes the provisions of Attachment A to the Revised RH SIP Agreement (or any amended provisions adopted by mutual agreement of the parties pursuant to Paragraph 8 of the Revised RH SIP Agreement), Sierra Club covenants not to sue, petition, appeal, or otherwise legally challenge any order, permit, license, authorization, or other approval necessary or appropriate to implement the terms of the Revised RH SIP Agreement or EPA's final action, including, without limitation, any permit, authorization, or approval for the installation of pollution control equipment, or

such other orders, permits, licenses, authorizations or approvals that may be required, or any application by PSO to include in customer rates the costs of compliance with the Revised RH SIP Agreement or EPA's final action. This includes a covenant not to challenge the provisions of the Clean Air Act Title V operating permit for the PSO Units that incorporate the requirements of EPA's final action. Sierra Club further agrees not to seek to participate in any lawsuit or formal administrative proceeding for the purpose of challenging any order, permit, license, authorization, or other approval necessary or appropriate to implement the terms of the Revised RH SIP Agreement that PSO seeks while ODEQ and EPA are in the process of implementing the Revised RH SIP Agreement.

7. If EPA promulgates a final action approving, unconditionally and in full, the Revised RH SIP that includes the provisions of Attachment A to the Revised RH SIP Agreement (or any amended provisions adopted by mutual agreement of the parties pursuant to Paragraph 8 of the Revised RH SIP Agreement), Sierra Club agrees not to oppose EPA's or Oklahoma's consideration of the further emission reductions and limited remaining life of PSO's Units required by the Revised RH SIP approved by EPA, in the development of any revised regulatory standards under the Regional Haze program, Section 112(d)(6), or Section 112(f)(2) of the Clean Air Act, 42 U.S.C. §§ 7491, 7412(d)(6), 7412(f)(2), that would affect PSO's Units through 2026.

8. To facilitate retirement of PSO's Units in accordance with the terms of the final action approving, unconditionally and in full, the Revised RH SIP that includes the provisions of Attachment A to the Revised RH SIP Agreement (or any amended provisions adopted by mutual agreement of the parties pursuant to Paragraph 8 of the Revised RH SIP Agreement), Sierra Club agrees not to oppose, appeal or otherwise legally challenge any application filed by PSO to establish depreciation schedules to allow depreciation of the full book value of PSO's Units and all costs associated with the removal or retirement of PSO's Units through rates by the end of 2026 or later.

9. In the event PSO believes that Sierra Club has breached its obligations under this Agreement, it shall provide Sierra Club with written notice, and a 30-day opportunity to cure any alleged breach committed by anyone purporting to act on behalf of the Sierra Club. In the event PSO issues such notice, Sierra Club will cooperate with PSO to have any action filed by anyone purporting to act on behalf of Sierra Club dismissed. In no event shall Sierra Club be liable for money damages in the event of breach, and PSO and Sierra Club expressly waive and forego the right to monetary damages for any breach of this Agreement.

#### **IV. GENERAL PROVISIONS**

10. The effective date of this Agreement (the "Effective Date") shall be the date upon which this Agreement is executed by the Parties.

11. The terms of this Agreement may be modified only by a subsequent written agreement signed by the Parties.

12. All references in this Agreement to statutory or regulatory provisions by specific citation shall refer to the language of those provisions as they exist on the Effective Date of this Agreement.


13. Nothing in this Agreement shall be construed to limit or modify the rights of PSO or Sierra Club to seek reconsideration or judicial review of any altered, amended, or revised provisions of any final action that EPA may take that differ in any respect from the provisions described in Attachment A to the Revised RH SIP Agreement (or any amended provisions adopted by mutual agreement of the parties pursuant to Paragraph 8 of the Revised RH SIP Agreement).

14. This Agreement does not limit, enlarge, or affect the rights of any party to this Agreement as against any third parties.

15. Each undersigned representative of the Parties certifies that he or she is fully authorized to enter into the terms and conditions of this Agreement and to execute and legally bind to this document the Party he or she represents.

16. This Agreement may be signed in counterparts, and such counterpart signature pages shall be given full force and effect.

**For Public Service Company of Oklahoma:**

  
\_\_\_\_\_  
**J. Stuart Solomon**  
**President**

**Date:** 10-17-12

**For Sierra Club:**



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**Bruce Nilles**  
**Senior Director**  
**Beyond Coal Campaign**

**Date:** 10-19-12

**Exhibit SN-4**

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY OF )  
OKLAHOMA FOR COMMISSION AUTHORIZATION )  
OF A PLAN AND COST RECOVERY OF ACTIONS )  
OF PSO TO BE IN COMPLIANCE WITH CERTAIN )  
ENVIRONMENTAL RULES PROMULGATED BY )  
THE UNITED STATES ENVIRONMENTAL ) CAUSE PUD 2 01200054  
PROTECTION AGENCY; SUCH ACTIVITIES TO )  
INCLUDE, BUT NOT BE LIMITED TO, CAPITAL )  
EXPENDITURES FOR EQUIPMENT AND )  
FACILITIES; CONSTRUCTION OR PURCHASE OF )  
AN ELECTRIC GENERATING FACILITY OR ENTER )  
INTO A LONG-TERM PURCHASE POWER )  
CONTRACT (AND POSSIBLE EARNINGS ON THE )  
CONTRACT); CHANGE IN DEPRECIATION RATES )  
AND/OR ESTABLISHMENT AND RECOVERY OF A )  
REGULATORY ASSET; AND FOR SUCH OTHER )  
RELIEF AS THE COMMISSION DEEMS PSO IS )  
ENTITLED. )

PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – FOURTH SET OF DATA  
REQUESTS

**Question 05:**

Does PSO intend to seek a stay of compliance deadlines under its Regional Haze FIP in light of the stay that the 10th Circuit recently granted to OG&E? If not, please explain why not.

**Response No. 05:**

No. PSO anticipates that the revised Regional Haze SIP adopted and approved pursuant to the Settlement Agreement will supersede the Regional Haze FIP prior to those compliance deadlines.

Prepared By: Howard L. Ground

Title: Manager, State Governmental and  
Environmental Affairs

**Exhibit SN-5**

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY OF )  
OKLAHOMA FOR COMMISSION AUTHORIZATION )  
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THE UNITED STATES ENVIRONMENTAL ) CAUSE PUD 2200054  
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RELIEF AS THE COMMISSION DEEMS PSO IS )  
ENTITLED. )

PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – NINTH SET OF DATA  
REQUESTS

**Question 05:**

Reference PSO's response to OIEC 3-4, please provide the expected timeframe in which PSO expects to have obtained all necessary approvals from ODEQ, DOJ and EPA in order to implement the proposed EPA settlement.

**Response No. 05:**

The Settlement Agreement was published in the Federal Register on November 14, 2012. It is expected that the EPA will approve the Settlement after the 30 day public comment period, but a definitive timeframe cannot be provided. PSO is currently implementing the terms of the Settlement Agreement pending receipt of EPA approval.

Prepared By: Howard L. Ground

Title: Manager, State Governmental and  
Environmental Affairs

**Exhibit SN-6**

Estimated Percentage Cost Difference  
Between Coal Retrofit Option and EPA Settlement

	PSO <u>(Fate Exh. SLF-2)</u>	OIEC <u>Adjusted</u>
Cost Advantage of Coal Retrofit Option vs Settlement	\$482	\$482
Total System Production Cost With EPA Settlement	\$14,822	\$14,822
<u>Adjustments for Costs in Both Cases:</u>		
Pre-Retrofit Costs	\$0	-\$2,707
Base O&M	\$0	-\$1,214
Oklaunion	\$0	-\$236
Exelon PPA	\$0	-\$2,481
Wind	\$0	-\$1,163
Other Fuel	\$0	-\$1,296
Total System Production Cost Impacted by Plans	\$14,822	\$5,724
Percentage Cost Advantage over EPA Settlement	3.3%	8.4%

**Exhibit SN-7**

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RELIEF AS THE COMMISSION DEEMS PSO IS )  
ENTITLED. )

PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – SEVENTH SET OF DATA  
REQUESTS

**Question 04:**

Reference pages 18-23 of Mr. Ground's direct testimony, for each of the proposed and emerging federal and state rulemaking requirements listed, please indicate whether it is possible at this time to determine the specific effective date, details of required provisions for compliance, or ultimate cost impact of such proposed or emerging environmental rules on PSO's coal units.

**Response No. 04:**

It is not possible at this time to give specific effective dates or exact details of required provisions, though general time frames are outlined in Mr. Ground's testimony. The ultimate cost impacts of the proposed rules or emerging environmental rules cannot be estimated until final promulgation.

Prepared By: Howard L. Ground

Title: Manager, State Governmental and  
Environmental Affairs

**Exhibit SN-8**

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY OF )  
OKLAHOMA FOR COMMISSION AUTHORIZATION )  
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ENVIRONMENTAL RULES PROMULGATED BY )  
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REGULATORY ASSET; AND FOR SUCH OTHER )  
RELIEF AS THE COMMISSION DEEMS PSO IS )  
ENTITLED. )

PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS -THIRD SET OF DATA  
REQUESTS

**Question 15:**

Reference page 41 of Mr. Weaver's direct testimony, please provide support for the listed estimated CO2 prices included in the analyses of the EPA Settlement and Option #1, and explain how these amounts and the timing they were first assumed to be incurred were determined in absence of any final rules regulating carbon emissions from existing power plants.

**Response No. 15:**

It is the assessment of Company experts, external consultants and others that the likelihood of any federal climate legislation is very low over the next three years and still unlikely through the tenure of the 113th Congress. With 2015-2017 as the earliest reasonable date for a climate proposal to pass through committee, reach the floor and be approved by house for eventual passage, there will likely be an implementation period of approximately five years (as seen in previous climate proposals). Thus, 2022 is the earliest reasonable projection as to when such legislation *could* become effective. As to the assumed value of CO2, PSO's "CO2 Price/Tax" was applied to all CO2 tonnes produced, whereas, in the cap-and-trade programs considered by Congress previously, there were provisions for an allocation of "free" allowances – which effectively reduced the CO2 costs to incumbent generators. Also, newly promulgated EPA regulations and

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PROTECTION AGENCY; SUCH ACTIVITIES TO )  
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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS –THIRD SET OF DATA  
REQUESTS

**Response No. 15(cont):**

standards such as MATS, more-stringent CAFÉ standards and others will result in an estimated 50,000 MW national reduction in inefficient coal-fired electric generation and an estimated 10% reduction in CO2 emissions since 2010. This creates a de facto system of CO2 reduction that is certain to reduce CO2 values from earlier (now outdated) cap-and-trade program models. PSO's "CO2 Price/Tax" is far more realistic than much higher cap-and-trade values because; 1) near-term action on cap-and-trade legislation is highly unlikely, 2) in order for any federal cap-and-trade legislation to ultimately pass, the effective price will have to be moderate for the next 15-20 years, and, 3) actions to regulate CO2 from electric generation will more likely take other forms – such as through energy efficiency standards, renewable or clean-energy standards on new power plants.

Prepared By: Karl R Bletzacker

Title: Director, Fundamental Analysis

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

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ENTITLED. )

PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – NINTH SET OF DATA  
REQUESTS

**Question 07:**

Reference PSO's response to OIEC 3-15; please explain why the cost of anticipated "free" CO2 allowances were included in the economic analysis of the proposed EPA Settlement and coal retrofit compliance alternatives.

**Response No. 07:**

"Free" CO2 allowances were not included in the EPA Settlement and compliance analysis. For simplicity, and in recognition of the vagaries of any potential CO2 cap-and-trade allowance system that would provide (so-called "free") allowances to incumbent generators, the AEPSC Fundamental Analysis group did not assume this allowance system for modeling purposes. Rather, CO2 costs were applied to the dispatch cost of all fossil generating sources emitting CO2.

Prepared By: Scott C. Weaver

Title: Managing Director – Resources  
Planning & Operational Analysis

**Exhibit SN-9**

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY OF )  
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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS -THIRD SET OF DATA  
REQUESTS

**Question 13:**

Please provide the assumed operating life in years for the Northeastern and Oklaunion coal units as reflected in PSO's current OCC approved depreciation rates along with the Commission order addressing this issue.

**Response No. 13:**

The assumed operating life in the current OCC approved depreciation rates for Northeastern Units 3 and 4 and Oklaunion is 60 years. The final order approving the current depreciation rates is attached.

Prepared By: Randall L. Hamlett

Title: Director, Regulatory Accounting  
Services

**Exhibit SN-10**

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – TENTH SET OF DATA  
REQUESTS

**Question 06:**

Was the Flint Creek coal-fired generating unit assumed to operate over the entire periods evaluated in the economic analyses of the scrubber retrofit option which were presented in the direct testimonies of SWEPCO witnesses Weaver and Rose in APSC Docket No. 12-008-U? If so, please provide the age of Flint Creek at the end of each study period for the scrubber retrofit case.

**Response No. 06:**

Yes, for the scrubber retrofit option, the Flint Creek unit was assumed to operate over the entire period evaluated, 2011 through 2040. The unit would be 62 years old in 2040.

Prepared By: Scott C. Weaver

Title: Managing Director – Resources  
Planning & Operational Analysis

**Exhibit SN-11**

Estimated Monthly Savings Due to  
Stay of RH FIP (\$1000s)

Scrubber Capital Cost	\$820,600
Est. Scrubber Annual FCR	0.1451
Scrubber Capital, \$/yr	\$119,069
Est Scrubber O&M, \$/yr	<u>\$30,000</u>
Total Annual Impact	\$149,069
Est. Monthly Savings	<b>\$12,422</b>

**Exhibit SN-12**

Estimated Annual Cost Savings Due to Adoption of  
Original RH SIP (\$1000s)

Scrubber Capital Cost	\$820,600
Est. Scrubber Annual FCR	0.1451
Scrubber Capital, \$/yr	\$119,069
Est Scrubber O&M, \$/yr	\$30,000
NE Coal, MWh/yr, 80%CF	6,517,440
Est. Coal Repl Energy, \$25/MWh	\$162,936
Est. Coal Repl Cap, \$100/kW-yr	<u>\$93,000</u>
Total Annual Impact	<b>\$405,005</b>

**Exhibit SN-13**

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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – TENTH SET OF DATA  
REQUESTS

**Question 17:**

Reference PSO's response to OIEC 6-25, please did PSO conduct a high commodity price scenario to assess the impact of higher gas and other commodity prices upon the EPA Settlement before entering into the settlement? If so, please provide the analysis and indicate whether the results were presented to the parties to the settlement agreement. If not, please explain why not.

**Response No. 17:**

No. At the time the EPA Settlement analyses were run, the full compliment of sensitivities associated with the "Fleet Transition – CSAPR" fundamental forecast was not available. PSO used the "Early Carbon" sensitivity as a proxy for the "High Band Pricing" as it was not available at the time.

Prepared By: Steven L. Fate

Title: Director, Business Operations  
Support

**Exhibit SN-14**

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO OKLAHOMA  
ATTORNEY GENERAL'S AND PUBLIC UTILITY DIVISIONS FIRST SET OF DATA  
REQUESTS

SUPPLEMENTAL RESPONSE

**Question 04:**

In Mr. Weaver's testimony, Exhibit SCW-8A and Exhibit SCW-813 each provide summaries of six possible fleet transitions under commodity pricing scenarios that PSO calls "CSAPR (13ASE)" and "LOWER Band", respectively. Note that these appear to be the same as two of the commodity pricing scenarios used in Mr. Weaver's testimony before the Arkansas Public Service Commission on February 8, 2012 in Docket No. 12-008-U.

a. Please also model in Strategist each of the six options spelled out in Boston Pacific 1-2 under the "Higher Band" commodity pricing scenario that Mr. Weaver presents in his February 8, 2012 Arkansas testimony in Exhibit SCW-4, page 2. Please provide a summary of the results of this modeling in the same format as Exhibit SCW-8A and Exhibit SCW-813 in Mr. Weaver's testimony in this case.

i. Please provide the "two-pager" summary sheets for each of the six options modeled under this "Higher Band" commodity pricing scenario.

ii. Please provide annual, plant-by-plant SO2 emissions for the period 2011 – 2040 for each of the six options under this "Higher Band" commodity pricing scenario.

b. Please provide a summary of the natural gas and coal prices in this "Higher Band" commodity pricing scenario for the period 2011 – 2040, in the same format as Exhibit SCW-4, page 2.

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO OKLAHOMA  
ATTORNEY GENERAL'S AND PUBLIC UTILITY DIVISIONS FIRST SET OF DATA  
REQUESTS

**Supplemental Response No. 04:**

- a) i. Please see file "(AG DR 1-4) Ex SCW-8C DETAIL WP (FOLLOW-UP\_NE 3&4\_CPW Summ\_HIGH Pricing).xls."
- a) ii. Please see file "Attachment 1 - AG DR 1-4aii.xls."
- b) Please see file "Attachment 2 - AG DR 1-4b.xls"

Prepared By: Scott C. Weaver

Title: Managing Director – Resources  
Planning & Operational Analysis

**Exhibit SN-15**

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – TWELFTH SET OF DATA  
REQUESTS

**Question 10:**

Please provide the basis for PSO's forecasted natural gas prices for years beyond year 2030.

**Response No. 10:**

PSO's forecasted natural gas prices through 2030 are provided by AEP's Fundamental Analysis group. For Strategist modeling purposes, the prices beyond 2030 are extended based on the escalation percentage from year 2029 to 2030 of the Fundamental Analysis forecast.

Prepared By: Karl R Bletzacker

Title: Director, Fundamental Analysis

**Exhibit SN-16**

**BEFORE THE CORPORATION COMMISSION OF OKLAHOMA**

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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – FOURTH SET OF DATA  
REQUESTS

**Question 01:**

Please indicate whether PSO has ever experienced a period in which the Company has recorded no net growth in peak demand on its system over a period of 15 consecutive years.

**Response No. 01:**

No, PSO has not observed 15 consecutive years of no net growth in peak demand.

As shown in Exhibit SCW-1, PSO has observed over the most recent 10 years ending 2011 peak demand annual compound growth of 0.27%. Over the same period, energy growth was 0.36%. Going forward, PSO is expecting peak demand load growth for the next 10 years of 0.03% (annual compound growth) after the impact of energy efficiency. The expected internal energy growth over the same period is 0.22%. Therefore, increasing annual load factors results indicating a more efficient system and use of capacity.

Excluding the impact of PSO energy efficiency programs, the projected peak demand and energy over the next 10 years is 0.30% and 0.49%, respectively. These growth rates are

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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – FOURTH SET OF DATA  
REQUESTS

**Response No. 01 (cont):**

consistent with the most recent historical 10 year period. The Company started sponsoring energy efficiency programs in 2009 and thus only impacted the historical growth in the last few years. The Company incorporates the impact of national energy efficiency appliance and building standards through the use of end-use load forecasting models. The appliance and building standards are driven by federal energy efficiency legislation such as the Energy Policy Act of 2005; Energy Independence and Security Act (EISA) of 2007; etc. These policies set forth efficiency improvement requirements for appliances and buildings for many years into the future.

Prepared By: Scott C. Weaver

Title: Managing Director – Resources  
Planning & Operational Analysis

**Exhibit SN-17**

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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – FOURTH SET OF DATA  
REQUESTS

**Question 02:**

Did PSO evaluate a higher peak demand sensitivity case in its August 2012 follow-up analysis of the EPA Settlement and Northeastern retrofit Option #1? If not, please explain why not. If so, please provide the complete results and supporting workpapers and assumptions for this higher demand growth sensitivity analysis and explain why it was not presented in PSO's testimony in this case.

**Response No. 02:**

A higher peak demand sensitivity was not performed. Given both the recognized limited customer load growth being projected, as well as in recognition of the "going-in" capacity position which indicated a capacity length of approximately 190 to 270 MW through the decade, PSO determined such a sensitivity exercise was not required.

Prepared By: Scott C. Weaver

Title: Managing Director – Resources  
Planning & Operational Analysis

**Exhibit SN-18**

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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – FOURTH SET OF DATA  
REQUESTS

**Question 14:**

Reference the confidential spreadsheet analysis provided in response to OIEC 2-4, please define and provide the assumptions underlying the "Value of ICAP" amounts reflected in each analysis and explain why these amounts were not included in calculating the difference in revenue requirements under the EPA Settlement and the alternative plans evaluated.

**Response No. 14:**

The "Value of ICAP" could be the potential revenues that PSO could receive for sales of excess capacity into a fungible SPP capacity market construct if a market existed. Because such a market does not exist, any such amounts are not factored into the determination of the total costs/revenue requirements for the results of any of the options presented. Moreover, given that the resultant PSO capacity position would generally be consistent across all options evaluated, any such incremental impact on the attendant relative economics--were such a capacity market to exist--we believe would be negligible.

Prepared By: Scott C. Weaver

Title: Managing Director – Resources  
Planning & Operational Analysis

**Exhibit SN-19**

**BEFORE THE CORPORATION COMMISSION OF OKLAHOMA**

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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
 OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – TWELFTH SET OF DATA  
 REQUESTS

**Question 04:**

Please provide non-fuel O&M costs by FERC account for the Northeastern coal units for each of the last five calendar years.

**Response No. 04:**

PSO					
NEPS 3 & 4					
O&M Expense Excluding Acct 501					
	Year				
FERC					
Account	2011	2010	2009	2008	2007
500	4,562,428	3,846,644	4,240,784	2,968,379	2,809,152
501					
502	1,079,678	1,174,109	968,297	1,441,925	1,375,104
503	0	0	0	0	0
504	0	0	0	0	0
505	1,317,139	1,353,713	990,778	1,875,450	1,428,860
506	2,315,642	5,244,297	3,470,769	2,899,094	2,219,435
507	6,450	0	0	0	0
509	97,849	7,548	811	851	12,421
510	1,477,094	2,439,206	3,400,485	1,432,654	1,196,708
511	1,098,495	649,720	699,116	912,809	889,568
512	13,540,178	14,509,318	11,339,359	14,859,090	15,493,275
513	(83,502)	1,652,974	349,373	4,153,527	3,310,639
514	449,149	450,236	812,577	673,274	225,108
	25,860,600	31,327,765	26,272,349	31,217,053	28,960,270
	Source: FERC Form 1				

Prepared By: Randall L. Hamlett

Title: Director, Regulatory Accounting Services

**Exhibit SN-20**

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – TWELFTH SET OF DATA  
REQUESTS

**Question 02:**

Provide forecasted non-fuel O&M costs for SWEPCO's new Turk coal plant as requested in rates and as forecasted for economic studies supporting construction of the plant.

**Response No. 02:**

Below is the forecasted non-fuel O&M costs for SWEPCO's 73.33% share of the new Turk coal plant that SWEPCO has requested be included in rates in its current Texas base rate case.

OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – TWELFTH SET OF DATA  
REQUESTS

**Response No. 02 (continued):**

SWEPCO - TURK O&M				Total Company
PUCT DOCKET 40443				Amount
				Requested In
				Rates
5000000	Oper Supervision & Engineering			207,069
5010000	Fuel			2,286,559
5020001	Lime Expense			35,338
5020007	Lime Hydrate Expense			3,675
5020008	Activated Carbon			3,675
5050000	Electric Expenses			5,445,546
5060000	Misc Steam Power Expenses			1,066,995
5110000	Maintenance of Structures			160,981
5120000	Maintenance of Boiler Plant			10,674,239
5130000	Maintenance of Electric Plant			58,666
5140000	Maintenance of Misc Steam Plt			5,867
				19,948,610

Please note that the fuel cost listed above are coal handling related costs properly recorded to fuel expense but recovered through base rates.

The project team used a figure of approximately \$24 million per year for non-fuel O&M in the RFP analysis of capacity resources that selected the Turk project.

Prepared By: Randall L. Hamlett

Title: Director, Regulatory Accounting  
Services

**Exhibit SN-21**

Estimated Impact of Forecasted Non-fuel O&M Cost Increase for Northeastern Units

(Sensitivity: 25 Yrs)	
NE3 (only) DFGD & ACI	
Exh SCW-5	

	TOTAL			Variable O&M (\$/mWh)
	Fixed O&M (\$000)	On-Going* Capital (\$000)	Fixed Costs (\$000)	
2012	25,783	7,119	32,902	\$2.43
2013	20,824	10,386	31,210	\$2.47
2014	20,352	11,118	31,470	\$2.51
2015	24,312	11,294	35,606	\$2.55
2016	20,842	11,469	32,311	\$2.59
2017	24,883	12,559	37,442	\$2.64
2018	27,604	14,005	41,608	\$2.34
2019	22,197	14,650	36,846	\$2.38
2020	27,803	16,095	43,898	\$2.42
2021	22,450	16,718	39,168	\$2.46
2022	22,537	17,341	39,878	\$2.49
2023	26,166	18,475	44,641	\$2.53
2024	21,888	18,942	40,831	\$2.57
2025	28,537	20,366	48,903	\$2.61
2026	25,310	21,300	46,609	\$2.65
2027	26,683	22,389	49,073	\$2.69
2028	19,308	22,389	41,698	\$2.73
2029	19,413	22,389	41,803	\$2.77
2030	19,729	22,389	42,118	\$2.81
2031	19,834	22,389	42,224	\$2.85
2032	19,969	21,718	41,687	\$2.90
2033	20,293	21,477	41,770	\$2.94
2034	20,404	21,229	41,633	\$2.98
2035	20,545	20,773	41,317	\$3.02
2036	20,878	19,746	40,624	\$3.05

(Sensitivity: 25 Yrs)	
NE4 (only) DFGD & ACI	
Exh SCW-5	

	TOTAL			Variable O&M (\$/mWh)
	Fixed O&M (\$000)	On-Going* Capital (\$000)	Fixed Costs (\$000)	
2012	18,121	4,414	22,536	\$2.49
2013	27,312	10,524	37,835	\$2.53
2014	19,242	11,263	30,505	\$2.57
2015	19,748	11,411	31,158	\$2.61
2016	23,601	11,559	35,160	\$2.65
2017	21,146	12,182	33,328	\$2.70
2018	26,006	13,472	39,478	\$2.39
2019	21,532	14,095	35,627	\$2.43
2020	21,616	14,718	36,333	\$2.47
2021	22,978	15,496	38,474	\$2.50
2022	22,015	16,119	38,134	\$2.54
2023	22,104	16,742	38,845	\$2.58
2024	26,676	17,987	44,663	\$2.62
2025	22,517	18,610	41,126	\$2.66
2026	22,610	19,233	41,843	\$2.70
2027	22,922	19,855	42,777	\$2.74
2028	18,767	19,855	38,623	\$2.78
2029	18,688	19,855	38,544	\$2.82
2030	19,006	19,855	38,861	\$2.87
2031	19,127	19,855	38,982	\$2.91
2032	19,231	19,633	38,864	\$2.95
2033	19,558	19,478	39,036	\$3.00
2034	19,685	19,245	38,930	\$3.04
2035	19,795	18,907	38,702	\$3.08
2036	20,130	17,865	37,995	\$3.11

	NE4	NE 3&4	Turk	NFOM ADJUST (\$0000)
	Total NFOM (\$0000)	Total NFOM (\$0000)	Total NFOM (\$0000)	
2012	\$25,808	\$58,940	\$42,300	\$16,640
2013	\$35,125	\$63,420	\$42,300	\$21,120
2014	\$27,180	\$55,122	\$42,300	\$12,822
2015	\$27,813	\$59,838	\$42,300	\$17,538
2016	\$31,798	\$60,477	\$42,300	\$18,177
2017	\$29,476	\$62,324	\$42,300	\$20,024
2018	\$33,381	\$68,064	\$42,300	\$25,764
2019	\$29,025	\$58,415	\$42,300	\$16,115
2020	\$29,228	\$64,338	\$42,300	\$22,038
2021	\$30,708	\$60,579	\$42,300	\$18,279
2022	\$29,864	\$59,936	\$42,300	\$17,636
2023	\$30,073	\$63,888	\$42,300	\$21,588
2024	\$34,765	\$64,418	\$42,300	\$22,118
2025	\$30,727	\$67,145	\$42,300	\$24,845
2026	\$30,944	\$64,254	\$42,300	\$21,954
2027	\$31,383	\$66,188	\$42,300	\$23,888
2028	\$27,358	\$54,912	\$42,300	\$12,612
2029	\$27,408	\$55,193	\$42,300	\$12,893
2030	\$27,857	\$56,083	\$42,300	\$13,783
2031	\$28,114	\$56,575	\$42,300	\$14,275
2032	\$28,352	\$57,076	\$42,300	\$14,776
2033	\$28,810	\$57,985	\$42,300	\$15,685
2034	\$29,071	\$58,485	\$42,300	\$16,185
2035	\$29,317	\$59,003	\$42,300	\$16,703
2036	\$29,723	\$59,809	\$42,300	\$17,509

NOM TOTAL \$454,966  
Cum NPV, 8.38% \$191,877

**Exhibit SN-22**

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY OF )  
OKLAHOMA FOR COMMISSION AUTHORIZATION )  
OF A PLAN AND COST RECOVERY OF ACTIONS )  
OF PSO TO BE IN COMPLIANCE WITH CERTAIN )  
ENVIRONMENTAL RULES PROMULGATED BY )  
THE UNITED STATES ENVIRONMENTAL ) CAUSE PUD 2 01200054  
PROTECTION AGENCY; SUCH ACTIVITIES TO )  
INCLUDE, BUT NOT BE LIMITED TO, CAPITAL )  
EXPENDITURES FOR EQUIPMENT AND )  
FACILITIES; CONSTRUCTION OR PURCHASE OF )  
AN ELECTRIC GENERATING FACILITY OR ENTER )  
INTO A LONG-TERM PURCHASE POWER )  
CONTRACT (AND POSSIBLE EARNINGS ON THE )  
CONTRACT); CHANGE IN DEPRECIATION RATES )  
AND/OR ESTABLISHMENT AND RECOVERY OF A )  
REGULATORY ASSET; AND FOR SUCH OTHER )  
RELIEF AS THE COMMISSION DEEMS PSO IS )  
ENTITLED. )

PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – TENTH SET OF DATA  
REQUESTS

**Question 05:**

Reference PSO's response to OIEC 3-2, please provide workpapers supporting the development of the annual amounts included in the "Carrying Charges" column of the two-pager summary sheets for the base case analyses of the EPA Settlement and coal retrofit alternatives (Option #1 and #1A), including the underlying capital investments, and assumptions used to develop the annual carrying charges.

**Response No. 05:**

Please see Attachment 1. The rates used are internal rates developed by the AEP Corporate Finance group.

Prepared By: Scott C. Weaver

Title: Managing Director – Resources  
Planning & Operational Analysis

WACC Used for August 2012 cases

<u>Description</u>	<u>12/31/2011 Balance</u>	<u>Capital Ratio</u>	<u>Cost of Capital</u>	<u>Weighted Average Cost of Capital</u>	<u>Weighted After-tax Cost of Capital</u>
<b><i>Public Service Oklahoma</i></b>					
Debt	965,971,257	52.0%	5.83%	3.03%	1.97%
Preferred	-	0.0%	0.00%	0.00%	0.00%
Equity	892,805,058	48.0%	11.15%	5.36%	5.36%
<b>Total</b>	<b>1,858,776,315</b>	<b>100.0%</b>		<b>8.38%</b>	<b>7.32%</b>

WACC Used for Late 2011 cases

<u>Description</u>	<u>2010 - 2014 Five Year Average Balance</u>	<u>Capital Ratio</u>	<u>Cost of Capital</u>	<u>Weighted Average Cost of Capital</u>	<u>Weighted After-tax Cost of Capital</u>
<b><i>Public Service Oklahoma</i></b>					
Debt	1,122,467,000	53.4%	6.10%	3.26%	2.12%
Preferred	5,258,000	0.3%	4.04%	0.01%	0.01%
Equity	952,461,000	46.4%	10.50%	4.87%	4.87%
<b>Total</b>	<b>2,080,185,000</b>	<b>100.0%</b>		<b>8.14%</b>	<b>7.00%</b>

Note: WACC was rounded to one decimal place for Late 2011 cases.

Source: AEP Corporate Finance

**Exhibit SN-23**

Estimated Impact of Adjusted Discount Rate  
and Present Value Calculation

	EPA vs Coal Retrofit <u>Diff (\$1000s)</u>
2011	\$296
2012	\$1,862
2013	\$1,917
2014	\$762
2015	\$4,292
2016	-\$38,645
2017	-\$28,657
2018	-\$5,341
2019	-\$19,155
2020	-\$20,518
2021	\$776
2022	-\$29,039
2023	-\$21,542
2024	\$32,069
2025	-\$383
2026	\$75,431
2027	\$105,519
2028	\$114,185
2029	\$101,479
2030	\$116,319
2031	\$162,960
2032	\$162,185
2033	\$151,090
2034	\$161,848
2035	\$155,752
2036	\$164,489
2037	\$158,124
2038	\$169,280
2039	\$159,729
2040	\$23,173
2011 Cum NPV, 8.38%	\$277,946
2013 Cum NPV, 8.38%	\$324,115
2013 Cum NPV, 7.9%	<u>\$357,972</u>
Change Due to DR/2013 PV	\$80,027

**PSO Cost of Capital:**

	<u>Capital Ratios</u>	<u>Cost of Capital</u>	<u>WACC</u>
Debt	52.00%	5.83%	3.03%
Preferred	0.00%	0.00%	0.00%
Equity	48.00%	<b>11.15%</b>	<u>5.35%</u>
Total			<b>8.38%</b>

**Adjusted PSO Cost of Capital:**

	<u>Capital Ratios</u>	<u>Cost of Capital</u>	<u>WACC</u>
Debt	52.00%	<b>5.83%</b>	3.03%
Preferred	0.00%	0.00%	0.00%
Equity	48.00%	<b>10.15%</b>	<u>4.87%</u>
Total			<b>7.90%</b>

**Exhibit SN-24**

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY OF )  
OKLAHOMA FOR COMMISSION AUTHORIZATION )  
OF A PLAN AND COST RECOVERY OF ACTIONS )  
OF PSO TO BE IN COMPLIANCE WITH CERTAIN )  
ENVIRONMENTAL RULES PROMULGATED BY )  
THE UNITED STATES ENVIRONMENTAL ) CAUSE PUD 2 01200054  
PROTECTION AGENCY; SUCH ACTIVITIES TO )  
INCLUDE, BUT NOT BE LIMITED TO, CAPITAL )  
EXPENDITURES FOR EQUIPMENT AND )  
FACILITIES; CONSTRUCTION OR PURCHASE OF )  
AN ELECTRIC GENERATING FACILITY OR ENTER )  
INTO A LONG-TERM PURCHASE POWER )  
CONTRACT (AND POSSIBLE EARNINGS ON THE )  
CONTRACT); CHANGE IN DEPRECIATION RATES )  
AND/OR ESTABLISHMENT AND RECOVERY OF A )  
REGULATORY ASSET; AND FOR SUCH OTHER )  
RELIEF AS THE COMMISSION DEEMS PSO IS )  
ENTITLED. )

PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – SIXTEENTH SET OF DATA  
REQUESTS

**Question 18:**

Reference PSO's response to OIEC 8-1, did the Company prepare a revenue requirement model to evaluate the impacts of the EPA Settlement and other options before entering into the settlement. If not, how were customer rate impacts of the settlement evaluated in discussing the settlement and other options with the Oklahoma AG and other parties to the settlement.

**Response No. 18:**

Yes. PSO estimated a year one customer impact and the CPWRR over the entire planning horizon from the Strategist model for the EPA Settlement and other options.

Prepared By: Steven L. Fate

Title: Director, Business Operations  
Support

**Exhibit SN-25**

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

APPLICATION OF PUBLIC SERVICE COMPANY OF )  
OKLAHOMA FOR COMMISSION AUTHORIZATION )  
OF A PLAN AND COST RECOVERY OF ACTIONS )  
OF PSO TO BE IN COMPLIANCE WITH CERTAIN )  
ENVIRONMENTAL RULES PROMULGATED BY )  
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AND/OR ESTABLISHMENT AND RECOVERY OF A )  
REGULATORY ASSET; AND FOR SUCH OTHER )  
RELIEF AS THE COMMISSION DEEMS PSO IS )  
ENTITLED. )

PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – FIFTH SET OF DATA  
REQUESTS

**Question 18:**

Reference pages 12-13, of Mr. Fate's direct testimony, please provide PSO's analyses of the impacts of the EPA Settlement to impacts of environmental compliance Options #1 and #1A, for the following impacts:

- a. PSO employees,
- b. Local communities and school districts,
- c. the State of Oklahoma,
- d. PSO customers, and
- e. Shareholders.

**Response No. 18:**

See Attachment 1 which contains the results of an analysis conducted as part of PSO's 2011 long-range planning and includes a qualitative evaluation of various environmental compliance scenarios for Northeastern Units 3 & 4.

Prepared By: Steven L. Fate

Title: Director, Business Operations  
Support

## PSO Long-Range Plan including Unit Disposition of Northeastern 3 & 4

### General Conclusions and Findings

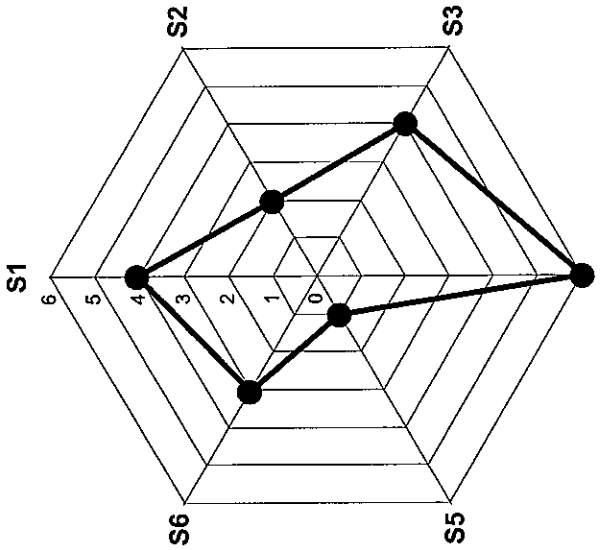
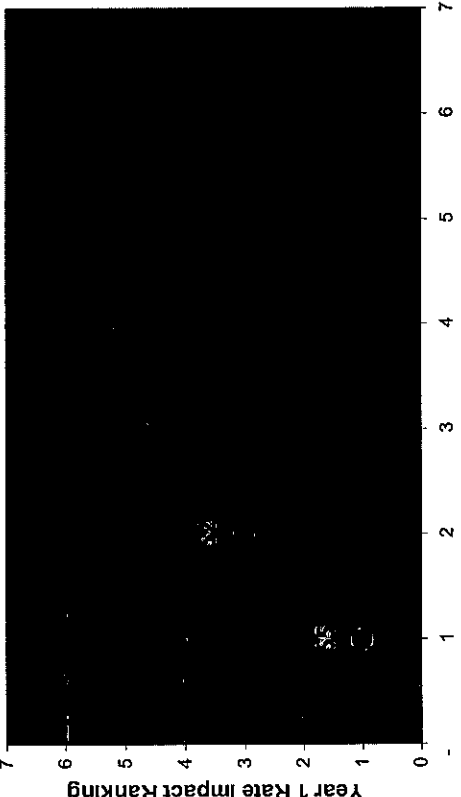
- Full life-cycle economics of each option are very similar with the most expensive option being only 3% higher than the least cost. Year one (2017) rate impacts vary significantly. Overall, analysis indicates no clear economic winner. However, several options generally appear to be more attractive than the others. The high degree of future uncertainty would support the selection of an alternative that does not fully commit to one fuel source or technology over another.
- All scenarios exceed 4% retail rate CAGR<sup>1</sup> willingness-to-pay assumption. Willingness-to-pay assumption may be to low as most competitors will be in a similar or worse rate impact and pricing situation.
- Scenarios which result in a loss of fuel diversity may require some long-term fixed price natural gas contracts as a hedge again fuel price and supply availability.
- The two scenarios which assume continued operation of one or both of the Northeastern units are low cost options on a year one rate impact and long-term CPWRR<sup>2</sup> basis. This is under the Q4 2010 Fundamental Analysis forecast which assumes a ~4-5% escalation of natural gas prices. A long-range natural gas price forecast with more moderate increases ameliorates some of the economic advantage of maintaining the coal generation.
- Any alternative that is not market tested through a competitive bidding process will likely be fought by the AG's office and IPPs. Therefore solutions that include market participants will likely receive less criticism for averting a competitive solicitation. Contract terms and conditions that are similar or better than the last baseload RFP will further assist in proving the case that the alternative is reasonable.
- Scenarios which appear do not achieve desired earning growth could be augmented by the addition of owned wind generation which could be built for about \$200 M per 100 MW.
- All scenarios include sufficient capital and O&M to adequately maintain reliable service to customers.

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<sup>1</sup> CAGR stands for Compound Annual Growth Rate which is the year-over-year growth rate of an set of numbers over a specified period of time.

<sup>2</sup> CPWRR stands for Cumulative Present Worth of Revenue Requirement and is the metric used to compare the relative economics of different generation options from the Strategist model.

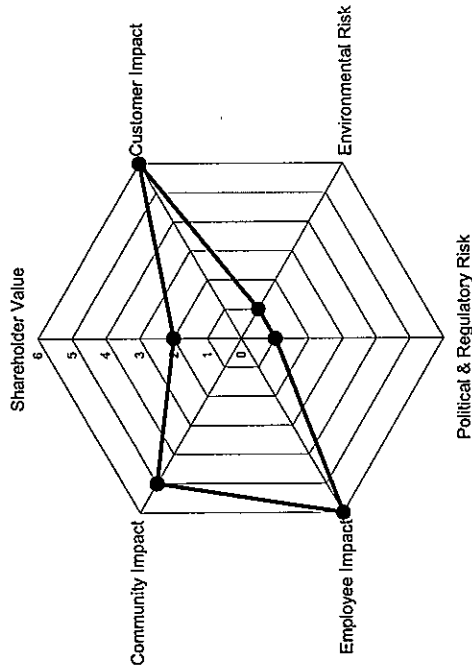
**Summary of Scenario Analysis**

Overall Relative Assessment	Customer Rate Impact
 <p>The radar chart displays the overall relative assessment for six scenarios (S1-S6) across six dimensions. The dimensions are represented by the axes of the hexagon, and the performance is measured on a scale from 0 to 6. S1 and S4 show the highest performance, while S2 and S3 show lower performance.</p>	 <p>The line graph shows the Year 1 Rate Impact Ranking for six scenarios (S1-S6) across seven CPWRR Ranking levels. The Y-axis represents the Year 1 Rate Impact Ranking (0 to 7), and the X-axis represents the CPWRR Ranking (1 to 7). S1 and S4 show the highest impact, while S2 and S3 show lower impact.</p> <p>*Note: CPWRR Ranking currently still includes CO2 tax assumption in 2017.</p>
<p><b>Scenario 1 – Retrofit Both Units with Full Emissions Controls</b> – An attractive option for shareholders and customers. Its success is dependent on Corporate ability to fund and overcoming likely opposition from in-state NG interests.</p> <p><b>Scenario 2 – Fuel Switch Both Units to Natural Gas</b> – A fairly high cost option for customers with little reward for shareholders.</p> <p><b>Scenario 3 – Mothball Both Units and Replace with a NGCC Joint Owned Unit and PPA</b> – Allows the “right-sizing” of investment in an existing IPP-owned unit. Creates risk as a minority owner. Option viability highly contingent on an available counterparty.</p> <p><b>Scenario 4 – Mothball One Unit, Retrofit One Unit, and Replace with PPA</b> – An attractive option for all stakeholders as it incorporates features attractive to all stakeholders.</p> <p><b>Scenario 5 – Mothball Both Units and Replace with New Build NGCC</b> – Most expensive option with greatest demand on capital. Will draw the ire of IPP’s and customer groups. Loss of fuel diversity.</p> <p><b>Scenario 6 – Mothball Both Units and Replace with PPA</b> – Least attractive option to shareholders, but is a fairly attractive price for customers.</p>	

**Scenario 1 – Retrofit Both Units with Full Emissions Controls**

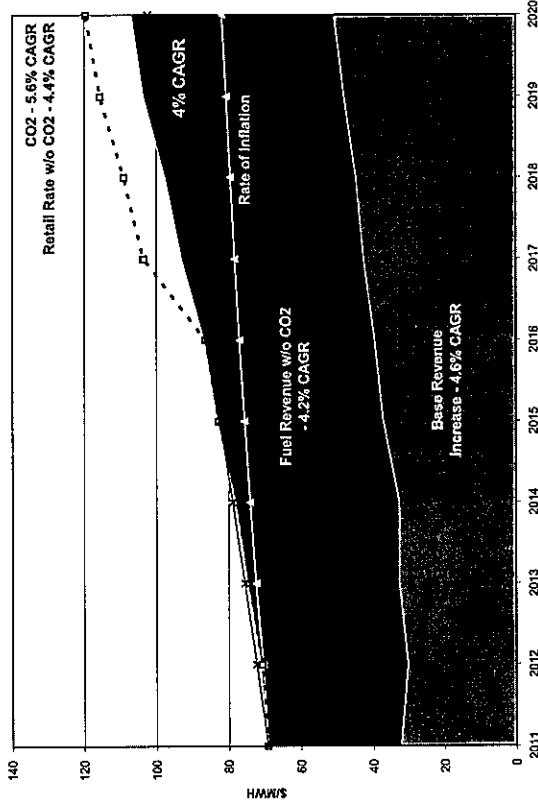
- Dry flue gas desulfurization, full flow baghouse, and activated carbon injection. Selective Catalytic Reduction not until 2025.
- In service dates of January 1, 2017 and January 1, 2019, assumes positive resolution to Oklahoma Regional Haze FIP and an extended and staggered implementation of the EPA Utility MACT rules. Accelerated installation increase cost.

**Relative Assessment**



\* Ranking of scenario relative to others with 6 being the best and 1 being the worst.

**Economic Assessment**



Shareholder Value	High Earnings growth rate. Capital requirement may exceed ability to fund. Ongoing risk of future emissions regulation.
Customer Impact	Lowest year one impact and CPWRR of any scenario. Maintains current fuel diversity.
Environmental Risk	Significant investment in coal generation does not mitigate future CO2 emissions regulations and provides minimal future optionality.
Political & Regulatory Risk	Keeping coal as the status quo in the state will not be politically attractive, but the lower cost profile and maintaining fuel diversity will be embraced by customer groups.
Employee Impact	Increases plant workforce by an estimated 45 positions to operate and maintain new environmental controls.
Community Impact	Significant tax base increase will benefit local community.

Rate Impact	4.4% average annual rate impact exceeds assumed maximum willingness-to-pay of 4%, but is least of all options considered.
Year One Rate Impact	Assuming 50% CWIP in rate base one year before in-service date results in 8% year-over-year rate impact. Lowest of all options considered.
Earnings	6.6% CAGR – Exceeds target of 4 – 5%
Credit Metrics	Good initially, below target during heavy capital spend, returns to acceptable levels.
CPW of Revenue Requirement	Strategist analysis indicates this is the least cost option over a 30 year planning horizon

**Scenario 2 -- Fuel Switch Both Units to Natural Gas**

- Minimal degradation of Units capacity and heat rate as a result of fuel switch.
- Significant investment in natural gas transportation infrastructure to reliably supply the plant site with incremental demand. Critical path activity with a 24 – 36 month lead time.

Relative Assessment		Economic Assessment	
<p style="text-align: center;">* Ranking of scenario relative to others with 6 being the best and 1 being the worst.</p>			
Shareholder Value	Earnings growth within target range and presents minimal stranded cost of cost disallowance risk	Rate Impact	5.1% average annual rate impact exceeds assumed willingness-to-pay of 4%.
Customer Impact	High year one impact and CPWRR. Loss of fuel diversity.	Year One Rate Impact	20% year one impact is middle of the pack.
Environmental Risk	Fuel switch mitigates risk of future CO2 regulation. Creates option to repower units in future but is also at risk of gas SCR being required as a result of NSR or NAAQS changes.	Earnings	4.2% CAGR of earnings is on the lower end of the target range of 4% - 5%.
Political & Regulatory Risk	Loss of fuel diversity would be unattractive to customer groups and IPP's would argue that their assets could lower overall costs.	Credit Metrics	Minimal investment allows credit metrics to stay within target range throughout planning period.
Employee Impact	Substantial loss of workforce at the plant (64%).	CPW of Revenue Requirement	Second highest primarily because of increased reliance on market-based natural gas generation and the relatively high heat rate of NES 3 & 4.
Community Impact	Minimal capital improvements to increase tax base and reduced outage labor force.		

**Scenario 3 – Mothball Both Units and Replace with a NGCC Joint Owned Unit and PPA**

- Includes risk of partnering as a minority owner.
- Success highly dependent on the availability of a viable counterparty.

Relative Assessment		Economic Assessment	
<p>Shareholder Value</p> <p>Customer Impact</p> <p>Environmental Risk</p> <p>Employee Impact</p> <p>Community Impact</p> <p>Political &amp; Regulatory Risk</p> <p>* Ranking of scenario relative to others with 6 being the best and 1 being the worst.</p>			
Shareholder Value	Earning growth potential is attractive moderated by risk as a minority owner in a JOU. Purchasing existing asset mitigates construction risk.	Rate Impact	4.5% average annual rate impact significantly exceeds assumed maximum willingness-to-pay of 4%.
Customer Impact	Tied for the largest year one rate impact and loss of fuel diversity.	Year One Rate Impact	19% year one impact is in the middle of the pack.
Environmental Risk	Fuel switch to NG generation with full controls mitigates future risk. Risk as minority owner in JOU.	Earnings	6.4% CAGR – Significantly exceeds target of 4% – 5%.
Political & Regulatory Risk	Including the NG industry and IPPs in the solution will make this an attractive option. But, higher cost profile will be unattractive to some customer groups.	Credit Metrics	Drops below target year that investment is made and quickly returns to acceptable levels
Employee Impact	Eliminates all but caretaking personnel at plant site (94% headcount reduction)	CPW of Revenue Requirement	Modestly higher least cost option by \$125 M. Second best ranking.
Community Impact	With units mothballed there is no additional tax base created.		

**Scenario 4 – Mothball One Unit, Retrofit One Unit, and Replace with PPA**

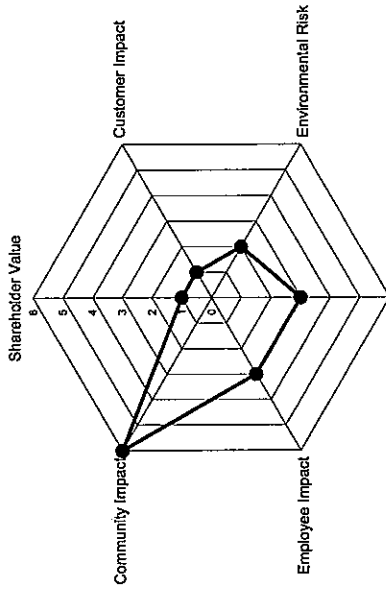
- “Goldilocks” scenario that maintains some fuel diversity, includes substantial generation investment, and utilizes IPP natural gas generation in the solution.

Relative Assessment		Economic Assessment	
<p>Shareholder Value Customer Impact Enviro Risk Political &amp; Regulatory Risk Employee Impact Community Impact</p> <p>* Ranking of scenario relative to others with 6 being the best and 1 being the worst.</p>		<p>CO2 - 5.6% CAGR Retail Rate w/o CO2 - 4.6% CAGR 4% CAGR Rate of Inflation Fuel Revenue w/o CO2 - 5.7% CAGR Baseo Revenue - 3.3% CAGR</p>	
Shareholder Value	Shares similar risk profile with Scenario 1 due to continued operation of one coal unit. Good earning growth potential.	Rate Impact	4.6% average annual rate impact exceeds assumed maximum willingness-to-pay of 4%.
Customer Impact	Moderately year one rate impact and incremental CPWRR. However, some fuel diversity is retained.	Year One Rate Impact	16% year-over-year rate impact is in the middle of the range of alternatives.
Enviro Risk	Significant capital investment in coal plant limits future options which is offset by PPA and the flexibility that might be created through T&Cs.	Earnings	4.6% CAGR is in the middle of earning target range.
Political & Regulatory Risk	Most customer groups will see the value of maintaining fuel diversity. PPA will be attractive to IPPs and NG industry.	Credit Metrics	Good initially, below target during heavy capital spend, returns to acceptable levels.
Employee Impact	Eliminates only 12 positions at plant.	CPW of Revenue Requirement	\$143 M over least cost option puts this scenario in the middle of the pack.
Community Impact	Significant addition to tax base and increases to outage and maintenance personnel will boost local economy.		

**Scenario 5 – Mothball Both Units and Replace with New Build NGCC at Northeastern**

- Most capital intensive option with approximately \$1 billion for NGCC and natural gas pipeline investment.

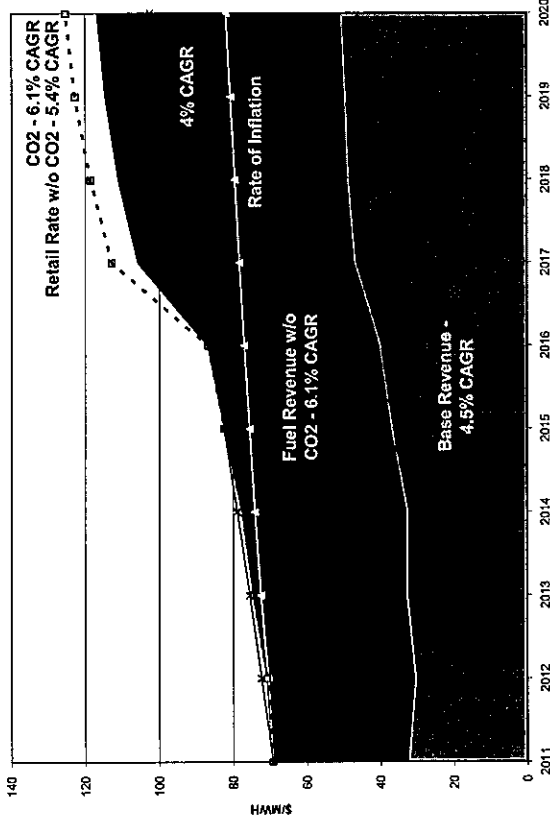
**Relative Assessment**



Political & Regulatory Risk

\* Ranking of scenario relative to others with 6 being the best and 1 being the worst.

**Economic Assessment**



Shareholder Value	Significantly exceed earning growth target but is the least affordable option at around \$1 billion.
Customer Impact	Largest year one rate impact and CPWRR. Loss of fuel diversity.
Environmental Risk	Significant near investment in new generation eliminates future optionality.
Political & Regulatory Risk	Switch to natural gas will be supported by some industries and politicians. But high cost and failure to incorporate IPPs into solution is a significant negative.
Employee Impact	Eliminate approximately 70% of Plant workforce
Community Impact	Creates significant increases in tax base.

Rate Impact	5.4% average annual rate impact exceeds assumed willingness-to-pay of 4%
Year One Rate Impact	22% year-over-year rate impact is highest of all alternatives considered.
Earnings	6.8% CAGR is substantially higher than target range of 4% – 5%
Credit Metrics	Good initially, below target during heavy capital spend, returns to acceptable levels.
CPW of Revenue Requirement	\$505 M over least cost options. Most expensive option analyzed.

**Scenario 6 – Mothball Both Units and Replace with PPA**

- Continuing availability of market resources at historically attractive pricing is a risk.
- Cost to received Network Integrated Transmission Service could be minimal or significant depending on replacement resource. Analysis assumes it is de minimus.

Relative Assessment		Economic Assessment	
Shareholder Value	Earnings growth potential is below target.	Rate Impact	5.0% average annual rate impact exceeds assumed maximum willingness-to-pay of 4%.
Customer Impact	Moderately more expensive than least cost option but fuel diversity is lost.	Year One Rate Impact	At 2.1% year one impact is second worst.
Environmental Risk	PPA could be structured as to allow multiple options to address future uncertainty. PPA would be with a fully controlled NGCC.	Earnings	3.4% CAGR is below target of 4% - 5%.
Political & Regulatory Risk	Seen as a win-win for NG industry and IPPs. Customer response unfavorable from moderate cost profile and loss of fuel diversity.	Credit Metrics	With no new generation or environmental capital requirements, credit metrics are acceptable throughout period.
Employee Impact	Eliminates a substantial part of the plant workforce.	CPW of Revenue Requirement	Second best alternative with only \$49 M incremental revenue requirement over least cost options.
Community Impact	No increase in tax base as a result of mothball. No outage maintenance personnel spending to help local economy.		

# Appendices

## **Major Assumptions**

### **All Scenarios**

1. Adjustments made to plant personnel headcount, coal inventory, property tax, O&M and ongoing capital according to the various scenarios.
2. But for scenario 1 which has an ISD for a second FGD in 2019, all scenarios assumed a January 1, 2017, effective for mothballing, fuel switch, PPA effective dates, etc.
3. Each scenario which includes the removal from service of a unit assumes a mothballing.
4. Company continues to depreciate balance of plant and earn a return on net plant after removal from service.
5. All Strategist analyses assume construction of replacement capacity for expiration of Exelon contract in 2022.

### **Scenario 1**

1. In-service date of January 1, 2017 and January 1, 2019 for dry FGD's, full flow baghouse, and ACI. SCR's not installed until 2025.
2. Fifty percent CWIP in rate base one year before in-service dates for environmental retrofits.
3. For capital spend and customer 10 year customer impact analysis eliminated NGCC and CT builds in the baseline plan scheduled for a 2022 ISD and assumed Exelon PPA would be extended.
4. Eliminated SCR's in capital spending plan, and added back in LNB/OFA for Northeastern 3 & 4, and incorporated updated capital cost estimates for environmental retrofits per Joe Ennis email 4/1.

### **Scenario 2**

1. \$78 million in boiler modifications to reliably burn natural gas over an extended period.
2. Substantial CIAC in natural gas pipeline to extend Enogex existing pipeline approximately 90 miles. Analysis assumes up front investment, but there may be some flexibility on deal structure with the gas transportation company.
3. Unit performance criteria: Max Capacity: 414 MW, 10,170 mmBtu/MWH heat rate.

### **Scenario 3**

1. Assumed NGCC purchase price of \$700/kW which is conservatively high based on latest transactional information from Strategic Initiatives.
2. PPA terms and conditions based on a proposal from PSO's last baseload RFP.
3. Assumed transmission service costs were de minimus.

### **Scenario 4**

1. PPA terms and conditions based on a proposal from PSO's last baseload RFP.
2. Assumed transmission service costs were de minimus.

**Scenario 5**

1. Assumes two 1 x 1 GE7H - 402 MW Nominal CC replacements at \$1,122/kW.
2. Substantial CIAC in natural gas pipeline to extend Engex existing pipeline approximately 90 miles.

**Scenario 6**

1. PPA terms and conditions based on a proposal from PSO's last baseload RFP.
2. Assumed transmission service costs were de minimus.

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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – NINTH SET OF DATA  
REQUESTS

**Question 16:**

Reference PSO's response to OIEC 5-18, please provide the approximate date that the attached analysis was performed.

**Response No. 16:**

The analysis provided in response to OIEC 5-18 was conducted in the February to April 2011 timeframe.

Prepared By: Steven L. Fate

Title: Director, Business Operations  
Support

**Exhibit SN-26**

BEFORE THE CORPORATION COMMISSION OF OKLAHOMA

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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
OKLAHOMA INDUSTRIAL ENERGY CONSUMERS – FIFTEENTH SET OF DATA  
REQUESTS

**Question 20:**

Reference PSO's response to OIEC 10-24, please provide the nominal gas price forecast used for the base case economic analysis supporting SWEPCO's proposal to construct the Turk coal plant.

**Response No. 20:**

Please see Attachment 1 - OIEC DR 15-20.

Prepared By: Scott C. Weaver

Title: Managing Director – Resources  
Planning & Operational Analysis

**Exhibit SN-27**

Estimated Impact of EPA Settlement on SO2 Emissions  
(Tons)

	<u>EPA Settlement</u>	<u>Coal Retrofit</u>
2016-2026	67,183	18,641
2016-2040	67,995	35,742

**Exhibit SN-28**

**BEFORE THE CORPORATION COMMISSION OF OKLAHOMA**

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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
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**Question 23:**

Reference page 16, of Mr. Fate's direct testimony, please provide PSO's total system energy requirements (MWh) and total natural gas-fired generation (MWh) and gas burns (MMBtu) for each of the last five calendar years and as forecasted for each year of PSO's August 2012 follow-up analysis of the EPA settlement option.

**Response No. 23:**

Attachment 1 contains PSO's total system energy requirements (MWh) and total natural gas-fired generation (MWh) and gas burns (MMBtu) as forecasted for each year of PSO's August 2012 follow-up analysis of the EPA settlement option.

OIEC 5-23, Attachment 2 contains the historical information requested.

Prepared By: Kevin J. Munson

Title: Project Director, Western Fleet  
Environmental Program

Forecasted Data

	FT-CSAPR			Lower Band		
	Total System Energy Requirement (MWh)	Total Natural Gas-Fired Generation (MWh)	Gas Burns (MMBtu)	Total System Energy Requirement (MWh)	Total Natural Gas-Fired Generation (MWh)	Gas Burns (MMBtu)
2011	18,643,332	8,454,378	78,361	18,643,332	8,455,129	78,366
2012	18,688,178	11,480,167	101,932	18,688,178	11,681,121	107,427
2013	18,701,984	11,505,112	97,020	18,701,984	11,660,491	98,440
2014	18,747,594	11,443,107	96,669	18,747,594	11,323,592	95,639
2015	18,778,693	11,847,805	100,315	18,778,693	11,863,894	100,524
2016	18,832,047	13,221,473	111,646	18,832,047	13,251,473	111,988
2017	18,846,695	13,986,522	116,654	18,846,695	14,089,863	117,692
2018	18,882,746	13,462,205	112,583	18,882,746	13,599,647	113,916
2019	18,945,334	13,678,309	113,826	18,945,334	13,921,350	116,006
2020	18,996,166	12,096,491	99,821	18,996,166	12,354,138	101,896
2021	19,063,760	12,449,314	103,506	19,063,760	12,805,413	106,339
2022	19,168,971	12,211,915	101,475	19,168,971	12,622,781	104,727
2023	19,279,541	12,081,859	101,013	19,279,541	12,521,450	104,542
2024	19,403,869	11,831,468	99,238	19,403,869	12,168,957	101,896
2025	19,533,910	12,189,248	102,302	19,533,910	12,424,352	104,092
2026	19,671,311	11,574,231	96,489	19,671,311	12,154,549	101,739
2027	19,813,459	11,697,615	97,198	19,813,459	12,887,572	109,487
2028	19,968,557	11,263,317	92,398	19,968,557	12,707,562	107,079
2029	20,127,443	11,294,993	93,177	20,127,443	12,659,173	107,388
2030	20,299,781	11,300,588	93,943	20,299,781	12,595,690	107,382
2031	20,485,029	10,723,126	89,815	20,485,029	12,477,832	108,210
2032	20,677,664	10,110,786	85,075	20,677,664	12,119,419	106,764
2033	20,875,334	10,171,685	85,914	20,875,334	12,134,722	106,888
2034	21,092,199	10,466,915	88,517	21,092,199	12,356,235	108,648
2035	21,323,686	10,393,700	88,409	21,323,686	12,404,448	109,833
2036	21,567,551	10,683,867	91,103	21,567,551	12,704,976	112,487
2037	21,821,250	10,711,705	91,450	21,821,250	12,725,613	113,375
2038	22,060,039	11,014,086	94,228	22,060,039	12,502,353	110,025
2039	22,299,184	10,867,677	93,502	22,299,184	12,230,901	108,012
2040	22,540,822	11,099,652	95,512	22,540,822	12,520,192	110,597

PSO	Energy	Gas-fired	Gas Burns
	Requirements	Generation	
	MWh	MWh	MMBtu
2007	19,032,350	7,528,369	73,232,906
2008	18,933,600	7,905,533	78,583,528
2009	18,073,850	6,775,812	68,427,137
2010	19,071,420	7,789,194	78,870,450
2011	19,353,240	7,183,266	73,055,271

**Exhibit SN-29**

Estimated Impact of \$1/MMBtu Increase in Natural Gas Prices  
on EPA Settlement Costs (\$1000s)

	<u>Est. COAL Repl. GWH</u>	<u>MMBtu w/8.0 HR</u>	<u>Repl Cost \$1/MMBtu</u>
2016	2,510	20,077,342	\$20,077
2017	3,128	25,020,774	\$25,021
2018	3,432	27,458,148	\$27,458
2019	3,004	24,030,544	\$24,031
2020	3,175	25,401,970	\$25,402
2021	3,578	28,626,914	\$28,627
2022	3,585	28,676,251	\$28,676
2023	3,613	28,906,856	\$28,907
2024	3,973	31,782,130	\$31,782
2025	4,345	34,758,546	\$34,759
2026	4,275	34,201,724	\$34,202
2027	5,864	46,915,107	\$46,915
2028	6,413	51,306,987	\$51,307
2029	5,794	46,353,958	\$46,354
2030	6,282	50,258,230	\$50,258
2031	6,043	48,341,939	\$48,342
2032	6,398	51,186,205	\$51,186
2033	6,050	48,402,654	\$48,403
2034	6,367	50,935,154	\$50,935
2035	6,141	49,130,211	\$49,130
2036	6,373	50,981,122	\$50,981
2037	6,135	49,083,464	\$49,083
2038	6,451	51,609,492	\$51,609
2039	5,988	47,906,650	\$47,907
2040	6,212	49,694,104	<u>\$49,694</u>
Total, Nominal \$			\$1,001,046
Cum NPV, 8%			\$368,126

**Exhibit SN-30**

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PUBLIC SERVICE COMPANY OF OKLAHOMA'S RESPONSE TO  
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REQUESTS

**Question 05:**

Reference PSO's response to OIEC 9-6; please provide documentation provided by PSO to the Oklahoma AG regarding the expected customer rate impacts and the recovery of the net book value of Northeastern Units 3 and 4.

**Response No. 05:**

Please refer to OIEC 2-4. All other information was provided verbally.

Prepared By: Steven L. Fate

Title: Director, Business Operations  
Support

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REQUESTS

**Question 06:**

Please provide information regarding customer rate impacts of the EPA Settlement that were provided to parties to the Settlement.

**Response No. 06:**

Please refer to OIEC 2-4.

Prepared By: Steven L. Fate

Title: Director, Business Operations  
Support