MISSOURI PUBLIC SERVICE COMMISSION

STAFF REPORT ON

THE EMPIRE DISTRICT ELECTRIC COMPANY

ELECTRIC UTILITY RESOURCE PLANNING TRIENNIAL COMPLIANCE FILING

FILE NO. EO-2013-0547

December 2, 2013

JEFFERSON CITY, MISSOURI

** Denotes Highly Confidential Information **



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Executive Summary

On July 1, 2013,¹ The Empire District Electric Company ("Empire" or "Company") filed its 2013 Integrated Resource Plan ("IRP") triennial compliance filing ("Filing") in File No. EO-2013-0547. The Filing is Empire's first triennial compliance filing under the Commission's revised Chapter 22 Electric Utility Resource Planning Rules.² Staff recognizes and appreciates the Company's significant effort to make its first triennial compliance filing under the Commission's revised Chapter 22 Rules in a shorter than normal period of time.³

In performing its Chapter 22 Electric Utility Resource Planning, Empire developed eighteen (18) alternative resource plans, sixteen (16) of which included demand-side management ("DSM") resources and supply-side resources to meet Empire's load forecasts, and renewable resources to meet the legal mandates of Missouri's Renewable Energy Standard⁴ ("RES"). Empire's recently completed DSM market potential study includes the realistic achievable potential ("RAP") portfolio and maximum achievable potential ("MAP") portfolio of DSM programs used in the Company's Chapter 22 planning. Two alternative resource plans, Plan 11 and Plan 18, contained no DSM programs. The eighteen (18) alternative resource plans are:

- (Plan 1) Base Plan (all resources)
- (Plan 2) Base Plan (meets RES)-Preferred Plan
- (Plan 3) Moderate Environmental (Higher avoided costs)
- (Plan 4) High Environmental (Highest avoided costs)
- (Plan 5) Base Assumptions (RAP + DSM)
- (Plan 6) Base Assumptions (RAP ++ DSM)
- (Plan 7) Moderate DSM (1% savings by 2015)
- (Plan 8) Aggressive DSM (2% savings by 2020)
- (Plan 9) MEEIA level DSM (Designed to meet MEEIA savings goals)

¹ Under Rule 4 CSR 240-22.080(1)(B), Empire's first triennial compliance filing was due on April 1, 2013. However, on February 28, 2013, Empire filed its *Application for Waiver/Extension* in File No. EO-2013-0405 requesting that the Commission grant it a waiver of Commission Rules 4 CSR 240-22.080(1) and 4 CSR 240-22.080(5)(A) and an extension of the date for filing its 2013 IRP until July 1, 2013; on March 30, 2013, the Commission issued its *Order Granting Waiver and Extension of Time* extending the filing date of Empire's 2013 IRP until July 1, 2013.

 $^{^{2}}$ The Commission's original Chapter 22 Rules were first effective on May 6, 1993, and remained unchanged until they were revised on June 30, 2011.

³ Empire's previous Chapter 22 triennial compliance filing was made under the Commission's original Chapter 22 Rules on September 3, 2010, in File No. EO-2011-0066. Thus, Empire had only approximately 34 months between its previous Chapter 22 triennial compliance filings and this Filing and did not have the normal 36 months between Chapter 22 triennial compliance filings.

⁴ §393.1030, RSMo, Supp. 2012, and 4 CSR 240-20.100.

- (Plan 10) Aggressive Capacity DSM (Only DSM utilized to meet future capacity goals)
- (Plan 11) Base Assumptions (No DSM)
- (Plan 12) Base Assumptions-RAP DSM (55% of RAP participation)
- (Plan 13) High Fuel (Base Portfolio RAP)
- (Plan 14) Low Fuel (Base Portfolio RAP)
- (Plan 15) High Load (Base Portfolio RAP)
- (Plan 16) Low Load (Base Portfolio RAP)
- (Plan 17) High Fuel No Future Coal (Base Portfolio RAP)
- (Plan 18) No DSM Aggressive Renewable

Empire's resource acquisition strategy and adopted preferred resource plan are summarized on pages 36 – 43 of Volume 1 Executive Summary of the Filing. Empire's adopted preferred resource plan is Alternative Plan 2 ("Plan 2"), which meets the RES, contains the RAP DSM portfolio and assumes no carbon costs over the 20-year planning horizon. Plan 2 is described in more detail in the next section of this Report.

As a result of its limited review,⁵ Staff finds that Empire has improved its Chapter 22 Electric Utility Planning processes when compared to its previous Chapter 22 filings. The addition of Volume 2 Table of Rule Requirements is appreciated and helps readers of the Filing locate the parts of the Filing which are relevant to specific Chapter 22 filing requirements. Other improvements include:

- The effectiveness of its Advisory Group, which met quarterly on nine (9) different occasions between June 30, 2011 and June 17, 2013 to provide feedback and advice to Empire on significant assumptions and analyses for Empire's 2013 IRP;
- Its load analysis and load forecasting methodology through its contract with Itron, Inc., and the use of economic variables and statistically adjusted end-use ("SAE") models for developing the residential and commercial revenue class models;
- Its load forecast, which is now more reasonable relative to the load forecasts of other Missouri electric utilities; and

 $^{^{5}}$ 4 CSR 240-22.080(7) states: "The staff shall conduct a limited review of each triennial compliance filing required by this rule and shall file a report not later than one hundred fifty (150) days after each utility's scheduled triennial compliance filing date. The report shall identify any deficiencies in the electric utility's compliance with the provisions of this chapter, any major deficiencies in the methodologies or analyses required to be performed by this chapter, and any other deficiencies and shall provide at least one (1) suggested remedy for each identified deficiency. Staff may also identify concerns with the utility's triennial compliance filing, may identify concerns related to the substantive reasonableness of the preferred resource plan or resource acquisition strategy, and shall provide at least one (1) suggested remedy for each identified concern. ..."

 Its 3-year implementation plan for demand-side resources included in its adopted preferred resource plan and its October 29, 2013, Application for Approval of Demand-Side Programs and for Authority to Establish a Demand-Side Management Investment Mechanism ("MEEIA Application").⁶

While Empire has made significant improvements to its Chapter 22 Electric Utility Resource Planning processes, Staff has identified five (5) deficiencies⁷ and three (3) concerns⁸ which are discussed in more detail in later sections of this Report. The most significant⁹ Staff deficiencies and concerns are:

- Deficiency 1 Empire's adopted preferred resource plan Plan 2 is not consistent with Missouri's energy policy of achieving a goal of all cost-effective demand-side savings over the 20-year planning horizon as required by MEEIA and by the Commission's Chapter 22 Rules and MEEIA Rules;¹⁰
- Concern A Staff believes Empire's 3-year implementation plan for demandside resources in Plan 2 and its MEEIA Application is an unrealistic and unhealthy stretch for Empire during its very first MEEIA 3-year program plan;
- Deficiency 4 Empire's resource acquisition strategy selection process is not compliant with Rules 4 CSR 240-22.070(1) and 4 CSR 240-22.010(2)(C), because Empire did not: a) explicitly identify and, where possible, quantitatively analyze any and all other considerations which are critical to meeting the fundamental objective of the resource planning process; and b) describe and document the

⁶ File No. EO-2014-0030.

 $^{^{7}}$ A "deficiency" is defined in Rule 4 CSR 240-22.020(9) by "deficiencies in the electric utility's compliance with the provisions of [Chapter 22], any major deficiencies in the methodologies or analyses required to be performed by [Chapter 22], and anything that would cause the electric utility's resource acquisition strategy to fail to meet the requirements identified in Chapter 22."

⁸ A "concern" is defined by Rule 4 CSR 240-22.020(6) by "concerns with the electric utility's compliance with the provisions of [Chapter 22], any major concerns with the methodologies or analyses required to be performed by [Chapter 22], and anything that, while not rising to the level of a deficiency, may prevent the electric utility's resource acquisition strategy from effectively fulfilling the objectives of Chapter 22."

⁹ Less significant deficiencies and concerns are included in sections <u>4 CSR 240-22.030 Load Analysis and</u> Forecasting and <u>4 CSR 240-22.045 Transmission and Distribution Analysis</u> of this Report.

¹⁰ When an electric utility files for approval of a demand-side program or program plan, it must include in its filing) "Demonstration and explanation in quantitative and qualitative terms of how the utility's demand-side programs are expected to make progress towards a goal of achieving all cost-effective demand-side savings over the life or the programs. Should the expected demand-side savings fall short of the incremental annual demand-side savings levels and/or the cumulative demand-side savings levels used to review the utility's progress, the utility shall provide detailed explanation of why the incremental annual demand-side savings levels and/or the cumulative demand-side to be achieved, and *the utility shall bear the burden of proof.*" 4 CSR 240-3.164(2)(D) (Emphasis added).

process used to select the preferred resource plan, including the relative weights given to the various performance measures and the rationale used by utility decision-makers to judge the appropriate trade-offs between competing planning objectives and between expected performance and risk; and

• Deficiency 5 - The Filing does not comply with Rule 4 CSR 240-22.070(2) concerning analysis and specification of ranges of critical uncertain factors for the adopted preferred resource plan.

To remedy these deficiencies and concerns, Staff recommends that Empire perform the following work and activities for its future Chapter 22 annual update and triennial compliance filings:

- To comply with 4 CSR 240-22.010(2)(C), describe and document the process used to explicitly identify, and where possible, quantitatively analyze any and all other considerations/constraints which are critical to meeting the fundamental objective of the resource planning process, but which may constrain or limit the minimization of the present value of utility revenue requirements ("PVRR") as the only selection criterion when choosing its adopted preferred resource plan;
- To comply with 4 CSR 240-22.070(1), describe and document the process used to select the preferred resource plan, including the relative weights given to the various performance measures and the rationale used by utility decision-makers to judge the appropriate tradeoffs between competing planning objectives and between expected performance and risk. Should Empire not use minimization of the present worth of long-run utility costs as the only selection criterion when choosing its adopted preferred resource plan, then it should utilize a decision scorecard. Exhibit 1 is an example of a decision scorecard prepared by Staff with information and quantitative analysis contained in the Filing; and
- To comply with 4 CSR 240-22.070(2), describe and document the ranges or combination of outcomes for the four current critical uncertain factors that define the limits within which the adopted preferred resource plan is judged to be appropriate. Empire should have also considered identification of the outcome of its MEEIA filing as an uncertain factor in the Filing, because the outcome of its MEEIA filing directly affects which plan is preferred.

<u>Summary of Empire's Preferred Resource Plan and Contingency Resource</u> <u>Plans</u>

Empire's resource acquisition strategy and adopted preferred resource plan are summarized on pages 36 – 43 of Volume 1 Executive Summary. Empire's adopted preferred resource plan is Alternative Plan 2 ("Plan 2"), which meets the RES¹¹, contains the RAP DSM portfolio and assumes no carbon costs over the 20-year planning horizon. Plan 2 has a PVRR of \$7.365 million over the 20-year planning horizon.

Plan 2 contains the following supply-side capacity additions and retirements:

- 2014 retire 14 MW Asbury 2 coal unit;
- 2015 add 5 MW to Asbury 1 coal unit air quality control system ("AQCS") and turbine project;
- 2016 add 4 MW "net" resulting from retirement of 104 MW Riverton 7, 8 and 9 natural gas units and conversion of 142 MW Riverton 12 combustion turbine ("CT") to 250 MW combined cycle turbine ("CC");
- 2027 add 50 MW CT;
- 2028 retire 105 MW Meridian Way wind¹² purchased power agreement ("PPA");
- 2029 add 100 MW wind PPA;
- 2030 retire 150 MW Elk River wind PPA;
- 2031 add 50 MW CT; 5 MW distributed generation; and 200 MW wind PPA; and
- 2032 retire 82 MW Energy Center 1 CT and add 50 MW CT.

Plan 2 includes implementation of Empire's RAP portfolio of DSM programs beginning in mid-2014. Implementation of the RAP portfolio will increase Empire's annual expenditures for DSM programs' costs to about \$5 million each year of the 20-year planning horizon, a significant increase from about \$1 million spent annually for programs' costs in recent years. The RAP portfolio – consisting of seven (7) residential energy efficiency programs, three (3)

¹¹ §393.1030, RSMo, Supp. 2012, and 4 CSR 240-20.100.

¹² Due to the intermittent nature of wind resources, Southwest Power Pool credits all wind generators with only 5% of name plate capacity.

commercial & industrial energy efficiency programs and one (1) commercial & industrial demand response program – is expected to achieve the following cumulative annual energy and demand savings over the 20-year planning horizon:



Empire's highly confidential capacity balance sheet for its adopted preferred resource plan – Plan 2 – illustrates that with the Plan 2 retirements and additions to Empire's supply-side resources and with the RAP demand-side portfolio, Empire is able to satisfy its annual peak demand¹³ with at least a 12% capacity reserve margin in each year of the 20-year planning horizon:

¹³ Page 10 of Volume 1 of the Filing includes the following: Over the next 20 years (2013 to 2032), Empire's net system input is forecast to grow from 5,324 GWh to 6,285 GWh (about a 0.88% compound [annual] growth rate [and about 48 GWh annually on average]) and its net peak (managed peak) is forecast to grow from 1,179 MW to 1,378 MW (about a 0.82% compound [annual] growth rate [and about 10 MW peak demand annually on average]) excluding the impact of future DSM.

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On October 29, 2013 Empire filed its MEEIA Application. Empire's implementation of Plan 2 – including implementation of its RAP DSM programs beginning in mid-2014 – is dependent upon Empire receiving a Commission order, acceptable to Empire, concerning its MEEIA Application. Should Empire decide to not implement its RAP portfolio, Empire has identified Plan 12¹⁴ ("RAP minus DSM") and Plan 11 ("No DSM") as its alternative resource plans depending upon the outcome of its MEEIA Application.¹⁵ Plan 2 (\$7,365 million PVRR), Plan 11 (\$7,321 million PVRR) and Plan 12 (\$7,348 million PVRR) have the lowest PVRRs of all of Empire's 18 alternative resource plans. Plan 12 and Plan 11 accelerate the need for supply-side resources in later years of the 20-year planning horizon by one year and two years, respectively, relative to Plan 2.

The following Table 7-10 from the Filing, summarized Empire's 18 alternative resource plans and identifies which plans may be contingency resource plans if critical uncertain factors change in the future causing adoption of a different preferred resource plan.¹⁶

					Carbon Costs for
Plan	Plan Description	Plan Type	DSM Portfolio	RES Requirement	DSM Screening
1	Base Case	Base Plan	Base Portfolio (RAP)	None	None
2	Base Case (Meets RPS)	Base Plan	Base Portfolio (RAP)	10 to 20% by 2021	None
3	Moderate Environmental	Other Contingency Plan	Moderate Env Portfolio (Higher avoided costs)	15 to 25% by 2021	Begin 2021
4	High Environmental	Other Contingency Plan	High Env Portfolio (Highest avoided costs)	15 to 25% by 2021	Begin 2015
5	RAP + DSM	Base Plan	Participation 1/3 between RAP and MAP	15 to 20% by 2021	None
6	RAP ++ DSM	Base Plan	Participation 2/3 between RAP and MAP	15 to 20% by 2021	None
7	Moderate DSM	Required Plan	Moderate (1% savings by 2015)	15 to 20% by 2021	Weighted
8	Aggressive DSM	Required Plan	Aggressive (2% savings by 2020)	15 to 20% by 2021	Weighted
9	MEEIA Level DSM	Required Plan	Designed to meet MEEIA savings goals	15 to 20% by 2021	Weighted
10	Aggressive Capacity DSM	Required Plan	Only DSM utilized to meet future capacity needs	15 to 20% by 2021	Weighted
11	No DSM	Base/Contingency Plan	None	15 to 20% by 2021	None
12	RAP - DSM	Base/Contingency Plan	55% of RAP participation	15 to 20% by 2021	None
13	High Fuel	Other Contingency Plan	Base Portfolio (RAP)	15 to 20% by 2021	None
14	Low Fuel	Other Contingency Plan	Base Portfolio (RAP)	15 to 20% by 2021	None
15	High Load	Other Contingency Plan	Base Portfolio (RAP)	15 to 20% by 2021	None
16	Low Load	Other Contingency Plan	Base Portfolio (RAP)	15 to 20% by 2021	None
17	High Fuel (No future coal)	Other Contingency Plan	Base Portfolio (RAP)	15 to 20% by 2021	None
18	Aggressive Renewable	Required Plan	None	Only renewables utilized	None

18 Alternative Resource Plans

4 CSR 240-22.010 Policy Objectives

Linkage between Chapter 22 Rules, the MEEIA and MEEIA Rules

Staff performed its review of the Filing in the context of the Commission's revised Chapter 22 Rules, the MEEIA and the Commission's MEEIA Rules. Staff performed its review

¹⁴ Plan 12 contains a DSM portfolio which is characterized as 55% RAP.

¹⁵ See pages 26 – 27 of Volume 7 of Filing for Empire's discussion of contingency resource Plans 11 and 12.

¹⁶ See discussion on pages 27 - 29 of Volume 7 of the Filing.

in this way because the policy objectives of Chapter 22 and of MEEIA are inseparable for electric utilities, since Rule 4 CSR 240-22.010(2) states:

The fundamental objective of the resource planning process at electric utilities *shall* be to provide the public with energy services that are safe, reliable, and efficient, at just and reasonable rates, in compliance with all legal mandates, and *in a manner that serves the public interest and is consistent with state energy and environmental policies.* ... (Emphasis added)

MEEIA establishes the following state energy policy for valuing demand-side resources and supply-side resources and for the cost recovery of these resources for Missouri's electrical corporations¹⁷ in Section 393.1075.3 and .4:

3. It shall be the policy of the state to value demand-side investments equal to traditional investments in supply and delivery infrastructure and allow recovery of all reasonable and prudent costs of delivering cost-effective demand-side programs. In support of this policy, the commission shall:

(1) Provide timely cost recovery for utilities;

(2) Ensure that utility financial incentives are aligned with helping customers use energy more efficiently and in a manner that sustains or enhances utility customers' incentives to use energy more efficiently; and

(3) Provide timely earnings opportunities associated with cost-effective measurable and verifiable efficiency savings.

4. The commission shall permit electric corporations to implement commissionapproved demand-side programs proposed pursuant to this section with a goal of achieving all cost-effective demand-side savings.

Although electric utilities are not required to request Commission approval of demandside programs and a demand-side programs investment mechanism ("DSIM") under MEEIA and the Commission's MEEIA rules, electric utilities are required to comply with the Commission's Chapter 22 Rules which establish that the fundamental objective of the electric utility resource planning process at each electric utility shall be to provide the public with energy services that are safe, reliable, and efficient, at just and reasonable rates, in compliance with all legal mandates, and in a manner that serves the public interest and is consistent with state energy and environmental policies. Because MEEIA establishes state energy policy, each electric utility is required – as part of its electric utility resource planning – to develop candidate resource plans

¹⁷ Rule 4 CSR 240-22.020(16): "Electric utility or utility mean any electrical corporation as defined in section 386.020, RSMo, which is subject to the jurisdiction of the commission."

and to analyze and document DSIM's which can allow the electric utility to make reasonable progress toward a goal of all cost-effective demand-side savings.¹⁸

It is important to also note the linkages between Chapter 22 Rules and the MEEIA Rules included in Rule 4 CSR 240-20.094(3)(A):

(A) For demand-side programs and program plans that have a total resource cost test ratio greater than one (1), the commission shall approve demand-side programs or program plans, and annual demand and energy savings targets for each demand-side program it approves, provided it finds that the utility has met the filing and submission requirements of 4 CSR 240-3.164(2) and the demand-side programs and program plans-

1. Are consistent with a goal of achieving all cost-effective demand-side savings;

2. Have reliable evaluation, measurement, and verification plans; and

3. Are included in the electric utility's preferred plan or have been analyzed through the integration process required by 4 CSR 240-22.060 to determine the impact of the demand-side programs and program plans on the net present value of revenue requirements of the electric utility.

Of less significance – but still important – is the linkage between Chapter 22 Rules and

the MEEIA Rules in Rule 4 CSR 240-22.070(8):

Evaluation of Demand-Side Programs and Demand-Side Rates. The utility shall describe and document its evaluation plans for all demand-side programs and demand-side rates that are included in the preferred resource plan selected pursuant to 4 CSR 240-22.070(1). Evaluation plans required by this section are for planning purposes and are separate and distinct from the evaluation, measurement, and verification reports required by 4 CSR 240-3.163(7) and 4 CSR 240-20.093(7); nonetheless, the evaluation plan should, in addition to the requirements of this section, include the proposed evaluation schedule and the proposed approach to achieving the evaluation plans for each program and rate shall be developed before the program or rate is implemented and shall be filed when the utility files for approval of demand-side programs or demand-side program plans with the tariff application for the program or rate as described in 4 CSR 240-20.094(3).

Finally, the MEEIA rules provide – in 4 CSR 240-3.164(2)(A) – detailed requirements for conducting current market potential studies including requirements for: 1) use of primary research, 2) updating the potential study no less frequently than every four (4) years, 3) review by Staff and stakeholders of required documentation, and 4) identification and discussion of the twenty (20)-year baseline energy and demand forecasts. Chapter 22 includes specific

¹⁸ See Rule 4 CSR 240-20.094(2) "Guideline to Review Progress Toward an Expectation that the Electric Utility's Demand-Side Programs Can Achieve a Goal of All Cost-Effective Demand-Side Savings."

requirements for demand-side management potential studies in 4 CSR240-22.050(2), demandside programs potential in 4 CSR 240-22.050(3), and demand-side rates potential in 4 CSR 240-22.050(4).

<u>Summary</u>

Staff performed its own analysis of Empire's RAP portfolio over the 3-year implementation period, the 9-year planning horizon and the 20-year planning horizon. The following charts summarize Staff analysis for Empire's RAP portfolio over the 3-year implementation period $(2013 - 2015)^{19}$ and the 9-year planning horizon:



Staff's analysis of Empire's RAP portfolio during the 3-year implementation period – 2013 through 2015 – suggests that Empire's RAP portfolio demonstrates progress toward achieving a goal of all cost-effective demand-side savings when using the guidelines – "soft

¹⁹ Empire's 3-year implementation plan (assumed to begin in mid-2014) in its MEEIA Application includes the DSM programs, programs' costs and energy and demand savings estimates contained in calendar years 2013 – 2015 of the Filing.

goals"²⁰ – provided in 4 CSR 240-20.094(2)(A) and (B). Specifically, Plan 2 includes cumulative annual energy savings of 1.02% in 2015 (vs. a "soft goal" of 1.50% in 2015) and cumulative annual demand savings of 1.08% in 2015 (vs. a "soft goal" of 3.00% in 2015).

However, Staff's analysis of Empire's RAP portfolio over the entire 20-year planning horizon suggests that Empire's RAP portfolio does not show progress toward achieving a goal of all cost-effective demand-side savings using the "soft goals." Specifically, Plan 2 includes cumulative annual energy savings of 2.14% in 2021 (vs. a "soft goal" of 9.90% in 2021) and includes growth of cumulative annual energy savings to only 2.76% by 2032 (the last year of the 20-year planning horizon). Similarly, Plan 2 includes cumulative annual demand savings of 2.40% in 2021 (vs. a "soft goal" of 9.00% in 2023) and includes growth of cumulative annual demand savings of 4.40% in 2021 (vs. a "soft goal" of 9.00% in 2023).



²⁰ 4 CSR 240-20.094 *Final Order of Rulemaking* in File No. EX-2010-0368 includes the following beginning on page 11: "Rulemaking is an exercise of the Commission's quasi- legislative power. Interim goals are well within the rulemaking authority granted to the commission in §393.1 075.11. An administrative agency has reasonable latitude regarding what methods and procedures to adopt in carrying out its statutory duties. ..." Moreover, the 'soft-goals' at issue are guidelines to review progress and are not mandatory.

The relative "shortcoming" of Empire's RAP portfolio following the first 3 - 5 years of the 20-year planning horizon for Plan 2 is the result of very low levels of incremental annual energy savings and incremental annual demand savings after 2017 even though the Company continues to spend about \$5 million annually each year through the end of the 20-year planning horizon.²¹

The relative "shortcoming" of the RAP portfolio over the 20-year planning horizon in Plan 2 (RAP DSM with PVRR of \$7.365 million) and – by definition – in Plan 12 (RAP minus DSM with PVRR of \$7.348 million), results in little material difference in the annual revenue requirements over the 20-year planning horizon for Plan 2, Plan 12 and Plan 11 (No DSM with PVRR of \$7.321 million).

Plan 2 has a higher annual revenue requirement in the early years of the 20-year planning horizon than do Plan 12 and Plan 11, which is expected because of the initial cost (\$5 million annually) of the new demand-side resources in Plan 2. However, because of the relative "shortcoming" of the RAP portfolio after the first 3 – 5 years of the 20-year planning horizon, Plan 2 is only able to postpone future supply-side resources by one year and two years relative to Plan 12 and Plan 11, respectively.²²

Staff also reviewed the risk adjusted²³ long-run revenue requirements for each of Missouri's electric utility's RAP DSM Plan and No DSM Plan contained in each utility's most recent integrated resource analysis. The following charts summarize the results of Staff's review and illustrate the incremental and cumulative risk-adjusted revenue requirements of Empire's RAP DSM Plan vs. No DSM Plan compared to the similar plans of all other Missouri electric utilities.

²¹ Because demand-side measures each have an expected useful life, as program measures reach the end of their expected useful lives – generally in the middle of the 20-year planning horizon – much of the annual \$5 million spent on DSM programs is going towards replacing program measures which have reached the end of their useful lives with new program measures, which adds little incremental annual savings. Further, since the \$5 million annual program costs is in "current year" dollars the buying power of the \$5 million in year 2013 is only \$3 million assuming an annual inflation rate of 2.5%.

²² Page 7-27 of Filing.

²³ Risk adjusted revenue requirements are the outcome of the utility's full integrated resource analysis using the entire decision tree. This is referred to as stochastic runs.

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				Ameren	GMO	KCPL	Empire
	ut		Source	EO-2011-0271	EO-2013-0538	EO-2013-0537	EO-2013-0547
ses	ghg		Years of Revenue Requirement	30	20	20	20
Ca	no .	ive	RAP PVRR	\$ 59,661,000	\$ 11,703,000	\$ 20,797,000	\$ 7,365,000
22	L.	ent	No DSM PVRR	\$ 61,259,000	\$ 12,509,000	\$ 21,239,000	\$ 7,321,000
er	<u>م</u>	inc					
apt	ij;	Dis	RAP PVRR % of No DSM PVRR	97.39%	93.56%	97.92%	100.60%
C,	K ch						
	E		No DSM or Low Risk DSM	Low Risk DSM	No DSM	No DSM	No DSM

PVRR (\$000) of RAP DSM vs. No DSM

Staff recognizes and appreciates the many differences in each electric utility's load forecasts, supply-side resource analyses, demand-side resource analyses, integrated resource analyses and resource acquisition strategy selection processes. It is with an appreciation for these relative differences that Staff finds that Empire's adopted preferred resource plan is not consistent with state energy policy of achieving the goal of all cost-effective demand-side savings over the entire 20-year planning horizon as contained in MEEIA and as required by the Commission's Chapter 22 Rules and the MEEIA Rules.

Further, 4 CSR 240-3.164(2)(D) requires that the electric utility demonstrate and explain in quantitative and qualitative terms how the utility's demand-side programs are expected to make progress towards the goal of achieving all cost-effective demand-side savings over the life of the programs. Should the expected demand-side savings fall short of the incremental annual demand-side savings levels and/or the cumulative demand-side savings levels used to review the utility's progress, the utility must provide a detailed explanation of why the incremental annual demand-side savings levels and/or the cumulative demand-side savings levels cannot be achieved, and *the utility bears the burden of proof.* (Emphasis added). Empire has not provided



the required demonstration and explanation of how its demand-side programs are expected to make progress towards the goal of achieving all cost-effective demand-side savings over the life of the programs.

Finally, Staff believes Plan 2 is an unrealistic and unhealthy stretch for Empire during its first 3-year MEEIA DSM programs' plan as reflected in Staff's summary analysis of Empire's Plan 2 (RAP DSM) and Plan 12 (RAP minus DSM) compared to Ameren Missouri's Cycle 1 programs (2009 – 2011); Ameren Missouri's MEEIA programs (2013 – 2015); KCP&L Greater Missouri Operations Company's ("GMO") MEEIA programs (2013 – 2015) and Kansas City Power & Light Company's ("KCPL") current adopted preferred resource plan – MEEIA/RAP (which is "scaled" after GMO's MEEIA programs) and KCPL's RAP alternative resource plan, which is KCPL's low cost plan, but not chosen as its adopted preferred resource plan due to the plan's short-term rate impact. Staff's analysis includes two high-level performance metrics for each 3-year DSM programs' plan: a) programs' costs per energy savings (\$/MWh), and b) average annual energy savings as a percentage of annual retail sales adjusted to exclude MWhs for opt-out customers.

Staff's Summary Analysis of DSM Program Plans									
	Rate Case Retail Revenue (\$ Millions) a	Rate Case Retail Sales (1) (MWh) b	DSM Programs' Costs 3-Year Budget (\$ Million) c	DSM Energy Savings 3-Year Target (MWh) d	Programs' Costs per Energy Savings (\$/MWb) c/d	Ave. Annual Energy Savings Percentage of Retail Sales d/3/b			
Ameren Cycle 1	\$ 2,842	31,011,495	\$ 72.6	553,796	\$ 131	0.60%			
Ameren MEEIA	\$ 2,842	31,011,495	\$ 147.3	793,100	\$ 186	0.85%			
GMO MEEIA	\$ 758	7,350,625	\$ 41.8	150,346	\$ 278	0.68%			
KCPL MEEIA/RAP	\$ 766	8,501,254	\$ 40.8	172,293	\$ 237	0.68%			
KCPL RAP	\$ 766	8,501,254	\$ 64.7	219,087	\$ 295	0.86%			
Empire RAP	\$ 429	3,655,291	\$ 15.3	111,527	\$ 137	1.02%			
Empire 55% RAP	\$ 429	3,655,291	\$ 8.4	61,340	\$ 137	0.56%			
(1) Excluding MWh for opt-out customers.									
Ameren Source	ER-2012-0166	ER-2012-0166	Dashboard	Dashboard					
Ameren Source	ER-2012-0166	ER-2012-0166	EO-2012-0142	EO-2012-0142					
GMO Source	ER-2012-0175	ER-2012-0175	EO-2012-0009	EO-2012-0009					
KCPL Sources	ER-2012-0174	ER-2012-0174	EE-2013-0537	EE-2013-0537					
Empire Sources	ER-2012-0345	ER-2012-0345	EO-2013-0547	EO-2013-0547					
	File Number	No/Low DSM	RAP DSM	Other DSM					
Ameren Missouri	EO-2011-0271	Plan B1	Plan RO						
KCPL	EO-2013-0537	Plan XDFKA	Plan ACBKA	Plan FDHKA					
GMO	EO-2013-0538	Plan XEEGA	Plan AICGA	Plan CICGA					
Empire	EO-2013-0547	Plan 11	Plan 2	Plan 12					

From its analysis of the three high-level performance metrics for each 3-year DSM programs' plan, Staff believes that Empire's 3-year implementation plan for Plan 2 (RAP DSM) is underfunded (programs' costs per energy savings of \$137/MWh and average annual programs' costs as a percentage of retail revenue of 0.65%) and overpromised (average annual energy savings percentage of retail energy sales of 1.02%).

Staff notes that Empire's 3-year implementation plan for Plan 12 (RAP minus DSM) has performance metrics similar to Ameren Missouri's Cycle 1 plan (2009 – 2011), although Empire does not benefit from the economies of scale of Ameren Missouri (by most measures Ameren Missouri is about 7 - 8 times larger than Empire). Staff also notes that all other utilities have used third-party contractors in past years to deliver their DSM programs' services, while Empire's 3-year implementation plan for Plan 2 represents the first time Empire will be hiring and training third-party contractors to deliver its expanded (planned \$5 million annual budget vs. about \$1 million annual expenditure in recent years) portfolio of demand-side programs. Finally, Empire's service territory does not contain a large metropolitan area like St. Louis or Kansas City, as Joplin is the largest city in Empire's Missouri service area, with a population of 50,000.

Deficiencies

Deficiency 1 - Empire's adopted preferred resource plan – Plan 2 – is not consistent with Missouri's energy policy of achieving a goal of all cost-effective demand-side savings over the 20-year planning horizon as required by MEEIA and by the Commission's Chapter 22 Rules and MEEIA Rules.²⁴

Concerns

Concern A - Staff believes Empire's 3-year implementation plan for demand-side resources in Plan 2 and its MEEIA Application is an unrealistic and unhealthy stretch for Empire during its very first MEEIA 3-year program plan.

²⁴ When an electric utility files for approval of demand-side programs or program plans, the filing must contain: "Demonstration and explanation in quantitative and qualitative terms of how the utility's demand-side programs are expected to make progress towards a goal of achieving all cost-effective demand-side savings over the life or the programs. Should the expected demand-side savings fall short of the incremental annual demand-side savings levels and/or the cumulative demand-side savings levels used to review the utility's progress, the utility shall provide detailed explanation of why the incremental annual demand-side savings levels and/or the cumulative demand-side savings levels cannot be expected to be achieved, and *the utility shall bear the burden of proof.*" 4 CSR 240-3.164(2)(D) (Emphasis added).

Please see the remedy for Deficiency 1, Concern A, Deficiency 4 and Deficiency 5 to become compliant with 4 CSR 240-22.010(2) and 4 CSR 240-22.070(1) and (2), which is located at the conclusion of <u>4 CSR 240-22.070 Resource Acquisition Strategy Selection</u> section of this Report.

Staff Expert Witness: John Rogers

4 CSR 240-22.030 Load Analysis and Forecasting

<u>Summary</u>

The stated purpose of Rule 4 CSR 240-22.030, Load Analysis and Load Forecasting, is to set the "minimum standards for the maintenance and updating of historical data, the level of detail required in analyzing and forecasting loads, and for the documentation of the inputs, components and methods used to derive the load forecasts."

The revised Load Analysis and Load Forecasting Rule is less prescriptive than the original rule regarding the analytical methods the utility shall use, allowing multiple methods and leaving more discretion to the utility to choose the methods by which it achieves the stated purpose of the rule. Empire did not request any variances from specific provisions of this rule.

Empire's 2010 Chapter 22 triennial compliance filing ("2010 IRP") – File No. EO-2011-0066 – included requests for twenty-two (22) variances from the requirements of 4 CSR 240-22.030 Load Analysis and Forecasting.²⁵ These variances pertained to: (1) end-use methodology and end-use modeling; (2) the use of 10 years of historical data; and (3) restricting modeling to three major revenue classes—residential, commercial and industrial. These variances allow Empire some flexibility in complying with many of the sections of 4 CSR 240-22.030. The variances were subject to the condition that after the completion of its 2010 IRP, Empire would provide the Staff with a plan that addresses the feasibility of changing the Company's forecasting method for its next Chapter 22 triennial compliance filing and consider the use of economic variables, forecasting rule in place at the time of Empire's 2013 Chapter 22 triennial compliance filing.

Empire also agreed to provide full disclosure of its Chapter 22 load forecasting methodology that includes a description of all assumptions, equations, and the rationale for each

²⁵ Empire's 2010 triennial compliance filing was filed under the Commission's original Chapter 22 Rules were first effective on May 6, 1993.

decision concerning an adjustment to the data used to develop the forecast. As one aspect of this disclosure, Empire agreed to describe each assumption concerning future economic conditions that can influence or were incorporated into the company's specification or assignment of values to variables, coefficients, or relationships in the equations used to forecast load over the 20-year planning horizon.

One of Staff's concerns with Empire's load forecast from the 2010 IRP was the compound annual load growth rates of ** _____ ** per year for annual energy growth and ** _____ ** per year for peak demand growth over the 20-year planning horizon. These growth rates seemed high relative to the forecasts of other Missouri electric utilities, and in light of the uncertainty regarding the length and impact of the economic recession on future consumption of electricity.

For the Filing, Empire's contractor, Itron, Inc., used economic variables and SAE models to develop the residential and commercial revenue class models in the base case. Itron also provided several white papers that are attached as appendices to the Load Analysis and Load Forecasting Report that cover forecasting at the class cost-of-service level. The 2013 to 2032 base load forecasts show compound load growth rates of ** ______ ** per year for energy and ** ______ ** per year for peak demand over the 20-year planning horizon. These growth rates appear to be in line with other Missouri electric utilities.

Deficiencies

Deficiency 2. Empire did not develop its load forecasts at the major class level (defined as cost-of-service class of the utility in 4 CSR 240-22.010(37)) as required by 4 CSR 240-22.030(7)(A). Instead, Empire used customer classes at the revenue level.

Empire did not develop its load forecasting models at the class-cost-of service classes used in its last general electric rate case. The current rule requires energy and peak demand load analysis and load forecasting to be conducted at the cost-of service class level. If Empire desires to develop its load forecasts using classes other than the cost-of-service classes, then Empire should file an application for a variance that demonstrates good cause for obtaining relief from 4 CSR 240-22.030(7)(A).

Concerns

Concern B. Empire agreed to provide full disclosure of its Chapter 22 load forecasting methodology in this IRP. However, this information was not provided as work papers with the Filing. This information was only provided as a response to a Data Request submitted by the Department of Economic Development Division of Energy.

To remedy this concern, Empire should provide – in all future Chapter 22 filing – its load analysis and load forecasting methodology, including economic and forecasting models, as work papers and always include them in the normal distribution of case work papers. *Staff Expert Witness: David Roos*

4 CSR 240-22.040 Supply Side Resource Analysis

Summary

Rule 4 CSR 240-22.040 – the revised Supply-Side Analysis Rule – clarifies the consideration of transmission and distribution requirements for each supply-side resource to ensure that the full cost of each resource type is factored into the supply-side analysis. The revised rule explicitly requires the consideration of transmission constraints in the supply-side resource screening process. Empire did not request any waivers from Rule 4 CSR 240-22.040.

Rule 4 CSR 240-22.040, Supply-Side Resource Analysis, requires Empire to review existing resources for opportunities to upgrade or retire existing resources and also review a wide variety of supply-side resource options to determine cost estimates for each type of resource.

Resource options are to be ranked based upon their relative levelized annual costs²⁶, including installed capital costs, fixed and variable operation and maintenance costs, and probable environmental costs levelized over the useful life of the potential supply-side resource option using the utility discount rate.²⁷ Resources which do not have significant disadvantages pass this pre-screening process and are to be included in the integrated resource analysis process used to select a preferred resource plan.

Empire initially considered a wide range of supply-side resource technologies with varying levels of technology development, feasibility, and size. After considering Empire's size,

²⁶ Per 4 CSR 240-22.020(29) Levelized cost means the dollar amount of a fixed annual payment for which a stream of those payments over a specified period of time is equal to a specified present value based on a specified rate of interest.

²⁷ 4 CSR 240-22.040(2)(A).

location, and interconnections, Empire selected the following potential supply-side resource options for further investigation:²⁸

- 1. Super-critical coal (joint-ownership with and w/o Carbon Capture and Storage ("CCS") and PPA).
- 2. Combustion turbines (Aero-derivative CT and frame CT).
- 3. Combined cycle (with and w/o CCS).
- 4. Integrated gasification combined cycle (IGCC).
- 5. Reciprocating internal combustion engine (RICE).
- 6. Distributed generation (DG).
- 7. Small modular nuclear (SMN).
- 8. Traditional nuclear (PPA).
- 9. Wind (ownership and PPA).
- 10. Biomass.
- 11. Landfill gas.
- 12. Utility scale solar Photovoltaic ("PV").

Empire reviewed and evaluated combined heat and power ("CHP"). Empire determined that some poultry processing plants in the area were potential CHP candidates, and one of the larger plants analyzed CHP potential. This plant determined CHP was not economically feasible, and, therefore, Empire excluded CHP from additional investigation and analysis.²⁹

Empire developed assumptions associated with the candidate resources, such as capital costs, fuel and purchased power costs, probable environmental costs, fixed and variable operations and maintenance ("O&M") costs, transmission and distribution ("T&D") costs and other operational data.

Empire developed screening curves, but did not eliminate any candidate resources from consideration based on capacity expansion modeling ("CEM"); and all supply-side candidates were passed on to the integration analysis phase of the IRP process for consideration.³⁰ Empire calculated implementation and bus bar costs for each of the potential supply-side resource options listed in Table 4-4 (conventional technologies) and Table 4-5 (renewable technologies) and Figures 4-3 through 4-6. Empire's supply-side resource screening analysis identified twelve

²⁸ Empire IRP Case no. EO-2013-0547, volume 4, page 4-19.

²⁹ Empire IRP Case no. EO-2013-0547, volume 4, page 4-20.

³⁰ Empire IRP Case no. EO-2013-0547, volume 1, page 14.

potential cost-effective options that it passed on to consider further in its integrated resource analysis.

Empire evaluated the efficiency, life extension, environmental enhancements, and retirement scenarios of the existing facilities it relies upon for capacity and power.

Empire evaluated probable environmental compliance costs of supply side resource options and identified the following newly proposed and developing environmental regulations that could impact resource planning:³¹

- 1. Mercury Air Toxic Standards ("MATS") rule.
- 2. Cross State Air Pollution Rule ("CSAPR")/Clean Air Interstate Rule ("CAIR").
- 3. Cooling water intake structure issues that impact plants using once-through cooling water.
- 4. Federal Resource Conservation and Recovery Act ("RCRA") governing the management and storage of coal combustion residuals ("CCR"), often referred to as coal ash.
- 5. Greenhouse gas ("GHG") legislation/regulations.

Empire examined recent and possible upgrades at its existing plants, and identified the following recent and possible upgrades³²:

- 1. New pollution control systems have recently been installed at the coal-fired Asbury and Iatan 1 units. Asbury Unit 1 was retrofitted with a selective catalytic reduction unit ("SCR") in 2008. A scrubber, SCR, fabric filter, and powder activated carbon system were installed at the jointly owned, coal-fired Iatan Unit 1 in 2009.
- 2. New pollution control systems are being installed at the Asbury 1 unit. Unit 1 is being retrofitted with a scrubber, fabric filter, and a powder-activated carbon injection system. The AQCS project and steam turbine project are planned for completion in 2015. Unit 2 will be retired prior to this in 2014.
- 3. The conversion of the Riverton 12 CT unit to a CC unit is to take place by 2016.
- 4. Empire's normal, ongoing maintenance program at each of its plants addresses critical operational and mechanical issues to ensure the longevity of the units.

Empire evaluated interconnection and transmission requirements associated with the preliminary supply-side options and assigned a cost of \$82.73/KW in 2013 dollars for each

 ³¹ Empire IRP Case no. EO-2013-0547, volume 4, page 4-26.
 ³² Empire IRP Case no. EO-2013-0547, volume 4, page 4-16

candidate resource.³³ Empire is a member of the Southwest Power Pool ("SPP") and relies on SPP to determinate which transmission lines will be built, when the lines will be built and the cost allocation for those lines. The SPP conducts studies directly associated with transmission planning and develops the transmission expansion plan ("STEP"). Since not all of Empire's planned construction projects are accounted for in the STEP, Empire provided details for its 2013 to 2017 construction budget in Volume 4.5 of this Filing.³⁴

Empire did not identify any transmission system capacity constraints that would limit the output of the Riverton 12 CC conversion.³⁵

As a member of the SPP, Empire is required to maintain a minimum 12% capacity margin which is approximately equivalent to a 13.7% reserve margin. This reserve margin was used as the minimum reserve margin value for capacity planning in this Filing.

In 2012, 73% of Empire's total system input (in kWh) was supplied by its steam and thermal generation units, 1% was supplied by its hydroelectric generation, and the remaining 26% was purchased power including wind energy. The 2012 Empire net system input by fuel type is shown in the following table³⁶.

³³ Empire IRP Case no. EO-2013-0547, volume 4, page 4-42.

³⁴ Empire IRP Case no. EO-2013-0547, volume 4, page 4-43.

³⁵ Empire IRP Case no. EO-2013-0547, volume 4, page 4-44.

³⁶ Empire IRP Case no. EO-2013-0547, volume 4, page 4-3

Power Plant Fuel Type Sta		State	Interest	Capacity (MW)	Start Date	Facility Age (Ye	ars)
Resource			(%)				
Asbury 1 37 Coal N		MO	100	189 now and 194 in 2015	1970		
Asbury 2 ³⁰	Coal	MO	100	14	1986	27	
latan 1	Coal	MO	12	85	1980	33	
latan 2	Coal	MO	12	102	2010	3	
Plum Point	Coal	AR	7.52	50	2010	3	
Riverton 7 ³⁹	Natural Gas	KS	100	38	1950	63	
Riverton 8	Natural Gas	KS	100	54	1954	59	
Riverton 9 CT ⁴⁰	Natural Gas/Oil	KS	100	12	1964	49	
Riverton 10 CT ⁴¹	Natural Gas	KS	100	16	1988	25	
Riverton 11 CT	Natural Gas	KS	100	17	1988	25	
Riverton 12 CT ⁴²	Natural Gas	KS	100	142 now and 250 in 2016	2007	6	
Empire Energy	Natural Gas/Oil	MO	100	82	1978	35	
Center 1 CT							
Empire Energy	Natural Gas/Oil	MO	100	82	1981	32	
Center 2 CT							
Empire Energy	Empire Energy Natural Gas/Oil		100	49	2003	10	
Center 3 CT							
Empire Energy	Natural Gas/Oil	MO	100	49	2003	10	
Center 4 CT							
State Line CT	Natural Gas/Oil	MO	100	94	1995	18	
State Line CC	State Line CC Natural Gas I		60	297 ⁴³	1997 & 2001 ⁴⁴	16 & 12	
Ozark Beach	Hydro	MO	100	16	1913	100	
Total Empire Installed	d Capacity			1,388			
Long Term Power Pu	rchases	Туре		Capacity (MW)	End Date		Term
Plum Point		Coal		50	2015 ⁴⁵		
Elk River Wind Farm ⁴	⁶ (150 MW PPA)	Wind	ł	7	2025		20 years
Meridian Way Wind Farm (105 MW PPA) ⁴⁷		⁷ Wind	ł	8	2028		20 years
Capacity Summary							
Total Coal		Coal		532			
Total Gas Turbine (GT)		Gas		543			
Total Combined Cycle (CC)				297			
Total Hydro			0	16			
Total Purchase includes wind			hased	65			
			er				
Total				1,453			

³⁷ Asbury 1 is in the process of an environmental retrofit and turbine project and it is assumed for the Filing that Unit 1 will increase its capacity to 194 MW in 2015 with the project's completion.

³⁸ It is assumed for this Filing that Unit 2 will retire in 2014 before the completion of the Unit 1 environmental retrofit and turbine project.

³⁹For the purposes of this Filing, Unit 7 and 8 are assumed to retire in 2016. Units 7 and 8 last burned coal on September 18, 2012, and will burn natural gas until retirement.

⁴⁰ For this Filing, it is assumed that Riverton 9 will retire in 2016 with the retirement of Riverton Units 7 and 8.

⁴¹Riverton 10 and 11 were manufactured in 1967 but were installed at Empire in 1988; they are 43 years old.

⁴²For purposes of this Filing, it is assumed that Riverton 12 will be converted to a combined-cycle unit in 2016 with a total capacity of 250 MW. ⁴³ Represents Empire's 60 percent share of a 500 MW State Line Combined Cycle unit.

⁴⁴ One of the gas turbines at State Line Combined Cycle unit was installed in 1997 and the others in 2001.

⁴⁵ Empire owns an undivided ownership interest of 7.52 percent (approximately 50 MW) in Plum Point Generating Station in Arkansas and has signed a PPA for the rights to an additional undivided ownership 50 MW of in 2015.

⁴⁶ The Elk River Wind Farm consists of one-hundred (100) 1.5 MW turbines for a total of 150 MW. For purposes of the IRP, 7 MW of its installed capacity is counted toward Empire's reserve margin. Although the term of the PPA is 20 years, the term can be extended once for a period of 5 years at Empire's option. For this Filing, 7 MW of wind capacity is assumed but is likely subject to rerating in the future ⁴⁷ Empire owns an undivided ownership interest of 7.52 percent (approximately 50 MW) in Plum Point and has

signed a PPA for the rights to an additional undivided ownership of 50 MW in 2015.

Based on its limited review, Staff concludes Empire's supply-side resource analysis filing meets the requirements of 4 CSR 240-22.040, and Staff identified no deficiencies or concerns. *Staff Expert Witness: Randy Gross*

<u>4 CSR 240-22.045 Transmission and Distribution Analysis</u>

Summary

Rule 4 CSR 240-22.045 Transmission and Distribution Analysis is a new rule which specifies the minimum standards for the scope and level of detail required for transmission and distribution network analysis and reporting. Rule 4 CSR 240-22.045 is prompted, in part, by the changes in federal law that can affect electric utility resource planning and resource viability, e.g., policies of Regional Transmission Organizations ("RTO"), development of regional power markets, and implementation of Smart Grid technologies. Rule 4 CSR 240-22.045 does not prescribe how analyses are to be done, but rather allows a utility to conduct its own analysis or adopt the RTO or Independent Transmission System Operator ("ISO") transmission plans. Rule 4 CSR 240-22.045 requires analysis and documentation of the RTO/ISO transmission projects and requires the electric utility to review transmission and distribution for the reduction of power losses, interconnection of new generation facilities, facilitation of sales and purchases and incorporation of advance technologies for the optimization of investment in transmission and distribution resources.

Empire did not request any variances from Rule 4 CSR 240-22.045 as a part of this Chapter 22 filing.

The Staff has identified one deficiency related to Empire's distribution analysis.

Deficiencies

Deficiency 3. Empire did not comply with requirements of 4 CSR 240-22.045(4)(C)1.A.,⁴⁸ since Empire has not yet performed a comprehensive analysis to optimize investments in advanced distribution technologies.⁴⁹

Staff understands that not all of the distribution technologies are fully developed; however, many advanced technologies have been successfully developed and deployed. A few

⁴⁸ 4CSR-240-22.045(4)(C)1.A. requires the utility to describe and document its optimization of investment in advanced transmission and distribution technologies based on an analysis of total costs and benefits including costs of the advanced grid investments.

⁴⁹ See Section 4.3.1.1. of Empire's Filing.

advanced technologies that have been deployed by Missouri utilities include: transformer insulating oil dissolved gas monitors, high voltage bushing monitors, fiber optic winding temperature sensors, comprehensive analysis monitor, multi-function transformer temperature monitors, and smart line regulators.

The Staff has also identified deficiencies related to Empire's distribution technology analysis related to:

4.3.1 Optimization of Investment – Reduction of Resource Costs
4.3.2 Optimization of Investment – Reduction of Supply-Side Costs
4.3.4 Optimization of Investment – Reduction of Resource Costs
4.4.2 Cost-effectiveness – Incremental Benefits Advanced Grid Technologies vs. Non-Advanced Grid Technologies
4.4.3 Optimization of Investment – Non-Monetary Factors
4.4.4 Optimization of Investment – Societal Benefit
4.4.4.1 Societal Benefit – Consumer Choice
4.4.2 Societal Benefit – Existing Resource Improvement
4.4.4.3 Societal Benefit – Price Signal Cost Reduction
4.4.4 Societal Benefit
4.4.5 Optimization of Investment – Other Utility-Identified Factors
4.4.6 Optimization of Investment – Other Non-Utility Identified Factors

Empire's responses for these areas of analysis are located in volume 4.5⁵⁰, pages 63 - 69,

and these responses were the same response given for 4.3.1.1;

At this time, Empire has not yet performed a comprehensive analysis to optimize investments in advanced distribution technologies. These implementations are in their infancy and as a result, Empire will continue to monitor for future comprehensive analysis.

To resolve these deficiencies, Empire should comply with all requirements of Rule 4 CSR 240-22.045(4)(C)1.A. in its transmission and distribution analysis, in its analysis for special contemporary issues,⁵¹ in its 2014 annual update report, and in its 2016 triennial compliance filing.

Staff Expert Witness: Dana Eaves

⁵⁰ Empire IRP Case no. EO-2013-0547

⁵¹ See File No. EO-2014-0063.

4 CSR 240-22.050 Demand-Side Resource Analysis

Summary

The revised Rule 4 CSR 240-22.050, Demand-Side Resource Analysis, "specifies the principles by which potential demand-side resource options shall be developed and analyzed for cost-effectiveness, with the goal of achieving all cost-effective demand-side savings." The revised Demand-Side Analysis Rule identifies the objectives to be achieved by the demand-side programs and portfolios, and gives each utility the option of developing demand-side programs or portfolios from the top down (starting with program designs and filling in the cost-effective measures) or from the bottom up (starting with screening a comprehensive menu of measures and ending with program designs). The rule clarifies the distinction between demand-side programs and demand-side rates, and places more emphasis on demand-side rates than the previous rule. It is less prescriptive than the original rule in that it does not specify how the utility is to conduct the screening analysis or to calculate the avoided costs. The current rule includes the calculation of the Total Resource Cost ("TRC") test, which meets the requirement of the MEEIA (Section 393.1075.4 RSMo, Supp. 2010). The rule requires documentation regarding how the potential demand-side resources were analyzed and screened to identify demand-side candidate resource options to advance to the integrated resource analysis. The requirements for the evaluation of demand-side programs are removed from this rule but are included in the revised resource acquisition strategy selection rule.

Finally, Rule 4 CSR 240-22.050 requires the selection of demand-side candidate resource options that are passed on to integrated resource analysis in Rule 4 CSR 240-22.060 and assessment of their technical potentials, maximum achievable potentials ("MAP"), and realistic achievable potentials ("RAP").

Empire's 2013 Filing improves and expands Empire's overall consideration and evaluation of demand-side resources from its 2010 IRP. Primary improvements include the knowledge gained from the actual program implementation and evaluation, measurement and verification ("EM&V") experience for the previous and the current demand-side programs, Empire's recently complete DSM market potential study performed by Applied Energy Group, and Empire's MEEIA application filed on October 29, 2013.⁵² Empire is communicating with

⁵² File No. EO-2014-0030.

stakeholders, meeting on a regular basis with significant decision-makers, and meeting quarterly with its DSM advisory group.

Empire did not request any variances from Rule 4 CSR 240-22.050 as a part of this Chapter 22 filing.

DEMAND-SIDE MANAGEMENT PROGRAMS

Empire has included – in Plan 2 and in its MEEIA Application – its RAP demand-side management ("DSM") portfolio which consists of seven (7) residential energy efficiency programs, three (3) commercial energy efficiency programs, and one (1) demand response program, which Empire considers to have RAP assuming no carbon costs over the 20-year planning horizon.

To cost-effectively evaluate Empire's DSM programs, the EM&V contractor will evaluate each program every two years, starting with the beginning of the second program year.

The Company engaged Applied Energy Group ("AEG") to conduct a DSM market potential study for its service territory and to help with the demand-side analysis requirements of 4 CSR 240-22.050. AEG reviewed multiple potential studies, technical reference manuals and DSM program evaluations from other utilities and states. In the potential study and the IRP analysis, Empire used its 2008 Residential Energy Management Survey as the only primary data for the residential sector. However, Empire compared the 2008 Energy Management Survey sample to the 2010 U.S. Census and confirmed that there has not been a significant change in residential demographics, and determined that a new residential baseline study is unnecessary at this time.⁵³

Staff reviewed the Company's DSM portfolio, consisting of seven (7) residential energy efficiency programs, three (3) commercial energy efficiency programs, and one (1) demand response program. A brief description of each program follows.

1. Residential energy efficiency Programs

a. Residential Products Program

The program's primary objective is to secure energy savings by incentivizing the purchase of Energy Star[®] qualified lighting and appliances for residential customers. Instant rebates will be applied to CFLs and LEDs at the point-of-purchase, varying in

⁵³ Page 28 of Volume 5 of the Filing.

amount depending upon the type of lighting, manufacturer and the associated retail cost. Mail-in rebates will be available to customers that purchase efficient appliances.

The program will be implemented by a third-party contractor and may be marketed through bill inserts, newspaper advertisements, and partnerships with participating retailers.

b. Appliance Recycling Program

The program encourages residential customers to remove inefficient refrigerators and freezers from the electric system and dispose of them in an environmentally safe and responsible manner.

The program will incent customers to turn in their old, inefficient refrigerator(s) or freezer(s). Customers are limited to 2 rebates per program year. The refrigerator or freezer must be in working condition, between 10 and 30 cubic feet in size and at least five years of age. The refrigerators and freezers will be picked up at no cost to the customer.

Empire will select a third-party implementation contractor that specializes in appliance recycling and has access to a recycling facility. The implementation contractor will handle scheduling, appliance pickup, recycling and disposal, and incentive processing.

c. Residential High-Efficiency HVAC Program

The program objective is to encourage residential customers, including owners of rental properties and new construction, and Heating, Ventilation, and Air Conditioning ("HVAC") contractors to use energy efficiency as a marketing tool, stocking and selling more efficient HVAC units and moving the market toward greater efficiency.

The implementation contractor will develop partnerships with HVAC contractors through education and training seminars, presentations at Chamber of Commerce meetings, and other informational events. Additional marketing activities will include newspaper advertisements, "email blasts"⁵⁴ and bill messaging.

⁵⁴ An email blast is an electronic mailing, sent all at once to a large mailing list and is commonly used by marketers who want to send email advertisements.

d. Residential Whole House Efficiency Program

The purpose of the program is to encourage whole-house improvements to existing homes by enhancing home energy audits and promoting comprehensive retrofit services. The target market includes residential customers that own or rent their homes.

The program will consist of two levels – Tier 1 and Tier 2:

Tier 1: Direct Install. A home energy audit will identify potential efficiency improvement opportunities. The program will offer the audit and installation of measures at no cost to the customer. The program includes the following measures: air sealing, faucet aerators, low-flow showerhead, water heater temperature setback, advanced power strip, water heater tank wrap, hot water pipe insulation and CFLs.

Tier 2: Insulation. Customers that have completed Tier 1 are eligible for incentives of up to three hundred dollars (\$300) to purchase and install attic insulation.

Empire will engage a contractor to implement the program. The program will be marketed through direct outreach to customers, bill inserts, newspaper advertisements, email blasts, and community events.

e. Low-Income Weatherization Program

The program reduces energy costs for eligible low-income homeowners and renters through increased home efficiency, at no cost to the participant. Home efficiency is improved through the installation of energy saving measures, such as insulation, caulking, weather stripping and heating system repair or replacement. The program supplements the federal Low-Income Weatherization Assistance Program.

Empire customers work with one of the Missouri Weatherization Agencies⁵⁵ to participate. These agencies offer cost-effective implementation, which allows most of the program budget to go directly to the purchase and installation of efficient equipment.

f. Low Income New Homes Program

Empire will work with local non-profit organizations to encourage efficient, affordable new housing for low-income customers. Organizations notify Empire of their intent to participate in the program. Upon acceptance, Empire holds the maximum

⁵⁵ Economic Security Corporation of Southwest Area, Ozarks Area Community Action Corporation, and West Central Missouri Community Action Agency.

available financing per home for up to six months, with payment occurring upon receipt and review of paid invoices.

g. School Energy Education Program

The program offers a set of classroom activities and a kit of low-cost energy and water efficiency products to 6th grade students within Empire's Missouri service territory. The program helps build awareness of energy conservation among children and can impact customers at all income levels. Teachers will receive education materials including lesson plans, program videos, classroom posters and supplemental activities.

Empire will engage a third-party implementation contractor to recruit and train teachers, track participation, and provide support to students and teachers. The program will be marketed to school officials including teachers, principals and school district personnel. Information on the benefits of this program will be explained to teachers or principals prior to handing out the energy kits.

2. Commercial Energy Efficiency ("EE") Programs

a. Small Business Lighting Program

The program targets non-residential customers with an average electric demand of less than 250 kW per year. The program offers customers a free lighting energy audit that includes information on potential energy savings and anticipated payback as well as incentives that cover up to 70 percent of the equipment and installation costs. Eligible measures include permanent interior lighting fixtures and ballasts, such as T5 lamps, LED exit signs, pulse-start metal halides and occupancy sensors.

Empire will select an implementation contractor that will contact business owners, operators, property owners and tenants and will provide the lighting audit and information on lighting incentives. Incentives will be assigned directly to the contractor, so that the value of utility incentives is reduced directly from the sale price of the project.

b. Commercial and Industrial EE Rebate Program

The program provides incentives to lower the cost of purchasing energy efficient equipment for Commercial and Industrial ("C&I") facilities. The program consists of prescriptive and custom rebates.

Prescriptive. Pre-qualified prescriptive rebates are available for new construction and retrofits. The rebated measures, including lighting, HVAC equipment, motors

and variable frequency drives, are proven technologies that are readily available with known performance characteristics.

Custom. Equipment that does not qualify for a prescriptive rebate will be eligible for a custom rebate. Applications must be pre-approved by Empire before equipment is purchased and installed to ensure that the equipment will have an incremental payback greater than two years.

The program will be marketed through partnerships with Empire trade allies as well as newspaper advertisements, email blasts or targeted mailings to customers and contractors, bill inserts, and advertising in HVAC trade publications.

c. Building Operator Certification Program

The program is a training and certification program that educates facility managers and operators in the energy efficiency of their equipment and processes. The training includes approximately 80 hours of classroom and project work in building systems operation and maintenance. Each course in the series is completed in a one-day training session, except *BOC 103 – HVAC Systems and Controls*, a two-day course.

Empire offers incentives for Level 1 training, HVAC Systems and Controls, Efficient Lighting Fundamentals, Facility Electrical Systems, and Indoor Air Quality. To become certified, participants must pass an exam at the end of each day of training and complete assigned projects. Rebates of \$575, half of the training tuition, are provided to Empire participants that complete the certification process.

The program is administered by the Missouri Energy Center in partnership with the Midwest Energy Efficiency Alliance (MEEA). The program is targeted at customers with facilities that employ full-time building operators.

3. Demand Response Program

a. Interruptible Service Rider Program⁵⁶

The program is a load-shedding strategy to be used where system peak demand exceeds available capacity or extreme energy prices are expected. The program is designed to reduce customer load during peak periods, upon request by Empire. The rider is available to commercial and industrial customers with a minimum monthly billing demand of 200 kW

⁵⁶ Empire IRP Case no. EO-2013-0547, volume 5, Figure 5-11, page 5-18

and an anticipated minimum load curtailment capability of 200 kW. The program year runs from June 1 through May 31.

Customers voluntarily enter into a contract for a term of one to five years for no greater than 50 MW annually. The contract is automatically renewed for a term of equal length unless termination notice is given by the customer or Empire. The customer rate for service interruption varies according to the length of the contract. Curtailments are limited to ten per year, with a maximum interruption of eight hours per curtailment event. TRC values for this program range from 20.79 in 2013 to 31.99 in 2015. Participation levels are indicated at 5 participants with a net MW savings of 2,738.

Empire also screened Peak Time Rebate and Critical Peak Pricing demand-side rates and direct load control for cost-effectiveness as stand-alone pilot programs⁵⁷.

For each program, the number of participants, program costs, avoided costs and demand reduction savings are included in the Work Paper "IRP Scenario Analysis – Base Avoided Cost.xlsx". Table 1 summarizes the results of three-year averages of each cost-effectiveness test for Empire's proposed Programs.

Cost-Effectiveness Test Summary							
Programs	TRC	UCT					
Residential Products	1.32	1.54					
Appliance Recycling	1.15	1.49					
High-Efficiency HVAC	1.35	1.97					
Whole House Efficiency	1.41	0.95					
Low Income Weatherization	0.86	2.09					
Low Income New Home	0.58	1.19					
School Energy Education	1.28	1.28					
Small Business Lighting	1.11	0.95					
C&I EE Rebate	3.04	5.25					
Building Operator Certificate	1.62	2.86					
Interruptible Service Rider	26.40	3.95					

<Table 1> Cost-Effectiveness Test Summary

As a result of its limited review, Staff found no deficiencies or concerns related to Rule 4 CSR 240-22.050.

Staff Expert Witnesses: Hojong Kang Energy Efficiency and Randy Gross Demand Response

⁵⁷ Empire IRP Case no. EO-2013-0547, volume 5, page 5-20

4 CSR 240-22.060 Integrated Resource Analysis

Summary

This rule requires the utility to design alternative resource plans to meet the planning objectives identified in Rule 4 CSR 240-22.010(2), and sets minimum standards for the scope and level of detail required in resource plan analysis and for the logically consistent and economically equivalent analysis of alternative resource plans. This rule also requires the utility to identify the critical uncertain factors that affect the performance of alternative resource plans and establishes minimum standards for the methods used to assess the risks associated with these uncertainties.

One major change to the revised Integrated Resource Analysis and Risk Analysis Rule is that it contains all of the risk analysis which was previously spread between Rule 4 CSR 240-22.060 Integrated Resource Analysis and Rule 4 CSR 240-22.070 Risk Analysis and Strategy Selection. This rule now requires the utility to develop cases for analysis that maximize reliance on energy efficiency and renewable energy resources, and then develop optimal cases. The rule requires the development of alternative resource plans based on normal conditions and also to assess the robustness of each plan under more extreme conditions (high and low cases). The revised rule is less prescriptive, does not specify the analytical methods, and does not require the utility to perform a specific decision tree analysis to evaluate risk. However, it adds the requirement to include performances measures of present worth of utility revenue requirements, with and without any financial performance incentives the utility is planning to request. The proposed rule requires analysis of financial parameters and, if required, describe any changes in legal mandates and cost recovery mechanisms necessary for the utility to maintain an investment grade credit rating, and documentation of the methods, analyses, judgments and data the utility chooses.

Empire did not request any variances to Rule 4 CSR 240-22.060 as a part of this Chapter 22 filing.

Empire developed eighteen (18) alternative resource plans, sixteen (16) of which included demand-side resources and supply-side resources to meet Empire's load forecasts, and renewable resources to meet the legal mandates of Proposition C.⁵⁸ Two alternative resource plans, Plan 11 and Plan 18, contained no DSM. Each alternative resource plan was analyzed

⁵⁸ Title XXV, Chapter 393 RSMo, Sections 393.1020, 393.1025, and 393.1030.

through integrated resource analysis as required by this rule to calculate values for specified performance measures.⁵⁹ The Midas[®] model⁶⁰ was used for the integrated resource analysis.

The base assumptions for all of the alternative resource plans are:

- The Base Plan applied the existing Empire resources and RAP DSM, but included no new renewables beyond Empire's current wind resources;
- Carbon costs for DSM screening were not included;
- The installation of natural gas-fired, aero-derivative combustion turbines in 50-MW increments beginning in 2027, adding a second in 2031, and a third in 2032;
- Distributed generation capacity of 5 MW in 2032;
- Wind PPAs were allowed to expire in 2029 and 2031; and
- RAP DSM beginning at 6 MW in 2013 was employed throughout the planning period, increasing to 47.6 MW by 2032.⁶¹

The eighteen (18) alternative resource plans are:

- (Plan 1) Base Plan (all resources)
- (Plan 2) Base Plan (meets RES)-Preferred Plan
- (Plan 3) Moderate Environmental (Higher avoided costs)
- (Plan 4) High Environmental (Highest avoided costs)
- (Plan 5) Base Assumptions (RAP + DSM)
- (Plan 6) Base Assumptions (RAP ++ DSM)
- (Plan 7) Moderate DSM (1% savings by 2015)
- (Plan 8) Aggressive DSM (2% savings by 2020)
- (Plan 9) MEEIA level DSM (Designed to meet MEEIA savings goals)
- (Plan 10) Aggressive Capacity DSM (Only DSM utilized to meet future capacity goals)
- (Plan 11) Base Assumptions (No DSM)
- (Plan 12) Base Assumptions-RAP DSM (55% of RAP participation)
- (Plan 13) High Fuel (Base Portfolio RAP)
- (Plan 14) Low Fuel (Base Portfolio RAP)
- (Plan 15) High Load (Base Portfolio RAP)
- (Plan 16) Low Load (Base Portfolio RAP)
- (Plan 17) High Fuel No Future Coal (Base Portfolio RAP)
- (Plan 18) No DSM Aggressive Renewable

⁵⁹ See 4 CSR 240-22.060(2).

⁶⁰ Empire utilizes two models for the integrated resource analysis, the Midas Gold and Capacity Expansion Model. The Midas Gold models the utility's financial statements and revenue requirements and the Capacity Expansion Model integrates additional supply side resources as needed.

⁶¹ Page 31 of Volume 1 of the Filing includes: "The demand-side inputs were supplied to Ventyx from AEG. Ventyx developed load shapes for distributing energy savings for the integration modeling. The demand-side programs are essentially a modification to the load forecast inputs. The Capacity Expansion Model (CEM) did not optimize demand-side resources. CEM optimized supply-side resources around the demand-side resources modified load."

All plans are modeled with Midas Gold and the Capacity Expansion Model[®] to determine their PVRR and other annual performance measures for the base case. This is referred to as deterministic runs.⁶² The plans are then subjected to decision analysis and risk analysis by applying critical uncertain factors – through a decision tree analysis – of each plan. This is referred to as stochastic runs.⁶³ The following table shows the general description and subjective probabilities for Empire's critical uncertain factors that are applied to each plan.



The stochastic runs generated 54 endpoints or branches for each of the eighteen (18) alternative resource plans for a total of 972 endpoints or branches. The results were used to develop risk profiles and tornado charts for all alternative resource plans.⁶⁴ Cumulative weights were then calculated and applied to each of the branches of the decision tree to allow for the calculation of the deterministic and stochastic PVRR for each alternative resource plan as shown in the following chart:

⁶² Deterministic runs are used to determine the present value of revenue requirement before critical uncertain factors or a decision tree is applied.

⁶³ A stochastic process is one whose behavior is non-deterministic, in that a system's subsequent state is determined both by the process' predictable actions and by a random element.

⁶⁴ Tornado charts are found in Vol. 6-.164, Figure 6-144 through Vol. 6-173, Figure 6-161. The risk profiles are found in Vol. 6-174, Figure 6-163



Finally the cumulative probability distributions – also known as risk profiles – were developed for each alternative resource plan and are shown in the following chart:

Risk Profiles 2013 - 2032



In its limited review of Empire's integrated resource analysis, Staff found no deficiencies or concerns regarding compliance with 4 CSR 240-22.060.

Staff Expert Witnesses: Matthew J. Barnes

4 CSR 240-22.070 Risk Analysis and Strategy Selection

Summary

This rule requires the utility to select a preferred resource plan, develop an implementation plan, and officially adopt a resource acquisition strategy. The rule also requires the utility to prepare contingency plans and evaluate the demand-side resources that are included in the resource acquisition strategy.

The revised Resource Acquisition Strategy Selection Rule requires an evaluation of demand-side programs, demand-side rates and load building programs in the strategy selection process, and clarifies the requirement to identify and develop implementation plans and

contingency resource plans. The rule provides some flexibility in choosing the preferred plan, but requires the selection process for the preferred resource plan to be documented, including the relative weights given to various performance measures and the tradeoffs between competing plan objectives. The rule provides additional flexibility to exercise judgment when satisfying the policy objectives of Chapter 22, but also requires investments in advanced transmission and distribution technologies, includes demand-side programs that meet legal mandates and includes sufficient resources to serve load forecasted under extreme weather conditions. The rule now requires the utility to officially adopt a preferred resource plan, contingency resource plans and resource acquisition strategy, including specific information to describe the implementation plan.

The Filing identifies Plan 2 (pursue RAP level DSM, install three natural gas-fired combustion turbines in 50 MW increments with the first in 2027, the second in 2031, and the third in 2032; add 5 MW of distributed generation in 2031, add 100 MW of wind PPAs in 2029, and increase wind PPAs to 300 MW in 2031), as Empire's adopted preferred resource plan with a 20-year PVRR⁶⁵ equal to \$7,365 million. However, at least two other alternative resource plans (Plan 11 and Plan 12) have lower long-run utility costs (20-year PVRR). Plan 11 meets future capacity needs with no DSM and only conventional supply-side resources (four (4) natural gas-fired combustion turbines in 50 MW increments each in 2024, 2028, 2030, and 2031) and wind PPAs to meet RES requirements. Plan 12 meets future capacity needs with DSM at 55% of RAP and two (2) natural gas-fired combustion turbines in 50 MW increments each in 2025, 2029 and one (1) 100 MW increment in 2032, and wind PPAs to meet RES requirements.

Pages 35 – 36 of Volume 1 of the Filing describes and documents Empire's strategy selection process:

Plan 11 (No DSM), Plan 12 (RAP minus DSM) and Plan 2 (RAP DSM) are all very close with regard to PVRR. More specifically, Empire looked at the difference in the 20-year PVRR among these plans and found that they were within 1% of each other. On a 40-year PVRR basis, the plans are all within 0.5% of each other. With all of the assumptions and future unknowns in an IRP process, the PVRR of these three plans can be judged to be nearly identical for preferred plan selection purposes. Additionally, these plans have similar rate impacts and similar risk profiles. . . . Therefore, considering all of the preferred plan selection criteria, and attempting to strike a balance over all of the planning objectives, Empire has selected Plan 2 with the RAP DSM level as the preferred plan. Plan 12 (RAP minus DSM) – which contains the same demand-side programs, but lower customer participation levels to account for demand-side

⁶⁵ Net present value of revenue requirements

load impact uncertainty – and Plan 11, which contains no DSM, are considered contingency plans depending on the outcome of Empire's upcoming MEEIA filing.

Plan 2 contains the DSM portfolio that AEG screened as the realistic achievable potential (RAP) for Empire. Having some level of DSM with appropriate cost recovery increases resource diversity, is aligned with state energy policy and offers a better hedge against future environmental uncertainty as compared to a plan with no DSM.

Because Empire did not use minimization of present worth of long-run utility costs as the only selection criterion when choosing its adopted preferred resource plan as required by 4 CSR 240-22.010(2)(B), Empire is required to explicitly identify and, where possible, quantitatively analyze other considerations which are critical to meeting the fundamental objective of the resource planning process, but which may constrain or limit the minimization of the present worth of expected utility costs. Further, Empire is required to describe and document the process and rationale used by the decision-makers to assess the tradeoffs and determine the appropriate balance between minimization of expected utility costs and these other considerations in selecting the preferred resource plan and developing the resource acquisition strategy including, but not limited to, mitigation of:

- 1. Risks associated with critical uncertain factors that will affect the actual costs associated with alternative resource plans;
- 2. Risks associated with new or more stringent legal mandates that may be imposed at some point within the planning horizon; and
- 3. Rate increases associated with alternative resource plans.

Further, Empire's strategy selection process on pages 35 – 36 of Volume 1 of the Filing suggests that other considerations its decision-makers used in selecting the preferred resource plan included:

- 1. Alignment with state energy policy contained in MEEIA; and
- 2. Hedge against future environmental uncertainty.

Empire's resource acquisition and strategy selection process is documented on pages 35 – 36 of Volume 1 of the Filing. Empire did not comply with the requirements of Rule 4 CSR 240-22.070(1) and Rule 4 CSR 240-22.010(2)(C), because it did not:

- Identify all constraints to using long-run utility costs (PVRR) as the only selection criterion when selecting its adopted preferred resource plan to comply with 4 CSR 240-22.010(2)(C);
- 2. Quantitatively analyze other considerations which are critical to meeting the fundamental objective of the resource planning process, but which may constrain or limit the minimization PVRR to comply with 4 CSR 240-22.010(2)(C); and
- 3. Describe and document the process used to select the preferred resource plan, including the relative weights given to the various performance measures and the rationale used by utility decision-makers to judge the appropriate tradeoffs between competing planning objectives and between expected performance and risk.

For example, part of Empire's rationale for selecting Plan 2 includes: "Plan 2 contains the DSM portfolio that AEG screened as the realistic achievable potential (RAP) for Empire. *Having some level of DSM with appropriate cost recovery increases resource diversity, is aligned with state energy policy and offers a better hedge against future environmental uncertainty as compared to a plan with no DSM.*"⁶⁶ (Emphasis added). However, Empire did not quantitatively analyze this constraint which it considered critical to meeting the fundamental objective of Chapter 22. Had Empire quantitatively analyzed this constraint, it would have realized, as demonstrated below, that based upon its own integrated resource analysis, Plan 2 does not provide any material *hedge against future environmental uncertainty as compared to a plan with no DSM*. Following is a summary of Staff's quantitative analysis of this issue which demonstrates that Plan 2 does not provide a benefit in the high CO₂ regulations scenario.

⁶⁶ See page 36 of Volume 1 of the Filing.



The different scenarios are defined in the table and the decision tree below:

Scenario	Market Prices /Fuel Prices	Environment	Load	Capital /Transmission /Interest	PVRR (\$ Millions)	Probability of Occurring
BBBB	Base	Base	Base	Base	\$65	8.75%
Risk Adjusted	High/Base/Low	High/Base/Low	High/Base/Low	High/Base	\$44	Expected
нннн	High	High	High	High	(\$19)	0.23%
BHBB	Base	High	Base	Base	\$46	1.75%



For the four scenarios for which Staff quantified the PVRRs of Plan 2 and Plan 11, only in the HHHH scenario does Plan 2 have a lower PVRR than Plan 11, and then Plan 2 has a PVRR which is only \$19 million lower than Plan 11. However, the probability of the HHHH scenario occurring is only 0.23%.

As a result of its limited review, Staff found two deficiencies in the Filing concerning 4 CSR 240-22.070 Resource Acquisition and Strategy Selection.

Deficiencies

Deficiency 4 – Empire's resource acquisition strategy selection process is not compliant with Rules 4 CSR 240-22.070(1) and 4 CSR 240-22.010(2)(C), because Empire did not: a) explicitly identify and, where possible, quantitatively analyze considerations other than [what?] which are critical to meeting the fundamental objective of the resource planning process; and b) describe and document the process used to select the preferred resource plan, including the relative weights given to the various performance measures and the rationale used by utility decision-makers to judge the appropriate tradeoffs between competing planning objectives and between expected performance and risk.

Deficiency 5 – The Filing does not comply with Rule 4 CSR 240-22.070(2) concerning analysis and specification of ranges of critical uncertain factors for the adopted preferred resource plan.

To remedy Deficiency 1, Concern A, Deficiency 4 and Deficiency 5 to comply with 4 CSR 240-22.010(2) and 4 CSR 240-22.070(1) and (2), Empire should perform the following work and activities for its future Chapter 22 annual update filings and triennial compliance filings :

- 1. To comply with 4 CSR 240-22.010(2)(C), describe and document the process used to explicitly identify, and where possible, quantitatively analyze any and all other considerations/constraints which are critical to meeting the fundamental objective of the resource planning process, but which may constrain or limit the minimization of the present worth of expected utility costs (PVRR) as the only selection criterion when choosing its adopted preferred resource plan;
- 2. To comply with 4 CSR 240-22.070(1), describe and document the process used to select the preferred resource plan, including the relative weights given to the various performance measures and the rationale used by utility decision-makers to judge the appropriate tradeoffs between competing planning objectives and between expected performance and risk. Should the Company not use

minimization of the present worth of long-run utility costs as the only selection criterion when choosing its adopted preferred resource plan, then Empire should utilize a decision scorecard. Exhibit 1 is an example of a decision scorecard prepared by Staff with information and quantitative analysis contained in the Filing; and

3. To comply with 4 CSR 240-22.070(2), describe and document the ranges or combination of outcomes for the four current critical uncertain factors that define the limits within which the adopted preferred resource plan is judged to be appropriate. Empire should also consider identification of the outcome of its MEEIA filing as an uncertain factor, because the outcome of its MEEIA filing directly effects which plan is preferred.

Concerns

Concern C – Using Empire's 2013 – 2015 RAP DSM programs measures and resulting energy and demand savings as the 3-year program plan in its MEEIA Application will result in inflated estimates of energy and demand savings in the MEEIA Application, because this approach will not accurately account for the timing of changes in equipment, lighting and appliance standards.

To remedy this concern, Empire should address this issue with its stakeholders during the technical conference(s) for its MEEIA case in File No. EO-2014-0030. Staff Expert Witnesses: David Roos and John Rogers

<u>4 CSR 240-22.080 Filing Schedule and Requirements</u>

Summary

This rule specifies the requirements for electric utility filings to demonstrate compliance with the provisions of Chapter 22. The purpose of the compliance review required by Chapter 22 is not Commission approval of the substantive findings, determinations, or analyses contained in the filing. The purpose of the compliance review required by Chapter 22 is to determine whether the utility's resource acquisition strategy meets the requirements of Chapter 22. However, if the Commission determines that the filing substantially meets these requirements, the Commission may further acknowledge that the preferred resource plan or resource acquisition strategy is reasonable in whole, or in part, at the time of the finding. This rule also establishes a mechanism for the utility to solicit and receive stakeholder input to its resource planning process.

The revised Filing Schedule, Filing Requirements and Stakeholder Process Rule establish a filing deadline for all electric utilities on April 1 of each year. A triennial compliance filing is due every third year with more informal annual update filings during the years between the full triennial compliance filings. The annual updates are coupled with a stakeholder workshop to communicate changing conditions and utility plans and to seek comments and suggestions from stakeholders during the planning process. Preliminary plans are reviewed with stakeholders to receive input regarding potential concerns and deficiencies. However, once plans are filed, stakeholders again have the opportunity to identify potential concerns and deficiencies. The Commission, with input from stakeholders, will identify special contemporary issues each year for each utility to analyze during its planning process. To make the resource planning process more meaningful, the revised rule requires action from the utility if its business plan or acquisition strategy becomes inconsistent with the latest adopted preferred resource plan filed by the utility. The revised rule also requires certification that any request of action from the Commission is consistent with the utility's adopted preferred resource plan.

On February 28, 2013, Empire filed its Application for Waiver/Extension in File No. EO-2013-0405 requesting that the Commission grant variances from Commission Rules 4 CSR 240-22.080(1)(B) and 4 CSR 240-22.080(5)(A) and extend the date for filing its 2013 IRP until July 1, 2013. On March 30, 2013, the Commission issued its *Order Granting Waiver and Extension of Time* extending the filing date of Empire's 2013 IRP until July 1, 2013.

Empire's July 1, 2013 Filing did not include a letter of transmittal expressing commitment to the approved preferred resource plan and resource acquisition strategy signed by an officer of the utility having the authority to bind and commit the utility to the resource acquisition strategy. Following Staff's urging, Empire made a supplemental filing on October 11, 2013, in File No. EO-2013-0547, to comply with the requirements of 4 CSR 240-22.080(2)(A).

As a result of its limited review, Staff has identified no deficiencies or concerns related to 4 CSR 240-22.080 Filing Schedule, Filing Requirements, and Stakeholder Process. *Staff Expert Witnesses: John Rogers*

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Exhibit 1

Is Deemed

Highly Confidential

In Its Entirety

OF THE STATE OF MISSOURI

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In the Matter of The Empire District Electric Company's 2013 Triennial Compliance Filing Pursuant to 4 CSR 240-22

Case No. EO-2013-0547

AFFIDAVIT OF DAVID C. ROOS

STATE OF MISSOURI)) ss COUNTY OF COLE)

David C. Roos, of lawful age, on his oath states: that he has participated in the preparation of the foregoing Staff Report in pages $\frac{18-20}{18-20}$; that he has knowledge of the matters set forth in such Report; and that such matters are true to the best of his knowledge and belief.

David C Roos

and

Subscribed and sworn to before me this $\mathcal{L}^{\mathcal{N}}$ day of December, 2013.

SUSAN L. SUNDERMEYER Notary Public - Notary Seal State of Missouri Commissioned for Callaway County My Commission Expires: October 03, 2014 Commission Number: 10942086

Notary Public

OF THE STATE OF MISSOURI

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)

In the Matter of The Empire District Electric Company's 2013 Triennial Compliance Filing Pursuant to 4 CSR 240-22

Case No. EO-2013-0547

AFFIDAVIT OF MATTHEW J. BARNES

STATE OF MISSOURI)) ss COUNTY OF COLE)

.

Matthew J. Barnes, of lawful age, on his oath states: that he has participated in preparation of the foregoing Staff Report in pages 34-38; that he has knowledge of the matters set forth in such Report; and that such matters are true to the best of his knowledge and belief.

Subscribed and sworn to before me this 2^{nd} day of December, 2013.

Notary Public

SUSAN L. SUNDERMEYER Notary Public - Notary Seal State of Missouri Commissioned for Callaway County My Commission Expires: October 03, 2014 Commission Number: 10942086

OF THE STATE OF MISSOURI

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In the Matter of The Empire District Electric Company's 2013 Triennial Compliance Filing Pursuant to 4 CSR 240-22

Case No. EO-2013-0547

AFFIDAVIT OF RANDY S. GROSS

STATE OF MISSOURI)) ss COUNTY OF COLE)

Randy S. Gross, of lawful age, on his oath states: that he has participated in the preparation of the foregoing Staff Report in pages 20-25, 27-28, 32-33; that he has knowledge of the matters set forth in such Report; and that such matters are true to the best of his knowledge and belief.

Randy S. Gross

Subscribed and sworn to before me this 2^{nd} day of December, 2013.

SUSAN L. SUNDERMEYER Notary Public - Notary Seal State of Missouri Commissioned for Callaway County My Commission Expires: October 03, 2014 Control as the obset 10942086

Notary Public

OF THE STATE OF MISSOURI

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In the Matter of The Empire District Electric Company's 2013 Triennial Compliance Filing Pursuant to 4 CSR 240-22

Case No. EO-2013-0547

AFFIDAVIT OF JOHN A. ROGERS

STATE OF MISSOURI)) ss COUNTY OF COLE)

.

John A. Rogers, of lawful age, on his oath states: that he has participated in the preparation of the foregoing Staff Report in pages $\frac{1-18}{38-45}$; that he has knowledge of the matters set forth in such Report; and that such matters are true to the best of his knowledge and belief.

John A. Rogers

Subscribed and sworn to before me this 2^{M} day of December, 2013.

SUSAN L. SUNDERMEYER Notary Public - Notary Seal State of Missouri Commissioned for Callaway County My Commission Expires: October 03, 2014 Commission Number: 10942086

Notary Public

OF THE STATE OF MISSOURI

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In the Matter of The Empire District Electric Company's 2013 Triennial Compliance Filing Pursuant to 4 CSR 240-22

Case No. EO-2013-0547

AFFIDAVIT OF DANA E. EAVES

STATE OF MISSOURI)) ss COUNTY OF COLE)

Dana E. Eaves, of lawful age, on his oath states: that he has participated in the preparation of the foregoing Staff Report in pages 25-26; that he has knowledge of the matters set forth in such Report; and that such matters are true to the best of his knowledge and belief.

Dana E. Caul Dana E. Eaves

Subscribed and sworn to before me this 2^{4} day of December, 2013.

SUSAN L. SUNDERMEYER Notary Public - Notary Seal State of Missouri Commissioned for Callaway County My Commission Expires: October 03, 2014 Commission Number: 10942086

Junder Notary Public

OF THE STATE OF MISSOURI

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In the Matter of The Empire District Electric Company's 2013 Triennial Compliance Filing Pursuant to 4 CSR 240-22

Case No. EO-2013-0547

AFFIDAVIT OF HOJONG KANG

STATE OF MISSOURI)) ss COUNTY OF COLE)

Hojong Kang, of lawful age, on his oath states: that he has participated in the preparation of the foregoing Staff Report in pages 27-33; that he has knowledge of the matters set forth in such Report; and that such matters are true to the best of his knowledge and belief.

ojong Kang

Subscribed and sworn to before me this \bigcirc day of December, 2013.

SUSAN L. SUNDERMEYER Notary Public - Notary Seal State of Missouri Commissioned for Callaway County My Commission Expires: October 03, 2014 Commission Lember: 10942086 Commissi

Notary Public