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Exhibit No. 600 Service Issue: Rate Design – RTP Tariff Witness: Robert Janssen Sponsoring Party: Dogwood Energy, LLC Type of Exhibit: Rebuttal Testimony Case No. ER-2018-0146

BEFORE THE MISSOURI PUBLIC SERVICE COMMISSION

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In the Matter of KCP&L Greater Missouri Operations Company's Request for Authority To Implement a General Rate Increase for Electric Service

File No. ER-2018-0146

REBUTTAL TESTIMONY – RATE DESIGN

OF ROBERT JANSSEN ON BEHALF OF

DOGWOOD ENERGY, LLC

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ATTORNEYS FOR DOGWOOD ENERGY, LLC

August 7, 2018

PUBLIC

Доднов Exhibit No. 600 Date 10/3/18 Reporter J File No. <u>ER-2018-014</u>ь

DISTRICT OF COLUMBIA

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BEFORE THE MISSOURI PUBLIC SERVICE COMMISSION

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In the Matter of KCP&L Greater Missouri **Operations Company's Request for Authority** To Implement a General Rate Increase for **Electric Service**

File No. ER-2018-0146

AFFIDAVIT OF ROBERT JANSSEN

COMES NOW Robert Janssen, of lawful age, sound of mind and being first duly sworn, deposes and states:

My name is Robert Janssen; I am Vice President of Dogwood Energy, 1. LLC.

Attached hereto and made a part hereof for all purposes is my Rebuttal 2. Testimony in the above-referenced case.

I hereby swear and affirm that my statements contained in the attached 3. testimony are true and correct to the best of my knowledge, information and belief.

Robert Janssen

SUBSCRIBED AND SWORN to before me, a Notary Public, this 64/ day fust , 2018, of

My Commission Expires: (SEAL)

LYNN L. SHEELER NOTARY PUBLIC STATE OF MARYLAND My Commission Expiner June 27, 2020

REBUTTAL TESTIMONY OF ROBERT JANSSEN ON BEHALF OF DOGWOOD ENERGY, LLC

1 I. QUALIFICATIONS

- 2 Q. Please state your name, business address, and title.
- A. My name is Robert Janssen. My business address is 6700 Alexander Bell Drive,
 Suite 360, Columbia, MD 21046. I am the Vice President and Chief Commercial
 Officer of Dogwood Energy, LLC ("Dogwood Energy").

6 Q. On whose behalf are you testifying?

A. I am testifying on behalf of Dogwood Energy, which is a limited liability
company organized and existing under the laws of the State of Delaware and
authorized to conduct business in the State of Missouri.

10 Q. Please describe your educational background and professional experience.

11 A. I have attached a copy of my resume as Schedule RJ-1, which outlines my 12 relevant background and experience. In brief, my experience includes: (a) 13 development and management of generating facilities, (b) analysis of electricity 14 markets and transmission systems, (c) analysis of, and development of testimony 15 regarding, utility rates and other electric industry issues before federal and state 16 regulatory commissions, (d) due diligence analysis of power purchase agreements 17 and fuel contracts, (e) financial analysis of utility and independent power

- 1 producer assets such as power plants and water supply systems, and (f) 2 monitoring and reviewing the results of power supply Requests for Proposals. What are your responsibilities? 3 Q. In my current position, I am responsible for the commercial, regulatory and 4 Α. 5 legislative aspects of Dogwood Energy's ownership interest in the Dogwood 6 facility. As Dogwood Energy's primary representative on the co-owners' 7 Management Committee and a member of the Executive Committee, I also provide direction to Dogwood Power Management on the operations and 8 maintenance of the Dogwood facility, along with the representatives of the other 9 10 co-owners. 11 Have you testified in other regulatory proceedings regarding electric utility Q. 12 rates and electric industry issues? Yes, I have submitted written testimony in other proceedings before this 13 A. Commission as well as proceedings before the Federal Energy Regulatory 14
- Corporation Commission, the Public Service Commission of Wisconsin, the City 16 Council of New Orleans, and the Public Utility Commission of Texas. 17

Commission, the Louisiana Public Service Commission, the Oklahoma

18

15

II. PURPOSE AND SUMMARY OF TESTIMONY

19 Q. What is the purpose of your testimony?

The purpose of my testimony is to respond to certain aspects of the direct 20 Α.

testimony submitted by KCP&L Greater Missouri Operations ("GMO") regarding
 its tariffs and rates applicable to the Dogwood generation facility and to describe
 Dogwood Energy's interests in this proceeding as a co-owner of the Dogwood
 facility (as described below), which is both a retail power customer of GMO and
 wholesale power supplier to, and competitor of, GMO.

6 Q. Please summarize your testimony.

Dogwood's payments to GMO for retail electricity service are a significant 7 A. portion of its fixed operating costs. GMO proposes to cancel its Real Time 8 Pricing ("RTP") tariff, in part based on the erroneous assertion in its testimony 9 that there are no customers being served pursuant to this frozen tariff. GMO's 10 11 suggested alternative tariff rate would more than double Dogwood's costs for 12 electricity from GMO. Due to the nature of Dogwood's operations, which is the production of electricity, its use of energy from GMO for station power service is 13 not coincident with the peak loads of GMO's system. As a result, Dogwood's 14 operations are consistent with the intended purposes of the RFP tariff, and do not 15 contribute significantly to GMO's costs of service. Non-utility generating 16 facilities similar to Dogwood have access to real time pricing for station power 17 use in other parts of the country. An unjustified increase in Dogwood's costs for 18 station power service from GMO would unreasonably subject the Dogwood 19 facility to a competitive disadvantage and would result in unjust and unreasonable 20 rate increases to the customers of the municipal utility's co-owners of the 21 Dogwood facility in Missouri and Kansas. As result, at the very least, GMO's 22

1		proposal to cancel the RTP tariff should be deferred so that the parties can work	
2		on alternative solutions.	
3	Q.	Does Dogwood Energy present testimony in addition to yours?	
4	A.	Yes. Mr. Greg Meyer of Brubaker and Associates is also submitting testimony	
5		that elaborates on many of the concepts discussed herein.	
6			
7	III. DOGWOOD ENERGY AND THE DOGWOOD ENERGY FACILITY		
8			
9	Q.	What is the relationship between Dogwood Energy and the Dogwood Energy	
10		Facility?	
11	А.	Dogwood Energy owns a minority share of a 650 MW natural gas-fired,	
12		combined cycle generating facility known as the Dogwood Energy Facility (and	
13		commonly referred to as "Dogwood", including herein) located in GMO's	
14		Missouri service territory, in Pleasant Hill, Missouri. ¹ Dogwood Power	
15		Management, a subsidiary of Dogwood Energy, operates the Dogwood facility on	
16	ı	behalf of the co-owners of the facility as their agent. Dogwood Energy currently	
17		owns the largest individual share of the facility at 34%.	
18	Q.	Who are the other owners of the Dogwood facility?	
19	A.	Municipal utilities and power authorities serving retail customers in Missouri and	
20		Kansas own 66% of the Dogwood facility. In Missouri, the City of Independence	

 $^{^1}$ This facility was formerly owned by Calpine and known as the Aries facility. Dogwood Energy acquired it at the end of 2006.

1		and the thirty-five cities that are members of the Missouri Public Energy Pool
2		("MoPEP") are owners of Dogwood with a 29% ownership share in total. In
3		Kansas, the Unified Government of Wyandotte County and Kansas City, twenty-
4		four cities that are members of the Kansas Power Pool, and five cities that are
5	-	members of the Kansas Municipal Energy Agency, own 37% of Dogwood in
6		total.
7		
8	r	V. DOGWOOD'S OPERATIONS AND USE OF STATION POWER
9		
10	Q.	What is Dogwood Energy's interest in this proceeding?
11	Α.	First, the Dogwood facility is a retail electricity customer of GMO. When
12		Dogwood is offline and not producing electricity, it takes electric service from
13		GMO for station power service purposes, which is electric energy used for
14		operating the equipment necessary for the process of generating electricity,
15		primarily pumps and motors, and to meet the electrical requirements of
16		administrative buildings at the site.
17		
18		Second, Dogwood is both a potential power supplier to, and a competitor of,
19	·	GMO in the wholesale power market. Dogwood Energy wants to ensure that it
20		and the other co-owners of the Dogwood facility have a fair and competitive
21		opportunity to supply power to GMO and others through the facility.
22	Q.	Please describe how Dogwood takes station power service from GMO.

A. Dogwood takes station power service from GMO across its three 161kV
 interconnections with GMO's transmission facilities at the Pleasant Hill
 substation. Dogwood currently takes service under GMO's Large Power Service
 ("LPS") – Real Time Pricing ("RTP") tariff (MO737). Dogwood's payments for
 retail electrical service from GMO are a significant component of its annual fixed
 operating costs.

7 Q. Please describe how Dogwood operates in the market.

GMO, as a member of the Southwest Power Pool ("SPP") Regional Transmission 8 A. Organization ("RTO"), has placed its transmission facilities under SPP's Open 9 Access Transmission Tariff ("OATT") and transferred functional control of such 10 facilities over to SPP. Like other generating facilities in SPP, Dogwood is 11 deployed by SPP for Day Ahead commitment and Real-Time dispatch for both 12 energy and ancillary services, based on the prices for such services offered by 13 Dogwood. Thus, Dogwood competes with other generation resources in SPP, 14 including GMO's, to supply energy economically to wholesale consumers within 15 SPP. The three 161kV transmission interconnections mentioned above are also 16 the points (together called Dogwood's market "node") at which SPP prices the 17 electrical energy generated by Dogwood for transactions in SPP's Day-Ahead and 18 Real-Time energy and ancillary services markets. 19

20

Electricity prices in SPP's energy and ancillary services markets are set by supply and demand and are influenced by constraints in the transmission system as SPP

attempts to balance the demand (load) with the available supply (generating 1 resources). The calculations required to run the SPP market are complex. 2 However, some general rules of thumb are applicable to most of the results of the 3 As a highly efficient, natural gas-fired, combined-cycle market system. 4 generating facility, Dogwood is typically deployed by SPP on a day-to-day basis 5 to operate when the regional and/or local electrical loads in the SPP system 6 cannot be economically met by the nuclear, coal-fired, and wind resources in the 7 system. Dogwood can also cycle down or offline overnight and then return to 8 full output quickly the next day, which makes it valuable to the SPP system in 9 following daily changes in both load and the output of wind resources in the 10 11 region.

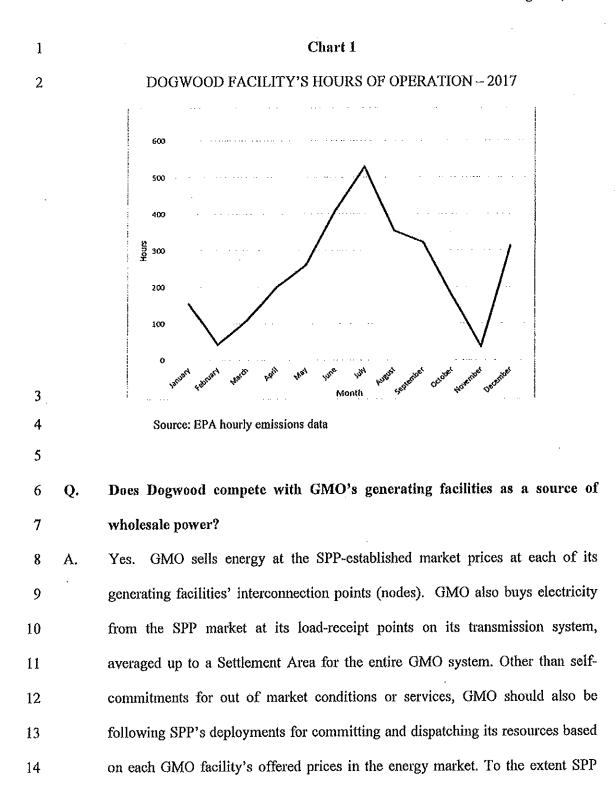
12

Because the electrical load of the SPP system, including the load of the individual 13 utilities (like GMO) in it, is summer peaking, SPP market prices are typically 14 highest during summer months. As a result, Dogwood typically operates the most 15 during the summer peak season, producing electricity and ancillary services that 16 the co-owners of the Facility sell to the SPP market at Dogwood's node. During 17 the spring and fall months, loads are lower and wind resource output is higher 18 than during the summer, and SPP market prices are typically lower. At these 19 times, Dogwood may operate less and cycle offline more often, depending in part 20 on the level of scheduled outages of other generating facilities in SPP. Dogwood 21 also typically takes its own brief, scheduled outages in the spring and fall months 22

to ensure that it is ready to operate reliably and efficiently during the summer and 1 winter months. During the winter, SPP's system load peaks at a lower level of 2 roughly 85% of its summer season peak. As a result, Dogwood is typically called 3 to operate less often during the winter months than during the summer period, 4 5 though it does typically operate when the weather gets cold enough that load is increasing toward its winter peak, wind resource generation drops off, and/or the 6 outputs of other generating facilities are reduced due to cold weather-related 7 operational issues. 8

9

10 To visually depict the typical operations that I describe above, the following chart 11 shows Dogwood's monthly hours of operation during 2017.



commits and dispatches Dogwood rather than GMO's units, it should be because
 deploying Dogwood is more cost effective than deploying those GMO units,
 which should then be reflected in lower prices at which GMO's load purchases
 energy from the SPP market.

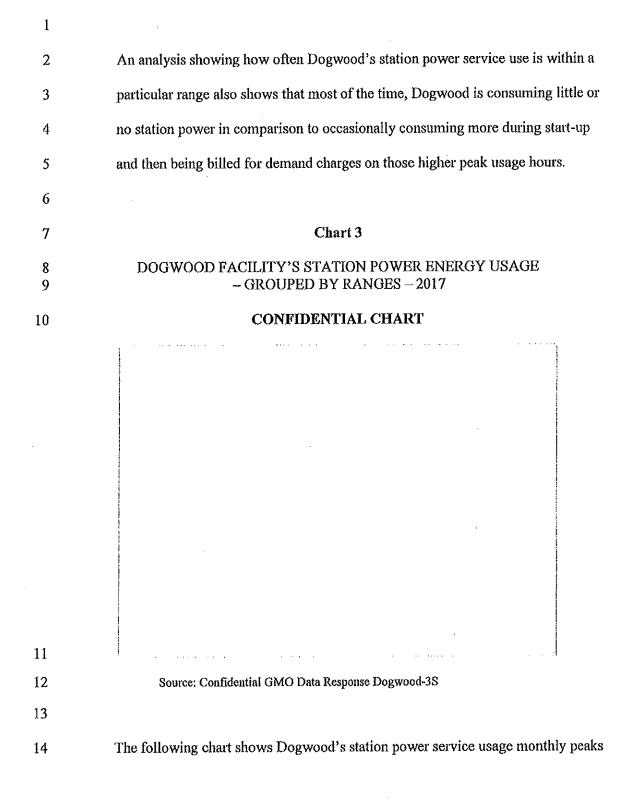
5 Q. How do Dogwood's operations relate to GMO's peak load?

Dogwood's operations are price-responsive, and price correlates to the level of б Α. loads both locally and regionally in SPP. Dogwood has station power needs when 7 it is not actually producing power. This station power supports Dogwood's ability 8 9 to produce power and provide reliable service. These station power needs increase during the start-up process as pumps and motors activate and Dogwood gets ready 10 to produce power. Once Dogwood is operating and generating power, it no longer 11 needs service from GMO because the energy it produces exceeds its own station 12 power needs and it dispatches to the transmission grid on a net production basis. 13 Dogwood's operations must commence in anticipation of load, so it typically does 14 not consume power from GMO during the summer days when GMO's own load 15 is hitting its monthly peaks. Hence, Dogwood's station power service use under 16 the RTP tariff is non-coincident with GMO's peak loads and does not contribute 17 significantly to GMO's fixed/demand costs. 18

19

20 The following chart shows how Dogwood's use of energy from GMO for station 21 power service drops off during the summer in terms of monthly MWh 22 consumption.

1	Chart 2		
2	DOGWOOD FACILITY'S STATION POWER ENERGY USAGE - 2017		
3	CONFIDENTIAL CHART		
4			
5	Source: Confidential GMO Data Response Dogwood-3S		
6			
7	The chart above shows that during the peak summer months, Dogwood averages		
8	around **** MWh per hour of station power consumption for the entire		
9	month. During the winter months, Dogwood's usage increases to around ****		
10	**** MWh for the entire month. In comparison, Dogwood's		
11	average monthly peak demand averaged slightly more than **** MW for		
12	the year based on GMO's billing data for the facility, so most of the time,		
13	Dogwood's station power service needs are much less than its peak requirements		
14	just prior to starting-up the generating units for operation.		



1	and the energy used at the date and time of each of GMO's monthly load peaks		
2	(coincident peaks).		
3			
4	Chart 4		
5 6	DOGWOOD FACILITY'S STATION POWER ENERGY PEAKS AND COINCIDENT PEAKS WITH THE GMO SYSTEM – 2017		
7	CONFIDENTIAL CHART		
8			
9	Source: Confidential GMO Data Response Dogwood-3S and KCPL 2017 FERC Form 1		
10			
11	The difference between Dogwood's coincident peaks and its stand-alone monthly		
12	peak usage shown above demonstrates the point that Dogwood is typically		
13	producing power and not consuming it from GMO for station power service at the		

ĺ		time GMO's load is peaking, particularly during the summer months. In terms of
2		averages, Dogwood's monthly average peak in 2017 was **** MW, and its
3		12-CP average was **** MW, which is only 8.0% of the monthly average
4		peak. Dogwood's 4-CP average was **** MW.
5		
6	v	. REAL TIME POWER TARIFF
7		
8	Q.	What are GMO's current terms of service to Dogwood.
9	A.	Under the RTP tariff rate, Dogwood (and thus its owners), pays GMO for energy
10		at the marginal cost of GMO's own generating units, which often roughly
11		approximates SPP's Day Ahead energy market pricing for the GMO Settlement
12		Area in the SPP Day Ahead market. In addition, Dogwood pays a transmission
13		system loss charge on the energy, plus a mark-up on the marginal energy price.
14		Dogwood also pays a demand charge on both its monthly peak station power
15		energy usage and reactive power peak usage, and a customer charge, in addition
16		to various other tariff fees and taxes. In total, before taxes, Dogwood pays GMO
17		roughly double the cost of the energy it purchases from GMO under the RTP
18		Tariff, which should be more than adequate compensation for any reasonable
19		allocation of GMO's costs to Dogwood based on commonly accepted cost
20		allocation principles, such as a 4-CP or 12-CP analysis. It is also far more than
21		many similarly-situated generating facilities are paying for station power service
22		in other states and regions near Dogwood, based on information I will provide

1 later in my testimony.

2 Q. Did GMO provide the owners of Dogwood any advance notice of the 3 proposal to cancel the tariff under which Dogwood obtains service?

A. No. As noted above, in its testimony GMO asserted that there were no customers.
While it has subsequently admitted that was incorrect, it has not revised that
testimony. Initially, there were limited discussions between GMO and Dogwood
Energy about this situation, as we learned about it during this rate case. More
recently, GMO and Dogwood Energy have begun to engage in constructive
discussions that I hope will result in some reasonable compromise of our
differences in this case regarding the continuation of the RTP tariff rate.

11 Q. Does Dogwood Energy oppose the cancellation of the RTP tariff?

12 A. Yes, Real time pricing has generally worked well to meet the Dogwood facility's 13 mostly off-peak station power service needs, subject to some recent billing issues 14 getting resolved. Real-time pricing works well in other jurisdictions and is the 15 norm for station power service at non-utility generating stations in many parts of 16 the US within a regional energy market structure. Further, in this proceeding, 17 GMO and other parties are emphasizing in testimony the value and necessity of 18 time of use ("TOU") pricing. Eliminating the RTP tariff would be inconsistent 19 with an overall focus on TOU rates. Rather than cancel the RTP tariff, GMO 20 should unfreeze and promote it.

21

22

Moreover, as Mr. Meyer testifies, GMO's proposed alternative to the RTP tariff

1		would more than double Dogwood's electricity costs. Such a result does not seem
2		just and reasonable. I discuss this proposed alternative further below.
3	Q.	Please explain the use of Real Time Pricing for station power service in other
4		parts of the US.
5	A.	Mr. Meyer addresses in his rebuttal testimony the prevalence of RTP rates in
6		other states. To the extent that station power service is considered a retail use of
7		electricity by a state, a non-utility generating facility may take service under such
8		retail tariff rates. In addition, some RTOs have a specific tariff schedule (such as
9		MISO's Schedule 20), that provide rules for generating facilities that purchase
10		their station power service needs at wholesale using real time pricing. MISO
11		Schedule 20 states:
12 13 14 15 16 17 18		for each Hour when a Facility has negative net output and has received Station Power from the Transmission System, Generation Owner will pay the Hourly Real-Time Ex Post LMP at its Bus for that Hour for all of the Energy consumed in accordance with Applicable Laws and Regulations. (See MISO OATT, Schedule 20 – Treatment of Station Power, Section II, 2)
19		The phrase "in accordance with Applicable Laws and Regulations" was intended
20		by MISO to prevent conflict between its Schedule 20 provisions and otherwise
21		applicable state law regarding whether station power is a retail or wholesale
22		consumption of electricity, as referenced by the Federal Energy Regulatory
23		Commission ("FERC") in its order dated May 14, 2012 in Docket No. ER12-1270
24		accepting such amendments to Schedule 20. MISO's OATT is applicable to all or
25		part of fifteen (15) states, including eastern Missouri.

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1	
2	PJM's OATT contains nearly identical language for supply of station power
3	service under Attachment K – Appendix, Section 1 – Market Operations,
4	subsection 1.7.10(d)(i), stating:
5 6 7 8	for each hour when a Market Seller has negative net output and has received Station Power from the Transmission System, it will pay the LMP at its bus for that hour for all of the energy consumed.
9	PJM's OATT is applicable to part or all of thirteen states and the District of
10	Columbia.
11	
12	Outside of the regions covered by MISO and PJM, states like Kansas specifically
13	provide for station power service to be a wholesale rather than retail use of
14	electricity. This enables non-utility generating facilities to purchase their station
15	power service needs at the hourly price of energy from the markets, which would
16	be SPP's markets in the case of Kansas, or a third-party supplier. Kansas statutes
17	specifically state:
18 19	[S]tation power shall not be deemed to be retail electric service,
20	where station power is defined as,
21 22 23 24	[E]lectric energy used for operating equipment necessary for the process of generating electricity at any generating plant (See KSA 66-1,173(b) and 66-1,170(i).)
25	These rules, particularly those in the FERC-jurisdictional OATTs of PJM and

MISO, ensure that non-utility generating facilities are treated similarly and in a 1 non-discriminatory manner in comparison to the way utility-owned generating 2 facilities obtain their station power service from their own fleet of generators. It 3 also recognizes the fact that, unlike other large industrial uses of electricity, 4 generation station power service is for the purpose of making electricity available 5 to the grid. By its nature, generation station power use is price-responsive because 6 the use goes away (i.e. the station starts to serve itself) when electricity prices rise 7 high enough to commit and dispatch the generating facility. 8 Has GMO proposed any alternative to the RTP tariff rate outside of its 9 Q. 10 testimony? Yes, it has suggested a Large Power Service (LPS) arrangement. 11 A. Would LPS be appropriate for Dogwood? 12 Q.

No. The unmodified LPS rate does not provide an appropriate rate structure. The 13 Α. underlying costs would not be allocated in a manner consistent with cost 14 causation, because Dogwood's limited needs for power are typically not 15 coincident with GMO's monthly peaks. These needs certainly are not coincident 16 with GMO's peak loads during the four summer months under a 4-CP cost 17 allocation analysis of GMO's fixed costs of service to Dogwood. Hence, GMO 18 does not need to have additional capacity in place to serve Dogwood's station 19 The resulting unjustified increase in power needs, which are off-peak. 20 Dogwood's costs for station power service from GMO would unreasonably 21 subject Dogwood to a competitive disadvantage. 22

1	Q.	What does Dogwood Energy propose instead of cancelling the RTP tariff?	
2	À.	At the very least, GMO's proposal to cancel the RTP tariff should be deferred so	
3		that the parties can work on alternative solutions. As mentioned above, more	
4		constructive discussions with GMO have started recently. There may be	
5		alternative arrangements that the parties could agree upon, but it may take some	
6		time to fully develop such options.	

7 VI. SUMMARY AND CONCLUSIONS

8 Q. Please summarize your testimony and conclusions.

Dogwood's payments to GMO for retail electricity service are a significant 9 A, portion of its fixed operating costs. GMO proposes to cancel its RTP tariff, in 10 part based on the erroneous assertion in its testimony that there are no customers 11 being served pursuant to this frozen tariff. GMO's suggested alternative tariff 12 rate would more than double Dogwood's costs for electricity from GMO. Due to 13 the nature of Dogwood's operations, which is the production of electricity, its use 14 of energy from GMO for station power service is not coincident with the peak 15 loads of GMO's system. As a result, Dogwood's operations are consistent with 16 the intended purposes of the RFP tariff, and do not contribute significantly to 17 GMO's costs of service. Non-utility generating facilities similar to Dogwood 18 have access to real time pricing for station power use in other parts of the country. 19 An unjustified increase in Dogwood's costs for station power service from GMO 20

1		would unreasonably subject the Dogwood facility to a competitive disadvantage
2		and would result in unjust and unreasonable rate increases to the customers of the
3		municipal utility's co-owners of the Dogwood facility in Missouri and Kansas.
4		As result, at the very least, GMO's proposal to cancel the RTP tariff should be
5		deferred so that the parties can work on alternative solutions.
6	Q.	Do you hold the opinions you express in this testimony to a reasonable degree
7		of certainty based on your experience regarding electrical power generation
8		and transmission markets and facilities?
9	A.	Yes.
0	Q.	Does this conclude your rebuttal testimony?
1	Α.	Yes.

ROBERT J. JANSSEN

6700 Alexander Bell Drive, Suite 360 · Columbia, MD 21046 · (443) 542-5125 · rob.janssen@kelsonenergy.com

SUMMARY OF QUALIFICATIONS

Senior executive energy professional with a technical background and over twenty years of corporate and consulting experience in the electricity and natural gas industries, including power plant management, acquisition, development, and financial analysis; RTO/ISO electricity market analysis, participation, design and monitoring; utility rate analysis and development; and directing state and federal regulatory initiatives.

EXPERIENCE

Kelson Energy, Columbia, MD	October 2005 - Present
Senior Vice President, Kelson and Vice President and Chief	
Commercial Officer, Dogwood Energy	12/14 – Present
Senior Vice President, Kelson and President, Dogwood Energy	/ 10/08 - 12/14
Vice President, Kelson and President, Redbud Energy	6/07 – 9/08
Vice President, Kelson and Vice President, Redbud Energy	2/07 – 6/07
Director, Kelson and Vice President, Redbud Energy	1/06 - 2/07
Director, Kelson	10/05 1/06

Primary Areas of responsibility include:

• Power plant management, operations and maintenance

- NERC reliability standards compliance
- State and Federal regulatory and legislative affairs
- RTO transmission and energy market participation

Southwest Power Pool Committee-level participation on behalf of Kelson Energy subsidiaries:

- Members Committee (Board of Directors), Member
- Strategic Planning Committee, Member
- Corporate Governance Committee, Member
- Markets and Operations Policy Committee, Member and Chair
- Holistic Integrated Tariff Team, Vice Chair
- SPP Integrated Marketplace Go-Live Team, Member
- Synergistic Planning Project Task Force, Member

Boston Pacific Company, Inc., Washington, DC	October 1997 – September 2005
Project Director	10/01 - 9/05
Project Manager	10/98 - 10/01
Senior Consultant	10/97 – 10/98

Consulting practice focusing on three primary areas:

- Power Plant Development, Acquisition and Sale Support
- Electricity Market Analysis, Design and Monitoring
- Expert Testimony and Litigation Support

UGI Utilities, Inc., Reading, PA Commercial Engineer II Industrial & Commercial Marketing Engineer I July 1994 – October 1997 5/96 – 10/97 7/94 – 5/96

Served as a technical expert and program manager for the Industrial and Commercial marketing department. Directed department initiatives, including promotion of natural gas vehicles and natural gas-driven cooling.

EDUCATION

University of Pennsylvania: GPA 3.39 / 4.00 B.S. in Mechanical Engineering with a Minor in Economics

Johns Hopkins University: GPA 4.00 / 4.00

Finance and Accounting Graduate Level Classes:

- Financial Accounting
- Managerial Finance
- Corporate Financial Theory

1990-1994

2000-2002