

JAN 30 2012

BEFORE THE WYOMING PUBLIC SERVICE COMMISSION

IN THE MATTER OF THE APPLICATION)
OF ROCKY MOUNTAIN POWER FOR) Docket No. 20000-400-EA-11
APPROVAL OF A CERTIFICATE OF) (RECORD NO. 12953)
PUBLIC CONVENIENCE AND)
NECESSITY TO CONSTRUCT THE)
SELECTIVE CATALYTIC REDUCTION)
SYSTEM, PULSE JET FABRIC FILTER)
SYSTEM AND RELATED)
ENVIRONMENTAL UPGRADES AT)
NAUGHTON UNIT NO. 3 LOCATED)
NEAR KEMMERER, WYOMING)

REDACTED

DIRECT TESTIMONY OF

Bryce J. Freeman

On behalf of the Wyoming Office of Consumer Advocate

Filed January 30, 2012
Hearing March 19, 2012

1 **Q. PLEASE STATE YOUR NAME, ADDRESS AND OCCUPATION.**

2 A. My name is Bryce J. Freeman. My business address is 2515 Warren Avenue, Suite 304,
3 Cheyenne, WY, 82002. I am the Administrator of the Wyoming Office of Consumer
4 Advocate (OCA). The OCA is an independent consumer advocacy agency that was
5 created by an act of the legislature in the 2003 general session.

6 **Q. WHAT IS THE FUNCTION OF THE OCA?**

7 A. Pursuant to W.S. § 37-2-401,

8 The office of consumer advocate shall represent the interests of Wyoming
9 citizens and all classes of utility customers in matters involving public
10 utilities. In the exercise of its powers the office of the consumer advocate
11 shall consider all relevant factors, including, but not limited to, the
12 provision of safe, efficient and reliable utility services at just and
13 reasonable prices.

14 **Q. ARE THE ANALYSES AND RECOMMENDATIONS OF THE OCA, IN THIS OR**
15 **ANY OTHER CASE BEFORE THE COMMISSION, INFLUENCED OR**
16 **DIRECTED BY THE COMMISSION?**

17 A. No. Although the OCA is a division within the Commission according to W.S. § 37-2-
18 401, it is a separate division with no reporting or supervisory links to the Commission.
19 The OCA has the right under W.S. § 37-2-402(ii) to appeal decisions of the Commission
20 that it does not find in the public interest. The only link between the OCA and the Public
21 Service Commission is the source of common funding provided by the assessment on
22 gross utility operating revenues; this assessment funds both the Commission and the
23 OCA. Additionally, as Administrator of the OCA, I report directly to the Governor of
24 Wyoming.

25 **Q. PLEASE DESCRIBE YOUR EDUCATIONAL BACKGROUND AND**
26 **OCCUPATIONAL EXPERIENCE.**

27 A. I received a Bachelor of Science degree in business administration from the University of
28 Wyoming in 1982. The area of concentration in my undergraduate work was statistics.
29 After graduating from the University of Wyoming, I was employed for three years by the

1 Laramie County Treasurer as Deputy Treasurer, and then for six years by the Wyoming
2 Department of Revenue as a Principal Appraiser dealing primarily with utility valuation
3 and capital cost issues. I came to the Wyoming Public Service Commission in April of
4 1994, in the capacity of Senior Economist, serving in that position for approximately two
5 years. In 1996 I accepted a position as Lead Rate Analyst in the rates and pricing section
6 on the Commission Staff, and in May of 2003 I was appointed Administrator of the
7 OCA.

8 In July of 2004, I was appointed to a two-year term of service on the board of the
9 Wyoming Infrastructure Authority (WIA). In July of 2006, I was reappointed to a four
10 year term and in 2010, I was appointed to a second four year term on the WIA Board. I
11 currently serve as secretary of the WIA Board of Directors. Also in 2004, I was elected
12 to the position of Secretary of the National Association of State Utility Consumer
13 Advocates (NASUCA), which is a national trade association composed primarily of state
14 chartered consumer advocate offices throughout the country. In November of 2010, I
15 stepped down as NASUCA Secretary and currently serve on the NASUCA Executive
16 Committee. My participation in both of these organizations provides me with unique
17 knowledge and experience upon which I can draw in formulating advocacy positions on
18 behalf of Wyoming utility consumers.

19 In 2010, I was appointed by the Board of Directors of the Western Electricity
20 Coordinating Council (WECC) to serve as a consumer representative on the Scenario
21 Planning Steering Group (SPSG). The SPSG was created to facilitate the development
22 of a Regional Transmission Expansion Plan (RTEP) pursuant to a contract that WECC
23 entered into with the U.S. Department of Energy (DOE). Funding for the RTEP project
24 was provided by DOE under the terms of the American Recovery and Reinvestment Act
25 (ARRA). Additionally, in November of 2011, I was appointed by the WECC Board of
26 Directors to serve on the WECC Transmission Expansion Policy Planning Committee
27 (TEPPC), a WECC Board committee. My participation in WECC and in the RTEP
28 project is another source of unique and valuable insight into regional electricity issues
29 that assist me in advocating for the interests of Wyoming consumers.

1 Finally, in December of 2011, I was elected to serve on the Advisory Council of the
2 Center for Public Utilities at New Mexico State University. The Center for Public
3 Utilities (CPU) provides training programs and current policy issues conferences to meet
4 the needs of professionals employed at federal and state commissions, utility companies,
5 and other stakeholders in the electricity, natural gas distribution, interstate pipeline,
6 telecommunications and water utility industries.

7 **Q. HAVE YOU TESTIFIED BEFORE THIS COMMISSION IN PREVIOUS**
8 **PROCEEDINGS?**

9 A. Yes. I have detailed the cases in which I have testified before this Commission in
10 Appendix A, attached to my testimony. I have also offered testimony before the Federal
11 Communications Commission, the Federal Energy Regulatory Commission and the
12 United States Congress.

13 **Q. ON WHOSE BEHALF DO YOU APPEAR HERE TODAY?**

14 A. I appear here today on behalf of the OCA. As I indicated previously, the OCA is an
15 independent party in this proceeding, separate and apart from the Commission or its
16 advisory staff.

17 **Q. AS A MEMBER OF THE OCA, DO YOU ADVOCATE THE INTERESTS OF**
18 **CERTAIN GROUPS OF CONSUMERS OVER OTHERS?**

19 A. No. As a member of the OCA, it is my statutory obligation to advocate the best interest
20 of all citizens in the state. Specifically, W.S. § 37-2-401 states that the OCA “shall
21 represent the interests of Wyoming citizens and all classes of utility customers in
22 matters involving public utilities.[emphasis added].” This public interest standard
23 requires the OCA to represent the broadest possible utility consumer constituency, even
24 though some of those consumers may also be represented independently as parties in this
25 case. The OCA is responsible for balancing the positions and recommendations of the
26 Company, and of other parties, to arrive at a set of recommendations that serve the
27 overall long term public interest.

28 **Q. ARE YOU SPONSORING ANY EXHIBITS IN THIS PROCEEDING?**

1 A. Yes, I am sponsoring OCA Confidential Exhibits BJJF 1 through 4. All three of these
2 exhibits contain confidential information that was provided by Rocky Mountain Power
3 (hereinafter RMP or Company) and are subject to non-disclosure requirements. I will
4 describe these exhibits later in my testimony.

5 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?**

6 A. In this proceeding the Commission must answer three basic questions in order to
7 determine whether issuance of the Certificate of Public Convenience and Necessity
8 (CPCN) sought by RMP for the Naughton 3 environmental upgrades is in the public
9 interest and are necessary pursuant to W.S. 37-2-205 and Chapter 2, Sections 204 through
10 207 of the Commission's General Regulations. Those questions are:

- 11 1. Is it prudent and cost effective for customers to fund the investments in the
12 Naughton 3 environmental upgrades or would customers be better served if
13 the Naughton 3 plant is retired and replaced with some other generation
14 resource, market purchases or a combination thereof?;
- 15 2. If it is prudent to upgrade the Naughton 3 generation unit to comply with
16 current and reasonably anticipated federal and state emission control
17 requirements, has RMP proposed the least cost, least risk technology solutions
18 for compliance?; and,
- 19 3. Is the cost of compliance proposed by RMP in this application reasonable or,
20 if lower cost compliance technologies are available, what is the estimated cost
21 of compliance using those technologies?

22 My testimony in this proceeding will address the complex issues associated with
23 questions one and three above. The answer to question number two will be presented in
24 the testimony of Mr. Leo Stander PE, BCEE in his direct testimony on behalf of the
25 OCA. Mr. Stander is a recognized expert on emissions requirements and technologies
26 having spent, among other things, over thirty years in public service with the United
27 States Environmental Protection Agency and the U.S. National Health Service. Mr.
28 Stander will provide the Commission with his assessment of current and anticipated

1 compliance requirements for various hazardous and non-hazardous emissions from
2 Naughton 3 as well as his recommendation regarding how compliance should be
3 accomplished going forward. Mr. Stander's analysis assumes that the upgrade of
4 Naughton 3 is both prudent and cost effective based on known and reasonably anticipated
5 compliance requirements. Future requirements that are not known now or that cannot be
6 reasonably anticipated at this point in time could change the OCA's recommended
7 compliance strategy. I will address this risk when I discuss the issues surrounding
8 question number one above later in my testimony.

9 **Q. WHAT IS THE GENESIS OF THIS CASE?**

10 A. In Docket Number 20000-384-ER-10, RMP's last general rate case proceeding, the
11 parties reached an agreement resolving the case which, in part, obligated RMP to request
12 a Certificate of Public Convenience and Necessity (CPCN) for certain environmental and
13 emissions control projects at its coal fired generation plants. Under the terms of the
14 stipulation RMP is required to file a CPCN for facilities for which the expected cost will
15 exceed \$25 million, are located within the state of Wyoming, and are not already
16 contracted or under construction. There are five projects specified in the stipulation that
17 meet these criteria, including the Naughton Unit 3 upgrades that are the subject of this
18 proceeding. There are an additional 23 environmental upgrade projects identified in the
19 stipulation that the parties agreed will not be subjected to the agreed upon CPCN process
20 either because they are not located in Wyoming, or the cost associated with them is
21 expected to be less than \$25 million. Most of the remaining 23 projects are associated
22 with mercury control upgrades at a number of the Company's coal plants both within and
23 without Wyoming. Additionally, the agreement specifies a process whereby RMP is
24 required to seek a CPCN and/or alternative ratemaking treatment for certain transmission
25 segments it plans to construct as part of its Gateway transmission project. Those filings
26 will be the subject of future proceedings before the Commission and are not included in
27 the instant case.

28 **Q. WHY DID THESE PROVISIONS COME TO BE INCLUDED IN THE ABOVE**
29 **REFERENCED AGREEMENT?**

1 A. As the Commission is aware, there were an unprecedented number of active parties in the
2 last rate case. All of the parties raised some unique issues and concerns based on the
3 particular advocacy and constituency of the individual parties. With regard to the
4 environmental issues, some parties argued that the cost of the environmental upgrades
5 proposed for recovery in that case were not supported by the Company's evidence and
6 should be disallowed from recovery. Others argued that the existing process used by the
7 Commission to review the prudence of those investments was flawed and would never
8 lead to a comprehensive evaluation of the prudence of RMP's emissions control strategy.
9 The Company argued that the emissions control upgrades were necessary and prudent
10 and are required for the plants to remain in operation. Many of the parties did not take a
11 position on these issues, at least in filed testimony.

12 For purposes of settlement, the parties agreed that in order to allow the Commission and
13 interested parties a meaningful opportunity to review the costs associated with RMP's
14 ongoing emissions control projects, and to have that opportunity generally before
15 construction of the projects begins, RMP would file for approval of the CPCNs specified
16 in the agreement. The parties also agreed, for purposes of settlement, that the
17 environmental upgrades requested for approval in Docket Number 20000-384-ER-10
18 should be deemed prudent and used and useful for serving customers and be reflected in
19 customer rates accordingly.

20 Importantly, in addition to the agreements outlined above, the parties also agreed that
21 RMP would provide, as part of any CPCN filing associated with environmental upgrades
22 required to be filed under the terms of the agreement, an estimate of the cost for the
23 upgrade. The parties further agreed that to the extent the Commission issues a CPCN for
24 the environmental upgrades pursuant to an application by RMP, the parties will not
25 challenge the cost of the environmental upgrades in future rate proceedings except to the
26 extent that such actual costs exceed estimated costs or in the event of mismanagement by
27 the Company. This provision not only gives the Commission and parties the opportunity
28 to review the prudence of these investments in isolation, but it also has the potential to
29 reduce the complexity of future general rate cases.

1 **Q. WHAT IS DRIVING THE NEED FOR THE ENVIRONMENTAL UPGRADES**
2 **PROPOSED BY RMP IN THIS CASE AS WELL AS MORE GENERALLY FOR**
3 **ALL OF ITS COAL FIRED PLANTS?**

4 A. These investments are being driven by various rules and regulations issued by the U.S.
5 Environmental Protection Agency (EPA) and subsequently the Wyoming Department of
6 Environmental Quality (WDEQ) which are in various stages of adoption. Broadly
7 speaking these rules are: 1) the Regional Haze Rule, which is meant to restore natural
8 visibility in national parks and wilderness areas by requiring the limitation and control of
9 emissions of particulate matter (PM), oxides of nitrogen (NO_x), and sulfur dioxides
10 (SO₂); 2) Mercury and Air Toxics Standard (MATS), which limits the amount of
11 mercury, non-mercury hazardous metals, and acid gases that can be emitted by coal and
12 oil-fired power plants; 3) Cooling water intake and discharge regulations, which will
13 require modification of cooling water intake structures and closed loop cooling systems;
14 and, 4) the CCR rule which may classify coal combustion residuals (captured ash) as
15 hazardous materials and significantly change the way that those materials are disposed of
16 and monitored. In his testimony in this proceeding, Mr. Stander will provide a more
17 detailed description of the above cited rules and what is required to comply with them.

18 Many of these rules and regulations have been delegated to and/or adopted by the WDEQ
19 for monitoring and enforcement purposes. For example, with regard to the Regional
20 Haze rules, the WDEQ has developed a State Implementation Plan (SIP) to comply with
21 the rules of the EPA. Accordingly, it is the WDEQ that actually issues "Best Available
22 Retrofit Technology (BART)" permits that must be obtained by emitters in order to
23 comply with the Regional Haze rule. It is the Regional Haze regulations and the related
24 Wyoming SIP that are the primary drivers of the emission investments sought for
25 approval in this case, although those investments will also assist in compliance with
26 various aspects of the above cited EPA rules as they become effective.

27 **Q. HOW IMPORTANT IS THIS PROCEEDING TO WYOMING CUSTOMERS?**

28 A. This is an extremely important case. The Commission is tasked with determining the
29 future usefulness of one of RMP's most staid and economic resources that, absent the
30 federal emissions requirements discussed previously, has a remaining useful life of at

1 least twenty years. I acknowledge that the Commission is not making a finding in this
2 proceeding relative to the future recoverability of the costs associated with Naughton 3
3 environmental upgrades. Still, the Commission's decision regarding the necessity and
4 prudence of upgrades proposed in this case will have a potentially profound impact on the
5 future generation resource mix employed by RMP to serve its Wyoming customers.
6 Notwithstanding the fact that decisions regarding pollution control retrofits must
7 necessarily be made on a plant by plant basis, this case is really the first case that
8 provides the Commission a window of opportunity to weigh in on the future efficacy of
9 coal fired generation to serve Wyoming customers.

10 Moreover, the Commission is being asked to make this decision in a highly uncertain
11 environment. Many of the rules cited above have been proposed but not adopted by the
12 EPA. Yet the compliance timeline is such that if decisions on compliance are delayed,
13 constructing the necessary emissions control facilities will be impossible for all practical
14 purposes. It is difficult, if not impossible, to know what the least cost compliance
15 technologies will be for rules that have not yet been adopted. Yet, construction must start
16 on the upgrades proposed in this case in order to finish them in time to meet the proposed
17 compliance deadlines.

18 Additionally, the costs associated with these upgrades are substantial, perhaps doubling
19 or more the cost of energy produced by the Company's coal fired power plants,
20 depending on the plant and the specific retrofits required. There is considerable risk that
21 the emissions investments necessary to keep the coal plants running may be stranded at
22 some point in the future should new and unanticipated pollution control regulations be
23 adopted. There is also an equal and countervailing risk that if these investments are
24 foregone in favor of retiring the coal plants and replacing them with less polluting
25 resources, customers will be exposed to higher cost replacement resources and associated
26 gas price risks, particularly if more stringent environmental standards are not
27 forthcoming. In either case, customers will no doubt be asked to pay a large majority of
28 the costs.

29 Again, the decision regarding whether or not to upgrade RMP's coal fired generation
30 resources, because of the unique circumstances associated with each plant, will

1 necessarily have to be made on a plant by plant basis. Some of those proceedings, in the
2 agreement from the last rate case, have already been initiated. However, the risks
3 attendant to those decisions will not change from plant to plant and will only become
4 more quantifiable as the proposed EPA rules are clarified and adopted. Given the amount
5 of rate payer money potentially at stake in this and future proceedings the issues raised in
6 this case could not be more important.

7 **Q. IS WYOMING ALONE IN THIS SEA OF UNCERTAINTY?**

8 A. No, of course not. This same story is unfolding in almost every state in the country, to a
9 greater or lesser degree. In fact, many of the states in the Midwest and East have a great
10 deal more exposure to environmental compliance costs due to the characteristics of the
11 installed coal capacity in those areas and the differing environmental regulations that
12 apply and may apply in those areas.¹

13 To date, several studies have been undertaken to estimate, generally, the amount of coal
14 capacity that will retire nationwide as a result of SO_x, NO_x, mercury and particulate
15 regulations. For example, a study by the Brattle Group completed in December of 2010
16 concludes that requiring scrubbers and selective catalytic conversion on non-compliant
17 coal plants will result in the incremental retirement of between 40 and 55 gigawatts of
18 coal fired generation nationwide by 2020.² For perspective, 55 gigawatts is
19 approximately 17% of the nations installed coal generation capacity base of 316
20 gigawatts and about 5% of total installed capacity. Additional environmental mandates
21 such as cooling water requirements and CCR mandates would further increase the
22 amount of coal fired capacity vulnerable to retirement.

23 The Brattle study also estimates the cost of compliance for plants that are required to
24 install scrubbers and SCR systems at between \$70 and \$130 billion. The lower figure
25 represents a business as usual case while the upper number represents cost escalations
26 that may occur as a result of shortages of materials and skilled labor necessary to

¹ The Cross State Air Pollution Rule (CSAPR) which becomes effective in January of 2012 covers generally the states in the eastern interconnection and ERCOT. The states in the western interconnection are not covered by CSAPR.

² Potential Coal Plant Retirements Under Emerging Environmental Regulations, The Brattle Group, December 2010, <http://botarobs.com/documents/UploadLibrary/Upload898.pdf>.

1 complete the retrofits in time to comply with the EPA's deadlines. There are lower cost
2 estimates as well. For instance, a report by the Congressional Research Service found
3 that after considering the emission limitations in the regulations, as promulgated, EPA's
4 estimate of costs and impact totals less than \$16 billion.³ Other studies have reached
5 conclusions similar to those of the Brattle study. For example, in a May 2010 study ICF
6 International identified 25 to 60 gigawatts of coal fired generation capacity that is likely
7 to retire by 2015 given current and reasonably anticipated environmental requirements.⁴
8 Later studies which were published after the regulations were actually proposed or
9 promulgated have lower projections of plant retirements. A report by the staff of the
10 Bipartisan Policy Center (BPC), BPC projects 15-18 GW of incremental coal plant
11 retirements by 2015 as a result of the suite of EPA regulations.⁵

12 **Q. ARE THERE IMPACTS TO THE INDUSTRY BEYOND THE LIKELY**
13 **RETIREMENTS YOU DISCUSSED EARLIER?**

14 A. Yes. In addition to the retirements that are likely to occur between now and 2020, nearly
15 all of the remaining coal fired capacity, approximately 257 gigawatts, will require
16 upgrades and retrofits of varying degrees in order to comply with the known and
17 expected environmental regulations identified earlier in my testimony. Approximately
18 16% of the coal fired generation in the country, mostly located in the Midwest and East,
19 has no environmental controls at all.⁶ Of the approximately 316 gigawatts of coal fired
20 generation capacity nationally, approximately 52% lack scrubbers to control SO₂, 57%
21 lack SCR units to control NO_x, and fully 96% lack a bag house or ACI system to control

³ EPA's Regulation of Coal-Fired Power: Is a "Train Wreck" Coming?,
<http://www.fas.org/sgp/crs/misc/R41914.pdf>.

⁴ See also: A Reliability Assessment of EPA's Proposed Transport Rule and Forthcoming Utility
MACT, Charles River Associates, December 2010, <http://cra.com/uploadedFiles/Publications/CRA-Reliability-Assessment-of-EPA's-Proposed-Transport-Rule.pdf>; 2010 Special Reliability Scenario Assessment: Resource;
Adequacy Impacts of Potential U.S. Environmental Regulation, North American Electric Reliability Council,
December 2010, http://www.nerc.com/files/EPA_Scenario_Final_v2.pdf; 2011 Long Term Reliability Assessment,
North American Electric Reliability Council, November 2011, http://www.nerc.com/files/2011LTRA_Final.pdf.

⁵ Environmental Regulation and Electric System Reliability, Bipartisan Policy Center,
<http://www.bipartisanpolicy.org/projects/environmental-regulation-and-electric-system-reliability>.

⁶ Potential Coal Plant Retirements Under Emerging Environmental Regulations, The Brattle Group, December 2010,
<http://botarobs.com/documents/UploadLibrary/Upload898.pdf>. Potential Coal Plant Retirements Under Emerging
Environmental Regulations, The Brattle Group, December 2010,
<http://botarobs.com/documents/UploadLibrary/Upload898.pdf>.

1 particulates and mercury.⁷ These are the plants that will be the most costly to upgrade
2 and which are most vulnerable to retirement.

3 Additionally, many of these uncontrolled plants are located in restructured market areas
4 and are owned by merchant generation companies. Because the merchant generators do
5 not have the obligation to serve retail rate payers, nor the ability to rate base plant
6 investments, their coal fired generation capacity is even more likely to be retired than that
7 owned by regulated utility companies due to the fact that merchant generation is
8 dispatched against hourly market prices. Regulated utilities, on the other hand, evaluate
9 generation options relative to the next least cost generation alternative. Also, in addition
10 to the economic retirements that will potentially occur as a result of the EPA regulations
11 discussed previously, there will also be forced retirements that result from the
12 implementation of state and local policy mandates and court cases. These mandates have
13 and will continue, as a matter of public policy preference, force the retirement of existing
14 coal generation plants that would otherwise be economic to retrofit and continue to run.

15 **Q. ARE THESE RETIREMENTS PREDICTED TO BE UNIFORM ACROSS THE**
16 **COUNTRY?**

17 A. No. According the studies that I have reviewed in preparing for this case the economic
18 retirements will be disproportionately located in the upper Midwest and Southeast portion
19 of the country. Specifically, according to the Brattle study, with EPA scrubber, SCR and
20 cooling water mandates approximately 16% to 21% of the coal fired generation capacity
21 nationwide is expected to be vulnerable to economic retirement as shown in the following
22 table:⁸

⁷ Ibid.

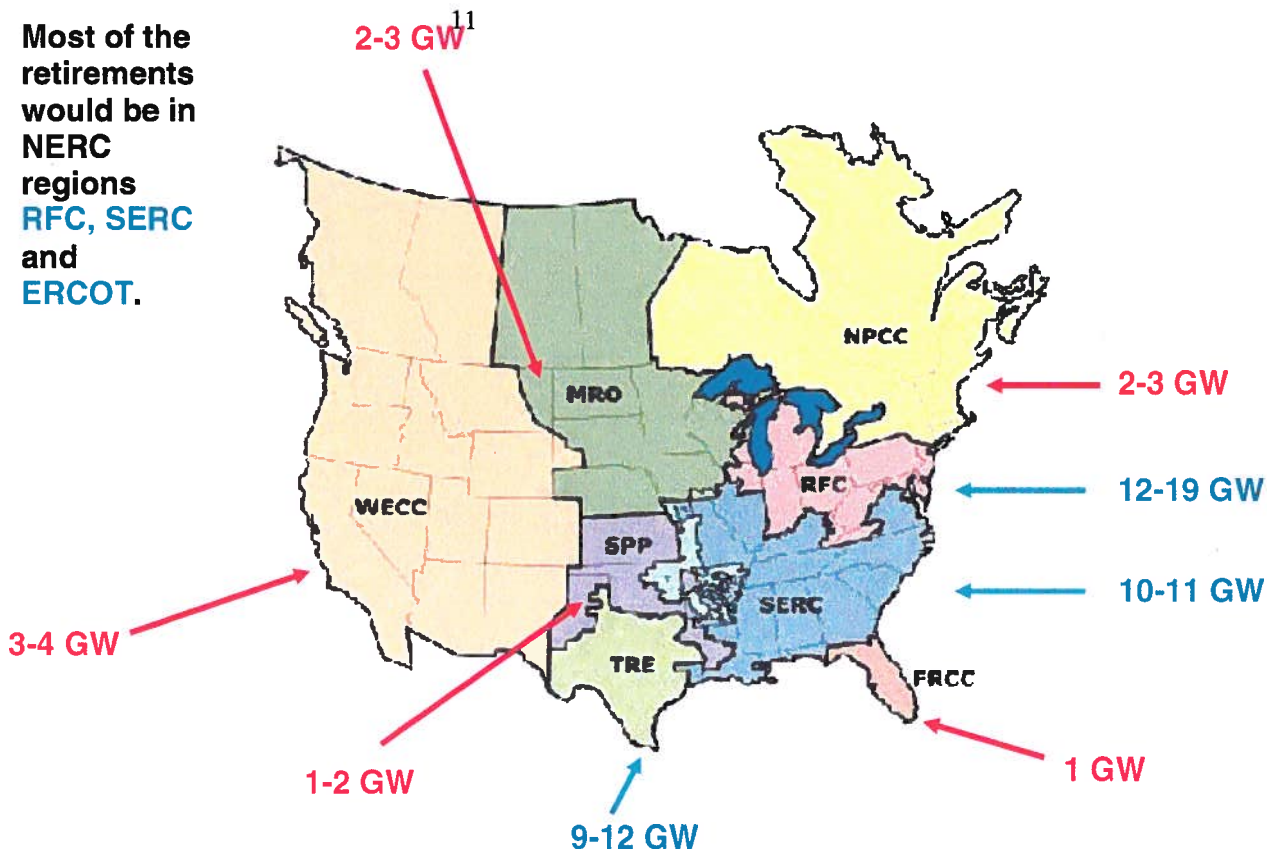
⁸ Ibid.

U.S. COAL PLANT CAPACITY VULNERABLE TO RETIREMENT BY 2020

	Retirements with Scrubber & SCR Mandate GW	Additional Retirements with Cooling Tower Mandate GW	Total Retirements GW	Percentage of		Retrofit Capital Costs for Compliance \$ Billion
				Coal Capacity	Total Capacity	
Nationwide Total	40-55	11-12	50-66	16-21%	5-7%	\$101-181
Merchant	37-48	8-10	47-56	64-76%	11-14%	\$5-7
Regulated	3-6	1-4	3-10	1-4%	1-2%	\$94-177

As shown in the table above, the bulk of the economic retirements are expected to be in the merchant power sector and in areas where electricity markets have been restructured. In fact, the majority of the economic retirements are expected to take place in the South East Reliability Council, Reliability First Corporation and Electric Reliability Council of Texas reliability regions, areas in which power markets have largely been restructured, as shown in the map and table below:⁹

Most of the retirements would be in NERC regions RFC, SERC and ERCOT.



⁹ Ibid.

COAL PLANT CAPACITY VULNERABLE TO RETIREMENT BY 2020 - SELECTED REGIONS

	Retirements with Scrubber & SCR Mandate GW	Additional Retirements with Cooling Tower Mandate GW	Total Retirements GW	Percentage of		Retrofit Capital Costs for Compliance \$ Billion
				Coal Capacity	Total Capacity	
Midwest ISO Total	12-15	3-5	16-20	21-28%	11-14%	\$27-48
Merchant	11-12	2-3	14	93-94%	30-31%	\$0
Regulated	1-3	0-3	2-6	3-11%	2-6%	\$27-48
ERCOT ISO Total	9-12	1-3	13	72	15%	\$3-5
Merchant	9-12	1-3	13	100%	18%	\$0
Regulated	0	0	0	0%	0%	\$3-5
PJM ISO Total	8-15	3-5	12-19	15-26%	6-11%	\$19-29
Merchant	8-15	3-4	12-19	33-54%	10-16%	\$4-6
Regulated	0	0	0	0-1%	0-1%	\$13-25

As shown in the above figures, the vast majority of economic retirements will occur in areas that have been restructured and will involve plants owned by merchant generators. Retirement of regulated generation, even in areas that have been restructured, will be relatively small by comparison. In the WECC area, which is still dominated by vertically integrated regulated electric utilities, coal plant retirements are expected to be the least of any NERC sub-region as shown in the following table:¹⁰

NERC Subregion	Basecase						Mandatory Scrubber & SCR by 2015					
	Cumulative Retired Capacity (GW)		Weighted Average Capacity Factor (%)		Generation Output (TWh)		Cumulative Retired Capacity (GW)		Weighted Average Capacity Factor (%)		Generation Output (TWh)	
	2010	2020	2010	2020	2010	2020	2010	2020	2010	2020	2010	2020
ERCOT	-	2.5	52%	44%	79.3	58.7	-	9.4	52%	39%	79.3	28.0
RFC-PJM	-	-	69%	72%	385.7	402.9	-	7.5	69%	74%	385.7	366.1
SERC-Gateway	0.2	0.2	72%	72%	93.2	92.9	0.3	6.5	73%	64%	92.6	46.6
RFC-MISO	0.1	0.1	60%	51%	217.5	185.6	1.3	4.8	61%	48%	213.1	152.3
Northwest	1.8	1.8	85%	85%	77.6	77.6	1.8	2.2	85%	80%	77.6	70.3
MRO	0.0	0.0	65%	51%	152.6	119.9	0.1	1.7	66%	44%	152.5	97.1
NYISO	-	-	46%	45%	11.3	10.9	-	1.2	46%	50%	11.3	6.7
Entergy	-	-	75%	75%	52.3	52.3	-	1.2	75%	69%	52.3	41.2
TVA	0.0	0.0	68%	68%	148.0	148.6	0.0	0.9	68%	60%	148.0	126.4
ISO-NE	-	0.1	37%	36%	9.0	8.3	-	0.8	37%	32%	9.0	5.6
FRCC	0.7	0.7	32%	61%	25.1	47.0	0.7	0.8	32%	57%	25.1	43.6
Southern	0.0	0.0	71%	72%	160.0	161.1	0.0	0.6	71%	66%	160.0	144.4
VACAR	0.0	0.0	62%	62%	144.2	145.6	0.0	0.5	62%	59%	144.2	134.7
California	-	-	78%	78%	15.4	15.4	-	0.5	78%	78%	15.4	12.3
SPP South	-	0.3	50%	40%	50.7	39.8	-	0.4	50%	30%	50.7	29.8
SPP North	-	0.0	60%	51%	44.3	37.7	-	0.2	60%	45%	44.3	32.3
Arizona	-	-	71%	69%	67.1	64.8	-	0.2	71%	67%	67.1	61.7
Rocky Mountain	0.0	0.0	72%	68%	40.4	38.3	0.0	0.1	72%	61%	40.4	33.7
Total US	2.9	5.8	65%	63%	1,774	1,708	4.4	39.6	65%	59%	1,769	1,433

¹⁰ Ibid.

1 As can be seen in foregoing table, retirements in the WECC Rocky Mountain Power Area
2 (RMPA) are expected to be minimal as a result of the EPA mandates for scrubbers and
3 SCR units. However, there are risks associated with additional EPA regulations not
4 included in the evaluation above. I will discuss those risks as well as the countervailing
5 risk associated with replacement power alternatives later in my testimony. In any event,
6 though the amount of coal fired capacity at risk for retirement, either for public policy or
7 economic reasons in the WECC and specifically in the RMPA is small, it is not zero.

8 For example, Xcel Energy (dba Public Service Company of Colorado) has announced
9 that it will retire 1,233 megawatts of coal fired generation in Colorado by 2022.¹¹
10 Similarly, APS has announced that it will retire 560 megawatts of coal generation at its
11 Four Corners plant by 2012 and Portland General Electric has announced the retirement
12 of the Bordman plant (560 megawatts) by 2020, twenty years earlier than its planned
13 useful life.¹² The Bordman plant retirement is an example of a forced retirement due to
14 public policy preferences and does not reflect economic retirement as a result of the
15 pending EPA regulations.

16 **Q. BASED ON THE AVAILABLE LITERATURE, WHAT ARE THE**
17 **CHARACTERISTICS OF A COAL FIRED PLANT THAT MAKE IT**
18 **ECONOMICALLY VULNERABLE TO RETIREMENT?**

19 A. According to the studies that I have reviewed, there are several distinguishing
20 characteristics that make a coal fired generation plant more or less vulnerable to
21 retirement. Keep in mind, as I stated earlier, merchant plants are subject to a different
22 economic evaluation framework than are regulated plants. But generally speaking, a coal
23 plant would be more likely to be retired if it is old, dirty, inefficient and not routinely
24 dispatched to serve load. In other words, plants that currently have no environmental
25 controls, have a high heat rate, and a low capacity factor are more likely to be retired than
26 those that are newer, have at least some environmental controls, burn coal efficiently and
27 have a relatively higher capacity factor. From an economic perspective this makes sense.

¹¹ EEI August 2011 Wall Street Briefing, University Club, August 10, 2011
<http://www.eei.org/meetings/Meeting%20Documents/2011-08-10-WallStreetBriefing-CoalFleetRetirementAnnouncementsSumm.pdf>.

¹² Ibid.

1 According to a study by Dr. Robert Peltier, P.E., the national coal fleet can be
2 characterized as follows: 1) average age (in years) is 42.5 years while the megawatt
3 weighted age is 37.1 years (newer plants are larger than older plants); 2) the fleet-wide
4 average capacity factor is 62% (plants built since 1970 have an average capacity factor of
5 72%); and, 3) average fleet wide heat rate is 10,766 btu/kWh (newer plants have lower
6 heat rates).¹³

7 Finally, as noted above, the Brattle study estimated that about 5% of the coal generation
8 in the WECC reliability region would retire by 2015 pursuant to known and reasonably
9 anticipated EPA regulations. In a January 2011 study by Synapse Energy Economics
10 (Synapse), the authors estimated the economic merit order of all coal fired generation
11 facilities in the WECC region and ranked the bottom 25% of those facilities in order of
12 economic merit against both new natural gas generation and existing natural gas
13 generation.¹⁴ Several Wyoming coal plants appear on the list, although they are well up
14 in the economic merit stack. Both the Naughton 1 and 2 units appear in both lists of the
15 least economic plants. However, Naughton Unit 3 does not appear in either list, implying
16 that it would at least be in the top 75% of the most economically meritorious plants in the
17 WECC region. As the Commission may recall, the Powder River Basin Resource
18 Council (PRBRC) provided the testimony of two witnesses (both were affiliated with
19 Synapse) in RMP's last rate case proceeding that opposed recovery of the environmental
20 upgrade investments sought by RMP in that case. Yet, even Synapse, with its avowed
21 environmental protection agenda, does not identify Naughton 3 as a ready target for
22 retirement.

23 **Q. WHAT USE SHOULD THE COMMISSION MAKE OF THIS GENERAL**
24 **INFORMATION ON COAL PLANT RETIREMENTS NATIONALLY AS IT**

¹³ Predicting U.S. Coal Plant Retirements, Dr. Robert Peltier, P.E., Klean Coal, October 2011,
<http://www.kleancoal.com/predicting-u-s-coal-plant-retirements>.

¹⁴ WECC Coal Plant Retirement Based On Forward-Going Economic Merit, Jeremy Fisher and Bruce
BiewaldSynapse Energy Economics, January 10, 2011,
<http://www.wecc.biz/committees/BOD/TEPPC/TAS/SWG/10March2011/Lists/Minutes/1/WECC%20Coal%20Retirement%20Criteria%201-10-2011%20Final.pdf>.

1 **CONTEMPLATES ITS DECISION REGARDING NAUGHTON UNIT 3 IN THIS**
2 **PROCEEDING?**

3 A. Although this sort of general information may not be dispositive of the prudence, or not,
4 of retrofitting the Naughton 3 unit in this case, nevertheless, I believe it is instructive in a
5 general sense in assessing the specific characteristics of the plant. The information
6 outlined above at least establishes a matrix for determining whether or not Naughton Unit
7 3 is a candidate for retirement using the same metrics generally being used by others
8 around the country to evaluate these same issues.

9 **Q. SPECIFICALLY, WHAT METRICS ARE YOU REFERRING TO?**

10 A. As outlined previously, I am referring to how the Naughton 3 plant compares to other
11 plants with regard to age, size, heat rate, capacity factor and existing environmental
12 controls.

13 **Q. AND, HOW DOES NAUGHTON UNIT 3 COMPARE WITH OTHER PLANTS**
14 **AROUND THE COUNTRY ON THE BASIS OF THESE METRICS?**

15 A. First, Naughton 3, as is the case with many coal fired plants in the WECC region, has
16 some existing environmental controls. As described in the testimony of Mr. Stander
17 Naughton Unit 3 is currently equipped with a wet flue gas desulfurization (FGD) system
18 that was installed in 1981 and upgraded in 1997 for control of SO₂, and low NO_x burners
19 which were installed in 1999. The plant also burns low sulfur coal supplied from an
20 adjacent coal mine. As part of the project at issue in this case, although not subject to
21 CPCN approval under the terms of the stipulation, the Company will be making upgrades
22 to the existing FGD system.

23 In addition to the above emissions control systems Naughton Unit 3 is also equipped with
24 an electrostatic precipitator (ESP), which is designed to capture particulate matter such as
25 fly ash for storage in on-site wet surface impoundments. The ESP, however, because of
26 its small size and poor performance, will be replaced with the proposed pulse-jet fabric
27 filter (PJFF or baghouse). The necessity for, and operation of the PJFF is more fully
28 described in Mr. Stander's testimony.

1 The importance of the existing emission controls, including the FGD and low NO_x
2 burners is that, unlike many of the coal units in the eastern part of the country, RMP is
3 not starting from scratch in upgrading the Naughton 3 plant. Consequently, the cost of
4 compliance will be comparatively less. The existing ESP, however, adds no value to
5 compliance efforts since it will be replaced by the PJFF.

6 Second, Naughton Unit 3 was placed into commercial service in 1971 making it 40 years
7 old. Recall that the average age of a coal fired power plant nationwide is approximately
8 42.5 years according Dr. Peltier's study making the Naughton 3 plant slightly younger
9 than the average coal plant nationally.¹⁵ In his study Dr. Peltier also states that the
10 average age of 91 recently announced or projected coal plant retirements is 55.1 years,
11 significantly older than the Naughton 3 plant.¹⁶ Naughton 3 doesn't seem to fit the mold
12 of plants likely to retire relative to the plant age metric.

13 Third, available data suggests that less efficient plants as measured by heat rate (the
14 efficiency of heat conversion to useable electric power) are more likely to retire than
15 more efficient plants. Generally speaking, western coal plants, particularly those in the
16 RMPA, are much more efficient than their eastern counterparts. According to the U.S.
17 Energy Information Administration, in 2010 the average heat rate for all coal plants
18 nationwide was 10,415 Btu/kWh. In 2014, RMP plans to install CO and O₂
19 measurement devices as well as a flue gas sampling grid that will substantially improve
20 the heat rate at Naughton Unit 3. These planned upgrades, which will come at a very
21 modest cost of [REDACTED], will keep the heat rate for Naughton 3 in the range of where it
22 has been historically even as the pollution control upgrades are added which would
23 otherwise degrade the heat rate.

24 In fact, the heat rate for Naughton 3 from 2015 through 2029 is projected to be in the
25 range of the national average for all coal plants, approximately [REDACTED] Btu/kWh. RMP's
26 projected operating heat rates for the period 2012 through 2029 are shown in **OCA**
27 **Confidential Exhibit BJF 1**. For comparison, a new efficient combined cycle natural gas

¹⁵ Footnote 13, supra.

¹⁶ Ibid.

1 plant would have an expected average heat rate of approximately 6,751 Btu/kWh.¹⁷
2 Based on the heat rate metric as described above, Naughton Unit 3 appears to be an
3 unlikely candidate for retirement.

4 Fourth, Naughton Unit 3 has a favorable capacity factor in comparison to plants located
5 elsewhere around the country. Recall that the average capacity factor for coal fired
6 power plants nationwide is 62%. Historically, the capacity factor for Naughton Unit 3
7 has averaged approximately [REDACTED] annually over the period 2006 through 2011.¹⁸ This is
8 well above the national average and indicates that Naughton 3 continues to run as a base-
9 load unit and is dispatched to serve load about [REDACTED] of the hours in a year, on average.
10 Moreover, based on the results of its analysis in this case, RMP estimates that the annual
11 capacity factor for Naughton 3 will remain favorable over the period to 2029 even after
12 the pollution control upgrades are made. RMP estimates an annual average capacity
13 factor of approximately [REDACTED] over that period under base case assumptions. I will discuss
14 how RMP arrives at this conclusion a bit later in my testimony.

15 **Q. HAVE THERE BEEN OTHER INDEPENDENT STUDIES OF THE IMPACT OF**
16 **EPA RULES ON THE ELECTRIC POWER INDUSTRY?**

17 A. The studies I have cited in my testimony thus far are indicative but not exhaustive of the
18 industry analysis that has been done both by industry participants and by third parties.
19 The EPA itself has also conducted an analysis of the impact of the MAST rule, which
20 was issued on December 16, 2011. The EPA's analysis is based on the results of its IPM
21 model and shows that approximately 9.6 gigawatts of coal fired generation capacity will
22 retire as result of this rule. However, it is not possible to compare the results of this
23 analysis to the results of the studies that I have cited previously in my testimony since
24 those studies attempt to quantify the cumulative effects of various existing and expected
25 EPA rules. The EPA study done for the NESHAP attempts to quantify only the impact of
26 adopting the NESHAP rule. To my knowledge, although the EPA has not undertaken an
27 analysis that attempts to quantify the cumulative impact of all of its existing and proposed

¹⁷ PacifiCorp 2011 Integrated Resource Plan, Volume I, March 31, 2011, page 115. Referenced heat rate is for a CCCT (Wet "G" 1x1) gas resource located in the east control area, at or below 4,500' elevation.

¹⁸ RMP response to WIEC data request 14.1.

1 rules, others have made compilations. In a report by the Congressional Research Service,
 2 the EPA provides an estimate of costs and impact totals for the expected EPA rules. A
 3 table summarizing this information is as follows:¹⁹

Table 1. Timing of EPA Rules and Impacts on Coal-Fired Utilities

Rule or Standard	Final Rule	EPA Estimate of Costs/Impacts ^a
Cross-State Air Pollution Rule	Finalized July 6, 2011	\$2.4 billion/year ^b
Utility MACT Rule	Expected November 16, 2011	\$10-\$11 billion/year
National Ambient Air Quality Standard (NAAQS) for sulfur dioxide	Promulgated June 22, 2010	\$1.5 billion/year for all sources, but limited impact on electric generating units (EGUs) ^a
NAAQS for ozone	Expected July 2011	\$19-\$25 billion/year for all sources but limited impact on EGUs ^a
NAAQS for particulate matter	Not yet proposed, expected in 2012	Unknown
New Source Performance Standards for Greenhouse Gases	Not yet proposed, expected May 26, 2012	Unknown
Cooling Water Intake Structure Rule	Expected July 27, 2012	\$319 million/year
Clean Water Effluent Limitation Guidelines Rule	Not yet proposed, expected January 31, 2014	Unknown
Coal Combustion Waste Rule	Expected 2012 or later	\$587 million-\$1.5 billion/year

Source: Compiled by CRS.

- a. Costs as estimated by EPA. See text for discussion of costs and impacts of specific rules.
- b. Of the \$2.4 billion annual cost, \$1.6 billion is attributed to the Clean Air Interstate Rule (CAIR), a 2005 rule that the Cross-State Rule is replacing.

4
 5 **Q. IS IT IMPORTANT TO EXAMINE THE POTENTIAL CUMULATIVE**
 6 **IMPACTS OF ALL EXISTING AND REASONABLY ANTICIPATED EPA**
 7 **EMISSIONS REGULATIONS?**

8 **A.** Yes, I believe it is crucial to examine the impacts of all of the emissions regulations with
 9 which RMP would need to comply in order to make a reasoned judgment regarding
 10 whether or not the investments proposed in the instant proceeding are cost effective as
 11 compared with available alternatives. The Commission would not want to approve the
 12 investments sought by the Company in this case only to have other compliance

¹⁹ EPA's Regulation of Coal-Fired Power: Is a "Train Wreck" Coming?, Congressional Research Service, <http://www.fas.org/sgp/crs/misc/R41914.pdf>.

1 obligations arise in the future that would make the continued operation of the Naughton 3
2 plant uneconomic. At least we should do everything we can to avoid that outcome.
3 Again, I acknowledge that the Commission's decision in this case does not in any way
4 bind it with regard to the recovery of these costs in future rate proceedings; the parties are
5 bound by the terms of the stipulation that I discussed earlier in my testimony.

6 Of course, since we cannot predict the future with certainty, there will always be some
7 risk that unanticipated events will occur that change the economics of the decision that
8 the Commission is being asked to make in this case. But, we are best served by
9 attempting to incorporate all possible known and potential impacts in our analysis of
10 upgrading the Naughton 3 plant in this proceeding.

11 In fact, a recent paper released by the Regulatory Assistance Project (RAP) underscored
12 the importance of taking into consideration all the various existing and potential
13 emissions compliance obligations when the authors stated:²⁰

14 The ultimate cost of compliance with the EPA's public health and
15 environmental regulations will depend on the final form that these rules
16 take and will vary from company to company, plant to plant, and region
17 to region, depending on what controls are currently installed and what
18 more are needed....Our purpose in this paper is not to discuss whether the
19 rules are appropriate or needed, but rather to educate utility regulators as
20 to the need for comprehensive analysis of retrofit costs so that reasoned
21 decisions can be made on whether incremental retrofit expenditures
22 should be approved...A retirement decision must compare the present
23 value or levelized cost of a compliance strategy and operating an existing
24 power plant with the least-cost alternative. That alternative may be
25 increased operation of other existing power plants, construction and
26 operation of new fossil or renewable power plants, investment in energy
27 efficiency measures, or a combination of these.

28 **Q. SHOULD THE COMMISSION CONCLUDE FROM THE FOREGOING**
29 **ANALYSIS THAT THE ENVIRONMENTAL UPGRADES SOUGHT BY RMP IN**
30 **THIS PROCEEDING ARE PRUDENT AND NECESSARY?**

²⁰ Incorporating Environmental Costs in Electric Rates; Working to Ensure Affordable Compliance with Public Health and Environmental Regulations, Regulatory Assistance Project, Jim Lazar and David Farnsworth, October 2011, <http://www.raonline.org/search>.

1 A. No. Although the analysis I have presented so far is compelling, it is not definitive.
2 Because a decision regarding whether or not to grant the CPCN requested in this
3 proceeding depends to a large degree on the assumptions made regarding future
4 investment, as well as operational and regulatory issues, it is necessary to assess the
5 validity of these assumptions as RMP has used them to support its application.

6 **Q. ON WHAT BASIS DOES RMP ASSERT THAT RETROFITTING NAUGHTON 3**
7 **IS MORE PRUDENT THAN RETIRING AND REPLACING IT?**

8 A. RMP bases its determination primarily on the results of the computer modeling it has
9 done. RMP uses what is known as the “System Optimizer” or SO model, which is a third
10 party proprietary computer model developed by Ventyx. Given a set of assumptions, the
11 SO model optimizes a portfolio of energy resources to provide the least cost least risk
12 portfolio. This is the same software that RMP uses in preparing its biennial Integrated
13 Resource Plans (IRP). The SO model allows the user to evaluate how a variety of
14 different assumptions will impact the future cost of energy over a fixed planning horizon.
15 Assumptions required to run the model include, but are not limited to, such factors as:
16 projected load growth; projected market prices for coal, gas and electricity; plant specific
17 operating limits; transmission constraints; emissions limits, including carbon emissions;
18 and, many others. Using the SO model, the analyst can build a number of discrete cases
19 using various assumptions and iterate those cases stochastically to determine the
20 optimum or least cost, least risk generation portfolio. RMP performed such an analysis
21 as part of its 2011 IRP, which was completed at the end of March of last year.

22 Chapter 8 of the 2011 IRP contains what RMP refers to as a “Coal Utilization Study.”
23 The coal utilization study in the IRP was designed to test the continued viability of the
24 Company’s coal generation fleet under a variety of different assumptions regarding future
25 emissions regulations and operating conditions. I opined extensively regarding the coal
26 utilization study in my direct testimony in RMP’s 2010 rate case (WPSC Docket Number
27 20000-384-ER-10).

28 Ultimately, in that proceeding I recommended inclusion of the pollution control
29 investments sought to be included in rate base, as well as the increased operating and
30 maintenance expenses associated therewith. My recommendation was based on the fact

1 that: 1) the plants cannot continue to be operated without the pollution control upgrades;
2 2) the pollution control upgrades are a relatively small part of the overall undepreciated
3 plant investments for the coal plants; 3) the cost of replacement resources would be far
4 more expensive than the embedded cost of the coal resources; and, 4) early retirement of
5 the coal plants, or severely limiting their output could substantially increase the monthly
6 bill of the average Wyoming RMP ratepayer.

7 While I concluded in the rate case that RMP should be allowed to recover the cost of the
8 pollution control upgrades, my analysis in that case was quite different from my analysis
9 in this case. For example, the investments in the rate case had already been made while
10 in this case the Naughton 3 investments have yet to be made. Further, in the rate case the
11 environmental upgrades were associated with a number of plants including: Jim Bridger;
12 Cholla; Craig; Dave Johnston; Hunter; Huntington; Naughton (Unit 2); and, Wyodak. I
13 based my recommendation in the rate case primarily on the results of the 2011 IRP (coal
14 utilization study) which limited the investigation to average figures for RMP's entire coal
15 fleet. The CPCN requested in this proceeding calls for a much more refined and specific
16 study of the Naughton Unit 3 plant.

17 **Q. HAS THE COMPANY PROVIDED AN ANALYSIS SPECIFIC TO THE**
18 **CONTINUED OPERATION OF NAUGHTON UNIT 3 IN THIS PROCEEDING?**

19 Yes. In support of the application in this case, RMP made several refinements to the
20 analysis conducted for the 2011 IRP including study design changes to more accurately
21 reflect the tradeoff between coal fired resources and alternative sources of generation,
22 updated assumptions regarding emissions requirements, and updated assumptions
23 regarding the magnitude and timing of future carbon regulations. The study also
24 contemplates the planned retirement of three coal plants: Carbon in 2020, Dave Johnston
25 in 2027 and Naughton in 2029. The IRP coal utilization study did not force the
26 retirement of these plants at the end of their useful lives.

27 **Q. WOULD YOU CONSIDER THE NAUGHTON 3 STUDY A COMPREHENSIVE**
28 **ANALYSIS OF THE ECONOMICS OF CONTINUING TO RUN THE PLANT AS**
29 **RECOMMENDED BY RAP?**

1 A. Yes. The SO model is a proprietary computer model developed by a third party vendor
2 (Vyntex), which requires substantial computing power to run. Consequently, I have not
3 run the model. I have, however, reviewed the results provided by the Company and have
4 reviewed the voluminous data requests and responses provided to WIEC and other parties
5 in this case and I am confident that RMP has attempted, short of speculating about future
6 environmental regulations, to incorporate known and expected compliance obligations
7 into its analysis in this proceeding. RMP has included the cost of compliance with the
8 Regional Haze rule, the mercury MACT rule, the 316(b) water intake rule, waste water
9 disposal rule, and the CCR rule (Title D, not Title C compliance). Additionally, RMP
10 has evaluated several sensitivities regarding a carbon price. All of these rules, if adopted,
11 would necessitate further investment for environmental remediation and would cause the
12 Company's existing coal fired generation plants to be relatively less attractive when
13 compared to available resource alternatives.

14 **Q. ARE YOU SATISFIED THAT RMP HAS ATTEMPTED TO ACCOUNT FOR**
15 **ALL KNOWN AND REASONABLY EXPECTED POLLUTION CONTROL**
16 **INVESTMENTS IN ITS ECONOMIC MODELING IN THIS CASE?**

17 A. Yes, I am. Keep in mind that many of these rules, including the CCR and 316(b) rules,
18 are not expected to be finalized for some time, perhaps not until 2015 or 2016, so there is
19 considerable uncertainty regarding what the final rule will look like. The CCR rule, for
20 example, under Title D would not classify coal combustion residuals as hazardous waste,
21 while regulation under Title C would classify it as hazardous waste. Compliance costs
22 under these two separate titles would be vastly different. Regulation under Title C would
23 require RMP to treat coal ash as a hazardous substance and probably require it to close
24 and remediate its existing ash ponds and separately develop dry land fills to store coal ash
25 in the future. Yet, compliance with the Regional Haze rule and NESHAP rule will be
26 required prior to the CCR rule becoming final, so we do not have the luxury of waiting to
27 see the final CCR rule before deciding whether or not to allow the upgrades to comply
28 with the Regional Haze and NESHAP rule. The same is true for the 316(b) water rules.

1 **Q. ARE THERE OTHER COSTS THAT WOULD NEED TO BE ACCOUNTED FOR**
2 **IF THE COMPANY ELECTED TO RETIRE NAUGHTON UNIT 3 PRIOR TO**
3 **THE END OF ITS PLANNED USEFUL LIFE IN 2029?**

4 A. Yes, other costs would include, but not necessarily be limited to, recovery of any
5 remaining undepreciated investment in the plant, removal and salvage costs, and
6 liquidated damages due to the mine owner that supplies coal to the plant under the terms
7 of the coal contract.

8 **Q. ARE YOU SATISFIED THAT RMP HAS ADEQUATELY ACCOUNTED FOR**
9 **THESE COSTS AS WELL?**

10 A. Yes, RMP has incorporated these costs into the various scenarios that it modeled using
11 the SO model. Additionally, RMP has estimated and included capital costs not related to
12 clean air compliance requirements that would be required even absent the new EPA rules.
13 These costs would include such things as periodic capital maintenance, such as scheduled
14 major overhauls of the turbine and boiler.

15 **Q. WHAT IS YOUR CONCLUSION REGARDING THE GOING FORWARD COST**
16 **OF OPERATING NAUGHTON UNIT 3, BASED ON THE MODEL**
17 **INFORMATION PROVIDED BY THE COMPANY?**

18 A. My conclusion is that RMP has made a good faith effort, consistent with principles
19 articulated by RAP as discussed earlier in my testimony, to make a comprehensive
20 estimate of the capital and operating costs necessary to operate Naughton 3 through the
21 end of its useful life. To be sure, it is only an estimate made without the benefit of
22 perfect foreknowledge and will likely be wrong when measured against history.
23 However, I am confident that RMP has attempted to make a fair assessment of the cost of
24 continuing to operate the plant and has not purposely omitted or ignored costs that might
25 place the decision to retrofit Naughton 3 in a better light relative to available options. It
26 would have no incentive to do so as it would bear the risk of recovery of investments
27 made based on an incomplete or inaccurate analysis.

1 **Q. ON WHAT BASIS DOES RMP CONCLUDE THAT INVESTING IN THE**
2 **REQUESTED UPGRADES WILL BE THE LEAST COST OPTION FOR**
3 **CUSTOMERS GOING FORWARD?**

4 A. In its analysis RMP compares the cost of retrofitting Naughton 3, in view of known and
5 expected environmental compliance obligations, with the estimated cost of available
6 alternatives. In its various SO model scenarios RMP analyzed the cost of several
7 alternatives including converting Naughton 3 to run on natural gas, locating a combined
8 cycle combustion turbine (CCCT) at the Naughton 3 plant site, and locating a CCCT
9 elsewhere on its system. The Company also allowed the SO model to select market
10 purchases and demand side management resources to replace the Naughton 3 capacity
11 subject to transmission constraints and other limiting protocols contained in the model.

12 **Q. DID RMP ALLOW THE MODEL TO SELECT RENEWABLE RESOURCES TO**
13 **REPLACE THE CAPACITY PROVIDED BY NAUGHTON 3 IF IT WERE**
14 **RETIRED?**

15 A. No. RMP limited the available alternatives to resources that can provide firm capacity to
16 replace Naughton 3. Renewable resources can provide system energy to replace the
17 energy produced by Naughton 3, but those resources cannot cost effectively provide
18 replacement system capacity. Even in Wyoming, where average wind capacity factors
19 are in the range of 35% to 40% for good wind sites, RMP would have to add additional
20 dispatchable capacity in order to achieve the same capacity factor that Naughton 3 is
21 expected to achieve which is in the range of 80% to 85%.

22 **Q. IS IT POSSIBLE THAT OTHER PARTIES IN THIS CASE MAY HAVE A**
23 **DIFFERENT VIEW OF THE EFFICACY OF THE COMPANY'S MODELING**
24 **OF THE COST OF CONTINUED OPERATION OF NAUGHTON UNIT 3?**

25 A. Not only is it possible, it is quite probable. WIEC in particular has propounded 29
26 individual sets of data requests in this case. I would not even hazard a guess as to how
27 many individual questions and requests for production of documents are contained in
28 those sets of data requests. WIEC has, by all appearances, devoted its resources to a deep
29 dive into the bowels of the SO model challenging both the design of the model and the

1 inputs used by RMP in analyzing the various scenarios it uses to support its decision to
2 retrofit Naughton 3 in this case. At least that is the sense one gets when reviewing the
3 questions propounded by WIEC and the responses provided by the Company.

4 **Q. HAVE YOU UNDERTAKEN A SIMILAR EVALUATION OF THE SO MODEL?**

5 A. No, although that is not to say that there is no merit to close scrutiny of the model that
6 provides the primary basis of support for the Company's decision to upgrade the
7 Naughton 3 plant rather than retire it. That model should be as accurate and
8 comprehensive as possible given the uncertainty of the inputs and assumptions that are
9 necessarily made in deriving results. However, ultimately it is just a model that provides
10 some useful guidance in determining the prudence, or not, of continued investment in the
11 Naughton 3 plant. It will not, by itself, provide the right answer in this case and it is
12 certainly no substitute for the informed and reasoned judgment of the Commission after
13 weighing all of the evidence in the case. While I believe the SO model and its results can
14 inform the Commission's decision in this case, my objective is to provide independent
15 and publicly available information, as described previously, against which the
16 Commission can benchmark the SO results. In other words, are the results of the SO
17 model reasonable when compared to the metrics being widely used around the country by
18 industry and interested observers to make these same decisions?

19 **Q. WITH THAT IN MIND, WHAT ARE THE RESULTS OF THE SO MODEL**
20 **RUNS OFFERED BY THE COMPANY TO SUPPORT THE CPCN IN THIS**
21 **CASE?**

22 A. The results of the various cases studied by RMP, given its inputs and assumptions,
23 support its decision to invest in the environmental upgrades at the Naughton 3 plant. In
24 its analysis RMP conducted sensitivities around a base, high and low gas price forecast as
25 well as a base, high and low projected price for carbon. Additionally, RMP studied the
26 present value revenue requirement (PVRR) impact of retiring Naughton 3 in 2014 and in
27 2024, again under base, high and low forecasts for gas and carbon prices. As shown in
28 Exhibit 2 to the application the SO model did not choose a replacement resource for
29 Naughton 3 in any of the scenarios studied. When Naughton 3 is forced to retire in 2014,
30 obviating the need for any environmental upgrades, the cost of the replacement portfolio

1 is significantly higher than if the plant is upgraded and operated through the end of its
2 useful life. Further, even when the upgrades are assumed to be made, as requested in this
3 case, and the plant is forced to retire in 2024, there are still substantial present value
4 revenue requirement (PVRR) benefits to customers compared to not making the upgrades
5 at all. In his testimony on behalf of the Company, Mr. Link provides a detailed
6 description of these PVRR benefits, so I will not repeat them here.

7 **Q. ARE THE RESULTS OF THE SO MODEL REASONABLE IN YOUR OPINION?**

8 A. Yes, but again, those results should not be the determining factor in judging the prudence
9 of upgrading the Naughton 3 plant in this case. Rather, the results of the SO modeling
10 done by the Company should be accorded the weight they are due relative to all the other
11 evidence submitted in this proceeding, evidence such as that outlined earlier in my
12 testimony. One might quibble over the inputs used by the Company in its modeling such
13 as the timing and magnitude of carbon pricing, forward gas and electricity prices,
14 expected loads, and so forth. In fact, I am quite sure that one could construct a scenario
15 based on the SO model in which retrofitting the Naughton 3 plant is never economic.
16 Likewise, I am certain that a scenario could be constructed in which alternative resources
17 never displace the Naughton 3 plant regardless of how much additional investment is
18 required. In my opinion, given the uncertainty surrounding these issues, RMP has based
19 its analysis on reasonable inputs and assumptions. However, it is precisely the
20 uncertainty surrounding those inputs and assumptions that makes it all the more
21 important that the Commission also examine other evidence, such as that presented
22 above, in making its determination in this case.

23 **Q. DID THE COMPANY ALSO EXAMINE ALTERNATIVES TO UPGRADING**
24 **THE NAUGHTON 3 PLANT OUTSIDE OF THE SO MODEL?**

25 A. Yes, RMP also conducted two studies that compared the PVRR of retrofitting the
26 Naughton 3 plant with converting Naughton 3 to burn natural gas or alternatively,
27 replacing Naughton 3 with a CCCT of similar size at the Naughton plant site. Both
28 studies show a considerable PVRR benefit to upgrading Naughton 3 to comply with
29 current and expected emissions limits. I should point out that WIEC did identify a
30 mistake in the original analysis of the conversion option that when corrected by the

1 Company reduced the benefit of continuing to run Naughton 3 on coal as compared to
2 converting it to natural gas, but the study still shows a substantial positive benefit to
3 customers from retrofitting the plant rather than converting it to natural gas.

4 **Q. ARE THESE STUDIES USEFUL IN DETERMINING THE PRUDENCE OF THE**
5 **ENVIRONMENTAL UPGRADES IN COMPARISON TO AVAILABLE**
6 **ALTERNATIVES?**

7 A. The two studies certainly provide a reference point in the analysis, but I do not believe
8 that they are viable options that the Company would pursue even if it declined to make
9 the environmental upgrades it seeks approval for in this case. Additionally, the Company
10 did not conduct these studies for the purpose of comparing the Naughton 3 environmental
11 upgrades to other options in the context of a least cost, least risk portfolio. Rather, they
12 were intended to be stand alone studies of the cost of replacing the existing Naughton 3
13 coal capacity through either converting or repowering the plant.

14 **Q. WHY ARE THESE TWO OPTIONS NOT VIABLE?**

15 A. With regard to the gas conversion alternative, RMP opines that converting the existing
16 coal fired boiler at Naughton 3 to burn natural gas would be inefficient because the
17 resulting heat rate would cause the unit to be dispatched on an infrequent basis. In fact,
18 RMP lists the bus bar cost of energy produced at its natural gas converted Gadsby Units
19 1,2, and 3 to be [REDACTED] per MWh, nearly two and half times the cost of delivered energy
20 to its Wyoming residential customers.²¹

21 Additionally, such a conversion of the Naughton 3 plant would require substantial
22 retrofits necessitating an extended outage for the plant, which in turn would require the
23 Company to find replacement resources in the interim, most likely market purchases.
24 These purchases would likely be solicited during a period of high demand when other
25 companies, who will also be retrofitting or retiring coal plants, will be looking for
26 replacement resources. There is a significant risk that the cost of purchased power will

²¹ As measured by the Utility Rate Comparison available from the Wyoming Public Service Commission at <http://psc.state.wy.us/htdocs/download/Ratecompweb.pdf>.

1 spike during this period. Upgrading the existing Naughton 3 coal plant for environmental
2 compliance will not require an extended outage.

3 Regarding the repowering option in which RMP would construct a new combined CCCT
4 gas plant to replace the existing Naughton 3 coal plant, that option too has many
5 challenges. First, RMP states that because of the configuration of the existing plant site,
6 which is limited by the ash ponds, and the extent of its current footprint, which is small,
7 the existing Naughton 3 coal plant would likely have to be demolished in order to
8 accommodate a CCCT at the existing site. Demolition of the existing plant and
9 replacement with a CCCT would be expensive and require a demolition/construction
10 period of as much as four years requiring the Company to acquire replacement power
11 supplies for the duration of the demolition/construction. Permitting a new CCCT at the
12 existing Naughton plant site would be further complicated by permitting issues assuming
13 Naughton units 1 and 2 remain in service at that site. Constructing a CCCT at the
14 Naughton plant site would also require the construction of a pipeline to service the CCCT
15 at an approximate cost of [REDACTED].²²

16 Finally, with regard to siting a new CCCT at the existing Naughton plant site, there
17 would be a significant altitude penalty. Because there is less oxygen available at higher
18 altitudes the combustion process is less efficient resulting in larger required fuel quantity
19 input for the same heat output. RMP states that the Naughton plant has an elevation of
20 6,936 feet above sea level.²³ This makes a CCCT constructed at that site 10% more
21 expensive than a plant constructed at 4,500 feet above sea level.²⁴

22 **Q. DID RMP COMPARE THE COST OF THESE TWO OPTIONS TO THE COST**
23 **OF THE ENVIRONMENTAL UPGRADES AT THE EXISTING NAUGHTON 3**
24 **COAL PLANT?**

25 A. No. In multiple responses to data requests, the Company indicates that these two studies,
26 which were conducted separately from the SO modeling exercise, were intended to be
27 stand alone studies of the cost of either converting or repowering the existing Naughton 3

²² Response to WIEC Data Request 23.3.

²³ Response to WIEC Data Request 11.17.

²⁴ Ibid.

1 plant. For purposes of evaluating the prudence of either upgrading the existing Naughton
2 3 plant or retiring it and replacing the capacity, the Company relies on the SO model,
3 which it avers is a more robust means of analyzing available options. The SO model
4 compares the cost of operating Naughton 3, including the required upgrades, with the
5 cost of replacing it with least cost available alternatives including both supply and
6 demand side resources. As noted earlier, given the alternatives available in the model,
7 and based on the inputs and assumptions used by RMP in the analysis, the SO chose to
8 keep Naughton 3 in service rather than selecting any other resource available to it.

9 **Q. HOW, THEN, SHOULD THE COMMISSION VIEW THE CONVERSION AND**
10 **REPLACEMENT OPTIONS STUDIED BY RMP IN THIS CASE?**

11 A. As I stated earlier, these two studies are reference points. In my view neither the
12 conversion nor the repowering options are viable options to replace the capacity of
13 Naughton 3 if it were retired. It would be less expensive and more efficient, if the
14 decision was taken to retire and replace the Naughton 3 coal plant, to replace it with a
15 green-field resource somewhere else on the system, presumably at a lower elevation. The
16 results of the SO model runs undertaken by the Company show the details of those
17 alternatives. At most, these two studies demonstrate that converting or repowering the
18 Naughton 3 coal fired plant are not viable options. Neither of the studies provides
19 decisive evidence regarding the underlying question of whether or not retrofitting the
20 Naughton 3 plant is prudent and in the best interest of customers.

21 **Q. IS THERE ANY OTHER EVIDENCE THAT THE COMMISSION SHOULD**
22 **CONSIDER IN MAKING ITS DECISION IN THIS PROCEEDING?**

23 A. In keeping with my discussion earlier regarding what factors might make Naughton 3 less
24 rather than more vulnerable to retirement, which included actual plant operating
25 parameters and pollution controls already installed, I suggest that the Commission look at
26 what we actually know about the impact of the proposed investment on the cost of
27 operating the plant. In response to data requests from both myself and the Commission
28 Technical Staff, RMP provided information regarding the cost of energy produced by
29 Naughton 3 both before and after the upgrades proposed in this case. I have attached

1 RMP's response to the staff as OCA Confidential Exhibit BJF 2 since it is more detailed
2 than RMP's response to my original request.

3 As can be seen in top portion of this exhibit, construction of the pollution control
4 upgrades requested in this proceeding will increase the cost of energy produced at the
5 Naughton 3 plant by approximately [REDACTED] to [REDACTED] per MWh. Making an allowance for
6 carbon pricing (starting in 2021, but converted to 2010 dollars) increases the cost further
7 to [REDACTED] per MWh, which is approximately double the existing bus bar (substation
8 interconnection with the transmission system at the plant site) cost of the unit.

9 **Q. DOES OCA CONFIDENTIAL EXHIBIT BJF 2 ACCOUNT FOR ALL OF THE**
10 **COSTS THAT CAN REASONABLY BE EXPECTED TO BE INCURRED**
11 **PURSUANT TO EVOLVING EPA REGULATIONS?**

12 A. No. The [REDACTED] per MWh bus bar cost after upgrades reflects only costs to comply with
13 existing regional haze SO₂, NO_x and particulate standards, although some of those
14 upgrades will also assist in complying with the mercury MACT rule, among others. It
15 does not include investment necessary to comply with the prospective CCR rules, 316(b)
16 water intake regulations, or additional investments that may be necessary to comply with
17 the MATS rule. Although we do not know the full extent of the environmental
18 requirements that will ultimately be imposed by the EPA since many of those rules have
19 yet to be finalized, or even drafted in some cases, we do know that any further
20 environmental requirements will only increase the bus bar cost of energy produced at
21 Naughton 3.

22 **Q. HOW CAN THE COMMISSION USE THIS INFORMATION TO MAKE ITS**
23 **DETERMINATION IN THIS CASE?**

24 A. By itself this cost information is not helpful. But, when one starts to compare the
25 information to existing and other alternative generation resources the value of Naughton
26 3 becomes more apparent. For instance, while we know that other environmental
27 upgrades will be necessary at Naughton 3, which remain unquantifiable at this point, we
28 also know that the upgrades proposed in this case represent the lion's share of
29 environmental upgrades that will be required. Additional investments in CCR, water

1 intake modifications and additional mercury removal equipment will be relatively modest
2 in comparison to the SCR and PJFF requested for approval in this proceeding.

3 So, if we compare the bus bar cost of energy produced by Naughton 3 after the upgrades
4 in this proceeding to other existing generation resources that are currently compliant with
5 all existing regulations adopted by the EPA, we see that there is considerable head room
6 for compliance with prospective regulations before Naughton 3 becomes uneconomic.
7 For example, RMP reports that the bus bar cost of energy produced at its Lakeside Unit 1
8 CCCT is ██████ per MWh, without an allowance for carbon cost. Allowing a cost
9 increment for the price of carbon emissions would put the Lakeside plant closer to ██████
10 per MWh at the bus bar. That would leave an increment of approximately ██████ per
11 MWh for additional expected but unquantified compliance costs at Naughton 3 before it
12 exceeded the cost of a representative existing generation resource.

13 Of course, the upgrades at Naughton 3 are not competing with existing resources but with
14 the next best alternative supply option. The Company indicates in responses to data
15 requests that if Naughton 3 were to be retired it would likely be replaced with an east side
16 (Utah, Idaho or Wyoming) gas fired generation resource of similar size located in Utah.²⁵
17 According to the 2011 IRP, this replacement resource would have a total cost of ██████
18 (East side Wet "G" 1x1) per MWh at a carbon price of \$19 per ton. Adjusting this cost to
19 reflect a carbon price of roughly \$13.00 per ton as shown in OCA Confidential Exhibit
20 BJF 2 rather than the \$19.00 used in the IRP calculation would imply a total resource cost
21 of roughly ██████ MWh as compared to the ██████ per MWh cost for an upgraded
22 Naughton 3 coal unit. The difference, approximately ██████ per MWh, is the head room
23 at the Naughton 3 plant for addressing expected but unquantified compliance costs when
24 compared to a new resource.

25 **Q. IS THERE AN ESTIMATE OF THE COST OF POTENTIAL ADDITIONAL**
26 **COMPLIANCE REQUIREMENTS AT THE NAUGHTON 3 PLANT?**

27 **A.** Yes. In addition to the incremental costs for the environmental control equipment
28 already included in its analysis in this case, RMP has provided rough order of magnitude

²⁵Ibid.

1 estimated cost information to further quantify the potential impacts of the Mercury and
2 Air Toxics Standards, water regulations under 316(b) and the cost of coal ash disposal
3 should it be regulated as a hazardous waste; a worst case scenario if you will. These
4 additional incremental costs are detailed in OCA Confidential Exhibit BJJ 3.

5 As shown on OCA Confidential Exhibit BJJ 3, the incremental cost of compliance with
6 the mercury and water rules is expected to be minor, adding only about [REDACTED]
7 [REDACTED] to the bus bar cost of electricity produced by Naughton 3. However, if CCR is
8 ultimately regulated as a hazardous waste, compliance costs could be in the range of
9 [REDACTED] per MWh at the bus bar. This would put the estimated cost of electricity produced
10 at Naughton 3 above the cost of that produced by a comparably sized natural gas CCCT.

11 With regard to the regulation of CCR, there are two critical points to remember. First, we
12 do not know, at this point, whether or not CCR will be regulated under Title C of RCRA;
13 there is some risk that it will. In order to keep Naughton 3 on line past 2014, however,
14 the Commission will have to make a decision on the investments in the PJFF and SCR in
15 this case before we know the answer to that question.

16 Secondly, and perhaps more importantly, if CCR is ultimately regulated as a hazardous
17 waste the Company is likely to incur all or a significant portion of the [REDACTED] in
18 compliance costs whether it continues to operate the plant or not. These costs will be
19 incurred to mitigate the environmental impacts of the Naughton site's existing coal ash
20 disposal facilities whether or not the plant continues to operate. As such, the decision to
21 retire the plant, or not, would be driven by other factors as discussed elsewhere in my
22 testimony. In other words, if RMP is going to incur the CCR costs anyway, it might as
23 well run the plant unless it is judged to be uneconomic on some other metric. The
24 proposed upgrades at Naughton 3 appear to be cost effective, again, knowing what we
25 know now, under either comparative scenario.

26 **Q. WHAT DO YOU CONCLUDE WITH REGARD TO THE QUESTION OF THE**
27 **PRUDENCE OF RMP INVESTING IN THE ENVIRONMENTAL UPGRADES IN**
28 **THIS CASE?**

1 A. Based on the model simulations RMP has conducted in this case using the System
2 Optimizer expansion module, as well as my review of independent evaluation metrics as
3 discussed extensively above, I conclude that based on what we know at this time,
4 upgrading the Naughton 3 plant to comply with known and expected environmental
5 regulations appears to provide the least cost, least risk alternative for providing continued
6 reliable service to Wyoming customers.

7 **Q. IS THIS A RISK FREE DECISION?**

8 A. No, of course not. There is abundant risk remaining on both sides of this equation
9 because there is simply so much that we do not know or cannot know at this point.
10 Although I am convinced that RMP has made a good faith attempt to measure and
11 account for the impacts of future federal environmental regulations, there is significant
12 risk that these regulations could turn out to be more costly than expected. For example,
13 RMP has assumed, based on Title D of RCRA, that it will need to convert its wet coal ash
14 disposal system at the Naughton 3 plant to a dry landfill system. It has not assumed,
15 however, as discussed previously, that CCR will be classified as a hazardous waste. Such
16 classification, if ultimately adopted by the EPA, would increase the cost of compliance
17 with CCR regulations. We simply do not know, definitively, what that impact will be at
18 this time.

19 Similarly, RMP has assumed forward carbon prices in its analysis in this case ranging
20 from ■ per ton emitted to ■ per ton emitted. The base case contained in the SO model
21 assumes a ■ per ton price of carbon beginning in 2021. However, there is no way of
22 knowing, at this point, when or if carbon will be regulated, and if so how it will be
23 regulated. If a hard cap regulation scheme were adopted with no provision for
24 allowances for existing emissions, continuing to operate the plant might become
25 uneconomic.

26 On the other hand, available alternatives to replace the Naughton 3 capacity are not
27 without their own set of challenges. Natural gas fired combined cycle generation which
28 is the leading candidate replacement resource, for instance, would introduce additional
29 fuel price risk that is likely incremental to coal price risk. Natural gas is currently priced
30 at historically low levels and conventional wisdom holds that continuously increasing

1 supplies will hold the price of natural gas down for the foreseeable future. However, a
2 new CCCT is a forty plus year investment decision. In the face of new demand for
3 natural gas fired electric generation, natural gas as a transportation fuel, as a feedstock for
4 chemicals and the potential export of domestic natural gas supplies to overseas markets,
5 is it reasonable to assume that gas will continue to be priced in the range of \$4 to \$6 over
6 the forty year life of a new CCCT? Couple the potential for increased demand with
7 potential environmental restrictions on new drilling (e.g. hydraulic fracturing) and one
8 quickly comes to the conclusion that there is no certainty about the future price of natural
9 gas. In fact, there is certainly some risk that the price of natural gas will rise, perhaps
10 significantly, and continue to be volatile as we have seen over the course of the last
11 decade.

12 Finally, like coal, natural gas fired generation emits CO₂ and will be subject to any
13 carbon regulation scheme that is ultimately adopted. Natural gas fired combined cycle
14 generation may also be subject to water intake and discharge rules under EPA's 316(b)
15 regulations. The point here is that changing the nation's generation portfolio to one that
16 relies much more heavily on natural gas may not be the environmental compliance silver
17 bullet that it appears to be at this moment.

18 **Q. ARE THERE RISKS OTHER THAN ECONOMIC RISKS THAT THE**
19 **COMMISSION SHOULD BE AWARE OF IN THIS PROCEEDING?**

20 A. Yes. There is growing concern in the industry that implementation of these rules on the
21 timeline laid out by the EPA may adversely impact the reliability of the bulk electric
22 system. For example, in its 2011 Long Term Reliability Assessment the North American
23 Electric Reliability Corporation (NERC) found that:²⁶

24 The industry must consider all EPA regulatory requirements in an
25 integrated fashion when making technology investments or retirement
26 decisions. Further, outages at one generating unit must be compensated
27 for by increased generation elsewhere. Therefore, the loss of reliability

²⁶ 2011 Long Term Reliability Assessment, North American Reliability Corporation, November 2011,
http://www.nerc.com/files/2011%20LTRA_Final.pdf.

1 support functions provided by coal-fired generation may not be easily
2 replaced given the time constraints. Studies demonstrate that regional
3 reserve requirements could be compromised by the cumulative impact of
4 EPA's actions, which indicate that between 2012 and 2018, the nation's
5 power grid will be stressed in ways never before experienced and could
6 pose a reliability concern.

7 NERC further found that:²⁷

8 ...EPA regulations may result in the potential loss of a significant amount
9 of generation, either through retirements or de-rates associated with
10 powering on-site environmental controls equipment, during a short time
11 frame (2012-2015). Within this timeframe, some generators may not
12 have enough time to acquire permits, engineering, equipment design,
13 acquisition of equipment, and systematically shut down their units to
14 install the necessary retrofitted equipment, while concurrently meeting
15 reliability goals.

16 NERC, the nation's foremost authority on the reliability of the bulk electric system, is
17 obviously concerned about the impacts that current and pending EPA rules could have on
18 the reliability of the bulk electric system. In its assessment, NERC recommends that
19 generators be given maximum flexibility to comply with the new rules, including time
20 extensions and outright waivers of the requirements in circumstances where compliance
21 requirements would jeopardize the reliability of the bulk electric system.

22 Although Naughton 3 is a tiny fraction of the capacity that exists in the WECC region,
23 nevertheless, it would be part of the cumulative impact on the bulk electric system that
24 NERC refers to in its assessment. As such, the reliability impacts of retiring Naughton 3
25 on the western bulk electric system should also be considered by the Commission in its
26 determination in this case. This is particularly true in light of the transmission constraints
27 that are known to exist in certain areas of the WECC region.

²⁷ Ibid.

1 **Q. HOW SHOULD THE COMMISSION FACTOR THESE RISKS INTO ITS**
2 **DECISION IN THIS CASE?**

3 A. The Company believes, and has supported its contention with extensive evidence, that
4 upgrading the Naughton 3 plant to comply with existing and expected environmental
5 regulations is the least cost, least risk alternative for customers going forward. Based on
6 my review of the Company's analysis and the results of my own independent
7 investigation, I agree. Still, there is considerable risk regarding all of the alternatives in
8 this proceeding, and the associated dollars, while not huge for the Naughton 3 upgrades,
9 will nevertheless be consequential for consumers. None of us really knows what the
10 future holds. Consumers and their representatives, including me, certainly cannot
11 guarantee that one option will yield lower costs than all others. Likewise, although the
12 Company is in a better position than customers to make inferences about the future, it
13 also can't guarantee that the outcome of the decision in this case will yield the lowest
14 possible cost to customers. Only in retrospect will we be able to make that
15 determination.

16 Accordingly, I believe it is unfair for customers to bear all of the risk associated with the
17 Company's preferred alternative in this case. If upgrading the Naughton 3 plant is a good
18 deal for customers, as the Company believes it is, then it should be willing to stand by
19 that decision and at least share the risk that this decision will turn out not to be in
20 customers' best interest. Therefore, I recommend that the Commission approve RMP's
21 request for the environmental controls in this case under the following conditions. If,
22 after making the upgrades proposed in this proceeding, RMP chooses to retire the
23 Naughton 3 plant prior to the end of 2020, recovery of the remaining undepreciated
24 investment in the environmental controls approved in this case, on the books at the time
25 the plant retires, should be limited to no more than 50%. In the event of retirement prior
26 to the end of 2020, the Commission should require the Company appear and show cause
27 as to why the this portion of the remaining undepreciated investment should be recovered
28 from customers.

29 To be clear, I am recommending ordinary rate base treatment of these investments unless
30 Naughton 3 retires on or before the end of 2020. If the plant retires before that date the

1 parties should have the right to recommend alternative treatment of half of the remaining
2 undepreciated investment in the environmental upgrades. For example, if the plant (and
3 the environmental upgrades) are no longer used and useful for serving customers the
4 parties might recommend that 50% of the remaining undepreciated investment be
5 excluded from rate recovery. Alternatively, the parties might recommend that the
6 undepreciated investment be amortized over some future period with the Company
7 earning no return on that investment. Or, the parties might ultimately agree that 50% of
8 the remaining undepreciated investment continue to receive ordinary rate base treatment.
9 The other 50% of the remaining undepreciated investment in the environmental upgrades
10 would continue to receive normal rate base treatment. Conditioning approval of the
11 CPCN in this manner will promote an equitable sharing of the risks of these investments
12 between the Company and its customers without tipping the scale in favor or against the
13 retrofits proposed in this case.

14 By the end of 2020 customers will have received a majority of the benefits of upgrading
15 Naughton 3 and the impact of the emission requirements that we currently expect but
16 can't quantify will be known by then. It would be unreasonable to speculate about the
17 factors that might impact the continued economic viability of Naughton 3 beyond 2020.

18 **Q. HAVING CONDITIONALLY ENDORSED THE COMPANY'S PLAN TO**
19 **UPGRADE THE NAUGHTON 3 PLANT IN THIS PROCEEDING, ARE THE**
20 **SPECIFIC INVESTMENTS PROPOSED BY THE COMPANY IN THIS CASE**
21 **NECESSARY AND PRUDENT?**

22 A. As I stated earlier in my testimony, Mr. Leo Stander will be testifying as to the prudence
23 of the Company's compliance strategy in this case. After a thorough review and
24 validation of RMP's environmental compliance obligations, both existing and
25 prospective, Mr. Stander has concluded that the Company's investment in the PJFF and
26 SCR are necessary and that there are no other viable options for compliance. The
27 remainder of my testimony assumes that the upgrades are prudent, as discussed earlier in
28 my testimony, and that the PJFF and SCR are projects are necessary as discussed in Mr.
29 Stander's testimony.

1 **Q. GIVEN THOSE FACTS, WHAT IS THE NEXT STEP IN YOUR ANALYSIS IN**
2 **THIS PROCEEDING?**

3 A. The next step, having determined that the upgrades are prudent and that the facilities and
4 equipment proposed by RMP are necessary to meet its compliance obligations, is to
5 determine whether or not the estimated costs for these projects are reasonable. The
6 installation of these facilities requires custom design and engineering as well as on site
7 fabrication. Such factors as the configuration of the existing plant, equipment type, fuel
8 quality and available space at the plant site must be considered when planning the
9 addition of any new equipment, including pollution control equipment.

10 **Q. WHAT CAN YOU OFFER THE COMMISSION WITH REGARD TO THE**
11 **QUESTION OF COST IN THIS CASE?**

12 A. I will offer some benchmark information on the cost of emissions control measures that is
13 based on publicly available information. In addition, I will offer some general
14 observations about how the costs were developed. Finally, I will highlight cost
15 information and associated recommendations based on information provided by RMP in
16 this case.

17 **Q. WHAT INFORMATION IS PUBLICLY AVAILABLE REGARDING**
18 **COMPLIANCE COSTS FOR THE EPA RULES THAT YOU HAVE**
19 **REFERENCED IN YOUR TESTIMONY?**

20 A. There is relatively little public information available regarding typical compliance costs
21 for these regulations and, what information is available relates to broad ranges of
22 expected costs rather than point estimates. This paucity of information is due to two
23 primary factors. First, as I have discussed previously, the cost of compliance at any
24 generation facility is highly dependent on site specific factors such as plant configuration,
25 existing pollution control equipment, space availability, etc. It is exceedingly difficult to
26 develop an average cost that fairly reflects the disparate circumstances each plant would
27 face in deciding whether or not compliance is economically justified. Secondly, there
28 have not been many of these projects completed thus far as the compliance requirements

1 for NO_x, SO₂ and particulate matter have only recently been adopted and compliance
2 deadlines established.

3 However, there have been some analyses done and some projects completed that provide
4 cost ranges that may be instructive to the Commission in determining whether or not the
5 cost of compliance proposed by RMP in this case is reasonable. Here I am focusing
6 specifically on the proposed cost of the PJFF and the SCR.

7 In the 2011 Long Term Reliability Assessment that I referenced earlier, NERC estimates
8 the cost of constructing a fabric filter at \$200 to \$400 per kW.²⁸ In its assessment NERC
9 found that:

10 In addition, the proposed EPA Utility Air Toxic rule also includes a total
11 particulate emission limitation of 0.03 pounds (lbs)/MMBtu as a surrogate
12 for non-mercury metals, which is applicable to coal-fired units. Given the
13 average ash content of coals, this limit will require power plants to
14 remove 99.6-99.8 percent of the particulate matter in the flue gas stream.
15 Such high performance can only be achieved on a consistent basis by
16 fabric filter controls that cost between \$200-\$400/kW to retrofit.

17 In a January 2011 study by ICF International on behalf of the Edison Electric Institute
18 (EEI), the cost of retrofitting a PJFF on an existing 325 MW coal fired power plant is
19 estimated to be \$285 per kW (2008 dollars).²⁹

20 There is a similarly wide range of estimates available for the cost of controlling NO_x
21 emissions with SCR equipment. In the same report referenced above EEI estimates the
22 cost to retrofit a 325 MW coal plant with SCR at \$436 per kW.³⁰ In its modeling of the
23 impacts of the CSAPR rule, the EPA estimates the cost of compliance with NO_x
24 standards using SCR will fall in a range between \$193 and \$209 per kW.³¹

²⁸ 2011 Long Term Reliability Assessment, North American Reliability Corporation, November 2011,
http://www.nerc.com/files/2011%20LTRA_Final.pdf.

²⁹ Potential Impacts of Environmental Regulation on the U.S. Generation Fleet Potential Impacts of Environmental
Regulation on the U.S. Generation Fleet, Final Report; Steven Fine, Shanyn Fitzgerald, Jesse Ingram, January 2011,
[http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2011IRP/EEIM
odelingReportFinal-28January2011.pdf](http://www.pacificorp.com/content/dam/pacificorp/doc/Energy_Sources/Integrated_Resource_Plan/2011IRP/EEIM
odelingReportFinal-28January2011.pdf).

³⁰ Ibid.

³¹ IPM Analyses of the Cross-State Air Pollution Rule (CSAPR), U.S. Environmental Protection Agency

1 I also obtained a simple spreadsheet emissions modeling program, the Integrated
 2 Environmental Control Model (IECM), developed by the U.S. DOE's National Energy
 3 Technology Laboratory.³² Results produced by this model show the estimated cost of
 4 compliance with current permit requirements for SO₂, NO_x and particulate matter (FGD,
 5 SCR and Bag House) at Naughton Unit 3 are in the range of \$500 per kW. Although the
 6 results of this model are interesting it is not possible to separate the cost of the individual
 7 piece parts (SCR, PJFF and FGD) so a comparison with other benchmarks for the
 8 individual components is not meaningful.

9 It is also interesting to look at the cost effectiveness of emissions control projects. Cost
 10 effectiveness is expressed as the cost per ton of emissions removed and reflects the fact
 11 that applications of identical technologies at different plant sites may have markedly
 12 different removal rates. For example, Black & Veatch performed a BART analysis on
 13 the Four Corners power plant operated by Arizona Public Service Company and found
 14 that the NO_x removal cost per ton for units 1, 2 and 3 would range from \$4,343 to \$5,484
 15 per ton.³³ Although the EPA found these costs to be "cost effective, particularly in
 16 comparison to the cost effectiveness of SCR retrofits estimated for other Western coal-
 17 fired power plants," APS concluded that it would be less expensive to retire the Four
 18 Corners plant. The other western coal plants examined by the EPA along with their
 19 associated cost per ton of removal for NO_x are shown in the table below:

Facility	Year of Cost Basis	Size	Cost Effectiveness (\$/Ton)
Centralia Power Plant (Units 1-2)	2008	702.5 MW	\$9,091
San Juan Generating Station (Units 1-4)	2007	350-544 MW	\$5,498-\$6,932
M.R. Young (Units 1-2)	2009	257-477 MW	\$3,950-\$4,250
Naughton (Units 1-3)	2006	160-330 MW	\$2,751-\$2,848
Jim Bridger (Units 1-4)	2006	530 MW	\$2,256-\$4,274

Clean Air Markets Division, August 2010, <http://www.epa.gov/airmarkets/progsregs/epa-ipm/transport.html>.

³² The IECM is available for download at <http://www.cmu.edu/cpp/iecm/>.

³³ Proposed Rule: Source Specific Federal Implementation Plan for Implementing Best Available Retrofit Technology for Four Corners Power Plant: Navajo Nation Technical Support Document Docket Number: EPA-R09-OAR-2010-0683, <http://www.epa.gov/region9/air/navajo/pdfs/FCPP-techdoc10-6-10.pdf>
<http://www.epa.gov/region9/air/navajo/pdfs/FCPP-techdoc10-6-10.pdf>.

1
2 In comments submitted by the National Park Service (NPS) contesting the BART
3 application of Nevada Power for its Reid Gardner Generating Station, NPS cites
4 thresholds as high as \$10,000 per ton removed (Wisconsin) as BART for NO_x removal.³⁴

5 Additionally, as noted in the table above, the EPA used both the Naughton and Bridger
6 plants, both of which are owned by RMP, as a basis of comparison in the Four Corners
7 BART analysis, the costs shown are only estimates. The actual Engineer, Procure,
8 Construct (EPC) costs developed by RMP in this proceeding are lower than the estimates
9 used in the Four Corners analysis.

10 **Q. IN VIEW OF THE FOREGOING INFORMATION HOW DO THE RETROFIT**
11 **COSTS PROPOSED BY RMP IN THIS CASE COMPARE TO COSTS**
12 **ESTIMATED FOR OTHER PLANTS?**

13 A. Based on information provided by the Company in response to data requests posed by
14 WIEC, the per kW cost of the SCR and PJFF projects in this case is approximately [REDACTED]
15 and [REDACTED], respectively.³⁵ These costs generally agree with range cited by NERC that I
16 referenced earlier of \$200-\$400 per kW for constructing a PJFF, especially in view of the
17 site specific factors that have not, but would need to be considered in that range.
18 Moreover, RMP estimates the first year cost of removal per ton for NO_x using the SCR
19 technology will be [REDACTED] which compares favorably, and in some cases quite favorably,
20 to the costs of compliance at plants elsewhere around the country.³⁶

21 **Q. DO YOU HAVE ANY OTHER OBSERVATIONS ABOUT THE COST OF THE**
22 **COMPLIANCE PROJECTS PROPOSED IN THIS CPCN PROCEEDING?**

23 A. It is important to note a couple of other factors regarding the cost of the upgrades in this
24 proceeding. First, in developing its compliance strategy for Naughton 3 the Company

³⁴ U.S. Department of the Interior, National Park Service, Air Resources Division, August 17, 2011,
http://www.nature.nps.gov/air/regs/sinletters/pdf/Nevada_EPA_Letter_08-17-2011.pdf.

³⁵ From WIEC 8.18, cost per kW (SCR) = total cost divided by total kW rating;
\$137,094,024/330,000=\$415.44/kW. cost per kW (PJFF) = total cost divided by total kW rating;
\$134,513,529/330,000=\$407.62/kW.

³⁶ Naughton 3 BART Analysis, CH2M Hill, as contained in the Company's application.

1 solicited bids from over 30 contractors, technology vendors and engineering firms. From
2 these competitive solicitations four proposals were received and an Engineer, Procure
3 Construct (EPC) contractor was selected based on the best price, performance guarantees
4 and security terms. The contract is a lump sum, fixed price contract under which the
5 Contractor guarantees substantial completion by July 1, 2014 with provisions for
6 liquidated damages if certain project milestones are not met. The process of developing
7 and executing the EPC contract appears to me to be reasonably calculated to protect the
8 Company and its customers from the risk of a large cost overrun while also ensuring that
9 the Company is able to comply with applicable emission control requirements by the
10 EPA's 2014 deadline.

11 Secondly, RMP has been engaged in upgrading environmental control systems
12 throughout its generation fleet for many years. In fact, since 2006 the Company has
13 invested over [REDACTED] million in pollution control upgrades at its Cholla, Dave Johnston,
14 Huntington, and Jim Bridger plants. Final costs for all of these projects were within
15 approximately 3% of estimated costs; on average the actual final cost of the projects was
16 about 97% of the estimated cost. These major pollution control projects and their
17 associated costs are shown in OCA Confidential Exhibit BJJ 4. For projects
18 that can potentially cost \$150 to \$200 million or more, cost estimates that turn out to be
19 97% accurate seems fairly remarkable and in my view supports the veracity of the
20 Company's contracting practices.

21 **Q. DO YOU HAVE ANY CONCLUSIONS OR RECOMMENDATIONS TO SHARE**
22 **WITH THE COMMISSION REGARDING THE COST OF THE SCR AND PJFF**
23 **PROJECTS IN THIS CASE?**

24 A. After comparing the estimated cost of these projects to the cost of other projects for
25 which information is publicly available, my conclusion is that the estimated costs appear
26 to be reasonable on both a per kW and cost per ton removed basis. Accordingly, pursuant
27 to the terms of the stipulation discussed earlier in my testimony, the OCA agrees not to
28 challenge the costs of these projects in any future rate proceeding so long as those costs
29 do not exceed the estimated amounts contained in this CPCN application.

30 **Q. MR. FREEMAN, WHAT IS YOUR ULTIMATE RECOMMENDATION TO THE**

1 **COMMISSION REGARDING THE REQUESTED CPCN IN THIS**
2 **PROCEEDING?**

3 A. I recommend that the Commission grant the CPCN and find that the pollution control
4 upgrades, specifically the SCR and PJFF, proposed by RMP are necessary for the
5 Company to continue to provide safe, adequate, reliable and affordable service to its
6 Wyoming customers. It is my opinion, after my review and analysis, and based upon the
7 expert review and advice of Mr. Stander, that these investments are prudent, will be used
8 and useful for serving customers and are therefore in the public interest. However, my
9 recommendation is premised on the assumption that Naughton 3 and the associated
10 environmental upgrades will remain used and useful for serving customers through the
11 end of its useful life in 2029. Should RMP choose to retire the plant after the upgrades
12 are made, but before the end of 2020, then I recommend that RMP be required to show
13 cause as to why 50% of the remaining undepreciated investment in the pollution control
14 upgrades should be recovered from customers.

15 **Q. DOES THAT CONCLUDE YOUR TESTIMONY IN THIS PROCEEDING?**

16 A. Yes, it does.

APPENDIX A

**CASES IN WHICH BRYCE FREEMAN HAS PRESENTED TESTIMONY BEFORE THE
WYOMING PUBLIC SERVICE COMMISSION AS OF 3/19/2012**

<u>Docket Number</u>	<u>Company</u>	<u>Hearing Date</u>	<u>Subject Of Testimony</u>
30016-GR-94-8	Pinedale Natural Gas Company	10/26/1994	ROR
70006-TR-94-14	Silver Star Telephone Company, Inc.	12/6/1994	ROR
20002-ER-95-48	Black Hills Power & Light	8/14/1995	ROR, IRP, DSM, AFOR
70000-TR-95-238	U S WEST Communications, Inc.	10/2/1995	TSLRIC
General Order No. 73	Commission Rule Making	4/11/1996	TSLRIC
20000-ER-95-99	PacifiCorp, Inc.	6/17/1996	ROR, AFOR, PBR
70007-TR-95-15	Dubois Telephone Company	8/5/1996	ROR, TSLRIC
30012-GR-96-33	Wyoming Industrial Gas Company	10/16/1996	ROR
70005-GR-95-15	Pacific Telecommunications, Inc.	12/10/1996	TSLRIC
70000-TT-96-301	U S West Communications, Inc.	1/10/1997	AFOR, Jurisdiction
70007-TR-95-15	U S West Communications, Inc.	1/28/1997	TSLRIC, RATE DESIGN
70000-TR-96-323	U S West Communications, Inc.	5/26/1997	TSLRIC, Imputation
30005-GR-97-51	Cheyenne Light, Fuel & Power, Inc.	8/25/1997	ROR
70011-TR-97-15	Tri-County Telephone Association, Inc.	3/31/1998	TSLRIC
70014-TR-97-7	TCT West, Inc.	3/31/1998	TSLRIC
80007-WR-98-6	Vista West Water Company	8/31/1998	Cost of Service
20000-EA-98-141	PacifiCorp, Inc.	7/6/1999	Merger
30010-GR-99-47	Questar Gas Company	10/28/1999	ROR, Revenue Requirement
20003-ER-99-54	Cheyenne Light, Fuel & Power, Inc.	1/18/2000	ROR, Rate Design
30005-GR-99-53	Cheyenne Light, Fuel & Power, Inc.	1/18/2000	ROR, Rate Design
20000-ER-99-145	PacifiCorp, Inc.	1/26/2000	ROR, Rate Design
80007-WR-99-8	Vista West Water Company	3/22/2000	Rate Design
30010-GA-01-56	Questar Gas Company/Wyoming Industrial Gas	6/12/2001	Merger/Acquisition
30012-GA-01-43	PacifiCorp, Inc.	7/9/2001	Rate Design
20000-ER-0-162	Qwest Communications	9/6/2001	TSLRIC
70000-TA-99-482	Qwest Communications	3/15/2002	TELRIC
70000-TA-01-700	All West Communications, Inc.	10/28/2002	TSLRIC
70013-TR-02-17	Silver Star Telephone Company, Inc., Teton Telecom	12/17/2002	TSLRIC
70006-TT-00-43	PacifiCorp, Inc.	1/7/2003	Power Cost
70016-TA-02-21	Kinder Morgan, Inc.	2/3/2003	Choice Gas
20000-ER-02-184	PacifiCorp, Inc.	1/16/2004	Power Cost
30022-GI-02-3	MEHC/PacifiCorp	12/15/2005	Merger/Acquisition
20000-ER-02-198	Kinder Morgan, Inc.	9/18/2006	ROR
20000-EA-05-226	Rocky Mountain Power	1/10/2007	Avoided Costs
30022-73-GR-06	Source Gas/Kinder Morgan/KMRUH; Knight HoldCo LLC, Knight Acquisition Co.	2/18/2007	Sale/Acquisition/Reorganization
20000-250-EA-06	Pinedale Natural Gas Company	3/21/2007	General Rate Case/ROR
30022-84-GA-06	WYRULEC	7/2/2007	General Rate Case
30085-85-GA-06	Cheyenne Light, Fuel & Power, Inc.	10/22/2007	General Rate Case/WYGEN II Prudence
30016-41-GR-06	Embarq Communications	11/2/2007	Access Charges/USF
10016-47-CR-06	WYRULEC	12/10/2007	Amended General Rate Case
20003-90-ER-07	Rocky Mountain Power	3/3/2008	General Rate Case/ROR
30005-112-GR-07	Rocky Mountain Power	5/27/2008	Amended DSM Application
70009-294-TT-07	Chugwater Telephone Company	8/21/2008	General Rate Case
10016-47-CR-06	Rocky Mountain Power	3/23/2009	General Rate Case/ROR
20000-277-ER-07	Questar Gas Company	4/1/2009	General Rate Case/ROR
20000-264-EA-06	Montana/Dakota Utilities	4/7/2009	General Rate Case/ROR
70005-24-TR-08	Wyoming Gas Company	5/18/2009	General Rate Case/ROR
70000-333-ER-08	Rocky Mountain Power	9/1/2009	Avoided Costs
30010-GR-94-08	Rocky Mountain Power	4/16/2010	ROR
20004-75-ER-08	Black Hills Power, Inc.	5/10/2010	ROR
300009-48-ER-08	Source Gas Distribution LLC	7/19/2010	Energy Efficiency/Decoupling
20000-342-EA-09	Cheyenne Light, Fuel & Power, Inc.	1/27/2011	DSM
20000-352-ER-09	Rocky Mountain Power	5/11/2011	DSM
20002-75-ER-09	Rocky Mountain Power	6/20/2011	General Rate Case/ROR
30022-148-GR-10	Rocky Mountain Power	8/1/2011	Avoided Costs
20003-108-EA-10	Rocky Mountain Power	3/19/2012	CPCN
30005-140-EA-10			
20000-383-EA-10			
20000-384-ER-10			
20000-388-ER-10			
20000-400-ER-10			

ROR = RATE OF RETURN; IRP = INTEGRATED RESOURCE PLANNING;
 DSM = DEMAND SIDE MANAGEMENT
 TSLRIC = TOTAL SERVICE LONG RUN INCREMENTAL COST;
 PBR = PERFORMANCE BASED RATE MAKING
 AFOR = ALTERNATIVE FORM OF REGULATION
 CPCN = Certificate of Public Convenience and Necessity

OCA Confidential Exhibit

BJF 1

This document is not included in the redacted version of Mr. Freeman's pre-filed direct testimony.

OCA Confidential Exhibit

BJF 2

**This document is not included
in the redacted version of Mr.
Freeman's pre-filed direct
testimony.**

OCA Confidential Exhibit

BJF 3

This document is not included
in the redacted version of Mr.
Freeman's pre-filed direct
testimony.

OCA Confidential Exhibit

BJF 4

This document is not included
in the redacted version of Mr.
Freeman's pre-filed direct
testimony.

BEFORE THE PUBLIC SERVICE COMMISSION OF WYOMING

IN THE MATTER OF THE APPLICATION OF)
ROCKY MOUNTAIN POWER FOR)
APPROVAL OF A CERTIFICATE OF PUBLIC)
CONVENIENCE AND NECESSITY TO)
CONSTRUCT THE SELECTIVE CATALYTIC)
REDUCTION SYSTEM, PULSE JET FABRIC)
FILTER SYSTEM AND RELATED)
ENVIRONMENTAL UPGRADES AT)
NAUGHTON UNIT 3 LOCATED NEAR)
KEMMERER, WYOMING)

DOCKET NO. 20000-400-EA-11
(Record No. 12953)

AFFIDAVIT, OATH AND VERIFICATION

Bryce J. Freeman (Affiant) being of lawful age and being first duly sworn, hereby deposes and says that:

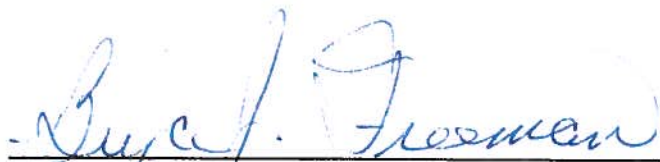
Affiant is the Administrator of the Wyoming Office of Consumer Advocate which is a party intervener in this matter pursuant to its Notice of Intervention filed on October 17, 2011.

Affiant prepared and caused to be filed the foregoing testimony. Affiant has, by all necessary action, been duly authorized to file this testimony and make this Oath and Verification.

Affiant hereby verifies that, based on Affiant's knowledge, all statements and information contained within the testimony and all of its attached schedules and/or exhibits are true and complete and constitute the recommendations of the Affiant in his official capacity as Administrator of the Wyoming Office of Consumer Advocate.

Further Affiant Sayeth Not.

Dated this 27th day of January, 2012.



Bryce J. Freeman, Administrator
Wyoming Office of Consumer Advocate
2515 Warren Avenue, Suite 204
Cheyenne, WY 82002
(307) 777-5742

STATE OF WYOMING)
) SS:
COUNTY OF LARAMIE)

The foregoing was acknowledged before me by Bryce J. Freeman on this 27th day of January, 2012. Witness my hand and official seal.

Angela D. Elliott

Notary Public

My Commission Expires: *6-24-13*

