BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF COLORADO
* * * *

IN THE MATTER OF THE APPLICATION OF	**)**	
PUBLIC SERVICE COMPANY OF COLORADO	**)**	**DOCKET NO. _____E**
FOR APPROVAL OF ITS 2011 ELECTRIC	**)**	
RESOURCE PLAN	**)**	

DIRECT TESTIMONY AND EXHIBITS OF JACK IHLE

ON

BEHALF OF

PUBLIC SERVICE COMPANY OF COLORADO

OCTOBER 31, 2011

LIST OF EXHIBITS

Exhibit No. JI-1	List of Attendees from Stakeholder Meeting

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I. INTRODUCTION AND QUALIFICATIONS

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Jack Ihle. My business address is 1800 Larimer Street, Suite 1600, Denver, Colorado 80202.

Q. BY WHOM ARE YOU EMPLOYED AND WHAT IS YOUR POSITION?

A. I am employed by Xcel Energy Services Inc., a wholly-owned subsidiary of Xcel Energy Inc., the parent company of Public Service Company of Colorado. I am Manager of Environmental Policy for Xcel Energy Services Inc.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?

A. I am testifying on behalf of Public Service Company of Colorado ("Public Service" or "Company").

Q. PLEASE PROVIDE A STATEMENT OF YOUR QUALIFICATIONS.

A. A statement of my qualifications is presented in Attachment A.

Q. WHAT ARE YOUR RESPONSIBILITIES AS MANAGER OF ENVIRONMENTAL POLICY?

A. My pertinent responsibilities include analyzing major environmental policies and policy proposals affecting Xcel Energy. I provide strategic insight to our executives on environmental policy issues and represent the Company's interests in these matters in discussions with federal and state policymakers.

Q. PLEASE PROVIDE AN OVERVIEW OF THE ENVIRONMENTAL REGULATIONS CURRENTLY AFFECTING ELECTRIC GENERATING UNITS IN COLORADO.

A. The utility sector is subject to a wide array of environmental regulations. The two air pollution programs currently in place that most affect the utility industry in Colorado are the Regional Haze Rule regulating visibility, and the national ambient air quality standards ("NAAQS") for ozone. The Denver Metropolitan Area does not meet the current NAAQS for ozone levels.

Q. IS THE FEDERAL ENVIRONMENTAL PROTECTION AGENCY ("EPA") IMPLEMENTING AND PROPOSING NEW AIR QUALITY REGULATIONS AFFECTING ELECTRIC GENERATING UNITS?

A. Yes. In addition to the major air quality regulations already in place, EPA is in the process of proposing or implementing a broad array of new air quality regulations. These include regulations to reduce hazardous air pollutants and potential revisions of ambient air quality standards.

Q. IS THE PUBLIC SERVICE SYSTEM READY TO MEET NEW AND EXISTING AIR REGULATIONS?

A. Yes. The Public Service system should be well prepared to meet new air regulations by implementing our current emission reduction plans, including the approved Clean Air-Clean Jobs Act ("CACJA") plan, without additional actions under the ERP. Public Service has reduced emissions through several rounds of projects involving environmental retrofits or coal plant retirements. Recent emissions reductions initiatives began in 2003 under the Voluntary Emissions Reduction Program that resulted in installations of sulfur dioxide removal equipment at five coal units at the Arapahoe, Cherokee, and Valmont coal plants, resulting in a seventy percent sulfur dioxide emissions reduction at those plants. Public Service also retired Arapahoe units 1 and 2 in 2003. The new coal unit Comanche 3 that came online in 2010 was built under a settlement agreement that included state-of-the art controls for the new unit, plus significant new emissions controls for sulfur dioxide ("SO_2"), nitrogen oxides ("NO_X") and mercury on Comanche 1 and 2. Under the 2007 Colorado Resource Plan, Public Service agreed to additional retirements of older coal units at Cameo and Arapahoe. Finally, under CACJA, Public Service plans to retire or fuel switch to natural gas over 900 MW of coal-fired units at Valmont and Cherokee. The approved CACJA plan further includes advanced NO_X controls at Hayden 1 and 2 and Pawnee, plus sulfur dioxide scrubbing at Pawnee. The result of these retirements and retrofits between 2003 and 2018 will be a Public Service coal fleet that is equipped with a robust set of advanced emissions equipment. As required by CACJA, the Commission approved a CACJA plan designed to meet both current and

reasonably foreseeable emission reduction requirements. In particular, CACJA is the central component in Colorado's efforts to prepare a State Implementation Plan ("SIP") for Regional Haze. The Regional Haze SIP (including the CACJA plan) is currently pending before EPA; we think EPA is very likely to approve the SIP for the plants covered by CACJA as proposed.

Public Services' emissions reduction efforts under the CACJA plan will reduce NO_X by 86%, and SO_2 by 83% from 2008 levels by 2018, the end of the Resource Acquisition Period ("RAP").[1] Due to the CACJA emissions reduction efforts and earlier emissions reduction efforts, we do not anticipate that Public Service will require any major emissions reductions (other than those required by CACJA) through the end of the RAP.

Q. IS EPA REGULATING GREENHOUSE GAS EMISSIONS ON POWER PLANTS?

A. Yes. Starting on January 1, 2011, EPA began requiring a review of greenhouse gas ("GHG") emissions for air permits issued to new power plants or those undertaking major modifications. EPA now requires this review, known as the Best Available Control Technology ("BACT") review, before the plant can receive an air permit. EPA requires the BACT review on all new plants emitting at least 100,000 tons per year of CO_2 emissions and modified facilities increasing their CO_2 emissions by at least 75,000 tons per

[1] Public Service coal plants under the CACJA plan are Arapahoe, Cherokee, Hayden, Pawnee, and Valmont.

year of CO_2.[2] The GHG BACT review is a process that involves identifying a set of options for reducing GHG emissions, analyzing those options, then choosing the best option based on energy, environmental, and economic factors.

Q. DOES THE GHG BACT REVIEW COVER NEW GAS TURBINE PEAKING UNITS?

A. The GHG BACT review will cover some but not all new gas turbine peaking units. The BACT review applies to new plants emitting at least 100,000 tons per year of CO_2 emissions. Depending on the plant size and how often it is run, some gas turbine peakers will emit enough GHGs to require GHG BACT review in order to obtain an air permit, and some will not.

Q. WILL THE BACT REVIEW CREATE NEW CHALLENGES TO THE DEVELOPMENT OF NEW GAS TURBINE PEAKING FACILITIES?

A. Yes. The GHG BACT review is likely to add time to the process of obtaining an air permit. Also, the timeline for completing GHG BACT review will not be entirely predictable, as it is an open stakeholder process conducted by state environmental agencies implementing the federal rule. Parties seeking GHG BACT permits will likely encounter some stakeholders seeking to stop new fossil units, or to modify the units in some way to minimize GHG emissions. Further, it is now less than one year into the implementation of this new rule,

[2] These limits are set by EPA's Tailoring Rule and are in place between July 1, 2011 and June 30, 2013. EPA may change these limits after this time period but, per the Tailoring Rule, will not reduce these limits below 50,000 tons per year before April 30, 2016.
http://www.epa.gov/nsr/documents/20100413final.pdf

so the GHG BACT review does not yet have a long track record of issuing permits.

Q. WILL EPA GHG REGULATION PREVENT PUBLIC SERVICE FROM BUILDING GAS TURBINE UNITS?

A. No. Despite the challenges that the GHG BACT process creates, we do not expect GHG regulation to ultimately prevent Public Service or other parties from building gas turbine power plants. Indeed, some parties have already sought and obtained GHG BACT permits for fossil fuel power plants since the EPA began this program. Gas turbine peaking facilities are an essential technology needed to meet critical peaking capacity needs for utility systems throughout the U.S. It is not expected that the BACT GHG process will stop development of gas turbine peakers by Public Service or other parties. The BACT review process is designed to encourage the implementation of the best technology available to reduce the emissions of various pollutants from power plants. GHGs are a unique application of the BACT process, because no end-of-pipe control technology for GHG reduction is commercially available. Thus, for GHGs, the BACT review process effectively requires that new plants strive for high efficiency, which is the primary route to minimize GHG emissions. It is worth noting that high plant efficiency is also a goal of power plant builders and equipment manufacturers seeking to reduce fuel usage and ongoing operating cost. Thus, the BACT process will likely require state-of-the-art gas turbine technology, which would probably have been chosen in the design of a new plant anyway. The BACT review might also

require other types of actions such as maintenance programs that maintain high efficiency through the life of a new plant.

Q. IS EPA ALSO PLANNING TO REGULATE CO_2 EMISSIONS FROM EXISTING POWER PLANTS?

A. Yes. The EPA has stated that it will propose GHG rules for existing power plants under Section 111(d) of the Clean Air Act and finalize these rules in 2012. At this time, the proposed Section 111(d) rule for GHGs has been delayed. If implemented, the Section 111(d) rule, in combination with the GHG New Source Review rule and GHG BACT process, will create comprehensive (all major new, modified and existing power plants) federal GHG regulation of the power sector.

Q. IS PUBLIC SERVICE WELL-POSITIONED TO COMPLY WITH EPA GHG REGULATION ON EXISTING SOURCES?

A. Although we do not yet know how the Section 111(d) rule will be constructed, we believe Public Service will be well-positioned to comply with the rule. Given that Public Service expects to reduce its GHG emissions significantly, by 30% between 2005 and 2020, we expect to be better off than many utilities under future GHG regulation.

Q. WHAT IS THE STATUS OF CARBON LEGISLATION OR RULES THAT MAY LEAD TO A CARBON PRICE ON CO_2 EMISSIONS?

A. Since the CACJA proceeding in late 2010, much has changed affecting the likelihood of future carbon legislation. Today, legislation creating a carbon price on CO_2 emissions, the result of a cap and trade or carbon tax policy,

does not appear to be likely in the near-term future. While the US House of Representatives passed a nationwide cap and trade program (H.R. 2454) in 2009, the Senate did not follow through and that proposal died. In 2010, Republicans took majority control of the House, and gained seats in the Senate. Far fewer Republicans have recently supported GHG cap and trade efforts; only eight House Republicans voted for H.R. 2454. Prolonged US economic weakness and concerns over US debt levels have pushed climate policy far down the list of political priorities for Congress. Further, compared to a few years ago, there is now weakened support among the US population for GHG policy. The Pew Research Center found in October of 2010 that 46% of the US public supported immediate government action for global warming, down from July of 2006 when 61% of the US public supported such action.[3] Given these conditions, it is difficult to forecast if or when a legislated GHG policy applying a carbon price might be implemented.

Q. IS IT YOUR OPINION THAT THERE WILL NEVER BE A CARBON POLICY AFFECTING ELECTRIC GENERATING UNITS?

A. No. As indicated above, there is today a carbon policy that EPA is implementing under the Clean Air Act. Either through that policy or as a reaction to its design, I believe that there is significant probability that, at some point, either EPA or Congress will impose some form of market-based carbon policy or tax on electric generating units. It is appropriate for the Company to consider the risk of such a policy in its resource planning efforts.

[3] Pew Research Center For the People & The Press, "Wide Partisan Divide Over Global Warming," http://pewresearch.org/pubs/1780/poll-global-warming-scientists-energy-policies-offshore-drilling-tea-party, October 27, 2010.

Q. WHAT STEPS HAVE YOU TAKEN TO ASSESS THE APPROPRIATE APPROACH TO CARBON POLICY RISK FOR THIS RESOURCE PLAN?

A. On September 7, 2011, we met with a wide range of stakeholders, including many of the likely parties to this resource plan, in a dialogue regarding the appropriate approach to the risk of carbon dioxide regulation in this docket. We invited environmental advocates, coal suppliers, natural gas suppliers, Colorado utilities, renewable developers, energy trade groups, environmental regulators, Colorado Public Utilities Commission staff, the Office of Consumer Counsel, and others to the dialogue. A list of the attendees is attached as Exhibit No. JI-1.

Q. WHAT DID YOU LEARN AT THIS DIALOGUE?

A. Carbon policy prediction is a subject that draws many views, and the carbon proxy price dialogue accordingly saw a variety of views expressed. However, we did not hear a strong objection to the use of a carbon proxy price in resource planning for the purposes of informing the generation evaluation and selection process and for carbon policy risk management. Also, there seemed to be general agreement that a range of carbon proxy price sensitivity cases ought to be presented in the resource plan. We used the feedback we received at the meeting as an input to formulate a range of carbon proxy price forecasting values.

Q. HOW IS THE COMPANY ACCOUNTING FOR THE RISK OF A FUTURE CARBON PRICE IN THE ERP?

A. Given the uncertainties in forecasting carbon policy, combined with the relatively short-term nature of the RAP, the small resource need, and the significant - 30% reduction between 2005 and 2020 - carbon emissions reduction projections already in our plans, Public Service has performed our least cost ERP analysis of a "Baseline Case" and "Alternative Plans" without the use of carbon pricing. Three levels of "carbon proxy cost," however, were included in sensitivity analyses of these alternative plans.

Q. IN THESE ALTERNATIVE PLAN SENSITIVITIES, HOW DID PUBLIC SERVICE DEVELOP A CARBON PROXY PRICE FORECAST?

A. Public Service has chosen an approach to forecast carbon pricing in the ERP that relies on surveying the forecasts of well-regarded third-party energy forecasting firms. This method of creating a carbon proxy price forecast is conceptually very similar to the method proposed by the Company and approved by the Commission in previous resource planning efforts for purposes of forecasting natural gas prices and other major resource planning input assumptions. To develop the carbon proxy price forecast, Public Service blended the baseline carbon proxy price forecast from three different consulting firms: IHS Cambridge Energy Research Associates, PIRA, and Wood MacKenzie. These three firms develop forecasts of energy demand, supply, and other factors, including an anticipated carbon price. Many major energy companies in the US and worldwide rely on the forecasts of these firms to make strategic and planning decisions.[4,5,6]

[4] IHS Cambridge Energy Research Associates North American Gas and Power Scenarios product described at http://www.ihs.com/products/cera/energy-research/north-america-gas-power.aspx

Q. HOW DID PUBLIC SERVICE CREATE THE BLENDED CARBON PROXY PRICE?

A Public Service obtained the most recent carbon price forecast from each firm. Next, the carbon prices were averaged by year for each year a carbon price was available. The firms started their forecast carbon price between 2018 and 2021. Prior to 2021, only one firm forecast a carbon price, which reduces the blended or averaged result in those years. Also, no firm forecasts beyond 2035; in order to match the ERP modeling time period, Public Service extrapolated the blend to 2050 by using the average escalation rate from the years available. The result is called the "3-Source" carbon proxy price forecast. The 3-Source forecast starts at $4.53 per ton in 2018, and climbs to $15.76 per ton in 2021 as all three consultant forecasts predict existence of a carbon price in 2021. From 2021 onward, it escalates at between 7.4% and 7.5% per year in nominal terms.

Q. DID THE COMPANY CREATE MORE THAN ONE CARBON PROXY PRICE FORECAST?

A. Yes. The Company created one forecast with lower carbon prices, and one forecast with higher carbon prices than the 3-Source forecast. The lower carbon price forecast uses a lower escalation rate in later years. We used this approach because the three consultants we cited for the 3-Source forecast do

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[5] PIRA North American Environmental Markets Service product described at http://www.pira.com/ClientServices/PIRAEnergyServicesBrochure.pdf

[6] Wood Mackenzie North American Power Service described at http://www.woodmacresearch.com/cgi-bin/wmprod/portal/energy/productMicrosite.jsp?prodID=140

not provide any carbon forecast data past 2035. In my opinion, and in the absence of any information from the consultants, it is reasonable to explore a lower price escalation rate past 2035 due to factors such as the potential for technology improvements in carbon abatement options, or political pressure against ever-increasing carbon prices. To develop a lower carbon proxy price forecast, Public Service took the 3-Source carbon price through 2035, but then escalated the carbon price from 2036 to 2050 based on an expected rate of inflation (in turn based on a forecast of the Consumer Price Index), which is several percentage points lower than the escalation in the 3-Source forecast. As a result of this lower inflation-based carbon price escalation, the carbon proxy price is lower in the years 2036 to 2050. This forecast is called the "3-Source Low Escalation" forecast.

To explore a higher carbon proxy price forecast, Public Service used a forecast similar to that used previously in our planning efforts, but with a 2017 start year to reflect current political and economic conditions. This forecast begins earlier than the 3-Source forecast, so it is called the "Early Start" forecast. The Early Start forecast begins in 2017 at $20 per short ton of CO_2, and escalates at seven percent per year thereafter.

Q. PLEASE SUMMARIZE THE CARBON PROXY PRICES USED IN THE RESOURCE PLAN.

A. The carbon proxy prices used in the resource plan are set forth in Table JI-1 below.

Table JI-1: Public Service 2011 ERP Carbon Proxy Prices

	Nominal $/Short Ton		
Year	3-Source	3-Source Low Escalation	Early Start
2012	$ -	$ -	
2013	$ -	$ -	
2014	$ -	$ -	
2015	$ -	$ -	
2016	$ -	$ -	
2017	$ -	$ -	$ 20.00
2018	$ 4.54	$ 4.54	$ 21.40
2019	$ 6.05	$ 6.05	$ 22.90
2020	$ 6.50	$ 6.50	$ 24.50
2021	$ 15.77	$ 15.77	$ 26.22
2022	$ 16.94	$ 16.94	$ 28.05
2023	$ 18.19	$ 18.19	$ 30.01
2024	$ 19.54	$ 19.54	$ 32.12
2025	$ 20.99	$ 20.99	$ 34.36
2026	$ 22.55	$ 22.55	$ 36.77
2027	$ 24.23	$ 24.23	$ 39.34
2028	$ 26.04	$ 26.04	$ 42.10
2029	$ 27.98	$ 27.98	$ 45.04
2030	$ 30.06	$ 30.06	$ 48.20
2031	$ 32.30	$ 32.30	$ 51.57
2032	$ 34.71	$ 34.71	$ 55.18
2033	$ 37.30	$ 37.30	$ 59.04
2034	$ 40.08	$ 40.08	$ 63.18
2035	$ 43.07	$ 43.07	$ 67.60
2036	$ 46.28	$ 43.89	$ 72.33
2037	$ 49.73	$ 44.72	$ 77.39
2038	$ 53.44	$ 45.57	$ 82.81
2039	$ 57.42	$ 46.44	$ 88.61
2040	$ 61.71	$ 47.32	$ 94.81
2041	$ 66.31	$ 48.22	$ 101.45
2042	$ 71.25	$ 49.14	$ 108.55
2043	$ 76.56	$ 50.07	$ 116.15
2044	$ 82.27	$ 51.02	$ 124.28
2045	$ 88.40	$ 51.99	$ 132.98
2046	$ 94.99	$ 52.98	$ 142.29
2047	$ 102.07	$ 53.99	$ 152.25
2048	$ 109.68	$ 55.01	$ 162.90
2049	$ 117.86	$ 56.06	$ 174.31
2050	$ 126.65	$ 57.12	$ 186.51

Q. WILL THE CARBON PROXY PRICES SHOWN IN TABLE JI-1 BE THE ONES EMPLOYED FOR BID EVALUATION PURPOSES?

A. Not necessarily. As part of its 2011 ERP filing, the Company is requesting that the Commission approve the proposed methodology of developing carbon proxy prices and not the prices themselves. The Company intends to update our carbon proxy prices with up-to-date forecasts from the three consulting firms at the time of bid evaluation.

Q. DOES THAT CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes.

Attachment A

Jack Ihle

Statement of Qualifications

Jack Ihle is a Manager of Environmental Policy for Xcel Energy Services Inc. He has spent twelve years in the energy industry, including roles at IHS Cambridge Energy Research Associates and Platts Research & Consulting, in addition to his work for Xcel Energy.

At Xcel Energy, Jack focuses on climate policy strategy and development at the federal and state levels. Jack provides strategic insight to internal executive leadership on climate, energy, and renewables policy. He also works with federal and state policymakers on environmental policy matters. Mr. Ihle recently co-supervised an award-winning carbon offsets purchase program for Public Service Company of Colorado, an Xcel Energy operating company.

Mr. Ihle has represented the company's interests in the National Petroleum Council, the Joint Institute for Strategic Energy Analysis, and the International Emissions Trading Association. He also represented Southwestern Public Service/Xcel Energy in the New Mexico Climate Change Advisory Group. Mr. Ihle sits on the Boards of Directors of the Solar Technology Acceleration Center and Power Tree Carbon Company. He has testified in New Mexico Environmental Improvement Board hearings considering greenhouse gas rules in 2010 and in 2011.

Mr. Ihle holds a Bachelor of Arts in Political Science from Bowling Green State University, and a Master of Science in Energy & Resources from the University of California at Berkeley.