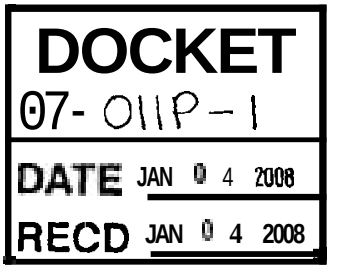
BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA AND THE CALIFORNIA ENERGY COMMISSION

Order Instituting Rulemaking to Implement the Commission's Procurement Incentive Framework and to Examine the Integration of Greenhouse Gas Emissions Standards into Procurement Policies.	Rulemaking 06-04-009 (Filed April 13,2006) Energy Commission Docket 07-OIIP-01

COMMENTS OF PACIFICORP (U 901 E) ON EMISSION REDUCTION MEASURES AND MODELING-RELATED ISSUES



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COMMENTS OF PACIFICORP (U 901 E) ON EMISSION REDUCTION MEASURES AND MODELING-RELATED ISSUES

Pursuant to the *Administrative Law Judges' Ruling Requesting Comments on Modeling Related Issues* dated November 9, 2007 (the "Ruling"), and the *Administrative Law Judges' Ruling Extending Comment Deadlines and Addressing Procedural Matters* dated November 30, 2007, PacifiCorp respectfully submits these comments on the Energy and Environmental Economics, Inc. ("E3") modeling methodology, a California Public Utilities Commission ("Commission") Staff workpaper on available emission reduction measures, and E3's model. PacifiCorp appreciates the opportunity to provide comments on these important issues.

I. INTRODUCTION

PacifiCorp is one of the West's leading utilities, serving more than 1.6 million customers in six western states (California, Idaho, Oregon, Utah, Washington, and Wyoming). In California, PacifiCorp serves approximately 46,500 customers in Del Norte, Modoc, Shasta and Siskiyou counties. PacifiCorp has more than 10,400 megawatts of generation capacity on a system-wide basis from coal, hydro, wind power, natural gas-fired combustion turbines, solar

and geothermal. PacifiCorp also has ownership interests in thermal generation units located in three additional western states (Arizona, Colorado, and Montana).

The Ruling requests responses to several specific questions, which PacifiCorp outlines below in the order in which they were presented. Importantly, PacifiCorp respectfully requests that the Commission not perceive the absence of comments by PacifiCorp on any specific issue or other matter as a conclusive indication of PacifiCorp's lack of interest with respect thereto. PacifiCorp acknowledges the ongoing nature of this proceeding and reserves the right to present additional comments at a future time, as necessary.

II. DISCUSSION

The Commissions have asked for parties input on recent studies, presentations, and articles that would inform the Staff's whitepaper. While not exhaustive, PacifiCorp has attempted to document the resources it relied upon while drafting its comments. At the outset, PacifiCorp notes that these comments rely, in part, on several recently completed studies by the Electric Power Research Institute ("EPRI"). One particular study that does not appear to have been considered by Commission Staff and that PacifiCorp recommends for further consideration is EPRI's *Program on Technology Innovation: Economic Analysis of California Climate Initiatives: An Integrated Approach Volume 1: Summary for Policymakers*, which examines a range of policy implementation scenarios for the California Climate Initiatives and estimates the potential costs likely to be associated with each.[1]

In addition to the California Climate Initiatives study, PacifiCorp also strongly endorses the concepts developed by EPRI and described in their recently released study *The Power to Reduce CO_2 Emissions: The Full Portfolio.*[2] In that study, EPRI describes a technology path for the electricity sector to return to 1990 emissions levels by 2030. EPRI

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[1] "Program on Technology Innovation: Economic Analysis of California Climate Initiatives: An Integrated Approach Volume 1: Summary for Policymakers"; Electric Power Research Institute; Report Number 1014641 (June 2007). See, http://www.epriweb.com/public/000000000001014641.pdf.

[2] "The Power to Reduce CO_2 Emissions: The Full Portfolio"; Electric Power Research Institute (August 2007). See, http://www.epri-reports.org/DiscussionPaper2007.pdf

establishes specific technology deployment targets in seven areas: efficiency, renewables, nuclear generation, advanced coal generation, carbon capture and storage ("CCS"), plug-in hybrid electric ("PHEV") and electric vehicles ("EVs"), and distributed energy resources. EPRI has also recently published an article titled *Electricity Solutions for a Carbon Constrained World*[3], which captures much of the current debate over the future of electricity generation in combination with climate policy.

Finally, during this past month EPRI released a study examining how climate policy could affect the electric power sector's customers and asset owners. This study, *The Costs of Reducing Electricity Sector CO_2 Emissions*[4] asserts that "the primary way to lower emissions with existing technology is through the substitution of low-emitting generation for high-emitting generation." The study mainly focuses on three forms of substitution: 1) displacing existing high-emission generators with existing low-emission generators through "redispatch" (i.e., changing how often existing assets are operated); 2) choosing new low-emission technologies instead of adding new high-emission alternatives to meet load growth; and 3) building new low-emission plants to displace existing high-emission plants.

During the past year, PacifiCorp has also been an active participant and attendee to the various meetings of the California Assembly Bill 32 ("AB 32") Economic and Technology Advancement Advisory Committee ("ETAAC") and in particular its Energy Sector subcommittee, where numerous presentations[5] on electricity sector-related technology advancement were shared. In these comments, PacifiCorp to some extent relies on information shared during the ETAAC discussions, as well as policy recommendations from the Committee's

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[3] PacifiCorp recommends an EPRI article titled, ""Electricity Solutions for a Carbon Constrained World""; Electric Power Research Institute (Fall 2007). See, http://mydocs.epri.com/docs/CorporateDocuments/EPRI_Journal/2007-Fall/1016127_2007SummerSeminar.pdf.

[4] PacifiCorp recommends an EPRI study titled, "The Costs of Reducing Electricity Sector CO_2 Emissions"; Electric Power Research Institute; Report Number 1014044 (December 2007).

[5] The various ETAAC presentations are available on the website of the California Independent Energy Producers Association whose staff chaired the Energy Sector subcommittee ("IEPA"). See, http://www.iepa.com/ETAAC.asp.

forthcoming final report.[6]

A. Questions Related to Attachment A, Public Utilities Commission Staff workpaper entitled "Greenhouse Gas Emissions Reduction Measures for the Electricity and Natural Gas Sectors Under Consideration as Part of R.06-04-009"

Question No. 1. Does Attachment A cover all of the viable emissions reduction measures available in the electricity and natural gas sectors? If not, what other measures should be considered for the purposes of forecasting emissions reduction potential within these sectors? Please include suggested data sources and references for information regarding any additional measure you purpose.

The Commission Staff workpaper broadly covers and discusses all of the emissions reduction measures available within the electricity sector. However, the workpaper could be much improved if it included a more robust discussion on the possible new electricity sector policies and/or enabling technologies necessary to achieve the further potential identified by Staff from these existing control measures.

For example, regarding the discussion on additional renewables,[7] PacifiCorp strongly endorses the development of renewable resource zones; however, within the same section of the Commission Staff workpaper, Staff provides only a single sentence on electricity storage, which inadequately represents its potential value as a significant enabling technology for cost-effectively realizing additional renewables. PacifiCorp further discusses the value of electricity storage in its response to Question 4.

The Commission Staff workpaper also does not identify on-road and off-road PHEVs and EVs as possible electricity storage devices (i.e., "Vehicle-to-Grid" or V2G[8]), avoiding the construction of additional electricity capacity and related transmission and distribution investments. The V2G electricity storage concept allows PHEVs/EVs to provide

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[6] The December 21, 2007, the ETAAC released its discussion draft report for public comment. See, http://www.arb.ca.gov/cc/etaac/etaac.htm.

[7] See, Section "3.2.2 Additional Renewables (Beyond Currently Targeted Levels" pages 7-8.

[8] The California company AC Propulsion Inc. coined the term V2G for vehicle-to-grid.

power to help balance loads by 'valley filling' (charging at night when demand is low) and 'peak shaving' (sending power back to the grid when demand is high). It can enable utilities new ways to provide regulation services (keeping voltage and frequency stable) and provide spinning reserves (to meet sudden demands for power). Akin to existing utility administered energy efficiency programs that foster beneficial customer behavior, a possible V2G electricity storage control measure could direct utilities to implement policies and programs to demonstrate and deploy V2G electricity storage not only within utility fleet operations, but within customer vehicle fleets (at least until such time when the technology has become broadly commercialized and accepted by the general public). The EPRI has extensive studies, articles[9], and presentations on the subject. The University of Delaware also maintains a useful V2G electricity storage website.[10]

The Commission Staff workpaper also does not identify "smart grid" technology (i.e., a "smart" and interactive grid and communication infrastructure) as a key enabling technology essential to achieve the two-way flow of energy and data necessary for the widespread commercialization of distributed renewable generation resources, PHEV/EVs (as V2G electricity storage devices), and end-use efficiency devices. Creating a smart grid will require years as the system evolves through the incremental deployment and integration of "smart" equipment or systems. PacifiCorp specifically elaborates on how smart grid technology enables additional energy efficiency in its response to Question 3.

A possible near-term "smart grid" control measure would direct utilities to change out conventional electro-mechanical house meters with solid state, two-way communicating meters. These advanced meters would provide enhanced service to customers while providing the utility with new capabilities for operating and maintaining the grid. Installing advanced meters is one step in a utility's evolution toward a smart grid, but before a utility installs an

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[9] PacifiCorp recommends an EPRI article titled, "Driving the Solution: The Plug-In Hybrid Vehicle"; Electric Power Research Institute (Fall 2005). See, http://mydocs.epri.com/docs/CorporateDocuments/EPRI_Journal/2005-Fall/1012885_PHEV.pdf.

[10] The University of Delaware website on v2G may be found at the following: http://www.udel.edu/V2G/.

advanced metering system, or any type of smart system, it must make a business case for the investment. Most utilities find it difficult to justify installing a communications infrastructure for a single application (e.g. meter reading). Because of this, a utility typically must identify several applications that will use the same communications infrastructure – for example, reading a meter, improved integration of solar photovoltaic distributed generation, monitoring power quality, remote connection and disconnection of customers, and enabling demand response, among other things. Ideally, the communications infrastructure will not only support near-term applications, but could be upgraded to accommodate unanticipated applications that will arise in the future. However, each utility has a unique set of business, regulatory, and legislative drivers that guide its investments. This means that each utility will take a different path in creating its smart grid and that different utilities will create smart grids at different rates. EPRI has produced extensive studies, articles[11], and presentations on the subject and the ETAAC has at least one presentation[12] addressing the subject. The U.S. Department of Energy and the Pacific Northwest National Laboratory, in conjunction with the GridWise Alliance of industry partners, maintain a useful website[13] with the latest information on smart grid technology and policy.

Question No. 2. **Are there emission reduction measures identified within Attachment A that you believe, based on currently available information, should *not* be implemented as a means to achieving emission reductions within the context of AB 32? Please justify your answer.**

PacifiCorp anticipates certain parties will oppose the development and demonstration of CCS technologies, nuclear power plant re-licensing or new capacity development, and/or hydroelectric plant re-licensing. However, until carbon dioxide ("CO_2") emissions control equipment is broadly commercialized, re-licensing of existing hydroelectric

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[11] PacifiCorp recommends an EPRI article titled, "Intelligrid: A Smart Network of Power"; Electric Power Research Institute (Fall 2005). See, http://mydocs.epri.com/docs/CorporateDocuments/EPRI_Journal/2005-Fall/1012885_IntelliGrid.pdf.

[12] See the Pacific Gas and Electric PowerPoint presentation titled "Energy Storage / Smart Grid" (July 12, 2007). See, http://www.iepa.com/ETAAC/ETAAC%20Handouts%207-12-07/Storage%20and%20Smart%20Grid%20PART%201%207-12-07.ppt#0.

[13] See, http://www.smartgridnews.com/.

and nuclear capacity, construction of new nuclear capacity, and the pursuit of CCS will be attractive near-zero and zero-carbon baseload resources utilities will be obligated to consider.

While PacifiCorp agrees with the Commission Staff workpaper's position that the "likely rate of deployment of geologic CCS is probably too slow for consideration of this technology in policy decisions over the short-term through 2020"[14], important policy decisions will need to be made by California in the short-term to ensure the broad commercialization of CCS post 2020.[15] The demonstration of CCS in geological formations is a key opportunity for California to benefit from partnerships nationally and internationally. Broad commercial deployment of technology for CCS in geological formations faces significant challenges. There is relatively little experience to date at the federal or state level in combining CO_2 capture, transport, and storage into a fully integrated CCS system. Furthermore, regulatory uncertainties and legal issues regarding property rights and liability are significant barriers for CCS that California must begin to resolve before CCS can play a major role. On the other hand, it offers a potential opportunity for achieving long-term reductions in greenhouse gas emissions, especially on a national and international scale. AB 32 calls for state policy that supports technology innovation and the ETAAC was subsequently established to consider strategies for fostering it.

The Commission and the CEC should not rule out any potential technology based upon its current commercial status, nor because of its relationship to fossil fuels. Doing so could have the direct effect of chilling innovative CCS-related technology advancement and early demonstration projects by suggesting to the market that California is not interested because such a technology cannot satisfy its immediate need for near-term emissions reductions. In fact, many

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[14] Staff workpaper page 10.

[15] California recently adopted Assembly Bill 1925 (2006), directing the California Energy Commission ("CEC") to recommend standards to accelerate the adoption of long-term management of industrial CO_2. A copy of the final staff report may be found at http://www.energy.ca.gov/2007publications/CEC-500-2007-100/CEC-500-2007-100-SF.PDF. Similarly, New Mexico Governor Richardson's Executive Order 2006-69 required the New Mexico Energy, Minerals, and Natural Resources Department ("EMNRD") to coordinate with a stakeholder group to explore and identify statutory and regulatory requirements needed to geologically sequester anthropogenic CO_2. The final report may be found at: http://www.emnrd.state.nm.us/OCD/documents/CarbonSequestrationFINALREPORT1212007.pdf.

of the identified barriers to CCS would be better addressed using knowledge gained from early demonstration projects. The Commission and the CEC should be investigating policies that provide incentives for early CCS demonstration projects or possibly even a control measure directing utilities to integrate demonstration and deployment of CCS technologies – including MW installation targets -- over the full period covered in their integrated resource plans. EPRI has produced numerous studies, articles,[16] and presentations on the subject of CCS.

Similarly, while California currently prohibits the construction of new nuclear power plants, the Commission and the CEC should not support, nor adopt, a position which discourages or even denies a California utility the ability to renew a license for an existing nuclear power plant or contract for the importation of electricity generated by a new nuclear power plant constructed outside of California. To do so would be directly contrary to the greenhouse gas emissions reduction goals established within AB 32. The greenhouse gas benefits of nuclear power are undeniable. In fact, a recent CEC report observed that "nuclear power generates greenhouse gas emissions throughout its life cycle at a scale comparable to renewable power", more specifically, solar photovoltaic generation.[17] A similar comparison was made during a presentation to the ETAAC Energy Sector subcommittee.[18] Today, with the high cost of natural gas, the adoption of greenhouse gas emissions performance standards,[19] impending limitations on greenhouse gas emissions, and loan guarantees and other significant

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[16] PacifiCorp recommends the following EPRI articles titled, "Closing the Fuel Carbon Cycle", "The Challenge of Carbon Capture" and "Expanding Options for CO_2 Storage"; Electric Power Research Institute (Spring 2007). See, http://mydocs.epri.com/docs/CorporateDocuments/EPRI_Journal/2007-Spring/1014795.pdf.

[17] "Nuclear Power in California: 2007 Status Report"; California Energy Commission (October 2007); pages 3, 24, 31-32, and 182-191. See, http://www.energy.ca.gov/2007publications/CEC-100-2007-005/CEC-100-2007-005-F.PDF.

[18] See the Unistar Nuclear PowerPoint presentation titled "New Nuclear Development: Part of the Path to a Lower Carbon Energy Future" (July 2, 2007). See, http://www.iepa.com/ETAAC/ETAAC%20HANDOUTS%207-2-07/Turnage%20CEC%206-28-07%20presentation%20-%20New%20Nuclear%20Development6-28-07.pdf.

[19] California's Senate Bill 1368 (2006) prohibits the state's utilities from taking new ownership interest in, or signing new contracts with a term of five or more years for, baseload generation with a CO_2 emission rate exceeding that of a combined-cycle natural gas unit. Washington's ESSB 6001, adopted in 2007, includes essentially the same set of provisions. These rates effectively ban traditional coal-fueled electricity generation.

federal subsidies in the Energy Policy Act of 2005, electric utilities are considering new commitments to nuclear power. One recent EPRI study[20] concludes that for California to achieve its aggressive greenhouse gas emissions reductions goals, new nuclear capacity plays a critical role in achieving the goals while in minimizing costs.

Finally, the Commission and the CEC should not support nor adopt a position which discourages or even denies a California utility the ability to renew a license for an existing hydroelectric facility, or contract for the importation of electricity generated by a new hydroelectric facility. To do so would increase compliance costs associated with achieving the greenhouse gas emissions reduction goals established within AB 32. The greenhouse gas benefits of hydroelectricity are undeniable, since hydroelectric dams do not burn fossil fuels. The major advantage of hydroelectricity is its use as a baseload or load-following resource and its substantially lower costs. Compared to wind farms, hydroelectric plants have a more predictable load factor. If the project has a storage reservoir, it can be dispatched to generate power when needed (i.e., electricity storage). Hydroelectric plants can also be easily regulated to follow variations in power demand (i.e., used to integrate intermittent renewable resources). The lower costs are primarily due to the elimination of the cost of fuel. The cost of operating a hydroelectric plant is nearly immune to increases in the cost of fossil fuels such as oil, natural gas or coal. Fuel is not required and so it need not be imported. Hydroelectric plants tend to also have longer economic lives than fuel-fired generation, with some plants now in service having been built 50 to 100 years ago. Finally, operating labor cost is usually low since plants are automated and have few personnel on site during normal operation.[21]

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[20] In particular the "Nuclear 80" scenario discussed within the EPRI study titled, "Program on Technology Innovation: Economic Analysis of California Climate Initiatives: An Integrated Approach Volume 1: Summary for Policymakers"; Electric Power Research Institute; Report Number 1014641 (June 2007). See, http://www.epriweb.com/public/000000000001014641.pdf.

[21] PacifiCorp strongly supports EPRI's conclusion in its study *The Power to Reduce CO_2 Emissions: The Full Portfolio* noting that **"A diverse portfolio of advanced technologies will be required**. No single technological "silver bullet" will suffice. Rather, a full portfolio is needed that includes efficiency, renewable energy resources, nuclear, coal with carbon capture and storage, and other technologies enabled by expanded transmission and distribution system capabilities." Page 5-1; "The Power to Reduce CO_2 Emissions: The Full Portfolio"; Electric Power Research Institute (August 2007). See, http://www.epri-reports.org/DiscussionPaper2007.pdf

Question No. 3. **What means beyond policies currently adopted by the two Commissions hold potential for the delivery of additional energy efficiency?**

It will take a Smart Grid to deliver additional energy efficiency, V2G electricity storage, and additional demand response. With the rollout of advanced metering, smart chargers, time-of-use rates, and real-time pricing customers will be able to see the economic incentives for reducing power consumption. A Smart Grid also means more intelligent appliances. The grid-friendly, power management appliances program from Pacific Northwest National Laboratory gives appliances the ability to sense grid stress and reduce their power use to prevent grid emergencies. Appliance manufacturers will be able to market grid-friendly appliances for a premium to consumers.

Similarly, the two Commissions should consider the potential for trading in energy efficiency, using so-called "negawatts". Negawatt power is a term coined for an arbitrage way of supplying additional electrical energy to consumers without increased generation capacity by the creation of a market for trading of increased efficiency. While it is related to and uses consumption efficiencies, it differs in scale and market behavior from individual company or consumer efficiencies. For example an industrial consumer can advertise for tenders to supply it with say 100 megawatt hours. A tenderer may find energy efficiencies within an unrelated business and contract to improve their heating or lighting for instance and then sell the savings through the utility to the industrial consumer so it becomes an arbitrage transaction rather than an in house process or requiring increased generation capacity from the electric power utility. Energy consumers may also reduce energy consumption for a few hours to "generate" negawatts - hypothetical tradeable units of saved energy. By turning off air conditioners electricity can be saved over a short period of time, the savings further monetized when represented as negawatts and sold in certain specialized markets. Each utility has a unique set of end-use energy efficiency potential. In addition to the Commission's recent adoption of a "risk-reward" mechanism for investor-owned utilities, negawatt certificate trading would use the market to discover and monetize additional opportunities for energy efficiency.

Question No. 4. What means beyond policies currently adopted by the two Commissions hold potential for the integration of additional renewable resources into the grid?

Electricity storage is an enabling technology for cost-effectively realizing significant amounts of utility-scale renewables. Electricity storage addresses the need to integrate intermittency and works to shift excess off-peak power production to peak periods of demand. For example, wind power is often generated at night. The greatest demand for electricity in California occurs during late afternoon peaks, when wind generation may be at lower levels. When electricity storage is used to provide the necessary services to integrate wind or solar power into the grid when needed, it displaces fossil fuel generation that would otherwise be needed to provide ancillary services (e.g., regulation up and down, ramping, spinning reserve) as well as meet capacity needs. Electricity storage can also provide those services more efficiently and without the CO_2 emissions associated with fossil fuel generation. Thus, large-scale successful electricity storage technologies can help to transform intermittent renewables generation, wind, solar and ocean, into reliable resources for electricity planning, enabling California to take full advantage of these renewable resources abundant off the coast of California and throughout the West. A possible electricity storage control measure would direct utilities to integrate demonstration and deployment of electricity storage technologies – including MW installation targets -- over the full period covered in their integrated resource plans. EPRI has extensive studies, articles[22], and presentations on the subject and the ETAAC heard at least one presentation[23] on the subject. The Electricity Storage Association also maintains a useful website on the subject.[24]

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[22] PacifiCorp recommends an EPRI article titled, "Energy Storage: Big Opportunities on a Smaller Scale"; Electric Power Research Institute (Spring 2006). See, http://mydocs.epri.com/docs/CorporateDocuments/EPRI_Journal/2006-Spring/1013289_storage.pdf.

[23] See the Pacific Gas and Electric PowerPoint presentation titled "Energy Storage / Smart Grid" (July 12, 2007). See, http://www.iepa.com/ETAAC/ETAAC%20Handouts%207-12-07/Storage%20and%20Smart%20Grid%20PART%201%207-12-07.ppt#0.

[24] The Electricity Storage Association's website may found at the following: http://www.energystorage.org/.

Finally, Smart Grid technology is also a critical enabling technology to integrate ever growing amounts of distributed renewable generation. The ability of Smart Grid technology to dynamically manage all sources of power on the grid means that more distributed renewable generation, such as solar photovoltaic or small-scale wind, can be successfully integrated with the grid. Today's utility grid can accommodate the occasional residential renewables project, but as additional houses within the neighborhood are retrofitted with systems, the local utility's distribution system may become overwhelmed if all of the residential systems were to operate simultaneously. The local utility's ability to manage the output from these multiple distributed generation projects will be critical to maintaining the integrity and reliability of the electricity grid and demonstrating the value of distributed generation in avoiding new central power station construction and related transmission investments.

Question No. 5. How might an emissions reduction strategy within the electricity sector be targeted to displace the most carbon intensive aspects of California's electricity resource mix?

The Commission and the CEC should place more emphasis on achieving early demonstration projects and broad commercial deployment of CCS technology as a critical component of achieving long-term reductions in greenhouse gas emissions for all types of higher carbon-emitting fossil fuel-based generation (i.e., coal, natural gas, and biomass). One emissions reduction strategy would be to aggressively pursue commercial-scale demonstration projects in order to prove or disprove the viability of the concept. Commercial-scale CCS demonstration projects would necessarily include projects that separate (capture) the CO_2 from industrial and power generation sources, and transport it to storage locations (via pipelines) for long term storage within deep geological formations (reservoirs). Most importantly, CCS should not be viewed as simply a control strategy that benefits coal alone. The CEC's recent CCS study[25] observed that fossil-fueled power plants, mainly natural gas combined-cycle power plants,

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[25] Pages 23-24 "Geologic Carbon Sequestration Strategies for California: The Assembly Bill 1925 Report to the California Legislature"; California Energy Commission; Report Number CEC-500-2007-100-SD (September 2007). See, http://www.energy.ca.gov/2007 publications/CEC-500-2007-100/CEC-500-2007-100-SD.PDF.

represented the largest population of industrial sources emitting CO_2 in California. For the electricity sector, coal-, natural gas-, and biomass-fueled power plants would all benefit from the successful commercialization of CCS technology.

B. QUESTIONS RELATED TO ATTACHMENT B, E3'S MODELING DOCUMENTATION

PacifiCorp has reviewed the E3 Stage 1 documentation, including the updated materials provided after the September 21 and November 14, 2007 public workshops. In this context, PacifiCorp provides responses to relevant questions below.[26]

Question No. 6. Does E3's modeling documentation adequately document the methodology, inputs, and other assumptions underlying its model? If not, what additional documentation should be added?

(1) Missing PacifiCorp-Owned Coal and Natural Gas Generating Units

Upon reviewing the "Modeling Methodology for Reference Case and Target Cases", specifically section 4 titled "Attributing Generator Emissions to LSEs,"[27] PacifiCorp's ownership interests in out-of-state coal and natural gas power plants do not appear to be represented within the documentation. PacifiCorp serves more than 1.6 million customers in six western states (California, Idaho, Oregon, Utah, Washington, and Wyoming). PacifiCorp has more than 10,400 megawatts of generation capacity on a system-wide basis from coal, hydro, wind power, natural gas-fired combustion turbines, solar and geothermal. PacifiCorp also has ownership interests in coal units located in three additional western states (Arizona, Colorado, and Montana). In California, PacifiCorp serves approximately 46,500 customers in Del Norte, Modoc, Shasta and Siskiyou counties. These California customers' retail load is served using a mix of system resources, including both utility-owned and contracted for resources. California

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[26] PacifiCorp notes that during the November 14, 2007 public workshop, several stakeholders objected to the use of the term or variation of the term "Other Northern POUs" within the E3 modeling documentation and presentation materials to describe one of the seven load-serving entities being modeled. PacifiCorp is an investor-owned utility serving approximately 46,500 customers in the Northern California counties of Del Norte, Modoc, Shasta and Siskiyou. As such, the term "Other Northern POUs", with POU being an abbreviation for publicly-owned utilities is incorrect. The term should be revised to "Other Northern California Utilities."

[27] Pages 11-15 "(Attachment B) CPUC GHG Modeling Stage 1 Documentation"; E3 (November 9, 2007)

customers share in the expense of these system resources according to an inter-jurisdictional cost allocation methodology.

PacifiCorp has reviewed the E3 model's generator assignments to load-serving entities. Unfortunately, the data does not reflect PacifiCorp's ownership in coal and natural gas generation, nor California's share of PacifiCorp system resources based on the aforementioned inter-jurisdictional cost allocation methodologies. For 2006, PacifiCorp's owned coal and natural gas system resources, as well as California's share of those utility-owned system resources were as follows:

Table Two - PacifiCorp's Owned Coal-Fueled Generation

GENERATOR (line #)[28]	UNIT #	STATE	PacifiCorp Ownership Share %	CA's Share (2006)[29]
Cholla (line 257)	4	AZ	100.00%	1.8371%
Craig (line 335)	C1	CO	19.28%	1.8371%
Craig (line 336)	C2	CO	19.28%	1.8371%
Hayden (line 663)	H1	CO	24.46%	1.8371%
Hayden (line 664)	H2	CO	12.60%	1.8371%
Colstrip (line 299)	3	MT	10.00%	1.8371%
Colstrip (line 300)	4	MT	10.00%	1.8371%
Carbon (line 194)	1	UT	100.00%	1.8371%
Carbon (line 195)	2	UT	100.00%	1.8371%
Hunter (line 734)	1	UT	93.75%	1.8371%
Hunter (line 735)	2	UT	60.31%	1.8371%
Hunter (line 736)	3	UT	100.00%	1.8371%
Huntington (missing!)	1	UT	100.00%	1.8371%
Huntington (missing!)	2	UT	100.00%	1.8371%
Dave Johnston (line 371)	BW41	WY	100.00%	1.8371%
Dave Johnston (line 372)	BW42	WY	100.00%	1.8371%
Dave Johnston (line 373)	BW43	WY	100.00%	1.8371%
Dave Johnston (line 374)	BW44	WY	100.00%	1.8371%
Jim Bridger (line 757)	BW71	WY	66.67%	1.8371%
Jim Bridger (line 758)	BW72	WY	66.67%	1.8371%
Jim Bridger (line 759)	BW73	WY	66.67%	1.8371%
Jim Bridger (line 760)	BW74	WY	66.67%	1.8371%
Naughton (line 1028)	1	WY	100.00%	1.8371%
Naughton (line 1029)	2	WY	100.00%	1.8371%
Naughton (line 1030)	3	WY	100.00%	1.8371%
Wyodak (line 1639)	BW91	WY	80.00%	1.8371%

[28] The line number refers to the row within E3's "Generator Data and Generator Ownership/Contract Assignments to LSEs" Excel spreadsheet. See, http://ethree.com/GHG/Template%20for%20Party%20Information%20on%20Generators.xls.

[29] This represents California's share of the fixed costs of the resources which is based on the system generation factor. The system generation factor is defined as the weighting of costs as follows: 75% system capacity and 25% system energy. The variable costs of the resources are based on the system energy factor which was 1.7576% for 2006. California's share of costs varies annually.

Table Three - PacifiCorp's Owned Natural Gas-Fueled Generation

GENERATOR (line #)[30]	UNIT #	STATE	PacifiCorp Ownership Share %	CA's Share (2006)[31]
Hermiston (line 690)	1	OR	50%	1.8371%
Hermiston (line 691)	2	OR	50%	1.8371%
Currant Creek Power Project (line 348)	CTG1A	UT	100.00%	1.8371%
Currant Creek Power Project (line 348)	CTG1B	UT	100.00%	1.8371%
Gadsby (missing!)	1	UT	100.00%	1.8371%
Gadsby (line 537)	2	UT	100.00%	1.8371%
Gadsby (line 538)	3	UT	100.00%	1.8371%
Gadsby (line 539)	4	UT	100.00%	1.8371%
Gadsby (line 540)	5	UT	100.00%	1.8371%
Gadsby (line 541)	6	UT	100.00%	1.8371%
Little Mountain (missing!)		UT	100.00%	1.8371%
West Valley Generation Project (line 1629)	U1	UT	100.00%	1.8371%
West Valley Generation Project (line 1630)	U2	UT	100.00%	1.8371%
West Valley Generation Project (line 1631)	U3	UT	100.00%	1.8371%
West Valley Generation Project (line 1632)	U4	UT	100.00%	1.8371%
West Valley Generation Project (line 1633)	U5	UT	100.00%	1.8371%

E3's "Generator Data and Generator Ownership/Contract Assignments to LSEs" Excel spreadsheet is missing entries for the following PacifiCorp-owned units: Huntington units 1 and 2 (coal), Gadsby unit 1 (natural gas), and Little Mountain (natural gas), all of which are located in Utah. All of these PacifiCorp-owned generating units, with the exception of the Little Mountain 14 megawatt gas turbine, participate in the U.S. Environmental Protection Agency's ("EPA") Acid Rain Program. As far as additional documentation, the EPA Clean Air Markets Division makes unit-specific information and CO_2 emissions data for these units publicly available online.[32]

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[30] The line number refers to the row within E3's "Generator Data and Generator Ownership/Contract Assignments to LSEs" Excel spreadsheet. See, http://ethree.com/GHG/Template%20for%20Party%20Information%20on%20Generators.xls.

[31] This represents California's share of the fixed costs of the resources which is based on the system generation factor. The system generation factor is defined as the weighting of costs as follows: 75% system capacity and 25% system energy. The variable costs of the resources are based on the system energy factor which was 1.7576% for 2006. California's share of costs varies annually.

[32] See: http://camddataandmaps.epa.gov/gdm/index.cfm?fuseaction=emissions.wizard

Table Four - PacifiCorp's Owned Units and EPA Clean Air Markets Division Codes

FACILITY_NAME	UNITID	ORISPL_CODE
Cholla	4	113
Craig	C1	6021
Craig	C2	6021
Hayden	H1	525
Hayden	H2	525
Colstrip	3	6076
Colstrip	4	6076
Dave Johnston	BW41	4158
Dave Johnston	BW42	4158
Dave Johnston	BW43	4158
Dave Johnston	BW44	4158
Hermiston	1	54761
Hermiston	2	54761
Carbon	1	3644
Carbon	2	3644
Currant Creek Power Project	CTG1A	56102
Currant Creek Power Project	CTG1B	56102
Gadsby	1	3648
Gadsby	2	3648
Gadsby	3	3648
Gadsby	4	3648
Gadsby	5	3648
Gadsby	6	3648
Hunter	1	6165
Hunter	2	6165
Hunter	3	6165
Huntington	1	8069
Huntington	2	8069
Jim Bridger	BW71	8066
Jim Bridger	BW72	8066
Jim Bridger	BW73	8066
Jim Bridger	BW74	8066
Naughton	1	4162
Naughton	2	4162
Naughton	3	4162
West Valley Generation Project	U1	55622
West Valley Generation Project	U2	55622
West Valley Generation Project	U3	55622
West Valley Generation Project	U4	55622
West Valley Generation Project	U5	55622
Wyodak	BW91	6101

(2) Lack of State and/or Regional Carbon Policy Modeling Constraints

The E3 documentation adequately accounts for existing RPS policy constraints, but it is unclear whether the 2008 or the 2020 reference cases take into account other western state efforts to address greenhouse gas emissions. At the very least, the E3 modeling should include a sensitivity run which evaluates the cumulative effect on western wholesale power prices of other western states limiting emissions of electricity sector greenhouse gas emissions, along with California. On August 22, 2007, the Western Climate Initiative announced a regional goal for greenhouse gas reduction. The goal would cap emissions of greenhouse gases to 15% below 2005 levels by 2020. This initiative now includes Arizona, California, Montana, New Mexico, Oregon, Utah and Washington. Colorado, Kansas, Nevada, Wyoming, the Canadian Provinces of Ontario, Quebec and Saskatchewan,and the Mexican state of Sonora participate as observers. Of these Western states, California, Oregon, and Washington have passed legislation formally codifying their emission reduction goals, although only California's law creates regulatory authority to enforce those goals.[33]

California and Washington have also both established greenhouse gas emission performance standards for electric power generation that effectively prohibit the states' utilities from building or signing new long-term contracts with coal-fired power plants lacking carbon sequestration.[34] Oregon and Washington require that new power plants mitigate a portion of their projected carbon emissions.[35]

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[33] AB 32 caps statewide emissions at 1990 levels in 2020, and directs the California Air Resources Board to develop regulations to achieve this goal. Washington's Engrossed Substitute Senate Bill (ESSB) 6001, enacted in 2007, also caps statewide emissions at 1990 levels in 2020, and ratchets down the cap to 25% below 1990 levels in 2035, and, in 2050, to the lesser of 50% below 1990 levels and 70% below projected emissions in 2050. Oregon House Bill 3543, enacted in 2007, caps statewide emissions at 10% below 1990 levels in 2020 and at 75% below 1990 levels in 2050.

[34] California's Senate Bill 1368, enacted in 2006, prohibits the state's utilities from taking new ownership interest in, or signing new contracts with a term of five or more years for, baseload generation with a carbon dioxide emission rate exceeding that of a combined-cycle natural gas unit. Washington's ESSB 6001, adopted in 2007, includes essentially the same set of provisions.

[35] Pursuant to Oregon House Bill 3283, enacted in 1997, the Oregon Energy Facility Siting Council requires that new baseload gas-fired generation and new non-baseload generation mitigate all projection CO_2 emissions in excess of what would be produced by a plant with an emission rate of 675 lbs/MWh (approximately 15-20% below the

(3) Missing PacifiCorp Transmission Project Assumptions

PacifiCorp publicly announced on May 30, 2007, its transmission expansion plan to build more than 1,200 miles of new 500-kilovolt transmission lines originating in Wyoming and connecting into Utah, Idaho, Oregon and the desert southwest, with completion targeted in 2014.[36] The $4 billion-plus investment plan includes projects already in PacifiCorp's 10-year business plan and additional investments that will address customers' increasing electricity use. In addition to improving system reliability, these projects are aimed at delivering wind and other renewable generation resources to more customers throughout PacifiCorp's six-state service area and the western region. The electric transmission project will consist of two electric transmission line routes, a northern route and a southern route.

Northern route

- Double-circuit 500-kilovolt transmission line; PacifiCorp and Idaho Power Company are pursuing joint ownership of this line
- Will start from the Jim Bridger power plant in Wyoming to southeastern Idaho with a connection south along an existing transmission path from southern Idaho into northern Utah (Path C)
- Will be extended, likely at 345 kilovolts, to the Dave Johnston area in Wyoming
- Will be extended west across Idaho and into Oregon in a single-circuit 500-kilovolt construction
- 600-plus miles of line capable of delivering up to 3,000 megawatts of electricity from Wyoming to Idaho into Utah and up to 2,500 megawatts of new incremental capacity from Idaho west into Oregon

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emission rate of the most efficient CCGT) operating 8760 hours per year for 30 years. Applicants for site certificates can mitigate their excess CO_2 emissions through cogeneration, by implementing mitigation projects directly or through a third party, or by providing an up-front payment (currently set at $1.27 per short ton of CO_2) to the Climate Trust, a designated third-party provider of mitigation projects. Washington's House Bill 3141, enacted in 2004, is similar to the Oregon law, except that it is applicable to all baseload plants regardless of fuel source, and requires all projects to mitigate a flat 20% of projected CO_2 emissions. Among the set of mitigation options, applicants can pay a mitigation fee of $1.60 per metric ton CO_2.

[36] See, http://www.pacificorp.com/File/File75005.pdf.

Southern route

- Double-circuit 500-kilovolt transmission line
- Will start from southwestern Wyoming (near the Jim Bridger power plant) with a connection into central Utah at the Mona substation located in Juab County
- Will extend from the Mona or Sigurd area into southern Utah and the desert southwest
- 600 miles of line capable of delivering up to 3,000 megawatts from Wyoming to Mona, and 3,000 megawatts from the Mona area into the desert southwest.

Appropriate attribution of California's share of PacifiCorp-owned coal- and natural gas-fueled generating units, inclusion of existing western state climate policies as modeling constraints akin to the modeling constraints created for the various western state RPS programs, plus updates to the E3's model's transmission pathway assumptions based on publicly announced projects, such as those announced by PacifiCorp, are necessary and will significantly improve the Stage 1 and 2 modeling results.

(4) Generally, the Documentation Lacks Specificity on Unit-Specific Information and Existing Transmission Pathways

PacifiCorp notes that normally it would have access to modeling documentation that identifies a generating unit's operating characteristics (i.e., fuel type, emissions controls, average heat rate, and etcetera). Similarly, modeling documentation also describes transmission pathways and constraint assumptions in more detail. Knowing these key model assumptions would allow PacifiCorp to comment on either mistakes in the characterization of its own generating units and transmission system, as well as share with the modeler on ways to improve the model's assumptions based upon PacifiCorp's planned generating and transmission improvements that will occur prior to or during the timeframe anticipated within the modeling.

(5) It is Difficult to Compare Key Modeling, Especially "Environmental

Policy Constraint", Assumptions

Finally, PacifiCorp notes one general observation regarding documentation. PacifiCorp observed that in several instances where E3 indicates that it relied on PacifiCorp's 2007 Integrated Resource Plan ("IRP") and information included within presentations made to PacifiCorp's Integrated Gasification Combined Cycle Working Group.[37] PacifiCorp's 2007 IRP presents the utility's resource planning principles and objectives, a profile of major external influences on the company's planning effort, a resource needs assessment, options considered for resource portfolio development, the modeling and risk analysis approach, portfolio evaluation results, and an action plan. The E3 documentation would be improved if it were to include additional matrices showing E3's preferred modeling assumptions compared to those used relied upon within the various utility IRPs, including PacifiCorp's 2007 IRP. In past modeling projects, PacifiCorp has required vendors to include matrices comparing the final modeling assumptions to those used within similar studies. Such matrices allow an interested stakeholder to quickly determine the key modeling assumption differences.

In PacifiCorp's experience, the key modeling assumptions include: electricity load growth; fuel supply and price curves (in particular natural gas price curves and natural gas supply curves that rely on liquefied natural gas importation); energy efficiency supply curves; new generation build costs; emission control costs (both new and retrofit); nuclear and hydro re-licensing; and the specific set of environmental regulatory policy constraints (i.e., emissions caps, RPS targets, greenhouse gas emissions performance standards, and etcetera).

Question No. 7. Provide feedback, as desired or appropriate, on the structure and approach taken by E3 in its GHG Calculator spreadsheet tool.

PacifiCorp is disappointed that the E3 model will not produce analysis unique to its Northern California operations. The results will also be heavily influenced by the fact that /

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[37] E3 referred to PacifiCorp's IRP on pages 43, 129. A copy of PacifiCorp's 2007 IRP may downloaded from http://www.pacificorp.com/Navigation/Navigation23807.html. Copies of the PacifiCorp Integrated Gasification Combined Cycle Working Group presentations may be downloaded from http://www.pacificorp.com/Article/Article66610.html.

three of the load-serving entities to be modeled are investor-owned utilities that have largely divested themselves of fossil-fueled generation, and the other two remaining load-serving entities are large consumer-owned utilities, all of whom have large service territories with a large customer base. While this approach will provide the Commission and the CEC with information on potential rate impacts for the largest number of customers, it may not provide the necessary detail to model the impacts of a carbon policy on smaller utility customer populations, including PacifiCorp's customers. Perhaps of less importance to the task at hand, but the results of California's modeling exercise may also not be readily transferable to other western states which have not fully deregulated their electricity sector. In sum, the documentation is insufficient for PacifiCorp to be able to adequately comment.

Question No. 9. Are uncertainties inherent in the resource potential and cost estimates adequately identified? Does E3's model provide enough flexibility to test alternative assumptions with respect to these uncertainties?

The documentation is insufficient for PacifiCorp to be able to adequately comment. To best inform the rulemaking, the modeling should include multiple runs with varying alternative assumptions (i.e., scenarios). As a start, E3 should define a worst-case set of assumptions (i.e., the worst-case scenario) to define one side of the policy spectrum, as well as define a best-case set of assumptions (i.e., the best-case scenario) to define the other side. Staff from the Commission and the CEC, after reviewing stakeholder input, would then select a set of assumptions that best define their expectations (i.e., the basecase or expected-case scenario). Multiple sensitivities could then be run off of the basecase scenario using different key assumptions. PacifiCorp believes it is important to define an upper limit on potential carbon compliance cost impacts on customer rates.

Question No. 11. Should E3's model, in Stage 2, attempt to model potential market transformation scenarios, in the form of cost decreases, new technologies, or behavioral changes? What might be an appropriate way to characterize such potential for market transformation?

Much like the role utilities play in fostering customer energy efficiency savings, utilities will likely have a role in administering programs to foster fuel switching within the

transportation sector from higher carbon fuels (i.e., diesel and gasoline) to electricity (i.e., PHEVs/EVs). Unfortunately, the Commission Staff workpaper discussion on electricity sector emissions[38] does not sufficiently address the potential for beneficial fuel switching within the transportation sector. Since the transportation sector is a significant contributor of greenhouse gases in California, it is not unreasonable to assume that California will take steps to address mobile source-related greenhouse gas emissions.

Examples of additional measures that could be promulgated include ones modeled after rules adopted by the South Coast Air Quality Management District (the "District")[39] which currently target emissions of nitrogen oxide and diesel particulates. The District has already promulgated various fleet procurement rules[40] for light- and medium-duty public fleet vehicles, transit buses, trash trucks, commercial airport vehicles, school buses, and heavy-duty public fleet vehicles, as well as various other mobile source emission offset programs targeting private fleet operations.[41] There are also numerous examples of state programs focused on state-, municipally- or privately owned and operated fleets.[42] Commission staff should further develop policies and/or technologies that would define the utilities' role in supporting beneficial fuel switching within the electricity sector, possibly through administering programs fostering customer transportation-related greenhouse gas emissions savings.

PacifiCorp suggests the Commission and the CEC use a method for characterizing the market potential for PHEVs/EVs similar to the one used by EPRI within its "The Power to

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[38] See, Section "2. Overview of Electric and Natural Gas Sector Emissions" pages 1-3.

[39] The South Coast Air Quality Management District is a California regulatory agency responsible for emissions occurring within portions of Los Angeles, San Bernardino, and Riverside counties and all of Orange County (see http://www.aqmd.gov)

[40] See, Regulation 11, Rules 1191, 1192, 1193, 1194, 1195, and 1196. (available at: http://www.aqmd.gov/rules/reg/reg11_tofc.html)

[41] See, Regulation 16, and the various rules (available at: http://www.aqmd.gov/rules/reg/reg16_tofc.html)

[42] See, interactive map of state incentives (available at: http://www.eere.energy.gov/afdc/incentives_laws.html)

Reduce CO_2 Emissions: The Full Portfolio."[43]

Question No. 12. What specific flexible GHG emission reduction mechanisms to mitigate the economic impacts of achieving the desired GHG emission reductions should be modeled in Stage 2?

Stage 2 modeling should examine varying limits in the amount of tradable carbon offset credits that can be used by regulated entities to demonstrate compliance. Carbon offset credits would be valued at a rate of one tradable credit representing one ton of CO_2. These credits would be used in addition to CO_2 allowances for compliance purposes. The modeling should examine at least two scenarios: 1) no use of tradable carbon offset credits and 2) unlimited use of carbon offset credits, with the Commission and the CEC seeking input from stakeholders on other possible limits in between to be modeled. Limits on the use of tradable carbon offset credits would be expressed as a percentage of the annual CO_2 emissions allowance budget.

The Kyoto Protocol has sanctioned offsets as a way for governments and private companies to earn carbon offset credits which can be traded on a marketplace. The protocol established a Clean Development Mechanism ("CDM") which validates and measures projects to ensure they produce authentic benefits and are genuinely "additional" activities that would not be otherwise undertaken. Organizations that have difficulties in meeting their emissions quota are able to offset their emissions by buying CDM-approved Certified Emissions Reductions. The CDM encourages projects that involve, for example, renewables power generation, changes in land use, and forestry, although not all trading countries allow their companies to buy all types of carbon offset credits. The Northeastern states' Regional Greenhouse Gas Inititiative also allows a limited amount of carbon offset credits to be used in addition to CO_2 allowances.[44]

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[43] Pages 3-3, A-4, and B-5; "The Power to Reduce CO_2 Emissions: The Full Portfolio"; Electric Power Research Institute (August 2007). See, http://www.epri-reports.org/DiscussionPaper2007.pdf

[44] In August 2005, the RGGI staff working group proposed an emissions reduction program that would start in 2009 and lead to a stabilization of emissions at current levels (an average of 2002-2004 levels) by 2015. This would be followed by a 10% reduction in emissions between 2015 and 2020. The proposal would also allow participants to purchase offsets to meet 50% of their emission reductions.

Question No. 13. What output metric or metrics should be utilized to evaluate the least cost way to meet a 2020 emission reduction target for the sector?

Since Assembly Bill 32 does not exclusively target emissions from the electricity and natural gas sectors, it is preferable that a common output metric be used such as dollars per ton of CO_2 reduced or avoided. Such a metric would allow California to compare the cost of emission reduction measures among different parts of the economy. Ideally, California utilities would be free to pursue the lowest cost emissions reductions anywhere within California's economy. Such a common metric would also facilitate linkages to regional, national, and international emission reduction measures and trading markets.

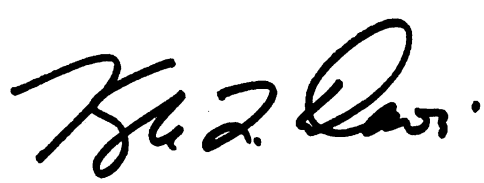
III. CONCLUSION

PacifiCorp appreciates the opportunity to provide comments on the Commission Staff workpaper on available emission reduction measures and the E3 modeling methodology. PacifiCorp respectfully requests that the Commission give careful consideration to the suggested program improvements detailed herein. PacifiCorp looks forward to working with the Commission on these important issues.

Dated: January 4, 2008

Respectfully submitted,

By



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CERTIFICATE OF SERVICE

I hereby certify that on this 4th day of January, 2007, I caused to be served, a true and correct copy of the foregoing

COMMENTS OF PACIFICORP (U 901 E) ON EMISSION REDUCTION MEASURES AND MODELING-RELATED ISSUES

to be served on the parties on the attached service list via Electronic Mail or U.S. Mail and Overnight delivery to the parties below:

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