BEFORE THE STATE CORPORATION COMMISSION

OF THE STATE OF KANSAS

DIRECT TESTIMONY

OF

PAUL ALVAREZ

ON BEHALF OF

ENVIRONMENTAL DEFENSE FUND

DOCKET NO. 15-WSEE-115-RTS

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Paul Alvarez. My business address is PO Box 150963, Lakewood, CO 80215.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am the President of the Wired Group, a consultancy specializing in the optimization of distribution utility businesses and operations as they relate to grid modernization, demand response, energy efficiency, and renewable generation.

Q. ON WHOSE BEHALF ARE YOU SUBMITTING TESTIMONY?

A. I am testifying on behalf of the Environmental Defense Fund (EDF).

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. My testimony supports EDF witness Munns' testimony that additional research and stakeholder participation is reasonable in response to Westar Energy's application to establish specific rates for customers who own Distributed Generation (DG).

Q. PLEASE PROVIDE A SUMMARY OF YOUR TESTIMONY.

A. After presenting my qualifications, I will describe how regulators in other states have addressed utility requests for changes in rate design to deal with increases in distributed solar generation, including both typical processes and various outcomes. I will explain the wide variation in regulatory outcomes by introducing the factors that impact the value of distributed solar generation, which is a critical component to be considered in related rate design changes. I will use these factors to identify the data required to design appropriate rates specific to

distributed generation owners, highlighting the opportunity to use such data to address many potential subsidy issues within the residential class, and between customer classes, that likely exist today. Finally, I will describe the potential consequences of implementing rates specific to distributed generation owners without adequate research and stakeholder engagement.

II. QUALIFICATIONS

Q. PLEASE DESCRIBE YOUR WORK EXPERIENCE AND EDUCATIONAL BACKGROUND.

A. My career began in 1984 in a series of finance and marketing roles of progressive responsibility for large corporations, including Motorola's Communications Division (now Android/Google), Baxter Healthcare, Searle Pharmaceuticals (now owned by Pfizer), and Option Care (now owned by Walgreens). My combined aptitude for finance and marketing were well suited for innovation and product development, leading to my first job in the utility industry in 2001 with Xcel Energy, one of the largest investor-owned utilities in the U.S. At Xcel Energy I served as product development manager, overseeing the development of new energy efficiency and demand response programs for residential, commercial, and industrial customers, as well as programs in support of voluntary renewable energy purchases and renewable portfolio standard compliance (including distributed solar incentive program design). As product development manager I learned the economics of traditional monopoly ratemaking and associated utility economic incentives, as well as the impact of self-generation, energy efficiency, and demand response on utility shareholders and management decisions. I also

learned a great deal about utility program impact measurement and verification (M & V).

I left Xcel Energy to lead the utility practice for boutique sustainability consulting firm MetaVu in 2008, where I utilized my M & V experience to lead two comprehensive, unbiased evaluations of smart grid deployment performance. To my knowledge these are the only two comprehensive, unbiased evaluations of smart grid deployment performance completed to date. The results of both were part of regulatory proceedings in the public domain and include an evaluation of the SmartGridCity™ deployment in Boulder, Colorado for Xcel Energy in 2010, and an evaluation of Duke Energy's Cincinnati deployment for the Ohio Public Utilities Commission in 2011.

In 2012 I started the Wired Group to focus exclusively on distribution utility businesses and operations as they relate to grid modernization, demand response, energy efficiency, and renewable generation. Wired Group clients include utilities, regulators, consumer and environmental advocates, and industry associations. In addition I serve as an adjunct professor at the University of Colorado's Global Energy Management Program, where I teach an elective graduate course on electric technologies, markets, and policy. I have also taught at Michigan State University's Institute for Public Utilities, where I educated new regulators and staff on grid modernization and distribution utility performance measurement.

Finally, I am the author of Smart Grid Hype & Reality: A Systems Approach to Maximizing Customer Return on Utility Investment, a book that helps laypersons understand smart grid capabilities, optimum designs, and post-deployment performance optimization. I received an undergraduate degree in Finance from Indiana University's Kelley School of Business in 1983, and a master's degree in Management from the Kellogg School at Northwestern University in 1991. My Curriculum Vitae is attached as Appendix A to this testimony.

Q. WHAT IS YOUR EXPERIENCE TESTIFYING BEFORE STATE UTILITY REGULATORY COMMISSIONS?

A. I have testified before state utility regulatory commissions on the issues of grid modernization, demand response, energy efficiency, and renewable generation in Colorado, Maryland, and Ohio.

III. OTHER STATES' ACTIONS ON RATES SPECIFIC TO DISTRIBUTED GENERATION

Q. CAN YOU DEFINE "RATES SPECIFIC TO DISTRIBUTED GENERATION?"

A. Most utilities offer a variety of rate designs from which customers within a class may choose. Increasingly, utilities are attempting to restrict distributed generation owners' rate choices to a limited number designed specifically for distributed generation owners, as Westar Energy is attempting to do in the present rate case.

Q. WHY ARE UTILITIES ASKING TO IMPLEMENT RATES SPECIFIC TO DISTRIBUTED GENERATION OWNERS?

A. Distributed generation reduces utility sales volumes, and utilities are understandably concerned about the associated reduction in revenues. So as distributed generation grows, more utilities are asking regulators for permission to implement rates that stem revenue erosion. Utilities also allege that rates specific to distributed generation owners are necessary to control cost shifts to customers without distributed generation. But utility-sponsored solutions to this issue also have the effect of slowing the adoption of distributed generation, and are therefore controversial. Distributed generation advocates say that specific rates should not be imposed to recover costs without considering the associated benefits that distributed generation provides.

Q. ARE YOU AWARE OF OTHER STATES' RECENT ACTIVITIES RELATED TO RATE DESIGNS SPECIFIC TO DISTRIBUTED GENERATION?

A. Yes. In the past few years regulators in Arizona, California, Idaho, and Louisiana have concluded proceedings dedicated to distributed generation-specific rate design. These cases have been processed outside general rate cases either through legislative direction (California, Louisiana) or because utilities' proposed rate changes are technically categorized as revenue neutral and allowed to proceed as single issue ratemaking proceedings (Arizona, Idaho). Rates specific to distributed generation are also an issue in the broader regulatory reform effort currently underway in New York, which has been characterized by a high level of informal stakeholder engagement.[1] In addition, informal initiatives are underway in several states with the support of regulatory Staff to consider how to manage

[1] Reforming the Energy Vision. New York Public Service Commission. Case 14-M-0101 initiated April 24, 2014.

distributed generation within the broader context of the changing utility business models, including Hawaii, Massachusetts, and Minnesota. Finally, almost every traditional utility rate case now being filed includes requests for higher fixed charges and/or specific rates for distributed generation owners in response to the revenue threat posed by distributed generation.

Q. WHAT PROCESSES ARE TYPICALLY EMPLOYED IN PROCEEDINGS DEDICATED TO DISTRIBTED GENERATION-SPECIFIC RATES?

A. In California (Assembly Bill 327) and Louisiana (Act 653), legislation directed regulators to establish rates and rules to compensate distributed generation owners for the energy they produce. In Arizona and Idaho, utilities (Arizona Public Service and Idaho Power) applied for permission to institute rates specific to distributed generation. In all these cases regulators established issue-specific dockets to allow impacted stakeholders to participate in the process.

Q. CAN YOU SUMMARIZE SOME OF THE APPROACHES ADOPTED BY COMMISSIONS THAT HAVE CONSIDERED RATES SPECIFIC TO DISTRIBUTED GENERATION?

A. Summarizing is difficult, as these proceedings have resulted in a wide variety of conclusions. For example, Idaho regulators determined that no special rates should apply to distributed generation owners, though they did agree that credit for energy produced by distributed generation systems should be limited to the owner's energy consumption.[2] In Arizona, regulators determined that a small fixed charge – $0.70 per kW of distributed generation capacity per month for existing systems, $3.00 per kW per month for future systems – was appropriate to

[2] Idaho Public Utilities Commission, Case No. IPC-E-12-27, Order No. 32846. July 3, 2013.

address the difference between solar system costs and benefits in that state, at least as an interim measure before the next APS rate case.[3]

The Arizona Commission Corporation's order in the case was particularly informative regarding the issue of cost shifting related to distributed generation. The order noted, "APS' application focuses on the costs associated with increasing levels of DG installations. However, integral to the discussion of DG is the question of what *value* DG offers to APS' electric system and thereby to the customers serviced by that system."[4] I observe that Westar Energy's request to implement rates specific to distributed generation owners suffers from the same omission; in particular, Dr. Faruqui's testimony does not consider the value of solar in avoiding energy purchases during high-cost periods. The importance of quantifying this value is critical to the design of rates specific to distributed generation, and the need is underscored by the Southwest Power Pool's recent (March 1, 2014) transition to a day-ahead energy market. In a day-ahead energy market, distributed generation will make more energy available for Westar Energy to sell while reducing the price of energy it must acquire; both are good for its ratepayers and any actions that might restrict distributed generation deployment should consider this value.

In a California PUC docket established in response to the ratification of AB 327, regulators determined that the rates at which distributed generation owners should be compensated were sufficiently important to justify conducting

[3] Arizona Commerce Commission, Docket No. E-01345A-13-0248, Decision No. 74202. December 3, 2013

[4] Ibid, page 7.

cost-benefit analyses at the circuit level, whereby rates would vary to serve as price signals to prospective distributed generation owners.[5] In the California approach, these price signals are intended to encourage distributed generation on some circuits (to avoid transmission bottlenecks or substation upgrades, for example) while discouraging it on others (in cases where such economic opportunities were not available). The California PUC's approach is intended to ensure the most cost-effective deployment of distributed generation, and the New York commission appears to be headed down the same path in its aforementioned regulatory reform proceeding.

In Louisiana, though Staff recommended the implementation of rates specific to distributed generation owners (including an increase in fixed fees), the Louisiana PSC did not permit the implementation of such rates.[6] However the PSC did elect to reduce any potential impact of distributed generation by limiting the capacity from which each utility is required to purchase energy at 1/2% of each utility's peak demand. I understand that less than 300 Westar Energy customers own solar systems;[7] I estimate the associated amount of solar capacity among Westar Energy's customers to be far below this very low limit deemed by the Louisiana commission to be acceptable. Moreover, I note Westar Energy fails to quantify the dollar amount of the alleged subsidy to distributed generation owners in its rate case.

[5] California Public Utilities Commission. Order Instituting Rulemaking Regarding Policies, Procedures, and Rules for Development of Distribution Resources Plans Pursuant to Public Utilities Code Section 769. Rulemaking 14-08-013. August 14, 2014.

[6] Louisiana Public Service Commission. Net Energy Metering Rule-making. Docket R-27558. November 9, 2005.
[7] Springe, David. Interview with Andy Marso, KHI News Service. June 11, 2015. Posted at www.kcur.org.

Q. WHAT DOES AVAILABLE RESEARCH SAY ABOUT THE COSTS AND BENEFITS OF SOLAR SYSTEMS?

A. The results of "value of solar" systems research varies with the types of economic benefit taken into account. Some utilities, like Arizona Public Service[8] and Public Service Company of Colorado[9] offer studies indicating that solar system value is less than the retail rates at which energy from distributed generation is reimbursed; other utilities like Austin Energy[10] and solar energy industry associations like TASC[11] offer studies indicating that solar system value is greater than retail rates. But perhaps of more practical value is a research review completed by the Interstate Renewable Energy Council specifically for regulators which recommends that all of the following sources of economic value be investigated when considering rates specific to distributed (solar) generation:

- Avoided energy costs
- Line losses avoided when generation is sited next to loads
- Some amount of generation capacity provided from solar systems in aggregate
- Avoided transmission and distribution capacity upgrades
- Distribution grid support (notably, voltage and possibly power factor)

[8] SAIC Energy, Environment & Infrastructure LLC. *2013 Updated Solar PV Value Report.* May 10, 2013.

[9] Xcel Energy. *Costs and Benefits of Distributed Solar Generation on the Public Service Company of Colorado System.* Docket 11M-426E. May 23, 2013.

[10] Clean Power Research LLC. *The Value of Distributed Photovoltaics to Austin Energy and the City of Austin.* March 17, 2006 and subsequent updates.

[11] Crossborder Energy. *The Benefits and Costs of Solar Distributed Generation for Arizona Public Service.* May 8, 2013.

- Distributed generation as a long-term hedge against fuel price volatility
- Reductions in market prices for energy (and perhaps capacity in Kansas' future)
- Improvements in reliability and resiliency
- Reduced environmental regulation compliance costs
- Local employment and economic development.[12]

Q. DOES DR. FARUQUI TAKE INTO ACCOUNT ANY OF THESE POTENTIAL BENEFITS IN HIS TESTIMONY ON BEHALF OF WESTAR ENERGY REGARDING THE UTILITY'S PROPOSAL FOR RATES SPECIFIC TO DISTRIBUTED GENERATION OWNERS?

A. No.

IV. DATA REQUIRED FOR ADVANCED RATE DESIGN PROCESSES

Q. CAN YOU EXPLAIN WHY A STATE-SPECIFIC INQUIRY IS INDICATED EACH TIME RATES SPECIFIC TO DISTRIBUTED GENERATION OWNERS ARE PROPOSED?

A. First, each utility's avoided energy costs are different; for example, some utilities are more exposed to natural gas price volatility, while others are more exposed to coal costs or day-ahead energy market prices than others. Second, solar resources vary by geography; note that solar resource maps from National Renewable Energy Laboratories indicate solar resources in eastern Kansas are better than those available to more than half the US population.[13] Third, different studies use different assumptions for timeframes, discount rates, and other financial

[12] Interstate Renewable Energy Council, Inc. *A Regulator's Guidebook: Calculating the Benefits and Costs of Distributed Solar Generation.* October, 2013.
[13] Derived from average annual direct normal irradiance map available at http://maps.nrel.gov/prospector

projection inputs. Finally each geography's customer base is different, marked by different customer type ratios (agricultural vs. industrial vs. commercial vs. residential), different customer loads (for example, the relative penetration of central air conditioning or electric heating among residential customers), and different load shapes and capacity factors (the ratio of average demand to peak demand).

Q. YOUR LAST OBSERVATION SUGGESTS THERE MAY BE ADDITIONAL REASONS TO LOOK MORE CLOSELY AT THE EQUITY OF RATE DESIGN BEYOND THE IMPACT FROM DISTRIBUTED GENERATION.

A. Yes, I believe there are. Consider central air conditioning, which is a significant driver of utility investment in generation, transmission, and distribution capacity. Business and low-income advocates have long claimed that residential customers with central air conditioning have been subsidized by these advocates' constituents; recent efforts by many regulators to correct this situation through inclining block rates seem to validate these claims.

Q. WHY DO YOU BELIEVE OTHER POTENTIAL SOURCES OF COST SHIFTING WITHIN THE RESIDENTIAL CLASS HAVE NOT PROMPTED UTILITY ACTION TO THE DEGREE THAT DISTRIBUTED GENERATION HAS?

A. Distributed generation advocates believe, with some justification, that the type of residential electric equipment they support, solar PV systems, is being unfairly singled-out and targeted by utilities as a source of cost shifting that requires

immediate attention. They cite that other types of residential electric equipment could be argued to also shift costs within the residential class, such as air central conditioning or electric heat. However, the addition of these kinds of loads, particularly air conditioning, have not been challenged by utilities on the basis of ratepayer equity, nor have they been aggressively cited by the industry as a reason to impose onerous rate designs that will impede adoption of solar by customers. One explanation is that central air conditioning and electric heat increase electric loads, utility investment, and utility profits, while distributed generation reduces electric loads, utility investment, and utility profits.

Q. WHAT DO YOU RECOMMEND THE COMMISSION CONSIDER AS IT REVIEWS THE DISTRIBUTED GENERATION-SPECIFIC RATES WESTAR ENERGY HAS PROPOSED?

A. I recommend the Commission reject Westar Energy's proposal for rates specific to distributed generation for now, taking the discussion of rate design related to distributed generation out of the rate case to a broader, less formal proceeding where more stakeholders can participate. This could be a statewide forum, with time parameters, where the issue can be addressed for all utilities. A distinct, informal proceeding would offer time for research and stakeholder input that would result in a more optimum Commission decision on needed rate design changes.

Q. HOW DO YOU SUGGEST THE COMMISSION RESEARCH THE COST SHIFT ISSUE?

A. I understand Westar Energy has installed almost 100,000 smart meters for residential customers. These meters collect data that could prove very valuable in quantifying all aspects of system use, costs, and benefits within the residential class. With such a large sample size, which I understand is growing every day, Westar Energy has the data the Commission could use to investigate all potential source of cost shifting – not just the impact of the residential customer who generates some of his own electricity – with a high degree of accuracy and confidence. This data includes:

- Hourly production profile data for solar systems in eastern Kansas
- Hourly usage profile and peak demand data for residential customers with central air conditioning
- Hourly usage profile and peak demand data for residential customers with pools or hot tubs
- Hourly usage profile and peak demand data for residential customers with electric heat
- Hourly usage profile and peak demand data for residential customers without central air conditioning, pools/hot tubs, or electric heat
- Hourly usage profile and peak demand data for low-use customers
- Hourly usage profile and peak demand data for low income customers
- Hourly usage profile and peak demand data for residential square footage (e.g. urban apartments, suburban homes)

This data could be analyzed in conjunction with usage profile and peak demand data long available from larger agricultural, commercial and industrial customers' meters to accurately and confidently measure the relative impacts of various customers' equipment and operations on generation, transmission, and distribution systems. In fact, the detailed data made available by smart meters

could be used to establish a full catalog of customer types distinguished by load shape and characteristics. In addition to rate design, this data could be used for integrated resource planning, for preparation of Kansas' response to the Environmental Protection Agency's Clean Power Plan, transmission and distribution system planning, demand response program potential and impact studies, and energy efficiency program potential and impact studies to name just a few.

VI. POTENTIAL CONSEQUENCES OF INADEQUATE RESEARCH AND INPUT

Q. WHAT COULD HAPPEN IF THE COMMISSION MAKES A DECISION WITHOUT THE RESEARCH AND STAKEHOLDER INPUT YOU SUGGEST?

A. While it is certainly possible the Commission could make an appropriate decision without the research and stakeholder input I recommend, I think it unlikely due to the number and variability of associated determinants presented in this testimony. If the Commission makes an inappropriate decision on this issue, a number of unintended and potentially significant consequences could result.

If the solar-specific rates are approved in a way that sets high rates for entry and under-estimates solar system benefits:

- Solar generation that could have delivered value to all Westar Energy customers will not be installed
- The option for Westar Energy customers to install solar systems will be needlessly restricted
- An equitable opportunity for economic development in Kansas through the solar energy industry will be missed

On the other hand, if the Commission does not fairly assign costs to customers who own distributed generation, all Westar Energy customers who do not own distributed generation will pay higher prices for electric service than they otherwise would have paid.

VII. CONCLUSION

Q. COULD YOU PLEASE SUMMARIZE YOUR TESTIMONY?

A. Certainly. In summary, I do not believe Westar Energy has completed the necessary research to craft a fair rate design specific to distributed generation owners. Further, the data to accurately and confidently measure the impact of various types of customer equipment on generation, transmission, and distribution systems is now readily available from smart meters. And finally, the consequences of setting the wrong precedent at this time could be significant and have unintended consequences. For all these reasons, it seems appropriate that the Commission remove the discussion of rate design specific to distributed generation from the rate case and place it in a broader, less formal proceeding offering opportunities for research and stakeholder input.

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes, it does.

Appendix A: Curriculum Vitae of Paul J. Alvarez MM, NPDP

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Profile

After 15 years in Fortune 500 product development and product management, including P&L responsibility, Mr. Alvarez entered the utility industry by way of demand-side management rate and program development, marketing, and impact measurement in 2001. He has since designed renewable portfolio standard compliance and distributed generation incentive programs. These experiences led to unique projects involving the measurement of grid modernization benefits (energy, capacity, operating savings, revenue capture, reliability, environmental, and customer experience) and costs, which revealed the limitations of current utility regulatory and governance models. Mr. Alvarez currently serves as the President of the Wired Group, a boutique consultancy serving utilities, regulators, staffs, advocates, and other stakeholders.

Research Project and Thought Leadership

Duke Energy Ohio Smart Grid Audit and Assessment. Primary research report prepared for the Public Utilities Commission of Ohio case 10-2326-GE. June 30, 2011.

SmartGridCity™ Demonstration Project Evaluation Summary. Primary research report prepared for Xcel Energy. Colorado Public Utilities Commission case 11A-1001E. October 21, 2011.

Smart Grid Economic and Environmental Benefits: A Review and Synthesis of Research on Smart Grid Benefits and Costs. Secondary research report prepared for the Smart Grid Consumer Collaborative. October 8, 2013. Companion piece: Smart Grid Technical and Economic Concepts for Consumers.

Regulatory Reform Proposal to Base a Significant Portion of Utility Compensation on Performance in the Public Interest. Testimony before the Maryland PSC on behalf of the Coalition for Utility Reform, case 9361. December 8, 2014.

Best Practices in Grid Modernization Capability Optimization: Visioning, Strategic Planning, and New Capability Portfolio Management. Top-5 US utility; client confidential. 2014.

Books

Smart Grid Hype & Reality: A Systems Approach to Maximizing Customer Return on Utility Investment. First edition. ISBN 978-0-615-88795-1. Wired Group Publishing. 327 pages. 2014.

Noteworthy Publications

Integrated Distribution Planning: An Idea Whose Time has Come. Public Utilities Fortnightly. November, 2014.

Maximizing Customer Benefits: Performance Measurement and Action Steps for Smart Grid Investments. Public Utilities Fortnightly. January, 2012.

Buying Into Solar: Rewards, Challenges, and Options for Rate-Based Investments. Public Utilities Fortnightly. December, 2009.

Smart Grid Regulation: Why Should We Switch to Performance-based Compensation? Smart Grid News. August 15, 2014.

A Better Way to Recover Smart Grid Costs. Smart Grid News. September 3, 2014.

Is This the Future? Simple Methods for Smart Grid Regulation. Smart Grid News. October 2, 2014.

The True Cost of Smart Grid Capabilities. Intelligent Utility. June 30, 2014.

Notable Presentations

NARUC Subcommittee on Electricity. *Maximizing Smart Grid Customer Benefits: Measurement and Other Implications for Investor-Owned Utilities and Regulators.* St. Louis. November 13, 2011.

NARUC Subcommittee on Energy Resources and the Environment. *The Distributed Generation (R)Evolution.* Orlando. November 17, 2013.

NASUCA 2013 Annual Conference. *A Review and Synthesis of Research on Smart Grid Benefits and Costs.* Orlando. November 18, 2013.

Mid-Atlantic Distributed Resource Initiative. *Smart Grid Deployment Evaluations: Findings and Implications for Regulators and Utilities.* Philadelphia. April 20, 2012

IEEE Power and Energy Society, ISGT 2013. *Distribution Performance Measures that Drive Customer Benefits.* Washington DC. February 26.

National Conference of Regulatory Attorneys 2014 Annual Meeting. *Smart Grid Hype & Reality.* Columbus, Ohio. June 16.

DistribuTECH 2012. *Lessons Learned: Utility and Regulator Perspectives.* Panel Moderator. January 25.

DistribuTECH 2012. *Optimizing the Value of Smart Grid Investments.* Half-day course. January 23.

Canadian Electric Institute 2013 Annual Distribution Conference. *The (Smart Grid) Story So Far: Costs, Benefits, Risks, Best Practices, and Missed Opportunities.* Keynote. Toronto, Canada. January 23.

Great Lakes Smart Grid Symposium. *What Smart Grid Deployment Evaluations are Telling Us.* Chicago. September 26, 2012.

Teaching

Post-graduate Adjunct Professor. University of Colorado, Global Energy Management Program. Course: Renewable Energy Commercialization -- Electric Technologies, Markets, and Policy.

Guest Lecturer. Michigan State University, Institute for Public Utilities. Courses: Performance Measurement of Distribution Utility Businesses; Introduction to Grid Modernization.

Education

Master of Management, 1991, Kellogg School of Management, Northwestern University. Concentrations: Accounting, Finance, Information Systems, and International Business.

Bachelor's Degree in Business Administration, 1984, Kelley School of Business, Indiana University. Concentrations: Marketing and Finance.

Certifications

New Product Development Professional. Product Development and Management Association. 2007.

STATE OF COLORADO

COUNTY OF Jefferson

VERIFICATION

Paul Alvarez, being duly sworn upon his oath, deposes and says that he is a designated expert witness for the intervenor Environmental Defense Fund, that he has read and is familiar with the foregoing direct testimony, and that the statements contained therein are true and correct to the best of his knowledge, information and belief.

Paul Alvarez

Subscribed and sworn to before me this 8th day of July, 2015.

Notary Public

ERIC K OLSEN
Notary Public
State of Colorado

My appointment expires: 1/27/2016