FILED
January 14, 2016
INDIANA UTILITY
REGULATORY COMMISSION

DIRECT TESTIMONY OF VANN K. STEPHENSON GENERAL MANAGER OF MAJOR PROJECTS ON BEHALF OF DUKE ENERGY INDIANA, LLC CAUSE NO. 44734 BEFORE THE INDIANA UTILITY REGULATORY COMMISSION

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Vann K. Stephenson and my business address is 400 South Tryon Street, Charlotte, North Carolina 28202.

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

A. I am employed as the General Manager of Major Projects by Duke Energy Business Services, LLC. Duke Energy Business Services, LLC is a service company affiliate of Duke Energy Indiana, LLC ("Duke Energy Indiana" or "Company"). Duke Energy Indiana is a wholly owned, indirect subsidiary of Duke Energy Corporation.

Q. WHAT ARE YOUR RESPONSIBILITIES AS THE GENERAL MANAGER OF MAJOR PROJECTS?

A. As the General Manager of Major Projects, I am responsible for the direct management and project execution of new natural-gas combined cycle generating facilities, major clean air-related retrofit projects, solar generating facilities and transmission projects in Duke Energy's territories in Florida and the Midwest, including Indiana.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A. I graduated from North Carolina State University with a B.S. in Civil Engineering, and have over thirty-five years of engineering and engineering project management experience in this industry. I began my career with Duke Power, and then, after a move back to my hometown of Raleigh, N.C., joined Progress Energy. I held a series of positions of increasing responsibility and was General Manager for Engineering and Construction Management for Progress Energy prior to the Duke Energy/Progress Energy merger. I continued that role post-merger but with an expanded area of coverage.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony in this proceeding is to support the Company's cost estimate, contracting strategy and construction schedule for the proposed 17 MW_{ac}/24 MW_{dc} solar-powered generating facility (the "Crane Solar Facility") to be located on land leased to Duke Energy Indiana by Naval Support Activity Crane ("NSA Crane").

II. COST ESTIMATE

Q. HOW DOES DUKE ENERGY INDIANA INTEND TO CONSTRUCT THE PROPOSED CRANE SOLAR FACILITY?

A. Duke Energy Indiana has entered into a fixed price, firm schedule engineering, procurement and construction ("EPC") contract for the construction and installation of the solar array with Mortenson Construction. Duke Energy Indiana will purchase the solar panels directly from SolarWorld Americas, LLC ("SolarWorld"), and the DC/AC inverters from Schneider Electric ("Schneider"). The transmission interconnection work will be performed under firm price contracts overseen by both the Duke Energy Indiana transmission organization and my organization, Duke Energy's project management and

construction organization. My organization will be managing all aspects of the construction of the Crane Solar Facility, in conjunction with Duke Energy Indiana's transmission organization, which will also be overseeing certain aspects of the Crane Solar Facility's interconnection with the transmission grid.

Q. HAS DUKE ENERGY INDIANA SUBMITTED THE PROPOSED CRANE SOLAR FACILITY TO THE MIDCONTINENT INDEPENDENT SYSTEM OPERATOR ("MISO") INTERCONNECTION QUEUE?

A. Yes, we have submitted the proposed Crane Solar Facility to MISO's interconnection queue. We anticipate learning more about any transmission system impacts of the proposed interconnection from the MISO System Impact Study and expect an Interconnection Agreement in approximately April 2016. After receiving from MISO a feasibility study, we have assumed limited transmission investment will be necessary in order to interconnect the Crane Solar Facility, and have included those potential expenses in our cost estimate in this proceeding. Any additional scope impacts produced by the MISO study process will be evaluated to determine the impact to both cost and the planned commercial operation date of the facility.

Q. PLEASE DESCRIBE PETITIONER'S CONFIDENTIAL EXHIBIT 2-A.

A. Petitioner's Confidential Exhibit 2-A consists of the Company's cost estimate for the Crane Solar Facility. The overall estimate is approximately $41.3 million, which includes a reasonable contingency amount of approximately $1.6M. This amount does not include an estimate of Allowance for Funds Used During Construction ("AFUDC"),

instead, the Company is requesting approval of our estimated project costs, plus the actual, accrued amount of AFUDC.

Q. PLEASE DESCRIBE THE MAIN COMPONENTS OF THE COST ESTIMATE FOR THE CRANE SOLAR FACILITY.

A. The Company's cost estimate for the Crane Solar Facility has four main components: (1) panels and inverters; (2) construction and racking of solar panels; (3) transmission interconnection and construction of a substation; and (4) remote monitoring and site communications infrastructure. I will discuss each component in more detail below.

First, Duke Energy Indiana will use negotiated Duke Energy supply agreements with SolarWorld and Schneider to procure its panels and inverters for the project. By design, solar panels are a direct current ("DC") source and multiple panels are interconnected to deliver a percentage of rated power at 1000V-DC. Multiple DC inputs are combined and connected to an inverter, which yields an alternating current ("AC"), again, at a percentage of the rated power of the facility at what is considered to be distribution voltage, *i.e.* 13kV. The output from multiple inverters is then combined within the facility and ultimately, at the solar facility's substation, to deliver 100% of the rated power of the facility to be stepped up to transmission voltage – in this case, 69kV – and delivery onto the Duke Energy Indiana system.

Second, Duke Energy Indiana has entered into an EPC contract with Mortenson to construct and rack the solar panels. Mortenson will be responsible for site preparation and installation of racking and panels. It will also provide and install the DC and AC cabling required to interconnect the solar modules into an array, aggregate the DC from

multiple arrays to an inverter and ultimately collect the AC output of all inverters to yield two 13kV distribution circuits that will be brought to a substation for transformation and interconnection with the Duke Energy Indiana transmission system.

Third, although we do not anticipate hearing back from MISO on the Crane interconnection until April 2016, Duke Energy Indiana has included costs associated with both the transmission interconnection and construction of a Crane Solar Facility-related substation. Based on the engineering assessment by Duke Energy Indiana's transmission group, it is reasonable for us to assume that such upgrades will ultimately be required by MISO to support the addition of this generation to the transmission grid. Because of the relative size of the proposed Crane Solar Facility and the low voltage of the transmission line with which it will interconnect, we reasonably expect limited system impacts associated with the project's interconnection. However, to the extent there are additional schedule or cost impacts associated with potential transmission system upgrades, those will have to be evaluated to determine the impact to the commercial operation date and cost estimate of the facility.

Fourth, Duke Energy Indiana has included costs for communications infrastructure and remote monitoring of the Crane Solar Facility to ensure real time data and grid optimization are both available. This facility will also be able to be isolated and interrupted, in the event of a grid fault event, to both protect the Crane Solar Facility from grid faults and the transmission grid from any faults associated with the Crane Solar Facility. This level of monitoring and system control allows Duke Energy to optimize this facility to the grid and ensure it is producing energy optimally as required by MISO.

In addition to these major components, Duke Energy Indiana has also included within its estimate a reasonable amount for contingency and risk, as well as Duke Energy labor and indirects. Given that nearly 80% of the capital costs for the Crane Solar Facility are based on fixed price contracts, Duke Energy Indiana is confident that its estimate is reasonable and accurate.

Q. PLEASE EXPLAIN THE PROCESS DUKE ENERGY INDIANA UNDERTOOK TO SELECT ITS CONTRACTORS FOR THIS PROJECT.

A. Duke Energy's supply chain organization has established long-term supply contracts with both SolarWorld and Schneider for photovoltaic modules and inverters, respectively. Both suppliers were selected through competitive bidding processes, and comply with the Buy American Act, which is required under the terms of the lease agreement with NSA Crane. The SolarWorld contract was established in January 2015, and since then, SolarWorld has successfully supplied photovoltaic modules for other Duke Energy solar projects in North Carolina and Florida, meeting its contractual obligations. In October 2015, Duke Energy solicited pricing from multiple inverter suppliers and selected Schneider as the best evaluated supplier for the Crane Solar Facility. The purchase order with Schneider was executed in January 2016. Schneider products have a proven record of quality and service with Duke Energy.

Our EPC contractor was selected through a competitive request for proposals and is also compliant with the Buy American Act requirements. After evaluating the bids, Duke Energy Indiana selected Mortenson based on its overall solar experience, Midwest regional labor familiarity, federal government contracting experience and competitive

pricing. As I mentioned previously, our EPC contract is a fixed price and firm schedule contract with a target commercial date of December 2016.

Those three agreements, together, comprise approximately 80% of the capital costs for the Crane Solar Facility. Although Duke Energy Indiana has taken the necessary steps to firm up the majority of the cost estimate, there are portions of the project for which contracts are not already in place – mainly the transmission and communication infrastructure portions. Our contracting strategy for those remaining portions is to enter into firm price contracts for engineering and construction in the first quarter of 2016, with Duke Energy Indiana's transmission organization providing the generation step up transformer.

Q. PLEASE EXPLAIN WHAT TRANSMISSION INVESTMENT COSTS ARE INCLUDED IN THE PROJECT ESTIMATE.

A. The Company has included costs associated with the interconnection of the Crane Solar Facility to Duke Energy Indiana's existing 69 kV transmission line, which is located near the Crane Solar Facility, as well as costs associated with necessary relay upgrades. The Company has received a MISO feasibility study, which is the first part of the process of submitting a complete application for generator interconnection to MISO, and has considered possible transmission investment that could be required for interconnecting a new generating facility to the grid. We do not presently anticipate investment beyond that included in our current estimate. We will not know for sure; however, what MISO may require until we receive our Interconnection Agreement and System Impact Study in April 2016. To the extent either the MISO Interconnection Agreement or System Impact

Study result in any additional project cost or impacts to the construction schedule, Duke Energy Indiana will file information regarding the costs and/or schedule impacts in this proceeding.

Q. PLEASE DESCRIBE HOW THE COMPANY DETERMINED THE AMOUNT OF CONTINGENCY TO INCLUDE IN THE PROJECT ESTIMATE.

A. My organization utilizes a standard process for identifying and quantifying project risks. Risk items are identified by project team members and quantified based on the project location, contracting strategy, technology and other project items. A project risk register is produced to tabulate and calculate the appropriate contingency required based on both the total project cost and schedule. My team will be responsible for managing this risk register.

Q. DO YOU BELIEVE THIS COST ESTIMATE IS REASONABLE?

A. Yes, I do. As I mentioned above, over 80% of this project estimate was based on fixed priced contracts. It also includes estimated Company labor, indirects and a reasonable level of contingency. Our contractors are experienced in their respective fields and I have no reason to believe that the Crane Solar Facility will experience unusual issues or delay.

Q. WHAT IS THE ESTIMATED LIFE OF THE CRANE SOLAR FACILITY?

A. Although the solar panels have a 10-year limited warranty and a 25-year limited performance guarantee, Duke Energy Indiana anticipates that the Crane Solar Facility will have a useful life of approximately 30 years. Duke Energy Indiana's lease with NSA Crane has a 30-year term, which will allow for a period of construction, 25-30 years of

operation, and future dismantlement activities to be completed. This information was provided to Ms. Sieferman for use in her rate calculations and depreciation estimates.

Q. FOLLOWING CONSTRUCTION, WILL DUKE ENERGY INDIANA OWN, OPERATE AND MAINTAIN THE CRANE SOLAR FACILITY?

A. Yes. Duke Energy Indiana intends to own, operate and maintain the Crane Solar Facility.

Q. WHAT KIND OF OPERATING AND MAINTENANCE ("O&M") EXPENSE IS DUKE ENERGY INDIANA ANTICIPATING ONCE THE CRANE SOLAR FACILITY IS IN-SERVICE?

A. Maintenance activities required for the Crane Solar Facility include remote performance monitoring; resolving any outage or system performance concerns; replacement of panels as needed due to breakage or performance loss; routine maintenance of the inverters and power transformers; repair of electrical connections, and routine vegetative management, including mowing and vegetation control. O&M activities will be managed out of the Company's Wheatland Generating Station and a solar technician will service the facility according to an established maintenance plan, as needed. Estimated O&M was provided to Ms. Sieferman for use in her rate calculations.

III. CONSTRUCTION SCHEDULE

Q. PLEASE DESCRIBE THE MAJOR MILESTONES AND SCHEDULE ASSOCIATED WITH THE CRANE PROJECT.

A. A construction milestone schedule has been attached to my testimony as Petitioner's Exhibit 2-B. We anticipate providing Mortenson a full notice to proceed in early May 2016 with site mobilization occurring in mid-June 2016. It is my understanding that

Congress and the President recently extended the federal Investment Tax Credit ("ITC"), which had been scheduled to expire January 1, 2017. This tax credit now has an expiration date of December 31, 2019. Even with this extension, Duke Energy Indiana's construction schedule supports an anticipated December 31, 2016 in-service date.

Q. HOW DO YOU PROPOSE TO KEEP THE COMMISSION INFORMED OF THE CONSTRUCTION STATUS OF THE CRANE FACILITY?

A. Duke Energy Indiana has requested ongoing review of its construction of the proposed Crane Solar Facility pursuant to Indiana's certificate of public convenience and necessity law. We propose updating the Commission and other interested parties on construction of the proposed Crane Solar Facility as it proceeds through the Company's existing semi-annual ECR proceedings (docketed as Cause Nos. 42060 ECR-XX).

VI. CONCLUSION

Q. WERE PETITIONER'S CONFIDENTIAL EXHIBIT 2-A AND EXHIBIT 2-B PREPARED BY YOU OR AT YOUR DIRECTION?

A. Yes.

Q. DOES THIS CONCLUDE YOUR PREPARED DIRECT TESTIMONY AT THIS TIME?

A. Yes.

VERIFICATION

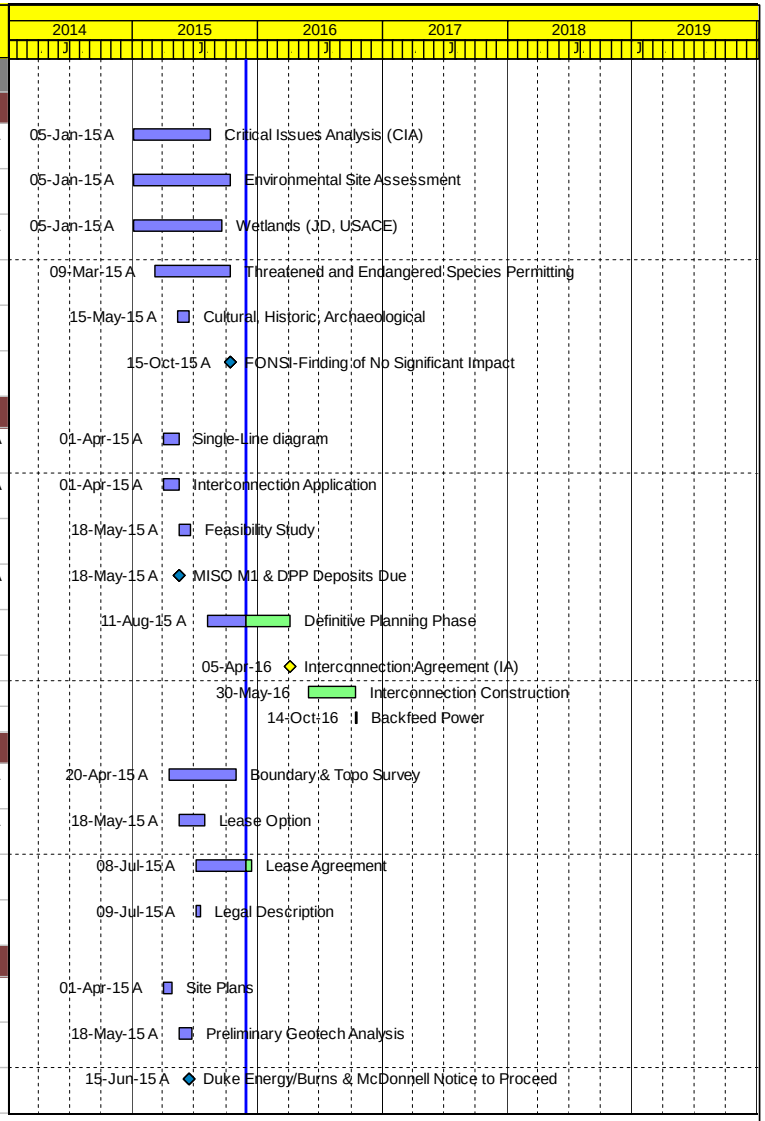
I hereby verify under the penalties of perjury that the foregoing representations are true to the best of my knowledge, information and belief.

Signed: _____ Dated: 1/14/2016

Vann Stephenson

PETITIONER'S EXHIBIT 2-A
IS CONFIDENTIAL

Activity ID	Activity Name	Original Duration	Start	Finish
Indiana-Crane 2016 Solar Project		768d	05-Jan-15 A	10-Feb-17
Environmental		204d	05-Jan-15 A	15-Oct-15 A
ENV100	Critical Issues Analysis (CIA)	160d	05-Jan-15 A	19-Aug-15 A
ENV110	Environmental Site Assessment	160d	05-Jan-15 A	15-Oct-15 A
ENV130	Wetlands (JD, USACE)	160d	05-Jan-15 A	18-Sep-15 A
ENV140	Threatened and Endangered Species Permitting	160d	09-Mar-15 A	15-Oct-15 A
ENV120	Cultural, Historic, Archaeological	160d	15-May-15 A	15-Jun-15 A
ENV150	FONSI-Finding of No Significant Impact	0d		15-Oct-15 A
Interconnection		405d	01-Apr-15 A	18-Oct-16
INT100	Single-Line diagram	20d	01-Apr-15 A	18-May-15 A
INT110	Interconnection Application	20d	01-Apr-15 A	18-May-15 A
INT120	Feasibility Study	26d	18-May-15 A	22-Jun-15 A
INT175	MISO M1 & DPP Deposits Due	0d		18-May-15 A
INT130	Definitive Planning Phase	131d	11-Aug-15 A	05-Apr-16
INT150	Interconnection Agreement (IA)	0d		05-Apr-16
INT160	Interconnection Construction	99d	30-May-16	13-Oct-16
INT170	Backfeed Power	3d	14-Oct-16	18-Oct-16
Real Estate		90d	20-Apr-15 A	16-Dec-15
ROW120	Boundary & Topo Survey	40d	20-Apr-15 A	02-Nov-15 A
ROW100	Lease Option	56d	18-May-15 A	03-Aug-15 A
ROW150	Lease Agreement	53d	08-Jul-15 A	16-Dec-15
ROW140	Legal Description	8d	09-Jul-15 A	20-Jul-15 A
Engineering & Design		303d	01-Apr-15 A	27-May-16
ENG100	Site Plans	20d	01-Apr-15 A	28-Apr-15 A
ENG130	Preliminary Geotech Analysis	28d	18-May-15 A	24-Jun-15 A
ENG010	Duke Energy/Burns & McDonnell Notice to Proceed	0d		15-Jun-15 A



Remaining Lvl Of Eff
Critical LOE
LOE Completed
Actual Work
Remaining Work
Critical Remaining ...
Current Milestone
Critical Milestone
Completed Milestone

Indiana-Crane 2016 Solar Project
All Activities

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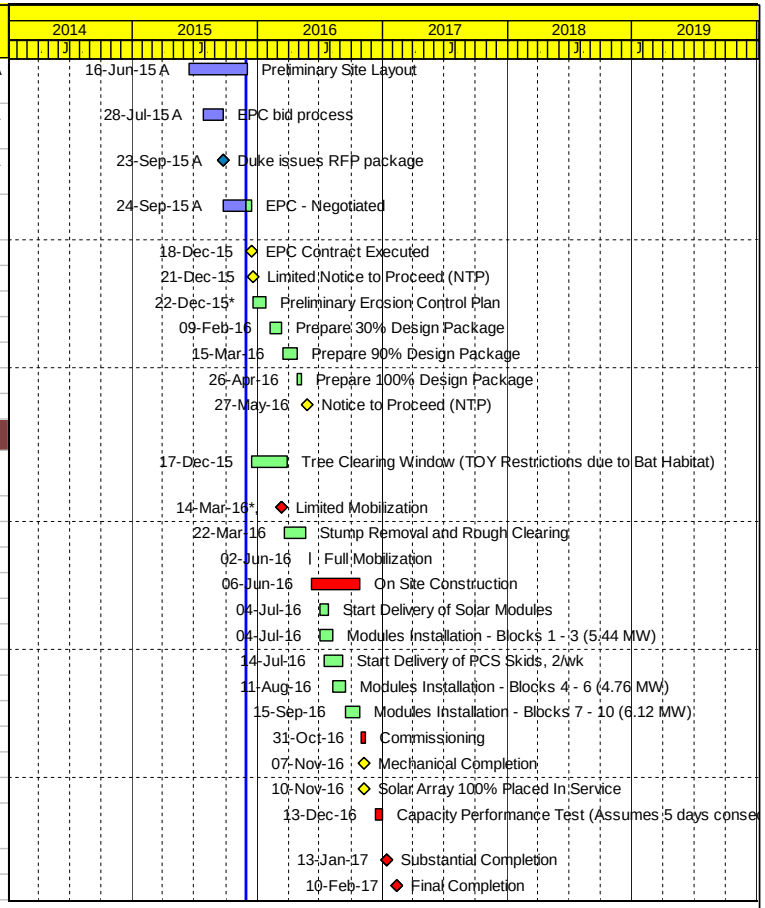
DUKE ENERGY.

Activity ID	Activity Name	Original Duration	Start	Finish
ENG225	Preliminary Site Layout	5d	16-Jun-15 A	04-Dec-15 A
ENG110	EPC bid process	28d	28-Jul-15 A	23-Sep-15 A
ENG250	Duke issues RFP package	0d		23-Sep-15 A
ENG140	EPC - Negotiated	30d	24-Sep-15 A	18-Dec-15
ENG150	EPC Contract Executed	0d		18-Dec-15
ENG160	Limited Notice to Proceed (NTP)	0d		21-Dec-15
ENG230	Preliminary Erosion Control Plan	27d	22-Dec-15*	27-Jan-16
ENG340	Prepare 30% Design Package	25d	09-Feb-16	14-Mar-16
ENG350	Prepare 90% Design Package	30d	15-Mar-16	25-Apr-16
ENG360	Prepare 100% Design Package	10d	26-Apr-16	09-May-16
ENG260	Notice to Proceed (NTP)	0d		27-May-16
Construction		422d	17-Dec-15	10-Feb-17
ENG215	Tree Clearing Window (TOY Restrictions due to Bat Habitat)	106d	17-Dec-15	31-Mar-16
ENG180	Limited Mobilization	0d	14-Mar-16*	
ENG170	Stump Removal and Rough Clearing	45d	22-Mar-16	23-May-16
ENG380	Full Mobilization	2d	02-Jun-16	03-Jun-16
ENG190	On Site Construction	105d	06-Jun-16	28-Oct-16
ENG270	Start Delivery of Solar Modules	19d	04-Jul-16	28-Jul-16
ENG290	Modules Installation - Blocks 1 - 3 (5.44 MW)	28d	04-Jul-16	10-Aug-16
ENG280	Start Delivery of PCS Skids, 2/wk	39d	14-Jul-16	06-Sep-16
ENG310	Modules Installation - Blocks 4 - 6 (4.76 MW)	25d	11-Aug-16	14-Sep-16
ENG320	Modules Installation - Blocks 7 - 10 (6.12 MW)	31d	15-Sep-16	27-Oct-16
ENG200	Commissioning	10d	31-Oct-16	11-Nov-16
ENG330	Mechanical Completion	0d		07-Nov-16
ENG390	Solar Array 100% Placed In Service	0d		10-Nov-16
ENG370	Capacity Performance Test (Assumes 5 days consecutive reqmt)	15d	13-Dec-16	02-Jan-17
ENG210	Substantial Completion	0d		13-Jan-17
ENG400	Final Completion	0d		10-Feb-17



Remaining Lvl Of Eff
Critical LOE
LOE Completed
Actual Work
Remaining Work
Critical Remaining ...
Current Milestone
Critical Milestone
Completed Milestone

Indiana-Crane 2016 Solar Project
All Activities

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