I&M Exhibit: _____

Cause No. 45235

INDIANA MICHIGAN POWER COMPANY

PRE-FILED VERIFIED DIRECT TESTIMONY

OF

TIMOTHY C. KERNS

INDEX

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ON BEHALF OF
INDIANA MICHIGAN POWER COMPANY

Q. Please state your name and business address.

A. My name is Timothy C. Kerns, and my business address is 2791 N. US Highway 231, Rockport, IN 47635.

Q. By whom are you employed and in what capacity?

A. I am employed as Managing Director – Generating Assets for Indiana Michigan Power Company (I&M or the Company), a wholly owned subsidiary of American Electric Power Company, Inc. (AEP).

Q What are your responsibilities as Managing Director – Generating Assets for I&M?

A. I am responsible for the safe, reliable, efficient, environmentally-compliant, and low-cost performance of I&M's Fossil (Steam), Hydroelectric (or Hydro), and Universal Solar generating fleet. More specifically, I oversee and direct this fleet's operation and maintenance (O&M) and capital budget expenditures. I collaborate with I&M's Executive Leadership, American Electric Power's (AEP) Fossil & Hydro Generation group, AEP's Commercial Operations group, and the AEP Service Corporation (AEPSC) organization in support of such responsibilities.

Q. Please briefly describe your educational background and business experience.

A. I hold a Bachelor of Science in Mechanical Engineering Degree from West Virginia Institute of Technology and have been employed with AEP for 30 years. I have worked at various power plants across the AEP system as a Performance Engineer, a Maintenance Engineer, and a Plant Manager. From 2001 to 2005, I was the Regional Services Organization Manager responsible for providing maintenance-related services to AEP's Fossil, Hydro, and Nuclear generating fleet. I have also held the positions of Regional Engineering Manager and Regional Outage Manager.

Q. Have you previously filed testimony before any regulatory commissions?

A. Yes. I have submitted testimony on behalf of I&M before the Indiana Utility Regulatory Commission (IURC) in Cause Nos. 44967 and 44511 and before the Michigan Public Service Commission (MPSC) in Cause Nos. U-18370 and U-20070.

I. PURPOSE OF TESTIMONY

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony in this proceeding is to describe I&M's non-nuclear generating fleet, which is comprised of fossil fueled and hydro assets, as well as I&M's Universal Solar generating assets. I support historical and forecasted O&M expense and capital investments for I&M's generating fleet. As described in more detail by Company witness Lucas, these forecasted costs are developed collaboratively as part of a work plan that fits within I&M's overall effort to continue to provide safe, reliable, efficient, environmentally-compliant, and low-cost service to its customers. More specifically, I support generation O&M expenses for the forward-looking 12-month test year period ending December 31, 2020 (the Test

Year), as well as historical generation O&M expenses for the 12-month period ending December 31, 2018. I also support I&M's forecasted generation capital expenditures during 2019 and 2020 (the Capital Forecast Period).

All O&M expenses and capital investments that I present in my testimony, both historical and forecasted, represent total Company levels and are not representative of the Indiana jurisdictional share. Company witness Duncan describes the Indiana jurisdictional allocation of the Test Year O&M expenses and capital investments.

I also describe the Dry Sorbent Injection Enhancement (Enhanced DSI) project at the Rockport Plant to reduce sulfur dioxide (SO_2) emissions, as further explained by Company witness Thomas. I support the Enhanced DSI project costs that are used by Company witness Williamson to calculate Rate Base O&M Adjustment RB/O&M-2 related to the Enhanced DSI.

Q. Did you submit any work papers?

A. Yes. I am supporting the following work papers:

- WP-TCK-1 – O&M
- WP-TCK-2 – Consumable Expense
- WP-TCK-3 – Capital

II. I&M's GENERATING FLEET

Q. Please describe the portion of I&M's fleet of generating units that you support in your testimony.

A. The portion of I&M's generating fleet that I support consists of the coal-fired Rockport Plant, six run-of-river hydro facilities, and four Universal Solar generating sites. For simplicity, I will sometimes refer to these assets as I&M's "generating fleet." I&M also owns and operates the Cook Nuclear Plant generating facility, which is supported by Company witness Lies in this proceeding. The terms "generation" and "generating" in my testimony exclude Cook.

I&M's generating units are well-maintained, in good condition, and necessary for I&M's provision of electric service to I&M's customers.

Q. Please describe the Rockport Plant.

A. I&M's Rockport Plant is located in Rockport, Indiana and consists of two similar coal fired generating units fired with pulverized coal. The nominal net generating capacity of Rockport Unit 1 is 1320 MW, and the nominal net generating capacity of Rockport Unit 2 is 1300 MW. I&M operates both units. As discussed further by Company witness Thomas, I&M has a 50% direct ownership share of Rockport Unit 1, and Rockport Unit 2 is operated under a lease agreement. I&M is directly entitled to 50% of the output of both Units; in addition, I&M affiliate AEP Generating Company is entitled to 50% of the output of both Units, and I&M purchases 70% of AEG's entitlement under a Unit Power Agreement (UPA) between I&M and AEG. Therefore, I&M is entitled to 85% of the total output of the Rockport Plant.

Units 1 and 2 at the Rockport Plant were placed in service in 1984 and 1989, respectively, and have been efficient and reliable performers for I&M and its customers. For over thirty years, the Rockport Plant has been a cornerstone of I&M's generation fleet and has achieved low emission rates of nitrogen oxides (NO_X) and SO_2 by consuming predominantly low-sulfur coal from the Powder River Basin (PRB). Each unit is equipped with an Electrostatic Precipitator (ESP) for collection of particulate matter (PM, also referred to as fly ash); low-NO_x burners (LNB) with overfire air (OFA) to minimize the formation of NO_x during combustion; Activated Carbon Injection (ACI) for the capture of mercury emissions; and Dry Sorbent Injection (DSI) for the reduction of acid gases and sulfur dioxide (SO_2) removal. In addition, Selective Catalytic Reduction (SCR) technology has been installed on Rockport Unit 1 and is currently under construction on Rockport Unit 2. These SCR installations will further reduce Rockport's NO_X emissions.

Each unit at the Rockport Plant currently consumes a blend of approximately 87% PRB sub-bituminous coal and 13% eastern bituminous coal. This high percentage PRB blend results in lower emission rates of SO_2 and NO_x relative to burning 100% eastern bituminous coal.

Q. What are Run-of-River Hydro units?

A. Run-of-River Hydro units are power stations situated along a river that utilize the river's flow for generation of power without materially altering the normal course of the river. A Run-of-River Hydro unit is advantageous in that it does not utilize a reservoir for power production and therefore has less of an impact on upstream ecosystems. Consequently, the output of these units is primarily dictated by river flow conditions and varies accordingly. Additionally, Run-of-River Hydro units are renewable energy sources that help to reduce I&M's carbon footprint and achieve compliance with state renewable mandates to which I&M is subject.

Q. Please discuss I&M's Run-Of-River Hydro facilities.

A. I&M has six Run-of-River Hydroelectric facilities as shown on Figure TCK-1:

Figure TCK-1
I&M Hydro Facilities

Facility Name	Number of Units	Location
Berrien Springs	10 Units	Berrien Springs MI
Elkhart Plant	3 Units	Elkhart IN
Buchanan Hydroelectric Plant	10 Units	Buchanan MI
Constantine Hydroelectric Plant	4 Units	Constantine MI
Mottville Hydroelectric Plant	4 Units	White Pigeon MI
Twin Branch	8 Units	Mishawaka IN

These facilities combine for a total of 22.4 megawatts (MW) of installed capacity and consistently produce, on average, approximately 100,000 MWH of emission-free renewable energy annually. With a proper maintenance schedule, these facilities will be viable generating assets for many more years.

Q. Please discuss the license expiration dates for the Hydro facilities.

A. Figure TCK-2 identifies the license expiration dates for each of I&M's Hydro facilities.

Figure TCK-2
I&M Hydro Facilities' License Expirations

Hydro Facility	Year Installed	License Expiration	Life Span (Years)
Berrien Springs	1908	2036	128
Buchanan	1919	2036	117
Constantine	1921	2053*	132
Elkhart	1913	2030	117
Mottville	1923	2033	110
Twin Branch	1904	2036	132

*Anticipated 30 year extension of current license by FERC

The current operating license for the Constantine Hydro facility, issued to I&M by the Federal Energy Regulatory Commission (FERC), expires September 30, 2023. I&M has begun initial steps to prepare a license renewal application for submission to FERC by September 30, 2021. I&M anticipates that FERC will approve the license renewal application and grant a 30-year extension through 2053 for operation of the Constantine Hydro facility. As each of the Hydro facilities approaches the date of its license expiration, I&M will evaluate the feasibility of continuing to operate the facility and determine whether to apply to FERC for a license extension.

Q. Please discuss I&M's Universal Solar generation.

A. I&M has four Universal Solar facilities: Deer Creek, Twin Branch, Watervliet, and Olive. The power output of these units is dictated by the amount of solar energy they are able to receive and transform into electric energy for consumption. Correspondingly, the time of day and the amount of atmospheric interference (e.g., cloud cover) dictate these units' generation output. Together, I&M's Universal

Solar generating units have an installed capacity of 14.7 MW[1] and provide another renewable energy resource to I&M's generation portfolio, which further reduces the Company's carbon emission profile. Figure TCK-3 identifies I&M's four Universal Solar facilities, their locations, and the corresponding capacity values.

Figure TCK-3
I&M Universal Solar Facilities

Facility #	Name	Location	In-Service Date	MW
1	Waterliet	Berrien County, MI	11/10/2016	4.6
2	Olive	St. Joseph County, IN	8/30/2016	5.0
3	Deer Creek	Grant County, IN	3/1/2016	2.5
4	Twin Branch	St. Joseph County, IN	8/18/2016	2.6

Q. Does I&M plan to add any new solar facilities to its renewable energy portfolio?

A. Yes. Subject to Commission approval, I&M proposes to build, own, and operate a 20 MW[1] solar facility in the South Bend, Indiana area. The South Bend Solar Project (SBSP) will be designed and constructed by a qualified third party turn-key contractor. The SBSP will be presented to the Commission in a separate docket. Company witness Williamson discusses the Company's proposed ratemaking if the SBSP is approved by the Commission and placed in service by Test Year end.

III. FORECASTED GENERATION CAPITAL INVESTMENT

Q. What is the projected capital period considered in this filing?

A. The projected period with respect to capital investment (Capital Forecast Period) is the period from January 1, 2019 through December 31, 2020. The Capital Forecast Period includes all of the Company's projected generation capital

[1] References to solar capacity in MW are in alternating current (AC).

expenditures in 2019 and 2020. The investment outlined in this testimony relates to the work plans developed by I&M to manage its system. This level of capital is included in the capital forecast presented by Company witness Lucas.

Q. How is the total amount of capital investment to be made in I&M's generating fleet determined?

A. As discussed by Company witness Lucas, I&M bases its investment on work plans developed by the Company and vetted through multiple steps. I&M staff work collaboratively with AEPSC's Environmental, Engineering, and Project Management teams to evaluate the needs of each generating unit to maintain reliability, safety, environmental compliance, and other unit performance parameters. The timing of capital investments depends on economic evaluations between competing projects and regulatory, safety, environmental, or reliability requirements. All of these factors serve as inputs to the capital projects approval process for I&M's generating fleet.

Q. What is the amount of capital to be invested in the Company's generating units during the Capital Forecast Period?

A. Total generation capital expenditures during the Capital Forecast Period are approximately $156 million (excluding AFUDC), as shown on Figure TCK-4 below.[2]

[2] Figure NAH-2 of Company witness Heimberger's testimony shows how AFUDC is added to capital expenditures.

Figure TCK-4
I&M Generation Capital Expenditures
($000 – Total Company – Excluding AFUDC)

Category	2019 Capital Expenditures	2020 Capital Expenditures	2019-2020 Total Capital Expenditures[3]
Major Projects	$75,117	$64,816	$139,932
Other Capital Investments	$5,383	$10,701	$16,084
Total	**$80,500**	**$75,516**	**$156,016**

Approximately $222 million of generation capital (including AFUDC) is forecasted to be placed in service during the Capital Forecast Period, as shown on Figure TCK-5 below.[4]

Figure TCK-5
I&M Generation Additions to Electric Plant in Service (EPIS)
($000 – Total Company – Including AFUDC)

Category	2019-2020 Additions to EPIS[5]
Major Projects	$202,126
Other Capital Investments	$20,051
Total	**$222,177**

In the Major Projects category, I have included all generation capital projects with capital expenditures exceeding $1 million during the Capital Forecast Period. I describe these in detail below.

The Other Capital Investment category includes capital expenditures associated with multiple smaller projects. For example, this category includes the

[3] Excludes Adjustment RB/O&M-2.
[4] Figure NAH-1 of Company witness Heimberger's testimony shows how generation additions to Electric Plant in Service (EPIS) are used to forecast total Company Plant in Service activity during the Capital Forecast Period.
[5] Excludes adjustment RB/O&M-2.

Rockport Unit 2 Turbine Supervisory Instrument Upgrade, which will monitor the turbine bearing vibrations; the Constantine Hydro Generator Step-Up Transformer replacement; and the installation of a Downstream Apron at Buchanan Hydro. The projects in the Other Capital Investment category represent the type of continuous investment that is necessary to maintain the availability and reliability of the generating units. These planned projects are reasonable and should be included as typical projects in a typical year.

Q. Please identify the in-service generation projects with capital expenditures greater than $1 million during the Capital Forecast Period.

A. Figure TCK-6 shows generation projects that will involve capital expenditures greater than $1 million during the Capital Forecast Period. It excludes projects that will involve capital expenditures greater than $1 million during the Capital Forecast Period but will be placed in service after the Test Year. Total forecasted project costs on Figure TCK-6 include AFUDC and present I&M's ownership share of the investment.

Figure TCK-6
I&M Generation Major Project Capital Expenditures
($000 - Total Company - Including AFUDC)

Number	Project Title	In-Service Date	Cost 1/1/2019 through 12/31/2020	I&M Total Project Cost Through End of Capital Forecast Period
1	RKU002SCR:Rockport Unit 2 SCR	5/31/2020	$105,874	$159,190
2	000025681: South Bend Solar Project	12/31/2020	$29,303	$29,303
3	RKIMC1801: Rockport Unit 1 Spare Low Pressure Turbine Rotor Upgrade	12/30/2019	$1,885	$1,885
4	000021635: Rockport Plant CCR Compliance	5/31/2020	$4,069	$4,069
5	RKIMC1904: Rockport Unit 1 SCR 1st Layer Catalyst Replacement	11/24/2019	$1,682	$1,804
6	CNH000098: Constantine Hydro Plant Trash Rake Intake	9/30/2019	$1,653	$1,680
7	RKIMC1901: Rockport Unit 2 HP Turbine Replacement	6/1/2020	$1,323	$1,323
8	RKIMC1707: Rockport Intermediate Pressure Turbine Steampath Upgrade	6/1/2020	$2,872	$2,872
9	Rockport Enhanced DSI*	12/31/2020	$13,315	$13,315

* The Rockport Enhanced DSI project is included as a capital adjustment.

Q. Please summarize the projects identified in Figure TCK-6.

A. The following projects will be placed in service during the Capital Forecast Period:

- Project 1 – Rockport Unit 2 SCR. The Rockport Unit 2 SCR Project will allow I&M to meet the requirements set forth in I&M's New Source Review (NSR) Consent Decree. The Commission granted a Certificate of Public Convenience and Necessity (CPCN) for this project in Cause No. 44871. The Rockport Unit 2 SCR is forecasted to be placed in service by May 31, 2020 at a total cost of $159.190 million (including AFUDC). I discuss the Rockport Unit 2 SCR operation later in my testimony.

- Project 2 – South Bend Solar Project. As noted above, the SBSP will be addressed by the Commission in a separate Cause. If approved by the Commission in that separate docket, the SBSP is forecasted to be placed in service by December 31, 2020 at a total cost of $29.303 million (including AFUDC).
- Project 3 – Rockport Unit 1 Spare Low Pressure Turbine Rotor Upgrade. I&M previously upgraded the steam path of Unit 1 and achieved a Low Pressure (LP) turbine efficiency improvement of 6% over the original design. This project will involve an upgrade of a spare LP turbine rotor to support the previously updated steam path. Having spare LP rotors significantly reduces the length of extended outages in the event of unexpected rotor damage or failure. Without a spare rotor or spare blades and in the event of failed forged blades, the lead time is greater than six months to procure new blades. This project is forecasted to be placed in service by December 30, 2019 at a total cost of $1.885 million (including AFUDC).
- Project 4 – Rockport Plant CCR Compliance. In April 2015, the U.S. EPA published a final rule to regulate the disposal and beneficial re-use of coal combustion residuals, including fly ash, bottom ash, and Flue Gas Desulphurization (FGD) gypsum generated at coal-fired electric generating

facilities. The rule applies to new and existing active CCR landfills and CCR surface impoundments. The rule imposes construction and operating obligations, including location restrictions, liner criteria, structural integrity requirements for impoundments, operating criteria, and additional groundwater monitoring requirements to be implemented on a schedule spanning an approximately four-year implementation period. Rockport's compliance with the CCR rule – which primarily consists of the discontinued use of the east bottom ash pond and inciting closure – is currently projected to be completed by May 31, 2020 at a total cost of $4.069 million (including AFUDC).

- Project 5 – Rockport Unit 1 SCR 1st Layer Catalyst Replacement. The first layer Unit 1 SCR catalyst replacement is required to maintain NO_X removal effectiveness. Regularly replacing SCR catalyst layers as they are exhausted allows I&M to efficiently operate the SCR to achieve the required NO_X removal. The first catalyst layer replacement is forecasted to be placed in service by November 24, 2019 at a total cost of $1.804 million (including AFUDC).
- Project 6 – Constantine Hydro Plant Trash Rake Intake. Due to the configuration of the Constantine Hydro Plant, waterborne debris collects on intake screens impeding water flow to the hydroelectric turbines. Left unchecked, this debris collection will block the intake screens, stopping the water flow to the turbines. Installation of intake screens and an intake

screen cleaner at the entrance of the head race canal will eliminate the need to removed debris from the intake screens manually. This project is forecasted to be placed in service by September 30, 2019 at a total cost of $1.680 million (including AFUDC).

- Project 7 – Rockport Unit 2 HP Turbine Replacement. This project involves rebuilding the Unit 2 High Pressure (HP) turbine, including the installation of the system spare turbine rotor and inner shell (inner block) and blade carriers during a scheduled Unit 2 outage in 2020. The 1300 Series turbines have a service life of 8 to 10 years based on good engineering practices. This project is forecasted to be placed in service by June 1, 2020 at a total cost of $1.323 million (including AFUDC).
- Project 8 – Rockport Intermediate Pressure Turbine Steampath Upgrade. This project upgrades the spare Intermediate Pressure (IP) D1000 turbine steampath to the upgraded D8000+ design. This project is forecasted to be placed in service by June 1, 2020 at a total cost of $2.872 million (including AFUDC).
- Project 9 – Rockport Enhanced DSI. As discussed further in Part V of my testimony, the Enhanced DSI project involves the relocation of the sodium bicarbonate injection points in order the increase the utilization and removal efficiency of the DSI systems on both generating units. This project is forecasted to be placed in service by December 31, 2020 at a total cost of $13.315 million (including AFUDC).

Q. Is the amount of capital to be invested in the Company's generating fleet during the Capital Forecast Period reasonable?

A. Yes. The components of I&M's generating fleet deteriorate, fail, or become obsolete over time and must be replaced to maintain safe, reliable, efficient, environmentally-compliant, and low-cost service. Additionally, capital investment must be made in response to evolving environmental regulatory requirements. The amount of capital investment to be made during the Capital Forecast Period is reasonable based on the needs of the generating facilities to maintain the expected level of service.

IV. GENERATION O&M EXPENSE

Q. What is I&M's non-fuel generation O&M expense?

A. Non-fuel generation O&M expense includes costs associated with the operation, maintenance, administration, and support of I&M's generating units. These costs exclude fuel but include labor, material and supplies, contractor services, consumables, allowances, and other miscellaneous expenses for I&M's generating facilities. For ease of reference, I will present these costs separately as the Fossil (Steam) Generation O&M expense for I&M's Fossil generation, the Hydro Generation O&M expense for I&M's Hydro generation, and the Universal Solar Generation O&M expense for I&M's Solar generation.

Q. What are you sponsoring related to the non-fuel generation O&M expenses in this testimony?

A. I am sponsoring generation overall plant work plans, which includes the Fossil (Steam), Hydro, and Universal Solar Generation O&M expenses presented in my testimony. As further discussed by Company witness Lucas, I participate in the prioritization and allocation of I&M's O&M expenses based on the work plan development.

Q. How is the total amount of O&M investment to be made in I&M's generating fleet determined?

A. As discussed by Company witness Lucas, I&M develops its O&M budget based on the costs that are necessary to maintain ongoing operations plus incremental O&M needs with a focus to optimize O&M costs whenever possible. Ongoing operations costs typically include labor, fringe benefits, consumable materials and chemicals, mandated fees, and other ongoing expenses, and are largely non-discretionary within a given year. Incremental O&M includes the cost associated with scheduled outages and maintenance at major generating facilities. Once ongoing operations O&M has been approved, the generation incremental needs are evaluated and prioritized against other business units by I&M management, and the available resources are allocated in order of greatest operational and/or customer benefit.

Q. What are the historical and Test Year levels of non-fuel generation O&M expenses that you are supporting in this filing?

A. As shown in Figure TCK-7 below, Fossil (Steam) Generation O&M expense was $121.299 million in 2018, and the projected Test Year Fossil (Steam) Generation O&M expense is $117.597 million. This includes FERC Accounts 500, 502, and 505-515. Hydro Generation O&M expense was $5.018 million in 2018, and the projected Test Year Hydro Generation O&M expense is $3.553 million. This includes FERC Accounts 535-545. Lastly, Universal Solar Generation O&M expense was $0.360 million in 2016, and the projected Test Year Universal Solar Generation expense is $0.246 million. This includes costs contained in FERC Account 549.

Q. Please describe the major areas of Fossil (Steam), Hydro, and Universal Solar Generation O&M expense.

A. There are four major categories into which Fossil (Steam), Hydro, and Universal Solar Generation O&M expense is divided. These include:

- Base Cost of Operations (BCO)
- Planned Outages
- Forced and Opportunity Outages
- Non-Outage Maintenance and Inspection (NOMI)

The largest portion of the Fossil (Steam) and Hydro Generation O&M expense is the BCO category, which includes costs involved in normal operation and maintenance that are relatively consistent from year-to-year. An example of

BCO costs would include maintenance on parts and equipment that is typically routine and predictable, along with their attendant labor costs. For Fossil (Steam) Generation O&M expense, emission allowances and consumables are other items that would fall under this category, but I will present them separately in my testimony below.

Planned Outages also represent a significant portion of the Fossil (Steam) and Hydro Generation O&M expense. Planned outages are outages that can include repair and major overhaul of large systems and components such as the boiler, turbine, or generator. These types of outages are scheduled and planned months or years in advance and often require long lead times on equipment and engineering of new or replacement components The O&M costs associated with planned outages can vary significantly from outage to outage, depending on the needs of each individual operating unit, but are necessary to maintain the safe, reliable, efficient, environmentally-compliant, and low-cost operation of I&M's Fossil (Steam) & Hydro generating units.

The Forced and Opportunity Outage category includes unplanned and unscheduled outages that require the unit to be taken offline because of an unanticipated event or failure. Due to system demand, it is often necessary to quickly bring the units back into operation as expeditiously as possible when out of service due to a forced outage. Costs associated with forced outages are influenced by I&M’s historic unit performance and the unit’s assessed health. This category also includes opportunity outages which are outages of a short duration scheduled typically just hours or days in advance with the purpose of mitigating an emergent issue. Opportunity outages are only scheduled if allowed by the level of system demand.

Lastly, the NOMI category of Fossil (Steam), Hydro, and Universal Solar Generation O&M expense represents maintenance work that can be performed while the generating unit remains in service.

Q. Are there any other significant costs included in the Fossil (Steam) Generation BCO category?

A. Yes. As discussed by Company witness Thomas, Rockport Unit 2 is leased by I&M, and the Company must make an annual lease payment to the Unit's owners. This cost, approximately $70.147 million per year (both in 2018 and in the 2020 Test Year), is included in the BCO category of the Fossil (Steam) Generation O&M expense.

Q. Please provide the historical and Test Year levels of Fossil (Steam), Hydro, and Universal Solar Generation O&M expense by category.

A. Figure TCK-7 provides the historical and Test Year Fossil (Steam) and Hydro Generation O&M expense, by category:

Figure TCK-7
Historical & Adjusted Test Year Fossil (Steam), Hydro, and Universal Solar Generation O&M Expense by Category ($000 – Total Company)

O&M Type	Generation O&M Category	2018	Test Year
Fossil (Steam) Generation O&M Expense	BCO	$95,055	$93,840**
	Planned Outage	$8,242	$1,263
	NOMI	$525	$825**
	Forced and Opportunity Outage	$1,168	$435
	Allowances	$1,224	$1,161
	Consumables	$15,085	$20,073**
	Total	**$121,299**	**$117,597****
Hydro Generation O&M Expense	BCO	$2,967	$2,651
	Planned Outage	$596	$255
	NOMI	$1,425	$647
	Forced and Opportunity Outage	$30	$0
	Total	**$5,018**	**$3,553**
Solar Generation O&M Expense *	BCO	$360	$246

* Solar O&M in Account 5490000 in "other generation" account group.
** Incremental increase of O&M for BCO, NOMI, and consumables is shown in Figure TCK-9 for the DSI project and O&M Adjustment-4 for the SCR.

Q. Were adjustments made to the O&M expenses for the forecasted Test Year?

A. Yes. Two sets of adjustments were necessary to accurately portray the forecasted Test Year O&M expenses. First, O&M Adjustment-4 was made to the amount of consumables expense (fossil) associated with the commissioning of the SCR on Unit 2. The Unit 2 SCR goes into service in May 2020. O&M Adjustment-4 is an annualized increase for the Test Year. That adjustment added $94,733 to the fossil test year consumables total. The second adjustment, RB/O&M-2, is related to the Enhanced DSI project as discussed further in Section V and includes adjustments for $100,000 to BCO expense (fossil) for additional preventive maintenance, $25,000 to NOMI expense (fossil) for more frequent feeder rebuilds, and an adjustment of $7,955,332 to the consumable expense (fossil) for the increased injection rates of sodium bicarbonate. Company witness Williamson further explains, supports, and discusses these adjustments in his testimony.

Q. Please explain the difference in Fossil (Steam) Generation O&M expense planned outage category between 2018 and the Test Year?

A. Planned outages are cyclical in nature and are necessary to maintain the operation of the units. The Fossil (Steam) Generation O&M Expense Planned Outage Category was greater in 2018 as opposed to the Test Year because there was more planned outage work in 2018 involving a larger scope. Specifically, outage costs in 2018 involved two planned outages on Rockport Unit 1 totaling 60 days and two planned outages on Rockport Unit 2 totaling 88 days, whereas the 2020 Test Year outage costs include an 86-day planned outage for Rockport Unit 2 and one 9-day planned fall outage on Rockport Unit 1.

Q. Please explain the difference in the Hydro and Fossil Generation O&M expense NOMI category in the Test Year as compared to 2018.

A. In 2020, only two large maintenance projects are scheduled to be completed at I&M's Hydro facilities: the restoration of the concrete spillway at the Twin branch Hydro Plant and concrete restoration at the Constantine Hydro Plant. In 2018, many more O&M projects took place, including window replacement and exterior steel painting at the Twin Branch Plant, repairs to the fish ladder at Buchanan Hydro, and rollway timber flashboards at Berrien Springs Hydro.

The 2018 Fossil NOMI expenses were less than what has historically been spent. There are two drivers for the reduced expenses. First, BCO expenses for corrective maintenance were higher than expected, therefore reducing the NOMI expenditures. Second, more Planned Outage time reduced the need to execute some of the NOMI spend in 2018. The amount of NOMI forecasted for 2020 is consistent with the historical expenditures in this category.

Q. What consumables are included in the Test Year Fossil (Steam) Generation O&M expense?

A. I&M has installed DSI control technology and has an existing ACI system on Rockport Units 1 and 2 to meet emission limitations required by the MATS Rule. The DSI and ACI systems inject sodium bicarbonate and activated carbon, respectively, into the flue gas stream, allowing the Rockport Plant to remove hazardous acid gases and mercury for compliance with the MATS Rule. In Part V below, I describe consumables costs associated with the Enhanced DSI project forecasted to be completed in 2020.

Additionally, I&M has completed the installation of SCR technology on Rockport Unit 1 and is completing the installation on Rockport Unit 2 to further reduce NO_X emissions. As part of the SCR process, anhydrous ammonia is vaporized and injected into the flue gas where, in the presence of the SCR catalyst, it reacts with the NO_X, transforming it into nitrogen, an inert gas, and water. These three consumables (sodium bicarbonate, activated carbon, and anhydrous ammonia) are included in the Test Year Fossil (Steam) Generation O&M expense identified in Figure TCK-7 above.

Sodium bicarbonate, activated carbon, and anhydrous ammonia are included in the 2018 and Test Year Fossil (Steam) Generation O&M expense. However, because the Rockport Unit 2 SCR expected in-service date is May 31, 2020, lower costs associated with anhydrous ammonia were incurred during 2018. Since the SCR on Rockport Unit 2 will be placed in service in 2020, its associated anhydrous ammonia has been included in the Test Year Fossil (Steam) Generation O&M expense (adjusted to reflect an annualized level).

Q. Are the sodium bicarbonate costs in 2018 different than the Test Year level?

A. Yes, the Test Year includes higher levels of sodium bicarbonate to meet increasingly stringent emission limits. The Rockport Plant utilizes the DSI system to meet reduced sulfur dioxide (SO_2) emission limits required under the Plant's air permit. This SO_2 limit becomes more stringent over multiple years, with lower SO_2 emission limit taking effect on January 1, 2018, and January 1, 2020. In response to the stepped reduction SO_2 limit, I&M will increase the injection rate of sodium bicarbonate. Both the 2018 and Test Year levels of consumable expense are identified in Figure TCK-7 above. In addition, the Enhanced DSI requires an additional increase of consumables in the Test Year.

Q. Will consumable consumption increase in years following the Test Year?

A. Yes, as I discuss further in Section V of my testimony, consumable consumption will increase in 2021 as a result of the Enhanced DSI. Company witness Williamson further discusses annualizing consumables in his testimony.

Q. Are the consumable costs included in the Test Year Fossil (Steam) generation O&M expense expected to be significant, variable, and largely outside I&M's control?

A. Yes. It is important to recognize that consumable costs vary in the same way that fuel costs vary with respect to generation levels. As the generation produced by the Rockport Plant increases or decreases, the amount of consumables used changes. As explained further below, Rockport's operation is largely dictated by PJM market prices. In addition, dispatch costs are largely impacted by market prices for commodities and transportation. These factors create variability and are largely outside the control of I&M. This variation in generation leads to a corresponding variation in consumable use that can be significant. This variability is further complicated from the mandated step-change decreases in the Rockport Plant's SO_2 emissions limit as described previously in this testimony.

Q. Please further explain why I&M's consumables costs and usage rates are variable.

A. In addition to variability in the level of consumables use, there is also variability in the price of the consumables that I&M purchases for use at the Rockport Plant. Several factors contribute to the variability of the price of consumables used at the

Rockport Plant. Many of these factors are not within the Company's control. For instance, the Company utilizes a competitive Request for Proposal (RFP) process to procure consumables, which helps ensure the best available market pricing. However, the RFP prices are market driven, meaning the Company does not have full control to maintain a steady procurement price.

Activated Carbon, for example, is used for mercury control, and Anhydrous Ammonia is used for NO_X control. These consumables generally must be procured using short, two- to three-year term contracts, which means pricing will fluctuate based on market conditions. The Activated Carbon price reduction I&M has realized in 2018 is an example of such a fluctuation, as demonstrated in Figure TCK-8 below.

Anhydrous Ammonia has a price index, meaning the cost represents a normalized average price for the consumable in a given region during a given interval of time. This cost is variable and based on current market conditions. Additionally, transportation charges associated with consumables are variable. Figure TCK-8 shows I&M's portion of the annual consumables expense for Activated Carbon, Sodium Bicarbonate, and Anhydrous Ammonia for historical years 2016-2018, as well as for forecasted years 2019 through 2021.

Figure TCK-8
I&M Annual Consumables Expense ($000 – Total Company)

Year	Activated Carbon (Total Dollars)	Anhydrous Ammonia (Total Dollars)	Sodium Bicarbonate (Total Dollars)	Total
2016	6,455	11	9,567	16,033
2017	6,621	97	9,687	16,405
2018	3,384	300	10,413	14,097***
2019*	2,599	343	10,570	13,513
2020**	2,286	617	17,170	20,073
2021**	1,994	623	15,672	18,290

*Annualized
**Forecasted (includes Adjustments RB/O&M-2 and O&M-4)
*** Excludes $988 of under-recovered consumable expense in 2018 that is included in Figure TCK-7.

The values shown above for the Test Year and 2021 include the consumable adjustments set forth in Figure TCK-9 below.

The costs shown in Figure TCK-8 demonstrate that the cost of the consumables used at Rockport vary significantly over time. The two largest drivers of variability are PJM market prices and the fuel mixture.

As with fuel usage, usage rates of consumables at Rockport vary significantly depending on several factors, including generating unit output, coal blend being fired, and emission removal targets. The generating unit output, which is determined by unit outages, weather, grid demand, power prices, and other factors, will directly impact the amount of air emissions in the flue gas and require varying amounts of consumables. Additionally, I&M makes an effort to manage its dispatch costs for the benefit of customers, but there are many factors outside our control that impact the price of energy in PJM that ultimately impacts Rockport's dispatch and volume of consumables.

Likewise, different coal blends fired at Rockport will result in different levels of air emissions in the flue gas. Low sulfur blends will result in lower NO_X and SO_2 levels in the flue gas, while high sulfur blends will result in higher NO_X and SO_2 levels in the flue gas. Coals are blended based on coal costs and emission allowances to optimize operation costs. The different air emissions quantities caused by varying coal blends require alternate injection rates of consumables. Further, as environmental rules are modified or enacted, air emissions removal targets for the Rockport Plant will potentially vary, impacting the rate of consumables required to meet the targets.

Q. Are allowance costs variable, largely outside I&M's control, and potentially significant?

A. Yes, similar to consumables costs, the allowance-related costs I&M incurs varies based on the dispatch of both Rockport Units. This dispatch is largely determined by PJM based on market energy prices and local needs for generation support, which is largely outside the control of I&M. Additionally, future changes in environmental regulations such as the regulation of carbon could cause significant increases in annual allowance costs. Company witness Williamson discusses I&M's proposal to track allowance costs along with consumables costs.

Q. Is the Test Year level of generation O&M expense reflected in the Company's filing reasonably representative of I&M's expected activities and expenses necessary to provide ongoing safe, reliable, efficient, environmentally-compliant, and low-cost generation of electricity for I&M's customers?

A. Yes. I&M has a long history of safely and reliably operating its generating fleet, which allows for experienced forecasting of O&M expenditures. The Test Year level of generation O&M expense represents a reasonable level going forward. These generation O&M expenses have been scrutinized at the plant, operating company, and corporate levels, and are representative of the level of O&M expense necessary to continue providing on-going safe, reliable, efficient, environmentally-compliant, and low-cost electric generation to I&M's customers.

V. ENHANCED DSI

Q. Please describe the Enhanced DSI project.

A. The Enhanced DSI will enhance the performance of the DSI equipment by injecting sodium bicarbonate into the flue gas stream upstream of its current location, allowing the Rockport Plant to remove additional SO_2. Previously, sodium bicarbonate was injected after the air pre-heater and before the electrostatic precipitators. The Enhanced DSI will relocate the sodium bicarbonate injection points upstream of the SCR. This relocation of the DSI system coupled with an increase in the sodium bicarbonate injection rate will enable the Rockport Plant to remove additional SO_2. Company witness Thomas explains the reasons why I&M

is undertaking the Enhanced DSI project and supports the overall reasonableness of the project.

Q. What are the forecasted capital expenditures to complete the Enhanced DSI?

A. The Enhanced DSI is forecasted to be placed in service by December 31, 2020 at a total Company cost of $13.315 million. This is a Class 4 Estimate. Class 4 estimates are prepared for a number of purposes, such as detailed strategic planning, business development, project screening at more developed stages, alternative scheme analysis, confirmation of economic and/or technical feasibility, and preliminary budget approval or approval to proceed to next stage. This forecasted capital expenditure is specific to I&M’s 50% owned and leased share of Rockport. Company witness Williamson explains how a similar level of costs will be incurred by AEG, which owns and leases the other 50% of Rockport. These AEG costs will impact I&M’s purchase power costs under the UPA between I&M and AEG.

Q. What are the forecasted O&M expenditures as a result of the Enhanced DSI project?

A. As shown below in Figure TCK-9, the Enhanced DSI will result in an incremental increase of O&M for BCO, NOMI, and consumables.

Figure TCK-9
Annual O&M Increase for Enhanced DSI ($000 – Total Company)

Generation O&M Category	Test Year
BCO	$100
NOMI	$25
Consumables (SBC)	$7,955
Total	**$8,080**

The costs shown in Figure TCK-9 are specific to I&M's 50% owned and leased share of Rockport. Company witness Williamson explains how a similar level of costs will be incurred by AEG and will impact I&M's purchase power costs under the UPA between I&M and AEG.

Q. Is I&M proposing to include the Enhanced DSI in its cost of service through an adjustment in this proceeding?

A. Yes. Using the cost information provided in my testimony for the Enhanced DSI project and increased consumables usage, Company witness Williamson supports Adjustment RB/O&M-2 relating to the Enhanced DSI project.

Q. Does this conclude your pre-filed verified direct testimony?

A. Yes.

VERIFICATION

I, Timothy C. Kerns, Managing Director – Generating Assets for Indiana Michigan Power Company (I&M or the Company), affirm under penalties of perjury that the foregoing representations are true and correct to the best of my knowledge, information, and belief.

Date: 5/6/2019

Timothy C. Kerns