NORTH CAROLINA
PUBLIC STAFF
UTILITIES COMMISSION

September 1, 2023

Ms. A. Shonta Dunston, Chief Clerk
North Carolina Utilities Commission
4325 Mail Service Center
Raleigh, North Carolina 27699-4300

Re: Docket No. E-2, Sub 1321 – Application of Duke Energy Progress, LLC, Pursuant to N.C.G.S. § 62-133.2 and Commission Rule R8-55 Relating to Fuel and Fuel-Related Charge Adjustments for Electric Utilities

Dear Ms. Dunston:

Attached for filing, on behalf of the Public Staff in the above-referenced docket, is the public version of the joint testimony of Evan D. Lawrence and Dustin R. Metz, Engineers with the Energy Division of the Public Staff – North Carolina Utilities Commission. Confidential information has been redacted from pages 7-8, and 10-14.

By copy of this letter, I am forwarding a copy to all parties of record by electronic delivery.

Sincerely,

/s/ William S.F. Freeman, by electronic filling
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CERTIFICATE OF SERVICE

I certify that I have served a copy of the following testimony on all parties of record in accordance with Commission Rule R1-39, by United States mail, postage prepaid, first class; by hand delivery; or by means of facsimile or electronic delivery upon agreement of the receiving party.

This the 1st day of September, 2023.

Electronically submitted
/s/ William S. F. Freeman

BEFORE THE NORTH CAROLINA UTILITIES COMMISSION

DOCKET NO. E-2, SUB 1321

In the Matter of Application of Duke Energy Progress, LLC, Pursuant to N.C.G.S. § 62-133.2 and Commission Rule R8-55 Relating to Fuel and Fuel-Related Charge Adjustments for Electric Utilities	)	**JOINT TESTIMONY OF EVAN D. LAWRENCE AND DUSTIN R. METZ PUBLIC STAFF – NORTH CAROLINA UTILITIES COMMISSION**

September 1, 2023

Q. Mr. Lawrence, please state your name, business address, and current position.

A. My name is Evan D. Lawrence. My business address is 430 North Salisbury Street, Dobbs Building, Raleigh, North Carolina. I am an engineer with the Electric Section – Operations and Planning within the Energy Division of the Public Staff – North Carolina Utilities Commission.

Q. Briefly state your qualifications and duties.

A. My qualifications and duties are attached as Appendix A.

Q. Mr. Metz, please state your name, business address, and current position.

A. My name is Dustin R. Metz. My business address is 430 North Salisbury Street, Dobbs Building, Raleigh, North Carolina. I am the manager of the Electric Section – Operations and Planning with the Energy Division of the Public Staff – North Carolina Utilities Commission.

Q. Mr. Metz, briefly state your qualifications and duties.

A. My qualifications and duties are attached as Appendix B.

Q. What is the mission of the Public Staff?

A. The Public Staff represents the concerns of the using and consuming public in all public utility matters that come before the North Carolina

Utilities Commission. Pursuant to N.C. Gen. Stat. § 62-15(d), it is the Public Staff's duty and responsibility to review, investigate, and make appropriate recommendations to the Commission with respect to the following utility matters: (1) retail rates charged, service furnished, and complaints filed, regardless of retail customer class; (2) applications for certificates of public convenience and necessity; (3) transfers of franchises, mergers, consolidations, and combinations of public utilities; and (4) contracts of public utilities with affiliates or subsidiaries. The Public Staff is also responsible for appearing before State and federal courts and agencies in matters affecting public utility service.

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

A. The purpose of our direct testimony is to set forth the Public Staff's recommendations regarding the proposed fuel and fuel-related cost factors by customer class[1] of Duke Energy Progress, LLC (DEP or the Company), as set forth the Company's June 13, 2023 Application, as supplemented by the Company's filing on August 28, 2023, and to present the Public Staff's recommended total fuel and

[1] These include residential, small general service, medium general service, large general service, and lighting customer classes.

fuel-related cost factors (including the Experience Modification Factors (EMFs)) recommended by Public Staff witness Brown.

Q. What are the test and billing periods for this proceeding?

A. For this proceeding, the test period is April 1, 2022, through March 31, 2023, and the billing period is December 1, 2023, through November 30, 2024.

Q. Please describe the scope of your investigation.

A. Our investigation of the Company's test period included a review of projected fuel and fuel-related costs as well as the following: (1) the Company's Application, testimony, supplemental testimony, and responses to Public Staff data requests; (2) documents related to the performance of the Company's baseload power plants, including the specific performance of the Company's nuclear facilities; (3) the Company's purchased power transactions, including those from renewable energy facilities; (4) the Company's coal, natural gas, nuclear, and reagent procurement practices and contracts; (5) the current state of the coal, natural gas, nuclear fuel, and reagent markets; and (6) the dispatch of the Company's generation resources. The Public Staff also engaged in discussions and meetings with Company personnel regarding these topics. In addition to this information, we have also reviewed the testimony of Public Staff witness Brown.

Q. Please summarize the results of your investigation and recommendations.

A. The Public Staff is not recommending any adjustment to the test or billing period amounts proposed by the Company in its supplemental testimony. We are providing summaries of certain power plant outages that are worthy of the Commission's attention. Our testimony also provides a summary of fuel and fuel-related costs incurred during Winter Storm Elliott.

Q. Did the Company meet the standards of Commission Rule R8-55(k) for the test year?

A. No. For the test year, the Company reported a single year system-wide nuclear capacity factor (CF) of 92.12% and a two-year average nuclear CF of 93.06%. This is below the North American Electric Reliability Corporation (NERC) five-year weighted average nuclear CF of 93.92%.

Q. Based on your investigation, please discuss the factors that contributed to the Company's failure to achieve the nuclear capacity factor required under Commission Rule R8-55(k).

A. As stated previously, the Company achieved a test year system wide nuclear capacity factor of 92.12%, as opposed to the NERC five-year average CF of 93.92%. During the test year, the Company experienced nine outages at its nuclear plants: (1) three refueling

outages that occurred in the test year; (2) one partial refueling outage that began in the previous test period; and (3) five forced outages. Table 1 below provides a short summary of each outage.

Table 1: Test Year Nuclear Outages

Outage ID	Station/ Unit	Scheduled/ Unscheduled	Event Start Date	Event End Date	Description
B1R24	Brunswick 1	Scheduled	4/1/2022	4/4/2022	Refueling outage B1R24
H1F24B	Harris	Unscheduled	4/29/2022	4/30/2022	Forced outage, improperly assembled vendor/OEM equipment supplied to the Company.
H1F24C	Harris	Unscheduled	8/28/2022	8/29/2022	Forced outage (H1F24C) due to lightning strike and subsequent motor failure.
R2F33B	Robinson	Unscheduled	9/24/2022	10/10/2022	Forced Outage R2F33B due to Reactor Coolant Pump (RCP) 'C' Seal leakage
H1R24	Harris	Scheduled	10/8/2022	10/30/2022	Refueling outage H1R24.
H1F25A	Harris	Unscheduled	10/30/2022	11/2/2022	Forced outage due to improper installation of new equipment during H1R24.
R2R33	Robinson	Scheduled	11/19/2022	12/30/2022	Refueling Outage R2R33, including a refueling outage extension.
R2F34A	Robinson	Unscheduled	12/30/2022	1/1/2023	Forced outage due to improper installation of new equipment in R2R33.
B2R26	Brunswick 2	Scheduled	2/7/2023	3/8/2023	B2R26 Refueling Outage.

Q. Please discuss the outages at the Brunswick Nuclear Plant.

A. There were two outages that occurred during the test period at the Brunswick Nuclear Plant, both of which were scheduled refueling outages. There were no abnormalities or items to report related to these outages.

Q. Please discuss the outages that occurred at the Harris Nuclear Plant.

A. There were four test period outages at the Harris Nuclear Plant (HNP): (1) three unscheduled forced outages; and (2) one scheduled refueling outage. We discuss each of the forced outages below.

Outage H1F24B

On April 29, 2022, HNP entered a forced outage. Based on a review of Company documentation, **[BEGIN CONFIDENTIAL]** [redacted] **[END CONFIDENTIAL]**.

Outage H1F24C

On August 28, 2022, HNP entered a forced outage due to failure of the 'B' condensate pump motor (CPM). As described in the Power Plant Performance Report for August 2022: "An electrical failure of the 'B' condensate pump motor led to the loss of a feedwater pump,

which resulted in a manual reactor trip. [The] Plant was brought back online with only a single feedwater train in service and limited to 50% power until the 'B' condensate pump motor is replaced." The Company attributed the cause of the failure to damage resulting from a lightning strike.

Based on our review of the outage documentation and discovery, we determined that **[BEGIN CONFIDENTIAL]** [redacted] **[END CONFIDENTIAL]**.

Outage H1F25A

On October 30, 2022, HNP entered a forced outage immediately following scheduled refueling outage H1R24. This outage appears to have resulted from a failure to align field installation with expected design, i.e., equipment was improperly connected and contributed to the plant outage.

Q. Please discuss the outages at the Robinson Nuclear Plant.

A. The Robinson Nuclear Plant (RNP) experienced three test period outages, two unscheduled outages and one scheduled refueling outage, which was extended beyond the original expected duration. In total, RNP was offline for about 1,200 hours during the test period (approximately 13% of the year), including a critical period of system need during Winter Storm Elliott. Below is a summary of each forced outage at RNP during the test year.

Outage R2F33B

The R2F33B outage began on September 24, 2022, due to excess leakage at the "C" reactor coolant pump (RCP) seal. Upon startup after the "C" RCP seal replacement, the "B" RCP seal package experienced issues and required replacement as well.

Each of the three RCP's ("A", "B", and "C") share common seal injection and seal return systems, which include the filtration system, the charging system, and the chemical and volume control system. As such, adverse conditions on any of these systems can impact the others. Analysis of each of the seal packages by the equipment manufacturer indicated that the cause of the failures was likely a buildup of corrosion products and debris.

[BEGIN CONFIDENTIAL] [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

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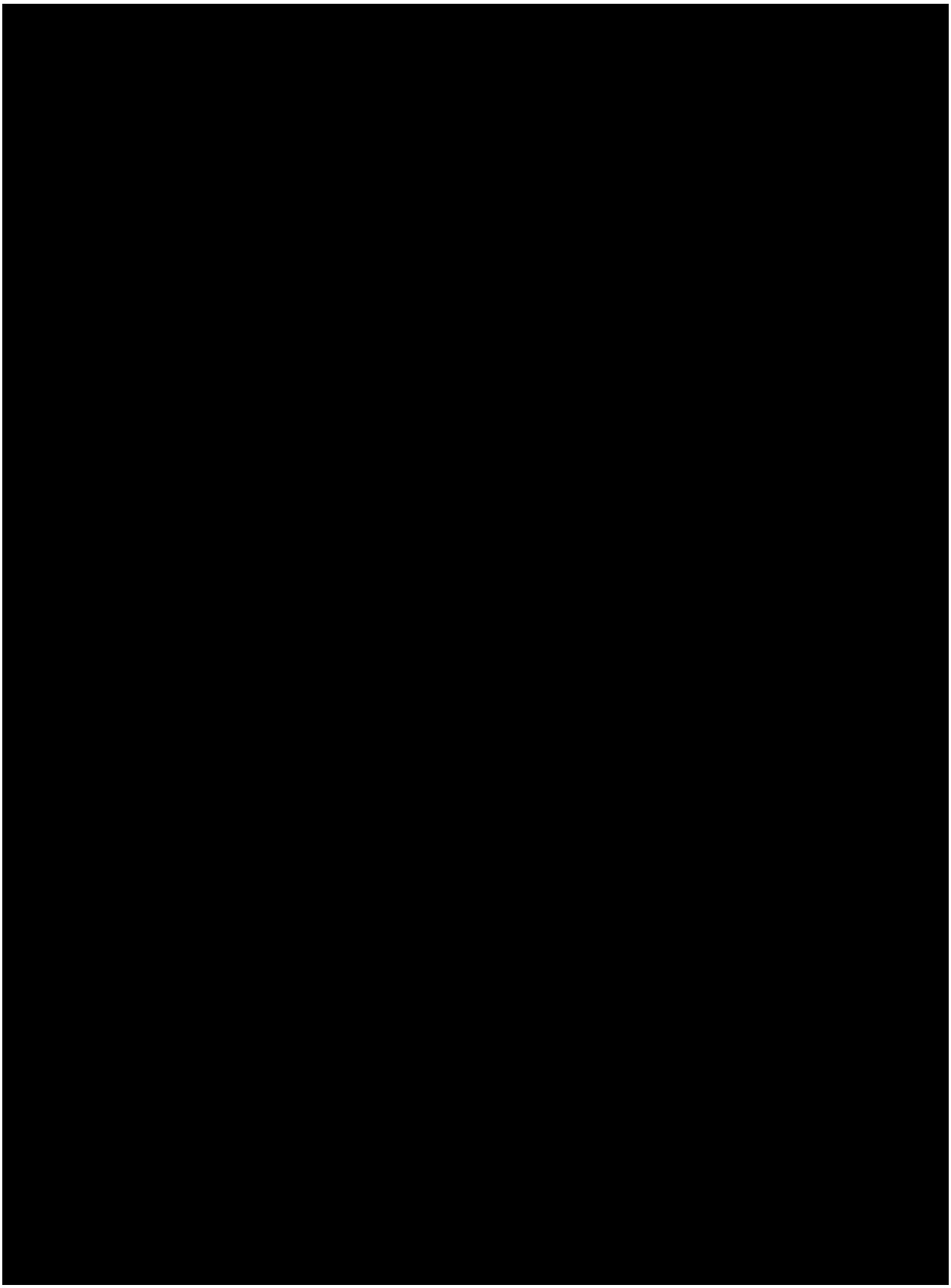

[redacted]

[END CONFIDENTIAL].

Outage R2R33/R2F34A

This outage lasted a total of 998 hours. It started when RNP was shut down on November 19, 2022, for a scheduled refueling outage. During this refueling outage, the Company completed a 10-year inspection of the reactor vessel internals. The 10-year inspection identified the need for additional and necessary repairs. These events extended the refueling outage by 278 hours.

Also during the refueling outage, the Company completed a project to install new relays. Upon startup, the plant tripped offline due to a main generator lockout, which added an additional 47 hours of outage. The trip resulted from the main generator protection relay being connected incorrectly and resulted in a prolonged outage.

[BEGIN CONFIDENTIAL] [redacted]

[redacted]

[redacted]

[END CONFIDENTIAL].

Q. Does the Public Staff have concerns about the outages described above?

A. Yes. The most notable outage of concern is the RNP RCP seal outage **[BEGIN CONFIDENTIAL]** [redacted]

[redacted]

[redacted] [END CONFIDENTIAL]

The Public Staff intends to review future RCP seal failures, should they occur, at RNP given the findings in this case and the NRC finding.

Winter Storm Elliott

Q. Did Winter Storm Elliott occur during the test period?

A. Yes, Winter Storm Elliott occurred in December of 2022.

Q. Please describe the impact Winter Storm Elliott had on this annual fuel rider proceeding.

A. Several plant outages or derates that occurred during, or as a result of, Winter Storm Elliott impacted the fuel and fuel-related costs included in this proceeding. See Appendix C for a summary of DEP plants that were either unavailable or derated during the period December 23, 2022, through December 26, 2022.

Q. Did your investigation result in findings of imprudence related to Winter Storm Elliott incurred fuel costs for Duke Energy Progress?

A. No. However, in his recent DEP rate case testimony (Docket No. E-2, Sub 1300), witness Metz identified several general trends in generating unit performance and staffing levels that raise concerns associated with plant availability and reliability. The outage extension at Robinson, discussed above (R2R33/R2F34A), associated with performing and addressing findings of the 10-year inspection for the reactor barrel core was required, but nevertheless contributed to the Winter Storm Elliott load shed event.

Q. Based on your investigation of Winter Storm Elliott, did you find any additional items that may impact the annual fuel rider of which the Commission should be aware?

A. Yes. During Winter Storm Elliott, there was an increase in energy imbalance net revenues compared to typical months.[2]

[2] Energy imbalance charges are charges that a transmission service provider, in this case DEP, collects when power flows at the delivery point do not match the scheduled flows. If a third party causes more than its scheduled power flows, the third party will be assessed a monetary penalty. If a third party causes less, the third party will have a monetary credit. These over- and under-deliveries are accumulated over each hour of the month, and a final amount is determined monthly and billed or credited to the third party.

Q. Did you find any errors in the energy imbalance calculation for the month of December 2022?

A. No.

Q. Does the NCUC approve the methodology for the energy imbalance calculation?

A. No. It is my understanding that the energy imbalance calculation is established by the Federal Energy Regulatory Commission and specified in DEP's Open Access Transmission Tariff (OATT);[3] however, any energy imbalance costs, if owed by the Company, and energy imbalance revenues, if owed to the Company, pass through the annual fuel rider.

Proposed Fuel Factors

Q. Have you reviewed the Commission's August 18, 2023 Order in Docket E-2, Sub 1300, regarding the cost allocation methodology to be used in this case?

A. Yes. The Order requires that the Company move away from using the equal percentage change allocation methodology for cost allocation purposes, and instead use a direct energy allocation

[3] The OATT requires that transmission network customers self-curtail or schedule replacement generation resources when directed to do so by the Transmission Service Provider (in this case, DEP) to balance the Balancing Authority Area load. During the Winter Storm Elliott load shed event, a certain transmission network customer did not respond to DEP's direction to do so; and therefore, was supplied uninterrupted service by DEP during the load shed event, which drove the increase in energy imbalance net revenues for the month of December 2022.

methodology. The Order also stated that the change would take effect for any cases filed after the date of the Sub 1300 Order, and specifically noted that the change does not apply to this fuel case.

Q. What are the Public Staff's proposed fuel components and total fuel factors?

A. Table 2 below sets out the Public Staff's recommended fuel and fuel-related cost factors. The EMF factors were provided by Public Staff witness DBrown. For comparison, Table 3 includes the existing fuel and fuel-related cost factors (excluding the regulatory fee) as approved in Docket No. E-2, Sub 1292.

Table 2 - Total Proposed Fuel and Fuel-Related Cost factors (¢ per kWh)

Rate Class	Base & Prospective	EMF	Total Fuel Factor
Residential	2.882	1.191	4.073
Small General Service	3.284	1.050	4.334
Medium General Service	2.563	1.090	3.653
Large General Service	2.112	1.249	3.361
Lighting	4.051	1.680	5.731

Table 3 – Total Existing Fuel and Fuel-Related Cost Factors (¢ per kWh)

Rate Class	Base & Prospective	EMF	Total Fuel Factor
Residential	2.808	0.649	3.457
Small General Service	3.097	0.449	3.546
Medium General Service	2.580	0.586	3.166
Large General Service	2.138	0.898	3.036
Lighting	3.376	0.834	4.210

Q. Q. Does this conclude your testimony?

A. Yes.

APPENDIX A

QUALIFICATIONS AND EXPERIENCE

EVAN D. LAWRENCE

I graduated from East Carolina University in Greenville, North Carolina in May 2016, earning a Bachelor of Science degree in Engineering with a concentration in Electrical Engineering. I started my current position with the Public Staff in September 2016. Since that time, my duties and responsibilities have focused on reviewing renewable energy projects, rate design, and renewable energy portfolio standards (REPS) compliance. I have filed an affidavit or testimony in DENC, DEC, and DEC REPS and fuel proceedings, testimony in New River Light and Power's 2017 rate case proceeding, testimony in Western Carolina University's 2020 rate case proceeding, and testimony in multiple dockets for requests for CPCNs. Additionally, I previously served as a co-chair of the National Association of State Utility and Consumer Advocates' Distributed Energy Resources and Energy Efficiency Committee from 2019 to 2021.

APPENDIX B

QUALIFICATIONS AND EXPERIENCE

DUSTIN R. METZ

Through the Commonwealth of Virginia Board of Contractors, I hold a current Tradesman License certification of Journeyman and Master within the electrical trade, awarded in 2008 and 2009 respectively. I graduated from Central Virginia Community College, receiving Associate of Applied Science degrees in Electronics and Electrical Technology (*Magna Cum Laude*) in 2011 and 2012 respectively, and an Associate of Arts in Science in General Studies (*Cum Laude*) in 2013. I graduated from Old Dominion University in 2014, earning a Bachelor of Science degree in Engineering Technology with a major in Electrical Engineering and a minor in Engineering Management. I completed engineering graduate course work in 2019 and 2020 at North Carolina State University.

I have over twelve years of combined experience in engineering, electromechanical system design, troubleshooting, repair, installation, commissioning of electrical and electronic control systems in industrial and commercial nuclear facilities, project planning and management, and general construction experience. My general construction experience includes six years of employment with Framatome, where I provided onsite technical support, craft oversight, and engineer design change packages, as well as participated in root cause analysis teams at commercial nuclear power plants, including plants owned by both Duke and Dominion. I also worked for six years for an industrial and commercial construction company, where I provided field fabrication and

installation of electrical components that ranged from low voltage controls to medium voltage equipment, project planning and coordination with multiple work groups, craft oversight, and safety inspections.

I joined the Public Staff in the fall of 2015. Since that time, I have worked on both electric and natural gas matters including general rate cases, fuel cases, annual gas cost reviews, applications for certificates of public convenience and necessity, service and power quality, customer complaints, North American Electric Reliability Corporation (NERC) Reliability Standards, nuclear decommissioning, National Electric Safety Code (NESC) Subcommittee 3 (Electric Supply Stations), avoided costs and PURPA, interconnection procedures, integrated resource planning, and power plant performance evaluations. I have also participated in multiple technical working groups and been involved in other aspects of utility regulation.

APPENDIX C

Winter Storm Elliott
Duke Energy Progress List of Power Plant Outages and Derates

Station	Unit ID	Type	Nameplate Capacity (MW)	De-rate prior to WSE (MW)	De-rate during WSE (MW)	Notes
Mayo	1	Steam	713	113	463	
Roxboro	1	Steam	380		185	De-rated due to coal reclaim - planned de-rates that did not affect availability at peak
Roxboro	2	Steam	673		503	De-rated due to coal reclaim - planned de-rates that did not affect availability at peak
Roxboro	3	Steam	698	73	350	
Roxboro	4	Steam	711	211	211	
Smith PB4		Combined Cycle	570		273	
Blewett	1	Simple Cycle CT	17		17	Unit returned to service 12/24 1105
Blewett	2	Simple Cycle CT	17		17	
Blewett	4	Simple Cycle CT	17		17	Unit returned to service 12/24 0710
Smith Energy Complex	1	Simple Cycle CT	192		192	Returned to service in 4 hours
Smith Energy Complex	2	Simple Cycle CT	192	47	47	
Wayne County	11	Simple Cycle CT	195	40	40	
Wayne County	14	Simple Cycle CT	195		195	Tripped while swapping gas to oil. Restarted in 12 minutes at 1418 on 12/24
Walters	3	Hydro	36	36	36	
Robinson	2	Nuclear	759	759	759	