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**UNITED STATES DEPARTMENT OF ENERGY**

PJM Interconnection, L.L.C.           )  
Request for Emergency Order        )  
Pursuant to Section 202(c) of the   )  
Federal Power Act                    )  
\_\_\_\_\_ )

Order No. 202-17-4

**SIERRA CLUB’S MOTION TO INTERVENE AND PETITION FOR  
REHEARING**

**Comments of  
Ariel Horowitz, PhD**

October 5, 2017

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1 **IDENTIFICATION**

2 My name is Ariel Horowitz, PhD. I am a Senior Associate at Synapse Energy Economics,  
3 located at 485 Massachusetts Avenue, Cambridge, MA 02139.

4 Synapse Energy Economics is a research and consulting firm specializing in electricity  
5 and gas industry regulation, planning, and analysis. Our work covers a range of issues,  
6 including economic and technical assessments of demand-side and supply-side energy  
7 resources; energy efficiency policies and programs; integrated resource planning;  
8 electricity market modeling and assessment; renewable resource technologies and  
9 policies; and climate change strategies. Synapse works for a wide range of clients,  
10 including state attorneys general, offices of consumer advocates, trade associations,  
11 public utility commissions, environmental advocates, the U.S. Environmental Protection  
12 Agency (EPA), U.S. Department of Energy (DOE), U.S. Department of Justice, the  
13 Federal Trade Commission, and the National Association of Regulatory Utility  
14 Commissioners. Synapse has over 25 professional staff with extensive experience in the  
15 electricity industry.

16 At Synapse, I have worked extensively on issues related to energy system planning, data  
17 analysis, and the use of new technologies. My work has included comments on integrated  
18 resource plans, as well as reports on and modeling of policy-driven changes to the energy  
19 sector pertaining to Oregon, Michigan, Puerto Rico, Connecticut, and the Regional  
20 Greenhouse Gas Initiative member state region. I have provided consulting services for  
21 clients including: the Energy Commission of Puerto Rico, U. S. EPA, the District of  
22 Columbia Office of the People's Counsel, the Michigan Public Service Commission and  
23 Department of Environmental Quality, multiple renewable energy developers, and the  
24 Sierra Club.

25 I have provided expert analysis and testimony on issues related to utility planning,  
26 revenue requirement, forecasting, and operations on behalf of the Energy Commission of  
27 Puerto Rico. I have also testified on grid modernization issues before the Massachusetts  
28 Department of Public Utilities and on wind resource economics before the Wisconsin  
29 Public Service Commission, and submitted formal comments on utility resource and

1 compliance plans before the Washington Utilities and Transportation Commission and  
2 the Oregon Public Utility Commission.

3 I hold a Doctorate in Chemical Engineering from Tufts University as well as a BS in  
4 Engineering from Swarthmore College. My research focused on design and use of  
5 electrochemical energy storage technologies.

6 In preparing the comments herein, I reviewed publicly-available information concerning  
7 the Yorktown Plant, the Skiffes Creek transmission project, and load and transmission  
8 conditions in the North Hampton Roads area and the Dominion zone generally. I have not  
9 reviewed any competitively-sensitive information or critical energy infrastructure  
10 information as part of the analysis presented below, but have submitted a request for  
11 access to critical energy infrastructure information and may update my analysis once I  
12 have had an opportunity to evaluate those data.

13

## 1 **1. INTRODUCTION**

2 In 2012, Dominion Electric Power Company (“Dominion” or “the Company”), the owner  
3 of the Yorktown power plant, announced it would be ceasing the operation of two of the  
4 plant’s units, effective 2015, as part of its strategy to comply with the United States  
5 Environmental Protection Agency’s Mercury and Air Toxics (MATS) rule. In June of  
6 2017, PJM Interconnection, the local regional transmission operator, appealed to the  
7 United States Department of Energy (DOE) for an emergency authorization to maintain  
8 operation of those two coal-fired units. In the intervening years, Dominion and PJM  
9 repeatedly failed to take into account reasonable alternatives to continued operation of the  
10 Yorktown coal units, negligently allowing the plant’s allowable life under MATS to run  
11 out without implementing either their preferred plan—a new transmission line—or any  
12 other “Plan B” alternative.

13 DOE granted PJM’s request in June of this year, allowing PJM and Dominion to maintain  
14 operations at the Yorktown units for a period of 90 days (lasting until September 14,  
15 2017). DOE has renewed its Order through December 13, 2017 (Order 202-17-04).  
16 PJM’s initial application included a request that DOE grant continued 90-day extensions  
17 until it has been conclusively demonstrated that the circumstances prompting the first  
18 application are no longer relevant—for example, because the preferred transmission  
19 project has come online, currently anticipated for 2019. This prolonged period of allowed  
20 operations would come with high costs for ratepayers and emissions that undermine the  
21 aims of the MATS rule.

22 Below, I discuss the history of the current application, including PJM and Dominion’s  
23 respective roles, responsibilities, and actions (or lack thereof). I describe why the  
24 Yorktown coal units are unlikely to be needed for load-based reliability purposes in the  
25 near term and, moreover, why they are ill-suited to provide reliability services in the first  
26 place. Finally, I describe a range of reasonable alternatives that PJM and Dominion  
27 should examine as a means of avoiding continued operation of one or both of the  
28 Yorktown coal units even during the construction of the preferred transmission  
29 alternative. I recommend that DOE require such an analysis from PJM and Dominion, as

1 well as a clear plan to implement the findings of the analysis, prior to reauthorizing  
2 continued operations of the Yorktown coal units.

## 3 **2. BACKGROUND OF PJM’S REQUEST AND DOE’S ORDER IN RESPONSE**

### 4 2.1. THE YORKTOWN PLANT AND ITS ROLE IN THE HAMPTON ROADS AREA

5 The North Hampton Roads Load Area (NHRLA) is located on a peninsula in the state of  
6 Virginia. This peninsula is occupied by the Newport News/Hampton metropolitan area  
7 and is home to the Langley Air Force Base, William and Mary College, and some  
8 600,000 residents. The peninsula’s electricity need is served by Dominion Electric Power  
9 Company. Dominion and the regional transmission operator, PJM, share the  
10 responsibility of providing reliable electric service to the residents of the NHRLA.

11 Although PJM and Dominion both have adequate generating capacity to serve load on a  
12 system-wide basis, they must also ensure reliability in areas subject to significant  
13 transmission constraints (sometimes referred to as “load pockets”). The NHRLA is itself  
14 one such load pocket. At present, the NHRLA’s electricity needs are served almost  
15 entirely by power imported to the area from other parts of PJM. In decades past, however,  
16 much of the NHRLA’s need was supported by the peninsula’s only power generating  
17 campus of note, the Yorktown plant. Yorktown consists of three electric generating units:  
18 two identical 188 MW coal-fired units, which had been slated for retirement earlier this  
19 year, and a third 882 MW oil-fired unit.<sup>1</sup> All three Yorktown units are owned and  
20 operated by Dominion through its subsidiary, Virginia Electric and Power Company.

21 Yorktown’s two coal units began operations in 1957 and 1959, respectively. At 60 years  
22 old, these units are ten years older than the average coal unit in the United States—and  
23 likely 20 to 30 years older than their original design lives. Yorktown’s coal units were  
24 originally designed to operate as “base load” generators, meaning that they were  
25 engineered to withstand near-constant operations. In recent years, however, the Yorktown  
26 units’ economic viability has collapsed as prices for alternative resources (such as natural  
27 gas and renewable energy) have fallen and coal prices have risen. Subject to transmission

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<sup>1</sup> The third oil-fired unit, constructed in 1974, has not been announced for retirement.

1 constraints, PJM is obligated to dispatch the cheapest units on the system first, and  
2 therefore it has chosen to dispatch the Yorktown units less and less over time. Over the  
3 past decade, dispatch of the Yorktown coal units has gradually diminished, falling from a  
4 47 percent capacity factor in 2007, to a 25 percent capacity factor in 2013, to a capacity  
5 factor of only 10 percent in 2016.

6 The Yorktown coal units have operated primarily as capacity resources in recent years,  
7 meaning that they are dispatched only at times of unusually high load in the NHRLA or  
8 in the Dominion load zone more broadly. Although load data for the NHRLA is not  
9 public and I have not yet been afforded the opportunity to review it, historical load data  
10 for the Dominion zone is available from PJM<sup>2</sup> and the Yorktown units' generation data  
11 by month is publicly available from the DOE's Energy Information Administration  
12 through May of 2017<sup>3</sup> as well as having been reported by PJM for June and July of 2017  
13 for compliance purposes.<sup>4</sup> In 2016, the Yorktown units were not dispatched at any time  
14 after early September.<sup>5</sup>

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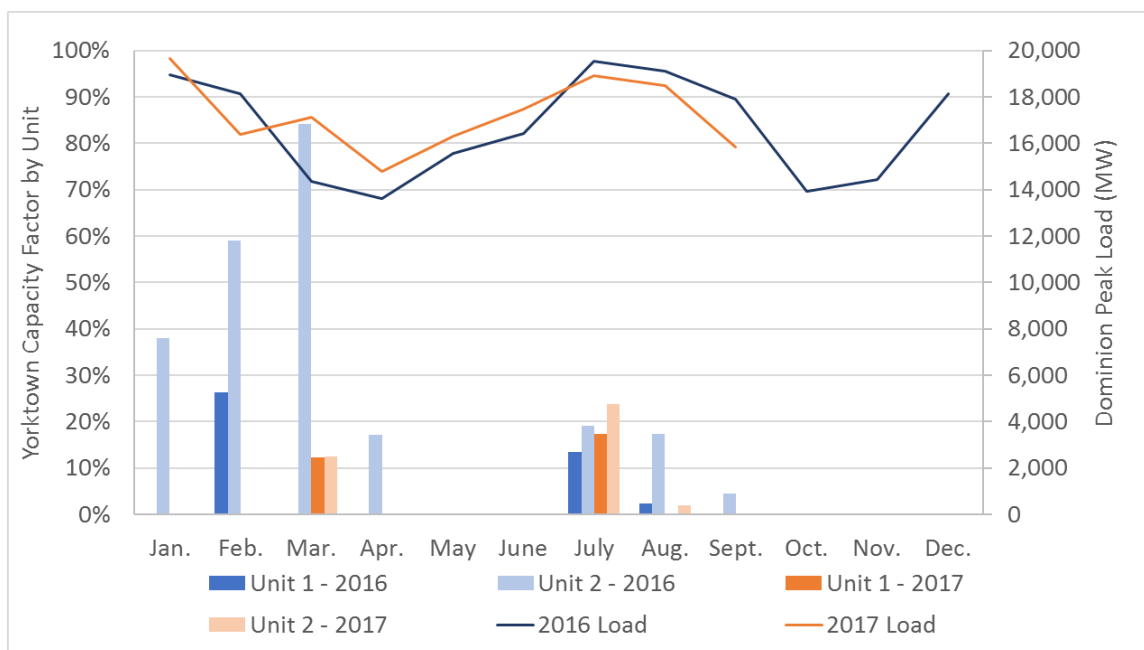
<sup>2</sup> Hourly metered loads are available in PJM's DataMiner2 tool.

<sup>3</sup> EIA Form 923.

<sup>4</sup> PJM, Report on Yorktown Units 1 and 2 Operations Pursuant to Order No. 202-17-2. 24 August, 2017.

<sup>5</sup> Based on a review of hourly generation data from EPA's AMPD database.

1 According to PJM, the Yorktown coal units are not needed for capacity purposes until  
 2 Dominion zone load exceeds 18,400 MW,<sup>6</sup> which generally occurs only in the summer  
 3 months and in January at the height of the winter peak (Figure 1). While it is possible that  
 4 Dominion will have a significant winter peak, as it did in January of 2017, Dominion will  
 5 be able to access capacity from outside of its territory to serve this peak, due to the fact  
 6 that PJM is a summer-peaking system. Because Dominion's overall capacity need is less  
 7 constrained in the winter than for the summer peak, its need of the Yorktown units is  
 8 likely less during the winter peak than during the summer peak.



9  
 10 **Figure 1. Dominion monthly peak load and Yorktown Units 1 and 2 Operations,**  
 11 **2016-2017.**  
 12

13 PJM recently submitted a compliance report to DOE recording generation from the  
 14 Yorktown coal units in June through August of 2017. My review of this data shows that,  
 15 as expected, the Yorktown coal units were dispatched more in July than in August  
 16 (Figure 1), indicating that capacity needs were likely a primary contributor to dispatching  
 17 the units. As above, Dominion's peak hour for 2017 has almost certainly passed. Neither  
 18 PJM nor Dominion have described load patterns in the NHRLA that differ materially

<sup>6</sup> PJM Application for Renewal, p2.



1 from those in the Dominion zone as a whole, suggesting that the NHRLA is also at the  
2 beginning of its fall shoulder season. It is reasonable to expect, based on this evidence,  
3 that the Yorktown units would not need to be dispatched at the same time on the basis of  
4 high load conditions alone between now and mid-December.

5 Like many thermal plants of its vintage, Yorktown was not compliant with EPA's  
6 Mercury and Air Toxics Standard (MATS) when the rule was finalized in 2011. Faced  
7 with the requirements of this rule, Dominion engaged in a multi-year decision-making  
8 process to consider how to comply. Yorktown unit 3, which burns heavy fuel oil, can  
9 comply with MATS by simply operating at an 8 percent capacity factor or less over the  
10 course of the year. Because Yorktown 3 has not run at more than a single-digit capacity  
11 factor for at least the past decade,<sup>7</sup> essentially no changes to the unit's operations were  
12 needed to bring it into compliance. In order to bring the Yorktown coal units into  
13 compliance with MATS, however, Dominion would have had to either install expensive  
14 emissions-control retrofits, convert the units to run on natural gas instead of coal, or retire  
15 them. There is not sufficient gas delivery infrastructure on the peninsula to support the  
16 second option. In consideration of the coal units' dim economic future, Dominion  
17 decided to retire the units as of its 2012 Integrated Resource Plan (IRP). At the time,  
18 Dominion anticipated taking the Yorktown units offline in 2015.<sup>8</sup>

## 19 2.2. THE SKIFFES CREEK PROJECT: SUMMARY AND CURRENT STATUS

20 PJM was made aware of Dominion's intent to retire the Yorktown units as part of its  
21 2012 Regional Transmission Expansion Plan (RTEP) process. In its RTEP studies, PJM  
22 found that retirement of the units would lead to multiple violations of North American  
23 Electric Reliability Corporation (NERC) reliability standards, which are heuristics, rules,  
24 and best practices meant to ensure reliable operation of the electric grid. PJM and  
25 Dominion proposed construction of additional transmission links between the NHRLA  
26 and the rest of Dominion's territory as the primary means of addressing these NERC  
27 violations. These links consist of three components: a new 500 kV line from the area of

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<sup>7</sup> Data published by the Energy Information Administration only provides per-unit generation information back through 2008.

<sup>8</sup> Dominion 2012 IRP, Figure 7.2.5.

1 Skiffes Creek (a tributary to the James River) on the peninsula to the Surry switching  
2 station across the James River; a 230 kV line along the peninsula between Skiffes Creek  
3 and Whealton; and a new switching station at Skiffes Creek itself. Collectively, these  
4 components are referred to as the Skiffes Creek project.

5 Dominion and PJM first proposed the Skiffes Creek project in 2012. During the planning  
6 process for the Skiffes Creek project, Dominion and the Army Corps of Engineers  
7 conducted multiple alternative analyses assessing other means of solving potential  
8 reliability problems in the NHRLA. These analyses were supplemented by an additional  
9 review of alternatives, conducted by Tabors Caramanis Rudkevich on behalf of the  
10 National Trust for Historic Preservation<sup>9</sup> and by Princeton Energy Research International  
11 on behalf of the National Parks Conservation Association.<sup>10</sup> Most of these alternatives  
12 consisted of either other transmission routes or installation of new conventional natural  
13 gas-fired generation on the peninsula.<sup>11</sup> Dominion discarded both options. The Army  
14 Corps of Engineers' environmental impact statement for the Skiffes Creek project  
15 concluded that alternative transmission routes (for example, going up the peninsula  
16 instead of across the James River) would cause greater environmental disturbances than  
17 the Skiffes Creek route. Dominion also determined that installation of a new gas-fired  
18 combustion turbine (CT) would be infeasible due to the development timeline necessary  
19 for such a project and to the lack of fuel delivery infrastructure on the peninsula.  
20 Although stakeholders proposed other, more minor transmission upgrades as an  
21 alternative to Skiffes Creek, PJM and Dominion argued that these options would be  
22 insufficient to address the full suite of potential violations.<sup>12</sup>

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<sup>9</sup> [https://nthp-savingplaces.s3.amazonaws.com/2017/02/14/10/27/11/381/NTHP-TCR%20Alternatives%20Report%20\(002\).pdf](https://nthp-savingplaces.s3.amazonaws.com/2017/02/14/10/27/11/381/NTHP-TCR%20Alternatives%20Report%20(002).pdf)

<sup>10</sup> <https://npca.s3.amazonaws.com/documents/3323/a084fea6-60eb-4c7c-81b0-9af1b4cd5594.pdf?1453909860>

<sup>11</sup> The analysis conducted by Princeton Energy Research International did discuss likely trends in peak load, demand-side management potential, and adoption of rooftop photovoltaics. However, this analysis relied on 2015-vintage forecasts to predict peak load in 2022. These values are informative but cannot be treated as decisive given the current context.

<sup>12</sup>

[http://www.nao.usace.army.mil/Portals/31/docs/regulatory/Skiffes/Alternatives/2016.11.17\\_Dom\\_response%20to%20NTHP\\_Tabors%20analysis.pdf?ver=2016-11-18-124548-357](http://www.nao.usace.army.mil/Portals/31/docs/regulatory/Skiffes/Alternatives/2016.11.17_Dom_response%20to%20NTHP_Tabors%20analysis.pdf?ver=2016-11-18-124548-357)

1 Dominion and PJM originally planned that the 18-to-20 month construction term of the  
2 Skiffes Creek project would be completed in time for the project to come online prior to  
3 the retirement of the Yorktown coal units.<sup>13</sup> However, the project has been held up in  
4 permitting and only recently received the final approvals necessary to begin construction.  
5 In response to these delays, Dominion sought and received an extension of the MATS  
6 compliance deadline and a one-year compliance order following the expiry of that  
7 extension. The order required the Yorktown units to comply with MATS or retire by  
8 April 15, 2017. As of that date, the new 500 kV line that forms the heart of the Skiffes  
9 Creek project had not even begun construction, much less come online.

### 10 2.3. DOE'S EMERGENCY ORDERS

11 PJM sent a request for emergency action under the Federal Power Act on June 13, 2017,  
12 approximately two months after the planned retirement date for the Yorktown units. PJM  
13 cited internal power flow studies that indicated a potential need for rolling blackouts  
14 (otherwise known as “shedding load”) under certain load and transmission system  
15 conditions, given the lack of both the Yorktown units and the intended replacement (the  
16 Skiffes Creek project). PJM identified two particular scenarios in which it anticipated  
17 needing to either operate the Yorktown units or shed load in the NHRLA:

- 18 a) During times of peak load under normal transmission conditions
- 19 b) During transmission outages anticipated to occur as part of the construction of the  
20 Skiffes Creek project

21 In addition, PJM submitted a proposed dispatch methodology to DOE, laying out how  
22 PJM would decide whether and when to call on the Yorktown coal units. This  
23 methodology implies a need to operate one or both of the Yorktown units in the event of  
24 certain transmission system contingencies, such as an unsolved N-2 contingency (i.e., a  
25 situation in which two elements of the transmission are unexpectedly out of service at the  
26 same time), although such situations are not listed as a formal “scenario” in the Request.

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<sup>13</sup> PJM Application, p13.

1 PJM requested wide latitude to operate one or both of the Yorktown units under any of  
2 these three situations. The application does not extensively describe the specific  
3 conditions under which PJM anticipated calling upon both of the Yorktown units rather  
4 than only one. However, PJM did state that the transmission outages associated with  
5 construction of the Skiffes Creek project could require at least one of the Yorktown units  
6 to operate for some portion of the construction period.<sup>14</sup> PJM went on to say that “the  
7 second unit will need to be ready if the first unit is not available” or in the event of  
8 unusually high local loads. I understand this statement to imply that one of the units is  
9 clearly preferable to the other in terms of ongoing operability or cost.

10 Given the dependency of PJM and Dominion’s plans to retire the Yorktown units on  
11 completion of the Skiffes Creek project, PJM’s application implies that its current state of  
12 apparent emergency will last until the project is completed. PJM proposed in its  
13 application that DOE issue an order and then allow that order to automatically “roll over”  
14 for additional 90-day periods. PJM suggested that this state of default continued approval  
15 last until it has provided “a demonstration of changed circumstances.”<sup>15</sup> It is not clear  
16 what circumstances those might be apart from completion of the Skiffes Creek project, as  
17 PJM did not describe any other efforts on its part or Dominion’s part to materially change  
18 the circumstances leading to PJM’s request. Indeed, PJM’s mitigation plan, as described  
19 within its application, refers primarily to development of the Skiffes Creek project and to  
20 PJM’s ability to shed load if necessary.

21 DOE granted PJM’s request on June 16, 2017, allowing PJM to dispatch the Yorktown  
22 units “in the event that [it] determines that generation from Yorktown Units 1 and 2 is  
23 needed to maintain reliability.”<sup>16</sup> DOE’s initial order operated through September 14,  
24 2017. In issuing its order, DOE required PJM and Dominion to develop a dispatch  
25 methodology “to operate Yorktown Units 1 and 2 *only* when called upon to address  
26 reliability needs.”<sup>17</sup> Moreover, DOE declined to allow the order to renew automatically,

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<sup>14</sup> PJM Request at p14; value redacted.

<sup>15</sup> PJM Request at p13.

<sup>16</sup> DOE Order, p2.

<sup>17</sup> DOE Order, p2, emphasis added.

1 stating that renewal “should it be needed, must be requested prior to [the] expiration” of  
2 the original order.

3 PJM submitted a Renewal Application on August 24, 2017, requesting a 90-day  
4 extension to DOE’s first order. DOE granted that request, issuing a renewed 90-day order  
5 on September 15, 2017.<sup>18</sup> Unlike DOE’s initial order, the renewal order expressly permits  
6 the Yorktown units to run as PJM deems necessary to support grid reliability during  
7 transmission outages associated with construction of the Skiffes Creek project. The  
8 renewal also requires, as the original order did not, that PJM and Dominion “shall  
9 exhaust all reasonably and practicably available resources, including demand response  
10 and behind-the-meter generation resources, prior to operating Yorktown Unit 1 or  
11 Yorktown Unit 2.”<sup>19</sup> This directive recognizes that the public interest is served by  
12 Dominion and PJM seeking alternatives to continued reliance on the Yorktown coal  
13 units.

### 14 **3. NEED FOR AND ALTERNATIVES TO CONTINUED OPERATION OF ONE OR BOTH** 15 **YORKTOWN UNITS**

#### 16 **3.1. PJM AND DOMINION’S RELIANCE ON THE YORKTOWN UNITS EXPOSES THE PUBLIC TO** 17 **RELIABILITY RISKS AND HIGH COSTS**

18 As mentioned above, PJM anticipates an 18-to-20-month construction period for the  
19 Skiffes Creek project. In order for the project to have come online prior to the anticipated  
20 retirement date of the Yorktown units, construction would have had to commence by the  
21 middle of October 2015. Dominion and PJM were, of course, aware that the project was  
22 held up in permitting and that some means of compensatory action would therefore be  
23 required to ensure stable grid operations in the NHRLA.

24 Dominion’s proposal was to employ a “Remedial Action Scheme” (RAS), which would  
25 lead to load-shedding in the NHLRA under high-load conditions. As early as mid-  
26 October of 2015, Dominion notified the Virginia State Corporation Commission (SCC)  
27 that it intended to conduct an inspection program to “ensure reliability for the Peninsula

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<sup>18</sup> Order 202-17-04

<sup>19</sup> *Id.* at 2.

1 while the Surry-Skiffes Creek Line is being constructed in anticipation of the Yorktown  
2 Unit 1 and 2 retirements.”<sup>20</sup> Dominion then continued:

3       If the Certificated Project is not in-service by the time that Yorktown  
4       Units 1 and 2 must retire to be in compliance with effective environmental  
5       regulations, then the plan for maintaining system reliability for the  
6       Peninsula will include careful planning of transmission outages and  
7       minimum work on assets on the Peninsula while the planned outages to  
8       support the construction of the Certificated Project outages are underway.  
9       Under some unplanned event scenarios, the reliability plan must include  
10      shedding of load in the amounts necessary to reduce stress on the system  
11      below critical demand levels.<sup>21</sup>

12 Dominion did not cite continued operation of the Yorktown units as a potential option for  
13 avoiding this load shedding. Nor did Dominion discuss any other feasible alternatives,  
14 despite referencing the potential loss of load and despite having over a year to pursue a  
15 mitigation plan more extensive than a line inspection program. Indeed, this same text  
16 appears in Dominion’s most recent update to the SCC,<sup>22</sup> along with a brief description of  
17 the exact load shedding scheme Dominion plans to employ in the event that the  
18 Yorktown units are not available and contingency conditions occur (the aforementioned  
19 RAS). However, Dominion has been clear with PJM and other stakeholders that the RAS  
20 is only a “stopgap measure” and cannot provide a long-term solution to the reliability  
21 issues posed by retirement of the Yorktown coal units under certain load conditions.<sup>23</sup>

22 PJM’s proposal was and continues to be limited to continued operation of the Yorktown  
23 units themselves. However, this path is hardly preferable to Dominion’s RAS from the  
24 public’s point of view. In addition to the harmful emissions associated with operation of  
25 Yorktown 1 and 2, these units come with high costs and are poorly-suited to provide  
26 reliability benefits. The Yorktown units are old and inflexible, requiring 10 to 12 hours to  
27 ramp from a cold state to full capacity.<sup>24</sup> As described above, the units have been  
28 dispatched infrequently and primarily for capacity-related purposes in recent years.

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<sup>20</sup> Dominion Update on Status of Certificated Project, 23 October 2015, docket PUE-2012-00029.

<sup>21</sup> *Id.*, p10.

<sup>22</sup> Dominion Update on Status of Certificated Project, 19 September 2017, docket PUE-2012-00029.

<sup>23</sup> Dominion North Hampton RAS Presentation to PJM, p8.

<sup>24</sup> Lazarro Att., p4.

1 Dominion's head of generation himself acknowledges that when these units are rarely  
2 used, "it is more difficult for [them] to quickly and reliably start up."<sup>25</sup> The reliability of  
3 the units will get even worse over time, as the Yorktown units experience "general  
4 degradation."<sup>26</sup>

5 The inflexibility, long startup times, and decreasing availability of the Yorktown units  
6 make them ill-suited to provide a reliability benefit even under conditions of need that are  
7 forecastable to a reasonable degree of certainty, such as peaks in demand and  
8 construction-related transmission outages. In such cases, Dominion may have enough  
9 advance notice to begin operations at Yorktown early so that the units are ready in time  
10 for a critical event. It is worth noting, however, that deploying the units under these  
11 circumstances necessarily causes additional emissions during the units' lengthy ramp-  
12 up/ramp-down periods.

13 However, PJM has also made clear its view that the Yorktown units may be needed in the  
14 case of contingencies or other unexpected events that impair the operability of the  
15 transmission network. These events can often pose a substantial threat to the reliability of  
16 electric service, although most contingencies do not cause a loss of service to end-users.  
17 Indeed, the transmission system is designed exactly to withstand most foreseeable  
18 contingencies without interrupting service.<sup>27</sup> Even so, the unpredictable nature of  
19 contingency conditions is in large part what allows them to pose a threat to grid  
20 reliability—sudden and unexpected losses of transmission facilities are challenging to  
21 adequately plan for and respond to on a real-time basis.

22 The Yorktown units are particularly ill-suited to provide a reliability benefit in response  
23 to such conditions. Contingencies are by definition unexpected, meaning that no notice  
24 can be given to allow Dominion to prepare for contingency conditions. Continued  
25 degradation of the units—for example, the development of corrosion, leaks, and other

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<sup>25</sup> Declaration of Kenneth Lazzaro ("Lazzaro Att."), attached, at p. 3.

<sup>26</sup> Lazzaro Att., p. 4.

<sup>27</sup> J. D. Kueck et al., "Measurement Practices for Reliability and Power Quality: a Toolkit of Reliability Measurement Practices." 2004. Oak Ridge National Laboratory.  
[http://www.science.smith.edu/~jcardell/Courses/EGR325/Readings/ornl\\_tm\\_2004\\_91.pdf](http://www.science.smith.edu/~jcardell/Courses/EGR325/Readings/ornl_tm_2004_91.pdf). P6.

1 faults—may prevent a rapid and reliable startup during a contingency event.<sup>28</sup> Even  
2 without considering forced outages, Yorktown 1 and 2 are sufficiently inflexible that they  
3 cannot be relied upon to provide generation or reactive power support in a short enough  
4 timeframe to be materially useful during an unforeseen contingency event.<sup>29</sup> PJM and  
5 Dominion’s claim that the Yorktown units will provide a substantial reliability benefit is  
6 therefore a dubious one. Over time, this degradation may even reduce the Yorktown  
7 units’ ability to provide services during foreseen peak load or planned transmission  
8 outage events.

9 Maintaining the Yorktown units to provide reliability services places a notable burden on  
10 the public. In addition to the variable cost of operating the plant when called upon to do  
11 so (which consists primarily of fuel), Dominion must spend about \$500,000 per month<sup>30</sup>  
12 to keep the units in a ready-to-operate state. Each three-month emergency order  
13 contemplated by DOE will therefore incur a cost of at least \$1.5 million, for a reliability  
14 benefit that will decrease over time. Fuel, as well as startup- and shutdown-related  
15 operational and other variable maintenance costs, will only increase the costs associated  
16 with dispatch of Yorktown units 1 and 2. Dominion may have already spent more than an  
17 additional \$1.7 million<sup>31</sup> on fuel costs alone simply to run the Yorktown coal units during  
18 June and July of 2017.

19 Given the long lead time between when Dominion foresaw its present conditions and  
20 when PJM appealed to DOE for emergency relief, it is not clear to me why neither  
21 Dominion nor PJM sought a more aggressive mitigation plan that included reliance on  
22 resources other than load-shedding. However, this decision to neglect pursuit of  
23 reasonable alternatives has committed the public in PJM to payment of the substantial  
24 costs associated with maintaining Yorktown 1 and 2 without providing the reliability  
25 benefits associated with modern resources in good operational condition. The substantial  
26 costs associated with maintaining and operating the Yorktown coal units and the minimal

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<sup>28</sup> Lazzaro Att., p4.

<sup>29</sup> Lazzaro Att., p4.

<sup>30</sup> Lazzaro Att., p5.

<sup>31</sup> Based on coal consumption data from Attachment 2 to PJM’s Application for Renewal and coal cost data from the EIA’s Form 923 and 923M publications for 2016 and 2017.



1 reliability benefits provided by these units underscore the importance of a mitigation plan  
2 to allow Dominion and PJM to cease or reduce their reliance on one or both Yorktown  
3 units as rapidly as possible. The public's interest is best be served by avoiding  
4 unnecessary usage of the Yorktown units, regardless of when the Skiffes Creek project  
5 comes online.

6 3.2. DOMINION AND PJM SHOULD PURSUE ALL REASONABLE ALTERNATIVES TO  
7 CONTINUED OPERATION OF THE YORKTOWN UNITS

8 As described above, several alternatives analyses examining options other than the  
9 Skiffes Creek project were conducted by Dominion and other stakeholders as part of the  
10 project's planning process. The most recent update to these analyses was performed by  
11 the Army Corps of Engineers (USACE) in March 2017. This analysis concluded with  
12 certainty that the Skiffes Creek project is the preferred path to resolving reliability issues  
13 posed by the retirement of the Yorktown units. However, the fact is that the Skiffes Creek  
14 project is not presently available and will not be available within the next 18 months at a  
15 minimum. In the meantime, Dominion and PJM can and should seek to mitigate or  
16 resolve their current needs using reasonable non-wires alternatives (NWAs).

17 When PJM, Dominion, and USACE approached their consideration of alternatives to the  
18 Skiffes Creek project initially in 2012, the concept of using distributed energy resources  
19 (DERs) and NWAs to meet reliability and other system needs was in its infancy. Over the  
20 past five years, increased sophistication and decreased costs associated with DERs have  
21 allowed NWAs to become one of the top-line means of addressing grid issues.<sup>32</sup> These  
22 strategies were not considered with adequate depth or, in some cases, considered at all in  
23 USACE's alternatives analysis process. For example, both PJM's application and the  
24 USACE's review of alternatives discard the possibility of demand-side management  
25 (including both energy efficiency and demand response) as a means of controlling load  
26 levels on the peninsula. PJM states that the existing demand response levels are limited-

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<sup>32</sup> A similar example is Bonneville Power Administration's I-5 Corridor Reinforcement Project, which was proposed in 2009 as a billion dollar transmission expansion project, and whose need was deferred entirely by a combination in NWAs and changes to their system. See U.S. DOE, BPA I-5 Decision Letter: [https://www.bpa.gov/Projects/Projects/I-5/Documents/letter\\_I-5\\_decision\\_final\\_web.pdf](https://www.bpa.gov/Projects/Projects/I-5/Documents/letter_I-5_decision_final_web.pdf)

1 use in nature and therefore it cannot rely upon those resources indefinitely.<sup>33</sup> The USACE  
2 states that “additional amounts [of DSM] cannot be assumed to be available.”<sup>34</sup> Other  
3 regulators, however, have taken a different tack—for example, the California Public  
4 Utilities Commission directed Southern California Edison (SCE) to “take immediate  
5 steps to enhance their demand response efforts” in response to emergency capacity needs  
6 in the wake of the Aliso Canyon Gas Storage Facility leak.<sup>35</sup> In response, SCE proposed  
7 to reach an additional 1 million customers<sup>36</sup> and accomplish at least an additional 8 to 14  
8 MW<sup>37</sup> of load reduction in the space of approximately six months.

9 Even a much more modest demand response or energy efficiency deployment effort in  
10 the NHRLA may yield notable benefits in terms of local peak reductions. Dominion  
11 achieved a total of almost 50 MW of peak reduction in Virginia between 2012 and 2015  
12 using energy efficiency measures, with 25 MW saved in 2015 alone.<sup>38</sup> Given the  
13 existence of several large institutions in the NHRLA, it is possible that Dominion could  
14 enter additional demand response arrangements quickly and at a meaningful scale. Large  
15 organizations have increasingly invested in microgrids and other resiliency-focused  
16 technologies that can also provide demand response-type services. Indeed, the United  
17 States Department of Defense has itself installed several microgrid and/or demand  
18 response projects at sites close to the NHRLA.<sup>39</sup> Dominion can also seek to enroll  
19 additional residential and small commercial customers in existing demand response  
20 programs. Rapid deployment of demand response may reduce the occurrence of  
21 situations in which PJM calls upon the Yorktown units.<sup>40</sup> Dominion’s 2017 Integrated

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<sup>33</sup> PJM Request, p21.

<sup>34</sup> USACE, p3.

[http://www.nao.usace.army.mil/Portals/31/docs/regulatory/Skiffes/Alternatives/Updated\\_Alt\\_White\\_Paper\\_3.30.17.pdf?ver=2017-04-04-105404-793](http://www.nao.usace.army.mil/Portals/31/docs/regulatory/Skiffes/Alternatives/Updated_Alt_White_Paper_3.30.17.pdf?ver=2017-04-04-105404-793)

<sup>35</sup> California Public Utilities Commission, Decision 16-06-029, p16.

<sup>36</sup> *Id.*, p20.

<sup>37</sup> *Id.*, p19.

<sup>38</sup> EIA 861 data for years 2012–2015.

<sup>39</sup> <http://map.serdp-estcp.org/index.html?ProgramArea=EW#>; see in particular: <https://www.serdp-estcp.org/Program-Areas/Energy-and-Water/Energy/Microgrids-and-Storage/EW-201600>, <https://www.serdp-estcp.org/Program-Areas/Energy-and-Water/Energy/Microgrids-and-Storage/EW-201343>.

<sup>40</sup> The oft-cited Brooklyn-Queens Demand Management program managed to defer a substation upgrade project for a fifth of the upgrade cost by investing in local demand response. See: <https://conedbqdmauction.com/>

1 Resource Plan points out that the achievable market potential (as per a 2013 potential  
2 study) is three times higher than the Company is currently planning to achieve, indicating  
3 that under the appropriate incentive regime, much more load reduction—both from an  
4 energy and capacity standpoint—is possible across Dominion’s territory.<sup>41</sup>

5 Distributed generation is another potential contributor to a rapid-deployment, non-wires  
6 strategy to approaching reliability needs on the peninsula. Dominion’s comments on a  
7 stakeholder-proposed alternative generation option make it clear generation must be  
8 located in the NHRLA in order to provide a reasonable alternative to the Yorktown units  
9 and the Skiffes Creek project, simply because of potential energy deficiencies in the  
10 NHRLA itself during summer peak periods.<sup>42</sup> Distributed rooftop solar generation is one  
11 of the most rapidly-deployable of all generation resources; a study by DOE’s National  
12 Renewable Energy Laboratory recently found that distributed solar systems of up to 50  
13 kW can be deployed within 1.5-2 months.<sup>43</sup> Although many individual installations may  
14 be needed to meet the NHRLA’s needs, the deployment time of such systems is far  
15 shorter than that required of a conventional resource such as a gas-fired CT. Because  
16 solar installations provide their maximum generation during summer peak hours, they can  
17 help alleviate the specific constraint from which the NHRLA suffers. If it obtained  
18 regulatory approval to do so, it is highly likely that Dominion could prompt substantial  
19 installations of distributed generation in the NHRLA—many years of industry experience  
20 have shown that customers readily respond with installations when given clear price  
21 signals in favor of distributed generation from their utility.<sup>44</sup> For example, Hawaii  
22 experienced annual increases in rooftop solar capacity on the order of 75–100 MW per

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<sup>41</sup> Dominion 2017 IRP, p 95-96.

<sup>42</sup> Dominion response to NTHP, June 2, 2017.

[http://www.nao.usace.army.mil/Portals/31/docs/regulatory/Skiffes/Alternatives/2017.06.02\\_2017.05.26%20Dom\\_Resps\\_NTHP.pdf?ver=2017-07-05-130502-077](http://www.nao.usace.army.mil/Portals/31/docs/regulatory/Skiffes/Alternatives/2017.06.02_2017.05.26%20Dom_Resps_NTHP.pdf?ver=2017-07-05-130502-077)

<sup>43</sup> NREL, Table 1. <https://www.nrel.gov/docs/fy15osti/63556.pdf>

<sup>44</sup> An analysis of a map of EIA-reported solar installations – such as the one available on Synapse’s website at <http://www.synapse-energy.com/tools/interactive-map-us-power-plants> – in the United States demonstrates the efficacy of state policy and incentives in promoting solar growth. Note that installations are almost perfectly aligned with state borders in North Carolina, Maryland, Massachusetts, and New Jersey as a result of favorable policies, incentives, and pricing signals.

1 year for the period 2011–2015, based in large part on the strong economics of net-  
2 metered distributed generation in that state.<sup>45</sup>

3 Finally, neither Dominion, nor PJM, nor the USACE appear to have considered the use of  
4 advanced energy storage systems as a means of providing both capacity and reactive  
5 support on the peninsula. Battery energy storage is perhaps the most promising of all  
6 potential near-term options for addressing the issues cited by PJM in its Request.

7 Advanced batteries have rapid ramp rates and response times<sup>46</sup> and are able to provide  
8 capacity, energy, and reactive power on an as-needed basis,<sup>47</sup> especially for short periods  
9 of need. The plummeting costs of battery systems in recent years have made this  
10 technology feasible and cost-effective for more applications than in the past, and other  
11 utilities have responded appropriately. Three recent examples show the potential of  
12 rapidly-deployed battery energy storage systems to address conditions similar to that in  
13 the NHRLA:

- 14 • SCE relied on battery storage to address its emergency capacity shortfall in the  
15 wake of the Aliso Canyon gas leak. SCE procured a 20 MW, four-hour battery  
16 storage system, with a total procurement time of approximately five months.<sup>48</sup>
- 17 • Arizona Public Service (APS) chose to install two four-megawatt-hour batteries to  
18 address local transmission constraints rather than construct a new line in rural  
19 Arizona.<sup>49</sup> APS is installing these batteries explicitly to provide grid services  
20 rather than load shifting or firming renewable energy. The utility expects these  
21 systems to come on line in early 2018, and to be the first steps towards adding  
22 500 MW of battery capacity system-wide over the next fifteen years.

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<sup>45</sup> [http://energy.hawaii.gov/wp-content/uploads/2011/10/FF\\_May2016\\_FINAL\\_5.13.16.pdf](http://energy.hawaii.gov/wp-content/uploads/2011/10/FF_May2016_FINAL_5.13.16.pdf), p23; Hawaii has since altered its net metering policy.

<sup>46</sup> <https://www.nrel.gov/docs/fy14osti/59003.pdf>, Table 7.

<sup>47</sup> <http://www.sandia.gov/ess/publications/SAND2010-0815.pdf>

<sup>48</sup> <https://www.sce.com/NR/sc3/tm2/pdf/3455-E.pdf>

<sup>49</sup> <https://www.aps.com/en/ourcompany/news/latestnews/Pages/aps-brings-battery-storage-to-rural-arizona.aspx>

- 1 • Tesla has committed to supplying a 100 MW storage system to address local  
2 reliability problems in South Australia with a total procurement time of 100 days  
3 after the signing of an interconnection agreement.<sup>50</sup>

4 Because I was not able to review the confidential values of Dominion and NHRLA load  
5 levels at which PJM anticipates requiring grid services from the Yorktown units, I was  
6 not able to perform an analysis of the capacity and generation required from alternative  
7 resources to provide local capacity and reliability services at the levels PJM found to be  
8 necessary to avoid load-shedding in the NHRLA. However, a strong possibility exists  
9 that Dominion can implement one or more of these alternatives at a sufficient scale and  
10 with sufficient rapidity to allow for the final retirement of one or both of the Yorktown  
11 coal units or, at a minimum, reduce the number of hours that these units are operated.

12 As a particular example, Dominion's presentations on the design of the Skiffes Creek  
13 project point to the limited transfer capabilities of the two currently-existing transmission  
14 paths into the peninsula as the primary motivator of reliability concerns in the absence of  
15 the Yorktown coal units.<sup>51</sup> One such path runs in parallel lines from the Chickahominy  
16 and Lanexa substations down to the peninsula, through the Lightfoot and Waller  
17 substations and towards Yorktown.<sup>52</sup> The other connects the Whealton and Winchester  
18 substations to the Chuckatuck substation across the James River.<sup>53</sup> The hypothetical  
19 posed by Dominion is that in the event that one of these transmission paths became  
20 unavailable, the other path would be insufficient to satisfy demand in the NHRLA, and  
21 that therefore either NHRLA-sited generation (i.e., the Yorktown coal units) or an  
22 additional transmission path (i.e., the Skiffes Creek project) is needed to ensure reliable  
23 electric service on the peninsula. Neither Dominion nor PJM has seriously studied the  
24 option of deploying local distributed generation and demand-side management strategies  
25 with the aim of substantially lowering local peak requirements. However, it may be the

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<sup>50</sup> <https://www.premier.sa.gov.au/index.php/jay-weatherill-news-releases/7736-tesla-to-pair-world-s-largest-lithium-ion-battery-with-neoen-wind-farm-in-sa>

<sup>51</sup>

[http://www.nao.usace.army.mil/Portals/31/docs/regulatory/Skiffes/Section%20106/11\\_02.10.2016\\_Dom\\_Skiffes\\_Modeling\\_Alternatives.pdf?ver=2016-06-28-124053-013](http://www.nao.usace.army.mil/Portals/31/docs/regulatory/Skiffes/Section%20106/11_02.10.2016_Dom_Skiffes_Modeling_Alternatives.pdf?ver=2016-06-28-124053-013)

<sup>52</sup> *Id.*

<sup>53</sup> *Id.*

1 case that these strategies could control the NHRLA's needs sufficiently that battery  
2 systems of moderate size (10-100 MW) located at the NHRLA end of the two major  
3 existing transmission paths, for example at the Waller and Whealton substations, would  
4 cost-effectively address these reliability concerns during the Skiffes Creek construction  
5 period.

6 Dominion and PJM should investigate the feasibility and cost-effectiveness of such  
7 alternative options. Battery system capital costs have been declining sharply in recent  
8 years. Recent estimates place the all-in capital cost of a 4-hour battery storage system at  
9 approximately \$3,000/kW.<sup>54</sup> Distributed solar generation has capital costs on the order of  
10 \$2,000-\$2,800/kW,<sup>55</sup> much of which is borne by the system owners themselves.

11 Dominion itself has recently been able to acquire energy efficiency for well under 3 cents  
12 per kWh on a lifetime basis.<sup>56</sup> While the cost of fully replacing the Yorktown coal units  
13 on a MW-for-MW basis would likely exceed the cost of keeping the units online, these  
14 alternative resources have lifetimes that would last far beyond the scope of the  
15 current conditions. DERs can generally provide other types of system benefits in addition  
16 to addressing the immediate need posed by the retirement of the Yorktown units, and  
17 would continue to provide these benefits for many years to come. The public's interest  
18 would be best served by PJM and Dominion conducting a thorough analysis of these  
19 options and formulating a mitigation plan that would allow them to reduce operations at  
20 the Yorktown units, and potentially to retire one or both of the Yorktown units on a near-  
21 immediate basis, regardless of the development path of the Skiffes Creek project.

#### 22 **4. CONCLUSIONS AND RECOMMENDATIONS**

23 Dominion and PJM should be actively pursuing all reasonable alternatives to continued  
24 operation of the Yorktown units. The Yorktown units themselves are poorly-suited to  
25 reliably provide generation or reactive power support (given the units' operational  
26 inflexibility and long startup times). Continued reliance on Yorktown 1 and 2 therefore

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<sup>54</sup> <https://www.wecc.biz/Administrative/2017-01-31%20E3%20WECC%20Capital%20Costs%20v1.pdf>, p48.

<sup>55</sup> <https://www.lazard.com/media/438038/levelized-cost-of-energy-v100.pdf>, p18.

<sup>56</sup> Savings-weighted average of total lifetime savings for years 2012–2015, based on EIA Form 861 data for Dominion.

1 places the reliability of electric service for residents of the NHRLA in a precarious  
2 position, while exposing the public to burdensome costs. Conversely, implementation of  
3 reasonable non-wires alternatives may render one or both units unnecessary even during  
4 transmission system outages associated with the construction of the Skiffes Creek  
5 project—and such alternative resources would continue to provide benefits even after the  
6 resolution of the current emergency.

7 At present, neither Dominion nor PJM has seriously assessed options like local  
8 distributed generation and demand-side management strategies as a means to  
9 substantially lower local peak requirements. PJM and Dominion have neglected to  
10 explore these options despite having adequate notice of the delay in the construction of  
11 the Skiffes Creek Project. Recent rapid deployment of demand response, renewables, and  
12 storage in other jurisdictions has proven that alternatives to units like Yorktown 1 and 2  
13 can be used to provide reliability support quickly and cost-effectively.

14 In light of these findings, I recommend that DOE enforce its directive that PJM and  
15 Dominion “exhaust all reasonably and practicably available resources... prior to  
16 operating” the Yorktown coal units. DOE should require PJM and Dominion to  
17 investigate the economic and technical viability of resources that may provide  
18 alternatives to continued reliance on the Yorktown coal units, rather than continuing to  
19 automatically renew its decision to allow continued operations at the two Yorktown coal  
20 units. I recommend that DOE require PJM and Dominion to submit a rigorous and  
21 thorough study of the extent to which implementation of demand-side management,  
22 distributed generation, and battery storage can be cost-effective as a means of avoiding  
23 further reliance on the Yorktown units as soon as practically possible, ideally within 60  
24 days of the issuance of DOE’s extension order. This study should be accompanied by a  
25 plan to implement those measures which Dominion and PJM find would allow final  
26 retirement of one or both of the Yorktown coal units prior to the online date of the Skiffes  
27 Creek project.

Attachment



**IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF COLUMBIA**

NATIONAL PARKS CONSERVATION )  
ASSOCIATION )  
777 6th Street, NW )  
Suite 700 )  
Washington, DC 20001, )

Plaintiff, )

v. )

Civil Action No. 1:17-cv-01361

TODD T. SEMONITE, Lieutenant General )  
U.S. Army Corps of Engineers )  
441 G Street, NW )  
Washington, DC 20314, )

and )

ROBERT M. SPEER )  
Secretary of the Army )  
101 Army Pentagon )  
Washington, DC 20310, )

Defendants, )

and )

VIRGINIA ELECTRIC AND )  
POWER COMPANY, )  
c/o HUNTON & WILLIAMS LLP )  
951 E Byrd Street )  
Richmond, VA 23219, )

Defendant-Intervenor. )

\_\_\_\_\_ )

**DECLARATION OF KENNETH LAZZARO**

I, Kenneth Lazzaro, hereby state as follows:

1. I am over the age of twenty-one and have personal knowledge of the facts set forth herein. I have knowledge of, and I am competent to testify regarding, all of the matters set forth herein.

2. I am the Director of Power Generation Operations at Virginia Electric and Power Company dba Dominion Energy Virginia (“Dominion Energy”).

### **Operation Of Yorktown 1 & 2 During Emergencies**

3. Dominion Energy owns and operates the Yorktown Power Station. Two coal-fired units at this facility, Units 1 and 2, originally placed into service in 1957 and 1958, respectively, were scheduled to cease operations as of April 15, 2015, in response to mandatory regulations issued by U.S. Environmental Protection Agency (“EPA”) in 2011, known as the “Mercury and Air Toxics Rule” (or “MATS Rule”), which imposed new restrictions on emissions of air pollutant that these older Yorktown units could not meet.

4. In order to meet reliability standards of the North American Reliability Corporation (“NERC”) and avoid load shedding throughout the North Hampton Roads Load Area (“NHRLA”), and as permitted by federal environmental regulations, the Virginia Department of Environmental Quality (“DEQ”) granted Dominion Energy the maximum one-year extension of the April 16, 2015 MATS compliance deadline, to April 15, 2016. A copy of this extension is provided as Exhibit 41.<sup>1</sup>

5. Prior to the expiration of the DEQ extension, EPA issued an Administrative Order to Dominion Energy extending the MATS deadline for another year through April 15, 2017, to operate the Yorktown Units on an as-needed basis to meet the NERC Reliability Standards. A copy of this Order is provided as Exhibit 42. By law, no further extensions of MATS were allowed, and therefore the Yorktown Units ceased operations on April 15, 2017.

6. Dominion Energy is constructing the Surry–Skiffes Creek–Wheaton Project (“Project”) to increase transmission capacity into the NHRLA. Due to the extended time

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<sup>1</sup> Exhibits referenced herein are attached to Dominion Energy’s Memorandum in Opposition to Plaintiff’s Motion for Preliminary Injunction.

required to obtain the necessary permit from the U.S. Army Corps of Engineers, it was not possible for the Project to be completed and in service before the Yorktown Units ceased operating due to the MATS rule. As a result, PJM Interconnection L.L.C. (“PJM”), the regional transmission organization, filed for an emergency order under § 202(c) of the Federal Power Act from the Department of Energy (“DOE”). A copy of the application is provided as Exhibit 43. On June 16, 2017, DOE issued Order No. 202-16-2, finding that an emergency exists under the Federal Power Act and requiring Dominion Energy to operate the Yorktown Units to meet that emergency. A copy of the emergency order is provided as Exhibit 7. The Sierra Club recently filed with DOE a Motion to Intervene and Petition for Reconsideration of the emergency order. A copy of that motion is provided as Exhibit 8. On August 11, 2017, DOE granted Sierra Club’s request for rehearing to allow time to consider the issues, but did not stay the effectiveness of the DOE Emergency order. A copy of the DOE Order granting rehearing is provided as Exhibit 44.

7. Both of the Yorktown Units were directed by PJM, under authority of the DOE emergency order, to operate during the extremely hot weather last month which resulted in high electricity demand. During July of 2017, Unit 1 was required to operate on seven days and Unit 2 was required to operate on 10 days. Both units were required to operate on July 24, 2017.

8. Relying on the emergency operation of the Yorktown Units under the DOE order is at best a stopgap measure. Due to the legal constraints since April 2015, the Yorktown Units have been called on less frequently, and only when needed during extreme heat or extreme cold conditions when electricity demands increase or when transmission line maintenance constrains normal transmission flow. It is more difficult for units to quickly and reliably start up in these conditions.

9. Units of this type also experience general degradation as a result of limited operation. This may take the form of corrosion to electronic switches, moisture build-up in various electric motors, leaks in cooling water lines, or faults in pressurized vessels and duct work. Any of these problems can delay start up or cause a unit to be shut down.

10. Problems of this kind generally can be identified, and thus corrected, only when the unit is operating. The limited operating authorization under the DOE order provides for more limited opportunities to detect and remedy such problems at the Yorktown Units, increasing the likelihood that the units will experience a problem upon startup or during operation on any given occasion.

11. When the Yorktown Units are needed to meet peak demand, PJM will typically give notice less than 24 hours before the units are needed. If there are no equipment malfunctions, the Yorktown Units take approximately 10-12 hours to come on-line.

12. The Yorktown Units typically will be needed only for a short periods of time—sometimes a day or two. Delays in starting up these units or the need to shut down due to an operating problem could cause the units to be unavailable during the short time period they are needed.

13. The Yorktown Units can, if started up successfully and running reliably, address known or anticipated demand (*i.e.*, extreme weather conditions, maintenance elsewhere in the power grid). Because of the time required to start up, the Yorktown Units cannot be relied on to address service disruption due to unforeseen immediate service outages (*i.e.*, a tree falling on transmission line currently bringing power into the NHRLA).

#### **Costs of Operating Yorktown Units 1 and 2**

14. Until the Project is completed and placed into service, Dominion Energy must be in a position to run the Yorktown Units when directed to do so.

15. The fixed cost of maintaining the Yorktown Units in an operational state, even when not running, is approximately \$500,000 per month.

[signature appears on following page]

I declare under penalty of perjury that the foregoing is true and correct.

Date: August 16, 2017

**Kenneth Lazzaro**

A handwritten signature in cursive script that reads "Kenneth Lazzaro". The signature is written in black ink and is positioned below the printed name. It features a long horizontal flourish at the end.