

VIRGINIA ELECTRIC AND POWER COMPANY  
RICHMOND, VIRGINIA 23261

May 10, 2019

10 CFR 50  
10 CFR 51  
10 CFR 54

United States Nuclear Regulatory Commission  
Attention: Document Control Desk  
Washington, D.C. 20555-0001

Serial No.: 19-184  
NRA/DEA: R2  
Docket Nos.: 50-280/281  
License Nos.: DPR-32/37

**VIRGINIA ELECTRIC AND POWER COMPANY**  
**SURRY POWER STATION (SPS) UNITS 1 AND 2**  
**SUBSEQUENT LICENSE RENEWAL APPLICATION**  
**RESPONSE TO REQUESTS FOR ADDITIONAL INFORMATION**  
**SET 1 – REGARDING ENVIRONMENTAL REVIEW**

By letter dated October 15, 2018 (Agencywide Documents Access and Management System (ADAMS) Package Accession No. ML18291A842), Virginia Electric and Power Company (Dominion Energy Virginia or Dominion) submitted an application for the subsequent license renewal of Renewed Facility Operating License Nos. DPR-32 and DPR-37 for Surry Power Station Units 1 and 2, respectively.

The NRC has been reviewing the SPS Subsequent License Renewal Application (SLRA) and has identified areas where additional information is needed to complete the review.

Specifically, in an email from Tam Tram, NRC, to Tony Banks, Dominion, dated April 11, 2019 the NRC requested additional information regarding the Environmental Review. These requests for additional information (RAIs) were discussed between Dominion and the NRC staff on April 9, 2019, and a date of May 13, 2019 was mutually agreed upon for submittal of the responses.

The purpose of this letter is to provide the responses to the RAIs.

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NRR

If there are any questions regarding this submittal or if additional information is needed, please contact Mr. Paul Aitken at (804) 273-2818.

Sincerely,

  
Gerald T. Bischof  
Senior Vice President - Nuclear Operations & Fleet Performance

Enclosures (included on one CD-ROM titled, "SPS SLRA Responses to ER1 RAIs):

1. Response to RAIs - Set 1 Regarding SPS SLRA Environmental Review
2. Attachments for RAI MBH-1
3. Attachments for RAI WR-1
4. Attachments for RAI WR-4
5. Attachments for RAI WR-5
6. Attachments for RAI VAR-1

Commitments made in this letter: None

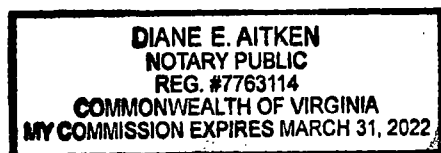
COMMONWEALTH OF VIRGINIA )  
  )  
COUNTY OF HENRICO         )

The foregoing document was acknowledged before me, in and for the County and Commonwealth aforesaid, today by Gerald T. Bischof, who is Senior Vice President - Nuclear Operations & Fleet Performance of Virginia Electric and Power Company. He has affirmed before me that he is duly authorized to execute and file the foregoing document in behalf of that Company, and that the statements in the document are true to the best of his knowledge and belief.

Acknowledged before me this 10 day of May, 2019.

My Commission Expires: March 31, 2022

  
Diane E. Aitken  
Notary Public



cc: (w/o Enclosures except \*)

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**Enclosure 1**

**RESPONSE TO RAIS**  
**SET 1 REGARDING SPS SLRA ENVIRONMENTAL REVIEW**

**Virginia Electric and Power Company  
(Dominion Energy Virginia or Dominion)  
Surry Power Station Units 1 and 2**

## **Air Quality and Meteorology (AQ)**

### **AQ – 1**

*Provide comparable 2017 data be added to ER Table E3.3-12 as discussed at the audit during the breakout session.*

### **Dominion Response**

The requested SPS 2017 through 2018 reported annual air emissions summary data for Table E3.3-12 of the Environmental Report is provided in Table 1 below.

Table 1: SPS 2017 - 2018 Reported Annual Air Emissions Summary, 2017 – 2018

SPS Annual Emissions (tons/year)						
YEAR	SO2	NOX	CO	PM10	VOCs	HAPs
2017	0.17	7.65	1.91	0.27	0.35	NA
2018	0.19	9.90	2.54	0.27	0.34	NA

### **AQ – 2**

*Confirm whether Dominion received any notices of violation or non-compliances from the Virginia Department of Environmental Quality (VDEQ) regarding Surry Air Permit No. PRO50336 subsequent to the period discussed in ER Section E3.3.3.2.*

### **Dominion Response**

There have been no notices of violation or non-compliances from the Virginia Department of Environmental Quality (VDEQ) associated with SPS air emissions regarding Surry Air Permit No. PR050336 subsequent to the time period discussed in Environmental Report (ER) Section E3.3.3.2 (2012 through 2016).

## **Aquatic Resources (A)**

### **A – 1**

*The March 1, 2016, Virginia Pollutant Discharge Elimination System (VPDES) Permit for Surry Power Station and Gravel Neck (permit no. VA0004090) issued by the Virginia Department of Environmental Quality requires Dominion to perform impingement and entrainment characterization studies of the Surry Power Station cooling water intake system. In 2015 and 2016, HDR Engineering, Inc. conducted the required impingement studies, and in 2015 through 2017, HDR Engineering conducted the required entrainment studies. The NRC staff understands that while HDR Engineering has*



*prepared draft final results of these studies for Dominion's preliminary review, the final reports will not be available until Dominion submits those reports to the Virginia Department of Environmental Quality on or before June 3, 2020, in accordance with VPDES permit condition E.3. To assist the NRC staff's assessment of the potential impacts of impingement and entrainment in the absence of these final reports, please provide the following information for each of the two studies.*

- a. Describe the sampling methods. Include the sampling event date range and frequency, daily collection schedule, targeted organisms, sampling location, sampling gear, sample duration, number of samples per event, total number of samples, and water quality measurements.*
- b. Summarize the taxa collected. Include in the summary the total number of samples collected, total number of organisms collected, list of all taxa collected, percent total of all taxa collected consisting of 1% or more of samples.*
- c. Summarize the study findings. Include in the summary the total impingement or entrainment estimates based on actual intake flows, notable similarities and differences from previous impingement and entrainment studies, and a summary of the findings made for each of the selected representative important species.*

### **Dominion Response**

- a. Draft final study plans for the impingement and entrainment studies are provided in Enclosure 6 (see responses to RAI VAR-1d and RAI VAR-1e). These study plans describe the sampling methods, frequency, daily collection schedule, sampling location, sampling gear, sampling duration, number of samples per event, targeted number of samples, and water quality measurements. The sampling event date range was August 2015 to July 2017 for entrainment, and August 2015 to July 2016 for impingement. Targeted organisms were finfish and shellfish.
- b. There was a total of 801,493 shellfish and finfish collected in the 560 entrainment samples taken over the two-year study. The taxa collected and the taxa's percentage of the total organisms collected in each year of sampling are listed in Table 1 below.

Table 1. Entrainment Sampling Results (August 2015 – July 2017)

Taxa	Life Stage*	Year 1 Percent Total (%)	Year 2 Percent Total (%)
<b>Finfish</b>			
Naked/Seaboard Goby	PYS	30	51
Naked Goby	PYS	24	14
Bay Anchovy	Juv	13	6
Bay Anchovy	PYS	8	4
Gobies	PYS	6	5
Common Anchovies	PYS	5	1
Atlantic Croaker	PYS	3	1
Herring and Anchovies	UIDL	3	-
Atlantic Menhaden	Juv	1	1
Herring and Anchovies	PYS	1	3
Bay Anchovy	Adult	1	4
Silversides	PYS	<1	7
Gray Trout	PYS	<1	<1
Hogchoker	PYS	<1	<1
Unidentified Finfish	UIDL	<1	1
Hogchoker	Juv	<1	<1
Herrings	PYS	<1	<1
Atlantic Croaker	Juv	<1	<1
Naked Goby	Juv	<1	1
White Perch	Juv	<1	<1
Striped Bass	Juv	<1	<1
Spot	PYS	<1	<1
Drums and Croakers	PYS	<1	<1
Northern Pipefish	PYS	<1	<1
Unidentified Egg	Egg	<1	-
Silversides	Egg	<1	<1
Gray Trout	Juv	<1	<1
Atlantic Silverside	PYS	<1	<1
White Perch	PYS	<1	<1
Atlantic Silverside	Juv	<1	-
American Eel	Juv	<1	<1
Striped Bass	PYS	<1	<1
Spot	Juv	<1	<1
Atlantic Silverside	YS	<1	<1
Striped Basses	PYS	<1	<1
Atlantic Menhaden	PYS	<1	<1
White Perch	Adult	<1	<1

Taxa	Life Stage*	Year 1 Percent Total (%)	Year 2 Percent Total (%)
Atlantic Silverside	Adult	<1	<1
Silver Perch	PYS	<1	<1
Blackcheek Tonguefish	Juv	<1	<1
Silversides	YS	<1	<1
Green Goby	PYS	<1	<1
Blueback Herring	Juv	<1	<1
Northern Pipefish	Juv	<1	<1
Blennies	PYS	<1	<1
Hogchoker	Adult	<1	<1
Southern Kingfish	PYS	<1	<1
Skilletfish	PYS	<1	<1
Gizzard Shad	Adult	<1	-
Naked Goby	Adult	<1	-
Silversides	UIDL	<1	-
Southern Kingfish	Juv	<1	<1
Summer Flounder	Juv	<1	-
Unidentified Finfish	Juv	<1	-
Unidentified Finfish	PYS	<1	<1
Atlantic Silverside	Egg	<1	<1
Atlantic Silverside	UIDL	<1	-
Bay Anchovy	UIDL	<1	-
Common Anchovies	Adult	<1	-
Conger Eel	Juv	<1	<1
Gizzard Shad	Juv	<1	-
Inland Silverside	PYS	<1	-
Naked Goby	Egg	<1	-
Spot	Adult	<1	-
Striped Bass	YS	<1	-
Striped Basses	YS	<1	-
Blackcheek Tonguefish	Adult	-	<1
Blueback Herring	Adult	-	<1
Gizzard Shad	YS	-	<1
Minnow	PYS	-	<1
Silver Perch	Juv	-	<1
<b>Shellfish</b>			
Mud Crabs (Panopeidae)	Zoea	39	33
Tellin Clams	Juv	35	8
Mysid Shrimp	Juv	9	13
Palaemonid Shrimp	Zoea	6	3
Mud Crabs (Panopeidae)	Mega	5	1

Taxa	Life Stage*	Year 1 Percent Total (%)	Year 2 Percent Total (%)
Fiddler Crab	Zoea	2	39
Grass Shrimp	Juv	2	1
Mysid Shrimp	Zoea	2	-
Ribbed Mussel	Juv	1	1
Mysid Shrimp	Adult	<1	-
Blue Crab	Juv	<1	<1
Palaemonid Shrimp	Juv	<1	<1
Crangonid Shrimp	Juv	<1	<1
Mud Crabs (Panopeidae)	Juv	<1	<1
Unidentified Shellfish	Zoea	<1	-
Blue Crab	Mega	<1	<1
Unidentified Shellfish	Mega	<1	-
Asian Clam	Juv	<1	-
Dark Falsemussel	Juv	<1	<1
Dwarf Surfclam	Juv	<1	<1
Sea Mussel	Juv	<1	<1
Lady Crab	Zoea	<1	-
Pea Crabs	Zoea	<1	-
Unidentified Shellfish	Juv	<1	-
Blue Mussel	Juv	<1	-
Sand Shrimp	Juv	<1	-
Lucifer Shrimp	Juv	<1	<1
Penaeid Shrimp	Juv	<1	<1
Blue Crab	Adult	-	<1
Palaemonid Shrimp	Mega	-	<1
Pea Crabs	Juv	-	<1
Sergestid shrimp	Juv	-	<1
White Shrimp	Adult	-	<1
<b>Finfish Total</b>		<b>25</b>	<b>15</b>
<b>Shellfish Total</b>		<b>75</b>	<b>85</b>
<b>Grand Total</b>		<b>100</b>	<b>100</b>
<p>* PYS: Post yolk-sac  YS: Yolk-sac  UIDL: Unidentified larvae</p>			

There was a total of 316,163 organisms collected in the 148 impingement samples taken over the one-year study. The taxa collected and the taxa's percentage of the total organisms collected are listed in Table 2 below.

Table 2. Impingement Sampling Results (August 2015 to July 2016)

<b>Taxa</b>	<b>Total Collected</b>	<b>Percent (%) of Total</b>
<b>Finfish</b>		
Bay Anchovy	235,831	75
Atlantic Croaker	12,675	4
White Perch	11,250	4
Atlantic Silverside	7,093	2
Atlantic Menhaden	4,460	1
Blueback Herring	3,879	1
Gizzard Shad	2,550	1
Hogchoker	2,468	1
Striped Bass	2,211	1
Gray Trout	1,081	<1
Spot	1,042	<1
Blue Catfish	370	<1
Harvestfish	168	<1
Naked Goby	114	<1
Alewife	110	<1
Silver Perch	87	<1
American Eel	81	<1
White Catfish	61	<1
Atlantic Cutlassfish	43	<1
American Shad	42	<1
Unidentified Finfish	26	<1
Striped Mullet	24	<1
Atlantic Needlefish	19	<1
Spottail Shiner	16	<1
Threadfin Shad	16	<1
Mummichog	10	<1
Dusky Pipefish	10	<1
Inland Silverside	9	<1

<b>Taxa</b>	<b>Total Collected</b>	<b>Percent (%) of Total</b>
Black Drum	9	<1
Gray Snapper	8	<1
Hickory Shad	8	<1
Eastern Silvery Minnow	7	<1
Brown Bullhead	7	<1
Channel Catfish	7	<1
Atlantic Spadefish	7	<1
Summer Flounder	7	<1
Blackcheek Tonguefish	6	<1
Spotted Seatrout	5	<1
Golden Shiner	5	<1
Common Searobin	4	<1
Bluegill	4	<1
Southern Kingfish	4	<1
Banded Killifish	4	<1
Bluefish	4	<1
Skilletfish	3	<1
Yellow Perch	2	<1
Atlantic Spanish Mackerel	2	<1
Silver Mullet	2	<1
Fourspine Stickleback	2	<1
Flier	1	<1
Pumpkinseed	1	<1
Unidentified Catfish sp.	1	<1
Largemouth Bass	1	<1
River Herrings	1	<1
Yellow Bullhead	1	<1
Black Crappie	1	<1
Sheepshead Minnow	1	<1
Common Carp	1	<1
Longnose Gar	1	<1
Lake Lamprey	1	<1
Striped Blenny	1	<1
Bridle Shiner	1	<1

<b>Taxa</b>	<b>Total Collected</b>	<b>Percent (%) of Total</b>
Alaskan Stickleback	1	<1
Grass Carp	1	<1
<b>Shellfish</b>		
Grass Shrimp Species	10,908	3
Mud Crabs (Xanthoidea)	8,385	3
Blue Crab	5,630	2
UID Shrimp	4,877	2
Mud Crabs (Panopeidae)	216	<1
Northern White Shrimp	147	<1
Sand Shrimp	128	<1
Brown Shrimp	4	<1
<b>Finfish Total</b>	<b>285,868</b>	<b>90</b>
<b>Shellfish Total</b>	<b>30,295</b>	<b>10</b>
<b>Grand Total</b>	<b>316,163</b>	<b>100</b>

- c. EPA defines impingeable organisms as those that would be collected or retained on a sieve with a maximum opening dimension of 0.56 inches (14.2 mm; a diagonal opening of 1/4 x 1/2 inch mesh), which is called "conceptual baseline screen." Only organisms that would pass through this mesh size, and thus be entrained, are used to estimate the regulatory definition of entrainment. SPS uses a finer sized 1/8 x 1/2 inch mesh screen on the traveling water screens. Therefore, there is also the potential for some organisms to be impinged on the finer SPS screen, i.e. organisms may be impinged rather than entrained. Organisms that are impinged by the SPS screen, but would have been entrained (pass through), based on the EPA rule mesh size (1/4 x 1/2 inch) are termed "converts." Organism limiting morphometrics sized at 3.2 mm correspond to exclusion on the 1/8-inch mesh of the SPS screens. To account for the different screen mesh sizes and to provide an accurate estimate of entrainment, several calculations were performed based on morphometric data collected on the sampled organisms 2015-2017. This was done for consistency with the CWA 316(b) rule (which defines an entrainable organism as one that would pass a 0.56 sieve opening).

Annual production of entrainable organisms is known to exhibit considerable year to year variation. Such was observed in comparisons of the current studies (2015-2017) entrainment estimates with those of the most recent prior study (2005-2006). Estimated annual entrainment based on actual intake flows in Year 1 of sampling (August 2015 through July 2016) during the current study was 97.2 percent lower

than the annual estimate obtained during sampling in 2005-2006. In Year 2 of sampling (August 2016 through June 2017), the annual estimate based on actual intake flows was 3.0 percent higher than the annual estimate for 2005-2006.

In accordance with the CWA 316(b) regulatory requirements, the current study was designed to characterize the entrainment impacts and was not required to select representative important species. Thus, representative important species were not selected for the study and there were no findings for selected representative species.

Detailed comparisons between the current entrainment study and prior studies (e.g., EA 2007) have not been attempted due to the current study being of two-year duration versus 1-year in prior studies, the use of a finer sample net mesh in the current study (330 micron) than in prior studies (505 micron), and the fact that non-viable eggs were not distinguished from viable eggs in prior studies. The current and prior studies were similar in that young life stages of invertebrates comprised the vast majority of organisms entrained, and the finfish component of entrainment was primarily represented by Goby sp. larvae. Seasonal abundance was also similar, with May – September accounting for the greatest numbers of entrainable organisms.

As noted above, the traveling water screens at Units 1 and 2 have a finer mesh opening than USEPA used in their rulemaking (0.56-inch [14.2-mm] diagonal mesh or 0.25 x 0.50 inch mesh). As indicated in the CWA 316(b) rule, "Impingement means the entrapment of any life stages of fish and shellfish on the outer part of an intake structure or against a screening device during periods of intake water withdrawal. For purposes of this subpart, impingement includes those organisms collected or retained on a sieve with maximum distance in the opening of 0.56 inches, and excludes those organisms that pass through the sieve. Examples of sieves meeting this definition include but are not limited to a 3/8 inch square mesh, or a 1/2 by 1/4 inch mesh. This definition is intended to prevent the conversion of entrainable organisms to counts of impingement or impingement mortality." Morphometric data collected during 2015-2016 allowed for quantification of those organisms collected during impingement sampling that were small enough that they would have passed through (i.e., been entrained) by the standard screens assumed by USEPA, but were impinged on the finer mesh used at Units 1 and 2. The percentage of the individuals measuring 14.2-mm maximum body depth (fish) or maximum body width (shellfish) was extrapolated to the total impingement to deduct those individuals impinged at Units 1 and 2 that were of entrainable size but were impinged as a result of the finer mesh used on the Units 1 and 2 traveling water screens.



Initial impingement survival was measured for most species collected and incorporated into the annual impingement estimate. However, impingement survival data for some species was not available or was based on less than five observations. In those cases, best professional judgment (BPJ) was used to assign a survival rate that was then used to estimate impingement mortality. The use of BPJ considered whether the species could be characterized as a 'fragile' species (as listed by the USEPA), if data were available for a similar or closely related species, and the intake unit. "Fragile" species are not counted against impingement.

Estimated annual impingement based on actual intake flows during the current one-year study (August 2015 through July 2016) was 35.0 percent lower than the annual estimate obtained during sampling in 2005-2006. Bay Anchovy (75%) dominated the estimated annual total impingement, with more than 50 million more impinged individuals than the second most common taxon, Atlantic Croaker (4%), which had nearly 3.1 million impinged individuals. White Perch (4%) and Grass Shrimp Species (4%) represented 2.7 and 2.6 million organisms, respectively, of the estimated annual total. All remaining taxa contributed less than 1.7 million (3%) to the estimated annual total. This included the estimated 1.2 million Blue Crab (2%) impinged.

In accordance with the CWA 316(b) regulatory requirements, the current study was designed to characterize the impingement impacts and was not required to select representative important species. Thus, representative important species were not selected for the study and there are no findings for selected representative species.

Prior impingement studies conducted at SPS (for years 1974 through 1983) made use of similar methods to the current study, i.e., CH2M Hill 2006. The relative abundance of species was notably different between the current and prior study. The relative abundance of species in the current study is Atlantic Menhaden, which accounted for 32% of the total impingement mortality for finfish, followed by Atlantic Croaker (22%), White Perch (14%), and Gizzard Shad (13%). Blue Crab accounted for 88 percent of the total impingement mortality for shellfish for the year. The relative abundance for the 9-year prior study is presented in ER Section E4.7.1.4, pg. E4-31.

**A - 2**

*Dominion collects samples of commercially and recreationally important fish and invertebrates as part of its annual radioactive effluent release monitoring in accordance with a permit issued by the Virginia Marine Resources Commission (for instance, see Note 3 on page 62 of the 2017 Annual Radioactive Effluent Release Report (ML18128A192)).*

- a. *Identify the species that the Virginia Marine Resources Commission permits Dominion to sample as part of this monitoring effort.*
- b. *Identify the species that Dominion most commonly collects during such sampling.*
- c. *Confirm that Dominion has not collected Atlantic sturgeon or any other federally listed species as part of this sampling effort.*

**Dominion Response**

- a. Virginia Code § 28.2-205.C provides the following: "Any person who has been issued a scientific collection permit shall be exempt from any licensing provision of this subtitle [Tidal Fisheries] relating to the taking or catching of fish, shellfish, or marine organisms."

The Virginia Marine Resources Commission (VMRC) Scientific Collection Permit (#19-004) has listed under the special permit conditions that: "This scientific collection permit does not provide the applicant or project personnel the authority to harvest or possess any species that is currently listed as endangered, threatened, or prohibited to possess by moratorium with the exception of Atlantic Sturgeon."

Dominion's scientific collection permit issued by VMRC allows the collection of any species of fish, shellfish, or marine organism with the exception of listed or prohibited-to-possess species except that the listed species, Atlantic Sturgeon, may be collected.

- b. Species that Dominion most commonly collects during sampling are identified as: Channel Catfish (*Ictalurus punctatus*), Blue Catfish (*Ictalurus fucatus*), White Perch (*Morone Americana*), Atlantic Croaker (*Micropogonias undulates*), Striped Bass (*Morone saxatilis*), Spot (*Leiostomus xanthurus*), Red Drum (*Sciaenops ocellatus*), Striped Mullet (*Mugil cephalus*), Blue Crab (*Callinectes sapidus*), Oyster (*Crassostrea virginica*), and Clam (*Mercenaria mercenaria*).
- c. Dominion has not collected Atlantic Sturgeon or any other federally listed species as part of the Station's Radiological Environmental Monitoring Plan's sampling efforts.

**A-3**

*The ER (Section E3.7.5.1 and E3.7.5.2) identifies several species of invasive aquatic plants and animals.*

- a. Identify which of these aquatic species occur on the Surry site.*
- b. Explain whether Dominion performs any specific environmental management or maintenance activities related to these species.*

**Dominion Response**

The following aquatic species occur on or near the SPS site:

- a. The non-native Phragmites is an invasive wetlands plant that exists on the SPS site. Blue Catfish (*Ictalurus furcatus*), Common Carp (*Cyprinus carpio*) and Asian Clam (*Corbicula fluminea*) are known to exist in the James River in the vicinity of SPS and in the SPS discharge canal.*
- b. Dominion does not perform any specific environmental management or maintenance activities related to these aquatic species.*

**Cumulative Impacts (CU)**

**CU-1**

*Section E4.12 of the ER contains Dominion's analysis of cumulative impacts. If Dominion has identified any additional past, present, or reasonably foreseeable projects or actions since the ER was prepared, provide the name, description, location, and status of any such projects. For any newly identified projects, provide a map(s) that show the approximate location(s) and/or routings of the projects.*

**Dominion Response**

Since the ER was prepared, the additional past, present, and foreseeable projects described below, located within the Surry Power Station (SPS) 50-mile region, have been identified which could affect cumulative impacts. There is no publicly accessible spatial data available for use in the creation of a map that would show the locations of the identified project locations.

1. The Atlantic Coast Pipeline (ACP) project is a 600-mile underground natural gas transmission pipeline being developed to transport new supplies of natural gas from West Virginia to communities in Virginia and North Carolina. The route through Virginia will include Southampton County and the independent cities of Suffolk and Chesapeake, all within the SPS 50-mile region. Although currently delayed, the ACP project is in the permitting/construction stage, with construction expected to recommence later in 2019. The ACP project is scheduled to be in partial service in 2020 and full service in 2021.

The ACP is being developed by Dominion Energy, Duke Energy, Piedmont Natural Gas, and Southern Company Gas.

The following website addresses are provided as support information for the ACP project:

<https://atlanticcoastpipeline.com/about/default.aspx>

<https://atlanticcoastpipeline.com/news/2019/1/3/acp-partner-delay-hurts-workers.aspx>

<http://wvmetronews.com/2019/02/10/dominion-energys-atlantic-coast-pipeline-delayed-until-2021/>

2. On July 24, 2018, Dominion Energy submitted requests to the Virginia State Corporation Commission for approval to construct and operate two large-scale solar facilities in Surry County, Virginia. Project details are provided as follows:
  - a. Colonial Trail West is a 142-megawatt facility to be constructed on approximately 1,800 acres. This ground-mounted, single-axis tracking solar facility will contain approximately 539,325 photovoltaic panels with an operating life of 35 years. Colonial Trail West is expected to be in service by December 2019.
  - b. Spring Grove 1 is a 98-megawatt facility to be constructed on approximately 1,150 acres. This ground-mounted, single-axis tracking solar facility will contain approximately 333,720 photovoltaic panels with an operating life of 35 years. Spring Grove 1 is expected to be in service by October 2020.

The following website address is provided as support information for both projects:

<https://www.dominionenergy.com/company/making-energy/renewable-generation/solar-generation/virginia-solar-projects/colonial-trail-spring-grove>

3. Dominion Energy's Surry-Skiffes Creek transmission line project originates at Surry Power Station in Surry County and crosses the James River to southern James City County and nearby independent cities on the Virginia peninsula. As of February 26, 2019, the approximate 8.0-mile transmission line was energized and has been

providing service to customers, improving the reliability of the electric transmission system and allowing for the retirement of two coal-fired units at Yorktown.

The following website addresses are provided as support information:

<https://www.dominionenergy.com/company/electric-projects/power-line-projects/skiffes-creek>

<https://www.13newsnow.com/article/news/local/peninsulanow/after-years-of-planning-work-power-flowing-through-surry-skiffes-creek-transmission-line/291-d39442a4-fa01-4402-9404-0b8196e87e08>

## **CU – 2**

*As referenced in the ER (e.g., Sections E2.2.7.2, E3.6.2.5, E3.7.2.6, and E4.1.2.4), Dominion is developing an offsite dredge material management area (DMMA) as a replacement for Surry's current onsite facility, once the existing facility reaches capacity. Provide the following information (or identify publicly available information as appropriate) regarding this project:*

- a. The projected remaining capacity and/or lifespan of the existing dredge material pond,*
- b. A brief summary description of the general design and operational features of the new offsite DMMA, dimensions of completed facility, disposal capacity, acreage to be devoted to dredge materials management, and total acreage of the DMMA site,*
- c. The status of construction and permitting and when the new DMMA is expected to be available to receive dredged materials,*
- d. Acreage to be temporarily and permanently disturbed during construction of the DMMA and return pipeline including habitat types affected (i.e., forest, wetlands, farmland),*
- e. A listing and brief summary of any resource studies that have been performed of the DMMA site (e.g., ecological, geotechnical, archaeological), and,*
- f. A listing and brief summary of the permits required for construction and operation of the DMMA and their receipt status; include copies of all permits received to date.*

## **Dominion Response**

- a. The existing dredge material pond has reached its end of life. The pond is comprised of three cells. Two cells are full. The capacity left in the third cell will not support a full dredge (150,000 cubic yards).*

- b. The proposed offsite dredge material management area (DMMA) site is approximately four miles south of Surry Power Station. The parcel is approximately 400 acres. This new DMMA will have a capacity of over 1,500,000 cubic yards. The DMMA will be approximately 58 acres in size and will be surrounded by an earthen embankment up to 20 feet high. The excavated materials from the bottom of the DMMA will be used to construct the earthen embankment. A one-foot thick clay liner will also be constructed along the bottom of the DMMA with material from the site. Sediments will be hydraulically dredged to the new DMMA via temporary influent dredge pipe routed from the intake channel to the DMMA site along Lawnes Creek. The dredged sediments will be sluiced to the southeast end of the DMMA via the temporary influent dredge pipe. Sediments will settle in the pond and clarified water from dredging activities will be discharged through a controlled pipe and riser spillway system at the north east corner of the DMMA. An earthen embankment spur dike will be constructed within the pond to allow for longer retention time and water clarification within the DMMA. The stormwater collected with the DMMA post dredging will be released via a 36-inch diameter high-density polyethylene (HDPE) pipe to an unnamed tributary located to the north of the DMMA. The clarified dredge effluent will be discharged via a separate 36-inch diameter ductile iron pipe to Lawnes Creek. Both discharge pipes will include redundant gate and valve systems with flap gates over the pipe openings in the riser and gate valves at the toe of the embankment. During normal operations the flap gate and the gate valve for the dredge effluent ductile iron pipe will remain closed and stormwater will be discharged through the HDPE pipe to the north. During dredging activities the flap gate and the gate valve for the stormwater HDPE pipe will be closed and dredge effluent will only be discharged through the ductile iron pipe once water has clarified. The 36-inch HDPE stormwater pipe will first discharge into riprap lined outlet protection and across a level spreader prior to flowing into the unnamed tributary to the north. The 36-inch ductile iron pipe for the dredge effluent to Lawnes Creek will discharge into riprap lined outlet protection along the slope down to Lawnes Creek. Spillway releases for both stormwater and dredge effluent will be managed using composite stop logs placed on all four sides of the spillway riser structure.
- c. The construction stormwater permit and the land disturbance permits were obtained in 2017 and 2018. Construction of the DMMA began in February 2019 and is anticipated to be complete by end of November 2019. Permitting of the dredging activity is anticipated to be complete by early November 2019. The new DMMA is expected to be available to receive dredged materials by January 2020.
- d. The majority of the new 58-acre DMMA will be constructed in an agricultural field. Approximately three acres of tree clearing will be necessary to widen the access road and to support construction of the DMMA. Wetlands and streams impacts were

avoided to the maximum extent practicable. There will be no permanent fill of wetlands or streams as a result of the project to construct the DMMA. Temporary impacts resulting from the placement of the influent dredge pipe on the mudline from the dredge area to the DMMA site will be 0.89 acre if a 22-inch pipe is used or 1.21 acres if a 30-inch pipe is used. The proposed project will also convert 4,200 square feet of non-tidal forested wetlands due to the installation of the DMMA return river water discharge pipe.

e. The following studies have been conducted:

- Environmental Site Assessment Phase I; 7-8-2016
- Geotechnical Engineering Study Report; 10-7-2016
- Cultural Resource Phase I Survey Report; 10-18-2016
- Cultural Resources Viewshed Analysis Report; 11-22-2016
- Cultural Resource Phase II Survey Report; 6-2017
- Cultural Resources Phase I (Discharge Pipe Area); 9-2017
- Cultural Resource Phase III Survey Archeological Data Recovery Completion of Field Work; 12-14-18
- Dam Breach Analysis and Flood Inundation Study; 7-15-2016
- Variance for Management and Reuse of Contaminated Media; 2-1-2017
- Discharge Pipes Hydraulic Design Memorandum; 9-14-2018
- Wetlands Delineation Report (MAP); 7-27-2016
- Wetlands Delineation (MAP) Revised Wetlands Map; 9-16-2016
- Wetlands Delineation Report (Angler); 10-2017
- Wetlands Delineation (Angler) Revised Wetlands Map; 1-1-2018
- FWS Threatened and Endangered Species IPAC Report; 11-26-2017
- VaFWIS Threatened and Endangered Species\_DMMA Site; 11-26-2017
- VaFWIS Threatened and Endangered Species\_Intake Channel Site; 11-26-2017

f. A listing and brief summary of the permits required for construction and operation of the DMMA and their receipt status is provided in the following table. No DMMA permits have been issued as of the date of this letter.

SURRY DMMA PERMITS								
ID	Project Activity	Permit/Approval	Needed For/To	Status	Application Submittal Date		Permit/Approval Issuance	
					Target	Actual	Target	Final
<b>1. Impacts to Wetlands and Waterbodies (USACE/DEQ/VMRC Permits)</b>								
1a	Dredging Activity, installation of dredge pipe	USACE CWA Section 404/Section 10 Individual Permit	USACE Individual 404/Section 10 permit needed for the periodic maintenance dredging activity and the installation of the dredge pipe in Lawnes Creek	<ul style="list-style-type: none"> <li>The COE public noticed the application on 1/22/2018</li> <li>The EPA did not have any comments 2/20/2018</li> <li>The USACE Operations Branch §408 NPR 7/17/2018</li> <li>NOAA provided a "Not Likely to Affect Listed Species" determination on 3/29/2018.</li> <li>RP-02 Reissued and no longer applicable- USACE will issue an IP.</li> <li>USACE approval to start construction (MOA) 1/3/2019</li> <li>USACE needs CZMA and 401 Certs to issue IP</li> </ul>		12/5/2017	12/1/2019	
1b	Dredging Activity, installation of dredge pipe	Virginia Water Protection (VWP) Permit (401 Certification)	Issuance of a WP4 for the conversion impacts from the discharge pipe. The DEQ will also issue a 401 Certification for the project since both the USACE and the VMRC are going to issue permits for the proposed activity.	DEQ requested the re-submittal the JPA to their office under a new transmittal letter.	5/15/2019		6/30/2019	
1c	Dredging Activity, installation of dredge pipe	VMRC Individual Permit	Modification to existing permit to add the new DMMA site and for the installation of the dredge pipe in Lawnes Creek	The VMRC sent an additional information request letter in January 2018 regarding agreements with oyster lease holders and dredge pipe route. We are working with Schnabel and Dominion Real Estate to develop the responses.	8/30/2019		12/1/2019	
<b>2. Coast Guards Permit/Notification</b>								
2a	Installation of dredge pipe	USCG Permit	Installation of buoys/markers required for dredging and for dredge pipes Submit USCG-2445 form	Submit USCG-2445 form	10/1/2019		12/1/2019	
<b>3. Cultural Resources (USACE/VDHR)</b>								
3a	DMMA site	Memorandum of Agreement (MOA) with DHR and USACE (Section 106 process)	Phase III Survey	Completed	--	--	--	4/5/2018
3b	DMMA site	Archeological Recovery of Human Remains Permit	Work on the historic graves	Completed	--	--	--	10/16/2018
<b>4. CZMA (DEQ)</b>								
4a	Dredging Activity, installation of dredge pipe	Federal Consistency Letter	Obtain concurrence letter from DEQ	The Certification was submitted to DEQ on 3/14/2019. Additional information was requested by DEQ on 3/15/2018. The response was submitted on 4/8/2019. The DEQ indicated that they are starting their review on 4/9/2019.			10/15/2019	



**SURRY DMMA PERMITS**

ID	Project Activity	Permit/Approval	Needed For/To	Status	Application Submittal Date		Permit/Approval Issuance	
					Target	Actual	Target	Final
<b>5. Construction Stormwater Permit (DEQ)</b>								
5a	Construction Stormwater DMMA Site	Construction stormwater discharge permit -VAR10 (2014)	Stormwater discharge during construction	Completed	--	--	--	3/18/2018
5b	Construction Stormwater DMMA Site	Construction stormwater discharge permit -VAR10 (2019)	Stormwater discharge during construction	The current CSGP will expire on 6/30/2019. Submit new NOI and Obtain new coverage	5/1/2019	4/30/2019		
<b>6. Land Disturbance Permit (Surry County)</b>								
6a	Land Disturbance	Land disturbance permit	Construction 2018	Completed	--	--	--	2/9/2018
6b	Land Disturbance	Land disturbance permit	Construction 2019	Completed	--	--	--	1/25/2019
<b>7. Industrial Stormwater Permit (DEQ)</b>								
7a	Post Construction Industrial Stormwater discharge from DMMA	Industrial stormwater discharge permit -VAR5	Discharge of rainwater accumulated within the DMMA (post construction)	Need to submit NOI. The ISGP is not needed until after the DMMA is constructed and stormwater needs to be discharged from the pond.	9/16/2019		2/1/2020	
<b>8. Dam Permits/Modifications (DCR)</b>								
8a	Construction Permit	VA DCR Dam Safety Construction Permit (2016)	DMMA perimeter dike construction	Completed		7/18/2016		8/31/2016
8b	Construction Permit	VA DCR Dam Safety Construction Permit (2018)	DMMA perimeter dike construction	Request permit's extension.	5/15/2019			
<b>9. VDOT Permits</b>								
9a	Construction/ Permanent Entrance	Land Use Permit	Installation of construction road which will be converted to a permanent road once construction is complete.	Initial permit issued on 7/14/2016 and renewed annually since.	--	--	--	7/19/2018
9b	Construction/ Permanent Entrance	Land Use Permit	Installation of construction road which will be converted to a permanent road once construction is complete.	Renewal is 7/14/2019. Initial issue was 7/14/2016 and renewed annually since.	6/1/2019		7/14/2019	

SURRY DMMA PERMITS								
ID	Project Activity	Permit/Approval	Needed For/To	Status	Application Submittal Date		Permit/Approval Issuance	
					Target	Actual	Target	Final
<b>10. Building Permits (Surry County)</b>								
10a	Temporary Installation of Construction Trailers	Building Permit	Installation of 4 construction trailers	Completed- Building Permit issued on 2-1-2019				2/1/2019
10b	Temporary Installation of Construction Trailers	Building Permit	Installation of 3 construction trailers one 400 AMP service 120/240 with 3 trailer feeds/ area lights/ice machine/outlets	Completed- Building Permit issued on 2-1-2019				2/1/2019

**CU – 3**

*Section E2.3 of the ER states in part that Dominion does not anticipate that continued operations of SPS would adversely affect the environment and further does not anticipate the need for any refurbishment for purposes of subsequent license renewal. As applicable, provide a brief description of the following: (1) any anticipated operation and maintenance activities with the potential to result in new ground disturbance during the second license renewal term, (2) any plans to demolish existing buildings and or related facilities, and (3) any plans to construct new facilities. Identify the general location(s) of any anticipated operation and maintenance or refurbishment (demolition or construction) activities.*

**Dominion Response**

1. There are no anticipated operation and maintenance activities with the potential to result in new ground disturbance during the SPS subsequent license renewal term. A potential land disturbance that could occur during the subsequent period of extended operation (PEO) is the possible construction of a fifth spent fuel storage pad (ISFSI Pad No. 5), however, no plans have been developed for this activity.
2. There are no plans to demolish any existing buildings and or related facilities at SPS during the subsequent PEO.
3. There are no plans to construct new facilities at SPS, nor has a site been selected or plans developed for construction of a potential fifth spent fuel storage pad (ISFSI Pad No. 5). Should it be decided that ISFSI Pad No. 5 is needed during the subsequent PEO, a project schedule, along with facility dimensions, location, design, operations support and impacts, would be a part of detailed engineering and construction planning.

**Land Use (LU)****LU – 1**

*Section E2.2.6 of the ER states that Dominion is currently developing a fourth ISFSI pad within the existing ISFSI area and which is scheduled to be completed by the end of 2020. Provide a brief summary description of the project including general design of the pad, area disturbed, footprint of the completed facility, storage capacity, and current project status. Section E2.2.6 of the ER also references Dominion's plans to develop a fifth spent fuel storage pad. Provide an update, if any is available, of Dominion's plans for the pad including dimensions and the schedule for siting and constructing the facility. If a site has been selected, identify the location.*

## **Dominion Response**

ISFSI Pad No. 4 is a single-array pad designed to hold 30 horizontal storage modules. Approximately 2.13 acres of land have been disturbed. The design of the pad is 302 feet long by 26 feet wide, with an apron 50 feet wide along the length of the pad. The project is currently on temporary hold, but completion is still planned by the end of 2020.

No site has been selected or plans developed for construction of a potential fifth pad (ISFSI Pad No. 5). Should it be decided that ISFSI Pad No. 5 is needed during the subsequent PEO, a project schedule, along with facility dimensions, location, design, operations support and impacts, would be a part of detailed engineering and construction planning.

## **LU – 2**

*Section E9.5.10 of the ER describes Dominion's process for obtaining a consistency certification for SPS subsequent license renewal from the Commonwealth of Virginia in accordance with the Federal Coastal Zone Management Act (CZMA). Dominion developed and submitted to VDEQ a CZMA consistency certification package (Appendix E of the ER). Dominion further states in the ER that VDEQ responded with a "conditional concurrence" on February 2, 2018. VDEQ's February 2nd, 2018 response is contained in Dominion's SLRA Supplement for Sufficiency Review, dated January 29, 2019, submitted to the NRC. Specifically, VDEQ states that its CZMA concurrence is conditional upon satisfaction of the following: "DGIF [Department of Game and Inland Fisheries] input and concurrence on the intake technology and conditions implemented to minimize impacts to fisheries resources and incidental take of endangered species in accordance with Virginia Code §29.1-100 to §29.1-570." Given the conditional nature of the CZMA certification, describe the steps that Dominion proposes to undertake to complete the CZMA consistency certification process with VDEQ, including the projected timeframe for completion of all anticipated activities requested by VDEQ.*

## **Dominion Response**

The condition in the Coastal Zone Management Act (CZMA) consistency certification package that VDEQ responded to with a "conditional concurrence" originates from the Virginia Department of Game and Inland Fisheries (VDGIF). The VDGIF recommends that Dominion consider the redesign or retrofitting of the cooling water intake on the James River to take advantage of currently best technology available (BTA). The VDGIF further suggests intake screen mesh or design changes, intake velocity restrictions, or time-of-year restrictions on certain dredging or instream construction activities as protective measures. The BTA determination is a component of compliance with the Clean Water Act (CWA) 316(b) regulations.

Dominion is actively preparing the required studies, analyses, and calculations to comply with CWA 316(b) regulations for submittal to Virginia Department of Environmental Quality (VDEQ) by the regulatory deadline of June 3, 2020 (270 days prior to the expiration of the current Virginia Pollutant Discharge Elimination System [VPDES] permit). The required analysis will include consideration of impingement and entrainment reduction technologies (e.g., screen design) and operating modes (e.g., intake velocity modifications).

The VDGIF also note that they anticipate participation with U.S. Fish and Wildlife Service (USFWS) on protection of the Atlantic sturgeon in any Endangered Species Act (ESA) Section 7 consultations initiated by NRC. VDGIF also requests to participate in discussions between NRC, USFWS, National Oceanic and Atmospheric Administration (NOAA), and Dominion on permit needs. As part of subsequent license renewal and CWA-related permit and compliance activities, Dominion is continuing consultations with other federal and state agencies, including NOAA and USFWS. Dominion has also communicated and will continue to communicate with VDEQ regarding actions necessary to meet and support the SPS's VPDES permit conditions including the requirements of CWA sections 316(a) and (b). Dominion also anticipates participating in any NRC initiated consultations.

## **Microbiological Hazards (MBH)**

### **MBH – 1**

*Regulatory Guide 4.2, Supplement 1, Revision 1 states that, "The applicant should consult the State agency responsible environmental health regarding the potential existence and concentration of...microorganisms in the receiving waters for plant cooling water discharge. The applicant should document the results of this consultation in the ER. The ER should include copies of correspondence with the responsible agency indicating concurrence with the applicant's risk assessment and proposed mitigation strategy, if one is required."*

- a. Describe Dominion's consultation with the State related to microbiological hazards and the State's views of the environmental health risks to the public from thermal effluent in the James River.*
- b. Please submit with this response copies of relevant correspondence between Dominion and the State.*

### **Dominion Response**

- a. Dominion has consulted with the Virginia Department of Health (VDH) regarding microbiological hazards. Consultation included discussions regarding current and historical SPS operations, effluents, permit compliance, and the minimal risks of exposure impacts to the station population and general public. Information was provided to assist VDH staff in responsiveness.
- b. Copies of correspondence between Dominion and VDH are provided in Enclosure 2.

### **Replacement Power Alternatives (ALT)**

#### **ALT – 1**

*ER Section E7.2.1.1 identifies that the proposed NGCC replacement power plant would be designed to generate approximately 1,743 MWe with an 87% capacity factor to replace Surry's 1,676 MWe. However, ER Section E7.2.3.1 identifies that the same facility would be designed to generate approximately 1,710 MWe, and ER Table E8.0-2 identifies that the facility would be designed to generate a total of 1,926 MWe. Address these inconsistencies as discussed in the audit breakout session. Further, as discussed in the audit breakout session, clarify how the design capacity and assumed capacity factor of each component of Dominion's proposed combination alternative contribute to replacing the 1,676 MWe generated by Surry. Confirm whether the 1,676 MWe is a gross or net value, and what, if any, capacity factor has been applied.*

#### **Dominion Response**

Inconsistencies in replacement power values for the proposed natural gas combined cycle (NGCC) facility alternative were revisited by applying the formula: Design Capacity MWe x Capacity Factor = Replacement Power. Using the 87% capacity factor for a NGCC facility and the replacement power value of 1,676 MWe, the ER Table E8.0-2 value of 1,926 MWe was confirmed to be the appropriate replacement power value for the proposed NGCC facility in the natural gas-fired generation alternative.

ER Section E7.2.1.3 presents the combination alternative as having three components: a photovoltaic (PV) solar facility with a design capacity of 20 MWe, demand-side management (DSM) programs that provide the equivalent 20 MWe of generation, and a 1,743 MWe NGCC facility. This combination alternative was reevaluated applying the formula identified above. The replacement power value of 1,676 MWe was reduced by 20 MWe to 1,656 MWe to account for the DSM programs. The net power of the solar facility was calculated using a 26 percent capacity factor and would contribute 5.2 MWe [20 MWe design capacity x 26% = 5.2 MWe]. This resulted in the NGCC component

providing 1,650.8 MWe [1,656 MWe – 5.2 MWe = 1,650.8 MWe]. To provide 1,650.8 MWe in replacement power at an 87 percent capacity factor, the NGCC facility needs a design capacity of approximately 1,897 MWe [1,650.8 MWe / 87% = 1,897 MWe]. Therefore, the NGCC facility component's design capacity is revised to 1,897 MWe.

ER Section E2.2.1.1 provides the following: "SPS's net generating capacity that Dominion plans on for meeting electrical demand of its service area is 1,676 Mwe (Dominion. 2018) (see Section 2.6)." The reference citation for the 1,676 value is Dominion's Integrated Resource Plan and reflects both Unit 1 and 2's past and projected capacities to generate electricity.

### **ALT – 2**

*Land requirements for a replacement NGCC plant are stated to be 66 acres in ER Sections E7.2.3.1.1 and E7.2.3.3, but 83 acres in ER Table E8.0-2. Explain (reconcile) these differences.*

#### **Dominion Response**

The 83 acres indicated in ER Table E8.0-2 has been confirmed to be the appropriate land area required for the natural gas-fired combined cycle (NGCC) facility in the natural gas-fired generation alternative. The response to RAI ALT-1 provides a discussion of the natural gas-fired alternative and the combination alternative.

### **ALT – 3**

*Provide a summary of the audit breakout session discussion addressing the location(s) on the Surry site that could be suitable for siting replacement power generation.*

#### **Dominion Response**

As discussed in ER Section E7.2.3.1.1, the location considered for the alternatives analysis is located entirely within the Surry Power Station (SPS) property on forested land that has not been previously disturbed. The approximately 83-acre land area is situated adjacent to the independent spent fuel storage installation site to the north and west and extends north to the SPS property boundary. Intermittent streams to the east and west define the extent of the land area in those directions, respectively.

## Socioeconomics (SOC)

### SOC – 1

*Besides property tax payments, describe any other sizeable annual support payments (e.g., emergency preparedness fees and payments or fees because of the independent spent fuel storage installation), one-time payments, or other forms of non-tax compensation (if any) provided to local governments, agencies, communities, and other jurisdictions, on behalf of SPS.*

### Dominion Response

Along with property tax payments to Surry County, Dominion pays approximately \$400 annually to James City County for assets related to the Surry Power Station (SPS).

Dominion also provides annual pass-through funds (e.g., approximately \$500,000 to \$600,000) to the Commonwealth of Virginia for emergency response support.

### SOC – 2

*Provide updated property tax information, similar to the data provided in Table E3.9-2 of the ER. Include data for years 2017 and 2018, if available.*

### Dominion Response

Dominion's property tax payments to Surry County for 2017 and 2018 are provided in Table 1 below:

Table 1: Property Tax Payments to Surry County, 2017 and 2018

Year	Total Property Tax Revenues (USD)	Property Tax Paid by SPS (USD)	Percent of Total Property Tax	Operating Budget (USD)
2017	\$21,692,941	\$13,535,942	62	\$23,704,528
2018	NA	\$13,295,214	NA	NA

SC 2019 Comprehensive Annual Financial Report

NA = Not available (as of April 12, 2019)

Publicly available comprehensive annual financial reports for Surry County are available at the following website address:

<https://www.surrycountyva.gov/Archive.aspx?AMID=39>.



## Special Status Species and Habitats (SSH)

### SSH – 1

Please provide an updated table of federally and state-listed threatened and endangered species based on currently available information to replace ER Table E3.7-4, "Federally and State Listed Threatened and Endangered Species..." which relies on 2016 data.

### Dominion Response

Table 1 below provides updated federally and state-listed threatened and endangered species in Surry, James City, York and Isle of Wight Counties to replace ER Table E3.7-4, "Federally and State Listed Threatened and Endangered Species in Surry, James City, York, and Isle of Wight Counties".

Table 1: Federally and State Listed Threatened and Endangered Species in Surry, James City, York and Isle of Wight Counties

Common Name	Scientific Name	Federal Legal Status	State Legal Status
<b>Amphibians</b>			
Barking treefrog <sup>(a)(b)</sup>	<i>Hyla gratiosa</i>	None	LT
Eastern tiger salamander <sup>(d)</sup>	<i>Ambystoma tigrinum</i>	None	LE
Mabee's salamander <sup>(b)</sup>	<i>Ambystoma mabeei</i>	None	LT
<b>Birds</b>			
Bachman's sparrow <sup>(b)</sup>	<i>Peucaea aestivalis</i>	None	LT
Bald eagle <sup>(c)</sup>	<i>Haliaeetus leucocephalus</i>	DL	None
Black rail <sup>(b)</sup>	<i>Laterallus jamaicensis</i>	None	LE
Henslow's sparrow <sup>(b)</sup>	<i>Ammodramus henslowii</i>	None	LT
Loggerhead shrike <sup>(b)</sup>	<i>Lanius ludovicianus</i>	None	LT
Migrant loggerhead shrike <sup>(b)</sup>	<i>Lanius ludovicianus migrans</i>	None	LT
Peregrine falcon <sup>(b)</sup>	<i>Falco peregrinus</i>	DL	LT
Piping plover <sup>(d)</sup>	<i>Charadrius melodus</i>	LT	LT
Red knot <sup>(b)</sup>	<i>Calidris canutus rufa</i>	LT	LT
Red-cockaded woodpecker <sup>(b)</sup>	<i>Picoides borealis</i>	LE	LE
Roseate tern <sup>(d)</sup>	<i>Sterna dougallii dougalli</i>	LE	LE

Common Name	Scientific Name	Federal Legal Status	State Legal Status
<b>Bivalvia (Mussels)</b>			
Yellow lance <sup>(b)</sup>	<i>Elliptio lanceolata</i>	LT	None
<b>Fish</b>			
Atlantic sturgeon <sup>(a)(b)</sup>	<i>Acipenser oxyrinchus</i>	LE	LE
Blackbanded sunfish <sup>(a)(b)</sup>	<i>Enneacanthus chaetodon</i>	None	LE
Shortnose sturgeon <sup>(d)(e)</sup>	<i>Acipenser brevirostrum</i>	LE	LE <sup>(f)</sup>
<b>Mammals</b>			
Little brown bat <sup>(b)</sup>	<i>Myotis lucifugus lucifugus</i>	None	LE
Northern long-eared bat <sup>(a)(b)(c)</sup>	<i>Myotis septentrionalis</i>	LT	LT
Rafinesque's eastern big-eared bat <sup>(b)</sup>	<i>Corynorhinus rafinesquii macrotis</i>	None	LE
Tri-colored bat <sup>(b)</sup>	<i>Perimyotis subflavus</i>	UR	LE
West Indian manatee <sup>(d)</sup>	<i>Trichechus manatus</i>	LT	LE
<b>Reptiles</b>			
Canebrake rattlesnake <sup>(b)</sup>	<i>Crotalus horridus</i>	None	LT
Eastern chicken turtle <sup>(d)</sup>	<i>Deirochelys reticularia reticularia</i>	None	LE
Green sea turtle <sup>(d)</sup>	<i>Chelonia mydas</i>	LT	LT
Kemp's Ridley sea turtle <sup>(d)</sup>	<i>Lepidochelys kempii</i>	LE	LE
Leatherback sea turtle <sup>(d)</sup>	<i>Dermochelys coriacea</i>	LE	LE
Loggerhead sea turtle <sup>(d)</sup>	<i>Caretta caretta</i>	LT	LT
Northern diamond-backed terrapin <sup>(b)</sup>	<i>Malaclemys terrapin terrapin</i>	None	CC
Spotted turtle <sup>(b)</sup>	<i>Clemmys guttata</i>	UR	CC

Common Name	Scientific Name	Federal Legal Status	State Legal Status
<b>Vascular Plants</b>			
Harper's fimbry <sup>(d)</sup>	<i>Fimbristylis perpusilla</i>	UR	LE
New Jersey Rush <sup>(d)</sup>	<i>Juncus caesariensis</i>	None	LT
Narrow-leaved Spatterdock <sup>(d)</sup>	<i>Nuphar sagittifolia</i>	UR	LT
Sensitive joint-vetch <sup>(a)(c)</sup>	<i>Aeschynomene virginica</i>	LT	LT
Small whorled pogonia <sup>(c)</sup>	<i>Isotria medeoloides</i>	LT	LE

- a) Identified in the VDCR Natural Heritage database as occurring or likely to occur in Surry County, Virginia (VDCR 2019).
- b) Identified by the Virginia Fish and Wildlife Information Service (VFWIS) as occurring or likely to occur in Surry County, Virginia (VDGIF 2019).
- c) Listed by the USFWS as occurring or likely to occur in Surry County, Virginia (USFWS 2019a and USFWS 2019b).
- d) Not identified as occurring in Surry County, Virginia, in the VFWIS database or by the USFWS (USFWS 2019a; USFWS 2019c; USFWS 2019d; USFWS 2019e; VDGIF 2019).
- e) NOAA 2018.
- f) VDGIF 2018.

LE = listed endangered; LT = listed threatened;

CC = collection concern; DL = delisted; UR = Under review (no federal protection)

The following websites address support information in the above table as denoted by the table footnotes:

NOAA (National Oceanic and Atmospheric Administration). 2018. Greater Atlantic Fisheries Office Master ESA Species Table. September 17, 2018. Retrieved from <[https://www.greateratlantic.fisheries.noaa.gov/protected/section7/listing/garfo\\_master\\_esa\\_species\\_table\\_-\\_shortnose\\_sturgeon\\_09172018.pdf](https://www.greateratlantic.fisheries.noaa.gov/protected/section7/listing/garfo_master_esa_species_table_-_shortnose_sturgeon_09172018.pdf)> (accessed December 19, 2018).

NOAA. 2019. Species Directory, New England/Mid-Atlantic. Retrieved from <<https://www.fisheries.noaa.gov/species-directory/>> (accessed April 16, 2019).

USFWS (United States Fish and Wildlife Service). 2019a. Information for Planning and Consultation, Explore Location Surry County, James City County, York County, and Isle of Wight County. Retrieved from <<https://ecos.fws.gov/ipac/>> (accessed April 16, 2019).

USFWS. 2019b. IPaC Resource List, Location: Surry County, Virginia. Retrieved from <<https://ecos.fws.gov/ipac/>> (accessed April 16, 2019).

USFWS. 2019c. Environmental Conservation Online System: Yellow Pond lily (*Nuphar lutea* ssp. *sagittifolia*). Retrieved from <<https://ecos.fws.gov/ecp/>> (accessed April 18, 2018).

USFWS. 2019d. Environmental Conservation Online System: Harper's fimbriatilis (*Fimbristylis perpusilla*). Retrieved from <<https://ecos.fws.gov/ecp/>> (accessed April 18, 2018).

USFWS. 2019e. Environmental Conservation Online System: New Jersey rush (*Juncus caesariensis*). Retrieved from <<https://ecos.fws.gov/ecp/>> (accessed April 18, 2018).

VDCR (Virginia Department of Conservation and Recreation). 2019. Virginia Natural Heritage Database, search for Surry County, James City County, York County, and Isle of Wight County. Retrieved from <<https://vanhde.org/species-search>> (accessed April 16, 2019).

VDGIF (Virginia Department of Game and Inland Fisheries). 2018. Special Status Faunal Species in Virginia. May 7, 2018. Retrieved from <<https://www.dgif.virginia.gov/wpcontent/uploads/virginia-threatened-endangered-species.pdf>> (accessed December 19, 2018).

VDGIF 2019. Fish and Wildlife Information Service, Species Information Report in County: James City, York, Isle of Wight, and Surry. Retrieved from <<https://vafwis.dgif.virginia.gov/fwis/?Menu=Home. By+Name>> (accessed April 16, 2019).

## **SSH – 2**

*During the NRC environmental site audit, Dominion personnel explained measures that its personnel take to ensure that potential impacts on the northern long-eared bat are considered prior to site maintenance activities that require tree clearing. These measures are contained in a Dominion guidance document, which Dominion provided for NRC staff review. Please confirm the accuracy of the NRC staff's characterization of Dominion's practices related to tree clearing below related to site maintenance activities and projects that involve (1) hazardous tree removal, (2) existing right-of-way maintenance and expansion, (3) clearing of less than or equal to 10 acres of trees; and (4) clearing of greater than 10 acres of trees that are not in or adjacent to an existing right-of-way. Hazardous Tree Removal: The U.S. Fish and Wildlife Service's (FWS) Endangered Species Act 4(d) rule for the northern long-eared bat (*Myotis septentrionalis*) (NLEB) (81 FR 1900) does not prohibit or restrict hazardous tree removal to protect human life or property. Prior to undertaking hazardous tree removal, Dominion documents its determination that the action meets the FWS's definition of hazardous tree removal. Dominion does not specifically coordinate with the FWS for such activities. Existing Right-of-Way Maintenance and Expansion: The FWS's NLEB 4(d) rule does not prohibit routine maintenance and expansion of up to 100 feet from either edge of an existing right-of-way as long as the project does not occur within 0.25 miles of known hibernacula; does not involve cutting of known maternity roost trees in June or July; and does not involve clear-cutting within 0.25 miles of known maternity*

roost trees in June or July. Prior to undertaking existing right-of-way maintenance and expansion, Dominion personnel review previously conducted bat surveys in the project area. If surveys have been conducted and those surveys identify no maternity roost trees, Dominion does not coordinate with the FWS prior to undertaking the activity. If no surveys have been conducted in the project area, Dominion coordinates with the applicable FWS field office or the State resource agency, as appropriate. If known roost trees or hibernacula occur within 0.25 miles of the project area, Dominion does not perform clearing in June or July without prior coordination with the FWS. Clearing of Less Than or Equal to 10 Acres of Trees: The FWS's NLEB 4(d) rule does not prohibit projects resulting in less than or equal to 10 acres of tree clearing if those projects are outside of certain location restrictions. For such projects, Dominion follows the process described above for existing right-of-way maintenance and expansion prior to undertaking tree clearing. Clearing of Greater Than 10 Acres of Trees That Are Not In or Adjacent to an Existing Right-of-Way: The FWS's NLEB 4(d) rule prohibits all projects not occurring in or adjacent to an existing right-of-way and resulting in greater than 10 acres of tree clearing that may affect the species. For such projects, Dominion requires its personnel to coordinate with the FWS prior to undertaking such a project. The company recognizes that the FWS will likely require habitat and/or bat surveys (acoustic or mist net) surveys for such projects with clearing planned between April 15 and September 15 if such surveys have not been completed within the past 5 years. If surveys do not identify suitable bat habitat and/or bats on the project site and the FWS agrees with the survey results, Dominion does not restrict clearing to a particular time of year. If surveys identify bats on the project site, Dominion restricts clearing to between September 16 and April 14. Alternately, Dominion may coordinate with the FWS to determine if there are options that would allow clearing in the spring and summer. Dominion recognizes that State resource agencies may have additional requirements related to surveys or development of habitat conservation plans.

### **Dominion Response**

Dominion has reviewed the NRC staff's characterization of Dominion's practices related to tree clearing and confirms the accuracy of the description with the following clarifications for accuracy:

1. Add the following sentence to the end of the paragraph on Hazardous Tree Removal: "Dominion endeavors to avoid clearing hazard trees in June and July, during the brooding season."
2. Revise the first sentence of the paragraph on Clearing of Less Than or Equal to 10 Acres of Trees, to: "The U.S. Fish and Wildlife Service (USFWS) Gloucester Field Office interprets the northern long-eared bat (NLEB) 4(d) rule to not prohibit

projects resulting in less than or equal to 10 acres of tree clearing if those projects are outside of certain location restrictions.”

3. Revise the first sentence of the paragraph on Clearing of Greater Than 10 Acres of Trees That Are Not In or Adjacent to an Existing Right-of-Way, to: “The USFWS’s Gloucester Field Office interprets the NLEB 4(d) rule to prohibit all projects not occurring in or adjacent to an existing right-of-way and resulting in greater than 10 acres of tree clearing that may affect the species.”

### **SSH – 3**

*During the NRC environmental site audit, Dominion personnel explained the company has reported the discovery of any injured or dead birds and bats on the Surry site to the U.S. Fish and Wildlife Service since 2009. However, Dominion has not reported any bats of any species as injured or dead from 2009 through present. Please affirm the staff's understanding of this information.*

### **Dominion Response**

Dominion affirms the NRC staff’s understanding of the reporting of injured or dead birds and bats discovered on the SPS site to the U.S. Fish and Wildlife Service, and confirms that Dominion has not reported any bats of any species as injured or dead from 2009 through the time of submittal of this letter.

### **SSH – 4**

*Does Dominion anticipate any activities during the proposed subsequent license renewal term that could cause increased site noise or vibration levels compared to current operations? If so, please explain such activities and the potential impacts of increased noise and vibration associated with these activities on bats.*

### **Dominion Response**

There are no equipment or activities that are anticipated to change the site’s noise and vibration sources on an ongoing basis as a result of activities during the proposed subsequent license renewal term. Similar to the current licensing term, the typical sound and vibration environment is temporarily altered by maintenance and construction activities and maintenance dredging. (See also responses to CU-3 and LU-1). Dominion carefully manages all onsite activities to identify and reduce potential impacts; therefore, no increased noise or vibration impacts to bats are anticipated.

**SSH – 5**

*Dominion's January 29, 2019, Supplement to the ER, Enclosure 1, Attachment 1 (p. 14) states: "The potential for dredging operations, shoreline modification, and water pollution to have detrimental effects to [Atlantic sturgeon critical] habitat is controlled and mitigated by regulatory processes and permits." To assist the NRC staff's assessment of the potential impacts of subsequent license renewal on the Atlantic sturgeon, please provide the following information.*

- a. How frequently does Dominion anticipate performing dredging of the intake canal during the proposed license renewal period?*
- b. How often does Dominion anticipate removing debris from the low-level intake structure between now and the end of the proposed license renewal term?*
- c. Does Dominion plan to perform activities that would result in "shoreline modification" (other than intake channel maintenance dredging or low-level intake structure debris removal) between now and the end of the proposed license renewal period? If so, please describe such activities, their purpose, and anticipated frequency.*

**Dominion Response**

- a. Dominion anticipates dredging the intake channel every three to four years during the subsequent period of extended operation (PEO).
- b. Dominion anticipates removing debris from the low-level intake structure in accordance with applicable permitting and preventive maintenance (PM) activities between now and the end of the subsequent PEO. Frequency of debris removal may be weekly to annually, or as needed. (See also RAI WR-5 response).
- c. Currently, Dominion has no plans to perform activities that would result in "shoreline modification" between now and the end of the subsequent PEO.

**Waste Management (WM)****WM – 1**

*In section E3.6.4.2.1 of the ER Dominion stated that there were three inadvertent onsite liquid radioactive releases estimated to be greater than 100 gallons each. The last inadvertent release referenced in the ER was September 23, 2012. Provide detailed information on this release and the preventive measures implemented. Are there any more recent reportable releases? If any, provide detailed information on the release.*

### **Dominion Response**

The 2013 through 2017 Annual Radioactive Effluent Release Report does not report any additional inadvertent onsite liquid radioactive releases since the inadvertent onsite liquid radioactive releases reported on September 23, 2012 that was described in Section E3.6.4.2.1 of the SPS SLR ER. Also, there have been no recent reportable onsite liquid radioactive releases since the ER was prepared.

As indicated in the RAI, the last inadvertent radioactive release occurred on September 23, 2012, when the Unit 2 turbine building heating steam drain receiver tank overflowed to the damaged east storm drain line. A sample of the water in the tank confirmed the presence of tritium at a concentration of 1,450 pCi/L, and this leak was subsequently reported to county and state officials and the NRC. This overflow event occurred due to the failure of the tank discharge pump to motor coupling. The overflow was estimated to be greater than 100 gallons.

The inoperability of the heating steam drain receiver pump resulted in water backup and overflow through the tank vent. Since the tank vent terminates on the turbine building roof, water then flowed across the adjacent service building roof and entered the degraded storm drain line through that roof drain.

As a corrective action, the degraded section of the storm drain line was replaced. Subsequent to the replacement, storm drain lines within the Protected Area were inspected and coated with an epoxy liner. Additionally, in accordance with periodic maintenance practices and work orders, routine examinations of storm drain lines are performed for debris and blockage. Results of the examinations are evaluated to ensure the integrity of the storm drain lines are maintained.

The leak described above was located within the Protected Area of Surry Power Station. Tritium has not been detected in monitoring wells in the vicinity of the east storm drain line (previously degraded) or any monitoring wells outside the Protected Area.

Groundwater restoration efforts, including pumping from monitoring wells, evaluating tritium measurements, and periodic reevaluation for additional process improvements, continue as an effective part of the groundwater protection program implementation.



**WM – 2**

*Surry is subject to the reporting provisions of 40 CFR Part 110 as it relates to the discharge of oil in such quantities as may be harmful pursuant to Section 311(b)(4) of the Federal Water Pollution Control Act. Any discharges of oil in such quantities that may be harmful to the public health or welfare or the environment must be reported to the U.S. Coast Guard (USCG) National Response Center. Also, Surry is subject to the reporting provisions of State Water Control Law section 62.1-44.34:19 (Article 11). This reporting provision requires that any release of oil in a quantity of 25 gallons or greater to the environment be reported to the VDEQ, the coordinator of emergency services of the locality that could reasonably be expected to be impacted, and appropriate federal authorities. In sections E3.6.4.2.2, E9.5.3.6, and E9.5.3.7 of the ER, Dominion stated that based on the review of site records from 2012–2017, there was one inadvertent release of approximately eight gallons of glycol-based hydraulic fluid occurred during cleaning of the Unit 2 D service [sic] water intake bay. The applicant states that the release was reported to VDEQ and no NOV resulted. Provide detailed information on this release and the preventive measures implemented. Are there any more recent reportable releases? If any, provide detailed information on the release.*

**Dominion Response**

On March 24, 2017 during cleaning of the SPS Unit 2D circulating water intake bay, a hydraulic line associated with the vendor supplied cleaning equipment failed and discharged approximately 8 gallons of Dow Chemical UCON Hydrolube DG-746 into the intake bay. The hydraulic fluid, comprised of 60% glycol and 40% water, quickly dispersed. The leak stopped after depressurization and the equipment was removed from the intake bay. Since the intake bay communicates with the James River, the fluid was assumed to discharge into state waters. No sheen was observed and no impact to state waters was noted or is expected to have resulted from this release. Dominion notified the Virginia Department of Emergency Management (VDEM) of the release on the day it occurred. A written summary of the release was submitted to Virginia Department of Environmental Quality (VDEQ) by letter dated March 28, 2017.

The event was entered into the station's corrective action program and an evaluation was performed to identify the cause and recommend corrective actions. From this evaluation, Dominion implemented safeguards to minimize spill potentials, including:

- placement of a berm around the equipment when in use,
- use of an individual that will be dedicated as the spill watch when equipment is in use, and

- inspection of hoses, fittings, and tanks containing hydraulic fluid will be performed by both Dominion and the vendor prior to use.

Additionally, Dominion selected Neptune AW-46, a polyalkalene glycol used routinely in equipment near marine environments, as a replacement hydraulic fluid in the hydro-washing equipment used to clean the intake structures at SPS. Neptune AW-46 is non-sheen forming, water soluble and biodegradable. By letter dated December 6, 2018, VDEQ provided no objection to the use of Neptune AW-46 and waived the reporting requirement for de minimus leaks of this product.

As noted in the WR-6 RAI response, SPS has not had any reportable Virginia Pollutant Discharge Elimination System (VPDES) discharge exceedances, spills, leaks, and other inadvertent releases (e.g., petroleum products, chemicals) since 2017.

## **Water Resources (WR)**

### **WR – 1**

*The issue of “radionuclides released to groundwater” looks at the potential contamination of groundwater from the release of radioactive liquids from plant systems into the environment. To address this issue, the DSEIS will need to describe the groundwater system, the extent of contamination, and project the impacts on groundwater and surface water bodies over the license renewal period (approximately a 30 period of time from the present). The following groundwater questions are focused on documenting information that can help to describe the extent of contamination, the risk to aquifers, and projecting what might occur over the period of license renewal. The site obtains its groundwater from the Upper Potomac Aquifer. To help determine if the radionuclides could reach the Upper Potomac Aquifer, a description of the stratigraphy beneath the site is very important. The U.S. Geological Survey publication titled “Hydrogeologic Framework of the Virginia Coastal Plain”, Professional Paper 1404-C. 1988, which is available at [https://pubs.usgs.gov/pp/pp1404-C/pdf/pp\\_1404-c.pdf](https://pubs.usgs.gov/pp/pp1404-C/pdf/pp_1404-c.pdf) provides information on aquifers and confining units from a well drilled at Surry (Well 57F26 in the report). Beneath the site, confining units are primarily clay and help to prevent the vertical movement of radionuclides into underlying aquifers, which contain mostly sand. On page E-3-84 of the environmental report, it is stated that at Surry, the soils are 50 to 80 ft in depth and that they are underlain by 240-270 ft of tough, impermeable clay containing only occasional and limited sand members. The first usable aquifer is encountered at a depth of 320 ft. However, from the U.S. Geological Survey publication, the first 50 ft of surficial material is identified as the Columbia aquifer. Below 50 ft it provides a different description. With increasing depth, the Columbia aquifer is underlain by (1) the Yorktown confining unit, (2) the Yorktown-*

*Eastover aquifer, (3) the St. Mary's confining unit, (4) the Calvert confining unit, (5) the Chickahominy-Piney Point aquifer, and the (6) Nanjemoy-Marlboro Clay confining unit. At a depth of 320 ft, the Aquia aquifer is encountered. It is underlain by the Upper Potomac confining unit, until the upper Potomac aquifer is reached. To help to define the hydrostratigraphy beneath the site, please provide: a. A well log from an onsite well that is representative of the stratigraphy (rock types) from the surface down to the top of the Potomac aquifer. To determine the extent of vertical contamination by radionuclides and to determine if any aquifers have been contaminated, please document if: a. The groundwater that contains tritium is believed to be in construction fill or sand? b. What is the first aquitard (low permeability layer) beneath the fill and sand? What is it made of (e.g., clay, silt, etc.). What is the depth to the aquitard? To help project the impact of groundwater contamination over the period of license renewal, it is very helpful to understand what actions have been taken and are planned to address the groundwater contamination. Please briefly describe: a. Actions taken to prevent the release of radionuclides into the groundwater (i.e., identifying sources, line pipes, etc.). b. Any plans to restore the groundwater. What has been the experience (effectiveness) of clean up actions to date?*

### **Dominion Response**

1. The following description of the stratigraphy beneath the site is provided to help determine if radionuclides could reach the Upper Potomac Aquifer:

The groundwater flow system of the Coastal Plain of Virginia is a multi-aquifer system. Near SPS, there are five major water bearing units, including corresponding confining units. Drilling logs and downhole electric logs of SPS production wells drilled to the Potomac aquifer (about 400 feet deep), including published information (U.S. Geological Survey publication titled "Hydrogeologic Framework of the Virginia Coastal Plain", Professional Paper 1404-C. 1988), identified sediments overlying the Potomac aquifer as unconsolidated to partly consolidated marine and non-marine sedimentary deposits. These deposits consist of interbedded clay, silt, sand and gravel with the stratified clays often acting as confining units. The majority of the Potomac aquifer is overlain by the Potomac confining zone. The potential for radionuclides to migrate to the Potomac aquifer from SPS is minimal.

Detection and measurement of tritium at SPS appears to be limited to groundwater within the protected area, between the intake canal and discharge canal. Tritium associated with SPS has not been detected in groundwater outside the protected area. Shallow groundwater likely discharges at the discharge canal. Vertical extent of tritium in the protected area has not been evaluated. Additional migration of tritium in groundwater is considered minimal given the presence of the discharge

canal as a hydraulic barrier to offsite migration and the Units 1 and 2 mat sump providing groundwater removal near suspected source(s).

2. The following information is provided to help to define the hydrostratigraphy beneath the site:

Well logs are provided in Enclosure 3 for SPS water supply wells. Additionally, wells 57F-26 and 57F-3 (located at the SPS site), listed in U.S. Geological Survey publication titled "Hydrogeologic Framework of the Virginia Coastal Plain", Professional Paper 1404-C. 1988, confirm the multiple confining units and aquifers overlying the Potomac Aquifer.

3. The following figures (included in Enclosure 3) and details are provided in Enclosure 3 to determine the extent of vertical contamination by radionuclides and to determine if any aquifers have been contaminated:

Figure 1, clarifies the filled area of the main plant site at the Units 1 and 2 Containment structures. Figure 4 (profile) illustrates compacted backfill around the Units 1 and 2 Containment structures. Sediment adjacent to the Containment structures is compacted fill material or in-situ soil. However, groundwater containing tritium at SPS appears to reside in both construction fill and natural, in-situ sand.

Figures 2A and 4 describes sediment underlying the Units 1 and 2 Containments as "Stiff Silty Clay" (near el. 0' msl). The figure confirms the presence of either the Yorktown-Eastover confining unit or the St. Mary's confining unit as described in the "Hydrogeologic Framework of the Virginia Coastal Plain", Professional Paper 1404-C. 1988. Together, the Yorktown-Eastover and the St. Mary's confining units are about 60 feet thick and underlie the Columbia Aquifer which is the uppermost aquifer at the site. The St. Mary's-Choptank Aquifer, which generally occurs between the two confining units, is missing in the site area.

4. The following actions have been taken to address the groundwater contamination by preventing the release of radionuclides into the groundwater (i.e., identifying sources, line pipes, etc.):
  - Concrete sumps exposed to radioactive fluids have been coated or lined with stainless steel to eliminate potential leakage.
  - Direct buried cast iron drain pipe exposed to radioactive fluids has been cleaned and coated to eliminate potential leakage.
  - Corrugated metal storm drain lines have been cleaned, replaced as necessary, and coated to eliminate potential leakage.
  - Building floor drain piping exposed to radioactive material has been cleaned and coated to eliminate potential leakage.

- Shake spaces have been sealed within buildings containing components transporting radioactive fluids.
- Components, located outside buildings (e.g., valves), that transport radioactive fluids and had a history of being difficult to detect leakage from, have been redesigned to easily detect leakage and prevent leakage from reaching soil.
- Improved liquid release process by reducing concentrations in discharge canal prior to release point.
- Restoration currently working, plans, and experience (effectiveness) of clean-up actions to date include the following:
  - Continuation of programmatic assessments for credible leakage mechanisms to groundwater;
  - Active pumping of groundwater, in progress through April 18, 2019, from two groundwater wells and building foundation drain systems at a rate of ~14,300 gpd;
  - Continuation of concentration measurements and trending from active pumping;
  - Installation of geoprobes to continue assessment of subsurface pathway concentrations. Post installation assessment may support additional pumping locations and/or rates.

## **WR – 2**

*The ER identifies that Dominion has been notified by the Virginia Department of Environmental Quality (VDEQ) that it will require a separate 401 certification for this renewal and that Dominion is coordinating with VDEQ on that process. Relevant to 10 CFR 51.45(d) and as further specified under the Clean Water Act, Section 401, if the applicant has not received Section 401 Certification, the NRC cannot issue a renewed operating license unless the State has waived the requirement.*

- a. *Has Dominion submitted a 401 Water Quality Certification application to VDEQ with respect to Surry Power Station (SPS) subsequent license renewal application? If so, when was the application submitted?*
- b. *What is the status of SPS's 401 Water Quality Certification?*
- c. *Has 401 Water Quality Certification been granted? If so, provide a copy of the Certification.*

## **Dominion Response**

- a. The initial VDEQ position was that Dominion would require a separate 401 certification for subsequent license renewal. However, recent and on-going discussions with the agency have resulted in a re-evaluation of that initial position.

As Section E9.5.3.1 points out, during the previous license renewal process, Dominion relied upon the Virginia Administrative Code provisions which exempt both surface water withdrawal and discharge from the state's VWP/401 certification requirements because the withdrawal was in place prior to July 1, 1989 (see Va. Code § 62.1-44.15:22.B; 9 VAC 25-210-60) and the discharge is authorized under a valid state-issued Virginia Pollutant Discharge Elimination (VPDES) Permit, Permit No. VA0004090 (see 9 VAC 25-210-60.2) to satisfy NRC requirements.

Given the clear, unambiguous language of the cited statutes/code, Dominion continues to believe that the station remains exempt from state 401 permitting requirements and is reasonably confident that this position will ultimately be found acceptable. However, VDEQ has not yet provided Dominion with a final agency determination regarding the exemption and Dominion remains in discussions with the VDEQ Staff in an effort to resolve this issue.

- b. As explained above, Dominion believes it is in full compliance with applicable state water quality requirements, and should be exempt from 401 permitting requirements.
- c. As explained above, DEQ has not yet provided Dominion with a final agency determination regarding the company's exemption from 401 permitting requirements.

### **WR – 3**

*Table E9.1-1 of the Environmental Report identifies that United States Army Corps of Engineers (USACE) Regional Permit (13-RP-02) expired August 14, 2018 and that the reissuance application is in progress. What is the status of the joint application submitted to the USACE to perform maintenance dredging within the intake channel in the James River and new Dredged Material Management Area? Has the USACE issued a permit to Dominion?*

### **Dominion Response**

In the Joint Permit Application (JPA) submitted on December 5, 2017, Dominion requested that a future offsite DMMA site be added to the permit as an upland disposal area for the sediments dredged from the SPS intake channel.

The U.S. Army Corps of Engineers (USACE) reissued the Regional Permit (RP)-02 September 25, 2018. The 2018 version of the RP-02 is only applicable to "certain navigation-related dredging projects." The RP-02 no longer authorizes non-navigational related dredging such as Surry's intake channel dredging. For this reason, the USACE has indicated that they plan to issue an individual permit for the proposed activity and that Section 401 certification and CZM Certification or waivers will be needed.

Dominion submitted the Federal Consistency CZM Certification to Virginia Department of Environmental Quality (VDEQ) - Office of Environmental Impact Review (OEIR) on February 28, 2019. The VDEQ-OEIR is expected to issue their concurrence by August 28, 2019.

Dominion is planning to request a Section 401 Certification or waiver from the VDEQ in May 2019. In a meeting between Dominion and VDEQ on April 9, 2019, VDEQ staff indicated that they will most likely provide a waiver since the USACE and the Virginia Marine Resources Commission (VMRC) are going to issue permits for the proposed maintenance dredging activity.

The USACE individual permit is expected to be issued in the third or fourth quarter of 2019 following receipt of the Section 401 Certification and the Federal Consistency CZM concurrence or waiver.

#### **WR – 4**

*Section E3.6.3.1 and Table E3.6-6 of the ER identify surface water withdrawal values for SPS. Please provide SPS surface water withdrawal for 2018, if available.*

#### **Dominion Response**

As submitted to the Virginia Department of Environmental Quality, the Annual Water Withdrawal Report Summary for the period between January 1, 2018 to December 31, 2018 for SPS is provided in Enclosure 4. The SPS surface water withdrawal value for 2018 was 662,922.96 MG.

#### **WR – 5**

*Section 9.5.3.9 of the ER identifies that Dominion performs maintenance dredging operation of the intake channel under a USACE Regional Permit and that “[no] other current operations at SPS require a Section 404 permit.” However, Table E9.1-1 of the ER identifies that in addition to periodic maintenance dredging of the intake channel in the James River, Dominion conducts debris removal of the low-level intake structure under USACE Nationwide Permit (2012-NWP #3/NAO-2018-00103/VMRC# 18-0069). Provide a brief summary regarding the type of debris removed, how the debris is disposed of (onsite, offsite, etc.) and frequency of debris removal. Include a copy of permit NAO-2018-00103 VMRC# 18-0069 with the response.*

### **Dominion Response**

Debris is collected at the SPS low-level intake structure during the following preventive maintenance (PM) activities:

- Intake structure PM - The structures are overhauled every two years (four structures per year);
- Trash rack PM - The trash racks are cleaned, inspected, and vacuumed once a year or on as needed basis. During that time, the apron in front and back on trash rack is vacuumed. These activities are performed by divers.
- Trash rack PM - The trash racks are cleaned weekly by running the trash rake.
- Screen well PM -The screen well is cleaned, inspected, and vacuumed every two years. These activities are performed by divers.
- Traveling screens PM - The traveling screens are inspected semi-annually to identify any issues that may need to be addressed.

Debris includes the following:

- Aquatic vegetation and algae
- Shells
- Woody debris
- Leafy material
- Sediments or other natural inorganic debris (e.g., gravel, sand, silt)
- Man-made debris/refuse (e.g., plastic, metal)

Removed debris is collected in dumpsters then hauled offsite for proper disposal at a permitted landfill.

As requested, a copy of permit NAO-2018-00103 VMRC# 18-0069 is provided in Enclosure 5.



**WR – 6**

*Section 9.2 of the ER discusses the status of compliance with various authorizations and Section E3.6.1.2.5 of the ER discusses the compliance history over a six year period (2012-2017) related to SPS wastewater discharges.(a) Provide a brief summary (e.g., actions taken, findings, etc.) of the January 2017 non-compliance report provided to VDEQ related to Enterococci bacteria exceedance referenced in Section E3.6.1.2.5.(b) Identify and describe any SPS VPDES discharge exceedances, as well as any spills, leaks, and other inadvertent releases (e.g., petroleum products, chemicals) since 2017.(c) Identify and describe any Notices of Violation (NOVs); nonconformance notifications; or infractions received from regulatory agencies associated with VPDES permitted discharges, received since 2017. Include self-reported violations.*

**Dominion Response**

- a. The SPS VPDES permit was reissued on March 1, 2016 and included a requirement that the site's sewage treatment plant (STP) discharge (Outfall 101) be sampled for Enterococci. Specifically, the request specified a minimum of four samples be taken at least seven days apart in one calendar month per year, and the geometric mean of the results be compared with the permit limit of 35 counts / 100 mL. January 2017 was the first month that Enterococci samples were collected at SPS.

The geometric mean of four samples collected during January 2017 was 38.08 counts / 100 mL. The permit limit exceedance was due to an elevated Enterococci count of 461 counts / 100 mL determined for the fourth sample collected on January 27, 2017. The previous three sample results were 15, 19 and 16 counts / 100 mL. There were no indications of an STP upset during collection of the January 27 sample. An additional set of four samples were collected during February 2017, and the geometric mean of those samples was 3.5 counts / 100 mL.

A root cause analysis and apparent cause evaluation identified the following as the most likely reason(s) for the permit exceedance:

- Contamination of the January 27, 2017 sample during collection, and
- Lack of a specific procedure for the collection of Enterococci samples.

SPS corrective actions included revising the guidance [for the VPDES Permit Sampling Guidelines] to minimize the likelihood of Enterococci sample contamination.

- b. SPS has not had any reportable VPDES discharge exceedances, spills, leaks, and other inadvertent releases (e.g., petroleum products, chemicals), since 2017.

- c. SPS has not received any NOV, nonconformance notifications, or infractions (including self-reported violations) associated with VPDES permitted discharges from regulatory agencies since 2017.

### **WR-7**

Section E2.2.3.2 of the ER discusses thermal effluent dispersion for the discharge canal. The ER states: "During a period of high ambient water temperatures (August 6 to September 10, 1975) when SPS was running at 90% or greater capacity, discharge temperatures ranged from 92.8°F to 99.9°F. These temperatures are believed to be typical of those observed in the discharge canal in late summer when both SPS units are operating at or near full power (Reference: SPS. 2001, Section 3.1.2.1). There are no changes since the 2010 uprate. Temperatures immediately outside the discharge canal in the James River are lower, with the effluent losing 1-2°F with every 1,000 feet from the mouth of the discharge canal (Reference: SPS. 2001, Section 3.1.2.1)." Section E3.6.3.1 of the ER states: "After passing through the condensers and the service water system, most of the water is returned to the James River. Less than 22,000 gpm is lost to evaporation, approximately 1% of the initial intake. (VDEQ. 2013a)." In a Clean Water Act 316(b) demonstration for SPS, the maximum temperature rise of water across the condensers was reported to be 7.8 °C (VEPCO 1980; ML020230042). The thermal studies, evaporation rate, and maximum temperature rise of water across the condensers do not account for any additional thermal loading as a result of SPS 2010 power uprate.

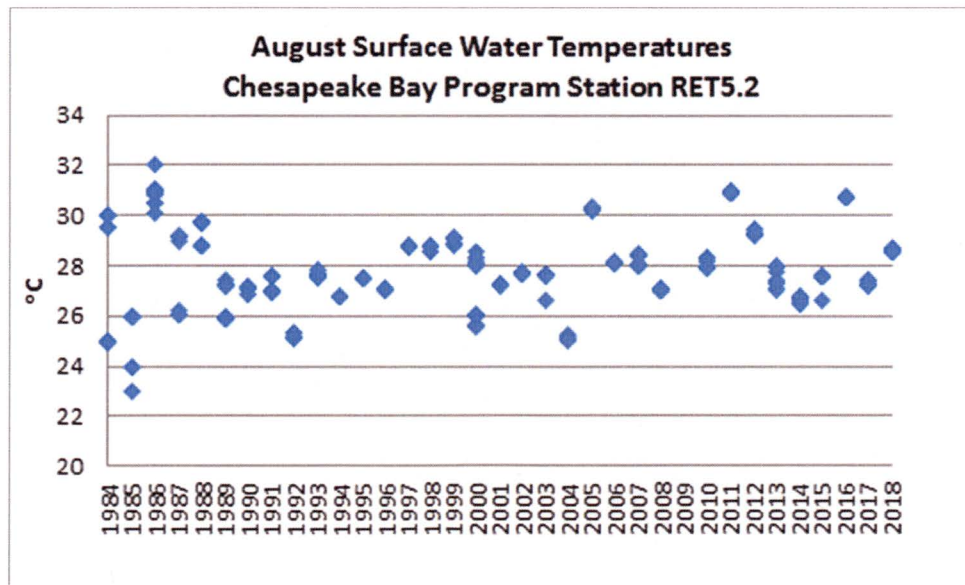
- a. Provide a basis for concluding the 1975 high ambient water temperatures recorded are representative of the discharge canal in late summer under current SPS operating conditions.
- b. Provide a basis for concluding there have been no changes in discharge temperatures (both in the canal and James River). If current discharge temperatures are available (in the discharge canal or James River), please provide these and identify the location where the temperatures were taken (e.g., in the discharge canal, in the James River at a certain distance from the discharge canal, etc.).
- c. Provide a basis for concluding the analysis of thermal impact on aquatic organisms (Section E4.6.2 of the ER), which relies on the 1970s thermal studies, are applicable to current thermal conditions.
- d. Has there been a change (increase or decrease) in evaporation under current operating conditions of SPS? If so, please discuss. If there has been no change, provide a basis for concluding that approximately 22,000 gpm of water withdrawals from the James River is lost to evaporation under current operating conditions.

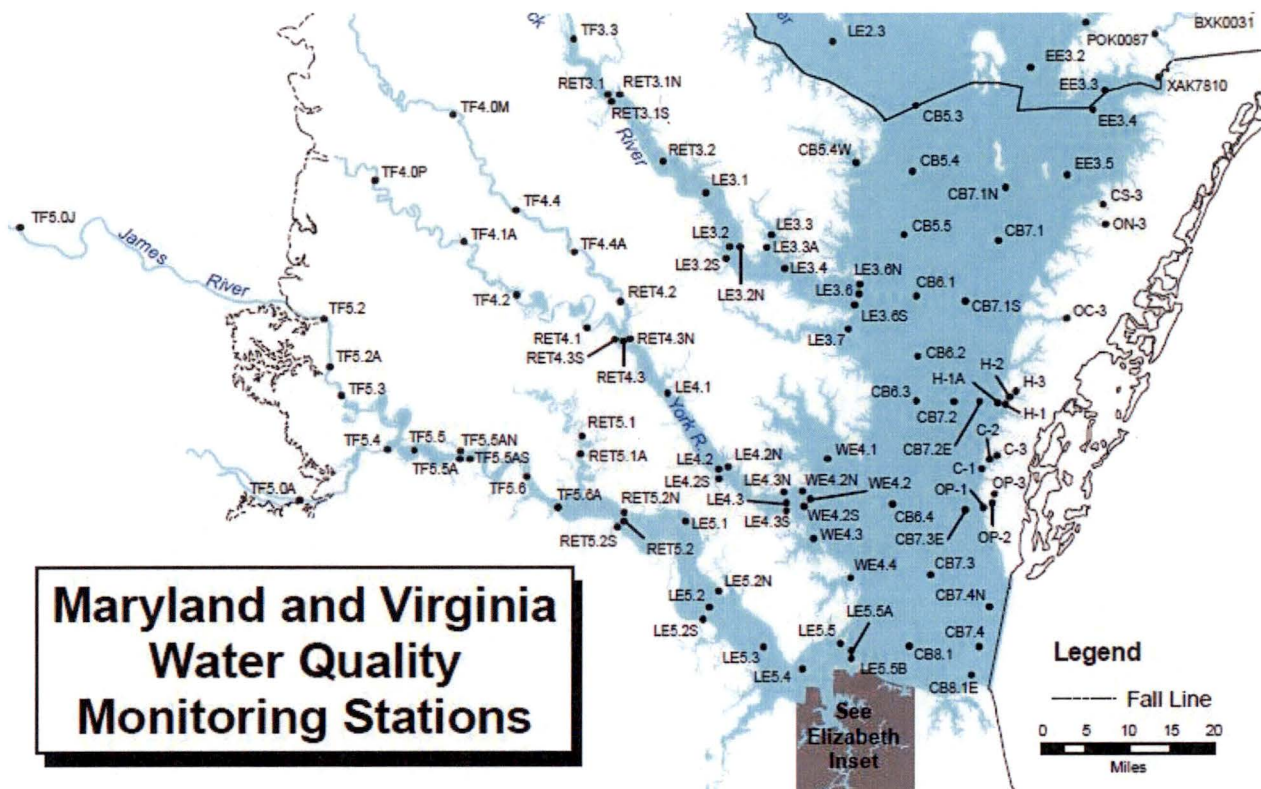
- e. Has there been a change (increase or decrease) in the temperature rise of water across the condensers under current operating conditions of SPS and as a result of SPS power uprates? If so, please discuss. If there has been no change in maximum temperature rise of water across the condenser under current SPS operating conditions, provide a basis for concluding this.

**Dominion Response**

- a. In 1975, a study was performed during August to determine temperatures within the SPS thermal mixing zone. The survey was conducted during slack before ebb and slack before flood tidal conditions during a period when the station had been operating at near full capacity for several days. Background temperatures of 29.6°C and 28.7°C (85.6°F and 83.7°F) were measured in the James River during the study at a location close to Chesapeake Bay Monitoring Program station RET5.2. Both temperatures are very close to maximum historical James River temperatures measured at station RET5.2 indicating that the survey reflects close to maximum expected mixing zone temperatures.

Below is a figure showing James River temperatures measured during August of each year 1985–2017 at a Chesapeake Bay Program monitoring station RET5.2 that is located upriver from SPS (see map below). The station is located outside of the influence of Surry’s thermal mixing zone.





b. In accordance with its VPDES permit, Surry Power Station calculates the maximum heat rejection (BTU/Hour) that occurs during any month and this value is reported in the discharge monitoring report submitted to the DEQ. Table 1 below shows estimated temperature increases and condenser outlet temperatures determined using the maximum heat rejection and corresponding daily condenser inlet temperature data for the month of August in the years 2013-2017. Note that the condenser outlet temperatures were calculated using the maximum (worst case) hourly heat rejection for each month and do not reflect the temperature loss that would occur as the cooling water moves down the discharge canal towards the James River. Even so, they are reasonably close to the range observed during the period between August 6 and September 10, 1975.

The temperature of the thermal discharge (Outfall 001) is a function of the amount of heat that is rejected to the cooling water (Btu/hour), and the volume of cooling water and temperature of the James River water as it enters the condensers. A basis for determining no change in discharge temperature impacts is provided below. Table 1 shows the monthly average and maximum hourly heat rejection and monthly average condenser inlet and outlet temperatures for the month of August in the years 2013-2017. Also shown is the daily average outlet temperature corresponding

to the day with the maximum hourly heat rejection. Note condenser outlet temperatures do not reflect (credit) temperature losses that occur as the cooling water moves down the discharge canal towards the James River. Even so, they are reasonably close to the temperatures observed during the period from August 6 to September 10, 1975.

**Table 1: Average and Maximum Heat Rejection Rates, Average Condenser Inlet Temperatures and Corresponding Monthly and Daily Average Condenser Outlet Temperatures for the Month of August in 2013 - 2017**

August	Heat Rejection (Btu/hour x 10 <sup>9</sup> )		Condenser Temperature (°F)		
	Monthly Average	Maximum Hourly	Monthly Average Inlet	Monthly Average Outlet	Daily Average Outlet
2013	10.843	11.963	85	98	101.12
2014	10.824	11.939	82	98	101.12
2015	10.888	12.012	86	100	103.31
2016	10.917	12.021	86	103	104.25
2017	10.702	11.979	87	99	102.88

In addition, SPS recorded internal monitoring of temperature at the discharge canal VPDES monitoring point for pH, from June through October 2018, and the maximum temperature recorded was approximately 91.4 degrees. It is still concluded there is no new and significant information affecting impact conclusions from evaluation of earlier and recent years operational thermal discharge data.

- c. Information provided in responses to (a) and (b) above and (e) below indicate SPS discharge and James River temperatures have not changed substantially since the original 1970s thermal studies. Dominion currently has plans to update its CWA 316(a) demonstration applicable for SPS. The update will include the following:
- Thermal modeling to evaluate the thermal mixing zone;
  - Update of the Representative Important Species (RIS) list to reflect current conditions in the James River near the station;
  - A biothermal assessment of the potential effects of the SPS thermal plume on critical RIS biological function; and
  - Development of a 316(a) update report that includes the methods and materials used to develop the above information, study results, and the overall conclusions.

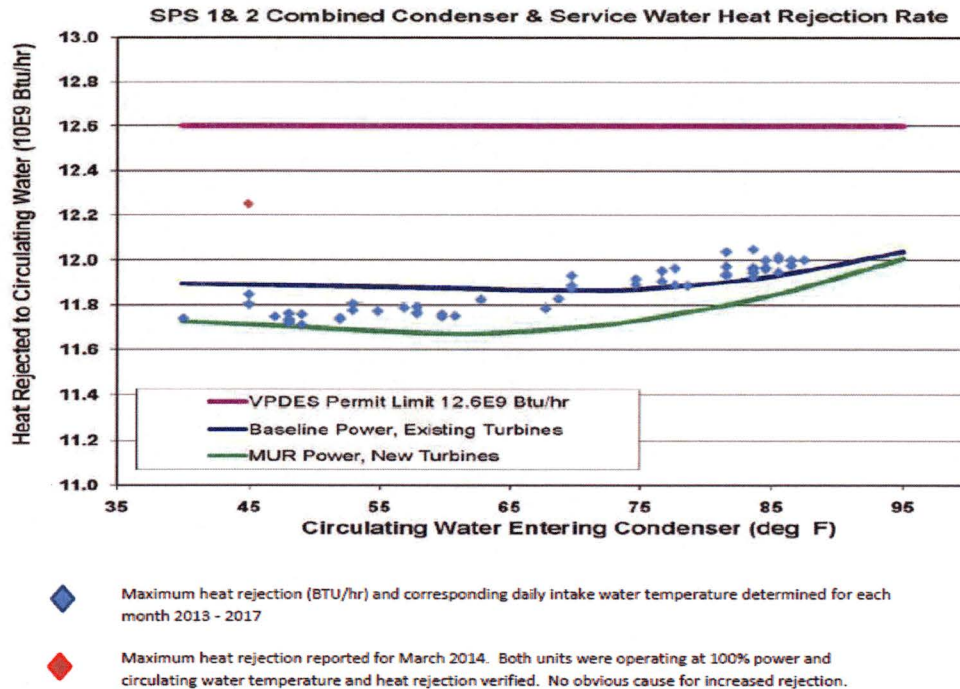
The CWA 316(a) update report is scheduled to be submitted to the Virginia Department of Environmental Quality (VDEQ) with the application for reissuance of the station's VPDES permit, currently due by September 1, 2020.

- d. SPS operations and conditions have not changed substantially since startup. While modifications have been implemented to improve station operations efficiency, heat rejection data generated (see e. below) are indicative of potential slight increases in evaporative loss during warmer periods of the year, and slight decreases in evaporative loss during cooler periods of the year. Neither change in evaporative loss would alter the environmental impact descriptions and conclusions of SMALL in NUREG-1437, Revision 1, 2013, (the GEIS), or NUREG-1437, Supplement 6, 2002 (the SEIS).
- e. Prior to implementation of the Measurement Uncertainty Recapture (MUR) Power and Alstom Turbine (TRP) uprates in 2010 and 2011, the impacts to waste heat rejection (BTU/hr) and resulting discharge temperature were evaluated using the Performance Evaluation of Power Station Evaluation (PEPSE) heat balance model for SPS 1 & 2. The PEPSE model was modified to reflect the MUR and TRP uprates using a maximum cooling water intake temperature of 95 degrees.

The analysis projected that implementation of the MUR uprate alone would result in an increase in the full plant thermal discharge to the James River from a baseline of  $12.04 \times 10^9$  BTU/Hour to approximately  $12.26 \times 10^9$  BTU/Hour. However, under TRP uprate conditions, the efficiency of the steam turbine, generator and condenser system to convert thermal energy originating from the reactor into electric power at the switchyard would be improved over that of the existing Siemens steam turbines. Consequently, evaluation of the combined MUR and TRP uprates projected that the TRP uprate would decrease the MUR heat rejection load from  $12.26 \times 10^9$  BTU/Hour to  $12.11 \times 10^9$  BTU/Hour.

Figure 1 compares the heat rejection rates projected to result from the MUR and TRP uprates (MUR Power, New Turbines) with the heat rejection rates existing prior to implementation of the uprates (Baseline Power, Existing Turbines). Figure 1 was discussed with VADEQ during a presentation given on January 10, 2010 prior to the uprates. At that time the analyses had indicated that implementation of the MUR and TRP uprates would result in a reduction in heat rejection from baseline for condenser inlet temperatures throughout the range from 40°F to 95°F. Because cooling water volumes were not impacted by the uprates, a decrease in water temperatures would also be predicted throughout this range.

FIGURE 1



Superimposed on Figure 1 (diamonds) are actual maximum heat rejections (BTU/hr) and corresponding daily intake temperatures determined for each month from 2013 – 2017. These data suggest the following:

- Implementation of the uprates has reduced heat rejection to the James River during periods of cooler intake water temperatures (i.e., < 70°F);
- The reduction in heat rejection has been less than was predicted at all intake water temperatures; and
- At intake water temperatures  $\geq 70^\circ\text{F}$  the amount of heat rejected has been equal to, or has slightly exceeded pre-uprate levels.

Water temperatures  $> 70^\circ\text{F}$  are typically experienced during the summer months in the James River near the Surry Power Station. Therefore, the amount of heat rejected during these periods could be slightly higher than pre-uprate levels. It should be noted, however, that any uprate-related increase in the temperature of the water discharged through Outfall 001 should be imperceptible. For example, the difference from baseline represented by the 2013-2017 data appears to be about  $0.2 \times 10^9$  BTU/Hour, which equates to a discharge temperature rise of approximately

0.25°F at a cooling water flow of 1.6 million gallons per minute (96 million gallons per hour).

### **WR – 8**

*The initial license renewal ER (submitted to the NRC in 2001) identifies that typical salinities in the area of the SPS intakes are up to 17.0 parts per thousand, while those in the area of the SPS discharge canal are typically lower at 0.0 to 9.2 parts per thousand. Have there been changes in salinities in the James River specifically in the immediate vicinity of SPS's intake and discharge points since 2001? As a part of the explanation, provide salinities in the James River at SPS's intake and discharge points, if available, under current operating conditions.*

### **Dominion Response**

Dominion has not detected changes in salinities (or impacts from changes in salinities) in the immediate vicinity of SPS's intake and discharge points since 2001, nor is it aware of any new and significant information related to salinities in these areas. Salinity data for the James River at or in the immediate vicinity of the SPS intake and discharge points are not available. The nearest salinity monitoring station to SPS is the Jamestown station of the Chesapeake Bay Interpretive Buoy System. Salinity data (practical salinity units, or psu) are publicly available through the National Oceanic and Atmospheric Administration (NOAA) website from April 24, 2008 to April 2019 as "Ocean" type data.

The following website address is provided as support information:

<https://buoybay.noaa.gov/observations/data-download>

### **WR – 9**

*Section E2.2.3.5 of the ER identifies that water for firefighting is obtained from 2 300,000-gallon water storage tanks that "are supplied from two wells (SPS. 2016a, Section 9.10.2.2.1)." However, Section E3.6.3.2 of the ER states that there are 3 wells that discharge into a common header that provides water to the two 300,000 gallon fire protection tanks: "Wells B, C, and ER discharge into a common header that provides water to the two 300,000-gallon fire protection tanks (Well E was abandoned and replaced with Well ER in 2015)." Clarify the apparent discrepancy regarding the number of wells that supply the 300,000 gallon water storage tanks.*



**Dominion Response**

The three wells indicated in ER Section E3.6.3.2 accurately describe the water supply for firefighting. Three wells (wells B, C, and ER) discharge into a common header that provides water the two 300,000 gallon fire protection tanks.

**WR – 10**

*Section E2.2.3 of the ER states “Cooling water is withdrawn from the James River through a channel dredged in the riverbed between the main river channel and the eastern shore of Gravel Neck Peninsula, a distance of approximately 5,700 feet. Dominion has typically dredged this channel every 3-4 years to maintain a depth of approximately 13 feet (Section E2.2.7.2).” Section E3.6.1.2.4 of the ER states “Dominion regularly performs maintenance dredging of the intake channel. Dredging occurs as needed and is permitted under a USACE 13- RP-02 Regional Permit 2 authorizing the dredging of a 2,000-foot long by 150- foot wide channel.” Section E2.2.7.2 further states: “Dominion has dredged approximately 150,000 cubic yards from this channel every 3-4 years. During maintenance dredging within the existing intake channel on the James River (October 2016-January 2017), approximately 41,544 cubic yards were hydraulically dredged to a depth of 12 feet mean lower low water within a 2,000- foot long by 150-foot wide channel.”*

- (a) Regarding the 5,700 ft distance discussed in Section E2.2.3 of the ER, clarify what this distance is referring to. Provide the length of the channel that is typically dredged, as discussed during NRC’s environmental audit.*
- (b) Clarify the depth that the intake channel is maintained at.*
- (c) Clarify if 150,000 cubic yards is the permitted limit and provide the range of typical dredged volumes.*
- (d) Discuss how dredge material from the intake channel has been transported to the current onsite dredge material management pond.*

**Dominion Response**

- (a) The SPS intake channel is approximately 5,700 feet long. The U.S. Army Corps of Engineers and the Virginia Marine Resources Commission (VMRC) permits allow the dredging of a 2,000-foot long section.
- (b) The intake channel is maintained at -12 feet mean low water (MLW) (or -13.3 feet mean sea level (msl)).

- (c) 150,000 cubic yards of sediments is the permitted limit per dredge cycle from the intake channel. Typical dredge sediment volumes have ranged from 65,650 cubic yards in 2013 to approximately 46,000 cubic yards in 2017, which was regarded as a partial dredge.
- (d) Sediments from the intake channel have been hydraulically dredged and sluiced to the existing [onsite] dredge storage pond using temporarily installed high-density polyethylene (HDPE) pipes.

## **Various Document Requests (VAR)**

### **VAR – 1**

*Please provide the following documents:*

- (a) *Dominion Energy. 2019. Letter from Jason E. Williams, Director Environmental, to Joseph Bryan, Department of Environmental Quality. RE: Dominion Energy-Surry Power Station VPDES Permit No. VA0004090 CWIS – 2018 Annual Certification and Effectiveness of Control Measures. 3 p. January 23, 2019.*
- (b) *Dominion Energy. 2018. Letter from Jason E. Williams, Director Environmental, to Emilee Adamson, Department of Environmental Quality. RE: Dominion Energy-Surry Power Station VPDES Permit No. VA0004090 CWIS – 2017 Annual Certification and Effectiveness of Control Measures. 4 p. January 29, 2018.*
- (c) *CH2MHill. 2006. Draft Comprehensive Demonstration Study. Surry Power Station. Revision 1. November 17, 2006.*
- (d) *EA Engineering, Science, and Technology, Inc. 2007. Entrainment Characterization Report; Surry Power Station, June 2005–May 2006. Final Report. August 2007.*
- (e) *Summary of HDR. 2016a. Draft Entrainment Characterization Study Plan. Prepared for Dominion Services. Inc. May 29, 2016.*
- (f) *Summary of HDR. 2016b. Draft Impingement Characterization Study Plan. Prepared for Dominion Services. Inc. May 29, 2016.*
- (g) *Summary of HDR. 2017. 2015-2016 Impingement Characterization Study Report, Draft Final. Surry Power Station, VPDES Permit VA0004090. April 3, 2017.*
- (h) *USFWS. 2015c. Email correspondence from S. Hoskin, USFWS, to M. Overton, Dominion Energy. December 9, 2015.*
- (i) *VDEQ. n.d.VPDES Permit Fact. Sheet. VA0004090. Surry Power Station & Gravel Neck. No date. (Include Attachment B to the fact sheet).*

- (j) *VEPCo. 1977. Section 316(a) Demonstration (Type L); Surry Power Station – Units 1 and 2. Submitted to the Virginia State Water Control Board. Richmond, Virginia.*

### **Dominion Response**

As requested, the following documents are provided in Enclosure 6:

- (a) Dominion Energy. 2019. Letter from Jason E. Williams, Director Environmental, to Joseph Bryan, Department of Environmental Quality. RE: Dominion Energy-Surry Power Station VPDES Permit No. VA0004090 CWIS – 2018 Annual Certification and Effectiveness of Control Measures. 3 p. January 23, 2019.
- (b) Dominion Energy. 2018. Letter from Jason E. Williams, Director Environmental, to Emilee Adamson, Department of Environmental Quality. RE: Dominion Energy-Surry Power Station VPDES Permit No. VA0004090 CWIS – 2017 Annual Certification and Effectiveness of Control Measures. 4 p. January 29, 2018.
- (d) EA Engineering, Science, and Technology, Inc. Entrainment Characterization Report; Surry Power Station, June 2005–May 2006. Final Report. August 2007.
- (e) HDR. 2016a. Draft Entrainment Characterization Study Plan. Prepared for Dominion Services. Inc. May 29, 2016.
- (f) HDR. 2016b. Draft Impingement Characterization Study Plan. Prepared for Dominion Services. Inc. May 29, 2016.
- (h) USFWS. 2015c. Email correspondence from S. Hoskin, USFWS, to M. Overton, Dominion Energy. December 9, 2015.
- (i) VDEQ. n.d. VPDES Permit Fact Sheet. VA0004090. Surry Power Station & Gravel Neck. No date. (Include Attachment B to the fact sheet).
- (j) VEPCO. 1977. Section 316(a) Demonstration (Type L); Surry Power Station – Units 1 and 2. Submitted to the Virginia State Water Control Board. Richmond, Virginia.

The following documents are not provided, but are summarized below:

- (c) CH2MHill. 2006. Draft Comprehensive Demonstration Study. Surry Power Station. Revision 1. November 17, 2006.

Data and content from this document are included in the HDR. 2016a. Draft Entrainment Characterization Study Plan. Prepared for Dominion Services. Inc. May 29, 2016, and is provided in the SLRA ER Table E3.7-2 and Section E4.6.1.4. While this document was preliminary and not finalized, the contents have been incorporated into following studies and reports.

- (g) Summary of HDR. 2017. 2015-2016 Impingement Characterization Study Report, Draft Final. Surry Power Station, VPDES Permit VA0004090. April 3, 2017.

Data and information from this document are included in the response to RAI A-1. This preliminary document is expected to be finalized for permitting purposes in 2020.