
Implementation of Carbon Emission Guidelines for Existing Electric Power Generation Facilities

*A Report to the Honorable Terence R. McAuliffe, Governor
and the General Assembly of Virginia pursuant to § 2.F.2
of Chapter 6 of the 2015 Acts of Assembly*

Virginia Department of Environmental Quality

December 2015

I. INTRODUCTION

This report is being submitted by the Department of Environmental Quality pursuant to Section 2,F 2 of Chapter 6 of the 2015 Acts of Assembly which provides that :

[During the Transitional Rate Period:] . . . The Department of Environmental Quality shall submit a report and make recommendations to the Governor and the General Assembly annually on or before December 1 of each year concerning the implementation of carbon emission guidelines for existing electric power generation facilities that the U.S. Environmental Protection Agency has issued pursuant to § 111(d) of the federal Clean Air Act. The report shall include an analysis of, among other matters, the impact of such federal regulations on the operation of any investor-owned incumbent electric utility's electric power generation facilities and any changes, interdiction, or suspension of such regulations. The Department of Environmental Quality shall submit copies of such annual reports to the Chairmen of the House and Senate Committees on Commerce and Labor and the Chairman of the Commission on Electric Utility Regulation.

II. IMPACT OF FEDERAL REGULATIONS ON THE OPERATION OF INVESTOR-OWNED INCUMBENT ELECTRIC UTILITY ELECTRIC POWER GENERATION FACILITIES

THE EPA REGULATIONS

The U.S. Environmental Protection Agency (EPA) issued proposed emissions guidelines for the control of carbon dioxide (CO₂) from existing power plants (79 FR 34830) and for modified and reconstructed power plants (79 FR 34960), which are collectively known as the Clean Power Plan (CPP), on June 18, 2014. The proposed emission guidelines set a CO₂ reduction target for Virginia of 810 pounds per megawatt hour (lb/MWh). During the federal public comment period on the proposal, the Department of Environmental Quality (DEQ) provided EPA with detailed comments which pointed out various inequities among states and provided suggestions for improving the plan.

On August 3, 2015, EPA issued two final CPP regulations: [emissions guidelines](#) for existing power plants, Subpart UUUU of 40 CFR Part 60; and a [New Source Performance Standard](#) (NSPS) for new power plants, Subpart TTTT of 40 CFR Part 60. EPA also issued a [proposed federal plan](#), Subpart MMM of 40 CFR Part 62, that EPA will implement in a state that fails to submit a plan, or fails to submit an approvable plan.

IMPACT ON POWER GENERATION FACILITIES IN VIRGINIA

Overview

The final rule is designed to reduce carbon dioxide from the power sector by 32%

nationwide below 2005 levels once the rule is fully implemented in 2030. To do this, the rule establishes CO₂ emission performance rates for two categories of fossil fuel-fired electric generating units (EGUs) as follows.

- A uniform performance rate of 1,305 lbs/MWh for Fossil fuel-fired steam generating units (coal and oil fired), and
- A uniform performance rate of 771 lbs/MWh for natural gas combined cycle units.

The EPA applied the 111(d) concept of best system of emission reduction (BSER) to develop the performance standards that was comprised of three building blocks that reduce CO₂ emissions from the power sector.

- Building Block 1 – increase the operational efficiency of existing coal-fired EGUs.
- Building Block 2 – shift generation from coal and oil-fired EGUs to lower emitting and more efficient natural gas-fired EGUs.
- Building Block 3 – increase generation from renewable sources of energy such as solar and wind power.

The rule goes on to provide state specific overall interim, interim step-down, and final goals based on these performance rates that are expressed as both rate and mass-based goals. Furthermore the state specific goals are based on a 2012 base year of CO₂ emissions and emission rates, combined with the fossil fuel generation mix between the two performance standard categories.

For Virginia, a final rate of 934 lbs/MWh is required in the final rule. This state specific rate is based on established emission standards for affected units along with the state specific generation mix in 2012 as seen below.

Virginia CPP Goal: 2012 Coal/Oil generation % (1,305 lbs/MWh x 31%) + 2012 Natural Gas Combined Cycle generation % (771 lbs/MWh x 69%) = **934 lbs/MWh**

The rule identifies the following interim and final rate and mass-based goals for Virginia that are based on the final rate goal as shown in Table 1 below. In the case of the mass-based goals, the EPA has developed both existing source and existing and new source goals for states to consider and possibly adopt.

Table 1: Clean Power Plan Interim and Final Goals for Virginia

Interim and Final Goal Periods	Rate-Based Goal (lbs/MWh)	Mass-Based Goal (tons)	Mass-Based Goal (existing & new)
Interim Period (2022-2029)	1,047	29,290,072	29,967,912
Interim Step 1 (2022-2024)	1,120	31,290,209	31,438,854
Interim Step 2 (2025-2027)	1,026	28,990,999	29,542,302
Interim Step 3 (2028-2029)	966	27,898,475	28,399,914
Final Goal (2030)	934	27,433,111	27,735,010

Source: Final EPA Clean Power Plan

The EPA rate and mass goals for Virginia in the final Clean Power Plan are presented graphically below in Figures 1 and 2. Please note that while the interim mass emission goals are higher than actual emissions levels in 2012, actual emissions have increased in more recent years (2013 & 2014) and are now above the interim goals as shown later in the report (Figure 5).

Figure 1: Final Clean Power Plan Emission Rate Goals for Virginia

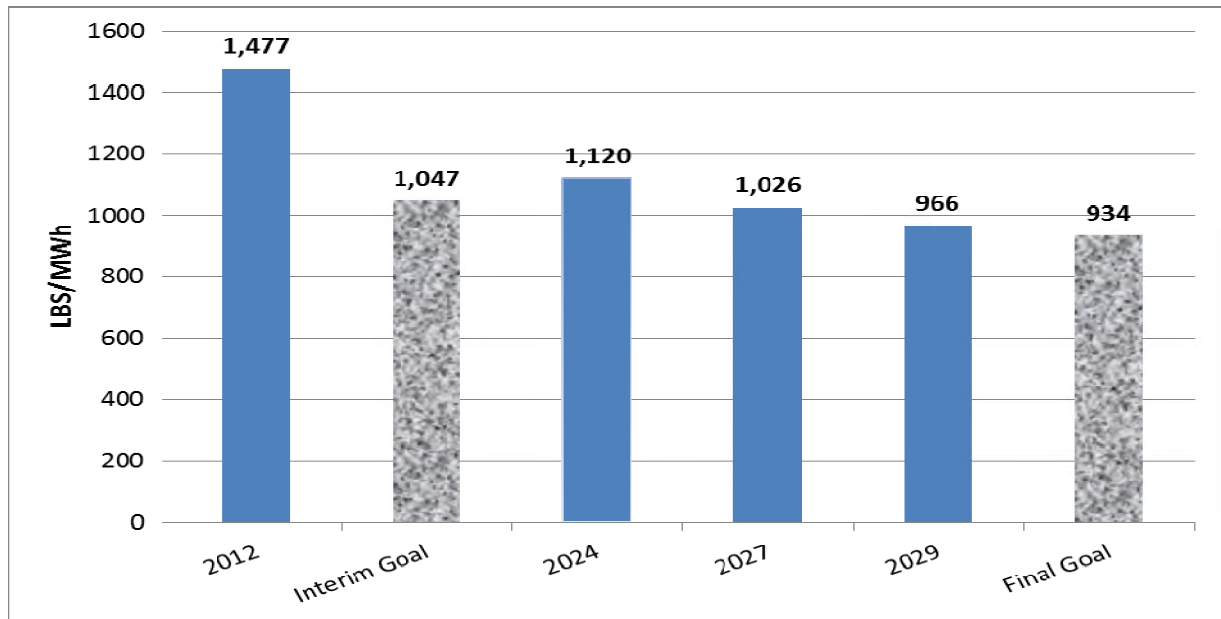
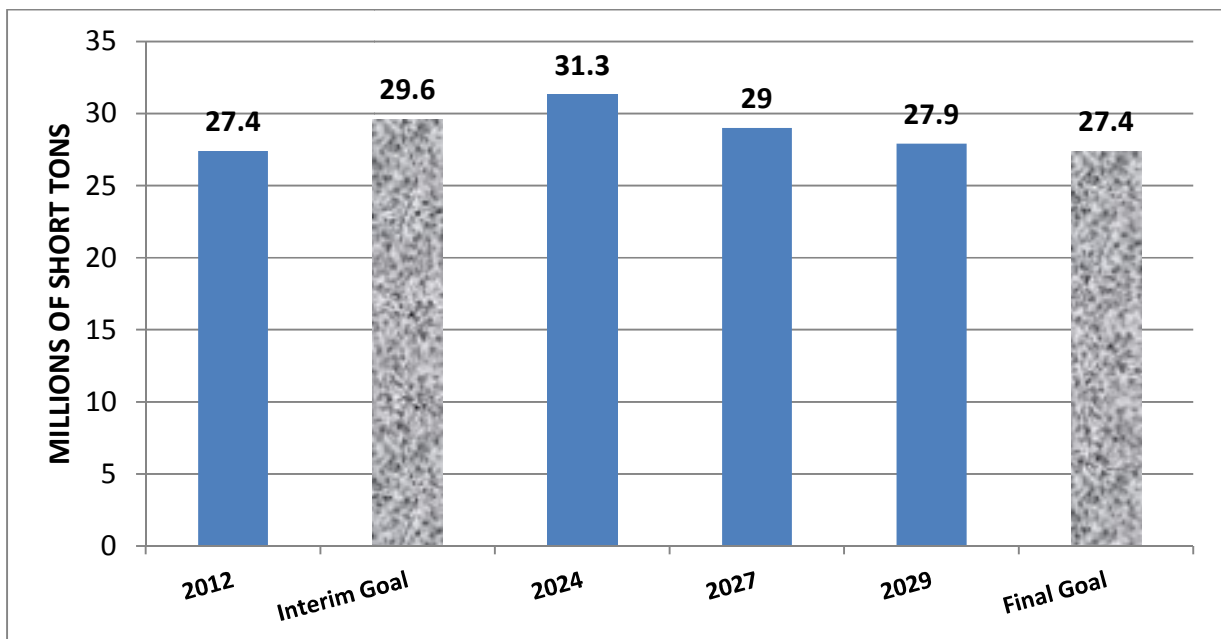


Figure 2: Final Clean Power Plan Mass Emission Goals for Virginia



Sources Affected in Virginia

A total of 26 electric generating facilities in Virginia are identified as affected sources in the final EPA rule. The combined capacity of these facilities is just over 16,000 megawatts (MWs) and their combined emissions in 2012 were 27.4 million tons of CO₂. However, two of affected sources, Dominion's Warren and Brunswick facilities had no emissions in 2012 as they were not yet constructed. In terms of fuel specific generation, 6,782 MWs of coal-fired generation emitted 16,596,275 tons of CO₂, 7,500 MWs of natural gas-fired combine cycle generation emitted 10,605,052 tons of CO₂, and 1,764 MWs of oil-fired generation emitted 164,110 tons of CO₂.

A list and map of the affected sources in Virginia are presented in Table 2 and Figure 3 Table 2, and a graph of source specific CO₂ emissions is shown in Figure 4.

Table 2: Clean Power Plan – Affected Sources in Virginia

	County	Plant Name	Capacity (MW)	2012 CO ₂ Emissions (Tons)
1	Campbell	Altavista Power Station	71	61
2	Buckingham	Bear Garden	559	1,698,810
3	Richmond	Bellmeade Power Station	330	618,235
4	King George	Birchwood Power	258	454,865
5	Fluvanna	Bremo Bluff	254	368,693
6	Brunswick	Brunswick County Power Station	1,472	0
7	Chesapeake	Chesapeake	650	1,539,544
8	Chesterfield	Chesterfield	1,800	4,986,812
9	Russell	Clinch River	713	918,331
10	Halifax	Clover	848	4,897,875
11	Hanover	Doswell Energy Center	752	1,660,973
12	Giles	Glen Lyn	338	98,133
13	Louisa	Gordonsville Energy LP	300	667,150
14	Hopewell	Hopewell Cogeneration	399	684,730
15	Hopewell	Hopewell Power Station	71	34,941
16	Hopewell	James River Genco LLC	115	463,570
17	Mecklenburg	Mecklenburg Power Station	140	253,910
18	Portsmouth	Portsmouth Genco LLC	115	52,908
19	Prince William	Possum Point	1,848	1,880,680
20	Alexandria	Potomac River	514	434,300
21	Southampton	Southampton Power Station	71	75,806
22	Richmond	Spruance Genco LLC	230	1,062,686
23	Fluvanna	Tenaska Generating Station	946	2,272,787
24	Wise	Virginia City Hybrid Energy Center	668	1,465,830
25	Warren	Warren County VA	1,329	0
26	York	Yorktown	1,257	773,808

Source: Final Clean Power – Emission Performance Rate and Goal Computation Technical Support Document – Appendix 1-5

Figure 3: Clean Power Plan – Affected Sources in Virginia

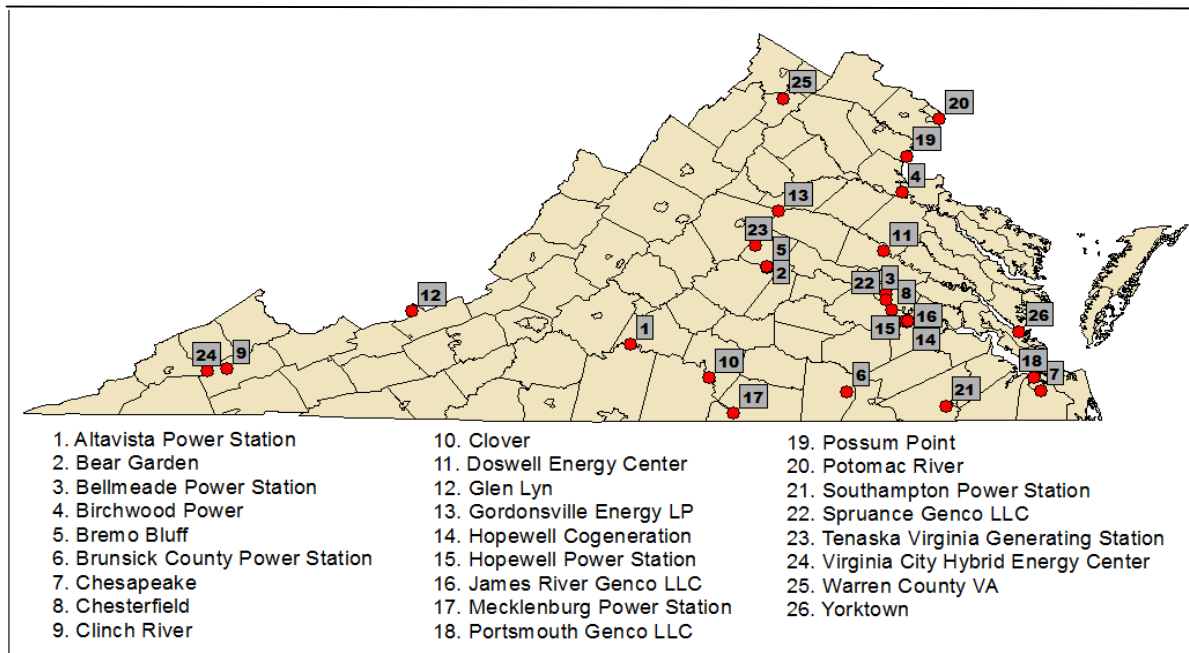
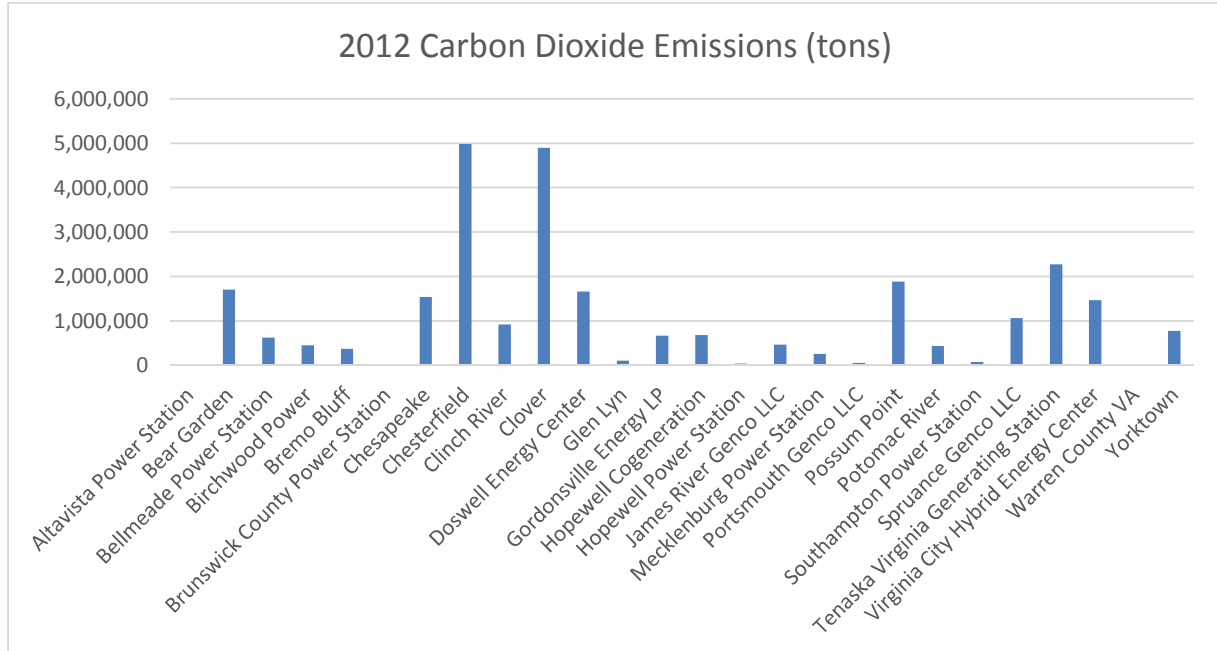


Figure 4: 2012 Facility Specific CO₂ Emissions



Changes in the Virginia Power Sector

Since 2012 is just a snapshot of conditions during the EPA selected base year, changes in the fleet of affected sources to the present time should be considered. A number of

changes have occurred in the Virginia fleet of affected sources that will impact current and future emissions and generation trends. A number of closures and fuel conversions have occurred at these sources as presented below in Table 3.

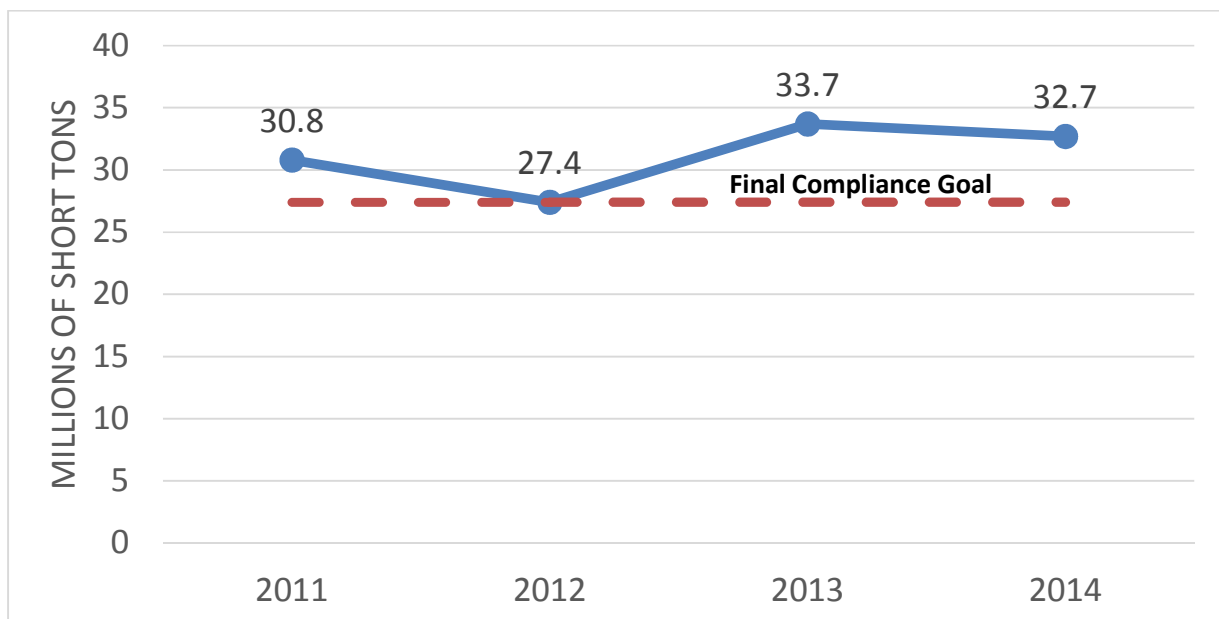
Table 3: Changes to Affected Sources in Virginia (Post-2012)

Plant Name	Change In Operation/Fuel	Year
Altavista Power Station	Converted to biomass (wood)	2012
Bremo Bluff	Converted to natural gas	2014
Brunswick County Power Station	Currently under construction	2016
Chesapeake	Coal units permanently shut down	2015
Clinch River	1 coal unit shut down/2 converting to gas	2015
Glen Lyn	Facility permanently closed	2015
Hopewell Power Station	Converted to biomass (wood)	2013
Portsmouth Genco LLC	Facility permanently closed	2015
Potomac River	Facility permanently closed	2012
Southampton Power Station	Converted to biomass (wood)	2013
Warren County VA	Constructed and began operations	2014

Recent Trends in Virginia

Both CO₂ mass emissions trends in recent years have been variable for many reasons. This trend in CO₂ emissions is shown in Figure 5. Corresponding trends in emission rates are not readily available at this time.

Figure 5: Virginia CO₂ Mass Emissions Trends (2011-2014)



Source: EPA Greenhouse Gas Reporting Program (GHGRP)

CLEAN POWER PLAN MILESTONES

Pursuant to EPA's final rule, Virginia must meet the following milestones:

SEPTEMBER 2016: Either submit a final state plan or an initial submission/request for extension containing:

- Identification of final plan approach under consideration
- Explanation of why the state needs additional time
- Description of meaningful engagement with community stakeholders
- Non-binding statement of intent to participate in the optional Clean Energy Incentive Program (CEIP)

SEPTEMBER 2017: Submit a progress report if an extension was requested, including:

- Summary of the status of each component of the final plan
- Commitment to a plan approach
- Updated comprehensive roadmap with a schedule and milestones for completing the final plan

SEPTEMBER 2018: Submit a final state plan if an extension was requested, including:

- Identification of affected electric generating units (EGUs)
- Identification of emission standards for each affected EGU, compliance periods for each emission standard, and demonstration that the emission standards are sufficiently protective to meet the emission performance rates or CO₂ emission goals
- If a state plan is submitted, a federally enforceable backstop that includes emission standards for affected EGUs that will be put into place if there is a triggering event
- Applicable monitoring, reporting, and recordkeeping requirements
- Description of the process, contents, and schedule for annual state reporting to EPA about plan implementation and progress
- Description of plan approach and geographic scope
- Identification of CO₂ emission performance rates or equivalent statewide CO₂ emission goals that affected EGUs will achieve
- Demonstration that affected EGUs are projected to achieve the CO₂ emission performance rates or CO₂ emission goals
- Demonstration that each emission standard is quantifiable, non-duplicative, permanent, verifiable, and enforceable
- Demonstration that reliability of the electrical grid has been considered
- A timeline with all programmatic milestone steps
- Demonstration of state's legal authority and funding
- Demonstration that each interim step goal will be met
- Certification of public participation
- Documentation of community outreach and community involvement

If Virginia fails to submit a plan, or fails to submit an approvable plan, EPA will impose the federal plan.

ONGOING OUTREACH ACTIVITIES

DEQ began engaging with stakeholders, including electric power generation facilities, regarding the impacts of the rule well before EPA's final emissions guidelines regulation was issued. A dedicated web page (<http://www.deq.virginia.gov/Programs/Air/GreenhouseGasPlan.aspx>) was established in July 2014 in order to convey both federal and state information about the CPP. To compliment this web page, an email feed (or RSS feed) was established in order to provide expeditious notification to interested parties.

An informal public comment period to gather written comment from the public on EPA's proposal was held from July 17, 2014 to August 15, 2014. In addition, DEQ held a series of public listening sessions regarding EPA's proposed plan around the Commonwealth. The public was given notice of these opportunities for comment via the web page, the RSS feed, and the Town Hall public comment forum.

Throughout the period in which the EPA proposal was undergoing formal federal comment, DEQ also met, on an ongoing basis, with interested stakeholders. These stakeholders included affected electric utilities, electric power generation facilities, the business community, and environmental organizations. DEQ also met, on an ongoing basis, with other affected Virginia government agencies, including the Secretary of Natural Resources, the Department of Mines, Minerals and Energy, the Department of Commerce, and the State Corporation Commission.

After the final EPA CPP emissions guidelines were signed on August 3, 2015, DEQ updated its web page and commenced an informal public comment period to receive written comment on EPA's rule from August 13 to October 13, 2015. Another series of informal listening sessions was held at six locations around the Commonwealth:

- September 16, 2015: DEQ Valley Regional Office, Harrisonburg, Virginia.
- September 22, 2015: DEQ Blue Ridge Regional Office, Roanoke, Virginia.
- September 28, 2015: Fairfax County South County High School, Lorton, Virginia.
- September 30, 2015: Henrico County Government Center, Henrico, Virginia.
- October 1, 2015: Mountain Empire Community College, Big Stone Gap, Virginia.
- October 6, 2015: Tidewater Community College, Portsmouth, Virginia.

The public was given notice of these opportunities for comment via the web page, the RSS feed, and Town Hall.

Throughout this period, DEQ also met, on an ongoing basis, with interested stakeholders. These stakeholders included affected electric utilities, the business community, environmental organizations, environmental justice organizations, and electric power generation facilities, including electric cooperatives. DEQ also met, on

an ongoing basis, with other affected Virginia government agencies, including the Department of Mines, Minerals and Energy, and the State Corporation Commission.

A stakeholders group has been established to advise and assist the Commonwealth on elements that could be included in the state compliance plan. Members were invited on the basis of the potential impact that the plan may have on their interests or on those whom they represent, and include the following:

Advanced Energy Economy (AEE): Malcolm Woolf, Senior Vice President, Policy and Government Affairs, Advanced Energy Economy
American Electric Power (AEP): John Hendricks, Director of Air Quality Services, AEP
Alpha Natural Resources: Donald Ratliff, President of Commonwealth Connections Inc.
Birchwood: Will Poleway, Birchwood Power Partners, L.P.
Cogentrix: Kris Gaus, EHS Manager at Power Plant Management Services
Covanta: Michael Van Brunt, Director of Sustainability, Covanta
Dominion: Lenny Dupuis, Manager of Environmental Policy, Dominion Resources
Doswell/LS Power: Kathy French, Vice President, Environmental Management, LS Power Development, LLC
Natural Resource Defense Council (NRDC): Walton Shepherd, Energy Staff Attorney, Natural Resources Defense Counsel
Old Dominion Electric Cooperative(ODEC): Laura Rose, Environmental Health and Safety Coordinator, Old Dominion Electric Cooperative
Tenaska: Greg Kunkel, Tenaska
Virginia Association of Counties(VACO): John Morrill, Energy Manager, Arlington Initiative to Rethink Energy
Virginia Manufacturers Association (VMA): Irene Kowalczyk, Director Global Energy, WestRock Company for Virginia Manufacturers Association
We Act: Dr. Jalonne White-Newsome, Environmental Justice Federal Policy Analyst, We Act for Environmental Justice

The first meeting of this stakeholders group was held on November 12, 2015.

III. CHANGES, INTERDICTION, OR SUSPENSION OF REGULATIONS

Although both the proposed Federal regulation and the final Federal regulation are the subject of ongoing legal challenges, as of the date of this report, no applicable federal regulations have been changed, interdicted or suspended.