west virginia department of environmental protection

Appendix G

Reasonable Progress Evaluation/Long-Term Strategy

G-1a. WVDAQ Letter to FirstEnergy (Harrison Plant)

G-1b. WVDAQ Letter to AEP (Mitchell Plant)

G-1c. WVDAQ Letter to FirstEnergy (Fort Martin Plant)

G-1d. WVDAQ Letter to Energy Harbor (Pleasants Station)

G-1e. WVDAQ Letter to AEP (John Amos Plant)

West Virginia Division of Air Quality
601 57th Street, SE
Charleston, WV 25304

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west virginia department of environmental protection

Appendix G

Reasonable Progress Evaluation/Long-Term Strategy

G-1a. WVDAQ Letter to FirstEnergy (Harrison Plant)

West Virginia Division of Air Quality
601 57th Street, SE
Charleston, WV 25304

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west virginia department of environmental protection

Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
(304) 926-0475

Austin Caperton, Cabinet Secretary
dep.wv.gov

November 4, 2020

Donald Hromulak
Senior Consulting Engineer
FirstEnergy Corporation
341 White Pond Drive
Akron, OH 44320

via email: dchromulak@firstenergycorp.com

Re: Regional Haze Reasonable Progress Assessment
Request for Four-Factor Analyses of Sulfur Dioxide Controls for Harrison Power Station

Dear Mr. Hromulak,

The West Virginia Department of Environmental Protection (DEP) is preparing the West Virginia Regional Haze State Implementation Plan (SIP) for the second planning period (2018-2028). The DEP has worked with the Visibility Improvement State and Tribal Association of the Southeast (VISTAS), of which West Virginia is a member, to identify emission source sectors and facilities that significantly impact visibility impairment in Class I federal areas within and outside of our state. This work is consistent with and required by the regional haze statutory and regulatory requirements and federal guidance.

Based on analyses and modeling conducted by West Virginia and VISTAS, sulfur dioxide (SO_2) emissions from Harrison Power Station (Harrison) have been shown to contribute at least 1.00% to total anthropogenic visibility impairment in 2028 at eight Class I federal areas. By this letter, DEP formally requests that FirstEnergy Corp (FirstEnergy) conduct a four-factor analysis on certain emissions units at the Harrison facility. The four-factor analyses must be submitted to DEP no later than January 31, 2021.

Part I to this request provides background on the regional haze program requirements. Part II explains the process that VISTAS followed to identify facilities such as Harrison for additional analyses. Part III explains how to proceed with a four-factor analysis of the major SO_2 sources at Harrison.

Please submit all items requested in this letter to Todd Shrewsbury, Engineer, Planning Section, West Virginia Division of Air Quality, by January 31, 2021. This information may be submitted electronically via email to Todd.H.Shrewsbury@wv.gov. Should you have any questions regarding this request, please contact Todd Shrewsbury via the email above or at (304) 414-1908.

Sincerely,

David R. Fewell

Digitally signed by: David R. Fewell
DN: CN = David R. Fewell email = david.r.fewell@wv.gov C = US O = DAQ OU = DEP
Date: 2020.11.04 09:45:41 -05'00'

David Fewell
Deputy Director
Division of Air Quality

Part I: Overview of the Regional Haze Program

Section 169A of the 1977 Amendments to the federal Clean Air Act (CAA) sets forth a program for protecting visibility in Class I federal areas that calls for the "prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I federal areas which impairment results from manmade air pollution." Congress added Section169B to the 1990 Amendments to the CAA, which requires the United States Environmental Protection Agency (EPA) to issue rules regarding regional haze. The Regional Haze Rule (RHR) promulgated by EPA on July 1, 1999 (64 FR 35713) revised the existing visibility rule to integrate provisions addressing regional haze impairment and establish a comprehensive visibility protection program for each federal Class I area. These programs must provide for reasonable progress toward achieving natural visibility conditions by 2064.

The regional haze rules are codified at 40 Code of Federal Regulations (CFR) Subpart P - Protection of Visibility. Regional haze program requirements are located under 40 CFR 51.308(f) and mandate that each state must "address regional haze in each mandatory Class I federal area located within the state and in each mandatory Class I federal area located outside the state that may be affected by emissions from within the state." West Virginia submitted its regional haze plan for the first planning period (2008 – 2018) to EPA on June 18, 2008, and EPA subsequently granted full approval of this plan on September 24, 2018 (83 FR 48249). DEP is now preparing West Virginia's regional haze plan for the second planning period (2018 – 2028).

EPA finalized revisions to the RHR in January 2017 (82 FR 3078) to strengthen, streamline, and clarify certain aspects of the agency's regional haze program. 40 CFR 51.308(f) of the RHR requires that states must submit a regional haze plan for the second planning period by July 31, 2021. As part of the plan revision, West Virginia must establish a reasonable progress goal expressed in deciviews (dv) that provides for reasonable progress toward achieving natural visibility conditions by 2064 in the state's two Class I areas, Dolly Sods Wilderness Area and Otter Creek Wilderness Area. The goal "must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the clearest days over the same period." West Virginia must also work with other states with Class I areas which sources within our state have a visibility impact. These Class I areas are identified in Part II below.

West Virginia must also submit a long-term strategy that addresses regional haze visibility impairment for Dolly Sods Wilderness Area and Otter Creek Wilderness Area. The long-term strategy must include enforceable emissions limitations, compliance schedules, and other measures as necessary to achieve the reasonable progress goals established for these Class I areas.

In establishing reasonable progress goals, West Virginia must consider the four factors specified in § 169A of the CAA and in 40 CFR 51.308(f)(2)(i):

- Statutory factor 1: the cost of compliance,
- Statutory factor 2: the time necessary for compliance,

- Statutory factor 3: the energy and non-air quality environmental impacts of compliance, and
- Statutory factor 4: the remaining useful life of any potentially affected sources.

On August 20, 2019, EPA issued "Guidance on Regional Haze State Implementation Plans for the Second Implementation Period.[1]" Portions of this document provide guidance to states on the selection of sources for analysis, characterization of factors for emission control measures, and decisions on what control measures are necessary to make reasonable progress.

Part II: Reasonable Progress Assessment

DEP has completed the reasonable progress assessment for its second regional haze SIP. The following steps describe DEP's process for conducting its reasonable progress assessment for the current planning period from 2018 through 2028.

Step 1: Determine pollutants of concern

Using 2013 through 2017 Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring data for Class I federal areas in the VISTAS states, VISTAS evaluated the species contribution on the 20% most impaired visibility days and concluded that sulfate accounted for greater than 70% of the visibility impairing pollution associated with anthropogenic emission sources. Since sulfate is a large contributor to visibility impairment during this period, the VISTAS states concluded that SO_2 emission reductions should be the focus for reasonable progress assessments in this second round of planning.

Step 2: Determine which source sectors should be evaluated for reasonable progress

For the ten VISTAS states, point source SO_2 emissions in 2028 are projected to represent over 80% of the total SO_2 emissions inventory for all sectors. Therefore, the VISTAS states concluded that the sector evaluated for reasonable progress should be the point source sector, which is comprised of electric generating units (EGUs) such as Harrison as well as certain non-EGU industrial sources.

Step 3: Determine which facilities would be evaluated based on impact

VISTAS relied upon an area of influence (AoI) analysis to help identify the areas and sources most likely contributing to poor visibility in Class I federal areas. This AoI analysis included a backward trajectory model to determine the origin of the air parcels affecting visibility in each Class I area. This information was then spatially combined with emissions data to determine the pollutants, sectors, and individual sources that were most likely contributing to the visibility impairment at each Class I area. West Virginia first used this information to determine that the pollutant and emissions sector with the largest impact on visibility impairment was SO_2 from point sources. West Virginia then used the AoI results for each Class I area to identify sources to select for Particulate Matter Source Apportionment Technology (PSAT) modeling.

[1] https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf

An initial AoI screen of 0.2% for sulfate or nitrate was utilized to construct a potential list of point sources that could include facilities both inside and outside of West Virginia that might impact one of our Class I areas. From this list, point source facilities with an AoI contribution of at least 2% for sulfate or nitrate were selected for PSAT modeling. Since Harrison had calculated AoI impacts >2% at a Class I area, its emissions were tagged for PSAT modeling. Table 1 below illustrates the calculated AoI impacts from Harrison at Class I areas.

Table 1: Harrison Power Station Nitrate and Sulfate AoI Screens

Class I Federal Area	Nitrate AoI Screen	Sulfate AoI Screen
Dolly Sods Wilderness Area (WV)	1.36%	13.58%
Otter Creek Wilderness Area (WV)	1.81%	17.37%
Shenandoah National Park (VA)	0.99%	4.60%
James River Face Wilderness Area (VA)	0.36%	2.76%

PSAT modeling uses "reactive tracers" to apportion particulate matter among different sources, source categories, and regions. PSAT was implemented with the Comprehensive Air Quality Model with extensions (CAMx) photochemical grid model to determine visibility impairment from individual facilities. Use of PSAT modeling is a superior approach to the AoI analyses for determining individual facility contributions to visibility impairment in Class I federal areas and is considered "state of the science" technology. Using PSAT results, West Virginia identified facilities with an impact on one or more Class I federal areas of at least 1.00% calculated based on the total visibility impairment associated with SO_2 on the 20% most impaired days for each Class I federal area. These sources are being considered for additional reasonable progress analyses. The projected visibility impairment percentage from the PSAT modeling associated with Harrison's projected SO_2 emissions of 10,356.24 tons in 2028 is illustrated in Table 2 below. Note that some Class I areas are included in the PSAT modeling that were not selected in the 2% AoI screen.

Table 2: Harrison Power Station Total PSAT Visibility Impacts at Class I Federal Areas

Class I Federal Area	Total PSAT Visibility Impact
Dolly Sods Wilderness Area (WV)	7.65%
Otter Creek Wilderness Area (WV)	6.93%
Shenandoah National Park (VA)	4.42%
James River Face Wilderness Area (VA)	3.88%
Swanquarter Wilderness Area (NC)	1.81%
Moosehorn Wilderness Area (ME)	1.13%
Roosevelt Campobello International Park (ME)	1.13%
Acadia National Park (ME)	1.04%

Harrison may choose to limit emissions to levels equating to less than 1.00% impact on the Class I areas listed above. Should Harrison select this option, the facility's annual, facility wide SO_2 emissions could not exceed 9,524 tons of SO_2 by 2028. Should Harrison choose to exercise this option and submit a permit application for this limitation by January 31, 2021, the facility needs not take further action to address reasonable progress requirements for this second round of regional haze planning.

Part III: Evaluate the Four Factors

To meet the requirements of 40 CFR 51.308(d)(1)(i)(A), DEP must consider each of the four statutory factors for emission sources at Harrison that are estimated to significantly contribute to visibility impairment in a Class I federal area:

- Statutory factor 1: the cost of compliance,
- Statutory factor 2: the time necessary for compliance,
- Statutory factor 3: the energy and non-air quality environmental impacts of compliance, and
- Statutory factor 4: the remaining useful life of any potentially affected sources.

DEP requests that Harrison conduct a four-factor analysis on all units contributing SO_2 emissions to the following emissions points in the facility's emissions inventory:

- Scrubber Stack No. 1
- Scrubber Stack No. 2
- Scrubber Stack No. 3

The requested four-factor analyses must be submitted to DEP no later than January 31, 2021.

EPA's August 20, 2019, regional haze guidance explains how the four statutory factors can be characterized. To identify control measures with the highest level of control effectiveness that are both technically feasible and cost effective, DEP requests that the analyses be conducted using a "top-down" approach for each emission unit as follows:

Step 1: Identify all control technologies.
Step 2: Eliminate technically infeasible options.
Step 3: Rank remaining control technologies by control effectiveness.
Step 4: Apply the four statutory factors (cost of compliance, time necessary for compliance, energy and non-air quality environmental impacts, remaining useful life of existing source) to control technologies identified in Step 3 and document the results.
Step 5: Select control technology and control effectiveness.

In accordance with EPA's 2019 guidance, Harrison should identify all SO_2 control technologies for each noted source at the facility. Harrison should then select the technically feasible technologies and provide a thorough justification for those screened out as infeasible. Technically feasible technologies, which may include but are not limited to reductions in sulfur content for fuels and raw materials, incremental improvements in the operation of existing air pollution control devices, and the installation of new air pollution control devices, should be ranked in order of highest to lowest control effectiveness. The facility's current emission limitations should be used as the baseline emission level for estimating control effective of each control measure.

Please estimate the cost of compliance, statutory factor 1, starting with the control measure with the highest level of control effectiveness. The cost of compliance should be in terms of cost per ton of SO_2 reduced. The cost used as the numerator in the cost per ton metric should be the

annualized cost of implementing the control measure and should be determined using methods consist with EPA's Air Pollution Cost Control Manual.[2] Please provide all assumptions and data used in this analysis.

Should the company rely on a methodology other than those included in EPA's Air Pollution Cost Control Manual, please include a description of that methodology in the submission, including all calculations and assumptions as well as a strong justification for why the methodology used is more appropriate than methods specified in the Air Pollution Cost Control Manual.

The emissions reduction used as the denominator of the cost per ton metric should be the annual tons of SO_2 reductions from implementation of the control measure. If the analysis indicates that the control measure should be included as part of West Virginia's long-term strategy for the second implementation period, further analysis of less effective control measures is not necessary. If the analysis indicates that the control measure is not cost effective, the company should estimate the cost of compliance for the control measure with the next highest level of control effectiveness. This process should be repeated until Harrison has identified a control measure to be included in West Virginia's long-term strategy or until all control measures have been fully analyzed and documented.

For statutory factor 2, time necessary for compliance, please provide a fully documented estimate of the time needed to comply with the control measures identified using statutory factor 1. This timeline should specify the source-specific factors used to estimate the time to install the control measures or to modify existing control strategies and provide a justification as to why the estimated time is reasonable.

For statutory factor 3, energy and non-air environmental impacts, please specify the cost of direct energy consumption of any control measure and which is included in the cost of compliance analysis. If any non-air environmental impacts associated with a certain control measure exist, such as impacts on nearby water bodies, those impacts should be thoroughly discussed.

Statutory factor 4, remaining useful life of the sources, is the number of years prior to the shutdown date during which the new emission control would be operating. If the remaining useful life of the source is less than the useful life of the control system being analyzed, please use the remaining useful life of the source in determining the annualized cost in the cost of compliance analysis. Otherwise, the company should use the useful life of the control measure in the cost of compliance analysis. If the remaining useful life of a source is relied upon in a four-factor analysis of a control measure instead of the useful life of the control system, and that control measure becomes part of West Virginia's long-term strategy, the shutdown date for the source will need to be included in West Virginia's SIP and shall become federally enforceable.

[2] https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution%23cost%20manual

west virginia department of environmental protection

Appendix G

Reasonable Progress Evaluation/Long-Term Strategy

G-1b. WVDAQ Letter to AEP (Mitchell Plant)

West Virginia Division of Air Quality
601 57th Street, SE
Charleston, WV 25304

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west virginia department of environmental protection

Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
(304) 926-0475

Austin Caperton, Cabinet Secretary
dep.wv.gov

November 4, 2020

Scott Weaver
Director Air Quality Services
American Electric Power
1 Riverside Plaza
Columbus, OH 43215

via email: saweaver@aep.com

Re: Regional Haze Reasonable Progress Assessment
Request for Four-Factor Analyses of Sulfur Dioxide Controls for the Mitchell Plant

Dear Mr. Weaver,

The West Virginia Department of Environmental Protection (DEP) is preparing the West Virginia Regional Haze State Implementation Plan (SIP) for the second planning period (2018-2028). The DEP has worked with the Visibility Improvement State and Tribal Association of the Southeast (VISTAS), of which West Virginia is a member, to identify emission source sectors and facilities that significantly impact visibility impairment in Class I federal areas within and outside of our state. This work is consistent with and required by the regional haze statutory and regulatory requirements and federal guidance.

Based on analyses and modeling conducted by West Virginia and VISTAS, sulfur dioxide (SO_2) emissions from the Mitchell Plant (Mitchell) have been shown to contribute at least 1.00% to total anthropogenic visibility impairment in 2028 at four Class I federal areas. By this letter, DEP formally requests that American Electric Power (AEP) conduct a four-factor analysis on certain emissions units at the Mitchell facility. The four-factor analyses must be submitted to DEP no later than January 31, 2021.

Part I to this request provides background on the regional haze program requirements. Part II explains the process that VISTAS followed to identify facilities such as Mitchell for additional analyses. Part III explains how to proceed with a four-factor analysis of the major SO_2 sources at Mitchell.

Please submit all items requested in this letter to Todd Shrewsbury, Engineer, Planning Section, West Virginia Division of Air Quality, by January 31, 2021. This information may be submitted electronically via email to Todd.H.Shrewsbury@wv.gov. Should you have any questions regarding this request, please contact Todd Shrewsbury via the email above or at (304) 414-1908.

Sincerely,

David R. Fewell

Digitally signed by: David R. Fewell
DN: CN = David R. Fewell email = david.r.fewell@wv.gov C = US O = DAQ OU = DEP
Date: 2020.11.04 09:43:19 -05'00'

David Fewell
Deputy Director
Division of Air Quality

Part I: Overview of the Regional Haze Program

Section 169A of the 1977 Amendments to the federal Clean Air Act (CAA) sets forth a program for protecting visibility in Class I federal areas that calls for the "prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I federal areas which impairment results from manmade air pollution." Congress added Section169B to the 1990 Amendments to the CAA, which requires the United States Environmental Protection Agency (EPA) to issue rules regarding regional haze. The Regional Haze Rule (RHR) promulgated by EPA on July 1, 1999 (64 FR 35713) revised the existing visibility rule to integrate provisions addressing regional haze impairment and establish a comprehensive visibility protection program for each federal Class I area. These programs must provide for reasonable progress toward achieving natural visibility conditions by 2064.

The regional haze rules are codified at 40 Code of Federal Regulations (CFR) Subpart P - Protection of Visibility. Regional haze program requirements are located under 40 CFR 51.308(f) and mandate that each state must "address regional haze in each mandatory Class I federal area located within the state and in each mandatory Class I federal area located outside the state that may be affected by emissions from within the state." West Virginia submitted its regional haze plan for the first planning period (2008 – 2018) to EPA on June 18, 2008, and EPA subsequently granted full approval of this plan on September 24, 2018 (83 FR 48249). DEP is now preparing West Virginia's regional haze plan for the second planning period (2018 – 2028).

EPA finalized revisions to the RHR in January 2017 (82 FR 3078) to strengthen, streamline, and clarify certain aspects of the agency's regional haze program. 40 CFR 51.308(f) of the RHR requires that states must submit a regional haze plan for the second planning period by July 31, 2021. As part of the plan revision, West Virginia must establish a reasonable progress goal expressed in deciviews (dv) that provides for reasonable progress toward achieving natural visibility conditions by 2064 in the state's two Class I areas, Dolly Sods Wilderness Area and Otter Creek Wilderness Area. The goal "must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the clearest days over the same period." West Virginia must also work with other states with Class I areas which sources within our state have a visibility impact. These Class I areas are identified in Part II below.

West Virginia must also submit a long-term strategy that addresses regional haze visibility impairment for Dolly Sods Wilderness Area and Otter Creek Wilderness Area. The long-term strategy must include enforceable emissions limitations, compliance schedules, and other measures as necessary to achieve the reasonable progress goals established for these Class I areas.

In establishing reasonable progress goals, West Virginia must consider the four factors specified in § 169A of the CAA and in 40 CFR 51.308(f)(2)(i):

- Statutory factor 1: the cost of compliance,
- Statutory factor 2: the time necessary for compliance,

- Statutory factor 3: the energy and non-air quality environmental impacts of compliance, and
- Statutory factor 4: the remaining useful life of any potentially affected sources.

On August 20, 2019, EPA issued "Guidance on Regional Haze State Implementation Plans for the Second Implementation Period.[1]" Portions of this document provide guidance to states on the selection of sources for analysis, characterization of factors for emission control measures, and decisions on what control measures are necessary to make reasonable progress.

Part II: Reasonable Progress Assessment

DEP has completed the reasonable progress assessment for its second regional haze SIP. The following steps describe DEP's process for conducting its reasonable progress assessment for the current planning period from 2018 through 2028.

Step 1: Determine pollutants of concern

Using 2013 through 2017 Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring data for Class I federal areas in the VISTAS states, VISTAS evaluated the species contribution on the 20% most impaired visibility days and concluded that sulfate accounted for greater than 70% of the visibility impairing pollution associated with anthropogenic emission sources. Since sulfate is a large contributor to visibility impairment during this period, the VISTAS states concluded that SO_2 emission reductions should be the focus for reasonable progress assessments in this second round of planning.

Step 2: Determine which source sectors should be evaluated for reasonable progress

For the ten VISTAS states, point source SO_2 emissions in 2028 are projected to represent over 80% of the total SO_2 emissions inventory for all sectors. Therefore, the VISTAS states concluded that the sector evaluated for reasonable progress should be the point source sector, which is comprised of electric generating units (EGUs) such as Mitchell as well as certain non-EGU industrial sources.

Step 3: Determine which facilities would be evaluated based on impact

VISTAS relied upon an area of influence (AoI) analysis to help identify the areas and sources most likely contributing to poor visibility in Class I federal areas. This AoI analysis included a backward trajectory model to determine the origin of the air parcels affecting visibility in each Class I area. This information was then spatially combined with emissions data to determine the pollutants, sectors, and individual sources that were most likely contributing to the visibility impairment at each Class I area. West Virginia first used this information to determine that the pollutant and emissions sector with the largest impact on visibility impairment was SO_2 from point sources. West Virginia then used the AoI results for each Class I area to identify sources to select for Particulate Matter Source Apportionment Technology (PSAT) modeling.

[1] https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf

An initial AoI screen of 0.2% for sulfate or nitrate was utilized to construct a potential list of point sources that could include facilities both inside and outside of West Virginia that might impact one of our Class I areas. From this list, point source facilities with an AoI contribution of at least 2% for sulfate or nitrate were selected for PSAT modeling. Since Mitchell had calculated AoI impacts >2% at a Class I area, its emissions were tagged for PSAT modeling. Table 1 below illustrates the calculated AoI impacts from Mitchell at Class I areas.

Table 1: Mitchell Plant Nitrate and Sulfate AoI Screens

Class I Federal Area	**Nitrate AoI Screen**	**Sulfate AoI Screen**
Dolly Sods Wilderness Area (WV)	0.07%	1.45%
Otter Creek Wilderness Area (WV)	0.06%	1.56%
Shenandoah National Park (VA)	0.11%	1.46%
James River Face Wilderness Area (VA)	0.03%	0.68%

PSAT modeling uses "reactive tracers" to apportion particulate matter among different sources, source categories, and regions. PSAT was implemented with the Comprehensive Air Quality Model with extensions (CAMx) photochemical grid model to determine visibility impairment from individual facilities. Use of PSAT modeling is a superior approach to the AoI analyses for determining individual facility contributions to visibility impairment in Class I federal areas and is considered "state of the science" technology. Using PSAT results, West Virginia identified facilities with an impact on one or more Class I federal areas of at least 1.00% calculated based on the total visibility impairment associated with SO_2 on the 20% most impaired days for each Class I federal area. These sources are being considered for additional reasonable progress analyses. The projected visibility impairment percentage from the PSAT modeling associated with Mitchell's projected SO_2 emissions of 4,230.41 tons in 2028 is illustrated in Table 2 below. Note that some Class I areas are included in the PSAT modeling that were not selected in the 2% AoI screen.

Table 2: Mitchell Plant Total PSAT Visibility Impacts at Class I Federal Areas

Class I Federal Area	**Total PSAT Visibility Impact**
Otter Creek Wilderness Area (WV)	1.66%
Dolly Sods Wilderness Area (WV)	1.52%
James River Face Wilderness Area (VA)	1.15%
Shenandoah National Park (VA)	1.08%

Mitchell may choose to limit emissions to levels equating to less than 1.00% impact on the Class I areas listed above. Should Mitchell select this option, the facility's annual, facility wide SO_2 emissions could not exceed 4,119 tons of SO_2 by 2028. Should Mitchell choose to exercise this option and submit a permit application for this limitation by January 31, 2021, the facility needs not take further action to address reasonable progress requirements for this second round of regional haze planning.

Part III: Evaluate the Four Factors

To meet the requirements of 40 CFR 51.308(d)(1)(i)(A), DEP must consider each of the four statutory factors for emission sources at Mitchell that are estimated to significantly contribute to visibility impairment in a Class I federal area:

- Statutory factor 1: the cost of compliance,
- Statutory factor 2: the time necessary for compliance,
- Statutory factor 3: the energy and non-air quality environmental impacts of compliance, and
- Statutory factor 4: the remaining useful life of any potentially affected sources.

DEP requests that Mitchell conduct a four-factor analysis on all units contributing SO_2 emissions to the following emissions points in the facility's emissions inventory:

- Unit 1 Stack
- Unit 2 Stack

The requested four-factor analyses must be submitted to DEP no later than January 31, 2021.

EPA's August 20, 2019, regional haze guidance explains how the four statutory factors can be characterized. To identify control measures with the highest level of control effectiveness that are both technically feasible and cost effective, DEP requests that the analyses be conducted using a "top-down" approach for each emission unit as follows:

Step 1: Identify all control technologies.
Step 2: Eliminate technically infeasible options.
Step 3: Rank remaining control technologies by control effectiveness.
Step 4: Apply the four statutory factors (cost of compliance, time necessary for compliance, energy and non-air quality environmental impacts, remaining useful life of existing source) to control technologies identified in Step 3 and document the results.
Step 5: Select control technology and control effectiveness.

In accordance with EPA's 2019 guidance, Mitchell should identify all SO_2 control technologies for each noted source at the facility. Mitchell should then select the technically feasible technologies and provide a thorough justification for those screened out as infeasible. Technically feasible technologies, which may include but are not limited to reductions in sulfur content for fuels and raw materials, incremental improvements in the operation of existing air pollution control devices, and the installation of new air pollution control devices, should be ranked in order of highest to lowest control effectiveness. The facility's current emission limitations should be used as the baseline emission level for estimating control effective of each control measure.

Please estimate the cost of compliance, statutory factor 1, starting with the control measure with the highest level of control effectiveness. The cost of compliance should be in terms of cost per ton of SO_2 reduced. The cost used as the numerator in the cost per ton metric should be the annualized cost of implementing the control measure and should be determined using methods

consist with EPA's Air Pollution Cost Control Manual.[2] Please provide all assumptions and data used in this analysis.

Should the company rely on a methodology other than those included in EPA's Air Pollution Cost Control Manual, please include a description of that methodology in the submission, including all calculations and assumptions as well as a strong justification for why the methodology used is more appropriate than methods specified in the Air Pollution Cost Control Manual.

The emissions reduction used as the denominator of the cost per ton metric should be the annual tons of SO_2 reductions from implementation of the control measure. If the analysis indicates that the control measure should be included as part of West Virginia's long-term strategy for the second implementation period, further analysis of less effective control measures is not necessary. If the analysis indicates that the control measure is not cost effective, the company should estimate the cost of compliance for the control measure with the next highest level of control effectiveness. This process should be repeated until Mitchell has identified a control measure to be included in West Virginia's long-term strategy or until all control measures have been fully analyzed and documented.

For statutory factor 2, time necessary for compliance, please provide a fully documented estimate of the time needed to comply with the control measures identified using statutory factor 1. This timeline should specify the source-specific factors used to estimate the time to install the control measures or to modify existing control strategies and provide a justification as to why the estimated time is reasonable.

For statutory factor 3, energy and non-air environmental impacts, please specify the cost of direct energy consumption of any control measure and which is included in the cost of compliance analysis. If any non-air environmental impacts associated with a certain control measure exist, such as impacts on nearby water bodies, those impacts should be thoroughly discussed.

Statutory factor 4, remaining useful life of the sources, is the number of years prior to the shutdown date during which the new emission control would be operating. If the remaining useful life of the source is less than the useful life of the control system being analyzed, please use the remaining useful life of the source in determining the annualized cost in the cost of compliance analysis. Otherwise, the company should use the useful life of the control measure in the cost of compliance analysis. If the remaining useful life of a source is relied upon in a four-factor analysis of a control measure instead of the useful life of the control system, and that control measure becomes part of West Virginia's long-term strategy, the shutdown date for the source will need to be included in West Virginia's SIP and shall become federally enforceable.

[2] https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution%23cost%20manual

west virginia department of environmental protection

Appendix G

Reasonable Progress Evaluation/Long-Term Strategy

G-1c. WVDAQ Letter to FirstEnergy (Fort Martin Plant)

West Virginia Division of Air Quality
601 57th Street, SE
Charleston, WV 25304

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west virginia department of environmental protection

Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
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Austin Caperton, Cabinet Secretary
dep.wv.gov

November 4, 2020

Donald Hromulak
Senior Consulting Engineer
FirstEnergy Corporation
341 White Pond Drive
Akron, OH 44320

via email: dchromulak@firstenergycorp.com

Re: Regional Haze Reasonable Progress Assessment
Request for Four-Factor Analyses of Sulfur Dioxide Controls for Fort Martin Power Station

Dear Mr. Hromulak,

The West Virginia Department of Environmental Protection (DEP) is preparing the West Virginia Regional Haze State Implementation Plan (SIP) for the second planning period (2018-2028). The DEP has worked with the Visibility Improvement State and Tribal Association of the Southeast (VISTAS), of which West Virginia is a member, to identify emission source sectors and facilities that significantly impact visibility impairment in Class I federal areas within and outside of our state. This work is consistent with and required by the regional haze statutory and regulatory requirements and federal guidance.

Based on analyses and modeling conducted by West Virginia and VISTAS, sulfur dioxide (SO_2) emissions from Fort Martin Power Station (Fort Martin) have been shown to contribute at least 1.00% to total anthropogenic visibility impairment in 2028 at three Class I federal areas. By this letter, DEP formally requests that FirstEnergy Corp (FirstEnergy) conduct a four-factor analysis on certain emissions units at the Fort Martin facility. The four-factor analyses must be submitted to DEP no later than January 31, 2021.

Part I to this request provides background on the regional haze program requirements. Part II explains the process that VISTAS followed to identify facilities such as Fort Martin for additional analyses. Part III explains how to proceed with a four-factor analysis of the major SO_2 sources at Fort Martin.

Please submit all items requested in this letter to Todd Shrewsbury, Engineer, Planning Section, West Virginia Division of Air Quality, by January 31, 2021. This information may be submitted electronically via email to Todd.H.Shrewsbury@wv.gov. Should you have any questions regarding this request, please contact Todd Shrewsbury via the email above or at (304) 414-1908.

Sincerely,

David R. Fewell

Digitally signed by: David R. Fewell
DN: CN = David R. Fewell email = david.r.fewell@wv.gov C = US O = DAQ OU = DEP
Date: 2020.11.04 09:46:46 -05'00'

David Fewell
Deputy Director
Division of Air Quality

Part I: Overview of the Regional Haze Program

Section 169A of the 1977 Amendments to the federal Clean Air Act (CAA) sets forth a program for protecting visibility in Class I federal areas that calls for the "prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I federal areas which impairment results from manmade air pollution." Congress added Section169B to the 1990 Amendments to the CAA, which requires the United States Environmental Protection Agency (EPA) to issue rules regarding regional haze. The Regional Haze Rule (RHR) promulgated by EPA on July 1, 1999 (64 FR 35713) revised the existing visibility rule to integrate provisions addressing regional haze impairment and establish a comprehensive visibility protection program for each federal Class I area. These programs must provide for reasonable progress toward achieving natural visibility conditions by 2064.

The regional haze rules are codified at 40 Code of Federal Regulations (CFR) Subpart P - Protection of Visibility. Regional haze program requirements are located under 40 CFR 51.308(f) and mandate that each state must "address regional haze in each mandatory Class I federal area located within the state and in each mandatory Class I federal area located outside the state that may be affected by emissions from within the state." West Virginia submitted its regional haze plan for the first planning period (2008 – 2018) to EPA on June 18, 2008, and EPA subsequently granted full approval of this plan on September 24, 2018 (83 FR 48249). DEP is now preparing West Virginia's regional haze plan for the second planning period (2018 – 2028).

EPA finalized revisions to the RHR in January 2017 (82 FR 3078) to strengthen, streamline, and clarify certain aspects of the agency's regional haze program. 40 CFR 51.308(f) of the RHR requires that states must submit a regional haze plan for the second planning period by July 31, 2021. As part of the plan revision, West Virginia must establish a reasonable progress goal expressed in deciviews (dv) that provides for reasonable progress toward achieving natural visibility conditions by 2064 in the state's two Class I areas, Dolly Sods Wilderness Area and Otter Creek Wilderness Area. The goal "must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the clearest days over the same period." West Virginia must also work with other states with Class I areas which sources within our state have a visibility impact. These Class I areas are identified in Part II below.

West Virginia must also submit a long-term strategy that addresses regional haze visibility impairment for Dolly Sods Wilderness Area and Otter Creek Wilderness Area. The long-term strategy must include enforceable emissions limitations, compliance schedules, and other measures as necessary to achieve the reasonable progress goals established for these Class I areas.

In establishing reasonable progress goals, West Virginia must consider the four factors specified in § 169A of the CAA and in 40 CFR 51.308(f)(2)(i):

- Statutory factor 1: the cost of compliance,
- Statutory factor 2: the time necessary for compliance,

- Statutory factor 3: the energy and non-air quality environmental impacts of compliance, and
- Statutory factor 4: the remaining useful life of any potentially affected sources.

On August 20, 2019, EPA issued "Guidance on Regional Haze State Implementation Plans for the Second Implementation Period.[1]" Portions of this document provide guidance to states on the selection of sources for analysis, characterization of factors for emission control measures, and decisions on what control measures are necessary to make reasonable progress.

Part II: Reasonable Progress Assessment

DEP has completed the reasonable progress assessment for its second regional haze SIP. The following steps describe DEP's process for conducting its reasonable progress assessment for the current planning period from 2018 through 2028.

Step 1: Determine pollutants of concern

Using 2013 through 2017 Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring data for Class I federal areas in the VISTAS states, VISTAS evaluated the species contribution on the 20% most impaired visibility days and concluded that sulfate accounted for greater than 70% of the visibility impairing pollution associated with anthropogenic emission sources. Since sulfate is a large contributor to visibility impairment during this period, the VISTAS states concluded that SO_2 emission reductions should be the focus for reasonable progress assessments in this second round of planning.

Step 2: Determine which source sectors should be evaluated for reasonable progress

For the ten VISTAS states, point source SO_2 emissions in 2028 are projected to represent over 80% of the total SO_2 emissions inventory for all sectors. Therefore, the VISTAS states concluded that the sector evaluated for reasonable progress should be the point source sector, which is comprised of electric generating units (EGUs) such as Fort Martin as well as certain non-EGU industrial sources.

Step 3: Determine which facilities would be evaluated based on impact

VISTAS relied upon an area of influence (AoI) analysis to help identify the areas and sources most likely contributing to poor visibility in Class I federal areas. This AoI analysis included a backward trajectory model to determine the origin of the air parcels affecting visibility in each Class I area. This information was then spatially combined with emissions data to determine the pollutants, sectors, and individual sources that were most likely contributing to the visibility impairment at each Class I area. West Virginia first used this information to determine that the pollutant and emissions sector with the largest impact on visibility impairment was SO_2 from point sources. West Virginia then used the AoI results for each Class I area to identify sources to select for Particulate Matter Source Apportionment Technology (PSAT) modeling.

[1] https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf

An initial AoI screen of 0.2% for sulfate or nitrate was utilized to construct a potential list of point sources that could include facilities both inside and outside of West Virginia that might impact one of our Class I areas. From this list, point source facilities with an AoI contribution of at least 2% for sulfate or nitrate were selected for PSAT modeling. Since Fort Martin had calculated AoI impacts >2% at a Class I area, its emissions were tagged for PSAT modeling. Table 1 below illustrates the calculated AoI impacts from Fort Martin at Class I areas.

Table 1: Fort Martin Power Station Nitrate and Sulfate AoI Screens

Class I Federal Area	Nitrate AoI Screen	Sulfate AoI Screen
Dolly Sods Wilderness Area (WV)	1.07%	6.53%
Otter Creek Wilderness Area (WV)	0.92%	4.98%

PSAT modeling uses "reactive tracers" to apportion particulate matter among different sources, source categories, and regions. PSAT was implemented with the Comprehensive Air Quality Model with extensions (CAMx) photochemical grid model to determine visibility impairment from individual facilities. Use of PSAT modeling is a superior approach to the AoI analyses for determining individual facility contributions to visibility impairment in Class I federal areas and is considered "state of the science" technology. Using PSAT results, West Virginia identified facilities with an impact on one or more Class I federal areas of at least 1.00% calculated based on the total visibility impairment associated with SO_2 on the 20% most impaired days for each Class I federal area. These sources are being considered for additional reasonable progress analyses. The projected visibility impairment percentage from the PSAT modeling associated with Fort Martin's projected SO_2 emissions of 3,056.87 tons in 2028 is illustrated in Table 2 below. Note that some Class I areas are included in the PSAT modeling that were not selected in the 2% AoI screen.

Table 2: Fort Martin Power Station Total PSAT Visibility Impacts at Class I Federal Areas

Class I Federal Area	Total PSAT Visibility Impact
Dolly Sods Wilderness Area (WV)	1.20%
Otter Creek Wilderness Area (WV)	1.07%
Shenandoah National Park (VA)	1.04%

Fort Martin may choose to limit emissions to levels equating to less than 1.00% impact on the Class I areas listed above. Should Fort Martin select this option, the facility's annual, facility wide SO_2 emissions could not exceed 2,990 tons of SO_2 by 2028. Should Fort Martin choose to exercise this option and submit a permit application for this limitation by January 31, 2021, the facility needs not take further action to address reasonable progress requirements for this second round of regional haze planning.

Part III: Evaluate the Four Factors

To meet the requirements of 40 CFR 51.308(d)(1)(i)(A), DEP must consider each of the four statutory factors for emission sources at Fort Martin that are estimated to significantly contribute to visibility impairment in a Class I federal area:

- Statutory factor 1: the cost of compliance,

- Statutory factor 2: the time necessary for compliance,
- Statutory factor 3: the energy and non-air quality environmental impacts of compliance, and
- Statutory factor 4: the remaining useful life of any potentially affected sources.

DEP requests that Fort Martin conduct a four-factor analysis on all units contributing SO_2 emissions to the following emissions points in the facility's emissions inventory:

- Stack Point 001
- Stack Point 002

The requested four-factor analyses must be submitted to DEP no later than January 31, 2021.

EPA's August 20, 2019, regional haze guidance explains how the four statutory factors can be characterized. To identify control measures with the highest level of control effectiveness that are both technically feasible and cost effective, DEP requests that the analyses be conducted using a "top-down" approach for each emission unit as follows:

Step 1: Identify all control technologies.
Step 2: Eliminate technically infeasible options.
Step 3: Rank remaining control technologies by control effectiveness.
Step 4: Apply the four statutory factors (cost of compliance, time necessary for compliance, energy and non-air quality environmental impacts, remaining useful life of existing source) to control technologies identified in Step 3 and document the results.
Step 5: Select control technology and control effectiveness.

In accordance with EPA's 2019 guidance, Fort Martin should identify all SO_2 control technologies for each noted source at the facility. Fort Martin should then select the technically feasible technologies and provide a thorough justification for those screened out as infeasible. Technically feasible technologies, which may include but are not limited to reductions in sulfur content for fuels and raw materials, incremental improvements in the operation of existing air pollution control devices, and the installation of new air pollution control devices, should be ranked in order of highest to lowest control effectiveness. The facility's current emission limitations should be used as the baseline emission level for estimating control effective of each control measure.

Please estimate the cost of compliance, statutory factor 1, starting with the control measure with the highest level of control effectiveness. The cost of compliance should be in terms of cost per ton of SO_2 reduced. The cost used as the numerator in the cost per ton metric should be the annualized cost of implementing the control measure and should be determined using methods consist with EPA's Air Pollution Cost Control Manual.[2] Please provide all assumptions and data used in this analysis.

[2] https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution%23cost%20manual

Should the company rely on a methodology other than those included in EPA's Air Pollution Cost Control Manual, please include a description of that methodology in the submission, including all calculations and assumptions as well as a strong justification for why the methodology used is more appropriate than methods specified in the Air Pollution Cost Control Manual.

The emissions reduction used as the denominator of the cost per ton metric should be the annual tons of SO_2 reductions from implementation of the control measure. If the analysis indicates that the control measure should be included as part of West Virginia's long-term strategy for the second implementation period, further analysis of less effective control measures is not necessary. If the analysis indicates that the control measure is not cost effective, the company should estimate the cost of compliance for the control measure with the next highest level of control effectiveness. This process should be repeated until Fort Martin has identified a control measure to be included in West Virginia's long-term strategy or until all control measures have been fully analyzed and documented.

For statutory factor 2, time necessary for compliance, please provide a fully documented estimate of the time needed to comply with the control measures identified using statutory factor 1. This timeline should specify the source-specific factors used to estimate the time to install the control measures or to modify existing control strategies and provide a justification as to why the estimated time is reasonable.

For statutory factor 3, energy and non-air environmental impacts, please specify the cost of direct energy consumption of any control measure and which is included in the cost of compliance analysis. If any non-air environmental impacts associated with a certain control measure exist, such as impacts on nearby water bodies, those impacts should be thoroughly discussed.

Statutory factor 4, remaining useful life of the sources, is the number of years prior to the shutdown date during which the new emission control would be operating. If the remaining useful life of the source is less than the useful life of the control system being analyzed, please use the remaining useful life of the source in determining the annualized cost in the cost of compliance analysis. Otherwise, the company should use the useful life of the control measure in the cost of compliance analysis. If the remaining useful life of a source is relied upon in a four-factor analysis of a control measure instead of the useful life of the control system, and that control measure becomes part of West Virginia's long-term strategy, the shutdown date for the source will need to be included in West Virginia's SIP and shall become federally enforceable.

west virginia department of environmental protection

Appendix G

Reasonable Progress Evaluation/Long-Term Strategy

G-1d. WVDAQ Letter to Energy Harbor (Pleasants Station)

West Virginia Division of Air Quality
601 57th Street, SE
Charleston, WV 25304

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west virginia department of environmental protection

Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
(304) 926-0475

Austin Caperton, Cabinet Secretary
dep.wv.gov

November 4, 2020

Mark Peters
Manager – Maintenance and Technical Services
Energy Harbor, Pleasants Power Station
1 Power Station Blvd
Willow Island, WV 26134

via email: mpeters@energyharbor.com

Re: Regional Haze Reasonable Progress Assessment
Request for Four-Factor Analyses of Sulfur Dioxide Controls for Pleasants Power Station

Dear Mr. Peters,

The West Virginia Department of Environmental Protection (DEP) is preparing the West Virginia Regional Haze State Implementation Plan (SIP) for the second planning period (2018-2028). The DEP has worked with the Visibility Improvement State and Tribal Association of the Southeast (VISTAS), of which West Virginia is a member, to identify emission source sectors and facilities that significantly impact visibility impairment in Class I federal areas within and outside of our state. This work is consistent with and required by the regional haze statutory and regulatory requirements and federal guidance.

Based on analyses and modeling conducted by West Virginia and VISTAS, sulfur dioxide (SO_2) emissions from Pleasants Power Station (Pleasants) have been shown to contribute at least 1.00% to total anthropogenic visibility impairment in 2028 at six Class I federal areas. By this letter, DEP formally requests that Energy Harbor conduct a four-factor analysis on certain emissions units at the Pleasants facility. The four-factor analyses must be submitted to DEP no later than January 31, 2021.

Part I to this request provides background on the regional haze program requirements. Part II explains the process that VISTAS followed to identify facilities such as Pleasants for additional analyses. Part III explains how to proceed with a four-factor analysis of the major SO_2 sources at Pleasants.

Please submit all items requested in this letter to Todd Shrewsbury, Engineer, Planning Section, West Virginia Division of Air Quality, by January 31, 2021. This information may be submitted electronically via email to Todd.H.Shrewsbury@wv.gov. Should you have any questions regarding this request, please contact Todd Shrewsbury via the email above or at (304) 414-1908.

Sincerely,

David R. Fewell

Digitally signed by: David R. Fewell
DN: CN = David R. Fewell email = david.r.fewell@wv.gov C = US O = DAQ OU = DEP
Date: 2020.11.04 11:36:22 -05'00'

David Fewell
Deputy Director
Division of Air Quality

Part I: Overview of the Regional Haze Program

Section 169A of the 1977 Amendments to the federal Clean Air Act (CAA) sets forth a program for protecting visibility in Class I federal areas that calls for the "prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I federal areas which impairment results from manmade air pollution." Congress added Section169B to the 1990 Amendments to the CAA, which requires the United States Environmental Protection Agency (EPA) to issue rules regarding regional haze. The Regional Haze Rule (RHR) promulgated by EPA on July 1, 1999 (64 FR 35713) revised the existing visibility rule to integrate provisions addressing regional haze impairment and establish a comprehensive visibility protection program for each federal Class I area. These programs must provide for reasonable progress toward achieving natural visibility conditions by 2064.

The regional haze rules are codified at 40 Code of Federal Regulations (CFR) Subpart P - Protection of Visibility. Regional haze program requirements are located under 40 CFR 51.308(f) and mandate that each state must "address regional haze in each mandatory Class I federal area located within the state and in each mandatory Class I federal area located outside the state that may be affected by emissions from within the state." West Virginia submitted its regional haze plan for the first planning period (2008 – 2018) to EPA on June 18, 2008, and EPA subsequently granted full approval of this plan on September 24, 2018 (83 FR 48249). DEP is now preparing West Virginia's regional haze plan for the second planning period (2018 – 2028).

EPA finalized revisions to the RHR in January 2017 (82 FR 3078) to strengthen, streamline, and clarify certain aspects of the agency's regional haze program. 40 CFR 51.308(f) of the RHR requires that states must submit a regional haze plan for the second planning period by July 31, 2021. As part of the plan revision, West Virginia must establish a reasonable progress goal expressed in deciviews (dv) that provides for reasonable progress toward achieving natural visibility conditions by 2064 in the state's two Class I areas, Dolly Sods Wilderness Area and Otter Creek Wilderness Area. The goal "must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the clearest days over the same period." West Virginia must also work with other states with Class I areas which sources within our state have a visibility impact. These Class I areas are identified in Part II below.

West Virginia must also submit a long-term strategy that addresses regional haze visibility impairment for Dolly Sods Wilderness Area and Otter Creek Wilderness Area. The long-term strategy must include enforceable emissions limitations, compliance schedules, and other measures as necessary to achieve the reasonable progress goals established for these Class I areas.

In establishing reasonable progress goals, West Virginia must consider the four factors specified in § 169A of the CAA and in 40 CFR 51.308(f)(2)(i):

- Statutory factor 1: the cost of compliance,
- Statutory factor 2: the time necessary for compliance,

- Statutory factor 3: the energy and non-air quality environmental impacts of compliance, and
- Statutory factor 4: the remaining useful life of any potentially affected sources.

On August 20, 2019, EPA issued "Guidance on Regional Haze State Implementation Plans for the Second Implementation Period.[1]" Portions of this document provide guidance to states on the selection of sources for analysis, characterization of factors for emission control measures, and decisions on what control measures are necessary to make reasonable progress.

Part II: Reasonable Progress Assessment

DEP has completed the reasonable progress assessment for its second regional haze SIP. The following steps describe DEP's process for conducting its reasonable progress assessment for the current planning period from 2018 through 2028.

Step 1: Determine pollutants of concern

Using 2013 through 2017 Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring data for Class I federal areas in the VISTAS states, VISTAS evaluated the species contribution on the 20% most impaired visibility days and concluded that sulfate accounted for greater than 70% of the visibility impairing pollution associated with anthropogenic emission sources. Since sulfate is a large contributor to visibility impairment during this period, the VISTAS states concluded that SO_2 emission reductions should be the focus for reasonable progress assessments in this second round of planning.

Step 2: Determine which source sectors should be evaluated for reasonable progress

For the ten VISTAS states, point source SO_2 emissions in 2028 are projected to represent over 80% of the total SO_2 emissions inventory for all sectors. Therefore, the VISTAS states concluded that the sector evaluated for reasonable progress should be the point source sector, which is comprised of electric generating units (EGUs) such as Pleasants as well as certain non-EGU industrial sources.

Step 3: Determine which facilities would be evaluated based on impact

VISTAS relied upon an area of influence (AoI) analysis to help identify the areas and sources most likely contributing to poor visibility in Class I federal areas. This AoI analysis included a backward trajectory model to determine the origin of the air parcels affecting visibility in each Class I area. This information was then spatially combined with emissions data to determine the pollutants, sectors, and individual sources that were most likely contributing to the visibility impairment at each Class I area. West Virginia first used this information to determine that the pollutant and emissions sector with the largest impact on visibility impairment was SO_2 from point sources. West Virginia then used the AoI results for each Class I area to identify sources to select for Particulate Matter Source Apportionment Technology (PSAT) modeling.

[1] https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf

An initial AoI screen of 0.2% for sulfate or nitrate was utilized to construct a potential list of point sources that could include facilities both inside and outside of West Virginia that might impact one of our Class I areas. From this list, point source facilities with an AoI contribution of at least 2% for sulfate or nitrate were selected for PSAT modeling. Since Pleasants had calculated AoI impacts >2% at a Class I area, its emissions were tagged for PSAT modeling. Table 1 below illustrates the calculated AoI impacts from Pleasants at Class I areas.

Table 1: Pleasants Power Station Nitrate and Sulfate AoI Screens

Class I Federal Area	Nitrate AoI Screen	Sulfate AoI Screen
Dolly Sods Wilderness Area (WV)	0.16%	4.64%
Otter Creek Wilderness Area (WV)	0.30%	8.19%
Shenandoah National Park (VA)	0.24%	4.97%
James River Face Wilderness Area (VA)	0.15%	3.87%
Swanquarter Wilderness Area (NC)	0.07%	0.84%

PSAT modeling uses "reactive tracers" to apportion particulate matter among different sources, source categories, and regions. PSAT was implemented with the Comprehensive Air Quality Model with extensions (CAMx) photochemical grid model to determine visibility impairment from individual facilities. Use of PSAT modeling is a superior approach to the AoI analyses for determining individual facility contributions to visibility impairment in Class I federal areas and is considered "state of the science" technology. Using PSAT results, West Virginia identified facilities with an impact on one or more Class I federal areas of at least 1.00% calculated based on the total visibility impairment associated with SO_2 on the 20% most impaired days for each Class I federal area. These sources are being considered for additional reasonable progress analyses. The projected visibility impairment percentage from the PSAT modeling associated with Pleasants' projected SO_2 emissions of 11,501.78 tons in 2028 is illustrated in Table 2 below. Note that some Class I areas are included in the PSAT modeling that were not selected in the 2% AoI screen.

Table 2: Pleasants Power Station Total PSAT Visibility Impacts at Class I Federal Areas

Class I Federal Area	Total PSAT Visibility Impact
Otter Creek Wilderness Area (WV)	4.52%
Dolly Sods Wilderness Area (WV)	4.46%
James River Face Wilderness Area (VA)	2.40%
Shenandoah National Park (VA)	2.35%
Swanquarter Wilderness Area (NC)	1.24%
Lye Brooke Wilderness Area (VT)	1.01%

Pleasants may choose to limit emissions to levels equating to less than 1.00% impact on the Class I areas listed above. Should Pleasants select this option, the facility's annual, facility wide SO_2 emissions could not exceed 10,894 tons of SO_2 by 2028. Should Pleasants choose to exercise this option and submit a permit application for this limitation by January 31, 2021, the facility needs not take further action to address reasonable progress requirements for this second round of regional haze planning.

Part III: Evaluate the Four Factors

To meet the requirements of 40 CFR 51.308(d)(1)(i)(A), DEP must consider each of the four statutory factors for emission sources at Pleasants that are estimated to significantly contribute to visibility impairment in a Class I federal area:

- Statutory factor 1: the cost of compliance,
- Statutory factor 2: the time necessary for compliance,
- Statutory factor 3: the energy and non-air quality environmental impacts of compliance, and
- Statutory factor 4: the remaining useful life of any potentially affected sources.

DEP requests that Pleasants conduct a four-factor analysis on all units contributing SO_2 emissions to the following emissions points in the facility's emissions inventory:

- Stack Point 001
- Stack Point 002

The requested four-factor analyses must be submitted to DEP no later than January 31, 2021.

EPA's August 20, 2019, regional haze guidance explains how the four statutory factors can be characterized. To identify control measures with the highest level of control effectiveness that are both technically feasible and cost effective, DEP requests that the analyses be conducted using a "top-down" approach for each emission unit as follows:

Step 1: Identify all control technologies.
Step 2: Eliminate technically infeasible options.
Step 3: Rank remaining control technologies by control effectiveness.
Step 4: Apply the four statutory factors (cost of compliance, time necessary for compliance, energy and non-air quality environmental impacts, remaining useful life of existing source) to control technologies identified in Step 3 and document the results.
Step 5: Select control technology and control effectiveness.

In accordance with EPA's 2019 guidance, Pleasants should identify all SO_2 control technologies for each noted source at the facility. Pleasants should then select the technically feasible technologies and provide a thorough justification for those screened out as infeasible. Technically feasible technologies, which may include but are not limited to reductions in sulfur content for fuels and raw materials, incremental improvements in the operation of existing air pollution control devices, and the installation of new air pollution control devices, should be ranked in order of highest to lowest control effectiveness. The facility's current emission limitations should be used as the baseline emission level for estimating control effective of each control measure.

Please estimate the cost of compliance, statutory factor 1, starting with the control measure with the highest level of control effectiveness. The cost of compliance should be in terms of cost per ton of SO_2 reduced. The cost used as the numerator in the cost per ton metric should be the annualized cost of implementing the control measure and should be determined using methods

consist with EPA's Air Pollution Cost Control Manual.[2] Please provide all assumptions and data used in this analysis.

Should the company rely on a methodology other than those included in EPA's Air Pollution Cost Control Manual, please include a description of that methodology in the submission, including all calculations and assumptions as well as a strong justification for why the methodology used is more appropriate than methods specified in the Air Pollution Cost Control Manual.

The emissions reduction used as the denominator of the cost per ton metric should be the annual tons of SO_2 reductions from implementation of the control measure. If the analysis indicates that the control measure should be included as part of West Virginia's long-term strategy for the second implementation period, further analysis of less effective control measures is not necessary. If the analysis indicates that the control measure is not cost effective, the company should estimate the cost of compliance for the control measure with the next highest level of control effectiveness. This process should be repeated until Pleasants has identified a control measure to be included in West Virginia's long-term strategy or until all control measures have been fully analyzed and documented.

For statutory factor 2, time necessary for compliance, please provide a fully documented estimate of the time needed to comply with the control measures identified using statutory factor 1. This timeline should specify the source-specific factors used to estimate the time to install the control measures or to modify existing control strategies and provide a justification as to why the estimated time is reasonable.

For statutory factor 3, energy and non-air environmental impacts, please specify the cost of direct energy consumption of any control measure and which is included in the cost of compliance analysis. If any non-air environmental impacts associated with a certain control measure exist, such as impacts on nearby water bodies, those impacts should be thoroughly discussed.

Statutory factor 4, remaining useful life of the sources, is the number of years prior to the shutdown date during which the new emission control would be operating. If the remaining useful life of the source is less than the useful life of the control system being analyzed, please use the remaining useful life of the source in determining the annualized cost in the cost of compliance analysis. Otherwise, the company should use the useful life of the control measure in the cost of compliance analysis. If the remaining useful life of a source is relied upon in a four-factor analysis of a control measure instead of the useful life of the control system, and that control measure becomes part of West Virginia's long-term strategy, the shutdown date for the source will need to be included in West Virginia's SIP and shall become federally enforceable.

[2] https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution%23cost%20manual

west virginia department of environmental protection

Appendix G

Reasonable Progress Evaluation/Long-Term Strategy

G-1e. WVDAQ Letter to AEP (John Amos Plant)

West Virginia Division of Air Quality
601 57th Street, SE
Charleston, WV 25304

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west virginia department of environmental protection

Division of Air Quality
601 57th Street, SE
Charleston, WV 25304
(304) 926-0475

Austin Caperton, Cabinet Secretary
dep.wv.gov

November 4, 2020

Scott Weaver
Director Air Quality Services
American Electric Power
1 Riverside Plaza
Columbus, OH 43215

via email: saweaver@aep.com

Re: Regional Haze Reasonable Progress Assessment
Request for Four-Factor Analyses of Sulfur Dioxide Controls for the John Amos Plant

Dear Mr. Weaver,

The West Virginia Department of Environmental Protection (DEP) is preparing the West Virginia Regional Haze State Implementation Plan (SIP) for the second planning period (2018-2028). The DEP has worked with the Visibility Improvement State and Tribal Association of the Southeast (VISTAS), of which West Virginia is a member, to identify emission source sectors and facilities that significantly impact visibility impairment in Class I federal areas within and outside of our state. This work is consistent with and required by the regional haze statutory and regulatory requirements and federal guidance.

Based on analyses and modeling conducted by West Virginia and VISTAS, sulfur dioxide (SO_2) emissions from the John Amos Plant (John Amos) have been shown to contribute at least 1.00% to total anthropogenic visibility impairment in 2028 at three Class I federal areas. By this letter, DEP formally requests that American Electric Power (AEP) conduct a four-factor analysis on certain emissions units at the John Amos facility. The four-factor analyses must be submitted to DEP no later than January 31, 2021.

Part I to this request provides background on the regional haze program requirements. Part II explains the process that VISTAS followed to identify facilities such as John Amos for additional analyses. Part III explains how to proceed with a four-factor analysis of the major SO_2 sources at John Amos.

Please submit all items requested in this letter to Todd Shrewsbury, Engineer, Planning Section, West Virginia Division of Air Quality, by January 31, 2021. This information may be submitted electronically via email to Todd.H.Shrewsbury@wv.gov. Should you have any questions regarding this request, please contact Todd Shrewsbury via the email above or at (304) 414-1908.

Sincerely,

David R. Fewell

Digitally signed by: David R. Fewell
DN: CN = David R. Fewell email = david.r.fewell@wv.gov C = US O = DAQ OU = DEP
Date: 2020.11.04 09:44:28 -05'00'

David Fewell
Deputy Director
Division of Air Quality

Part I: Overview of the Regional Haze Program

Section 169A of the 1977 Amendments to the federal Clean Air Act (CAA) sets forth a program for protecting visibility in Class I federal areas that calls for the "prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I federal areas which impairment results from manmade air pollution." Congress added Section169B to the 1990 Amendments to the CAA, which requires the United States Environmental Protection Agency (EPA) to issue rules regarding regional haze. The Regional Haze Rule (RHR) promulgated by EPA on July 1, 1999 (64 FR 35713) revised the existing visibility rule to integrate provisions addressing regional haze impairment and establish a comprehensive visibility protection program for each federal Class I area. These programs must provide for reasonable progress toward achieving natural visibility conditions by 2064.

The regional haze rules are codified at 40 Code of Federal Regulations (CFR) Subpart P - Protection of Visibility. Regional haze program requirements are located under 40 CFR 51.308(f) and mandate that each state must "address regional haze in each mandatory Class I federal area located within the state and in each mandatory Class I federal area located outside the state that may be affected by emissions from within the state." West Virginia submitted its regional haze plan for the first planning period (2008 – 2018) to EPA on June 18, 2008, and EPA subsequently granted full approval of this plan on September 24, 2018 (83 FR 48249). DEP is now preparing West Virginia's regional haze plan for the second planning period (2018 – 2028).

EPA finalized revisions to the RHR in January 2017 (82 FR 3078) to strengthen, streamline, and clarify certain aspects of the agency's regional haze program. 40 CFR 51.308(f) of the RHR requires that states must submit a regional haze plan for the second planning period by July 31, 2021. As part of the plan revision, West Virginia must establish a reasonable progress goal expressed in deciviews (dv) that provides for reasonable progress toward achieving natural visibility conditions by 2064 in the state's two Class I areas, Dolly Sods Wilderness Area and Otter Creek Wilderness Area. The goal "must provide for an improvement in visibility for the most impaired days over the period of the implementation plan and ensure no degradation in visibility for the clearest days over the same period." West Virginia must also work with other states with Class I areas which sources within our state have a visibility impact. These Class I areas are identified in Part II below.

West Virginia must also submit a long-term strategy that addresses regional haze visibility impairment for Dolly Sods Wilderness Area and Otter Creek Wilderness Area. The long-term strategy must include enforceable emissions limitations, compliance schedules, and other measures as necessary to achieve the reasonable progress goals established for these Class I areas.

In establishing reasonable progress goals, West Virginia must consider the four factors specified in § 169A of the CAA and in 40 CFR 51.308(f)(2)(i):

- Statutory factor 1: the cost of compliance,
- Statutory factor 2: the time necessary for compliance,

- Statutory factor 3: the energy and non-air quality environmental impacts of compliance, and
- Statutory factor 4: the remaining useful life of any potentially affected sources.

On August 20, 2019, EPA issued "Guidance on Regional Haze State Implementation Plans for the Second Implementation Period.[1]" Portions of this document provide guidance to states on the selection of sources for analysis, characterization of factors for emission control measures, and decisions on what control measures are necessary to make reasonable progress.

Part II: Reasonable Progress Assessment

DEP has completed the reasonable progress assessment for its second regional haze SIP. The following steps describe DEP's process for conducting its reasonable progress assessment for the current planning period from 2018 through 2028.

Step 1: Determine pollutants of concern

Using 2013 through 2017 Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring data for Class I federal areas in the VISTAS states, VISTAS evaluated the species contribution on the 20% most impaired visibility days and concluded that sulfate accounted for greater than 70% of the visibility impairing pollution associated with anthropogenic emission sources. Since sulfate is a large contributor to visibility impairment during this period, the VISTAS states concluded that SO_2 emission reductions should be the focus for reasonable progress assessments in this second round of planning.

Step 2: Determine which source sectors should be evaluated for reasonable progress

For the ten VISTAS states, point source SO_2 emissions in 2028 are projected to represent over 80% of the total SO_2 emissions inventory for all sectors. Therefore, the VISTAS states concluded that the sector evaluated for reasonable progress should be the point source sector, which is comprised of electric generating units (EGUs) such as John Amos as well as certain non-EGU industrial sources.

Step 3: Determine which facilities would be evaluated based on impact

VISTAS relied upon an area of influence (AoI) analysis to help identify the areas and sources most likely contributing to poor visibility in Class I federal areas. This AoI analysis included a backward trajectory model to determine the origin of the air parcels affecting visibility in each Class I area. This information was then spatially combined with emissions data to determine the pollutants, sectors, and individual sources that were most likely contributing to the visibility impairment at each Class I area. West Virginia first used this information to determine that the pollutant and emissions sector with the largest impact on visibility impairment was SO_2 from point sources. West Virginia then used the AoI results for each Class I area to identify sources to select for Particulate Matter Source Apportionment Technology (PSAT) modeling.

[1] https://www.epa.gov/sites/production/files/2019-08/documents/8-20-2019_-_regional_haze_guidance_final_guidance.pdf

An initial AoI screen of 0.2% for sulfate or nitrate was utilized to construct a potential list of point sources that could include facilities both inside and outside of West Virginia that might impact one of our Class I areas. From this list, point source facilities with an AoI contribution of at least 2% for sulfate or nitrate were selected for PSAT modeling. Since John Amos had calculated AoI impacts >2% at a Class I area, its emissions were tagged for PSAT modeling. Table 1 below illustrates the calculated AoI impacts from John Amos at Class I areas.

Table 1: John Amos Plant Nitrate and Sulfate AoI Screens

Class I Federal Area	**Nitrate AoI Screen**	**Sulfate AoI Screen**
Dolly Sods Wilderness Area (WV)	0.11%	3.56%
Otter Creek Wilderness Area (WV)	0.12%	4.36%
James River Face Wilderness Area (VA)	0.13%	3.50%

PSAT modeling uses "reactive tracers" to apportion particulate matter among different sources, source categories, and regions. PSAT was implemented with the Comprehensive Air Quality Model with extensions (CAMx) photochemical grid model to determine visibility impairment from individual facilities. Use of PSAT modeling is a superior approach to the AoI analyses for determining individual facility contributions to visibility impairment in Class I federal areas and is considered "state of the science" technology. Using PSAT results, West Virginia identified facilities with an impact on one or more Class I federal areas of at least 1.00% calculated based on the total visibility impairment associated with SO_2 on the 20% most impaired days for each Class I federal area. These sources are being considered for additional reasonable progress analyses. The projected visibility impairment percentage from the PSAT modeling associated with John Amos's projected SO_2 emissions of 6,098.36 tons in 2028 is illustrated in Table 2 below. Note that some Class I areas are included in the PSAT modeling that were not selected in the 2% AoI screen.

Table 2: John Amos Plant Total PSAT Visibility Impacts at Class I Federal Areas

Class I Federal Area	**Total PSAT Visibility Impact**
James River Face Wilderness Area (VA)	2.05%
Otter Creek Wilderness Area (WV)	1.39%
Dolly Sods Wilderness Area (WV)	1.22%

John Amos may choose to limit emissions to levels equating to less than 1.00% impact on the Class I areas listed above. Should John Amos select this option, the facility's annual, facility wide SO_2 emissions could not exceed 5,916 tons of SO_2 by 2028. Should John Amos choose to exercise this option and submit a permit application for this limitation by January 31, 2021, the facility needs not take further action to address reasonable progress requirements for this second round of regional haze planning.

Part III: Evaluate the Four Factors

To meet the requirements of 40 CFR 51.308(d)(1)(i)(A), DEP must consider each of the four statutory factors for emission sources at John Amos that are estimated to significantly contribute to visibility impairment in a Class I federal area:

- Statutory factor 1: the cost of compliance,
- Statutory factor 2: the time necessary for compliance,
- Statutory factor 3: the energy and non-air quality environmental impacts of compliance, and
- Statutory factor 4: the remaining useful life of any potentially affected sources.

DEP requests that John Amos conduct a four-factor analysis on all units contributing SO_2 emissions to the following emissions points in the facility's emissions inventory:

- Unit 1 Stack
- Unit 2 Stack
- Unit 3 Stack

The requested four-factor analyses must be submitted to DEP no later than January 31, 2021.

EPA's August 20, 2019, regional haze guidance explains how the four statutory factors can be characterized. To identify control measures with the highest level of control effectiveness that are both technically feasible and cost effective, DEP requests that the analyses be conducted using a "top-down" approach for each emission unit as follows:

Step 1: Identify all control technologies.
Step 2: Eliminate technically infeasible options.
Step 3: Rank remaining control technologies by control effectiveness.
Step 4: Apply the four statutory factors (cost of compliance, time necessary for compliance, energy and non-air quality environmental impacts, remaining useful life of existing source) to control technologies identified in Step 3 and document the results.
Step 5: Select control technology and control effectiveness.

In accordance with EPA's 2019 guidance, John Amos should identify all SO_2 control technologies for each noted source at the facility. John Amos should then select the technically feasible technologies and provide a thorough justification for those screened out as infeasible. Technically feasible technologies, which may include but are not limited to reductions in sulfur content for fuels and raw materials, incremental improvements in the operation of existing air pollution control devices, and the installation of new air pollution control devices, should be ranked in order of highest to lowest control effectiveness. The facility's current emission limitations should be used as the baseline emission level for estimating control effective of each control measure.

Please estimate the cost of compliance, statutory factor 1, starting with the control measure with the highest level of control effectiveness. The cost of compliance should be in terms of cost per ton of SO_2 reduced. The cost used as the numerator in the cost per ton metric should be the

annualized cost of implementing the control measure and should be determined using methods consist with EPA's Air Pollution Cost Control Manual.[2] Please provide all assumptions and data used in this analysis.

Should the company rely on a methodology other than those included in EPA's Air Pollution Cost Control Manual, please include a description of that methodology in the submission, including all calculations and assumptions as well as a strong justification for why the methodology used is more appropriate than methods specified in the Air Pollution Cost Control Manual.

The emissions reduction used as the denominator of the cost per ton metric should be the annual tons of SO_2 reductions from implementation of the control measure. If the analysis indicates that the control measure should be included as part of West Virginia's long-term strategy for the second implementation period, further analysis of less effective control measures is not necessary. If the analysis indicates that the control measure is not cost effective, the company should estimate the cost of compliance for the control measure with the next highest level of control effectiveness. This process should be repeated until John Amos has identified a control measure to be included in West Virginia's long-term strategy or until all control measures have been fully analyzed and documented.

For statutory factor 2, time necessary for compliance, please provide a fully documented estimate of the time needed to comply with the control measures identified using statutory factor 1. This timeline should specify the source-specific factors used to estimate the time to install the control measures or to modify existing control strategies and provide a justification as to why the estimated time is reasonable.

For statutory factor 3, energy and non-air environmental impacts, please specify the cost of direct energy consumption of any control measure and which is included in the cost of compliance analysis. If any non-air environmental impacts associated with a certain control measure exist, such as impacts on nearby water bodies, those impacts should be thoroughly discussed.

Statutory factor 4, remaining useful life of the sources, is the number of years prior to the shutdown date during which the new emission control would be operating. If the remaining useful life of the source is less than the useful life of the control system being analyzed, please use the remaining useful life of the source in determining the annualized cost in the cost of compliance analysis. Otherwise, the company should use the useful life of the control measure in the cost of compliance analysis. If the remaining useful life of a source is relied upon in a four-factor analysis of a control measure instead of the useful life of the control system, and that control measure becomes part of West Virginia's long-term strategy, the shutdown date for the source will need to be included in West Virginia's SIP and shall become federally enforceable.

[2] https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution%23cost%20manual