Appendix B: Notifications to Provide Four-Factor Analysis
Mr. Jeffrey Walsh  
General Manager  
Kalaeloa Partners, L.P.  
91-111 Kalaeloa Boulevard  
Kapolei, Hawaii 96707

Dear Mr. Walsh:

Subject: Four-Factor Analysis for Regional Haze
Covered Source Permit No. 0214-01-C
Kalaeloa Partners, L.P.
223.5 MW Kalaeloa Cogeneration Plant
Located At: 91-111 Kalaeloa Boulevard, Kapolei, Oahu

The Department of Health, Clean Air Branch (CAB) is working on implementing the Regional Haze Rule for the second planning period (2018–2028) and has determined that a four-factor analysis is required for the subject facility. This determination is based on a Q/d screening evaluation to identify point sources with the greatest visibility impact on Hawaii’s two (2) Class I Areas (Haleakala National Park on Maui Island and Hawaii Volcanoes National Park on Hawaii Island). In the screening process, Q/d is the emissions in tons per year (tpy) divided by the distance in kilometers (km) between a source and the nearest Class I Area. The four-factor analysis will be used to establish control measures and reasonable progress goals for Hawaii’s Regional Haze State Implementation Plan.

In the first regional haze planning period (2001-2018), the emphasis was on Best Available Retrofit Technology (BART) to address reasonable progress that included a 0.5 deciview threshold. In the second planning period, there is no BART or deciview threshold. In this planning period, the focus is on determining reasonable progress through analyses of the four factors identified in Section 169A(g)(1) of the Clean Air Act:

1) The cost of compliance;  
2) The time necessary to achieve compliance;  
3) The energy and non-air quality environmental impact of compliance; and  
4) The remaining useful life of any existing source subject to such requirements.

In considering visibility benefit thresholds, recent guidance from the U.S. Environmental Protection Agency (EPA) notes that because regional haze results from a multitude of sources over a broad geographic area, progress may require addressing many relatively small contributions to impairment. Thus, a measure may be necessary for reasonable progress even if that measure in isolation does not result in perceptible visibility improvement.
Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring sites for both Haleakala National Park and Volcanoes National Park indicate primarily sulfates and nitrates with lower levels of elemental carbon. The primary precursors of sulfates and nitrates are emissions of sulfur dioxide (SO2) and nitrogen oxide (NOx), respectively. Although there are still releases of SO2 from the Kilauea Volcano, nitrates and elemental carbon measured at the IMPROVE sites are markers of particulate from anthropogenic sources.

A screening tool developed from work led by the Western Regional Air Partnership (WRAP) with Ramboll US Corporation was used for screening with the following assumptions:

a. The visibility facility-level emissions are the total combined emissions of NOx, SO2, and particulate matter less than ten (10) microns in diameter (PM10) - facility level emission Q = QNOx + QSO2 + QPM10
b. Distance (d) from the Class I Area in kilometers, includes only facilities within 400 km (250 miles) of a Class I Area. When evaluating sources for impacts, the larger of the two (2) Q/d values were used for noncontiguous regions of each national park.
c. Emissions were from the 2014 National Emissions Inventory (NEI)v2.
d. For facilities with multiple emission units/processes, facility location was based on the emission unit/process with the highest Q.
e. Screening thresholds were set at Q = 25 tpy and Q/d = 10 tpy/km to pre-screen sources for four-factor analysis.

The Kalaeloa Cogeneration Plant was identified as a significant source of emissions for Haleakala National Park with a Q/d values of 30.91 that exceeds the threshold of ten (10). Therefore, CAB requests that you prepare a four-factor analysis for the subject plant by February 29, 2020. Please refer to the enclosed attachment for information on completing and submitting your four-factor analysis.

If there are any questions regarding this matter, please contact Mr. Mike Macsen of my staff at (808) 586-4200.

Sincerely,

MARIANNE ROSSIO, P.E.
Manager, Clean Air Branch

MM/dh::rkb
Attachment

c: Anthony Koyamatsu, Director, Environmental Division, Hawaiian Electric
Don Shepard, National Park Service, Air Resources Division
Melanie Peters, National Park Service, NPS-Air
The following information is provided for your use in completing and submitting the four-factor analysis:


b. Evaluate control measures for NOx, SO2, and PM10 using the following four factors in section 169A(g)(1) of the Clean Air Act and 40 Code of Federal Regulations (CFR) §51.308(f)(2)(i) of the Regional Haze Rule:

1. The cost of compliance;
2. The time necessary to achieve compliance;
3. The energy and non-air quality environmental impacts of compliance; and
4. The remaining useful life of any existing source subject to such requirements.

c. Use calendar year 2017 emission estimates as a baseline to evaluate cost and feasibility of additional control measures for the following units:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Unit Description</th>
<th>Primary Fuel</th>
<th>Existing Control Equipment for Visibility Impairing Pollutants</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT-1</td>
<td>86 MW Combustion Turbine</td>
<td>Fuel Oil No. 6 with 0.5% maximum sulfur content</td>
<td>Steam injection for NOx</td>
</tr>
<tr>
<td>CT-2</td>
<td>86 MW Combustion Turbine</td>
<td>Fuel Oil No. 6 with 0.5% maximum sulfur content</td>
<td>Steam injection for NOx</td>
</tr>
</tbody>
</table>

1: MW-megawatt.

d. Identify and consider all available control measures that are technically feasible for each pollutant. A top-down sequence shall be used to analyze multiple control options to select the most effective and reasonable control measure in light of the costs of compliance. A control measure may only be rejected when one of the four factors, makes it unreasonable to require the control.

e. Consider emission reductions due to ongoing air pollution programs and source retirement and replacement schedules for control measure options pursuant to 40 CFR §51.308(f)(2)(iv) of the Regional Haze Rule and sections II.B.3(e) and II.B.4 of the EPA guidance.
f. The following are key sections in the EPA guidance for your analysis:

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<tr>
<th>EPA Guidance Section</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>II.B.4</td>
<td>Step 4: Characterization of factors for emission control measures</td>
</tr>
<tr>
<td>II.B.4(a)</td>
<td>Determining which emission control measures to consider</td>
</tr>
<tr>
<td>II.B.4(b)</td>
<td>Selection of emissions information for characterizing emission-related factors</td>
</tr>
<tr>
<td>II.B.4(c)</td>
<td>Characterizing the cost of compliance (statutory factor 1)</td>
</tr>
<tr>
<td>II.B.4(d)</td>
<td>Characterizing the time necessary for compliance (statutory factor 2)</td>
</tr>
<tr>
<td>II.B.4(e)</td>
<td>Characterizing energy and non-air environmental impacts (statutory factor 3)</td>
</tr>
<tr>
<td>II.B.4(f)</td>
<td>Characterizing remaining useful life of the source (statutory factor 4)</td>
</tr>
</tbody>
</table>
Mr. Michael R. DeCaprio
Director, Power Generation Division
Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawaii 96840-0001

Dear Mr. DeCaprio:

Subject: Four-Factor Analysis for Regional Haze
Covered Source Permit No. 0240-01-C
Hawaiian Electric Company, Inc. (HECO)
Kahe Generating Station
Located At: 92-200 Farrington Highway, Waianae, Oahu

The Department of Health, Clean Air Branch (CAB) is working on implementing the Regional Haze Rule for the second planning period (2018–2028) and has determined that a four-factor analysis is required for the subject facility. This determination is based on a Q/d screening evaluation to identify point sources with the greatest visibility impact on Hawaii's two (2) Class I Areas (Haleakala National Park on Maui Island and Hawaii Volcanoes National Park on Hawaii Island). In the screening process, Q/d is the emissions in tons per year (tpy) divided by the distance in kilometers (km) between a source and the nearest Class I Area. The four-factor analysis will be used to establish control measures and reasonable progress goals for Hawaii's Regional Haze State Implementation Plan.

In the first regional haze planning period (2001-2018), the emphasis was on Best Available Retrofit Technology (BART) to address reasonable progress that included a 0.5 deciview threshold. In the second planning period, there is no BART or deciview threshold. In this planning period, the focus is on determining reasonable progress through analyses of the four factors identified in Section 169A(g)(1) of the Clean Air Act:

1) The cost of compliance;
2) The time necessary to achieve compliance;
3) The energy and non-air quality environmental impact of compliance; and
4) The remaining useful life of any existing source subject to such requirements.

In considering visibility benefit thresholds, recent guidance from the U.S. Environmental Protection Agency (EPA) notes that because regional haze results from a multitude of sources over a broad geographic area, progress may require addressing many relatively small contributions to impairment. Thus, a measure may be necessary for reasonable progress even if that measure in isolation does not result in perceptible visibility improvement.
Mr. Michael R. DeCaprio  
September 11, 2019  
Page 2

Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring sites for both Haleakala National Park and Volcanoes National Park indicate primarily sulfates and nitrates with lower levels of elemental carbon. The primary precursors of sulfates and nitrates are emissions of sulfur dioxide (SO$_2$) and nitrogen oxide (NO$_x$), respectively. Although there are still releases of SO$_2$ from the Kilauea Volcano, nitrates and elemental carbon measured at the IMPROVE sites are markers of particulate from anthropogenic sources.

A screening tool developed from work led by the Western Regional Air Partnership (WRAP) with Ramboll US Corporation was used for screening with the following assumptions:

a. The visibility facility-level emissions are the total combined emissions of NO$_x$, SO$_2$, and particulate matter less than ten (10) microns in diameter (PM$_{10}$) - facility level emission $Q = Q_{NOX} + Q_{SO2} + Q_{PM10}$.

b. Distance (d) from the Class I Area in kilometers, includes only facilities within 400 km (250 miles) of a Class I Area. When evaluating sources for impacts, the larger of the two (2) Q/d values were used for noncontiguous regions of each national park.

c. Emissions were from the 2014 National Emissions Inventory (NEI)v2.

d. For facilities with multiple emission units/processes, facility location was based on the emission unit/process with the highest Q.

e. Screening thresholds were set at Q = 25 tpy and Q/d = 10 tpy/km to pre-screen sources for four-factor analysis.

Screening identified Kahe Generating Station as a significant source of emissions with Q/d values of 67.77 and 42.46 for Haleakala National Park and Volcanoes National Park, respectively. These Q/d values exceed the threshold of ten (10) for requiring further evaluation. Therefore, CAB requests that you prepare a four-factor analysis for the subject plant by February 29, 2020. Please refer to the enclosed attachment for information on completing and submitting your four-factor analysis.

If there are any questions regarding this matter, please contact Mr. Mike Madsen of my staff at (808) 586-4200.

Sincerely,

MARIANNE ROSSIO, P.E.  
Manager, Clean Air Branch

MM/dh: rkb  
Attachment

c: Anthony Koyamatsu, Director, Environmental Division, Hawaiian Electric  
   Don Shepard, National Park Service, Air Resources Division  
   Melanie Peters, National Park Service, NPS-Air
The following information is provided for your use in completing and submitting the four-factor analysis:


b. Evaluate control measures for NO\textsubscript{X}, SO\textsubscript{2}, and PM\textsubscript{10} using the following four factors in section 169A(g)(1) of the Clean Air Act and 40 Code of Federal Regulations (CFR) §51.308(f)(2)(i) of the Regional Haze Rule:

1. The cost of compliance;
2. The time necessary to achieve compliance;
3. The energy and non-air quality environmental impacts of compliance; and
4. The remaining useful life of any existing source subject to such requirements.

c. Use calendar year 2017 emission estimates as a baseline to evaluate cost and feasibility of additional control measures for the following units:

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<tr>
<th>Unit</th>
<th>Unit Description</th>
<th>Primary Fuel</th>
<th>Existing Control Equipment for Visibility Impairing Pollutants</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-1</td>
<td>92 MW Boiler</td>
<td>Fuel Oil No. 6 with 0.5% maximum allowable sulfur content</td>
<td></td>
</tr>
<tr>
<td>K-2</td>
<td>90 MW Boiler</td>
<td>Fuel Oil No. 6 with 0.5% maximum allowable sulfur content</td>
<td></td>
</tr>
<tr>
<td>K-3</td>
<td>92 MW Boiler</td>
<td>Fuel Oil No. 6 with 0.5% maximum allowable sulfur content</td>
<td></td>
</tr>
<tr>
<td>K-4</td>
<td>93 MW Boiler</td>
<td>Fuel Oil No. 6 with 0.5% maximum allowable sulfur content</td>
<td></td>
</tr>
<tr>
<td>K-5</td>
<td>142 MW Boiler</td>
<td>Fuel Oil No. 6 with 0.5% maximum allowable sulfur content</td>
<td></td>
</tr>
<tr>
<td>K-6</td>
<td>142 MW Boiler</td>
<td>Fuel Oil No. 6 with 0.5% maximum allowable sulfur content</td>
<td>Low-NO\textsubscript{X} Burner</td>
</tr>
</tbody>
</table>

1: MW-megawatt.

d. Identify and consider all available control measures that are technically feasible for each pollutant. A top-down sequence shall be used to analyze multiple control options to select the most effective and reasonable control measure in light of the costs of compliance. A control measure may only be rejected when one of the four factors, makes it unreasonable to require the control.

e. Consider emission reductions due to ongoing air pollution programs and source retirement and replacement schedules for control measure options pursuant to 40 CFR §51.308(f)(2)(iv) of the Regional Haze Rule and sections II.B.3(e) and II.B.4 of the EPA guidance.
f. The following are key sections in the EPA guidance for your analysis:

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</tr>
<tr>
<td>II.B.4(e)</td>
<td>Characterizing energy and non-air environmental impacts (statutory factor 3)</td>
</tr>
<tr>
<td>II.B.4(f)</td>
<td>Characterizing remaining useful life of the source (statutory factor 4)</td>
</tr>
</tbody>
</table>
Mr. Michael R. DeCaprio  
Director, Power Generation Division  
Hawaiian Electric Company, Inc.  
P.O. Box 2750  
Honolulu, Hawaii 96840-0001

Dear Mr. DeCaprio:

Subject: Four-Factor Analysis for Regional Haze  
Covered Source Permit No. 0239-01-C  
Hawaiian Electric Company, Inc. (HECO)  
Waiau Generating Station  
Six (6) Boilers and Two (2) Combustion Turbines  
Located At: 475 Kamehameha Highway, Pearl City, Oahu

The Department of Health, Clean Air Branch (CAB) is working on implementing the Regional Haze Rule for the second planning period (2018-2028) and has determined that a four-factor analysis is required for the subject facility. This determination is based on a Q/d screening evaluation to identify point sources with the greatest visibility impact on Hawaii’s two (2) Class I Areas (Haleakala National Park on Maui Island and Hawaii Volcanoes National Park on Hawaii Island). In the screening process, Q/d is the emissions in tons per year (tpy) divided by the distance in kilometers (km) between a source and the nearest Class I Area. The four-factor analysis will be used to establish control measures and reasonable progress goals for Hawaii’s Regional Haze State Implementation Plan.

In the first regional haze planning period (2001-2018), the emphasis was on Best Available Retrofit Technology (BART) to address reasonable progress that included a 0.5 deciview threshold. In the second planning period, there is no BART or deciview threshold. In this planning period, the focus is on determining reasonable progress through analyses of the four factors identified in Section 169A(g)(1) of the Clean Air Act:

1) The cost of compliance;  
2) The time necessary to achieve compliance;  
3) The energy and non-air quality environmental impact of compliance; and  
4) The remaining useful life of any existing source subject to such requirements.

In considering visibility benefit thresholds, recent guidance from the U.S. Environmental Protection Agency (EPA) notes that because regional haze results from a multitude of sources over a broad geographic area, progress may require addressing many relatively small contributions to impairment. Thus, a measure may be necessary for reasonable progress even if that measure in isolation does not result in perceptible visibility improvement.
Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring sites for both Haleakala National Park and Volcanoes National Park indicate primarily sulfates and nitrates with lower levels of elemental carbon. The primary precursors of sulfates and nitrates are emissions of sulfur dioxide (SO₂) and nitrogen oxide (NOₓ), respectively. Although there are still releases of SO₂ from the Kilauea Volcano, nitrates and elemental carbon measured at the IMPROVE sites are markers of particulate from anthropogenic sources.

A screening tool developed from work led by the Western Regional Air Partnership (WRAP) with Ramboll US Corporation was used for screening with the following assumptions:

a. The visibility facility-level emissions are the total combined emissions of NOₓ, SO₂, and particulate matter less than ten (10) microns in diameter (PM₁₀) - facility level emission Q = Q_NOₓ + Q_SO₂ + Q_PM₁₀
b. Distance (d) from the Class I Area in kilometers, includes only facilities within 400 km (250 miles) of a Class I Area. When evaluating sources for impacts, the larger of the two (2) Q/d values were used for noncontiguous regions of each national park.
c. Emissions were from the 2014 National Emissions Inventory (NEI)v2.
d. For facilities with multiple emission units/processes, facility location was based on the emission unit/process with the highest Q.
e. Screening thresholds were set at Q = 25 tpy and Q/d = 10 tpy/km to pre-screen sources for four-factor analysis.

Screening identified Waiau Generating Station as a significant source of emissions with Q/d values of 30.53 and 18.31 for Haleakala National Park and Volcanoes National Park, respectively. These Q/d values exceed the threshold of ten (10) for requiring further evaluation. Therefore, CAB requests that you prepare a four-factor analysis for the subject plant by February 29, 2020. Please refer to the enclosed attachment for information on completing and submitting your four-factor analysis.

If there are any questions regarding this matter, please contact Mr. Dale Hamamoto of my staff at (808) 586-4200.

Sincerely,

MARIANNE ROSSIO, P.E.
Manager, Clean Air Branch

Attachment

c: Anthony Koyamatsu, Director, Environmental Division, Hawaiian Electric
Don Shepard, National Park Service, Air Resources Division
Melanie Peters, National Park Service, NPS-Air
ATTACHMENT
Page 1 of 2

The following information is provided for your use in completing and submitting the four-factor analysis:


b. Evaluate control measures for NOX, SO2, and PM10 using the following four factors in Section 169A(g)(1) of the Clean Air Act and 40 Code of Federal Regulations (CFR) §51.308(f)(2)(i) of the Regional Haze Rule:

1. The cost of compliance;
2. The time necessary to achieve compliance;
3. The energy and non-air quality environmental impacts of compliance; and
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c. Use calendar year 2017 emission estimates as a baseline to evaluate cost and feasibility of additional control measures for the following units:

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<th>Primary Fuel</th>
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<tbody>
<tr>
<td>3</td>
<td>49 MW Boiler</td>
<td>Fuel Oil No. 6 with 0.5% maximum sulfur content</td>
<td>None</td>
</tr>
<tr>
<td>4</td>
<td>49 MW Boiler</td>
<td>Fuel Oil No. 6 with 0.5% maximum sulfur content</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>57 MW Boiler</td>
<td>Fuel Oil No. 6 with 0.5% maximum sulfur content</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>58 MW Boiler</td>
<td>Fuel Oil No. 6 with 0.5% maximum sulfur content</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>92 MW Boiler</td>
<td>Fuel Oil No. 6 with 0.5% maximum sulfur content</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>92 MW Boiler</td>
<td>Fuel Oil No. 6 with 0.5% maximum sulfur content</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>52 MW Combustion Turbine</td>
<td>Diesel Fuel Oil No. 2 with 0.5% maximum sulfur content</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>50 MW Combustion Turbine</td>
<td>Diesel Fuel Oil No. 2 with 0.5% maximum sulfur content</td>
<td>None</td>
</tr>
</tbody>
</table>

1: MW-megawatt.

d. Identify and consider all available control measures that are technically feasible for each pollutant. A top-down sequence shall be used to analyze multiple control options to select the most effective and reasonable control measure in light of the costs of compliance. A control measure may only be rejected when one of the four factors, makes it unreasonable to require the control.
e. Consider emission reductions due to ongoing air pollution programs and source retirement and replacement schedules as control measure options pursuant to 40 CFR §51.308(f)(2)(iv) of the Regional Haze Rule and sections II.B.3(e) and II.B.4 of the EPA guidance.

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</tr>
<tr>
<td>II.B.4(f)</td>
<td>Characterizing remaining useful life of the source (statutory factor 4)</td>
</tr>
</tbody>
</table>
Mr. Norman M. Uchida, P.E.
Director, Production Division
Hawaii Electric Light Company, Inc.
P.O. Box 1027
Hilo, Hawaii 96721-1027

Dear Mr. Uchida:

Subject: Four-Factor Analysis for Regional Haze
Covered Source Permit No. 0234-01-C
Hawaii Electric Light Company, Inc. (HELCO)
Kaneohe-Hill Generating Station
Two (2) Boilers, One (1) Combustion Turbine, and Four (4) Diesel Engines
Located At: 54 Haleakaula Street, Hilo, Hawaii
UTM Coordinates: 284,300 Meters East and 2,179,800 Meters North, Zone 5

The Department of Health, Clean Air Branch (CAB) is working on implementing the Regional Haze Rule for the second planning period (2018–2028) and has determined that a four-factor analysis is required for the subject facility. This determination is based on a Q/d screening evaluation to identify point sources with the greatest visibility impact on Hawaii’s two (2) Class I Areas (Haleakala National Park on Maui Island and Hawaii Volcanoes National Park on Hawaii Island). In the screening process, Q/d is the emissions in tons per year (tpy) divided by the distance in kilometers (km) between a source and the nearest Class I Area. The four-factor analysis will be used to establish control measures and reasonable progress goals for Hawaii’s Regional Haze State Implementation Plan.

In the first regional haze planning period (2001-2018), the emphasis was on Best Available Retrofit Technology (BART) to address reasonable progress that included a 0.5 deciview threshold. In the second planning period, there is no BART or deciview threshold. In this planning period, the focus is on determining reasonable progress through analyses of the four factors identified in Section 169A(g)(1) of the Clean Air Act:

1) The cost of compliance;
2) The time necessary to achieve compliance;
3) The energy and non-air quality environmental impact of compliance; and
4) The remaining useful life of any existing source subject to such requirements.

In considering visibility benefit thresholds, recent guidance from the U.S. Environmental Protection Agency (EPA) notes that because regional haze results from a multitude of sources over a broad geographic area, progress may require addressing many relatively small contributions to impairment. Thus, a measure may be necessary for reasonable progress even if that measure in isolation does not result in perceptible visibility improvement.
Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring sites for both Haleakala National Park and Volcanoes National Park indicate primarily sulfates and nitrates with lower levels of elemental carbon. The primary precursors of sulfates and nitrates are emissions of sulfur dioxide (SO₂) and nitrogen oxide (NOₓ), respectively. Although there are still releases of SO₂ from the Kilauea Volcano, nitrates and elemental carbon measured at the IMPROVE sites are markers of particulate from anthropogenic sources.

A screening tool developed from work led by the Western Regional Air Partnership (WRAP) with Ramboll US Corporation was used for screening with the following assumptions:

a. The visibility facility-level emissions are the total combined emissions of NOₓ, SO₂, and particulate matter less than ten (10) microns in diameter (PM₁₀) - facility level emission Q = Q_{NOX} + Q_{SO2} + Q_{PM10}.

b. Distance (d) from the Class I Area in kilometers, includes only facilities within 400 km (250 miles) of a Class I Area. When evaluating sources for impacts, the larger of the two (2) Q/d values were used for noncontiguous regions of each national park.

c. Emissions were from the 2014 National Emissions Inventory (NEI)v2.

d. For facilities with multiple emission units/processes, facility location was based on the emission unit/process with the highest Q.

e. Screening thresholds were set at Q = 25 tpy and Q/d = 10 tpy/km to pre-screen sources for four-factor analysis.

Screening identified Kanoelehua-Hill Generating Station as a significant source of emissions with Q/d values of 17.13 and 98.07 for Haleakala National Park and Volcanoes National Park, respectively. These Q/d values exceed the threshold of ten (10) for requiring further evaluation. Therefore, CAB requests that you prepare a four-factor analysis for the subject plant by February 29, 2020. Please refer to the enclosed attachment for information on completing and submitting your four-factor analysis.

If there are any questions regarding this matter, please contact Mr. Dale Hamamoto of my staff at (808) 586-4200.

Sincerely,

MARIANNE ROSSIO, P.E.
Manager, Clean Air Branch

MM/dh:rk
Attachment

c: Anthony Koyamatsu, Director, Environmental Division, Hawaiian Electric
Don Shepard, National Park Service, Air Resources Division
Melanie Peters, National Park Service, NPS-Air
The following information is provided for your use in completing and submitting the four-factor analysis:


b. Evaluate control measures for NOX, SO2, and PM10 using the following four factors in Section 169A(g)(1) of the Clean Air Act and 40 Code of Federal Regulations (CFR) §51.308(f)(2)(i) of the Regional Haze Rule:

   1. The cost of compliance;
   2. The time necessary to achieve compliance;
   3. The energy and non-air quality environmental impacts of compliance; and
   4. The remaining useful life of any existing source subject to such requirements.

c. An evaluation of control measures for SO2 and PM10 is not required for fuel combustion units that are restricted to using ultra-low-sulfur diesel (ULSD) with a sulfur content of no more than 0.0015 percent, per enforceable requirements.

d. Use calendar year 2017 emission estimates as a baseline to evaluate cost and feasibility of additional control measures for the following units:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Unit Description</th>
<th>Primary Fuel</th>
<th>Existing Control Equipment and Mass Emission Limit for Visibility Impairing Pollutants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hill 5</td>
<td>14 MW Boiler</td>
<td>Fuel Oil No. 6 with 2.0% maximum sulfur content</td>
<td>SO2 emissions cap 2</td>
</tr>
<tr>
<td>Hill 6</td>
<td>23 MW Boiler</td>
<td>Fuel Oil No. 6 with 2.0% maximum sulfur content</td>
<td>SO2 emissions cap 2</td>
</tr>
<tr>
<td>CT-1</td>
<td>11.6 MW Combustion Turbine</td>
<td>Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content</td>
<td>None</td>
</tr>
<tr>
<td>D-11</td>
<td>2.0 MW Diesel Engine Generator</td>
<td>ULSD 3</td>
<td>Oxidation catalyst for VOC</td>
</tr>
<tr>
<td>D-15</td>
<td>2.75 MW Diesel Engine Generator</td>
<td>ULSD 3</td>
<td>Oxidation catalyst for VOC</td>
</tr>
<tr>
<td>D-16</td>
<td>2.75 MW Diesel Engine Generator</td>
<td>ULSD 3</td>
<td>Oxidation catalyst for VOC</td>
</tr>
<tr>
<td>D-17</td>
<td>2.75 MW Diesel Engine Generator</td>
<td>ULSD 3</td>
<td>Oxidation catalyst for VOC</td>
</tr>
</tbody>
</table>

1: MW=megawatt, ULSD-ultra-low-sulfur diesel (0.0015% maximum allowable sulfur content), and VOC-volatile organic compound.
2: No control equipment, however, permits limit total combined SO2 emissions from boilers at the Kanoeluhia-Hill and Puna Generating Stations to 3,550 tpy.
3: Fuel combustion units that are restricted to using only ULSD or distillate fuel with a sulfur content of no more than 0.0015 percent, per enforceable requirements, do not need further evaluation of SO2 and PM control measures.
e. Identify and consider all available control measures that are technically feasible for each pollutant. A top-down sequence shall be used to analyze multiple control options to select the most effective and reasonable control measure in light of the costs of compliance. A control measure may only be rejected when one of the four factors, makes it unreasonable to require the control.

f. Consider emission reductions due to ongoing air pollution programs and source retirement and replacement schedules as control measure options pursuant to 40 CFR §51.308(f)(2)(iv) of the Regional Haze Rule and sections II.B.3(e) and II.B.4 of the EPA guidance.

g. The following are key sections in the EPA guidance for your analysis:

<table>
<thead>
<tr>
<th>EPA Guidance Section</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>II.B.4</td>
<td>Step 4: Characterization of factors for emission control measures</td>
</tr>
<tr>
<td>II.B.4(a)</td>
<td>Determining which emission control measures to consider</td>
</tr>
<tr>
<td>II.B.4(b)</td>
<td>Selection of emissions information for characterizing emission-related factors</td>
</tr>
<tr>
<td>II.B.4(c)</td>
<td>Characterizing the cost of compliance (statutory factor 1)</td>
</tr>
<tr>
<td>II.B.4(d)</td>
<td>Characterizing the time necessary for compliance (statutory factor 2)</td>
</tr>
<tr>
<td>II.B.4(e)</td>
<td>Characterizing energy and non-air environmental impacts (statutory factor 3)</td>
</tr>
<tr>
<td>II.B.4(f)</td>
<td>Characterizing remaining useful life of the source (statutory factor 4)</td>
</tr>
</tbody>
</table>
Mr. Norman M. Uchida, P.E.
Director, Production Division
Hawaiian Electric Light Company, Inc.
P.O. Box 1027
Hilo, Hawaii 96721-1027

Dear Mr. Uchida:

Subject: Four-Factor Analysis for Regional Haze
Covered Source Permit No. 0235-01-C
Hawaii Electric Light Company, Inc. (HELCO)
Puna Generating Station
One (1) 20 MW Combustion Turbine with a 600 KW Black Start
Diesel Engine Generator, and One (1) 15.5 MW Boiler with a
Multi-Cyclone Dust Collector
Located At: Keaau, Hawaii

UTM Coordinates: 286.6 km East, 2172.3 km North, Zone 5,
Old Hawaiian

The Department of Health, Clean Air Branch (CAB) is working on implementing the Regional Haze Rule for the second planning period (2018–2028) and has determined that a four-factor analysis is required for the subject facility. This determination is based on a Q/d screening evaluation to identify point sources with the greatest visibility impact on Hawaii’s two (2) Class I Areas (Haleakala National Park on Maui Island and Hawaii Volcanoes National Park on Hawaii Island). In the screening process, Q/d is the emissions in tons per year (tpy) divided by the distance in kilometers (km) between a source and the nearest Class I Area. The four-factor analysis will be used to establish control measures and reasonable progress goals for Hawaii’s Regional Haze State Implementation Plan.

In the first regional haze planning period (2001-2018), the emphasis was on Best Available Retrofit Technology (BART) to address reasonable progress that included a 0.5 deciview threshold. In the second planning period, there is no BART or deciview threshold. In this planning period, the focus is on determining reasonable progress through analyses of the four factors identified in Section 169A(g)(1) of the Clean Air Act:

1) The cost of compliance;
2) The time necessary to achieve compliance;
3) The energy and non-air quality environmental impact of compliance; and
4) The remaining useful life of any existing source subject to such requirements.

In considering visibility benefit thresholds, recent guidance from the U.S. Environmental Protection Agency (EPA) notes that because regional haze results from a multitude of sources over a broad geographic area, progress may require addressing many relatively small contributions to impairment. Thus, a measure may be necessary for reasonable progress even if that measure in isolation does not result in perceptible visibility improvement.
Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring sites for both Haleakalā National Park and Volcanoes National Park indicate primarily sulfates and nitrates with lower levels of elemental carbon. The primary precursors of sulfates and nitrates are emissions of sulfur dioxide (SO₂) and nitrogen oxide (NOₓ), respectively. Although there are still releases of SO₂ from the Kilauea Volcano, nitrates and elemental carbon measured at the IMPROVE sites are markers of particulate from anthropogenic sources.

A screening tool developed from work led by the Western Regional Air Partnership (WRAP) with Ramboll US Corporation was used for screening with the following assumptions:

a. The visibility facility-level emissions are the total combined emissions of NOₓ, SO₂, and particulate matter less than ten (10) microns in diameter (PM₁₀) - facility level emission \( Q = Q_{NOX} + Q_{SO2} + Q_{PM10} \).  
b. Distance (d) from the Class I Area in kilometers, includes only facilities within 400 km (250 miles) of a Class I Area. When evaluating sources for impacts, the larger of the two (2) Q/d values were used for noncontiguous areas of each national park.

c. Emissions were from the 2014 National Emissions Inventory (NEI)v2.

d. For facilities with multiple emission units/processes, facility location was based on the emission unit/process with the highest Q.

e. Screening thresholds were set at \( Q = 25 \) tpy and \( Q/d = 10 \) tpy/km to pre-screen sources for four-factor analysis.

Screening identified Puna Generating Station as a significant source of emissions for Hawaii Volcanoes National Park with a Q/d values of 27.09 that exceeds the threshold of ten (10). Therefore, CAB requests that you prepare a four-factor analysis for the subject plant by February 29, 2020. Please refer to the enclosed attachment for information on completing and submitting your four-factor analysis.

If there are any questions regarding this matter, please contact Mr. Dale Hamamoto of my staff at (808) 586-4200.

Sincerely,

MARIANNE ROSSIO, P.E.
Manager, Clean Air Branch

MM/dh:rkb
Attachment

c: Anthony Koyamatsu, Director, Environmental Division, Hawaiian Electric
Don Shepard, National Park Service, Air Resources Division
Melanie Peters, National Park Service, NPS-Air
ATTACHMENT
Page 1 of 2

The following information is provided for your use in completing and submitting the four-factor analysis:


b. Evaluate control measures for NOₓ, SO₂, and PM₁₀ using the following four factors in Section 169A(g)(1) of the Clean Air Act and 40 Code of Federal Regulations (CFR) §51.308(f)(2)(i) of the Regional Haze Rule:

1. The cost of compliance;
2. The time necessary to achieve compliance;
3. The energy and non-air quality environmental impacts of compliance; and
4. The remaining useful life of any existing source subject to such requirements.

c. Use calendar year 2017 emission estimates as a baseline to evaluate cost and feasibility of additional control measures for the following units:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Unit Description</th>
<th>Primary Fuel</th>
<th>Existing Control Equipment for Visibility Impairing Pollutants</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT-3</td>
<td>20 MW Combustion Turbine</td>
<td>Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content</td>
<td>Water injection system for NOₓ</td>
</tr>
<tr>
<td>Boiler</td>
<td>15.5 MW Boiler</td>
<td>Diesel Fuel Oil No. 6 with 2.0% maximum sulfur content</td>
<td>MultiCyclone Dust Collector for PM and SO₂ Emissions Cap ²</td>
</tr>
</tbody>
</table>

1: MW-megawatt.
2: Permits limit total combined SO₂ emissions from boilers at the Kanoelehu-Hili and Puna Generating Stations to 3,550 tpy.

d. Identify and consider all available control measures that are technically feasible for each pollutant. A top-down sequence shall be used to analyze multiple control options to select the most effective and reasonable control measure in light of the costs of compliance. A control measure may only be rejected when one of the four factors, makes it unreasonable to require the control.

e. Consider emission reductions due to ongoing air pollution programs and source retirement and replacement schedules as control measure options pursuant to 40 CFR §51.308(f)(2)(iv) of the Regional Haze Rule and sections II.B.3(e) and II.B.4 of the EPA guidance.
The following are key sections in the EPA guidance for your analysis:

<table>
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<td>II.B.4</td>
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</tr>
<tr>
<td>II.B.4(a)</td>
<td>Determining which emission control measures to consider</td>
</tr>
<tr>
<td>II.B.4(b)</td>
<td>Selection of emissions information for characterizing emission-related factors</td>
</tr>
<tr>
<td>II.B.4(c)</td>
<td>Characterizing the cost of compliance (statutory factor 1)</td>
</tr>
<tr>
<td>II.B.4(d)</td>
<td>Characterizing the time necessary for compliance (statutory factor 2)</td>
</tr>
<tr>
<td>II.B.4(e)</td>
<td>Characterizing energy and non-air environmental impacts (statutory factor 3)</td>
</tr>
<tr>
<td>II.B.4(f)</td>
<td>Characterizing remaining useful life of the source (statutory factor 4)</td>
</tr>
</tbody>
</table>
Mr. Mathew McNeff  
Director, Power Supply Division  
Maui Electric Company, Ltd.  
P. O. Box 398  
Kahului, Hawaii 96733  

Dear Mr. McNeff:  

Subject: Four-Factor Analysis for Regional Haze  
Covered Source Permit No. 0232-01-C  
Maui Electric Company, Ltd. (MECO)  
Kahului Generating Station  
Located At: 200 Hobron Avenue, Kahului, Maui  
UTM: 763,673 Meters East and 2,313,143 Meters North, Zone 4 (Old Hawaiian)  

The Department of Health, Clean Air Branch (CAB) is working on implementing the Regional Haze Rule for the second planning period (2018–2028) and has determined that a four-factor analysis is required for the subject facility. This determination is based on a Q/d screening evaluation to identify point sources with the greatest visibility impact on Hawaii's two (2) Class I Areas (Haleakala National Park on Maui Island and Hawaii Volcanoes National Park on Hawaii Island). In the screening process, Q/d is the emissions in tons per year (tpy) divided by the distance in kilometers (km) between a source and the nearest Class I Area. The four-factor analysis will be used to establish control measures and reasonable progress goals for Hawaii's Regional Haze State Implementation Plan.

In the first regional haze planning period (2001-2018), the emphasis was on Best Available Retrofit Technology (BART) to address reasonable progress that included a 0.5 deciview threshold. In the second planning period, there is no BART or deciview threshold. In this planning period, the focus is on determining reasonable progress through analyses of the four factors identified in Section 169A(g)(1) of the Clean Air Act:  

1) The cost of compliance;  
2) The time necessary to achieve compliance;  
3) The energy and non-air quality environmental impact of compliance; and  
4) The remaining useful life of any existing source subject to such requirements.

In considering visibility benefit thresholds, recent guidance from the U.S. Environmental Protection Agency (EPA) notes that because regional haze results from a multitude of sources over a broad geographic area, progress may require addressing many relatively small contributions to impairment. Thus, a measure may be necessary for reasonable progress even if that measure in isolation does not result in perceptible visibility improvement.
Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring sites for both Haleakala National Park and Volcanoes National Park indicate primarily sulfates and nitrates with lower levels of elemental carbon. The primary precursors of sulfates and nitrates are emissions of sulfur dioxide (SO2) and nitrogen oxide (NOx), respectively. Although there are still releases of SO2 from the Kilauea Volcano, nitrates and elemental carbon measured at the IMPROVE sites are markers of particulate from anthropogenic sources.

A screening tool developed from work led by the Western Regional Air Partnership (WRAP) with Ramboll US Corporation was used for screening with the following assumptions:

a. The visibility facility-level emissions are the total combined emissions of NOx, SO2, and particulate matter less than ten (10) microns in diameter (PM10) - facility level emission $Q = Q_{NOX} + Q_{SO2} + Q_{PM10}$.

b. Distance (d) from the Class I Area in kilometers, includes only facilities within 400 km (250 miles) of a Class I Area. When evaluating sources for impacts, the larger of the two (2) Q/d values were used for noncontiguous regions of each national park.

c. Emissions were from the 2014 National Emissions Inventory (NEI)v2.

d. For facilities with multiple emission units/processes, facility location was based on the emission unit/process with the highest Q.

e. Screening thresholds were set at $Q = 25$ tpy and $Q/d = 10$ tpy/km to pre-screen sources for four-factor analysis.

Screening identified Kahului Generating Station as a significant source of emissions with Q/d values of 82.20 and 12.31 for Haleakala National Park and Volcanoes National Park, respectively. These Q/d values exceed the threshold of ten (10) for requiring further evaluation. Therefore, CAB requests that you prepare a four-factor analysis for the subject plant by February 29, 2020. Please refer to the enclosed attachment for information on completing and submitting your four-factor analysis.

If there are any questions regarding this matter, please contact Mr. Dale Hamamoto of my staff at (808) 586-4200.

Sincerely,

[Signature]

MARIANNE ROSSIO, P.E.
Manager, Clean Air Branch

MM/dh:rk
Attachment

c: Anthony Koyamatsu, Director, Environmental Division, Hawaiian Electric
   Don Shepard, National Park Service, Air Resources Division
   Melanie Peters, National Park Service, NPS-Air
ATTACHMENT
Page 1 of 2

The following information is provided for your use in completing and submitting the four-factor analysis:


b. Evaluate control measures for NO\textsubscript{X}, SO\textsubscript{2}, and PM\textsubscript{10} using the following four factors in section 169A(g)(1) of the Clean Air Act and 40 Code of Federal Regulations (CFR) §51.308(f)(2)(i) of the Regional Haze Rule:

1. The cost of compliance;
2. The time necessary to achieve compliance;
3. The energy and non-air quality environmental impacts of compliance; and
4. The remaining useful life of any existing source subject to such requirements.

c. Use calendar year 2017 emission estimates as a baseline to evaluate cost and feasibility of additional control measures for the following units:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Unit Description</th>
<th>Primary Fuel</th>
<th>Existing Control Equipment for Visibility Impairing Pollutants</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-1</td>
<td>5.0 MW Boiler</td>
<td>Fuel Oil No. 6 with maximum 2.0% sulfur content</td>
<td>None</td>
</tr>
<tr>
<td>K-2</td>
<td>5.0 MW Boiler</td>
<td>Fuel Oil No. 6 with maximum 2.0% content</td>
<td>None</td>
</tr>
<tr>
<td>K-3</td>
<td>11.5 MW Boiler</td>
<td>Fuel Oil No. 6 with maximum 2.0% sulfur content</td>
<td>None</td>
</tr>
<tr>
<td>K-4</td>
<td>12.5 MW Boiler</td>
<td>Fuel Oil No. 6 with maximum 2.0% sulfur content</td>
<td>None</td>
</tr>
</tbody>
</table>

1: MW-megawatt.

d. Identify and consider all available control measures that are technically feasible for each pollutant. A top-down sequence shall be used to analyze multiple control options to select the most effective and reasonable control measure in light of the costs of compliance. A control measure may only be rejected when one of the four factors, makes it unreasonable to require the control.

e. Consider emission reductions due to ongoing air pollution programs and source retirement and replacement schedules for control measure options pursuant to 40 CFR §51.308(f)(2)(iv) of the Regional Haze Rule and sections II.B.3(e) and II.B.4 of the EPA guidance.
f. The following are key sections in the EPA guidance for your analysis:

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<tr>
<td>II.B.4(e)</td>
<td>Characterizing energy and non-air environmental impacts (statutory factor 3)</td>
</tr>
<tr>
<td>II.B.4(f)</td>
<td>Characterizing remaining useful life of the source (statutory factor 4)</td>
</tr>
</tbody>
</table>
Mr. Mathew McNeff  
Director, Power Supply Division  
Maui Electric Company, Ltd.  
P. O. Box 398  
Kahului, Hawaii 96733

Dear Mr. McNeff:

Subject: Four-Factor Analysis for Regional Haze  
Covered Source Permit No. 0067-01-C  
Maui Electric Company, Ltd. (MECO)  
Maalaea Generating Station  
Four (4) 20 MW (Nominal) Combustion Turbine Generators (Units M14, M16,  
M17, and M19) and Sixteen (16) Diesel Engine Generators (Units M1  
through M13, X1, X2, and SG1)  
Located At: Maalaea Generating Station, Maalaea, Maui

The Department of Health, Clean Air Branch (CAB) is working on implementing the Regional Haze Rule for the second planning period (2018–2028) and has determined that a four-factor analysis is required for the subject facility. This determination is based on a Q/d screening evaluation to identify point sources with the greatest visibility impact on Hawaii’s two (2) Class I Areas (Haleakala National Park on Maui Island and Hawaii Volcanoes National Park on Hawaii Island). In the screening process, Q/d is the emissions in tons per year (tpy) divided by the distance in kilometers (km) between a source and the nearest Class I Area. The four-factor analysis will be used to establish control measures and reasonable progress goals for Hawaii’s Regional Haze State Implementation Plan.

In the first regional haze planning period (2001-2018), the emphasis was on Best Available Retrofit Technology (BART) to address reasonable progress that included a 0.5 deciview threshold. In the second planning period, there is no BART or deciview threshold. In this planning period, the focus is on determining reasonable progress through analyses of the four factors identified in Section 169A(g)(1) of the Clean Air Act:

1) The cost of compliance;  
2) The time necessary to achieve compliance;  
3) The energy and non-air quality environmental impact of compliance; and  
4) The remaining useful life of any existing source subject to such requirements.

In considering visibility benefit thresholds, recent guidance from the U.S. Environmental Protection Agency (EPA) notes that because regional haze results from a multitude of sources over a broad geographic area, progress may require addressing many relatively small contributions to impairment. Thus, a measure may be necessary for reasonable progress even if that measure in isolation does not result in perceptible visibility improvement.
Interagency Monitoring of Protected Visual Environments (IMPROVE) monitoring sites for both Haleakala National Park and Volcanoes National Park indicate primarily sulfates and nitrates with lower levels of elemental carbon. The primary precursors of sulfates and nitrates are emissions of sulfur dioxide (SO₂) and nitrogen oxide (NOₓ), respectively. Although there are still releases of SO₂ from the Kilauea Volcano, nitrates and elemental carbon measured at the IMPROVE sites are markers of particulate from anthropogenic sources.

A screening tool developed from work led by the Western Regional Air Partnership (WRAP) with Ramboll US Corporation was used for screening with the following assumptions:

a. The visibility facility-level emissions are the total combined emissions of NOₓ, SO₂, and particulate matter less than ten (10) microns in diameter (PM₁₀) - facility level emission \( Q = Q_{NOX} + Q_{SO2} + Q_{PM10} \)

b. Distance (d) from the Class I Area in kilometers, includes only facilities within 400 km (250 miles) of a Class I Area. When evaluating sources for impacts, the larger of the two (2) Q/d values were used for noncontiguous regions of each national park.

c. Emissions were from the 2014 National Emissions Inventory (NEI)v2.

d. For facilities with multiple emission units/processes, facility location was based on the emission unit/process with the highest Q.

e. Screening thresholds were set at \( Q = 25 \) tpy and \( Q/d = 10 \) tpy/km to pre-screen sources for four-factor analysis.

Screening identified Maalaea Generating Station as a significant source of emissions with Q/d values of 110.18 and 16.57 for Haleakala National Park and Volcanoes National Park, respectively. These Q/d values exceed the threshold of ten (10) for requiring further evaluation. Therefore, CAB requests that you prepare a four-factor analysis for the subject plant by February 29, 2020. Please refer to the enclosed attachment for information on completing and submitting your four-factor analysis.

If there are any questions regarding this matter, please contact Mr. Dale Hamamoto of my staff at (808) 586-4200.

Sincerely,

MARIANNE ROSSIO, P.E.
Manager, Clean Air Branch

MM/dh:rk
Attachment

c: Anthony Koyamatsu, Director, Environmental Division, Hawaiian Electric
Don Shepard, National Park Service, Air Resources Division
Melanie Peters, National Park Service, NPS-Air
ATTACHMENT
Page 1 of 3

The following information is provided for your use in completing and submitting the four-factor analysis:


b. Evaluate control measures for NOX, SO2, and PM10 using the following four factors in section 169A(g)(1) of the Clean Air Act and 40 Code of Federal Regulations (CFR) §51.308(f)(2)(i) of the Regional Haze Rule:

1. The cost of compliance;
2. The time necessary to achieve compliance;
3. The energy and non-air quality environmental impacts of compliance; and
4. The remaining useful life of any existing source subject to such requirements.

c. An evaluation of control measures for SO2 and PM10 is not required for fuel combustion units that are restricted to using ultra-low-sulfur diesel (ULSD) with a sulfur content of no more than 0.0015 percent, per enforceable requirements.

d. Use calendar year 2017 emission estimates as a baseline to evaluate cost and feasibility of additional control measures for the following units:

<table>
<thead>
<tr>
<th>Unit</th>
<th>Unit Description</th>
<th>Primary Fuel</th>
<th>Existing Control Equipment for Visibility Impairing Pollutants</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>2.5 MW Diesel Engine Generator</td>
<td>ULSD²</td>
<td>Oxidation catalyst for VOC and lube oil separator for PM10</td>
</tr>
<tr>
<td>M2</td>
<td>2.5 MW Diesel Engine Generator</td>
<td>ULSD²</td>
<td>Oxidation catalyst for VOC and lube oil separator for PM10</td>
</tr>
<tr>
<td>M3</td>
<td>2.5 MW Diesel Engine Generator</td>
<td>ULSD²</td>
<td>Oxidation catalyst for VOC and lube oil separator for PM10</td>
</tr>
<tr>
<td>M4</td>
<td>5.6 MW Diesel Engine Generator</td>
<td>Diesel Fuel Oil No. 2 with maximum 0.4% sulfur content</td>
<td>Oxidation catalyst for VOC and crankcase filtration for PM10</td>
</tr>
<tr>
<td>M5</td>
<td>5.6 MW Diesel Engine Generator</td>
<td>Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content</td>
<td>Oxidation catalyst for VOC and crankcase filtration for PM10</td>
</tr>
<tr>
<td>M6</td>
<td>5.6 MW Diesel Engine Generator</td>
<td>Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content</td>
<td>Oxidation catalyst for VOC and crankcase filtration for PM10</td>
</tr>
<tr>
<td>Unit</td>
<td>Unit Description ¹</td>
<td>Primary Fuel ¹</td>
<td>Existing Control Equipment for Visibility Impairing Pollutants ¹</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------</td>
<td>----------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>M7</td>
<td>5.6 MW Diesel Engine Generator</td>
<td>Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content.</td>
<td>Oxidation catalyst for VOC and crankcase filtration for PM&lt;sub&gt;10&lt;/sub&gt;</td>
</tr>
<tr>
<td>M8</td>
<td>5.6 MW Diesel Engine Generator</td>
<td>Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content</td>
<td>Oxidation catalyst for VOC and crankcase filtration for PM&lt;sub&gt;10&lt;/sub&gt;</td>
</tr>
<tr>
<td>M9</td>
<td>5.6 MW Diesel Engine Generator</td>
<td>Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content</td>
<td>Oxidation catalyst for VOC and crankcase filtration for PM&lt;sub&gt;10&lt;/sub&gt;</td>
</tr>
<tr>
<td>M10</td>
<td>12.5 MW Diesel Engine Generator</td>
<td>Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content</td>
<td>Oxidation catalyst for VOC and crankcase filtration for PM&lt;sub&gt;10&lt;/sub&gt;</td>
</tr>
<tr>
<td>M11</td>
<td>12.5 MW Diesel Engine Generator</td>
<td>Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content</td>
<td>Oxidation catalyst for VOC and crankcase filtration for PM&lt;sub&gt;10&lt;/sub&gt;</td>
</tr>
<tr>
<td>M12</td>
<td>12.5 MW Diesel Engine Generator</td>
<td>Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content</td>
<td>Oxidation catalyst for VOC, crankcase filtration for PM&lt;sub&gt;10&lt;/sub&gt; and FITR for NO&lt;sub&gt;x&lt;/sub&gt;</td>
</tr>
<tr>
<td>M13</td>
<td>12.5 MW Diesel Engine Generator</td>
<td>Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content</td>
<td>Oxidation catalyst for VOC, crankcase filtration for PM&lt;sub&gt;10&lt;/sub&gt; and FITR for NO&lt;sub&gt;x&lt;/sub&gt;</td>
</tr>
<tr>
<td>X1</td>
<td>2.5 MW Diesel Engine Generator</td>
<td>ULSD&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Oxidation catalyst for VOC and FITR for NO&lt;sub&gt;x&lt;/sub&gt;</td>
</tr>
<tr>
<td>X2</td>
<td>2.5 MW Diesel Engine Generator</td>
<td>ULSD&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Oxidation catalyst for VOC and FITR for NO&lt;sub&gt;x&lt;/sub&gt;</td>
</tr>
<tr>
<td>M14</td>
<td>20 MW Combustion Turbine</td>
<td>Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content and 0.015% maximum nitrogen content.</td>
<td>Water injection system for NO&lt;sub&gt;x&lt;/sub&gt;</td>
</tr>
<tr>
<td>M16</td>
<td>20 MW Combustion Turbine</td>
<td>Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content and 0.015% maximum nitrogen content.</td>
<td>Water injection system for NO&lt;sub&gt;x&lt;/sub&gt;</td>
</tr>
<tr>
<td>M17</td>
<td>20 MW Combustion Turbine</td>
<td>Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content and 0.015% average nitrogen content.</td>
<td>Water injection system for NO&lt;sub&gt;x&lt;/sub&gt;</td>
</tr>
<tr>
<td>M19</td>
<td>20 MW Combustion Turbine</td>
<td>Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content and 0.015% average nitrogen content.</td>
<td>Water injection system for NO&lt;sub&gt;x&lt;/sub&gt;</td>
</tr>
</tbody>
</table>

¹. FITR = fuel injection timing retard, MW-megawatt, ULSD-ultra-low-sulfur diesel (0.0015% maximum allowable sulfur content), and VOC-volatile organic compound.

². Fuel combustion units that are restricted to using only ULSD or distillate fuel with a sulfur content of no more than 0.0015 percent, per enforceable requirements, do not need further evaluation of SO<sub>2</sub> and PM control measures.
e. Identify and consider all available control measures that are technically feasible for each pollutant. A top-down sequence shall be used to analyze multiple control options to select the most effective and reasonable control measure in light of the costs of compliance. A control measure may only be rejected when one of the four factors, makes it unreasonable to require the control.

f. Consider emission reductions due to ongoing air pollution programs and source retirement and replacement schedules for control measure options pursuant to 40 CFR §51.308(f)(2)(iv) of the Regional Haze Rule and sections II.B.3(e) and II.B.4 of the EPA guidance.

g. The following are key sections in the EPA guidance for your analysis:

<table>
<thead>
<tr>
<th>EPA Guidance Section</th>
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<tr>
<td>II.B.4</td>
<td>Step 4: Characterization of factors for emission control measures</td>
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<tr>
<td>II.B.4(a)</td>
<td>Determining which emission control measures to consider</td>
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<td>II.B.4(b)</td>
<td>Selection of emissions information for characterizing emission-related factors</td>
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<td>II.B.4(c)</td>
<td>Characterizing the cost of compliance (statutory factor 1)</td>
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<td>II.B.4(f)</td>
<td>Characterizing remaining useful life of the source (statutory factor 4)</td>
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