Appendix B:
Notifications to Provide Four-Factor Analysis
August 12, 2022 RH-SIP Submittal

DAVID Y. IGE
GOVERNOR OF HAWAII

BRUCE S. ANDERSON, Ph.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File:

19-505E CAB
File No. 0214

September 11, 2019

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 (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.

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 Madsen of my staff at (808) 586-4200.

Sincerely,

Marianne Rossio

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:

a. Use guidance from EPA (Guidance on Regional Haze State Implementation Plans for the Second Implementation Period) at https://www.epa.gov/visibility/guidance-regional-haze-state-implementation-plans-second-implementation-period for the analysis.

b. Evaluate control measures for NO_X, SO_2, and PM_{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:

Unit	Unit Description[1]	Primary Fuel	Existing Control Equipment for Visibility Impairing Pollutants
CT-1	86 MW Combustion Turbine	Fuel Oil No. 6 with 0.5% maximum sulfur content	Steam injection for NO_X
CT-2	86 MW Combustion Turbine	Fuel Oil No. 6 with 0.5% maximum sulfur content	Steam injection for NO_X

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:

EPA Guidance Section	Title
II.B.4	Step 4: Characterization of factors for emission control measures
II.B.4(a)	Determining which emission control measures to consider
II.B.4(b)	Selection of emissions information for characterizing emission-related factors
II.B.4(c)	Characterizing the cost of compliance (statutory factor 1)
II.B.4(d)	Characterizing the time necessary for compliance (statutory factor 2)
II.B.4(e)	Characterizing energy and non-air environmental impacts (statutory factor 3)
II.B.4(f)	Characterizing remaining useful life of the source (statutory factor 4)

DAVID Y. IGE
GOVERNOR OF HAWAII

BRUCE S. ANDERSON, Ph.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File:

19-502E CAB
File No. 0240

September 11, 2019

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.

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

ATTACHMENT
Page 1 of 2

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

a. Use guidance from EPA (Guidance on Regional Haze State Implementation Plans for the Second Implementation Period) at https://www.epa.gov/visibility/guidance-regional-haze-state-implementation-plans-second-implementation-period for the analysis.

b. Evaluate control measures for NO_X, SO_2, and PM_{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:

Unit	Unit Description[1]	Primary Fuel	Existing Control Equipment for Visibility Impairing Pollutants
K-1	92 MW Boiler	Fuel Oil No. 6 with 0.5% maximum allowable sulfur content	----------
K-2	90 MW Boiler	Fuel Oil No. 6 with 0.5% maximum allowable sulfur content	----------
K-3	92 MW Boiler	Fuel Oil No. 6 with 0.5% maximum allowable sulfur content	----------
K-4	93 MW Boiler	Fuel Oil No. 6 with 0.5% maximum allowable sulfur content	----------
K-5	142 MW Boiler	Fuel Oil No. 6 with 0.5% maximum allowable sulfur content	----------
K-6	142 MW Boiler	Fuel Oil No. 6 with 0.5% maximum allowable sulfur content	Low-NO_X Burner

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:

EPA Guidance Section	Title
II.B.4	Step 4: Characterization of factors for emission control measures
II.B.4(a)	Determining which emission control measures to consider
II.B.4(b)	Selection of emissions information for characterizing emission-related factors
II.B.4(c)	Characterizing the cost of compliance (statutory factor 1)
II.B.4(d)	Characterizing the time necessary for compliance (statutory factor 2)
II.B.4(e)	Characterizing energy and non-air environmental impacts (statutory factor 3)
II.B.4(f)	Characterizing remaining useful life of the source (statutory factor 4)

DAVID Y. IGE
GOVERNOR OF HAWAII

BRUCE S. ANDERSON, Ph.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File:

19-501E CAB
File No. 0239

September 11, 2019

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 (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 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

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:

a. Use the guidance from EPA (Guidance on Regional Haze State Implementation Plans for the Second Implementation Period) at https://www.epa.gov/visibility/guidance-regional-haze-state-implementation-plans-second-implementation-period for the analysis.

b. Evaluate control measures for NO_X, SO_2, and PM_{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:

Unit	Unit Description[1]	Primary Fuel	Existing Control Equipment for Visibility Impairing Pollutants
3	49 MW Boiler	Fuel Oil No. 6 with 0.5% maximum sulfur content	None
4	49 MW Boiler	Fuel Oil No. 6 with 0.5% maximum sulfur content	None
5	57 MW Boiler	Fuel Oil No. 6 with 0.5% maximum sulfur content	None
6	58 MW Boiler	Fuel Oil No. 6 with 0.5% maximum sulfur content	None
7	92 MW Boiler	Fuel Oil No. 6 with 0.5% maximum sulfur content	None
8	92 MW Boiler	Fuel Oil No. 6 with 0.5% maximum sulfur content	None
9	52 MW Combustion Turbine	Diesel Fuel Oil No. 2 with 0.5% maximum sulfur content	None
10	50 MW Combustion Turbine	Diesel Fuel Oil No. 2 with 0.5% maximum sulfur content	None

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.

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

EPA Guidance Section	Title
II.B.4	Step 4: Characterization of factors for emission control measures
II.B.4(a)	Determining which emission control measures to consider
II.B.4(b)	Selection of emissions information for characterizing emission-related factors
II.B.4(c)	Characterizing the cost of compliance (statutory factor 1)
II.B.4(d)	Characterizing the time necessary for compliance (statutory factor 2)
II.B.4(e)	Characterizing energy and non-air environmental impacts (statutory factor 3)
II.B.4(f)	Characterizing remaining useful life of the source (statutory factor 4)

DAVID Y. IGE
GOVERNOR OF HAWAII

BRUCE S. ANDERSON, Ph.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File:

19-506E CAB
File No. 0234

September 11, 2019

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)
Kanoelehua-Hill Generating Station
Two (2) Boilers, One (1) Combustion Turbine, and Four (4) Diesel Engines
Located At: 54 Halekauila 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 (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 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: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:

a. Use the guidance from EPA (Guidance on Regional Haze State Implementation Plans for the Second Implementation Period) at https://www.epa.gov/visibility/guidance-regional-haze-state-implementation-plans-second-implementation-period for the analysis.

b. Evaluate control measures for NO_X, SO_2, and PM_{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. An evaluation of control measures for SO_2 and PM_{10} 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:

Unit	Unit Description [1]	Primary Fuel [1]	Existing Control Equipment and Mass Emission Limit for Visibility Impairing Pollutants [1]
Hill 5	14 MW Boiler	Fuel Oil No. 6 with 2.0% maximum sulfur content	SO_2 emissions cap [2]
Hill 6	23 MW Boiler	Fuel Oil No. 6 with 2.0% maximum sulfur content	SO_2 emissions cap [2]
CT-1	11.6 MW Combustion Turbine	Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content	None
D-11	2.0 MW Diesel Engine Generator	ULSD [3]	Oxidation catalyst for VOC
D-15	2.75 MW Diesel Engine Generator	ULSD [3]	Oxidation catalyst for VOC
D-16	2.75 MW Diesel Engine Generator	ULSD [3]	Oxidation catalyst for VOC
D-17	2.75 MW Diesel Engine Generator	ULSD [3]	Oxidation catalyst for VOC

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 SO_2 emissions from boilers at the Kanoelehua-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 SO_2 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:

EPA Guidance Section	Title
II.B.4	Step 4: Characterization of factors for emission control measures
II.B.4(a)	Determining which emission control measures to consider
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II.B.4(d)	Characterizing the time necessary for compliance (statutory factor 2)
II.B.4(e)	Characterizing energy and non-air environmental impacts (statutory factor 3)
II.B.4(f)	Characterizing remaining useful life of the source (statutory factor 4)

DAVID Y. IGE
GOVERNOR OF HAWAII

BRUCE S. ANDERSON, Ph.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to File:

19-503E CAB
File No. 0235

September 11, 2019

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 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 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:

a. Use the guidance from EPA (Guidance on Regional Haze State Implementation Plans for the Second Implementation Period) at https://www.epa.gov/visibility/guidance-regional-haze-state-implementation-plans-second-implementation-period for the analysis.

b. Evaluate control measures for NO_X, SO_2, and PM_{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:

Unit	Unit Description[1]	Primary Fuel	Existing Control Equipment for Visibility Impairing Pollutants
CT-3	20 MW Combustion Turbine	Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content	Water injection system for NO_x
Boiler	15.5 MW Boiler	Diesel Fuel Oil No. 6 with 2.0 % maximum sulfur content	MultiCyclone Dust Collector for PM and SO_2 Emissions Cap [2]

1: MW-megawatt.
2: Permits limit total combined SO_2 emissions from boilers at the Kanoelehua-Hill 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.

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

EPA Guidance Section	Title
II.B.4	Step 4: Characterization of factors for emission control measures
II.B.4(a)	Determining which emission control measures to consider
II.B.4(b)	Selection of emissions information for characterizing emission-related factors
II.B.4(c)	Characterizing the cost of compliance (statutory factor 1)
II.B.4(d)	Characterizing the time necessary for compliance (statutory factor 2)
II.B.4(e)	Characterizing energy and non-air environmental impacts (statutory factor 3)
II.B.4(f)	Characterizing remaining useful life of the source (statutory factor 4)

DAVID Y. IGE
GOVERNOR OF HAWAII

BRUCE S. ANDERSON, Ph.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to
File:

19-504E CAB
File No. 0232

September 11, 2019

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 (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 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,

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:

a. Use guidance from EPA (Guidance on Regional Haze State Implementation Plans for the Second Implementation Period) at https://www.epa.gov/visibility/guidance-regional-haze-state-implementation-plans-second-implementation-period for the analysis.

b. Evaluate control measures for NO_X, SO_2, and PM_{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:

Unit	Unit Description [1]	Primary Fuel	Existing Control Equipment for Visibility Impairing Pollutants
K-1	5.0 MW Boiler	Fuel Oil No. 6 with maximum 2.0% sulfur content	None
K-2	5.0 MW Boiler	Fuel Oil No. 6 with maximum 2.0% content	None
K-3	11.5 MW Boiler	Fuel Oil No. 6 with maximum 2.0% sulfur content	None
K-4	12.5 MW Boiler	Fuel Oil No. 6 with maximum 2.0% sulfur content	None

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:

EPA Guidance Section	Title
II.B.4	Step 4: Characterization of factors for emission control measures
II.B.4(a)	Determining which emission control measures to consider
II.B.4(b)	Selection of emissions information for characterizing emission-related factors
II.B.4(c)	Characterizing the cost of compliance (statutory factor 1)
II.B.4(d)	Characterizing the time necessary for compliance (statutory factor 2)
II.B.4(e)	Characterizing energy and non-air environmental impacts (statutory factor 3)
II.B.4(f)	Characterizing remaining useful life of the source (statutory factor 4)

DAVID Y. IGE
GOVERNOR OF HAWAII

BRUCE S. ANDERSON, Ph.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. Box 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File:

19-507E CAB
File No. 0067

September 11, 2019

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 (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 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: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 3

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

a. Use guidance from EPA (Guidance on Regional Haze State Implementation Plans for the Second Implementation Period) at https://www.epa.gov/visibility/guidance-regional-haze-state-implementation-plans-second-implementation-period for the analysis.

b. Evaluate control measures for NO_X, SO_2, and PM_{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. An evaluation of control measures for SO_2 and PM_{10} 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:

Unit	Unit Description [1]	Primary Fuel [1]	Existing Control Equipment for Visibility Impairing Pollutants [1]
M1	2.5 MW Diesel Engine Generator	ULSD[2]	Oxidation catalyst for VOC and lube oil separator for PM_{10}
M2	2.5 MW Diesel Engine Generator	ULSD[2]	Oxidation catalyst for VOC and lube oil separator for PM_{10}
M3	2.5 MW Diesel Engine Generator	ULSD[2]	Oxidation catalyst for VOC and lube oil separator for PM_{10}
M4	5.6 MW Diesel Engine Generator	Diesel Fuel Oil No. 2 with maximum 0.4% sulfur content	Oxidation catalyst for VOC and crankcase filtration for PM_{10}
M5	5.6 MW Diesel Engine Generator	Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content.	Oxidation catalyst for VOC and crankcase filtration for PM_{10}
M6	5.6 MW Diesel Engine Generator	Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content	Oxidation catalyst for VOC and crankcase filtration for PM_{10}

Unit	Unit Description [1]	Primary Fuel [1]	Existing Control Equipment for Visibility Impairing Pollutants [1]
M7	5.6 MW Diesel Engine Generator	Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content.	Oxidation catalyst for VOC and crankcase filtration for PM_{10}
M8	5.6 MW Diesel Engine Generator	Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content	Oxidation catalyst for VOC and crankcase filtration for PM_{10}
M9	5.6 MW Diesel Engine Generator	Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content	Oxidation catalyst for VOC and crankcase filtration for PM_{10}
M10	12.5 MW Diesel Engine Generator	Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content	Oxidation catalyst for VOC and crankcase filtration for PM_{10}
M11	12.5 MW Diesel Engine Generator	Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content	Oxidation catalyst for VOC and crankcase filtration for PM_{10}
M12	12.5 MW Diesel Engine Generator	Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content	Oxidation catalyst for VOC, crankcase filtration for PM_{10} and FITR for NO_x
M13	12.5 MW Diesel Engine Generator	Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content	Oxidation catalyst for VOC, crankcase filtration for PM_{10}, and FITR for NO_x
X1	2.5 MW Diesel Engine Generator	ULSD[2]	Oxidation catalyst for VOC and FITR for NO_x
X2	2.5 MW Diesel Engine Generator	ULSD[2]	Oxidation catalyst for VOC and FITR for NO_x
M14	20 MW Combustion Turbine	Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content and 0.015% maximum nitrogen content.	Water injection system for NO_x.
M16	20 MW Combustion Turbine	Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content and 0.015% maximum nitrogen content.	Water injection system for NO_x.
M17	20 MW Combustion Turbine	Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content and 0.015% average nitrogen content.	Water injection system for NO_x.
M19	20 MW Combustion Turbine	Diesel Fuel Oil No. 2 with 0.4% maximum sulfur content and 0.015% average nitrogen content.	Water injection system for NO_x.

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_2 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:

EPA Guidance Section	Title
II.B.4	Step 4: Characterization of factors for emission control measures
II.B.4(a)	Determining which emission control measures to consider
II.B.4(b)	Selection of emissions information for characterizing emission-related factors
II.B.4(c)	Characterizing the cost of compliance (statutory factor 1)
II.B.4(d)	Characterizing the time necessary for compliance (statutory factor 2)
II.B.4(e)	Characterizing energy and non-air environmental impacts (statutory factor 3)
II.B.4(f)	Characterizing remaining useful life of the source (statutory factor 4)