APPENDIX D
AIR

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D1.0 Class II

D1.1 Modeling Analysis Design

Air quality impacts from the Dry Fork Station were determined with the latest version of the EPA's Industrial Source Complex Short-Term (ISCST) model that incorporates enhanced building downwash algorithms (EPA 2003). The enhanced downwash algorithms are referred to as Plume Rise Model Enhancements (PRIME), and the model as ISC-PRIME (version 04269). The land surrounding the Dry Fork Station Project is primarily rangeland. Therefore, rural dispersion coefficients were used within the ISC-PRIME model.

Point sources were modeled with stack heights that are consistent with good engineering practice (GEP) stack height. Building downwash parameters for the point sources at the Dry Fork Station were determined with the latest version of the EPA Building Profile Input Program (BPIP) designed for the ISC-PRIME model (BPIP-Prime). GEP for all of the point sources, as determined with BPIP-Prime, was 550 feet. The GEP height was driven by the boiler building and the proximity of all point sources relative to that structure.

D1.2 Receptor Network

The base receptor grid for ISC-PRIME consisted of arrays of receptors with spacing that increased with distance from the origin. The base grid originated at the proposed location of the Dry Fork Station boiler stack. The WDEQ 2003 guidelines for receptor spacing are shown below:

- 50-meter spacing for ambient boundary (fence line) receptors
- 100-meter spacing from the ambient boundary to 1 kilometer (km) from the origin
- 500-meter spacing from beyond 1 km to 5 km from the origin
- 1,000-meter spacing from beyond 5 km to 50 km from the origin

The base receptor grid was supplemented with receptors at closer (tighter) receptor spacing, where appropriate, to ensure that the maximum points of impact were identified. Terrain near the Dry Fork Station site was accounted for by assigning elevations to each modeling receptor.

Meteorology Data. Surface meteorological data collected at a 100-meter meteorological tower southeast of Gillette were used as input to the ISC-PRIME model. The 100-meter tower was equipped with meteorological sensors at 2, 10, 50, and 100 m. Data were processed using the EPA's Meteorological Processor for Regulatory Models (MPRM, version 99349). Data for the full calendar year from January 1, 2002, through December 31, 2002, were processed into a model-ready format. Model-ready files with hourly wind speeds and directions from the 10- and 100-meter level of the tower were produced.

Raw data from the 100-meter tower were missing for a 2-week period in August 2002 because an elevator failure in the tower occurred. Data collected at the nearby Gillette-Campbell County Airport were used to fill this data gap. The process and use of Gillette-Campbell County Airport data to fill this 2-week data gap were determined to be appropriate by WDEQ and approved for use for all ISC-PRIME modeling.

For model runs that included emissions from the proposed boiler stack only, the model-ready file that contained winds measured at the 100-meter level were used to allow for the best possible approximation of the winds at the boiler stack height (152.4 meters). This meteorological input file was also used for the model run for annual NO_X impacts that included the principal boiler and auxiliary boiler.

For modeling PM_{10} impacts, the project emissions inventory included sources released from near the surface (haul roads and landfill activity) and other point sources with lower release heights than the boiler stack. Because the maximum impacts from PM_{10} were expected to occur near the facility boundary, where the contribution from the boiler stack would be small, the model-ready file containing winds measured at the 10-m level was used for PM_{10} modeling. This allowed for a better approximation of the dispersion from the full suite of PM_{10} sources.

Emissions Source Characterization. Depending on the nature of the particular source, emissions sources at the Dry Fork Station were modeled as point, area, and volume sources at locations where actual operations would occur. Sources emitted from a stack, including PM_{10} sources from the auxiliary cooling towers' cells and material handling dust collectors, were modeled as point sources. Fugitive emissions from the landfill were modeled as an area source. Although landfill dumping and maintenance would occur well below grade within the landfill (up to 100 feet deep), the landfill area source was conservatively modeled as a surface-based source. The area source release height was set to 15 feet to represent a typical average height at which dumping and maintenance activities would occur.

Fugitive particulate emissions from haul roads were modeled as a series of volume sources (EPA 1994). The source height of the haul road volume sources was set to 2 m (approximately 6.6 feet), based on the statement from the EPA document that the maximum mass flux from haul road dust plumes occurs at that height.

Material transfer emissions points that are not controlled by dust collectors or other control equipment were also modeled as volume sources. These volume sources were elevated at an appropriate height representative of the actual release height of the source. For this project, the only source in this category was the truck loading at the fly ash/FGD waste silo.

Load Screening Analysis. The first step in the preliminary analysis was to evaluate boiler stack operation at peak load (103 percent load), full load (100 percent load), and selected reduced loads (75 percent and 50 percent) to determine which operating condition would produce the highest predicted impacts. The load condition that yielded the highest impacts for a particular averaging period was used to represent the boiler in subsequent modeling analyses. The 100-meter meteorological dataset was used for the load screening. Operation at full (100 percent) load would yield impacts for the annual averaging period, and therefore full load was used to represent the boiler for the annual averaging period. Operations at both peak (103 percent) load and full (100 percent) load would yield impacts for the short-term averaging periods, with operations at full load more typical than at peak load.

D2.0 Class I

D2.1 Model Selection

The three Class I-certified locations that could be affected by the proposed Dry Fork Station Project are more than 50 km from the proposed source. Work groups representing the interests of federal land managers in the PSD-permitting process recommended that a Class I analysis be made of the effect of this proposed source on air quality and air quality-related values in these Class I-designated areas located more than 50 km away. The CALPUFF modeling system, as recommended by the EPA and federal land managers for Class I analysis, was used to obtain predicted impacts. This system includes the CALMET meteorological model, a Gaussian puff dispersion model (CALPUFF) with algorithms for chemical transformation and deposition, and a postprocessor capable of calculating concentrations, visibility impacts, and deposition (CALPOST). The CALPUFF modeling system was applied in a full, refined mode rather than a screening mode. The CALMET model was run to produce 3 years of analysis (2001, 2002, and 2003).

The geographic extent of cumulative air quality impacts can be larger than impacts for other resource areas. Therefore, this cumulative analysis considers potential air emission impacts to the Northern Cheyenne Indian Reservation in southern Montana that may be associated with the proposed project. Additional air emission sources in this region not on the base list of cumulative projects evaluated were reviewed in this Class I analysis.

To conduct a cumulative increment consumption analysis at the Northern Cheyenne Indian Reservation in southern Montana, a CALMET/CALPUFF modeling domain that was centered on the reservation itself was established. The modeling domain covers a region 600 km by 600 km. This domain is sized to potentially accommodate any source within the accepted effective distance of the CALPUFF model, which is 300 km.

As with the project-only analysis, upper-air observations from Rapid City, South Dakota were input to CALMET and the CALMET model was run to produce three years of analysis: 2001, 2002 and 2003. A 2044-receptor grid, supplied to WDEQ by Montana DEQ was used to model the cumulative impacts at Northern Cheyenne Indian Reservation.

D2.2 Source and Emissions Inventory

To determine the inventory of sources to include in the cumulative Class I SO_2 increment consumption analysis, states that fall within a 300-km radius of the Northern Cheyenne Indian Reservation were considered. These states include Montana, Wyoming, the northwest corner of South Dakota, and the extreme southwest corner of North Dakota.

For North Dakota sources, the Gascoyne Generating Station, a recently permitted coal-fired power plant in Bowman County in extreme southwest North Dakota was included. For sources in South Dakota, the South Dakota Department of Environment & Natural Resources was contacted, and an extraction from their emissions database was requested. A review of the data extraction provided by the Department revealed that four very small sources of SO_2 were located within 300 km of the reservation. Due to the large distance of these sources from the reservation and the low magnitude of the emissions, none of the South Dakota sources were input to CALPUFF.

Sources in Montana were provided by the Montana Department of Environmental Quality Air Resources Management Bureau. Locations and stack parameters were provided for the following sources in southern Montana:

- Colstrip Units 3 and 4
- Rocky Mountain Power (Hardin)
- Rocky Mountain Ethanol
- Colstrip Energy Limited Partnership
- Roundup Power Project Units 1 and 2

The SO_2 emission rates provided for these sources were based on short-term allowable (permit) limits. This represents a conservative approach because PSD increment consumption is ordinarily based on impacts from actual emission changes.

Input data for sources in Wyoming were provided by the WDEQ or assembled at WDEQ’s offices. All Wyoming Sources were conservatively modeled with their respective allowable short-term emissions for SO_2. The master list of Wyoming sources in the analysis included the following:

- Wygen1
- Wygen2
- Neil Simpson Unit 2
- Wyodak Unit 1
- 2 Elk Unit 1
- KFx

All Wyoming sources were conservatively modeled with their respective allowable short-term emissions for SO_2.

D2.3 Tier 1 Inhalation Risk Analysis

A Tier 1 inhalation risk analysis was conducted for the Dry Fork Station boiler following guidelines developed by EPA (EPA 2004). The inhalation risk analysis assessed impacts in the Class II area surrounding the project. This analysis is a screening-level assessment that allows a simple, health-protective risk estimate to be calculated. The resulting risk estimates are likely to be higher than actual risks because of the conservative nature of the analysis. If the facility passes this screening analysis, then the likelihood for significant risk is low.

Exposure Assessment. Human exposure via inhalation can be assessed by estimating the ambient air concentration of a hazardous air pollutant (HAP). The emissions estimates and dispersion modeling results discussed previously were used to calculate ambient air concentrations and exposure concentrations (EC). The EC is the ambient air concentration at a receptor location (exposure point). In a Tier 1 analysis, it is assumed that the modeled ambient air concentrations and ECs are the same and that the exposure estimates derived from a single year's emissions estimates are commonly used to represent a chronic exposure (EPA 2004).

The modeled ambient air concentration used in the Tier 1 risk analysis is based on the maximum exposed individual (MEI). The MEI provides a conservative estimate of exposure. The default assumption is that the receptor population is breathing, over a lifetime (that is, 70 years by convention), outdoor air continuously at the MEI location. This is believed to be a conservative assumption because indoor air concentrations of air toxics are expected to be the same or lower than the outdoor concentrations.

The predicted MEI ambient air concentration is used as the EC. The EC for each HAP is calculated by multiplying the 1-hour or annual model results obtained with a modeled emissions rate of 1 gram per second by the hourly or annual emissions rates. Exposure concentrations (ECL) for estimating chronic cancer risk are derived using the average annual emissions rate, assuming the plant is operating at a 100 percent load. Exposure concentrations (ECST) for estimating chronic and acute non-cancer hazards are derived using the peak hourly emission rate assuming the plant is operating at a 103 percent load.

Toxicity Criteria Used in the Tier 1 Risk Analysis. The following screening-level toxicity criteria (chronic and acute dose-response values) published by EPA's Office of Air Quality Planning and Standards Air Toxics Web site were used in this Tier 1 risk analysis (http:/www.epa.gov/ttn/atw/toxsource/ summary.html):

- Chronic Cancer Toxicity Criteria
  - Inhalation Unit Risk (IUR) values from Table 1. Prioritized Chronic Dose-Response Values (2/28/05) were used.

- Chronic Non-Cancer Toxicity Criteria
  - Reference Concentration (RfC) values from Table 1. Prioritized Chronic Dose-Response Values (2/28/05) were used.

- Acute Non-Cancer Toxicity Criteria
  - Acute Dose-Response Values (AV) from Table 2. Acute Dose-Response Values for Screening Risk Assessments (6/02/2005) were used.

EPA provides specific dose-response recommendations for unspeciated HAP data (EPA 2004).
Therefore, the inhalation toxicity criteria for chromium compounds are based on 100 percent chromium VI (Cr+6); Hg compounds are assumed to be 100 percent elemental Hg; and nickel compounds are assumed to be Ni_3S_2 for estimating cancer risk and NiO for estimating chronic non-cancer hazard.

D3.0 Boiler Criteria Emissions

The estimated hourly and annual controlled emission rates of criteria pollutants from ES1-01, the stack, as well as selected BACT control technologies are shown in table D1. The hourly emissions are estimated at peak conditions and the annual emissions are estimated at 100 percent load operation for the entire year. The peak operating conditions assume a worst case coal analysis and maximum heat input to the boiler of 3,801 million British thermal units per hour (mmBtu/hr). The annual emissions assume an average expected coal analysis, heat input to the boiler of 3,701 mmBtu/hr and annual capacity factor of 100 percent.

Table D1 – Boiler Criteria Pollutants

Pollutant	**Hourly Emissions (pounds per hour [lb/hr])**	**Annual Emissions (tons per year [tpy])**	**PSD Significant Emission Rates (tpy)**	**Selected BACT Control Technology**
Sulfur Dioxide	380	1,625	40	Dry FGD and low sulfur coal (0.10 lb/mmBtu – 30 day rolling average)
Nitrogen Oxides	266	1,137	40	SCR with Low-NO_x Burners and Overfire Air (0.07 lb/mmBtu 30 day rolling average)
Filterable Particulate Matter	57.0	244	NA	Fabric Filter (0.015 lb/mmBtu 3-hr rolling average)
Total Particulate Matter	76.0	325	25	NA
Filterable Particulate Matter PM_{10}	45.6	195	NA	Fabric Filter (0.012 lb/mmBtu 3-hr rolling average)
Total Particulate Matter PM_{10}	64.6	276	15	NA
Carbon Monoxide	570	2,437	100	Combustion Control (0.15 lb/mmBtu 30 day rolling average)
VOCs	14.6	60.6	40	Combustion Control (0.00385 lb/mmBtu annual average)
Lead	0.006	0.03	0.6	Fabric Filter
Beryllium	0.00097	0.0040	0.0004	Dry lime FGD system, followed by fabric filter (0.00097 lb/mmBtu)
Hg	0.0113	0.047	0.1	Compliance with CAMR – Discussion provided in Section 4.5.3.2.4
Sulfuric Acid Mist	9.5	40.6	7	Dry lime FGD system, followed by fabric filter (0.0045 lb/mmBtu)
Fluorides (as HF)	2.6	11.2	3	Spray dryer FGD system, followed by fabric filter (0.00069 lb/mmBtu)

The total PM and PM_{10} emissions include filterable, condensable (hydrogen chloride, hydrogen fluoride, sulfuric acid, ammonium sulfate and organic condensibles) and elemental carbon emissions.

D4.0 Boiler Hazardous Air Pollutant Emissions

The estimated annual controlled emission rates of total trace metal hazardous air pollutants (HAPs), total organic compounds, and total acid gas HAPs for ES1-01, the stack, are shown in table D2**.** The unit will be designed to burn coal from the adjacent Dry Fork Mine. The metal concentration was used to estimate the trace metal HAP emissions. Hourly emissions are estimated at peak operation for the boiler; and annual emissions are estimated at 100 percent capacity factor for the boiler.

Table D2 – Boiler Acid Gas HAPs

Pollutant	Annual Emission Rate (tons/yr)	Emission Factor Reference
Total Trace Metal HAPs	0.48	Coal Analysis
Total Organic Compounds	9.8	AP-42 Tables 1.1-13 and 1.1-14 (EPA 1996)
Total Acid Gas HAPs	25.0	Engineering Estimates

Notes:
HAPs Hazardous Air Pollutants

D4.1 Coal Handling

The estimated hourly and annual controlled particulate emission rates from the coal handling system, and selected BACT control technologies are shown in table D3**.** The tables summarize particulate emissions; details on each emission point can be found in Appendix B of the permit application (CH2M Hill 2005a). The annual emissions are based on 100 percent capacity factor. The emission sources will be equipped with fabric filter dust collectors to control particulate emissions.

The emission sources will be equipped with fabric filter dust collectors and/or bin vent filters to control particulate emissions.

Table D3 – Coal Handling

Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (tpy)	Selected BACT Control Technology
Total Particulate Matter	3.81	16.7	Fabric Filters on Dust Collectors (0.005 gr/dscf) Water and dust suppression chemicals on haul roads
Particulate Matter PM_{10}	3.81	16.7	Fabric Filters on Dust Collectors (0.005 gr/dscf) Water and dust suppression chemicals on haul roads

Includes Coal Storage Silos (ES1-07, ES1-08, ES1-09), Coal Crusher (ES1-10), and Plant Coal Transfer Bay Silo (ES1-11)

Notes:
BACT Best Available Control Technology
gr/dscf grains per dry standard cubic foot
lb/hr pounds per hour
PM_{10} Particulate Matter less than 10 microns in diameter
tpy tons per year

D4.2 Lime Handling

The estimated hourly and annual controlled particulate emission rates from the lime handling system, and selected BACT control technologies are shown in table D4. The table summarizes particulate emissions; details on each emission point can be found in Appendix B of the permit application (CH2M Hill 2005a). The annual emissions are based on 100 percent capacity factor.

Table D4 – Lime Handling

Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (tpy)	Selected BACT Control Technology
Total Particulate Matter	2.03	8.89	Fabric Filters on Dust Collectors (0.005 gr/dscf) Water and dust suppression chemicals on haul roads
Particulate Matter PM_{10}	2.03	8.89	Fabric Filters on Dust Collectors (0.005 gr/dscf) Water and dust suppression chemicals on haul roads

Includes Pebble Lime Receiving Silo (ES1-12), Pebble Lime Day Silo (ES1-13), Lime Hydrator Mixers (ES1-14, ES1-15), Hydrated Lime Crushers (ES1-16, ES1-17), and Hydrated Lime Silos (ES1-18, ES1-19)

Notes:
BACT Best Available Control Technology
gr/dscf grains per dry standard cubic foot
lb/hr pounds per hour
PM_{10} Particulate Matter less than 10 microns in diameter
tpy tons per year

D4.3 Sorbent Injection System

The estimated hourly and annual controlled particulate emission rates from the sorbent injection system (if installed) are shown in table D5**.** The annual emissions are based on 100 percent capacity factor. The emission source will be equipped with bin vent filters to control particulate emissions. Sorbent (activated carbon or another material) will be used to control Hg emissions from the boiler.

Table D5 – Sorbet Injection System

Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (tpy)	Emission Factor Reference
Total Particulate Matter	0.0312	0.137	Bin Vent Filter Grain Loading Method and Engineering Estimates
Particulate matter PM_{10}	0.0312	0.137	Bin Vent Filter Grain Loading Method and Engineering Estimates

Includes Sorbent Silo (ES1-20)

Notes:
lb/hr pounds per hour
PM_{10} Particulate Matter less than 10 microns in diameter
tpy tons per year

D4.4 Fly Ash/FGD Waste Handling and Hauling

The estimated hourly and annual controlled particulate emission rates from the fly ash/ FGD waste-handling systems, and selected BACT control technologies are shown in table D6**.** Fly ash and FGD wastes are a combined product that is collected in the fabric filter hoppers following the FGD system. Both fly ash and FGD waste are loaded "dry" into the silo from the fabric filter hoppers. The silos will be equipped with bin vent filters to reduce emissions. Water is added to reduce dust emissions when unloading the combined product from the silo into the trucks. The moisture content of the combined product unloaded into the trucks is 20 percent. The combined product is hauled on paved and unpaved roads to the landfill for disposal. Annual emissions are based on the annual fly ash/FGD waste generated at 100 percent capacity factor for the main boiler.

Table D6 – Fly Ash/FGD Waste Handling System

Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (tpy)	Selected BACT Control Technology	Emission Factor Reference
Total Particulate Matter	0.317	0.569	Water and dust suppression chemicals on haul roads	Bin Vent Filter Grain Loading Method, WDEQ Emissions Guidance Document and Engineering Estimates
Particulate Matter PM_{10}	0.162	0.434	Water and dust suppression chemicals on haul roads	Bin Vent Filter Grain Loading Method, WDEQ Emissions Guidance Document and Engineering Estimates

Includes Fly Ash/FGD Waste Silo Separator/Filter Exhaust (ES1-21), Fly Ash/FGD Waste Silo Bin Vent Filter (ES1-22), Fly Ash/FGD Waste Loading into Trucks (FS1-01), Fly Ash/FGD Waste Disposal Paved Haul Road (FS1-02P), and Fly Ash/FGD Waste Disposal Unpaved Haul Road (FS1-02UP)

Notes:
BACT Best Available Control Technology
lb/hr pounds per hour
PM_{10} Particulate Matter less than 10 microns in diameter
tpy tons per year
WDEQ Wyoming Department of Environmental Quality

D4.5 Bottom Ash Handling and Hauling

The estimated hourly and annual controlled particulate emission rates from the bottom ash handling systems, and selected BACT control technologies are shown in table D7**.** Bottom ash is removed from the boiler furnace by being quenched in water and then and transferred on a continuous basis to the bottom ash storage area using a drag chain conveyor. The storage area will have a concrete floor with concrete walls on three sides. Bottom ash dumped in the storage area will be loaded into haul trucks and taken to the landfill. The handling of the wet granulized bottom ash in the storage area will result in no emissions. Emissions will be generated by the haul trucks transferring material on paved and unpaved roads to the landfill. Annual emissions are based on the annual bottom ash generated at 100 percent capacity factor for the main boiler.

Table D7 – Bottom Ash Handling System

Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (tpy)	Selected BACT Control Technology	Emission Factor Reference
Total Particulate Matter	0.0104	0.0228	Water and dust suppression chemicals on haul roads	WDEQ Emissions Guidance Document and Engineering Estimates
Particulate Matter PM_{10}	0.00313	0.00685	Water and dust suppression chemicals on haul roads	WDEQ Emissions Guidance Document and Engineering Estimates

Includes Bottom Ash Disposal Paved Haul Road (FS1-04P) and Bottom Ash Disposal Unpaved Haul Road (FS1-04UP)

Notes:
BACT Best Available Control Technology
lb/hr pounds per hour
PM_{10} Particulate Matter less than 10 microns in diameter
tpy tons per year
WDEQ Wyoming Department of Environmental Quality

D4.6 Fly Ash/FGD Waste Landfill

The estimated hourly and annual controlled particulate emission rates from the fly ash/FGD waste landfill are shown in table D8**.** The table summarizes particulate emissions; details can be found in Appendix B of the permit application (CH2M Hill 2005a). The sources for fugitive emissions include the dumping of fly ash/FGD waste material and bottom ash from the haul trucks onto the landfill; and maintenance of the landfill.

Table D8 – Ash Landfill

Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (tpy)	Emission Factor Reference
Total Particulate Matter	0.831	1.79	AP-42 (EPA 1996) and Engineering Estimates
Particulate Matter PM_{10}	0.202	0.428	AP-42 (EPA 1996) and Engineering Estimates

Includes Maintenance of Landfill (FS1-03a), Fly Ash/FGD Waste Dumping onto the Landfill from Haul Trucks (FS1-03c), and Bottom Ash Dumping onto the Landfill from Haul Trucks (FS1-03d)

Notes:
lb/h pounds per hour
PM_{10} Particulate Matter less than 10 microns in diameter
tpy tons per year

D4.7 Auxiliary Equipment

The auxiliary equipment at the Dry Fork Station will include an auxiliary boiler, diesel fire pump, emergency generator, inlet gas heater, and auxiliary cooling tower. Both the auxiliary boiler and inlet gas heater will be operated with natural gas. The fire pump and emergency generator will be powered by diesel fuel.

D4.8 Auxiliary Boiler

Basin Electric proposes to install a 134.1 MMBTU/hr natural gas operated auxiliary boiler. The hours of operation for the auxiliary boiler will not exceed 2,000 hours per year. table D9 and table D10 provide annual emissions for criteria pollutants and HAPs for the auxiliary boiler, respectively.

Table D9 – Auxiliary Boiler Criteria Pollutants

Pollutant	Annual Emissions (tpy)	Emission Factor Reference
NO_X	7.24	Vendor Data and Engineering Estimates
CO	14.7	Vendor Data and Engineering Estimates
SO_2	0.0789	AP-42, Table 1.4-2 (EPA 1996)
PM_{10}	1.00	AP-42, Table 1.4-2 (EPA 1996)
VOC	0.72	AP-42, Table 1.4-2 (EPA 1996)
Lead	0.0000657	AP-42, Table 1.4-2 (EPA 1996)

Notes:
CO Carbon monoxide
NO_X Nitrogen oxides
PM_{10} Particulate Matter less than 10 microns in diameter
SO_2 Sulfur dioxide
tpy tons per year
VOC Volatile organic compound

Table D10 – Auxiliary Boiler HAPs

Pollutant	Annual Emission Rate (tpy)	Emission Factor Reference
Total Metal HAPs	7.31E-04	AP-42 Table 1.4-4 (EPA 1996)
Total Organic HAPs	2.47E-01	AP-42 Table 1.4-3 (EPA 1996)

Notes:
HAPs Hazardous Air Pollutants

The auxiliary boiler is located at, or is part of, a major source of HAP emissions and, therefore, meets the criteria of an “affected” source as described in 40 CFR 63.7490 and is subject to the requirements of this subpart. The auxiliary boiler is considered a new large gaseous fuel boiler and is subject to the emission limitations, work practice standards, performance testing, monitoring, startup shutdown malfunction plan, and notification requirements described in the rule. The auxiliary boiler will be fired using pipeline quality natural gas only, with no backup fuel, Therefore, the only applicable emission limits and work practice standards that Dry Fork must comply with for the auxiliary boiler are for the pollutant CO. CO is identified as a surrogate to represent a variety of organic compounds for organic HAP emissions because CO is a good indicator of incomplete combustion and there is a direct correlation between CO emissions and the formation of organic HAP emissions. Good combustion control is the technique to be used to limit CO emissions for the auxiliary boiler.

D4.9 Fire Pump

Basin Electric proposes to install a 360 HP diesel-operated fire pump. The expected hours of operation for the fire pump are 500 hours per year for periodic startup and testing of the pump Table D11 provides annual emissions for criteria pollutants for the diesel fire pump. Total estimated HAPs for the diesel fire pump are 8.85 pounds per year, estimated using Table 3.3-1 in AP-42.

Table D11 – Fire Pump Criteria Pollutants

Pollutant	Annual Emissions (tpy)	Emission Factor Reference
NO_X	2.79	AP-42, Table 3.3-1 (EPA 1996)
CO	0.601	AP-42, Table 3.3-1 (EPA 1996)
SO_2	0.185	AP-42, Table 3.3-1 (EPA 1996)
PM_{10}	0.198	AP-42, Table 3.3-1 (EPA 1996)
VOC	0.226	AP-42, Table 3.3-1 (EPA 1996)

Notes:
CO Carbon monoxide
NO_X Nitrogen oxides
PM_{10} Particulate Matter less than 10 microns in diameter
SO_2 Sulfur dioxide
tpy tons per year
VOC Volatile organic compound

D4.10 Emergency Generator

BEPC proposes to install a 2,377 HP diesel fuel operated emergency generator. The estimated hours of operation for the generator are 500 hours per year for periodic startup testing of the emergency generator. Table D12 provides annual emissions for criteria pollutants for the emergency generator. Total estimated HAPs for the diesel fire pump are 12.5 pounds per year, estimated using Table 3.4-1 in AP-42.

Table D12 – Fire Pump Criteria Pollutants

Pollutant	Annual Emissions (tpy)	Emission Factor Reference
NO_X	14.3	AP-42, Table 3.4-1 (EPA 1996)
CO	3.27	AP-42, Table 3.4-1 (EPA 1996)
SO_2	0.240	AP-42, Table 3.4-1 (EPA 1996)
PM	0.416	AP-42, Table 3.4-1 (EPA 1996)
VOC	0.419	AP-42, Table 3.4-1 (EPA 1996)

Notes:
CO Carbon monoxide
NO_X Nitrogen oxides
PM_{10} Particulate Matter less than 10 microns in diameter
SO_2 Sulfur dioxide
tpy tons per year
VOC Volatile organic compound

D4.11 Inlet Gas Heater

BEPC proposes to install an 8.36 MMBTU/hr natural gas operated inlet gas heater. The hours of operation for the gas heater are estimated at 2,500 hours per year. Table D13 and table D14 provide annual emissions for criteria pollutants and HAPs for the inlet gas heater.

Table D13 – Inlet Gas Heater Criteria Pollutants

Pollutant	Annual Emissions (tpy)	Emission Factor Reference
NO_X	1.02	AP-42, Table 1.4-1 (EPA 1996)
CO	0.86	AP-42, Table 1.4-1 (EPA 1996)
SO_2	0.00615	AP-42, Table 1.4-1 (EPA 1996)
PM_{10}	0.08	AP-42, Table 1.4-1 (EPA 1996)
VOC	0.06	AP-42, Table 1.4-1 (EPA 1996)
Lead	0.00000512	AP-42, Table 1.4-1 (EPA 1996)

Notes:
CO Carbon monoxide
NO_X Nitrogen oxides
PM_{10} Particulate Matter less than 10 microns in diameter
SO_2 Sulfur dioxide
tpy tons per year
VOC Volatile organic compound

Table D14 – Inlet Gas Heater HAPs

Pollutant	Annual Emission Rate (tpy)	Emission Factor Reference
Total Metal HAPs	0.0000570	AP-42 Table 1.4-4 (EPA 1996)
Total Or anic HAPs	0.0193	AP-42 Table 1.4-3 EPA 1996

Notes:
HAPs = Hazardous Air Pollutants

D4.12 Auxiliary Cooling Tower

The boiler will be equipped with a wet auxiliary cooling tower to maintain the efficiency and capacity output of the plant during extreme ambient summer temperatures to provide supplemental cooling capability to the air-cooled condensers (ACC). The ACC itself will not have any associated air emissions. The estimated annual controlled particulate emission rates from ES1-04, the wet auxiliary cooling tower, are shown in table D15**.** The annual emissions are based on a 100 percent capacity factor.

Table D15 – Wet Auxiliary Cooling Tower

Pollutant	Hourly Emissions (lb/hr)	Annual Emissions (tpy)	Selected BACT Control Technology
Total Particulate Matter	0.26	1.12	Drift eliminators with a control efficiency of 0.0005% (gallons of drift per gallon of cooling water flow)
Particulate Matter PM_{10}	0.06	0.27	Drift eliminators with a control efficiency of 0.0005% (gallons of drift per gallon of cooling water flow)

Notes:
BACT Best Available Control Technology
lb/hr pounds per hour
PM_{10} Particulate Matter less than 10 microns in diameter
tpy tons per year