

Appendix A
North Dakota Permit Application Forms

North Dakota Department of Health Air Permit Application Forms

Summary of Application Forms Submitted

Emission Unit ID (EUI)	Emission Unit Description	Applicable Forms
NA	Entire Facility	Air Contaminant Sources Permit Application (AP-100)
EUI 001	CFB Boiler	Fuel Burning Equipment For Indirect Heating Application (AP-101)
		Permit Application For Hazardous Air Pollutant (HAP) Sources (AP-117)
	CFB Boiler – SNCR (Ammonia Injection)	Gas Cleaning Equipment Permit Application (AP-109)
	CFB Boiler – Carbon Injection System	Gas Cleaning Equipment Permit Application (AP-109)
	CFB Boiler – Spray Dry Absorber	Gas Cleaning Equipment Permit Application (AP-109)
EUI 002, EUI 003, EUI 004, EUI 005	Coal Handling	Permit Application – Manufacturing or Process Equipment (AP-102)
	Coal Handling – Coal Unloading Baghouse (EUI 002)	Gas Cleaning Equipment Permit Application (AP-109)
	Coal Handling – Coal Silo Bin Vent (EUI 003)	Gas Cleaning Equipment Permit Application (AP-109)
	Coal Handling – Coal Silo Discharge Baghouse (EUI 004)	Gas Cleaning Equipment Permit Application (AP-109)
	Coal Handling – Coal Bunker Baghouse (EUI 005)	Gas Cleaning Equipment Permit Application (AP-109)
EUI 006	Limestone Handling	Permit Application – Manufacturing or Process Equipment (AP-102)
	Limestone Silo Bin Vent	Gas Cleaning Equipment Permit Application (AP-109)
EUI 007	Lime Handling	Permit Application – Manufacturing or Process Equipment (AP-102)
	Lime Silo Bin Vent	Gas Cleaning Equipment Permit Application (AP-109)

EUI 008	Bed Ash Handling	Permit Application – Manufacturing or Process Equipment (AP-102)
	Bed Material Silo Bin Vent	Gas Cleaning Equipment Permit Application (AP-109)
EUI 009, EUI 010, EUI 011	Fly Ash Handling	Permit Application – Manufacturing or Process Equipment (AP-102)
	Fly Ash Handling – Recycle Ash Silo Bin Vent (EUI 009)	Gas Cleaning Equipment Permit Application (AP-109)
	Fly Ash Handling – Ash Silo Filter Receiver (EUI 010)	Gas Cleaning Equipment Permit Application (AP-109)
	Fly Ash Handling – Ash Loadout Spout Baghouse (EUI 011)	Gas Cleaning Equipment Permit Application (AP-109)
EUI 012	Package Boiler 1	Fuel Burning Equipment For Indirect Heating Application (AP-101)
		Permit Application For Hazardous Air Pollutant (HAP) Sources (AP-117)
EUI 013	Package Boiler 2	Fuel Burning Equipment For Indirect Heating Application (AP-101)
		Permit Application For Hazardous Air Pollutant (HAP) Sources (AP-117)
EUI 014	Package Boiler 3	Fuel Burning Equipment For Indirect Heating Application (AP-101)
		Permit Application For Hazardous Air Pollutant (HAP) Sources (AP-117)
EUI 015	Diesel Fire Water Pump	Permit Application – Internal Combustion Engines (AP-113)
EUI 016	Cooling Tower	Permit Application – Manufacturing or Process Equipment (AP-102)
EUI 017	Propane Vaporizer	Fuel Burning Equipment For Indirect Heating Application (AP-101)
EUI 018	Diesel Backup Generator	Permit Application – Internal Combustion Engines (AP-113)
IA	Package Boiler Fuel Oil Storage Tank	Permit Application – Volatile Organic Compounds Storage Tank (AP-112)
IA	Fire Pump Diesel Storage Tank	Permit Application – Volatile Organic Compounds Storage Tank (AP-112)
IA	Emergency Generator Diesel Storage Tank	Permit Application – Volatile Organic Compounds Storage Tank (AP-112)
EUI 022	Rail Car Heaters	Fuel Burning Equipment For Indirect Heating Application (AP-101)
		Permit Application For Hazardous Air Pollutant (HAP) Sources (AP-117)



AIR CONTAMINANT SOURCES PERMIT APPLICATION
 NORTH DAKOTA DEPARTMENT OF HEALTH
 DIVISION OF AIR QUALITY
 SFN 8516 (12-05) (AP 100)

ENTIRE FACILITY

FACILITY IDENTIFICATION

Name of Firm or Institution Great River Energy – Spiritwood Station				
Owner or Official to Contact on Air Pollution Matters Richard R. Lancaster		Title VP, Generation		Telephone Number 763-241-2428
Application Being Submitted By (Name): Mary Jo Roth		Title Manager, Environmental Services		Telephone Number 763-241-2449
Application Prepared By: Mark Strohfus		Title Environmental Project Leader		Telephone Number 763-241-2491 Cell Phone Number 612-961-9820
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10		City Elk River		State MN Zip Code 55330
Plant Location (Street & No.) TBD		City Spiritwood	County Stutsman	State ND Zip Code 58481
Legal Description of Plant Site NW ¼ SW ¼, Section 22 Twp. 140 North Range 62 West		Latitude (Nearest Second) 46 degrees, 55 minutes, 32 seconds		Longitude (Nearest Second) 98 degrees, 30 minutes, 1 second
Land Area at Plant Site 35.25 Acres (or) Sq. Ft.		MSL Elevation at Plant 1,479 feet		

GENERAL NATURE OF BUSINESS:

DESCRIBE NATURE OF BUSINESS	STANDARD INDUSTRIAL CLASSIFICATION NUMBER
Electrical and steam generation via combustion of lignite	4931

SOURCE IDENTIFICATION AND CATEGORY OF EACH SOURCE INCLUDED ON THIS PERMIT APPLICATION:

Assign your Identification Number (1, 2, 3, etc.) to each Source or Permit Unit. List ID Number and identify device below, then check appropriate category in the box to the right of listed device.		PERMIT TO CONSTRUCT				MINOR SOURCE PERMIT TO OPERATE						
YOUR ID NUMBER	SOURCE OR UNIT (Equipment, Machines, Devices, Boilers, Processes, Incinerators, Etc.)	NEW SOURCE	EXISTING SOURCE MODIFICATION, ALTERATION, REPAIRING, REBUILDING	EXISTING SOURCE EXPANSION	EXISTING SOURCE CHANGE LOCATION	NEW SOURCE	EXISTING SOURCE INITIAL APPLICATION	EXISTING SOURCE AFTER MODIFICATION, ALTERATION, REPAIRING, REBUILDING	EXISTING SOURCE AFTER EXPANSION	EXISTING SOURCE AFTER CHANGE OF LOCATION	EXISTING SOURCE AFTER CHANGE OF OWNERSHIP OR LESSEE	OTHER
Please see list of emission units associated with Spiritwood project on following page. All emission units are new.		X										

Summary of Spiritwood Energy Emission Units

Emission Unit ID (EUI)	Emission Unit Description	Emission Point (EPN)
EUI 001	Main Stack - CFB Boiler / Start-up Burners	001
EUI 002	Coal Unloading	002
EUI 003	Coal Silo	003
EUI 004	Coal Silo Discharge	004
EUI 005	Coal Bunker	005
EUI 006	Limestone Unloading / Limestone Silo	006
EUI 007	Lime Unloading / Lime Silo	007
EUI 008	Bed Material Silo	008
EUI 009	Recycle Ash Silo	009
EUI 010	Ash Silo	010
EUI 011	Ash Loadout	011
	Reserved	012
	Reserved	013
EUI 012	Package Boiler 1	014
EUI 013	Package Boiler 2	014
EUI 014	Package Boiler 3	014
EUI 015	Diesel Fire Water Pump	015
EUI 016	Cooling Tower	016
EUI 017	Propane Vaporizer	017
EUI 018	Diesel Generator	018
IA	Paved Road Emissions	Fug
IA	Equipment Leaks	Fug
EUI 019	Package Boiler Fuel Oil Tank (500,000 gal)	Tank
EUI 020	Fire Pump Diesel Storage Tank (500 gal)	Tank
EUI 021	Emerg. Generator Diesel Tank (500 gal)	Tank
EUI 022	Rail Car Heaters	002

IF APPLICATION IS FOR A PERMIT TO CONSTRUCT, PROVIDE THE FOLLOWING DATA:

Name of Installer or Contractor TBD		Telephone Number NA
Mailing Address NA	Start Date/Construct April – June 2007	Completion Date October 2009 – March 2010

ESTIMATED COST OF EQUIPMENT OR MODIFICATION (FOR PERMIT TO CONSTRUCT ONLY):

Basic Equipment \$ 100,000,000	Air Pollution Control Equipment Existing as of Date of Application New Construction
New Air Pollution Control Equipment to be Installed TBD	Modification to Existing Air Pollution Control Equipment New Construction

IDENTIFICATION OF AIR CONTAMINANTS (Check all which are emitted in measurable quantities into the atmosphere from any operation at this facility.)

<input checked="" type="checkbox"/> ARSENIC	<input checked="" type="checkbox"/> CHLORINE COMPOUNDS	<input type="checkbox"/> HYDROGEN SULFIDE	<input type="checkbox"/> PESTICIDES
<input type="checkbox"/> ASBESTOS	<input checked="" type="checkbox"/> DUST	<input checked="" type="checkbox"/> LEAD	<input type="checkbox"/> RADIOISOTOPES
<input checked="" type="checkbox"/> BERYLLIUM	<input checked="" type="checkbox"/> FLUORINE COMPOUNDS	<input checked="" type="checkbox"/> MERCURY	<input type="checkbox"/> SILICIA
<input checked="" type="checkbox"/> CADMIUM	<input checked="" type="checkbox"/> VOLATILE ORGANIC COMPOUNDS	<input checked="" type="checkbox"/> NITROGEN COMPOUNDS	<input checked="" type="checkbox"/> SULFUR COMPOUNDS
<input checked="" type="checkbox"/> VISIBLE EMISSIONS	<input checked="" type="checkbox"/> OTHER ORGANIC COMPOUNDS	<input type="checkbox"/> ODORS	<input checked="" type="checkbox"/> CHROMIUM COMPOUNDS
<input checked="" type="checkbox"/> CARBON MONOXIDE	<input type="checkbox"/> OTHER (specify)	<input checked="" type="checkbox"/> PARTICULATES (specify)	

List Specific Compounds: 1,1,1-Trichloroethane, 1,3-Butadiene, 1,4-Dichlorobenzene(p), 2,4-Dinitrotoluene, 2-Chloroacetophenone, Acetaldehyde, Acetophenone, Acrolein, Arsenic (7440-38-2), Benzene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(b,k)fluoranthene, Benzo(k)fluoranthene, Benzyl chloride, Beryllium, Biphenyl, Bis(2-ethylhexyl)phthalate (DEHP), Bromoform, Cadmium, Carbon disulfide, Chlorobenzene, Chloroform, Chromium, Chrysene, Cobalt, Cumene, Dibenzo(a,h)anthracene, Dichlorobenzene, Dimethyl sulfate, Ethyl benzene, Ethyl chloride, Ethylene dibromide, Ethylene dichloride, Formaldehyde, Hexane, Indeno(1,2,3-cd)pyrene, Isophorone, Lead, Manganese, Mercury, Methyl bromide, Methyl chloride, Methyl ethyl ketone, Methyl hydrazine, Methyl methacrylate, Methyl tert butyl ether, Methylene chloride, Naphthalene, Nickel, polycyclic aromatic hydrocarbons, Phenol, polycyclic organic matter, Propionaldehyde, Propylene, Selenium, Styrene, Tetrachloroethylene, Toluene, Vinyl acetate, Xylenes, Benzo(b,j,k)fluoranthene, 5-Methyl chrysene, Antimony, Chromium (VI), Magnesium, Hydrochloric acid, hydrofluoric acid, sulfuric acid mist.

Has Source Testing Been Done at the Facility? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Last Date When a Testing Program was Completed NA	If Program is Continuous, Give Approximate Testing Frequency: NA
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INDICATE WITH "X" WHICH OF THE FOLLOWING FORMS ARE ATTACHED AND MADE PART OF THE APPLICATION

<input checked="" type="checkbox"/>	Fuel Burning Equipment Used for Indirect Heating			Rock, Sand and Gravel Processing
<input checked="" type="checkbox"/>	Manufacturing or Processing Equipment		<input checked="" type="checkbox"/>	Gas Cleaning Equipment
	Incinerators		<input checked="" type="checkbox"/>	Volatile Organic Compounds Storage Tank
	Grain, Feed, and Fertilizer Operations		<input checked="" type="checkbox"/>	Internal Combustion Engine Sources
	Asphalt Concrete Plants			Oil/Gas Production Facility Report
	Concrete Batch Plants and Cement Handling Equipment		<input checked="" type="checkbox"/>	Hazardous Air Pollution (HAP) Sources
	Natural Gas Processing Plants			Contaminated Soil Treatment Facility

OTHER ATTACHMENTS ARE AS FOLLOWS AND ARE A PART OF THIS APPLICATION:

1.	4.
2.	5.
3.	6.

I, the undersigned applicant, am fully aware that statements made in this application and the attached exhibits and statements constitute the application for Permit(s) to Construct and/or Operate Air Contaminant sources from the North Dakota Department of Health and certify that the information in this application is true, correct and complete to the best of my knowledge and belief. Further, I agree to comply with the provisions of Chapter 23-25 of the North Dakota Century Code and all rules and regulations of the Department, or revisions thereof. I also understand the permit is nontransferable and, if granted a permit, I will promptly notify the Department upon sale or legal transfer of this permitted establishment.

Signature of Applicant 	Date 05/15/07
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CFB Boiler
FUEL BURNING EQUIPMENT FOR INDIRECT HEATING PERMIT
APPLICATION

NORTH DAKOTA DEPARTMENT OF HEALTH
 DIVISION OF AIR QUALITY
 SFN 8518 (12-00) (AP-101)

GENERAL

Name of Firm or Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP100) 001 – CFB Boiler	

EQUIPMENT

Name of Manufacturer Babcock & Wilcox	Rated Capacity/Maximum Input 1102 MMBtu/hr / 1280 MMBtu/hr	Model Number TBD (Fluidized Bed)
Purpose <input type="checkbox"/> Space Heat % <input type="checkbox"/> Process Heat % <input checked="" type="checkbox"/> Power Generation 100% <input type="checkbox"/> Other (Specify % if multi-purpose)		

TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

<input checked="" type="checkbox"/> COAL (If other solid fuel, specify here:	<input type="checkbox"/> Fuel Oil	<input checked="" type="checkbox"/> Gas (Startup Burners)
<input type="checkbox"/> Pulverized <input type="checkbox"/> General <input type="checkbox"/> Dry Bottom <input type="checkbox"/> Wet Bottom with Fly Ash Reinjection <input type="checkbox"/> Wet Bottom without Fly Ash Reinjection <input type="checkbox"/> Spreader Stoker without Fly Ash Reinjection <input checked="" type="checkbox"/> Fluidized Bed <input type="checkbox"/> Cyclone <input type="checkbox"/> Hand-Fired <input type="checkbox"/> Other (Specify)	<input type="checkbox"/> Horizontally Fired <input type="checkbox"/> Tangentially Fired <input type="checkbox"/> Other - Specify:	<input type="checkbox"/> Horizontally Fired <input type="checkbox"/> Tangentially Fired <input type="checkbox"/> Other - Specify:

NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
24	7	52	8760	January-December

TYPE AND QUANTITY OF FUEL EXPECTED TO BE USED IN A CALENDAR YEAR

Year 20	PRIMARY FUELS			STANDBY FUELS		
	Type Beneficiated Lignite (Design Fuel)			Type Natural Gas (startup only)		
	Quantity/Year	Units tons		Quantity/Year	Units	
	Maximum	Minimum	Average	Maximum	Minimum	Average
	659,600					
Percent Ash (Solids Fuel Only)	16.65	10.11	13.38	Negligible	Negligible	Negligible
Percent Sulfur	1.06	0.52	0.79	Negligible	Negligible	Negligible
BTU Per Unit (Specify):	7,914 Btu/lb	7,086 Btu/lb	7,500 Btu/lb	1,020 Btu/scf	1,020 Btu/scf	1,020 Btu/scf

TYPE AND QUANTITY OF FUEL EXPECTED TO BE USED IN A CALENDAR YEAR

Year 20	PRIMARY FUELS			STANDBY FUELS		
	Type Subbituminous coal			Type Lignite		
	Quantity/Year		Units tons	Quantity/Year		Units
	Maximum	Minimum	Average	Maximum	Minimum	Average
Percent Ash (Solids Fuel Only)	5.1	3.1	4.1	15.1	8.7	11.9
Percent Sulfur	0.55	0.13	0.34	0.79	0.43	0.61
BTU Per Unit (Specify):	9,647 Btu/lb	9,029 Btu/lb	9,338 Btu/lb	6,575	5,933	6,254

COMBUSTION AIR

<input type="checkbox"/> Natural Draft <input type="checkbox"/> Induced <input checked="" type="checkbox"/> Forced <input type="checkbox"/> Other - Specify:
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STACK DATA

Height Above Grade	200 ft	Gas Temperature at Exit	180 °F
Inside Diameter at Exit	7.5 ft	Gas Velocity at Exit	147 fps
Stack Exit Gas Flow Rate		Average	Maximum
ACFM		390,000	390,000
SCFM		321,750	321,750
Are sampling ports available? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes - Describe: There will be four sampling ports; more detailed information TBD.			
Describe Fuel Transport and Storage Methods Beneficiated lignite will be produced by Great River Energy at the Coal Creek Station from raw lignite obtained from the North American Coal Company, Falkirk Mine, located near the city of Underwood, North Dakota, approximately 155 miles from the Spiritwood plant site. Subbituminous coal is a possible alternative solid fuel. The coal will be delivered to the Spiritwood facility by railcar. The unloading station will be enclosed and vented to a baghouse, and coal will be conveyed to a storage silo, transferred by conveyors and into the CFB Boiler.			
Is any air contaminant control device used in conjunction with this equipment? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes - Attach a completed gas cleaning equipment form (SFN 8532 AP-109) to this application			

NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
 Preliminary drawings depicting the building housing the CFB Boiler and the Package Boiler buildings are attached.

STACK EMISSIONS

Pollutant	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities:
Particulate	See Appendix C, Table C-2		1,280 MMBtu/hr heat input (85.25 ton/hr coal); emission calculations were prepared using AP 42 emission factors (uncontrolled) and BACT limits (controlled). See Appendix C for more information.
PM ₁₀			
Sulfur Dioxide			
Nitrogen Oxide			
Carbon Monoxide			
Other - Specify			

Signature of Applicant 	Date 05/15/07
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BUILDING PLANS
SCALE: 1/16" = 1'-0"

== POSSIBLE FIRE RATED DOORS, TWO
EXTERIOR WALLS AND ROOF SHALL BE
INSULATED AND HAVE VAPOR BARRIERS.
EXTERIOR PARTITION WALL BUILT-OUT
BY OTHER.

NOTES:

GENERAL BUILDING DESIGN REQUIREMENTS

1. THESE NOTES SUPPLEMENT SPECIFICATION 284711-TWO-ENGINEERED METAL BUILDING SPECIFICATION.
2. THE BUILDINGS SHOWN IN THIS BOOK INCLUDE THE FOLLOWING:
 - a. AUXILIARY BUILDING
 - b. TURBINE BUILDING
 - c. WAREHOUSE
 - d. COOL UNLOADING BUILDING
3. THE BOILER BUILDING SHOWN ON THE DRAWINGS SHALL BE DESIGNED AND ERRECTED BY OTHERS.
4. THE BUILDINGS SHALL BE DESIGNED TO THE CRITERIA LISTED HEREIN AND SHOWN ON THE DRAWINGS.
5. THE ANTICIPATED SEQUENCE OF CONSTRUCTION IS AS FOLLOWS:
 - a. AUXILIARY BUILDING AND WAREHOUSE
 - b. TURBINE BUILDING
 - c. COOL UNLOADING BUILDING
6. THE AUXILIARY BUILDING SHALL BE DESIGNED AS A FREE-STANDING STRUCTURE WITH AN ATTACHED GASKET WAREHOUSE. ALTERNATE DESIGNS SHALL BE COMPLETED FOR CLEAR-SPAN ROOF FRAMES AND ROOF FRAMES WITH ONE POST LOCATED AT MIDDLE OF FRAMES.
7. THE WAREHOUSE DRIFT SHALL BE DESIGNED AS A LEAN-TO EXTENSION OF THE AUXILIARY BUILDING.
8. THE TURBINE BUILDING SHALL BE DESIGNED AS A FREE-STANDING, ROOF FRAME STRUCTURE. TURBINE BUILDING SHALL BE STRUCTURALLY ISOLATED FROM THE AUXILIARY BUILDING AND THE BOILER BUILDING.
9. THE COOL UNLOADING BUILDING SHALL BE DESIGNED AS A FREE-STANDING, ROOF FRAME STRUCTURE.
10. BUILDING WALLS AND ROOFS SHALL BE INSULATED AS INDICATED ON THE DRAWINGS. WALL INSULATION SHALL BE R-18 MINIMUM AND ROOF INSULATION SHALL BE R-30 MINIMUM AND INSULATION IS REQUIRED FOR THE COOL UNLOADING BUILDING.

LOADING LOADS

1. COLLATERAL LOAD A UNIFORM COLLATERAL LOAD SHALL BE APPLIED TO THE ENTIRE ROOF STRUCTURE TO ACCOMMODATE FOR THE WEIGHT OF ADDITIONAL PERMANENT MATERIALS OTHER THAN THE BUILDING SYSTEM. COLLATERAL LOADS SHALL BE AS FOLLOWS:
 - a. AUXILIARY BUILDING: 15 PSF
 - b. WAREHOUSE: 10 PSF
 - c. TURBINE BUILDING: 20 PSF
 - d. COOL UNLOADING BUILDING: 15 PSF
2. ROOFTOP EQUIPMENT WEIGHTS OF ROOFTOP EQUIPMENT WEIGHING MORE THAN 100 LB ARE SHOWN ON THE DRAWINGS. ROOFTOP EQUIPMENT WEIGHTS SHALL BE CONSIDERED AS A COLLATERAL LOAD.
3. SNOW LOADS (GROUND SNOW LOAD 40 PSF). UNIFORM FLAT ROOF SNOW SHALL NOT BE LESS THAN 30 PSF. SNOW LOAD IMPORTANCE FACTOR SHALL BE 1.0. DRIFT LOADS SHALL BE COMPUTED IN ACCORDANCE WITH IRC.
4. WIND LOADS (IC BASIC WIND SPEED 80 MPH) PER HOUR, EXPOSURE FACTOR C. WIND LOAD IMPORTANCE FACTOR SHALL BE 1.0.
5. SEISMIC LOADS (SEISMIC LOADS SHALL BE COMPUTED IN ACCORDANCE WITH IRC USING THE FOLLOWING PARAMETERS:
 - a. SHORT PERIOD DESIGN SPECTRAL ACCELERATION S_{DS} 0.09g
 - b. 1 SECOND DESIGN SPECTRAL ACCELERATION S_{D1} 0.09g
 - c. SEISMIC LOAD IMPORTANCE FACTOR 1.0
6. ROOF PANELS SHALL BE DESIGNED FOR A 200 LB CONCENTRATED LOAD AT MID-SPAN ON A 12'-0" WIDE SECTION OF PANEL. ROOF AND WALL PANELS SHALL NOT BE DESIGNED AS SPANDRILS OR SHEAR WALLS.
7. THE LOAD COMBINATIONS CONTAINED IN THE IRC OR THE WIND MANUAL, WHICHEVER PRODUCES THE MOST UNFAVORABLE LOADING, SHALL BE USED IN THE DESIGN.

CONSTRUCTION LIMITS

1. MAXIMUM DEFLECTION OF STRUCTURAL MEMBERS SHALL NOT EXCEED L/240 WITH APPLIED WIND OR SNOW LOADS. FRAMING MEMBERS SHALL HAVE SUFFICIENT RIGIDITY TO RESIST POSITIVE.
2. HORIZONTAL DRIFT AT ROOF GABLE LEVEL, RELATIVE TO FLOOR LEVEL, SHALL NOT EXCEED THE FOLLOWING:
 - a. AUXILIARY BUILDING: 1/100
 - b. WAREHOUSE: 1/300
 - c. TURBINE BUILDING: 1/200
 - d. COOL UNLOADING BUILDING: 1/125

ISSUED FOR BID

REVISION NO.	REVISIONS	DATE	DESCRIPTION	BY	CHECKED	DATE	DATE	DATE

ISSUED FOR BID

ISSUED FOR BID

SPIRITWOOD ENERGY

BUILDING GASKET COP PLAN

PROJECT: SPIRITWOOD, FORTY DABLA

DATE: 08/24-A-211



CFB Boiler

PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH

DIVISION OF AIR QUALITY

SFN 8329 (12/00) (AP-117)

SECTION A - APPLICANT INFORMATION

Name of Firm/Organization Great River Energy - Spiritwood Station		Standard Industrial Classification No. 4931	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330

FACILITY INFORMATION

Contact Person for Air Pollution Matters Richard Lancaster	Title VP, Generation	Phone Number 763-241-2428	
Facility Address (street & no.) TBD	City and County Spiritwood, Stutsman County	State ND	Zip Code 58481
Land Area at Plant Site 35.25 Acres (or) Sq. Ft.	MSL Elevation at Plant 1479 ft	Number of Employees at Location 20	

Describe Nature of Business/Process Proposed nominally 92.5 MW power plant that fires solid fuels such as lignite coal, beneficiated lignite coal, and sub-bituminous coal.

SECTION B - STACK DATA


Inside Diameter 90 in.	Inside Area 6362 Sq. in.	Height Above Grade 200 ft.	Are Emission Control Devices in Place? If so Complete SFN 8532 (AP 109) Yes
Gas Temperature at Exit 170-180 °F	Gas Velocity at Exit 147 ft/sec	Gas Volume 390,000 acfm	324,300 scfm
Basis of Estimate (attach separate sheet if necessary)			
Nearest Residences or Building Spiritwood Cemetery	Distance (ft.) ~940	Direction SSW	
Nearest Property Line Gravel Road	Distance (ft.) ~500	Direction West	

SECTION C - EMISSION STREAM DATA

Source ID # Form AP-100 001 – CFB Boiler	Mean Particle Diameter (um) TBD
Flow Rate (scfm) 324,300	Drift Velocity (ft/sec) TBD
Stream Temperature (EF) 170-180 °F	Particulate Concentration (gr/dscf) 0.01
Moisture Content (%) TBD	Halogens or Metals Present? Yes
Pressure (in. Hg) TBD	Organic Content (PPMv) See Appendix C, Table C-8
Heat Content (Btu/scfm) TBD	O ₂ Content (%) TBD

SECTION D - POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted See Appendix C, Table C-8	Chemical Abstract Services (CAS) Number See Appendix C, Table C-8
Proposed Emission Rate (lb/hr) See Appendix C, Table C-8	Emission Source (describe) CFB Boiler – coal combustion
Source Classification (process point, process fugitive, area fugitive) Point	Pollutant Class and Form (organic/inorganic - particulate/vapor) See Appendix C, Table C-8
Concentration in Emission Stream (PPMv) See Appendix C, Table C-8	Vapor Pressure (in. Hg @ EF) See Appendix C, Table C-8
Solubility See Appendix C, Table C-8	Molecular Weight (lb/lb-mole) See Appendix C, Table C-8
Absorptive Properties	

Signature of Applicant 	Date 05/15/07
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**Selective Non-Catalytic Reduction Unit
GAS CLEANING EQUIPMENT PERMIT APPLICATION**
North Dakota Department of Health
Division of Air Quality
SFN 8532 (12-05) (AP-109)

APPLICANT

Name of Firm/Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP-100) 001 – CFB Boiler	

EQUIPMENT

Type <input type="checkbox"/> Cyclone <input type="checkbox"/> Multiclone <input type="checkbox"/> Baghouse <input type="checkbox"/> Electrostatic Precipitator <input type="checkbox"/> Wet Scrubber <input type="checkbox"/> Spray Dryer				
<input checked="" type="checkbox"/> Other (Describe) Selective Non-Catalytic Reduction for NO _x control				
Name of Manufacturer TBD		Model Number TBD		Date To Be Installed Prior to startup
Application <input checked="" type="checkbox"/> Boiler <input type="checkbox"/> Kiln <input type="checkbox"/> Other (Specify):				
Pollutants Removed	NO _x			
Design Efficiency	30-50% estimated	%	%	%
Operating Efficiency	TBD	%	%	%
Describe Method Used to Determine Operating Efficiency: The design efficiency is based on similar current systems. The operating efficiency is unknown because the facility is not yet operating.				

GAS CONDITIONS		INLET	OUTLET
Gas Volume (SCFM 68°F., 14.7 psia)		324,300	NA
Gas Temperature (°F.)		1500 -1800	NA
Gas Pressure (in. H ₂ O)		TBD	NA
Gas Velocity (ft/sec)		TBD	NA
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration	
	NO _x	PPM _v	129 54
Pressure Drop Through Gas Cleaning Device NA; ammonia injection			

Signature of Applicant 	Date 05/15/07
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Carbon Injection System
GAS CLEANING EQUIPMENT PERMIT APPLICATION
 North Dakota Department of Health
 Division of Air Quality
 SFN 8532 (12-05) (AP-109)

APPLICANT

Name of Firm/Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP-100) 001 – CFB Boiler	

EQUIPMENT

Type	Cyclone	Multiclone	Baghouse	Electrostatic Precipitator	Wet Scrubber	Spray Dryer
	<input checked="" type="checkbox"/> Other (Describe) Powdered activated carbon injection system controlling mercury emissions					
Name of Manufacturer TBD		Model Number TBD		Date To Be Installed Prior to startup		
Application						
<input checked="" type="checkbox"/> Boiler		<input type="checkbox"/> Kiln		Other (Specify):		
Pollutants Removed	Hg					
Design Efficiency	50% - 90 % estimated		%	%	%	%
Operating Efficiency	TBD		%	%	%	%
Describe Method Used to Determine Operating Efficiency: The design efficiency is based on similar current systems. The operating efficiency is unknown because the facility is not yet operating.						

GAS CONDITIONS		INLET	OUTLET
Gas Volume (SCFM 68°F., 14.7 psia)		324,300	NA
Gas Temperature (°F.)		300	NA
Gas Pressure (in. H ₂ O)		TBD	NA
Gas Velocity (ft/sec)		TBD	NA
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration	
	Hg (for dried lignite; 0.093 ug Hg/g coal)	ppbv	1.6
			TBD
Pressure Drop Through Gas Cleaning Device NA; activated carbon injection			

Signature of Applicant 	Date 05/15/07
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Spray Dryer Absorber
GAS CLEANING EQUIPMENT PERMIT APPLICATION
 North Dakota Department of Health
 Division of Air Quality
 SFN 8532 (12-05) (AP-109)


APPLICANT

Name of Firm/Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP-100) 001 – CFB Boiler	

EQUIPMENT

Type	Cyclone	Multiclone	Baghouse	Electrostatic Precipitator	Wet Scrubber	<input checked="" type="checkbox"/> Spray Dryer
Other (Describe)						
Name of Manufacturer TBD		Model Number TBD		Date To Be Installed TBD		
Application						
<input checked="" type="checkbox"/> Boiler		Kiln		Other (Specify):		
Pollutants Removed	SO ₂		HCl/HF			
Design Efficiency	60-90% estimated		95%		%	%
Operating Efficiency	TBD		TBD		%	%
Describe Method Used to Determine Operating Efficiency: The design efficiency is based on similar current systems. The operating efficiency is unknown because the facility is not yet operating.						

GAS CONDITIONS		INLET	OUTLET
Gas Volume (SCFM 68°F., 14.7 psia)		324,300	324,300
Gas Temperature (°F.)		~300	~300
Gas Pressure (in. H ₂ O)		TBD	TBD
Gas Velocity (ft/sec)		TBD	TBD
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration	
	SO ₂	PPM _v	291 23
Pressure Drop Through Gas Cleaning Device NA; Lime slurry injection			

Signature of Applicant 	Date 05/15/07
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CFB Boiler Baghouse
GAS CLEANING EQUIPMENT PERMIT APPLICATION
 North Dakota Department of Health
 Division of Air Quality
 SFN 8532 (12-05) (AP-109)

APPLICANT

Name of Firm/Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491 Cell Phone Number 612-961-9820
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP-100) 001 – CFB Boiler

EQUIPMENT

Type	Cyclone Other (Describe)	Multiclone	<input checked="" type="checkbox"/> Baghouse	Electrostatic Precipitator	Wet Scrubber	Spray Dryer
Name of Manufacturer TBD		Model Number TBD		Date To Be Installed TBD		
Application <input checked="" type="checkbox"/> Boiler Kiln Other (Specify):						
Pollutants Removed	PM10					
Design Efficiency	99.9%		%	%	%	%
Operating Efficiency	TBD		%	%	%	%
Describe Method Used to Determine Operating Efficiency: The design efficiency is based on similar current systems. The operating efficiency is unknown because the facility is not yet operating.						

GAS CONDITIONS		INLET	OUTLET
Gas Volume (SCFM 68°F., 14.7 psia)		324,300	324,300
Gas Temperature (°F.)		~300	170-180
Gas Pressure (in. H ₂ O)		NA	NA
Gas Velocity (ft/sec)		147	147
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration	
	PM10	grains/dscf	~0.5 0.005
Pressure Drop Through Gas Cleaning Device TBD			

Signature of Applicant 	Date 05/15/07
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Coal Handling
PERMIT APPLICATION - MANUFACTURING OR PROCESSING EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY

SFN 8520 (AP 102) 12/00

GENERAL - Equipment items operating as a functional unit may be grouped as one application

Name of Firm or Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP 100) el 002, 003, 004, 005 – Coal Handling	
Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.): Coal Handling			
Make TBD	Model TBD	Date Installed TBD	
Capacity (manufacturer's or designer's guaranteed maximum) NA	Operating Capacity (Specific Units)		
Brief description of operation of unit or process: Coal is delivered to the site by railcar and unloaded in an enclosed area. The coal is conveyed to a storage silo, and moved by bucket elevator to coal bunkers. Gravimetric feeders move the coal to the CFB Boiler.			

NORMAL OPERATING SCHEDULE

Hours per Day 24	Days per Week 7	Weeks per Year 52	Peak Production Season, if any NA	Dates of Annual Shutdown TBD
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RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS (Include solid fuels such as coke or coal - exclude indirect heat exchangers - Put that information on AP 101)

Material	Hourly Process Weight Rate Pounds per Hour			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours/Week)
	Average	Maximum	Design		
Coal	155,000	170,600	170,600	679,000 tons / year	NA
	(77.5 tph)	(85.3 tph)	(85.3 tph)		

PRODUCTS OF UNIT OR PROCESS (Include all, even those not usable because they do not meet specifications)

Material	Hourly Process Weight Rate Pounds per Hour			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours/Week)
	Average	Maximum	Design		
NA					

FUELS USED (Exclude heat supplied or indirect heat exchangers, list those on AP 101)

Coal (Tons/Yr) NA	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
Natural Gas (Thousand CF/Yr)		LP Gas (Gal/Yr)		Other (Specify)	

EMISSION POINTS (List each point separately, number each and locate on attached flow chart)

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
EPN 002	50	4.6	96,000	Ambient	50
EPN 003	190	1.7	8,500	90	62
EPN 004	10	1	2,200	75	46
EPN 005	120	1.5	5,000	90	47

AIR CONTAMINANTS EMITTED - Known or Suspected

Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
EPN 002	See emission calculations in Appendix C			
EPN 003				
EPN 004				
EPN 005				

ARE ANY VOLATILE ORGANIC COMPOUNDS STORED ON PREMISES

NO YES - List Below

(See Rules 33-15, Section 33-15-01-04 for classes of compounds covered)

Material Stored	Size Tank (Gallons)	Vapor Control Device
No separate VOC tanks associated with this unit.	NA	NA

ARE ANY ORGANIC SOLVENTS USED OR PRODUCED?


NO (None or less than 50 gallons per year) YES - identify below

Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

IS THERE ANY EMISSION CONTROL EQUIPMENT ON THIS UNIT OR PROCESS? NO YES - Attach form AP109 (SFN 8532)

Does the input material or product from this process contain finely divided material which could become airborne? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES		Describe storage methods used			
Storage Piles	Type of Material	Particle Diameter (Average Diameter or Screen Size)	Pile Size Average Tons	Pile Wetted (Yes or No)	Pits Covered (Yes or No)
Describe any fugitive dust problems:					

Attach additional sheets if needed to explain any answers. Use separate form for each process that emits contaminants.

Signature of Applicant 	Date 05/15/07
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Coal Unloading Baghouse
GAS CLEANING EQUIPMENT PERMIT APPLICATION
 North Dakota Department of Health
 Division of Air Quality
 SFN 8532 (12-05) (AP-109)

APPLICANT

Name of Firm/Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP-100) 002 – Coal Unloading	

EQUIPMENT

Type	Cyclone Other (Describe)	Multiclone	<input checked="" type="checkbox"/> Baghouse	Electrostatic Precipitator	Wet Scrubber	Spray Dryer
Name of Manufacturer TBD		Model Number TBD		Date To Be Installed TBD		
Application Boiler Kiln <input checked="" type="checkbox"/> Other (Specify): Baghouse controlling PM emissions from coal unloading operations						
Pollutants Removed	PM10					
Design Efficiency	99%		%	%	%	%
Operating Efficiency	TBD		%	%	%	%
Describe Method Used to Determine Operating Efficiency: The design efficiency is based on BACT. The operating efficiency is unknown because the facility is not yet operating.						

GAS CONDITIONS		INLET	OUTLET
Gas Volume (SCFM 68°F., 14.7 psia)		96,000	96,000
Gas Temperature (°F.)		Ambient	Ambient
Gas Pressure (in. H ₂ O)		Ambient	Ambient
Gas Velocity (ft/sec)		50	50
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration	
	PM10	grains/dscf	~0.5 0.005
Pressure Drop Through Gas Cleaning Device TBD			

Signature of Applicant 	Date 05/15/07
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Coal Silo Bin Vent
GAS CLEANING EQUIPMENT PERMIT APPLICATION
 North Dakota Department of Health
 Division of Air Quality
 SFN 8532 (12-05) (AP-109)

APPLICANT

Name of Firm/Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP-100) 003 – Coal Silo	

EQUIPMENT

Type	Cyclone Other (Describe)	Multiclone	<input checked="" type="checkbox"/> Baghouse	Electrostatic Precipitator	Wet Scrubber	Spray Dryer
Name of Manufacturer TBD		Model Number TBD		Date To Be Installed TBD		
Application Boiler Kiln <input checked="" type="checkbox"/> Other (Specify): Bin vent controlling coal silo operations						
Pollutants Removed	PM10					
Design Efficiency	99%		%	%	%	%
Operating Efficiency	TBD		%	%	%	%
Describe Method Used to Determine Operating Efficiency: The design efficiency is based on BACT. The operating efficiency is unknown because the facility is not yet operating.						

GAS CONDITIONS		INLET	OUTLET
Gas Volume (SCFM 68°F., 14.7 psia)		8,500	8,500
Gas Temperature (°F.)		90	90
Gas Pressure (in. H ₂ O)		Ambient	Ambient
Gas Velocity (ft/sec)		62	62
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration	
	PM10	grains/dscf	~0.5 0.005
Pressure Drop Through Gas Cleaning Device TBD			

Signature of Applicant 	Date 05/15/07
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Coal Silo Discharge Baghouse
GAS CLEANING EQUIPMENT PERMIT APPLICATION
 North Dakota Department of Health
 Division of Air Quality
 SFN 8532 (12-05) (AP-109)

APPLICANT

Name of Firm/Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP-100) 004 – Coal Silo Discharge	

EQUIPMENT

Type	Cyclone Other (Describe)	Multiclone	<input checked="" type="checkbox"/> Baghouse	Electrostatic Precipitator	Wet Scrubber	Spray Dryer
Name of Manufacturer TBD		Model Number TBD		Date To Be Installed TBD		
Application Boiler Kiln <input checked="" type="checkbox"/> Other (Specify): Baghouse controlling coal bunker operations						
Pollutants Removed	PM10					
Design Efficiency	99%		%	%	%	%
Operating Efficiency	TBD		%	%	%	%
Describe Method Used to Determine Operating Efficiency: The design efficiency is based on BACT. The operating efficiency is unknown because the facility is not yet operating.						

GAS CONDITIONS			INLET	OUTLET
Gas Volume (SCFM 68°F., 14.7 psia)			2,200	2,200
Gas Temperature (°F.)			75	75
Gas Pressure (in. H ₂ O)			Ambient	Ambient
Gas Velocity (ft/sec)			46	46
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration		
	PM10	grains/dscf	~0.5	0.005
Pressure Drop Through Gas Cleaning Device TBD				

Signature of Applicant 	Date 05/15/07
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Coal Bunker Baghouse
GAS CLEANING EQUIPMENT PERMIT APPLICATION
 North Dakota Department of Health
 Division of Air Quality
 SFN 8532 (12-05) (AP-109)

APPLICANT

Name of Firm/Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP-100) 005 – Coal Bunker System	

EQUIPMENT

Type	Cyclone Other (Describe)	Multiclone	<input checked="" type="checkbox"/> Baghouse	Electrostatic Precipitator	Wet Scrubber	Spray Dryer
Name of Manufacturer TBD		Model Number TBD		Date To Be Installed TBD		
Application Boiler Kiln <input checked="" type="checkbox"/> Other (Specify): Baghouse controlling coal bunker operations						
Pollutants Removed	PM10					
Design Efficiency	99%		%	%	%	%
Operating Efficiency	TBD		%	%	%	%
Describe Method Used to Determine Operating Efficiency: The design efficiency is based on BACT. The operating efficiency is unknown because the facility is not yet operating.						

GAS CONDITIONS		INLET	OUTLET
Gas Volume (SCFM 68°F., 14.7 psia)		5,000	5,000
Gas Temperature (°F.)		90	90
Gas Pressure (in. H ₂ O)		Ambient	Ambient
Gas Velocity (ft/sec)		47	47
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration	
	PM10	grains/dscf	~0.5 0.005
Pressure Drop Through Gas Cleaning Device TBD			

Signature of Applicant 	Date 05/15/07
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Limestone Handling
PERMIT APPLICATION - MANUFACTURING OR PROCESSING EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY

SFN 8520 (AP 102) 12/00

GENERAL - Equipment items operating as a functional unit may be grouped as one application

Name of Firm or Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP 100) el 006 – Limestone Operations	
Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.): Limestone Handling			
Make TBD	Model TBD	Date Installed TBD	
Capacity (manufacturer's or designer's guaranteed maximum) NA	Operating Capacity (Specific Units)		
Brief description of operation of unit or process: Limestone is delivered to the site by truck, and transferred pneumatically to a silo. Limestone will be delivered to the CFB Boiler pneumatically at several injection ports.			

NORMAL OPERATING SCHEDULE

Hours per Day 24	Days per Week 7	Weeks per Year 52	Peak Production Season, if any NA	Dates of Annual Shutdown TBD
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RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS (Include solid fuels such as coke or coal - exclude indirect heat exchangers - Put that information on AP 101)

Material	Hourly Process Weight Rate Pounds per Hour			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours/Week)
	Average	Maximum	Design		
Limestone	11,500	60,000	60,000	50,370 tons / year	NA
	(5.75 tph)	(30 tph)	(30 tph)		

PRODUCTS OF UNIT OR PROCESS (Include all, even those not usable because they do not meet specifications)

Material	Hourly Process Weight Rate Pounds per Hour			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours/Week)
	Average	Maximum	Design		
NA					

FUELS USED (Exclude heat supplied or indirect heat exchangers, list those on AP 101)

Coal (Tons/Yr) NA	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
Natural Gas (Thousand CF/Yr)		LP Gas (Gal/Yr)		Other (Specify)	

EMISSION POINTS (List each point separately, number each and locate on attached flow chart)

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
EPN 006	36	1	3,500	90	74

AIR CONTAMINANTS EMITTED - Known or Suspected Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
EPN 006	See emission calculations in Appendix C			

ARE ANY VOLATILE ORGANIC COMPOUNDS STORED ON PREMISES NO YES - List Below

(See Rules 33-15, Section 33-15-01-04 for classes of compounds covered)

Material Stored	Size Tank (Gallons)	Vapor Control Device
NA	NA	NA

ARE ANY ORGANIC SOLVENTS USED OR PRODUCED? NO (None or less than 50 gallons per year) YES - identify below

Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

IS THERE ANY EMISSION CONTROL EQUIPMENT ON THIS UNIT OR PROCESS? NO YES - Attach form AP 109

Does the input material or product from this process contain finely divided material which could become airborne? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES		Describe storage methods used			
Storage Piles	Type of Material	Particle Diameter (Average Diameter or Screen Size)	Pile Size Average Tons	Pile Wetted (Yes or No)	Pits Covered (Yes or No)
Describe any fugitive dust problems:					

Attach additional sheets if needed to explain any answers. Use separate form for each process that emits contaminants.

Signature of Applicant 	Date 05/15/07
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Limestone Silo Bin Vent
GAS CLEANING EQUIPMENT PERMIT APPLICATION
 North Dakota Department of Health
 Division of Air Quality
 SFN 8532 (12-05) (AP-109)

APPLICANT

Name of Firm/Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP-100) 006 – Limestone Operations	

EQUIPMENT

Type <input type="checkbox"/> Cyclone <input type="checkbox"/> Multiclone <input checked="" type="checkbox"/> Baghouse <input type="checkbox"/> Electrostatic Precipitator <input type="checkbox"/> Wet Scrubber <input type="checkbox"/> Spray Dryer <input type="checkbox"/> Other (Describe)				
Name of Manufacturer TBD		Model Number TBD		Date To Be Installed TBD
Application <input type="checkbox"/> Boiler <input type="checkbox"/> Kiln <input checked="" type="checkbox"/> Other (Specify): Bin vent controlling limestone silo and unloading operations				
Pollutants Removed	PM10			
Design Efficiency	99%	%	%	%
Operating Efficiency	TBD	%	%	%
Describe Method Used to Determine Operating Efficiency: The design efficiency is based on BACT. The operating efficiency is unknown because the facility is not yet operating.				

GAS CONDITIONS		INLET	OUTLET
Gas Volume (SCFM 68°F., 14.7 psia)		3,360	3,360
Gas Temperature (°F.)		90	90
Gas Pressure (in. H ₂ O)		Ambient	Ambient
Gas Velocity (ft/sec)		74	74
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration	
	PM10	grains/dscf	~0.5 0.005
Pressure Drop Through Gas Cleaning Device TBD			

Signature of Applicant 	Date 05/15/07
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Lime Handling
PERMIT APPLICATION - MANUFACTURING OR PROCESSING EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY

SFN 8520 (AP 102) 12/00

GENERAL - Equipment items operating as a functional unit may be grouped as one application

Name of Firm or Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP 100) el 007 – Lime Handling	
Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.): Lime Handling			
Make TBD	Model TBD	Date Installed TBD	
Capacity (manufacturer's or designer's guaranteed maximum) NA	Operating Capacity (Specific Units)		
Brief description of operation of unit or process: Lime will be delivered to the site by truck, and pneumatically unloaded to a storage silo. The lime will be mixed with water to form a slurry, which will be broken into fine drops and injected into the boiler flue gas by the SDA.			

NORMAL OPERATING SCHEDULE

Hours per Day 24	Days per Week 7	Weeks per Year 52	Peak Production Season, if any NA	Dates of Annual Shutdown TBD
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RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS (Include solid fuels such as coke or coal - exclude indirect heat exchangers - Put that information on AP 101)

Material	Hourly Process Weight Rate Pounds per Hour			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours/Week)
	Average	Maximum	Design		
Lime	1,000	120,000	120,000	4380 tons / year	NA
	(.50 tph)	(60 tph)	(60 tph)		

PRODUCTS OF UNIT OR PROCESS (Include all, even those not usable because they do not meet specifications)

Material	Hourly Process Weight Rate Pounds per Hour			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours/Week)
	Average	Maximum	Design		
NA					

FUELS USED (Exclude heat supplied or indirect heat exchangers, list those on AP 101)

Coal (Tons/Yr) NA	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
Natural Gas (Thousand CF/Yr)		LP Gas (Gal/Yr)		Other (Specify)	

EMISSION POINTS (List each point separately, number each and locate on attached flow chart)

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
EPN 007	60	1	4,000	90	85

AIR CONTAMINANTS EMITTED - Known or Suspected Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
EPN 007	See emission calculations in Appendix C			

ARE ANY VOLATILE ORGANIC COMPOUNDS STORED ON PREMISES NO YES - List Below

(See Rules 33-15, Section 33-15-01-04 for classes of compounds covered)

Material Stored	Size Tank (Gallons)	Vapor Control Device
No separate VOC tanks associated with this unit.	NA	NA


ARE ANY ORGANIC SOLVENTS USED OR PRODUCED? NO (None or less than 50 gallons per year) YES - identify below

Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

IS THERE ANY EMISSION CONTROL EQUIPMENT ON THIS UNIT OR PROCESS? NO YES - Attach form AP109 (SFN 8532)

Does the input material or product from this process contain finely divided material which could become airborne? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES		Describe storage methods used			
Storage Piles	Type of Material	Particle Diameter (Average Diameter or Screen Size)	Pile Size Average Tons	Pile Wetted (Yes or No)	Pits Covered (Yes or No)
Describe any fugitive dust problems:					

Attach additional sheets if needed to explain any answers. Use separate form for each process that emits contaminants.

Signature of Applicant 	Date 05/15/07
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Lime Silo Bin Vent
GAS CLEANING EQUIPMENT PERMIT APPLICATION
 North Dakota Department of Health
 Division of Air Quality
 SFN 8532 (12-05) (AP-109)

APPLICANT

Name of Firm/Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth		Title Manager, Environmental Services	Telephone Number 763-241-2449
Application Prepared By: Mark Strohfus		Title Environmental Project Leader	Telephone Number 763-241-2491
		Cell Phone Number 612-961-9820	
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND			Source ID No. (AP-100) 007 – Lime Operations

EQUIPMENT

Type <input type="checkbox"/> Cyclone <input type="checkbox"/> Multiclone <input checked="" type="checkbox"/> Baghouse <input type="checkbox"/> Electrostatic Precipitator <input type="checkbox"/> Wet Scrubber <input type="checkbox"/> Spray Dryer <input type="checkbox"/> Other (Describe)				
Name of Manufacturer TBD		Model Number TBD		Date To Be Installed TBD
Application <input type="checkbox"/> Boiler <input type="checkbox"/> Kiln <input checked="" type="checkbox"/> Other (Specify): Bin vent controlling limestone silo and unloading operations				
Pollutants Removed	PM10			
Design Efficiency	99%	%	%	%
Operating Efficiency	TBD	%	%	%
Describe Method Used to Determine Operating Efficiency: The design efficiency is based on BACT. The operating efficiency is unknown because the facility is not yet operating.				

GAS CONDITIONS		INLET	OUTLET
Gas Volume (SCFM 68°F., 14.7 psia)		3,840	3,840
Gas Temperature (°F.)		90	90
Gas Pressure (in. H ₂ O)		Ambient	Ambient
Gas Velocity (ft/sec)		85	85
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration	
	PM10	grains/dscf	~0.5 0.005
Pressure Drop Through Gas Cleaning Device TBD			

Signature of Applicant 	Date 05/15/07
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Bed Ash System
PERMIT APPLICATION - MANUFACTURING OR PROCESSING EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY

SFN 8520 (AP 102) 12/00

GENERAL - Equipment items operating as a functional unit may be grouped as one application

Name of Firm or Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP 100) el 008 – Bed Ash Handling	
Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.): Bed Ash System			
Make TBD	Model TBD	Date Installed TBD	
Capacity (manufacturer's or designer's guaranteed maximum) NA	Operating Capacity (Specific Units)		
Brief description of operation of unit or process: Fluid bed coolers will remove the ash from the CFB Boiler. The bottom ash discharged from each fluid bed cooler will be conveyed to a common hopper. The bottom ash will be transported by a dedicated pneumatic conveying system to either the ash silo for disposal or bed material silo for reuse.			

NORMAL OPERATING SCHEDULE

Hours per Day 24	Days per Week 7	Weeks per Year 52	Peak Production Season, if any NA	Dates of Annual Shutdown TBD
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RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS (Include solid fuels such as coke or coal - exclude indirect heat exchangers - Put that information on AP 101)

Material	Hourly Process Weight Rate Pounds per Hour			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours/Week)
	Average	Maximum	Design		
Bed Ash	11,600	48,000	48,000	50,808 tons / year	NA
	(5.8 tph)	(24 tph)	(24 tph)		

PRODUCTS OF UNIT OR PROCESS (Include all, even those not usable because they do not meet specifications)

Material	Hourly Process Weight Rate Pounds per Hour			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours/Week)
	Average	Maximum	Design		
NA					

FUELS USED (Exclude heat supplied or indirect heat exchangers, list those on AP 101)

Coal (Tons/Yr) NA	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
Natural Gas (Thousand CF/Yr)		LP Gas (Gal/Yr)		Other (Specify)	

EMISSION POINTS (List each point separately, number each and locate on attached flow chart)

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
EPN 008	36	1	2,800	400	59

AIR CONTAMINANTS EMITTED - Known or Suspected Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
EPN 008	See emission calculations in Appendix C			

ARE ANY VOLATILE ORGANIC COMPOUNDS STORED ON PREMISES NO YES - List Below

(See Rules 33-15, Section 33-15-01-04 for classes of compounds covered)

Material Stored	Size Tank (Gallons)	Vapor Control Device
No separate VOC tanks associated with this unit.	NA	NA

ARE ANY ORGANIC SOLVENTS USED OR PRODUCED? NO (None or less than 50 gallons per year) YES - identify below


Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

IS THERE ANY EMISSION CONTROL EQUIPMENT ON THIS UNIT OR PROCESS? NO YES - Attach form AP109 (SFN 8532)

Does the input material or product from this process contain finely divided material which could become airborne? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES		Describe storage methods used			
Storage Piles	Type of Material	Particle Diameter (Average Diameter or Screen Size)	Pile Size Average Tons	Pile Wetted (Yes or No)	Pits Covered (Yes or No)

Describe any fugitive dust problems:

Attach additional sheets if needed to explain any answers. Use separate form for each process that emits contaminants.

Signature of Applicant 	Date 05/15/07
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Bed Material Silo Bin Vent
GAS CLEANING EQUIPMENT PERMIT APPLICATION
 North Dakota Department of Health
 Division of Air Quality
 SFN 8532 (12-05) (AP-109)

APPLICANT

Name of Firm/Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP-100) 008 – Bed Ash System	

EQUIPMENT

Type <input type="checkbox"/> Cyclone <input type="checkbox"/> Multiclone <input checked="" type="checkbox"/> Baghouse <input type="checkbox"/> Electrostatic Precipitator <input type="checkbox"/> Wet Scrubber <input type="checkbox"/> Spray Dryer <input type="checkbox"/> Other (Describe)				
Name of Manufacturer TBD		Model Number TBD		Date To Be Installed TBD
Application <input type="checkbox"/> Boiler <input type="checkbox"/> Kiln <input checked="" type="checkbox"/> Other (Specify): Bin vent controlling bed ash operations and silo				
Pollutants Removed	PM10			
Design Efficiency	99%	%	%	%
Operating Efficiency	TBD	%	%	%
Describe Method Used to Determine Operating Efficiency: The design efficiency is based on BACT. The operating efficiency is unknown because the facility is not yet operating.				

GAS CONDITIONS		INLET	OUTLET
Gas Volume (SCFM 68°F., 14.7 psia)		1,720 acfm	1,720 acfm
Gas Temperature (°F.)		400	400
Gas Pressure (in. H ₂ O)		Ambient	Ambient
Gas Velocity (ft/sec)		59	59
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration	
	PM10	grains/dscf	
		~0.5	0.005
Pressure Drop Through Gas Cleaning Device TBD			

Signature of Applicant 	Date 05/15/07
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Fly Ash Handling
PERMIT APPLICATION - MANUFACTURING OR PROCESSING EQUIPMENT
NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY

SFN 8520 (AP 102) 12/00

GENERAL - Equipment items operating as a functional unit may be grouped as one application

Name of Firm/Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth		Title Manager, Environmental Services	Telephone Number 763-241-2449
Application Prepared By: Mark Strohfus		Title Environmental Project Leader	Telephone Number 763-241-2491
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10		City Elk River	State MN
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP 100) el 009, 010, 011 – Fly Ash Handling	
Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.): Fly Ash Handling			
Make TBD	Model TBD	Date Installed TBD	
Capacity (manufacturer's or designer's guaranteed maximum) NA		Operating Capacity (Specific Units)	
Brief description of operation of unit or process: Fly ash collected in the air heater hoppers, SDA hopper, and CFB boiler baghouse hoppers will be transported by a vacuum-pneumatic conveying system to a receiver/bin vent located over the ash storage silo. Ash will be removed on an intermittent basis.			

NORMAL OPERATING SCHEDULE

Hours per Day 24	Days per Week 7	Weeks per Year 52	Peak Production Season, if any NA	Dates of Annual Shutdown TBD
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RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS (Include solid fuels such as coke or coal - exclude indirect heat exchangers - Put that information on AP 101)

Material	Hourly Process Weight Rate Pounds per Hour			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours/Week)
	Average	Maximum	Design		
Ash	5,802	5,802	20,000	25,404 tons / year	NA
	(2.9 tph)	(2.9 tph)	(10 tph)		

PRODUCTS OF UNIT OR PROCESS (Include all, even those not usable because they do not meet specifications)

Material	Hourly Process Weight Rate Pounds per Hour			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours/Week)
	Average	Maximum	Design		
NA					

FUELS USED (Exclude heat supplied or indirect heat exchangers, list those on AP 101)

Coal (Tons/Yr) NA	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
Natural Gas (Thousand CF/Yr)		LP Gas (Gal/Yr)		Other (Specify)	

EMISSION POINTS (List each point separately, number each and locate on attached flow chart)

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
EPN 009	32	0.75	1,500	400	57
EPN 010	126	1	3,200	120	68
EPN 011	8	0.83	800	90	24

AIR CONTAMINANTS EMITTED - Known or Suspected Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
EPN 009	See emission calculations in Appendix C			
EPN 010				
EPN 011				

ARE ANY VOLATILE ORGANIC COMPOUNDS STORED ON PREMISES NO YES - List Below

(See Rules 33-15, Section 33-15-01-04 for classes of compounds covered)

Material Stored	Size Tank (Gallons)	Vapor Control Device
No separate VOC tanks associated with this unit.	NA	NA


ARE ANY ORGANIC SOLVENTS USED OR PRODUCED? NO (None or less than 50 gallons per year) YES - identify below

Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

IS THERE ANY EMISSION CONTROL EQUIPMENT ON THIS UNIT OR PROCESS? NO YES - Attach form AP109 (SFN 8532)

Does the input material or product from this process contain finely divided material which could become airborne? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES		Describe storage methods used			
Storage Piles	Type of Material	Particle Diameter (Average Diameter or Screen Size)	Pile Size Average Tons	Pile Wetted (Yes or No)	Pits Covered (Yes or No)
Describe any fugitive dust problems:					

Attach additional sheets if needed to explain any answers. Use separate form for each process that emits contaminants.

Signature of Applicant 	Date 05/15/07
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Recycle Ash Silo Bin Vent
GAS CLEANING EQUIPMENT PERMIT APPLICATION
 North Dakota Department of Health
 Division of Air Quality

SFN 8532 (12-05) (AP-109)

APPLICANT

Name of Firm/Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP-100) 009 – Recycle Ash System	

EQUIPMENT

Type <input type="checkbox"/> Cyclone <input type="checkbox"/> Multiclone <input checked="" type="checkbox"/> Baghouse <input type="checkbox"/> Electrostatic Precipitator <input type="checkbox"/> Wet Scrubber <input type="checkbox"/> Spray Dryer <input type="checkbox"/> Other (Describe)				
Name of Manufacturer TBD		Model Number TBD		Date To Be Installed TBD
Application <input type="checkbox"/> Boiler <input type="checkbox"/> Kiln <input checked="" type="checkbox"/> Other (Specify): Bin vent controlling limestone silo and unloading operations				
Pollutants Removed	PM10			
Design Efficiency	99%	%	%	%
Operating Efficiency	TBD	%	%	%
Describe Method Used to Determine Operating Efficiency: The design efficiency is based on BACT. The operating efficiency is unknown because the facility is not yet operating.				

GAS CONDITIONS		INLET	OUTLET
Gas Volume (SCFM 68°F., 14.7 psia)		920	920
Gas Temperature (°F.)		400	400
Gas Pressure (in. H ₂ O)		Ambient	Ambient
Gas Velocity (ft/sec)		57	57
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration	
	PM10	grains/dscf	~0.5 0.005
Pressure Drop Through Gas Cleaning Device TBD			

Signature of Applicant 	Date 05/15/07
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Ash Silo Filter-Receiver
GAS CLEANING EQUIPMENT PERMIT APPLICATION
 North Dakota Department of Health
 Division of Air Quality
 SFN 8532 (12-05) (AP-109)

APPLICANT

Name of Firm/Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth		Title Manager, Environmental Services	Telephone Number 763-241-2449
Application Prepared By: Mark Strohfus		Title Environmental Project Leader	Telephone Number 763-241-2491
		Cell Phone Number 612-961-9820	
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP-100) 010 – Ash Silo	

EQUIPMENT

Type <input type="checkbox"/> Cyclone <input type="checkbox"/> Multiclone <input checked="" type="checkbox"/> Baghouse <input type="checkbox"/> Electrostatic Precipitator <input type="checkbox"/> Wet Scrubber <input type="checkbox"/> Spray Dryer <input type="checkbox"/> Other (Describe)				
Name of Manufacturer TBD		Model Number TBD		Date To Be Installed TBD
Application <input type="checkbox"/> Boiler <input type="checkbox"/> Kiln <input checked="" type="checkbox"/> Other (Specify): Filter-receiver controlling PM emissions from ash silo operations				
Pollutants Removed	PM10			
Design Efficiency	99%	%	%	%
Operating Efficiency	TBD	%	%	%
Describe Method Used to Determine Operating Efficiency: The design efficiency is based on BACT. The operating efficiency is unknown because the facility is not yet operating.				

GAS CONDITIONS		INLET	OUTLET
Gas Volume (SCFM 68°F., 14.7 psia)		2,910	2,910
Gas Temperature (°F.)		120	120
Gas Pressure (in. H ₂ O)		Ambient	Ambient
Gas Velocity (ft/sec)		68	68
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration	
	PM10	grains/dscf	~0.5 0.005
Pressure Drop Through Gas Cleaning Device TBD			

Signature of Applicant 	Date 05/15/07
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Ash Loadout Spout Baghouse
GAS CLEANING EQUIPMENT PERMIT APPLICATION
 North Dakota Department of Health
 Division of Air Quality
 SFN 8532 (12-05) (AP-109)


APPLICANT

Name of Firm/Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP-100) 011 – Ash Loadout System	

EQUIPMENT

Type <input type="checkbox"/> Cyclone <input type="checkbox"/> Multiclone <input checked="" type="checkbox"/> Baghouse <input type="checkbox"/> Electrostatic Precipitator <input type="checkbox"/> Wet Scrubber <input type="checkbox"/> Spray Dryer <input type="checkbox"/> Other (Describe)				
Name of Manufacturer TBD		Model Number TBD		Date To Be Installed TBD
Application <input type="checkbox"/> Boiler <input type="checkbox"/> Kiln <input checked="" type="checkbox"/> Other (Specify): Baghouse controlling ash loadout operations				
Pollutants Removed	PM10			
Design Efficiency	99%	%	%	%
Operating Efficiency	TBD	%	%	%
Describe Method Used to Determine Operating Efficiency: The design efficiency is based on BACT. The operating efficiency is unknown because the facility is not yet operating.				

GAS CONDITIONS		INLET	OUTLET
Gas Volume (SCFM 68°F., 14.7 psia)		770	770
Gas Temperature (°F.)		90	90
Gas Pressure (in. H ₂ O)		Ambient	Ambient
Gas Velocity (ft/sec)		5	5
Pollutant Concentration (Specify Pollutant and Unit of Concentration)	Pollutant	Unit of Concentration	
	PM10	grains/dscf	~0.5 0.005
Pressure Drop Through Gas Cleaning Device TBD			

Signature of Applicant 	Date 05/15/07
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Package Boiler 1
FUEL BURNING EQUIPMENT FOR INDIRECT HEATING PERMIT APPLICATION
 NORTH DAKOTA DEPARTMENT OF HEALTH
 DIVISION OF AIR QUALITY
 SFN 8518 (12-00) (AP-101)
GENERAL

Name of Firm or Organization Great River Energy - Spiritwood Station		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330
Plant Location The NW 1/4 of the SW 1/4 of Sec 22, Township 140 N, Range 62 W; Stutsman County, ND		Source ID No. (AP100) 012 – Package Boiler 1	

EQUIPMENT

Name of Manufacturer TBD	Rated Capacity/Maximum Input 256/256 MMBtu/hr	Model Number TBD
Purpose <input type="checkbox"/> Space Heat % <input type="checkbox"/> Power Generation % <input checked="" type="checkbox"/> Process Heat % <input type="checkbox"/> Other (Specify % if multi-purpose)		

TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

<input type="checkbox"/> COAL (If other solid fuel, specify here:	<input checked="" type="checkbox"/> Fuel Oil	<input checked="" type="checkbox"/> Gas (Propane too)
<input type="checkbox"/> Pulverized <input type="checkbox"/> General <input type="checkbox"/> Spreader Stoker without Fly Ash Reinjection <input type="checkbox"/> Dry Bottom <input type="checkbox"/> Fluidized Bed <input type="checkbox"/> Wet Bottom with Fly Ash Reinjection <input type="checkbox"/> Cyclone <input type="checkbox"/> Wet Bottom without Fly Ash Reinjection <input type="checkbox"/> Hand-Fired <input type="checkbox"/> <input type="checkbox"/> Other (Specify)	<input checked="" type="checkbox"/> Horizontally Fired <input type="checkbox"/> Tangentially Fired <input type="checkbox"/> Other - Specify:	<input checked="" type="checkbox"/> Horizontally Fired <input type="checkbox"/> Tangentially Fired <input type="checkbox"/> Other - Specify:

NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
standby	7	52	8760	Years 1 and 2 will see nearly full utilization followed by a change to standby designation after the CFB is commissioned.

TYPE AND QUANTITY OF FUEL EXPECTED TO BE USED IN A CALENDAR YEAR

Year	PRIMARY FUELS			STANDBY FUELS			STANDBY FUELS		
	Type Natural Gas			Type #2 Fuel Oil (Ultra low sulfur)			Type Propane		
	Quantity/Year	Units		Quantity/Year (backup use only)	Units		Quantity/Year (backup use only)	Units	
2009	2,190	MMcf							
	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average
Percent Ash (Solids Fuel Only)	Negligible	Negligible	Negligible	0.1%	0.1%	0.1%	Negligible	Negligible	Negligible
Percent Sulfur	Negligible	Negligible	Negligible	0.0010%	0.0008%	0.0008%	Negligible	Negligible	Negligible
BTU Per Unit (Specify):	1,020 Btu/scf	1,020 Btu/scf	1,020 Btu/scf	140,000 Btu/gal	140,000 Btu/gal	140,000 Btu/gal	90,500 Btu/gal	90,500 Btu/gal	90,500 Btu/gal

COMBUSTION AIR

<input type="checkbox"/> Natural Draft <input type="checkbox"/> Induced <input checked="" type="checkbox"/> Forced <input type="checkbox"/> Other - Specify:
--

STACK DATA

Height Above Grade	140 ft	Gas Temperature at Exit		300 °F
Inside Diameter at Exit	9.84 ft	Gas Velocity at Exit		50 fps
Stack Exit Gas Flow Rate		Average		Maximum
ACFM		224,900	224,900	
SCFM		157,100	157,100	
Are sampling ports available? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes - Describe: TBD				
Describe Fuel Transport and Storage Methods The fuel oil will be delivered to the site by truck and stored in a 500,000 gallon storage tank. Natural gas will be supplied via pipeline.				
Is any air contaminant control device used in conjunction with this equipment: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes - Attach a completed gas cleaning equipment form (SFN 8532 AP-109) to this application				

NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
 See CFB Boiler "Fuel Burning Equipment for Indirect Heating Application" for drawings of the building housing each Package Boiler

STACK EMISSIONS

Pollutant	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities:
Particulate	See Appendix C, Table C-2		274/281/270 MMBtu/hr heat inputs for natural gas, propane, and fuel oil respectively; emission calculations were prepared using AP 42 emission factors (uncontrolled) and BACT limits (controlled). See Appendix C for more information.
PM ₁₀			
Sulfur Dioxide			
Nitrogen Oxide			
Carbon Monoxide			
Other – Specify			

Signature of Applicant 	Date 05/15/07
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**Package Boiler 1****PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES**

NORTH DAKOTA DEPARTMENT OF HEALTH

DIVISION OF AIR QUALITY

SFN 8329 (12/00) (AP-117)

SECTION A - APPLICANT INFORMATION

Name of Firm/Organization Great River Energy - Spiritwood Station		Standard Industrial Classification No. 4931	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330

FACILITY INFORMATION

Contact Person for Air Pollution Matters Richard R. Lancaster	Title VP	Telephone Number 763-241-2428	
Facility Address (street & no.) TBD	City and County Spiritwood, Stutsman County	State ND	Zip Code 58481
Land Area at Plant Site 35.25 Acres (or)	Sq. Ft.	MSL Elevation at Plant 1479 ft	Number of Employees at Location 20

Describe Nature of Business/Process Auxiliary process steam production from gas/propane or fuel oil fired package boiler.

SECTION B - STACK DATA

Inside Diameter 118 in.	Inside Area 11000 Sq. in.	Height Above Grade 140 ft.	Are Emission Control Devices in Place? If so Complete SFN 8532 (AP 109) No
Gas Temperature at Exit 300 °F	Gas Velocity at Exit 50 ft/sec	Gas Volume 224,900 acfm 157,100 scfm	
Basis of Estimate (attach separate sheet if necessary)			
Nearest Residences or Building Spiritwood Cemetery	Distance (ft.) ~940	Direction SSW	
Nearest Property Line Gravel Road	Distance (ft.) ~500	Direction West	

SECTION C - EMISSION STREAM DATA

Source ID # Form AP-100 012 – Package Boiler 1	Mean Particle Diameter (um) TBD
Flow Rate (scfm) 157,103	Drift Velocity (ft/sec) TBD
Stream Temperature (EF) 296 °F	Particulate Concentration (gr/dscf) 0.03
Moisture Content (%) TBD	Halogens or Metals Present? Yes
Pressure (in. Hg) TBD	Organic Content (PPMv) 0.23
Heat Content (Btu/scfm) TBD	O ₂ Content (%) TBD

SECTION D - POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted See Appendix C, Table C-9	Chemical Abstract Services (CAS) Number See Appendix C, Table C-9
Proposed Emission Rate (lb/hr) See Appendix C, Table C-9	Emission Source (describe) Package Boiler – Gas Combustion
Source Classification (process point, process fugitive, area fugitive) Point	Pollutant Class and Form (organic/inorganic - particulate/vapor) See Appendix C, Table C-9
Concentration in Emission Stream (PPMv) See Appendix C, Table C-9	Vapor Pressure (in. Hg @ EF) See Appendix C, Table C-9
Solubility See Appendix C, Table C-9	Molecular Weight (lb/lb-mole) See Appendix C, Table C-9
Absorptive Properties	

Signature of Applicant 	Date 05/15/07
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Package Boiler 2
FUEL BURNING EQUIPMENT FOR INDIRECT HEATING PERMIT APPLICATION
 NORTH DAKOTA DEPARTMENT OF HEALTH
 DIVISION OF AIR QUALITY
 SFN 8518 (12-00) (AP-101)
GENERAL

Name of Firm or Organization Spiritwood Energy, LLC		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330
Plant Location The NW 1/4 of the SW 1/4 of Sec 22, Township 140 N, Range 62 W; Stutsman County, ND		Source ID No. (AP100) 013 – Package Boiler 2	

EQUIPMENT

Name of Manufacturer TBD	Rated Capacity/Maximum Input 256/256 MMBtu/hr	Model Number TBD
Purpose <input type="checkbox"/> Space Heat % <input type="checkbox"/> Power Generation % <input checked="" type="checkbox"/> Process Heat % <input type="checkbox"/> Other (Specify % if multi-purpose)		

TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

<input type="checkbox"/> COAL (If other solid fuel, specify here:	<input checked="" type="checkbox"/> Fuel Oil	<input checked="" type="checkbox"/> Gas (Propane too)
<input type="checkbox"/> Pulverized <input type="checkbox"/> General <input type="checkbox"/> Spreader Stoker without Fly Ash Reinjection <input type="checkbox"/> Dry Bottom <input type="checkbox"/> Fluidized Bed <input type="checkbox"/> Wet Bottom with Fly Ash Reinjection <input type="checkbox"/> Cyclone <input type="checkbox"/> Wet Bottom without Fly Ash Reinjection <input type="checkbox"/> Hand-Fired <input type="checkbox"/> <input type="checkbox"/> Other (Specify)	<input checked="" type="checkbox"/> Horizontally Fired <input type="checkbox"/> Tangentially Fired <input type="checkbox"/> Other - Specify:	<input checked="" type="checkbox"/> Horizontally Fired <input type="checkbox"/> Tangentially Fired <input type="checkbox"/> Other - Specify:

NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
standby	7	52	8760	Years 1 and 2 will see nearly full utilization followed by a change to standby designation after the CFB is commissioned.

TYPE AND QUANTITY OF FUEL EXPECTED TO BE USED IN A CALENDAR YEAR

Year	PRIMARY FUELS			STANDBY FUELS			STANDBY FUELS		
	Type Natural Gas			Type #2 Fuel Oil (Ultra low sulfur)			Type Propane		
	Quantity/Year		Units	Quantity/Year (backup use only)		Units	Quantity/Year (backup use only)		Units
2009	2,190		MMcf	(backup use only)			(backup use only)		
	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average
Percent Ash (Solids Fuel Only)	Negligible	Negligible	Negligible	0.1%	0.1%	0.1%	Negligible	Negligible	Negligible
Percent Sulfur	Negligible	Negligible	Negligible	0.0010%	0.0008%	0.0008%	Negligible	Negligible	Negligible
BTU Per Unit (Specify):	1,020 Btu/scf	1,020 Btu/scf	1,020 Btu/scf	140,000 Btu/gal	140,000 Btu/gal	140,000 Btu/gal	90,500 Btu/gal	90,500 Btu/gal	90,500 Btu/gal

COMBUSTION AIR

<input type="checkbox"/> Natural Draft <input type="checkbox"/> Induced <input checked="" type="checkbox"/> Forced <input type="checkbox"/> Other - Specify:
--

STACK DATA

Height Above Grade	140 ft	Gas Temperature at Exit	300 °F
Inside Diameter at Exit	9.84 ft	Gas Velocity at Exit	50 fps
Stack Exit Gas Flow Rate		Average	Maximum
ACFM		224,900	224,900
SCFM		157,100	157,100
Are sampling ports available? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes - Describe: TBD			
Describe Fuel Transport and Storage Methods The fuel oil will be delivered to the site by truck and stored in a 500,000 gallon storage tank. Natural gas will be supplied via pipeline.			
Is any air contaminant control device used in conjunction with this equipment: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes - Attach a completed gas cleaning equipment form (SFN 8532 AP-109) to this application			

NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
 See CFB Boiler “Fuel Burning Equipment for Indirect Heating Application” for drawings of the building housing each Package Boiler

STACK EMISSIONS

Pollutant	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities:
Particulate	See Appendix C, Table C-2		274/281/270 MMBtu/hr heat inputs for natural gas, propane, and fuel oil respectively; emission calculations were prepared using AP 42 emission factors (uncontrolled) and BACT limits (controlled). See Appendix C for more information.
PM ₁₀			
Sulfur Dioxide			
Nitrogen Oxide			
Carbon Monoxide			
Other - Specify			

Signature of Applicant 	Date 05/15/07
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Package Boiler 2

PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES

NORTH DAKOTA DEPARTMENT OF HEALTH

DIVISION OF AIR QUALITY

SFN 8329 (12/00) (AP-117)

SECTION A - APPLICANT INFORMATION

Name of Firm/Organization Spiritwood Energy, LLC		Standard Industrial Classification No. 4931	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330

FACILITY INFORMATION

Contact Person for Air Pollution Matters Richard R. Lancaster	Title VP	Telephone Number 763-241-2428	
Facility Address (street & no.) TBD	City and County Spiritwood, Stutsman County	State ND	Zip Code 58481
Land Area at Plant Site 35.25 Acres (or)	MSL Elevation at Plant 1479 ft	Number of Employees at Location 20	

Describe Nature of Business/Process Auxiliary process steam production from gas/propane or fuel oil fired package boiler.

SECTION B - STACK DATA

Inside Diameter 118 in.	Inside Area 11000 Sq. in.	Height Above Grade 140 ft.	Are Emission Control Devices in Place? If so Complete SFN 8532 (AP 109) No
Gas Temperature at Exit 300 °F	Gas Velocity at Exit 50 ft/sec	Gas Volume 224,900 acfm 157,100 scfm	
Basis of Estimate (attach separate sheet if necessary)			
Nearest Residences or Building Spiritwood Cemetery	Distance (ft.) ~940	Direction SSW	
Nearest Property Line Gravel Road	Distance (ft.) ~500	Direction West	

SECTION C - EMISSION STREAM DATA

Source ID # Form AP-100 013 – Package Boiler 2	Mean Particle Diameter (um) TBD
Flow Rate (scfm) 157,103	Drift Velocity (ft/sec) TBD
Stream Temperature (EF) 300 °F	Particulate Concentration (gr/dscf) 0.03
Moisture Content (%) TBD	Halogens or Metals Present? Yes
Pressure (in. Hg) TBD	Organic Content (PPMv) 0.23
Heat Content (Btu/scfm) TBD	O ₂ Content (%) TBD

SECTION D - POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted See Appendix C, Table C-9	Chemical Abstract Services (CAS) Number See Appendix C, Table C-9
Proposed Emission Rate (lb/hr) See Appendix C, Table C-9	Emission Source (describe) Package Boiler – Gas Combustion
Source Classification (process point, process fugitive, area fugitive) Point	Pollutant Class and Form (organic/inorganic - particulate/vapor) See Appendix C, Table C-9
Concentration in Emission Stream (PPMv) See Appendix C, Table C-9	Vapor Pressure (in. Hg @ EF) See Appendix C, Table C-9
Solubility See Appendix C, Table C-9	Molecular Weight (lb/lb-mole) See Appendix C, Table C-9
Absorptive Properties	

Signature of Applicant 	Date 05/15/07
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**Package Boiler 3
FUEL BURNING EQUIPMENT FOR INDIRECT HEATING PERMIT
APPLICATION**

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8518 (12-00) (AP-101)

GENERAL

Name of Firm or Organization Spiritwood Energy, LLC		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330
Plant Location The NW 1/4 of the SW 1/4 of Sec 22, Township 140 N, Range 62 W; Stutsman County, ND		Source ID No. (AP100) 014 – Package Boiler 3	

EQUIPMENT

Name of Manufacturer TBD	Rated Capacity/Maximum Input 256/256 MMBtu/hr	Model Number TBD
Purpose <input type="checkbox"/> Space Heat % <input type="checkbox"/> Power Generation % <input checked="" type="checkbox"/> Process Heat % <input type="checkbox"/> Other (Specify % if multi-purpose)		

TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

<input type="checkbox"/> COAL (If other solid fuel, specify here:	<input checked="" type="checkbox"/> Fuel Oil	<input checked="" type="checkbox"/> Gas (Propane too)
<input type="checkbox"/> Pulverized <input type="checkbox"/> General <input type="checkbox"/> Spreader Stoker without Fly Ash Reinjection <input type="checkbox"/> Dry Bottom <input type="checkbox"/> Fluidized Bed <input type="checkbox"/> Wet Bottom with Fly Ash Reinjection <input type="checkbox"/> Cyclone <input type="checkbox"/> Wet Bottom without Fly Ash Reinjection <input type="checkbox"/> Hand-Fired <input type="checkbox"/> <input type="checkbox"/> Other (Specify)	<input checked="" type="checkbox"/> Horizontally Fired <input type="checkbox"/> Tangentially Fired <input type="checkbox"/> Other - Specify:	<input checked="" type="checkbox"/> Horizontally Fired <input type="checkbox"/> Tangentially Fired <input type="checkbox"/> Other - Specify:

NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
standby	7	52	8760	Years 1 and 2 will see nearly full utilization followed by a change to standby designation after the CFB is commissioned.

TYPE AND QUANTITY OF FUEL EXPECTED TO BE USED IN A CALENDAR YEAR

Year	PRIMARY FUELS			STANDBY FUELS			STANDBY FUELS		
	Type Natural Gas			Type #2 Fuel Oil (Ultra low sulfur)			Type Propane		
2009	Quantity/Year		Units	Quantity/Year (backup use only)		Units	Quantity/Year (backup use only)		Units
	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average
Percent Ash (Solids Fuel Only)	Negligible	Negligible	Negligible	0.1%	0.1%	0.1%	Negligible	Negligible	Negligible
Percent Sulfur	Negligible	Negligible	Negligible	0.0010%	0.0008%	0.0008%	Negligible	Negligible	Negligible
BTU Per Unit (Specify):	1,020 Btu/scf	1,020 Btu/scf	1,020 Btu/scf	140,000 Btu/gal	140,000 Btu/gal	140,000 Btu/gal	90,500 Btu/gal	90,500 Btu/gal	90,500 Btu/gal

COMBUSTION AIR

<input type="checkbox"/> Natural Draft <input type="checkbox"/> Induced <input checked="" type="checkbox"/> Forced <input type="checkbox"/> Other - Specify:
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STACK DATA

Height Above Grade	140 ft	Gas Temperature at Exit	300 °F
Inside Diameter at Exit	9.84 ft	Gas Velocity at Exit	50 fps
Stack Exit Gas Flow Rate		Average	Maximum
ACFM		224,900	224,900
SCFM		157,100	157,100
Are sampling ports available? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes - Describe: TBD			
Describe Fuel Transport and Storage Methods The fuel oil will be delivered to the site by truck and stored in a 500,000 gallon storage tank. Natural gas will be supplied via pipeline.			
Is any air contaminant control device used in conjunction with this equipment: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes - Attach a completed gas cleaning equipment form (SFN 8532 AP-109) to this application			

NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
 See CFB Boiler “Fuel Burning Equipment for Indirect Heating Application” for drawings of the building housing each Package Boiler

STACK EMISSIONS

Pollutant	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities:
Particulate	See Appendix C, Table C-2		274/281/270 MMBtu/hr heat inputs for natural gas, propane, and fuel oil respectively; emission calculations were prepared using AP 42 emission factors (uncontrolled) and BACT limits (controlled). See Appendix C for more information.
PM ₁₀			
Sulfur Dioxide			
Nitrogen Oxide			
Carbon Monoxide			
Other – Specify			

Signature of Applicant 	Date 05/15/07
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**Package Boiler 3****PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES**

NORTH DAKOTA DEPARTMENT OF HEALTH

DIVISION OF AIR QUALITY

SFN 8329 (12/00) (AP-117)

SECTION A – APPLICANT INFORMATION

Name of Firm/Organization Spiritwood Energy, LLC		Standard Industrial Classification No. 4931	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330

FACILITY INFORMATION

Contact Person for Air Pollution Matters Richard R. Lancaster	Title VP	Telephone Number 763-241-2428	
Facility Address (street & no.) TBD	City and County Spiritwood, Stutsman County	State ND	Zip Code 58481
Land Area at Plant Site 35.25 Acres (or)	MSL Elevation at Plant 1479 ft	Number of Employees at Location 20	

Describe Nature of Business/Process Auxiliary process steam production from gas/propane or fuel oil fired package boiler.

SECTION B – STACK DATA

Inside Diameter 118 in.	Inside Area 11000 Sq. in.	Height Above Grade 140 ft.	Are Emission Control Devices in Place? If so Complete SFN 8532 (AP 109) No
Gas Temperature at Exit 300 °F	Gas Velocity at Exit 50 ft/sec	Gas Volume 224,900 acfm 157,100 scfm	
Basis of Estimate (attach separate sheet if necessary)			
Nearest Residences or Building Spiritwood Cemetery	Distance (ft.) ~940	Direction SSW	
Nearest Property Line Gravel Road	Distance (ft.) ~500	Direction West	

SECTION C – EMISSION STREAM DATA

Source ID # Form AP-100 EPN 014 – Package Boiler 3	Mean Particle Diameter (um) TBD
Flow Rate (scfm) 157,103	Drift Velocity (ft/sec) TBD
Stream Temperature (EF) 300 °F	Particulate Concentration (gr/dscf) 0.03
Moisture Content (%) TBD	Halogens or Metals Present? Yes
Pressure (in. Hg) TBD	Organic Content (PPMv) 0.23
Heat Content (Btu/scfm) TBD	O ₂ Content (%) TBD

SECTION D – POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted See Appendix C, Table C-9	Chemical Abstract Services (CAS) Number See Appendix C, Table C-9
Proposed Emission Rate (lb/hr) See Appendix C, Table C-9	Emission Source (describe) Package Boiler – Gas Combustion
Source Classification (process point, process fugitive, area fugitive) Point	Pollutant Class and Form (organic/inorganic – particulate/vapor) See Appendix C, Table C-9
Concentration in Emission Stream (PPMv) See Appendix C, Table C-9	Vapor Pressure (in. Hg @ EF) See Appendix C, Table C-9
Solubility See Appendix C, Table C-9	Molecular Weight (lb/lb-mole) See Appendix C, Table C-9
Absorptive Properties	

Signature of Applicant 	Date 05/15/07
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Diesel Fire Water Pump
PERMIT APPLICATION – INTERNAL COMBUSTION ENGINES
 NORTH DAKOTA DEPARTMENT OF HEALTH
 DIVISION OF AIR QUALITY
 SFN 8891 (12-05) (AP-113)

GENERAL

Name of Firm or Organization Spiritwood Energy, LLC		Plant Location The location is the NW ¼ of the SW ¼ of Section 22, Township 140 North, Range 62 West; Stutsman County, ND	
Facility Name Spiritwood Energy Combined Heat and Power Plant		Source Identification Number (From Form AP 100) 015 – Diesel Fire Water Pump	
Application Being Submitted By (Name): Mary Jo Roth	Title Mgr, Env Services	Telephone Number 763-241-2449	Application Date May 3, 2007
Application Prepared By: Mark Strohfus	Title Env Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
TYPE OF UNIT <input type="checkbox"/> Stationary Gas Turbine for Electricity Generation <input type="checkbox"/> Heavy Duty Nat. Gas-Fired Pipeline Compressor Engines and Turbines <input type="checkbox"/> Large Stationary Diesel and Dual Fuel Engines <input checked="" type="checkbox"/> Gasoline and Diesel Industrial Engines			

MANUFACTURER'S DATA

Make TBD	Model TBD	Maximum Rating 350 BHP	Operating Capacity 350 BHP
TBD- <input type="checkbox"/> 4 Stroke <input type="checkbox"/> 2 Stroke	TBD- <input type="checkbox"/> Rich Burn <input type="checkbox"/> Lean Burn	<input type="checkbox"/> Spark Ignition <input checked="" type="checkbox"/> Compression Ignition	

FUELS USED

Natural Gas	x 10 ³ cu. Ft./year	Percent Sulfur	Percent H ₂ S
Oil	3180.5 gal./year @ 500 hrs/yr	Percent Sulfur 0.05 %	Grade No. #2 Fuel Oil / Diesel
LP Gas	gal./year	Other (Specify)	

COMPRESSOR STATION & FLARE DATA (if applicable)

Frequency of Flaring NA	Quantity Flared	Percent H ₂ S
WILL FLARING OF GAS COMPLY WITH APPLICABLE AMBIENT AIR QUALITY STANDARDS?		
For natural gas pipeline transmission and/or distribution, indicate volume of natural gas compressed.		Cu.ft./hour

NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year 500	Peak Production Season (if any)
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EMISSIONS TO THE ATMOSPHERE

EMISSION POINT	STACK HEIGHT (FEET)	STACK DIAMETER (FEET AT TOP)	GAS DISCHARGED (SCFM)	EXIT TEMP (°F)	GAS VELOCITY (FPS)
(ENGINE)	8	0.5	653	870	140
(FLARE)					

EMISSION CONTROL EQUIPMENT

Is there any emission control equipment on this unit? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Where a gas cleaning device exists, a GAS CLEANING EQUIPMENT Form AP 109 (SFN 8532) must be completed and attached.
--	---

AIR CONTAMINANTS EMITTED

EMISSION POINT	POLLUTANT	AMOUNT (POUNDS PER HOUR)	AMOUNT (TONS PER YEAR)	BASIS OF ESTIMATE*
	NO _x	See Appendix C, Table C-2		Based on AP-42 Emission Factors. See Appendix C for more information.
	CO			
	PM			
	PM ₁₀			
(ENGINE)	SO ₂			
(FLARE)	SO ₂			
	Formaldehyde			
	Total HAPS**			

* If performance test results are available for the unit, submit a copy of test with this application.

** Total HAPS includes formaldehyde

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	If "NO" a Compliance Schedule must be completed and attached.
---	---

Signature of Applicant 	Date 05/15/07
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**Cooling Tower
 PERMIT APPLICATION - MANUFACTURING OR PROCESSING EQUIPMENT
 NORTH DAKOTA DEPARTMENT OF HEALTH
 DIVISION OF AIR QUALITY**

SFN 8520 (AP 102) 12/00

GENERAL - Equipment items operating as a functional unit may be grouped as one application

Name of Firm/Organization Spiritwood Energy, LLC		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth		Title Manager, Environmental Services	Telephone Number 763-241-2449
Application Prepared By: Mark Strohfus		Title Environmental Project Leader	Telephone Number 763-241-2491
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10		City Elk River	State MN
			Cell Phone Number 612-961-9820
Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND		Source ID No. (AP 100) el 016 – Cooling Tower	
Type of Unit or Process (rotary dryer, cupola furnace, crusher, pelletizer, etc.): Cooling Tower			
Make TBD	Model TBD	Date Installed TBD	
Capacity (manufacturer's or designer's guaranteed maximum) NA		Operating Capacity (Specific Units)	
Brief description of operation of unit or process:			

NORMAL OPERATING SCHEDULE

Hours per Day 24	Days per Week 7	Weeks per Year 52	Peak Production Season, if any NA	Dates of Annual Shutdown TBD
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RAW MATERIALS INTRODUCED INTO UNIT OR PROCESS (Include solid fuels such as coke or coal - exclude indirect heat exchangers - Put that information on AP 101)

Material	Hourly Process Weight Rate Pounds per Hour			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours/Week)
	Average	Maximum	Design		
Cooling Water		80,000 gpm	80,000 gpm		NA

PRODUCTS OF UNIT OR PROCESS (Include all, even those not usable because they do not meet specifications)

Material	Hourly Process Weight Rate Pounds per Hour			Average Annual (Specify Units)	Intermittent Operation Only (Average Hours/Week)
	Average	Maximum	Design		
NA					

FUELS USED (Exclude heat supplied or indirect heat exchangers, list those on AP 101)

Coal (Tons/Yr) NA	% Sulfur	% Ash	Oil (Gal/Yr)	% Sulfur	Grade No.
Natural Gas (Thousand CF/Yr)		LP Gas (Gal/Yr)		Other (Specify)	

EMISSION POINTS (List each point separately, number each and locate on attached flow chart)

Number	Stack Height (ft)	Stack Diameter (ft at top)	Gas Volume (ACFM)	Exit Temp (°F)	Gas Velocity (fps)
EPN 016	30	22	800,000	100	35

AIR CONTAMINANTS EMITTED - Known or Suspected Use same identification number as above

Number	Pollutant	Amount		Basis of Estimate
		Pounds/Hr	Tons/Yr	
EPN 016	See emission calculations in Appendix C			

ARE ANY VOLATILE ORGANIC COMPOUNDS STORED ON PREMISES NO YES - List Below

(See Rules 33-15, Section 33-15-01-04 for classes of compounds covered)

Material Stored	Size Tank (Gallons)	Vapor Control Device
No separate VOC tanks associated with this unit.	NA	NA

ARE ANY ORGANIC SOLVENTS USED OR PRODUCED? NO (None or less than 50 gallons per year) YES - identify below


Type	Principal Use	Gallons/Yr Consumed	Gallons/Yr Produced

IS THERE ANY EMISSION CONTROL EQUIPMENT ON THIS UNIT OR PROCESS? NO YES - Attach form AP109 (SFN 8532)

Does the input material or product from this process contain finely divided material which could become airborne? <input type="checkbox"/> NO <input checked="" type="checkbox"/> YES		Describe storage methods used			
Storage Piles	Type of Material	Particle Diameter (Average Diameter or Screen Size)	Pile Size Average Tons	Pile Wetted (Yes or No)	Pits Covered (Yes or No)

Describe any fugitive dust problems:

Attach additional sheets if needed to explain any answers. Use separate form for each process that emits contaminants.

Signature of Applicant 	Date 05/15/07
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**Propane Vaporizer
FUEL BURNING EQUIPMENT FOR INDIRECT HEATING PERMIT
APPLICATION**

NORTH DAKOTA DEPARTMENT OF HEALTH
DIVISION OF AIR QUALITY
SFN 8518 (12-00) (AP-101)

GENERAL

Name of Firm or Organization Spiritwood Energy, LLC		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330
Plant Location The NW 1/4 of the SW 1/4 of Sec 22, Township 140 N, Range 62 W; Stutsman County, ND		Source ID No. (AP100) 017 – Propane Vaporizer	

EQUIPMENT

Name of Manufacturer TBD	Rated Capacity/Maximum Input 14.6/14.6 MMBtu/hr	Model Number TBD
Purpose <input type="checkbox"/> Space Heat % <input type="checkbox"/> Power Generation % <input checked="" type="checkbox"/> Process Heat % <input type="checkbox"/> Other (Specify % if multi-purpose)		

TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

<input type="checkbox"/> COAL (If other solid fuel, specify here:	<input type="checkbox"/> Fuel Oil	<input checked="" type="checkbox"/> Gas (Propane)
<input type="checkbox"/> Pulverized <input type="checkbox"/> General <input type="checkbox"/> Spreader Stoker without Fly Ash Reinjection <input type="checkbox"/> Dry Bottom <input type="checkbox"/> Fluidized Bed <input type="checkbox"/> Wet Bottom with Fly <input type="checkbox"/> Cyclone Ash Reinjection <input type="checkbox"/> Hand-Fired <input type="checkbox"/> Wet Bottom without <input type="checkbox"/> Other (Specify) Fly Ash Reinjection	<input type="checkbox"/> Horizontally Fired <input type="checkbox"/> Tangentially Fired <input type="checkbox"/> Other - Specify:	<input type="checkbox"/> Horizontally Fired <input type="checkbox"/> Tangentially Fired <input type="checkbox"/> Other - Specify:

NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
standby	7	52	8760	

TYPE AND QUANTITY OF FUEL EXPECTED TO BE USED IN A CALENDAR YEAR

Year 2009	PRIMARY FUELS			STANDBY FUELS		
	Type Propane			Type		
	Quantity/Year (backup use only)		Units	Quantity/Year		Units
	Maximum	Minimum	Average	Maximum	Minimum	Average
Percent Ash (Solids Fuel Only)	Negligible	Negligible	Negligible			
Percent Sulfur	Negligible	Negligible	Negligible			
BTU Per Unit (Specify):	90,500 Btu/gal	90,500 Btu/gal	90,500 Btu/gal			

COMBUSTION AIR

<input type="checkbox"/> Natural Draft <input type="checkbox"/> Induced <input checked="" type="checkbox"/> Forced <input type="checkbox"/> Other - Specify:
--

STACK DATA

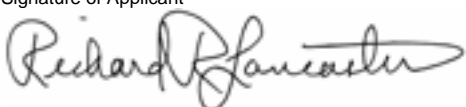
Height Above Grade	12 ft	Gas Temperature at Exit	300 °F
Inside Diameter at Exit	1.83 ft	Gas Velocity at Exit	25 fps
Stack Exit Gas Flow Rate		Average	Maximum
ACFM		4,000	4,000
SCFM		2,779	2,779
Are sampling ports available? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes - Describe:			
Describe Fuel Transport and Storage Methods Propane supply will be a slipstream from the boiler supply.			
Is any air contaminant control device used in conjunction with this equipment? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes - Attach a completed gas cleaning equipment form (SFN 8532 AP-109) to this application			

NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
 See CFB Boiler “Fuel Burning Equipment for Indirect Heating Application” for drawings

STACK EMISSIONS

Pollutant	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities: 14.6 MMBtu/hr heat input; emission calculations were prepared using AP 42 emission factors. See Appendix C for more information.
Particulate	See Appendix C, Table C-2		
PM ₁₀			
Sulfur Dioxide			
Nitrogen Oxide			
Carbon Monoxide			
Other - Specify			

Signature of Applicant 	Date 05/15/07
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Diesel Backup Generator
PERMIT APPLICATION - INTERNAL COMBUSTION ENGINES
 NORTH DAKOTA DEPARTMENT OF HEALTH
 DIVISION OF AIR QUALITY
 SFN 8891 (12-05) (AP-113)

GENERAL

Name of Firm or Organization Spiritwood Energy, LLC		Plant Location The location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND	
Facility Name Spiritwood Energy Combined Heat and Power Plant		Source Identification Number (From Form AP 100) 018 - Diesel Generator	
Application Being Submitted By (Name): Mary Jo Roth	Title Mgr, Env Services	Telephone Number 763-241-2449	Application Date May 3, 2007
Application Prepared By: Mark Strohfus	Title Env Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
TYPE OF UNIT <input type="checkbox"/> Stationary Gas Turbine for Electricity Generation <input type="checkbox"/> Heavy Duty Nat. Gas-Fired Pipeline Compressor Engines and Turbines <input checked="" type="checkbox"/> Large Stationary Diesel and Dual Fuel Engines <input type="checkbox"/> Gasoline and Diesel Industrial Engines			

MANUFACTURER'S DATA

Make Caterpillar	Model STANDBY 1000 ekW 1250 kVA	Maximum Rating 1400 BHP @ 1800 rpm	Operating Capacity 1400 BHP @ 1800 rpm
<input checked="" type="checkbox"/> 4 Stroke <input type="checkbox"/> 2 Stroke	TBD- <input type="checkbox"/> Rich Burn <input type="checkbox"/> Lean Burn	<input type="checkbox"/> Spark Ignition	<input checked="" type="checkbox"/> Compression Ignition

FUELS USED

Natural Gas	x 10 ³ cu. ft./year	Percent Sulfur	Percent H ₂ S
Oil	12,722 gal./year @ 500 hrs/yr	Percent Sulfur 0.05 %	Grade No. #2 Fuel Oil / Diesel
LP Gas	gal./year	Other (Specify)	

COMPRESSOR STATION & FLARE DATA (if applicable)

Frequency of Flaring NA	Quantity Flared	Percent H ₂ S
WILL FLARING OF GAS COMPLY WITH APPLICABLE AMBIENT AIR QUALITY STANDARDS?		
For natural gas pipeline transmission and/or distribution, indicate volume of natural gas compressed. Cu.ft./hour		

NORMAL OPERATING SCHEDULE

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year 500	Peak Production Season (if any)
---------------	---------------	----------------	-----------------------	---------------------------------

EMISSIONS TO THE ATMOSPHERE

EMISSION POINT	STACK HEIGHT (FEET)	STACK DIAMETER (FEET AT TOP)	GAS DISCHARGED (SCFM)	EXIT TEMP (°F)	GAS VELOCITY (FPS)
(ENGINE)	35	0.67	1438	825	390
(FLARE)					

EMISSION CONTROL EQUIPMENT

Is there any emission control equipment on this unit? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Where a gas cleaning device exists, a GAS CLEANING EQUIPMENT Form AP 109 (SFN 8532) must be completed and attached.
--	---

AIR CONTAMINANTS EMITTED

EMISSION POINT	POLLUTANT	AMOUNT (POUNDS PER HOUR)	AMOUNT (TONS PER YEAR)	BASIS OF ESTIMATE*
	NO _x	See Appendix C, Table C-2		1400 HP heat input; emission calculations were prepared using AP 42 emission factors. See Appendix C for more information.
	CO			
	PM			
	PM ₁₀			
(ENGINE)	SO ₂			
(FLARE)	SO ₂			
	Formaldehyde			
	Total HAPS**			

* If performance test results are available for the unit, submit a copy of test with this application.

** Total HAPS includes formaldehyde

IS THIS UNIT IN COMPLIANCE WITH ALL APPLICABLE AIR POLLUTION RULES AND REGULATIONS? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	If "NO" a Compliance Schedule must be completed and attached.
---	---

Signature of Applicant 	Date 05/15/07
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Package Boiler Fuel Oil Storage Tank
PERMIT APPLICATION - VOLATILE ORGANIC COMPOUNDS STORAGE TANK
 NORTH DAKOTA DEPARTMENT OF HEALTH
 DIVISION OF AIR QUALITY
 SFN 8535 (12-05) (AP-112)

GENERAL

Name of Firm or Institution Spiritwood Energy, LLC		Application Date May 3, 2007	
Name of Person Submitting Application Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Tank Location The plant location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND	County Stutsman	Source ID IA (Insignificant Activity)	
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330

TANK DATA

CAPACITY:	Barrels	Gallons 500,000													
DIMENSIONS:	Diameter 42 feet	Height 46 feet	Length Width												
SHAPE:	<input checked="" type="checkbox"/> Cylindrical <input type="checkbox"/> Spherical <input type="checkbox"/> Other (Specify):														
MATERIALS OF CONSTRUCTION:	(i.e., steel) Steel														
CONSTRUCTION: TBD	<input type="checkbox"/> Riveted <input type="checkbox"/> Welded <input type="checkbox"/> Other (Specify):														
COLOR:	White														
CONDITION:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor														
STATUS:	<input checked="" type="checkbox"/> New Construction <input type="checkbox"/> Alteration <input type="checkbox"/> Existing, Give Date Constructed:														
TYPE OF TANK:	<input checked="" type="checkbox"/> Fixed Roof <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> External Floating <input type="checkbox"/> Pressure (low or high) <input type="checkbox"/> Internal Floating <input type="checkbox"/> Other (Specify):														
TYPE OF ROOF:	<input type="checkbox"/> Pan <input type="checkbox"/> Double Deck <input type="checkbox"/> Pontoon <input checked="" type="checkbox"/> Other (Specify): Fixed														
TYPE OF SEAL: NA	<table style="width:100%; border:none;"> <tr> <td><input type="checkbox"/> Metallic Shoe Seal</td> <td><input type="checkbox"/> Liquid Mounted Resilient Seal</td> <td><input type="checkbox"/> Vapor Mounted Resilient Seal</td> </tr> <tr> <td><input type="checkbox"/> Primary Seal Only</td> <td><input type="checkbox"/> Primary Seal Only</td> <td><input type="checkbox"/> Primary Seal Only</td> </tr> <tr> <td><input type="checkbox"/> With Shoe Mounted Secondary Seal</td> <td><input type="checkbox"/> With Weather Shield</td> <td><input type="checkbox"/> With Weather Shield</td> </tr> <tr> <td><input type="checkbox"/> With Rim Mounted Seal</td> <td><input type="checkbox"/> With Rim Mounted Seal</td> <td><input type="checkbox"/> With Rim Mounted Seal</td> </tr> </table>			<input type="checkbox"/> Metallic Shoe Seal	<input type="checkbox"/> Liquid Mounted Resilient Seal	<input type="checkbox"/> Vapor Mounted Resilient Seal	<input type="checkbox"/> Primary Seal Only	<input type="checkbox"/> Primary Seal Only	<input type="checkbox"/> Primary Seal Only	<input type="checkbox"/> With Shoe Mounted Secondary Seal	<input type="checkbox"/> With Weather Shield	<input type="checkbox"/> With Weather Shield	<input type="checkbox"/> With Rim Mounted Seal	<input type="checkbox"/> With Rim Mounted Seal	<input type="checkbox"/> With Rim Mounted Seal
<input type="checkbox"/> Metallic Shoe Seal	<input type="checkbox"/> Liquid Mounted Resilient Seal	<input type="checkbox"/> Vapor Mounted Resilient Seal													
<input type="checkbox"/> Primary Seal Only	<input type="checkbox"/> Primary Seal Only	<input type="checkbox"/> Primary Seal Only													
<input type="checkbox"/> With Shoe Mounted Secondary Seal	<input type="checkbox"/> With Weather Shield	<input type="checkbox"/> With Weather Shield													
<input type="checkbox"/> With Rim Mounted Seal	<input type="checkbox"/> With Rim Mounted Seal	<input type="checkbox"/> With Rim Mounted Seal													

VAPOR DISPOSAL

<input checked="" type="checkbox"/> Atmosphere <input type="checkbox"/> Vapor Recovery Unit <input type="checkbox"/> Flare <input type="checkbox"/> Other (Specify):
--

Name all liquids, vapors, gases, or mixtures of such materials to be stored in the tank. Give density (lbs or gal) or A.P.I. #2 Fuel Oil Density of #2 Fuel Oil: 7.2 lb/gal

VAPOR PRESSURE DATA (psia)

Maximum True Vapor Pressure 0.0042 psia (TANKS @ Daily Max Surf Temp 507 degree R)	Maximum Reid Vapor Pressure
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OPERATIONAL DATA

Maximum Filling Rate (barrels per hour of gallons per hour) 5,500 gal/hr	Average Outage (average distance from tank shell to liquid surface (ft)) ~2 ft
Average Throughput (barrels per day or gallon per day) At maximum use, 131,506 gallons per day	Tank Turnovers per Year At maximum use, 96 turnovers

IF MATERIAL STORED IS A SOLUTION, SUPPLY THE FOLLOWING INFORMATION

Name of Solvent NA	Name of Material Dissolved NA
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) NA	

TANK EMISSIONS

POLLUTANT	MAXIMUM POUNDS PER HOUR	TONS PER YEAR	BASIS AND CALCULATIONS FOR QUANTITIES (Attach separate sheet if needed)
VOC	See Appendix C, Table C-2		Emissions found using EPA TANKS program. See Appendix C for TANKS summary printout.

Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable?

YES NO – Explain Subparts K, Ka, and Kb are not applicable. Subparts K and Ka do not apply because the tank will be newly constructed. Subpart Kb does not apply because the maximum true vapor pressure of fuel oil is 0.0042 psia (~0.03 kPa), which is less than the applicability threshold of 3.5 kPa.

Signature of Applicant 	Date 05/15/07
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Fire Pump Diesel Storage Tank
PERMIT APPLICATION - VOLATILE ORGANIC COMPOUNDS STORAGE TANK
 NORTH DAKOTA DEPARTMENT OF HEALTH
 DIVISION OF AIR QUALITY
 SFN 8535 (12-05) (AP-112)

GENERAL

Name of Firm or Institution Spiritwood Energy, LLC		Application Date May 3, 2007	
Name of Person Submitting Application Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Tank Location The plant location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND	County Stutsman	Source ID IA (Insignificant Activity)	
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330

TANK DATA

CAPACITY:	Barrels	Gallons 500		
DIMENSIONS:	Diameter 4 feet	Height	Length 6.23 feet	Width
SHAPE:	<input checked="" type="checkbox"/> Cylindrical <input type="checkbox"/> Spherical <input type="checkbox"/> Other (Specify):			
MATERIALS OF CONSTRUCTION:	(i.e., steel) Steel			
CONSTRUCTION: TBD	<input type="checkbox"/> Riveted <input type="checkbox"/> Welded <input type="checkbox"/> Other (Specify):			
COLOR:	White			
CONDITION:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor			
STATUS:	<input checked="" type="checkbox"/> New Construction <input type="checkbox"/> Alteration <input type="checkbox"/> Existing, Give Date Constructed:			
TYPE OF TANK:	<input type="checkbox"/> Fixed Roof <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> External Floating <input type="checkbox"/> Pressure (low or high) <input type="checkbox"/> Internal Floating <input checked="" type="checkbox"/> Other (Specify): Horizontal			
TYPE OF ROOF: NA	<input type="checkbox"/> Pan <input type="checkbox"/> Double Deck <input type="checkbox"/> Pontoon <input type="checkbox"/> Other (Specify):			
TYPE OF SEAL:	<input type="checkbox"/> Metallic Shoe Seal <input type="checkbox"/> Liquid Mounted Resilient Seal <input type="checkbox"/> Vapor Mounted Resilient Seal <input type="checkbox"/> Primary Seal Only <input type="checkbox"/> Primary Seal Only <input type="checkbox"/> Primary Seal Only <input type="checkbox"/> With Shoe Mounted Secondary Seal <input type="checkbox"/> With Weather Shield <input type="checkbox"/> With Weather Shield <input type="checkbox"/> With Rim Mounted Seal <input type="checkbox"/> With Rim Mounted Seal <input type="checkbox"/> With Rim Mounted Seal			

VAPOR DISPOSAL

<input checked="" type="checkbox"/> Atmosphere <input type="checkbox"/> Vapor Recovery Unit <input type="checkbox"/> Flare <input type="checkbox"/> Other (Specify):
--

Name all liquids, vapors, gases, or mixtures of such materials to be stored in the tank. Give density (lbs or gal) or A.P.I. #2 Fuel Oil Density of #2 Fuel Oil: 7.2 lb/gal

VAPOR PRESSURE DATA (psia)

Maximum True Vapor Pressure 0.0042 psia (TANKS @ Daily Max Surf Temp 507 degree R)	Maximum Reid Vapor Pressure
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OPERATIONAL DATA

Maximum Filling Rate (barrels per hour of gallons per hour) TBD	Average Outage (average distance from tank shell to liquid surface (ft)) 0.5 feet
Average Throughput (barrels per day or gallon per day) At 500 hours/year, 5 gallons per day	Tank Turnovers per Year At 500 hours/year, 3.5 turnovers

IF MATERIAL STORED IS A SOLUTION, SUPPLY THE FOLLOWING INFORMATION

Name of Solvent NA	Name of Material Dissolved NA
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) NA	

TANK EMISSIONS

POLLUTANT	MAXIMUM POUNDS PER HOUR	TONS PER YEAR	BASIS AND CALCULATIONS FOR QUANTITIES (Attach separate sheet if needed)
VOC	See Appendix C, Table C-2		Emissions found using EPA TANKS program. See Appendix C for TANKS summary printout.

Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable?

YES NO – Explain Subparts K, Ka, and Kb are not applicable. Subparts K and Ka do not apply because the tank will be newly constructed. Subpart Kb does not apply because the tank size is under the applicability threshold.

Signature of Applicant 	Date 05/15/07
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Emergency Generator Diesel Storage Tank
PERMIT APPLICATION - VOLATILE ORGANIC COMPOUNDS STORAGE TANK
 NORTH DAKOTA DEPARTMENT OF HEALTH
 DIVISION OF AIR QUALITY
 SFN 8535 (12-05) (AP-112)

GENERAL

Name of Firm or Institution Spiritwood Energy, LLC		Application Date May 3, 2007	
Name of Person Submitting Application Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Tank Location The plant location is the NW 1/4 of the SW 1/4 of Section 22, Township 140 North, Range 62 West; Stutsman County, ND	County Stutsman	Source ID IA (Insignificant Activity)	
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330

TANK DATA

CAPACITY:	Barrels	Gallons 500
DIMENSIONS:	Diameter 4 feet	Height
DIMENSIONS:	Diameter 4 feet	
SHAPE:	<input checked="" type="checkbox"/> Cylindrical <input type="checkbox"/> Spherical <input type="checkbox"/> Other (Specify):	
MATERIALS OF CONSTRUCTION:	(i.e., steel) Steel	
CONSTRUCTION:	<input type="checkbox"/> Riveted <input type="checkbox"/> Welded <input type="checkbox"/> Other (Specify):	
TBD		
COLOR:	White	
CONDITION:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Fair <input type="checkbox"/> Poor	
STATUS:	<input checked="" type="checkbox"/> New Construction <input type="checkbox"/> Alteration <input type="checkbox"/> Existing, Give Date Constructed:	
TYPE OF TANK:	<input type="checkbox"/> Fixed Roof <input type="checkbox"/> Variable Vapor Space <input type="checkbox"/> External Floating <input type="checkbox"/> Pressure (low or high) <input type="checkbox"/> Internal Floating <input checked="" type="checkbox"/> Other (Specify): Horizontal	
TYPE OF ROOF: NA	<input type="checkbox"/> Pan <input type="checkbox"/> Double Deck <input type="checkbox"/> Pontoon <input type="checkbox"/> Other (Specify):	
TYPE OF SEAL:	<input type="checkbox"/> Metallic Shoe Seal <input type="checkbox"/> Liquid Mounted Resilient Seal <input type="checkbox"/> Vapor Mounted Resilient Seal <input type="checkbox"/> Primary Seal Only <input type="checkbox"/> Primary Seal Only <input type="checkbox"/> Primary Seal Only <input type="checkbox"/> With Shoe Mounted Secondary Seal <input type="checkbox"/> With Weather Shield <input type="checkbox"/> With Weather Shield <input type="checkbox"/> With Rim Mounted Seal <input type="checkbox"/> With Rim Mounted Seal <input type="checkbox"/> With Rim Mounted Seal	

VAPOR DISPOSAL

<input checked="" type="checkbox"/> Atmosphere <input type="checkbox"/> Vapor Recovery Unit <input type="checkbox"/> Flare <input type="checkbox"/> Other (Specify):
--

Name all liquids, vapors, gases, or mixtures of such materials to be stored in the tank. Give density (lbs or gal) or A.P.I.

#2 Fuel Oil
 Density of #2 Fuel Oil: 7.2 lb/gal

VAPOR PRESSURE DATA (psia)

Maximum True Vapor Pressure 0.0042 psia (TANKS @ Daily Max Surf Temp 507 degree R)	Maximum Reid Vapor Pressure
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OPERATIONAL DATA

Maximum Filling Rate (barrels per hour of gallons per hour) TBD	Average Outage (average distance from tank shell to liquid surface (ft)) -0.5 feet
Average Throughput (barrels per day or gallon per day) At 500 hours/year, 0.8 gallons per day	Tank Turnovers per Year At 500 hours/year, 14 turnovers

IF MATERIAL STORED IS A SOLUTION, SUPPLY THE FOLLOWING INFORMATION

Name of Solvent NA	Name of Material Dissolved NA
Concentration of Material Dissolved (% by weight or % by volume or lbs/gal) NA	

TANK EMISSIONS

POLLUTANT	MAXIMUM POUNDS PER HOUR	TONS PER YEAR	BASIS AND CALCULATIONS FOR QUANTITIES (Attach separate sheet if needed)
VOC	See Appendix C, Table C-2		Emissions found using EPA TANKS program. See Appendix C for TANKS summary printout.

Are the standards of performance for new stationary sources; petroleum liquid storage vessels, 40 CFR Part 60, Subparts K, Ka, and Kb being adhered to, where applicable?

YES NO – Explain Subparts K, Ka, and Kb are not applicable. Subparts K and Ka do not apply because the tank will be newly constructed. Subpart Kb does not apply because the tank size is under the applicability threshold.

Signature of Applicant 	Date 05/15/07
--	------------------



Railcar Heaters
FUEL BURNING EQUIPMENT FOR INDIRECT HEATING PERMIT APPLICATION
 NORTH DAKOTA DEPARTMENT OF HEALTH DIVISION OF AIR QUALITY
 SFN 8518 (12-00) (AP-101)
GENERAL

Name of Firm or Organization Spiritwood Energy, LLC		Application Date May 3, 2007	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330
Plant Location The NW 1/4 of the SW 1/4 of Sec 22, Township 140 N, Range 62 W; Stutsman County, ND		Source ID No. (AP100) 022 – Railcar Heaters	

EQUIPMENT

Name of Manufacturer TBD	Rated Capacity/Maximum Input 8 heaters @ 1.75 MMBtu/hr each; 14 MMBtu/hr total	Model Number TBD
Purpose <input type="checkbox"/> Space Heat % <input type="checkbox"/> Power Generation % <input checked="" type="checkbox"/> Process Heat % <input type="checkbox"/> Other (Specify % if multi-purpose)		

TYPE OF COMBUSTION UNIT AND FUEL FEEDING METHOD

<input type="checkbox"/> COAL (If other solid fuel, specify here:	<input type="checkbox"/> Fuel Oil	<input checked="" type="checkbox"/> Gas (Propane too)
<input type="checkbox"/> Pulverized <input type="checkbox"/> General <input type="checkbox"/> Spreader Stoker without Fly Ash Reinjection <input type="checkbox"/> Dry Bottom <input type="checkbox"/> Fluidized Bed <input type="checkbox"/> Wet Bottom with Fly Ash Reinjection <input type="checkbox"/> Cyclone <input type="checkbox"/> Wet Bottom without Fly Ash Reinjection <input type="checkbox"/> Hand-Fired <input type="checkbox"/> Other (Specify)	<input type="checkbox"/> Horizontally Fired <input type="checkbox"/> Tangentially Fired <input type="checkbox"/> Other - Specify:	<input checked="" type="checkbox"/> Horizontally Fired <input type="checkbox"/> Tangentially Fired <input type="checkbox"/> Other - Specify:

NORMAL SCHEDULE OF OPERATION

Hours Per Day	Days Per Week	Weeks Per Year	Hours Per Year Total	Peak Season (Specify Months)
standby	7	16	2,900	Winter (December – March)

TYPE AND QUANTITY OF FUEL EXPECTED TO BE USED IN A CALENDAR YEAR

Year	PRIMARY FUELS			STANDBY FUELS			STANDBY FUELS		
	Type: Natural Gas			Type: Propane			Type		
2009	Quantity/Year		Units:	Quantity/Year		Units	Quantity/Year		Units
	Maximum	Minimum	Average	Maximum	Minimum	Average	Maximum	Minimum	Average
	40		MMcf	440		MGal			
Percent Ash (Solids Fuel Only)	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible			
Percent Sulfur	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible			
BTU Per Unit (Specify):	1,020 Btu/scf	1,020 Btu/scf	1,020 Btu/scf	90,500 Btu/gal	90,500 Btu/gal	90,500 Btu/gal			

COMBUSTION AIR

<input checked="" type="checkbox"/> Natural Draft <input type="checkbox"/> Induced <input type="checkbox"/> Forced <input type="checkbox"/> Other - Specify:
--

STACK DATA (The railcar heaters will be exhausted through the coal unloading baghouse – EPN 002)

Height Above Grade	50 ft	Gas Temperature at Exit	Ambient
Inside Diameter at Exit	4.6 ft	Gas Velocity at Exit	50 fps
Stack Exit Gas Flow Rate		Average	Maximum
ACFM	96,000		96,000
SCFM	96,000		96,000
Are sampling ports available? <input type="checkbox"/> No <input checked="" type="checkbox"/> Yes - Describe: TBD			
Describe Fuel Transport and Storage Methods Natural gas and propane piping. Note: the railcar heater combustion gases will exhaust into the unloading building interior and ultimately be vented to the atmosphere by the unloading building baghouse stack.			
Is any air contaminant control device used in conjunction with this equipment: <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes - Attach a completed gas cleaning equipment form (SFN 8532 AP-109) to this application			

NEARBY BUILDINGS

Attach drawings which show the plan and elevation views of any nearby buildings including the building that houses the fuel-fired equipment.
 See CFB Boiler "Fuel Burning Equipment for Indirect Heating Application" for drawings of the building housing each Package Boiler

STACK EMISSIONS

Pollutant	Maximum Pounds Per Hour	Tons Per Year	Basis and Calculations for Quantities:
Particulate	See Appendix C, Table C-2		14 MMBtu/hr combined heat input for natural gas or propane; emission calculations were prepared using AP 42 emission factors (uncontrolled). See Appendix C for more information.
PM ₁₀			
Sulfur Dioxide			
Nitrogen Oxide			
Carbon Monoxide			
Other – Specify			

Signature of Applicant 	Date 05/15/07
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**Railcar Heaters****PERMIT APPLICATION FOR HAZARDOUS AIR POLLUTANT (HAP) SOURCES**

NORTH DAKOTA DEPARTMENT OF HEALTH DIVISION OF AIR QUALITY

SFN 8329 (12/00) (AP-117)

SECTION A - APPLICANT INFORMATION

Name of Firm/Organization Spiritwood Energy, LLC		Standard Industrial Classification No. 4931	
Application Being Submitted By (Name): Mary Jo Roth	Title Manager, Environmental Services	Telephone Number 763-241-2449	
Application Prepared By: Mark Strohfus	Title Environmental Project Leader	Telephone Number 763-241-2491	Cell Phone Number 612-961-9820
Mailing Address (Street & No.) Great River Energy 17845 East Highway 10	City Elk River	State MN	Zip Code 55330

FACILITY INFORMATION

Contact Person for Air Pollution Matters Richard R. Lancaster	Title VP	Telephone Number 763-241-2428	
Facility Address (street & no.) TBD	City and County Spiritwood, Stutsman County	State ND	Zip Code 58481
Land Area at Plant Site 35.25 Acres (or)	Sq. Ft.	MSL Elevation at Plant 1479 ft	Number of Employees at Location 20

Describe Nature of Business/Process

Standby heating units to defrost frozen rail shipments prior to unloading. Ten heaters, 1.4 MMBtu/hr each will be rack mounted and moved into position as needed next to railcars waiting to be unloaded to thaw frozen load (e.g., coal) to allow material to flow through railcar hoppers and on to power plant handling equipment. Railcar heater combustion gases will vent to the railcar unloading building interior and ultimately vent through the baghouse stack.

SECTION B - STACK DATA

Inside Diameter 4.5 ft	Inside Area 2,393 Sq. in.	Height Above Grade 50 ft.	Are Emission Control Devices in Place? If so Complete SFN 8532 (AP 109) Fabric filter	
Gas Temperature at Exit Ambient	Gas Velocity at Exit 50 ft/sec	Gas Volume 96,000 acfm 96,000 scfm		
Basis of Estimate (attach separate sheet if necessary)				
Nearest Residences or Building Spiritwood Cemetery	Distance (ft.) ~940	Direction SSW		
Nearest Property Line Gravel Road	Distance (ft.) ~500	Direction West		

SECTION C - EMISSION STREAM DATA

Source ID # Form AP-100 022 – Railcar Heaters	Mean Particle Diameter (um) TBD
Flow Rate (scfm) 96,000	Drift Velocity (ft/sec) TBD
Stream Temperature (EF) ambient	Particulate Concentration (gr/dscf) -----
Moisture Content (%) TBD	Halogens or Metals Present? -----
Pressure (in. Hg) TBD	Organic Content (PPMv) -----
Heat Content (Btu/scfm) TBD	O ₂ Content (%) TBD

SECTION D - POLLUTANT SPECIFIC DATA (Complete One Box for Each Pollutant in Emission Stream)

Pollutant Emitted See Appendix C, Table C-10	Chemical Abstract Services (CAS) Number See Appendix C, Table C-10
Proposed Emission Rate (lb/hr) See Appendix C, Table C-10	Emission Source (describe) Railcar Heaters
Source Classification (process point, process fugitive, area fugitive) Point	Pollutant Class and Form (organic/inorganic - particulate/vapor) See Appendix C, Table C-10
Concentration in Emission Stream (PPMv) See Appendix C, Table C-10	Vapor Pressure (in. Hg @ EF) See Appendix C, Table C-10
Solubility See Appendix C, Table C-10	Molecular Weight (lb/lb-mole) See Appendix C, Table C-10
Absorptive Properties	

Signature of Applicant 	Date 05/15/07
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Appendix B
Regulatory Applicability Summary

Spiritwood Station
Appendix B - Air Quality Regulatory Applicability

Table of Contents

Regulation		Page Number
<u>Federal Regulations</u>		B-2 to B-25
40 CFR 60	Standards of Performance for Stationary Sources	B-3
40 CFR 61	National Emission Standards for Hazardous Air Pollutants	B-11
40 CFR 63	National Emission Standards for Hazardous Air Pollutants for Source Categories	B-13
<u>North Dakota Air Quality Regulations</u>		B-26 to B-28

Spiritwood Station
Appendix B - Air Quality Regulatory Applicability

Regulatory Citation	Subpart	Title	Facility-wide	Coal Handling	CFB Boiler	Package Boilers	Diesel Engines	Other	Not Applicable	Statement of Applicability
40 CFR 49	--	Tribal Clean Air Act Authority							X	These regulations authorize eligible Indian tribes to have the same rights and responsibilities as states under the Clean Air Act and authorize EPA approval of tribal air quality programs meeting the applicable minimum requirements of the Act. The Spiritwood Energy facility is not located on an Indian reservation.
40 CFR 50	--	National Primary and Secondary Ambient Air Quality Standards	X							National primary ambient air quality standards define levels of air quality which the Administrator judges are necessary, with an adequate margin of safety, to protect the public health. Any emission source operator can be asked to demonstrate, with modeling or ambient monitoring, that ambient standards are not exceeded at the property line. Modeling may be required as a function of the 2/15/05 NDDH policy memorandum mandating dispersion modeling for projects that exceed the PSD significant emission rates.
40 CFR 51	--	Requirements for Preparation, Adoption, and Submittal of Implementation Plans.							X	Requirements for states to develop air quality programs that implement the minimum requirements of the Clean Air Act. This part does not apply directly to individual sources, such as the Spiritwood Energy facility.
40 CFR 52	--	Approval and Promulgation of Implementation Plans	X							This Part contains the air quality requirements that apply to the construction of any new major stationary air emissions source in an area designated as attainment or unclassifiable under sections 107(d)(1)(A)(ii) or (iii) of the Act.
40 CFR 53	--	Ambient Air Monitoring Reference and Equivalent Methods							X	This section provides the procedural requirements for approving standard ambient air monitoring sampling and testing methods. The Spiritwood Energy facility does not involve ambient testing method development.
40 CFR 55	--	Outer Continental Shelf Air Regulations							X	These regulations include the requirements to control air pollution from outer continental shelf ("OCS") sources in order to attain and maintain federal and state ambient air quality standards and to comply with the provisions of part C of title I of the Act. The Spiritwood Energy facility is not located on the OCS.
40 CFR 56	--	Regional Consistency							X	Requirements for Regional EPA employees and administrators, and EPA Headquarters personnel, to the extent that they implement procedures to be followed by regional staff, to be fair and uniform in enforcing the Clean Air Act. Spiritwood Energy is not a Regional EPA entity.
40 CFR 57	--	Primary Nonferrous Smelter Orders							X	The Spiritwood Energy facility is not a smelter.
40 CFR 58	--	Ambient Air Quality Surveillance							X	This part includes the State requirements for ambient air quality monitoring and data reporting. It also establishes a national ambient air quality monitoring network operated by the States to provide timely air quality data upon which to base national assessments and policy decisions. The requirements of this Part apply to state governments only.
40 CFR 59	--	National Volatile Organic Compound Emission Standards for Consumer and Commercial Products							X	Spiritwood Energy does not: manufacture or import automobile refinish coatings or coating components; manufacture or import consumer products, as defined by 40 CFR 59.202; or manufacture architectural coatings.

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Appendix B - Air Quality Regulatory Applicability

Regulatory Citation	Subpart	Title	Facility-wide	Coal Handling	CFB Boiler	Package Boilers	Diesel Engines	Other	Not Applicable	Statement of Applicability
40 CFR 60	--	Standards of Performance for New Stationary Sources								
40 CFR 60	A	General Provisions	X							Applicable to a facility that is subject to a specific standard of performance under 40 CFR part 60. Spiritwood is subject to specific standards of performance; therefore it is also subject to the general provisions under Subpart A.
40 CFR 60	B	Adoption and Submittal of State Plans for Designated Facilities							X	Administrative rule.
40 CFR 60	C	Emission Guidelines and Compliance Times							X	Applies to sources covered under subparts Cb - Ce. Spiritwood Energy is not subject to any of these subparts.
40 CFR 60	Cb	Emission Guidelines and Compliance Times for Large Municipal Waste Combustors That Are Constructed on or Before September 20, 1994							X	Applies to municipal waste combustor units with a combustion capacity greater than 250 tons per day of municipal solid waste for which construction commenced on or before 09/20/94. Cement kilns are specifically exempted. Spiritwood Energy is not a municipal waste combustor.
40 CFR 60	Cc	Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills							X	Applies to each existing MSW landfill for which construction, reconstruction or modification was commenced before 05/30/91. Spiritwood Energy is not a MSW landfill.
40 CFR 60	Cd	Emissions Guidelines and Compliance Times for Sulfuric Acid Production Units							X	Applies to each existing sulfuric acid production plant. Spiritwood Energy is not a sulfuric acid production plant.
40 CFR 60	Ce	Emission Guidelines and Compliance Times for Hospital/Medical/Infectious Waste Incinerators							X	Applies to each HMIWI for which construction was commenced on or before 06/20/96. Cement kilns are specifically exempted. Spiritwood Energy is not a HMIWI.
40 CFR 60	D	Standards of Performance for Fossil-Fuel-Fired Steam Generators for Which Construction is Commenced After August 17, 1971							X	Applies to each fossil-fuel-fired steam generating unit (not subject to Da) of more than 250 MMBtu/hr heat input and each fossil-fuel and wood-residue-fired steam generating unit (not subject to Da) capable of firing fossil fuel at a heat input of more than 250 MMBtu/hr that commenced construction or modification after 08/17/71 and each lignite-fired steam generating unit that commenced construction or modification after 12/22/76. Spiritwood Energy is subject to subpart Da, and therefore not subject to this subpart.
40 CFR 60	Da	Standards of Performance for Electric Utility Steam Generating Units for Which Construction is Commenced After September 18, 1978			X					Applies to each electric utility steam generating unit that is capable of combusting more than 73 megawatts (250 million Btu/hour) heat input of fossil fuel (either alone or in combination with any other fuel) for which construction or modification is commenced after September 18, 1978. The CFB Boiler will be subject to this subpart.
40 CFR 60	Db	Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units				X				Applies to each steam generating unit that commences construction, modification, or reconstruction after June 19, 1984 and that has a heat input capacity from fuels combusted in the steam generating unit of greater than 29 MW (100 million Btu/hour). The auxiliary (package) boilers have heat input capacities of approximately 250 MMBtu/hr each and are subject to Subpart Db.
40 CFR 60	Dc	Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units							X	Applicable to each steam generating unit for which construction, modification, or reconstruction is commenced after June 9, 1989 and that has a maximum design heat input capacity of 29 megawatts (MW) (100 MMBtu/hr) or less, but greater than or equal to 2.9 MW (10 MMBtu/hr). Spiritwood Energy will not contain a steam generating unit within this heat input capacity range.

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Regulatory Citation	Subpart	Title	Facility-wide	Coal Handling	CFB Boiler	Package Boilers	Diesel Engines	Other	Not Applicable	Statement of Applicability
40 CFR 60	E	Standards of Performance for Incinerators							X	Applies to each incinerator of more than 50 tons per day charging rate that commences construction or modification after 08/17/71. Spiritwood Energy does not operate an incinerator.
40 CFR 60	Ea	Standards of Performance for Municipal Waste Combustors for Which Construction is Commenced After December 20, 1989 and on or Before September 20, 1994							X	Applies to each municipal waste combustor unit with a capacity greater than 250 tons/day of municipal solid waste for which construction commenced after 12/20/89 but on or before 09/20/94 or modification or reconstruction commenced after 12/20/89 but on or before 06/19/96. Spiritwood Energy is not a MSW combustor.
40 CFR 60	Eb	Standards of Performance for Large Municipal Waste Combustors for Which Construction is Commenced After September 20, 1994 or for Which Modification of Reconstruction is Commenced After June 19, 1996							X	Applies to each municipal waste combustor unit with a combustion capacity greater than 250 tons/day of municipal solid waste for which construction commenced after 09/20/94 or for which modification or reconstruction commenced after 06/19/96. Spiritwood Energy is not a MSW combustor.
40 CFR 60	Ec	Standards of Performance for Hospital/Medical/Infectious Waste Incinerators for Which Construction is Commenced After June 20, 1996							X	Applies to each individual hospital/medical/infectious waste incinerator for which construction commenced after 06/20/96 or for which modification commenced after 03/16/98. Spiritwood Energy does not operate a hospital waste incinerator.
40 CFR 60	F	Standards of Performance for Portland Cement Plants							X	Applies to Portland cement plant units that commence construction or modification after 08/17/71. Spiritwood Energy is not a cement plant.
40 CFR 60	G	Standards of Performance for Nitric Acid Plants							X	Applies to nitric acid production units that commence construction or modification after 08/17/71. Spiritwood Energy is not a nitric acid plant.
40 CFR 60	H	Standards of Performance for Sulfuric Acid Plants							X	Applies to sulfuric acid production units that commence construction or modification after 08/17/71. Spiritwood Energy is not a sulfuric acid plant.
40 CFR 60	I	Standards of Performance for Hot Mix Asphalt Facilities							X	Applies to hot mix asphalt facilities that commence construction or modification after 06/11/73. Spiritwood Energy is not an asphalt facility.
40 CFR 60	J	Standards of Performance for Petroleum Refineries							X	Applies to fluid catalytic cracking unit catalyst regenerators and fuel gas combustion devices located within petroleum refineries which commenced construction or modification after 06/11/73 and all Claus sulfur recover plants of greater than 20 long tons/day associated with petroleum refineries which commence construction or modification after 10/04/76. Spiritwood Energy is not a petroleum refinery.
40 CFR 60	K	Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978							X	Applies to storage vessels for petroleum liquids which have a storage capacity greater than 40,000 gallons that commence construction or modification after 03/08/74 but prior to 05/19/78 if the vessel is equal to or less than 65,000 gallons and after 06/11/73 but prior to 05/19/78 if greater than 65,000 gallons. Spiritwood Energy has no storage vessels that meet these criteria.

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Regulatory Citation	Subpart	Title	Facility-wide	Coal Handling	CFB Boiler	Package Boilers	Diesel Engines	Other	Not Applicable	Statement of Applicability
40 CFR 60	Ka	Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984							X	Applies to storage vessels for petroleum liquids which have storage capacities greater than 40,000 gallons and for which construction commences after 05/18/78 but before 07/23/84. Spiritwood Energy will have no storage vessels that meet these criteria.
40 CFR 60	Kb	Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction or Modification Commenced After July 23, 1984							X	Applies to each storage vessel with a capacity equal to or greater than 40 cubic meters that is used to store volatile organic liquids and meet maximum true vapor pressure criteria and for which construction, reconstruction or modification commenced after 07/23/84. Spiritwood Energy will install a 500,000 gallon fuel oil tank, which is greater than 40 cubic meters (19,813 gallons); however, the maximum true vapor pressure of #2 fuel oil/diesel is ~0.2 kPa, which is less than the 3.5 kPa applicability threshold.
40 CFR 60	L	Standards of Performance for Secondary Lead Smelters							X	Applies to affected sources at secondary lead smelters that commence construction or modification after 06/11/73. Spiritwood Energy is not a lead smelter.
40 CFR 60	M	Standards of Performance for Secondary Brass and Bronze Production Plants							X	Applies to affected sources at secondary brass or bronze production plants that commence construction or modification after 06/11/73. Spiritwood Energy is not a brass or bronze production plant.
40 CFR 60	N	Standards of Performance for Primary Emissions from Basic Oxygen Process Furnaces for Which Construction is Commenced After June 11, 1973							X	Applies to each basic oxygen process furnace that commences construction or modification after 06/11/73. Spiritwood Energy is not a steelmaking furnace.
40 CFR 60	Na	Standards of Performance for Secondary Emissions from Basic Oxygen Process Steelmaking Facilities for Which Construction is Commenced After January 20, 1983							X	Applies to affected sources at each iron and steel plant that commences construction or modification after 01/20/83. Spiritwood Energy is not a steelmaking furnace.
40 CFR 60	O	Standards of Performance for Sewage Treatment Plants							X	Applies to each incinerator that combusts wastes containing more than 10% sewage sludge (dry basis) produced by municipal sewage treatment plants or each incinerator that charges more than 2205 lb/day municipal sewage sludge (dry basis) that commences construction or modification after 06/11/73. Spiritwood Energy does not operate an incinerator.
40 CFR 60	P	Standards of Performance for Primary Copper Smelters							X	Applies to affected sources at primary copper smelters that commence construction or modification after 10/16/74. Spiritwood Energy is not a copper smelter.
40 CFR 60	Q	Standards of Performance for Primary Zinc Smelters							X	Applies to affected sources at primary zinc smelters that commence construction or modification after 10/16/74. Spiritwood Energy is not a zinc smelter.
40 CFR 60	R	Standards of Performance for Primary Lead Smelters							X	Applies to affected sources at primary lead smelters that commence construction or modification after 10/16/74. Spiritwood Energy is not a lead smelter.
40 CFR 60	S	Standards of Performance for Primary Aluminum Reduction Plants							X	Applies to potroom groups and anode bake plants at primary aluminum reduction plants that commence construction or modification after 10/23/74. Spiritwood Energy is not an aluminum production facility.

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Regulatory Citation	Subpart	Title	Facility-wide	Coal Handling	CFB Boiler	Package Boilers	Diesel Engines	Other	Not Applicable	Statement of Applicability
40 CFR 60	T	Standards of Performance for the Phosphate Fertilizer Industry: Wet-Process Phosphoric Acid Plants							X	Applies to affected sources at each wet-process phosphoric acid plant having design capacity of more than 15 tons of equivalent P2O5 feed per calendar day that commenced construction or modification after 10/22/74. Spiritwood Energy is not a phosphoric acid plant.
40 CFR 60	U	Standards of Performance for the Phosphate Fertilizer Industry: Superphosphoric Acid Plants							X	Applies to affected sources at each superphosphoric acid plant having design capacity of more than 15 tons of equivalent P2O5 feed per calendar day that commenced construction or modification after 10/22/74. Spiritwood Energy is not a superphosphoric acid plant.
40 CFR 60	V	Standards of Performance for the Phosphate Fertilizer Industry: Diammonium Phosphate Plants							X	Applies to affected sources at each granular diammonium phosphate plant having design capacity of more than 15 tons of equivalent P2O5 feed per calendar day that commenced construction or modification after 10/22/74. Spiritwood Energy is not a fertilizer production plant.
40 CFR 60	W	Standards of Performance for the Phosphate Fertilizer Industry: Triple Superphosphate Plants							X	Applies to affected sources at each triple superphosphate plant having design capacity of more than 15 tons of equivalent P2O5 feed per calendar day that commenced construction or modification after 10/22/74. Spiritwood Energy is not a fertilizer production plant.
40 CFR 60	X	Standards of Performance for the Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities							X	Applies to affected sources at each granular triple superphosphate storage facility that commences construction or modification after 10/22/74. Spiritwood Energy is not a fertilizer production plant.
40 CFR 60	Y	Standards of Performance for Coal Preparation Plants		X						Applies to thermal dryers, pneumatic coal-cleaning equipment (air tables), coal processing and conveying equipment (including breakers and crushers), coal storage systems and coal transfer and loading systems in coal preparation plants which process greater than 200 tons per day that commence construction or modification after 10/24/74. Spiritwood Energy is installing coal conveying equipment.
40 CFR 60	Z	Standards of Performance for Ferroalloy Production Facilities							X	Applies to electric submerged arc furnaces which produce silicon metal, ferrosilicon, calcium silicon, silicomanganese zirconium, ferrochrome silicon, silvery iron, high-carbon ferrochrome, charge chrome, standard ferromanganese, silicomanganese, ferromanganese silicon or calcium carbide and dust handling equipment that commences construction or modification after 10/21/74. Spiritwood Energy is not a ferroalloy production facility.
40 CFR 60	AA	Standards of Performance for Steel Plants: Electric Arc Furnaces Constructed After October 21, 1974, and On or Before August 17, 1983							X	Applies to electric arc furnaces and dust handling equipment in steel plants that produce carbon, alloy or specialty steels and which commence construction, modification or reconstruction after 10/21/74 but on or before 08/17/83. Spiritwood Energy does not include an electric arc furnace.
40 CFR 60	AAa	Standards of Performance for Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 7, 1983							X	Applies to electric arc furnaces, argon-oxygen decarburization vessels and dust handling systems that commence construction, modification or reconstruction after 08/17/83. Spiritwood Energy does not include an electric arc furnace.
40 CFR 60	BB	Standards of Performance for Kraft Pulp Mills							X	Applies to affected sources at kraft pulp mills that commence construction or modification after 09/24/76. Spiritwood Energy is not a Kraft pulp mill.
40 CFR 60	CC	Standards of Performance for Glass Manufacturing Plants							X	Applies to each non-hand and non-electric glass melting furnace designed to produce greater than 4550 kg of glass/day that commences construction or modification after 06/15/79. Spiritwood Energy is not a glass manufacturing plant.

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40 CFR 60	DD	Standards of Performance for Grain Elevators							X	Applies to affected sources at grain terminal or grain storage elevators that commence construction, modification or reconstruction after 08/03/78. Spiritwood Energy is not a grain elevator.
40 CFR 60	EE	Standards of Performance for Surface Coating of Metal Furniture							X	Applies to each metal furniture surface coating operation in which organic coatings are applied and that commence construction, modification or reconstruction after 11/28/80. Spiritwood Energy does not produce or coat metal furniture.
40 CFR 60	GG	Standards of Performance for Stationary Gas Turbines							X	Applicable to combustion turbines with a heat input capacity at peak load greater than 10.7 gigajoules (10.14 MMBtu) per hour constructed after 10/3/77. Spiritwood Energy does not operate a stationary gas turbine.
40 CFR 60	HH	Standards of Performance for Lime Manufacturing Plants							X	Applies to rotary lime kilns used in the manufacture of lime that commences construction or modification after 05/03/77. Spiritwood Energy is not a lime manufacturing plant.
40 CFR 60	KK	Standards of Performance for Lead-Acid Battery Manufacturing Plants							X	Applies to affected sources at any lead-acid battery manufacturing plant that produces or has the design capacity to produce in one day (24 hours) batteries containing an amount of lead equal to or greater than 6.5 tons that commences construction or modification after 01/14/80. The Spiritwood Energy facility does not produce lead-acid batteries.
40 CFR 60	LL	Standards of Performance for Metallic Mineral Processing Plants							X	Applies to affected sources metallic mineral processing plants that commence construction or modification after 08/24/82. (Plants that produce concentrates containing any of aluminum, copper, gold, iron, lead, uranium, zinc or zirconium in concentrations that contribute to the concentrate's commercial value.) Spiritwood Energy does not process metallic mineral.
40 CFR 60	MM	Standards of Performance for Automobile and Light Duty Truck Surface Coating Operations							X	Applies to affected sources automobile or light-duty truck assembly plants that begin construction, reconstruction or modification after 10/05/79. Spiritwood Energy is not a vehicle surface coating facility.
40 CFR 60	NN	Standards of Performance for Phosphate Rock Plants							X	Applies to affected sources at phosphate rock plants which have a maximum plant production capacity greater than 4 tons/hr that commences construction, modification or reconstruction after 09/21/79. Spiritwood Energy is not a phosphate rock plant.
40 CFR 60	PP	Standards of Performance for Ammonium Sulfate Manufacture							X	Applies to each ammonium sulfate dryer within an ammonium sulfate manufacturing plant in the caprolactam by-product, synthetic and coke oven by-product sectors of the ammonium sulfate industry that commences construction or modification after 02/04/80. Spiritwood does not manufacture ammonium sulfate.
40 CFR 60	QQ	Standards of Performance for the Graphic Arts Industry: Publication Rotogravure Printing							X	Applies to each publication rotogravure printing press that commences construction, modification or reconstruction after 10/28/80. Spiritwood Energy does not operate any publication rotogravure printing presses.
40 CFR 60	RR	Standards of Performance for Pressure Sensitive Tape and Label Surface Coating Operations							X	Applies to each coating line used in the manufacture of pressure sensitive tape and label materials that begins construction, modification or reconstruction after 12/30/80. Spiritwood Energy does not produce pressure sensitive tape.
40 CFR 60	SS	Standards of Performance for Industrial Surface Coating: Large Appliances							X	Applies to each surface coating operation in a large appliance surface coating line that commences construction, modification or reconstruction after 12/24/80. Spiritwood Energy does not manufacture or coat large appliances.

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Regulatory Citation	Subpart	Title	Facility-wide	Coal Handling	CFB Boiler	Package Boilers	Diesel Engines	Other	Not Applicable	Statement of Applicability
40 CFR 60	TT	Standards of Performance for Metal Coil Surface Coating							X	Applies to affected sources at metal coil surface coating operations that commence construction, modification or reconstruction after 01/05/81. The Spiritwood Energy facility does not include metal coil coating.
40 CFR 60	UU	Standards of Performance for Asphalt Processing and Asphalt Roofing Manufacture							X	Applies to affected sources at asphalt roofing plants and affected sources at asphalt processing plants, petroleum refineries and asphalt roofing plants that process and/or store only non-roofing asphalts which commence construction or modification after 11/18/80 and all other affected sources at asphalt processing plants, petroleum refineries and asphalt roofing plants which commence construction or modification after 05/26/81. The Spiritwood Energy facility is not an asphalt or asphalt roofing facility.
40 CFR 60	VV	Standards of Performance for Equipment Leaks of Volatile Organic Compounds (VOC) in the Synthetic Organic Chemicals Manufacturing Industry (SOCMI)							X	Applies to affected sources at synthetic organic chemical manufacturing industry facilities that commence construction or modification after 01/05/81. The Spiritwood Energy coal burning facility is not a synthetic organic chemical manufacturer.
40 CFR 60	WW	Standards of Performance for the Beverage Can Surface Coating Industry							X	Applies to affected sources at beverage can surface coating lines that commence construction, modification or reconstruction after 11/26/80. The Spiritwood Energy facility does not include beverage can coating.
40 CFR 60	XX	Standards of Performance for Bulk Gasoline Terminals							X	Applies to the total of all loading racks at bulk gasoline terminals which deliver liquid product into gasoline tank trucks that commence construction or modification after 12/17/80. The Spiritwood Energy facility is not a bulk gasoline terminal.
40 CFR 60	AAA	Standards of Performance for New Residential Wood Heaters							X	Applies to wood heaters manufactured on or after 07/01/88 or sold at retail on or after 07/01/90. The Spiritwood Energy facility does not include residential wood heaters.
40 CFR 60	BBB	Standards of Performance for the Rubber Tire Manufacturing Industry							X	Applies to affected sources at rubber tire manufacturing plants that commence construction, modification or reconstruction after 01/20/83. The Spiritwood Energy facility does not manufacture rubber tires.
40 CFR 60	DDD	Standards of Performance for Volatile Organic Compound (VOC) Emissions from the Polymer Manufacturing Industry							X	Applies to affected sources at the manufacture of polypropylene, polyethylene, polystyrene or polyethylene terephthalate. The Spiritwood Energy facility does not manufacture any of the subject polymers.
40 CFR 60	FFF	Standards of Performance for Flexible Vinyl and Urethane Coating and Printing							X	Applies to each rotogravure printing line used to print or coat flexible vinyl or urethane products which begins construction, modification or reconstruction after 01/18/83. Spiritwood Energy does not coat or print flexible vinyl or urethane products.
40 CFR 60	GGG	Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries							X	Applies to affected sources at petroleum refineries that commence construction or modification after 01/04/83. The Spiritwood Energy facility is not a petroleum refinery.
40 CFR 60	HHH	Standards of Performance for Synthetic Fiber Production Facilities							X	Applies to each solvent spun synthetic fiber process that produces more than 500 megagrams of fiber per year and that commences construction or reconstruction after 11/23/82. The Spiritwood Energy facility does not produce synthetic fiber.

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40 CFR 60	III	Standards of Performance for Volatile Organic Compound (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes							X	Applies to affected air oxidation reactors and associated recovery systems that produce any of the listed chemicals as a product, co-product, by-product or intermediate and that commences construction, modification or reconstruction after 10/21/83. The Spiritwood Energy facility is not a SOCMI air oxidation unit process.
40 CFR 60	JJJ	Standards of Performance for Petroleum Dry Cleaners							X	Applies to affected sources at petroleum dry cleaning plants with a total manufacturers' rated dryer capacity greater than or equal to 84 pounds that commences construction or modification after 12/14/82. The Spiritwood Energy facility does not include petroleum dry cleaners.
40 CFR 60	KKK	Standards of Performance for Equipment Leaks of VOC From Onshore Natural Gas Processing Plants							X	Applies to affected sources at onshore natural gas processing plants that commence construction, reconstruction or modification after 01/20/84. The Spiritwood Energy facility is not a natural gas processing plant.
40 CFR 60	LLL	Standards of Performance for Onshore Natural Gas Processing: SO ₂ Emissions							X	Applies to each sweetening unit and each sweetening unit followed by a sulfur recovery unit that process natural gas that commence construction or modification after 01/20/84. The Spiritwood Energy facility is not a natural gas processing plant.
40 CFR 60	NNN	Standards of Performance for Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations							X	Applies to affected distillation units and associated recovery systems that are a part of a process unit that produce a listed chemical as a product, co-product, by-product or intermediate that commences construction, modification or reconstruction after 12/30/83. The Spiritwood Energy facility does not include SOCMI distillation operations.
40 CFR 60	OOO	Standards of Performance for Nonmetallic Mineral Processing Plants							X	Applies to affected sources at nonmetallic mineral processing plants that commence construction, reconstruction or modification after 08/31/83. The Spiritwood Energy facility will handle and use limestone but will not crush or grind it. Limestone will be delivered to the plant in the form needed for the CFB boiler. Therefore, the limestone handling operations at the facility does not meet the definition of nonmetallic mineral processing plant.
40 CFR 60	PPP	Standard of Performance for Wool Fiberglass Insulation Manufacturing Plants							X	Applies to each rotary spin wool fiberglass insulation manufacturing line that commences construction, modification or reconstruction after 02/07/84. The Spiritwood Energy facility does not manufacture fiberglass.
40 CFR 60	QQQ	Standards of Performance for VOC Emissions From Petroleum Refinery Wastewater Systems							X	Applies to individual drain systems, oil-water separators and aggregate facilities located in petroleum refineries for which construction, modification or reconstruction commenced after 05/04/87. The Spiritwood Energy facility is not a petroleum refinery.
40 CFR 60	RRR	Standards of Performance for Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes							X	Applies to affected reactor process and associated recovery systems that are part of a process unit that produces a listed chemical as a product, co-product, by-product or intermediate and that commences construction, modification or reconstruction after 06/29/90. The Spiritwood Energy facility does not operate a reactor process.
40 CFR 60	SSS	Standards of Performance for Magnetic Tape Coating Facilities							X	Applies to each coating operation and each piece of coating mix preparation equipment for which construction, modification or reconstruction begins after 01/22/86. The Spiritwood Energy facility is not a magnetic tape coating facility.

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40 CFR 60	TTT	Standards of Performance for Industrial Surface Coating: Surface Coating of Plastic Parts for Business Machines							X	Applies to each spray booth in which plastic parts for use in the manufacture of business machines receive prime coats, color coats, texture coats or touch-up coats for which construction, modification or reconstruction begins after 01/08/86. The Spiritwood Energy facility does not spray coat plastic parts for use in the manufacture of business machines.
40 CFR 60	UUU	Standards of Performance for Calciners and Dryers in Mineral Industries							X	Applies to each calciner and dryer (not subject to LL) at a mineral processing plant that commences construction, modification or reconstruction after 04/23/86. The Spiritwood Energy facility does not include mineral processing.
40 CFR 60	VVV	Standards of Performance for Polymeric Coating of Supporting Substrates Facilities							X	Applies to each coating operation and any onsite coating mix preparation equipment used to prepare coatings for the polymeric coating of supporting substrates for which construction, modification or reconstruction begins after 04/30/87. Spiritwood Energy does not operate a substrate facility.
40 CFR 60	WWW	Standards of Performance for Municipal Solid Waste Landfills							X	Applies to each municipal solid waste landfill that commenced construction, reconstruction or modification after 05/30/91. The Spiritwood Energy facility is not a MSW landfill project.
40 CFR 60	AAAA	Standards of Performance for Small Municipal Waste Combustion Units							X	Applies to new municipal solid waste combustion units built after August 30, 1999 or modified after June 6, 2001; and have the capacity to combust at least 35 tons per day but no more than 250 tons per day of municipal solid waste or refuse-derived fuel. The Spiritwood Energy facility is not a municipal solid waste combustor.
40 CFR 60	BBBB	Standards of Performance for Small Municipal Waste Combustion Units							X	Applies to state Administrators with one or more existing small municipal waste combustion units that commenced construction on or before August 30, 1999. Spiritwood Energy does not fit this requirement.
40 CFR 60	CCCC	Standards of Performance for Commercial and Industrial Solid Waste Incineration Units							X	Applies to new incineration units built after November 30, 1999 or modified after June 1, 2001. The Spiritwood Energy facility is not a solid waste incinerator.
40 CFR 60	DDDD	Emissions Guidelines and Compliance Times for Commercial and Industrial Solid Waste Incineration Units							X	Applies to state Administrators with one or more existing CISWI units that commenced construction on or before November 30, 1999. Spiritwood Energy is not a CISWI.
40 CFR 60	EEEE	Standards of Performance for Other Solid Waste Incineration Units							X	Applies to new incineration units built after December 9, 2004 or modified after June 16, 2006. The Spiritwood Energy facility is not a solid waste incinerator.
40 CFR 60	FFFF	Emission Guidelines and Compliance Times for Other Solid Waste Incineration Units							X	Applies to the Administrator of an air quality program in a State or United States protectorate with one or more existing OSWI units or air curtain incinerators that commenced construction on or before December 9, 2004. Spiritwood Energy does not fit this requirement.
40 CFR 60	HHHH	Emission Guidelines and Compliance Times for Coal-Fired Electric Steam Generating Units			X					Applies to stationary, coal-fired boiler or stationary, coal-fired combustion turbine serving at any time, since the later of November 15, 1990 or the start-up of the unit's combustion chamber, a generator with nameplate capacity of more than 25 MWe producing electricity for sale. The Spiritwood Energy's CFB boiler will be subject to this requirement.

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40 CFR 60	III	Standards of Performance for Stationary Compression Ignition Internal Combustion Engines					X			Applies to stationary compression ignition (CI) internal combustion engines (ICE) that commence construction after July 11, 2005 where the stationary CI ICE is either manufactured after April 1, 2006 and are not fire pump engines, or are manufactured as certified NFPA fire pump engines after July 1, 2006. Spiritwood Energy plans to install an emergency generator and a fire pump engine and will both be subject to this rule.
40 CFR 60	KKKK	Standards of Performance for Stationary Combustion Turbines							X	Applies to stationary combustion turbines with a heat input at peak load equal to or greater than 10.7 gigajoules (10 MMBtu) per hour, which commenced construction, modification, or reconstruction after February 18, 2005. The Spiritwood Energy facility does not contain any combustion turbines.
40 CFR 61	--	National Emission Standards for Hazardous Air Pollutants								
40 CFR 61	A	General Provisions							X	Applies to owners or operators of stationary sources for which a standard is prescribed under this part. The Spiritwood Energy facility is not subject to any of the Part 61 standards.
40 CFR 61	B	National Emission Standards for Radon Emissions From Underground Uranium Mines							X	Applies to active underground uranium mines which have mined, will mine or are designed to mine over 100,000 tons of ore during the life of the mine or has had or will have an annual ore production rate greater than 10,000 tons. The Spiritwood Energy facility does not involve uranium mining.
40 CFR 61	C	National Emission Standard for Beryllium							X	Applies to extraction plants, ceramic plants, foundries, incinerators and propellant plants which process beryllium ore, beryllium, beryllium oxide, beryllium alloys or beryllium-containing wastes and machine shops which process beryllium, beryllium oxides or any alloy that contains more than 5% beryllium. The Spiritwood Energy facility does not process any material containing 5% beryllium.
40 CFR 61	D	National Emission Standard for Beryllium Rocket Motor Firing							X	Applies to rocket motor test sites. The Spiritwood Energy facility is not a rocket motor test site.
40 CFR 61	E	National Emission Standard for Mercury							X	Applies to those stationary sources which process mercury ore to recover mercury, use mercury chlor-alkali cells to produce chlorine gas and alkali metal hydroxide and incinerate or dry wastewater treatment plant sludge. The Spiritwood Energy facility does not process mercury ore.
40 CFR 61	F	National Emission Standard for Vinyl Chloride							X	Applies to plants which produce ethylene dichloride by reaction of oxygen and hydrogen chloride with ethylene, vinyl chloride by any process and/or one or more polymers containing any fraction of polymerized vinyl chloride. The Spiritwood Energy facility is not an ethylene dichloride production facility.
40 CFR 61	H	National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities							X	Applies to operations at any facility owned or operated by the Department of Energy that emits any radionuclides other than radon-222 and radon-220 into the air. The Spiritwood Energy facility is not a DOE facility.
40 CFR 61	I	National Emission Standards for Radionuclide Emissions From Federal Facilities Other Than Nuclear Regulatory Commission Licensees and Not Covered by Subpart H							X	Applies to facilities owned or operated by any federal agency other than the Department of Energy and not licensed by the Nuclear Regulatory Commission. The Spiritwood Energy facility is not a federal facility.

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40 CFR 61	J	National Emission Standard for Equipment Leaks (Fugitive Emission Sources) of Benzene							X	Applies to each pump, compressor, pressure relief device, sampling connection system, open-ended valve or line, valve, flange and other connectors, product accumulator vessel and control device or system required by this subpart that is intended to operate in benzene service. The Spiritwood Energy facility does not have any systems considered to be "in benzene service".
40 CFR 61	K	National Emission Standards for Radionuclide Emissions From Elemental Phosphorous Plants							X	Applies to calciners and nodulizing kilns at elemental phosphorous plants. The Spiritwood Energy facility is not a phosphorus plant.
40 CFR 61	L	National Emission Standard for Benzene Emissions from Coke By-Product Recovery Plants							X	Applies to affected sources at furnace and foundry coke by-product recovery plants. The Spiritwood Energy facility is not a coke by-product recovery plant.
40 CFR 61	M	National Emission Standard for Asbestos							X	Applies to asbestos mills, roadways using asbestos tailings or waste materials, manufacturing operations using commercial asbestos, demolition or renovation projects, operations in which asbestos-containing materials are spray applied, fabricating operations using commercial asbestos, installation of insulating materials containing commercial asbestos, waste disposal of asbestos material activity, operations that convert asbestos-containing waste material into nonasbestos material. The Spiritwood Energy facility processes do not involve the use of asbestos.
40 CFR 61	N	National Emission Standard for Inorganic Arsenic Emissions From Glass Manufacturing Plants							X	Applies to glass melting furnaces that use commercial arsenic as a raw material. The Spiritwood Energy facility is not a glass manufacturing plant.
40 CFR 61	O	National Emission Standard for Inorganic Arsenic Emissions From Primary Copper Smelters							X	Applies to each copper converter at any new or existing primary copper smelter. The Spiritwood Energy facility is not a copper smelting facility.
40 CFR 61	P	National Emission Standard for Inorganic Arsenic Emissions From Arsenic Trioxide and Metallic Arsenic Production Facilities							X	Applies to each metallic arsenic production plant and to each arsenic trioxide plant that processes low-grade arsenic-bearing materials by a roasting condensation process. The Spiritwood Energy facility is not an arsenic production facility.
40 CFR 61	Q	National Emission Standards for Radon Emissions From Department of Energy Facilities							X	Applies to the design and operation of all storage and disposal facilities for radium-containing material that are owned or operated by the Department of Energy that emit radon-222. The Spiritwood Energy facility is not a DOE facility.
40 CFR 61	R	National Emission Standards for Radon Emissions From Phosphogypsum Stacks							X	Applies to each phosphogypsum stack and to each person who owns, sells, distributes or otherwise uses any quantity of phosphogypsum which is produced as a result of wet acid phosphorus production or is removed from any existing phosphogypsum stack. The Spiritwood Energy facility is not a phosphogypsum processing plant.
40 CFR 61	T	National Emission Standards for Radon Emissions From the Disposal of Uranium Mill Tailings							X	Applies to all sites that are used for the disposal of tailings and that managed residual radioactive material or uranium by-product materials during and following the processing of uranium ores that are regulated under the Uranium Tailings Radiation Control Act of 1978. The Spiritwood Energy facility does not include the use of uranium mill tailings.

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40 CFR 61	V	National Emission Standard for Equipment Leaks (Fugitive Emission Sources)							X	Applies to each pump, compressor, pressure relief device, sampling connection system, open-ended valve or line, valve, flange and other connectors, product accumulator vessel and control device or system required by this subpart that are intended to convey volatile hazardous air pollutant (VHAP) containing materials in excess of 10% VHAP. The Spiritwood Energy facility does not prepare solutions containing greater than 10% VHAP.
40 CFR 61	W	National Emission Standards for Radon Emissions From Operating Mill Tailings							X	Applies to facilities licensed to manage uranium byproduct materials during and following the processing of uranium ores. The Spiritwood Energy facility does not generate mill tailings.
40 CFR 61	Y	National Emission Standard for Benzene Emissions From Benzene Storage Vessels							X	Applies to each storage vessel storing benzene that has a specific gravity within the range of the listed specific gravities. The Spiritwood Energy facility does not include benzene storage.
40 CFR 61	BB	National Emission Standard for Benzene Emissions From Benzene Transfer Operations							X	Applies to the total of all loading racks at which benzene is loaded into tank trucks, railcars or marine vessels at each benzene production facility and each bulk terminal. The Spiritwood Energy facility does not include benzene loading operations.
40 CFR 61	FF	National Emissions Standard for Benzene Waste Operations							X	Applies to hazardous waste treatment, storage and disposal facilities that treat, store or dispose of hazardous waste generated by chemical manufacturing plants, coke by-product recovery plants or petroleum refineries. The Spiritwood Energy facility is not a TSDF.
40 CFR 63	--	National Emission Standards for Hazardous Air Pollutants for Source Categories								
40 CFR 63	A	General Provisions	X							Applies to owners or operators who are subject to subsequent subparts of this part. The Spiritwood Energy facility will be a major source for HAP emissions and will be subject to subparts ZZZZ and DDDDD of 40 CFR Part 63.
40 CFR 63	B	Requirements for Control Technology Determinations for Major Sources in Accordance With Clean Air Act Sections, Sections 112(g) and 112(j)							X	After the effective date of a permit program under title V in any State, no person may construct or reconstruct any major source of hazardous air pollutants, unless the Administrator (or the State) determines that the maximum achievable control technology emission limitation under this section for new sources will be met. The requirements of this subpart do not apply to electric utility steam generating units, therefore Spiritwood Energy is exempt.
40 CFR 63	C	List of Hazardous Air Pollutants, Petition Process, Lesser Quantity Designations, Source Category List							X	Administrative rule. Subpart C does not include any direct requirements for the Spiritwood Energy facility.
40 CFR 63	D	Regulations Governing Compliance Extensions for Early Reductions of Hazardous Air Pollutants							X	Applies to an owner or operator of an existing source who wishes to obtain a compliance extension from a standard issued under section 112(d) of the Act. The Spiritwood Energy facility is not an existing source.
40 CFR 63	E	Approval of State Programs and Delegation of Federal Authorities							X	Administrative rule. Subpart E does not include any direct requirements for the Spiritwood Energy facility.
40 CFR 63	F	National Emission Standards for Organic Hazardous Air Pollutants From the Synthetic Organic Chemical Manufacturing Industry							X	Applies to chemical manufacturing process units that manufacture as a primary product a listed chemical, use as a reactant or manufacture as a product or co-product a listed chemical and are located at a plant site that is a major source of HAPs. The Spiritwood Energy facility is not a SOCMII source.

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40 CFR 63	G	National Emission Standards for Organic Hazardous Air Pollutants From the Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater							X	Applies to all process vents, storage vessels, transfer racks and wastewater streams within a source subject to 40 CFR 63 Subpart F. The Spiritwood Energy facility is not a SO2 source.
40 CFR 63	H	National Emission Standards for Organic Hazardous Air Pollutants for Equipment Leaks							X	Applies to pumps, compressors, agitators, pressure relief devices, sampling connection systems, open-ended valves or lines, valves, connectors, surge control vessels, bottoms receivers, instrumentation systems and control devices or systems required by this subpart that are intended to operate in organic hazardous air pollutant service 300 hours or more during the calendar year within a source subject to the provisions of a specific subpart in 40 CFR Part 63 that references this subpart. The Spiritwood Energy facility does not include equipment in the service described in this subpart.
40 CFR 63	I	National Emission Standards for Organic Hazardous Air Pollutants for Certain Processes Subject to the Negotiated Regulation for Equipment Leaks							X	Applies to emissions of designated organic HAPs from listed processes located at major sources of HAPs. The Spiritwood Energy facility does not produce the chemicals listed as subject to this subpart.
40 CFR 63	J	National Emission Standards for Polyvinyl Chloride and Copolymers Production							X	This subpart establishes the NESHAP for facilities producing polyvinyl chloride and copolymers. The Spiritwood Energy facility will not produce polyvinyl chloride or copolymers.
40 CFR 63	L	National Emission Standards for Coke Oven Batteries							X	Applies to existing by-product coke oven batteries at a coke plant, existing nonrecovery coke oven batteries at a coke plant, greenfield coke oven batteries, new or reconstructed coke oven batteries at existing coke plants if the coke oven battery results in an increase in the design capacity of the coke plant as of 11/15/90, the capacity of any coke oven battery subject to a construction permit on 11/15/90 which commenced operation before 10/27/93, each brownfield coke oven battery, each rebuild pad, each cold-idle coke oven battery that is restarted and each foundry coke producer. The Spiritwood Energy facility does not include a coke oven battery.
40 CFR 63	M	National Perchloroethylene Air Emissions Standards for Dry Cleaning Facilities							X	Applies to any dry cleaning facility that uses perchloroethylene. The Spiritwood Energy facility is not a dry cleaning operation.
40 CFR 63	N	National Emission Standards for Chromium Emissions From Hard and Decorative Chromium Electroplating And Chromium Anodizing Tanks							X	Applies to each chromium electroplating or chromium anodizing tank at facilities performing hard chromium electroplating, decorative chromium electroplating or chromium anodizing. The Spiritwood Energy facility is not a chromium plating operation.
40 CFR 63	O	Ethylene Oxide Emissions Standards for Sterilization Facilities							X	Applies to all sterilization sources in sterilization or fumigation operations. The Spiritwood project is not a sterilization operation.

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40 CFR 63	Q	National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling Towers						X		Applies to all new and existing industrial process cooling towers that are operated with chromium-based water treatment chemicals on or after 09/08/94 and are either major sources or are integral parts of facilities that are major sources of HAPs. The Spiritwood Energy facility includes cooling towers; however, Spiritwood will not use chromium-containing water treatment chemicals.
40 CFR 63	R	National Emission Standards for Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations)							X	Applies to affected bulk gasoline terminals and pipeline breakout stations. The Spiritwood Energy facility is not a gasoline terminal or pipeline facility.
40 CFR 63	S	National Emission Standards for Hazardous Air Pollutants from the Pulp and Paper Industry							X	Applies to affected processes that produce pulp, paper or paperboard that are located at plant sites that are major sources of HAPs and that use kraft, soda, sulfite or semi-chemical pulping processes using wood, mechanical pulping processes using wood or any process using secondary or non-wood fibers. The Spiritwood Energy facility is not a pulp and paper facility.
40 CFR 63	T	National Emission Standards for Halogenated Solvent Cleaning							X	Applies to each batch vapor, in-line vapor, in-line cold and batch cold solvent cleaning machine that uses methylene chloride, perchloroethylene, trichloroethylene, 1,1,1-trichloroethane, carbon tetrachloride, chloroform or any combination of these halogenated HAP solvents in a total concentration greater than 5% by wt as a cleaning and/or drying agent. The Spiritwood Energy facility does not include halogenated solvent cleaning.
40 CFR 63	U	National Emission Standards for Hazardous Air Pollutant Emissions: Group I Polymers and Resins							X	Applies to each group of one or more elastomer product process units that manufacture the same primary product and are located at a plant site that is a major source. The Spiritwood Energy facility is not a resin or polymer production facility.
40 CFR 63	W	National Emissions Standards for Hazardous Air Pollutants for Epoxy Resins Production and Non-Nylon Polyamides Production							X	Applies to all manufacturers of basic liquid epoxy resins and manufacturers of wet strength resins that are located at a plant site that is a major source of HAPs. The Spiritwood Energy facility is not a resin or polyamide production facility.
40 CFR 63	X	National Emission Standards for Hazardous Air Pollutants from Secondary Lead Smelting							X	Applies to blast, reverberatory, rotary and electric smelting furnaces, refining kettles, agglomerating furnaces, dryers, process fugitive sources and fugitive dust sources at all secondary lead smelters. The Spiritwood Energy facility is not a lead smelter.
40 CFR 63	Y	National Emission Standards for Marine Tank Vessel Loading Operations							X	Applies to any location where at least one dock or loading berth is bulk loading liquid such as gasoline or crude oil onto marine tank vessels. The Spiritwood Energy facility does not include a petroleum products loading dock.
40 CFR 63	AA	National Emission Standards for Hazardous Air Pollutants from Phosphoric Acid Manufacturing Plants							X	Applies to affected sources at phosphoric acid manufacturing plants that are major sources of HAPs. The Spiritwood Energy facility is not a phosphoric acid manufacturing plant.
40 CFR 63	BB	National Emission Standards for Hazardous Air Pollutants from Phosphate Fertilizer Production Plants							X	Applies to affected sources at phosphate fertilizers production plants located at major sources of HAPs. The Spiritwood Energy facility is not a phosphate fertilizer plant.

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40 CFR 63	CC	National Emission Standards for Hazardous Air Pollutants From Petroleum Refineries							X	Applies to petroleum refining process units and related emission points that are located at a plant site that is a major source of HAPs and emit or have equipment containing or contacting one or more of the listed HAPs. The Spiritwood Energy facility is not a petroleum refinery.
40 CFR 63	DD	National Emission Standards for Hazardous Air Pollutants from Off-Site Waste and Recovery Operations							X	Applies to affected sources at a plant site that is a major source of HAPs and has located at it one or more operations that receives off-site materials and the operations are specified waste management or recovery operations. The Spiritwood Energy facility is not a waste management or recovery operation.
40 CFR 63	EE	National Emission Standards for Magnetic Tape Manufacturing Operations							X	Applies to magnetic tape manufacturing operations located at a major source of HAPs or one that chooses to obtain a federally enforceable limit on its potential to emit HAPs. The Spiritwood Energy facility is not a magnetic tape manufacturing facility.
40 CFR 63	GG	National Emission Standards for Aerospace Manufacturing and Rework Facilities							X	Applies to affected sources at facilities that are engaged, either in part or in whole, in the manufacture or rework of commercial, civil or military aerospace vehicles or components and that are major sources of HAPs. The Spiritwood Energy facility is not an aerospace facility.
40 CFR 63	HH	National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities							X	Applies to affected sources at oil and natural gas production facilities that are major sources of HAPs and either process, upgrade or store hydrocarbon liquids prior to point of custody transfer or process, upgrade or store natural gas prior to the point at which natural gas enters the transmission and storage source category or is delivered to a final end user. The Spiritwood Energy facility is not an oil or natural gas production facility.
40 CFR 63	II	National Emission Standards for Shipbuilding and Ship Repair (Surface Coating)							X	Applies to shipbuilding and ship repair operations at any facility that is a major source of HAPs. The Spiritwood Energy facility is not a shipbuilding facility.
40 CFR 63	JJ	National Emission Standards for Wood Furniture Manufacturing Operations							X	Applies to each facility that is engaged, either in part or in whole, in the manufacture of wood furniture or wood furniture components and that is located at a plant site that is a major source of HAPs. The Spiritwood Energy facility is not a wood furniture manufacturing facility.
40 CFR 63	KK	National Emission Standards for the Printing and Publishing Industry							X	Applies to each facility that is a major source of HAPS at which publication rotogravure, product and packaging rotogravure or wide-web flexographic printing presses are operated. The Spiritwood Energy facility is not a printing or publishing operation.
40 CFR 63	LL	National Emission Standards for Hazardous Air Pollutants for Primary Aluminum Reduction Plants							X	Applies to each new pitch storage tank and each new or existing potline, paste production plant or anode bake furnace associated with primary aluminum production and located at a major source of HAPs. The Spiritwood Energy facility is not an aluminum plant.
40 CFR 63	MM	National Emission Standards for Hazardous Air Pollutants for Combustion Sources at Kraft, Soda, and Sulfite Pulp and Paper Mills							X	Applies to pulp and paper mill operations. The Spiritwood Energy facility is not a pulp and paper plant.

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40 CFR 63	OO	National Emission Standards for Tanks - Level 1							X	Applies to the control of air emissions from tanks for which another subpart of 40 CFR parts 60, 61 or 63 references the use of this subpart for such air emission control. Unless referred to this subpart by another rule, OO is not applicable to the Spiritwood Energy facility.
40 CFR 63	PP	National Emission Standards for Containers							X	Applies to the control of air emissions from containers for which another subpart of 40 CFR parts 60, 61 or 63 references the use of this subpart for such air emission control. Unless referred to this subpart by another rule, PP is not applicable to the Spiritwood Energy facility.
40 CFR 63	QQ	National Emission Standards for Surface Impoundments							X	Applies to the control of air emissions from surface impoundments for which another subpart of 40 CFR parts 60, 61 or 63 references the use of this subpart for such air emission control. If the Spiritwood Energy facility includes ponds or lagoons, the material stored will not contain organic compounds.
40 CFR 63	RR	National Emission Standards for Individual Drain Systems							X	Applies to the control of air emissions from individual drain systems for which another subpart of 40 CFR parts 60, 61 or 63 references the use of this subpart for such air emission control. Unless referred to this subpart by another rule, RR is not applicable to the Spiritwood Energy facility.
40 CFR 63	SS	National Emission Standards for Closed Vent Systems, Control Devices, Recovery Devices and Routing to a Fuel Gas System or a Process							X	Applies to closed vent systems, control devices and routing of air emissions to a fuel gas system or process when another subpart references this subpart. Unless referred to this subpart by another rule, SS is not applicable to the Spiritwood Energy facility.
40 CFR 63	TT	National Emission Standards for Equipment Leaks - Control Level 1							X	Applies to equipment leaks for which another subpart references this subpart. Unless referred to this subpart by another rule, UU is not applicable to the Spiritwood Energy facility.
40 CFR 63	UU	National Emission Standards for Equipment Leaks - Control Level 2 Standards							X	Applies to equipment leaks for which another subpart references this subpart. Unless referred to this subpart by another rule, UU is not applicable to the Spiritwood Energy facility.
40 CFR 63	VV	National Emission Standards for Oil-Water Separators and Organic-Water Separators							X	Applies to the control of air emissions from oil-water separators and organic-water separators for which another subpart of 40 CFR parts 60, 61 or 63 references the use of this subpart for such air emission control. Unless referred to this subpart by another rule, VV is not applicable to the Spiritwood Energy facility.
40 CFR 63	WW	National Emission Standards for Storage Vessels (Tanks) - Control Level 2							X	Applies to storage vessels for which another subpart references this subpart. Unless referred to this subpart by another rule, WW is not applicable to the Spiritwood Energy facility.
40 CFR 63	XX	National Emission Standards for Ethylene Manufacturing Process Units: Heat Exchange Systems and Waste Operations							X	Applies to a heat exchange system operated in conjunction with an ethylene production unit expressly referenced to this subpart from subpart YY of this part. The Spiritwood Energy facility does not include a heat exchanger in ethylene service.
40 CFR 63	YY	National Emission Standards for Hazardous Air Pollutants for Source Categories: Generic Maximum Achievable Control Technology Standards							X	Applies to acetal resins production, acrylic and modacrylic fibers production, hydrogen fluoride production and polycarbonate production facilities. The Spiritwood Energy facility does not include any of these processes.

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40 CFR 63	CCC	National Emission Standards for Hazardous Air Pollutants for Steel Pickling - HCl Process Facilities and Hydrochloric Acid Regeneration Plants							X	Applies to affected sources at steel pickling facilities that use hydrochloric acid solution that contains 6% or more HCl and is at a temperature of 100 F or greater and hydrochloric acid regeneration plants that are located at a plant site that is a major source of HAPs. The Spiritwood Energy facility does not include steel pickling with 6% or more hydrochloric acid.
40 CFR 63	DDD	National Emission Standards for Hazardous Air Pollutants for Mineral Wool Production							X	Applies to mineral wool production facilities located at plant sites that major sources of HAPs. The Spiritwood Energy facility does not include mineral wool production.
40 CFR 63	EEE	National Emission Standards for Hazardous Air Pollutants From Hazardous Waste Combustors							X	Applies to sources that combust hazardous waste. The Spiritwood Energy facility does not include hazardous waste combustion.
40 CFR 63	GGG	National Emission Standards for Pharmaceuticals Production							X	Applies to pharmaceutical manufacturing operations that manufacture a pharmaceutical product, are located at a major source of HAPs and process, use or produce a HAP. The Spiritwood Energy facility is not a pharmaceutical facility.
40 CFR 63	HHH	National Emission Standards for Hazardous Air Pollutants From Natural Gas Transmission and Storage Facilities							X	Applies to each glycol dehydration units at natural gas transmission and storage facilities that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final end user and that are major sources of HAPs. The Spiritwood Energy facility is not a natural gas transmission and storage facility.
40 CFR 63	III	National Emission Standards for Hazardous Air Pollutants for Flexible Polyurethane Foam Production							X	Applies to each flexible polyurethane foam or rebond foam process that produces flexible polyurethane or rebond foam, emits a HAP and is located at a major source. The Spiritwood Energy facility will not produce polyurethane foam.
40 CFR 63	JJJ	National Emission Standards for Hazardous Air Pollutant Emissions: Group IV Polymers and Resins							X	Applies to each group of one or more thermoplastic product process units that is manufacturing the same primary product and that is located at a plant site that is a major source of HAPs. The Spiritwood Energy facility will not produce polymers or resins.
40 CFR 63	LLL	National Emission Standards for Hazardous Air Pollutants From the Portland Cement Manufacturing Industry							X	Applies to affected sources at portland cement plants. The Spiritwood Energy facility is not a portland cement plant.
40 CFR 63	MMM	National Emission Standards for Hazardous Air Pollutants for Pesticide Active Ingredient Production							X	Applies to the facility-wide collection of pesticide active ingredient manufacturing process units that process, use or produce HAPs and that are located at major sources of HAPs. The Spiritwood Energy facility will not produce pesticide active ingredients.
40 CFR 63	NNN	National Emission Standards for Hazardous Air Pollutants for Wool Fiberglass Manufacturing							X	Applies to affected sources at each wool fiberglass manufacturing facility that is a major source or is located at a major source. The Spiritwood Energy facility will not produce wool fiberglass.
40 CFR 63	OOO	National Emission Standards for Hazardous Air Pollutants for Polymers & Resins III, Amino Acids, Phenolic Resins							X	Applies to polymer, resin and amino acid manufacturing process units and associated equipment. The Spiritwood Energy facility will not produce polymers, resins or amino acids.
40 CFR 63	PPP	National Emission Standards for Hazardous Air Pollutants for Polyether Polyols Production							X	Applies to polyether polyol manufacturing process units and associated equipment. The Spiritwood Energy facility will not produce polyether polyols.
40 CFR 63	QQQ	National Emission Standards for Hazardous Air Pollutants for Primary Copper Production							X	Applies to primary copper production facilities. The Spiritwood Energy facility is not a primary copper facility.

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40 CFR 63	RRR	National Emission Standards for Hazardous Air Pollutants for Secondary Aluminum							X	Applies to aluminum production facilities. The Spiritwood Energy facility will not produce aluminum.
40 CFR 63	TTT	National Emission Standards for Hazardous Air Pollutants for Primary Lead Smelting							X	Applies to sinter machines, blast furnaces, dross furnaces, process fugitive sources and fugitive dust sources located at primary lead smelters. The Spiritwood Energy facility is not a lead smelter.
40 CFR 63	UUU	National Emission Standards for Hazardous Air Pollutants for Petroleum Refineries							X	Applies to certain petroleum refinery processes (catalytic cracking, catalytic reforming and sulfur plant units). The Spiritwood Energy facility is not a petroleum refinery.
40 CFR 63	VVV	National Emission Standards for Hazardous Air Pollutants for Publicly Owned Treatment Works (POTW)							X	Applies to publicly owned treatment works (POTWs). The Spiritwood Energy facility is not a POTW.
40 CFR 63	XXX	National Emission Standards for Hazardous Air Pollutants for Ferroalloys Production: Ferromanganese and Silicomanganese							X	Applies to affected sources at ferromanganese and silicomanganese production facilities that manufacture ferromanganese or silicomanganese and are major sources of HAPs or are co-located at major sources of HAPs. The Spiritwood Energy facility is not a ferroalloy production facility.
40 CFR 63	AAAA	National Emission Standards for Hazardous Air Pollutants for Municipal Solid Waste Landfills							X	Applies to municipal solid waste landfills that are major HAP sources. The Spiritwood Energy facility is not a municipal solid waste landfill.
40 CFR 63	CCCC	National Emission Standards for Hazardous Air Pollutants for Manufacturing Nutritional Yeast							X	Applies to facilities that manufacture nutritional yeast. The Spiritwood Energy facility will not manufacture nutritional yeast.
40 CFR 63	DDDD	National Emission Standards for Hazardous Air Pollutants: Plywood and Composite Wood Products							X	Applies to plywood and composite wood products (PCWP) manufacturing facilities. The Spiritwood Energy facility will not include PCWP manufacturing.
40 CFR 63	EEEE	National Emission Standards for Hazardous Air Pollutants for Organic Liquids Distribution							X	Applies to organic liquid distribution (OLD) facilities. Spiritwood Energy will not be an OLD facility.
40 CFR 63	FFFF	National Emission Standards for Hazardous Air Pollutants for Miscellaneous Organic Chemical Manufacturing (23 subcategories)							X	Applies to miscellaneous organic chemical manufacturing process units (MCPUs) that are located at, or are part of, a major source of hazardous air pollutants (HAP) emissions. The Spiritwood Energy facility does not contain any MCPUs.
40 CFR 63	GGGG	National Emission Standards for Hazardous Air Pollutants for Solvent Extraction for Vegetable Oil Production							X	Applies to solvent extraction process for vegetable oil production at major HAP sources. The Spiritwood Energy facility will not produce vegetable oil.
40 CFR 63	HHHH	National Emission Standards for Hazardous Air Pollutants for Wet Formed Fiberglass Mat Production							X	Applies to fiberglass mat production processes. The Spiritwood Energy facility will not produce fiberglass materials.
40 CFR 63	IIII	National Emission Standards for Hazardous Air Pollutants: Surface Coating of Automobiles and Light-Duty Trucks							X	Applies to facilities which surface coat new automobile or new light-duty truck bodies or body parts for new automobiles or new light-duty trucks. Spiritwood Energy will not include vehicle surface coating operations.

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Regulatory Citation	Subpart	Title	Facility-wide	Coal Handling	CFB Boiler	Package Boilers	Diesel Engines	Other	Not Applicable	Statement of Applicability
40 CFR 63	JJJJ	National Emission Standards for Hazardous Air Pollutants for Paper and Other Web Surface Coating							X	Applies to paper and web-coating operations. The Spiritwood Energy facility will not include paper and web-coating operations.
40 CFR 63	KKKK	National Emission Standards for Hazardous Air Pollutants for Metal Can Surface Coating							X	Applies to facilities engaged in surface coating of metal cans and ends (including decorative tins) and metal crowns and closures. Spiritwood Energy will not include metal can coating operations.
40 CFR 63	MMMM	National Emission Standards for Hazardous Air Pollutants for Miscellaneous Metal Parts and Products (Surface Coating)							X	Miscellaneous metal parts and products include, but are not limited to, metal components of the following types of products as well as the products themselves: motor vehicle parts and accessories, bicycles and sporting goods, recreational vehicles, extruded aluminum structural components, railroad cars, heavy duty trucks, medical equipment, lawn and garden equipment, electronic equipment, magnet wire, steel drums, industrial machinery, metal pipes, and numerous other industrial, household, and consumer products. Spiritwood Energy will not include metal coating operations.
40 CFR 63	NNNN	National Emission Standards for Hazardous Air Pollutants for Large Appliance Manufacturing							X	Applies to surface coating operations for large appliance manufacturing. The Spiritwood Energy facility is not an appliance manufacturing facility.
40 CFR 63	OOOO	National Emission Standards for Hazardous Air Pollutants for Fabric Printing, Coating & Dyeing							X	Applies to fabric and other textiles printing, coating and dyeing operations. Spiritwood Energy operations will not include fabric and other textiles printing, coating and dyeing.
40 CFR 63	PPPP	National Emission Standards for Hazardous Air Pollutants for Plastic Parts and Products Surface Coating							X	Applies to plastic product coating operations. The Spiritwood Energy facility does not include the coating of plastic products.
40 CFR 63	QQQQ	National Emission Standards for Hazardous Air Pollutants for Wood Building Products							X	Applies to wood building product manufacture at major HAP sources. The Spiritwood Energy facility will not manufacture wood building products.
40 CFR 63	RRRR	National Emission Standards for Hazardous Air Pollutants for Surface Coating of Metal Furniture							X	Applies to any metal furniture coating process at a facility that is a major HAP source. The Spiritwood Energy facility does not include metal furniture coating.
40 CFR 63	SSSS	National Emission Standards for Hazardous Air Pollutants for Surface Coating of Metal Coil							X	Applies to any metal coil coating line at a facility that is a major HAP source. Metal coil means a continuous metal strip that is at least 0.15 millimeter (0.006 inch) thick, which is packaged in a roll or coil prior to coating. Coatings that consist only of solvents, protective oils, acids, bases, or any combination of these substances are not considered coatings for the purposes of this subpart. The Spiritwood Energy facility does not include a coil coating process as defined by Part 63.
40 CFR 63	TTTT	National Emission Standards for Hazardous Air Pollutants for Leather Finishing Operations							X	Applies to leather finishing operations at a major HAP source. The Spiritwood Energy facility does not include leather finishing.
40 CFR 63	UUUU	National Emission Standards for Hazardous Air Pollutants for Cellulose Products Manufacturing							X	Applies to cellulose products manufacturing operations. Spiritwood Energy will not have cellulose operations.

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Regulatory Citation	Subpart	Title	Facility-wide	Coal Handling	CFB Boiler	Package Boilers	Diesel Engines	Other	Not Applicable	Statement of Applicability
40 CFR 63	VVVV	National Emission Standards for Hazardous Air Pollutants for Boat Manufacturing							X	Applies to boat manufacturing facilities. The Spiritwood Energy facility is not a boat manufacturing facility.
41 CFR 63	WWWW	National Emission Standards for Hazardous Air Pollutants for Reinforced Plastic Composites Production							X	Applies to reinforced plastic composites production facilities located at a major source of HAP emissions. Spiritwood Energy will not include reinforced plastic composites manufacturing.
40 CFR 63	XXXX	National Emission Standards for Hazardous Air Pollutants for Tire Manufacturing							X	Applies to tire manufacturing facilities. The Spiritwood Energy facility is not a tire manufacturing facility.
40 CFR 63	YYYY	National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines							X	Applies to stationary combustion turbines located at major sources of HAP emissions; however, the rule as it applies to several subcategories of turbines within this NESHAP category has been stayed. Spiritwood Energy operations will not include combustion turbine units.
40 CFR 63	ZZZZ	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines					X			Applies to stationary reciprocating internal combustion engines (RICE) located at major sources of HAP emissions. Emergency engines are subject to notification requirements only. Spiritwood Energy will have two emergency RICE units - a backup diesel-powered generator and a diesel powered fire-water pump.
40 CFR 63	AAAA	National Emission Standards for Hazardous Air Pollutants for Lime Manufacturing							X	Applies to lime manufacturing plants. Spiritwood Energy will purchase lime from an offsite source for the spray dryer absorber.
40 CFR 63	BBBB	National Emission Standards for Hazardous Air Pollutants for Semiconductor Manufacturing							X	Applies to semiconductor manufacturing processes. The Spiritwood Energy facility will not produce semiconductors.
40 CFR 63	CCCC	National Emission Standards for Hazardous Air Pollutants for Coke Oven: Pushing, Quenching & Battery Stacks							X	Applies to coke oven operations. The Spiritwood Energy facility does not include coke ovens.
40 CFR 63	DDDD	National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters				X				Applies to industrial, commercial, and institutional boilers and process heaters. The CFB Boiler is not subject since it is considered an electric utility steam generating unit. The Spiritwood Energy facility includes three package boilers that are subject to these requirements.
40 CFR 63	EEEE	National Emission Standards for Hazardous Air Pollutants for Iron and Steel Foundries							X	Applies to iron and steel foundries. An iron and steel foundry is defined as a facility or portion of a facility that melts scrap, ingot, and/or other forms of iron and/or steel and pours the resulting molten metal into molds to produce final or near final shape products for introduction into commerce. Research and development facilities and operations that only produce non-commercial castings are not included in this definition. Spiritwood Energy is not a foundry and will not produce commercial castings.
40 CFR 63	FFFF	National Emission Standards for Hazardous Air Pollutants for Integrated Iron & Steel							X	Applies to integrated iron and steel manufacturing facilities, which are defined as establishments engaged in the production of steel from iron ore. The affected sources are each new or existing sinter plant, blast furnace, and basic oxygen process furnace (BOPF) shop. The Spiritwood Energy facility will not include any of the affected sources listed by the standard.

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Regulatory Citation	Subpart	Title	Facility-wide	Coal Handling	CFB Boiler	Package Boilers	Diesel Engines	Other	Not Applicable	Statement of Applicability
40 CFR 63	GGGGG	National Emission Standards for Hazardous Air Pollutants for Remediation Sites							X	Establishes emissions limitations and work practice standards for hazardous air pollutants (HAP) emitted from site remediation activities. The Spiritwood Energy facility is not a remediation project.
40 CFR 63	HHHHH	National Emission Standards for Hazardous Air Pollutants: Miscellaneous Coating Manufacturing							X	Applies to miscellaneous coating manufacturing facilities. Coatings are defined as any materials such as paint, ink, or adhesive that are intended to be applied to a substrate. Spiritwood Energy will not manufacture miscellaneous coatings.
40 CFR 63	IIIII	National Emission Standards for Hazardous Air Pollutants for Mercury-Cell Chlor-Alkali Plants							X	Applies to affected sources of mercury emissions at mercury cell chlor-alkali plants. Spiritwood Energy is not a chlor-alkali facility.
40 CFR 63	JJJJJ	National Emission Standards for Hazardous Air Pollutants for Brick and Structural Clay Products Manufacturing.							X	Applies to clay products manufacturing facilities. The Spiritwood Energy facility will not manufacture clay products.
40 CFR 63	KKKKK	National Emission Standards for Hazardous Air Pollutants for Clay Ceramics Manufacturing							X	Applies to clay ceramics manufacturing. The Spiritwood Energy facility will not be a clay ceramics manufacturing facility.
40 CFR 63	LLLLL	National Emission Standards for Hazardous Air Pollutants for Asphalt Roofing & Processing							X	Applies to asphalt roofing manufacture and processing. The Spiritwood Energy facility will not produce asphalt roofing products.
40 CFR 63	MMMMM	National Emission Standards for Hazardous Air Pollutants for Flexible Polyurethane Foam Production							X	Applies to a plant site that is a major HAP source where pieces of flexible polyurethane foam are bonded together or to other substrates using HAP-based adhesives or flame lamination. The Spiritwood Energy facility will not process polyurethane foam.
40 CFR 63	NNNNN	National Emission Standards for Hazardous Air Pollutants for Hydrochloric Acid Production							X	Applies to hydrochloric acid production processes. The Spiritwood Energy facility will not produce hydrochloric acid.
40 CFR 63	PPPPP	National Emission Standards for Hazardous Air Pollutants for Engine Test Cells/Stands							X	Applies to engine test cells and stands. The Spiritwood Energy facility does not include engine test cells and stands.
40 CFR 63	QQQQQ	National Emission Standards for Hazardous Air Pollutants for Friction Products Manufacturing							X	Applies to any facility engaged in the manufacture of friction materials such as brake and clutch linings. The Spiritwood Energy facility will not manufacture friction materials.
40 CFR 63	RRRRR	National Emission Standards for Hazardous Air Pollutants for Taconite Ore Processing							X	Applies to taconite iron ore processing plants. The Spiritwood Energy facility does not include a taconite plant.
40 CFR 63	SSSSS	National Emission Standards for Hazardous Air Pollutants for Refractory Products Manufacturing							X	Applies to facilities that manufacture refractory products. The Spiritwood Energy facility will not manufacture refractory materials.
40 CFR 63	TTTTT	National Emission Standards for Hazardous Air Pollutants for Primary Magnesium Refining							X	Applies to facilities that engaged in primary magnesium production. The Spiritwood Energy facility will not produce magnesium materials.
40 CFR 64	---	COMPLIANCE ASSURANCE MONITORING FOR MAJOR STATIONARY SOURCES		X						The requirements of this part apply to a pollutant-specific emissions unit at a major source that is required to obtain a part 70 or 71 permit if the unit satisfies several criteria. The coal unloading and coal silo activities are subject to CAM for particulate matter emissions.

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Regulatory Citation	Subpart	Title	Facility-wide	Coal Handling	CFB Boiler	Package Boilers	Diesel Engines	Other	Not Applicable	Statement of Applicability
40 CFR 65	---	CONSOLIDATED FEDERAL AIR RULE							X	This part describes the standards and procedures under which EPA will approve State programs for administering the noncompliance penalty program under section 120 of the Clean Air Act and will evaluate actions taken by States with approved programs. There are no direct requirements for operating facilities in this part.
40 CFR 66	---	ASSESSMENT AND COLLECTION OF NONCOMPLIANCE PENALTIES BY EPA							X	This part sets forth EPA procedure for the assessment by EPA of a noncompliance penalty as provided by section 120 of the Clean Air Act. This penalty is designed to recover the economic advantage which might otherwise accrue to a source by reason of its failure to comply with air pollution control standards after receipt of a notice of noncompliance. There are no direct requirements for operating facilities in this part.
40 CFR 67	---	EPA APPROVAL OF STATE NONCOMPLIANCE PENALTY PROGRAM							X	This part describes the standards and procedures under which EPA will approve State programs for administering the noncompliance penalty program under section 120 of the Clean Air Act and will evaluate actions taken by States with approved programs. There are no direct requirements for operating facilities in this part.
40 CFR 68	---	CHEMICAL ACCIDENT PREVENTION PROVISIONS							X	This Part sets forth the list of regulated substances and thresholds, the petition process for adding or deleting substances to the list of regulated substances, the requirements for owners or operators of stationary sources concerning the prevention of accidental releases, and the State accidental release prevention programs approved under section 112(r). Spiritwood Energy expects to use aqueous ammonia in a concentration less than the regulated threshold of 20%. Propane at the site will be used for fuel and is categorically exempt under the RMP rule. Therefore, the requirements of the RMP will not apply.
40 CFR 69	---	SPECIAL EXEMPTIONS FROM REQUIREMENTS OF THE CLEAN AIR ACT							X	The Spiritwood Energy facility is not located in Guam, American Samoa, Commonwealth of Northern Mariana Islands, the U.S. Virgin Islands or Alaska.
40 CFR 70	---	STATE OPERATING PERMIT PROGRAMS	X							The regulations in this part provide for the establishment of comprehensive State air quality permitting systems consistent with the requirements of title V of the Clean Air Act (Act) (42 U.S.C. 7401, et seq.). The Spiritwood Energy facility will be obtaining an operating permit via North Dakota's federally-approved air permit program.
40 CFR 71	---	FEDERAL OPERATING PERMIT PROGRAMS							X	This part sets forth the comprehensive Federal air quality operating permits permitting program consistent with the requirements of title V of the Act (42 U.S.C. 7401 et seq.) and defines the requirements and the corresponding standards and procedures by which the US EPA will issue operating permits for those sources not administered by a state under Part 70. The Spiritwood Energy facility will be permitted by the North Dakota air program approved under Part 70, therefore the provisions for EPA-administered permitting under Part 71 will not be used.
40 CFR 72	---	PERMITS	X							This part establishes general provisions and the operating permit program requirements for affected sources and affected units under the Acid Rain Program, pursuant to title IV of the Clean Air Act. As a new utility unit that will sell more than one-third its potential electrical output capacity and more than 25 MWe to any utility power distribution system, Spiritwood Energy qualifies and is subject to Acid Rain Provisions.

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Regulatory Citation	Subpart	Title	Facility-wide	Coal Handling	CFB Boiler	Package Boilers	Diesel Engines	Other	Not Applicable	Statement of Applicability
40 CFR 73	---	SULFUR DIOXIDE ALLOWANCE SYSTEM	X							Owners, operators, and designated representatives of affected units pursuant to §72.6 of this chapter are subject to the SO2 allowance requirements of this Part. Spiritwood Energy is subject to Acid Rain Provisions and therefore subject to this part.
40 CFR 74	---	SULFUR DIOXIDE OPT-INS							X	Combustion or process sources that are not affected units under §72.6 of this chapter and that are operating and are located in the 48 contiguous States or the District of Columbia may submit an opt-in permit application. Since Spiritwood Energy is already subject to the Acid Rain Provisions, it cannot opt-in.
40 CFR 75	---	CONTINUOUS EMISSION MONITORING	X							This part establishes the requirements for the monitoring, recordkeeping, and reporting of sulfur dioxide (SO2), nitrogen oxides (NOX), and carbon dioxide (CO2) emissions, volumetric flow, and opacity data from affected units under the Acid Rain Program. Since Spiritwood Energy is subject to the Acid Rain Provisions, it is subject to this part.
40 CFR 76	---	ACID RAIN NITROGEN OXIDES EMISSION REDUCTION PROGRAM							X	The provisions apply to each coal-fired utility unit that is subject to an Acid Rain emissions limitation or reduction requirement for SO2 under Phase I or Phase II. Spiritwood Energy is not one of these facilities.
40 CFR 77	---	EXCESS EMISSIONS							X	These excess emissions offset planning and offset penalty requirements apply to the owners and operators of each affected unit and affected source under the Acid Rain Program. The Spiritwood facility will be subject to these requirements if it has SO2 emissions in excess of regulatory limits. Currently Spiritwood is not projecting excess SO2 emissions.
40 CFR 78	---	APPEAL PROCEDURES FOR ACID RAIN PROGRAM							X	This part provides for appeals of any final decision of the Administrator under parts 72, 73, 74, 75, 76, and 77 of this chapter. This part will apply if the Spiritwood Energy facility wishes to appeal any decision made by the Administrator.
40 CFR 79	---	REGISTRATION OF FUELS AND FUEL ADDITIVES							X	The regulations of this part apply to the registration of fuels and fuel additives designated by the Administrator. Spiritwood is not seeking to register a fuel or fuel additive.
40 CFR 80	---	REGULATION OF FUELS AND FUEL ADDITIVES							X	This part prescribes regulations for the control and/or prohibition of fuels and additives for use in motor vehicles and motor vehicle engines. Spiritwood Energy is not seeking to register a fuel or fuel additive.
40 CFR 81	---	EPA REGULATIONS DESIGNATING AREAS FOR AIR QUALITY PLANNING							X	Air quality control regions designated by the Administrator pursuant to section 107 of the Act are listed in this subpart. There are no direct requirements in this Part.
40 CFR 82	---	PROTECTION OF STRATOSPHERIC OZONE							X	The regulations in this subpart implement the Montreal Protocol on Substances that Deplete the Ozone Layer and sections 602, 603, 604, 605, 606, 607, 614 and 616 of the Clean Air Act Amendments of 1990, Public Law 101-549. The Protocol and section 604 impose limits on the production and consumption (defined as production plus imports minus exports, excluding transshipments and used controlled substances) of certain ozone-depleting substances, according to specified schedules. The Spiritwood Energy facility will not include ozone-depleting substances nor will the facility import/export controlled products.

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Regulatory Citation	Subpart	Title	Facility-wide	Coal Handling	CFB Boiler	Package Boilers	Diesel Engines	Other	Not Applicable	Statement of Applicability
40 CFR 83	---	[Reserved/Not in Use]							X	
40 CFR 84	---	[Reserved/Not in Use]							X	
40 CFR 85	---	CONTROL OF AIR POLLUTION FROM MOBILE SOURCES							X	These regulations do not directly apply to a stationary industrial source.
40 CFR 86	---	CONTROL OF EMISSIONS FROM NEW AND IN-USE HIGHWAY VEHICLES AND ENGINES							X	This part regulates highway vehicle emissions. The Spiritwood Energy facility does not include highway vehicle or engine manufacturing.
40 CFR 87	---	CONTROL OF AIR POLLUTION FROM AIRCRAFT AND AIRCRAFT ENGINES							X	This part regulates aircraft emissions. The Spiritwood Energy facility does not include aircraft.
40 CFR 88	---	CLEAN—FUEL VEHICLES							X	The motor vehicle emission standards of this part do not affect the Spiritwood Energy facility, as its vehicles are not part of the Clean Fuel Fleet Program or the California Pilot Test Program.
40 CFR 89	---	CONTROL OF EMISSIONS FROM NEW AND IN-USE NONROAD COMPRESSION-IGNITION ENGINES							X	The engine emission standards of this part apply to non-road compression ignition engine manufacturers. The Spiritwood Energy facility does not include the manufacture of engines.
40 CFR 90	---	CONTROL OF EMISSIONS FROM NONROAD SPARK-IGNITION ENGINES AT OR BELOW 19 KILOWATTS							X	The engine emission standards of this part apply to spark ignition engine manufacturers. The Spiritwood Energy facility does not include the manufacture of engines.
40 CFR 91	---	CONTROL OF EMISSIONS FROM MARINE SPARK-IGNITION ENGINES							X	The engine emission standards of this part apply to spark ignition marine engine manufacturers. The Spiritwood Energy facility does not include the manufacture of engines.
40 CFR 92	---	CONTROL OF AIR POLLUTION FROM LOCOMOTIVES AND LOCOMOTIVE ENGINES							X	The Spiritwood Energy facility does not manufacture, remanufacture, own, or operate locomotives.
40 CFR 93	---	DETERMINING CONFORMITY OF FEDERAL ACTIONS TO STATE OR FEDERAL IMPLEMENTATION PLANS							X	Subpart B of this part establishes the conformity with Federal criteria for state implementation plans. Because these are state agency and government requirements, there are no direct requirements for Spiritwood Energy in this part.
40 CFR 94	---	CONTROL OF EMISSIONS FROM MARINE COMPRESSION - IGNITION ENGINES							X	The Spiritwood Energy facility does not manufacture, rebuild, own, or operate marine engines or marine vessels.
40 CFR 95	---	MANDATORY PATENT LICENSES							X	This part establishes patent license application procedure if the subject of the patent is needed to comply with limitations in Sections 111, 112 or 202 of the Act. The Spiritwood Energy facility is not anticipating the need for a patent license application in order to comply with the Clean Air Act.
40 CFR 96	---	NO _x BUDGET TRADING PROGRAM FOR STATE IMPLEMENTATION PLANS							X	This part establishes general provisions and the applicability, permitting, allowance, excess emissions, monitoring, and opt-in provisions for the NO _x Budget Trading Program for State implementation plans. Spiritwood Energy is not a government agency charged with administering a NO _x budget program.
40 CFR 97	---	FEDERAL NO _x BUDGET TRADING PROGRAM							X	This part establishes the Administrator's approval and disapproval of State NO _x budget plans and the Administrator's promulgation of such plans. Spiritwood Energy is not administering a NO _x budget program.

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Regulatory Citation	Subpart	Title	Facility-wide	Coal Handling	CFB Boiler	Package Boilers	Diesel Engines	Other	Not Applicable	Statement of Applicability
North Dakota APC Rules	Chapter 33-15-01	General Provisions	X							Topics covered: entry onto premises - authority, variances, circumvention, severability, land use plans and zoning regulations, measurement of air contaminants, shutdown and malfunction of an installation - requirements for notification, time schedule for compliance, prohibition of air pollution, confidentiality of records, enforcement, and compliance certifications.
North Dakota APC Rules	Chapter 33-15-02	Ambient Air Quality Standards	X							It is the purpose of these air quality standards to set forth levels of air quality for the maintenance of public health and welfare and to provide guidance to governmental and other parties interested in abating air pollution. Spiritwood Energy is required to meet the AAQS as outlined in this chapter. Modeling may be required as a function of the 2/15/05 NDDH policy memorandum mandating dispersion modeling for projects that exceed the PSD significant emission rates.
North Dakota APC Rules	Chapter 33-15-03	Restriction of Emission of Visible Air Contaminants	X							No person may discharge into the ambient air from any single source of emission whatsoever any air contaminant which exhibits an opacity greater than twenty percent except that a maximum of forty percent opacity is permissible for not more than one six-minute period per hour. All sources at Spiritwood Energy are subject to this chapter.
North Dakota APC Rules	Chapter 33-15-04	Open Burning							X	No person may dispose of refuse and other combustible material by open burning, or cause, allow, or permit open burning of refuse and other combustible material, except as provided for in section 33-15-04-02 or 33-15-10-02, and no person may conduct, cause, or permit the conduct of a salvage operation by open burning. Spiritwood Energy will not conduct open burning at the facility.
North Dakota APC Rules	Chapter 33-15-05	Emissions of Particulate Matter Restricted		X	X	X	X			This section applies to any operation, process, or activity from which particulate matter is emitted. For the Spiritwood Energy facility, Subsection 01 is applicable to the coal handling emission sources and the diesel engines; and Subsection 02 is applicable to the boilers.
North Dakota APC Rules	Chapter 33-15-06	Emissions of Sulfur Compounds Restricted							X	This section applies to any installation in which fuel is burned and in which the sulfur dioxide emissions are substantially due to the content of the fuel burned, and in which the fuel is burned primarily to produce heat. This chapter does not apply to installations which are subject to a sulfur dioxide emission limit under chapter 33-15-12. These are the NSPS standards, and Spiritwood Energy has SO2 limits on the CFB Boiler and Package Boilers under Subpart Da and Db. Therefore Spiritwood Energy is exempt from this Chapter.
North Dakota APC Rules	Chapter 33-15-07	Control of Organic Compounds Emissions						X		This chapter establishes requirements for organic compound facilities. VOC-water separators handling more than 200 gallons per day of a volatile organic liquid must be equipped with a closed-vent system and control device. Tanks must be constructed with a submerged fill pipe during filling operations or the tank must be a pressure tank, or fitted with vapor recovery system. All rotating pumps & compressors handling VOC must be equipped and operated with properly maintained seals designed for their specific product service and operating condition. For the Spiritwood Energy facility, these requirements apply to the oil-water separator and various pumps.

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Regulatory Citation	Subpart	Title	Facility-wide	Coal Handling	CFB Boiler	Package Boilers	Diesel Engines	Other	Not Applicable	Statement of Applicability
North Dakota APC Rules	Chapter 33-15-08	Control of Air Pollution from Vehicles and other Internal Combustion Engines					X	X		No person shall operate, or cause to be operated, any internal combustion engine which emits from any source any unreasonable and excessive smoke, obnoxious or noxious gases, fumes or vapor. Spiritwood Energy's diesel engines and vehicles will be subject to this chapter.
North Dakota APC Rules	Chapter 33-15-09	Emission of Certain Settleable Acids and Alkaline Substances Restricted [Repealed]							X	Repealed
North Dakota APC Rules	Chapter 33-15-10	Control of Pesticides							X	Spiritwood Energy will not use or permit the use of pesticides at the facility.
North Dakota APC Rules	Chapter 33-15-11	Prevention of Air Pollution Emergency Episodes	X							When an air pollution emergency episode is declared by the Department, the permittee shall comply with the requirements in NDAC 33-15-11 of the ND APC rules. The permittee shall prepare an air pollution abatement strategy in accordance with 33-15-11-04.
North Dakota APC Rules	Chapter 33-15-12	Standards of Performance for New Stationary Sources		X	X	X	X			Spiritwood Energy is subject to NSPS Subparts Da, Kb, Y, HHHH and IIII as indicated in the Federal rules section above. North Dakota's rules contain some variations from federal rules; however none of them affect Spiritwood Energy.
North Dakota APC Rules	Chapter 33-15-13	Emission Standards for Hazardous Air Pollutants							X	The Spiritwood Energy facility is not subject to any of the Part 61 standards and not subject to these rules
North Dakota APC Rules	Chapter 33-15-14	Designated Air Contaminant Sources, Permit to Construct, Minor Source Permit to Operate, Title V Permit to Operate	X							Spiritwood Energy will be required to submit a permit to construct application for the proposed plant. A thirty-day notice prior to proposed startup is required to be submitted to satisfy the requirement to apply for a permit to operate under this subdivision.
North Dakota APC Rules	Chapter 33-15-15	Prevention of Significant Deterioration of Air Quality	X							Since Spiritwood Energy is subject to the federal PSD rules, it is also subject to these rules. North Dakota's rules contain some variations from federal rules.
North Dakota APC Rules	Chapter 33-15-16	Restriction of Odorous Air Contaminants	X							This chapter restricts discharging into the atmosphere any objectionable odorous contaminant that exceeds the standards in this chapter. Spiritwood Energy is subject to the provisions of this chapter.
North Dakota APC Rules	Chapter 33-15-17	Restriction of Fugitive Emissions						X		This chapter sets restrictions on fugitives and requires reasonable precautions to prevent emissions from causing air pollution. The fugitive emissions from the facility can not exceed AAQS or the restrictions of visible air contaminants at or beyond property line. Spiritwood Energy is subject to the provisions of this chapter.
North Dakota APC Rules	Chapter 33-15-18	Stack Heights	X							Spiritwood Energy will be required to comply with the provisions of this chapter in regards to stack height.
North Dakota APC Rules	Chapter 33-15-19	Visibility Protection	X							The provisions of this chapter apply to the owner or operator of a major stationary source or major modification, whose construction or modification is commenced after August 12, 1985. Spiritwood will be required to comply with these provisions.
North Dakota APC Rules	Chapter 33-15-20	Control of Emissions from Oil and Gas Well Production Facilities							X	Spiritwood Energy is not an oil or gas well production facility.

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North Dakota APC Rules	Chapter 33-15-21	Acid Rain Program	X							Since Spiritwood is subject to the federal Acid Rain Provisions, it is subject to the provisions of this chapter. North Dakota's rules incorporate the federal Acid Rain Provisions.
North Dakota APC Rules	Chapter 33-15-22	Emissions Standards for Hazardous Air Pollutants for Source Categories				X	X			Spiritwood Energy will be subject to NESHAP Subparts ZZZZ and DDDDD as indicated in the Federal rules section above. North Dakota has adopted Subpart DDDD without variation from Federal rules. Subpart ZZZZ is not yet adopted as of January, 2007.
North Dakota APC Rules	Chapter 33-15-23	Fees	X							Spiritwood Energy will be responsible for various fees. These include a \$150 filing fee for construction permit applications, plus any additional fees based on actual processing costs. An annual operating permit fee of \$519 is also applicable. Major sources are also subject to fees based on actual annual emissions of regulated contaminants.
North Dakota APC Rules	Chapter 33-15-24	Standards for Lead-Based Paint Activities							X	Spiritwood Energy will not perform lead-based paint activities.

Appendix C
Emission Calculations and TANKS Report

**Table C-1
Spiritwood Station
Limited Potential to Emit by Source**

EPN #	Emission Unit ID	Source Description	PM tons/year	PM10 tons/year	SO2 tons/year	NOx tons/year	VOC tons/year	CO tons/year
001	EUI 001	Main Stack - CFB Boiler / Start-up Burners	84.0	168.0	336.1	504.1	39.2	840.1
002	EUI 002	Coal Unloading	18.0	18.0				
003	EUI 003	Coal Silo	1.6	1.6				
004	EUI 004	Coal Silo Discharge	0.4	0.4				
005	EUI 005	Coal Bunker	0.9	0.9				
006	EUI 006	Limestone Unloading / Limestone Silo	0.7	0.7				
007	EUI 007	Lime Unloading / Lime Silo	0.8	0.8				
008	EUI 008	Bed Material Silo	0.5	0.5				
009	EUI 009	Recycle Ash Silo	0.3	0.3				
010	EUI 010	Ash Silo	0.6	0.6				
011	EUI 011	Ash Loadout	0.2	0.2				
012		Reserved						
013		Reserved						
014	EUI 012	Package Boiler 1	35.4	35.4	60.2	153.5	6.2	98.5
014	EUI 013	Package Boiler 2	35.4	35.4	60.2	153.5	6.2	98.5
014	EUI 014	Package Boiler 3	35.4	35.4	60.2	153.5	6.2	98.5
015	EUI 015	Diesel Fire Water Pump	0.2	0.2	0.2	2.7		0.6
016	EUI 016	Cooling Tower	5.3	5.3				
017	EUI 017	Propane Vaporizer	0.4	0.4	1.3	2.6		5.1
018	EUI 018	Diesel Generator	0.2	0.2	0.1	8.4		1.9
002	EUI 022	Rail Car NG/Propane Heaters	0.5	0.5	1.2	11.4	0.3	5.0
N/A	IA	Space Heaters (12 Combined) - NG Fired	0.02	0.02	0.001	0.46	0.01	0.20
Fugitive Emissions								
Fugitives	IA	Paved Road Emissions	0.03	0.003				
	IA	Equipment Leaks					1.0	
Tank Emissions								
Tanks	EUI 19	Package Boiler Fuel Oil Tank (500,000 gal)					0.14	
	EUI 20	Fire Pump Diesel Storage Tank (500 gal)					4.0E-05	
	EUI 21	Emerg. Generator Diesel Tank (500 gal)					6.5E-05	
TOTAL			220.9	304.9	519.5	990.1	59.2	1,148.5

Table C-2
Spiritwood Station
Emission Calculations by Unit

Emission Unit ID	Unit Name	Emission Point (EPN)	Pollutant	Maximum Rate (units/hr)	Emission Factor (lb/units) (Ref.No.)	Emission Rate (lb/hr)	Uncontrolled Potential to Emit (PTE) (ton/yr)	Pollution Control Efficiency (%)	Controlled Potential to Emit (PTE) (ton/yr)	Estimated Operating Hours (hr/yr)	Limited VOC Potential to Emit (PTE) (ton/yr)	Estimated Actual Emissions (ton/yr)		
EUI 001	CFB Boiler Baghouse	001	PM10	16768049	ft ³ /hr	2.3E-04	BACT Att A	3.8E+03	1.7E+04	99	1.7E+02	8760	1.7E+02	1.7E+02
EUI 001	CFB Boiler Baghouse	001	Total PM	16768049	ft ³ /hr	1.1E-04	BACT Att A	1.9E+03	8.4E+03	99	8.4E+01	8760	8.4E+01	8.4E+01
EUI 002	Coal Unloading Baghouse	002	PM10	5760000	ft ³ /hr	7.1E-05	30	4.1E+02	1.8E+03	99	1.8E+01	8760	1.8E+01	1.8E+01
EUI 002	Coal Unloading Baghouse	002	Total PM	5760000	ft ³ /hr	7.1E-05	30	4.1E+02	1.8E+03	99	1.8E+01	8760	1.8E+01	1.8E+01
EUI 003	Coal Silo Bin Vent	003	PM10	510000	ft ³ /hr	7.1E-05	30	3.6E+01	1.6E+02	99	1.6E+00	8760	1.6E+00	1.6E+00
EUI 003	Coal Silo Bin Vent	003	Total PM	510000	ft ³ /hr	7.1E-05	30	3.6E+01	1.6E+02	99	1.6E+00	8760	1.6E+00	1.6E+00
EUI 004	Coal Silo Discharge Baghouse	004	PM10	132000	ft ³ /hr	7.1E-05	30	9.4E+00	4.1E+01	99	4.1E-01	8760	4.1E-01	4.1E-01
EUI 004	Coal Silo Discharge Baghouse	004	Total PM	132000	ft ³ /hr	7.1E-05	30	9.4E+00	4.1E+01	99	4.1E-01	8760	4.1E-01	4.1E-01
EUI 005	Coal Bunker Baghouse	005	PM10	300000	ft ³ /hr	7.1E-05	30	2.1E+01	9.4E+01	99	9.4E-01	8760	9.4E-01	9.4E-01
EUI 005	Coal Bunker Baghouse	005	Total PM	300000	ft ³ /hr	7.1E-05	30	2.1E+01	9.4E+01	99	9.4E-01	8760	9.4E-01	9.4E-01
EUI 006	Limestone Silo Bin Vent	006	PM10	210000	ft ³ /hr	7.1E-05	30	1.5E+01	6.6E+01	99	6.6E-01	8760	6.6E-01	6.6E-01
EUI 006	Limestone Silo Bin Vent	006	Total PM	210000	ft ³ /hr	7.1E-05	30	1.5E+01	6.6E+01	99	6.6E-01	8760	6.6E-01	6.6E-01
EUI 007	Lime Silo Bin Vent	007	PM10	240000	ft ³ /hr	7.1E-05	30	1.7E+01	7.5E+01	99	7.5E-01	8760	7.5E-01	7.5E-01
EUI 007	Lime Silo Bin Vent	007	Total PM	240000	ft ³ /hr	7.1E-05	30	1.7E+01	7.5E+01	99	7.5E-01	8760	7.5E-01	7.5E-01
EUI 008	Bed Material Silo Bin Vent	008	PM10	168000	ft ³ /hr	7.1E-05	30	1.2E+01	5.3E+01	99	5.3E-01	8760	5.3E-01	5.3E-01
EUI 008	Bed Material Silo Bin Vent	008	Total PM	168000	ft ³ /hr	7.1E-05	30	1.2E+01	5.3E+01	99	5.3E-01	8760	5.3E-01	5.3E-01
EUI 009	Recycle Ash Silo Bin Vent	009	PM10	90000	ft ³ /hr	7.1E-05	30	6.4E+00	2.8E+01	99	2.8E-01	8760	2.8E-01	2.8E-01
EUI 009	Recycle Ash Silo Bin Vent	009	Total PM	90000	ft ³ /hr	7.1E-05	30	6.4E+00	2.8E+01	99	2.8E-01	8760	2.8E-01	2.8E-01
EUI 010	Ash Silo Filter-Receiver	010	PM10	192000	ft ³ /hr	7.1E-05	30	1.4E+01	6.0E+01	99	6.0E-01	8760	6.0E-01	6.0E-01
EUI 010	Ash Silo Filter-Receiver	010	Total PM	192000	ft ³ /hr	7.1E-05	30	1.4E+01	6.0E+01	99	6.0E-01	8760	6.0E-01	6.0E-01
EUI 011	Ash Loadout Spout Baghouse	011	PM10	48000	ft ³ /hr	7.1E-05	30	3.4E+00	1.5E+01	99	1.5E-01	8760	1.5E-01	1.5E-01
EUI 011	Ash Loadout Spout Baghouse	011	Total PM	48000	ft ³ /hr	7.1E-05	30	3.4E+00	1.5E+01	99	1.5E-01	8760	1.5E-01	1.5E-01
EUI 001	CFB Boiler	001	PM10	85.25	tph coal	0.45	15, 22	3.8E+01	1.7E+02	[1]	1.7E+02	8760	1.7E+02	1.7E+02
EUI 001	CFB Boiler	001	Total PM	85.25	tph coal	0.23	15, 22	1.9E+01	8.4E+01	[1]	8.4E+01	8760	8.4E+01	8.4E+01
EUI 001	CFB Boiler	001	Total VOC	85.25	tph coal	1.1E-01	15, 22	9.0E+00	3.9E+01	0	3.9E+01	8760	3.9E+01	3.9E+01
EUI 001	CFB Boiler	001	Carbon Monoxide	85.25	tph coal	2.25	15, 22	1.9E+02	8.4E+02	0	8.4E+02	8760	8.4E+02	8.4E+02
EUI 001	CFB Boiler	001	Sulfur Dioxide	85.25	tph coal	11.30	11	9.6E+02	4.2E+03	92.0	3.4E+02	8760	3.4E+02	3.4E+02
EUI 001	CFB Boiler	001	Nitrogen Oxides	85.25	tph coal	3.60	11	3.1E+02	1.3E+03	62.5	5.0E+02	8760	5.0E+02	5.0E+02
EUI 001	CFB Boiler	001	Lead	85.25	tph coal	4.2E-02	14	3.6E+00	1.6E+01	99	1.6E-01	8760	1.6E-01	1.6E-01
EUI 001	CFB Boiler	001	Biphenyl	85.25	tph coal	1.7E-06	12	1.4E-04	6.3E-04	0	6.3E-04	8760	6.3E-04	6.3E-04
EUI 001	CFB Boiler	001	Benzo(a)anthracene	85.25	tph coal	8.0E-08	12	6.8E-06	3.0E-05	0	3.0E-05	8760	3.0E-05	3.0E-05
EUI 001	CFB Boiler	001	Benzo(a)pyrene	85.25	tph coal	3.8E-08	12	3.2E-06	1.4E-05	0	1.4E-05	8760	1.4E-05	1.4E-05
EUI 001	CFB Boiler	001	Benzo(b,j,k)fluoranthene	85.25	tph coal	1.1E-07	12	9.4E-06	4.1E-05	0	4.1E-05	8760	4.1E-05	4.1E-05
EUI 001	CFB Boiler	001	Chrysene	85.25	tph coal	1.0E-07	12	8.5E-06	3.7E-05	0	3.7E-05	8760	3.7E-05	3.7E-05
EUI 001	CFB Boiler	001	Indeno(1,2,3-cd)pyrene	85.25	tph coal	6.1E-08	12	5.2E-06	2.3E-05	0	2.3E-05	8760	2.3E-05	2.3E-05
EUI 001	CFB Boiler	001	5-Methyl chrysene	85.25	tph coal	2.2E-08	12	1.9E-06	8.2E-06	0	8.2E-06	8760	8.2E-06	8.2E-06
EUI 001	CFB Boiler	001	Naphthalene	85.25	tph coal	1.3E-05	12	1.1E-03	4.9E-03	0	4.9E-03	8760	4.9E-03	4.9E-03
EUI 001	CFB Boiler	001	Acetaldehyde	85.25	tph coal	5.7E-04	13	4.9E-02	2.1E-01	0	2.1E-01	8760	2.1E-01	2.1E-01
EUI 001	CFB Boiler	001	Acetophenone	85.25	tph coal	1.5E-05	13	1.3E-03	5.6E-03	0	5.6E-03	8760	5.6E-03	5.6E-03
EUI 001	CFB Boiler	001	Acrolein	85.25	tph coal	2.9E-04	13	2.5E-02	1.1E-01	0	1.1E-01	8760	1.1E-01	1.1E-01
EUI 001	CFB Boiler	001	Benzene	85.25	tph coal	1.3E-03	13	1.1E-01	4.9E-01	0	4.9E-01	8760	4.9E-01	4.9E-01
EUI 001	CFB Boiler	001	Benzyl chloride	85.25	tph coal	7.0E-04	13	6.0E-02	2.6E-01	0	2.6E-01	8760	2.6E-01	2.6E-01
EUI 001	CFB Boiler	001	Bis(2-ethylhexyl)phthalate (DEHP)	85.25	tph coal	7.3E-05	13	6.2E-03	2.7E-02	0	2.7E-02	8760	2.7E-02	2.7E-02
EUI 001	CFB Boiler	001	Bromoform	85.25	tph coal	3.9E-05	13	3.3E-03	1.5E-02	0	1.5E-02	8760	1.5E-02	1.5E-02
EUI 001	CFB Boiler	001	Carbon disulfide	85.25	tph coal	1.3E-04	13	1.1E-02	4.9E-02	0	4.9E-02	8760	4.9E-02	4.9E-02
EUI 001	CFB Boiler	001	2-Chloroacetophenone	85.25	tph coal	7.0E-06	13	6.0E-04	2.6E-03	0	2.6E-03	8760	2.6E-03	2.6E-03
EUI 001	CFB Boiler	001	Chlorobenzene	85.25	tph coal	2.2E-05	13	1.9E-03	8.2E-03	0	8.2E-03	8760	8.2E-03	8.2E-03
EUI 001	CFB Boiler	001	Chloroform	85.25	tph coal	5.9E-05	13	5.0E-03	2.2E-02	0	2.2E-02	8760	2.2E-02	2.2E-02
EUI 001	CFB Boiler	001	Cumene	85.25	tph coal	5.3E-06	13	4.5E-04	2.0E-03	0	2.0E-03	8760	2.0E-03	2.0E-03
EUI 001	CFB Boiler	001	Cyanide compounds	85.25	tph coal	2.5E-03	13	2.1E-01	9.3E-01	0	9.3E-01	8760	9.3E-01	9.3E-01
EUI 001	CFB Boiler	001	2,4-Dinitrotoluene	85.25	tph coal	2.8E-07	13	2.4E-05	1.0E-04	0	1.0E-04	8760	1.0E-04	1.0E-04
EUI 001	CFB Boiler	001	Dimethyl sulfate	85.25	tph coal	4.8E-05	13	4.1E-03	1.8E-02	0	1.8E-02	8760	1.8E-02	1.8E-02
EUI 001	CFB Boiler	001	Ethyl benzene	85.25	tph coal	9.4E-05	13	8.0E-03	3.5E-02	0	3.5E-02	8760	3.5E-02	3.5E-02
EUI 001	CFB Boiler	001	Ethyl chloride	85.25	tph coal	4.2E-05	13	3.6E-03	1.6E-02	0	1.6E-02	8760	1.6E-02	1.6E-02
EUI 001	CFB Boiler	001	Ethylene dichloride	85.25	tph coal	4.0E-05	13	3.4E-03	1.5E-02	0	1.5E-02	8760	1.5E-02	1.5E-02
EUI 001	CFB Boiler	001	Ethylene dibromide	85.25	tph coal	1.2E-06	13	1.0E-04	4.5E-04	0	4.5E-04	8760	4.5E-04	4.5E-04
EUI 001	CFB Boiler	001	Formaldehyde	85.25	tph coal	2.4E-04	13	2.0E-02	9.0E-02	0	9.0E-02	8760	9.0E-02	9.0E-02
EUI 001	CFB Boiler	001	Hexane	85.25	tph coal	6.7E-05	13	5.7E-03	2.5E-02	0	2.5E-02	8760	2.5E-02	2.5E-02
EUI 001	CFB Boiler	001	Isophorone	85.25	tph coal	5.8E-04	13	4.9E-02	2.2E-01	0	2.2E-01	8760	2.2E-01	2.2E-01

Table C-2
Spiritwood Station
Emission Calculations by Unit

Emission Unit ID	Unit Name	Emission Point (EPN)	Pollutant	Maximum Rate (units/hr)	Emission Factor (lb/units) (Ref.No.)	Emission Rate (lb/hr)	Uncontrolled Potential to Emit (PTE) (ton/yr)	Pollution Control Efficiency (%)	Controlled Potential to Emit (PTE) (ton/yr)	Estimated Operating Hours (hr/yr)	Limited VOC Potential to Emit (PTE) (ton/yr)	Estimated Actual Emissions (ton/yr)
EUI 001	CFB Boiler	001	Methyl bromide	85.25	tph coal 1.6E-04 13	1.4E-02	6.0E-02	0	6.0E-02	8760	6.0E-02	6.0E-02
EUI 001	CFB Boiler	001	Methyl chloride	85.25	tph coal 5.3E-04 13	4.5E-02	2.0E-01	0	2.0E-01	8760	2.0E-01	2.0E-01
EUI 001	CFB Boiler	001	Methyl ethyl ketone	85.25	tph coal 3.9E-04 13	3.3E-02	1.5E-01	0	1.5E-01	8760	1.5E-01	1.5E-01
EUI 001	CFB Boiler	001	Methyl hydrazine	85.25	tph coal 1.7E-04 13	1.4E-02	6.3E-02	0	6.3E-02	8760	6.3E-02	6.3E-02
EUI 001	CFB Boiler	001	Methyl methacrylate	85.25	tph coal 2.0E-05 13	1.7E-03	7.5E-03	0	7.5E-03	8760	7.5E-03	7.5E-03
EUI 001	CFB Boiler	001	Methyl tert butyl ether	85.25	tph coal 3.5E-05 13	3.0E-03	1.3E-02	0	1.3E-02	8760	1.3E-02	1.3E-02
EUI 001	CFB Boiler	001	Methylene chloride	85.25	tph coal 2.9E-04 13	2.5E-02	1.1E-01	0	1.1E-01	8760	1.1E-01	1.1E-01
EUI 001	CFB Boiler	001	Phenol	85.25	tph coal 1.6E-05 13	1.4E-03	6.0E-03	0	6.0E-03	8760	6.0E-03	6.0E-03
EUI 001	CFB Boiler	001	Propionaldehyde	85.25	tph coal 3.8E-04 13	3.2E-02	1.4E-01	0	1.4E-01	8760	1.4E-01	1.4E-01
EUI 001	CFB Boiler	001	Tetrachloroethylene	85.25	tph coal 4.3E-05 13	3.7E-03	1.6E-02	0	1.6E-02	8760	1.6E-02	1.6E-02
EUI 001	CFB Boiler	001	Toluene	85.25	tph coal 2.4E-04 13	2.0E-02	9.0E-02	0	9.0E-02	8760	9.0E-02	9.0E-02
EUI 001	CFB Boiler	001	1,1,1-Trichloroethane	85.25	tph coal 2.0E-05 13	1.7E-03	7.5E-03	0	7.5E-03	8760	7.5E-03	7.5E-03
EUI 001	CFB Boiler	001	Styrene	85.25	tph coal 2.5E-05 13	2.1E-03	9.3E-03	0	9.3E-03	8760	9.3E-03	9.3E-03
EUI 001	CFB Boiler	001	Xylenes	85.25	tph coal 3.7E-05 13	3.2E-03	1.4E-02	0	1.4E-02	8760	1.4E-02	1.4E-02
EUI 001	CFB Boiler	001	Vinyl acetate	85.25	tph coal 7.6E-06 13	6.5E-04	2.8E-03	0	2.8E-03	8760	2.8E-03	2.8E-03
EUI 001	CFB Boiler	001	Antimony	85.25	tph coal 1.8E-05 14	1.5E-03	6.7E-03	0	6.7E-03	8760	6.7E-03	6.7E-03
EUI 001	CFB Boiler	001	Arsenic (7440-38-2)	85.25	tph coal 4.1E-04 14	3.5E-02	1.5E-01	0	1.5E-01	8760	1.5E-01	1.5E-01
EUI 001	CFB Boiler	001	Beryllium (744-43-0-9)	85.25	tph coal 2.1E-05 14	1.8E-03	7.8E-03	0	7.8E-03	8760	7.8E-03	7.8E-03
EUI 001	CFB Boiler	001	Cadmium (7440-43-9)	85.25	tph coal 5.1E-05 14	4.3E-03	1.9E-02	0	1.9E-02	8760	1.9E-02	1.9E-02
EUI 001	CFB Boiler	001	Chromium	85.25	tph coal 2.6E-04 14	2.2E-02	9.7E-02	0	9.7E-02	8760	9.7E-02	9.7E-02
EUI 001	CFB Boiler	001	Chromium (VI)	85.25	tph coal 2.9E-05 14b	2.4E-03	1.1E-02	0	1.1E-02	8760	1.1E-02	1.1E-02
EUI 001	CFB Boiler	001	Cobalt	85.25	tph coal 1.0E-04 14	8.5E-03	3.7E-02	0	3.7E-02	8760	3.7E-02	3.7E-02
EUI 001	CFB Boiler	001	Magnesium	85.25	tph coal 1.1E-02 14	9.4E-01	4.1E+00	0	4.1E+00	8760	4.1E+00	4.1E+00
EUI 001	CFB Boiler	001	Manganese (74439-96-5)	85.25	tph coal 4.9E-04 14	4.2E-02	1.8E-01	0	1.8E-01	8760	1.8E-01	1.8E-01
EUI 001	CFB Boiler	001	Mercury (7439-97-6)	85.25	tph coal 8.3E-05 22	7.1E-03	3.1E-02	0	5.1E-02	8760	5.1E-02	5.1E-02
EUI 001	CFB Boiler	001	Nickel (7440-02-0)	85.25	tph coal 2.8E-04 14	2.4E-02	1.0E-01	0	1.0E-01	8760	1.0E-01	1.0E-01
EUI 001	CFB Boiler	001	Selenium (7782-49-2)	85.25	tph coal 1.3E-03 14	1.1E-01	4.9E-01	0	4.9E-01	8760	4.9E-01	4.9E-01
EUI 001	CFB Boiler	001	Hydrochloric acid	85.25	tph coal 1.2E+00 15	1.0E+02	4.5E+02	95	2.2E+01	8760	2.2E+01	2.2E+01
EUI 001	CFB Boiler	001	Hydrogen flouride (hydrofluoric acid)	85.25	tph coal 1.5E-01 15	1.3E+01	5.6E+01	95	2.8E+00	8760	2.8E+00	2.8E+00
EUI 001	CFB Boiler	001	Sulfuric Acid Mist	85.25	tph coal 1.1E+00 22	9.6E+01	4.2E+02	92.0	3.4E+01	8760	3.4E+01	3.4E+01
EUI 001	CFB Boiler	001	Fluoride Compounds	1279	MMBtu/hr 3.113E-06 13A	4.0E-03	1.7E-02	0	1.7E-02	8760	1.7E-02	1.7E-02
EUI 001	Start-up Burners 1-7 (Propane-fired)	001	PM10	420	MMBtu/hr 6.6E-03 10	2.8E+00	1.2E+01	0	1.2E+01	8760	1.2E+01	1.2E+01
EUI 001	Start-up Burners 1-7 (Propane-fired)	001	Total PM	420	MMBtu/hr 6.6E-03 10	2.8E+00	1.2E+01	0	1.2E+01	8760	1.2E+01	1.2E+01
EUI 001	Start-up Burners 1-7 (Propane-fired)	001	Sulfur Dioxide	420	MMBtu/hr 1.8E-03 10	7.4E-01	3.2E+00	0	3.2E+00	8760	3.2E+00	3.2E+00
EUI 001	Start-up Burners 1-7 (Propane-fired)	001	Nitrogen Oxides	420	MMBtu/hr 2.1E-01 10	8.8E+01	3.9E+02	0	3.9E+02	8760	3.9E+02	3.9E+02
EUI 001	Start-up Burners 1-7 (Propane-fired)	001	Carbon Monoxide	420	MMBtu/hr 3.5E-02 10	1.5E+01	6.5E+01	0	6.5E+01	8760	6.5E+01	6.5E+01
EUI 001	Start-up Burners 1-7 (Propane-fired)	001	Total VOC	420	MMBtu/hr 5.5E-03 10	2.3E+00	1.0E+01	0	1.0E+01	8760	1.0E+01	1.0E+01
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Lead	420	MMBtu/hr 4.9E-07 7	2.1E-04	9.0E-04	0	9.0E-04	8760	9.0E-04	9.0E-04
EUI 001	Start-up Burners 1-7 (NG-fired)	001	PM10	420	MMBtu/hr 7.5E-03 7	3.1E+00	1.4E+01	0	1.4E+01	8760	1.4E+01	1.4E+01
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Total PM	420	MMBtu/hr 7.0E-03 7	2.9E+00	1.3E+01	0	1.3E+01	8760	1.3E+01	1.3E+01
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Sulfur Dioxide	420	MMBtu/hr 5.9E-04 7	2.5E-01	1.1E+00	0	1.1E+00	8760	1.1E+00	1.1E+00
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Total VOC	420	MMBtu/hr 5.4E-03 7	2.3E+00	9.9E+00	0	9.9E+00	8760	9.9E+00	9.9E+00
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Nitrogen Oxides	420	MMBtu/hr 9.8E-02 7	4.1E+01	1.8E+02	0	1.8E+02	8760	1.8E+02	1.8E+02
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Carbon Monoxide	420	MMBtu/hr 8.2E-02 7	3.5E+01	1.5E+02	0	1.5E+02	8760	1.5E+02	1.5E+02
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Benzene	420	MMBtu/hr 2.1E-06 8	8.6E-04	3.8E-03	0	3.8E-03	8760	3.8E-03	3.8E-03
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Dichlorobenzene	420	MMBtu/hr 1.2E-06 8	4.9E-04	2.2E-03	0	2.2E-03	8760	2.2E-03	2.2E-03
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Formaldehyde	420	MMBtu/hr 7.4E-05 8	3.1E-02	1.4E-01	0	1.4E-01	8760	1.4E-01	1.4E-01
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Hexane	420	MMBtu/hr 1.8E-03 8	7.4E-01	3.2E+00	0	3.2E+00	8760	3.2E+00	3.2E+00
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Naphthalene	420	MMBtu/hr 6.0E-07 8	2.5E-04	1.1E-03	0	1.1E-03	8760	1.1E-03	1.1E-03
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Toluene	420	MMBtu/hr 3.3E-06 8	1.4E-03	6.1E-03	0	6.1E-03	8760	6.1E-03	6.1E-03
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Benzo(a)anthracene	420	MMBtu/hr 1.8E-09 8	7.4E-07	3.2E-06	0	3.2E-06	8760	3.2E-06	3.2E-06
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Benzo(a)pyrene	420	MMBtu/hr 1.2E-09 8	4.9E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Benzo(b)fluoranthene	420	MMBtu/hr 1.8E-09 8	7.4E-07	3.2E-06	0	3.2E-06	8760	3.2E-06	3.2E-06
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Benzo(k)fluoranthene	420	MMBtu/hr 1.8E-09 8	7.4E-07	3.2E-06	0	3.2E-06	8760	3.2E-06	3.2E-06
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Chrysene	420	MMBtu/hr 1.8E-09 8	7.4E-07	3.2E-06	0	3.2E-06	8760	3.2E-06	3.2E-06
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Dibenzo(a,h)anthracene	420	MMBtu/hr 1.2E-09 8	4.9E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Indeno(1,2,3-cd)pyrene	420	MMBtu/hr 1.8E-09 8	7.4E-07	3.2E-06	0	3.2E-06	8760	3.2E-06	3.2E-06
EUI 001	Start-up Burners 1-7 (NG-fired)	001	PAH Total	420	MMBtu/hr 8.6E-08 8	3.6E-05	1.6E-04	0	1.6E-04	8760	1.6E-04	1.6E-04
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Polycyclic organic matter (POM)	420	MMBtu/hr 8.6E-08 8	3.6E-05	1.6E-04	0	1.6E-04	8760	1.6E-04	1.6E-04
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Arsenic (7440-38-2)	420	MMBtu/hr 2.0E-07 9	8.2E-05	3.6E-04	0	3.6E-04	8760	3.6E-04	3.6E-04

Table C-2
Spiritwood Station
Emission Calculations by Unit

Emission Unit ID	Unit Name	Emission Point (EPN)	Pollutant	Maximum Rate (units/hr)	Emission Factor (lb/units) (Ref.No.)	Emission Rate (lb/hr)	Uncontrolled Potential to Emit (PTE) (ton/yr)	Pollution Control Efficiency (%)	Controlled Potential to Emit (PTE) (ton/yr)	Estimated Operating Hours (hr/yr)	Limited VOC Potential to Emit (PTE) (ton/yr)	Estimated Actual Emissions (ton/yr)
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Beryllium (744-43-0-9)	420	MMBtu/hr 1.2E-08 9	4.9E-06	2.2E-05	0	2.2E-05	8760	2.2E-05	2.2E-05
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Cadmium (7440-43-9)	420	MMBtu/hr 1.1E-06 9	4.5E-04	2.0E-03	0	2.0E-03	8760	2.0E-03	2.0E-03
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Chromium	420	MMBtu/hr 1.4E-06 9	5.8E-04	2.5E-03	0	2.5E-03	8760	2.5E-03	2.5E-03
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Cobalt	420	MMBtu/hr 8.2E-08 9	3.5E-05	1.5E-04	0	1.5E-04	8760	1.5E-04	1.5E-04
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Manganese (74439-96-5)	420	MMBtu/hr 3.7E-07 9	1.6E-04	6.9E-04	0	6.9E-04	8760	6.9E-04	6.9E-04
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Mercury (7439-97-6)	420	MMBtu/hr 2.5E-07 9	1.1E-04	4.7E-04	0	4.7E-04	8760	4.7E-04	4.7E-04
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Nickel (7440-02-0)	420	MMBtu/hr 2.1E-06 9	8.6E-04	3.8E-03	0	3.8E-03	8760	3.8E-03	3.8E-03
EUI 001	Start-up Burners 1-7 (NG-fired)	001	Selenium (7782-49-2)	420	MMBtu/hr 2.4E-08 9	9.9E-06	4.3E-05	0	4.3E-05	8760	4.3E-05	4.3E-05
EUI 012	Package Boiler 1 (Propane Fired)	014	PM10	274	MMBtu/hr 7.0E-03 23	1.9E+00	8.4E+00	0	8.4E+00	8760	8.4E+00	8.4E+00
EUI 012	Package Boiler 1 (Propane Fired)	014	Total PM	274	MMBtu/hr 7.0E-03 23	1.9E+00	8.4E+00	0	8.4E+00	8760	8.4E+00	8.4E+00
EUI 012	Package Boiler 1 (Propane Fired)	014	Sulfur Dioxide	274	MMBtu/hr 2.0E-02 23	5.5E+00	2.4E+01	0	2.4E+01	8760	2.4E+01	2.4E+01
EUI 012	Package Boiler 1 (Propane Fired)	014	Nitrogen Oxides	274	MMBtu/hr 5.0E-02 23	1.4E+01	6.0E+01	0	6.0E+01	8760	6.0E+01	6.0E+01
EUI 012	Package Boiler 1 (Propane Fired)	014	Carbon Monoxide	274	MMBtu/hr 8.0E-02 23	2.2E+01	9.6E+01	0	9.6E+01	8760	9.6E+01	9.6E+01
EUI 012	Package Boiler 1 (Propane Fired)	014	Total VOC	274	MMBtu/hr 5.0E-03 23	1.4E+00	6.0E+00	0	6.0E+00	8760	6.0E+00	6.0E+00
EUI 012	Package Boiler 1 (NG fired)	014	Lead	281	MMBtu/hr 4.9E-07 7	1.4E-04	6.0E-04	0	6.0E-04	8760	6.0E-04	6.0E-04
EUI 012	Package Boiler 1 (NG fired)	014	PM10	281	MMBtu/hr 7.0E-03 24	2.0E+00	8.6E+00	0.0	8.6E+00	8760	8.6E+00	8.6E+00
EUI 012	Package Boiler 1 (NG fired)	014	Total PM	281	MMBtu/hr 7.0E-03 24	2.0E+00	8.6E+00	0.0	8.6E+00	8760	8.6E+00	8.6E+00
EUI 012	Package Boiler 1 (NG fired)	014	Sulfur Dioxide	281	MMBtu/hr 6.0E-03 24	1.7E+00	7.4E+00	0.0	7.4E+00	8760	7.4E+00	7.4E+00
EUI 012	Package Boiler 1 (NG fired)	014	Total VOC	281	MMBtu/hr 5.0E-03 24	1.4E+00	6.2E+00	0.0	6.2E+00	8760	6.2E+00	6.2E+00
EUI 012	Package Boiler 1 (NG fired)	014	Nitrogen Oxides	281	MMBtu/hr 3.5E-02 24	9.8E+00	4.3E+01	0.0	4.3E+01	8760	4.3E+01	4.3E+01
EUI 012	Package Boiler 1 (NG fired)	014	Carbon Monoxide	281	MMBtu/hr 8.0E-02 24	2.2E+01	9.9E+01	0.0	9.9E+01	8760	9.9E+01	9.9E+01
EUI 012	Package Boiler 1 (NG fired)	014	Benzene	281	MMBtu/hr 2.1E-06 8	5.8E-04	2.5E-03	0	2.5E-03	8760	2.5E-03	2.5E-03
EUI 012	Package Boiler 1 (NG fired)	014	Dichlorobenzene	281	MMBtu/hr 1.2E-06 8	3.3E-04	1.4E-03	0	1.4E-03	8760	1.4E-03	1.4E-03
EUI 012	Package Boiler 1 (NG fired)	014	Formaldehyde	281	MMBtu/hr 7.4E-05 8	2.1E-02	9.1E-02	0	9.1E-02	8760	9.1E-02	9.1E-02
EUI 012	Package Boiler 1 (NG fired)	014	Hexane	281	MMBtu/hr 1.8E-03 8	5.0E-01	2.2E+00	0	2.2E+00	8760	2.2E+00	2.2E+00
EUI 012	Package Boiler 1 (NG fired)	014	Naphthalene	281	MMBtu/hr 6.0E-07 8	1.7E-04	7.4E-04	0	7.4E-04	8760	7.4E-04	7.4E-04
EUI 012	Package Boiler 1 (NG fired)	014	Toluene	281	MMBtu/hr 3.3E-06 8	9.4E-04	4.1E-03	0	4.1E-03	8760	4.1E-03	4.1E-03
EUI 012	Package Boiler 1 (NG fired)	014	Benzo(a)anthracene	281	MMBtu/hr 1.8E-09 8	5.0E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 012	Package Boiler 1 (NG fired)	014	Benzo(a)pyrene	281	MMBtu/hr 1.2E-09 8	3.3E-07	1.4E-06	0	1.4E-06	8760	1.4E-06	1.4E-06
EUI 012	Package Boiler 1 (NG fired)	014	Benzo(b)fluoranthene	281	MMBtu/hr 1.8E-09 8	5.0E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 012	Package Boiler 1 (NG fired)	014	Benzo(k)fluoranthene	281	MMBtu/hr 1.8E-09 8	5.0E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 012	Package Boiler 1 (NG fired)	014	Chrysene	281	MMBtu/hr 1.8E-09 8	5.0E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 012	Package Boiler 1 (NG fired)	014	Dibenzo(a,h)anthracene	281	MMBtu/hr 1.2E-09 8	3.3E-07	1.4E-06	0	1.4E-06	8760	1.4E-06	1.4E-06
EUI 012	Package Boiler 1 (NG fired)	014	Indeno(1,2,3-cd)pyrene	281	MMBtu/hr 1.8E-09 8	5.0E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 012	Package Boiler 1 (NG fired)	014	PAH Total	281	MMBtu/hr 8.6E-08 8	2.4E-05	1.1E-04	0	1.1E-04	8760	1.1E-04	1.1E-04
EUI 012	Package Boiler 1 (NG fired)	014	Polycyclic organic matter (POM)	281	MMBtu/hr 8.6E-08 8	2.4E-05	1.1E-04	0	1.1E-04	8760	1.1E-04	1.1E-04
EUI 012	Package Boiler 1 (NG fired)	014	Arsenic (7440-38-2)	281	MMBtu/hr 2.0E-07 9	5.5E-05	2.4E-04	0	2.4E-04	8760	2.4E-04	2.4E-04
EUI 012	Package Boiler 1 (NG fired)	014	Beryllium (744-43-0-9)	281	MMBtu/hr 1.2E-08 9	3.3E-06	1.4E-05	0	1.4E-05	8760	1.4E-05	1.4E-05
EUI 012	Package Boiler 1 (NG fired)	014	Cadmium (7440-43-9)	281	MMBtu/hr 1.1E-06 9	3.0E-04	1.3E-03	0	1.3E-03	8760	1.3E-03	1.3E-03
EUI 012	Package Boiler 1 (NG fired)	014	Chromium	281	MMBtu/hr 1.4E-06 9	3.9E-04	1.7E-03	0	1.7E-03	8760	1.7E-03	1.7E-03
EUI 012	Package Boiler 1 (NG fired)	014	Cobalt	281	MMBtu/hr 8.2E-08 9	2.3E-05	1.0E-04	0	1.0E-04	8760	1.0E-04	1.0E-04
EUI 012	Package Boiler 1 (NG fired)	014	Manganese (74439-96-5)	281	MMBtu/hr 3.7E-07 9	1.0E-04	4.6E-04	0	4.6E-04	8760	4.6E-04	4.6E-04
EUI 012	Package Boiler 1 (NG fired)	014	Mercury (7439-97-6)	281	MMBtu/hr 2.5E-07 9	7.2E-05	3.1E-04	0	3.1E-04	8760	3.1E-04	3.1E-04
EUI 012	Package Boiler 1 (NG fired)	014	Nickel (7440-02-0)	281	MMBtu/hr 2.1E-06 9	5.8E-04	2.5E-03	0	2.5E-03	8760	2.5E-03	2.5E-03
EUI 012	Package Boiler 1 (NG fired)	014	Selenium (7782-49-2)	281	MMBtu/hr 2.4E-08 9	6.6E-06	2.9E-05	0	2.9E-05	8760	2.9E-05	2.9E-05
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	PM10	270	MMBtu/hr 3.0E-02 25	8.1E+00	3.5E+01	0	3.5E+01	8760	3.5E+01	3.5E+01
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Total PM	270	MMBtu/hr 3.0E-02 25	8.1E+00	3.5E+01	0	3.5E+01	8760	3.5E+01	3.5E+01
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Sulfur Dioxide	270	MMBtu/hr 5.1E-02 25	1.4E+01	6.0E+01	0	6.0E+01	8760	6.0E+01	6.0E+01
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Nitrogen Oxides	270	MMBtu/hr 1.3E-01 25	3.5E+01	1.5E+02	0	1.5E+02	8760	1.5E+02	1.5E+02
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Carbon Monoxide	270	MMBtu/hr 4.0E-02 25	1.1E+01	4.7E+01	0	4.7E+01	8760	4.7E+01	4.7E+01
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Total VOC	270	MMBtu/hr 5.0E-03 25	1.3E+00	5.9E+00	0	5.9E+00	8760	5.9E+00	5.9E+00
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Sulfuric Acid Mist	270	MMBtu/hr 5.6E-04 1	1.5E-01	6.6E-01	0	6.6E-01	8760	6.6E-01	6.6E-01
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Naphthalene	270	MMBtu/hr 8.1E-06 5	2.2E-03	9.5E-03	0	9.5E-03	8760	9.5E-03	9.5E-03
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Benzo(a)anthracene	270	MMBtu/hr 2.9E-08 5	7.7E-06	3.4E-05	0	3.4E-05	8760	3.4E-05	3.4E-05
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Benzo(b,k)fluoranthene	270	MMBtu/hr 1.1E-08 5	2.8E-06	1.2E-05	0	1.2E-05	8760	1.2E-05	1.2E-05
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Chrysene	270	MMBtu/hr 1.7E-08 5	4.6E-06	2.0E-05	0	2.0E-05	8760	2.0E-05	2.0E-05
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Dibenzo(a,h)anthracene	270	MMBtu/hr 1.2E-08 5	3.2E-06	1.4E-05	0	1.4E-05	8760	1.4E-05	1.4E-05
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Indeno(1,2,3-cd)pyrene	270	MMBtu/hr 1.5E-08 5	4.1E-06	1.8E-05	0	1.8E-05	8760	1.8E-05	1.8E-05
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Polycyclic organic matter (POM)	270	MMBtu/hr 2.4E-05 4	6.4E-03	2.8E-02	0	2.8E-02	8760	2.8E-02	2.8E-02

Table C-2
Spiritwood Station
Emission Calculations by Unit

Emission Unit ID	Unit Name	Emission Point (EPN)	Pollutant	Maximum Rate (units/hr)	Emission Factor (lb/units) (Ref.No.)	Emission Rate (lb/hr)	Uncontrolled Potential to Emit (PTE) (ton/yr)	Pollution Control Efficiency (%)	Controlled Potential to Emit (PTE) (ton/yr)	Estimated Operating Hours (hr/yr)	Limited VOC Potential to Emit (PTE) (ton/yr)	Estimated Actual Emissions (ton/yr)	
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	PAH Total	270	8.5E-06	5	2.3E-03	1.0E-02	0	1.0E-02	8760	1.0E-02	1.0E-02
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Benzene	270	1.7E-06	5	4.6E-04	2.0E-03	0	2.0E-03	8760	2.0E-03	2.0E-03
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Ethyl benzene	270	4.5E-07	5	1.2E-04	5.4E-04	0	5.4E-04	8760	5.4E-04	5.4E-04
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Formaldehyde	270	2.4E-04	5	6.4E-02	2.8E-01	0	2.8E-01	8760	2.8E-01	2.8E-01
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	1,1,1-Trichloroethane	270	1.7E-06	5	4.5E-04	2.0E-03	0	2.0E-03	8760	2.0E-03	2.0E-03
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Toluene	270	4.4E-05	5	1.2E-02	5.2E-02	0	5.2E-02	8760	5.2E-02	5.2E-02
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Xylenes	270	7.8E-07	5	2.1E-04	9.2E-04	0	9.2E-04	8760	9.2E-04	9.2E-04
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Arsenic (7440-38-2)	270	4.0E-06	6	1.1E-03	4.7E-03	0	4.7E-03	8760	4.7E-03	4.7E-03
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Beryllium (744-43-0-9)	270	3.0E-06	6	8.1E-04	3.5E-03	0	3.5E-03	8760	3.5E-03	3.5E-03
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Cadmium (7440-43-9)	270	3.0E-06	6	8.1E-04	3.5E-03	0	3.5E-03	8760	3.5E-03	3.5E-03
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Chromium	270	3.0E-06	6	8.1E-04	3.5E-03	0	3.5E-03	8760	3.5E-03	3.5E-03
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Lead	270	9.0E-06	6	2.4E-03	1.1E-02	0	1.1E-02	8760	1.1E-02	1.1E-02
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Manganese (74439-96-5)	270	6.0E-06	6	1.6E-03	7.1E-03	0	7.1E-03	8760	7.1E-03	7.1E-03
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Mercury (7439-97-6)	270	3.0E-06	6	8.1E-04	3.5E-03	0	3.5E-03	8760	3.5E-03	3.5E-03
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Nickel (7440-02-0)	270	3.0E-06	6	8.1E-04	3.5E-03	0	3.5E-03	8760	3.5E-03	3.5E-03
EUI 012	Package Boiler 1 (Fuel Oil fired)	014	Selenium (7782-49-2)	270	1.5E-05	6	4.0E-03	1.8E-02	0	1.8E-02	8760	1.8E-02	1.8E-02
EUI 013	Package Boiler 2 (Propane fired)	014	PM10	274	7.0E-03	23	1.9E+00	8.4E+00	0	8.4E+00	8760	8.4E+00	8.4E+00
EUI 013	Package Boiler 2 (Propane fired)	014	Total PM	274	7.0E-03	23	1.9E+00	8.4E+00	0	8.4E+00	8760	8.4E+00	8.4E+00
EUI 013	Package Boiler 2 (Propane fired)	014	Sulfur Dioxide	274	2.0E-02	23	5.5E+00	2.4E+01	0	2.4E+01	8760	2.4E+01	2.4E+01
EUI 013	Package Boiler 2 (Propane fired)	014	Nitrogen Oxides	274	5.0E-02	23	1.4E+01	6.0E+01	0	6.0E+01	8760	6.0E+01	6.0E+01
EUI 013	Package Boiler 2 (Propane fired)	014	Carbon Monoxide	274	8.0E-02	23	2.2E+01	9.6E+01	0	9.6E+01	8760	9.6E+01	9.6E+01
EUI 013	Package Boiler 2 (Propane fired)	014	Total VOC	274	5.0E-03	23	1.4E+00	6.0E+00	0	6.0E+00	8760	6.0E+00	6.0E+00
EUI 013	Package Boiler 2 (NG fired)	014	Lead	281	4.9E-07	7	1.4E-04	6.0E-04	0	6.0E-04	8760	6.0E-04	6.0E-04
EUI 013	Package Boiler 2 (NG fired)	014	PM10	281	7.0E-03	24	2.0E+00	8.6E+00	0.0	8.6E+00	8760	8.6E+00	8.6E+00
EUI 013	Package Boiler 2 (NG fired)	014	Total PM	281	7.0E-03	24	2.0E+00	8.6E+00	0.0	8.6E+00	8760	8.6E+00	8.6E+00
EUI 013	Package Boiler 2 (NG fired)	014	Sulfur Dioxide	281	6.0E-03	24	1.7E+00	7.4E+00	0.0	7.4E+00	8760	7.4E+00	7.4E+00
EUI 013	Package Boiler 2 (NG fired)	014	Total VOC	281	5.0E-03	24	1.4E+00	6.2E+00	0.0	6.2E+00	8760	6.2E+00	6.2E+00
EUI 013	Package Boiler 2 (NG fired)	014	Nitrogen Oxides	281	3.5E-02	24	9.8E+00	4.3E+01	0.0	4.3E+01	8760	4.3E+01	4.3E+01
EUI 013	Package Boiler 2 (NG fired)	014	Carbon Monoxide	281	8.0E-02	24	2.2E+01	9.9E+01	0.0	9.9E+01	8760	9.9E+01	9.9E+01
EUI 013	Package Boiler 2 (NG fired)	014	Benzene	281	2.1E-06	8	5.8E-04	2.5E-03	0	2.5E-03	8760	2.5E-03	2.5E-03
EUI 013	Package Boiler 2 (NG fired)	014	Dichlorobenzene	281	1.2E-06	8	3.3E-04	1.4E-03	0	1.4E-03	8760	1.4E-03	1.4E-03
EUI 013	Package Boiler 2 (NG fired)	014	Formaldehyde	281	7.4E-05	8	2.1E-02	9.1E-02	0	9.1E-02	8760	9.1E-02	9.1E-02
EUI 013	Package Boiler 2 (NG fired)	014	Hexane	281	1.8E-03	8	5.0E-01	2.2E+00	0	2.2E+00	8760	2.2E+00	2.2E+00
EUI 013	Package Boiler 2 (NG fired)	014	Naphthalene	281	6.0E-07	8	1.7E-04	7.4E-04	0	7.4E-04	8760	7.4E-04	7.4E-04
EUI 013	Package Boiler 2 (NG fired)	014	Toluene	281	3.3E-06	8	9.4E-04	4.1E-03	0	4.1E-03	8760	4.1E-03	4.1E-03
EUI 013	Package Boiler 2 (NG fired)	014	Benzo(a)anthracene	281	1.8E-09	8	5.0E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 013	Package Boiler 2 (NG fired)	014	Benzo(a)pyrene	281	1.2E-09	8	3.3E-07	1.4E-06	0	1.4E-06	8760	1.4E-06	1.4E-06
EUI 013	Package Boiler 2 (NG fired)	014	Benzo(b)fluoranthene	281	1.8E-09	8	5.0E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 013	Package Boiler 2 (NG fired)	014	Benzo(k)fluoranthene	281	1.8E-09	8	5.0E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 013	Package Boiler 2 (NG fired)	014	Chrysene	281	1.8E-09	8	5.0E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 013	Package Boiler 2 (NG fired)	014	Dibenzo(a,h)anthracene	281	1.2E-09	8	3.3E-07	1.4E-06	0	1.4E-06	8760	1.4E-06	1.4E-06
EUI 013	Package Boiler 2 (NG fired)	014	Indeno(1,2,3-cd)pyrene	281	1.8E-09	8	5.0E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 013	Package Boiler 2 (NG fired)	014	PAH Total	281	8.6E-08	8	2.4E-05	1.1E-04	0	1.1E-04	8760	1.1E-04	1.1E-04
EUI 013	Package Boiler 2 (NG fired)	014	Polycyclic organic matter (POM)	281	8.6E-08	8	2.4E-05	1.1E-04	0	1.1E-04	8760	1.1E-04	1.1E-04
EUI 013	Package Boiler 2 (NG fired)	014	Arsenic (7440-38-2)	281	2.0E-07	9	5.5E-05	2.4E-04	0	2.4E-04	8760	2.4E-04	2.4E-04
EUI 013	Package Boiler 2 (NG fired)	014	Beryllium (744-43-0-9)	281	1.2E-08	9	3.3E-06	1.4E-05	0	1.4E-05	8760	1.4E-05	1.4E-05
EUI 013	Package Boiler 2 (NG fired)	014	Cadmium (7440-43-9)	281	1.1E-06	9	3.0E-04	1.3E-03	0	1.3E-03	8760	1.3E-03	1.3E-03
EUI 013	Package Boiler 2 (NG fired)	014	Chromium	281	1.4E-06	9	3.9E-04	1.7E-03	0	1.7E-03	8760	1.7E-03	1.7E-03
EUI 013	Package Boiler 2 (NG fired)	014	Cobalt	281	8.2E-08	9	2.3E-05	1.0E-04	0	1.0E-04	8760	1.0E-04	1.0E-04
EUI 013	Package Boiler 2 (NG fired)	014	Manganese (74439-96-5)	281	3.7E-07	9	1.0E-04	4.6E-04	0	4.6E-04	8760	4.6E-04	4.6E-04
EUI 013	Package Boiler 2 (NG fired)	014	Mercury (7439-97-6)	281	2.5E-07	9	7.2E-05	3.1E-04	0	3.1E-04	8760	3.1E-04	3.1E-04
EUI 013	Package Boiler 2 (NG fired)	014	Nickel (7440-02-0)	281	2.1E-06	9	5.8E-04	2.5E-03	0	2.5E-03	8760	2.5E-03	2.5E-03
EUI 013	Package Boiler 2 (NG fired)	014	Selenium (7782-49-2)	281	2.4E-08	9	6.6E-06	2.9E-05	0	2.9E-05	8760	2.9E-05	2.9E-05
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	PM10	270	3.0E-02	25	8.1E+00	3.5E+01	0	3.5E+01	8760	3.5E+01	3.5E+01
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Total PM	270	3.0E-02	25	8.1E+00	3.5E+01	0	3.5E+01	8760	3.5E+01	3.5E+01
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Sulfur Dioxide	270	5.1E-02	25	1.4E+01	6.0E+01	0	6.0E+01	8760	6.0E+01	6.0E+01
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Nitrogen Oxides	270	1.3E-01	25	3.5E+01	1.5E+02	0	1.5E+02	8760	1.5E+02	1.5E+02
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Carbon Monoxide	270	4.0E-02	25	1.1E+01	4.7E+01	0	4.7E+01	8760	4.7E+01	4.7E+01
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Total VOC	270	5.0E-03	25	1.3E+00	5.9E+00	0	5.9E+00	8760	5.9E+00	5.9E+00

Table C-2
Spiritwood Station
Emission Calculations by Unit

Emission Unit ID	Unit Name	Emission Point (EPN)	Pollutant	Maximum Rate (units/hr)	Emission Factor (lb/units) (Ref.No.)	Emission Rate (lb/hr)	Uncontrolled Potential to Emit (PTE) (ton/yr)	Pollution Control Efficiency (%)	Controlled Potential to Emit (PTE) (ton/yr)	Estimated Operating Hours (hr/yr)	Limited Potential to Emit (PTE) (ton/yr)	Estimated Actual Emissions (ton/yr)
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Sulfuric Acid Mist	270	5.6E-04 1	1.5E-01	6.6E-01	0	6.6E-01	8760	6.6E-01	6.6E-01
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Naphthalene	270	8.1E-06 5	2.2E-03	9.5E-03	0	9.5E-03	8760	9.5E-03	9.5E-03
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Benzo(a)anthracene	270	2.9E-08 5	7.7E-06	3.4E-05	0	3.4E-05	8760	3.4E-05	3.4E-05
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Benzo(b,k)fluoranthene	270	1.1E-08 5	2.8E-06	1.2E-05	0	1.2E-05	8760	1.2E-05	1.2E-05
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Chrysene	270	1.7E-08 5	4.6E-06	2.0E-05	0	2.0E-05	8760	2.0E-05	2.0E-05
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Dibenzo(a,h)anthracene	270	1.2E-08 5	3.2E-06	1.4E-05	0	1.4E-05	8760	1.4E-05	1.4E-05
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Indeno(1,2,3-cd)pyrene	270	1.5E-08 5	4.1E-06	1.8E-05	0	1.8E-05	8760	1.8E-05	1.8E-05
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Polycyclic organic matter (POM)	270	2.4E-05 4	6.4E-03	2.8E-02	0	2.8E-02	8760	2.8E-02	2.8E-02
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	PAH Total	270	8.5E-06 5	2.3E-03	1.0E-02	0	1.0E-02	8760	1.0E-02	1.0E-02
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Benzene	270	1.7E-06 5	4.6E-04	2.0E-03	0	2.0E-03	8760	2.0E-03	2.0E-03
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Ethyl benzene	270	4.5E-07 5	1.2E-04	5.4E-04	0	5.4E-04	8760	5.4E-04	5.4E-04
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Formaldehyde	270	2.4E-04 5	6.4E-02	2.8E-01	0	2.8E-01	8760	2.8E-01	2.8E-01
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	1,1,1-Trichloroethane	270	1.7E-06 5	4.5E-04	2.0E-03	0	2.0E-03	8760	2.0E-03	2.0E-03
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Toluene	270	4.4E-05 5	1.2E-02	5.2E-02	0	5.2E-02	8760	5.2E-02	5.2E-02
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Xylenes	270	7.8E-07 5	2.1E-04	9.2E-04	0	9.2E-04	8760	9.2E-04	9.2E-04
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Arsenic (7440-38-2)	270	4.0E-06 6	1.1E-03	4.7E-03	0	4.7E-03	8760	4.7E-03	4.7E-03
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Beryllium (744-43-0-9)	270	3.0E-06 6	8.1E-04	3.5E-03	0	3.5E-03	8760	3.5E-03	3.5E-03
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Cadmium (7440-43-9)	270	3.0E-06 6	8.1E-04	3.5E-03	0	3.5E-03	8760	3.5E-03	3.5E-03
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Chromium	270	3.0E-06 6	8.1E-04	3.5E-03	0	3.5E-03	8760	3.5E-03	3.5E-03
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Lead	270	9.0E-06 6	2.4E-03	1.1E-02	0	1.1E-02	8760	1.1E-02	1.1E-02
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Manganese (74439-96-5)	270	6.0E-06 6	1.6E-03	7.1E-03	0	7.1E-03	8760	7.1E-03	7.1E-03
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Mercury (7439-97-6)	270	3.0E-06 6	8.1E-04	3.5E-03	0	3.5E-03	8760	3.5E-03	3.5E-03
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Nickel (7440-02-0)	270	3.0E-06 6	8.1E-04	3.5E-03	0	3.5E-03	8760	3.5E-03	3.5E-03
EUI 013	Package Boiler 2 (Fuel Oil fired)	014	Selenium (7782-49-2)	270	1.5E-05 6	4.0E-03	1.8E-02	0	1.8E-02	8760	1.8E-02	1.8E-02
EUI 014	Package Boiler 3 (Propane fired)	014	PM10	274	7.0E-03 23	1.9E+00	8.4E+00	0	8.4E+00	8760	8.4E+00	8.4E+00
EUI 014	Package Boiler 3 (Propane fired)	014	Total PM	274	7.0E-03 23	1.9E+00	8.4E+00	0	8.4E+00	8760	8.4E+00	8.4E+00
EUI 014	Package Boiler 3 (Propane fired)	014	Sulfur Dioxide	274	2.0E-02 23	5.5E+00	2.4E+01	0	2.4E+01	8760	2.4E+01	2.4E+01
EUI 014	Package Boiler 3 (Propane fired)	014	Nitrogen Oxides	274	5.0E-02 23	1.4E+01	6.0E+01	0	6.0E+01	8760	6.0E+01	6.0E+01
EUI 014	Package Boiler 3 (Propane fired)	014	Carbon Monoxide	274	8.0E-02 23	2.2E+01	9.6E+01	0	9.6E+01	8760	9.6E+01	9.6E+01
EUI 014	Package Boiler 3 (Propane fired)	014	Total VOC	274	5.0E-03 23	1.4E+00	6.0E+00	0	6.0E+00	8760	6.0E+00	6.0E+00
EUI 014	Package Boiler 3 (NG fired)	014	Lead	281	4.9E-07 7	1.4E-04	6.0E-04	0	6.0E-04	8760	6.0E-04	6.0E-04
EUI 014	Package Boiler 3 (NG fired)	014	PM10	281	7.0E-03 24	2.0E+00	8.6E+00	0.0	8.6E+00	8760	8.6E+00	8.6E+00
EUI 014	Package Boiler 3 (NG fired)	014	Total PM	281	7.0E-03 24	2.0E+00	8.6E+00	0.0	8.6E+00	8760	8.6E+00	8.6E+00
EUI 014	Package Boiler 3 (NG fired)	014	Sulfur Dioxide	281	6.0E-03 24	1.7E+00	7.4E+00	0.0	7.4E+00	8760	7.4E+00	7.4E+00
EUI 014	Package Boiler 3 (NG fired)	014	Total VOC	281	5.0E-03 24	1.4E+00	6.2E+00	0.0	6.2E+00	8760	6.2E+00	6.2E+00
EUI 014	Package Boiler 3 (NG fired)	014	Nitrogen Oxides	281	3.5E-02 24	9.8E+00	4.3E+01	0.0	4.3E+01	8760	4.3E+01	4.3E+01
EUI 014	Package Boiler 3 (NG fired)	014	Carbon Monoxide	281	8.0E-02 24	2.2E+01	9.9E+01	0.0	9.9E+01	8760	9.9E+01	9.9E+01
EUI 014	Package Boiler 3 (NG fired)	014	Benzene	281	2.1E-06 8	5.8E-04	2.5E-03	0	2.5E-03	8760	2.5E-03	2.5E-03
EUI 014	Package Boiler 3 (NG fired)	014	Dichlorobenzene	281	1.2E-06 8	3.3E-04	1.4E-03	0	1.4E-03	8760	1.4E-03	1.4E-03
EUI 014	Package Boiler 3 (NG fired)	014	Formaldehyde	281	7.4E-05 8	2.1E-02	9.1E-02	0	9.1E-02	8760	9.1E-02	9.1E-02
EUI 014	Package Boiler 3 (NG fired)	014	Hexane	281	1.8E-03 8	5.0E-01	2.2E+00	0	2.2E+00	8760	2.2E+00	2.2E+00
EUI 014	Package Boiler 3 (NG fired)	014	Naphthalene	281	6.0E-07 8	1.7E-04	7.4E-04	0	7.4E-04	8760	7.4E-04	7.4E-04
EUI 014	Package Boiler 3 (NG fired)	014	Toluene	281	3.3E-06 8	9.4E-04	4.1E-03	0	4.1E-03	8760	4.1E-03	4.1E-03
EUI 014	Package Boiler 3 (NG fired)	014	Benzo(a)anthracene	281	1.8E-09 8	5.0E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 014	Package Boiler 3 (NG fired)	014	Benzo(a)pyrene	281	1.2E-09 8	3.3E-07	1.4E-06	0	1.4E-06	8760	1.4E-06	1.4E-06
EUI 014	Package Boiler 3 (NG fired)	014	Benzo(b)fluoranthene	281	1.8E-09 8	5.0E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 014	Package Boiler 3 (NG fired)	014	Benzo(k)fluoranthene	281	1.8E-09 8	5.0E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 014	Package Boiler 3 (NG fired)	014	Chrysene	281	1.8E-09 8	5.0E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 014	Package Boiler 3 (NG fired)	014	Dibenzo(a,h)anthracene	281	1.2E-09 8	3.3E-07	1.4E-06	0	1.4E-06	8760	1.4E-06	1.4E-06
EUI 014	Package Boiler 3 (NG fired)	014	Indeno(1,2,3-cd)pyrene	281	1.8E-09 8	5.0E-07	2.2E-06	0	2.2E-06	8760	2.2E-06	2.2E-06
EUI 014	Package Boiler 3 (NG fired)	014	PAH Total	281	8.6E-08 8	2.4E-05	1.1E-04	0	1.1E-04	8760	1.1E-04	1.1E-04
EUI 014	Package Boiler 3 (NG fired)	014	Polycyclic organic matter (POM)	281	8.6E-08 8	2.4E-05	1.1E-04	0	1.1E-04	8760	1.1E-04	1.1E-04
EUI 014	Package Boiler 3 (NG fired)	014	Arsenic (7440-38-2)	281	2.0E-07 9	5.5E-05	2.4E-04	0	2.4E-04	8760	2.4E-04	2.4E-04
EUI 014	Package Boiler 3 (NG fired)	014	Beryllium (744-43-0-9)	281	1.2E-08 9	3.3E-06	1.4E-05	0	1.4E-05	8760	1.4E-05	1.4E-05
EUI 014	Package Boiler 3 (NG fired)	014	Cadmium (7440-43-9)	281	1.1E-06 9	3.0E-04	1.3E-03	0	1.3E-03	8760	1.3E-03	1.3E-03
EUI 014	Package Boiler 3 (NG fired)	014	Chromium	281	1.4E-06 9	3.9E-04	1.7E-03	0	1.7E-03	8760	1.7E-03	1.7E-03
EUI 014	Package Boiler 3 (NG fired)	014	Cobalt	281	8.2E-08 9	2.3E-05	1.0E-04	0	1.0E-04	8760	1.0E-04	1.0E-04
EUI 014	Package Boiler 3 (NG fired)	014	Manganese (74439-96-5)	281	3.7E-07 9	1.0E-04	4.6E-04	0	4.6E-04	8760	4.6E-04	4.6E-04
EUI 014	Package Boiler 3 (NG fired)	014	Mercury (7439-97-6)	281	2.5E-07 9	7.2E-05	3.1E-04	0	3.1E-04	8760	3.1E-04	3.1E-04

Table C-2
Spiritwood Station
Emission Calculations by Unit

Emission Unit ID	Unit Name	Emission Point (EPN)	Pollutant	Maximum Rate (units/hr)	Emission Factor (lb/units) (Ref.No.)	Emission Rate (lb/hr)	Uncontrolled Potential to Emit (PTE) (ton/yr)	Pollution Control Efficiency (%)	Controlled Potential to Emit (PTE) (ton/yr)	Estimated Operating Hours (hr/yr)	Limited VOC Potential to Emit (PTE) (ton/yr)	Estimated Actual Emissions (ton/yr)	
EUI 014	Package Boiler 3 (NG fired)	014	Nickel (7440-02-0)	281	MMBtu/hr 2.1E-06	9	5.8E-04	2.5E-03	0	2.5E-03	8760	2.5E-03	2.5E-03
EUI 014	Package Boiler 3 (NG fired)	014	Selenium (7782-49-2)	281	MMBtu/hr 2.4E-08	9	6.6E-06	2.9E-05	0	2.9E-05	8760	2.9E-05	2.9E-05
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	PM10	270	MMBtu/hr 3.0E-02	25	8.1E+00	3.5E+01	0	3.5E+01	8760	3.5E+01	3.5E+01
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Total PM	270	MMBtu/hr 3.0E-02	25	8.1E+00	3.5E+01	0	3.5E+01	8760	3.5E+01	3.5E+01
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Sulfur Dioxide	270	MMBtu/hr 5.1E-02	25	1.4E+01	6.0E+01	0	6.0E+01	8760	6.0E+01	6.0E+01
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Nitrogen Oxides	270	MMBtu/hr 1.3E-01	25	3.5E+01	1.5E+02	0	1.5E+02	8760	1.5E+02	1.5E+02
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Carbon Monoxide	270	MMBtu/hr 4.0E-02	25	1.1E+01	4.7E+01	0	4.7E+01	8760	4.7E+01	4.7E+01
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Total VOC	270	MMBtu/hr 5.0E-03	25	1.3E+00	5.9E+00	0	5.9E+00	8760	5.9E+00	5.9E+00
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Sulfuric Acid Mist	270	MMBtu/hr 5.6E-04	1	1.5E-01	6.6E-01	0	6.6E-01	8760	6.6E-01	6.6E-01
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Naphthalene	270	MMBtu/hr 8.1E-06	5	2.2E-03	9.5E-03	0	9.5E-03	8760	9.5E-03	9.5E-03
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Benzo(a)anthracene	270	MMBtu/hr 2.9E-08	5	7.7E-06	3.4E-05	0	3.4E-05	8760	3.4E-05	3.4E-05
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Benzo(b,k)fluoranthene	270	MMBtu/hr 1.1E-08	5	2.8E-06	1.2E-05	0	1.2E-05	8760	1.2E-05	1.2E-05
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Chrysene	270	MMBtu/hr 1.7E-08	5	4.6E-06	2.0E-05	0	2.0E-05	8760	2.0E-05	2.0E-05
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Dibenzo(a,h)anthracene	270	MMBtu/hr 1.2E-08	5	3.2E-06	1.4E-05	0	1.4E-05	8760	1.4E-05	1.4E-05
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Indeno(1,2,3-cd)pyrene	270	MMBtu/hr 1.5E-08	5	4.1E-06	1.8E-05	0	1.8E-05	8760	1.8E-05	1.8E-05
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Polycyclic organic matter (POM)	270	MMBtu/hr 2.4E-05	4	6.4E-03	2.8E-02	0	2.8E-02	8760	2.8E-02	2.8E-02
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	PAH Total	270	MMBtu/hr 8.5E-06	5	2.3E-03	1.0E-02	0	1.0E-02	8760	1.0E-02	1.0E-02
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Benzene	270	MMBtu/hr 1.7E-06	5	4.6E-04	2.0E-03	0	2.0E-03	8760	2.0E-03	2.0E-03
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Ethyl benzene	270	MMBtu/hr 4.5E-07	5	1.2E-04	5.4E-04	0	5.4E-04	8760	5.4E-04	5.4E-04
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Formaldehyde	270	MMBtu/hr 2.4E-04	5	6.4E-02	2.8E-01	0	2.8E-01	8760	2.8E-01	2.8E-01
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	1,1,1-Trichloroethane	270	MMBtu/hr 1.7E-06	5	4.5E-04	2.0E-03	0	2.0E-03	8760	2.0E-03	2.0E-03
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Toluene	270	MMBtu/hr 4.4E-05	5	1.2E-02	5.2E-02	0	5.2E-02	8760	5.2E-02	5.2E-02
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Xylenes	270	MMBtu/hr 7.8E-07	5	2.1E-04	9.2E-04	0	9.2E-04	8760	9.2E-04	9.2E-04
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Arsenic (7440-38-2)	270	MMBtu/hr 4.0E-06	6	1.1E-03	4.7E-03	0	4.7E-03	8760	4.7E-03	4.7E-03
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Beryllium (744-43-0-9)	270	MMBtu/hr 3.0E-06	6	8.1E-04	3.5E-03	0	3.5E-03	8760	3.5E-03	3.5E-03
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Cadmium (7440-43-9)	270	MMBtu/hr 3.0E-06	6	8.1E-04	3.5E-03	0	3.5E-03	8760	3.5E-03	3.5E-03
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Chromium	270	MMBtu/hr 3.0E-06	6	8.1E-04	3.5E-03	0	3.5E-03	8760	3.5E-03	3.5E-03
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Lead	270	MMBtu/hr 9.0E-06	6	2.4E-03	1.1E-02	0	1.1E-02	8760	1.1E-02	1.1E-02
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Manganese (74439-96-5)	270	MMBtu/hr 6.0E-06	6	1.6E-03	7.1E-03	0	7.1E-03	8760	7.1E-03	7.1E-03
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Mercury (7439-97-6)	270	MMBtu/hr 3.0E-06	6	8.1E-04	3.5E-03	0	3.5E-03	8760	3.5E-03	3.5E-03
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Nickel (7440-02-0)	270	MMBtu/hr 3.0E-06	6	8.1E-04	3.5E-03	0	3.5E-03	8760	3.5E-03	3.5E-03
EUI 014	Package Boiler 3 (Fuel Oil fired)	014	Selenium (7782-49-2)	270	MMBtu/hr 1.5E-05	6	4.0E-03	1.8E-02	0	1.8E-02	8760	1.8E-02	1.8E-02
EUI 015	Diesel Fire Water Pump	015	Nitrogen Oxides	350	HP 3.1E-02	16	1.1E+01	4.8E+01	0	4.8E+01	500	2.7E+00	2.7E+00
EUI 015	Diesel Fire Water Pump	015	Carbon Monoxide	350	HP 6.7E-03	16	2.3E+00	1.0E+01	0	1.0E+01	500	5.8E-01	5.8E-01
EUI 015	Diesel Fire Water Pump	015	Sulfur Dioxide	350	HP 2.1E-03	16	7.2E-01	3.1E+00	0	3.1E+00	500	1.8E-01	1.8E-01
EUI 015	Diesel Fire Water Pump	015	PM10	350	HP 2.2E-03	16	7.7E-01	3.4E+00	0	3.4E+00	500	1.9E-01	1.9E-01
EUI 015	Diesel Fire Water Pump	015	Total PM	350	HP 2.2E-03	16	7.7E-01	3.4E+00	0	3.4E+00	500	1.9E-01	1.9E-01
EUI 015	Diesel Fire Water Pump	015	Total VOC	350	HP 2.5E-03	16	8.6E-01	3.8E+00	0	3.8E+00	500	2.2E-01	2.2E-01
EUI 015	Diesel Fire Water Pump	015	Benzene	350	HP 6.5E-06	17	2.3E-03	1.0E-02	0	1.0E-02	500	5.7E-04	5.7E-04
EUI 015	Diesel Fire Water Pump	015	Toluene	350	HP 2.9E-06	17	1.0E-03	4.4E-03	0	4.4E-03	500	2.5E-04	2.5E-04
EUI 015	Diesel Fire Water Pump	015	Xylenes	350	HP 2.0E-06	17	7.0E-04	3.1E-03	0	3.1E-03	500	1.7E-04	1.7E-04
EUI 015	Diesel Fire Water Pump	015	1,3-Butadiene	350	HP 1.8E-05	17	6.3E-03	2.8E-02	0	2.8E-02	500	1.6E-03	1.6E-03
EUI 015	Diesel Fire Water Pump	015	Formaldehyde	350	HP 2.7E-07	17	9.6E-05	4.2E-04	0	4.2E-04	500	2.4E-05	2.4E-05
EUI 015	Diesel Fire Water Pump	015	Acetaldehyde	350	HP 8.3E-06	17	2.9E-03	1.3E-02	0	1.3E-02	500	7.2E-04	7.2E-04
EUI 015	Diesel Fire Water Pump	015	Acrolein	350	HP 5.4E-06	17	1.9E-03	8.2E-03	0	8.2E-03	500	4.7E-04	4.7E-04
EUI 015	Diesel Fire Water Pump	015	Naphthalene	350	HP 5.9E-07	17	2.1E-04	9.1E-04	0	9.1E-04	500	5.2E-05	5.2E-05
EUI 015	Diesel Fire Water Pump	015	Benzo(a)anthracene	350	HP 1.2E-08	17	4.1E-06	1.8E-05	0	1.8E-05	500	1.0E-06	1.0E-06
EUI 015	Diesel Fire Water Pump	015	Chrysene	350	HP 2.5E-09	17	8.6E-07	3.8E-06	0	3.8E-06	500	2.2E-07	2.2E-07
EUI 015	Diesel Fire Water Pump	015	Benzo(b)fluoranthene	350	HP 6.9E-10	17	2.4E-07	1.1E-06	0	1.1E-06	500	6.1E-08	6.1E-08
EUI 015	Diesel Fire Water Pump	015	Benzo(k)fluoranthene	350	HP 1.1E-09	17	3.8E-07	1.7E-06	0	1.7E-06	500	9.5E-08	9.5E-08
EUI 015	Diesel Fire Water Pump	015	Benzo(a)pyrene	350	HP 1.3E-09	17	4.6E-07	2.0E-06	0	2.0E-06	500	1.2E-07	1.2E-07
EUI 015	Diesel Fire Water Pump	015	Indeno(1,2,3-cd)pyrene	350	HP 2.6E-09	17	9.2E-07	4.0E-06	0	4.0E-06	500	2.3E-07	2.3E-07
EUI 015	Diesel Fire Water Pump	015	Dibenzo(a,h)anthracene	350	HP 4.1E-09	17	1.4E-06	6.3E-06	0	6.3E-06	500	3.6E-07	3.6E-07
EUI 015	Diesel Fire Water Pump	015	PAH Total	350	HP 1.2E-06	17	4.1E-04	1.8E-03	0	1.8E-03	500	1.0E-04	1.0E-04
EUI 015	Diesel Fire Water Pump	015	Polycyclic organic matter (POM)	350	HP 1.2E-06	17	4.1E-04	1.8E-03	0	1.8E-03	500	1.0E-04	1.0E-04
EUI 016	Cooling Tower	016	Total PM	4800	10 ³ gal/hr 2.5E-04	21	1.2E+00	5.3E+00	[1]	5.3E+00	8760	5.3E+00	5.3E+00
EUI 016	Cooling Tower	016	PM10	4800	10 ³ gal/hr 8.1E-05	21	3.9E-01	1.7E+00	[1]	1.7E+00	8760	1.7E+00	1.7E+00
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Nitrogen Oxides	0	HP 3.1E-02	16	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Carbon Monoxide	0	HP 6.7E-03	16	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00

Table C-2
Spiritwood Station
Emission Calculations by Unit

Emission Unit ID	Unit Name	Emission Point (EPN)	Pollutant	Maximum Rate (units/hr)	Emission Factor (lb/units) (Ref.No.)	Emission Rate (lb/hr)	Uncontrolled Potential to Emit (PTE) (ton/yr)	Pollution Control Efficiency (%)	Controlled Potential to Emit (PTE) (ton/yr)	Estimated Operating Hours (hr/yr)	Limited VOC Potential to Emit (PTE) (ton/yr)	Estimated Actual Emissions (ton/yr)	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Sulfur Dioxide	0	HP 2.1E-03 16	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	PM10	0	HP 2.2E-03 16	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Total PM	0	HP 2.2E-03 16	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Total VOC	0	HP 2.5E-03 16	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Benzene	0	HP 6.5E-06 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Toluene	0	HP 2.9E-06 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Xylenes	0	HP 2.0E-06 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	1,3-Butadiene	0	HP 1.8E-05 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Formaldehyde	0	HP 2.7E-07 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Acetaldehyde	0	HP 8.3E-06 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Acrolein	0	HP 5.4E-06 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Naphthalene	0	HP 5.9E-07 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Benzo(a)anthracene	0	HP 1.2E-08 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Chrysene	0	HP 2.5E-09 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Benzo(b)fluoranthene	0	HP 6.9E-10 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Benzo(k)fluoranthene	0	HP 1.1E-09 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Benzo(a)pyrene	0	HP 1.3E-09 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Indeno(1,2,3-cd)pyrene	0	HP 2.6E-09 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Dibenzo(a,h)anthracene	0	HP 4.1E-09 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	PAH Total	0	HP 1.2E-06 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
N/A	Backup Boiler Diesel Feed Water Pump	N/A	Polycyclic organic matter (POM)	0	HP 1.2E-06 17	0.0E+00	0.0E+00	0	0.0E+00	500	0.0E+00	0.0E+00	
EUI 017	Propane Vaporizer (fired with propane)	017	PM10	14.6	MMBtu/hr 7.0E-03 26	1.0E-01	4.5E-01	0	4.5E-01	8760	4.5E-01	4.5E-01	
EUI 017	Propane Vaporizer (fired with propane)	017	Total PM	14.6	MMBtu/hr 7.0E-03 26	1.0E-01	4.5E-01	0	4.5E-01	8760	4.5E-01	4.5E-01	
EUI 017	Propane Vaporizer (fired with propane)	017	Sulfur Dioxide	14.6	MMBtu/hr 2.0E-02 26	2.9E-01	1.3E+00	0	1.3E+00	8760	1.3E+00	1.3E+00	
EUI 017	Propane Vaporizer (fired with propane)	017	Nitrogen Oxides	14.6	MMBtu/hr 4.0E-02 26	5.8E-01	2.6E+00	0	2.6E+00	8760	2.6E+00	2.6E+00	
EUI 017	Propane Vaporizer (fired with propane)	017	Carbon Monoxide	14.6	MMBtu/hr 8.0E-02 26	1.2E+00	5.1E+00	0	5.1E+00	8760	5.1E+00	5.1E+00	
EUI 017	Propane Vaporizer (fired with propane)	017	Total VOC	14.6	MMBtu/hr 5.0E-03 26	7.3E-02	3.2E-01	0	3.2E-01	8760	3.2E-01	3.2E-01	
EUI 018	Diesel Generator	018	Nitrogen Oxides	1400	HP 2.4E-02 18	3.4E+01	1.5E+02	0	1.5E+02	500	8.4E+00	8.4E+00	
EUI 018	Diesel Generator	018	Carbon Monoxide	1400	HP 5.5E-03 18	7.7E+00	3.4E+01	0	3.4E+01	500	1.9E+00	1.9E+00	
EUI 018	Diesel Generator	018	Sulfur Dioxide	1400	HP 4.0E-04 18	5.7E-01	2.5E+00	0	2.5E+00	500	1.4E-01	1.4E-01	
EUI 018	Diesel Generator	018	PM10	1400	HP 7.0E-04 18	9.8E-01	4.3E+00	0	4.3E+00	500	2.5E-01	2.5E-01	
EUI 018	Diesel Generator	018	Total PM	1400	HP 7.0E-04 18	9.8E-01	4.3E+00	0	4.3E+00	500	2.5E-01	2.5E-01	
EUI 018	Diesel Generator	018	Total VOC	1400	HP 7.1E-04 18	9.9E-01	4.3E+00	0	4.3E+00	500	2.5E-01	2.5E-01	
EUI 018	Diesel Generator	018	Benzene	1400	HP 5.4E-06 19	7.6E-03	3.3E-02	0	3.3E-02	500	1.9E-03	1.9E-03	
EUI 018	Diesel Generator	018	Toluene	1400	HP 2.0E-06 19	2.8E-03	1.2E-02	0	1.2E-02	500	6.9E-04	6.9E-04	
EUI 018	Diesel Generator	018	Xylenes	1400	HP 1.4E-06 19	1.9E-03	8.3E-03	0	8.3E-03	500	4.7E-04	4.7E-04	
EUI 018	Diesel Generator	018	1,3-Butadiene	1400	HP 1.8E-05 17	2.5E-02	1.1E-01	0	1.1E-01	500	6.3E-03	6.3E-03	
EUI 018	Diesel Generator	018	Propylene	1400	HP 2.0E-05 19	2.7E-02	1.2E-01	0	1.2E-01	500	6.8E-03	6.8E-03	
EUI 018	Diesel Generator	018	Formaldehyde	1400	HP 5.5E-07 19	7.7E-04	3.4E-03	0	3.4E-03	500	1.9E-04	1.9E-04	
EUI 018	Diesel Generator	018	Acetaldehyde	1400	HP 1.8E-07 19	2.5E-04	1.1E-03	0	1.1E-03	500	6.2E-05	6.2E-05	
EUI 018	Diesel Generator	018	Acrolein	1400	HP 5.5E-08 19	7.7E-05	3.4E-04	0	3.4E-04	500	1.9E-05	1.9E-05	
EUI 018	Diesel Generator	018	Naphthalene	1400	HP 9.1E-07 20	1.3E-03	5.6E-03	0	5.6E-03	500	3.2E-04	3.2E-04	
EUI 018	Diesel Generator	018	Benzo(a)anthracene	1400	HP 4.4E-09 20	6.1E-06	2.7E-05	0	2.7E-05	500	1.5E-06	1.5E-06	
EUI 018	Diesel Generator	018	Chrysene	1400	HP 1.1E-08 20	1.5E-05	6.6E-05	0	6.6E-05	500	3.7E-06	3.7E-06	
EUI 018	Diesel Generator	018	Benzo(b)fluoranthene	1400	HP 7.8E-09 20	1.1E-05	4.8E-05	0	4.8E-05	500	2.7E-06	2.7E-06	
EUI 018	Diesel Generator	018	Benzo(k)fluoranthene	1400	HP 1.5E-09 20	2.1E-06	9.4E-06	0	9.4E-06	500	5.3E-07	5.3E-07	
EUI 018	Diesel Generator	018	Benzo(a)pyrene	1400	HP 1.8E-09 20	2.5E-06	1.1E-05	0	1.1E-05	500	6.3E-07	6.3E-07	
EUI 018	Diesel Generator	018	Indeno(1,2,3-cd)pyrene	1400	HP 2.9E-09 20	4.1E-06	1.8E-05	0	1.8E-05	500	1.0E-06	1.0E-06	
EUI 018	Diesel Generator	018	Dibenzo(a,h)anthracene	1400	HP 2.4E-09 20	3.4E-06	1.5E-05	0	1.5E-05	500	8.5E-07	8.5E-07	
EUI 018	Diesel Generator	018	PAH Total	1400	HP 1.5E-06 20	2.1E-03	9.1E-03	0	9.1E-03	500	5.2E-04	5.2E-04	
EUI 018	Diesel Generator	018	Polycyclic organic matter (POM)	1400	HP 5.7E-07 20	8.0E-04	3.5E-03	0	3.5E-03	500	2.0E-04	2.0E-04	
EUI 019	Package Boiler Fuel Oil Tank (500,000)	019	Total VOC	-	-	27	3.2E-02	1.4E-01	0	1.4E-01	8760	1.4E-01	1.4E-01
EUI 020	Fire Pump Diesel Storage Tank (500 gal)	020	Total VOC	-	-	27	9.1E-06	4.0E-05	0	4.0E-05	8760	4.0E-05	4.0E-05
EUI 021	Emerg. Generator Diesel Tank (500 gal)	021	Total VOC	-	-	27	1.5E-05	6.5E-05	0	6.5E-05	8760	6.5E-05	6.5E-05
N/A	Pack. Boiler Feedwater Pump Diesel Tank	FUG	Total VOC	-	-	27	0.0E+00	0.0E+00	0	0.0E+00	8760	0.0E+00	0.0E+00
IA	Building HVAC NG Unit	N/A	Lead	1.2	MMBtu/hr 4.9E-07 7	5.9E-07	2.6E-06	0	2.6E-06	8760	2.6E-06	2.6E-06	
IA	Building HVAC NG Unit	N/A	PM10	1.2	MMBtu/hr 7.5E-03 7	8.9E-03	3.9E-02	0	3.9E-02	8760	3.9E-02	3.9E-02	
IA	Building HVAC NG Unit	N/A	Total PM	1.2	MMBtu/hr 7.0E-03 7	8.4E-03	3.7E-02	0	3.7E-02	8760	3.7E-02	3.7E-02	
IA	Building HVAC NG Unit	N/A	Sulfur Dioxide	1.2	MMBtu/hr 5.9E-04 7	7.1E-04	3.1E-03	0	3.1E-03	8760	3.1E-03	3.1E-03	

Table C-2
Spiritwood Station
Emission Calculations by Unit

Emission Unit ID	Unit Name	Emission Point (EPN)	Pollutant	Maximum Rate (units/hr)	Emission Factor (lb/units) (Ref.No.)	Emission Rate (lb/hr)	Uncontrolled Potential to Emit (PTE) (ton/yr)	Pollution Control Efficiency (%)	Controlled Potential to Emit (PTE) (ton/yr)	Estimated Operating Hours (hr/yr)	Limited VOC Potential to Emit (PTE) (ton/yr)	Estimated Actual Emissions (ton/yr)	
IA	Building HVAC NG Unit	N/A	Total VOC	1.2	MMBtu/hr 5.4E-03	7	6.5E-03	2.8E-02	0	2.8E-02	8760	2.8E-02	2.8E-02
IA	Building HVAC NG Unit	N/A	Nitrogen Oxides	1.2	MMBtu/hr 1.9E-01	7	2.2E-01	9.8E-01	0	9.8E-01	8760	9.8E-01	9.8E-01
IA	Building HVAC NG Unit	N/A	Carbon Monoxide	1.2	MMBtu/hr 8.2E-02	7	9.9E-02	4.3E-01	0	4.3E-01	8760	4.3E-01	4.3E-01
IA	Building HVAC NG Unit	N/A	Benzene	1.2	MMBtu/hr 2.1E-06	8	2.5E-06	1.1E-05	0	1.1E-05	8760	1.1E-05	1.1E-05
IA	Building HVAC NG Unit	N/A	Dichlorobenzene	1.2	MMBtu/hr 1.2E-06	8	1.4E-06	6.2E-06	0	6.2E-06	8760	6.2E-06	6.2E-06
IA	Building HVAC NG Unit	N/A	Formaldehyde	1.2	MMBtu/hr 7.4E-05	8	8.8E-05	3.9E-04	0	3.9E-04	8760	3.9E-04	3.9E-04
IA	Building HVAC NG Unit	N/A	Hexane	1.2	MMBtu/hr 1.8E-03	8	2.1E-03	9.3E-03	0	9.3E-03	8760	9.3E-03	9.3E-03
IA	Building HVAC NG Unit	N/A	Naphthalene	1.2	MMBtu/hr 6.0E-07	8	7.2E-07	3.1E-06	0	3.1E-06	8760	3.1E-06	3.1E-06
IA	Building HVAC NG Unit	N/A	Toluene	1.2	MMBtu/hr 3.3E-06	8	4.0E-06	1.8E-05	0	1.8E-05	8760	1.8E-05	1.8E-05
IA	Building HVAC NG Unit	N/A	Benzo(a)anthracene	1.2	MMBtu/hr 1.8E-09	8	2.1E-09	9.3E-09	0	9.3E-09	8760	9.3E-09	9.3E-09
IA	Building HVAC NG Unit	N/A	Benzo(a)pyrene	1.2	MMBtu/hr 1.2E-09	8	1.4E-09	6.2E-09	0	6.2E-09	8760	6.2E-09	6.2E-09
IA	Building HVAC NG Unit	N/A	Benzo(b)fluoranthene	1.2	MMBtu/hr 1.8E-09	8	2.1E-09	9.3E-09	0	9.3E-09	8760	9.3E-09	9.3E-09
IA	Building HVAC NG Unit	N/A	Benzo(k)fluoranthene	1.2	MMBtu/hr 1.8E-09	8	2.1E-09	9.3E-09	0	9.3E-09	8760	9.3E-09	9.3E-09
IA	Building HVAC NG Unit	N/A	Chrysene	1.2	MMBtu/hr 1.8E-09	8	2.1E-09	9.3E-09	0	9.3E-09	8760	9.3E-09	9.3E-09
IA	Building HVAC NG Unit	N/A	Dibenzo(a,h)anthracene	1.2	MMBtu/hr 1.2E-09	8	1.4E-09	6.2E-09	0	6.2E-09	8760	6.2E-09	6.2E-09
IA	Building HVAC NG Unit	N/A	Indeno(1,2,3-cd)pyrene	1.2	MMBtu/hr 1.8E-09	8	2.1E-09	9.3E-09	0	9.3E-09	8760	9.3E-09	9.3E-09
IA	Building HVAC NG Unit	N/A	PAH Total	1.2	MMBtu/hr 8.6E-08	8	1.0E-07	4.5E-07	0	4.5E-07	8760	4.5E-07	4.5E-07
IA	Building HVAC NG Unit	N/A	Polycyclic organic matter (POM)	1.2	MMBtu/hr 8.6E-08	8	1.0E-07	4.5E-07	0	4.5E-07	8760	4.5E-07	4.5E-07
IA	Building HVAC NG Unit	N/A	Arsenic (7440-38-2)	1.2	MMBtu/hr 2.0E-07	9	2.4E-07	1.0E-06	0	1.0E-06	8760	1.0E-06	1.0E-06
IA	Building HVAC NG Unit	N/A	Beryllium (744-43-0-9)	1.2	MMBtu/hr 1.2E-08	9	1.4E-08	6.2E-08	0	6.2E-08	8760	6.2E-08	6.2E-08
IA	Building HVAC NG Unit	N/A	Cadmium (7440-43-9)	1.2	MMBtu/hr 1.1E-06	9	1.3E-06	5.7E-06	0	5.7E-06	8760	5.7E-06	5.7E-06
IA	Building HVAC NG Unit	N/A	Chromium	1.2	MMBtu/hr 1.4E-06	9	1.6E-06	7.2E-06	0	7.2E-06	8760	7.2E-06	7.2E-06
IA	Building HVAC NG Unit	N/A	Cobalt	1.2	MMBtu/hr 8.2E-08	9	9.9E-08	4.3E-07	0	4.3E-07	8760	4.3E-07	4.3E-07
IA	Building HVAC NG Unit	N/A	Manganese (74439-96-5)	1.2	MMBtu/hr 3.7E-07	9	4.5E-07	2.0E-06	0	2.0E-06	8760	2.0E-06	2.0E-06
IA	Building HVAC NG Unit	N/A	Mercury (7439-97-6)	1.2	MMBtu/hr 2.5E-07	9	3.1E-07	1.3E-06	0	1.3E-06	8760	1.3E-06	1.3E-06
IA	Building HVAC NG Unit	N/A	Nickel (7440-02-0)	1.2	MMBtu/hr 2.1E-06	9	2.5E-06	1.1E-05	0	1.1E-05	8760	1.1E-05	1.1E-05
IA	Building HVAC NG Unit	N/A	Selenium (7782-49-2)	1.2	MMBtu/hr 2.4E-08	9	2.8E-08	1.2E-07	0	1.2E-07	8760	1.2E-07	1.2E-07
EUI 022	Rail Car NG/Propane Heaters	002	Lead	14	MMBtu/hr 4.9E-07	7	6.9E-06	3.0E-05	0	3.0E-05	8760	3.0E-05	3.0E-05
EUI 022	Rail Car NG/Propane Heaters	002	PM10	14	MMBtu/hr 7.5E-03	7	1.0E-01	4.6E-01	0	4.6E-01	8760	4.6E-01	4.6E-01
EUI 022	Rail Car NG/Propane Heaters	002	Total PM	14	MMBtu/hr 7.5E-03	7	1.0E-01	4.6E-01	0	4.6E-01	8760	4.6E-01	4.6E-01
EUI 022	Rail Car NG/Propane Heaters	002	Sulfur Dioxide	14	MMBtu/hr 2.0E-02	26	2.8E-01	1.2E+00	0	1.2E+00	8760	1.2E+00	1.2E+00
EUI 022	Rail Car NG/Propane Heaters	002	Total VOC	14	MMBtu/hr 5.4E-03	7	7.5E-02	3.3E-01	0	3.3E-01	8760	3.3E-01	3.3E-01
EUI 022	Rail Car NG/Propane Heaters	002	Nitrogen Oxides	14	MMBtu/hr 1.9E-01	7	2.6E+00	1.1E+01	0	1.1E+01	8760	1.1E+01	1.1E+01
EUI 022	Rail Car NG/Propane Heaters	002	Carbon Monoxide	14	MMBtu/hr 8.2E-02	7	1.2E+00	5.0E+00	0	5.0E+00	8760	5.0E+00	5.0E+00
EUI 022	Rail Car NG/Propane Heaters	002	Benzene	14	MMBtu/hr 2.1E-06	8	2.9E-05	1.3E-04	0	1.3E-04	8760	1.3E-04	1.3E-04
EUI 022	Rail Car NG/Propane Heaters	002	Dichlorobenzene	14	MMBtu/hr 1.2E-06	8	1.6E-05	7.2E-05	0	7.2E-05	8760	7.2E-05	7.2E-05
EUI 022	Rail Car NG/Propane Heaters	002	Formaldehyde	14	MMBtu/hr 7.4E-05	8	1.0E-03	4.5E-03	0	4.5E-03	8760	4.5E-03	4.5E-03
EUI 022	Rail Car NG/Propane Heaters	002	Hexane	14	MMBtu/hr 1.8E-03	8	2.5E-02	1.1E-01	0	1.1E-01	8760	1.1E-01	1.1E-01
EUI 022	Rail Car NG/Propane Heaters	002	Naphthalene	14	MMBtu/hr 6.0E-07	8	8.4E-06	3.7E-05	0	3.7E-05	8760	3.7E-05	3.7E-05
EUI 022	Rail Car NG/Propane Heaters	002	Toluene	14	MMBtu/hr 3.3E-06	8	4.7E-05	2.0E-04	0	2.0E-04	8760	2.0E-04	2.0E-04
EUI 022	Rail Car NG/Propane Heaters	002	Arsenic (7440-38-2)	14	MMBtu/hr 2.0E-07	9	2.7E-06	1.2E-05	0	1.2E-05	8760	1.2E-05	1.2E-05
EUI 022	Rail Car NG/Propane Heaters	002	Beryllium (744-43-0-9)	14	MMBtu/hr 1.2E-08	9	1.6E-07	7.2E-07	0	7.2E-07	8760	7.2E-07	7.2E-07
EUI 022	Rail Car NG/Propane Heaters	002	Cadmium (7440-43-9)	14	MMBtu/hr 1.1E-06	9	1.5E-05	6.6E-05	0	6.6E-05	8760	6.6E-05	6.6E-05
EUI 022	Rail Car NG/Propane Heaters	002	Chromium	14	MMBtu/hr 1.4E-06	9	1.9E-05	8.4E-05	0	8.4E-05	8760	8.4E-05	8.4E-05
EUI 022	Rail Car NG/Propane Heaters	002	Cobalt	14	MMBtu/hr 8.2E-08	9	1.2E-06	5.0E-06	0	5.0E-06	8760	5.0E-06	5.0E-06
EUI 022	Rail Car NG/Propane Heaters	002	Manganese (74439-96-5)	14	MMBtu/hr 3.7E-07	9	5.2E-06	2.3E-05	0	2.3E-05	8760	2.3E-05	2.3E-05
EUI 022	Rail Car NG/Propane Heaters	002	Mercury (7439-97-6)	14	MMBtu/hr 2.5E-07	9	3.6E-06	1.6E-05	0	1.6E-05	8760	1.6E-05	1.6E-05
EUI 022	Rail Car NG/Propane Heaters	002	Nickel (7440-02-0)	14	MMBtu/hr 2.1E-06	9	2.9E-05	1.3E-04	0	1.3E-04	8760	1.3E-04	1.3E-04
EUI 022	Rail Car NG/Propane Heaters	002	Selenium (7782-49-2)	14	MMBtu/hr 2.4E-08	9	3.3E-07	1.4E-06	0	1.4E-06	8760	1.4E-06	1.4E-06

Table C-2
Spiritwood Station
Emission Calculations by Unit

Emission Unit ID	Unit Name	Emission Point (EPN)	Pollutant	Maximum Rate (units/hr)	Emission Factor (lb/units) (Ref.No.)	Emission Rate (lb/hr)	Uncontrolled Potential to Emit (PTE) (ton/yr)	Pollution Control Efficiency (%)	Controlled Potential to Emit (PTE) (ton/yr)	Estimated Operating Hours (hr/yr)	Limited VOC Potential to Emit (PTE) (ton/yr)	Estimated Actual Emissions (ton/yr)
IA	Space Heaters (12 Combined) - NG Fired	N/A	Lead	0.56 MMBtu/hr	4.9E-07 7	2.7E-07	1.2E-06	0	1.2E-06	8760	1.2E-06	1.2E-06
IA	Space Heaters (12 Combined) - NG Fired	N/A	PM10	0.56 MMBtu/hr	7.5E-03 7	4.2E-03	1.8E-02	0	1.8E-02	8760	1.8E-02	1.8E-02
IA	Space Heaters (12 Combined) - NG Fired	N/A	Total PM	0.56 MMBtu/hr	7.0E-03 7	3.9E-03	1.7E-02	0	1.7E-02	8760	1.7E-02	1.7E-02
IA	Space Heaters (12 Combined) - NG Fired	N/A	Sulfur Dioxide	0.56 MMBtu/hr	5.9E-04 7	3.3E-04	1.4E-03	0	1.4E-03	8760	1.4E-03	1.4E-03
IA	Space Heaters (12 Combined) - NG Fired	N/A	Total VOC	0.56 MMBtu/hr	5.4E-03 7	3.0E-03	1.3E-02	0	1.3E-02	8760	1.3E-02	1.3E-02
IA	Space Heaters (12 Combined) - NG Fired	N/A	Nitrogen Oxides	0.56 MMBtu/hr	1.9E-01 7	1.0E-01	4.6E-01	0	4.6E-01	8760	4.6E-01	4.6E-01
IA	Space Heaters (12 Combined) - NG Fired	N/A	Carbon Monoxide	0.56 MMBtu/hr	8.2E-02 7	4.6E-02	2.0E-01	0	2.0E-01	8760	2.0E-01	2.0E-01
IA	Space Heaters (12 Combined) - NG Fired	N/A	Benzene	0.56 MMBtu/hr	2.1E-06 8	1.2E-06	5.0E-06	0	5.0E-06	8760	5.0E-06	5.0E-06
IA	Space Heaters (12 Combined) - NG Fired	N/A	Dichlorobenzene	0.56 MMBtu/hr	1.2E-06 8	6.6E-07	2.9E-06	0	2.9E-06	8760	2.9E-06	2.9E-06
IA	Space Heaters (12 Combined) - NG Fired	N/A	Formaldehyde	0.56 MMBtu/hr	7.4E-05 8	4.1E-05	1.8E-04	0	1.8E-04	8760	1.8E-04	1.8E-04
IA	Space Heaters (12 Combined) - NG Fired	N/A	Hexane	0.56 MMBtu/hr	1.8E-03 8	9.9E-04	4.3E-03	0	4.3E-03	8760	4.3E-03	4.3E-03
IA	Space Heaters (12 Combined) - NG Fired	N/A	Naphthalene	0.56 MMBtu/hr	6.0E-07 8	3.3E-07	1.5E-06	0	1.5E-06	8760	1.5E-06	1.5E-06
IA	Space Heaters (12 Combined) - NG Fired	N/A	Toluene	0.56 MMBtu/hr	3.3E-06 8	1.9E-06	8.2E-06	0	8.2E-06	8760	8.2E-06	8.2E-06
IA	Space Heaters (12 Combined) - NG Fired	N/A	Benzo(a)anthracene	0.56 MMBtu/hr	1.8E-09 8	9.9E-10	4.3E-09	0	4.3E-09	8760	4.3E-09	4.3E-09
IA	Space Heaters (12 Combined) - NG Fired	N/A	Benzo(a)pyrene	0.56 MMBtu/hr	1.2E-09 8	6.6E-10	2.9E-09	0	2.9E-09	8760	2.9E-09	2.9E-09
IA	Space Heaters (12 Combined) - NG Fired	N/A	Benzo(b)fluoranthene	0.56 MMBtu/hr	1.8E-09 8	9.9E-10	4.3E-09	0	4.3E-09	8760	4.3E-09	4.3E-09
IA	Space Heaters (12 Combined) - NG Fired	N/A	Benzo(k)fluoranthene	0.56 MMBtu/hr	1.8E-09 8	9.9E-10	4.3E-09	0	4.3E-09	8760	4.3E-09	4.3E-09
IA	Space Heaters (12 Combined) - NG Fired	N/A	Chrysene	0.56 MMBtu/hr	1.8E-09 8	9.9E-10	4.3E-09	0	4.3E-09	8760	4.3E-09	4.3E-09
IA	Space Heaters (12 Combined) - NG Fired	N/A	Dibenzo(a,h)anthracene	0.56 MMBtu/hr	1.2E-09 8	6.6E-10	2.9E-09	0	2.9E-09	8760	2.9E-09	2.9E-09
IA	Space Heaters (12 Combined) - NG Fired	N/A	Indeno(1,2,3-cd)pyrene	0.56 MMBtu/hr	1.8E-09 8	9.9E-10	4.3E-09	0	4.3E-09	8760	4.3E-09	4.3E-09
IA	Space Heaters (12 Combined) - NG Fired	N/A	PAH Total	0.56 MMBtu/hr	8.6E-08 8	4.8E-08	2.1E-07	0	2.1E-07	8760	2.1E-07	2.1E-07
IA	Space Heaters (12 Combined) - NG Fired	N/A	Polycyclic organic matter (POM)	0.56 MMBtu/hr	8.6E-08 8	4.8E-08	2.1E-07	0	2.1E-07	8760	2.1E-07	2.1E-07
IA	Space Heaters (12 Combined) - NG Fired	N/A	Arsenic (7440-38-2)	0.56 MMBtu/hr	2.0E-07 9	1.1E-07	4.8E-07	0	4.8E-07	8760	4.8E-07	4.8E-07
IA	Space Heaters (12 Combined) - NG Fired	N/A	Beryllium (7443-0-9)	0.56 MMBtu/hr	1.2E-08 9	6.6E-09	2.9E-08	0	2.9E-08	8760	2.9E-08	2.9E-08
IA	Space Heaters (12 Combined) - NG Fired	N/A	Cadmium (7440-43-9)	0.56 MMBtu/hr	1.1E-06 9	6.0E-07	2.6E-06	0	2.6E-06	8760	2.6E-06	2.6E-06
IA	Space Heaters (12 Combined) - NG Fired	N/A	Chromium	0.56 MMBtu/hr	1.4E-06 9	7.7E-07	3.4E-06	0	3.4E-06	8760	3.4E-06	3.4E-06
IA	Space Heaters (12 Combined) - NG Fired	N/A	Cobalt	0.56 MMBtu/hr	8.2E-08 9	4.6E-08	2.0E-07	0	2.0E-07	8760	2.0E-07	2.0E-07
IA	Space Heaters (12 Combined) - NG Fired	N/A	Manganese (74439-96-5)	0.56 MMBtu/hr	3.7E-07 9	2.1E-07	9.1E-07	0	9.1E-07	8760	9.1E-07	9.1E-07
IA	Space Heaters (12 Combined) - NG Fired	N/A	Mercury (7439-97-6)	0.56 MMBtu/hr	2.5E-07 9	1.4E-07	6.3E-07	0	6.3E-07	8760	6.3E-07	6.3E-07
IA	Space Heaters (12 Combined) - NG Fired	N/A	Nickel (7440-02-0)	0.56 MMBtu/hr	2.1E-06 9	1.2E-06	5.0E-06	0	5.0E-06	8760	5.0E-06	5.0E-06
IA	Space Heaters (12 Combined) - NG Fired	N/A	Selenium (7782-49-2)	0.56 MMBtu/hr	2.4E-08 9	1.3E-08	5.8E-08	0	5.8E-08	8760	5.8E-08	5.8E-08

Table C-3
Spiritwood Station
Summary of Facility Hazardous Air Pollutant (HAP) Emissions

Listed HAP	Uncontrolled Potential to Emit (PTE) (ton/yr)	Controlled Potential to Emit (PTE) (ton/yr)	Estimated Actual Emissions (ton/yr)
Acetaldehyde	2.3E-01	2.3E-01	2.1E-01
Acetophenone	5.6E-03	5.6E-03	5.6E-03
Acrolein	1.2E-01	1.2E-01	1.1E-01
Benzene	5.4E-01	5.4E-01	5.0E-01
Benzyl chloride	2.6E-01	2.6E-01	2.6E-01
Biphenyl	6.3E-04	6.3E-04	6.3E-04
Bis (2-ethylhexyl) phthalate (DEHP)	2.7E-02	2.7E-02	2.7E-02
Bromoform	1.5E-02	1.5E-02	1.5E-02
1,3-Butadiene	1.4E-01	1.4E-01	7.9E-03
Carbon disulfide	4.9E-02	4.9E-02	4.9E-02
2-Chloroacetophenone	2.6E-03	2.6E-03	2.6E-03
Chlorobenzene	8.2E-03	8.2E-03	8.2E-03
Chloroform	2.2E-02	2.2E-02	2.2E-02
Cumene	2.0E-03	2.0E-03	2.0E-03
1,4-Dichlorobenzene(p)	6.6E-03	6.6E-03	6.6E-03
Dimethyl Sulfate	1.8E-02	1.8E-02	1.8E-02
2,4-Dinitrotoluene	1.0E-04	1.0E-04	1.0E-04
Ethyl benzene	3.7E-02	3.7E-02	3.7E-02
Ethyl chloride (Chloroethane)	1.6E-02	1.6E-02	1.6E-02
Ethylene dibromide (Dibromoethane)	4.5E-04	4.5E-04	4.5E-04
Ethylene dichloride (1,2- Dichloroethane)	1.5E-02	1.5E-02	1.5E-02
Formaldehyde	9.8E-01	9.8E-01	9.8E-01
Hexane	9.9E+00	9.9E+00	9.9E+00
Hydrochloric acid	4.5E+02	2.2E+01	2.2E+01
Hydrogen flouride (hydrofluoric acid)	5.6E+01	2.8E+00	2.8E+00
Isophorone	2.2E-01	2.2E-01	2.2E-01
Methyl bromide (Bromomethane)	6.0E-02	6.0E-02	6.0E-02
Methyl chloride (Choromethane)	2.0E-01	2.0E-01	2.0E-01
Methyl chloroform (1,1,1-Trichloroethane)	1.3E-02	1.3E-02	1.3E-02
Methyl hydrazine	6.3E-02	6.3E-02	6.3E-02
Methyl methacrylate	7.5E-03	7.5E-03	7.5E-03
Methyl tert butyl ether	1.3E-02	1.3E-02	1.3E-02
Methylene chloride (Dichloromethane)	1.1E-01	1.1E-01	1.1E-01
Naphthalene	4.0E-02	4.0E-02	3.4E-02
Phenol	6.0E-03	6.0E-03	6.0E-03
Propionaldehyde	1.4E-01	1.4E-01	1.4E-01
Styrene	9.3E-03	9.3E-03	9.3E-03
Tetrachloroethylene (Perchloroethylene)	1.6E-02	1.6E-02	1.6E-02
Toluene	2.6E-01	2.6E-01	2.5E-01
Vinyl acetate	2.8E-03	2.8E-03	2.8E-03
Xylenes (isomers and mixtures)	2.8E-02	2.8E-02	1.7E-02
Antimony	6.7E-03	6.7E-03	6.7E-03
Arsenic (7440-38-2)	1.7E-01	1.7E-01	1.7E-01
Beryllium (744-43-0-9)	1.8E-02	1.8E-02	1.8E-02
Cadmium (7440-43-9)	3.0E-02	3.0E-02	3.0E-02
Chromium	1.1E-01	1.1E-01	1.1E-01
Cobalt	3.8E-02	3.8E-02	3.8E-02
Cyanide compounds	9.3E-01	9.3E-01	9.3E-01
Lead	1.6E+01	1.9E-01	1.9E-01
Manganese (74439-96-5)	2.0E-01	2.0E-01	2.0E-01
Mercury (7439-97-6)	4.2E-02	6.1E-02	6.1E-02
Nickel (7440-02-0)	1.2E-01	1.2E-01	1.2E-01
Polycyclic organic matter (POM)	8.9E-02	8.9E-02	8.4E-02
Selenium (7782-49-2)	5.4E-01	5.4E-01	5.4E-01
Total HAPs	535.7	41.3	41.1
Largest HAP			
Hydrochloric acid	448.1	22.4	22.4

Table C-4
Spiritwood Station
References used for Emission Calculations

EMISSION FACTORS FROM AP-42

All emissions calculated using AP-42 emission factors, unless noted otherwise, were calculated in the following manner:

$$\text{Emission Rate [lb/hr]} = (\text{Maximum Rate}) * (\text{Emission Factor}) * (\text{Conversion Factor})$$

$$\text{Uncontrolled PTE [ton/yr]} = \text{Emission Rate [lb/hr]} * (2000 \text{ lb/ton}) / (8760 \text{ hours/yr})$$

$$\text{Controlled PTE [ton/yr]} = (\text{Uncontrolled PTE}) * (100 - (\text{Control Efficiency})) / 100$$

$$\text{Limited PTE [ton/yr]} = (\text{Controlled PTE}) * (\text{operating hours}) / 8760$$

AP-42 SECTION 1.3 - FUEL OIL COMBUSTION

- [1] Table 1.3-1. CRITERIA POLLUTANT EMISSION FACTORS FOR FUEL OIL COMBUSTION
 Boilers > 100 MMBtu/hr, No. 2 oil fired

Pollutant	Emission Factor	EF Rating
SO2	sulfur content of 0.05% → 0.05 × 157 = 7.85 lb/10 ³ gal	A
NOx	24 lb/10 ³ gal	D
CO	5 lb/10 ³ gal	A
PM filterable	2 lb/10 ³ gal	A
H2SO4 Mist	0.08 lb/10 ³ gal	A

From AP-42 section 1.3, the sulfuric acid mist emission factor was found by assuming 1% of SO2 emissions convert to H2SO4 Mist.

- [2] Table 1.3-2. CONDENSABLE PARTICULATE MATTER EMISSION FACTORS FOR OIL COMBUSTION

No. 2 oil fired	Total Condensable PM	Emission Factor	EF Rating
		1.3 lb/10 ³ gal	D

This emission factor is added to filterable PM from reference [1] for total PM emissions.

- [3] Table 1.3-3. EMISSION FACTORS FOR TOTAL ORGANIC COMPOUNDS (TOC), METHANE, AND NONMETHANE TOC (NMTOC)
 FROM UNCONTROLLED FUEL OIL COMBUSTION
 Industrial Boilers, Distillate Oil Fired

Pollutant	Emission Factor	EF Rating
VOC	0.2 lb/10 ³ gal	A

- [4] Table 1.3-8. EMISSION FACTORS FOR NITROUS OXIDE (N2O), POLYCYCLIC ORGANIC MATTER (POM), AND FORMALDEHYDE (HCOH)
 FROM FUEL OIL COMBUSTION
 Distillate oil fired

Pollutant	Emission Factor
POM	0.0033 lb/10 ³ gal
Formaldehyde	0.061 lb/10 ³ gal

- [5] Table 1.3-9. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM FUEL OIL COMBUSTION

Organic Compound	Emission Factor
Benzene	2.4E-04 lb/10 ³ gal
Ethylbenzene	6.4E-05 lb/10 ³ gal
Formaldehyde	3.3E-02 lb/10 ³ gal
Naphthalene	1.1E-03 lb/10 ³ gal
1,1,1-Trichloroethane	2.4E-04 lb/10 ³ gal
Toluene	6.2E-03 lb/10 ³ gal
o-Xylene	1.1E-04 lb/10 ³ gal
Benz(a)anthracene	4.0E-06 lb/10 ³ gal
Benzo(b,k)fluoranthene	1.5E-06 lb/10 ³ gal
Chrysene	2.4E-06 lb/10 ³ gal
Dibenzo(a,h)anthracene	1.7E-06 lb/10 ³ gal
Indo(1,2,3-cd)pyrene	2.1E-06 lb/10 ³ gal
Total PAH EF	1.2E-03 lb/10 ³ gal

Table C-4
Spiritwood Station
References used for Emission Calculations

[6] Table 1.3-10. EMISSION FACTORS FOR TRACE ELEMENTS FROM DISTILLATE FUEL OIL COMBUSTION SOURCES
 Distillate oil fired

Pollutant	Emission Factor
As	4 lb/10 ¹² Btu
Be	3 lb/10 ¹² Btu
Cd	3 lb/10 ¹² Btu
Cr	3 lb/10 ¹² Btu
Pb	9 lb/10 ¹² Btu
Mn	6 lb/10 ¹² Btu
Hg	3 lb/10 ¹² Btu
Ni	3 lb/10 ¹² Btu
Se	15 lb/10 ¹² Btu
No. 2 Fuel Oil Conversion Factor	140 MMBtu/10 ³ gal

AP-42 SECTION 1.4 - NATURAL GAS COMBUSTION

[7] TABLE 1.4-1 & 1.4-2. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM NATURAL GAS COMBUSTION

Pollutant	Emission Factor	EF Rating
Lead	0.0005 lb/10 ⁶ scf	D
PM, total	7.6 lb/10 ⁶ scf	D
SO ₂	0.6 lb/10 ⁶ scf	A
VOC	5.5 lb/10 ⁶ scf	C
NO _x	190 lb/10 ⁶ scf	A
CO	84 lb/10 ⁶ scf	B
NO _x	100 lb/10 ⁶ scf	B

Large (>100 MMBtu/hr) Post NSPS Boiler
 Small (<100 MMBtu/hr) Boiler

[8] Table 1.4-3. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM NATURAL GAS COMBUSTION

CAS No.	Pollutant	Emission Factor	EF Rating
56-55-3	Benzo(a)anthracene	1.80E-06 lb/10 ⁶ scf	E
71-43-2	Benzene	2.10E-03 lb/10 ⁶ scf	B
50-32-8	Benzo(a)pyrene	1.20E-06 lb/10 ⁶ scf	E
205-99-2	Benzo(b)fluoranthene	1.80E-06 lb/10 ⁶ scf	E
205-82-3	Benzo(k)fluoranthene	1.80E-06 lb/10 ⁶ scf	E
218-01-9	Chrysene	1.80E-06 lb/10 ⁶ scf	E
53-70-3	Dibenzo(a,h)anthracene	1.20E-06 lb/10 ⁶ scf	E
25321-22-6	Dichlorobenzene	1.20E-03 lb/10 ⁶ scf	E
50-00-0	Formaldehyde	7.50E-02 lb/10 ⁶ scf	B
110-54-3	Hexane	1.80E+00 lb/10 ⁶ scf	E
193-39-5	Indeno(1,2,3-cd)pyrene	1.80E-06 lb/10 ⁶ scf	E
91-20-3	Naphthalene	6.10E-04 lb/10 ⁶ scf	E
108-88-3	Toluene	3.40E-03 lb/10 ⁶ scf	C
	POM	8.82E-05 lb/10 ⁶ scf	Calculated
	Total PAH	8.82E-05 lb/10 ⁶ scf	Calculated

[9] Table 1.4-4. EMISSION FACTORS FOR METALS FROM NATURAL GAS COMBUSTION

CAS No.	Pollutant	Emission Factor	EF Rating
7440-38-2	Arsenic	2.00E-04 lb/10 ⁶ scf	E
7440-41-7	Beryllium	1.20E-05 lb/10 ⁶ scf	E
7440-43-9	Cadmium	1.10E-03 lb/10 ⁶ scf	D
7440-47-3	Chromium	1.40E-03 lb/10 ⁶ scf	D
7439-96-5	Manganese	3.80E-04 lb/10 ⁶ scf	D
7439-97-6	Mercury	2.60E-04 lb/10 ⁶ scf	D
7440-02-0	Nickel	2.10E-03 lb/10 ⁶ scf	C
7782-49-2	Selenium	2.40E-05 lb/10 ⁶ scf	E

Natural Gas Conversion Factor

1020 MMBtu/10⁶ scf

AP-42 SECTION 1.5 - LIQUIFIED PETROLEUM GAS COMBUSTION

[10] Table 1.5-1. EMISSION FACTORS FOR LPG COMBUSTION
 Propane - Industrial Boilers (10 to 100 MMBtu/hr)

BACT/Vendor lb/MMBtu	Pollutant	Emission Factor	EF Rating
0.007	PM	0.6 lb/10 ³ gal	E
0.02	SO ₂	1.79 lb/10 ³ gal	E
0.04	NO _x	19 lb/10 ³ gal	E
0.08	CO	3.2 lb/10 ³ gal	E
0.005	TOC	0.5 lb/10 ³ gal	E

Sulfur content of propane = 220 ppmw →

Table C-4
Spiritwood Station
References used for Emission Calculations

Propane Conversion Factor

90.5 MMBtu/10³ gal propane

AP-42 SECTION 1.7 - LIGNITE COMBUSTION

[11] Table 1.7-1. EMISSION FACTORS FOR SO_x, NO_x, CO, AND CO₂ FROM UNCONTROLLED LIGNITE COMBUSTION

Pollutant	Emission Factor	EF Rating
	using sulfur content of 1.13% → 1.13 × 10 =	
SO _x	11.3 lb/ton	C
NO _x	3.6 lb/ton	C
CO	0.15 lb/ton	C
TNMOC	0.03 lb/ton	C

[12] Table 1.7-10 EMISSION FACTORS FOR POLYNUCLEAR AROMATIC HYDROCARBONS (PAH) FROM CONTROLLED COAL COMBUSTION

Pollutant	Emission Factor	EF Rating
Biphenyl	1.70E-06 lb/ton	D
Benzo(a)anthracene	8.00E-08 lb/ton	B
Benzo(a)pyrene	3.80E-08 lb/ton	D
Benzo(b,j,k)fluoranthene	1.10E-07 lb/ton	B
Chrysene	1.00E-07 lb/ton	C
Indeno(1,2,3-cd)pyrene	6.10E-08 lb/ton	C
Naphthalene	1.30E-05 lb/ton	C
5-Methyl chrysene	2.20E-08 lb/ton	D

[13] Table 1.7-11 EMISSION FACTORS FOR VARIOUS ORGANIC COMPOUNDS FROM CONTROLLED COAL COMBUSTION

Pollutant	Emission Factor	EF Rating
Acetaldehyde	5.70E-04 lb/ton	C
Acetophenone	1.50E-05 lb/ton	D
Acrolein	2.90E-04 lb/ton	D
Benzene	1.30E-03 lb/ton	A
Benzyl chloride	7.00E-04 lb/ton	D
Bis(2-ethylhexyl)phthalate (DEHP)	7.30E-05 lb/ton	D
Bromoform	3.90E-05 lb/ton	E
Carbon disulfide	1.30E-04 lb/ton	D
2-Chloroacetophenone	7.00E-06 lb/ton	E
Chlorobenzene	2.20E-05 lb/ton	D
Chloroform	5.90E-05 lb/ton	D
Cumene	5.30E-06 lb/ton	E
Cyanide	2.50E-03 lb/ton	D
Dimethyl sulfate	4.80E-05 lb/ton	E
Ethyl benzene	9.40E-05 lb/ton	D
Ethyl chloride	4.20E-05 lb/ton	D
Ethylene dichloride	4.00E-05 lb/ton	E
Ethylene dibromide	1.20E-06 lb/ton	E
Formaldehyde	2.40E-04 lb/ton	A
Hexane	6.70E-05 lb/ton	D
Methyl bromide	1.60E-04 lb/ton	D
Methyl chloride	5.30E-04 lb/ton	D
Methyl ethyl ketone	3.90E-04 lb/ton	D
Methyl hydrazine	1.70E-04 lb/ton	E
Methyl methacrylate	2.00E-05 lb/ton	E
Methyl tert butyl ether	3.50E-05 lb/ton	E
Methylene chloride	2.90E-04 lb/ton	D
Phenol	1.60E-05 lb/ton	D
Propionaldehyde	3.80E-04 lb/ton	D
Tetrachloroethylene	4.30E-05 lb/ton	D
Toluene	2.40E-04 lb/ton	A
1,1,1-Trichloroethane	2.00E-05 lb/ton	E
Styrene	2.50E-05 lb/ton	D
Xylenes	3.70E-05 lb/ton	C
Vinyl acetate	7.60E-06 lb/ton	E

[13A] Fluoride compound emissions are estimated based on EPRI emission factors developed from EPRI and DOE measurements at 51 different power plants. The data indicates that a significant portion of the fluoride in the fuel forms HF, which is readily controlled by the acid gas scrubber. The testing for organic compounds indicated the trace presence of four different fluorine compounds. Based on the 95-percentile upper confidence interval emission factors, fluoride compound emissions will be less 0.018 tons per year, which is significantly less than the PSD threshold of 3 tons/yr.

Operating Data

Heat Input 1280 mmBtu/hr

EPRI Emission Factors	Mean	Log Normal UCI	Sites Tested	Sites Detected	Sample Size	Data Quality
Fluoranthene	0.15 lb/10 ¹² Btu	0.39 lb/10 ¹² Btu	24	13	22	5 or more detected values, ≤ 50 non-detects in statistics
Fluorene	0.14 lb/10 ¹² Btu	0.4 lb/10 ¹² Btu	24	11	23	4 or more detected values, ≤ 67 non-detects in statistics
Trichlorofluoromethane	0.87 lb/10 ¹² Btu	2.3 lb/10 ¹² Btu	12	5	12	4 or more detected values, ≤ 67 non-detects in statistics
Benzo(b,j,k)fluoranthene	0.0096 lb/10 ¹² Btu	0.023 lb/10 ¹² Btu	26	10	14	5 or more detected values, ≤ 50 non-detects in statistics
Total	1.1696 lb/10¹² Btu	3.113 lb/10¹² Btu				

Fluoride Compound Emission Calculation

$$\text{Mean Fluoride Compound Emissions} = \frac{1,280 \text{ } 10^6 \text{ Btu}}{\text{hr}} \times \frac{1.1696 \text{ lb}}{1\text{E}+12 \text{ Btu}} \times \frac{\text{ton}}{2000 \text{ lb}} \times \frac{8760 \text{ hr}}{\text{yr}} = \frac{0.0066 \text{ tons F compounds}}{\text{yr}}$$

$$\text{UCI Fluoride Compound Emissions} = \frac{1,280 \text{ } 10^6 \text{ Btu}}{\text{hr}} \times \frac{3.113 \text{ lb}}{1\text{E}+12 \text{ Btu}} \times \frac{\text{ton}}{2000 \text{ lb}} \times \frac{8760 \text{ hr}}{\text{yr}} = \frac{0.0175 \text{ tons F compounds}}{\text{yr}}$$

Table C-4
Spiritwood Station
References used for Emission Calculations

[14] Table 1.7-14 EMISSION FACTORS FOR TRACE METALS FROM CONTROLLED COAL COMBUSTION

Pollutant	Emission Factor	EF Rating
Antimony	1.80E-05 lb/ton	A
Arsenic	4.10E-04 lb/ton	A
Beryllium	2.10E-05 lb/ton	A
Cadmium	5.10E-05 lb/ton	A
Chromium	2.60E-04 lb/ton	A
Chromium (VI)	7.90E-05 lb/ton	D
Cobalt	1.00E-04 lb/ton	A
Lead	4.20E-04 lb/ton	A
Magnesium	1.10E-02 lb/ton	A
Manganese	4.90E-04 lb/ton	A
Mercury	8.30E-05 lb/ton	A
Nickel	2.80E-04 lb/ton	A
Selenium	1.30E-03 lb/ton	A

It is anticipated that the above metal emissions, with the exception of arsenic, will have up to 99% reduction by the CFB boiler baghouse. However, for conservative estimation of emissions, zero percent control has been assumed. Using a control efficiency of 99%, an uncontrolled rate was "back calculated" out of the determined control rate for lead.

[14b] "Study of Hazardous Air Pollutant Emissions from Electric Utility Steam Generating Units" Final Report to Congress. EPA 453/R-98-004a
Emissions of Cr (IV) are 11% of all Cr emissions for coal combustion sources. Emission rate for Cr total is from reference [14]

Chromium (VI)	2.86E-05 lb/ton
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[15] Table 1.7-15. EMISSION FACTORS FOR HYDROGEN CHLORIDE (HCl) AND HYDROGEN FLUORIDE (HF) FROM COAL COMBUSTION
FBC, Circulating Bed

Pollutant	Emission Factor	EF Rating
HCl	1.2 lb/ton	B
HF	0.15 lb/ton	B

Lignite Conversion Factor

(7500 Btu/lb)

15 MMBtu/ton lignite

AP SECTION 3.3 - DIESEL INDUSTRIAL ENGINES (under 600 HP)

[16] Table 3.3-1. EMISSION FACTORS FOR UNCONTROLLED GASOLINE AND DIESEL INDUSTRIAL ENGINES

Pollutant	Emission Factor	EF Rating
NOx	0.031 lb/hp-hr	D
CO	6.68E-03 lb/hp-hr	D
SOx	2.05E-03 lb/hp-hr	D
PM-10	2.20E-03 lb/hp-hr	D
VOC	2.47E-03 lb/hp-hr	D

[17] TABLE 3.3-2. SPECIATED ORGANIC COMPOUND EMISSION FACTORS FOR UNCONTROLLED DIESEL ENGINES

Pollutant	Emission Factor
Benzene	9.33E-04 lb/MMBtu
Toluene	4.09E-04 lb/MMBtu
Xylenes	2.85E-04 lb/MMBtu
Propylene	2.58E-03 lb/MMBtu
1,3-Butadiene	3.91E-05 lb/MMBtu
Formaldehyde	1.18E-03 lb/MMBtu
Acetaldehyde	7.67E-04 lb/MMBtu
Acrolein	9.25E-05 lb/MMBtu
Polycyclic aromatic hydrocarbons (PAH):	
Naphthalene	8.48E-05 lb/MMBtu
Benzo(a)anthracene	1.68E-06 lb/MMBtu
Chrysene	3.53E-07 lb/MMBtu
Benzo(b)fluoranthene	9.91E-08 lb/MMBtu
Benzo(k)fluoranthene	1.55E-07 lb/MMBtu
Benzo(a)pyrene	1.88E-07 lb/MMBtu
Indeno(1,2,3-cd)pyrene	3.75E-07 lb/MMBtu
Dibenz(a,h)anthracene	5.83E-07 lb/MMBtu
Total PAH	1.68E-04 lb/MMBtu
POM	1.68E-04 lb/MMBtu

Table C-4
Spiritwood Station
References used for Emission Calculations

AP SECTION 3.4 - LARGE STATIONARY DIESEL INDUSTRIAL ENGINES (over 600 HP)

[18] Table 3.4-1. GASEOUS EMISSION FACTORS FOR LARGE STATIONARY DIESEL AND ALL STATIONARY DUAL-FUEL ENGINES

Pollutant	Emission Factor	EF Rating
NOx (Uncontrolled)	2.40E-02 lb/hp-hr	B
CO	5.50E-03 lb/hp-hr	C
SOx	4.05E-04 lb/hp-hr	B
PM	7.00E-04 lb/hp-hr	B
VOC	7.05E-04 lb/hp-hr	C

Assume S content of 0.05% →

[19] Table 3.4-3. SPECIATED ORGANIC COMPOUND EMISSION FACTORS FOR LARGE UNCONTROLLED STATIONARY DIESEL ENGINES

"Large" stationary diesel engines are those greater than 600 horsepower [hp]

Pollutant	Emission Factor	EF Rating
Benzene	7.76E-04 lb/MMBtu	E
Toluene	2.81E-04 lb/MMBtu	E
Xylenes	1.93E-04 lb/MMBtu	E
Propylene	2.79E-03 lb/MMBtu	E
Formaldehyde	7.89E-05 lb/MMBtu	E
Acetaldehyde	2.52E-05 lb/MMBtu	E
Acrolein	7.88E-06 lb/MMBtu	E

[20] Table 3.4-4. PAH EMISSION FACTORS FOR LARGE UNCONTROLLED STATIONARY DIESEL ENGINES

"Large" stationary diesel engines are those greater than 600 horsepower [hp]

Pollutant	Emission Factor	EF Rating
Naphthalene	1.30E-04 lb/MMBtu	E
Benz(a)anthracene	6.22E-07 lb/MMBtu	E
Chrysene	1.53E-06 lb/MMBtu	E
Benzo(b)fluoranthene	1.11E-06 lb/MMBtu	E
Benzo(k)fluoranthene	2.18E-07 lb/MMBtu	E
Benzo(a)pyrene	2.57E-07 lb/MMBtu	E
Indeno(1,2,3-cd)pyrene	4.14E-07 lb/MMBtu	E
Dibenz(a,h)anthracene	3.46E-07 lb/MMBtu	E
TOTAL PAH	2.12E-04 lb/MMBtu	E
POM	8.15E-05 lb/MMBtu	E

Diesel Engine Conversion Factor

0.007 MMBtu/HP-hr

[21] Table 13.4-1 (Metric And English Units). PARTICULATE EMISSIONS FACTORS FOR WET COOLING TOWERS

Emissions from cooling towers based on AP-42 calculation method contained within Chapter 13, Section 4.

Circulating Water Flow Rate:	80,000 gal/min
	4,800,000 gal/hr
Total Drift:	0.0005% circulating flow
	24.00 gal/hr
	200 lb/hr
Total Dissolved Solids:	6,000 ppm
<u>Emissions</u>	
PM:	1.21 lb/hr
Fraction PM ₁₀ (%) :	32
PM ₁₀ :	0.40 lb/hr
Fan Air Flow:	1,700,000 acfm/fan

Circulating water flow rate and fan air flow rate per 11/9/2006 email from Mike Botz of Unifield Engineering.
 No control is indicated for the cooling tower because the calculation is based on a BACT limit of 0.0005% drift.
 See Table C-7 for percentage PM₁₀ calculations.

Table C-4
Spiritwood Station
References used for Emission Calculations

[22] **Guarantees indicated by Babcock & Wilcox for CFB Boiler**

Pollutant		Emission Factor
	Using a heating value of	
SO2	15 MMBtu/ton	0.06 lb/MMBtu
NOx	for lignite	0.09 lb/MMBtu
PM10		0.03 lb/MMBtu
Total PM		0.015 lb/MMBtu
CO		0.15 lb/MMBtu
VOC		0.007 lb/MMBtu
Sulfuric Acid Mist		0.006 lb/MMBtu

Mercury NSPS limit = 1.75E-01 lb/GWh = 1.75E-04 lb/MWh
 dried lignite mercury content: 0.093 ug/g = 0.00000093 lb Hg/lb coal
 = 0.000186 lb Hg/ton coal

Boiler rating 60 MW

The above BACT limits have been used to calculate controlled PTE emissions.
 AP 42 emission factors (see references [11], [12]) have been used to calculate uncontrolled emissions for SO2 and NOx.
 Control efficiencies have been "back calculated" for SO2 and NOx.

Short-term emissions for SDA atomizer cleaning - 1 hour SDA outage

SO ₂	Emission Factor	Using BACT Limit of
	0.75 lb/MMBtu (uncontrolled lb/hr / 1,278.8 MMBtu/hr)	0.06 lb/MMBtu
	3-hour EF 2.9E-01 lb/MMBtu	Lignite Fuel Rating
	24-hour EF 8.9E-02 lb/MMBtu	15 MMBtu/ton lignite

	Pollutant	Max Rate (units/hr)		EF (lb/units)	Rate (lb/hr)	Rate (g/s)
3-hr	Sulfur Dioxide	85.25	tph coal	4.4	372.3	46.9
24-hr	Sulfur Dioxide	85.25	tph coal	1.3	113.7	14.3
Normal	Sulfur Dioxide	85.25	tph coal	0.9	76.7	9.7

[23] **BACT Limit for Package Boiler propane combustion**

Pollutant		Emission Factor
	Using a heating value of	
SO2	0.024 MMBtu/ton	0.06 lb/MMBtu
NOx	for lignite	0.09 lb/MMBtu
PM10		0.03 lb/MMBtu
Total PM		0.015 lb/MMBtu
CO		0.15 lb/MMBtu
VOC		0.007 lb/MMBtu
Sulfuric Acid Mist		0.006 lb/MMBtu
Pollutant		Emission Factor
PM		0.007 lb/MMBtu
PM10		0.007 lb/MMBtu
SO2		0.02 lb/MMBtu
NOx		0.05 lb/MMBtu
CO		0.08 lb/MMBtu
VOC		0.005 lb/MMBtu

[24] **BACT Limit for Package Boiler natural gas combustion**

Pollutant	Emission Factor
PM	0.007 lb/MMBtu
PM10	0.007 lb/MMBtu
SO2	0.006 lb/MMBtu
NOx	0.035 lb/MMBtu
CO	0.08 lb/MMBtu
VOC	0.005 lb/MMBtu

The above BACT limits have been used to calculate controlled PTE emissions.
 AP 42 emission factors (see reference [7]) have been used to calculate uncontrolled emissions for PM, PM10, and SO2.
 Manufacturer's guarantees (see reference [26]) have been used to calculate uncontrolled emissions for NOx, CO, and VOC.
 A control efficiency has been "back calculated" for NOx.

Table C-4
Spiritwood Station
References used for Emission Calculations

[25] **BACT Limits for Package Boiler fuel oil combustion**

Pollutant	Emission Factor
CO	0.04 lb/MMBtu
NOx	0.13 lb/MMBtu
PM	0.03 lb/MMBtu
PM10	0.03 lb/MMBtu
SO2	0.051 lb/MMBtu
VOC	0.005 lb/MMBtu

The above BACT limits have been used to calculate controlled PTE emissions.
 Manufacturer's guarantees (see reference [26]) have been used to calculate uncontrolled emissions.
 Control efficiencies have been "back calculated" for PM/PM10, SO2, and NOx.

[26] **BACT Limits for Propane Vaporizer propane combustion**

Fuel	Pollutant	Emission Factor
Propane	CO	0.08 lb/MMBtu
Propane	NOx	0.04 lb/MMBtu
Propane	PM	0.007 lb/MMBtu
Propane	PM10	0.007 lb/MMBtu
Propane	SO2	0.02 lb/MMBtu
Propane	VOC	0.005 lb/MMBtu

The above BACT limits have been used to calculate controlled PTE emissions.
 Manufacturer's guarantees (see reference [26]) have been used to calculate uncontrolled emissions.
 Control efficiencies have been "back calculated" for PM/PM10, SO2, and NOx.

[27] **EPA TANKS Program**

Uncontrolled PTE calculated using EPA TANKS program.

[28] **Paved Road Calculations**

From AP-42 section 13. See Table B-5 for detailed calculations.

[29] **Fugitive Emissions due to Fuel Oil System Leaks**

See Table B-6 for calculations.

BAGHOUSE AND BIN VENT EMISSIONS

[30] **Baghouse and Bin Vent Emissions**

Maximum flow rate based on information from Unifield.
 Emission factor based on vendor specifications of 0.005 gr/acf
 Uncontrolled emissions based on control efficiencies (assumed at 99%)

It was assumed that the baghouses and bin vents will achieve 0.005 gr/dscf loading and 99% control,
 and the potential uncontrolled emissions were "back calculated" from these assumptions.

Table C-5
Spiritwood Station
Paved Road Truck Hauling Emissions

Shipping Activities	Required	Units	Notes	Truck Size	Estimated vehicles/day	Rounded trucks/day	Estimated trucks/year
Limestone	125	tons/day	3.5 trucks per day	30 tons	5	5	1,825
Ammonia	1148	lb/hr	4 trucks per week	24 tons	0.5	0.5	183
Powder Activated Carbon	52	lb/hr	1 truck per month	20 tons	0.02	0.02	12
Lime	0.5	tons/hr	15 trucks per month	30 tons	0.4	0.5	183
Ash	5.8	tons/hr	8 trucks per day	31 tons	4.6	5	1,825
Fuel Oil			as required; 47.5 million gallons/year	5,000 gal; 30 tons	26	26	260

(assume 10 days @ 130,000 gal/day)

Total Trucks:					37/day	4,288/yr
40 employees	-	-	Assume 20 employees; ea. with 2-ton car	2 tons	20	7300

Total 2-ton cars

No. of Trucks Loaded/Day: 37 Based on estimates
No. of Trucks Loaded/Year: 4,288 Based on estimates
 Distance of One Round Trip: 0.56 miles (one trip around the outer loop of the plant)
 Total VMT per year: 2,401 miles
 Assumed Silt Content: 2.0 g/m², Verasun Fort Dodge onsite testing
 Mean Vehicle Wt of Trucks: 30.7 tons Average of loaded and unloaded

Table 13.2-1.1 Particle Size Multipliers for Pave Road Equation (k)

	Particle Size Multiplier		
	g/VKT	g/VMT	lb/VMT
PM10	4.6	7.3	0.016
PM30	24	38	0.082

Table 13.2-1.2 Emission Factor for 1980's Vehicle Fleet Exhaust, Brake Wear and Tire Wear (C)

	g/VMT	g/VKT	lb/VMT
PM10	0.2119	0.1317	0.00047
PM30	0.2119	0.1317	0.00047

$$E = (k (sL/2)^{0.65} \times (W/3)^{1.5} - C) \times (S/30)^{0.5}$$

For PM10

	For PM10	For PM30 (TSP)
C =	0.00047	0.00047 lb/VMT
W =	30.7	30.7 tons
sL =	2	2 g/m ²
k =	0.016	0.082 lb/VMT
S =	10	10 mph
E =	0.3	2.7 lb/VMT

emission factor for 1980's vehicle fleet exhaust, brake wear and tire wear
 average weight of the vehicles traveling the road
 road surface silt loading
 particle size multiplier for particle size range and units of interest
 Speed, mph, applied in correction factor for plants with speed limits
 particulate emission factor (having units matching the units of k)

Fugitive Particulate Emissions - Future

Particulate Source	Pollutant	Emission Factor lb/VMT	Emission Factor Units	Vehicle Miles Traveled VMT/day	Uncontrolled Emission Rate (lb/day)	Uncontrolled Emissions (tons/day)	Natural Mitigation (1-(P/4N)) *	Controlled Emissions (tons/day)	Emission Factor Source
All Trucks - Paved Road	PM	2.7	lb/VMT	21	56	0.03	0.93	0.03	AP-42, Section 13.2.1
All Trucks - Paved Road	PM10	0.3	lb/VMT	21	6	0.00	0.93	0.00	AP-42, Section 13.2.1

* Where P = number of "wet days" with at least 0.01 inches precipitation during the averaging period (100 for Eastern North Dakota) and N = the number of days in the averaging period (365).

Table C-6
VOC Emission Calculations for Valves, Flanges and Pumps [1]
Fuel Forwarding System
Spiritwood Station

Distillate Oil ("heavy liquid") Service

Component	Size	Count	VOC Emission Factor (lb/hr/source) [1]	50% Safety Factor [3]	Emission Rate (lb/hr)	Annual PTE Conversion [4]	PTE VOC (tons/year)
		[A]	[B]	[C]	[A]*[B]*[C]	[D]	[A]*[B]*[C]*[D]
Pumps	1.5"	3	0.0463	1.50	0.000	4.38	0.00
	3"		0.0463	1.50	0.208	4.38	0.91
	4"		0.0463	1.50	0.000	4.38	0.00
Valves	2.5"	12	0.00051	1.50	0.000	4.38	0.00
	3"		0.00051	1.50	0.009	4.38	0.04
	4"		0.00051	1.50	0.000	4.38	0.00
Flanges (Connectors)	1.5"	24	0.00055	1.50	0.000	4.38	0.00
	2"		0.00055	1.50	0.000	4.38	0.00
	2.5"		0.00055	1.50	0.000	4.38	0.00
	3"		0.00055	1.50	0.020	4.38	0.09
	4"		0.00055	1.50	0.000	4.38	0.00
	6"		0.00055	1.50	0.000	4.38	0.00
TOTAL:							1.04

[1] Calculations are based on the configuration for a similar (6-turbine) facility at NSP Inver Hills.

[2] Protocol for Equipment Leak Emission Estimates, US-EPA OAQPS; EPA-453/R-93-026

[3] A safety factor of 50% was included for a conservative estimate.

[4] Conservative estimate of year-long operation.

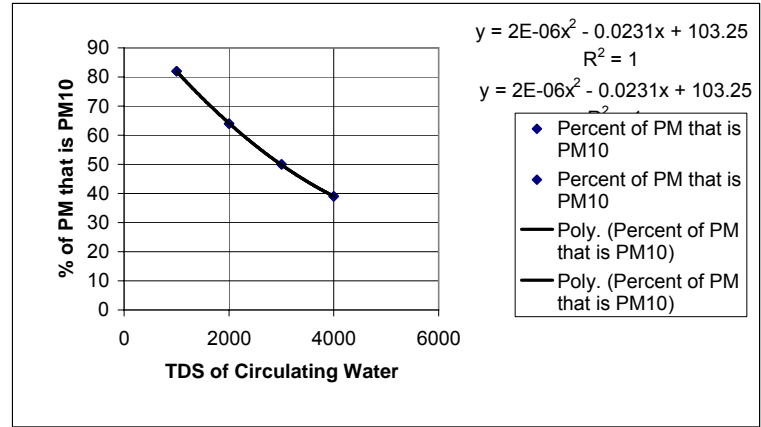
8760 hr per year / 2,000 lbs per ton = 4.38 hr-lb/yr-ton

Table C-7

Cooling PM10 Emission Calculation Method (Based on AWMA Reference¹)
 Spiritwood Station

TDS (ppmw)= 6,000

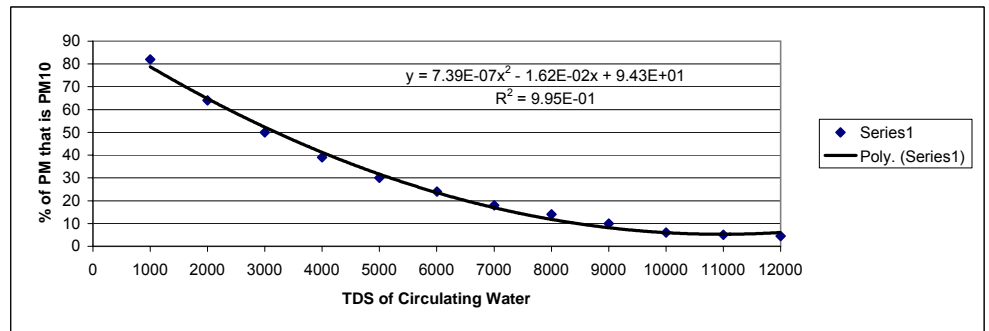
EPRI Droplet Diameter (um)	Droplet Volume (um ³)	Droplet Mass (ug)	Particle Mass Solids (ug)	Solid Particle Volume (um ³)	Solid Particle Diameter (um)	EPRI% Mass Smaller
10	524	5.24E-04	3.14E-06	1.43	1.397	0.000
20	4189	4.19E-03	2.51E-05	11.42	2.794	0.196
30	14137	1.41E-02	8.48E-05	38.56	4.191	0.226
40	33510	3.35E-02	2.01E-04	91.39	5.589	0.514
50	65450	6.54E-02	3.93E-04	178.50	6.986	1.816
60	113097	1.13E-01	6.79E-04	308.45	8.383	5.702
70	179594	1.80E-01	1.08E-03	489.80	9.780	21.38
90	381704	3.82E-01	2.29E-03	1041.01	12.574	49.812
110	696910	6.97E-01	4.18E-03	1900.66	15.369	70.509
130	1150347	1.15E+00	6.90E-03	3137.31	18.163	82.023
150	1767146	1.77E+00	1.06E-02	4819.49	20.957	88.012
180	3053628	3.05E+00	1.83E-02	8328.08	25.149	88.012
210	4849048	4.85E+00	2.91E-02	13224.68	29.340	91.032
240	7238230	7.24E+00	4.34E-02	19740.63	33.532	92.468
270	10305995	1.03E+01	6.18E-02	28107.26	37.723	94.689
300	14137167	1.41E+01	8.48E-02	38555.91	41.914	96.288
350	22449298	2.24E+01	1.35E-01	61225.36	48.900	97.011
400	33510322	3.35E+01	2.01E-01	91391.79	55.886	98.340
450	47712939	4.77E+01	2.86E-01	130126.20	62.872	99.071
500	65449848	6.54E+01	3.93E-01	178499.59	69.857	99.071
600	113097337	1.13E+02	6.79E-01	308447.28	83.829	100



slope y-intercept
 -0.006626158 71.99274744

At a constant flow rate of: 80,000 gpm

TDS	Percent of PM that is PM10	PM, tpy	Calculated % PM10 (linear)	Calculated PM10, tpy based on eqn.	PM10 based on table
1000	82	2.74	65.37	1.79	2.25
2000	64	5.49	58.74	3.22	3.51
2500	56	6.86	55.43	3.80	3.84
3000	50	8.23	52.11	4.29	4.12
4000	39	10.98	45.49	4.99	4.28
5000	30	13.72	38.86	5.33	4.12
6000	24	16.46	32.24	5.31	3.95
7000	18	19.21	25.61	4.92	3.46
8000	14	21.95	18.98	4.17	3.07
9000	10	24.70	12.36	3.05	2.47
10000	6	27.44	5.73	1.57	1.65
11000	5	30.18	-0.89	-0.27	1.51
12000	4.5	32.93	-7.52	-2.48	1.48



1. "Calculating Realistic PM₁₀ Emissions from Cooling Towers", Joel Reisman and Gordon Frisbie. Abstract No. 216, presented at the 2001 Air & Waste Management Association 94th Annual Conference and Exhibition in Orlando, FL, June 25-28.

Table C-8
CFB Boiler / Startup Burners HAP Emissions - Information for Form 117
Spiritwood Station

Pollutant Emitted	CAS Number	Controlled Emission Rate (lb/hr)	Pollutant Class	Pollutant Form	Conc. in Emission Stream (ppmv)	Vapor Pressure (in. Hg) ¹	Solubility ¹	Molecular Weight (lb/lbmol)	Source of Information ²
Acetaldehyde	75070	4.9E-02	Organic	Vapor	2.2E-02	29.13	Miscible	44.1	NIOSH Pocket Guide
Acetophenone	98862	1.3E-03	Organic	Liquid	2.5E-04	0.02	0.61%	120.2	Chemfinder, ChemIDplus
Acrolein	107028	2.5E-02	Organic	Vapor	8.9E-03	8.27	40%	56.1	NIOSH Pocket Guide
Benzene	71432	1.1E-01	Organic	Vapor	2.9E-02	2.95	0.07%	78.1	NIOSH Pocket Guide
Benzyl chloride	100447	6.0E-02	Organic	Liquid	9.5E-03	0.04	0.05%	126.6	NIOSH Pocket Guide
Biphenyl	92524	1.4E-04	Organic	Liquid	1.9E-05	0	Insoluble	154.2	NIOSH Pocket Guide
Bis(2-ethylhexyl)phthalate (DEHP)	117817	6.2E-03	Organic	Liquid	3.7E-04	0	0.00%	390.6	NIOSH Pocket Guide
Bromoform	75252	3.3E-03	Organic	Liquid	2.6E-04	0.20	0.1%	252.7	NIOSH Pocket Guide
Carbon disulfide	75150	1.1E-02	Organic	Liquid	2.9E-03	11.69	0.3%	76.1	NIOSH Pocket Guide
2-Chloroacetophenone	532274	6.0E-04	Organic	Liquid	7.8E-05	0	Insoluble	154.6	NIOSH Pocket Guide
Chlorobenzene	108907	1.9E-03	Organic	Liquid	3.3E-04	0.35	0.05%	112.6	NIOSH Pocket Guide
Chloroform	67663	5.0E-03	Organic	Vapor	8.5E-04	6.30	0.5%	119.4	NIOSH Pocket Guide
Cumene	98828	4.5E-04	Organic	Liquid	7.6E-05	0.31	Insoluble	120.2	NIOSH Pocket Guide
Dimethyl sulfate	77781	4.1E-03	Organic	Particulate	6.5E-04	0	3%	126.1	NIOSH Pocket Guide
2,4-Dinitrotoluene	121142	2.4E-05	Organic	Liquid	3.1E-06	0	0.03%	182.1	Chemfinder, ChemIDplus
Ethyl benzene	100414	8.0E-03	Organic	Liquid	1.5E-03	0.28	0.01%	106.2	NIOSH Pocket Guide
Ethyl chloride (Chloroethane)	75003	3.6E-03	Organic	Vapor	1.1E-03	39.37	0.6%	64.5	NIOSH Pocket Guide
Ethylene dibromide	106934	1.0E-04	Organic	Liquid	1.1E-05	0.47	0.4%	187.9	NIOSH Pocket Guide
Ethylene dichloride (1,2 Dichloroethane)	107062	3.4E-03	Organic	Liquid	6.9E-04	2.52	0.9%	99.0	NIOSH Pocket Guide
Formaldehyde	50000	3.1E-02	Organic	Vapor	2.1E-02	152.99	Miscible	30.0	NIOSH Pocket Guide
Hexane	110543	7.4E-01	Organic	Vapor	1.7E-01	4.88	0.002%	86.2	NIOSH Pocket Guide
Hydrochloric acid	7647010	5.1	Inorganic	Vapor	2.8E+00	1211.81	67% ³	36.5	NIOSH Pocket Guide
Hydrogen fluoride (hydrofluoric acid)	7664393	6.4E-01	Inorganic	Vapor	6.4E-01	30.83	Miscible	20.0	NIOSH Pocket Guide
Isophorone	78591	4.9E-02	Organic	Liquid	7.2E-03	0.01	1%	138.2	NIOSH Pocket Guide
Methyl bromide (Bromomethane)	74839	1.4E-02	Organic	Vapor	2.9E-03	56.85	2%	95.0	NIOSH Pocket Guide
Methyl chloride (Chloromethane)	74873	4.5E-02	Organic	Vapor	1.8E-02	149.60	0.5%	50.5	NIOSH Pocket Guide
Methylene chloride (Dichloromethane)	75092	2.5E-02	Organic	Vapor	5.9E-03	13.78	2%	84.9	NIOSH Pocket Guide
Methyl hydrazine	60344	1.4E-02	Organic	Liquid	6.3E-03	1.50	Miscible	46.1	NIOSH Pocket Guide
Methyl methacrylate	80626	1.7E-03	Organic	Liquid	3.4E-04	1.14	1.50%	100.1	NIOSH Pocket Guide
Methyl tert butyl ether (MTBE)	1634044	3.0E-03	Organic	Vapor	7.9E-04	9.84	5.10%	88.1	Chemfinder, ChemIDplus
Naphthalene	91203	1.1E-03	Organic	Particulate	1.7E-04	0	0.003%	128.2	NIOSH Pocket Guide
Phenol	108952	1.4E-03	Organic	Liquid	2.9E-04	0.02	9% ⁴	94.1	NIOSH Pocket Guide
Propionaldehyde	123386	3.2E-02	Organic	Vapor	1.3E-02	12.48	30.60%	58.1	Chemfinder, ChemIDplus
Styrene	100425	2.1E-03	Organic	Liquid	4.0E-04	0.20	0.03%	104.2	NIOSH Pocket Guide
Tetrachloroethylene (Perchloroethylene)	127184	3.7E-03	Organic	Liquid	4.5E-04	0.55	0.02%	165.8	NIOSH Pocket Guide
Toluene	108883	2.0E-02	Organic	Liquid	4.5E-03	0.83	0.07%	92.1	NIOSH Pocket Guide
Vinyl acetate	108054	6.5E-04	Organic	Vapor	1.5E-04	3.27	2%	86.1	NIOSH Pocket Guide
Xylenes	1330207	3.2E-03	Organic	Liquid	2.3E-04	0.31	0.01%	318.5	Chemfinder, ChemIDplus
Antimony	7440360	1.5E-03	Inorganic	Particulate	2.9E-04	0	Insoluble	121.8	NIOSH Pocket Guide
Arsenic	7440382	3.5E-02	Inorganic	Particulate	1.1E-02	0	Insoluble	74.9	NIOSH Pocket Guide
Beryllium	7444309	1.8E-03	Inorganic	Particulate	4.6E-03	0	Insoluble	9.0	NIOSH Pocket Guide
Cadmium	7440439	4.3E-03	Inorganic	Particulate	9.0E-04	0	Insoluble	112.4	NIOSH Pocket Guide
Chromium	7440473	2.2E-02	Inorganic	Particulate	1.0E-02	0	Insoluble	52.0	NIOSH Pocket Guide
Cobalt	7440484	8.5E-03	Inorganic	Particulate	3.4E-03	0	Insoluble	58.9	NIOSH Pocket Guide
Lead	7439921	3.6E-02	Inorganic	Particulate	4.0E-03	0	Insoluble	207.2	NIOSH Pocket Guide
Manganese	74439965	4.2E-02	Inorganic	Particulate	1.8E-02	0	Insoluble	54.9	NIOSH Pocket Guide
Mercury	7439976	1.2E-02	Inorganic	Particulate	1.3E-03	0	Insoluble	200.6	NIOSH Pocket Guide
Nickel	7440020	2.4E-02	Inorganic	Particulate	9.5E-03	0	Insoluble	58.7	NIOSH Pocket Guide
Selenium	7782492	1.1E-01	Inorganic	Particulate	3.3E-02	0	Insoluble	79.0	NIOSH Pocket Guide
Polycyclic Organic Matter (POM)		3.6E-05	Organic	Vapor/Liquid					

Total Organic Content In Emission Stream (ppmv)	3.3E-01
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- Information from NIOSH Pocket Guide: At 68°F, by weight.
Information from Chemfinder: At 77°F, by weight.
- NIOSH Pocket Guide: <http://www.cdc.gov/niosh/npg/default.html>
Chemfinder: <http://chemfinder.cambridgesoft.com>
ChemIDplus : <http://sis.nlm.nih.gov/chemical.html>
- Solubility at 86°F
- Solubility at 77°F

Table C-9
Package Boiler HAP Emissions¹ - Information for Form 117
Spiritwood Station

Pollutant Emitted	CAS Number	Controlled Emission Rate (lb/hr)	Pollutant Class	Pollutant Form	Conc. in Emission Stream (ppmv)	Vapor Pressure (in. Hg) ²	Solubility ²	Molecular Weight (lb/lbmol)	Source of Information ³
Benzene	71432	5.8E-04	Organic	Vapor	2.2E-04	2.95	0.07%	78.1	NIOSH Pocket Guide
Dichlorobenzene	25321226	3.3E-04	Organic	Liquid	9.1E-05	0.06	0.80%	147.0	Chemfinder, ChemIDplus
Ethyl benzene	100414	4.9E-06	Organic	Vapor	1.4E-06	0.28	0.01%	106.2	NIOSH Pocket Guide
Formaldehyde	50000	6.4E-02	Organic	Vapor	6.1E-02	152.99	Miscible	30.0	NIOSH Pocket Guide
Hexane	110543	5.0E-01	Organic	Vapor	1.7E-01	4.88	0.002%	86.2	NIOSH Pocket Guide
Naphthalene	91203	2.2E-03	Organic	Liquid	4.9E-04	0	0.003%	128.2	NIOSH Pocket Guide
1,1,1-Trichloroethane	71556	4.5E-04	Organic	Vapor	9.9E-05	3.94	0.40%	133.4	NIOSH Pocket Guide
Toluene	108863	1.2E-02	Organic	Vapor	3.8E-03	0.83	0.07%	92.1	NIOSH Pocket Guide
Xylenes	1330207	2.1E-04	Organic	Vapor	2.7E-05	0.31	0.01%	318.5	Chemfinder, ChemIDplus
Arsenic	7440382	1.1E-03	Inorganic	Particulate	5.8E-04	0	Insoluble	74.9	NIOSH Pocket Guide
Beryllium	7444309	8.1E-04	Inorganic	Particulate	3.6E-03	0	Insoluble	9.0	NIOSH Pocket Guide
Cadmium	7440439	8.1E-04	Inorganic	Particulate	2.9E-04	0	Insoluble	112.4	NIOSH Pocket Guide
Chromium	7440473	8.1E-04	Inorganic	Particulate	6.3E-04	0	Insoluble	52.0	NIOSH Pocket Guide
Cobalt	7440484	2.3E-05	Inorganic	Particulate	1.6E-05	0	Insoluble	58.9	NIOSH Pocket Guide
Lead	7439921	2.4E-03	Inorganic	Particulate	4.7E-04	0	Insoluble	207.2	NIOSH Pocket Guide
Manganese	74439965	1.6E-03	Inorganic	Particulate	1.2E-03	0	Insoluble	54.9	NIOSH Pocket Guide
Mercury	7439976	8.1E-04	Inorganic	Particulate	1.6E-04	0	Insoluble	200.6	NIOSH Pocket Guide
Nickel	7440020	8.1E-04	Inorganic	Particulate	5.6E-04	0	Insoluble	58.7	NIOSH Pocket Guide
Selenium	7782492	4.0E-03	Inorganic	Particulate	2.1E-03	0	Insoluble	79.0	NIOSH Pocket Guide
Polycyclic Organic Matter (POM)		6.4E-03	Organic	Vapor/Liquid					

Total Organic Content In Emission Stream (ppmv)	2.3E-01
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1. Worst-case emission rates are equivalent for each Package Boiler. This table represents worst-case emissions for one Package Boiler.
2. Information from NIOSH Pocket Guide: At 68°F, by weight.
Information from Chemfinder: At 77°F, by weight.
3. NIOSH Pocket Guide: <http://www.cdc.gov/niosh/npg/default.html>
Chemfinder: <http://chemfinder.cambridgesoft.com>
ChemIDplus : <http://sis.nlm.nih.gov/chemical.html>

Table C-10

Railcar Heater HAP Emissions - Information for Form 117

Spiritwood Station

Pollutant Emitted	CAS Number	Controlled Emission Rate (lb/hr)	Pollutant Class	Pollutant Form	Conc. in Emission Stream (ppmv)	Vapor Pressure (in. Hg) ²	Solubility ²	Molecular Weight (lb/lbmol)	Source of Information ³
Benzene	71432	2.9E-05	Organic	Vapor	2.5E-05	2.95	0.07%	78.1	NIOSH Pocket Guide
Dichlorobenzene	25321226	1.6E-05	Organic	Liquid	7.4E-06	0.06	0.80%	147.0	Chemfinder, ChemIDplus
Formaldehyde	50000	1.0E-03	Organic	Vapor	2.3E-03	152.99	Miscible	30.0	NIOSH Pocket Guide
Hexane	110543	2.5E-02	Organic	Vapor	1.9E-02	4.88	0.002%	86.2	NIOSH Pocket Guide
Naphthalene	91203	8.4E-06	Organic	Particulate	1.9E-06	0.00	0.003%	128.2	NIOSH Pocket Guide
Toluene	108883	4.7E-05	Organic	Vapor	1.5E-05	0.83	0.07%	92.1	NIOSH Pocket Guide
Arsenic (7440-38-2)	7440382	2.7E-06	Inorganic	Particulate	2.4E-06	0	Insoluble	74.9	NIOSH Pocket Guide
Beryllium (744-43-0-9)	7444309	1.6E-07	Inorganic	Particulate	1.5E-07	0	Insoluble	74.9	NIOSH Pocket Guide
Cadmium (7440-43-9)	7440439	1.5E-05	Inorganic	Particulate	1.1E-04	0	Insoluble	9.0	NIOSH Pocket Guide
Chromium	7440473	1.9E-05	Inorganic	Particulate	1.1E-05	0	Insoluble	112.4	NIOSH Pocket Guide
Cobalt	7440484	1.2E-06	Inorganic	Particulate	1.5E-06	0	Insoluble	52.0	NIOSH Pocket Guide
Manganese (74439-96-5)	74439965	5.2E-06	Inorganic	Particulate	5.9E-06	0	Insoluble	58.9	NIOSH Pocket Guide
Mercury (7439-97-6)	7439976	3.6E-06	Inorganic	Vapor	1.2E-06	4.7E-05	Insoluble	200.6	NIOSH Pocket Guide
Nickel (7440-02-0)	7440020	2.9E-05	Inorganic	Particulate	3.2E-05	0	Insoluble	58.7	NIOSH Pocket Guide
Selenium (7782-49-2)	7782492	3.3E-07	Inorganic	Particulate	2.8E-07	0	Insoluble	79.0	NIOSH Pocket Guide

Total Organic Content In Emission Stream (ppmv)	2.2E-02
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1. Worst-case emission rates are for combined (8) railcar heaters with a total heat input capacity of 14 MMBtu/hr
2. Information from NIOSH Pocket Guide: At 68°F, by weight.
Information from Chemfinder: At 77°F, by weight.
3. NIOSH Pocket Guide: <http://www.cdc.gov/niosh/npg/default.html>
Chemfinder: <http://chemfinder.cambridgesoft.com>
ChemIDplus : <http://sis.nlm.nih.gov/chemical.html>

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	500,000 Gallon Fuel Oil Tank
City:	Spiritwood
State:	North Dakota
Company:	Spiritwood Station
Type of Tank:	Vertical Fixed Roof Tank
Description:	Fuel Oil Storage Tank

Tank Dimensions

Shell Height (ft):	46.00
Diameter (ft):	42.00
Liquid Height (ft) :	46.00
Avg. Liquid Height (ft):	30.00
Volume (gallons):	500,000.00
Turnovers:	96.00
Net Throughput(gal/yr):	48,000,000.00
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Roof Characteristics

Type:	Dome
Height (ft)	0.00
Radius (ft) (Dome Roof)	42.00

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meteorological Data used in Emissions Calculations: Fargo, North Dakota (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

500,000 Gallon Fuel Oil Tank - Vertical Fixed Roof Tank
Spiritwood, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Distillate fuel oil no. 2	All	42.58	37.32	47.84	40.96	0.0035	0.0031	0.0042	130.0000			188.00	Option 1: VP40 = .0031 VP50 = .0045
1,2,4-Trimethylbenzene						0.0099	0.0078	0.0124	120.1900	0.0100	0.0412	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						0.7058	0.6010	0.8254	78.1100	0.0000	0.0024	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0576	0.0471	0.0702	106.1700	0.0001	0.0031	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						1.1933	1.0265	1.3819	86.1700	0.0000	0.0005	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Toluene						0.1875	0.1565	0.2236	92.1300	0.0003	0.0251	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0030	0.0027	0.0029	134.5078	0.9866	0.8700	189.60	
Xylene (-m)						0.0477	0.0389	0.0582	106.1700	0.0029	0.0578	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

500,000 Gallon Fuel Oil Tank - Vertical Fixed Roof Tank
Spiritwood, North Dakota

Annual Emission Calculations

Standing Losses (lb):	30.0036
Vapor Space Volume (cu ft):	26,158.2589
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0378
Vented Vapor Saturation Factor:	0.9965
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	26,158.2589
Tank Diameter (ft):	42.0000
Vapor Space Outage (ft):	18.8808
Tank Shell Height (ft):	46.0000
Average Liquid Height (ft):	30.0000
Roof Outage (ft):	2.8808
Roof Outage (Dome Roof)	
Roof Outage (ft):	2.8808
Dome Radius (ft):	42.0000
Shell Radius (ft):	21.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0035
Daily Avg. Liquid Surface Temp. (deg. R):	502.2537
Daily Average Ambient Temp. (deg. F):	40.9417
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	500.6317
Tank Paint Solar Absorptance (Shell):	0.1700
Tank Paint Solar Absorptance (Roof):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,214.3245
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0378
Daily Vapor Temperature Range (deg. R):	21.0442
Daily Vapor Pressure Range (psia):	0.0011
Breather Vent Press. Setting Range (psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0035
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0031
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0042
Daily Avg. Liquid Surface Temp. (deg R):	502.2537
Daily Min. Liquid Surface Temp. (deg R):	496.9927
Daily Max. Liquid Surface Temp. (deg R):	507.5148
Daily Ambient Temp. Range (deg. R):	21.2000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9965
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0035
Vapor Space Outage (ft):	18.8808

Working Losses (lb):	246.4414
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0035
Annual Net Throughput (gal/yr.):	48,000,000.0000
Annual Turnovers:	96.0000
Turnover Factor:	0.4792
Maximum Liquid Volume (gal):	500,000.0000
Maximum Liquid Height (ft):	46.0000
Tank Diameter (ft):	42.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	276.4450

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

500,000 Gallon Fuel Oil Tank - Vertical Fixed Roof Tank
Spiritwood, North Dakota

Components	Losses(lbs)		
	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	246.44	30.00	276.44
Hexane (-n)	0.12	0.01	0.14
Benzene	0.58	0.07	0.65
Toluene	6.18	0.75	6.93
Ethylbenzene	0.77	0.09	0.87
Xylene (-m)	14.24	1.73	15.97
1,2,4-Trimethylbenzene	10.14	1.24	11.38
Unidentified Components	214.40	26.10	240.51

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	500 Gallon Diesel Storage Tank (Emerg. Generator)
City:	Spiritwood
State:	North Dakota
Company:	Spiritwood Station
Type of Tank:	Horizontal Tank
Description:	500 Gallon Emergency Generator Diesel Storage Tank

Tank Dimensions

Shell Length (ft):	6.23
Diameter (ft):	4.00
Volume (gallons):	500.00
Turnovers:	14.00
Net Throughput(gal/yr):	7,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meteorological Data used in Emissions Calculations: Fargo, North Dakota (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

500 Gallon Diesel Storage Tank (Emerg. Generator) - Horizontal Tank
Spiritwood, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Distillate fuel oil no. 2	All	42.58	37.32	47.84	40.96	0.0035	0.0031	0.0042	130.0000			188.00	Option 1: VP40 = .0031 VP50 = .0045
1,2,4-Trimethylbenzene						0.0099	0.0078	0.0124	120.1900	0.0100	0.0412	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						0.7058	0.6010	0.8254	78.1100	0.0000	0.0024	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0576	0.0471	0.0702	106.1700	0.0001	0.0031	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						1.1933	1.0265	1.3819	86.1700	0.0000	0.0005	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Toluene						0.1875	0.1565	0.2236	92.1300	0.0003	0.0251	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0030	0.0027	0.0029	134.5078	0.9866	0.8700	189.60	
Xylene (-m)						0.0477	0.0389	0.0582	106.1700	0.0029	0.0578	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

500 Gallon Diesel Storage Tank (Emerg. Generator) - Horizontal Tank
Spiritwood, North Dakota

Annual Emission Calculations

Standing Losses (lb):	0.0574
Vapor Space Volume (cu ft):	49.8653
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0378
Vented Vapor Saturation Factor:	0.9996
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	49.8653
Tank Diameter (ft):	4.0000
Effective Diameter (ft):	5.6343
Vapor Space Outage (ft):	2.0000
Tank Shell Length (ft):	6.2300
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0035
Daily Avg. Liquid Surface Temp. (deg. R):	502.2537
Daily Average Ambient Temp. (deg. F):	40.9417
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	500.6317
Tank Paint Solar Absorptance (Shell):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,214.3245
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0378
Daily Vapor Temperature Range (deg. R):	21.0442
Daily Vapor Pressure Range (psia):	0.0011
Breather Vent Press. Setting Range (psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0035
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0031
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0042
Daily Avg. Liquid Surface Temp. (deg R):	502.2537
Daily Min. Liquid Surface Temp. (deg R):	496.9927
Daily Max. Liquid Surface Temp. (deg R):	507.5148
Daily Ambient Temp. Range (deg. R):	21.2000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9996
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0035
Vapor Space Outage (ft):	2.0000
Working Losses (lb):	
Working Losses (lb):	0.0750
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0035
Annual Net Throughput (gal/yr.):	7,000.0000

Annual Turnovers:	14.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	4.0000
Working Loss Product Factor:	1.0000

Total Losses (lb):	0.1324
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TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

500 Gallon Diesel Storage Tank (Emerg. Generator) - Horizontal Tank
Spiritwood, North Dakota

Components	Losses(lbs)		
	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	0.08	0.06	0.13
Hexane (-n)	0.00	0.00	0.00
Benzene	0.00	0.00	0.00
Toluene	0.00	0.00	0.00
Ethylbenzene	0.00	0.00	0.00
Xylene (-m)	0.00	0.00	0.01
1,2,4-Trimethylbenzene	0.00	0.00	0.01
Unidentified Components	0.07	0.05	0.12

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Identification and Physical Characteristics

Identification

User Identification:	500 Gallon Diesel Storage Tank (Fire Pump)
City:	Spiritwood
State:	North Dakota
Company:	Spiritwood Station
Type of Tank:	Horizontal Tank
Description:	500 Gallon Fire Pump Diesel Storage Tank

Tank Dimensions

Shell Length (ft):	6.23
Diameter (ft):	4.00
Volume (gallons):	500.00
Turnovers:	3.50
Net Throughput(gal/yr):	1,750.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	White/White
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meteorological Data used in Emissions Calculations: Fargo, North Dakota (Avg Atmospheric Pressure = 14.25 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

500 Gallon Diesel Storage Tank (Fire Pump) - Horizontal Tank
Spiritwood, North Dakota

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Distillate fuel oil no. 2	All	42.58	37.32	47.84	40.96	0.0035	0.0031	0.0042	130.0000			188.00	Option 1: VP40 = .0031 VP50 = .0045
1,2,4-Trimethylbenzene						0.0099	0.0078	0.0124	120.1900	0.0100	0.0412	120.19	Option 2: A=7.04383, B=1573.267, C=208.56
Benzene						0.7058	0.6010	0.8254	78.1100	0.0000	0.0024	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Ethylbenzene						0.0576	0.0471	0.0702	106.1700	0.0001	0.0031	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Hexane (-n)						1.1933	1.0265	1.3819	86.1700	0.0000	0.0005	86.17	Option 2: A=6.876, B=1171.17, C=224.41
Toluene						0.1875	0.1565	0.2236	92.1300	0.0003	0.0251	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Unidentified Components						0.0030	0.0027	0.0029	134.5078	0.9866	0.8700	189.60	
Xylene (-m)						0.0477	0.0389	0.0582	106.1700	0.0029	0.0578	106.17	Option 2: A=7.009, B=1462.266, C=215.11

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

500 Gallon Diesel Storage Tank (Fire Pump) - Horizontal Tank
Spiritwood, North Dakota

Annual Emission Calculations

Standing Losses (lb):	0.0574
Vapor Space Volume (cu ft):	49.8653
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.0378
Vented Vapor Saturation Factor:	0.9996
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	49.8653
Tank Diameter (ft):	4.0000
Effective Diameter (ft):	5.6343
Vapor Space Outage (ft):	2.0000
Tank Shell Length (ft):	6.2300
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0035
Daily Avg. Liquid Surface Temp. (deg. R):	502.2537
Daily Average Ambient Temp. (deg. F):	40.9417
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	500.6317
Tank Paint Solar Absorptance (Shell):	0.1700
Daily Total Solar Insulation Factor (Btu/sqft day):	1,214.3245
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0378
Daily Vapor Temperature Range (deg. R):	21.0442
Daily Vapor Pressure Range (psia):	0.0011
Breather Vent Press. Setting Range (psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0035
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0031
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0042
Daily Avg. Liquid Surface Temp. (deg R):	502.2537
Daily Min. Liquid Surface Temp. (deg R):	496.9927
Daily Max. Liquid Surface Temp. (deg R):	507.5148
Daily Ambient Temp. Range (deg. R):	21.2000
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9996
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0035
Vapor Space Outage (ft):	2.0000
Working Losses (lb):	
Vapor Molecular Weight (lb/lb-mole):	130.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0035
Annual Net Throughput (gal/yr.):	1,750.0000

Annual Turnovers:	3.5000
Turnover Factor:	1.0000
Tank Diameter (ft):	4.0000
Working Loss Product Factor:	1.0000

Total Losses (lb):	0.0761
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TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

500 Gallon Diesel Storage Tank (Fire Pump) - Horizontal Tank
Spiritwood, North Dakota

Components	Losses(lbs)		
	Working Loss	Breathing Loss	Total Emissions
Distillate fuel oil no. 2	0.02	0.06	0.08
Hexane (-n)	0.00	0.00	0.00
Benzene	0.00	0.00	0.00
Toluene	0.00	0.00	0.00
Ethylbenzene	0.00	0.00	0.00
Xylene (-m)	0.00	0.00	0.00
1,2,4-Trimethylbenzene	0.00	0.00	0.00
Unidentified Components	0.02	0.05	0.07

