Dominion Energy Services, Inc.
5000 Dominion Boulevard
Glen Allen, VA 23060
DominionEnergy.com

Dominion Energy

July 20, 2017

BY: OVERNIGHT MAIL

Mr. Charles McEachern
Raleigh Regional Office
NCDEQ Division of Air Quality
Suite 101
3800 Barrett Drive
Raleigh, NC 27609

RE: Atlantic Coast Pipeline, L.L.C.
Northampton Compressor Station
Air Permit Application Update

Dear Mr. McEachern:

Atlantic Coast Pipeline, LLC (ACP) is submitting updates to the Northampton Compressor Station permit application, dated September 16, 2015. The changes are to ancillary equipment including emergency generators and storage tanks. No changes are requested for the main natural gas compressors. The changes do not materially affect the applicable regulatory requirements. ACP is proposing the following updates:

- Replace the Caterpillar G3516 emergency generator rated at 1,416 hp (EG-01) with a Caterpillar G3516B emergency generator rated at 1,818 hp;
- Add a new Generac SG100 emergency generator rated at 148.9 hp (EG-02) for the regional operations center;
- Replace the boiler rated at 6.3 MMBtu/hr (WH-01) with a Hurst LPW-G-125-60W boiler rated at 5.25 MMBtu/hr;
- Decrease the volume of the proposed pipeline fluids tank (TK-2) from 1,500 gallons to 1,000 gallons;
- Increase the volume of the proposed Ammonia Tank (TK-3) from 8,000 gallons to 13,400 gallons; and
- Correct a calculation error that overestimated fugitive emissions.

The updated application forms are contained in Attachment 1 including the equipment changes. A revised site plan is contained in Attachment 2. Revised emission calculations are provided in Attachment 3 based on the same operating assumptions used in the original application. Vendor specifications are provided in Attachment 4 for the updated emergency generators (EG-01, EG-

02) and the boiler (WH-01). The changes in annual emissions are summarized in the following table; creating a decrease in NO_X, CO, VOC, and CO_{2e} values.

	Annual Emissions (Tons/Year)					
	NO_X	CO	VOC	PM	SO_2	CO_{2e}
Original Application	19.7	31.1	41.1	18.4	3.1	145,686
Proposed Update	19.2	31.0	21.2	18.4	3.1	129,133

If you have questions about this submittal, please do not hesitate to contact Mr. Laurence Labrie at (804) 273-3075 or at laurence.a.labrie@dominionenergy.com.

Sincerely,

Richard B. Gangle, Manager
Environmental
Atlantic Coast Pipeline

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Sincerely,

Richard B. Gangle, Manager
Environmental
Atlantic Coast Pipeline

ATTACHMENTS

ATTACHMENT A

NC DENR PERMIT APPLICATION FORMS

FORM A1

FACILITY (General Information)

REVISED 05/25/12 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — A1

NOTE- APPLICATION WILL NOT BE PROCESSED WITHOUT THE FOLLOWING:

☑ Local Zoning Consistency Determination (if required) ☐ Facility Reduction & Recycling Survey Form (Form A4) ☑ Application Fee
☑ Responsible Official/Authorized Contact Signature ☑ Appropriate Number of Copies of Application ☐ P.E. Seal (if required)

GENERAL INFORMATION

Legal Corporate/Owner Name: Atlantic Coast Pipeline, LLC	
Site Name: Northampton Compressor Station	
Site Address (911 Address) Line 1: 718 Forest Rd	
Site Address Line 2:	
City: Pleasant Hill	State: North Carolina
Zip Code: 27866	County: Northampton

CONTACT INFORMATION

Permit/Technical Contact:	***Facility/Inspection Contact:***
Name/Title: Laurence A. Labrie	Name/Title:
Mailing Address Line 1: 5000 Dominion Boulevard	Mailing Address Line 1:
Mailing Address Line 2: 2 NE	Mailing Address Line 2:
City: Glen Allen State: VA Zip Code: 23060	City: State: Zip Code:
Phone No. (area code) 804-273-3075 Fax No. (area code)	Phone No. (area code) Fax No. (area code)
Email Address: laurence.a.labrie@dominionenergy.com	Email Address:
Responsible Official/Authorized Contact:	***Invoice Contact:***
Name/Title: Leslie Hartz	Name/Title: Richard B Gangle
Mailing Address Line 1: 707 E. Main Street	Mailing Address Line 1: 5000 Dominion Boulevard
Mailing Address Line 2:	Mailing Address Line 2: 2 NE
City: Richmond State: VA Zip Code: 23219	City: Glen Allen State: VA Zip Code: 23060
Phone No. (area code) 804-771-4468 Fax No. (area code)	Phone No. (area code) 804-273-2814 Fax No. (area code)
ail Address: leslie.hartz@dominionenergy.com	Email Address: richard.b.gangle@dominionenergy.com

APPLICATION IS BEING MADE FOR

☑ New Non-permitted Facility/Greenfield ☐ Modification of Facility (permitted) ☐ Renewal with Modification
☐ Renewal (TV Only)

FACILITY CLASSIFICATION AFTER APPLICATION (Check Only One)

☐ General ☑ Small ☐ Prohibitory Small ☐ Synthetic Minor ☐ Title V

FACILITY (Plant Site) INFORMATION

Describe nature of (plant site) operation(s): **Facility ID No. :** TBD
Proposed new (greenfield) natural gas pipeline compressor station.

Primary SIC/NAICS Code: 4922/486210	Current/Previous Air Permit No. N/A Expiration Date:
Facility Coordinates: Latitude: 36.543874	Longitude: -77.505712

Does this application contain confidential data? YES ☐ NO ☑ ***If yes, please contact the DAQ Regional Office prior to submitting this application.*** **(See Instructions)**

PERSON OR FIRM THAT PREPARED APPLICATION

Person Name: Robert Sawyer	Firm Name: Environmental Resources Management
Mailing Address Line 1: 180 Admiral Cochrane Dr	Mailing Address Line 2: Suite 400
City: Annapolis State: MD	Zip Code: 21401 County: Anne Arundel
Phone No. (area code) 410-266-0006 Fax No. (area code)	Email Address: robert.sawyer@erm.com

SIGNATURE OF RESPONSIBLE OFFICIAL/AUTHORIZED CONTACT

Name (typed): Leslie Hartz	Title: VP Pipeline Construction
X Signature(Blue Ink):	Date: 7/13/17

Attach Additional Sheets As Necessary

FORMs A2, A3

EMISSION SOURCE LISTING FOR THIS APPLICATION - A2

112r APPLICABILITY INFORMATION - A3

REVISED 04/10/07 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **A2**

EMISSION SOURCE LISTING: New, Modified, Previously Unpermitted, Replaced, Deleted

EMISSION SOURCE ID NO.	EMISSION SOURCE DESCRIPTION	CONTROL DEVICE ID NO.	CONTROL DEVICE DESCRIPTION
Equipment To Be ADDED By This Application (New, Previously Unpermitted, or Replacement)			
CT-01	Taurus 70-10802S Compressor Turbine	CT-01-SCR	Selective Catalyst Reduction
		CT-01-OC	Oxidation Catalyst
CT-02	Centaur 50-6200LS Compressor Turbine	CT-02-SCR	Selective Catalyst Reduction
		CT-02-OC	Oxidation Catalyst
CT-03	Centaur 40-4700S Compressor Turbine	CT-03-SCR	Selective Catalyst Reduction
		CT-03-OC	Oxidation Catalyst
EG-01	Caterpillar G3516B Emergency Generator	N/A	
EG-02	Generac SG100 Emergency Generator	N/A	
WH-01	Hurst LPW-G-125-60W Hot Water Boiler	N/A	
TK-1	Pipeline Liquids Storage Tank	N/A	
TK-2	Hydrocarbon Waste Tank	N/A	
TK-3	Ammonia Tank	N/A	
TK-4	Odorant Tank	N/A	
Fug-01	Fugitive Leaks - Blowdowns	N/A	
Fug-02	Fugitive Leaks - Piping	N/A	
Existing Permitted Equipment To Be MODIFIED By This Application			
N/A			
Equipment To Be DELETED By This Application			
N/A			

112(r) APPLICABILITY INFORMATION — A 3

Is your facility subject to 40 CFR Part 68 "Prevention of Accidental Releases" - Section 112(r) of the Federal Clean Air Act? No

If No, please specify in detail how your facility avoided applicability: No chemicals subject to regulation under this Subpart will be present onsite. The aqueous ammonia stored in TK-3 (exempt from permitting) will have an ammonia concentration of less than 20%.

If your facility is Subject to 112(r), please complete the following:

A. Have you already submitted a Risk Management Plan (RMP) to EPA Pursuant to 40 CFR Part 68.10 or Part 68.150?

Yes No Specify required RMP submittal date: _____ If submitted, RMP submittal date: _____

B. Are you using administrative controls to subject your facility to a lesser 112(r) program standard?

Yes No If yes, please specify: _____

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

VISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

ISSION SOURCE DESCRIPTION: Taurus 70-10802S Compressor Turbine	EMISSION SOURCE ID NO: CT-01
	CONTROL DEVICE ID NO(S): CT-01-SCR and CT-01-OC
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): EP-01

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Natural gas fired compressor turbine used to boost the pressure of natural gas in a transmission pipeline.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

☐ Coal,wood,oil, gas, other burner (Form B1)	☐ Woodworking (Form B4)	☐ Manufact. of chemicals/coatings/inks (Form B7)
☑ Int.combustion engine/generator (Form B2)	☐ Coating/finishing/printing (Form B5)	☐ Incineration (Form B8)
☐ Liquid storage tanks (Form B3)	☐ Storage silos/bins (Form B6)	☐ Other (Form B9)

START CONSTRUCTION DATE: April 2017	OPERATION DATE: November 2018	DATE MANUFACTURED: 2016 or Later
MANUFACTURER / MODEL NO.: Solar Turbines Taurus 70-10802S	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): Yes, KKKK NESHAP (SUBPART?): No MACT (SUBPART?): No		
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25		
EXPECTED ANNUAL HOURS OF OPERATION: 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: <20 % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	Mfg/AP-42	1.92	8.41	1.92	8.41	1.92	8.41
PARTICULATE MATTER<10 MICRONS (PM_{10})	Mfg/AP-42	1.92	8.41	1.92	8.41	1.92	8.41
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	Mfg/AP-42	1.92	8.41	1.92	8.41	1.92	8.41
SULFUR DIOXIDE (SO2)	AP-42	0.33	1.43	0.33	1.43	0.33	1.43
NITROGEN OXIDES (NOx)	Mfg	1.91	8.35	3.41	14.95	1.91	8.35
RBON MONOXIDE (CO)	Mfg	2.99	13.08	7.33	32.11	2.99	13.08
LATILE ORGANIC COMPOUNDS (VOC)	Mfg	0.18	0.78	0.33	1.46	0.18	0.78
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.		SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
1,3-Butadiene	106-99-0	AP-42	0.00002	0.0001	0.00003	0.0001	0.00002	0.0001
Acetaldehyde	75-07-0	AP-42	0.002	0.01	0.003	0.01	0.002	0.01
Acrolein	107-02-8	AP-42	0.0003	0.001	0.0005	0.002	0.0003	0.001
Benzene	71-43-2	AP-42	0.0005	0.002	0.001	0.004	0.0005	0.002
Ethylbenzene	100-41-4	AP-42	0.001	0.01	0.003	0.01	0.001	0.01
Formaldehyde	50-00-0	Mfg.	0.11	0.50	0.23	0.99	0.11	0.50
Naphthalene	91-20-3	AP-42	0.0001	0.0002	0.0001	0.0004	0.0001	0.0002
PAH		AP-42	0.0001	0.0004	0.0002	0.001	0.0001	0.0004

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.		EF SOURCE	lb/hr	lb/day	lb/yr
1,3-Butadiene	106-99-0	AP-42	0.00002	0.0004	0.15
Acetaldehyde	75-07-0	AP-42	0.002	0.04	13.78
Acrolein	107-02-8	AP-42	0.0003	0.01	2.20
Ammonia	7664-41-7	Mfg.	1.32	31.68	11,563.20
Benzene	71-43-2	AP-42	0.0005	0.01	4.13
Formaldehyde	50-00-0	Mfg.	0.11	2.72	992.03
Toluene	108-88-3	AP-42	0.005	0.12	44.78
lene	1330-20-7	AP-42	0.003	0.06	22.05

achments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 | NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate | **B**

EMISSION SOURCE DESCRIPTION: Taurus 70-10802S Compressor Turbine, continued	EMISSION SOURCE ID NO: CT-01
	CONTROL DEVICE ID NO(S): CT-01-SCR and CT-01-OC
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): EP-01

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Natural gas fired compressor turbine used to boost the pressure of natural gas in a transmission pipeline.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☑ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☐ Liquid storage tanks (Form B3)
- ☐ Storage silos/bins (Form B6)
- ☐ Other (Form B9)

START CONSTRUCTION DATE: April 2017	OPERATION DATE: November 2018	DATE MANUFACTURED: 2016 or Later
MANUFACTURER / MODEL NO.: Solar Turbines Taurus 70-10802S	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): Yes, KKKK NESHAP (SUBPART?): No MACT (SUBPART?): No		
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25		
EXPECTED ANNUAL HOURS OF OPERATION: 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: <20 % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	Mfg/AP-42						
PARTICULATE MATTER<10 MICRONS (PM_{10})	Mfg						
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	Mfg						
SULFUR DIOXIDE (SO2)	AP-42						
NITROGEN OXIDES (NOx)	Mfg						
CARBON MONOXIDE (CO)	Mfg						
VOLATILE ORGANIC COMPOUNDS (VOC)	Mfg						
LEAD							
OTHER							

See Form B, Page 1, for criteria pollutant totals for this source

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.		SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
Propylene oxide	75-56-9	AP-42	0.001	0.005	0.002	0.01	0.001	0.005
Toluene	108-88-3	AP-42	0.005	0.02	0.010	0.04	0.005	0.02
Xylene	1330-20-7	AP-42	0.003	0.01	0.005	0.02	0.003	0.01

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr

See Form B, Page 1, for TAP totals for this source

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B2

EMISSION SOURCE (INTERNAL COMBUSTION ENGINES/GENERATORS)

REVISED 12/01/01 **NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate** **B2**

EMISSION SOURCE DESCRIPTION: Taurus 70-10802S Compressor Turbine	EMISSION SOURCE ID NO:	CT-01
	CONTROL DEVICE ID NO(S):	CT-01-SCR and CT-01-OC
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S):	EP-01

CHECK ALL THAT APPLY ☐ EMERGENCY ☐ SPACE HEAT ☐ ELECTRICAL GENERATION ☐ PEAK SHAVER ☑ OTHER (DESCRIBE): Natural Gas Compressor Turbine

GENERATOR OUTPUT (KW): N/A | ANTICIPATED ACTUAL HOURS OF OPERATION AS PEAK SHAVER (HRS/YR): N/A

ENGINE OUTPUT (HP): 11,107 horsepower output ISO

TYPE ICE: ☐ GASOLINE ENGINE ☐ DIESEL ENGINE UP TO 600 HP ☐ DIESEL ENGINE GREATER THAN 600 HP ☐ DUAL FUEL ENGINE ☑ OTHER (DESCRIBE): Natural Gas Compressor Turbine (complete below)

ENGINE TYPE ☐ RICH BURN ☑ LEAN BURN

EMISSION REDUCTION MODIFICATIONS ☐ INJECTION TIMING RETARD ☐ PREIGNITION CHAMBER COMBUSTION ☐ OTHER _____

OR STATIONARY GAS TURBINE (complete below)

FUEL ☑ NATURAL GAS ☐ OIL ☐ OTHER (DESCRIBE):_____

CYCLE: ☐ COGENERATION ☑ SIMPLE ☐ REGENERATIVE ☐ COMBINED

CONTROLS: ☐ WATER-STEAM INJECTION ☐ UNCONTROLLED ☑ LEAN-PREMIX

NATURAL GAS PIPELINE COMPRESSOR OR TURBINE (complete below)

ENGINE TYPE: ☐ 2-CYCLE LEAN BURN ☐ 4-CYCLE LEAN ☑ TURBINE ☐ 4-CYCLE RICH BURN ☐ OTHER (DESCRIBE): _____

CONTROLS: COMBUSTION MODIFICATIONS (DESCRIBE): _____

NONSELECTIVE CATALYTIC REDUCTION ☐ SELECTIVE CATALYTIC REDUCTION ☑

CLEAN BURN AND PRECOMBUSTION CHAMBER ☐ UNCONTROLLED ☐

and oxidation catalyst

FUEL USAGE (INCLUDE STARTUP/BACKUP FUEL)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
Natural Gas	MMBtu	96.00	N/A

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	BTU/UNIT	UNITS	SULFUR CONTENT (% BY WEIGHT)
Natural Gas	1,020	scf	0.0005

MANUFACTURER'S SPECIFIC EMISSION FACTORS (IF AVAILABLE)

POLLUTANT	NOX	CO	PM	PM10	VOC	Formaldehyde
EMISSION FACTOR LB/UNIT	3.20	5.30	1.92	1.92	0.30	0.00288
UNIT	hour	hour	hour	hour	hour	MMBtu

DESCRIBE METHODS TO MINIMIZE VISIBLE EMISSIONS DURING IDLING, OR LOW LOAD OPERATIONS:

COMMENTS:

Attach Additional Sheets As Necessary

FORM C3

CONTROL DEVICE (THERMAL OR CATALYTIC)

REVISED 12/01/01 | NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate | C3

AS REQUIRED BY 15A NCAC 2Q .0112, THIS FORM MUST BE SEALED BY A PROFESSIONAL ENGINNER (P.E.) LICENSED IN NORTH CAROLINA.

CONTROL DEVICE ID NO: CT-01-SCR and CT-01-OC	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): CT-01
EMISSION POINT (STACK) ID NO(S): EP-01	POSITION IN SERIES OF CONTROLS 1 NO. OF UNITS 1
MANUFACTURER:	MODEL NO:
MANUFACTURE DATE:	PROPOSED OPERATION DATE: November 2018
OPERATING SCENARIO:	PROPOSED CONSTRUCTION DATE: April 2017
1 of 1	

TYPE: AFTERBURNER | REGENERATIVE THERMAL OXIDATION | RECUPERATIVE THERMAL OXIDATION

X CATALYTIC OXIDATION

EXPECTED LIFE OF CATALYST (YRS): TBD	METHOD OF DETECTING WHEN CATALYST NEEDS REPLACMENT: TBD

CATALYST MASKING AGENT IN AIR STREAM: HALOGEN | SILICONE | PHOSPHOROUS COMPOUND | HEAVY METAL

TBD | SULFUR COMPOUND | OTHER_____ | NONE

TYPE OF CATALYST: TBD	CATALYST VOL (FT^3): TBD	VELOCITY THROUGH CATALYST (FPS): TBD

SCFM THROUGH CATALYST:

DESCRIBE CONTROL SYSTEM, INCLUDING RELATION TO OTHER CONTROL DEVICES AND SOURCES, AND ATTACH DIAGRAM OF SYSTEM:

Selective Catalyst Reduction and Oxidation Catalyst

POLLUTANT(S) COLLECTED:	NO_x	CO	VOC	Formaldehyde
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	44 %	80 %	50 %	50 %
OVERALL SYSTEM EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				
TOTAL EMISSION RATE (LB/HR) :				

PRESSURE DROP (IN. H2O): MIN MAX	OUTLET TEMPERATURE (°F): MIN MAX
INLET TEMPERATURE (°F): MIN MAX	RESIDENCE TIME (SECONDS):
INLET AIR FLOW RATE (ACFM): (SCFM):	COMBUSTION TEMPERATURE (°F):
COMBUSTION CHAMBER VOLUME (FT^3):	INLET MOISTURE CONTENT (%):
% EXCESS AIR:	CONCENTRATION (ppmv) _____INLET _____OUTLET
AUXILIARY FUEL USED:	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR):
MAXIMUM ANNUAL FUEL USE: UNITS:	MAXIMUM HOURLY FUEL USE: UNITS:
ACTUAL ANNUAL FUEL USE: UNITS:	ACTUAL HOURLY FUEL USE: UNITS:

DESCRIBE METHOD USED TO INCREASE MIXING:

DESCRIBE METHOD TO INSURE ADEQUATE START-UP TEMPERATURE:

DESCRIBE TEMPERATURE MONITORING DEVICES AND PROCEDURES:

STACK TESTING PORTS: G NO G YES (INLET AND OUTLET)

DESCRIBE MAINTENANCE PROCEDURES:

DESCRIBE ANY AUXILIARY MATERIALS INTRODUCED INTO THE CONTROL SYSTEM:

ATTACH A DIAGRAM OF THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S):

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

EVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

ISSION SOURCE DESCRIPTION: Centaur 50-6200LS Compressor Turbine	EMISSION SOURCE ID NO: CT-02
	CONTROL DEVICE ID NO(S): CT-02-SCR and CT-02-OC
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): EP-02

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Natural gas fired compressor turbine used to boost the pressure of natural gas in a transmission pipeline.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☑ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE:	April 2017	OPERATION DATE:	November 2018	DATE MANUFACTURED:	2016 or Later
MANUFACTURER / MODEL NO.:	Solar Turbines Centaur 50-6200LS	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR			
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): Yes, KKKK NESHAP (SUBPART?): No MACT (SUBPART?): No					
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25					
EXPECTED ANNUAL HOURS OF OPERATION:	8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:			<20 % OPACITY

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	Mfg/AP-42	1.20	5.26	1.20	5.26	1.20	5.26
PARTICULATE MATTER<10 MICRONS (PM_{10})	Mfg/AP-42	1.20	5.26	1.20	5.26	1.20	5.26
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	Mfg/AP-42	1.20	5.26	1.20	5.26	1.20	5.26
SULFUR DIOXIDE (SO2)	AP-42	0.20	0.89	0.20	0.894	0.20	0.89
NITROGEN OXIDES (NOx)	Mfg	1.19	5.20	2.13	9.31	1.19	5.20
RBON MONOXIDE (CO)	Mfg	1.87	8.19	4.57	20.04	1.87	8.19
LATILE ORGANIC COMPOUNDS (VOC)	Mfg	0.11	0.48	0.20	0.89	0.11	0.48
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.		SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
1,3-Butadiene	106-99-0	AP-42	0.00001	0.00005	0.00002	0.0001	0.00001	0.00005
Acetaldehyde	75-07-0	AP-42	0.001	0.005	0.002	0.01	0.001	0.005
Acrolein	107-02-8	AP-42	0.0002	0.001	0.0003	0.001	0.0002	0.001
Benzene	71-43-2	AP-42	0.0003	0.001	0.001	0.003	0.0003	0.001
Ethylbenzene	100-41-4	AP-42	0.0008	0.004	0.002	0.01	0.001	0.004
Formaldehyde	50-00-0	Mfg.	0.08	0.33	0.15	0.66	0.08	0.33
Naphthalene	91-20-3	AP-42	0.00003	0.0002	0.0001	0.0003	0.00003	0.0002
PAH		AP-42	0.0001	0.0003	0.0001	0.001	0.0001	0.0003

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.		EF SOURCE	lb/hr	lb/day	lb/yr
1,3-Butadiene	106-99-0	AP-42	0.00001	0.0003	0.10
Acetaldehyde	75-07-0	AP-42	0.001	0.03	9.23
Acrolein	107-02-8	AP-42	0.0002	0.004	1.48
Ammonia	7664-41-7	Mfg.	0.82	19.63	7,165.68
Benzene	71-43-2	AP-42	0.0003	0.008	2.77
Formaldehyde	50-00-0	Mfg.	0.08	1.82	664.78
Toluene	108-88-3	AP-42	0.003	0.12	44.78
lene	1330-20-7	AP-42	0.002	0.06	22.05

ttachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

EMISSION SOURCE DESCRIPTION: Centaur 50-6200LS Compressor Turbine	EMISSION SOURCE ID NO: CT-02
	CONTROL DEVICE ID NO(S): CT-02-SCR and CT-02-OC
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): EP-02

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Natural gas fired compressor turbine used to boost the pressure of natural gas in a transmission pipeline.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☑ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE	April 2017	OPERATION DATE:	November 2018	DATE MANUFACTURED:	2016 or Later
MANUFACTURER / MODEL NO.:	Solar Turbines Centaur 50-6200LS	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR			
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): Yes, KKKK NESHAP (SUBPART?): No MACT (SUBPART?): No					
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25					
EXPECTED ANNUAL HOURS OF OPERATION:	8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:			<20 % OPACITY

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	Mfg/AP-42						
PARTICULATE MATTER<10 MICRONS (PM_{10})	Mfg						
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	Mfg						
SULFUR DIOXIDE (SO2)	AP-42						
NITROGEN OXIDES (NOx)	Mfg						
CARBON MONOXIDE (CO)	Mfg						
VOLATILE ORGANIC COMPOUNDS (VOC)	Mfg						
LEAD							
OTHER							

See Form B, Page 1, for criteria pollutant totals for this source

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.		SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
Propylene oxide	75-56-9	AP-42	0.001	0.003	0.002	0.01	0.001	0.003
Toluene	108-88-3	AP-42	0.003	0.02	0.01	0.03	0.003	0.02
Xylene	1330-20-7	AP-42	0.002	0.01	0.003	0.01	0.002	0.01

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr

See Form B, Page 1, for TAP totals for this source

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B2

EMISSION SOURCE (INTERNAL COMBUSTION ENGINES/GENERATORS)

REVISED 12/01/01 **NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate** **B2**

EMISSION SOURCE DESCRIPTION: Centaur 50-6200LS Compressor Turbine	EMISSION SOURCE ID NO:	CT-02
	CONTROL DEVICE ID NO(S):	CT-02-SCR and CT-02-OC
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S):	EP-02

CHECK ALL THAT APPLY ☐ EMERGENCY ☐ SPACE HEAT ☐ ELECTRICAL GENERATION ☐ PEAK SHAVER ☑ OTHER (DESCRIBE): Natural Gas Compressor Turbine

GENERATOR OUTPUT (KW): N/A | ANTICIPATED ACTUAL HOURS OF OPERATION AS PEAK SHAVER (HRS/YR): N/A

ENGINE OUTPUT (HP): 6,276 horsepower output ISO

TYPE ICE: ☐ GASOLINE ENGINE ☐ DIESEL ENGINE UP TO 600 HP ☐ DIESEL ENGINE GREATER THAN 600 HP ☐ DUAL FUEL ENGINE ☑ OTHER (DESCRIBE): Natural Gas Compressor Turbine (complete below)

ENGINE TYPE ☐ RICH BURN ☑ LEAN BURN

EMISSION REDUCTION MODIFICATIONS ☐ INJECTION TIMING RETARD ☐ PREIGNITION CHAMBER COMBUSTION ☐ OTHER _____

OR STATIONARY GAS TURBINE (complete below)

FUEL ☑ NATURAL GAS ☐ OIL ☐ OTHER (DESCRIBE):_____

CYCLE: ☐ COGENERATION ☑ SIMPLE ☐ REGENERATIVE ☐ COMBINED

CONTROLS: ☐ WATER-STEAM INJECTION ☐ UNCONTROLLED ☑ LEAN-PREMIX

NATURAL GAS PIPELINE COMPRESSOR OR TURBINE (complete below)

ENGINE TYPE: ☐ 2-CYCLE LEAN BURN ☐ 4-CYCLE LEAN ☑ TURBINE ☐ 4-CYCLE RICH BURN ☐ OTHER (DESCRIBE): _____

CONTROLS: COMBUSTION MODIFICATIONS (DESCRIBE): _____

NONSELECTIVE CATALYTIC REDUCTION ☐ SELECTIVE CATALYTIC REDUCTION ☑

CLEAN BURN AND PRECOMBUSTION CHAMBER ☐ UNCONTROLLED ☐

and oxidation catalyst

FUEL USAGE (INCLUDE STARTUP/BACKUP FUEL)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
Natural Gas	MMBtu	60.0	N/A

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	BTU/UNIT	UNITS	SULFUR CONTENT (% BY WEIGHT)
Natural Gas	1,020	scf	0.0005

MANUFACTURER'S SPECIFIC EMISSION FACTORS (IF AVAILABLE)

POLLUTANT	NOX	CO	PM	PM10	VOC	Formaldehyde
EMISSION FACTOR LB/UNIT	1.98	3.30	1.20	1.20	0.19	0.00288
UNIT	hour	hour	hour	hour	hour	MMBtu

DESCRIBE METHODS TO MINIMIZE VISIBLE EMISSIONS DURING IDLING, OR LOW LOAD OPERATIONS:

COMMENTS:

Attach Additional Sheets As Necessary

FORM C3

CONTROL DEVICE (THERMAL OR CATALYTIC)

REVISED 12/01/01 | **NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate** | **C3**

AS REQUIRED BY 15A NCAC 2Q .0112, THIS FORM MUST BE SEALED BY A PROFESSIONAL ENGINNER (P.E.) LICENSED IN NORTH CAROLINA.

CONTROL DEVICE ID NO: CT-02-SCR and CT-02-OC	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): CT-02
EMISSION POINT (STACK) ID NO(S): EP-02	POSITION IN SERIES OF CONTROLS 1 NO. OF UNITS 1
MANUFACTURER:	MODEL NO:
MANUFACTURE DATE:	PROPOSED OPERATION DATE: November 2018
OPERATING SCENARIO:	PROPOSED CONSTRUCTION DATE: April 2017
1 of 1	

TYPE: AFTERBURNER | REGENERATIVE THERMAL OXIDATION | RECUPERATIVE THERMAL OXIDATION

X CATALYTIC OXIDATION

EXPECTED LIFE OF CATALYST (YRS): TBD	METHOD OF DETECTING WHEN CATALYST NEEDS REPLACMENT: TBD

CATALYST MASKING AGENT IN AIR STREAM: HALOGEN | SILICONE | PHOSPHOROUS COMPOUND | HEAVY METAL

TBD | SULFUR COMPOUND | OTHER_____ | NONE

TYPE OF CATALYST: TBD	CATALYST VOL (FT^3): TBD	VELOCITY THROUGH CATALYST (FPS): TBD

SCFM THROUGH CATALYST:

DESCRIBE CONTROL SYSTEM, INCLUDING RELATION TO OTHER CONTROL DEVICES AND SOURCES, AND ATTACH DIAGRAM OF SYSTEM:

Selective Catalyst Reduction and Oxidation Catalyst

POLLUTANT(S) COLLECTED:	NO_x	CO	VOC	Formaldehyde
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	44 %	80 %	50 %	50 %
OVERALL SYSTEM EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				

TOTAL EMISSION RATE (LB/HR) :

PRESSURE DROP (IN. H2O): MIN MAX	OUTLET TEMPERATURE (°F): MIN MAX
INLET TEMPERATURE (°F): MIN MAX	RESIDENCE TIME (SECONDS):
INLET AIR FLOW RATE (ACFM): (SCFM):	COMBUSTION TEMPERATURE (°F):
COMBUSTION CHAMBER VOLUME (FT^3):	INLET MOISTURE CONTENT (%):
% EXCESS AIR:	CONCENTRATION (ppmv) _____INLET _____OUTLET
AUXILIARY FUEL USED:	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR):
MAXIMUM ANNUAL FUEL USE: UNITS:	MAXIMUM HOURLY FUEL USE: UNITS:
ACTUAL ANNUAL FUEL USE: UNITS:	ACTUAL HOURLY FUEL USE: UNITS:

DESCRIBE METHOD USED TO INCREASE MIXING:

DESCRIBE METHOD TO INSURE ADEQUATE START-UP TEMPERATURE:

DESCRIBE TEMPERATURE MONITORING DEVICES AND PROCEDURES:

STACK TESTING PORTS: G NO G YES (INLET AND OUTLET)

DESCRIBE MAINTENANCE PROCEDURES:

DESCRIBE ANY AUXILIARY MATERIALS INTRODUCED INTO THE CONTROL SYSTEM:

ATTACH A DIAGRAM OF THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S):

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

EMISSION SOURCE DESCRIPTION: Centaur 40-4700S Compressor Turbine	EMISSION SOURCE ID NO: CT-03
	CONTROL DEVICE ID NO(S): CT-03-SCR and CT-03-OC
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): EP-03

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Natural gas fired compressor turbine used to boost the pressure of natural gas in a transmission pipeline.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☑ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE:	April 2017	OPERATION DATE:	November 2018	DATE MANUFACTURED:	2016 or Later
MANUFACTURER / MODEL NO.:	Solar Turbines Centaur 40-4700S	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR			
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): Yes, KKKK	NESHAP (SUBPART?): No	MACT (SUBPART?): No			
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25	MAR-MAY 25	JUN-AUG 25	SEP-NOV 25		
EXPECTED ANNUAL HOURS OF OPERATION:	8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:		<20 % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	Mfg/AP-42	1.02	4.47	1.02	4.47	1.02	4.47
PARTICULATE MATTER<10 MICRONS (PM_{10})	Mfg/AP-42	1.02	4.47	1.02	4.47	1.02	4.47
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	Mfg/AP-42	1.02	4.47	1.02	4.47	1.02	4.47
SULFUR DIOXIDE (SO2)	AP-42	0.17	0.76	0.17	0.76	0.17	0.76
NITROGEN OXIDES (NOx)	Mfg	1.01	4.44	5.02	22.01	1.01	4.44
CARBON MONOXIDE (CO)	Mfg	1.66	7.29	6.92	30.31	1.66	7.29
VOLATILE ORGANIC COMPOUNDS (VOC)	Mfg	0.09	0.41	0.17	0.76	0.09	0.41
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.		SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
1,3-Butadiene	106-99-0	AP-42	0.00001	0.00004	0.00002	0.0001	0.00001	0.00004
Acetaldehyde	75-07-0	AP-42	0.001	0.004	0.002	0.01	0.001	0.004
Acrolein	107-02-8	AP-42	0.0001	0.0006	0.0003	0.001	0.0001	0.001
Benzene	71-43-2	AP-42	0.0003	0.001	0.001	0.002	0.0003	0.001
Ethylbenzene	100-41-4	AP-42	0.001	0.003	0.001	0.01	0.001	0.003
Formaldehyde	50-00-0	Mfg.	0.06	0.27	0.12	0.54	0.06	0.27
Naphthalene	91-20-3	AP-42	0.00003	0.0001	0.0001	0.0002	0.00003	0.0001
PAH		AP-42	0.00005	0.0002	0.0001	0.000	0.0000	0.0002

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.		EF SOURCE	lb/hr	lb/day	lb/yr
1,3-Butadiene	106-99-0	AP-42	0.00001	0.0002	0.08
Acetaldehyde	75-07-0	AP-42	0.0009	0.02	7.51
Acrolein	107-02-8	AP-42	0.0001	0.003	1.20
Ammonia	7664-41-7	Mfg.	0.69	16.56	6,044.40
Benzene	71-43-2	AP-42	0.0003	0.006	2.25
Formaldehyde	50-00-0	Mfg.	0.062	1.48	541.00
Toluene	108-88-3	AP-42	0.003	0.07	24.42
Xylene	1330-20-7	AP-42	0.001	0.03	12.02

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

EMISSION SOURCE DESCRIPTION: Centaur 40-4700S Compressor Turbine	EMISSION SOURCE ID NO: CT-03
	CONTROL DEVICE ID NO(S): CT-03-SCR and CT-03-OC
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): EP-03

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Natural gas fired compressor turbine used to boost the pressure of natural gas in a transmission pipeline.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☑ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DAT April 2017	OPERATION DATE: November 2018	DATE MANUFACTURED: 2016 or Later
MANUFACTURER / MODEL NO.: Solar Turbines Centaur 40-4700S	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): Yes, KKKK	NESHAP (SUBPART?): No	MACT (SUBPART?): No
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25	MAR-MAY 25	JUN-AUG 25 SEP-NOV 25
EXPECTED ANNUAL HOURS OF OPERATION: 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:	<20 % OPACITY

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	Mfg/AP-42						
PARTICULATE MATTER<10 MICRONS (PM_{10})	Mfg						
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	Mfg						
SULFUR DIOXIDE (SO2)	AP-42						
NITROGEN OXIDES (NOx)	Mfg						
CARBON MONOXIDE (CO)	Mfg						
VOLATILE ORGANIC COMPOUNDS (VOC)	Mfg						
LEAD							
OTHER							

See Form B, Page 1, for criteria pollutant totals for this source

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.		SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
Propylene oxide	75-56-9	AP-42	0.001	0.003	0.001	0.01	0.001	0.003
Toluene	108-88-3	AP-42	0.003	0.01	0.01	0.02	0.003	0.01
Xylene	1330-20-7	AP-42	0.001	0.01	0.003	0.01	0.001	0.01

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr

See Form B, Page 1, for TAP totals for this source

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B2

EMISSION SOURCE (INTERNAL COMBUSTION ENGINES/GENERATORS)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B2**

EMISSION SOURCE DESCRIPTION: Centaur 40-4700S Compressor Turbine	EMISSION SOURCE ID NO:	CT-03
	CONTROL DEVICE ID NO(S):	CT-03-SCR and CT-03-OC
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S):	EP-03

CHECK ALL THAT APPLY ☐ EMERGENCY ☐ SPACE HEAT ☐ ELECTRICAL GENERATION ☐ PEAK SHAVER ☑ OTHER (DESCRIBE): Natural Gas Compressor Turbine

GENERATOR OUTPUT (KW): N/A — ANTICIPATED ACTUAL HOURS OF OPERATION AS PEAK SHAVER (HRS/YR): N/A

ENGINE OUTPUT (HP): 4,427 horsepower output ISO

TYPE ICE: ☐ GASOLINE ENGINE ☐ DIESEL ENGINE UP TO 600 HP ☐ DIESEL ENGINE GREATER THAN 600 HP ☐ DUAL FUEL ENGINE ☑ OTHER (DESCRIBE): Natural Gas Compressor Turbine (complete below)

ENGINE TYPE ☐ RICH BURN ☑ LEAN BURN

EMISSION REDUCTION MODIFICATIONS ☐ INJECTION TIMING RETARD ☐ PREIGNITION CHAMBER COMBUSTION ☐ OTHER _____

OR STATIONARY GAS TURBINE (complete below)

FUEL ☑ NATURAL GAS ☐ OIL ☐ OTHER (DESCRIBE):_____

CYCLE: ☐ COGENERATION ☑ SIMPLE ☐ REGENERATIVE ☐ COMBINED

CONTROLS: ☐ WATER-STEAM INJECTION ☐ UNCONTROLLED ☑ LEAN-PREMIX

NATURAL GAS PIPELINE COMPRESSOR OR TURBINE (complete below)

ENGINE TYPE: ☐ 2-CYCLE LEAN BURN ☐ 4-CYCLE LEAN ☑ TURBINE ☐ 4-CYCLE RICH BURN ☐ OTHER (DESCRIBE): _____

CONTROLS: COMBUSTION MODIFICATIONS (DESCRIBE): _____ NONSELECTIVE CATALYTIC REDUCTION ☐ SELECTIVE CATALYTIC REDUCTION ☑ CLEAN BURN AND PRECOMBUSTION CHAMBER ☐ UNCONTROLLED ☐ and oxidation catalyst

FUEL USAGE (INCLUDE STARTUP/BACKUP FUEL)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
Natural Gas	MMBtu	51.0	N/A

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	BTU/UNIT	UNITS	SULFUR CONTENT (% BY WEIGHT)
Natural Gas	1,020	scf	0.0005

MANUFACTURER'S SPECIFIC EMISSION FACTORS (IF AVAILABLE)

POLLUTANT	NOX	CO	PM	PM10	VOC	Formaldehyde
EMISSION FACTOR LB/UNIT	4.70	5.70	1.02	1.02	0.16	0.00288
UNIT	hour	hour	hour	hour	hour	MMBtu

DESCRIBE METHODS TO MINIMIZE VISIBLE EMISSIONS DURING IDLING, OR LOW LOAD OPERATIONS:

COMMENTS:

Attach Additional Sheets As Necessary

FORM C3

CONTROL DEVICE (THERMAL OR CATALYTIC)

REVISED 12/01/01 | NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate | C3

AS REQUIRED BY 15A NCAC 2Q .0112, THIS FORM MUST BE SEALED BY A PROFESSIONAL ENGINNER (P.E.) LICENSED IN NORTH CAROLINA.

CONTROL DEVICE ID NO: CT-03-SCR and CT-03-OC	CONTROLS EMISSIONS FROM WHICH EMISSION SOURCE ID NO(S): CT-03
EMISSION POINT (STACK) ID NO(S): EP-03	POSITION IN SERIES OF CONTROLS 1 NO. OF UNITS 1
MANUFACTURER:	MODEL NO:
MANUFACTURE DATE:	PROPOSED OPERATION DATE: November 2018
OPERATING SCENARIO:	PROPOSED CONSTRUCTION DATE: April 2017
1 of 1	

TYPE: AFTERBURNER | REGENERATIVE THERMAL OXIDATION | RECUPERATIVE THERMAL OXIDATION

X CATALYTIC OXIDATION

EXPECTED LIFE OF CATALYST (YRS): TBD	METHOD OF DETECTING WHEN CATALYST NEEDS REPLACMENT: TBD

CATALYST MASKING AGENT IN AIR STREAM: HALOGEN | SILICONE | PHOSPHOROUS COMPOUND | HEAVY METAL

TBD | SULFUR COMPOUND | OTHER_____ | NONE

TYPE OF CATALYST: TBD	CATALYST VOL (FT^3): TBD	VELOCITY THROUGH CATALYST (FPS): TBD

SCFM THROUGH CATALYST:

DESCRIBE CONTROL SYSTEM, INCLUDING RELATION TO OTHER CONTROL DEVICES AND SOURCES, AND ATTACH DIAGRAM OF SYSTEM:

Selective Catalyst Reduction and Oxidation Catalyst

POLLUTANT(S) COLLECTED:	NO_x	CO	VOC	Formaldehyde
BEFORE CONTROL EMISSION RATE (LB/HR):				
CAPTURE EFFICIENCY:	%	%	%	%
CONTROL DEVICE EFFICIENCY:	80 %	90 %	50 %	50 %
OVERALL SYSTEM EFFICIENCY:	%	%	%	%
EFFICIENCY DETERMINATION CODE:				

TOTAL EMISSION RATE (LB/HR) :

PRESSURE DROP (IN. H2O): MIN MAX	OUTLET TEMPERATURE (°F): MIN MAX
INLET TEMPERATURE (°F): MIN MAX	RESIDENCE TIME (SECONDS):
INLET AIR FLOW RATE (ACFM): (SCFM):	COMBUSTION TEMPERATURE (°F):
COMBUSTION CHAMBER VOLUME (FT^3):	INLET MOISTURE CONTENT (%):
% EXCESS AIR:	CONCENTRATION (ppmv) _____INLET _____OUTLET
AUXILIARY FUEL USED:	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR):
MAXIMUM ANNUAL FUEL USE: UNITS:	MAXIMUM HOURLY FUEL USE: UNITS:
ACTUAL ANNUAL FUEL USE: UNITS:	ACTUAL HOURLY FUEL USE: UNITS:

DESCRIBE METHOD USED TO INCREASE MIXING:

DESCRIBE METHOD TO INSURE ADEQUATE START-UP TEMPERATURE:

DESCRIBE TEMPERATURE MONITORING DEVICES AND PROCEDURES:

STACK TESTING PORTS: G NO G YES (INLET AND OUTLET)

DESCRIBE MAINTENANCE PROCEDURES:

DESCRIBE ANY AUXILIARY MATERIALS INTRODUCED INTO THE CONTROL SYSTEM:

ATTACH A DIAGRAM OF THE RELATIONSHIP OF THE CONTROL DEVICE TO ITS EMISSION SOURCE(S):

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

EMISSION SOURCE DESCRIPTION: Caterpillar G3516B Emergency Generator	EMISSION SOURCE ID NO: EG-01
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): EP-04

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Natural gas fired emergency generator used to provide power during emergency periods when the primary source of power to the facility is unavailable.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☑ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE:	April 2017	OPERATION DATE:	November 2018	DATE MANUFACTURED:	2016 or Later
MANUFACTURER / MODEL NO.:	Caterpillar G3516B	EXPECTED OP. SCHEDULE: 100 HR/YR			
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): Yes, JJJJ		NESHAP (SUBPART?): No		MACT (SUBPART?): Yes, ZZZZ	
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25		MAR-MAY 25		JUN-AUG 25	SEP-NOV 25
EXPECTED ANNUAL HOURS OF OPERATION:	100	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:			<20 % OPACITY

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	Mfg/AP-42	0.638	0.032	0.638	0.032	0.638	0.032
PARTICULATE MATTER<10 MICRONS (PM_{10})	Mfg/AP-42	0.638	0.032	0.638	0.032	0.638	0.032
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	Mfg/AP-42	0.638	0.032	0.638	0.032	0.638	0.032
SULFUR DIOXIDE (SO2)	AP-42	0.008	3.88E-04	0.008	3.88E-04	0.008	3.88E-04
NITROGEN OXIDES (NOx)	Mfg	2.00	0.100	2.00	0.100	2.00	0.100
CARBON MONOXIDE (CO)	Mfg	9.98	0.499	9.98	0.499	9.98	0.499
VOLATILE ORGANIC COMPOUNDS (VOC)	Mfg	2.16	0.108	2.16	0.108	2.16	0.108
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.		SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
1,1,2,2-Tetrachloroethane	79-34-5	AP-42	0.0003	0.00002	0.0003	0.00002	0.0003	0.00002
1,1,2-Trichloroethane	79-00-5	AP-42	0.0002	0.00001	0.0002	0.00001	0.0002	0.00001
1,1-Dichloroethane	75-34-3	AP-42	0.0002	0.00001	0.0002	0.00001	0.0002	0.00001
1,2-Dichloroethane	107-06-2	AP-42	0.0002	0.00001	0.0002	0.00001	0.0002	0.00001
1,2-Dichloropropane	78-87-5	AP-42	0.0002	0.00001	0.0002	0.00001	0.0002	0.00001
1,3-Butadiene	106-99-0	AP-42	0.004	0.0002	0.004	0.0002	0.004	0.0002
1,3-Dichloropropene	542-75-6	AP-42	0.0002	0.00001	0.0002	0.00001	0.0002	0.00001
2,2,4-Trimethylpentane	540-84-1	AP-42	0.004	0.0002	0.004	0.0002	0.004	0.0002

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.		EF SOURCE	lb/hr	lb/day	lb/yr
1,1,2,2-Tetrachloroethane	79-34-5	AP-42	0.0003	0.01	0.03
1,2-Dichloroethane	107-06-2	AP-42	0.0002	0.00	0.02
1,3-Butadiene	106-99-0	AP-42	0.004	0.09	0.38
Acetaldehyde	75-07-0	AP-42	0.04	0.86	3.59
Acrolein	107-02-8	AP-42	0.04	0.86	3.60
Benzene	71-43-2	AP-42	0.009	0.22	0.90
Benzo(a)pyrene	50-32-8	AP-42	0.00000003	0.0000006	2.63E-06
Carbon Tetrachloride	56-23-5	AP-42	0.0003	0.01	0.03

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

EMISSION SOURCE DESCRIPTION: Caterpillar G3516B Emergency Generator	EMISSION SOURCE ID NO: EG-01
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): EP-04

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Natural gas fired emergency generator used to provide power during emergency periods when the primary source of power to the facility is unavailable.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☑ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☐ Liquid storage tanks (Form B3)
- ☐ Storage silos/bins (Form B6)
- ☐ Other (Form B9)

START CONSTRUCTION DAT	April 2017	OPERATION DATE:	November 2018	DATE MANUFACTURED:	2016 or Later
MANUFACTURER / MODEL NO.:	Caterpillar G3516B	EXPECTED OP. SCHEDULE: 100 HR/YR			
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): Yes, JJJJ		NESHAP (SUBPART?): No		MACT (SUBPART?): Yes, ZZZZ	
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25		MAR-MAY 25		JUN-AUG 25	SEP-NOV 25
EXPECTED ANNUAL HOURS OF OPERATION: 100		VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:			<20 % OPACITY

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	Mfg/AP-42						
PARTICULATE MATTER<10 MICRONS (PM_{10})	Mfg/AP-42						
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	Mfg/AP-42						
SULFUR DIOXIDE (SO2)	AP-42						
NITROGEN OXIDES (NOx)	Mfg						
CARBON MONOXIDE (CO)	Mfg						
VOLATILE ORGANIC COMPOUNDS (VOC)	Mfg						
LEAD							
OTHER							

See Form B, Page 1, for criteria pollutant totals for this source

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.		SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
Acetaldehyde	75-07-0	AP-42	0.04	0.002	0.04	0.002	0.04	0.002
Acrolein	107-02-8	AP-42	0.04	0.002	0.04	0.002	0.04	0.002
Benzene	71-43-2	AP-42	0.01	0.0004	0.01	0.0004	0.01	0.0004
Biphenyl	92-52-4	AP-42	0.00002	0.000001	0.00002	0.000001	0.00002	0.000001
Carbon Tetrachloride	56-23-5	AP-42	0.0003	0.00001	0.0003	0.00001	0.0003	0.00001
Chlorobenzene	108-90-7	AP-42	0.0002	0.00001	0.0002	0.00001	0.0002	0.00001
Chloroform	67-66-3	AP-42	0.0002	0.00001	0.0002	0.00001	0.0002	0.00001
Ethylbenzene	100-41-4	AP-42	0.0005	0.00002	0.00	0.00002	0.0005	0.00002

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.		EF SOURCE	lb/hr	lb/day	lb/yr
Chlorobenzene	108-90-7	AP-42	0.0002	0.005	0.02
Chloroform	67-66-3	AP-42	0.0002	0.005	0.02
Ethylene Dibromide	106-93-4	AP-42	0.0003	0.0081	0.03
Formaldehyde	50-00-0	AP-42	0.26	6.13	25.53
Hexane (or n-Hexane)	110-54-3	AP-42	0.002	0.05	0.21
Methylene Chloride	75-09-2	AP-42	0.0007	0.02	0.07
Phenol	108-95-2	AP-42	0.0002	0.005	0.02

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

EMISSION SOURCE DESCRIPTION: Caterpillar G3516B Emergency Generator	EMISSION SOURCE ID NO: EG-01
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): EP-04

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Natural gas fired emergency generator used to provide power during emergency periods when the primary source of power to the facility is unavailable.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☑ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☐ Liquid storage tanks (Form B3)
- ☐ Storage silos/bins (Form B6)
- ☐ Other (Form B9)

START CONSTRUCTION DAT	April 2017	OPERATION DATE:	November 2018	DATE MANUFACTURED:	2016 or Later
MANUFACTURER / MODEL NO.:	Caterpillar G3516B	EXPECTED OP. SCHEDULE: 100 HR/YR			
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): Yes, JJJJ		NESHAP (SUBPART?): No		MACT (SUBPART?): Yes, ZZZZ	
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25		MAR-MAY 25		JUN-AUG 25	SEP-NOV 25
EXPECTED ANNUAL HOURS OF OPERATION: 100		VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:			<20 % OPACITY

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	Mfg/AP-42						
PARTICULATE MATTER<10 MICRONS (PM_{10})	Mfg/AP-42						
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	Mfg/AP-42						
SULFUR DIOXIDE (SO2)	AP-42						
NITROGEN OXIDES (NOx)	Mfg						
CARBON MONOXIDE (CO)	Mfg						
VOLATILE ORGANIC COMPOUNDS (VOC)	Mfg						
LEAD							
OTHER							

See Form B, Page 1, for criteria pollutant totals for this source

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.		SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
Ethylene Dibromide	106-93-4	AP-42	0.0003	0.00002	0.0003	0.00002	0.0003	0.00002
Formaldehyde	50-00-0	AP-42	0.26	0.01	0.26	0.01	0.26	0.01
Hexane (or n-Hexane)	110-54-3	AP-42	0.002	0.0001	0.002	0.0001	0.002	0.0001
Methanol	67-56-1	AP-42	0.011	0.0006	0.01	0.0006	0.01	0.0006
Methylene Chloride	75-09-2	AP-42	0.001	0.00003	0.001	0.00003	0.001	0.00003
Naphthalene	91-20-3	AP-42	0.0004	0.00002	0.0004	0.00002	0.0004	0.00002
PAH		AP-42	0.0006	0.00003	0.0006	0.00003	0.0006	0.00003
Phenol	108-95-2	AP-42	0.0002	0.00001	0.0002	0.00001	0.0002	0.00001

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.		EF SOURCE	lb/hr	lb/day	lb/yr
Styrene	100-42-5	AP-42	0.0003	0.006	0.03
Toluene	108-88-3	AP-42	0.004	0.11	0.45
Vinyl Chloride	75-01-4	AP-42	0.0001	0.003	0.01
Xylene	1330-20-7	AP-42	0.001	0.03	0.12

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

EMISSION SOURCE DESCRIPTION: Caterpillar G3516B Emergency Generator	EMISSION SOURCE ID NO: EG-01
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): EP-04

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Natural gas fired emergency generator used to provide power during emergency periods when the primary source of power to the facility is unavailable.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☑ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☐ Liquid storage tanks (Form B3)
- ☐ Storage silos/bins (Form B6)
- ☐ Other (Form B9)

START CONSTRUCTION DAT	April 2017	OPERATION DATE:	November 2018	DATE MANUFACTURED:	2016 or Later
MANUFACTURER / MODEL NO.:	Caterpillar G3516B	EXPECTED OP. SCHEDULE: 100 HR/YR			

IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): Yes, JJJJ NESHAP (SUBPART?): No MACT (SUBPART?): Yes, ZZZZ

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

EXPECTED ANNUAL HOURS OF OPERATION: 100 — VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: <20 % OPACITY

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	Mfg/AP-42						
PARTICULATE MATTER<10 MICRONS (PM_{10})	Mfg/AP-42						
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	Mfg/AP-42						
SULFUR DIOXIDE (SO2)	AP-42						
NITROGEN OXIDES (NOx)	Mfg						
CARBON MONOXIDE (CO)	Mfg						
VOLATILE ORGANIC COMPOUNDS (VOC)	Mfg						
LEAD							
OTHER							

See Form B, Page 1, for criteria pollutant totals for this source

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.		SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
Styrene	100-42-5	AP-42	0.0003	0.00001	0.0003	0.00001	0.0003	0.00001
Toluene	108-88-3	AP-42	0.004	0.0002	0.004	0.0002	0.004	0.0002
Vinyl Chloride	75-01-4	AP-42	0.0001	0.000006	0.0001	0.000006	0.0001	0.000006
Xylene	1330-20-7	AP-42	0.001	0.00006	0.001	0.00006	0.001	0.00006

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr

See Form B, Pages 1-3, for TAP totals for this source

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B2

EMISSION SOURCE (INTERNAL COMBUSTION ENGINES/GENERATORS)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B2**

EMISSION SOURCE DESCRIPTION: Caterpillar G3516B Emergency Generator	EMISSION SOURCE ID NO:	EG-01
	CONTROL DEVICE ID NO(S):	NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S):	EP-04

CHECK ALL THAT APPLY ☑ EMERGENCY ☐ SPACE HEAT ☐ ELECTRICAL GENERATION ☐ PEAK SHAVER ☐ OTHER (DESCRIBE):

GENERATOR OUTPUT (KW): 1,300 — ANTICIPATED ACTUAL HOURS OF OPERATION AS PEAK SHAVER (HRS/YR): N/A

ENGINE OUTPUT (HP): 1,818

TYPE ICE: ☐ GASOLINE ENGINE ☐ DIESEL ENGINE UP TO 600 HP ☐ DIESEL ENGINE GREATER THAN 600 HP ☐ DUAL FUEL ENGINE ☑ OTHER (DESCRIBE): NG SI ICE emergency generator (complete below)

ENGINE TYPE ☐ RICH BURN ☑ LEAN BURN

EMISSION REDUCTION MODIFICATIONS ☐ INJECTION TIMING RETARD ☐ PREIGNITION CHAMBER COMBUSTION ☑ OTHER Air/fuel ratio

OR STATIONARY GAS TURBINE (complete below)

FUEL ☐ NATURAL GAS ☐ OIL ☐ OTHER (DESCRIBE):_____

CYCLE: ☐ COGENERATION ☐ SIMPLE ☐ REGENERATIVE ☐ COMBINED

CONTROLS: ☑ WATER-STEAM INJECTION ☐ UNCONTROLLED ☐ LEAN-PREMIX

NATURAL GAS PIPELINE COMPRESSOR OR TURBINE (complete below)

ENGINE TYPE: ☐ 2-CYCLE LEAN BURN ☐ 4-CYCLE LEAN ☐ TURBINE ☐ 4-CYCLE RICH BURN ☐ OTHER (DESCRIBE): _____

CONTROLS: ☐ COMBUSTION MODIFICATIONS (DESCRIBE): _____

NONSELECTIVE CATALYTIC REDUCTION ☐ SELECTIVE CATALYTIC REDUCTION ☐

CLEAN BURN AND PRECOMBUSTION CHAMBER ☐ UNCONTROLLED ☐

FUEL USAGE (INCLUDE STARTUP/BACKUP FUEL)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
Natural Gas	MMBtu	14.9	N/A

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	BTU/UNIT	UNITS	SULFUR CONTENT (% BY WEIGHT)
Natural Gas	1,020	scf	0.0005

MANUFACTURER'S SPECIFIC EMISSION FACTORS (IF AVAILABLE)

POLLUTANT	NOX	CO	PM	PM10	VOC	OTHER
EMISSION FACTOR g/hp-hr	0.50	2.49	NA	NA	0.54	
UNIT	g/hp-hr	g/hp-hr			g/hp-hr	

DESCRIBE METHODS TO MINIMIZE VISIBLE EMISSIONS DURING IDLING, OR LOW LOAD OPERATIONS:

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

EMISSION SOURCE DESCRIPTION: Generac SG100 Emergency Generator	EMISSION SOURCE ID NO: EG-02
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): EP-05

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Natural gas fired emergency generator used to provide power during emergency periods when the primary source of power to the facility is unavailable.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

☐ Coal,wood,oil, gas, other burner (Form B1)	☐ Woodworking (Form B4)	☐ Manufact. of chemicals/coatings/inks (Form B7)
☑ Int.combustion engine/generator (Form B2)	☐ Coating/finishing/printing (Form B5)	☐ Incineration (Form B8)
☐ Liquid storage tanks (Form B3)	☐ Storage silos/bins (Form B6)	☐ Other (Form B9)

START CONSTRUCTION DATE:	April 2017	OPERATION DATE:	November 2018	DATE MANUFACTURED:	2016 or Later
MANUFACTURER / MODEL NO.:	Generac SG100	EXPECTED OP. SCHEDULE: 100 HR/YR			

IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): Yes, JJJJ NESHAP (SUBPART?): No MACT (SUBPART?): Yes, ZZZZ

PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25

EXPECTED ANNUAL HOURS OF OPERATION: 100 — VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: <20 % OPACITY

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	AP-42	0.052	0.003	0.052	0.003	0.052	0.003
PARTICULATE MATTER<10 MICRONS (PM_{10})	AP-42	0.052	0.003	0.052	0.003	0.052	0.003
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	AP-42	0.052	0.003	0.052	0.003	0.052	0.003
SULFUR DIOXIDE (SO2)	AP-42	0.001	3.18E-05	0.001	3.18E-05	0.001	3.18E-05
NITROGEN OXIDES (NOx)	Mfg	0.001	4.92E-05	0.001	4.92E-05	0.001	4.92E-05
CARBON MONOXIDE (CO)	Mfg	0.020	0.001	0.020	0.001	0.020	0.001
VOLATILE ORGANIC COMPOUNDS (VOC)	Mfg	0.056	0.003	0.056	0.003	0.056	0.003
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.		SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
1,1,2,2-Tetrachloroethane	79-34-5	AP-42	2.51E-05	1.26E-06	2.51E-05	1.26E-06	2.51E-05	1.26E-06
1,1,2-Trichloroethane	79-00-5	AP-42	2.00E-05	9.98E-07	2.00E-05	9.98E-07	2.00E-05	9.98E-07
1,1-Dichloroethane	75-34-3	AP-42	1.48E-05	7.41E-07	1.48E-05	7.41E-07	1.48E-05	7.41E-07
1,2-Dichloroethane	107-06-2	AP-42	1.60E-05	7.99E-07	1.60E-05	7.99E-07	1.60E-05	7.99E-07
1,2-Dichloropropane	78-87-5	AP-42	1.69E-05	8.45E-07	1.69E-05	8.45E-07	1.69E-05	8.45E-07
1,3-Butadiene	106-99-0	AP-42	3.11E-04	1.55E-05	3.11E-04	1.55E-05	3.11E-04	1.55E-05
1,3-Dichloropropene	542-75-6	AP-42	1.66E-05	8.30E-07	1.66E-05	8.30E-07	1.66E-05	8.30E-07
2,2,4-Trimethylpentane	540-84-1	AP-42	3.21E-04	1.60E-05	3.21E-04	1.60E-05	3.21E-04	1.60E-05

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.		EF SOURCE	lb/hr	lb/day	lb/yr
1,1,2,2-Tetrachloroethane	79-34-5	AP-42	2.51E-05	6.03E-04	0.003
1,2-Dichloroethane	107-06-2	AP-42	1.60E-05	3.84E-04	0.002
1,3-Butadiene	106-99-0	AP-42	3.11E-04	0.007	0.031
Acetaldehyde	75-07-0	AP-42	0.003	0.071	0.294
Acrolein	107-02-8	AP-42	0.003	0.071	0.295
Benzene	71-43-2	AP-42	7.35E-04	0.018	0.073
Benzo(a)pyrene	50-32-8	AP-42	2.15E-09	5.16E-08	2.15E-07
Carbon Tetrachloride	56-23-5	AP-42	2.81E-04	0.007	0.028

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 **NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

EMISSION SOURCE DESCRIPTION: Generac SG100 Emergency Generator	EMISSION SOURCE ID NO: EG-02
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): EP-05

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Natural gas fired emergency generator used to provide power during emergency periods when the primary source of power to the facility is unavailable.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

☐ Coal,wood,oil, gas, other burner (Form B1)	☐ Woodworking (Form B4)	☐ Manufact. of chemicals/coatings/inks (Form B7)
☑ Int.combustion engine/generator (Form B2)	☐ Coating/finishing/printing (Form B5)	☐ Incineration (Form B8)
☐ Liquid storage tanks (Form B3)	☐ Storage silos/bins (Form B6)	☐ Other (Form B9)

START CONSTRUCTION DAT April 2017	OPERATION DATE: November 2018	DATE MANUFACTURED: 2016 or Later
MANUFACTURER / MODEL NO.: Generac SG100	EXPECTED OP. SCHEDULE: 100 HR/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): Yes, JJJJ NESHAP (SUBPART?): No MACT (SUBPART?): Yes, ZZZZ		
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25		
EXPECTED ANNUAL HOURS OF OPERATION: 100	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:	<20 % OPACITY

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	Mfg/AP-42						
PARTICULATE MATTER<10 MICRONS (PM_{10})	Mfg/AP-42						
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	Mfg/AP-42						
SULFUR DIOXIDE (SO2)	AP-42						
NITROGEN OXIDES (NOx)	Mfg						
CARBON MONOXIDE (CO)	Mfg						
VOLATILE ORGANIC COMPOUNDS (VOC)	Mfg						
LEAD							
OTHER							

See Form B, Page 1, for criteria pollutant totals for this source

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.		SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
Acetaldehyde	75-07-0	AP-42	0.003	1.47E-04	0.003	1.47E-04	0.003	1.47E-04
Acrolein	107-02-8	AP-42	0.003	1.47E-04	0.003	1.47E-04	0.003	1.47E-04
Benzene	71-43-2	AP-42	7.35E-04	3.67E-05	7.35E-04	3.67E-05	7.35E-04	3.67E-05
Biphenyl	92-52-4	AP-42	1.50E-06	7.48E-08	1.50E-06	7.48E-08	1.50E-06	7.48E-08
Carbon Tetrachloride	56-23-5	AP-42	2.30E-05	1.15E-06	2.30E-05	1.15E-06	2.30E-05	1.15E-06
Chlorobenzene	108-90-7	AP-42	1.68E-05	8.41E-07	1.68E-05	8.41E-07	1.68E-05	8.41E-07
Chloroform	67-66-3	AP-42	1.78E-05	8.92E-07	1.78E-05	8.92E-07	1.78E-05	8.92E-07
Ethylbenzene	100-41-4	AP-42	4.09E-05	2.05E-06	4.09E-05	2.05E-06	4.09E-05	2.05E-06

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.		EF SOURCE	lb/hr	lb/day	lb/yr
Chlorobenzene	108-90-7	AP-42	1.68E-05	4.04E-04	0.002
Chloroform	67-66-3	AP-42	1.78E-05	4.28E-04	0.002
Ethylene Dibromide	106-93-4	AP-42	3.40E-04	0.008	0.003
Formaldehyde	50-00-0	AP-42	0.021	0.502	2.091
Hexane (or n-Hexane)	110-54-3	AP-42	1.69E-04	0.004	0.017
Methylene Chloride	75-09-2	AP-42	5.57E-05	0.001	0.006
Phenol	108-95-2	AP-42	1.59E-05	3.83E-04	0.002

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 **NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

EMISSION SOURCE DESCRIPTION: Generac SG100 Emergency Generator	EMISSION SOURCE ID NO: EG-02
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): EP-05

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Natural gas fired emergency generator used to provide power during emergency periods when the primary source of power to the facility is unavailable.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

☐ Coal,wood,oil, gas, other burner (Form B1)	☐ Woodworking (Form B4)	☐ Manufact. of chemicals/coatings/inks (Form B7)
☑ Int.combustion engine/generator (Form B2)	☐ Coating/finishing/printing (Form B5)	☐ Incineration (Form B8)
☐ Liquid storage tanks (Form B3)	☐ Storage silos/bins (Form B6)	☐ Other (Form B9)

START CONSTRUCTION DAT April 2017	OPERATION DATE: November 2018	DATE MANUFACTURED: 2016 or Later
MANUFACTURER / MODEL NO.: Generac SG100	EXPECTED OP. SCHEDULE: 100 HR/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): Yes, JJJJ NESHAP (SUBPART?): No MACT (SUBPART?): Yes, ZZZZ		
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25		
EXPECTED ANNUAL HOURS OF OPERATION: 100	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:	<20 % OPACITY

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	Mfg/AP-42						
PARTICULATE MATTER<10 MICRONS (PM_{10})	Mfg/AP-42						
PARTICULATE MATTER<2 5 MICRONS ($PM_{2.5}$)	Mfg/AP-42						
SULFUR DIOXIDE (SO2)	AP-42						
NITROGEN OXIDES (NOx)	Mfg						
CARBON MONOXIDE (CO)	Mfg						
VOLATILE ORGANIC COMPOUNDS (VOC)	Mfg						
LEAD							
OTHER							

See Form B, Page 1, for criteria pollutant totals for this source

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.		SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
Ethylene Dibromide	106-93-4	AP-42	2.78E-05	1.39E-06	2.78E-05	1.39E-06	2.78E-05	1.39E-06
Formaldehyde	50-00-0	AP-42	0.021	0.001	0.021	0.001	0.021	0.001
Hexane (or n-Hexane)	110-54-3	AP-42	1.69E-04	8.43E-06	1.69E-04	8.43E-06	1.69E-04	8.43E-06
Methanol	67-56-1	AP-42	9.40E-04	4.70E-05	9.40E-04	4.70E-05	9.40E-04	4.70E-05
Methylene Chloride	75-09-2	AP-42	5.57E-05	2.78E-06	5.57E-05	2.78E-06	5.57E-05	2.78E-06
Naphthalene	91-20-3	AP-42	3.65E-05	1.82E-06	3.65E-05	1.82E-06	3.65E-05	1.82E-06
PAH		AP-42	5.08E-05	2.54E-06	5.08E-05	2.54E-06	5.08E-05	2.54E-06
Phenol	108-95-2	AP-42	1.59E-05	7.97E-07	1.59E-05	7.97E-07	1.59E-05	7.97E-07

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.		EF SOURCE	lb/hr	lb/day	lb/yr
Styrene	100-42-5	AP-42	2.08E-05	4.98E-04	0.002
Toluene	108-88-3	AP-42	3.65E-04	0.009	0.036
Vinyl Chloride	75-01-4	AP-42	9.36E-06	2.25E-04	9.36E-04
Xylene	1330-20-7	AP-42	1.02E-04	0.002	0.010

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 **NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate** **B**

EMISSION SOURCE DESCRIPTION: Generac SG100 Emergency Generator	EMISSION SOURCE ID NO: EG-02
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): EP-05

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Natural gas fired emergency generator used to provide power during emergency periods when the primary source of power to the facility is unavailable.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

☐ Coal,wood,oil, gas, other burner (Form B1) ☐ Woodworking (Form B4) ☐ Manufact. of chemicals/coatings/inks (Form B7)
☑ Int.combustion engine/generator (Form B2) ☐ Coating/finishing/printing (Form B5) ☐ Incineration (Form B8)
☐ Liquid storage tanks (Form B3) ☐ Storage silos/bins (Form B6) ☐ Other (Form B9)

START CONSTRUCTION DAT April 2017	OPERATION DATE: November 2018	DATE MANUFACTURED: 2016 or Later
MANUFACTURER / MODEL NO.: Generac SG100	EXPECTED OP. SCHEDULE: 100 HR/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): Yes, JJJJ NESHAP (SUBPART?): No MACT (SUBPART?): Yes, ZZZZ		
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25 MAR-MAY 25 JUN-AUG 25 SEP-NOV 25		
EXPECTED ANNUAL HOURS OF OPERATION: 100	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION: <20 % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	Mfg/AP-42						
PARTICULATE MATTER<10 MICRONS (PM_{10})	Mfg/AP-42						
PARTICULATE MATTER<2 5 MICRONS ($PM_{2.5}$)	Mfg/AP-42						
SULFUR DIOXIDE (SO2)	AP-42						
NITROGEN OXIDES (NOx)	Mfg						
CARBON MONOXIDE (CO)	Mfg						
VOLATILE ORGANIC COMPOUNDS (VOC)	Mfg						
LEAD							
OTHER							

See Form B, Page 1, for criteria pollutant totals for this source

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.		SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
Styrene	100-42-5	AP-42	2.08E-05	1.04E-06	2.08E-05	1.04E-06	2.08E-05	1.04E-06
Toluene	108-88-3	AP-42	3.65E-04	1.82E-05	3.65E-04	1.82E-05	3.65E-04	1.82E-05
Vinyl Chloride	75-01-4	AP-42	9.36E-06	4.68E-07	9.36E-06	4.68E-07	9.36E-06	4.68E-07
Xylene	1330-20-7	AP-42	1.02E-04	5.08E-06	1.02E-04	5.08E-06	1.02E-04	5.08E-06

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr

See Form B, Pages 1-3, for TAP totals for this source

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency, and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B2

EMISSION SOURCE (INTERNAL COMBUSTION ENGINES/GENERATORS)

REVISED 12/01/01 — **NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate** — **B2**

EMISSION SOURCE DESCRIPTION: Generac SG100 Emergency Generator	EMISSION SOURCE ID NO:	EG-02
	CONTROL DEVICE ID NO(S):	NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S):	EP-05

CHECK ALL THAT APPLY ☑ EMERGENCY ☐ SPACE HEAT ☐ ELECTRICAL GENERATION ☐ PEAK SHAVER ☐ OTHER (DESCRIBE):

GENERATOR OUTPUT (KW): 100 | ANTICIPATED ACTUAL HOURS OF OPERATION AS PEAK SHAVER (HRS/YR): N/A

ENGINE OUTPUT (HP): 148.9

TYPE ICE: ☐ GASOLINE ENGINE ☐ DIESEL ENGINE UP TO 600 HP ☐ DIESEL ENGINE GREATER THAN 600 HP ☐ DUAL FUEL ENGINE ☑ OTHER (DESCRIBE) NG SI ICE emergency generator (complete below)

ENGINE TYPE ☐ RICH BURN ☐ LEAN BURN

EMISSION REDUCTION MODIFICATIONS ☐ INJECTION TIMING RETARD ☐ PREIGNITION CHAMBER COMBUSTION ☑ OTHER Air/fuel ratio

OR STATIONARY GAS TURBINE (complete below)

FUEL ☐ NATURAL GAS ☐ OIL ☐ OTHER (DESCRIBE):_____

CYCLE: ☐ COGENERATION ☐ SIMPLE ☐ REGENERATIVE ☐ COMBINED

CONTROLS: ☐ WATER-STEAM INJECTION ☐ UNCONTROLLED ☐ LEAN-PREMIX

NATURAL GAS PIPELINE COMPRESSOR OR TURBINE (complete below)

ENGINE TYPE: ☐ 2-CYCLE LEAN BURN ☐ 4-CYCLE LEAN ☐ TURBINE ☐ 4-CYCLE RICH BURN ☐ OTHER (DESCRIBE): _____

CONTROLS: ☐ COMBUSTION MODIFICATIONS (DESCRIBE): _____

NONSELECTIVE CATALYTIC REDUCTION ☐ SELECTIVE CATALYTIC REDUCTION ☐

CLEAN BURN AND PRECOMBUSTION CHAMBER ☐ UNCONTROLLED ☐

FUEL USAGE (INCLUDE STARTUP/BACKUP FUEL)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
Natural Gas	cf/hr	1116.0	N/A

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	BTU/UNIT	UNITS	SULFUR CONTENT (% BY WEIGHT)
Natural Gas	1,020	scf	0.0005

MANUFACTURER'S SPECIFIC EMISSION FACTORS (IF AVAILABLE)

POLLUTANT	NOX	CO	PM	PM10	VOC	OTHER
EMISSION FACTOR g/hp-hr	0.003	0.06	NA	NA	0.17	
UNIT	g/hp-hr	g/hp-hr			g/KW-hr	

DESCRIBE METHODS TO MINIMIZE VISIBLE EMISSIONS DURING IDLING, OR LOW LOAD OPERATIONS:

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 | NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate | **B**

EMISSION SOURCE DESCRIPTION: Hurst LPW-G-125-60W Hot Water Boiler	EMISSION SOURCE ID NO: WH-01
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): EP-06

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Natural gas fired hot water boiler used to provide building heat

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☑ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DATE:	April 2017	OPERATION DATE:	November 2018	DATE MANUFACTURED:	2016 or Later
MANUFACTURER / MODEL NO.:	Hurst LPW-G-125-60W	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR			
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): No	NESHAP (SUBPART?): No	MACT (SUBPART?): No			
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25	MAR-MAY 25	JUN-AUG 25	SEP-NOV 25		
EXPECTED ANNUAL HOURS OF OPERATION:	8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:		<20 % OPACITY	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	AP-42	0.039	0.171	0.039	0.171	0.039	0.171
PARTICULATE MATTER<10 MICRONS (PM_{10})	AP-42	0.039	0.171	0.039	0.171	0.039	0.171
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	AP-42	0.039	0.171	0.039	0.171	0.039	0.171
SULFUR DIOXIDE (SO2)	AP-42	0.003	0.014	0.003	0.014	0.003	0.014
NITROGEN OXIDES (NOx)	AP-42	0.257	1.13	0.257	1.13	0.257	1.13
CARBON MONOXIDE (CO)	AP-42	0.432	1.89	0.432	1.89	0.432	1.89
VOLATILE ORGANIC COMPOUNDS (VOC)	AP-42	0.028	0.124	0.028	0.124	0.028	0.124
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.		SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
Benzene	71-43-2	AP-42	1.08E-05	4.73E-05	1.08E-05	4.73E-05	1.08E-05	4.73E-05
Dichlorobenzene	106-46-7	AP-42	6.18E-06	2.71E-05	6.18E-06	2.71E-05	6.18E-06	2.71E-05
Formaldehyde	50-00-0	AP-42	3.86E-04	0.002	3.86E-04	0.002	3.86E-04	0.002
Hexane (or n-Hexane)	110-54-3	AP-42	0.009	0.041	0.009	0.041	0.009	0.041
Naphthalene	91-20-3	AP-42	3.14E-06	1.38E-05	3.14E-06	1.38E-05	3.14E-06	1.38E-05
Toluene	108-88-3	AP-42	1.75E-05	7.67E-05	1.75E-05	7.67E-05	1.75E-05	7.67E-05
Arsenic Compounds		AP-42	1.03E-06	4.51E-06	1.03E-06	4.51E-06	1.03E-06	4.51E-06
Beryllium	7440-41-7	AP-42	6.18E-08	2.71E-07	6.18E-08	2.71E-07	6.18E-08	2.71E-07

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.		EF SOURCE	lb/hr	lb/day	lb/yr
Benzene	71-43-2	AP-42	1.08E-05	2.59E-04	0.095
Dichlorobenzene	106-46-7	AP-42	6.18E-06	1.48E-04	0.054
Formaldehyde	50-00-0	AP-42	3.86E-04	0.009	3.38
Hexane (or n-Hexane)	110-54-3	AP-42	0.009	0.222	81.2
Toluene	108-88-3	AP-42	1.75E-05	4.20E-04	0.153
Arsenic Compounds		AP-42	1.03E-06	2.47E-05	0.009
Beryllium	7440-41-7	AP-42	6.18E-08	1.48E-06	5.41E-04
Cadmium	7440-43-9	AP-42	5.66E-06	1.36E-04	0.050

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

EMISSION SOURCE DESCRIPTION: Hurst LPW-G-125-60W Hot Water Boiler	EMISSION SOURCE ID NO: WH-01
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): EP-06

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Natural gas fired hot water boiler used to provide building heat

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☑ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Woodworking (Form B4)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Incineration (Form B8)
- ☐ Liquid storage tanks (Form B3)
- ☐ Storage silos/bins (Form B6)
- ☐ Other (Form B9)

START CONSTRUCTION DAT	April 2017	OPERATION DATE:	November 2018	DATE MANUFACTURED:	2016 or Later
MANUFACTURER / MODEL NO.:	Hurst LPW-G-125-60W	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR			
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): No	NESHAP (SUBPART?): No	MACT (SUBPART?): No			
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25	MAR-MAY 25	JUN-AUG 25	SEP-NOV 25		
EXPECTED ANNUAL HOURS OF OPERATION: 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:	<20 % OPACITY			

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	AP-42						
PARTICULATE MATTER<10 MICRONS (PM_{10})	AP-42						
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	AP-42						
SULFUR DIOXIDE (SO2)	AP-42						
NITROGEN OXIDES (NOx)	AP-42						
CARBON MONOXIDE (CO)	AP-42						
VOLATILE ORGANIC COMPOUNDS (VOC)	AP-42						
LEAD							
OTHER							

See Form B, Page 1, for criteria pollutant totals for this source

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.		SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
Cadmium	7440-43-9	AP-42	5.66E-06	2.48E-05	5.66E-06	2.48E-05	5.66E-06	2.48E-05
Chromium Compounds		AP-42	7.21E-06	3.16E-05	7.21E-06	3.16E-05	7.21E-06	3.16E-05
Cobalt	7440-48-4	AP-42	4.32E-07	1.89E-06	4.32E-07	1.89E-06	4.32E-07	1.89E-06
Manganese Compounds		AP-42	1.96E-06	8.57E-06	1.96E-06	8.57E-06	1.96E-06	8.57E-06
Mercury	7439-97-6	AP-42	1.34E-06	5.86E-06	1.34E-06	5.86E-06	1.34E-06	5.86E-06
Nickel	7440-02-0	AP-42	1.08E-05	4.73E-05	1.08E-05	4.73E-05	1.08E-05	4.73E-05
Selenium	7782-49-2	AP-42	1.24E-07	5.41E-07	1.24E-07	5.41E-07	1.24E-07	5.41E-07

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.		EF SOURCE	lb/hr	lb/day	lb/yr
Chromium Compounds		AP-42	7.21E-06	1.73E-04	0.063
Manganese Compounds		AP-42	1.96E-06	4.69E-05	0.017
Mercury	7439-97-6	AP-42	1.34E-06	3.21E-05	0.012
Nickel	7440-02-0	AP-42	1.08E-05	2.59E-04	0.095

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B1

EMISSION SOURCE (WOOD, COAL, OIL, GAS, OTHER FUEL-FIRED BURNER)

REVISED 09/22/16 | NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate | B1

EMISSION SOURCE DESCRIPTION: Hurst LPW-G-125-60W Hot Water Boiler	EMISSION SOURCE ID NO: WH-01
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO: 1 OF 1	EMISSION POINT (STACK) ID NO(S): EP-06

DESCRIBE USE: PROCESS HEAT | X SPACE HEAT | ELECTRICAL GENERATION
CONTINUOUS USE | STAND BY/EMERGENCY | OTHER (DESCRIBE): _____

HEATING MECHANISM: X INDIRECT | DIRECT

MAX. FIRING RATE (MMBTU/HOUR): 5.25

WOOD-FIRED BURNER

WOOD TYPE: BARK | WOOD/BARK | WET WOOD | DRY WOOD | OTHER (DESCRIBE): _____

PERCENT MOISTURE OF FUEL: _____

UNCONTROLLED | CONTROLLED WITH FLYASH REINJECTION | CONTROLLED W/O REINJECTION

FUEL FEED METHOD: | HEAT TRANSFER MEDIA: STEAM | AIR | OTHER (DESCRIBE) _____

COAL-FIRED BURNER

TYPE OF BOILER | IF OTHER DESCRIBE:

PULVERIZED	OVERFEED STOKER	UNDERFEED STOKER	SPREADER STOKER	FLUIDIZED BED
☐ WET BED	UNCONTROLLED	UNCONTROLLED	UNCONTROLLED	CIRCULATING
☐ DRY BED	CONTROLLED	CONTROLLED	FLYASH REINJECTION	RECIRCULATING
			NO FLYASH REINJECTION	

OIL/GAS-FIRED BURNER

TYPE OF BOILER: UTILITY | INDUSTRIAL | x COMMERCIAL | INSTITUTIONAL

TYPE OF FIRING: NORMAL | TANGENTIAL | x LOW NOX BURNERS | NO LOW NOX BURNER

OTHER FUEL-FIRED BURNER

TYPE(S) OF FUEL: _____

TYPE OF BOILER: UTILITY | INDUSTRIAL | COMMERCIAL | INSTITUTIONAL

TYPE OF FIRING: _____ TYPE(S) OF CONTROL(S) (IF ANY): _____

FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
Natural Gas	scf	5,147	5,147

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	SPECIFIC BTU CONTENT	SULFUR CONTENT (% BY WEIGHT)	ASH CONTENT (% BY WEIGHT)
Natural Gas	1020/scf	0.0005	0

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

MISSION SOURCE DESCRIPTION: TK-1 Pipeline Liquids Storage Tank	EMISSION SOURCE ID NO: TK-1
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): NA

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
TK-1 will have a capacity of 1,000 gallons and will receive liquids from the compressor engine fluids filter.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

☐ Coal,wood,oil, gas, other burner (Form B1)	☐ Woodworking (Form B4)	☐ Manufact. of chemicals/coatings/inks (Form B7)
☐ Int.combustion engine/generator (Form B2)	☐ Coating/finishing/printing (Form B5)	☐ Incineration (Form B8)
☑ Liquid storage tanks (Form B3)	☐ Storage silos/bins (Form B6)	☐ Other (Form B9)

START CONSTRUCTION DAT April 2017	OPERATION DATE: November 2018	DATE MANUFACTURED: 2016 or Later
MANUFACTURER / MODEL NO.: NA	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): No	NESHAP (SUBPART?): No	MACT (SUBPART?): No
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25	MAR-MAY 25	JUN-AUG 25 SEP-NOV 25
EXPECTED ANNUAL HOURS OF OPERATION: 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:	% OPACITY

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	-	-	-	-	-	-	-
PARTICULATE MATTER<10 MICRONS (PM_{10})	-	-	-	-	-	-	-
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	-	-	-	-	-	-	-
SULFUR DIOXIDE (SO2)	-	-	-	-	-	-	-
NITROGEN OXIDES (NOx)	-	-	-	-	-	-	-
ARBON MONOXIDE (CO)	-	-	-	-	-	-	-
OLATILE ORGANIC COMPOUNDS (VOC)	Mass balance	0.033	0.145	0.033	0.145	0.033	0.145
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
NA							

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
NA				

achments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B3

EMISSION SOURCE (LIQUID STORAGE TANK)

REVISED 12/01/01 | NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate | B3

EMISSION SOURCE DESCRIPTION: Pipeline Liquids Storage Tank	EMISSION SOURCE ID NO: TK-1
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): NA

EACH STORAGE TANK

DESCRIBE IN DETAIL THE STORAGE TANK (ATTACH FLOW DIAGRAM):
TK-1 will have a capacity of 1,000 gallons and will receive liquids from the compressor engine fluids filter.

LIQUID STORED: Liquids from compressor engine fluids filter	LIQUID MOLECULAR WEIGHT (LB/LB-MOLE): TBD	
TANK CAPACITY (GAL): 1,000	VAPOR MOLECULAR WEIGHT (LB/LB-MOLE): TBD	
AVERAGE LIQUID SURFACE TEMPERATURE (F): 77	VAPOR PRESSURE AT AVE. LIQUID SURFACE TEMP (PSIA): 7.70 (Reid)	
MIN. LIQUID SURFACE TEMP (F): 44	MAX. LIQUID SURFACE TEMP (F): 80	MAX. TRUE VAPOR PRESS. (PSIA): 7.70 (Reid)
BULK LIQUID TEMPERATURE (F):	BREATHER VENT SETTINGS (PSIG) ____ VACUUM ____ PRESSURE	
SHELL DIAMETER (FT): 4.12	SHELL CONDITION: X GOOD ___ POOR	IS TANK HEATED: ___ YES X NO
SHELL COLOR: Grey/Light	MAXIMUM THROUGHPUT (GAL/YR): 5,000	MAXIMUM TURNOVERS PER YEAR: 5.00
WORKING VOLUME (GAL): 1,000	ACTUAL THROUGHPUT (GAL/YR): 5,000	ACTUAL TURNOVERS PER YEAR: 5.00
MAX. FILLS PER DAY: TBD	MAX. FILLING RATE (GAL/MIN): TBD	MIN. DURATION OF FILL (HR/FILL): TBD

VERTICAL FIXED ROOF TANKS

SHELL HEIGHT (FT): 10	ROOF TYPE: X CONE OR ___ DOME	ROOF HEIGHT (FT): 4.12
AVERAGE LIQUID HEIGHT (FT): 5	ROOF CONDITION: X GOOD OR _____ POOR	
MAXIMUM LIQUID HEIGHT (FT): 10	ROOF COLOR: Grey	

HORIZONTAL TANKS

SHELL LENGTH (FT): NA	IS TANK UNDERGROUND ?: ___ YES X NO

FLOATING ROOF TANKS

DESCRIBE PERTINENT TANK DATA SUCH AS DECKS, RIM-SEALS, LIQUID DENSITY @ 60 DEG F:

NA

DESCRIBE ANY MONITORING OR WARNING DEVICES (SUCH AS LEAK AND FUME DETECTION INSTRUMENTATION):

NA

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

MISSION SOURCE DESCRIPTION: TK-2 Hydrocarbon Waste Tank	EMISSION SOURCE ID NO: TK-2
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): NA

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
TK-2 will have a capacity of 2,500 gallons and will store waste oil.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☑ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DAT	April 2017	OPERATION DATE:	November 2018	DATE MANUFACTURED:	2016 or Later
MANUFACTURER / MODEL NO.:	NA	EXPECTED OP. SCHEDULE: 24 HR/DAY 7 DAY/WK 52 WK/YR			
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): No		NESHAP (SUBPART?): No		MACT (SUBPART?): No	
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25		MAR-MAY 25		JUN-AUG 25	SEP-NOV 25
EXPECTED ANNUAL HOURS OF OPERATION: 8,760		VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:			% OPACITY

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	-	-	-	-	-	-	-
PARTICULATE MATTER<10 MICRONS (PM_{10})	-	-	-	-	-	-	-
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	-	-	-	-	-	-	-
SULFUR DIOXIDE (SO2)	-	-	-	-	-	-	-
NITROGEN OXIDES (NOx)	-	-	-	-	-	-	-
ARBON MONOXIDE (CO)	-	-	-	-	-	-	-
VOLATILE ORGANIC COMPOUNDS (VOC)	Mass balance	5.01E-06	2.19E-05	5.01E-06	2.19E-05	5.01E-06	2.19E-05
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
NA							

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
NA				

achments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B3

EMISSION SOURCE (LIQUID STORAGE TANK)

REVISED 12/01/01 | **NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate** | **B3**

EMISSION SOURCE DESCRIPTION: Hydrocarbon Waste Tank	EMISSION SOURCE ID NO: TK-2
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): NA

EACH STORAGE TANK

DESCRIBE IN DETAIL THE STORAGE TANK (ATTACH FLOW DIAGRAM):
TK-2 will have a capacity of 1,000 gallons and will store waste oil.

LIQUID STORED: Waste Oil	LIQUID MOLECULAR WEIGHT (LB/LB-MOLE): TBD	
TANK CAPACITY (GAL): 2,500	VAPOR MOLECULAR WEIGHT (LB/LB-MOLE): TBD	
AVERAGE LIQUID SURFACE TEMPERATURE (F): 77	VAPOR PRESSURE AT AVE. LIQUID SURFACE TEMP (PSIA): 0.0001	
MIN. LIQUID SURFACE TEMP (F): 44	MAX. LIQUID SURFACE TEMP (F): 80	MAX. TRUE VAPOR PRESS. (PSIA): 0.0001
BULK LIQUID TEMPERATURE (F):	BREATHER VENT SETTINGS (PSIG) ____ VACUUM ____ PRESSURE Default Tanks 4.09d settings	
SHELL DIAMETER (FT): 4.6	SHELL CONDITION: X GOOD ___ POOR	IS TANK HEATED: ___ YES X NO
SHELL COLOR: Grey/Light	MAXIMUM THROUGHPUT (GAL/YR): 12,500	MAXIMUM TURNOVERS PER YEAR: 5.00
WORKING VOLUME (GAL): 2,500	ACTUAL THROUGHPUT (GAL/YR): 12,500	ACTUAL TURNOVERS PER YEAR: 5.00
MAX. FILLS PER DAY: TBD	MAX. FILLING RATE (GAL/MIN): TBD	MIN. DURATION OF FILL (HR/FILL): TBD

VERTICAL FIXED ROOF TANKS

SHELL HEIGHT (FT): 20	ROOF TYPE: X CONE OR ___ DOME	ROOF HEIGHT (FT): 4.6
AVERAGE LIQUID HEIGHT (FT): 10	ROOF CONDITION: X GOOD OR _____ POOR	
MAXIMUM LIQUID HEIGHT (FT): 20	ROOF COLOR: Grey	

HORIZONTAL TANKS

SHELL LENGTH (FT): NA	IS TANK UNDERGROUND ?: ___ YES X NO

FLOATING ROOF TANKS

DESCRIBE PERTINENT TANK DATA SUCH AS DECKS, RIM-SEALS, LIQUID DENSITY @ 60 DEG F:

NA

DESCRIBE ANY MONITORING OR WARNING DEVICES (SUCH AS LEAK AND FUME DETECTION INSTRUMENTATION):

NA

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

EVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

MISSION SOURCE DESCRIPTION: TK-3 Ammonia Tank	EMISSION SOURCE ID NO: TK-3
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): NA

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
TK-3 will have a capacity of 13,400 gallons and will store aqueous ammonia.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☑ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☐ Other (Form B9)

START CONSTRUCTION DAT	April 2017	OPERATION DATE:	November 2018	DATE MANUFACTURED:	2016 or Later
MANUFACTURER / MODEL NO.:	NA	EXPECTED OP. SCHEDULE: 24 HR/DAY	7 DAY/WK	52 WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): No	NESHAP (SUBPART?): No	MACT (SUBPART?): No			
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25	MAR-MAY 25	JUN-AUG 25	SEP-NOV 25		
EXPECTED ANNUAL HOURS OF OPERATION: 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:	% OPACITY			

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	-	-	-	-	-	-	-
PARTICULATE MATTER<10 MICRONS (PM_{10})	-	-	-	-	-	-	-
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	-	-	-	-	-	-	-
SULFUR DIOXIDE (SO2)	-	-	-	-	-	-	-
NITROGEN OXIDES (NOx)	-	-	-	-	-	-	-
ARBON MONOXIDE (CO)	-	-	-	-	-	-	-
VOLATILE ORGANIC COMPOUNDS (VOC)	-	-	-	-	-	-	-
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
NA							

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
Ammonia	Eng. Data	Neg.	Neg.	Neg.

achments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B3

EMISSION SOURCE (LIQUID STORAGE TANK)

REVISED 12/01/01 | NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate | B3

EMISSION SOURCE DESCRIPTION: Ammonia Tank	EMISSION SOURCE ID NO: TK-3
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): NA

EACH STORAGE TANK

DESCRIBE IN DETAIL THE STORAGE TANK (ATTACH FLOW DIAGRAM):
TK-3 will have a capacity of 13,000 gallons and store aqueous ammonia.

LIQUID STORED: Aqueous ammonia	LIQUID MOLECULAR WEIGHT (LB/LB-MOLE): TBD	
TANK CAPACITY (GAL): 13,400	VAPOR MOLECULAR WEIGHT (LB/LB-MOLE): TBD	
AVERAGE LIQUID SURFACE TEMPERATURE (F): NA	VAPOR PRESSURE AT AVE. LIQUID SURFACE TEMP (PSIA): NA	
MIN. LIQUID SURFACE TEMP (F): NA	MAX. LIQUID SURFACE TEMP (F): NA	MAX. TRUE VAPOR PRESS. (PSIA): NA
BULK LIQUID TEMPERATURE (F):	BREATHER VENT SETTINGS (PSIG) ____ VACUUM ____ PRESSURE	
SHELL DIAMETER (FT): 8.2	SHELL CONDITION: X GOOD ___ POOR	IS TANK HEATED: ___ YES X NO
SHELL COLOR: Grey/Light	MAXIMUM THROUGHPUT (GAL/YR): NA	MAXIMUM TURNOVERS PER YEAR: NA
WORKING VOLUME (GAL): 13,400	ACTUAL THROUGHPUT (GAL/YR): NA	ACTUAL TURNOVERS PER YEAR: NA
MAX. FILLS PER DAY: NA	MAX. FILLING RATE (GAL/MIN): NA	MIN. DURATION OF FILL (HR/FILL): NA

VERTICAL FIXED ROOF TANKS

SHELL HEIGHT (FT):	ROOF TYPE: X CONE OR ___ DOME	ROOF HEIGHT (FT):
AVERAGE LIQUID HEIGHT (FT):	ROOF CONDITION: X GOOD OR _____ POOR	
MAXIMUM LIQUID HEIGHT (FT):	ROOF COLOR: Grey	

HORIZONTAL TANKS

SHELL LENGTH (FT): 32.9	IS TANK UNDERGROUND ?: ___ YES X NO

FLOATING ROOF TANKS

DESCRIBE PERTINENT TANK DATA SUCH AS DECKS, RIM-SEALS, LIQUID DENSITY @ 60 DEG F:

NA

DESCRIBE ANY MONITORING OR WARNING DEVICES (SUCH AS LEAK AND FUME DETECTION INSTRUMENTATION):

NA

COMMENTS:

Attach Additional Sheets As Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

EMISSION SOURCE DESCRIPTION: Fugitive Leaks - Blowdowns	EMISSION SOURCE ID NO: Fug-01
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): NA

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Fugitive Emissions from station blowdowns.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

- ☐ Coal,wood,oil, gas, other burner (Form B1)
- ☐ Int.combustion engine/generator (Form B2)
- ☐ Liquid storage tanks (Form B3)
- ☐ Woodworking (Form B4)
- ☐ Coating/finishing/printing (Form B5)
- ☐ Storage silos/bins (Form B6)
- ☐ Manufact. of chemicals/coatings/inks (Form B7)
- ☐ Incineration (Form B8)
- ☑ Other (Form B9)

START CONSTRUCTION DAT	April 2017	OPERATION DATE:	November 2018	DATE MANUFACTURED:	2016 or Later
MANUFACTURER / MODEL NO.:	NA			EXPECTED OP. SCHEDULE: 24 HR/DAY	7 DAY/WK 52 WK/YR
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): No		NESHAP (SUBPART?): No		MACT (SUBPART?): No	
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB	25	MAR-MAY	25	JUN-AUG 25	SEP-NOV 25
EXPECTED ANNUAL HOURS OF OPERATION:	8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:			% OPACITY

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	-	-	-	-	-	-	-
PARTICULATE MATTER<10 MICRONS (PM_{10})	-	-	-	-	-	-	-
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	-	-	-	-	-	-	-
SULFUR DIOXIDE (SO2)	-	-	-	-	-	-	-
NITROGEN OXIDES (NOx)	-	-	-	-	-	-	-
CARBON MONOXIDE (CO)	-	-	-	-	-	-	-
VOLATILE ORGANIC COMPOUNDS (VOC)	Mass balance	4.30	18.84	4.30	18.84	4.30	18.84
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
Hexane 110-54-3	Mass balance	0.24	1.06	0.24	1.06	0.24	1.06

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
Hexane 110-54-3	Mass balance	0.24	5.81	2120.00

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

REVISED: 12/01/01 | NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate | B9

EMISSION SOURCE DESCRIPTION: Fugitive Leaks - Blowdowns	EMISSION SOURCE ID NO: Fug-01
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO: 1 of 1	EMISSION POINT (STACK) ID NO(S): NA

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Fugitive Emissions from station blowdowns.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	APACITY (UNIT/H	LIMITATION(UNIT/HR)
Natural gas	NA	NA	NA

MATERIALS ENTERING PROCESS - BATCH OPERATION		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	PACITY (UNIT/BA	LIMITATION (UNIT/BATCH)
NA			

MAXIMUM DESIGN (BATCHES / HOUR): NA			
REQUESTED LIMITATION (BATCHES / HOUR): NA		(BATCHES/YR): NA	
FUEL USED: NA		TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR): NA	
MAX. CAPACITY HOURLY FUEL USE: NA		REQUESTED CAPACITY ANNUAL FUEL USE: NA	

COMMENTS:

Attach Additional Sheets as Necessary

FORM B

SPECIFIC EMISSIONS SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **B**

EMISSION SOURCE DESCRIPTION: Fugitive Leaks - Piping	EMISSION SOURCE ID NO: Fug-02
	CONTROL DEVICE ID NO(S): NA
OPERATING SCENARIO 1 of 1	EMISSION POINT (STACK) ID NO(S): NA

DESCRIBE IN DETAILTHE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
Fugitive Emissions from station piping leaks.

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

☐ Coal,wood,oil, gas, other burner (Form B1)	☐ Woodworking (Form B4)	☐ Manufact. of chemicals/coatings/inks (Form B7)
☐ Int.combustion engine/generator (Form B2)	☐ Coating/finishing/printing (Form B5)	☐ Incineration (Form B8)
☐ Liquid storage tanks (Form B3)	☐ Storage silos/bins (Form B6)	☑ Other (Form B9)

START CONSTRUCTION DAT	April 2017	OPERATION DATE:	November 2018	DATE MANUFACTURED:	2016 or Later
MANUFACTURER / MODEL NO.:	NA	EXPECTED OP. SCHEDULE: 24 HR/DAY	7 DAY/WK	52 WK/YR	
IS THIS SOURCE SUBJECT TO? NSPS (SUBPART?): No	NESHAP (SUBPART?): No	MACT (SUBPART?): No			
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 25	MAR-MAY 25	JUN-AUG 25	SEP-NOV 25		
EXPECTED ANNUAL HOURS OF OPERATION: 8,760	VISIBLE STACK EMISSIONS UNDER NORMAL OPERATION:	% OPACITY			

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
PARTICULATE MATTER (PM)	-	-	-	-	-	-	-
PARTICULATE MATTER<10 MICRONS (PM_{10})	-	-	-	-	-	-	-
PARTICULATE MATTER<2.5 MICRONS ($PM_{2.5}$)	-	-	-	-	-	-	-
SULFUR DIOXIDE (SO2)	-	-	-	-	-	-	-
NITROGEN OXIDES (NOx)	-	-	-	-	-	-	-
CARBON MONOXIDE (CO)	-	-	-	-	-	-	-
VOLATILE ORGANIC COMPOUNDS (VOC)	EPA	0.080	0.352	0.080	0.352	0.080	0.352
LEAD							
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT AND CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) lb/hr	EXPECTED ACTUAL (AFTER CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (BEFORE CONTROLS / LIMITS) tons/yr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) lb/hr	POTENTIAL EMSSIONS (AFTER CONTROLS / LIMITS) tons/yr
Hexane 110-54-3	Mass Balance	0.005	0.020	0.005	0.020	0.005	0.020

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

INDICATE EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

TOXIC AIR POLLUTANT AND CAS NO.	EF SOURCE	lb/hr	lb/day	lb/yr
Hexane 110-54-3	Mass Balance	0.005	0.110	40.0

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE

Attach Additional Sheets As Necessary

FORM B9
EMISSION SOURCE (OTHER)

REVISED: 12/01/01 | NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate | B9

EMISSION SOURCE DESCRIPTION: Fugitive Leaks - Piping	EMISSION SOURCE ID NO: Fug-02
OPERATING SCENARIO: 1 of 1	CONTROL DEVICE ID NO(S): NA
	EMISSION POINT (STACK) ID NO(S): NA

DESCRIBE IN DETAIL THE PROCESS (ATTACH FLOW DIAGRAM):
Fugitive Emissions from station piping leaks.

MATERIALS ENTERING PROCESS - CONTINUOUS PROCESS		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	APACITY (UNIT/H	LIMITATION(UNIT/HR)
Natural gas	NA	NA	NA

MATERIALS ENTERING PROCESS - BATCH OPERATION		MAX. DESIGN	REQUESTED CAPACITY
TYPE	UNITS	PACITY (UNIT/BA	LIMITATION (UNIT/BATCH)
NA			

MAXIMUM DESIGN (BATCHES / HOUR): NA		
REQUESTED LIMITATION (BATCHES / HOUR): NA	(BATCHES/YR): NA	
FUEL USED: NA	TOTAL MAXIMUM FIRING RATE (MILLION BTU/HR):	NA
MAX. CAPACITY HOURLY FUEL USE: NA	REQUESTED CAPACITY ANNUAL FUEL USE:	NA

COMMENTS:

Attach Additional Sheets as Necessary

FORM D1

FACILITY-WIDE EMISSIONS SUMMARY

REVISED 12/01/01 | NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate | D1

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

AIR POLLUTANT EMITTED	EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITATIONS)	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)
	tons/yr	tons/yr	tons/yr
PARTICULATE MATTER (PM)	18.3	18.3	18.3
PARTICULATE MATTER < 10 MICRONS (PM_{10})	18.3	18.3	18.3
PARTICULATE MATTER < 2.5 MICRONS ($PM_{2.5}$)	18.3	18.3	18.3
SULFUR DIOXIDE (SO2)	3.10	3.10	3.10
NITROGEN OXIDES (NOx)	19.2	47.5	19.2
CARBON MONOXIDE (CO)	31.0	84.9	31.0
VOLATILE ORGANIC COMPOUNDS (VOC)	21.2	22.7	21.2
LEAD			
OTHER			

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

HAZARDOUS AIR POLLUTANT EMITTED	CAS NO.	EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITATIONS)	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)
		tons/yr	tons/yr	tons/yr
1,1,2,2-Tetrachloroethane	79-34-5	1.66E-05	1.66E-05	1.66E-05
1,1,2-Trichloroethane	79-00-5	1.32E-05	1.32E-05	1.32E-05
1,1-Dichloroethane	75-34-3	9.78E-06	9.78E-06	9.78E-06
1,2-Dichloroethane	107-06-2	1.06E-05	1.06E-05	1.06E-05
1,2-Dichloropropane	78-87-5	1.12E-05	1.12E-05	1.12E-05
1,3-Butadiene	106-99-0	3.69E-04	5.33E-04	3.69E-04
1,3-Dichloropropene	542-75-6	1.10E-05	1.10E-05	1.10E-05
2,2,4-Trimethylpentane	540-84-1	2.12E-04	2.12E-04	2.12E-04
Acetaldehyde	106-99-0	0.017	0.032	0.017
Acrolein	75-07-0	0.004	0.007	0.004
Benzene	71-43-2	0.005	0.010	0.005
Biphenyl	92-52-4	9.88E-07	9.88E-07	9.88E-07
Carbon Tetrachloride	56-23-5	1.52E-05	1.52E-05	1.52E-05

TOXIC AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

INDICATE REQUESTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS. EMISSIONS ABOVE THE TOXIC PERMIT EMISSION RATE (TPER) IN 15A NCAC 2Q .0711 MAY REQUIRE AIR DISPERSION MODELING. USE NETTING FORM D2 IF NECESSARY.

TOXIC AIR POLLUTANT EMITTED	CAS NO.	lb/hr	lb/day	lb/year	Modeling Required ? Yes	Modeling Required ? No	Note
1,1,2,2-Tetrachloroethane	79-34-5	3.32E-04	0.008	0.033		x	1
1,2-Dichloroethane	107-06-2	1.97E-04	0.005	0.021		x	1
1,3-Butadiene	106-99-0	0.004	0.099	0.739		x	1
Acetaldehyde	75-07-0	0.042	1.02	34.4		x	1
Acrolein	75-07-0	0.039	0.948	8.78		x	1
Ammonia	7664-41-7	2.83	67.9	24,773		x	1
Benzene	71-43-2	0.011	0.258	10.2		x	1
Benzo(a)pyrene	50-32-8	2.84E-08	6.82E-07	2.84E-06		x	1
Carbon Tetrachloride	56-23-5	5.62E-04	0.013	0.030		x	1
Chlorobenzene	108-90-7	2.22E-04	0.005	0.022		x	1
Chloroform	67-66-3	2.36E-04	0.006	0.024		x	1
Dichlorobenzene	106-46-7	6.18E-06	1.48E-04	0.054		x	1
Ethylene Dibromide	106-93-4	6.79E-04	0.016	0.037		x	1
Formaldehyde	50-00-0	0.528	12.7	2,229		x	1
Hexane (or n-Hexane)	110-54-3	0.258	6.2	2,241		x	1

COMMENTS:

Note 1: The combustion sources proposed for the Northampton Compressor Station are exempt from NC DENR Air Toxics permitting requirements per 15A NCAC 02Q.0702(a)(25), as the aggregate allowable natural gas heat input value for these sources is less than 450 MMBtu/hr, and they will be the only source of benzene at the facility.

FORM D1

FACILITY-WIDE EMISSIONS SUMMARY

REVISED 12/01/01 | NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate | D1

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

AIR POLLUTANT EMITTED	EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITATIONS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS) tons/yr
PARTICULATE MATTER (PM)	*See Form D1, Page 1, for criteria pollutant totals.*		
PARTICULATE MATTER < 10 MICRONS (PM_{10})			
PARTICULATE MATTER < 2.5 MICRONS ($PM_{2.5}$)			
SULFUR DIOXIDE (SO2)			
NITROGEN OXIDES (NOx)			
CARBON MONOXIDE (CO)			
VOLATILE ORGANIC COMPOUNDS (VOC)			
LEAD			
OTHER			

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

HAZARDOUS AIR POLLUTANT EMITTED	CAS NO.	EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITATIONS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS) tons/yr
Chlorobenzene	108-90-7	1.11E-05	1.11E-05	1.11E-05
Chloroform	67-66-3	1.18E-05	1.18E-05	1.18E-05
Dichlorobenzene	106-46-7	2.71E-05	2.71E-05	2.71E-05
Ethylbenzene	100-41-4	0.012	0.024	0.012
Ethylene Dibromide	106-93-4	1.84E-05	1.84E-05	1.84E-05
Formaldehyde	75-07-0	1.11	2.21	1.11
Hexane (or n-Hexane)	110-54-3	1.12	1.12	1.12
Methanol	67-56-1	6.21E-04	6.21E-04	6.21E-04
Methylene Chloride	75-09-2	3.68E-05	3.68E-05	3.68E-05
Napthalene	91-20-3	5.34E-04	0.001	5.34E-04
PAH		8.73E-04	0.002	8.73E-04
Phenol	108-95-2	1.05E-05	1.05E-05	1.05E-05
Propylene oxide	75-56-9	0.011	0.022	0.011
Styrene	100-42-5	1.37E-05	1.37E-05	1.37E-05
Toluene	108-88-3	0.050	0.100	0.050

TOXIC AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

INDICATE REQUESTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS. EMISSIONS ABOVE THE TOXIC PERMIT EMISSION RATE (TPER) IN 15A NCAC 2Q .0711 MAY REQUIRE AIR DISPERSION MODELING. USE NETTING FORM D2 IF NECESSARY.

TOXIC AIR POLLUTANT EMITTED	CAS NO.	lb/hr	lb/day	lb/year	Modeling Required ? Yes	Modeling Required ? No	Note 1
Methylene Chloride	75-09-2	7.36E-04	0.018	0.074		x	1
Phenol	108-95-2	2.11E-04	0.005	0.021		x	1
Styrene	100-42-5	2.74E-04	0.007	0.027		x	1
Toluene	108-88-3	0.016	0.388	99.8		x	1
Vinyl Chloride	75-01-4	1.24E-04	0.003	0.012		x	1
Xylene	1330-20-7	0.007	0.166	49.0		x	1

COMMENTS:

Note 1: The combustion sources proposed for the Northampton Compressor Station are exempt from NC DENR Air Toxics permitting requirements per 15A NCAC 02Q.0702(a)(25), as the aggregate allowable natural gas heat input value for these sources is less than 450 MMBtu/hr, and they will be the only source of benzene at the facility.

FORM D1

FACILITY-WIDE EMISSIONS SUMMARY

REVISED 12/01/01 — NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate — **D1**

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

AIR POLLUTANT EMITTED	EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITATIONS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS) tons/yr
PARTICULATE MATTER (PM)	*See Form D1, Page 1, for criteria pollutant totals.*		
PARTICULATE MATTER < 10 MICRONS (PM_{10})			
PARTICULATE MATTER < 2.5 MICRONS ($PM_{2.5}$)			
SULFUR DIOXIDE (SO2)			
NITROGEN OXIDES (NOx)			
CARBON MONOXIDE (CO)			
VOLATILE ORGANIC COMPOUNDS (VOC)			
LEAD			
OTHER			

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

HAZARDOUS AIR POLLUTANT EMITTED	CAS NO.	EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS) tons/yr	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITATIONS) tons/yr	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS) tons/yr
Vinyl Chloride	75-01-4	6.18E-06	6.18E-06	6.18E-06
Xylene	1330-20-7	0.024	0.049	0.024
Arsenic Compounds		4.51E-06	4.51E-06	4.51E-06
Beryllium	7440-41-7	2.71E-07	2.71E-07	2.71E-07
Cadmium	7440-43-9	2.48E-05	2.48E-05	2.48E-05
Chromium Compounds		3.16E-05	3.16E-05	3.16E-05
Cobalt	7440-48-4	1.89E-06	1.89E-06	1.89E-06
Manganese Compounds		8.57E-06	8.57E-06	8.57E-06
Mercury	7439-97-6	5.86E-06	5.86E-06	5.86E-06
Nickel	7440-02-0	4.73E-05	4.73E-05	4.73E-05
Selenium	7782-49-2	5.41E-07	5.41E-07	5.41E-07

TOXIC AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE

INDICATE REQUESTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS. EMISSIONS ABOVE THE TOXIC PERMIT EMISSION RATE (TPER) IN 15A NCAC 2Q .0711 MAY REQUIRE AIR DISPERSION MODELING. USE NETTING FORM D2 IF NECESSARY.

TOXIC AIR POLLUTANT EMITTED	CAS NO.	lb/hr	lb/day	lb/year	Modeling Required ? Yes	Modeling Required ? No	Note
Arsenic Compounds		1.03E-06	2.47E-05	0.009		X	1
Beryllium	7440-41-7	6.18E-08	1.48E-06	5.41E-04		X	1
Cadmium	7440-43-9	5.66E-06	1.36E-04	0.050		X	1
Chromium Compounds		7.21E-06	1.73E-04	0.063		X	1
Manganese Compounds		1.96E-06	4.69E-05	0.017		X	1
Mercury	7439-97-6	1.34E-06	3.21E-05	0.012		X	1
Nickel	7440-02-0	1.08E-05	2.59E-04	0.095		X	1

COMMENTS:

Note 1: The combustion sources proposed for the Northampton Compressor Station are exempt from NC DENR Air Toxics permitting requirements per 15A NCAC 02Q.0702(a)(25), as the aggregate allowable natural gas heat input value for these sources is less than 450 MMBtu/hr, and they will be the only source of benzene at the facility.

FORM D2

AIR POLLUTANT NETTING WORKSHEET

evised:12/01/01 | NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate | D2

PURPOSE OF NETTING: X AIR TOXICS PSD (100/250 tons per year) PSD SIGNIFICANT LEVELS

AIR POLLUTANT: All (See Form D1) CAS NO.:

EMISSION SOURCE ID NOS.: Facility-Wide

SECTION A - EMISSION OFFSETTING ANALYSIS FOR MODIFIED/NEW SOURCES

Summarize in this section using the B forms	EMISSIONS - USE APPROPRIATE COLUMNS ONLY		
	LB/YEAR	LB/DAY	LB/HR
MODIFICATION INCREASE	See comments below		
- MINUS -	- MINUS -	- MINUS -	- MINUS -
MODIFICATION DECREASE			
= EQUALS =	= EQUALS =	= EQUALS =	= EQUALS =
NET CHANGE FROM MODIFICATION			

SECTION B - FACILITY-WIDE EMISSION NETTING ANALYSIS

CREDITABLE INCREASE	See comments below		
- MINUS -	- MINUS -	- MINUS -	- MINUS -
CREDITABLE DECREASE			
= EQUALS =	= EQUALS =	= EQUALS =	= EQUALS =
NET CREDITABLE CHANGE			

SECTION C - FACILITY-WIDE EMISSIONS

TOTAL FACILITY EMISSIONS	See comments below		
TPER LEVELS (2Q .0711)			

CHECK HERE IF AN AIR DISPERSION MODELING ANALYSIS IS REQUIRED

COMMENTS:

The combustion sources proposed for the Northampton Compressor Station are exempt from NC DENR Air Toxics permitting requirements per 15A NCAC 02Q.0702(a)(25), as the aggregate allowable natural gas heat input value for these sources is less than 450 MMBtu/hr, and they will be the only source of benzene at the facility.

FORM D4

EXEMPT AND INSIGNIFICANT ACTIVITIES SUMMARY

ACTIVITIES EXEMPTED PER 2Q .0102 OR INSIGNIFICANT ACTIVITIES PER 2Q .0503 FOR TITLE V SOURCES

	DESCRIPTION OF EMISSION SOURCE	SIZE OR PRODUCTION RATE	BASIS FOR EXEMPTION OR INSIGNIFICANT ACTIVITY
1.	Natural Gas Boiler (used for building heat)	5.25 MMBtu/hr	Per 15A NCAC 2Q.0102(h)(1)(B), fuel combustion equipment (excluding internal combustion engines) firing exclusively natural gas or liquefied petroleum gas or a mixture of these fuels.
2.	TK-1, Pipeline Liquids Storage Tank, will receive and store pipeline liquids captured by the station's separators and filter-separator.	1,000 gallons	Per 15A NCAC 02Q.0102(g)(14)(B), sources for which there are no applicable requirements.
3.	TK-2, Hydrocarbon Waste Tank, will receive and store used oil used in oil-filled operational equipment throughout the facility.	2,500 gallons	Per 15A NCAC 02Q.0102(g)(4), storage tanks with no applicable requirements other than Stage I controls pursuant to 15A NCAC 02D.0928, Gasoline Service Stations Stage I.
4.	TK-3, Aqueous Ammonia Storage Tank, will be used to supply aqueous ammonia to the SCRs.	13,400 gallons	Per 15A NCAC 02Q.0102(g)(4), storage tanks with no applicable requirements other than Stage I controls pursuant to 15A NCAC 02D.0928, Gasoline Service Stations Stage I.
	TK-4, Odorant Storage Tank	6,000 gallons	Per 15A NCAC 02Q.0102(g)(14)(B), sources for which there are no applicable requirements.
6.			
7.			
8.			
9.			
10.			

FORM D

TECHNICAL ANALYSIS TO SUPPORT PERMIT APPLICATION

REVISED: 12/01/01 **NCDENR/Division of Air Quality - Application for Air Permit to Construct/Operate** **D5**

PROVIDE DETAILED TECHNICAL CALCULATIONS TO SUPPORT ALL EMISSION, CONTROL, AND REGULATORY DEMONSTRATIONS MADE IN THIS APPLICATION. INCLUDE A COMPREHENSIVE PROCESS FLOW DIAGRAM AS NECESSARY TO SUPPORT AND CLARIFY CALCULATIONS AND ASSUMPTIONS. ADDRESS THE FOLLOWING SPECIFIC ISSUES ON SEPARATE PAGES:

A **SPECIFIC EMISSIONS SOURCE (EMISSION INFORMATION) (FORM B) -** SHOW CALCULATIONS USED, INCLUDING EMISSION FACTORS, MATERIAL BALANCES, AND/OR OTHER METHODS FROM WHICH THE POLLUTANT EMISSION RATES IN THIS APPLICATION WERE DERIVED. INCLUDE CALCULATION OF POTENTIAL BEFORE AND, WHERE APPLICABLE, AFTER CONTROLS. CLEARLY STATE ANY ASSUMPTIONS MADE AND PROVIDE ANY REFERENCES AS NEEDED TO SUPPORT MATERIAL BALANCE CALCULATIONS.

B **SPECIFIC EMISSION SOURCE (REGULATORY INFORMATION)(FORM E2 - TITLE V ONLY) -** PROVIDE AN ANALYSIS OF ANY REGULATIONS APPLICABLE TO INDIVIDUAL SOURCES AND THE FACILITY AS A WHOLE. INCLUDE A DISCUSSION OUTING METHODS (e.g. FOR TESTING AND/OR MONITORING REQUIREMENTS) FOR COMPLYING WITH APPLICABLE REGULATIONS, PARTICULARLY THOSE REGULATIONS LIMITING EMISSIONS BASED ON PROCESS RATES OR OTHER OPERATIONAL PARAMETERS. PROVIDE JUSTIFICATION FOR AVOIDANCE OF ANY FEDERAL REGULATIONS (PREVENTION OF SIGNIFICANT DETERIORATION (PSD), NEW SOURCE PERFORMANCE STANDARDS (NSPS), NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPS), TITLE V), INCLUDING EXEMPTIONS FROM THE FEDERAL REGULATIONS WHICH WOULD OTHERWISE BE APPLICABLE TO THIS FACILITY. SUBMIT ANY REQUIRED TO DOCUMENT COMPLIANCE WITH ANY REGULATIONS. INCLUDE EMISSION RATES CALCULATED IN ITEM "A" ABOVE, DATES OF MANUFACTURE, CONTROL EQUIPMENT, ETC. TO SUPPORT THESE CALCULATIONS.

C **CONTROL DEVICE ANALYSIS (FORM C) -** PROVIDE A TECHNICAL EVALUATION WITH SUPPORTING REFERENCES FOR ANY CONTROL EFFICIENCIES LISTED ON SECTION C FORMS, OR USED TO REDUCE EMISSION RATES IN CALCULATIONS UNDER ITEM "A" ABOVE. INCLUDE PERTINENT OPERATING PARAMETERS (e.g. OPERATING CONDITIONS, MANUFACTURING RECOMMENDATIONS, AND PARAMETERS AS APPLIED FOR IN THIS APPLICATION) CRITICAL TO ENSURING PROPER PERFORMANCE OF THE CONTROL DEVICES). INCLUDE AND LIMITATIONS OR MALFUNCTION POTENTIAL FOR THE PARTICULAR CONTROL DEVICES AS EMPLOYED AT THIS FACILITY. DETAIL PROCEDURES FOR ASSURING PROPER OPERATION OF THE CONTROL DEVICE INCLUDING MONITORING SYSTEMS AND MAINTENANCE TO BE PERFORMED.

D **PROCESS AND OPERATIONAL COMPLIANCE ANALYSIS - (FORM E3 - TITLE V ONLY) -** SHOWING HOW COMPLIANCE WILL BE ACHIEVED WHEN USING PROCESS, OPERATIONAL, OR OTHER DATA TO DEMONSTRATE COMPLIANCE. REFER TO COMPLIANCE REQUIREMENTS IN THE REGULATORY ANALYSIS IN ITEM "B" WHERE APPROPRIATE. LIST ANY CONDITIONS OR PARAMETERS THAT CAN BE MONITORED AND REPORTED TO DEMONSTRATE COMPLIANCE WITH THE APPLICABLE REGULATIONS.

E **PROFESSIONAL ENGINEERING SEAL -** PURSUANT TO 15A NCAC 2Q .0112 "APPLICATION REQUIRING A PROFESSIONAL ENGINEERING SEAL," A PROFESSIONAL ENGINEER REGISTERED IN NORTH CAROLINA SHALL BE REQUIRED TO SEAL TECHNICAL PORTIONS OF THIS APPLICATION FOR NEW SOURCES AND MODIFICATIONS OF EXISTING SOURCES. (SEE INSTRUCTIONS FOR FURTHER APPLICABILITY).

I, _____, attest that this application for _____ has been reviewed by me and is accurate, complete and consistent with the information supplied in the engineering plans, calculations, and all other supporting documentation to the best of my knowledge. I further attest that to the best of my knowledge the proposed design has been prepared in accordance with the applicable regulations. Although certain portions of this submittal package may have been developed by other professionals, inclusion of these materials under my seal signifies that I have reviewed this material and have judged it to be consistent with the proposed design. Note: In accordance with NC General Statutes 143-215.6A and 143-215.6B, any person who knowingly makes any false statement, representation, or certification in any application shall be guilty of a Class 2 misdemeanor which may include a fine not to exceed $10,000 as well as civil penalties up to $25,000 per violation.

(PLEASE USE BLUE INK TO COMPLETE THE FOLLOWING)

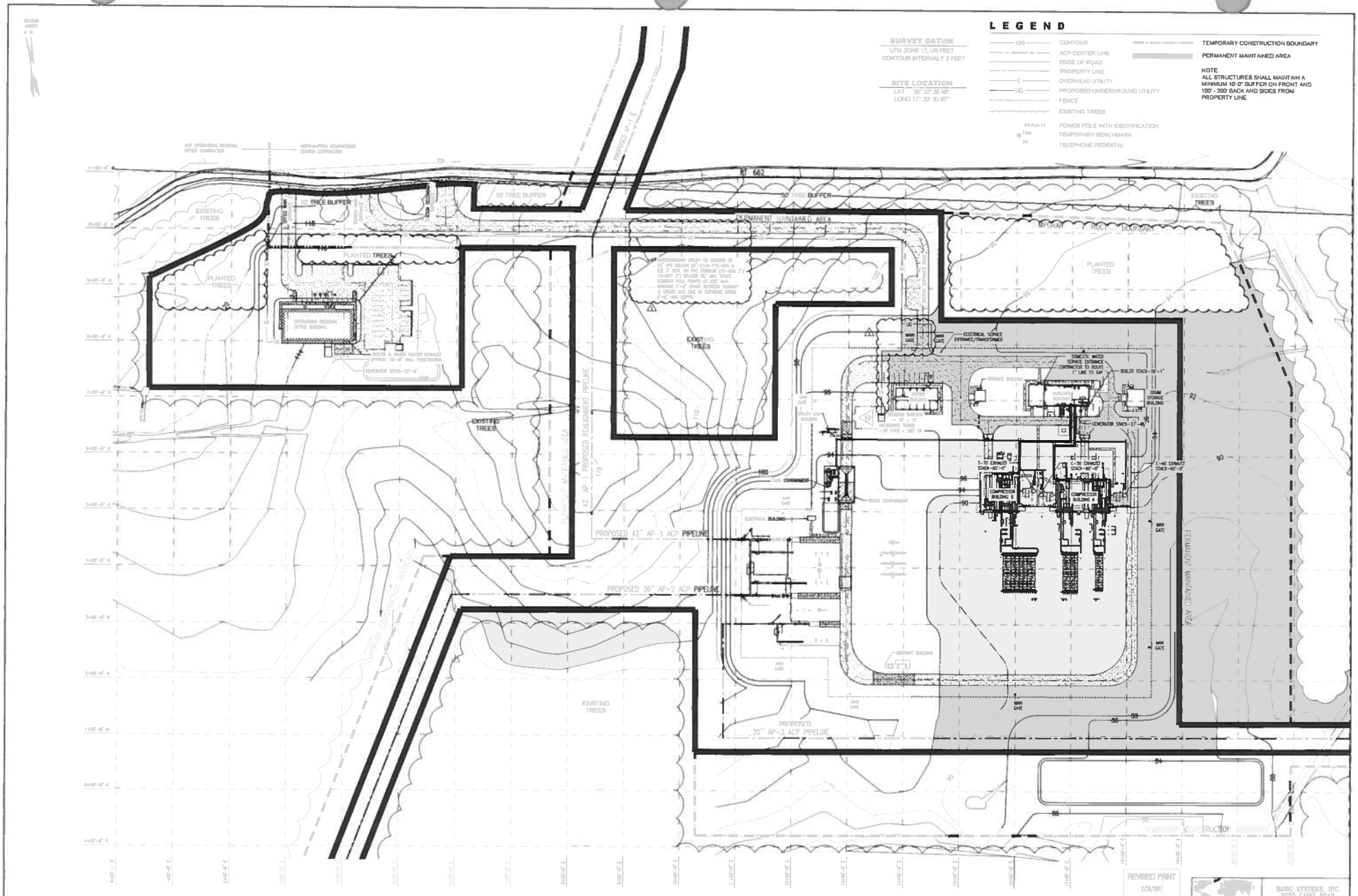
NAME:	Jeffrey H. Twaddle, P.E.
DATE:	5/12/2017
COMPANY:	ERM Southeast, Inc.
ADDRESS:	5000 Meridian Blvd., Ste. 300, Franklin, TN 37067
TELEPHONE:	615-656-7100
SIGNATURE:	Jeffrey H. Twaddle
PAGES CERTIFIED:	Attachment A - Form C3 for CT-01-SCR & CT-01-OC, CT-02-SCR & CT-02-OC, and CT-03-SCR & CT-03-OC; Attachment C - Potential to Emit Calculations

(IDENTIFY ABOVE EACH PERMIT FORM AND ATTACHMENT THAT IS BEING CERTIFIED BY THIS SEAL)

PLACE NORTH CAROLINA SEAL HERE

ATTACHMENT B

FACILITY PLOT PLAN



GENERAL NOTES AND COMMENTS:

1. ACP OPERATIONS REGIONAL OFFICE BUILDING, SITE, AND ENTRANCE WORK TO BE UNDER SEPARATE CONTRACT

ATTACHMENT C

POTENTIAL TO EMIT CALCULATIONS

Table C-1 Permit to Construct Application Project Equipment List
ACP Compressor Station 3 - Northampton County, North Carolina

Emission Point ID	Source	Manufacturer	Model/Type	Rated Capacity
CT-01	Compressor Turbine	Solar Turbines	Taurus 70-10802S	10,915 hp
CT-02	Compressor Turbine	Solar Turbines	Centaur 50-6200LS	6,200 hp
CT-03	Compressor Turbine	Solar Turbines	Centaur 40-4700S	4,700 hp
EG-01	Emergency Generator	Caterpillar	G3516B	1,818 hp
EG-02	Emergency Generator	Generac	SG100	148.9 hp
WH-01	Boiler	Hurst	LPW-G-125-60W	5.25 MMBtu/hr
FUG-01	Fugitive Leaks - Blowdowns	-	-	-
FUG-02	Fugitive Leaks - Piping	-	-	-
TK-1	Pipeline Liquids Tank	-	-	1,000 gal
TK-2	Hydrocarbon (Waste Oil) Tank	--	--	2,500 gal
TK-3	Ammonia Tank	--	--	13,400 gal

Table C-2 Potential Emissions From Combustion Sources
ACP Compressor Station 3 - Northampton County, North Carolina

Turbine Operational Parameters:

Normal Hours of Operation:	8,677
Hours at Low Load (<50%)	0
Hours of Low Temp. (< 0 deg. F)	50
Hours of Start-up/Shut-down	33.3
Total Hours of Operation (hr/yr):	8,760

Emergency Generator Operational Hours:

Normal Hours of Operation:	100

Boiler/Heater Operational Parameters:

Normal Hours of Operation:	8,760

Pre-Control Potential to Emit

Combustion Sources	Power Rating	Units	Fuel	Criteria Pollutants (tpy)											GHG Emissions (tpy)				Ammonia (tpy)	HAP (tpy)
				NOx	CO	VOC	SO2	Total PM	Total PM10	Total PM2.5	PMF	PMF-10	PMF-2.5	PMC	CO2	CH4	N2O	CO2e	NH3	Total HAP
Solar Taurus 70 Turbine	10,915	hp	Natural Gas	14.9	23.8	1.36	1.43	8.41	8.41	8.41	2.42	2.42	2.42	5.99	49,980	3.62	1.26	50,446	5.77	0.525
Solar Centaur 50L Turbine	6,200	hp	Natural Gas	9.25	14.8	0.834	0.894	5.26	5.26	5.26	1.51	1.51	1.51	3.74	31,295	2.26	0.788	31,587	3.58	0.352
Solar Centaur 40 Turbine	4,700	hp	Natural Gas	22.0	25.6	0.702	0.760	4.47	4.47	4.47	1.29	1.29	1.29	3.18	26,718	1.92	0.671	26,966	3.02	0.286
Caterpillar G3516B Egen	1,818	hp	Natural Gas	0.100	0.499	0.108	3.88E-04	0.032	0.032	0.032	0.025	0.025	0.025	0.007	101	0.859	0	122	0	0.018
Generac SG100 Egen	148.9	hp	Natural Gas	4.92E-05	9.85E-04	0.003	3.18E-05	0.003	0.003	0.003	0.002	0.002	0.002	0.001	759	0.015	0	759	0	0.002
Boiler	5.25	MMBtu/hr	Natural Gas	1.13	1.89	0.124	0.014	0.171	0.171	0.171	0.043	0.043	0.043	0.129	2,705	0.052	0.050	2,721	0	0.043
Total (tons/yr)				47.3	66.6	3.13	3.10	18.3	18.3	18.3	5.29	5.29	5.29	13.1	111,559	8.72	2.77	112,602	12.4	1.23

Turbine Control Efficiencies

Control Technology	NOx	CO	VOC
Selective Catalytic Reduction (Centaur 40)	80%	-	-
Selective Catalytic Reduction (All Others)	44%	-	-
Oxidation Catalyst (Centaur 40)	-	90%	50%
Oxidation Catalyst (All Others)	-	80%	50%

Post-Control Potential to Emit

Combustion Sources	Power Rating	Units	Fuel	Criteria Pollutants (tpy)											GHG Emissions (tpy)				Ammonia (tpy)	HAP (tpy)
				NOx	CO	VOC	SO2	Total PM	Total PM10	Total PM2.5	PMF	PMF-10	PMF-2.5	PMC	CO2	CH4	N2O	CO2e	NH3	Total HAP
Solar Taurus 70 Turbine	10915	hp	Natural Gas	8.25	4.76	0.680	1.43	8.41	8.41	8.41	2.42	2.42	2.42	5.99	49,980	3.62	1.26	50,446	5.77	0.525
Solar Centaur 50L Turbine	6200	hp	Natural Gas	5.14	2.96	0.417	0.894	5.26	5.26	5.26	1.51	1.51	1.51	3.74	31,295	2.26	0.788	31,587	3.58	0.352
Solar Centaur 40 Turbine	4700	hp	Natural Gas	4.39	2.56	0.351	0.760	4.47	4.47	4.47	1.29	1.29	1.29	3.18	26,718	1.92	0.671	26,966	3.02	0.286
Caterpillar G3516B Egen	1818	hp	Natural Gas	0.100	0.499	0.108	3.88E-04	0.032	0.032	0.032	0.025	0.025	0.025	0.007	101	0.859	0	122	0	0.018
Generac SG100 Egen	148.9	hp	Natural Gas	4.92E-05	9.85E-04	0.003	3.18E-05	0.003	0.003	0.003	0.002	0.002	0.002	0.001	759	0.015	0	759	0	0.002
Boiler	5.25	MMBtu/hr	Natural Gas	1.13	1.89	0.124	0.014	0.171	0.171	0.171	0.043	0.043	0.043	0.129	2,705	0.052	0.050	2,721	0	0.043
Total (tons/yr)				19.0	12.7	1.68	3.10	18.3	18.3	18.3	5.29	5.29	5.29	13.1	111,559	8.72	2.77	112,602	12.4	1.23

Notes:

(1) Turbine emissions are calculated by the following formula: ER * Run Hours / 2000 * (1 - Control Efficiency)
ER = Emission Rate for particular equipment and pollutant (lbs/hr)
2000 = the amount of lbs in a ton
(2) Emergency Generator emissions are calculated by the following formula: Power Rating * Run Hours * EF / 2000
Power Rating = Engine hp rating (hp)
EF = Emission Factor from either manufacturer's data or AP-42 (lb/hp-hr)
2000 = the amount of lbs in a ton
(3) Boiler/Heater emissions calculated by the following formula: EF * Power Rating * Run Hours / HHV / 2000
EF = AP-42 Emission Factor (lb/MMSCF)
Power Rating = Boiler/Heater Heat Capacity (MMBtu/hr)
HHV = Natural Gas High Heating Value (1020 MMBtu/MMSCF)
(4) Turbines are equipped with Selective Catalytic Reduction (SCR) and oxidation catalyst for control of NOx (44%), CO (80%), and VOC (50%)
(5) Taurus Centaur 40 oxidation catalyst has a control of 90% for CO
(6) Emergency generator engine hp taken from manufacturer data
(7) Boiler assumed to have low-NOx burners
(8) See the "HAP Emissions" worksheet for a more detailed breakdown of HAP emissions
(9) See Emissions Factors table for Emissions Factors for each operating scenario.
(10) Each start-up/shut-down event assumed to last 10 minutes

Table C-3 Event Based Potential Emissions From Combustion Sources
ACP Compressor Station 3 - Northampton County, North Carolina

Start-up Emissions

Combustion Sources	Power Rating	Units	Fuel	Start-up Events	Criteria Pollutants (tpy)			GHG Emissions (tpy)		
					NOx	CO	VOC	CO2	CH4	CO2e
Solar Taurus 70 Turbine	10,915	hp	Natural Gas	100	0 040	3 66	0 042	25 95	0 168	30 2
Solar Centaur 50L Turbine	6,200	hp	Natural Gas	100	0 040	3 46	0 040	23 45	0 160	27 45
Solar Centaur 40 Turbine	4,700	hp	Natural Gas	100	0 035	3 22	0 037	19 60	0 148	23 30
Total (tons/yr)					0.115	10.33	0.119	69.0	0.476	80.9

Shutdown Emissions

Combustion Sources	Power Rating	Units	Fuel	Shutdown Events	Criteria Pollutants (tpy)			GHG Emissions (tpy)		
					NOx	CO	VOC	CO2	CH4	CO2e
Solar Taurus 70 Turbine	10,915	hp	Natural Gas	100	0 055	4 67	0 053	28 8	0 212	34 1
Solar Centaur 50L Turbine	6,200	hp	Natural Gas	100	0 020	1 770	0 020	10 85	0 080	12 85
Solar Centaur 40 Turbine	4,700	hp	Natural Gas	100	0 015	1.510	0 017	9 05	0 068	10 75
Total (tons/yr)					0.090	7.950	0.090	48.7	0.360	57.7
Total SUSD Emissions (tons/yr)					0.205	18.28	0.209	117.7	0.836	139

Compressor Blowdown Emissions

Source Designation	FUG-01

Blowdown Start-up Events

Blowdown from Start-up	38000	scf/event
Volumetric flow rate	385	scf-lbmol
Methane Molecular Weight	16	lb-lbmol
Methane Percent Weight	93%	%
Start-up Blowdown	1691	lb/event

Blowdown Shutdown Events

Blowdown from Shutdown	63000	scf/event
Volumetric flow rate	385	scf-lbmol
Methane Molecular Weight	16	lb-lbmol
Methane Percent Weight	93%	%
Shutdown Blowdown	2803	lb/event

Gas Composition

Pollutant	Molecular Weight (lb/lb-mol)	Molar (Volume) Fraction (mol%)	Wt. Fraction[1] (wt. %)
Total Stream Molecular Weight	16.89		
Non-VOC			
Carbon Dioxide	44.01	1.041%	2.71%
Nitrogen	28.01	0.994%	1.65%
Methane	16.04	94.21%	89.47%
Ethane	30.07	2.923%	5.20%
VOC			
Propane	44.10	0.546%	1.43%
n-Butane	58.12	0.084%	0.29%
IsoButane	58.12	0.079%	0.27%
n-Pentane	72.15	0.022%	0.09%
IsoPentane	72.15	0.024%	0.10%
n-Hexane	78.11	0.032%	0.15%
n-Heptane	100.21	0.049%	0.29%
Total VOC Fraction			2.62%
Total HAP Fraction			0.15%

Blowdown from Startup Events

Combustion Sources	Start-up Events	VOC	GHG Emissions (tpy)			HAPs
			CO2	CH4	CO2e	
Solar Taurus 70 Turbine	100	2.216	2.293	75 634	1,893	0 125
Solar Centaur 50L Turbine	100	2.216	2.293	75 634	1,893	0 125
Solar Centaur 40 Turbine	100	2.216	2.293	75 634	1,893	0 125
Total (tons/yr)		6.649	6.880	227	5,679	0.375

Blowdown from Shutdown Events

Combustion Sources	Startup Events	VOC	GHG Emissions (tpy)			HAPs
			CO2	CH4	CO2e	
Solar Taurus 70 Turbine	100	3 675	3 80	125 39	3,139	0 207
Solar Centaur 50L Turbine	100	3 675	3 80	125 39	3,139	0 207
Solar Centaur 40 Turbine	100	3 675	3 80	125 39	3,139	0 207
Total (tons/yr)		11.024	11.41	376	9,416	0.622

Site-Wide Blowdown Events

Site-Wide Blowdown	2,000,000	scf/event
Volumetric flow rate	385	scf-lbmol
Methane Molecular Weight	16	lb-lbmol
Methane Percent Weight	93%	%
Site-Wide Blowdown	88,990	lb/event

Blowdown from Site Wide Events

Combustion Sources	Startup Events	VOC	GHG Emissions (tpy)			HAPs
			CO2	CH4	CO2e	
ACP-3	1	1.167	1.21	39 8	996	0 066
Total (tons/yr)		1.167	1.21	39.8	996	0.066

Total Blowdown Emissions (tons/yr)		18.8	19.5	643	16,092	1.06

Table C-4 Combustion Source Criteria Pollutant Emission Factors
ACP Compressor Station 3 - Northampton County, North Carolina

Solar Turbine Normal Operation Emission Factors (lb/hr)															
Equipment Name	Fuel	Units	NOx	CO	VOC	SO2	PMF	PMF-10	PMF-2.5	PMC	CO2	CH4	N2O	CO2e	NH3
Solar Centaur 40 Turbine	Natural Gas	lb/hr	4.70	5.70	0.160	0.17	0.29	0.29	0.29	0.73	6100	0.44	0.15	6157	0.690
Solar Centaur 50L Turbine	Natural Gas	lb/hr	1.98	3.30	0.190	0.20	0.35	0.35	0.35	0.85	7145	0.52	0.18	7212	0.818
Solar Taurus 70 Turbine	Natural Gas	lb/hr	3.18	5.30	0.310	0.33	0.55	0.55	0.55	1.37	11411	0.83	0.29	11517	1.317
			1.7808	1.06	0.155										
			1.1088	0.66	0.095										
			0.94	0.57	0.08										

Notes
(1) Pre-Control Emission Rates for NOx, CO, VOC, PMF, PMC, and CO2 taken from Solar Turbine Data at 100% load and 0 degrees F
(2) Emission Factors for SO2, CH4, N2O taken from AP-42 in (lbs/MMBtu) and multiplied by turbine fuel throughput by Solar Turbine at 100% load and 0 degree F to get Emission Rates
(3) Assume PMF=PMF-10=PMF-2.5, Filterable and Condensable based on Solar Turbine Emission Factor and ratio of AP-42 Table 3.1 factors
(4) NH3 emission rates based on a 10 ppm ammonia slip from the SCR based on manufacturer information
(5) CO2e emission rate calculated by multiplying each GHG (CO2, CH4, N2O) by its Global Warming Potential (GWP) and adding them together
(6) CO2 GWP = 1; CH4 GWP = 25; N2O GWP = 298 [40 CFR Part 98]

Solar Turbine Alternate Operation Emission Factors (lb/hr)								
			< 0 degrees F			Solar Turbine Low Load F Operation		
Equipment Name	Fuel	Units	NOx	CO	VOC	NOx	CO	VOC
Solar Centaur 40 Turbine	Natural Gas	lb/hr	62.7	34.2	0.320	36.6	2,280	6.40
Solar Centaur 50L Turbine	Natural Gas	lb/hr	26.4	19.8	0.380	15.4	1,320	7.60
Solar Taurus 70 Turbine	Natural Gas	lb/hr	42.4	31.8	0.620	24.7	2,120	12.4
			23.744	6.36	0.31			
			14.784	3.96	0.19			
			12.533333	3.42	0.16			

Notes
(1) Pre-Control low temperature Emission Rates for NOx, CO, VOC. Conservatively assume 120 ppm NOx, 150 ppm CO, and 5 ppm VOC (10% of UHC) per Table 2 of Solar PIL 167
(2) Pre-Control low load Emission Rates for NOx, CO, VOC. Conservatively assume 70 ppm NOx, 10,000 ppm CO, and 100 ppm VOC (10% of UHC) per Table 4 of Solar PIL 167

Solar Turbine Start-up and Shutdown Emission Factors (lb/event)														
			Start-up EFs						Shutdown EFs					
Equipment Name	Fuel	Units	NOx	CO	VOC	CO2	CH4	CO2e	NOx	CO	VOC	CO2	CH4	CO2e
Solar Centaur 40 Turbine	Natural Gas	lb/event	0.7	64.4	0.7	392	3.0	466	0.3	30.2	0.3	181	1.4	215
Solar Centaur 50L Turbine	Natural Gas	lb/event	0.8	69.1	0.8	469	3.2	549	0.4	35.4	0.4	217	1.6	257
Solar Taurus 70 Turbine	Natural Gas	lb/event	0.8	73.1	0.8	519	3.4	603	1.1	93.4	1.1	575	4.2	681

Notes
(1) Start-up and Shutdown Emissions based on Solar Turbines Incorporated Product Information Letter 170: Emission Estimates at Start-up, Shutdown, and Commissioning for SoLoNOx Combustion Products (13 June 2012). Emission Estimates do not include SO2, PM, N2O, or any HAPs.
(2) VOCs assumed to be 20% of UHC and CH4 assumed to be 80% of UHC.
(3) CO2e emission rate calculated by multiplying each GHG (CO2, CH4) by its Global Warming Potential (GWP) and adding them together
(4) CO2 GWP = 1; CH4 GWP = 25; [40 CFR Part 98]

Engine and Boiler Emission Factors															
Equipment Type	Fuel	Units	NOx	CO	VOC	SO2	PMF	PMF-10	PMF-2.5	PMC	CO2	CH4	N2O	CO2e	NH3
Boiler < 100 MMBtu	Natural Gas	lb/MMscf	50	84	5.5	0.6	1.9	1.9	1.9	5.7	120000	2.3	2.2	120713	0.00
1300 KW Caterpillar Egen	Natural Gas	lb/hp-hr	0.0011023	0.00549	0.00119	4.269E-06	0.000278822	0.000278822	0.000278822	7.19565E-05	1.111131	0.009445	0	1	0.00
100 kW Generac Egen	Natural Gas	lb/hp-hr	0.000007	0.00013	0.00037	4.269E-06	0.000278822	0.000278822	0.000278822	7.19565E-05	101.9472	0.001954	0	102	0.00

Notes
(1) Emission factors for natural gas boilers taken from AP-42 Tables 1.4-1 & 1.4-2
(2) Boiler assumed to have low-NOx burners
(3) Emission Factors for Space & Water Heaters taken from AP-42 Tables 1.4-1 & 1.4-2
(4) Emission Factors for 2 SLB engine taken from AP-42 Table 3.2-1
(5) NOx, CO, VOC, CO2, and CH4 emission factors for Caterpillar Egens taken from Caterpillar Manufacturer data
(6) NOx, CO, and VOC emission factors for Generac Egens taken from Generac manufacturer statement of exhaust emissions for SCAQMD certification
(7) SO2, PMF, PMF-10, PMF-2.5, PMC, and N2O Emission factors for Caterpillar Egens taken from AP-42 Table 3.2-1 and converted using manufacturer fuel data
(8) SO2, PMF, PMF-10, PMF-2.5, PMC, and N2O Emission factors for Generac Egens taken from AP-42 for natural gas combustion
(9) Assume PMF=PMF-10=PMF-2.5
(10) CO2e emission rate calculated by multiplying each GHG (CO2, CH4, N2O) by its Global Warming Potential (GWP) and adding them together
(11) CO2 GWP = 1; CH4 GWP = 25; N2O GWP = 298 [40 CFR 98]

Table C-5 Hazardous Air Pollutant (HAP) Emissions From Combustion Sources
ACP Compressor Station 3 - Northampton County, North Carolina

		Annual HAP Emissions (lb/yr)					
Quantity @ ACP-3		1	1	1	1	1	1
Pollutant	HAP?	Solar Centaur 40 Turbine	Solar Centaur 50L Turbine	Solar Taurus 70 Turbine	Boiler < 100 MMBtu	1300 KW Caterpillar Egen	100 kW Generac Egen
		4700 hp	6200 hp	10915 hp	5.25 MMBTU/hr	1818 hp	148.9 hp
		9125 Btu/hp-hr	8500 Btu/hp-hr	7205 Btu/hp-hr			
1,1,2,2-Tetrachloroethane	Yes					0.031	0.003
1,1,2-Trichloroethane	Yes					0.024	0.002
1,1-Dichloroethane	Yes					0.018	0.001
1,2,3-Trimethylbenzene	No					0.016	0.001
1,2,4-Trimethylbenzene	No					0.051	0.004
1,2-Dichloroethane	Yes					0.020	0.002
1,2-Dichloropropane	Yes					0.021	0.002
1,3,5-Trimethylbenzene	No					0.008	0.001
1,3-Butadiene	Yes					0.379	0.031
1,3-Dichloropropene	Yes					0.020	0.002
2,2,4-Trimethylpentane	Yes					0.391	0.032
2-Methylnaphthalene	No				0.001	0.010	0.001
3-Methylchloranthrene	No				0.000		
7,12-Dimethylbenz(a)anthracene	No				0.001		
Acenaphthene	No				0.000	0.001	0.000
Acenaphthylene	No				0.000	0.001	0.000
Acetaldehyde	Yes					3.590	0.294
Acrolein	Yes					3.599	0.295
Anthracene	No				0.000	0.000	0.000
Benz(a)anthracene	No				0.000	0.000	0.000
Benzene	Yes				0.095	0.897	0.073
Benzo(a)pyrene	No				0.000	0.000	0.000
Benzo(b)fluoranthene	No				0.000	0.000	0.000
Benzo(e)pyrene	No					0.000	0.000
Benzo(g,h,i)perylene	No				0.000	0.000	0.000
Benzo(k)fluoranthene	No				0.000	0.000	0.000
Biphenyl	Yes					0.002	0.000
Butane	No				94.685	2.197	0.180
Butyr/Isobutyraldehyde	No					0.202	0.017
Carbon Tetrachloride	Yes					0.028	0.002
Chlorobenzene	Yes					0.021	0.002
Chloroethane	Yes						
Chloroform	Yes					0.0218	0.002
Chrysene	No				0.000	0.000	0.000
Cyclohexane	No					0.142	0.012
Cyclopentane	No					0.044	0.004
Dibenzo(a,h)anthracene	No				0.000		
Dichlorobenzene	Yes				0.054		
Ethane	No				139.774	32.798	2.686
Ethylbenzene	Yes					0.050	0.004
Ethylene Dibromide	Yes					0.034	0.003
Fluoranthene	No				0.000	0.000	0.000
Fluorene	No				0.000	0.001	0.000
Formaldehyde	Yes	541.000	664.779	992.029	3.382	25.534	2.091
Hexane (or n-Hexane)	Yes				81.159	0.206	0.017
Indeno(1,2,3-c,d)pyrene	No				0.000	0.000	0.000
Isobutane	No					1.735	0.142
Methanol	Yes					1.147	0.094
Methylcyclohexane	No					0.158	0.013
Methylene Chloride	Yes					0.068	0.006
n-Nonane	No					0.014	0.001
n-Octane	No					0.034	0.003
Naphthalene	Yes				0.028	0.045	0.004
PAH	Yes					0.062	0.005
Pentane (or n-Pentane)	No				117.229	0.708	0.058
Perylene	No					0.000	0.000
Phenanthrene	No				0.001	0.002	0.000
Phenol	Yes					0.019	0.002
Propane	No				72.141	13.276	1.087
Propylene Oxide	Yes						
Pyrene	No				0.000	0.000	0.000
Styrene	Yes					0.025	0.002
Tetrachloroethane	No						
Toluene	Yes				0.153	0.445	0.036
Vinyl Chloride	Yes					0.011	0.001
Xylene	Yes					0.124	0.010
Arsenic	Yes				0.009		
Barium	No				0.198		
Beryllium	Yes				0.001		
Cadmium	Yes				0.050		
Chromium	Yes				0.063		
Cobalt	Yes				0.004		
Copper	No				0.038		
Manganese	Yes				0.017		
Mercury	Yes				0.012		
Molybdenum	No				0.050		
Nickel	Yes				0.095		
Selenium	Yes				0.001		
Vanadium	No				0.104		
Zinc	No				1.308		
Lead	Yes				0.023		
Total HAPs		572.934	704.019	1050.586			
Total HAP/unit (lb/yr)		573	704	1051	85.1	36.8	3.02
Total HAP/unit (TPY)		0.286	0.352	0.525	0.043	0.018	0.002

Hazardous Air Pollutant

Notes:
(1) Emissions above are on a per unit basis
(2) Calculations for the Caterpillar emergency generator assume 100 hours of operation, all other calculations assume 8,760 hours of operation
(3) Heat rates for Solar Turbines taken from Solar Datasheets
(4) Solar turbines have a 50% HAP control efficiency due to the Oxidation Catalyst

Table C-6 Combustion Source HAP Emission Factors
ACP Compressor Station 3 - Northampton County, North Carolina

Pollutant	HAP?	Emission Factors					
		Solar Centaur 40 Turbine	Solar Centaur 50L Turbine	Solar Taurus 70 Turbine	Boiler < 100 MMBtu	1300 KW Caterpillar Egen	100 kW Generac Egen
		lb/MMBtu	lb/MMBtu	lb/MMBtu	lb/MMscf	lb/hp-hr	lb/hp-hr
1,1,2,2-Tetrachloroethane	Yes					1.7E-07	1.7E-07
1,1,2-Trichloroethane	Yes					1.3E-07	1.3E-07
1,1-Dichloroethane	Yes					9.9E-08	9.9E-08
1,2,3-Trimethylbenzene	No					9.0E-08	9.0E-08
1,2,4-Trimethylbenzene	No					2.8E-07	2.8E-07
1,2-Dichloroethane	Yes					1.1E-07	1.1E-07
1,2-Dichloropropane	Yes					1.1E-07	1.1E-07
1,3,5-Trimethylbenzene	No					4.6E-08	4.6E-08
1,3-Butadiene	Yes					2.1E-06	2.1E-06
1,3-Dichloropropene	Yes					1.1E-07	1.1E-07
2,2,4-Trimethylpentane	Yes					2.2E-06	2.2E-06
2-Methylnaphthalene	No				2.4E-05	5.4E-08	5.4E-08
3-Methylchloranthrene	No				1.8E-06		
7,12-Dimethylbenz(a)anthracene	No				1.6E-05		
Acenaphthene	No				1.8E-06	3.4E-09	3.4E-09
Acenaphthylene	No				1.8E-06	8.1E-09	8.1E-09
Acetaldehyde	Yes					2.0E-05	2.0E-05
Acrolein	Yes					2.0E-05	2.0E-05
Anthracene	No				2.4E-06	1.8E-09	1.8E-09
Benz(a)anthracene	No				1.8E-06	8.5E-10	8.5E-10
Benzene	Yes				2.1E-03	4.9E-06	4.9E-06
Benzo(a)pyrene	No				1.2E-06	1.4E-11	1.4E-11
Benzo(b)fluoranthene	No				1.8E-06	2.2E-11	2.2E-11
Benzo(e)pyrene	No					6.0E-11	6.0E-11
Benzo(g,h,i)perylene	No				1.2E-06	6.3E-11	6.3E-11
Benzo(k)fluoranthene	No				1.8E-06	1.1E-11	1.1E-11
Biphenyl	Yes					1.0E-08	1.0E-08
Butane	No				2.1E+00	1.2E-05	1.2E-05
Butyr/Isobutyraldehyde	No					1.1E-06	1.1E-06
Carbon Tetrachloride	Yes					1.5E-07	1.5E-07
Chlorobenzene	Yes					1.1E-07	1.1E-07
Chloroethane	Yes						
Chloroform	Yes					1.2E-07	1.2E-07
Chrysene	No				1.8E-06	1.7E-09	1.7E-09
Cyclohexane	No					7.8E-07	7.8E-07
Cyclopentane	No					2.4E-07	2.4E-07
Dibenzo(a,h)anthracene	No				1.2E-06		
Dichlorobenzene	Yes				1.2E-03		
Ethane	No				3.1E+00	1.8E-04	1.8E-04
Ethylbenzene	Yes					2.7E-07	2.7E-07
Ethylene Dibromide	Yes					1.9E-07	1.9E-07
Fluoranthene	No				3.0E-06	9.2E-10	9.2E-10
Fluorene	No				2.8E-06	4.3E-09	4.3E-09
Formaldehyde	Yes	2.9E-03	2.9E-03	2.9E-03	7.5E-02	1.4E-04	1.4E-04
Hexane (or n-Hexane)	Yes				1.8E+00	1.1E-06	1.1E-06
Indeno(1,2,3-c,d)pyrene	No				1.8E-06	2.5E-11	2.5E-11
Isobutane	No					9.5E-06	9.5E-06
Methanol	Yes					6.3E-06	6.3E-06
Methylcyclohexane	No					8.6E-07	8.6E-07
Methylene Chloride	Yes					3.7E-07	3.7E-07
n-Nonane	No					7.8E-08	7.8E-08
n-Octane	No					1.9E-07	1.9E-07
Naphthalene	Yes				6.1E-04	2.5E-07	2.5E-07
PAH	Yes					3.4E-07	3.4E-07
Pentane (or n-Pentane)	No				2.6E+00	3.9E-06	3.9E-06
Perylene	No					1.3E-11	1.3E-11
Phenanthrene	No				1.7E-05	9.0E-09	9.0E-09
Phenol	Yes					1.1E-07	1.1E-07
Propane	No				1.6E+00	7.3E-05	7.3E-05
Propylene Oxide	Yes						
Pyrene	No				5.0E-06	1.5E-09	1.5E-09
Styrene	Yes					1.4E-07	1.4E-07
Tetrachloroethane	No						
Toluene	Yes				3.4E-03	2.5E-06	2.5E-06
Vinyl Chloride+A32	Yes					6.3E-08	6.3E-08
Xylene	Yes					6.8E-07	6.8E-07
Arsenic	Yes				2.0E-04		
Barium	No				4.4E-03		
Beryllium	Yes				1.2E-05		
Cadmium	Yes				1.1E-03		
Chromium	Yes				1.4E-03		
Cobalt	Yes				8.4E-05		
Copper	No				8.5E-04		
Manganese	Yes				3.8E-04		
Mercury	Yes				2.6E-04		
Molybdenum	No				1.1E-03		
Nickel	Yes				2.1E-03		
Selenium	Yes				2.4E-05		
Vanadium	No				2.3E-03		
Zinc	No				2.9E-02		
Lead	Yes				5.0E-04		
Total HAPs		3.1E-03	3.1E-03	3.1E-03			

Hazardous Air Pollutant

Notes:
(1) Emission factors for Solar and Capstone natural gas turbines from AP-42 Table 3.1-3
(2) Emission factors for natural gas boilers from AP-42 Tables 1.4-2, 1.4-3, and 1.4-4
(3) Emission factors for 2 SLB natural gas engines and Caterpillar and Generac natural gas emergency generators taken from AP-42 Table 3.2-1
(4) Emission factors for Solar natural gas turbines and Caterpillar and Generac natural gas emergency generators converted using 1 KWh = 3412 Btu and 1 kw = 1.341 hp
(5) Emission Factors (lb/MMBtu) for Formaldehyde and Total HAPs for Solar Turbines from Solar PIL 168

Table C-7 Potential Emissions From Fugitive Leaks
ACP Compressor Station 3 - Northampton County, North Carolina

Fugitive Emissions (FUG)

Source Designation:	FUG-02

Operational Parameters:

Annual Hours of Operation (hr/yr):	8,760

Compressor Fugitive Emissions Rate

Equipment	Service	CH4 Emission Factor[1] ton/comp-hr	CH_4 Weight Fraction[1]	Fug Emission Rate tpy
Solar Turbine	Gas	2.67E-02	0.934	250.2

1. Default methane basis and emission factor taken from Table 6-6 of Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry, API, August 2009.
2. Sample calculations: Hours of operation (hr/yr) * EF (ton / compressor -hr) / Methane Fraction

Pipeline Natural Gas Fugitive Emissions

Equipment	Service	Emission Factor[1] lb/hr/source	Source Count[2]	Total HC Potential Emissions lb/hr	Total HC Potential Emissions tpy	VOC Weight Fraction	VOC Emissions tpy	CO_2 Weight Fraction	CO_2 Emissions tpy	CH_4 Weight Fraction	CH_4 Emissions tpy	HAP Weight Fraction	HAP Emissions tpy
Valves	Gas	4.50E-03	646	2.91	12.7	0.026	0.334	0.0271	0.345	0.895	11.4	1.48E-03	1.88E-02
Pump Seals	Gas	2.40E-03		0.00	0.00	0.026	0.00	0.0271	0.00	0.895	0.00	1.48E-03	0.00E+00
Others (compressors and others)	Gas	8.80E-03	3	0.03	0.12	0.026	0.00	0.0271	0.00	0.895	0.10	1.48E-03	1.71E-04
Connectors	Gas	2.00E-04	1	2.00E-04	8.76E-04	0.026	2.30E-05	0.0271	2.38E-05	0.895	7.84E-04	1.48E-03	1.30E-06
Flanges	Gas	3.90E-04	340	0.133	0.581	0.026	0.015	0.0271	0.016	0.895	0.520	1.48E-03	8.59E-04
Open-ended lines	Gas	2.00E-03		0.00	0.00	0.026	0.00	0.0271	0.00	0.895	0.00	1.48E-03	0.00E+00
			Total	3	13	-	0.4	-	0.4	-	12.015	-	0.02

1. EPA Protocol for Equipment Leaks Emissions Estimate (EPA-453/R-95-017) Table 2-4: Oil and Gas Production Operations Emission Factors.
2. Component count based on Basic Systems Engineering Estimate.

Sample Calculations:

Potential Emissions (lb/hr) = Emission Factor (lb/hr/source) * Source Count

Potential Emissions (tons/yr) = $(lb/hr)_{Potential}$ × Hours of Operation (hr/yr) × (1 ton/2,000 lb).

Table C-8 Tank Emissions
ACP Compressor Station 3 - Northampton County, North Carolina

Source Designation:	TK-1, TK-2, TK-3

Tank Parameters

Source	Type of Tank	Contents	Capacity	Throughput	Tank Diam.	Tank Length	Paint Color	Paint Condition
			(gal)	gal/yr	ft	ft		
TK-1	Horizontal, fixed	Produced Fluids	1,000	5,000	4.12	10	Light Grey	Good
TK-2	Horizontal, fixed	Lube Oil	2,500	12,500	4.61	20	Light Grey	Good

Total Emissions

Source	VOC Emissions							
	Flashing Losses		Working Losses		Breathing Losses		Total Losses	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
TK-1[1]	–	–	–	–	–	–	0.033	0.145
TK-2[2]	NA	NA	1.29E-06	5.65E-06	3.72E-06	1.63E-05	5.01E-06	2.19E-05

1. Losses were calculated for TK-1 using E&P Tanks Software. See attached for output.
2. Losses were calculated for TK-2 using EPA's TANKS 4.09d software with default breather vent settings.
3. Losses (Emissions) from TK-3 13,400-gallon Ammonia tank assumed to be insignficant.

Table C-9 Project Potential Emissions

ACP Compressor Station 3 - Northampton County, North Carolina

Combustion Sources	ID	Criteria Pollutants (tpy)								GHG Emissions (tpy)				Ammonia (tpy)	HAP (tpy)
		NOx	CO	VOC	SO2	PMF	PMF-10	PMF-2.5	PMC	CO2	CH4	N2O	CO2e	NH3	Total HAP
Solar Taurus 70 Turbine	CT-01	8.35	13.1	0.775	1.43	2.42	2.42	2.42	5.99	50,035	4.00	1.26	50,511	5.77	0.525
Solar Centaur 50L Turbine	CT-02	5.20	8.19	0.477	0.894	1.51	1.51	1.51	3.74	31,329	2.50	0.788	31,627	3.58	0.352
Solar Centaur 40 Turbine	CT-03	4.44	7.29	0.405	0.760	1.29	1.29	1.29	3.18	26,747	2.14	0.671	27,000	3.02	0.286
Caterpillar G3516B Egen	EG-01	0.100	0.499	0.108	3.88E-04	0.025	0.025	0.025	0.007	101	0.859	0	122	0	0.018
Generac SG100 Egen	EG-02	4.92E-05	0.001	0.003	3.18E-05	0.002	0.002	0.002	0.001	759	0.015	0	759	0	0.002
Boiler	WH-01	1.13	1.89	0.124	0.014	0.043	0.043	0.043	0.129	2,705	0.052	0.050	2,721	0	0.043
Fugitive Leaks - Blowdowns	FUG-01	-	-	18.8	-	-	-	-	-	19.5	643		16,092	-	1.06
Fugitive Leaks - Piping	FUG-02	-	-	0.352	-	-	-	-	-	0.4	12	-	301	-	0.02
Pipeline Liquids Tank	TK-1	-	-	0.145	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbon (Waste Oil) Tank	TK-2	-	-	2.19E-05	-	-	-	-	-	-	-	-	-	-	-
Total (tons/yr)		**19.2**	**31.0**	**21.2**	**3.10**	**5.29**	**5.29**	**5.29**	**13.1**	**111,696**	**664**	**2.77**	**129,133**	**12.4**	**2.31**

```
********************************************************************************
******
*     Project Setup Information
    *
********************************************************************************
******
Project File              : M:\0345197 DRS ATL Coast Pipe.PR\T501 Air Permit\ACP &
SHP-Permitting\Air Permitting Round 2\Round 5\ACP-1 - Marts\Aug 2016 - EG and Tank
Replacements\TK-1 - 05152017 Update to Throughput.ept
Flowsheet Selection       : Oil Tank with Separator
Calculation Method        : AP42
Control Efficiency        : 100.0%
Known Separator Stream    : Low Pressure Gas
Entering Air Composition  : No

Date                      : 2017.06.05


********************************************************************************
******
*     Data Input
    *
********************************************************************************
******

Separator Pressure        : 552.00[psig]
Separator Temperature     : 77.00[F]
Molar GOR                 : 0.0500
Ambient Pressure          : 14.70[psia]
Ambient Temperature       : 70.00[F]
C10+ SG                   : 0.8990
C10+ MW                   : 166.00

-- Low Pressure Gas
-------------------------------------------------------------------------
   No.    Component            mol %
   1      H2S                  0.0000
   2      O2                   0.0000
   3      CO2                  0.5112
   4      N2                   0.5295
   5      C1                  94.0604
   6      C2                   4.7199
   7      C3                   0.1590
   8      i-C4                 0.0099
   9      n-C4                 0.0099
   10     i-C5                 0.0000
   11     n-C5                 0.0000
   12     C6                   0.0000
   13     C7+                  0.0000
   14     Benzene              0.0000
   15     Toluene              0.0000
   16     E-Benzene            0.0000
   17     Xylenes              0.0000
   18     n-C6                 0.0000
   19     224Trimethylp        0.0000

   C7+ Molar Ratio: C7  :     C8  :     C9  :     C10+
                    1.0000    1.0000    1.0000    1.0000

-- Sales Oil
-------------------------------------------------------------------------
Production Rate           : 0.3[bbl/day]
```

Days of Annual Operation : 365 [days/year]
API Gravity : 46.0
Reid Vapor Pressure : 7.70[psia]
Bulk Temperature : 80.00[F]

-- Tank and Shell Data

Diameter : 4.12[ft]
Shell Height : 10.00[ft]
Cone Roof Slope : 0.06
Average Liquid Height : 5.00[ft]
Vent Pressure Range : 0.06[psi]
Solar Absorbance : 0.54

-- Meteorological Data

City : Charleston, WV
Ambient Pressure : 14.70[psia]
Ambient Temperature : 70.00[F]
Min Ambient Temperature : 44.00[F]
Max Ambient Temperature : 65.50[F]
Total Solar Insolation : 1123.00[Btu/ft^2*day]

****
******
* Calculation Results *
****
******

-- Emission Summary

Item	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]
Total HAPs	0.000	0.000
Total HC	0.174	0.040
VOCs, C2+	0.157	0.036
VOCs, C3+	0.145	0.033

Uncontrolled Recovery Info.

Vapor	8.5700 x1E-3	[MSCFD]
HC Vapor	8.0800 x1E-3	[MSCFD]
GOR	26.29	[SCF/bbl]

-- Emission Composition

No	Component	Uncontrolled [ton/yr]	Uncontrolled [lb/hr]
1	H2S	0.001	0.000
2	O2	0.000	0.000
3	CO2	0.009	0.002
4	N2	0.000	0.000
5	C1	0.017	0.004
6	C2	0.013	0.003
7	C3	0.032	0.007
8	i-C4	0.013	0.003
9	n-C4	0.042	0.010
10	i-C5	0.017	0.004
11	n-C5	0.020	0.005

12	C6	0.006	0.001
13	C7	0.006	0.001
14	C8	0.002	0.000
15	C9	0.000	0.000
16	C10+	0.000	0.000
17	Benzene	0.000	0.000
18	Toluene	0.000	0.000
19	E-Benzene	0.000	0.000
20	Xylenes	0.000	0.000
21	n-C6	0.004	0.001
22	224Trimethylp	0.000	0.000
	Total	0.182	0.042

-- Stream Data

No.	Component	MW	LP Oil	Flash Oil	Sale Oil	Flash Gas	W&S Gas	Total Emissions
			mol %	mol %	mol %	mol %	mol %	mol %
1	H2S	34.80	0.0508	0.0349	0.0010	0.6834	0.0657	0.5435
2	O2	32.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3	CO2	44.01	0.2437	0.0907	0.0000	6.3467	0.0001	4.9092
4	N2	28.01	0.0102	0.0005	0.0000	0.3990	0.0001	0.3087
5	C1	16.04	0.9543	0.1475	0.0000	33.1362	0.0001	25.6311
6	C2	30.07	0.6701	0.3531	0.0000	13.3133	0.0001	10.2979
7	C3	44.10	2.1827	1.7648	0.3098	18.8508	12.6125	17.4378
8	i-C4	58.12	1.1269	1.0450	0.5408	4.3934	9.3522	5.5165
9	n-C4	58.12	4.6091	4.4100	2.8709	12.5490	34.3185	17.4797
10	i-C5	72.15	3.1066	3.0997	2.7402	3.3810	13.0110	5.5621
11	n-C5	72.15	5.0558	5.0823	4.7421	4.0000	16.4491	6.8196
12	C6	86.16	4.1726	4.2520	4.3903	1.0044	4.6741	1.8355
13	C7	100.20	10.3655	10.6043	11.2777	0.8388	4.1346	1.5853

14	C8	114.23	10.8426	11.1074	11.9365	0.2806	1.4375	0.5426
15	C9	128.28	5.5127	5.6497	6.0913	0.0497	0.2624	0.0979
16	C10+	166.00	45.9695	47.1217	50.8962	0.0099	0.0544	0.0200
17	Benzene	78.11	0.5685	0.5808	0.6114	0.0778	0.3692	0.1438
18	Toluene	92.13	0.2132	0.2183	0.2341	0.0082	0.0407	0.0155
19	E-Benzene	106.17	0.0711	0.0729	0.0785	0.0009	0.0046	0.0017
20	Xylenes	106.17	0.6802	0.6971	0.7513	0.0075	0.0387	0.0146
21	n-C6	86.18	3.5939	3.6672	3.8242	0.6694	3.1745	1.2368

22	224Trimethylp	114.24	0.0000	0.0000	0.0000	0.0000	0.0000
0.0000							
	MW		123.89	126.03	130.08	38.64	65.28
44.68							
	Stream Mole Ratio		1.0000	0.9755	0.9684	0.0245	0.0072
0.0316							
	Heating Value	[BTU/SCF]				2044.13	3627.44
2402.74							
	Gas Gravity	[Gas/Air]				1.33	2.25
1.54							
	Bubble Pt. @ 100F	[psia]	56.28	19.66	5.57		
	RVP @ 100F	[psia]	126.75	78.89	35.25		
	Spec. Gravity @ 100F		0.800	0.803	0.811		

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

Identification

User Identification:	TK-2
City:	
State:	West Virginia
Company:	
Type of Tank:	Horizontal Tank
Description:	Used Oil Aboveground Storage Tank

Tank Dimensions

Shell Length (ft):	20.00
Diameter (ft):	4.61
Volume (gallons):	2,500.00
Turnovers:	5.00
Net Throughput(gal/yr):	12,500.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Light
Shell Condition	Good

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

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

TK-2 - Horizontal Tank

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol Weight	Basis for Vapor Pressure Calculations
Used Oil	All	61.57	52.97	70.18	57.22	0.0001	0.0001	0.0001	360.0000			200.00	Option 1: VP60 = .0001 VP70 = .0001

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

TK-2 - Horizontal Tank

Annual Emission Calculations	
Standing Losses (lb):	0.0326
Vapor Space Volume (cu ft):	212.6288
Vapor Density (lb/cu ft):	0.0000
Vapor Space Expansion Factor:	0.0618
Vented Vapor Saturation Factor:	1.0000
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	212.6288
Tank Diameter (ft):	4.6100
Effective Diameter (ft):	10.6375
Vapor Space Outage (ft):	2.3050
Tank Shell Length (ft):	20.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0000
Vapor Molecular Weight (lb/lb-mole):	380.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0001
Daily Avg. Liquid Surface Temp. (deg. R):	521.2427
Daily Average Ambient Temp. (deg. F):	54.9833
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	516.8933
Tank Paint Solar Absorptance (Shell):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,250.5726
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.0618
Daily Vapor Temperature Range (deg. R):	34.4127
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0001
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0001
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0001
Daily Avg. Liquid Surface Temp. (deg R):	521.2427
Daily Min. Liquid Surface Temp. (deg R):	512.6395
Daily Max. Liquid Surface Temp. (deg R):	529.8458
Daily Ambient Temp. Range (deg. R):	21.5333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	1.0000
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0001
Vapor Space Outage (ft):	2.3050
Working Losses (lb):	0.0113
Vapor Molecular Weight (lb/lb-mole):	380.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0001
Annual Net Throughput (gal/yr.):	12,500.0000
Annual Turnovers:	5.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	4.6100
Working Loss Product Factor:	1.0000
Total Losses (lb):	0.0439

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

Emissions Report for: Annual

TK-2 - Horizontal Tank

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Used Oil	0.01	0.03	0.04

ATTACHMENT D

VENDOR SPECIFICATIONS

Solar Turbines Emissions Estimates

Taurus 70-10802S

Assumptions: pipeline natural gas, sea level, 4"/4" inlet/outlet losses, nominal performance

50% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 lb/hr	PM10/2.5 lb/mmbtu	PM10/2.5 lb/hr	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	5941	63.54	23.79	9	2.3	25	3.9	25	2.2	2.5	0.2	8321	0.02	1.4	910	199,373
59	5430	56.92	24.27	9	2.0	25	3.4	25	2.0	2.5	0.2	7407	0.02	1.3	991	170,275
100	4341	49.58	22.28	9	1.7	25	3.0	25	1.7	2.5	0.2	6336	0.02	1.1	1045	149576
75% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 lb/hr	PM10/2.5 lb/mmbtu	PM10/2.5 lb/hr	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	8912	76.91	29.49	9	2.8	25	4.7	25	2.7	2.5	0.3	10063	0.02	1.7	898	224,735
59	8145	68.47	30.27	9	2.5	25	4.2	25	2.4	2.5	0.2	8905	0.02	1.5	957	194,658
100	6512	59.08	28.05	9	2.1	25	3.5	25	2.0	2.5	0.2	7544	0.02	1.3	1019	165855
100% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 lb/hr	PM10/2.5 lb/mmbtu	PM10/2.5 lb/hr	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	11882	87.27	34.64	9	3.2	25	5.3	25	3.1	2.5	0.3	11411	0.02	1.9	864	366,922
59	10860	79.24	34.87	9	2.8	25	4.8	25	2.8	2.5	0.3	10301	0.02	1.7	908	334,207
100	8683	68.40	32.30	9	2.4	25	4.1	25	2.3	2.5	0.2	8730	0.02	1.5	945	298619

Solar Turbines Emissions Estimates

Centaur 50-6200LS

Assumptions: pipeline natural gas, 150' elevation, 5"/8" inlet/outlet losses, nominal performance

50% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 lb/hr	PM10/2.5 lb/mmbtu	PM10/2.5 lb/hr	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	3321	39.27	21.54	9	1.4	25	2.4	25	1.4	2.5	0.1	5155	0.02	0.9	837	139,384
59	3006	35.20	21.73	9	1.3	25	2.1	25	1.2	2.5	0.1	4591	0.02	0.8	915	119,683
100	2426	30.76	20.06	9	1.1	25	1.8	25	1.0	2.5	0.1	3938	0.02	0.7	966	103305
75% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 lb/hr	PM10/2.5 lb/mmbtu	PM10/2.5 lb/hr	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	4981	47.21	26.85	9	1.7	25	2.9	25	1.6	2.5	0.2	6189	0.02	1.0	849	152,889
59	4509	42.05	27.29	9	1.5	25	2.5	25	1.5	2.5	0.2	5479	0.02	0.9	908	133,124
100	3639	36.70	25.23	9	1.3	25	2.2	25	1.2	2.5	0.1	4695	0.02	0.8	959	115664
100% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 lb/hr	PM10/2.5 lb/mmbtu	PM10/2.5 lb/hr	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	6642	54.55	30.98	9	2.0	25	3.3	25	1.9	2.5	0.2	7145	0.02	1.2	871	161,184
59	6012	50.72	30.16	9	1.8	25	3.1	25	1.7	2.5	0.2	6603	0.02	1.1	956	144,840
100	4852	44.43	27.78	9	1.6	25	2.6	25	1.5	2.5	0.2	5679	0.02	1.0	1004	127484

Solar Turbines Emissions Estimates

Centaur 40-4700S

Assumptions: pipeline natural gas, sea level, 4"/4" inlet/outlet losses, nominal performance

50% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 lb/hr	PM10/2.5 lb/mmbtu	PM10/2.5 lb/hr	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	2511	32.29	19.78	25	3.2	50	3.9	25	1.1	2.5	0.1	4259	0.02	0.7	726	140,550
59	2278	29.85	19.41	25	3.0	50	3.6	25	1.0	2.5	0.1	3911	0.02	0.7	818	122,244
100	1735	26.09	16.92	25	2.6	50	3.1	25	0.9	2.5	0.1	3355	0.02	0.6	876	106980
75% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 lb/hr	PM10/2.5 lb/mmbtu	PM10/2.5 lb/hr	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	3767	39.31	24.39	25	3.9	50	4.8	25	1.4	2.5	0.1	5177	0.02	0.9	736	156,668
59	3417	35.41	24.55	25	3.5	50	4.3	25	1.2	2.5	0.1	4635	0.02	0.8	810	136,464
100	2602	30.78	21.51	25	3.0	50	3.7	25	1.0	2.5	0.1	3955	0.02	0.7	873	117366
100% load																
Temp, F	HP	fuel flow, mmbtu/hr LHV	Thermal Eff, %	NOx (ppm)	NOx (lb/hr)	CO (ppm)	CO (lb/hr)	UHC (ppm)	UHC (lb/hr)	VOC (ppm)	VOC (lb/hr)	CO2 lb/hr	PM10/2.5 lb/mmbtu	PM10/2.5 lb/hr	Exhaust Temp (F)	Exhaust Flow (lb/hr)
0	5023	46.39	30.23	25	4.7	50	5.7	25	1.6	2.5	0.2	6100	0.02	1.0	779	164,995
59	4556	42.27	29.51	25	4.2	50	5.1	25	1.5	2.5	0.2	5526	0.02	0.9	840	148,793
100	3470	35.07	27.45	25	3.4	50	4.2	25	1.2	2.5	0.1	4503	0.02	0.8	873	127331

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PIL 167
Product Information Letter

SoLoNOx Products: Emissions in Non-SoLoNOx Modes

Leslie Witherspoon
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PURPOSE

Solar's gas turbine dry low NOx emissions combustion systems, known as *SoLoNOx*™, have been developed to provide the lowest emissions possible during normal operating conditions. In order to optimize the performance of the turbine, the combustion and fuel systems are designed to reduce NOx, CO and unburned hydrocarbons (UHC) without penalizing stability or transient capabilities. At very low load and cold temperature extremes, the *SoLoNOx* system must be controlled differently in order to assure stable operation. The required adjustments to the turbine controls at these conditions cause emissions to increase.

The purpose of this Product Information Letter is to provide emissions estimates, and in some cases warrantable emissions for NOx, CO and UHC, at off-design conditions.

Historically, regulatory agencies have not required a specific emissions level to be met at low load or cold ambient operating conditions, but have asked what emissions levels are expected. The expected values are necessary to appropriately estimate emissions for annual emissions inventory purposes and for New Source Review applicability determinations and permitting.

COLD AMBIENT EMISSIONS ESTIMATES

Solar's standard temperature range warranty for gas turbines with *SoLoNOx* combustion is ≥ 0°F (–20°C). The *Titan*™ 250 is an exception, with a lower standard warranty at ≥ –20°F (–29°C). At ambient temperatures below 0°F, many of Solar's turbine engine models are controlled to increase pilot fuel to improve flame stability and emissions are higher. Without the increase in pilot fuel at temperatures below 0°F the engines may exhibit combustor rumble, as operation may be near the lean stability limit.

If a cold ambient emissions warranty is requested, a new production turbine configured with the latest combustion hardware is required. For most models this refers to the inclusion of Cold Ambient Fuel Control Logic.

Emissions warranties are not offered for ambient temperatures below –20°F (–29°C). In addition, cold ambient emissions warranties cannot be offered for the *Centaur*® 40 turbine.

Table 1 provides expected and warrantable (upon Solar's documented approval) emissions levels for Solar's *SoLoNOx* combustion turbines. All emissions levels are in ppm at 15% O_2. Refer to Product Information Letter 205 for *Mercury*™ 50 turbine emissions estimates.

For information on the availability and approvals for cold ambient temperature emissions warranties, please contact Solar's sales representatives.

Table 2 summarizes "expected" emissions levels for ambient temperatures below 0°F (–20°C) for Solar's *SoLoNOx* turbines that do not have current production hardware or for new production hardware that is not equipped with the cold ambient fuel control logic. The emissions levels are extrapolated from San Diego factory tests and may vary at extreme temperatures and as a result of variations in other parameters, such as fuel composition, fuel quality, etc.

For more conservative NOx emissions estimate for new equipment, customers can refer to the New Source Performance Standard (NSPS) 40CFR60, subpart KKKK, where the allowable NOx emissions level for ambient temperatures < 0°F (–20°F) is 150 ppm NOx at 15% O_2. For pre-February 18, 2005, *SoLoNOx* combustion turbines subject to 40CFR60 subpart GG, a conservative estimate is the appropriate subpart GG emissions level. Subpart GG levels range from 150 to 214 ppm NOx at 15% O_2 depending on the turbine model.

Table 3 summarizes emissions levels for ambient temperatures below –20°F (–29°C) for the *Titan* 250.

Table 1. Warrantable Emissions Between 0°F and –20°F (–20° to –29°C) for New Production

Turbine Model	Fuel System	Fuel	Applicable Load	NOx, ppm	CO, ppm	UHC, ppm
Centaur 50	Gas Only	Gas	50 to 100% load	42	100	50
	Dual Fuel	Gas	50 to 100% load	72	100	50
Taurus™ 60	Gas Only or Dual Fuel	Gas	50 to 100% load	42	100	50
Taurus 65	Gas Only	Gas	50 to 100% load	42	100	50
Taurus 70	Gas Only or Dual Fuel	Gas	50 to 100% load	42	100	50
Mars® 90	Gas Only	Gas	50 to 100% load	42	100	50
Mars 100	Gas Only or Dual Fuel	Gas	50 to 100% load	42	100	50
Titan 130	Gas Only or Dual Fuel	Gas	50 to 100% load	42	100	50
Titan 250	Gas Only	Gas	40 to 100% load	25	50	25
	Gas Only	Gas	40 to 100% load	15	25	25
Centaur 50	Dual Fuel	Liquid	65 to 100% load	120	150	75
Taurus 60	Dual Fuel	Liquid	65 to 100% load	120	150	75
Taurus 70	Dual Fuel	Liquid	65 to 100% load	120	150	75
Mars 100	Dual Fuel	Liquid	65 to 100% load	120	150	75
Titan 130	Dual Fuel	Liquid	65 to 100% load	120	150	75

Table 2. Expected Emissions below 0°F (–20°C) for SoLoNOx Combustion Turbines

Turbine Model	Fuel System	Fuel	Applicable Load	NOx, ppm	CO, ppm	UHC, ppm
Centaur 40	Gas Only or Dual Fuel	Gas	80 to 100% load	120	150	50
Centaur 50	Gas Only	Gas	50 to 100% load	120	150	50
	Dual Fuel	Gas	50 to 100% load	120	150	50
Taurus 60	Gas Only or Dual Fuel	Gas	50 to 100% load	120	150	50
Taurus 65	Gas Only	Gas	50 to 100% load	120	150	50
Taurus 70	Gas Only or Dual Fuel	Gas	50 to 100% load	120	150	50
Mars 90	Gas Only	Gas	80 to 100% load	120	150	50
Mars 100	Gas Only or Dual Fuel	Gas	50 to 100% load	120	150	50
Titan 130	Gas Only or Dual Fuel	Gas	50 to 100% load	120	150	50
Centaur 40	Dual Fuel	Liquid	80 to 100% load	120	150	75
Centaur 50	Dual Fuel	Liquid	65 to 100% load	120	150	75
Taurus 60	Dual Fuel	Liquid	65 to 100% load	120	150	75
Taurus 70	Dual Fuel	Liquid	65 to 100% load	120	150	75
Mars 100	Dual Fuel	Liquid	65 to 100% load	120	150	75
Titan 130	Dual Fuel	Liquid	65 to 100% load	120	150	75

Table 3. Expected Emissions below –20°F (–29°C) for the Titan 250 SoLoNOx Combustion Turbine

Turbine Model	Fuel System	Fuel	Applicable Load	NOx, ppm	CO, ppm	UHC, ppm
Titan 250	Gas Only	Gas	40 to 100% load	70	150	50

COLD AMBIENT PERMITTING STRATEGY

There are several permitting options to consider when permitting in cold ambient climates. Customers can use a tiered permitting approach or choose to permit a single emission rate over all temperatures. Historically, most construction and operating permits were silent on the ambient temperature boundaries for *SoLoNOx* operation.

Some customers have used a tiered permitting strategy. For purposes of compliance and annual emissions inventories, a digital thermometer is installed to record ambient temperature. The amount of time is recorded that the ambient temperature falls below 0°F. The amount of time below 0°F is then used with the emissions estimates shown in Tables 1 and 2 to estimate "actual" emissions during sub-zero operation.

A conservative alternative to using the NOx values in Tables 1, 2 and 3 is to reference 40CFR60 subpart KKKK, which allows 150 ppm NOx at 15% O_2 for sub-zero operation.

For customers who wish to permit at a single emission rate over all ambient temperatures, inlet air heating can be used to raise the engine inlet air temperature (T_1) above 0°F. With inlet air heating to keep T_1 above 0°F, standard emission warranty levels may be offered.

Inlet air heating technology options include an electric resistance heater, an inlet air to exhaust heat exchanger and a glycol heat exchanger.

If an emissions warranty is desired and ambient temperatures are commonly below –20°F (–29°C), inlet air heating can be used to raise the turbine inlet temperature (T_1) to at least –20°F. In such cases, the values shown in Table 1 can be warranted for new production.

EMISSIONS ESTIMATES IN NON-SOLONOX MODE (LOW LOAD)

At operating loads < 50% (<40% load for the *Titan* 250) on natural gas fuel and < 65% (< 80% load for *Centaur* 40) on liquid fuels, *SoLoNOx* engines are controlled to increase stability and transient response capability. The control steps that are required affect emissions in two ways: 1) pilot fuel flow is increased, increasing NOx emissions, and 2) airflow through the combustor is increased, increasing CO emissions. Note that the load levels are approximate. Engine controls are triggered either by power output for single-shaft engines or gas producer speed for two-shaft engines.

A conservative method for estimating emissions of NOx at low loads is to use the applicable NSPS: 40CFR60 subpart GG or KKKK. For projects that commence construction after February 18, 2005, subpart KKKK is the applicable NSPS and contains a NOx level of 150 ppm @ 15% O_2 for operating loads less than 75%.

Table 4 provides estimates of NOx, CO, and UHC emissions when operating in non-SoLoNOx mode for natural gas or liquid fuel. The estimated emissions can be assumed to vary linearly as load is decreased from just below 50% load for natural gas (or 65% load for liquid fuel) to idle.

The estimates in Table 4 apply for any product for gas only or dual fuel systems using pipeline quality natural gas. Refer to Product Information Letter 205 for *Mercury* 50 emissions estimates.

Table 4. Estimated Emissions in non-SoLoNOx Mode

Ambient	Fuel System	Engine Load	NOx, ppm	CO, ppm	UHC, ppm
***Centaur* 40/50, *Taurus* 60/65/70, *Mars* 90/100, *Titan* 130**					
≥ –20°F (–29°C)	Natural Gas	Less than 50%	70	8,000	800
		Idle	50	10,000	1,000
< –20°F (–29°C)	Natural Gas	Less than 50%	120	8,000	800
		Idle	120	10,000	1,000
***Titan* 250**					
≥ –20°F (–29°C)	Natural Gas	Less than 40%	50	25	20
		Idle	50	2,000	200
< –20°F (–29°C)	Natural Gas	Less than 40%	70	150	50
		Idle	70	2,000	200
***Centaur* 50, *Taurus* 60/70, *Mars* 100, *Titan* 130**					
≥ –20°F (–29°C)	Liquid	Less than 65%	120	1,000	100
		Idle	120	10,000	3,000
< –20°F (–29°C)	Liquid	Less than 65%	120	1,000	150
		Idle	120	10,000	3,000
***Centaur* 40**					
≥ –20°F (–29°C)	Liquid	Less than 80%	120	1,000	100
		Idle	120	10,000	3,000
< –20°F (–29°C)	Liquid	Less than 80%	120	1,000	150
		Idle	120	10,000	3,000

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PIL 168
Product Information Letter

Volatile Organic Compound, Sulfur Dioxide, and Formaldehyde Emission Estimates

Leslie Witherspoon
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PURPOSE

This Product Information Letter summarizes methods that are available to estimate emissions of volatile organic compounds (VOC), sulfur dioxide (SO_2), and formaldehyde from gas turbines. Emissions estimates of these pollutants are often necessary during the air permitting process.

INTRODUCTION

In absence of site-specific or representative source test data, Solar refers customers to a United States Environmental Protection Agency (EPA) document titled "AP-42" or other appropriate EPA reference documents. AP-42 is a collection of emission factors for different emission sources. The emission factors found in AP-42 provide a generally accepted way of estimating emissions when more representative data are not available. The most recent version of AP-42 (dated April 2000) can be found at:

http://www.epa.gov/ttn/chief/ap42/ch03/index.html

Solar does not typically warranty the emission rates for VOC, SO_2 or formaldehyde.

Volatile Organic Compounds

Many permitting agencies require gas turbine users to estimate emissions of VOC, a subpart of the unburned hydrocarbon (UHC) emissions, during the air permitting process. Volatile organic compounds, non-methane hydrocarbons (NMHC), and reactive organic gases (ROG) are some of the many ways of referring to the non-methane (and non-ethane) portion of an "unburned hydrocarbon" emission estimate.

For natural gas fuel, Solar's customers use 10-20% of the UHC emission rate to represent VOC emissions. The estimate of 10-20% is based on a ratio of total non-methane hydrocarbons to total organic compounds. The use of 10-20% provides a conservative estimate of VOC emissions. The balance of the UHC is assumed to be primarily methane.

For liquid fuel, it is appropriate to estimate that 100% of the UHC emission estimate is VOC.

Sulfur Dioxide

Sulfur dioxide emissions are produced by conversion of sulfur in the fuel to SO_2. Since Solar does not control the amount of sulfur in the fuel, we are unable to predict SO_2 emissions without a site fuel composition analysis. Customers generally estimate SO_2 emissions with a mass balance calculation by assuming that any sulfur in the fuel will convert to SO_2. For reference, the typical mass balance equation is shown below.

Variables: wt % of sulfur in fuel
Btu/lb fuel (LHV*)
MMBtu/hr fuel flow (LHV)

$$\frac{\text{lb } SO_2}{\text{hr}} = \left(\frac{\text{wt\% Sulfur}}{100}\right)\left(\frac{\text{lb fuel}}{\text{Btu}}\right)\left(\frac{10^6 \text{ Btu}}{\text{MMBtu}}\right)\left(\frac{\text{MMBtu fuel}}{\text{hr}}\right)\left(\frac{\text{MW } SO_2}{\text{MW Sulfur}}\right)$$

As an alternative to the mass balance calculation, EPA's AP-42 document can be used. AP-42 (Table 3.1-2a, April 2000) suggests emission factors of 0.0034 lb/MMBtu for gas fuel (HHV*) and 0.033 lb/MMBtu for liquid fuel (HHV).

*LHV = Lower Heating Value; HHV = Higher Heating Value

Formaldehyde

In gas turbines, formaldehyde emissions are a result of incomplete combustion. Formaldehyde

in the exhaust stream is unstable and very difficult to measure. In addition to turbine characteristics including combustor design, size, maintenance history, and load profile, the formaldehyde emission level is also affected by:

- Ambient temperature
- Humidity
- Atmospheric pressure
- Fuel quality
- Formaldehyde concentration in the ambient air
- Test method measurement variability
- Operational factors

The emission factor data in Table 1 is an excerpt from an EPA memo: "Revised HAP Emission Factors for Stationary Combustion Turbines, 8/22/03." The memo presents hazardous air pollutant (HAP) emission factor data in several categories including: mean, median, maximum, and minimum. The emission factors in the memo are a compilation of the HAP data EPA collected during the Maximum Achievable Control Technology (MACT) standard development process. The emission factor documentation shows there is a high degree of variability in formaldehyde emissions from gas turbines, depending on the manufacturer, rating size of equipment, combustor design, and testing events. To estimate formaldehyde emissions from gas turbines, users should use the emission factor(s) that best represent the gas turbines actual / planned operating profile. Refer to the memo for alternative emission factors.

Table 1. EPA's Total HAP and Formaldehyde Emission Factors for <50 MW Lean-Premix Gas Turbines burning Natural Gas

(Source: Revised HAP Emission Factors for Stationary Combustion Turbines, OAR-2002-0060, IV-B-09, 8/22/03)

Pollutant	Engine Load	95% Upper Confidence of Mean, lb/MMBtu HHV	95% Upper Confidence of Data, lb/MMBtu HHV	Memo Reference
Total HAP	> 90%	0.00144	0.00258	Table 19
Total HAP	All	0.00160	0.00305	Table 16
Formaldehyde	> 90%	0.00127	0.00241	Table 19
Formaldehyde	All	0.00143	0.00288	Table 16

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Emission Estimates at Start-up, Shutdown, and Commissioning for SoLoNOx Combustion Products

Leslie Witherspoon
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PURPOSE

The purpose of this Product Information Letter (PIL) is to provide emission estimates for start-up and shutdown events for *Solar*® gas turbines with *SoLoNOx*™ dry low emissions combustion systems. The commissioning process is also discussed.

INTRODUCTION

The information presented in this document is representative for both generator set (GS) and compressor set/mechanical drive (CS/MD) combustion turbine applications. Operation of duct burners and/or any add-on control equipment is not accounted for in the emissions estimates. Emissions related to the start-up, shutdown, and commissioning of combustion turbines will not be guaranteed or warranted.

Combustion turbine start-up occurs in one of three modes: cold, warm, or hot. On large, utility size, combustion turbines, the start-up time varies by the "mode". The start-up duration for a hot, warm, or cold *Solar* turbine is less than 10 minutes in simple-cycle and most combined heat and power applications.

Heat recovery steam generator (HRSG) steam pressure is usually 250 psig or less. At 250 psig or less, thermal stress within the HRSG is minimized and, therefore, firing ramp-up is not limited. However, some combined heat and power plant applications will desire or dictate longer start-up times, therefore emissions assuming a 60-minute start are also estimated.

A typical shutdown for a *Solar* turbine is <10 minutes. Emissions estimates for an elongated shutdown, 30-minutes, are also included.

Start-up and shutdown emissions estimates for the *Mercury*™ 50 engine are found in PIL 205.

For start-up and shutdown emissions estimates for conventional combustion turbines, landfill gas, digester gas, or other alternative fuel applications, contact Solar's Environmental Programs Department.

START-UP SEQUENCE

The start-up sequence, or getting to *SoLoNOx* combustion mode, takes three steps:

1. Purge-crank
2. Ignition and acceleration to idle
3. Loading / thermal stabilization

During the "purge-crank" step, rotation of the turbine shaft is accomplished with a starter motor to remove any residual fuel gas in the engine flow path and exhaust. During "igni-

tion and acceleration to idle," fuel is introduced into the combustor and ignited in a diffusion flame mode and the engine rotor is accelerated to idle speed.

The third step consists of applying up to 50% load[1] while allowing the combustion flame to transition and stabilize. Once 50% load is achieved, the turbine transitions to *SoLoNOx* combustion mode and the engine control system begins to hold the combustion primary zone temperature and limit pilot fuel to achieve the targeted nitrogen oxides (NOx), carbon monoxide (CO), and unburned hydrocarbons (UHC) emission levels.

Steps 2 and 3 are short-term transient conditions making up less than 10 minutes.

SHUTDOWN PROCESS

Normal, planned cool down/shutdown duration varies by engine model. The *Centaur*® 40, *Centaur* 50, *Taurus*™ 60, and *Taurus* 65 engines take about 5 minutes. The *Taurus* 70, *Mars*® 90 and 100, *Titan*™ 130 and *Titan* 250 engines take about 10 minutes. Typically, once the shutdown process starts, the emissions will remain in *SoLoNOx* mode for approximately 90 seconds and move into a transitional mode for the balance of the estimated shutdown time (assuming the unit was operating at full-load).

START-UP AND SHUTDOWN EMISSIONS ESTIMATES

Tables 1 through 5 summarize the estimated pounds of emissions per start-up and shutdown event for each product. Emissions estimates are presented for both GS and CS/MD applications on both natural gas and liquid fuel (diesel #2). The emissions estimates are calculated using empirical exhaust characteristics.

COMMISSIONING EMISSIONS

Commissioning generally takes place over a two-week period. Static testing, where no combustion occurs, usually requires one week and no emissions are expected. Dynamic testing, where combustion will occur, will see the engine start and shutdown a number of times and a variety of loads will be placed on the system. It is impossible to predict how long the turbine will run and in what combustion / emissions mode it will be running. The dynamic testing period is generally followed by one to two days of "tune-up" during which the turbine is running at various loads, most likely within low emissions mode (warranted emissions range).

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[1] 40% load for the *Titan* 250 engine on natural gas. 65% load for all engines on liquid fuel (except 80% load for the *Centaur* 40).

Table 1. Estimation of Start-up and Shutdown Emissions (lbs/event) for SoLoNOx Generator Set Applications
10 Minute Start-up and 10 Minute Shutdown
Natural Gas Fuel

Data will NOT be warranted under any circumstances

	Centaur 40 4701S				Centaur 50 6201S				Taurus 60 7901S				Taurus 65 8401S			
	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)
Total Emissions per Start (lbs)	0.6	58.1	3.3	359	0.8	75.0	4.3	454	0.8	78.5	4.5	482	0.9	85.8	4.9	523
Total Emissions per Shutdown (lbs)	0.3	25.5	1.5	160	0.4	31.1	1.8	194	0.4	34.7	2.0	217	0.4	38.2	2.2	237

	Taurus 70 10801S				Mars 90 13002S GSC				Mars 100 16002S GSC				Titan 130 20501S				Titan 250 30002S			
	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)
Total Emissions per Start (lbs)	1.1	103.9	5.9	634	1.4	129.0	7.4	868	1.6	151.2	8.6	952	2.1	195.6	11.2	1,194	2.5	22.7	1.5	1,925
Total Emissions per Shutdown (lbs)	1.3	110.7	6.3	689	1.7	147.9	8.4	912	1.9	166.8	9.5	1,026	2.4	210.0	12.0	1,303	3.0	19.9	1.5	1,993

Assumes ISO conditions: 59F, 60% RH, sea level, no losses

Assumes unit is operating at full load prior to shutdown.

Assumes natural gas fuel; ES 9-98 compliant.

Table 2. Estimation of Start-up and Shutdown Emissions (lbs/event) for SoLoNOx Generator Set Applications
60 Minute Start-up and 30 Minute Shutdown
Natural Gas Fuel

Data will NOT be warranted under any circumstances

	Centaur 40 4701S				Centaur 50 6201S				Taurus 60 7901S				Taurus 65 8401S			
	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)
Total Emissions per Start (lbs)	4.1	219.4	13.0	3,420	5.0	272.4	16.1	4,219	5.7	299.8	17.8	4,780	6.1	326.5	19.3	5,074
Total Emissions per Shutdown (lbs)	1.8	121.1	7.1	1,442	2.3	163.3	9.5	1,834	2.5	163.5	9.6	1,994	2.6	177.2	10.4	2,119

	Taurus 70 10801S				Mars 90 13002S				Mars 100 16002S				Titan 130 20501S				Titan 250 30002S			
	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)
Total Emissions per Start (lbs)	7.6	410.3	24.2	6,164	10.5	570.8	33.7	8,641	11.3	583.5	34.6	9,691	13.8	740.4	43.8	11,495	14.6	75.5	7.3	16,253
Total Emissions per Shutdown (lbs)	3.3	223.0	13.0	2,588	4.3	277.0	16.2	3,685	4.8	308.1	18.0	4,056	6.0	405.3	23.7	4,826	6.2	52.6	4.1	7,222

Assumes ISO conditions: 59F, 60% RH, sea level, no losses.

Assumes unit is operating at full load prior to shutdown.

Assumes natural gas fuel; ES 9-98 compliant.

Table 3. Estimation of Start-up and Shutdown Emissions (lbs/event) for SoLoNOx CS/MD Applications
10 Minute Start-up and 10 Minute Shutdown
Natural Gas Fuel

Data will NOT be warranted under any circumstances

	Centaur 40 4702S				Centaur 50 6102S				Taurus 60 7802S			
	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)
Total Emissions per Start (lbs)	0.7	64.4	3.7	392	0.8	69.1	4.0	469	0.7	64.3	3.7	410
Total Emissions per Shutdown (lbs)	0.3	30.2	1.7	181	0.4	35.4	2.0	217	0.4	33.0	1.9	204

	Taurus 70 10302S				Mars 90 13002S CSMD				Mars 100 16002S CSMD				Titan 130 20502S				Titan 250 30002S			
	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)
Total Emissions per Start (lbs)	0.8	73.1	4.2	519	1.2	109.3	6.2	805	1.4	123.5	7.1	829	1.9	176.9	10.1	1,161	2.6	26.2	1.7	1,794
Total Emissions per Shutdown (lbs)	1.1	93.4	5.3	575	1.5	132.6	7.6	817	1.7	149.2	8.5	920	2.4	207.6	11.9	1,272	2.9	19.1	1.4	1,918

Assumes ISO conditions: 59F, 60% RH, sea level, no losses.

Assumes unit is operating at full load prior to shutdown.

Assumes natural gas fuel; ES 9-98 compliant.

Table 4. Estimation of Start-up and Shutdown Emissions (lbs/event) for SoLoNOx Generator Set
10 Minute Start-up and 10 Minute Shutdown
Liquid Fuel (Diesel #2)

Data will NOT be warranted under any circumstances

	Centaur 40 4701S				Centaur 50 6201S				Taurus 60 7901S			
	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)
Total Emissions per Start (lbs)	1.3	44.5	7.4	473	1.7	59.0	9.8	601	1.7	59.8	9.9	636
Total Emissions per Shutdown (lbs)	0.6	17.3	2.8	211	0.7	21.2	3.4	256	0.8	23.5	3.8	286

	Taurus 70 10801S				Mars 100 16002S GSC				Titan 130 20501S			
	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)
Total Emissions per Start (lbs)	2.3	78.5	13.0	823	3.4	114.1	18.8	1,239	4.3	147.5	24.4	1,547
Total Emissions per Shutdown (lbs)	2.5	73.6	12.0	889	3.8	111.4	18.1	1,331	4.7	139.1	22.6	1,677

Assumes ISO conditions: 59F, 60% RH, sea level, no losses.

Assumes unit is operating at full load prior to shutdown.

Assumes #2 Diesel fuel; ES 9-98 compliant.

Table 5. Estimation of Start-up and Shutdown Emissions (lbs/event) for SoLoNOx Generator Set
60 Minute Start-up and 30 Minute Shutdown
Liquid Fuel (Diesel #2)

Data will NOT be warranted under any circumstances

	Centaur 40 4701S				Centaur 50 6201S				Taurus 60 7901S			
	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)
Total Emissions per Start (lbs)	11.7	194.7	30.9	4,255	15.2	271.9	43.3	5,302	14.7	282.6	45.0	5,962
Total Emissions per Shutdown (lbs)	4.4	84.7	13.6	1,816	6.7	164.3	27.0	2,334	6.3	159.0	26.0	2,515

	Taurus 70 10801S				Mars 100 16002S				Titan 130 20501S			
	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)	NOx (lbs)	CO (lbs)	UHC (lbs)	CO2 (lbs)
Total Emissions per Start (lbs)	18.4	360.3	57.4	7,375	29.1	552.0	87.7	11,685	34.4	677.0	108.0	13,731
Total Emissions per Shutdown (lbs)	8.0	207.8	34.1	3,156	12.3	302.6	49.4	4,970	15.0	388.5	63.7	5,876

Assumes ISO conditions: 59F, 60% RH, sea level, no losses.

Assumes unit is operating at full load prior to shutdown.

Assumes #2 Diesel fuel; ES 9-98 compliant.

PEERLESS Mfg. Co.

SCR SYSTEM DESIGN DATASHEET

ENQUIRY DETAILS	
Enquiry Number	32237
Revision	0
Date of Revision	01-Sep-2015
Project Name	Atlantic Coast Pipeline
Project Location	ACP-3
Application	Simple Cycle
Number of SCRs	17

PROCESS DATA													
Design Case			Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8	Case 9	Case 10	Case 11	Case 12
Customer Design Case			Centaur 40	Centaur 40	Centaur 50L	Centaur 50L	Taurus 60	Taurus 60	Taurus 70	Taurus 70	Mars 100	Mars 100	Titan 130	Titan 130
Percent Load		Percent	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Fuel Case		Percent	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG	NG
EXHAUST GAS EMISSIONS DATA (BEFORE COOLING)														
Exhaust Gas Mass Flowrate, Wet		lb/h	164994	127403	161184	127484	186880	151704	247255	179824	367228	289445	437956	341226
Exhaust Gas Volumetric Flowrate, Wet		ACFM	87269	73508	91781	80971	107807	96052	139492	112383	207193	177388	254955	215260
Exhaust Gas Temperature		degrees F	779.0	873.0	871.0	1004.0	888.0	999.0	858.0	980.0	859.0	953.0	900.0	993.0
Exhaust Gas Composition														
Component	*MW*													
O2	31.999	vol% (wet)	15.78	15.29	14.80	14.08	14.50	13.93	14.39	13.86	14.73	14.23	14.40	13.69
H2O	18.015	vol% (wet)	4.87	8.15	5.55	9.21	5.81	9.34	5.91	9.39	5.61	9.08	5.90	9.55
N2	28.013	vol% (wet)	76.23	73.41	75.66	73.01	75.78	72.96	75.74	72.93	75.85	73.06	75.75	72.88
CO2	44.010	vol% (wet)	2.41	2.27	2.86	2.83	3.00	2.90	3.05	2.93	2.90	2.76	3.04	3.01
Ar	39.948	vol% (wet)	0.91	0.88	0.91	0.87	0.91	0.87	0.91	0.87	0.91	0.87	0.91	0.87
			100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Emissions from the Source	@ %O2	15												
Reference applicable for ppmvd and mg/Nm3 (dry)														
Nox as NO2		ppmvd	25.00	25.00	9.00	9.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
Nox as NO2		lb/h	4.66	3.44	1.95	1.55	3.97	3.16	5.34	3.77	7.51	5.73	9.44	7.38
CO		ppmvd	50.00	50.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00
CO		lb/h	5.87	4.19	3.31	2.63	4.02	3.20	5.42	3.83	7.62	5.81	9.58	7.49
SO2		ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO2		lb/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO3		ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO3		lb/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
COOLING AIR DATA														
Cooling Air Mass Flowrate, Wet		lb/h	7181.2	27800.1	29270.9	57444.9	38705.3	67013.0	40077.2	73373.3	60074.6	104237.6	98593.9	147099.4
Cooling Air Volumetric Flowrate, Wet		ACFM	1387	6438	5653	13303	7475	15518	7739	16991	11601	24139	19040	34064
Ambient Air Temperature		degrees F	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00	0.00	100.00
Relative Humidity		Percent	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
EXHAUST GAS EMISSIONS DATA (AFTER COOLING)														
Exhaust Gas Mass Flowrate, Wet		lb/h	172175	155203	190455	184929	225585	218717	287332	253197	427303	393683	536550	488325
Exhaust Gas Volumetric Flowrate, Wet		ACFM	88898	80938	98384	96292	116559	113920	148553	131945	220785	205195	277243	254464
Exhaust Gas Temperature (after cooling)		degrees F	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
Exhaust Gas Composition														
Component	*MW*													
O2	31.999	vol% (wet)	15.99	16.15	15.73	15.95	15.59	15.82	15.29	15.68	15.59	15.78	15.59	15.82
H2O	18.015	vol% (wet)	4.48	7.38	4.72	7.55	4.84	7.67	5.11	7.79	4.84	7.70	4.84	7.84
N2	28.013	vol% (wet)	76.30	73.71	76.21	73.65	76.16	73.61	76.05	73.55	76.15	73.59	76.16	73.54
CO2	44.010	vol% (wet)	2.31	1.87	2.43	1.97	2.50	2.03	2.63	2.10	2.50	2.04	2.49	2.12
Ar	39.948	vol% (wet)	0.91	0.88	0.91	0.88	0.91	0.88	0.91	0.88	0.91	0.88	0.91	0.88
			100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Emissions from the Source	@ %O2	15												
Reference applicable for ppmvd and mg/Nm3 (dry)														
Nox as NO2		ppmvd	25.00	25.06	9.00	9.04	15.00	15.07	15.00	15.06	15.00	15.06	15.00	15.06
Nox as NO2		lb/h	4.66	3.44	1.95	1.55	3.97	3.16	5.34	3.77	7.51	5.73	9.44	7.38
CO		ppmvd	50.00	50.13	25.00	25.11	25.00	25.11	25.00	25.10	25.00	25.09	25.00	25.11
CO		lb/h	5.67	4.19	3.31	2.63	4.02	3.20	5.42	3.83	7.62	5.81	9.58	7.49
SO2		ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO2		lb/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO3		ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SO3		lb/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Particulates		kg/h	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trace Elements		mg/Nm3 (dry)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
VOC		ppmvd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Amount of Nox as NO2		Percent	50	50	50	50	50	50	50	50	50	50	50	50
Nox Reduction		Percent	80.00	80.00	44.44	44.44	66.67	66.67	66.67	66.67	66.67	66.67	66.67	66.67
Dilution Air Required		lb/h	327	327	327	327	327	327	327	327	327	327	655	327
Dilution Air Required		SCFM	68	68	68	68	68	68	68	68	68	68	135	68
Aqueous Ammonia Requirement		lb/h	11	8	6	5	10	8	14	10	20	15	25	19
Aqueous Ammonia Requirement		gal/month	1046	772	569	452	989	787	1331	941	1873	1429	2354	1841
Total Mass injected by SCR		lb/h	338	335	333	332	337	335	341	337	347	342	680	346
Exhaust Gas Mass Flowrate, Wet at SCR catalyst		lb/h	172513.1	155538.2	190787.8	185260.6	225922.6	219052.2	287673.0	253534.1	427649.1	394024.5	537229.4	488671.5
Exhaust Gas Vol Flowrate, Wet at SCR Catalyst		ACFM	89073	81113	98556	96465	116734	114095	148729	132120	220965	205373	277594	254645
Performance Warranties	@ %O2	15												
Reference applicable for ppmvd and mg/Nm3 (dry)														
Nox as NO2		ppmvd	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Nox as NO2		lb/h	0.93	0.69	1.09	0.86	1.32	1.05	1.78	1.26	2.50	1.91	3.15	2.46
NH3 Slip		ppmvd	10.00	10.03	10.00	10.04	10.00	10.04	10.00	10.04	10.00	10.04	10.00	10.04
NH3 Slip		lb/h	0.69	0.51	0.80	0.64	0.98	0.78	1.32	0.93	1.85	1.41	2.33	1.82

* *VTA = Vendor to Advise*

SITE/AMBIENT CONDITIONS		
Design Ambient Temperature	100	degrees F
Design Ambient Pressure	407	inH2O
Site Elevation	VARIOUS	ft
Gauge Duct Pressure	20.00	inH2O
Relative Humidity	60	Percent

AFCU DESIGN		
Reagent	Aqueous Ammonia	
Reagent Concentration	19.00	%w/w

G3516B

GAS ENGINE TECHNICAL DATA

CATERPILLAR®

ENGINE SPEED (rpm):	1800	RATING STRATEGY:	STANDARD
COMPRESSION RATIO:	11	APPLICATION:	GENSET
AFTERCOOLER TYPE:	SCAC	RATING LEVEL:	CONTINUOUS
AFTERCOOLER - STAGE 2 INLET (°F):	130	FUEL:	NAT GAS
AFTERCOOLER - STAGE 1 INLET (°F):	192	FUEL SYSTEM:	CAT LOW PRESSURE WITH AIR FUEL RATIO CONTROL
JACKET WATER OUTLET (°F):	198		
ASPIRATION:	TA	FUEL PRESSURE RANGE(psig):	1.5-5.0
COOLING SYSTEM:	JW+OC+1AC, 2AC	FUEL METHANE NUMBER:	80
CONTROL SYSTEM:	ADEM3	FUEL LHV (Btu/scf):	905
EXHAUST MANIFOLD:	DRY	ALTITUDE CAPABILITY AT 77°F INLET AIR TEMP. (ft):	2238
COMBUSTION:	LOW EMISSION	POWER FACTOR:	0.8
NOx EMISSION LEVEL (g/bhp-hr NOx):	0.5	VOLTAGE(V):	380-4160

RATING		NOTES	LOAD	100%	75%	50%
GENSET POWER	(WITHOUT FAN)	(1)(2)	ekW	1300	975	650
GENSET POWER	(WITHOUT FAN)	(1)(2)	kVA	1625	1218	812
ENGINE POWER	(WITHOUT FAN)	(2)	bhp	1818	1364	910
GENERATOR EFFICIENCY		(1)	%	95.9	95.8	95.8
GENSET EFFICIENCY(@ 1.0 Power Factor)	(ISO 3046/1)	(3)	%	34.7	33.2	31.1
THERMAL EFFICIENCY		(4)	%	50.8	52.3	54.5
TOTAL EFFICIENCY (@ 1.0 Power Factor)		(5)	%	85.5	85.5	85.6
ENGINE DATA						
GENSET FUEL CONSUMPTION	(ISO 3046/1)	(6)	Btu/ekW-hr	9965	10415	11036
GENSET FUEL CONSUMPTION	(NOMINAL)	(6)	Btu/ekW-hr	10158	10618	11250
ENGINE FUEL CONSUMPTION	(NOMINAL)	(6)	Btu/bhp-hr	7261	7589	8037
AIR FLOW (77°F, 14.7 psia)	(WET)	(7)	ft3/min	4121	3172	2188
AIR FLOW	(WET)	(7)	lb/hr	18272	14067	9702
FUEL FLOW (60°F, 14.7 psia)			scfm	243	191	135
COMPRESSOR OUT PRESSURE			in Hg(abs)	87.4	82.5	60.2
COMPRESSOR OUT TEMPERATURE			°F	345	326	234
AFTERCOOLER AIR OUT TEMPERATURE			°F	129	130	130
INLET MAN. PRESSURE		(8)	in Hg(abs)	79.9	62.9	43.8
INLET MAN. TEMPERATURE	(MEASURED IN PLENUM)	(9)	°F	139	140	140
TIMING		(10)	°BTDC	22	22	22
EXHAUST TEMPERATURE - ENGINE OUTLET		(11)	°F	974	985	1009
EXHAUST GAS FLOW (@engine outlet temp, 14.5 psia)	(WET)	(12)	ft3/min	11850	9202	6461
EXHAUST GAS MASS FLOW	(WET)	(12)	lb/hr	18939	14590	10072
MAX INLET RESTRICTION		(13)	in H2O	10.04	7.99	3.98
MAX EXHAUST RESTRICTION		(13)	in H2O	20.07	12.41	5.51
EMISSIONS DATA - ENGINE OUT						
NOx (as NO2)		(14)(15)	g/bhp-hr	0.50	0.50	0.50
CO		(14)(16)	g/bhp-hr	2.49	2.58	2.82
THC (mol. wt. of 15.84)		(14)(16)	g/bhp-hr	5.45	5.82	6.78
NMHC (mol. wt. of 15.84)		(14)(16)	g/bhp-hr	0.82	0.87	1.02
NMNEHC (VOCs) (mol. wt. of 15.84)		(14)(16)(17)	g/bhp-hr	0.54	0.58	0.68
HCHO (Formaldehyde)		(14)(16)	g/bhp-hr	0.34	0.37	0.42
CO2		(14)(16)	g/bhp-hr	504	527	559
EXHAUST OXYGEN		(14)(18)	% DRY	9.3	9.1	9.0
LAMBDA		(14)(18)		1.73	1.70	1.66
ENERGY BALANCE DATA						
LHV INPUT		(19)	Btu/min	220051	172501	121849
HEAT REJECTION TO JACKET WATER (JW)		(20)(28)	Btu/min	28688	25137	21558
HEAT REJECTION TO ATMOSPHERE		(21)	Btu/min	7365	6138	4912
HEAT REJECTION TO LUBE OIL (OC)		(22)(28)	Btu/min	7401	6761	5967
HEAT REJECTION TO EXHAUST (LHV TO 77°F)		(23)(24)	Btu/min	81165	63518	45440
HEAT REJECTION TO EXHAUST (LHV TO 248°F)		(23)	Btu/min	61754	48372	34572
HEAT REJECTION TO A/C - STAGE 1 (1AC)		(25)(28)	Btu/min	9380	6325	1345
HEAT REJECTION TO A/C - STAGE 2 (2AC)		(26)(29)	Btu/min	7961	5809	3073
PUMP POWER		(27)	Btu/min	977	977	977

CONDITIONS AND DEFINITIONS

Engine rating obtained and presented in accordance with ISO 3046/1. (Standard reference conditions of 77°F, 29.60 in Hg barometric pressure.) No overload permitted at rating shown. Consult the altitude deration factor chart for applications that exceed the rated altitude or temperature.

Emission levels are at engine exhaust flange prior to any after treatment. Values are based on engine operating at steady state conditions, adjusted to the specified NOx level at 100% load. Tolerances specified are dependent upon fuel quality. Fuel methane number cannot vary more than ± 3.

For notes information consult page three.

FUEL USAGE GUIDE

CAT METHANE NUMBER	30	35	40	45	50	55	60	65	70	75	80	100
SET POINT TIMING	-	-	-	-	-	-	22	21	20	21	22	22
DERATION FACTOR	0	0	0	0	0	0	0.84	0.92	1	1	1	1

ALTITUDE DERATION FACTORS AT RATED SPEED

INLET AIR TEMP °F	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	0.99	0.95	0.92	0.88	0.85	0.82	0.79	0.76	0.73	0.70	0.67	0.64	0.62
120	1	0.97	0.93	0.90	0.87	0.83	0.80	0.77	0.74	0.71	0.68	0.65	0.63
110	1	0.99	0.95	0.92	0.88	0.85	0.81	0.78	0.75	0.72	0.69	0.67	0.64
100	1	1	0.97	0.93	0.90	0.86	0.83	0.80	0.77	0.74	0.71	0.68	0.65
90	1	1	0.99	0.95	0.91	0.88	0.84	0.81	0.78	0.75	0.72	0.69	0.66
80	1	1	1	0.97	0.93	0.89	0.86	0.83	0.79	0.76	0.73	0.70	0.67
70	1	1	1	0.98	0.95	0.91	0.88	0.84	0.81	0.78	0.75	0.72	0.69
60	1	1	1	1	0.97	0.93	0.89	0.86	0.82	0.79	0.76	0.73	0.70
50	1	1	1	1	0.98	0.95	0.91	0.87	0.84	0.81	0.78	0.74	0.71

ALTITUDE (FEET ABOVE SEA LEVEL)

AFTERCOOLER HEAT REJECTION FACTORS (ACHRF)

INLET AIR TEMP °F	0	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000
130	1.34	1.39	1.45	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46	1.46
120	1.27	1.32	1.38	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39
110	1.20	1.25	1.31	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32
100	1.13	1.18	1.24	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
90	1.06	1.11	1.17	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
80	1	1.05	1.09	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11	1.11
70	1	1	1.02	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04	1.04
60	1	1	1	1	1	1	1	1	1	1	1	1	1
50	1	1	1	1	1	1	1	1	1	1	1	1	1

ALTITUDE (FEET ABOVE SEA LEVEL)

FUEL USAGE GUIDE:

This table shows the derate factor and full load set point timing required for a given fuel. Note that deration and set point timing adjustment may be required as the methane number decreases. Methane number is a scale to measure detonation characteristics of various fuels. The methane number of a fuel is determined by using the Caterpillar methane number calculation.

ALTITUDE DERATION FACTORS:

This table shows the deration required for various air inlet temperatures and altitudes. Use this information along with the fuel usage guide chart to help determine actual engine power for your site. The derate factors shown do not take into account external cooling system capacity. The derate factors provided assume the external cooling system can maintain the specified cooling water temperatures at site conditions.

ACTUAL ENGINE RATING:

To determine the actual rating of the engine at site conditions, one must consider separately, limitations due to fuel characteristics and air system limitations. The Fuel Usage Guide deration establishes fuel limitations. The Altitude/Temperature deration factors and RPC (reference the Caterpillar Methane Program) establish air system limitations. RPC comes into play when the Altitude/Temperature deration is less than 1.0 (100%). Under this condition, add the two factors together. When the site conditions do not require an Altitude/Temperature derate (factor is 1.0), it is assumed the turbocharger has sufficient capability to overcome the low fuel relative power, and RPC is ignored. To determine the actual power available, take the lowest rating between 1) and 2).

1) Fuel Usage Guide Deration
2) 1-((1-Altitude/Temperature Deration) + (1-RPC))

AFTERCOOLER HEAT REJECTION FACTORS(ACHRF):

To maintain a constant air inlet manifold temperature, as the inlet air temperature goes up, so must the heat rejection. As altitude increases, the turbocharger must work harder to overcome the lower atmospheric pressure. This increases the amount of heat that must be removed from the inlet air by the aftercooler. Use the aftercooler heat rejection factor (ACHRF) to adjust for inlet air temp and altitude conditions. See notes 28 and 29 for application of this factor in calculating the heat exchanger sizing criteria. Failure to properly account for these factors could result in detonation and cause the engine to shutdown or fail.

INLET AND EXHAUST RESTRICTIONS FOR ALTITUDE CAPABILITY:

The altitude derate chart is based on the maximum inlet and exhaust restrictions provided on page 1. Contact factory for restrictions over the specified values. Heavy Derates for higher restrictions will apply.

NOTES:

1. Generator efficiencies, power factor, and voltage are based on standard generator. [Genset Power (ekW) is calculated as: Engine Power (bkW) x Generator Efficiency], [Genset Power (kVA) is calculated as: Engine Power (bkW) x Generator Efficiency / Power Factor]
2. Rating is with two engine driven water pumps. Tolerance is (+)3, (-)0% of full load.
3. Genset Efficiency published in accordance with ISO 3046/1, based on a 1.0 power factor.
4. Thermal Efficiency is calculated based on energy recovery from the jacket water, lube oil, 1st stage aftercooler, and exhaust to 248°F with engine operation at ISO 3046/1 Genset Efficiency, and assumes unburned fuel is converted in an oxidation catalyst.
5. Total efficiency is calculated as: Genset Efficiency + Thermal Efficiency. Tolerance is ±10% of full load data.
6. ISO 3046/1 Genset fuel consumption tolerance is (+)5, (-)0% at the specified power factor. Nominal genset and engine fuel consumption tolerance is ± 3.0% of full load data at the specified power factor.
7. Air flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 5 %.
8. Inlet manifold pressure is a nominal value with a tolerance of ± 5 %.
9. Inlet manifold temperature is a nominal value with a tolerance of ± 9°F.
10. Timing indicated is for use with the minimum fuel methane number specified. Consult the appropriate fuel usage guide for timing at other methane numbers.
11. Exhaust temperature is a nominal value with a tolerance of (+)63°F, (-)54°F.
12. Exhaust flow value is on a 'wet' basis. Flow is a nominal value with a tolerance of ± 6 %.
13. Inlet and Exhaust Restrictions are maximum allowed values at the corresponding loads. Increasing restrictions beyond what is specified will result in a significant engine derate
14. Emissions data is at engine exhaust flange prior to any after treatment.
15. NOx tolerances are ± 18% of specified value.
16. CO, CO2, THC, NMHC, NMNEHC, and HCHO values are "Not to Exceed" levels. THC, NMHC, and NMNEHC do not include aldehydes.
17. VOCs - Volatile organic compounds as defined in US EPA 40 CFR 60, subpart JJJJ
18. Exhaust Oxygen tolerance is ± 0.5; Lambda tolerance is ± 0.05. Lambda and Exhaust Oxygen level are the result of adjusting the engine to operate at the specified NOx level.
19. LHV rate tolerance is ± 3.0%.
20. Heat rejection to jacket water value displayed includes heat to jacket water alone. Value is based on treated water. Tolerance is ± 10% of full load data.
21. Heat rejection to atmosphere based on treated water. Tolerance is ± 50% of full load data.
22. Lube oil heat rate based on treated water. Tolerance is ± 20% of full load data.
23. Exhaust heat rate based on treated water. Tolerance is ± 10% of full load data.
24. Heat rejection to exhaust (LHV to 77°F) value shown includes unburned fuel and is not intended to be used for sizing or recovery calculations.
25. Heat rejection to A/C - Stage 1 based on treated water. Tolerance is ±5% of full load data.
26. Heat rejection to A/C - Stage 2 based on treated water. Tolerance is ±5% of full load data.
27. Pump power includes engine driven jacket water and aftercooler water pumps. Engine brake power includes effects of pump power.
28. Total Jacket Water Circuit heat rejection is calculated as: (JW x 1.1) + (OC x 1.2) + (1AC x 1.05) + [0.764 x (1AC + 2AC) x (ACHRF - 1) x 1.05]. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.
29. Total Second Stage Aftercooler Circuit heat rejection is calculated as: (2AC x 1.05) + [(1AC + 2AC) x 0.238 x (ACHRF - 1) x 1.05]. Heat exchanger sizing criterion is maximum circuit heat rejection at site conditions, with applied tolerances. A cooling system safety factor may be multiplied by the total circuit heat rejection to provide additional margin.

ENGINE POWER (bhp):	1818	COOLING SYSTEM:	JW+OC+1AC, 2AC
ENGINE SPEED (rpm):	1800		
EXHAUST MANIFOLD:	DRY	JACKET WATER OUTLET (°F):	198

Free Field Mechanical and Exhaust Noise

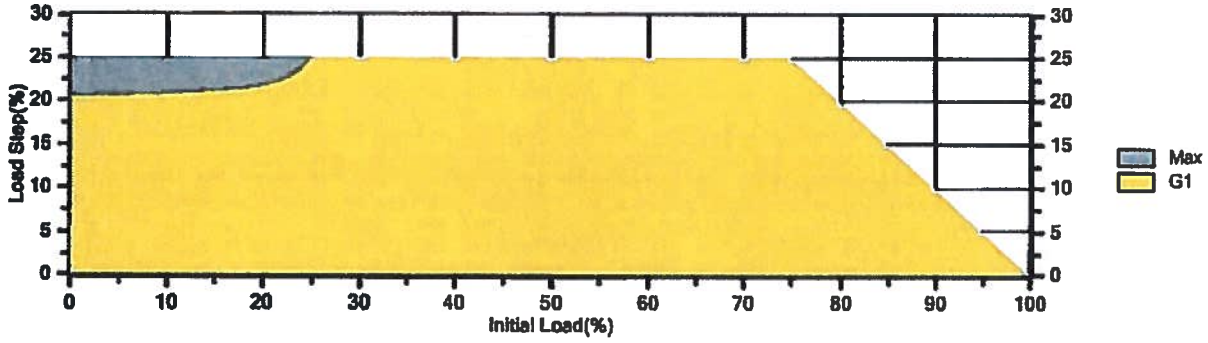
SOUND PRESSURE LEVEL (dB)										
			Octave Band Center Frequency (OBCF)							
100% Load Data			dB(A)	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Mechanical Sound	Distance from the Engine (ft)	3.3	109.3	64.7	81.4	87.8	94.9	98.1	95.4	93.9	105.2
		23.0	92.4	47.8	64.5	70.9	78	81.2	78.5	77	88.3
		49.2	85.8	41.2	57.9	64.3	71.4	74.6	71.9	70.4	81.7
Exhaust Sound	Distance from the Engine (ft)	4.9	112.1	70.5	105.3	90.6	92.1	91.7	98.5	100.2	99
		23.0	98.7	57.1	91.9	77.2	78.7	78.3	85.1	86.8	85.6
		49.2	92.1	50.5	85.3	70.6	72.1	81.7	78.5	80.2	79

SOUND PARAMETER DEFINITION:

Data Variability Statement:

Sound data presented by Caterpillar has been measured in accordance with ISO 6798 in a Grade 3 test environment. Measurements made in accordance with ISO 6798 will result in some amount of uncertainty. The uncertainties depend not only on the accuracies with which sound pressurelevels and measurement surface areas are determined, but also on the 'near-field error' which increases for smaller measurement distances and lower frequencies. The uncertainty for a Grade 3 test environment, that has a source that produces sounds that are uniformly distributed in frequency over the frequency range of interest, is equal to 4 dB (A-weighted). This uncertainty is expressed as the largest value of the standard deviation.

Load Acceptance



Transient Load Acceptance					
Load Step	Frequency Deviation +/- (%)	Voltage Deviation +/- (%)	Recovery Time (sec)	Classification as Defined by ISO 8528 - 5	Notes
25	+18/-16	+12/-12	20		
20	+9/-9	+9/-9	9	G1	2
15	+7/-7	+6/-6	7	G1	2
10	+5/-5	+3/-3	5	G1	2
5	+3/-3	+1/-1	5	G1	2
-5	+3/-3	+1/-1	5		
-10	+5/-5	+3/-3	5		
-15	+7/-7	+6/-6	7		
-20	+9/-9	+9/-9	9		
-25	+16/-16	+12/-12	20		
Breaker Open	+25/-25	+35/-35	40		1
Recovery Specification	+1.75/-1.75	+5/-5			
Steady State Specification	+1.25/-1.25	+5/-5			

Transient Information

The transient load steps listed above are stated as a percentage of the engine's full rated load as indicated in the appropriate performance technical data sheet. Site ambient conditions, fuel quality, inlet/exhaust restriction and emissions settings will all affect engine response to load change. Engines that are not operating at the standard conditions stated in the Technical data sheet should be set up according to the guidelines included in the technical data; applying timing changes and/or engine derates as needed. Adherence to the engine settings guidelines will allow the engines to retain the transient performance stated in the tables above as a percentage of the site derated power (where appropriate) Fuel supply pressure and stability is critical to transient performance. Proper installation requires that all fuel train components (including filters, shut off valves, and regulators) be sized to ensure adequate fuel be delivered to the engine. The following are fuel pressure requirements to be measured at the engine mounted fuel control valve.

a. Steady State Fuel Pressure Stability +/- .15 psi/sec
b. Transient fuel Pressure Stability +/- .15 psi/sec

Inlet water temperature to the SCAC must be maintained at specified value for all engines. It is important that the external cooling system design is able to maintain the inlet water temp to the SCAC to within +/- 1 °C during all engine-operating cycles. The SCAC inlet temperature stability criterion is to maintain stable inlet manifold air temperature. The Air Fuel Ratio control system requires up to 180 seconds to converge after a load step has been performed for NOx to return to nominal setting. If the stabilization time is not met between load steps the transient performance listed in the document may not be met. Differences in generator inertia may change the transient response of engine. Engine Governor gains and Voltage regulator settings may need to be tuned for site conditions. The time needed to start and stabilize at rated engine speed is a minimum of 60 seconds after a successful crank cycle. Engines must be maintained in accordance to guidelines specified in the Caterpillar Service Manuals applicable to each engine. Wear of components outside of the specified tolerances will affect the transient capability of the engine. Transient performance data is representative of a "Hot" (previously loaded or fully heat soaked) genset.

NOTES

1. For unloading the engine to 0% load from a loaded condition no external input is needed. The engine control algorithm employs a load sensing strategy to determine a load drop. In the event that the local generator breaker opens the strategy provides control to the engine that resets all control inputs to the rated idle condition. This prevents engine over speeding and will allow the engine to remain running unloaded at the rated synchronous speed.
2. The engines specified above have been tested against the voltage deviation, frequency deviation, and recovery time requirements defined in ISO 8528 - 5. At this time the engines stated above will meet class G1 transient performance as defined by ISO 8528 - 5 with exceptions.

SG100 | 9.0L | 100 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency

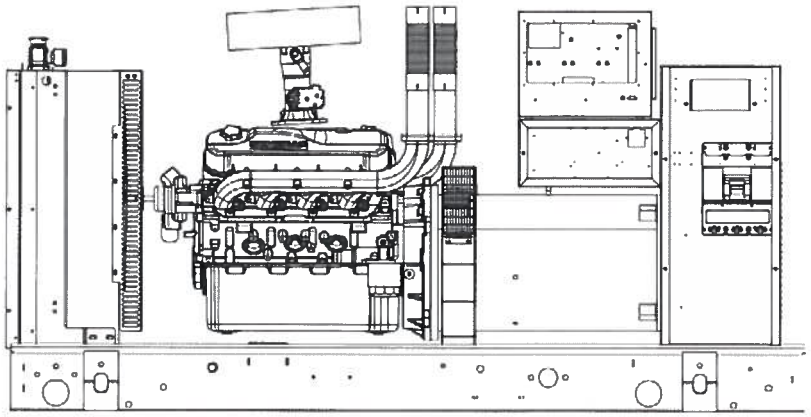
GENERAC | INDUSTRIAL POWER

STANDBY POWER RATING

100 kW, 125 kVA, 60 Hz

PRIME POWER RATING*

90 kW, 113 kVA, 60 Hz



*Built in the USA using domestic and foreign parts

*EPA Certified Prime ratings are not available in the U.S. or its Territories.

Image used for illustration purposes only

CODES AND STANDARDS

Generac products are designed to the following standards:

UL2200, UL508, UL142, UL498

NFPA70, 99, 110, 37

NEC700, 701, 702, 708

ISO9001, 8528, 3046, 7637, Pluses #2b, 4

NEMA ICS10, MG1, 250, ICS6, AB1

ANSI C62.41

IBC 2009, CBC 2010, IBC 2012, ASCE 7-05, ASCE 7-10, ICC-ES AC-156 (2012)

POWERING AHEAD

For over 50 years, Generac has led the industry with innovative design and superior manufacturing.

Generac ensures superior quality by designing and manufacturing most of its generator components, including alternators, enclosures and base tanks, control systems and communications software.

Generac's gensets utilize a wide variety of options, configurations and arrangements, allowing us to meet the standby power needs of practically every application.

Generac searched globally to ensure the most reliable engines power our generators. We choose only engines that have already been proven in heavy-duty industrial application under adverse conditions.

Generac is committed to ensuring our customers' service support continues after their generator purchase.

SG100 | 9.0L | 100 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

STANDARD FEATURES

ENGINE SYSTEM

General

- Oil Drain Extension
- Air Cleaner
- Fan Guard
- Stainless Steel flexible exhaust connection
- Factory Filled Oil & Coolant
- Radiator Duct Adapter (open set only)
- Critical Exhaust Silencer (enclosed only)

Fuel System

- Flexible fuel line - NPT Connection
- Primary and secondary fuel shutoff

Cooling System

- Closed Coolant Recovery System
- UV/Ozone resistant hoses
- Factory-Installed Radiator
- 50/50 Ethylene glycol antifreeze
- Radiator drain extension

Engine Electrical System

- Battery charging alternator
- Battery cables
- Battery tray
- Rubber-booted engine electrical connections
- Solenoid activated starter motor

ALTERNATOR SYSTEM

- UL2200 Genprotect ™
- Class H insulation material
- 2/3 Pitch
- Skewed Stator
- Brushless Excitation
- Sealed Bearings
- Amortisseur winding
- Full load capacity alternator

GENERATOR SET

- Internal Genset Vibration Isolation
- Separation of circuits - high/low voltage
- Separation of circuits - multiple breakers
- Wrapped Exhaust Piping
- Standard Factory Testing
- 2 Year Limited Warranty (Standby rated Units)
- 1 Year Warranty (Prime rated units)
- Silencer mounted in the discharge hood (enclosed only)

ENCLOSURE (IF SELECTED)

- Rust-proof fasteners with nylon washers to protect finish
- High performance sound-absorbing material (L1 & L2)
- Gasketed doors
- Stamped air-intake louvers
- Air discharge hoods for radiator-upward pointing
- Stainless steel lift off door hinges
- Stainless steel lockable handles
- Rhino Coat™ - Textured polyester powder coat

CONTROL SYSTEM

Control Panel

- Digital H Control Panel - Dual 4x20 Display
- Programmable Crank Limiter
- 7-Day Programmable Exerciser
- Special Applications Programmable PLC
- RS-232/485
- All-Phase Sensing DVR
- Full System Status
- Utility Monitoring
- Low Fuel Pressure Indication
- 2-Wire Start Compatible
- Power Output (kW)
- Power Factor
- kW Hours, Total & Last Run
- Real/Reactive/Apparent Power
- All Phase AC Voltage
- All Phase Currents
- Oil Pressure
- Coolant Temperature
- Coolant Level
- Engine Speed
- Battery Voltage
- Frequency
- Date/Time Fault History (Event Log)
- Isochronous Governor Control
- Waterproof/sealed Connectors
- Audible Alarms and Shutdowns
- Not in Auto (Flashing Light)
- Auto/Off/Manual Switch
- E-Stop (Red Mushroom-Type)
- NFPA110 Level I and II (Programmable)
- Customizable Alarms, Warnings, and Events
- Modbus protocol
- Predictive Maintenance algorithm
- Sealed Boards
- Password parameter adjustment protection
- Single point ground
- 15 channel data logging
- 0.2 msec high speed data logging
- Alarm information automatically comes up on the display

Alarms

- Oil Pressure (Pre-programmable Low Pressure Shutdown)
- Coolant Temperature (Pre-programmed High Temp Shutdown)
- Coolant Level (Pre-programmed Low Level Shutdown)
- Low Fuel Pressure Alarm
- Engine Speed (Pre-programmed Over speed Shutdown)
- Battery Voltage Warning
- Alarms & warnings time and date stamped
- Alarms & warnings for transient and steady state conditions
- Snap shots of key operation parameters during alarms & warnings
- Alarms and warnings spelled out (no alarm codes)

SG100 | 9.0L | 100 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

CONFIGURABLE OPTIONS

ENGINE SYSTEM

General

- O Engine Block Heater
- O Oil Heater
- O Air Filter Restriction
- O Stone Guad (Open Set Only)

Engine Electrical System

- O 10A & 2.5A UL battery charger
- O Battery Warmer

ALTERNATOR SYSTEM

- O Alternator Upsizing
- O Anti-Condensation Heater
- O Tropical Coating
- O Permanent Magnet Excitation

CIRCUIT BREAKER OPTIONS

- O Main Line Circuit Breaker
- O 2nd Main Line Circuit Breaker
- O Shunt Trip and Auxiliary Contact
- O Electronic Trip Breaker

GENERATOR SET

- O Gen-Link Communications Software (English Only)
- O Extended Factory Testing (3 Phase Only)
- O IBC Seismic Certification
- O 8 Position Load Center
- O 2 Year Extended Warranty
- O 5 Year Warranty
- O 5 Year Extended Warranty

ENCLOSURE

- O Standard Enclosure
- O Level 1 Sound Attenuation
- O Level 2 Sound Attenuation
- O Steel Enclosure
- O Aluminum Enclosure
- O 150 MPH Wind Kit
- O 12 VDC Enclosure Lighting Kit
- O 120 VAC Enclosure Lighting Kit
- O AC/DC Enclosure Lighting Kit
- O Door Alarm Switch

CONTROL SYSTEM

- O NFPA 110 Compliant
- O Remote Relay Board (8 or 16)
- O Oil Temperature Sender with Indication Alarm
- O Remote E-Stop (Break Glass-Type, Surface Mount)
- O Remote E-Stop (Red Mushroom-Type, Surface Mount)
- O Remote E-Stop (Red Mushroom-Type, Flush Mount)
- O Remote Communication - Bridge
- O Remote Communication - Ethernet
- O 10A Run Relay
- O Ground Fault Indication and Protection Functions

ENGINEERED OPTIONS

ENGINE SYSTEM

- O Coolant heater ball valves
- O Fluid containment pans

ALTERNATOR SYSTEM

- O 3rd Breaker Systems

CONTROL SYSTEM

- O Spare inputs (x4) / outputs (x4) - H Panel Only
- O Battery Disconnect Switch

GENERATOR SET

- O Special Testing
- O Battery Box

ENCLOSURE

- O Motorized Dampers
- O Intrusion Alert Door Switch
- O Ambient Heaters

RATING DEFINITIONS

Standby - Applicable for a varying emergency load for the duration of a utility power outage with no overload capability.

Prime - Applicable for supplying power to a varying load in lieu of utility for an unlimited amount of running time. A 10% overload capacity is available for 1 out of every 12 hours. The Prime Power option is only available on International applications. Power ratings in accordance with ISO 8528-1, Second Edition

SG100 | 9.0L | 100 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

APPLICATION AND ENGINEERING DATA

ENGINE SPECIFICATIONS

General

Make	Generac
Cylinder #	8
Type	V
Displacement - L (cu In)	8.9L (540)
Bore - mm (in)	114.23 (4.49)
Stroke - mm (in)	107.15 (4.25)
Compression Ratio	10.5:1
Intake Air Method	Naturally Aspirated
Number of Main Bearings	5
Connecting Rods	Forged
Cylinder Head	Cast Iron
Cylinder Liners	No
Ignition	High Energy
Piston Type	Aluminum Alloy
Crankshaft Type	Forged Steel
Lifter Type	Hydraulic Roller
Intake Valve Material	Steel Alloy
Exhaust Valve Material	Stainless Steel
Hardened Valve Seats	Yes

Engine Governing

Governor	Electronic
Frequency Regulation (Steady State)	±0.25%

Lubrication System

Oil Pump Type	Gear
Oil Filter Type	Full-flow sping-on cartridge
Crankcase Capacity - L (qts)	8.5 (8.0)

Cooling System

Cooling System Type	Pressurized Closed
Water Pump Flow -gal/min (l/min)	26 (98)
Fan Type	Pusher
Fan Speed (rpm)	2330
Fan Diameter mm (in)	558 (22)
Coolant Heater Wattage	1500
Coolant Heater Standard Voltage	120 V

Fuel System

Fuel Type	Natural Gas, Propane Vapor
Carburetor	Down Draft
Secondary Fuel Regulator	Standard
Fuel Shut Off Regulator	Standard
Operating Fuel Pressure (Standard)	11" - 14" H_2O
Operating Fuel Pressure (Optional)	7" - 14" H_2O

Engine Electrical System

System Voltage	12 VDC
Battery Charging Alternator	Standard
Battery Size	See Battery Index 0161970SBY
Battery Voltage	12 VDC
Ground Polarity	Negative

ALTERNATOR SPECIFICATIONS

Standard Model	390mm
Poles	4
Field Type	Revolving
Insulation Class - Rotor	H
Insulation Class - Stator	H
Total Harmonic Distortion	<5%
Telephone Interference Factor (TIF)	<50
Standard Excitation	Brushless
Bearings	Sealed Ball
Coupling	Direct Drive
Prototype Short Circuit Test	Yes
Voltage Regulator Type	Full Digital
Number of Sensed Phases	All
Regulation Accuracy (Steady State)	±0.25%

SG100 | 9.0L | 100 kW

INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

OPERATING DATA

POWER RATINGS

		Natural Gas	Propane Vapor
Single-Phase 120/240 VAC @1.0pf	100 kW	Amps: 417	Amps: 417
Three-Phase 120/208 VAC @0.8pf	100 kW	Amps: 347	Amps: 347
Three-Phase 120/240 VAC @0.8pf	100 kW	Amps: 301	Amps: 301
Three-Phase 277/480 VAC @0.8pf	100 kW	Amps: 150	Amps: 150
Three-Phase 347/600 VAC @0.8pf	100 kW	Amps: 120	Amps: 120

STARTING CAPABILITIES (sKVA)

sKVA vs. Voltage Dip

		480 VAC						208/240 VAC					
Alternator	kW	10%	15%	20%	25%	30%	35%	10%	15%	20%	25%	30%	35%
Standard	100	79	118	157	197	236	275	59	89	118	148	177	206
Upsize 1	130	116	174	232	290	348	406	87	131	174	218	261	305

FUEL CONSUMPTION RATES*

Natural Gas - ft³/hr (m³/hr)		Propane Vapor - ft³/hr (m³/hr)	
Percent Load	Standby	Percent Load	Standby
25%	391 (11.1)	25%	157.4 (4.5)
50%	669 (19.0)	50%	269.9 (7.6)
75%	904 (25.6)	75%	364.4 (10.3)
100%	1116 (31.6)	100%	449.8 (12.7)

* Fuel supply installation must accommodate fuel consumption rates at 100% load.

COOLING

		Standby
Air Flow (inlet air combustion and radiator)	ft³/min(m³/min)	5797 (164.2)
Coolant Flow per Minute	gal/min (l/min)	26 (98)
Coolant System Capacity	gal (l)	6.0 (22.7)
Heat Rejection to Coolant	BTU/hr	390,000
Max. Operating Ambient Temperature (before derate)	°F (°C)	122 (50)
Maximum Radiator Backpressure	in H_2O	0.5

COMBUSTION AIR REQUIREMENT

	Standby
Flow at Rated Power cfm (m³/min)	282 (7.9)

ENGINE

		Standby
Rated Engine Speed	rpm	1800
Horsepower at Rated kW**	hp	149
Piston Speed	ft/min	1275
BMEP	psi	125

** Refer to "Emissions Data Sheet" for maximum bHP for EPA and SCAQMD permitting purposes.

EXHAUST

		Standby
Exhaust Flow (Rated Output)	cfm (m³/min)	866 (24.5)
Max. Backpressure (Post Turbo)	inHg (Kpa)	1.5 (5.1)
Exhaust Temp (Rated Output - post silencer)	°F (°C)	1230 (666)
Exhaust Outlet Size (Open Set)	mm (in)	63.5 (2.5)

Deration – Operational characteristics consider maximum ambient conditions. Derate factors may apply under atypical site conditions. Please consult a Generac Power Systems Industrial Dealer for additional details. All performance ratings in accordance with ISO3046, BS5514, ISO8528 and DIN6271 standards.

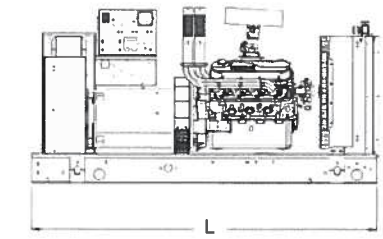
SG100 | 9.0L | 100 kW

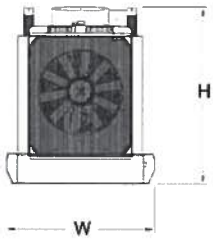
INDUSTRIAL SPARK-IGNITED GENERATOR SET

EPA Certified Stationary Emergency

GENERAC | INDUSTRIAL POWER

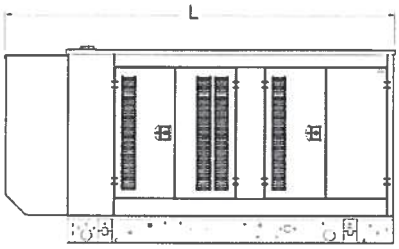
DIMENSIONS AND WEIGHTS*

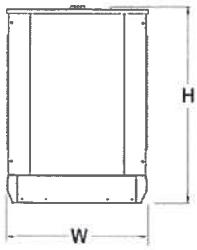




OPEN SET (Includes Exhaust Flex)

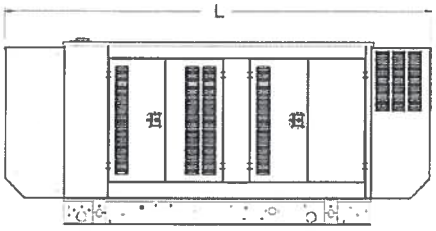
L x W x H in (mm)	94.2 (2394) x 40 (1016) x 47.5 (1206)
Weight lbs (kg)	2064 (936.2)

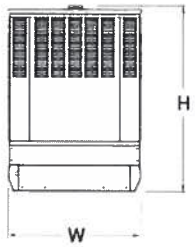




STANDARD ENCLOSURE

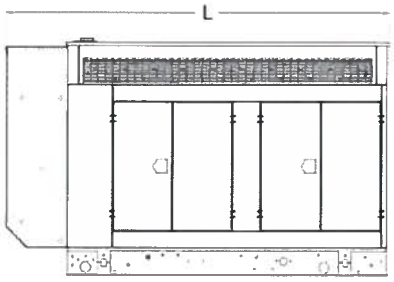
L x W x H in (mm)	111.79 (2839.5) x 40.46 (1027.8) x 56.18 (1427)
Weight lbs (kg)	Steel: 2708 (1228) Aluminum: 2413 (1094)

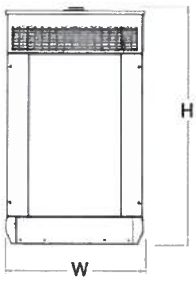




LEVEL 1 ACOUSTIC ENCLOSURE

L x W x H in (mm)	129.42 (3287.2) x 40.46 (1027.8) x 56.18 (1427)
Weight lbs (kg)	Steel: 2798 (1269.2) Aluminum: 2355 (1068)





LEVEL 2 ACOUSTIC ENCLOSURE

L x W x H in (mm)	111.81 (2840) x 40.46 (1027.8) x 68.61 (1742.8)
Weight lbs (kg)	Steel: 3022 (1370.8) Aluminum: 2431 (1103)

*All measurements are approximate and for estimation purposes only.

YOUR FACTORY RECOGNIZED GENERAC INDUSTRIAL DEALER

SPEC SHEET

6 OF 6

Specification characteristics may change without notice. Please consult a Generac Power Systems Industrial Dealer for detailed installation drawings.

Part No 0K4291
Rev. D 07/27/15

STATEMENT OF EXHAUST EMISSIONS
2015 SPARK-IGNITED, SCAQMD CERTIFIED

	Model	Engine	EPA Engine Family	Fuel	CAT Req'd	SCAQMD CEP #	EPA Cert #	Grams/bhp-hr.			Rated RPM	BHP	Fuel Flow (lb/hr)
								THC	NOx	CO			
Small Spark Ignited Engines - SSIE (SORE)	QTA25	2.4	FGNXB02.42NN	NG	No	NR	FGNXB02.42NN-005	2.14	2.37	93.95	1800	38.39	16.52
	QTA25	2.4	FGNXB02.42NL	LPG	No	NR	FGNXB02.42NL-006	1.43	4.38	86.18	1800	43.29	17.59
	SG035	5.4	FGNXB05.42L1	NG	Yes	530212	FGNXB05.42L1-019	0.38	0.22	0.64	1800	81.95	24.91
	SG035	5.4	FGNXB05.42L2	LPG	Yes	530215	FGNXB05.42L2-020	0.04	0.10	0.70	1800	81.70	29.13
	SG040	5.4	FGNXB05.42L1	NG	Yes	530212	FGNXB05.42L1-019	0.38	0.22	0.64	1800	81.95	24.91
	SG040	5.4	FGNXB05.42L2	LPG	Yes	530215	FGNXB05.42L2-020	0.04	0.10	0.70	1800	81.70	29.13
	SG045	5.4	FGNXB05.42L1	NG	Yes	530212	FGNXB05.42L1-019	0.38	0.22	0.64	1800	81.95	24.91
	SG045	5.4	FGNXB05.42L2	LPG	Yes	530215	FGNXB05.42L2-020	0.04	0.10	0.70	1800	81.70	29.13
	SG050	5.4	FGNXB05.42L1	NG	Yes	530212	FGNXB05.42L1-019	0.38	0.22	0.64	1800	81.95	24.91
	SG050	5.4	FGNXB05.42L2	LPG	Yes	530215	FGNXB05.42L2-020	0.04	0.10	0.70	1800	81.70	29.13
	SG050	6.8	FGNXB06.82L5	NG	Yes	470347	FGNXB06.82L5-025	0.21	0.02	0.19	1800	85.65	33.10
	SG050	6.8	FGNXB06.82L6	LPG	Yes	470347	FGNXB06.82L6-026	0.01	0.05	0.50	1800	85.92	34.14
	SG060	6.8	FGNXB06.82L5	NG	Yes	468721	FGNXB06.82L5-025	0.22	0.02	0.35	1800	99.58	37.58
	SG060	6.8	FGNXB06.82L6	LPG	Yes	468721	FGNXB06.82L6-026	0.01	0.01	0.76	1800	99.15	38.69
	SG070	6.8	FGNXB06.82L3	NG	Yes	470208	FGNXB06.82L3-023	0.20	0.04	0.49	1800	110.84	41.00
	SG070	6.8	FGNXB06.82L4	LPG	Yes	470208	FGNXB06.82L4-024	0.08	0.07	0.91	1800	112.42	42.35
	SG080	8.0	FGNXB08.02L1	NG	Yes	575822	FGNXB08.02L1-027	0.42	0.51	0.07	1800	125.69	39.76
	SG080	8.0	FGNXB08.02L2	LPG	Yes	575823	FGNXB08.02L2-028	0.04	0.13	0.30	1800	127.89	44.69
	SG080	9.0	FGNXB08.92L1	NG	Yes	543428	FGNXB08.92L1-029	0.38	0.76	0.41	1800	126.31	39.71
	SG080	9.0	FGNXB08.92L2	LPG	Yes	543429	FGNXB08.92L2-030	0.06	0.88	0.30	1800	126.40	44.34
Large Spark Ignited Engines (LSIE)	SG130 (DF)	6.8	FGNXB06.82C3	NG & LP	Yes	480473	FGNXB06.82C3-033	0.08	0.05	0.92	3000	193.49	72.31
	SG150 (DF)	6.8	FGNXB06.82C3	NG & LP	Yes	480069	FGNXB06.82C3-033	0.18	0.14	1.54	3600	231.00	91.34
	SG100	9.0	FGNXB08.92C1	NG	Yes	543423	FGNXB08.92C1-035	0.17	0.003	0.06	1800	148.90	46.86
	SG100 (LPF)	9.0	FGNXB08.92C1	NG	Yes	573274	FGNXB08.92C1-035	0.06	0.240	0.01	1800	156.00	43.83
	SG100 (DF)	9.0	FGNXB08.92C1	NG/LPV	Yes	543425	FGNXB08.92C1-035	0.30	0.400	0.79	1800	133.16	45.36
	SG100 (DF)	9.0	FGNXB08.92C1	NG/LPL	Yes	543424	FGNXB08.92C1-035	0.34	0.006	1.10	1800	135.75	45.47
	SG100	9.0	FGNXB08.92C2	LPV	Yes	543426	FGNXB08.92C2-036	0.03	0.08	0.13	1800	157.67	53.08
	SG100	9.0	FGNXB08.92C2	LPL	Yes	543427	FGNXB08.92C2-036	0.07	0.04	0.30	1800	156.15	54.47
	SG130,150	9.0	FGNXB08.92C3	NG	Yes	573276	FGNXB08.92C3-053	0.10	0.03	0.02	1800	230.30	71.97
	SG130,150 (DF)	9.0	FGNXB08.92C3	NG/LPV	Yes	573273	FGNXB08.92C3-053	0.10	0.03	0.02	1800	230.30	71.97
	SG130,150 (DF)	9.0	FGNXB08.92C3	NG/LPL	Yes	573271	FGNXB08.92C3-053	0.10	0.03	0.02	1800	230.30	71.97
	SG130, 150	9.0	FGNXB08.92C4	LPV	Yes	573267	FGNXB08.92C4-054	0.02	0.57	1.30	1800	230.30	75.43
	SG130, 150	9.0	FGNXB08.92C4	LPL	Yes	573269	FGNXB08.92C4-054	0.02	0.57	1.30	1800	230.30	75.43
	SG150	12.9	FGNXB12.92C2	NG	Yes	532838	FGNXB12.92C2-042	0.53	0.13	0.53	1800	307.87	107.99
	MG150	12.9	FGNXB12.92C2	NG	Yes	532839	FGNXB12.92C2-042	0.53	0.13	0.53	1800	307.87	107.99
	SG175	12.9	FGNXB12.92C2	NG	Yes	532838	FGNXB12.92C2-042	0.53	0.13	0.53	1800	307.87	107.99
	SG200	12.9	FGNXB12.92C2	NG	Yes	532838	FGNXB12.92C2-042	0.53	0.13	0.53	1800	307.87	107.99
	MG200	12.9	FGNXB12.92C2	NG	Yes	532839	FGNXB12.92C2-042	0.53	0.13	0.53	1800	307.87	107.99
	SG230	12.9	FGNXB12.92C2	NG	Yes	536816	FGNXB12.92C2-042	0.38	0.03	0.53	1800	379.10	125.30
	SG250	12.9	FGNXB12.92C2	NG	Yes	536816	FGNXB12.92C2-042	0.38	0.03	0.53	1800	379.10	125.30
	MG250	12.9	FGNXB12.92C2	NG	Yes	536816	FGNXB12.92C2-042	0.38	0.03	0.53	1800	379.10	125.30
	SG275	12.9	FGNXB12.92C3	NG	Yes	557131	FGNXB12.92C3-043	0.06	0.06	0.81	2150	477.00	164.20
	SG300	12.9	FGNXB12.92C3	NG	Yes	557131	FGNXB12.92C3-043	0.06	0.06	0.81	2150	477.00	164.20
	MG300	12.9	FGNXB12.92C3	NG	Yes	557132	FGNXB12.92C3-043	0.06	0.06	0.81	2150	477.00	164.20
	SG150,175,200	14.2L	FGNXB14.22C1	NG	Yes	575824	FGNXB14.22C1-047	0.08	0.05	0.39	1800	304.00	98.54
	SG230, 250	14.2L	FGNXB14.22C1	NG	Yes	575826	FGNXB14.22C1-047	0.08	0.05	0.39	1800	304.00	98.54
	SG275, 300	14.2L	FGNXB14.22C1	NG	Yes	575828	FGNXB14.22C1-047	0.04	0.02	0.23	1800	374.00	120.84
	MG150, 200	14.2L	FGNXB14.22C1	NG	Yes	575825	FGNXB14.22C1-047	0.04	0.02	0.23	1800	374.00	120.84
	MG250	14.2L	FGNXB14.22C1	NG	Yes	575827	FGNXB14.22C1-047	0.03	0.03	0.17	1800	460.00	142.87
	MG300	14.2L	FGNXB14.22C1	NG	Yes	575829	FGNXB14.22C1-047	0.03	0.03	0.17	1800	460.00	142.87
	SG350, 400	21.9	FGNXB21.92C1	NG	Yes	558477	FGNXB21.92C1-037	0.18	0.14	0.82	1800	636.00	201.17
	MG350, 400	21.9	FGNXB21.92C1	NG	Yes	558478	FGNXB21.92C1-037	0.18	0.14	0.82	1800	636.00	201.17
	SG350,400 (LPF)	21.9	FGNXB21.92C1	NG	Yes	573266	FGNXB21.92C1-037	0.18	0.14	0.82	1800	636.00	201.17
	MG350,400 (LPF)	21.9	FGNXB21.92C1	NG	Yes	573265	FGNXB21.92C1-037	0.18	0.14	0.82	1800	636.00	201.17

NR: Not Required

DF: Dual Fuel

LPF: Units with optional Low Pressure Fuel system

Refer to page 2 for definitions and advisory notes.

STATEMENT OF EXHAUST EMISSIONS
2015 SPARK-IGNITED, SCAQMD CERTIFIED

2015 EPA SPARK-IGNITED EXHAUST EMISSIONS DATA

Effective since 2009, the EPA has implemented exhaust emissions regulations on stationary spark-ignited (gaseous) engine generators for emergency applications. All Generac spark-ignited gensets, including SG, MG, QTA and QT series gensets, that are built with engines manufactured in 2009 and later meet the requirements of 40CFR part 60 subpart JJJJ and are EPA certified. These generator sets are labeled as EPA Certified with decals affixed to the engines' valve covers.

The attached documents summarize the general information relevant to EPA certification on these generator sets. This information can be used for submittal data and for permitting purposes, if required. These documents include the following information:

EPA Engine Family
The EPA Engine Family is assigned by the Manufacturer under EPA guidelines for certification purposes and appears on the EPA certificate.

Catalyst Required
Indicates whether an exhaust catalyst and Air/Fuel Ratio control system are required on the generator set to meet EPA certification requirements. Generally, units rated 80kW and smaller do not require a catalyst to meet EPA certification requirements. Please note that some units that do not require a catalyst to meet EPA requirements do need a catalyst if the California SCAQMD option is selected. Please see "California SCAQMD" below for additional information on this option.

Combination Catalyst or Separate Catalyst
SG and MG series generator sets typically utilize a single combination catalyst/silencer as part of meeting EPA certification requirements. Many QT and QTA series generator sets use the same engines as SG and MG series units, but have different exhaust configurations that require the use of conventional silencers with additional separate catalysts installed.

EPA Certificate Number
Upon certification by the EPA, a Certificate Number is assigned by the EPA.

Emissions Actuals -Grams/bhp-hr
Actual exhaust emission data for Total Hydrocarbons (THC), Nitrogen Oxides (NOx) and Carbon Monoxide (CO) that were submitted to EPA and are official data of record for certification. This data can be used for permitting if necessary. Values are expressed in grams per brake horsepowerhour; to convert to grams/kW-hr, multiply by 1.341. Please see advisory notes below for further information.

California Units, SCAQMD CEP Number
A separate low-emissions option is available on many Generac gaseous-fueled generator sets to comply with the more stringent South Coast Air Quality Management District requirements that are recognized in certain areas in California. Gensets that include this option are also EPA Certified.

General Advisory Note to Dealers
The information provided here is proprietary to Generac and its' authorized dealers. This information may only be disseminated upon request, to regulatory governmental bodies for emissions permitting purposes or to specifying organizations as submittal data when expressly required by project specifications, and shall remain confidential and not open to public viewing. This information is not intended for compilation or sales purposes and may not be used as such, nor may it be reproduced without the expressed written permission of Generac Power Systems, Inc.

Advisory Notes on Emissions Actuals

- The stated values are actual exhaust emission test measurements obtained from units representative of the generator types and engines described.
- Values are official data of record as submitted to the EPA and SCAQMD for certification purposes. Testing was conducted in accordance with prevailing EPA protocols, which are typically accepted by SCAQMD and other regional authorities.
- No emission values provided are to be construed as guarantees of emissions levels for any given Generac generator unit.
- Generac Power Systems reserves the right to revise this information without prior notice.
- Consult state and local regulatory agencies for specific permitting requirements.
- The emissions performance data supplied by the equipment manufacturer is only one element required toward completion of the permitting and installation process. State and local regulations may vary on a case-by-case basis and must be consulted by the permit applicant/equipment owner prior to equipment purchase or installation. The data supplied herein by Generac Power Systems cannot be construed as a guarantee of installability of the generator set.
- The emission values provided are the result of multi-mode, weighted scale testing in accordance with EPA testing regulations, and may not be representative of any specific load point.
- The emission values provided are not to be construed as emission limits.

Hurst BOILER & WELDING COMPANY, INC

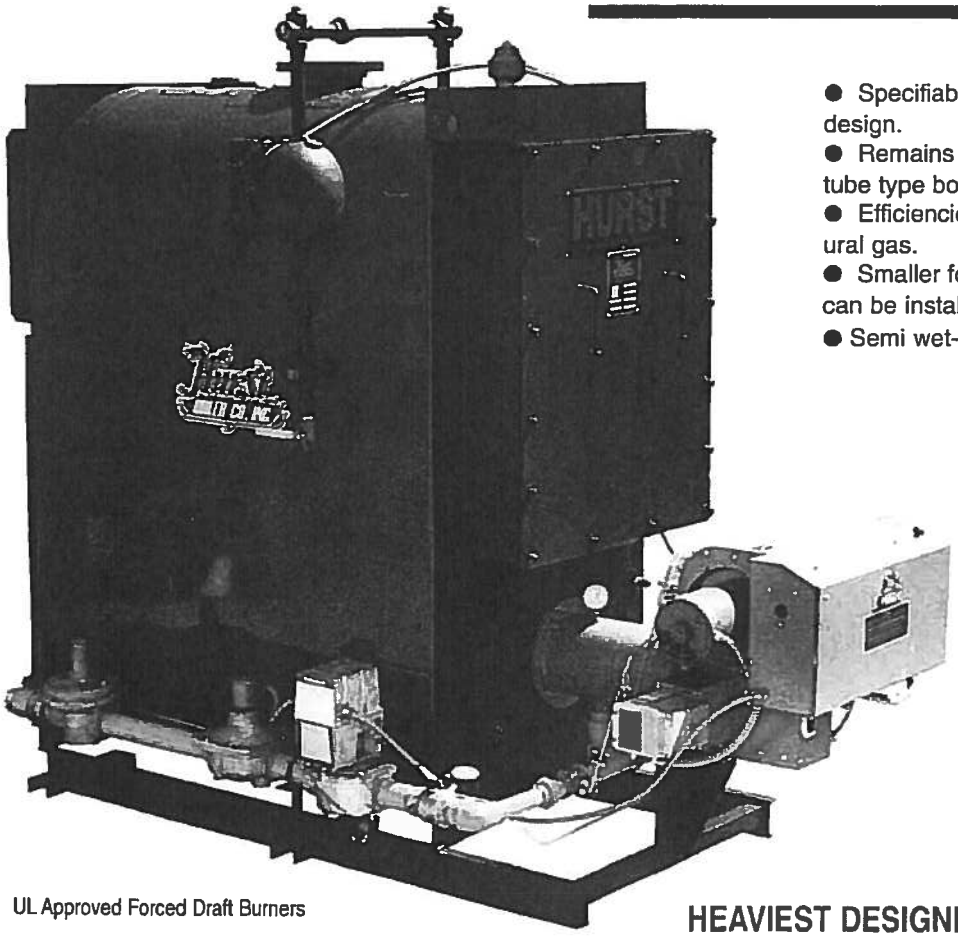
THREE PASS FIRETUBE HOT WATER BOILER

■ HURST "PERFORMANCE" BOILERS ■

LPW SERIES

THROUGH THE DOOR DESIGN!

Hot Water Applications



UL Approved Forced Draft Burners

- Specifiable using the attributes of the LPW design.
- Remains classified as a modified scotch, fire tube type boiler.
- Efficiencies tested in our lab at >83% on natural gas.
- Smaller foot print. As compared to the LPE, can be installed in tighter places.
- Semi wet-back construction

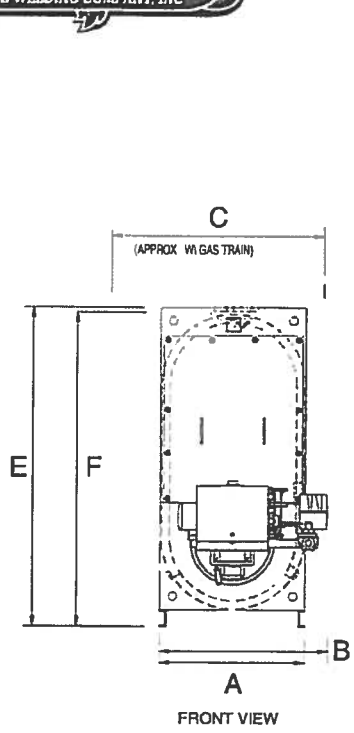
Capacities From 30 to 125 HP

30 PSI Water
[60 PSI Water Optional]

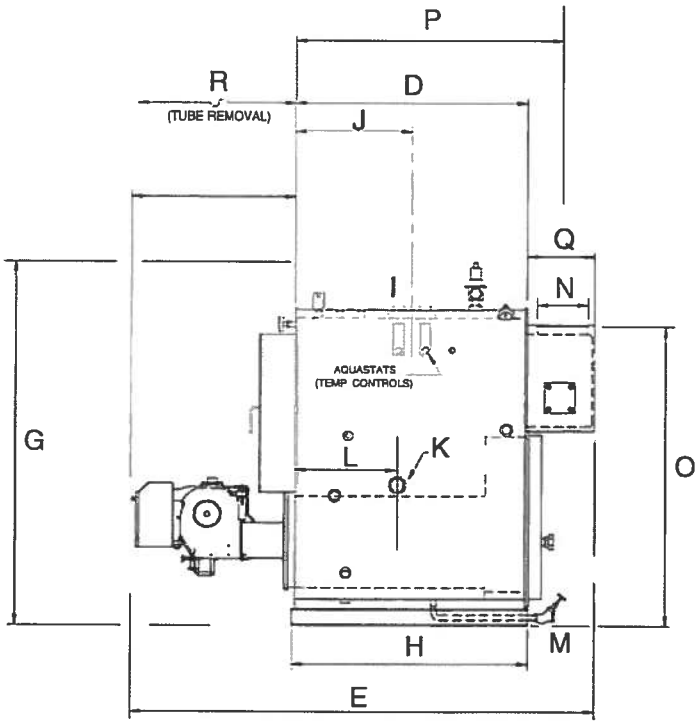
HEAVIEST DESIGNED BOILER IN ITS CLASS

Designed, constructed and stamped in accordance with the requirements of the ASME Boiler Codes.

Inspected and registered with the National Board of Boiler & Pressure Vessel Inspectors.



FRONT VIEW



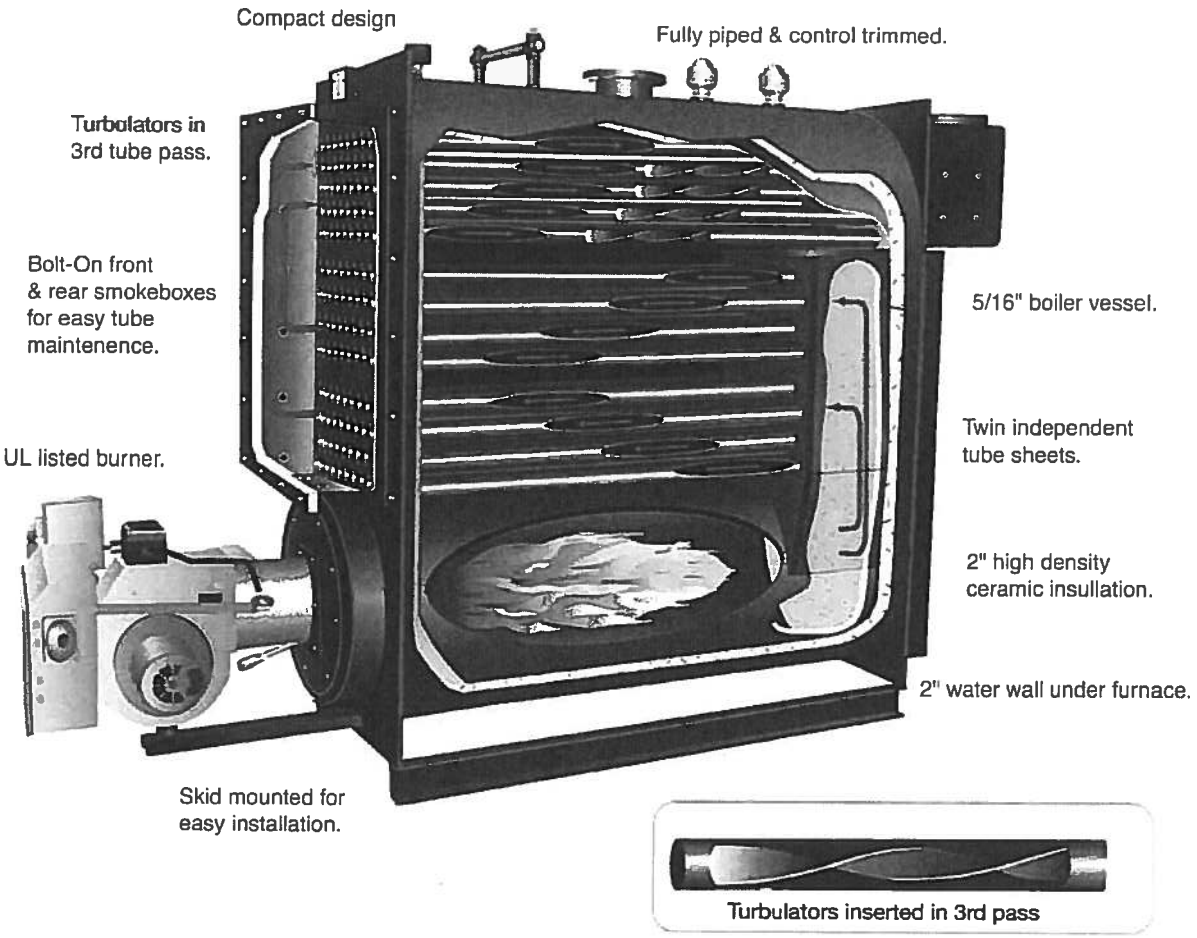
RIGHT SIDE VIEW

BOILER SPECIFICATIONS (ALL DIMENSIONS ARE IN INCHES)

DIMENSIONS SUBJECT TO CHANGE WITHOUT NOTICE. CERTIFIED DRAWINGS AVAILABLE UPON

	BOILER HORSEPOWER			30	40	50	60	70	80	100	125	
	HEATING SURFACE	FIRESIDE	SQ.FT.	120	160	200	240	280	320	400	500	
	MBH OUTPUT, HOT WATER			1004	1339	1674	2009	2343	2678	3348	4184	
	FIRING RATE, GAS	1,000 BTU	CFH	1260	1680	2100	2520	2940	3360	4200	5250	
	FIRING RATE, #2 OIL	140,000 BTU	GPH	9	12	15	18	21	24	30	37 1/2	
A	WIDTH WITHOUT TRIM		IN	31	31	31	34 1/2	34 1/2	3472	34 1/2	34 1/2	A
B	WIDTH WITH TRIM		IN	38	38	38	42	42	42	42	42	B
C	WIDTH WITH GAS TRAIN		IN	49	49	49	52	52	52	52	52	C
D	BOILER LENGTH		IN	37	49	61	55	67	79	91	106	D
E	OVERALL LENGTH	STD. BURNER	IN	86	98	114	111	123	140	152	169	E
F	SUPPLY HEIGHT		IN	71 1/2	71 1/2	71 1/2	76 5/8	76 5/8	76 5/8	76 5/8	76 5/8	F
G	HEIGHT WITH TRIM		IN	79	79	79	86	86	86	86	86	G
H	LENGTH OF SKID		IN	54	66	78	72	84	96	108	123	H
I	SUPPLY SIZE		IN	4	4	4	6	6	6	6	6	I
J	SUPPLY LOCATION		IN	18 1/2	24 1/2	30 1/2	27 1/2	33 1/2	39 1/2	45 1/2	50 1/2	J
K	RETURN SIZE		IN	4	4	4	4	4	4	4	4	K
L	RETURN LOCATION		IN	27 1/4	27 1/4	27 1/4	32	32	32	32	36	L
M	BOILER DRAIN SIZE		IN	1	1 1/4	1 1/4	1 1/4	1 1/2	1 1/2	1 1/2	1 1/2	M
N	STACK DIAMETER, O.D.		IN	10	10	10	12	12	12	12	14	N
O	STACK HEIGHT		IN	60 1/4	60 1/4	60 1/4	67 1/4	67 1/4	67 1/4	67 1/4	67 1/4	O
P	TO CENTER OF STACK		IN	6 7/8	6 7/8	6 7/8	8 1/4	8 1/4	8 1/4	8 1/4	9 1/4	P
Q	REAR SMOKEBOX DEPTH		IN	13 3/4	13 3/4	13 3/4	15 3/4	15 3/4	15 3/4	15 3/4	17 3/4	Q
R	TUBE PULL SPACE		IN	38	50	62	56	68	80	92	107	R
	SHIPPING WEIGHT		LBS	3150	3900	4500	4350	5100	5900	6600	7500	
	WATER CONTENT - WATER	FLOODED	GALS	135	185	240	250	310	390	430	500	
	BOILER HORSEPOWER			30	40	50	60	70	80	100	125	

CONNECTIONS FOUR INCHES AND SMALLER ARE FEMALE THREAD, 6" CONNECTIONS ARE 150 LB. FLANGES. * STUDDING FLANGE.



STANDARD EQUIPMENT

BOILER: Three pass design for 30 psi hot water (available for 60 psi water). Factory assembled with trim and, tested in accorance with ASME code, UL, and CSD-1 codes. Steel turbolators inserted in third pass for maximum heat-transfer control.

STANDARD BOILER TRIM: Kunkle safety relief valve, operating temperature control, high limit temperature control with manual reset, 3 1/2" combination pressure & temperature gauge, M&M 750 low water cut-off control with manual reset.

BURNER: UL listed with pre-piped, wired and factory tested forced draft power burners for:

- Natural Gas
- Propane (LP) Gas
- No. 2 (Diesel) Oil
- Combination Gas/Oil.

LPW SERIES

THREE PASS FIRETUBE
COMPACT BOILERS

■ HURST "PERFORMANCE" BOILER ■

- Factory Assembled, Prewired and Tested
- No Field Assembly Required
- UL Listed Boiler/Burner Packages
- Fully Assembled, Pre-piped, Prewired, Pressure Tested Gas Trains
- Complies with ASME, UL, CSD-1 and ASHRAE Standards
- High Efficiency, Low Stack Temperatures
- Customer Service Support Through National Network of Sales, Service, St Training and Parts by Factory Representatives

LPW BOILER FEATURES

Modified Scotch designed to fit through a standard 36" x 80" door opening
Up to 125 HP (4,184 mbh output).

The Hurst LPW "Performance" boiler is America's most heavily designed and built boiler in its class. Consider the features and specify the Hurst LPW Series.

1. A welded steel firetube boiler, the LPW has extra-heavy 13-gauge tubes for extended life. All tubes are attached to the tube sheets by rolling and flaring. There are no welded tubes in the LPW.

2. Thickest materials used in the industry . . .

   A. Boiler shell is 5/16" thick boiler plate 30-40 HP / 3/8" 50-125 HP.
   B. Twin boiler tube sheets are 1/2" thick boiler plate.
   C. Insulation is 2" ceramic wool and is lagged with 22-gauge boiler jacket.
   D. Extra heavy 4" channel iron boiler skids.

3. Designed to last with special industrial grade features . . .

   A. Couplings are 3,000 psi.
   B. Flanged, detachable front and rear smoke boxes.
   C. Brass nuts on front access panels, brass plugs in factory pre-piped crosses and tees on trim.

Hurst BOILER & WELDING COMPANY, INC

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