Dominion Resources Services, Inc.
5000 Dominion Boulevard, Glen Allen, VA 23060

Web Address: www.dom.com

September 16, 2015

BY: OVERNIGHT MAIL

Patrick Butler
Regional Supervisor
Raleigh Regional Office
NCDENR Division of Air Quality
Suite 101
3800 Barrett Drive
Raleigh, NC 27609

RE: Northampton Compressor Station
New Source Permit

Dear Mr. Butler:

Atlantic Coast Pipeline, LLC proposes to construct and operate the Atlantic Coast Pipeline, an approximately 556-mile-long interstate natural gas transmission pipeline system designed to meet growing energy needs in Virginia and North Carolina. Enclosed is an application for a new natural gas compressor station to be located in Northampton County, North Carolina. The Northampton Compressor Station will include the following equipment:

- Solar Taurus 70 combustion turbine;
- Solar Centaur 50L combustion turbine;
- Solar Centaur 40 combustion turbine;
- Caterpillar G3516 emergency generator;
- Boiler rated at 6.3 MMBtu/hr;
- Accumulator tank with a capacity of 2,500 gallons;
- Hydrocarbon waste tank with a capacity of 1,500 gallons;
- Aqueous ammonia storage tank with a capacity of 8,000 gallons;

SHADED AREA MUST GRADUALLY CHANGE FROM BLUE AT TOP TO GREEN AT BOTTOM

Atlantic Coast Pipeline
C/O Dominion
P.O. BOX 25459
Richmond, VA 23260-5459

Atlantic Coast Pipeline

66-156/531

Date: 09/09/2015
Check #: 000121
Vendor #: 300159136
Document #: 2000001303ACP1

Amount
$******50.00

VOID AFTER 90 DAYS

Pay Exactly **Fifty and 00/100 -US Dollars **

TO THE ORDER OF
NORTH CAROLINA STATE OF
ENVIRONMENT & NATURAL RESOURCES
DEPT OF RALEIGH REGIONAL OFFICE

Authorized Signer

WELLS FARGO BANK, N.A.

⑈0000000121⑈ ⑆053101561⑆80180159851⑈

MAILED
9/28/15

North Carolina Department of Environmental Quality

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

September 22, 2015

Ms. Leslie Hartz
VP Pipeline Construction
Northampton Compressor Station
707 E. Main Street
Richmond, VA 23219

SUBJECT: Receipt of Permit Application
Greenfield Facility
Application No. 6600169.15A
Northampton Compressor Station
Facility ID: 6600169, Pleasant Hill, Northampto

Dear Ms. Hartz:

Your air permit application (6600169.15A) for Northampton Compressor Station, located in Northampton County, North Carolina received by this Division on September 17, 2015 has been deemed to be incomplete. Your air permit application request must include the following items:

Local zoning and subdivision ordinances consistency determination:

Your application **did not** contain the complete request for consistency determination. Your application must include a copy of your written request for a "determination of consistency" with local government ordinances bearing the date of receipt entered by the clerk of each local government having jurisdiction. The following is a detailed explanation of the determination of consistency requirements, and includes a description of documentation that must be submitted with your application.

a. The permit applicant shall submit a signed statement listing any and all local governments having jurisdiction over any part of the land on which the facility and its appurtenances are to be located.

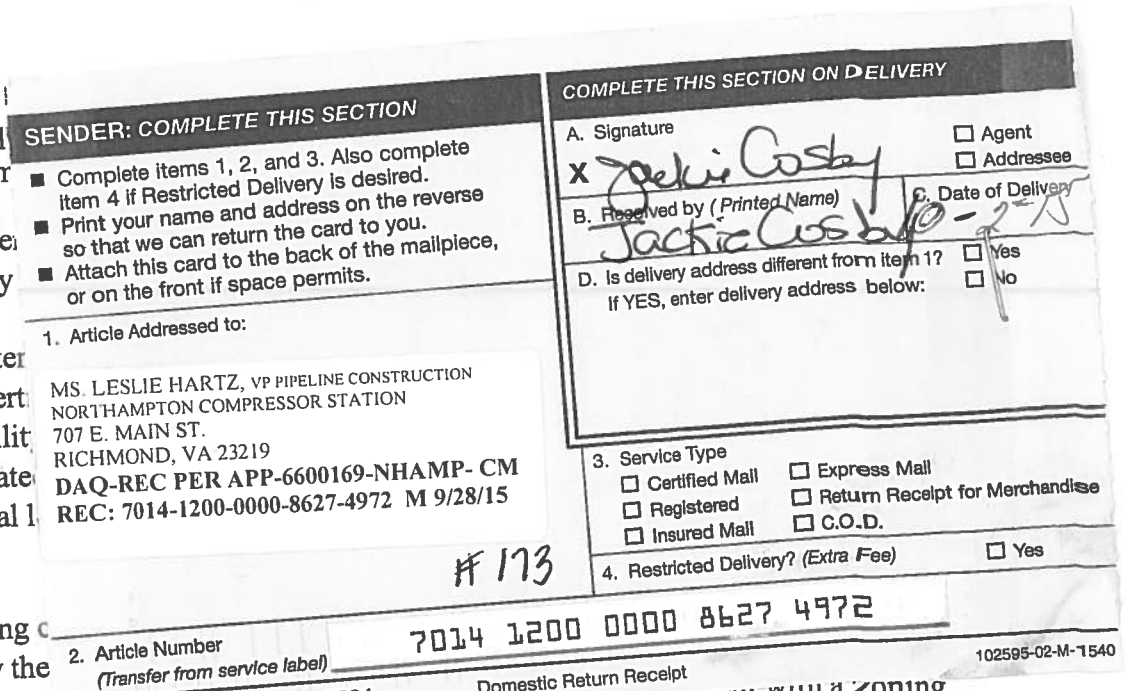
Raleigh Regional Office - Division of Air Quality
3800 Barrett Drive, Raleigh, North Carolina 27609
Phone: 919-791-4200 / FAX: 919- 881-2261
Internet: www.ncdenr.gov

b. The applicant is req
every local governm

c. The zoning consiste
shall include a copy

d. The zoning consiste
personally or by cert
letter from the facilit
the official designate
received transmittal l
Division.

e. The required zoning c
must be signed by the
determination. If the
or subdivision ordinance, a copy of such a determination shall be submitted to the applicant.


SENDER: COMPLETE THIS SECTION

■ Complete items 1, 2, and 3. Also complete item 4 if Restricted Delivery is desired.
■ Print your name and address on the reverse so that we can return the card to you.
■ Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

MS. LESLIE HARTZ, VP PIPELINE CONSTRUCTION
NORTHAMPTON COMPRESSOR STATION
707 E. MAIN ST.
RICHMOND, VA 23219
DAQ-REC PER APP-6600169-NHAMP- CM
REC: 7014-1200-0000-8627-4972 M 9/28/15

#173

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X Jackie Cosby
☐ Agent
☐ Addressee

B. Received by (Printed Name) Jackie Cosby
C. Date of Delivery 9-24-15

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Certified Mail ☐ Express Mail
☐ Registered ☐ Return Receipt for Merchandise
☐ Insured Mail ☐ C.O.D.

4. Restricted Delivery? (Extra Fee) ☐ Yes

2. Article Number (Transfer from service label) 7014 1200 0000 8627 4972

PS Form 3811, February 2004 Domestic Return Receipt 102595-02-M-1540

PE Seal Requirement:

The technical portion(s) of your application **was not** sealed by a North Carolina registered professional engineer (PE) as required by 15A NCAC 2Q.0112. You are required to re-submit the technical portion(s) of your application bearing the seal of a North Carolina PE.

Additional Requirements:
The Form A1 does not include the site address (911 Address) or zip code. Please include them in your response.

In summary, this application **did not** contain all the required elements as indicated above and has not been accepted for processing. This information must be submitted and contain the above requested information. The requested information must be submitted to our Office within thirty (30) days or the application may be terminated.

Should you have any questions concerning this matter, please contact Charles McEachern at 919-791-4200.

Sincerely,

for Patrick Butler, P.E., Regional Supervisor
Division of Air Quality, NCDENR

cc: Raleigh Regional Office Files

North Carolina Department of Environmental Quality

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

October 8, 2015

Kimberly Bose, Secretary
Federal Energy Regulatory Commission (FERC)
888 First Street, NE
Washington, D.C. 20426
Docket #: CP15-554-000

SUBJECT: Preliminary Assessment of Air Permit Application
Atlantic Coast Pipeline, LLC – Northampton Compressor Station
Pleasant Hill, NC, Northampton County, Facility ID No. 6600169
Project Docket #: CP15-554-000

Dear Kimberly Bose:

This letter is written in response to an air permit application received from the Subject facility on September 17, 2015 and the consequent State responsibilities under 18 CFR 385.2013 – Notification of requests for Federal authorizations and requests for further information (Rule 2013). The applicant has applied for an air permit for a natural gas compressor station which will be subject to Federal rules (NSPS Subparts JJJJ and KKKK, and NESHAP Subpart ZZZZ) for which the State of North Carolina has delegated authority. Pursuant to 18 CFR 385.2013(a), following are the initial observations for this application:

1) The application has not been accepted for processing due to the lack of a request for local zoning determination, a PE Seal, and site address. Please see the attached September 22, 2015 acknowledgment letter for further detail.
2) The attached acknowledgement letter requests the requested information be submitted within 30 days of receipt of the letter.
3) No studies are necessary in order to evaluate this request.
4) This application is processed under rule 15A NCAC 2Q .0312 which requires the North Carolina Division of Air Quality (NC DAQ) to complete the technical review of the application within 90 days of receipt of a complete application. It is anticipated this will result in air permit issuance by December 31, 2015.
5) There are no known Federal laws which set schedules for the NC DAQ to act.

If you have any questions or require further information please feel free to call me at 919-791-4276.

Sincerely,

Charles M. McEachern, III, P.E., Environmental Engineer
Division of Air Quality, NC DEQ

attachment
c: RRO files

Raleigh Regional Office
3800 Barrett Drive, Raleigh, North Carolina 27609
Phone: 919-791-4200 \ FAX: 919-881-2261 \ Internet: www.ncdenr.gov

North Carolina Department of Environmental Quality

MAILED
9/28/15

Pat McCrory
Governor

Donald R. van der Vaart
Secretary

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

September 22, 2015

Ms. Leslie Hartz
VP Pipeline Construction
Northampton Compressor Station
707 E. Main Street
Richmond, VA 23219

SUBJECT: Receipt of Permit Application
Greenfield Facility
Application No. 6600169.15A
Northampton Compressor Station
Facility ID: 6600169, Pleasant Hill, Northampton County

Dear Ms. Hartz:

Your air permit application (6600169.15A) for Northampton Compressor Station, located in Northampton County, North Carolina received by this Division on September 17, 2015 has been deemed to be incomplete. Your air permit application request must include the following items:

Local zoning and subdivision ordinances consistency determination:

Your application **did not** contain the complete request for consistency determination. Your application must include a copy of your written request for a "determination of consistency" with local government ordinances bearing the date of receipt entered by the clerk of each local government having jurisdiction. The following is a detailed explanation of the determination of consistency requirements, and includes a description of documentation that must be submitted with your application.

a. The permit applicant shall submit a signed statement listing any and all local governments having jurisdiction over any part of the land on which the facility and its appurtenances are to be located.

Raleigh Regional Office - Division of Air Quality
3800 Barrett Drive, Raleigh, North Carolina 27609
Phone: 919-791-4200 / FAX: 919- 881-2261
Internet: www.ncdenr.gov

b. The applicant is required to send a zoning consistency request determination to each and every local government entity identified by the applicant as stated above.

c. The zoning consistency request determination from the applicant to the local government shall include a copy of the draft permit application.

d. The zoning consistency request must be delivered to the clerk of the local government personally or by certified mail. Personal delivery should be evidenced by a transmittal letter from the facility stamped received by the local government, dated, and signed by the official designated by the government to make such a determination. The stamped received transmittal letter must be included in the permit application submitted to the Division.

e. The required zoning consistency determination in response to the request by the applicant must be signed by the official designated by the local government to make such a determination. If the local government states that the facility is inconsistent with a zoning or subdivision ordinance, a copy of such a determination shall be submitted to the applicant.

PE Seal Requirement:

The technical portion(s) of your application **was not** sealed by a North Carolina registered professional engineer (PE) as required by 15A NCAC 2Q.0112. You are required to re-submit the technical portion(s) of your application bearing the seal of a North Carolina PE.

Additional Requirements:
The Form A1 does not include the site address (911 Address) or zip code. Please include them in your response.

In summary, this application **did not** contain all the required elements as indicated above and has not been accepted for processing. This information must be submitted and contain the above requested information. The requested information must be submitted to our Office within thirty (30) days or the application may be terminated.

Should you have any questions concerning this matter, please contact Charles McEachern at 919-791-4200.

Sincerely,

for Patrick Butler, P.E., Regional Supervisor
Division of Air Quality, NCDENR

cc: Raleigh Regional Office Files

Zoning Consistency Determination

Facility Name	Northampton Compressor Station
Facility Street Address	Northampton County Parcel 0500230 to be further defined by survey. Address to be assigned associated with structures.
Facility City	Pleasant Hill Township
Description of Process	Natural gas transmission
SIC/NAICS Code	4922/486210
Facility Contact	William Scarpinato
Phone Number	804-273-3019
Mailing Address	5000 Dominion Boulevard
Mailing City, State Zip	Glen Allen, VA 23060

Based on the information given above:

- [x] I have received a copy of the air permit application (draft or final) AND...
  - [ ] There are no applicable zoning ordinances for this facility at this time
  - [ ] The proposed operation IS consistent with applicable zoning ordinances
  - [ ] The proposed operation IS NOT consistent with applicable zoning ordinances (please include a copy of the rules in the package sent to the air quality office)
  - [x] The determination is pending further information and can not be made at this time
  - [ ] Other: _____

Agency	Northampton County
Name of Designated Official	Kimberly L. Turner
Title of Designated Official	County Manager
Signature	Kimberley R. Turner
Date	10/22/15

Please forward to the facility mailing address listed above and the air quality office at the appropriate address as checked on the back of this form.

Dominion Resources Services, Inc.
5000 Dominion Boulevard, Glen Allen, VA 23060

Web Address: www.dom.com

Dominion

October 20, 2015

BY: OVERNIGHT MAIL

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

RE: Northampton Compressor Station
New Source Permit Application
Professional Engineer Seal

Dear Mr. McEachern:

As requested in letter from Patrick Butler dated September 22, 2015, enclosed is the professional engineer (PE) sealed portion of the application for the above reference project.

Should you have any questions or need additional in the formation, please feel free to contact William Scarpinato at (804) 273-3019 or via email at william.a.scarpinato@dom.com.

Sincerely,

Robert M. Bisha
Project Director, Atlantic Coast Pipeline
Dominion Environmental Services

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, Jeffrey Twaddle, attest that this application for Atlantic Coast Pipeline, LLC 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:	October 14, 2015
COMPANY:	ERM Southeast, Inc.
ADDRESS:	5000 Meridian Blvd., Ste. 300, Franklin, TN 37067
TELEPHONE:	615-656-7100
SIGNATURE:	
PAGES CERTIFIED:	Appendix A - Form C3 for CT-01-SCR & CT-01-OC, CT-02-SCR & CT-02-OC, and CT-03-SCR & CT-03-OC; Appendix C - Potential to Emit Calculations

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

PLACE NORTH CAROLINA SEAL HERE

APPENDIX A

NC DENR PERMIT APPLICATION FORMS

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

	NO_x	CO	VOC	Formaldehyde
POLLUTANT(S) COLLECTED:				
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 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 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

APPENDIX C

POTENTIAL TO EMIT CALCULATIONS

Table C-2 Potential Emissions From Combustion Sources

ACP Northampton Compressor Station - 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	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	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	9.2	14.8	0.834	0.894	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	1.29	1.29	1.29	3.18	26,718	1.92	0.671	26,966	3.02	0.286
Caterpillar G3516 Egen	1,416	hp	Natural Gas	0.312	0.295	0.0375	0.0003	0.0214	0.0214	0.0214	0.006	77.9	0.290	0	85.1	0	0.0143
Boiler	6.3	MMBtu/hr	Natural Gas	1.35	2.27	0.149	0.0162	0.0514	0.0514	0.0514	0.154	3246	0.0622	0.0595	3266	0	0.0511
Total (tons/yr)				47.7	66.8	3.08	3.10	5.3	5.3	5.3	13.07	111,317	8.15	2.78	112,350	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	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	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	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	1.29	1.29	1.29	3.18	26,718	1.92	0.671	26,966	3.02	0.286
Caterpillar G3516 Egen	1416	hp	Natural Gas	0.312	0.295	0.0375	0.0003	0.0214	0.0214	0.0214	0.006	77.9	0.290	0	85.1	0	0.0143
Boiler	6.3	MMBtu/hr	Natural Gas	1.35	2.27	0.149	0.0162	0.0514	0.0514	0.0514	0.154	3,246	0.0622	0.0595	3,266	0	0.0511
Total (tons/yr)				19.4	12.8	1.63	3.10	5.3	5.3	5.3	13.07	111,317	8.15	2.78	112,350	12.4	1.229

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 Northampton Compressor Station - 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	0.0400	3.66	0.0420	26.0	0.168	30.2
Solar Centaur 50L Turbine	6,200	hp	Natural Gas	100	0.0400	3.48	0.0400	23.5	0.160	27.5
Solar Centaur 40 Turbine	4,700	hp	Natural Gas	100	0.0350	3.22	0.0370	19.6	0.148	23.3
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	0.0550	4.67	0.0530	28.8	0.212	34.1
Solar Centaur 50L Turbine	6,200	hp	Natural Gas	100	0.0200	1.77	0.0200	10.9	0.0800	12.9
Solar Centaur 40 Turbine	4,700	hp	Natural Gas	100	0.0150	1.51	0.0170	9.05	0.0680	10.8
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	1891	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	0.081%	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 Northampton Compressor Station - 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	0.173	0.294	0.294	0.294	0.727	6100	0.439	0.153	6157	0.690
Solar Centaur 50L Turbine	Natural Gas	lb/hr	1.98	3.30	0.190	0.204	0.345	0.345	0.345	0.855	7145	0.516	0.180	7212	0.818
Solar Taurus 70 Turbine	Natural Gas	lb/hr	3.18	5.30	0.310	0.326	0.553	0.553	0.553	1.37	11411	0.826	0.288	11517	1.32

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		
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

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	0.700	64.4	0.740	392	2.96	466	0.300	30.2	0.340	181	1.36	215
Solar Centaur 50L Turbine	Natural Gas	lb/event	0.800	69.1	0.800	469	3.20	549	0.400	35.4	0.400	217	1.60	257
Solar Taurus 70 Turbine	Natural Gas	lb/event	0.800	73.1	0.840	519	3.36	603	1.10	93.4	1.06	575	4.24	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
Space & Water Heaters	Natural Gas	lb/MMscf	100	84	5.5	0.6	1.9	1.9	1.9	5.7	120000	2.3	2.2	120713	0.00
Engine 2 SLB	Natural Gas	lb/MMBtu	3.17	0.386	0.12	0.000588	0.0384	0.0384	0.0384	0.00991	110	1.45	0	146	0.00
1000 KW Caterpillar Egen	Natural Gas	lb/hp-hr	0.004408	0.004166	0.000529	4.62E-06	0.0003018	0.00030179	0.000302	7.79E-05	1.0998	0.0041	0	1	0.00

Notes

(1) NOx, CO, VOC, and PMF-10 Emission Factors for Boilers < 100 MMBtu from ETI Combustion Analysis June 2015

(2) All other emission factors for natural gas boilers taken from AP-42 Tables 1.4-1 & 1.4-2

(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) 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

(7) Assume PMF=PMF-10=PMF-2.5

(8) CO2e emission rate calculated by multiplying each GHG (CO2, CH4, N2O) by its Global Warming Potential (GWP) and adding them together

(9) CO2 GWP = 1; CH4 GWP = 25; N2O GWP = 298 [40 CFR 98]

Table C-6 Combustion Source HAP Emission Factors

ACP Northampton Compressor Station - Northampton County, North Carolina

Pollutant	HAP?	Emission Factors				
		Solar Centaur 40 Turbine	Solar Centaur 50L Turbine	Solar Taurus 70 Turbine	Boiler < 100 MMBtu	1000 KW Caterpillar Egen
		lb/MMBtu	lb/MMBtu	lb/MMBtu	lb/MMscf	lb/hp-hr
1,1,2,2-Tetrachloroethane	Yes					1.7E-07
1,1,2-Trichloroethane	Yes					1.3E-07
1,1-Dichloroethane	Yes					9.9E-08
1,2,3-Trimethylbenzene	No					9.0E-08
1,2,4-Trimethylbenzene	No					2.8E-07
1,2-Dichloroethane	Yes					1.1E-07
1,2-Dichloropropane	Yes					1.1E-07
1,3,5-Trimethylbenzene	No					4.6E-08
1,3-Butadiene	Yes					2.1E-06
1,3-Dichloropropene	Yes					1.1E-07
2,2,4-Trimethylpentane	Yes					2.2E-06
2-Methylnaphthalene	No				2.4E-05	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
Acenaphthylene	No				1.8E-06	8.1E-09
Acetaldehyde	Yes					2.0E-05
Acrolein	Yes					2.0E-05
Anthracene	No				2.4E-06	1.8E-09
Benz(a)anthracene	No				1.8E-06	8.5E-10
Benzene	Yes				2.1E-03	4.9E-06
Benzo(a)pyrene	No				1.2E-06	1.4E-11
Benzo(b)fluoranthene	No				1.8E-06	2.2E-11
Benzo(e)pyrene	No					6.0E-11
Benzo(g,h,i)perylene	No				1.2E-06	6.3E-11
Benzo(k)fluoranthene	No				1.8E-06	1.1E-11
Biphenyl	Yes					1.0E-08
Butane	No				2.1E+00	1.2E-05
Butyr/Isobutyraldehyde	No					1.1E-06
Carbon Tetrachloride	Yes					1.5E-07
Chlorobenzene	Yes					1.1E-07
Chloroethane	Yes					
Chloroform	Yes					1.2E-07
Chrysene	No				1.8E-06	1.7E-09
Cyclohexane	No					7.8E-07
Cyclopentane	No					2.4E-07
Dibenzo(a,h)anthracene	No				1.2E-06	
Dichlorobenzene	Yes				1.2E-03	
Ethane	No				3.1E+00	1.8E-04
Ethylbenzene	Yes					2.7E-07
Ethylene Dibromide	Yes					1.9E-07
Fluoranthene	No				3.0E-06	9.2E-10
Fluorene	No				2.8E-06	4.3E-09
Formaldehyde	Yes	2.9E-03	2.9E-03	2.9E-03	7.5E-02	1.4E-04
Hexane (or n-Hexane)	Yes				1.8E+00	1.1E-06
Indeno(1,2,3-c,d)pyrene	No				1.8E-06	2.5E-11
Isobutane	No					9.5E-06
Methanol	Yes					6.3E-06
Methylcyclohexane	No					8.6E-07
Methylene Chloride	Yes					3.7E-07
n-Nonane	No					7.8E-08
n-Octane	No					1.9E-07
Naphthalene	Yes				6.1E-04	2.5E-07
PAH	Yes					3.4E-07
Pentane (or n-Pentane)	No				2.6E+00	3.9E-06
Perylene	No					1.3E-11
Phenanthrene	No				1.7E-05	9.0E-09
Phenol	Yes					1.1E-07
Propane	No				1.6E+00	7.3E-05
Propylene Oxide	Yes					
Pyrene	No				5.0E-06	1.5E-09
Styrene	Yes					1.4E-07
Tetrachloroethane	No					
Toluene	Yes				3.4E-03	2.5E-06
Vinyl Chloride+A32	Yes					6.3E-08
Xylene	Yes					6.8E-07
Arsenic	Yes				2.0E-04	
Barium	No				4.4E-03	
Beryllium	Yes				1.2E-05	
Cadmium	Yes				1.1E-03	

Table C-6 Combustion Source HAP Emission Factors

ACP Northampton Compressor Station - Northampton County, North Carolina

Pollutant	HAP?	Emission Factors				
		Solar Centaur 40 Turbine	Solar Centaur 50L Turbine	Solar Taurus 70 Turbine	Boiler < 100 MMBtu	1000 KW Caterpillar Egen
		lb/MMBtu	lb/MMBtu	lb/MMBtu	lb/MMscf	lb/hp-hr
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 natural gas emergency generators taken from AP-42 Table 3.2-1
(4) Emission factors for Solar natural gas turbines and Caterpillar 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

Mceachern, Charles

From: Laurence A Labrie <laurence.a.labrie@dominionenergy.com>
Sent: Wednesday, August 02, 2017 9:24 AM
To: Mceachern, Charles
Cc: Andrew Woerner (andrew.woerner@erm.com); robert.sawyer@erm.com
Subject: FW: Northampton Compressor Station
Attachments: Northampton Application 07.31.17 - Updated Pages.pdf

Charles,

Attached pages from the application correct the emission factor error. Please let me know if you need any additional information.

Thanks,
Larry Labrie
Phone: 804-273-3075
Mobile: 804-347-9592

Dominion Energy

From: Robert Sawyer [mailto:Robert.Sawyer@erm.com]
Sent: Tuesday, August 01, 2017 9:44 PM
To: Laurence A Labrie (Services - 6)
Cc: Andrew Woerner
Subject: [External] RE: Northampton Compressor Station

Larry,

Please note that we have fixed the fugitive leaks emissions factor error in Table C-7.
The attached document includes the following replacement pages associated with this correction:

- Form B – Fugitive Leaks – Piping Source Information
- Form D1 – Facility-wide Emissions Summary
- Table C-7 – Potential Emissions from Fugitive Leaks
- Table C-9 – Project Potential Emissions

Let me know if you have any questions.

Robert Sawyer
Maryland & DC Area Manager

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ERM *The business of sustainability*

From: Laurence A Labrie [mailto:laurence.a.labrie@dominionenergy.com]
Sent: Friday, July 28, 2017 10:45 AM
To: Andrew Woerner; Robert Sawyer
Subject: Northampton Compressor Station

Got a question from Charles McEachern at NCDEQ about fugitive emission calculations. He said he check the source of the emission calculation procedure and determined that the emission factor units are in kilograms not pounds, which would increase emission value.

Larry Labrie
Phone: 804-273-3075
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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)
- ☐ 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)	EPA	0.177	0.776	0.177	0.776	0.177	0.776
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	0.010	0.044	0.010	0.044	0.010	0.044

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	0.010	0.241	88.0

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 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)	21.7	23.1	21.7
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	0.264	6.3	2,289		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	1.14	1.14	1.14
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.

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

Pipeline Natural Gas Fugitive Emissions

Equipment	Service	Emission Factor[1]	Source Count[2]	Total HC Potential Emissions		VOC Weight Fraction	VOC Emissions	CO_2 Weight Fraction	CO_2 Emissions	CH_4 Weight Fraction	CH_4 Emissions	HAP Weight Fraction	HAP Emissions
		kg/hr/source		lb/hr	tpy		tpy		tpy		tpy		tpy
Valves	Gas	4.50E-03	646	6.41	28.1	0.026	0.736	0.027	0.761	0.895	25.1	1.48E-03	0.042
Pump Seals	Gas	2.40E-03		0.000	0.000	0.026	0.000	0.027	0.000	0.895	0.000	1.48E-03	0.000
Others (compressors and others)	Gas	8.80E-03	3	0.058	0.255	0.026	0.007	0.027	0.007	0.895	0.228	1.48E-03	3.77E-04
Connectors	Gas	2.00E-04	1	4.41E-04	0.002	0.026	5.06E-05	0.027	5.24E-05	0.895	0.002	1.48E-03	2.86E-06
Flanges	Gas	3.90E-04	340	0.292	1.28	0.026	0.034	0.027	0.035	0.895	1.15	1.48E-03	0.002
Open-ended lines	Gas	2.00E-03		0.000	0.000	0.026	0.000	0.027	0.000	0.895	0.000	1.48E-03	0.000
			Total	6.76	29.6	-	0.776	-	0.803	-	26.5	-	0.044

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 (kg/hr/source) * Source Count * (2.2046 lb/1 kg)

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

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	-	-	0.776	-	-	-	-	-	0.803	26.5	-	663	-	0.044
Pipeline Liquids Tank	TK-1	-	-	0.145	-	-	-	-	-	-	-	-	-	-	-
Hydrocarbon (Waste Oil) Tank	TK-2	-	-	2.19E-05	-	-	-	-	-	-	-	-	-	-	-
Total (tons/yr)		19.2	31.0	21.7	3.10	5.29	5.29	5.29	13.1	111,697	679	2.77	129,495	12.4	2.33