Atlantic Coast Pipeline – Buckingham Compressor Station Air Permit Briefing

Virginia Department of Environmental Quality
Air and Renewable Energy Division
Buckingham County, Virginia
August 16, 2018
Agenda

• Meeting Purpose and Format
• Air Permit Program Overview
• Application Background
• Emission Units at the Site
• Best Available Control Technology (BACT) – Unit by Unit, Pollutant by Pollutant, State of the Art
• Air Quality Analysis (Modeling) – Protecting Human Health
• Public Comments, Hearing, Board Consideration
• Q&A
Purpose of Information Briefing

• Explain the air permitting process to assist the public’s ability to provide meaningful comments on the draft air permit

• Provide an overview of the DEQ draft air permit determination

• Provide an opportunity for public to ask questions

• Comments and questions discussed tonight WILL NOT be considered as formal comments and WILL NOT be part of the formal record
Meeting Format

• DEQ will explain the air permitting process and review the BCS draft permit

• After the presentation, DEQ will take questions from the audience

• Questions will be taken one at a time to allow everyone a chance to speak

• Please be respectful - Everyone is here to learn and to gain a better understanding of the process
Air Permit Process - Overview

• Source determines activity and location

• Siting of a facility is the responsibility of the Local Government – Zoning

• Source completes an application for a permit to construct and operate

• DEQ processes application for regulatory compliance
Air Permit Process – DEQ Review

• DEQ reviews application
  • Reviews type and quantity of pollutants emitted
  • Determines what federal and state regulations may apply
  • Reviews Best Available Control Technology
  • Reviews any necessary air quality analysis – Including approving a modeling protocol prior to any modeling being submitted
Air Permit Process – DEQ Review (cont’d)

• DEQ reviews application
  • Ensures monitoring, recordkeeping and reporting to assure compliance

• DEQ drafts permit documents
  • Holds public comment period if required
  • Holds public hearing if required
BCS Application Background

• Application initially received in 2015
  • FERC process requires early submittal

• Local Government Approval (Buckingham County Board of Supervisors Special Permit) - February 2017

• Application substantially updated in 2017

• DEQ requested clarifications and updates – July 2018 final submittal – Application determined to be complete
Compressor Turbines

• Burn Natural Gas with air

• Hot air pushes through blades to spin shaft

• Rotation of shaft turns compressor fan blades

• Fan blades push natural gas down the pipe
Turbine Operations

• Burning Natural Gas creates by-products of combustion
  • Mainly nitrogen oxides (NOx) and carbon monoxide (CO)
  • Particulates (PM10, PM2.5), volatile organic compounds (VOC) and formaldehyde are emitted in smaller quantities

• Routine Operations
  • Startup
  • Shutdown
  • Less than 0°F
  • Steady-State (normal)
Control Technology Overview

• NOx – Selective Catalytic Reduction (SCR)

• CO, VOC, Formaldehyde – Oxidation catalyst

• A catalyst changes time and temperature range of reaction

• SCR – Adds ammonia to the stream to react with NOx
SCR Overview

NOx in Turbine Exhaust

Ammonia (NH₃)

SCR

Catalyst Bed Layers

Nitrogen & Water Out
BACT - Turbines

• The proposed air permit does not specify a control efficiency for the SCR or the oxidation catalyst, but requires an emission standard of 3.75 ppm NOx, 2 ppm CO, and 1.25 ppm VOC.

• **Performance testing** ensures that the emission standards are met, and establishes the flow rate of ammonia.

• On-going monitoring of temperatures and ammonia flowrate
Natural Gas Emissions

• Natural gas contains:
  • Volatile organic compounds (2.6%)
  • Hexane (0.16%)
  • Methane (88%)

• Natural gas is emitted by the following mechanisms:
  • Equipment Leaks
  • Emissions from line cleaning operations – pigging
  • Emissions from start-up and shutdown of compressor turbines
  • Emissions from emergency system testing
Equipment Leaks

• Piping connection points
  • Valves
  • Pumps
  • Flanges

• Minimize by on-going inspection and repair
  • Leak detection and repair (LDAR)
BACT - Equipment Leaks

• Daily Audio, Visual, Olfactory (AVO)
• Quarterly Leak Detection and Repair Survey
  • Uses camera to see leaks

• [https://www.youtube.com/watch?v=62SEYQ5ecKI](https://www.youtube.com/watch?v=62SEYQ5ecKI)

• Fix leaks as quickly as possible – Potential penalties if leaks are not fixed within a specified timeframe
BACT - Pigging operations

• Pig – essentially squeegee style operation

• Uses natural gas pressure to push

• Pig pushes any liquids to collection point

• Emissions from putting the pig in the pipe (launching) and taking it out (receiving)

• Minimize number of events
Compressor Start-up and Shutdown

• Turbines do not run continuously

• Work on compressor may require opening of piping

• If turbine shutdown dry seals usually stop operating

• Shutdown venting requires start-up purge to get rid of oxygen
Compressor Case
BACT – Compressor Start-up and Shutdown

• Use Vent Gas Reduction System (VGRS)
BACT – Compressor Start-up and Shutdown (cont’d)

• Minimize Number of Vented Shutdowns

• Minimize Pressure in Compressor Case

• On-going monitoring of VGRS pressures
BACT - Emergency Shutdown System Testing

• Test of System for Emergency Situations
• Opening emergency valve during test vents natural gas
• Testing required once per year (PHMSA)

• “Capping” blocks pipe after the emergency valve
• Tests valve with little vented natural gas
# BACT COMPARISON

<table>
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<tr>
<th>Pollutant/Process</th>
<th>Buckingham Proposed</th>
<th>Buckingham</th>
<th>West Virginia</th>
<th>North Carolina</th>
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<tr>
<td>NOx</td>
<td>5 ppm</td>
<td>3.75 ppm</td>
<td>5 ppm</td>
<td>25 ppm</td>
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<td>CO</td>
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<td>2 ppm</td>
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<tr>
<td>VOC</td>
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<tr>
<td>ESD Methane</td>
<td>2,012 tpy (CO₂e)</td>
<td>0.125 tpy (CO₂e)</td>
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<td>No limit</td>
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<td>ESD VOC</td>
<td>2.4 tpy</td>
<td>0.00016 tpy</td>
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<td>ESD Hexane</td>
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<td>No limit</td>
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<td>SU/SD Methane</td>
<td>52,195 tpy (CO₂e)</td>
<td>216 tpy (CO₂e)</td>
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<td>0.02 tpy</td>
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Air Quality Analysis - Modeling

• National Ambient Air Quality Standards (NAAQS)
  • Health-based Concentrations
  • Rules for Entire United States

• A variety of averaging times depending on pollutants
  • As short as 1 hour
  • As long as 1 year

• Buckingham currently meets all standards
Modeling Results

• Background values are based on measured air concentrations
  • Higher population
  • Higher emissions from vehicles and other sources

• Emissions from BCS
  • Worst-case emissions
  • Analyzed multiple operational scenarios
  • Dependent on pollutant and averaging time
Modeling Results (cont’d)

• The following NAAQS were modeled following EPA procedures:
  • 1-hour NO₂
  • Annual NO₂
  • 1-hour CO
  • 8-hour CO
  • 24-hour PM2.5
  • Annual PM2.5
  • 24-hour PM10
  • 8-hour ozone

• All results are less than the applicable NAAQS
Air Toxics Air Quality Analysis

• Virginia Regulation for “toxic pollutants”

• Significant Ambient Air Concentration (SAAC)
  • Health-based standard
  • 1-hour and annual standards
  • Dependent on pollutant impact

• Emissions from BCS
  • Worst-case emissions
  • Analyzed multiple operational scenarios
Air Toxics Modeling Results

• The following standards were modeled:
  • 1-hour formaldehyde
  • Annual formaldehyde
  • 1-hour hexane

• Modeled impacts are less than SAAC
Purpose of Public Comment Period

• Provide an opportunity for interested parties to comment on the draft air permit

• Refine and improve draft air permit documents as necessary based on information received during comment period

• Ensure air permit properly implements all applicable regulatory requirements and meets all federal and state air quality standards
Air Pollution Control Board Consideration

• Director has determined permit will be directly considered by the Board

• Public hearing is **NOT** a meeting of the Board – a Board member will be serving as the Hearing Officer

• Board will take final action at a meeting to be scheduled in late October/early November timeframe – Date will be announced as soon as available

• Board will take into consideration all documents associated with the permit including the response to comments document prepared by DEQ based on comments received during the 30-day comment period and public hearing
Steps before Board Consideration

• Public Comment Period - Comments received between August 8\textsuperscript{th} and September 11\textsuperscript{th} including comments at the public hearing
• DEQ reviews, considers, and responds to all public comments
• DEQ makes any necessary changes to permit documents
• DEQ proposes final draft permit to Board
• Public commenters may address Board
  • \textbf{No new information may be presented at the meeting}
  • \textbf{Only people who comment during the formal comment period may provide comment at the Board meeting}
• Board will take final action
Q&A Reminders

• Purpose is to gain a better understanding of the process

• Questions should pertain to the air quality permit

• Questions will be taken one at a time to allow everyone a chance to speak

• Comments and questions discussed tonight WILL NOT be considered as formal comments and WILL NOT be part of the formal record