McCann, Eric (Health)

From: John Green <john.green@lipscomb.edu>
Sent: Wednesday, October 25, 2017 8:36 AM
To: Finke, John (Health)
Subject: CGT - public commen

Dear Mr. Finke,

Thanks for your service taking a few minutes to read.

I am a ***very*** concerned citizen living in SE Nashville about the compressor station being proposed, and more than likely being built right in our backyard.
This is wrong on SO many levels. To put this station in a highly densely populated area is absolutely asinine, and shows no respect or concern for the people living there. A few more miles down the road there is a tremendously less dense population, however, **it is a known fact the SE Nashville gets dumped on**. I am going to get to health issues in a minute, but first I would like to say there is no economic value in this station for Nashville as well.

As it has been explained to us, this station simply gives the gas a boost to get to the coast to be shipped outside the United States. It is becoming more evident everyday that the little man in the lower social-economic status of SE Nashville can not defeat this. Big business wins again, sadly it is not even Davidson County big business. ***So please push for the following so we can at least have cleaner air to breath.***

As I have been informed, the following,would at least help.

One, eliminate all emissions from this station by **demanding** it be run electronically. The gas company can more than afford it, and it at least shows a concern for us living here. We have to have our cars go through emissions for public health, why can't big business who is building the station have it run electronically? They can they just don't want their profits cut. I know you know this. They will still make plenty of money and we can have cleaner air.

Two, in order to have cleaner ground level ozone, please make the company use turbines the emit 9 ppm NOx rather than 15 ppm, which is the present plan for TransCanada. Go to "TransCanda" home page, the following is copied and pasted from their home page.

Delivering energy responsibly

Make them put their money where there mouth is, if they are going to deliver this energy to the coast quicker, they need to be more responsible to the people who will be breathing the air at the booster station.

Finally, as I type this the air quality in Nashville is 25. (https://airnow.gov/index.cfm?action=airnow.local_city&cityid=180). Very safe, good for us! Please demand also, if the air quality is above 150, the booster station has to be shut down. There is not a valid reason why this should not happen, again, it is a "booster station," gas will still get to the coast to be shipped elsewhere. It will just take a few minutes longer to get there, but it will help those who have to live with the station.

Thanks again for your service and reading this. The MPHD mission is copied below.

The mission of the Metro Public Health Department is to protect, improve, and sustain the health and well-being of all people in Metropolitan Nashville.

"People Creating Healthy Conditions Everywhere"

Please help us, you are our voice, thank you!

John Green

McCann, Eric (Health)

From: Justin Verted <justinverted@gmail.com>
Sent: Wednesday, October 25, 2017 1:38 PM
To: Finke, John (Health)
Subject: Natural Gas Compressor Station

I live just on the edge of Antioch and many of my friends and family live in Antioch. PLEASE STOP the natural gas compressor station from being built in the Antioch neighborhood of Cane Ridge!
Its construction will impact all of the Nashville area air quality negatively and if you truly care about the health of Nashville citizens and our natural lands, you will do everything you can to end this project.

Sincerely,
Justin Henderson

McCann, Eric (Health)

From: McKenzie Sintic <mckenzie.sintic@gmail.com>
Sent: Wednesday, October 25, 2017 2:28 PM
To: Finke, John (Health)
Subject: Stop the natural gas compressor from being built in Antioch!!

John Finke,

I grew up in Antioch and it is home to many friends and family, so STOP the natural gas compressor station from being built in the Antioch neighborhood of Cane Ridge!
Destroying forty acres of pristine forest for this air polluting project IS NOT OK and will impact all of the Nashville area air NEGATIVELY by sending FRACKED gas to the coast to be exported to other countries.

This unsustainable practice IS NOT WORTH IT for ANYONE.

McCann, Eric (Health)

From: Micah Judd <micahmjudd@gmail.com>
Sent: Wednesday, October 25, 2017 10:18 AM
To: Finke, John (Health)
Subject: natural gas compressor station in Antioch

Dear Mr. Finke,

It is my understanding that 40 acres of forest will be cleared for supplying natural gas to consumers.
Would you support the use of energy options that support and replenish the Earth that we inhabit, rather than options like this that steal from nature to feed the heady appetite of mankind...?
I wish to support any measures that nurture us as a whole, from the ground below our feet to the air above our crowns.
From a native Tennessean whose surrogate mother was, and is, this beautiful land.

Sincerely,
Micah Judd

McCann, Eric (Health)

From: Nate Lee <nate@thenatelee.com>
Sent: Wednesday, October 25, 2017 5:25 PM
To: Finke, John (Health)
Subject: CGT - public comment

I am writing in regards to the proposed compressor station on Barnes Rd. in the Cane Ridge ares. I urge you to please require that the station be powered electrically to eliminate emissions. I also ask that you require the use of Titan 130 turbines which would reduce NOx emissions by 40%. NOx is a major solution and threatens our ground level ozone, which is a huge respiratory hazard. I also ask that you require the facility to shut down when the Air Quality Index is in the Orange, Red, or higher alert status in order to protect Nashville's citizens from hazardous pollution.

Thank you.

Nathanael Lee
Cane Ridge, TN

McCann, Eric (Health)

From: Pamela Hunt <pamela@midwiferyworkshops.org>
Sent: Wednesday, October 25, 2017 8:06 AM
To: Finke, John (Health)
Subject: Gas lines through Tennessee and Nashville

Hello John Finke,
This is to ask you to please stop and not permit TransCanada from pushing gas through the Columbia Pipeline running through Nashville and past us to take gas to export through LA/TX ports. This gas is not for our good and will only cause danger and pollution to our state and the people who live here.
I represent many friends who feel the same as I do.
Thank you for your service

Pamela Hunt, C.P.M.
The Farm Midwifery Center
Midwifery Workshop Program Director
P.O. Box 217
Summertown,TN 38483
931-964-2257
pamela@miwiferyworkshops.org
www.midwiferyworkshops.org

McCann, Eric (Health)

From: Patricia McCarthy <mccarthp43@gmail.com>
Sent: Wednesday, October 25, 2017 8:27 AM
To: Finke, John (Health)
Subject: Pipe line

I am opposed to the pipeline coming through TN. None of the gas will come to us.
I do not want TN polluted by oil, and it always happens at some point. Please vote NO on the pipeline

Sent from my iPad

McCann, Eric (Health)

From: Patricia Miller <plantatree@comcast.net>
Sent: Wednesday, October 25, 2017 3:27 PM
To: Finke, John (Health)
Cc: fbedne@gmail.com
Subject: Opposition to the issuance of a Part 70 Operating (Title V) permit to Columbia Gulf Transmission, LLC

Mr. John Finke, Director
Metro Public Health Department
Pollution Control Division
2500 Charlotte Avenue
Nashville, Tennessee 37209

Re: Columbia Gulf Transmission, LLC application for Part 70 Operating (Title V) permit

Dear Director Finke,

As a Cane Ridge resident, I am writing to voice my opposition to the issuance of a Part 70 Operating (Title V) permit on behalf of Columbia Gulf Transmission, LLC and to strongly encourage your denial of the application.

If approved, this extensive project would include significant emission sources consisting of two turbines, an emergency generator and fugitive emissions – all within our Cane Ridge community in Davidson County, Tennessee. If permitted, these sources would have a direct and negative impact on the surrounding community and upon well-being of all residents.

Although I strongly believe no permit should be issued at all, I would like to offer what I and others in the community have determined to be the only acceptable alternative to the opposed gas-powered gas compressor station, which would be the construction of an entirely electric-powered gas compressor station.

An electric-powered station would eliminate all air emissions and greatly reduce noise pollution, which is the only acceptable alternative for a large station in the midst of this highly-populated urban area. There would also be much-reduced danger in the event of a tornado or other natural disaster. The proposed gas compressor station will offer virtually no benefit in employment or gas availability to Nashville, and if built at all, it must be done in a manner that is least harmful to the health and well-being of our community. As a regular user of Mill Creek Park and Greenway, I know that the health and outdoor experience of us Greenway users would be much less impacted by an electric compressor station.

For these reasons, I implore you to deny Columbia Gulf Transmission, LLC's application for a Part 70 Operating (Title V) permit as presented, and to either deny the permit, or if that is not an option, to only permit an entirely electric station. We of the the Cane Ridge community have strongly conveyed our concerns and disapproval. I respectfully ask you to consider the health, environmental, and residential implications of the requested permit. I thank you for your time and attention.

Sincerely,

Patricia Miller
13566 Old Hickory Blvd.
Cane Ridge, TN 37013

Sent from my iPad

McCann, Eric (Health)

From: Rachel Gilleland <rachel.gilleland@gmail.com>
Sent: Wednesday, October 25, 2017 12:26 PM
To: Finke, John (Health)
Subject: STOP the natural gas compressor in Antioch

This must stop as it is unhealthy for the neighbors and Nashville!

Sent from my iPhone

McCann, Eric (Health)

From: Sir Nicholas <spiritualtesting123@gmail.com>
Sent: Wednesday, October 25, 2017 10:03 AM
To: Finke, John (Health)
Subject: A word of advice

Dear John,
In a time where resources are valuable, humanity has saw to it that they contol what the intended outcome is for these resources. However, even though we control the destination of the resource, we do not control the impact that the industry has on the surrounding areas.
Please reconsider or consider taking the appropriate measures to insure that the surrounding areas of the natural gas project in Antioch receive compensation; i.e. inovative clean air solutuions, repopulating those big green air filters we call trees, and perhaps some other forms of giving back to the surrounding community and nature.

Your consideration is greatly appreciated.

Thanks,
Nicholas

McCann, Eric (Health)

From: Susannah Fotopulos <susfoto@gmail.com>
Sent: Wednesday, October 25, 2017 2:34 PM
To: Finke, John (Health)
Subject: PLEASE oppose Cane Ridge compressor station

Hi, Mr. Finke,
I'm writing to request that you please deny a permit for the Cane Ridge natural gas compressor station. It is very close to my mom's neighborhood, and these things are known to cause horrible air and water pollution. I'm not opposed to development or progress. I'm not even a NIMBY (not in my backyard), as I understand some communities must bear the brunt of some of our efforts toward development and progress. This particular project though does not seem a good fit for Nashville at this time. As you know, we are in an incredible growth spurt, much of which is positive. A heavy polluter so close to the city that is designed to export natural gas, rather than make it more available and less inexpensive for Tennessee or US residents, just doesn't make sense. I'd like to strongly encourage you to oppose the permitting of this project. Many thanks for your time and attention.
Be well.
Susannah

why on earth if not to grow?

McCann, Eric (Health)

From: Tamberine Cloudmonster <seejanebike@gmail.com>
Sent: Wednesday, October 25, 2017 10:26 AM
To: Finke, John (Health)
Subject: Pipeline

I am writing to to ask that you please. put a stop to the pipeline being built in Cane Ridge. Residents as well as non residents are opposed and I believe for the safety of the people and wildlife here, it needs to be halted or relocated. Please help. Money is never as important as life. Thank you for reading,
Tammy Hutchison
Nashville Resident for 36 years

McCann, Eric (Health)

From: Patricia Faulkner <patriciafaulknertattoos@gmail.com>
Sent: Thursday, October 26, 2017 12:18 AM
To: Finke, John (Health)
Subject: NO FRACKING AT CANE RIDGE

Dear John,
I have been informed that there is currently intention to build a pipeline in a Nolensville neighborhood and we have a situation similar to that of North Dakota's Access Pipeline ordeal, where the land was blatantly disrespected. There are many that wish not to see this through. There are other ways. Please stop this!! We do not need a natural gas coppressor station in this neighborhood OR city, as a matter of fact. Please consider the integrity of our big little city and don't let money fool you, it's nothing compared to the beauty left of Tennessee.

With passion and love,
Patricia Faulkner

From: Jim Tokarski
To: Finke, John (Health)
Cc: jimtokarski56@comcast.net
Subject: Cane Ridge Gas compression station , FERC Docket No. CP16-361-000
Date: Saturday, October 21, 2017 3:23:53 PM

Dear Mr. Finke

Thank you very much for the opportunity to speak at the Public Hearing at the Metro Public Health Department on October 18,2017.
The hearing was fair & all speakers (pro & con) were given ample time to express their views on this controversial issue.

I have been a part of the group "Keep Southeast Nashville Healthy" for the last 6 months, our group is opposed to the construction of the proposed gas compression station in Cane Ridge, TN, ref. FERC Docket No. CP16-361-000.
Columbia Gulf Transmission, LLC has made application to construct the gas compression station in Cane Ridge.

Recently our group travelled to Hartsville, TN to review the Columbia Gulf Transmission, LLC gas compression station currently in place there. We had the following observations from our Hartsville trip: no sub-divisions located anywhere near the compression station. No schools, greenways, or retail establishments located near the compression station in Hartsville. The Hartsville gas compression station made business & environmental sense to us since the compression station is located in a rural area and is very isolated.

The proposed address for the gas compression station in Cane Ridge, TN is 984 Barnes Rd. , this location is adjacent to the Delvin Downs sub-division off of Barnes Rd. The affected radius will include over 6000 homes and nearly 20,000 people.
Like the Hartsville gas compression station, these stations are predominantly located in rural areas, making the Cane Ridge station proposed for our community unprecedented.

We understand that we are a nation of laws, and that you can't make decisions based on emotion. In the event that Columbia Gulf Transmission, LLC obtains all of the necessary permits and obtains all regulatory approvals to begin the construction of the Cane Ridge station, we ask that you carefully consider the following counter-measures to lessen the impact on our community:
Require that the compression station be powered electrically, this will eliminate all emissions.
Condition the permit to require that TransCanada use Titan 130 turbines that emit 9 ppm NOx rather than the 15 ppm that they have proposed
Put a condition that requires the facility to shut down when the Air Quality Index is in the Orange, Red, or higher alert status

Thanks again for allowing me to speak at the hearing, thank you for your time & consideration

Regards,

James N. Tokarski
360 Upper Mill Dr.
Antioch, TN 37013
C:615-830-6974

From:	Chris Strong
To:	Finke, John (Health)
Cc:	Bedne, Fabian (Council Member)
Subject:	CGT - Public Comment
Date:	Thursday, October 19, 2017 12:56:28 PM
Importance:	High

Dear Mr. Finke:

I have asthma and use a daily rescue inhaler as well as a daily inhaled steroid. Two of my four children have asthma. This installation will be detrimental to the health and well-being of my family. There are no less than 8 elementary and middle schools within a 5 mile radius of the proposed site which should be enough reason in itself to deny this permit. They are:

- Maxwell Elementary
- AZ Kelly Elementary
- Thurgood Marshall Middle
- Antioch Middle
- Lighthouse Christian Academy (K-12)
- Tusculum Elementary
- Shayne Elementary
- Oliver Middle

I know you are busy and you have already heard a multitude of arguments brought forth against this station. If you have not visited the area, I request that before you make your decision you drive Southbound on Nolensville Road, turn left on Barnes Road and drive the mile to the intended site and note all of the new and beautiful homes along that route where this will be the new neighbor. Continue down Nolensville Road and see all the existing and new development. Over 5,000 homes are either planned or currently being constructed within a 5 mile radius of this site.

You must know in your heart this is not the right thing for Nashville or for this community – I guarantee Columbia Gulf Transmission knows it is not the right or decent thing to do as well. Not one voice is in favor of this except for the applicant. Why are they doing this? – because it will save them a tremendous amount of money, and our federal government says that local laws and the impact to a community and a city does not matter. My questions to you are "what will you tell your children and grandchildren"? Do you want this as your legacy – that you allowed this installation to be built when you could have stopped it or imposed restrictions to lessen the deadly impact of this installation? What will the residents be told in 10 or 20 years when the cancers from the known carcinogens being emitted from this site start to appear or what happens if god forbid, an explosion or accident occurs at the site? Sorry won't be good enough. Looking at the number and frequency of such accidents at similar sites across the country – are we just going to hope that one won't occur here? What value is being placed on the lives of the residents of this community with 8 elementary and middle schools in such proximity to this? There is zero benefit to the citizens of Nashville to have this placed here – only a tremendous burden. Would you want to live by this or have your child go to school next to this? These are the reasons why these facilities belong in a rural setting and not in a growing, vibrant, and densely populated urban area.

Please stand with the citizens of Nashville and say we cannot allow this to devastate our community. We would strongly support the allocation of tax dollars to fight this legally if needed. Please deny the Permit to Columbia Gulf Transmission LLC.

Thank you – we are counting on you to do the right thing.

Sincerely,

Chris Strong
6323 Pettus Road
Cane Ridge, TN 37013
(615) 397-0971

From: Geraldine E. Markus
To: Finke, John (Health)
Subject: CGT - Public Comment
Date: Monday, October 23, 2017 10:46:27 PM

Dear Mr.Finke,

We are writing to express our strong opposition to the granting of an air quality permit to Columbia Gulf Transmission, LLC, for the construction and operation of the proposed Cane Ridge Compressor Station. The proposed station will be located approximately 1.1 miles from our front door on Barnes Road. Our fundamental objection to the station is based on the nature of the location - a residential neighborhood with developments, schools, a greenway, parks and a few remnants of a semi-agricultural past. It is highly unusual for such a facility to be located in the middle of a densely populated area. The compressor station will be a significant source of both noise and air pollution, as well as many other negative impacts on the area. I'm sure the Board is well aware of the many noxious and carcinogenic emissions the station will generate - 24 hours a day. If it is the job of the Board to protect the air quality, and hence the citizens, of Metro Nashville, then it is incumbent upon the Board to do so by rejecting this permit.

Although the EIS outlines many concerns, the fundamental thrust of the report was that all concerns could be reasonably mitigated. But who will monitor the mitigation and who will guard the hen house once the station is in operation - the fox? This entire proposal has been cloaked with deceit - utilizing the false premise of public good, i.e., a public utility - for essentially an operation for private gain - exporting gas for the benefit of a now Canadian company with the least possible expense. Columbia Gas wants to be a good citizen - bah humbug!

Based on the limitations of the Board's remit, you may be severely restricted in your ability to deny this permit. If that is the case, then we strongly urge the Board to hold Columbia Gas's feet to the fire by putting some conditions on the permit. We would ask that Metro Health would require Columbia Gas to demonstrate their "good citizenship" by utilizing the most current technology to reduce emissions. An example would be requiring the use of Titan 130 turbines to reduce the amount of NOx emissions. Another condition that Metro Health could require would be the use of electricity to power the station for a complete reduction of emissions. And a third condition to be considered would be the restriction of the plant from operating during days when the Air Quality Index is at Orange, Red or higher alert status. All of these conditions are ways to ensure a healthier environment for Southeast Nashville.

We appreciate any attention the Board will give to this issue and hope for your favorable consideration.

Sincerely,

Geraldine and Richard Markus
1235 Barnes Road
Antioch, TN 37013

From:	Erica Roberts
To:	Finke, John (Health)
Subject:	CGT - Public Comment
Date:	Sunday, October 22, 2017 8:34:57 PM

Dear Metro Health Department,

I am writing to express my concern about the proposed compressor station in the Cane Ridge community. My family and I have lived in this community for over 16 years. We are property owners, our children attend Metro Nashville Public Schools, and my husband and I are employees of Metro Nashville Public Schools. We are invested in the community and think this compressor station will be a detriment to it. As you consider awarding a permit to TransCanada, I first request that the permit not be granted. I think this compressor station will have a negative impact on the air quality, will decrease property values, and will increase noise pollution. For these reasons, I strongly encourage you not to grant this permit.

Should you decide to grant the permit, I ask that it be done so with the following conditions. In order to help eliminate emissions, this compressor station should be powered by electricity. This will help alleviate emissions, which negatively impact air quality. I ask for a condition that when the Air Quality Index is in the Orange, Red, or higher alert range, that the facility be shut down until the Air Quality Index is in a more acceptable range. As an asthma sufferer, I am acutely aware of the impact that air quality has on health. Allowing unnecessary pollution, such as any that may be emitted from this compressor station, is a health hazard to citizens of the Davidson County.

Again, I ask that you do not grant the permit at this time. This compressor station does nothing to increase the quality of life for the citizens of Davidson County.

Thank you for your consideration.

Sincerely,

Erica Robert

201 Claybrook Lane

Cane Ridge, TN 37013

From:	Hawkins Management
To:	Finke, John (Health); Finke, John (Health)
Subject:	CGT - public comment
Date:	Sunday, October 22, 2017 12:11:35 PM

Dear Director Finke:

I am writing to you on behalf of myself, my family, and the 524 other homeowners that I serve and represent in the Oak Highlands/Deer Valley community in Cane Ridge. We desperately need a hero in our government to stand with us and protect Nashville's air quality by denying the issuance of a Part 70 Operating (Title V) permit on behalf of Columbia Gulf Transmission, LLC.

If approved, this project would include significant emission sources consisting of two turbines, an emergency generator and fugitive emissions – all within the Cane Ridge community in Davidson County, Tennessee. If permitted, these sources would have an immediately negative impact on our entire neighborhood, our property values, the surrounding Cane Ridge community and our health and well-being.

The Federal Energy Regulatory Committee staff stated in their environmental impact statement (EIS) related to this project, that "approval of the proposed projects would result in some adverse and significant environmental impacts." FERC's EIS statement acknowledged that, generally, station sites are in rural areas with population densities less than the statewide averages, except for the Cane Ridge site in Davidson County, Tennessee, which is the second largest population center in the state.

Cane Ridge is too heavily populated and too sensitive an area to warrant issuance of these permits. The project is located on Barnes Road and Old Hickory Boulevard – right in the middle of a densely populated residential area, near two (2) schools, and across the street from the Mill Creek Park and the Greenway system. Soccer fields are currently being built a few hundred yards down the street at the 3M sports field. There is no doubt the location poses health, safety and environmental risks to the surrounding community.

The immediate and long term consequences of this compressor station cannot be overlooked. We seriously need a hero in charge of protecting Nashville's air quality to stand up and say "NO!" We need you, Director Fink, to protect our right to breathe clean air and to protect our health, our property and the surrounding ecosystem. We implore you to deny Columbia Gulf Transmission, LLC's application for a Part 70 Operating (Title V) permit. The fate of our community and our air quality rests in your hands. Thank you for your time and careful consideration.

Sincerely,
Lillian Hawkins, Hawkins Management
Oak Highlands/Deer Valley HOA
5729 Sonoma Trace
Cane Ridge, TN 37013
Cell: (615) 598-4205
Office: (615) 838-2876
www.oakhighlands.com

From:	Chris Tuley
To:	Finke, John (Health)
Subject:	CGT - public comment
Date:	Monday, October 23, 2017 8:33:43 AM

Dear Metro Health department,

I am emailing to ask that you do not accept Columbia Gulf Transmission's air quality permit in it's current state. I believe there are 3 major issues that need to be addressed before a permit can be issued:

1) **The Cane Ridge compressor station should be powered electrically.** As you are aware, this process would eliminate all emissions. This is very feasible for CGT to do as there is already sufficient power grid access at or immediately near the proposed site. CGT is not interested in going an all electric route as it is more costly to the company, but what about the cost for Davidson county citizens? The need for a complete reduction in emissions is because this large compressor station is located in a highly populated urban area. The Cane Ridge compressor station's emissions need to be taken into account with the combined emissions from the already approved Joelton, TN compressor station. To the best of our understanding Nashville is the only city in the southeast with even one large gas compressor station, let alone two (Cane Ridge and Joelton). This is simply unacceptable.

2) **If the Cane Ridge compressor station is not powered electrically, then Metro Health department should condition the permit to require that TransCanada use at the very least Titan 130 turbines that emit 9 ppm NOx rather than the 15 ppm that is currently proposed.** This move would reduce the NOx emission by about 40%.

3) **Regardless of the first 2 points, Metro Health department should place a condition on the air permit that requires the facility to be shut down when the Air Quality Index is in the Orange, Red, or higher alert status.** This move is designed to protect the citizens of Davidson County from unnecessary pollution on days when the air quality presents a particularly high health hazard.

Thank you for your time and consideration.

Sincerely,

Chris & Aubrey Tuley
912 Morning Rd.
Cane Ridge, TN 37013

From: Cindy Swartz
To: Finke, John (Health)
Subject: CGT - Public Comment
Date: Monday, October 23, 2017 9:20:59 AM

Dear Metro Health Department,

I live off Barnes Road in Antioch and have a child with a compromised respiratory system. As you deliberate the permit which Columbia Gulf Transmission has applied for, I urge you to protect the health and welfare of the citizens of Davidson County.

Above all, let me make it clear that we don't want this gas compressor station in our area. Davidson county is too heavily populated to risk the catastrophic effects of 2 compressor stations. However, if it must be there, please require Columbia Gulf Transmission to power the station electronically. This would reduce emissions dramatically. We also ask that you require them to use Titan 130 turbines - also reducing the NOx emissions from 15ppm (which they have proposed) to 9ppm.

This station has no economic benefit to Nashville, Davidson County, Tennessee or the United States of America. If Columbia Gulf Transmission wants to benefit from our land and infrastructure, please require them to make the financial investment in the systems that will protect the *thousands* of us who live here. Once this permit is issued, there's not turning back. Please impose strict parameters on them NOW.

Thank you for the work you do on behalf of the citizens of Davidson County.

Best regards,
Cindy Swartz
Antioch, TN

From:	Kristie
To:	Finke, John (Health)
Subject:	CGT - public comment
Date:	Monday, October 23, 2017 1:48:15 PM

To whom it may concern,

I live in Autumn Oaks, a subdivision very close to the proposed building of the new Columbia Pipeline. I am deeply concerned for the health of my family and the health of all the families close to this location. I am completely against this being built there. Since I'm sure my being concerned won't deter this from happening, I have a few comments about how to at least make it safer for all the people in this heavily populated area.

1. Please enforce an electronically powered compressor as it would greatly help eliminate toxic emissions which would very likely affect everyone's health.

2. Please require that TransCanada use Titan 130 turbines that emit 9 ppm NOx rather than 15 ppm.

3. Please require the facility to shut down when air quality is already high and in the orange or red status.

Please listen to the community's opinions. We are the people who will suffer if this happens and we want to have a say in these huge decisions.

Thank you for your consideration,
Kristen Marquart

From: NANCY HAMANN
To: Finke, John (Health)
Subject: CGT - public comment
Date: Monday, October 23, 2017 11:11:37 PM

Oct. 23, 2017

Metro Public Health Dept.

Pollution Control Division

Attention: John Finke

To Whom It May Concern:

I was unable to attend the Air Quality Board hearing this past Wednesday due to my work schedule, but I am most definitely concerned with the negative impact of a gas compressor station in the Cane Ridge community. I live in the Mill Run subdivision that is just across the street from the proposed site, which is one of several subdivisions in close proximity. Since this area is highly populated, I am shocked that this deal may actually be approved.

The people who live here are very concerned with the impact such a station can have, not only on property values, but also on the air, water, and sound quality of our neighborhood. Obviously, we continue to hope that this station could be placed in an industrial area rather than a residential one; however, if final approval is given for this site, we are depending on the Metro Health Department to impose appropriate restrictions to minimize adverse effects to the health of our community.

1) Please require this large compressor station to be electrically powered to eliminate emissions since it would be in a highly populated area.

2) Please condition the permit to require that TransCanada use Titan 130 turbines that emit 9ppm NOx rather than the 15ppm they have proposed, resulting in a NOx emission reduction of roughly 40%. This is a significant reduction since NOx is the main pollutant that leads to ground level ozone which is a key respiratory hazard.

3) Please put a condition on the air permit to require the facility to shut down when the local Air Quality Index is in the orange, red, or higher alert status, to help protect residents of Davidson County from unnecessary pollution on days of already hazardous air quality.

4) Please impose strict noise pollution control requirements appropriate for a residential area.

Thank you for your consideration.

Nancy Hamann

1208 Bending Creek Dr.

Cane Ridge, TN 37013

zoelife123@comcast.net

From:	Stephanie Taylor-Poole
To:	Finke, John (Health)
Cc:	Jimmy Poole
Subject:	CGT - public comment
Date:	Wednesday, October 25, 2017 11:41:36 AM

Metro Public Health Department
Pollution Control Division
2500 Charlotte Avenue
Nashville, TN. 37209

Good morning John Finke,

I have been a resident of the Cane Ridge community for 12 years. I implore and beseech you to stop the development of the TransCanada Gas Compressor Station.

I would like to to appeal to your sense of reason in regards to the impact on our living environment. It would be inhumane to inflict NOx emissions upon the breathing environment of vibrant adults and children, unsuspecting wildlife, sustainable waterways and trees as well as those potential inhabitants, who have no knowledge of what's about to effect their health.

Our quality of life and property values would erode with this type of constant activity and exposure. We planned to retire in our home. Now, we are faced with the difficult decision to relocate amid soaring Middle Tennessee home prices.

If we have to have this station in our community, I would like to ask three conditions of the Metro Health department:

1) Power the compressor station electrically

2) Require TransCanada to use Titan 130 turbines that emit 9 ppm NOx rather than 15 ppm

3) Require the facility to shut down when the air quality index is in the Orange, Red or higher alert status

In closing, poisoning our environment will have lasting and long-term effects on our health in which your organization is already aware of. I find it disturbing to profit from the demise of those in a thriving residential area versus developing your operation in an uninhabited area.

Sincerely,

Stephanie Taylor-Poole

From: Zach Bresee
To: Finke, John (Health)
Subject: CGT - public comment
Date: Wednesday, October 25, 2017 3:47:46 PM

I am writing you to request that you deny the Part 70 Operating (Title V) permit on behalf of Columbia Gulf Transmission, LLC. The planned station will be located in a densely populated, and rapidly growing area of Cane Ridge. The presence of this station will greatly diminish the quality of life of the residents near this facility, due to the emissions that it will produce as well as the noise pollution the station will add. Nashville and the surrounding area already has enough air quality issues, which will only get worse as the area grows in population; we do not need a compressor station adding to these issues.

As part of the Clean Air Act Title IV (Noise Pollution, https://www.epa.gov/clean-air-act-overview/clean-air-act-title-iv-noise-pollution), I would request that their permit be denied, or a condition included as part of the permit that they either bury or completely enclose and soundproof the building. It is unprecedented that a gas compressor station be located in the middle of such a densely populated area. Columbia Gulf Transmission LLC should take the necessary actions to prevent the nearby residents from hearing the operation of the facility at all. Regardless of whether the station operates within 55db, the ongoing noise produced by the facility will be disruptive and diminish the quality of the nearby residents. This is categorized as noise pollution.

At the public hearing, Columbia Gulf Transmission LLC claimed they wanted to be a good neighbor. If they truly wanted to be a good neighbor, they would not place their facility here in this densely populated area, and would spend the money necessary to locate it elsewhere.

However, if they cannot feasibly do so, they should take the actions necessary to minimize the detrimental impact of this facility on their neighbors. There is an option to power the station via an electric compressor. By doing so, no emissions will be released. They should prove that they wish to be good neighbors, and power the facility with the cleanest option possible. Currently the turbines they are planning to use emit 15ppm NOx. There is also a cleaner gas turbine option that is available to them that they did not choose initially, the Titan 130. At the very least, if they refuse to choose the cleanest option (an electric compressor) for the community, at least choose the Titan 130. Regardless of the option used, the station should be soundproofed, buried, and Columbia Gulf Transmission should not rely on their land to provide a natural barrier, so as to avoid producing unwanted noise pollution that will affect their neighbors quality of life.

Before any permit is granted, we should hold Columbia Gulf Transmission, LLC accountable to their claim that they wish "to be a good neighbor" and require them to operate in the cleanest and quietest manner available to the community which they are forcing their way into.

Regards,
Zach Bresee
6993 Calderwood Drive
Cane Ridge, TN 37013

From:	Seth Marquart
To:	Finke, John (Health)
Subject:	CGT - public comment
Date:	Monday, October 23, 2017 2:04:54 PM

I live in a subdivision very close to the proposed building of the new Columbia Pipeline. I am completely against this being built there and am very concerned for the health of all the families nearby. This area is way too heavily populated for such a facility. Please consider moving this facility to a less populated area and also please consider the following suggestions.

1. Please require an electronically powered compressor which would greatly help eliminate toxic emissions.
2. Please require that TransCanada use Titan 130 turbines that emit 9 ppm NOx rather than 15 ppm.
3. Please require the facility to shut down when air quality is already at a high status.

The community wants to have a say in these big, important decisions. We are the people who will be deeply affected by this facility and our opinions should matter.

Thank you for your time and consideration,

Seth Marquart

From: Stefanie Waterman
To: Finke, John (Health)
Subject: CGT - Public Comment
Date: Monday, October 23, 2017 10:01:05 AM

Hello Mr. Finke,

My name is Stefanie Waterman and I am a resident of the Indian Creek neighborhood. I am writing to you with regards to the proposed gas compression station at Old Hickory Blvd. and Barnes Road. I am opposed to the proposal to the building of this compression station. This station will be in close proximity to at least six subdivisions, three schools and the Mill Creek greenway

I understand that it could provide a considerable amount of noise pollution but my biggest concern is the air pollution it will emit. This is a highly populated area and as a mother to a young child I am concerned of the health risks associated with this proposal.

The best case scenario is that the appropriate permit approvals are denied and this station is not built, but if it is I implore you to push for the recommendations provided at the recent Air Quality Board Meeting. At the very least the Metro Health department needs to require that the station be run under strict standards in order to reduce emissions that could harm the health of the residents in close proximity. I understand one of the recommendations is that the station be run electrically. I think this would be the most ideal situation.

My husband and I love living in the Cane Ridge community and want to keep it healthy for our child as well as all the other children and residents in our community.

Thank you for your time,
Stefanie Waterman

From:	Jessalynn Whyte
To:	Finke, John (Health)
Subject:	CGT - public comment
Date:	Wednesday, October 25, 2017 12:02:42 PM

Dear Mr. Finke,

I am sure your inbox is being inundated with commentary about the Gas Compressor Station proposed for South Nashville/Antioch/Cane Ridge. I want to add my voice to the list of people and request a moment of your time as you consider recommendations.

As Davidson County and the surrounding areas continue to grow at record rates, it is alarming to think about the potential environmental issues a gas compression station may bring to the area. With all the new growth, current non-renewable resources become more and more precious; the idea of using land nearby many current homes and businesses, as well as natural areas and potential future neighborhoods is concerning. In order to minimize the concerns about the impact of such a station being permanently located in our community, I'd like to ask for the following considerations:

1. It will be extremely important for the compressor station to have minimal emissions if it is to be located near such a populous area- the less we pollute the air, the better. I would ask for Metro Health to require the compressor station to use electricity to power it in order to ensure the lowest possible emissions possible.

2. If TransCanada insists on benefiting from locating in our community, it is important to require them to also be a responsible part of our community, in part by using the most state-of-the-art, cleanest equipment possible. To that end, I'd ask that the Health Department require them to upgrade the equipment they've proposed to use from a turbine that emits 15ppm NOx to Titan 130 Turbines that only emit 9ppm NOx, in order to reduce emissions by up to 40%, and minimize the ground level ozone produced by this station.

3. With the increasing population, we can certainly expect to experience more airborne pollutants with additional vehicles, homes, and businesses joining our community. The citizens who live, work and play here on a daily basis should take priority when considering our air quality. I would ask that Metro Health require the facility to temporarily cease operations whenever the Air Quality index reaches a level of Orange or higher (Orange, Red, Purple, and Maroon) in order to protect the people of our city from unnecessary pollution on those higher threat days.

We know that Nashville has several factors that already contribute to respiratory issues. I have friends, family members, and colleagues that deal with seasonal allergies, asthma, and respiratory irritants due to pollution. While we cannot control some of these, we can choose to limit the impact of pollutants in our city and surrounding areas. It would be a shame to have the taxpayers of our county shouldering the cost of the proposed public transit systems that will make a dent in these areas, only to find that a corporation that has little investment yet much benefit from our city devours any environmental gains we as a city make. I hope that the Metro Health Department will think of the long-term effects that this station will have on our community's health
Thank you for your time to read my concerns and for thoughtfully considering these

request when thinking about our city's future.

Best,
Jess

Jessalynn G. Whyte

Cane Ridge Community Member - Lifelong Nashvillian
615.519.8108

From:	Victoria Lentini
To:	Finke, John (Health)
Subject:	CGT - public comment
Date:	Wednesday, October 25, 2017 12:15:32 PM

I live in the Cane Ridge community. For our safety, and all of Nashville's safely, please require the following:

1) Require that the compressor station be powered **electrically**.

2) Require that TransCanada **use Titan 130 turbines** that emit 9 ppm NOx rather than the 15 ppm that they have proposed.

3) Require the facility to **shut down when the Air Quality Index is in the Orange, Red, or higher alert status**.

Small price to pay for our safety.

Victoria Oyston

1276 Blairfield Drive

Cane Ridge, TN

From:	Allison Grammer
To:	Finke, John (Health)
Subject:	CGT- public comment
Date:	Wednesday, October 25, 2017 5:54:21 AM

I am not satisfied with the precautions that are being put in place currently, I suggest the following:

1) Ask Metro Health department to require that the compressor station be powered electrically to eliminate all emissions.

2) Ask Metro Health department to condition the permit to require that TransCanada use Titan 130 turbines that emit 9 ppm NOx rather than the 15 ppm that they have proposed.

3) Ask Metro Health department to put a condition on the air permit that requires the facility to shut down when the Air Quality Index is in the Orange, Red, or higher alert status.

Sincerely,
Allison Grammer

Sent via the Samsung GALAXY S® 5, an AT&T 4G LTE smartphone

From: Sarah Siegand
To: Finke, John (Health)
Subject: CGT-public comment
Date: Wednesday, October 25, 2017 9:18:40 AM

Dear Mr. Finke,

As a longtime Nashville resident, I have been worried to learn about the proposed Columbia Gulf Transmission (CGT) gas compression station to be built at the intersection of Barnes Road and Old Hickory Boulevard. My understanding is that this station would offer no benefits to the Cane Ridge community, but would merely serve as a conduit for natural gas to get from point A to B. If anything, it's operation would be detrimental to the many residents within a short distance of the station, plus users of a greenway, park, and school.

It makes no sense to build a station in a densely populated residential area. After doing some research, I have learned of numerous hazardous side effects of gas compression stations, the two most concerning being air pollution and noise. There is data showing that people within a two mile radius may be affected by the air pollution, causing issues like respiratory difficulties, headaches, rashes, etc. Also, a constant droning noise with periodic surges may be heard up to a mile away from the station. Home values may be diminished on the houses nearby. Basically, there appear to be no benefits to building this station in Cane Ridge, only negatives.

Because of this, I urge you to deny the permit allowing construction of the gas compression station. Should a veto of the station not be forthcoming, I believe there are measures are available to mitigate the negative effects of the station: 1. require the use of sound deadening construction material. 2. Metro Health should require certain pollution reduction measures like running the station electrically as well as specifying the type of turbine used, and requiring that the station be shut down when the Air Quality Index reaches specified hazardous levels. If there is approval for construction of the station, the Metro Health Department should exercise its authority to minimize pollution from the facility. The health and well being of the residents of Cane Ridge depend on it.

It's reasonable to believe that there are other locations in TN that could accommodate such a station, locations that are not surrounded by homes, parks, schools. Surely CGT could find a more suitable place for this station which will not disrupt the daily lives of so many.

Thank you for your consideration of my concerns.

Sincerely,

Sarah Siegand

From:	Rita Jane Coones
To:	Finke, John (Health)
Subject:	CGT-public comment
Date:	Tuesday, October 24, 2017 9:37:18 PM
Attachments:	CaneRidgeHealthDeptComment.pdf

Dear Mr. Finke:

Attached please find my comment regarding the air permit for the proposed Cane Ridge natural gas compressor station.

Please reply to acknowledge successful receipt of my comment.

Regards

Bill Robertson
615 838 7301

From:	Meg Watson
To:	Finke, John (Health)
Subject:	CGT-public comment
Date:	Thursday, October 19, 2017 12:22:56 PM

Dear Mr. Finke,

This letter is to voice strong opposition to the approval of Columbia Gulf Transmission's permit to build a gas compression station in Cane Ridge. As a resident of Cane Ridge for the last four years, one thing I value most is that it's a quiet community, a bit off the beaten path, more like living in the country than in the city. If this compression station is built, it will certainly ruin what I love about this community.

In addition to the catastrophic events that could occur: leaks, spills, explosions, fires, daily life near a compression station is even more concerning to me. The toxic elements regularly emitted into the air will have seriously damaging effects on the health of those living near it. People living within two miles of a compression station have reported all manner of health difficulties including: headaches, respiratory problems, allergies and fatigue, just to name a few. My daughter suffers from asthma and would not be able to tolerate this kind of air pollution, nor would I want to expose the rest of my family to it.

This compression station will be loud! It is said that those living a mile away will be able to hear it. The property where the station will be built is very hilly so I wouldn't be surprised if the noise could reach even farther depending on where the station is situated.

This station will sit smack in the middle of scores of subdivisions, just across the street from the Mill Creek Greenway, a short distance from an elementary school and a park which is currently under construction. It makes no sense to build a station in close proximity to all of these things. It's putting the residents of Cane Ridge at risk for something that has absolutely no benefit to our Cane Ridge community. No benefits, only disadvantages and probable injury to residents.

Please do the right thing and DO NOT ISSUE A PERMIT to Columbia Gulf Transmission. The health and well being of our community depend on it. Thank you for your time.

Sincerely,

Margaret Watson
5909 Tee Pee Trace
Cane Ridge, TN 37013

From: Eleanor Dyer
To: Finke, John (Health)
Subject: CGT-public comment
Date: Monday, October 23, 2017 4:05:27 PM

My name is Eleanor C Dyer. I have lived at 6355 Nolensville Pike for 47 years. I can hear the sound of trains on railroad tracks at night. I know sound pollution and air pollution travel. I would like to request you do more to mitigate the air and sound pollution that will be caused by the Gas Compression Station planned for my neighborhood.

#1....Power the compression station electrically. This will eliminate emissions.

#2 This is a highly populated residential neighborhood.

#3....Reduce the NOx emissions by using Titan 130 Turbines.

#4...I have to worry about air quality because of my severe chronic bronchitis. The Metro Health MUST require the facility to shut down when Air Quality Index is in the Orange , Red or higher range. This is a significant cause of many other peoples respiratory illnesses.

Always respect the needs of the community. You want to come into a congested established neighborhood, protect our health and well being.

From: doctorgrover1991@gmail.com
To: Finke, John (Health)
Subject: CGT-public comment
Date: Tuesday, October 24, 2017 9:52:33 AM

Dear Mr. Finke,

I am a new resident of the Nashville area. I live in Culbertson View. One reason I chose to build in Culbertson View was the quiet setting and nice view, but still with good proximity to city life. In recent months I have been disturbed to learn about the proposed Columbia Gulf Transmission (CGT) gas compression station that is proposed near the intersection of Barnes Road and Old Hickory Boulevard. That is about 1.5 miles from my home and an intersection that I frequently use. My understanding is that this station will not benefit service in the local area, but is on a gas line that passes through enroute to other places. That gas line is clearly evident by easements in the area. And yet the residents of many nice residential communities within a short distance of the proposed station (some within about 1000 feet), plus users of a greenway, park, and school, will have to live with an industrial-type facility in their midst. This is completely out of accord with the residential, recreational, pastoral nature of the area. In addition, this station may preclude further improvements to the area and may have negative effects on property values. Finally, during the construction process there will surely be disruptions to traffic in the area and damage to the roads.

After talking with people in the area and doing my own research, I have learned of hazardous side effects of gas compression stations, in addition to the ones cited above. The two most mentioned are air pollution and noise. There is evidence that air pollution may be evident within two miles of a compression station, particularly affecting those with respiratory problems. Also, a constant noise with periodic bursts may be present within one mile of a station. I have experienced engines that drive gas compression. They are big and noisy. Not to be forgotten is the visual pollution of having an industrial-type complex in the area. In sum there appear to be no economic, cultural, or aesthetic benefits to the area, only negatives.

For these reasons I urge those with authority to deny the permit for construction of the gas compression station. Should a veto of the station not be forthcoming, measures are available to mitigate the negative effects of the station. One is to require the use of sound deadening construction material. The Metro Health Department has the authority to require certain pollution reduction measures. These include specifying that the station to be all-electric, specifying the type of turbine used, and requiring that the station be shut down when the Air Quality Index reaches specified hazardous levels. If there is approval for construction of the station, the Metro Health Department should exercise its authority to minimize pollution from the facility. The wellbeing of the area depends on it.

It is unclear why metro Nashville is targeted for two gas compression stations. No other city in the Southeast has a single such station. Surely, there are other locations along the gas line outside the metro area that are better suited for such a facility, that will enable CGT to reach its transmission goals, and that will not have undesirable side effects on populated areas.

Thank you for consideration of my concerns.

Sincerely,

William M. Hinton
8287 Tapoco Lane
Brentwood, TN 37027

Sent from Mail for Windows 10

From:	Sharon Litts
To:	Finke, John (Health)
Subject:	Columbia Gulf Transmission, LLC application for Part 70 Operating (Title V) permit
Date:	Thursday, October 19, 2017 2:09:44 PM

Dear Director Finke:

I am writing as a concerned resident of the Hidden Creek subdivision in Cane Ridge, TN. Our family is strongly opposed to the issuance of Part 70 Operating (Title V) permit for the Columbia Gulf Transmission's proposed gas compressor station on Barnes Rd, which is less than a mile from our home and 1600 feet from the Mill Creek Greenway. We use the greenway for walking, jogging, and just enjoying the beauty of nature. The greenway is also presently being expanded, according to a plan begun ten years sgo. An adjoining sports park is also under construction, two schools are within two miles of the proposed station, and thousands of residents live here.

FERC has admitted that there would be "some adverse and significant environmental risks" to the public. With the huge population density of the area, and all of the activity, it does seem risky to introduce more pollutants into the air. The residents of Cane Ridge have consistently shown their disapproval and concerns regarding this compressor station by attending meetings, fund-raisers, and distributing flyers in the nearby subdivisions.

We are asking you to please consider our concerns, and deny the approval of the permit. Thank you.

Sincerely,
Bob & Sharon Litts
3497 Chandler Cove Way
Cane Ridge, TN 37013

From:	Nichole Schmidt
To:	bill.haslam@tn.gov; Paul, Bill (Health); Bedne, Fabian (Council Member); Finke, John (Health); Barry, Megan (Mayor); rep.jason.powell@capitol.tn.gov; rep.jim.cooper@mail.house.gov; sen.jeff.yarbo@capitol.tn.gov
Subject:	DENY PART 70
Date:	Wednesday, October 18, 2017 6:35:47 PM

We are begging you, please, deny Part 70 Operating (Title V) permit on behalf of Columbia Gulf Transmission, LLC.

From: C.Burke
To: Finke, John (Health)
Subject: gas compression station
Date: Wednesday, October 18, 2017 10:39:24 AM

I live in Lenox Creekside . Please deny Part 70 operating (Title V) permit behalf of Columbia Gulf Transmission LLC

Thank you.

Carol Burke

From:	Jamie Pierce
To:	Finke, John (Health); Barry, Megan (Mayor); Bedne, Fabian (Council Member); rep.jason.powell@capital.tn.gov; sen.jeff.yarbro@capitol.tn.gov; rep.jim.cooper@mail.house.gov; bill.haslam@tn.gov; Paul, Bill (Health)
Subject:	Gas Compression Station
Date:	Wednesday, October 18, 2017 1:39:39 PM

Good afternoon –

I am writing you to voice my request to please deny part 70 Operating (Title V) permit on behalf of Columbia Gulf Transmission. I own a home in the area and oppose this project.

Thank you for listening to the voices of the people.

Sincerely,
Jamie Pierce

Jamie L. Pierce
Project Coordinator

Design and Engineering, Inc.
1645 Westgate Circle
Brentwood, TN 37027
615.370.1779
www.dandeinc.us

From: jkhawk@comcast.net
To: Finke, John (Health)
Subject: Gas compression station
Date: Monday, October 23, 2017 1:15:59 PM

Dear Mr. Finke,

Please don't allow this gas compressor station to be built in Cane Ridge.

But If you decide to allow the facility must be built, these are some of the conditions I would like to see put on them for the health of our community. If this facility can be powered electrically, that would keep out

the dangerous emissions that would hurt us. This is a highly populated area with people who have various health conditions that will make life here unbearable if the emissions are allowed. This includes many

children. Require the facility to shut down when the air quality is in the high alert range.

Please require them to use turbines that emit lower ppms of NOx than the proposed 15 ppms. NOx can lead to ground level ozone and acid rain, both of which can lead to decreased lung function and

increased allergic response. Both can lead to damaged vegetation. Goodbye trees.

This facility will greatly impact our property values. The Metro planning commission has designated this area as high density. There are many homes, schools, parks, businesses and more on the way, that are

not far from the land where the proposed compression station will be built. If allowed, no one will want to live out here. Why endanger a rapidly growing area with a facility that brings no good to the community

it affects? No gas, no jobs, nothing but harm.

June Hawkins

Cane Ridge, TN 37013

From: Bob Campbell
To: Finke, John (Health)
Subject: Gas compressor station
Date: Friday, October 20, 2017 9:11:43 AM

Mr. Finke,

My name is Bob Campbell, and I am a homeowner in the Cane Ridge Community of Nashville. I am writing to ask you to please deny the Part 70 Operating (Title V) permit on behalf of Columbia Gulf Transmission, LLC.

There is much concern on how this compressor station will effect our community. The station is set to be built less than a mile from my home, and I am very concerned how it will impact property values in the area as well as the environment.

I am aware that Nashville is an expanding city, but I find it very hard to believe there isn't a better, more rural option for a station of this sort. It seems very backwards to be creating a brand new green space in this community, and also a massive environmental risk at the same time. Please consider the impact this will have on OUR community.

Thanks you, from a concerned Nashvillian.

Bob Campbell

From:	Suzanne Richter
To:	Finke, John (Health)
Subject:	Gas Compressor Station
Date:	Wednesday, October 18, 2017 1:58:36 PM

Please deny Part 70 Operating (Title V) permit on behalf of Columbia Gulf Transmission, LLC. I am opposed to the gas compressor station being in the midst of residential neighborhoods.

Suzanne K. Richter

September 28, 2017

RECEIVED
OCT 12 2017
POLLUTION CONTROL

Metro Public Health Department
Pollution Control Division
2500 Charlotte Avenue
Nashville, Tennessee 37209

To Whom It May Concern,

This letter is regarding the Columbia Gulf Transmission, LLC application for Part 70 Operating (Title V) permit. As a resident of the area for the proposed location, I urge you to deny this application.

Within a 2 mile radius of this proposed station are 3200 homes, and within 3 miles are 5 Metro Public Schools and the thousands of families that send their children there. Not to mention the numerous churches, daycares, restaurants and other businesses. It's a known fact that these gas compressor stations emit numerous toxins that are detrimental to the health of human life and the environment around it. This area is too densely populated and the impact is too great to allow this station to be located at this site.

Our Councilman, Fabian Bedne, has also made this request of you in a letter that communicates these facts better than I ever could. We are asking you to use your position to protect the people of Davidson County. This is a defining moment in our city - once these stations are built, we can never go back and "un-do" the damage they will cause.

I, again, ask you to deny Columbia Gulf Transmission this permit.

Respectfully,

Cindy Swartz
Antioch, TN

RECEIVED
OCT 17 2017
POLLUTION CONTROL

October 11, 2017

Metro Public Health Department
Pollution Control Division
2500 Charlotte Avenue
Nashville, Tennessee 37209

Re: Columbia Gulf Transmission, LLC application for Part 70 Operating (Title V) permit

To whom it may concern:

I am writing in opposition to Columbia Gulf Transmission, LLC's application for a Part 70 Operating (Title V) permit for the building of the Gas Compression station. This is a residential neighborhood, not an industrial site, and is less than a mile away from the Mill Creek Park and Greenway.

I understand there is to be a public hearing on Oct.18 at the Lentz Health Center, but I am unable to attend due to my work schedule.

As you know, there are health, safety, and environmental risks to the surrounding community. I am very concerned about the health of my community. I have been a Registered Nurse for over 30 years and have worked in Health and Wellness and Disease Management the last 20 years.

I was very excited to have Mill Creek Park and Greenway put in a couple of years ago. It is imperative for families to have a place to be outside, to enjoy physical activity and take care of our health and wellbeing. My family and I use it almost every day, as do many of my neighbors.

Building a Gas Compression station this close to homes ~~is~~ poses health, safety, and environmental risks to the surrounding homes and is unhealthy for the residents of this area. I have seen the Environmental Impact Statements for this project which states that "approval of the proposed projects would result in some adverse and significant environmental impacts."

It is irrational that the Metro Health Department would allow a permit for this compression station to be built so close to the Greenway that was built to promote health and wellness of the community.

I know that in some cases, the voice of the affected citizens is often not heard due to powerful influences from profit-seeking entities who do not live in the area. However, those who serve on public boards have the obligation to protect the environment and the health of the citizens of Nashville.

I strongly implore you to deny this permit for this gas compression station for the health of thousands of us in the affected area.

Sincerely,

Gina Sinecki RN, BSN, MS

6840 Sunnywood Dr.

Nashville, TN 37211

gsinecki@yahoo.com

Oct. 20, 2017

Members of the Metro Public Health Dept.,

I'm sending you these articles to show you what you would be subjecting the Cane Ridge neighbors to if you allow the part 70 operating (Title V) permit on behalf of Columbia Gulf Transmission, LLC. Please deny it. Please don't put our lives and property at risk.

June Hawkins
6375 Pettus Rd
Cane Ridge, TN 37013

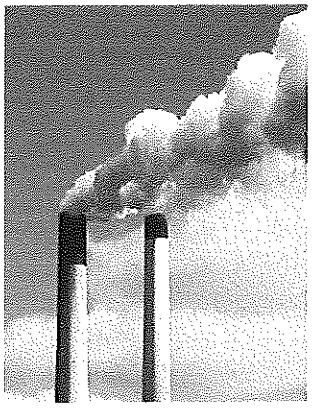
Natural Gas Compressor Stations

Air Pollution, Explosions and Fires

Pipelines transporting natural gas require pressure to keep the gas moving. The pressure is provided by compressors. The power to move the gas is normally provided by gas-powered turbines or reciprocating engines. The pipeline company selects the type of compressor to install. The selection is based on local conditions, regulations and cost.

Pipeline compressors are installed at intervals of about 40 to 100 miles. So a 500 mile pipeline could have as few as 5 or as many as 12 compressors.

Air Pollution 24/7



Compressors operate around the clock, and they emit air pollution 24 hours a day, seven days a week. The pollution comes from large engines needed to drive the compressors. Of course, the cheapest fuel available on a pipeline is natural gas.

Pollution is no accident

Compressors normally have no pollution control devices. Air quality agencies may require performance or operating standards, but pollution is emitted in one form or another, including nitrogen oxides, carbon monoxide, volatile organic compounds and greenhouse gas. For example, lean-burn engines can reduce nitrogen oxides but increase carbon monoxide emissions. Catalytic oxidizers reduce carbon monoxide by converting it to carbon dioxide. In addition to intentional smokestack emissions, air pollution is caused by venting to prevent blowouts, flaring of unwanted gas, and fugitive emissions. Toxic air emissions include formaldehyde, benzene, toluene, ethylbenzene, xylene, hydrogen disulfide, methane and other pollutants.

Negative Health Impacts

Nitrogen oxide emissions cause red and purple ozone alerts, aggravating asthma and COPD. Many of the air toxics emitted are carcinogenic or neurotoxic, such as benzene and hydrogen sulfide. Other negative impacts on public health include respiratory problems, early mortality and childhood learning defects.

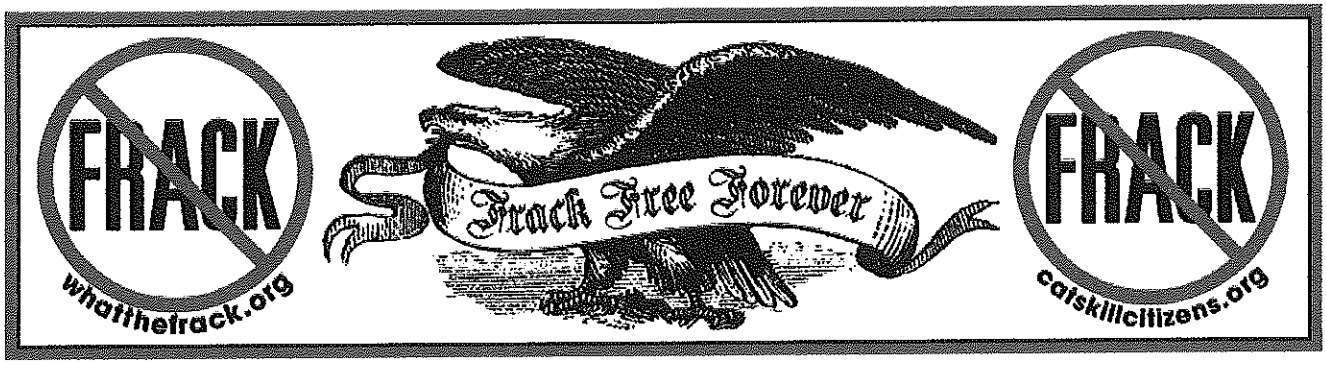
A recent 21-county study in the Barnett Shale region in Texas revealed that the air pollution emissions from natural gas production were greater than that emitted from all on-road cars and trucks in the Dallas-Fort Worth metropolitan region, an area with a population of 6.5 million.

Safety Hazards

Risks to health and safety and environmental contamination come with natural gas compressor stations. Compressors operate under high risk conditions, created by the high pressures and reduced temperatures of operation. These conditions cause vibrations, cracks and corrosion leading to failure of mechanical components, explosions and fires.

Blue Ridge Environmental Defense League

www.BREDL.org PO Box 88 Glendale Springs, North Carolina 28629 BREDL@skybest.com (336) 982-2691



RECENT COMPRESSOR STATION EXPLOSIONS AND FIRES

1. **Explosion rocks Missouri natural gas plant** (November 29, 2013)

   http://fox2now.com/2013/11/29/explosion-rocks-missouri-natural-gas-plant/

   "... the blast ... could be seen for miles around ... some living nearby were evacuated from their homes as a precaution..."

2. **Two injured in explosion at Williams gas pipeline facility Branchburg** (May 31, 2013)

   http://www.mycentraljersey.com/article/20130530/NJNEWS/305300063/?nclick_check=1

   "The workers were welding a portion of a nonactive pipe at the compressor station at the time of the explosion, about 7 p.m. Emergency responders, including firefighters and ambulances, rushed to the scene."

3. **Fire, possible explosion at Susquehanna gas compressor station thought to be accidental** (May 16, 2013)

   http://thetimes-tribune.com/news/fire-possible-explosion-at-susquehanna-gas-compressor-station-thought-to-be-accidental-1.1489789

   "A fire and possible explosion at a Susquehanna County gas compressor station late Tuesday night remain under investigation but is thought to be an accident, a state police fire marshal said ... ... bulging walls in the building indicated there may have been an explosion."
   "DEP air quality engineer/emergency response team member Shailesh Patel discussed specific air quality issues with Williams Site Operations Manager Mike Dickinson and recommended an air quality program follow up."

3. **Ohio worker killed after West Virginia natural gas explosion** (April 14, 2013)

   http://www.news-herald.com/general-news/20130414/ohio-worker-killed-after-west-virginia-natural-gas-explosion

"Two other workers were injured in Thursday's accident at a Eureka Hunter Pipeline operation near Wick. The sheriff's office says it doesn't have any information on them. Authorities have said the incident was an explosion at a compressor station. But Eureka's parent, Magnum Hunter Resources, says it was a flash fire at a "pig receiving station."

4. Explosion at Gas Compressor Station in Oklahoma (April 12, 2013)

http://earthfirstjournal.org/newswire/2013/04/05/explosion-at-gas-compressor-station-in-oklahoma/

"An explosion at a natural gas compressor station near the Logan and Lincoln County lines has forced the evacuation of homes within one square mile of the incident, Thursday night." "Crews from Lincoln, Payne and Oklahoma Counties have responded to the scene." "...it is unclear how long residents in the area will have to remain evacuated."

5. Arkansas Gas Explosion – Evacuations – BHP compressor station at Fracking operation (March 5, 2013)

http://sincedutch.wordpress.com/2013/03/06/352013-arkansas-gas-explosion-evacuations-bhp-compressor-station-at-fracking-operation/

"A fire that followed a blast at a natural gas compression station in Van Buren County led to several dozen homes being evacuated..."

6. Explosion at Susquehanna County gas compressor station (February 16, 2013)

http://www.timesleader.com/stories/Explosion-at-Susquehanna-County-gas-compressor-station,130704

"Vera Scroggins, an anti-drilling activist who lives in the area, said she saw thick clouds of black smoke billowing from the site."
"The compressor station pressurizes natural gas taken from the Marcellus Shale formation for movement along the pipeline system. "Once it's safe to return to the station, we'll begin a thorough investigation..."
"... a fire department from South Abington Township, Lackawanna County, was called in to spray a foaming agent onto the site."

7. Fire at Harrison County Compressor Station Kept Under Control (December 7, 2012)

http://www.wdtv.com/wdtv.cfm?func=view&section=5-News&item=Fire-at-Harrison-County-Compressor-Station-Kept-Under-Control7030

"Several Harrison County fire departments were on the scene of a fire at a compressor station in Good Hope Friday night." "They said crews were on scene to make sure the fire stayed under control until Antero and Enervest workers got there to shut down the compressor's pressure.":

8. Explosion, fire rage through natural gas compressor station

(November 22, 2012)

http://www.sunad.com/index.php?tier=1&article_id=26535

"An explosion and fire ripped through a natural gas compressor station in remote eastern Carbon County Tuesday morning, injuring two workers and engulfing the entire facility in flame. The injured workers were evacuated by medical helicopters ..."

"Fire fighting units from every city in Carbon County responded." "...the fire was contained but *not extinguished as of 1 p.m ..." "... the main compressor station and several other buildings at the site were consumed in the blaze."*

9. Lightning Likely Cause of Natural Gas Pump Station Fire (July 23, 2012)

Fox 40

"Windsor resident Bert Scherer told Fox40 he was watching the storm when he noticed a lightning strike very close to the pump station which is about a half mile away from his home. Scherer said within a minute he saw a blazing fire above the tree line and called 9-1-1. "They were huge flames. I mean really big. It was kind of scary," said Scherer. Patterson Road was closed off while fire crews including a foam truck from Vestal Fire Department worked to contain the blaze. As a safety precaution, people living within a quarter mile of the fire were asked to evacuate until further notice."

"Lount and other neighbors told Fox40 they've had issues with the pump station. They say the station is very noisy and can be very loud in the middle of the night."

10. BP gas compressor station explosion in Colorado kills one (June 26, 2012)

http://www.hazardexonthenet.net/article/51303/BP-gas-compressor-station-explosion-in-Colorado-kills-one.aspx

"BP said a contractor was killed and two others injured after an explosion at a gas compressor station in Durango, Colorado."

11. Explosion reported at Susquehanna compressor station (March 30, 2012)

By Laura Legere (Staff Writer)

"SPRINGVILLE TWP. - An explosion at a natural gas compressor station in Susquehanna County on Thursday morning blew a hole in the roof of the complex holding the engines, shaking homes as far as a half-mile from the compressor complex and drawing emergency responders from nearby counties. The 11 a.m. blast at the Lathrop compressor station off Route 29 in Springville Township sent black and gray clouds billowing from the building for several hours..."

"The DEP has permitted seven compressor engines for the site, although it was unclear Thursday how many were running at the time of the fire." "We're going to begin a full-scale investigation into how this happened," she said, "what was going on up there and the situation with the permits - how many compressors were operating up there and how many they were allowed to operate."

"Springville Volunteer Fire Co. Assistant Chief Jason Rinker said more than seven fire companies responded to the explosion. "It was hectic," Rinker said." "Burton Miller, who lives about half a mile across a field from the compressor station, heard a "big bang" that shook his house. "I looked out the window and I saw the building all blown apart up there and smoke," he said. "A lot of the roof and metal siding is all gone."

12. Fire destroys Mercer County compressor station housing (February 4, 2012)

http://triblive.com/x/pittsburghtrib/news/regional/s_779962.html#axzz2nJDYVKpl

"An early morning fire on Friday destroyed the housing of a compressor station that serves 11 natural gas wells and a fuel-gas pipeline in Mercer County." "A few nearby homes were evacuated briefly as a precaution, Mercer County emergency officials said. Firefighters extinguished the flames by 6:30 a.m. No one was injured."

13. Two suffer injuries due to fire at Wyoming natural gas site (December 6, 2011)

http://trib.com/news/state-and-regional/two-suffer-injuries-due-to-fire-at-wyoming-natural-gas/article_1e7e73ac-e3a0-563a-bff1-0b6a716457da.html

"A fire at a natural gas compressor station in southwest Wyoming on Tuesday set off two explosions, sent smoke billowing into the sky and caused two people to be taken away by ambulance, authorities say." "Reports indicated venting gas ignited and set off two explosions, the sheriff's office said in a news release. Firefighters, medical personnel and sheriff's deputies responded to the scene."

14. Gas explosion, fire forces evacuations (November 3, 2011)

http://www.times-news.com/local/x459214584/Gas-explosion-fire-forces-evacuations

"ARTEMAS, Pa. — Two buildings were destroyed and several others damaged when fire broke out early Thursday at the Columbia Gas Transmission compressor station. Residents in the area were evacuated ..." "Bedford County Emergency Management Director Dave Cubbison said it took four hours to control the fire. Flames reportedly shot hundreds of feet into the air when the fire occurred. The Allegany County 911 center was inundated with calls about the fire. "We probably received about a hundred calls," said acting 911 director Roger Bennett. Sixteen volunteer fire units remained at the scene at 10:30 a.m. Between 40 and 50 homes were evacuated because of the fire."

Oak Highlands
Homeowners Association

P.O. BOX 455 • ANTIOCH, TN 37011-0455

October 19, 2017

John Finke, Director
Metro Public Health Department
Pollution Control Division
2500 Charlotte Avenue
Nashville, Tennessee 37209

Re: Columbia Gulf Transmission, LLC application for Part 70 Operating (Title V) permit

Dear Director Finke:

I am writing to you on behalf of myself, my family, and the 524 other homeowners that I serve and represent in the Oak Highlands/Deer Valley community in Cane Ridge. We desperately need a hero in our government to stand with us and protect Nashville's air quality by denying the issuance of a Part 70 Operating (Title V) permit on behalf of Columbia Gulf Transmission, LLC.

If approved, this project would include significant emission sources consisting of two turbines, an emergency generator and fugitive emissions – all within the Cane Ridge community in Davidson County, Tennessee. If permitted, these sources would have an immediately negative impact on our entire neighborhood, our property values, the surrounding Cane Ridge community and our health and well-being.

The Federal Energy Regulatory Committee staff stated in their environmental impact statement (EIS) related to this project, that "approval of the proposed projects would result in some adverse and significant environmental impacts." FERC's EIS statement acknowledged that, generally, station sites are in rural areas with population densities less than the statewide averages, except for the Cane Ridge site in Davidson County, Tennessee, which is the second largest population center in the state.

Cane Ridge is too heavily populated and too sensitive an area to warrant issuance of these permits. The project is located on Barnes Road and Old Hickory Boulevard – right in the middle of a densely populated residential area, near two (2) schools, and across the street from the Mill Creek Park and the Greenway system. Soccer fields are currently being built a few hundred yards down the street at the 3M sports field. There is no doubt the location poses health, safety and environmental risks to the surrounding community.

The immediate and long term consequences of this compressor station cannot be overlooked. We seriously need a hero in charge of protecting Nashville's air quality to stand up and say "NO!" We need you, Director Fink, to protect our right to breathe clean air and to protect our health, our property and the surrounding ecosystem. We implore you to deny Columbia Gulf Transmission, LLC's application for a Part 70 Operating (Title V) permit. The fate of our community and our air quality rests in your hands. Thank you for your time and careful consideration.

Sincerely,

Lillian Hawkins

Lillian Hawkins, Hawkins Management
Oak Highlands/Deer Valley HOA
5729 Sonoma Trace
Cane Ridge, TN 37013
(615) 598-4205

Metro Public Health Department

Pollution Control Division

2500 Charlotte Avenue

Nashville, Tennessee 37209

Re: Columbia Gulf Transmission, LLC application for Part 70 Operating (Title V) permit

To whom it may concern,

I write to convey the interests of my constituents in opposing the issuance of a Part 70 Operating (Title V) permit on behalf of Columbia Gulf Transmission, LLC and to strongly encourage your denial of the application.

If approved, this extensive project would include significant emission sources consisting of two turbines, an emergency generator and fugitive emissions – all within the Cane Ridge community of my Metropolitan Council district in Davidson County, Tennessee. If permitted, these sources would have a direct and negative impact on the surrounding community and upon the residents' well-being.

The project is located on Barnes Road approximately ½ mile west of Old Hickory Boulevard -- an area zoned residential, not industrial. The operations would be in very close proximity to several residential subdivisions, two (2) schools, and less than one mile away from the Mill Creek Park and the Greenway system that is currently undergoing an expansion as part of the Master Plan conceived ten (10) years ago. Construction is also underway on the nearby 3M sports field. Under these circumstances, there is no doubt the location poses health, safety and environmental risks to the surrounding community.

In a notice for the draft environmental impact statement (EIS) related to this project, the Federal Energy Regulatory Committee staff concluded that "approval of the proposed projects would result in some adverse and significant environmental impacts." An FERC fact sheet also noted that "natural gas-fired engines and turbines burn a portion of the natural gas in the pipeline and would emit pollutants." FERC's EIS statement acknowledged that, generally, station sites are in rural areas with population densities less than the statewide averages, except for the Cane Ridge site in Davidson County, Tennessee, which is the second largest population center in the state. Simply put, Cane Ridge is too sensitive an area to warrant issuance of these permits.

In addition to detrimental health impacts, residents are concerned that property values will decrease as a result of these operations. If permitted, the resulting emissions will not only be a burden to current residents, but will also make the area less desirable for prospective home buyers, further decreasing property values.

Constituents have increasingly and overwhelmingly voiced their concerns to me, to fellow Council members, and to state officials. In light of these concerns, I sponsored an ordinance in 2016 that added gas compressor stations to the list of facilities regulated locally as a major source of air pollutants in Nashville. This ordinance also required gas compressor stations to obtain construction permits to open. As part of this ordinance, Nashville's health department director could also deny a construction permit if a facility violates air quality standards. The numerous adverse effects of this compressor station necessitated such action to protect the surrounding ecosystem and the thousands of residents who live in close proximity to this facility.

For these reasons, I implore you to deny Columbia Gulf Transmission, LLC's application for a Part 70 Operating (Title V) permit. The Cane Ridge community has strongly conveyed their concerns and disapproval. I respectfully ask you to consider the health, environmental, and residential implications of the requested permit. I thank you for your time and attention.

Josh White
1453 Hunters Branch Rd
Antioch TN 37013

1216 Bending Creek Drive
Cane Ridge, Tenn. 37013
404-583-1508
October 22, 2017

Director,
Metro Health Department, for
Davidson County,Tennessee
Pollution Control Division
2500 Charlotte Avenue
Nashville, Tenn. 37209

Re: Metro Health Department
Air Quality Board Hearing
Wednesday October 18, 2017
Columbia Pipeline Group and Gulf Express Project
Docket No. CP!6-361-000

Dear Sir:

I am responding to an URGENT COMMENTS NEEDED BY OCT. 25TH from my neighborhood given to me today, which I will address further down in this document:

1) First of all as stated in my numerous complaints re the above problem, I told the Columbia Pipeline CEO on June 21. 2016, I felt the whole deal was a "DONE" deal before anyone was even notified or meetings to object were ever even discussed or meetings held. IT APPEARS THAT I WAS RIGHT!

2) My subsequent letter of Dec. 9, 2016 mentions a visit to my home by the Pipeline reps wherein I mention that I was assured that everything would be ok, IT IS NOT! (copy enclosed)

3) Please note in my communications that I also complain that I was deliberately not sent notifications of meetings or even of the problem, and please be advised that I was not apparently deliberately also notified of the meeting of October 18, 2017. If I had been, I WOULD HAVE BEEN THERE! Why was I not notified? This appears to be total violation of my civil rights as a taxpayer of Davidson County. This problem has been discussed in my previous letters many times with no answer except to send two Pipeline reps to my home to assure me everything was ok, but it is not!

4) Now that I appeared to have been right, that it was all "A DONE DEAL", The Metro Health Department should attempt TO AT LEAST SEE THAT THE COMPRESSOR STATION BE POWERED ELECTRICALLY. This would lead to lowering emissions and less pollution of our area. Why was our county Davidson County, Tenn. Singled out anyway to be targeted to be the apparently only Southeast city to have 2 large compression stations to be located in Cane Ridge and Joelton? These are very highly populated areas.

5) Where was the Metro Health Department during all of the above proceedings? Why were we not represented and protected as taxpayers by them?

6) Metro Health Department needs to condition the air permit to require TransCanada to use Titan 130 turbines to emit 9 ppm NOx rather then 15 ppm that was proposed. This reduces NOx emission by about 40% NOz leads to ground level ozone which is bad for my respiratory system.

7) When the Air quality index indicated Orange, Red, or higher alert status, Metro Health Department needs to force the facility to shut down.

I fully expect that my proposals be adhered to and that I and my fellow residents of Davidson County need to be protected. Why are we being singled out for deliberate, vicious, and malicious treatment to our health and well being? Guess in a few years, we will all BECOME THE "SECOND LOVE CANAL" with many residents passing away at an early age from cancer and other serious respiratory conditions.

WHEN I was a child I lived in Greenwich, Conn. and I had an uncle who was the County Commissioner in a neighboring town. I was told by my aunt how honest my uncle was and I did not believe her then nor do I believe now that apparently politicians protect their constituents. Money appeared to work then and apparently still does. That was why I told the Pipeline CEO and everyone else that I talked to, that it appeared to me to be a "DONE DEAL" in June 2016 and was from the inception of the Project, and it still is.

With kindest regards,

Lorraine Guth (Parker)

1216 Bending Creek Drive
Cane Ridge, Tenn. 37013
404-583-1508
July 5, 2016 re-sent December 9, 2016

Mr. Robert Skagg, CEO
Columbia Pipeline Group
5151 San Felipe, Suite 2400
Houston, Texas 77056

Re: Davidson County, Tennessee residents and businesses and Columbia Pipeline Group - Gulf Express Project – Docket No. CP16-361-000

Dear Mr. Skagg:

It has now come to my attention that my real estate value of my home has been severely damaged by the prospect of your compressor station. As I have previously notified you of what I would do if my real estate value was damaged by the threat of or the actual building of a compressor station in my back yard, I hereby demand $500,000.00 for my home. You have trashed my investment and failed to inform me that you even were attempting to enter my neighborhood with your compressor station. This was done due to my being elderly and was total discrimination. If I had known in time, I could have sold my home a year ago for $200.000.00 Values in the entire Davidson County are are climbing drastically as Nashville is the up and coming place to move too; however, not the 37013 neighborhood now tha t the re is the threat of the compressor station. Our are is going totally contrary to the Nashville trend. You have damaged my investment.

A check a year ago revealed real estate values climbing in my area yearly and there were almost no homes for sale. Now there are many for sales and values have tumbled even though Nashville, Tenn. Values have sharply increased. I had been a licensed Georgia Real Estate agent for almost 20 years so my input is credible. Per the rate of the Nashville increases my home should have been worth at least $215,000.00; however, a check with Zillow shows $184,500.00.

In view of the fact that I forewarned of this problem as soon as I found out about the compressor station, it was already too late. Apparently it was "the best kept secret" from me and this is a case of total elderly abuse. I hereby demand payment for each and every decrease my home suffers as well as the total losses that I have suffered financially due to not being informed of your compressor station being built so close to my home.

A couple of months ago, 2 of your representatives came to my home to reassure me everything was ok; however, it is not!

The following is from my many letters to your advising you of the problems that Columbia Pipeline could cause; and they now have.

As a follow-up to my letter to you under date of June 21, 2016, I have done some research concerning the accident rates of gas pipeline problems over the last 15 years and 4 months in the United States.

It appears that there were approximately 408 accidents, which includes all types of gasoline accidents such as pipeline worker related accidents, tornadoes, lightning strikes, negligence, old pipelines, as well as other type of pipeline accidents. It also appears that approximately 45 of these pipeline accidents were related to natural gas pipelines. There appeared to be 89 fatalities; 223 + injuries. It would appear that Columbia was responsible for some of these problems. That is if Columbia Transmissions is one and the same as Columbia Pipeline Group. Perhaps I need to do a further study to unravel any information that I have missed during my first research of the problem.

What is also shocking is the fact that there appears to be only 14 fines; 3 citations; 2 consent orders, and 1 criminal complaint against any of those responsible for the deaths, human injuries, as well as damage to properties.

Most of the study that I did does not give names of the pipeline owners who caused the problem; however, I have to-date located at least 3 apparently attributed to Columbia. One 2009, 2011, and February 13, 2014. Even one accident would be too much for my backyard!

The following is also another copy of my letter to you dated June 21, 2016, with no response to date.

"On Tuesday, June 21, 2016 I received a call from a neighbor asking if I would like to attend a FERC scoping meeting concerning the Columbia Pipeline (Gulf Express) project @ 6:00 P.M. At the Cane Ridge High School in Cane Ridge, Tenn.

Needless-to say I was shocked at this message as I, as an 87-year old recent TSU Master's Degree recipient, had never received any type of information or literature concerning this imminent danger to health, property value, Green-way tranquility, or quiet enjoyment of property in my neighborhood.

As a retired real estate agent in another state, I am floored at this news as well as the fact that I obviously was deliberately singled out (due to my age) from being notified. This is a serious breach of my rights as a taxpayer in Davidson County and as a United States citizen.

The meeting appeared to be nothing more then a "done deal" being pushed before poor unsuspecting public, and with the guise of attempting to allay fears of the community and as a good future partner. It all appeared to be nothing more then "contrived" and I did not believe a word of it either from the staff of the FERC or the representatives of the Columbia Pipeline, who I talked to after the meeting. The Columbia Pipeline representatives were not apparently available during the meeting but only in the foyer afterwards.

The only conclusion that could be reached that the Green-way project built around Davidson County appears to be nothing but a waste of taxpayers monies as it will be worthless to the

residents after your project enters our area. Noise pollution alone would ruin tranquility not to mention environmental harm. The homeowners attending the meeting the other night, were painted a "pretty picture" of no harm; however, the information given was from areas not affected by your pipeline project due to the fact that they were in very low population areas, and not like Davidson County that has a very large population. The Cane Ridge area alone probably represents at least 200,000. This whole meeting appeared to be a deliberate cover-up of a deal already "done".

The only comment I will have about my suspicions being true,would be that if I were the CEO of a large pipeline company, I would not want to subject myself, my personnel, representatives, employees, or any or all entities that would help or provide help to start or run my project to the possible future hostility, or even perhaps legal actions against them. Am I right? As the owner and officer of a former chemical corporation
for years, I am aware of these pitfalls.

Further, the literature indicates that the pipeline project can even bring about condemnation with eminent domain against our properties. This means that we could end up receiving only a small portion of what our properties are worth. At almost 88 years of age, this would be devastating, as well as having to pack up and make a move. Please be advised that I have already been faced with a move to work on my doctorate; however, will not do so due to the moving.

As you are probably aware if you follow the news around the world, my graduation from TSU on May 6, 2016 with my Master's went around the world and it was viral on almost every station including the BBC. I am also already well known for being the lead singer, (opening all the shows for the Atlanta County Music Hall of Fame) in Atlanta, Georgia for the past 24 years. I was voted "Entertainer of The Year 2006" for Georgia. I was inducted into Phi Kappa Phi National Honor Society on April 17, 2015; was inducted into Alpha Lamba Delta at Georgia State University; National Honor Society at Greenwich High School in Greenwich, Conn.; attended law school 2 years maintaining a 104 grade on a cite test @ age 77; received an 80-hour Private Investigator Certificate from college; and a real estate license in Georgia. I am told by the media that I had one of the highest scores in the Master's program. I still maintain a 4bedroom home by myself; detail my Lexus myself; and 2 weeks ago traveled to Georgia by myself to open a show in Macon, Georgia for the Atlanta Country Music Hall of Fame, and will open the "Entertainer of the Year Show" in Atlanta, Ga. on August 21, 2016 at age 88. I also formerly owned 2 aircraft.

I have filed actions against doctors (settled one of the first malpractice suits in the U.S. in 1958) collecting from Lloyds of London; filed against insurance companies; utility companies; lawyers; credit reporting companies; dishonest auto mechanics; dishonest contractors; and even dishonest new car dealers, so now you know part of my background. I was a paralegal for 15 years also.

I am shocked and appalled that the Mill Run Homeowners as well as other homeowner associations have not notified the homeowners of the problems that I have related above, as well as having not attempted to put a STOP to the project before it ever escalated to the level it now has. Now it is like"locking the barn door after the horse has escaped". It apparently already is too late to stop it.

pictures in the literature that I have been given at the June 21st meeting, shows a very ugly landscape with your pipes and buildings on the property. It is a disaster ready to happen apparently!

I have no choice but to copy the FERC; Governor Haslam; Nashville, Tenn. Mayor; the President of the Tennessee Board of Realtors; the Chamber of Commerce; the CEO of the Management company for the Mill Run Homeowners Association and will request to know the exact time they were informed of this apparent disaster to our area. If they knew prior to my being notified, then there obviously should be consequences as a result of any possible harm to me or my finances. Correct?"

It has come to my attention that Columbia is sold or being sold to a Canadian company. Is that apparently in order to avoid any or all types of legal action?

With kindest regards, I remain

Lorraine Guth Parker

cc: Barrack Obama, President of the United States
1600 Pennsylvania Avenue NW
Washington, D.C. 20004

cc: Kimberly D. Bose, Secretary - Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

cc: Governor of Tennessee, Bill Haslam
State Capitol,1st floor
600 Charlotte Avenue
Nashville, Tenn. 37243

cc: Nashville Mayor, Megan Barry
1 Public Square
Nashville, Tennessee 37201

cc: Tennessee Association of Realtors
c/o Nashville Association of Realtors
4540 Trousdale Drive
Nashville, Tennessee 37204

cc: Kenyon M. Rush, President
Chamber of Commerce
c/o 211 Commerce Street, Suite 100
Nashville, Tennessee 37201

cc: Dan Henning, CEO
Community Management Association
as management company for:
Nashville Mill Run S.D.
1465 Northside Drive NW
Atlanta, Georgia 30218

cc: President, PBS TV
161 Rains Avenue
Nashville, Tennessee 37202-8330

cc: President, TV Fox 17
631 Mainstream Drive
Nashville, Tennessee 37228

cc: President, CBS News Channel 5 TV
474 James Robertson Parkway
Nashville, Tennessee 37219-1212

cc: President, NBC WSMV TV 4
5700 Knob Road
Nashville,Tennessee 37209-4523

cc: President, ABC WKRN News 2
441 Murfreesboro Road
Nashville, Tennessee 37210

1216 Bending Creek Drive
Cane Ridge, Tenn. 37013
404-583-1508
July 5, 2016

Mr. Robert Skagg, CEO
Columbia Pipeline Group
5151 San Felipe, Suite 2400
Houston, Texas 77056

Re: Davidson County, Tennessee residents and businesses and Columbia Pipeline Group - Gulf Express Project – Docket No. CP16-361-000

Dear Mr. Skagg:

As a follow-up to my letter to you under date of June 21, 2016, I have done some research concerning the accident rates of gas pipeline problems over the last 15 years and 4 months in the United States.

It appears that there were approximately 408 accidents, which includes all types of gasoline accidents such as pipeline worker related accidents, tornadoes, lightning strikes, negligence, old pipelines, as well as other type of pipeline accidents. It also appears that approximately 45 of these pipeline accidents were related to natural gas pipelines. There appeared to be 89 fatalities; 223 + injuries. It would appear that Columbia was responsible for some of these problems. That is if Columbia Transmissions is one and the same as Columbia Pipeline Group. Perhaps I need to do a further study to unravel any information that I have missed during my first research of the problem.

What is also shocking is the fact that there appears to be only 14 fines; 3 citations; 2 consent orders, and 1 criminal complaint against any of those responsible for the deaths, human injuries, as well as damage to properties.

Most of the study that I did does not give names of the pipeline owners who caused the problem; however, I have to-date located at least 3 apparently attributed to Columbia. One 2009, 2011, and February 13, 2014. Even one accident would be too much for my backyard!

The following is also another copy of my letter to you dated June 21, 2016, with no response to date.

"On Tuesday, June 21, 2016 I received a call from a neighbor asking if I would like to attend a FERC scoping meeting concerning the Columbia Pipeline (Gulf Express) project @ 6:00 P.M. At the Cane Ridge High School in Cane Ridge, Tenn.

Needless-to say I was shocked at this message as I, as an 87-year old recent TSU Master's Degree recipient, had never received any type of information or literature concerning this imminent danger to health, property value, Green-way tranquility, or quiet enjoyment of property in my neighborhood.

As a retired real estate agent in another state, I am floored at this news as well as the fact that I obviously was deliberately singled out (due to my age) from being notified. This is a serious breach of my rights as a taxpayer in Davidson County and as a United States citizen.

The meeting appeared to be nothing more then a "done deal" being pushed before poor unsuspecting public, and with the guise of attempting to allay fears of the community and as a good future partner. It all appeared to be nothing more then "contrived" and I did not believe a word of it either from the staff of the FERC or the representatives of the Columbia Pipeline, who I talked to after the meeting. The Columbia Pipeline representatives were not apparently available during the meeting but only in the foyer afterwards.

The only conclusion that could be reached that the Green-way project built around Davidson County appears to be nothing but a waste of taxpayers monies as it will be worthless to the residents after your project enters our area. Noise pollution alone would ruin tranquility not to mention environmental harm. The homeowners attending the meeting the other night, were painted a "pretty picture" of no harm; however, the information given was from areas not affected by your pipeline project due to the fact that they were in very low population areas, and not like Davidson County that has a very large population. The Cane Ridge area alone probably represents at least 200,000. This whole meeting appeared to be a deliberate cover-up of a deal already "done".

The only comment I will have about my suspicions being true,would be that if I were the CEO of a large pipeline company, I would not want to subject myself, my personnel, representatives, employees, or any or all entities that would help or provide help to start or run my project to the possible future hostility, or even perhaps legal actions against them. Am I right? As the owner and officer of a former chemical corporation for years, I am aware of these pitfalls.

Further, the literature indicates that the pipeline project can even bring about condemnation with eminent domain against our properties. This means that we could end up receiving only a small portion of what our properties are worth. At almost 88 years of age, this would be devastating, as well as having to pack up and make a move. Please be advised that I have already been faced with a move to work on my doctorate; however, will not do so due to the moving.

As you are probably aware if you follow the news around the world, my graduation from TSU on May 6, 2016 with my Master's went around the world and it was viral on almost every station including the BBC. I am also already well known for being the lead singer, (opening all the shows for the Atlanta County Music Hall of Fame) in Atlanta, Georgia for the past 24 years. I was voted "Entertainer of The Year 2006" for Georgia. I was inducted into Phi Kappa Phi National Honor Society on April 17, 2015; was inducted into Alpha Lamba Delta at Georgia State University; National Honor Society at Greenwich High School in Greenwich, Conn.; attended law school 2 years maintaining a 104 grade on a cite test @ age 77; received an 80-hour Private Investigator Certificate from college; and a real estate license in Georgia. I am told by the media that I had one of the highest scores in the Master's program. I still maintain a 4bedroom home by myself; detail my Lexus myself; and 2 weeks ago traveled to Georgia by myself to open a show in Macon, Georgia for the Atlanta Country Music Hall of Fame, and will open the "Entertainer of the Year Show" in Atlanta, Ga. on August 21, 2016 at age 88. I also formerly owned 2 aircraft.

I have filed actions against doctors (settled one of the first malpractice suits in the U.S. in 1958) collecting from Lloyds of London; filed against insurance companies; utility companies; lawyers; credit reporting companies; dishonest auto mechanics; dishonest contractors; and even dishonest new car dealers, so now you know part of my background. I was a paralegal for 15 years also.

I am shocked and appalled that the Mill Run Homeowners as well as other homeowner associations have not notified the homeowners of the problems that I have related above, as well as having not attempted to put a STOP to the project before it ever escalated to the level it now has. Now it is like"locking the barn door after the horse has escaped". It apparently already is too late to stop it.

The pictures in the literature that I have been given at the June 21st meeting, shows a very ugly landscape with your pipes and buildings on the property. It is a disaster ready to happen apparently!

I have no choice but to copy the FERC; Governor Haslam; Nashville, Tenn. Mayor; the President of the Tennessee Board of Realtors; the Chamber of Commerce; the CEO of the Management company for the Mill Run Homeowners Association and will request to know the exact time they were informed of this apparent disaster to our area. If they knew prior to my being notified, then there obviously should be consequences as a result of any possible harm to me or my finances. Correct?"

It has come to my attention that Columbia is sold or being sold to a Canadian company. Is that apparently in order to avoid any or all types of legal action?

With kindest regards, I remain

Lorraine Guth Parker

cc: Barrack Obama, President of the United States
1600 Pennsylvania Avenue NW
Washington, D.C. 20004

cc: Kimberly D. Bose, Secretary - Federal Energy Regulatory Commission
888 First Street NE, Room 1A
Washington, DC 20426

cc: Governor of Tennessee, Bill Haslam
State Capitol,1st floor
600 Charlotte Avenue
Nashville, Tenn. 37243

cc: Nashville Mayor, Megan Barry
1 Public Square
Nashville, Tennessee 37201

cc: Tennessee Association of Realtors
c/o Nashville Association of Realtors
4540 Trousdale Drive
Nashville, Tennessee 37204

cc: Kenyon M. Rush, President
Chamber of Commerce
c/o 211 Commerce Street, Suite 100
Nashville, Tennessee 37201

cc: Dan Henning, CEO
Community Management Association
as management company for:
Nashville Mill Run S.D.
1465 Northside Drive NW
Atlanta, Georgia 30218

cc: President, PBS TV
161 Rains Avenue
Nashville, Tennessee 37202-8330

cc: President, TV Fox 17
631 Mainstream Drive
Nashville, Tennessee 37228

cc: President, CBS News Channel 5 TV
474 James Robertson Parkway
Nashville, Tennessee 37219-1212

cc: President, NBC WSMV TV 4
5700 Knob Road
Nashville,Tennessee 37209-4523

cc: President, ABC WKRN News 2
441 Murfreesboro Road
Nashville, Tennessee 37210

From:	Mari.Dew
To:	Finke, John (Health)
Subject:	Natural gas compressor station
Date:	Wednesday, October 25, 2017 2:42:57 PM

Dear John Finke,

I am opposed to the natural gas compressor station being built in the Antioch neighborhood of Cane Ridge and the effects it will have on our air, our trees, our environment, and ultimately our community. Some things are more important than money, and nature and the air we breathe are certainly two incredibly important ones that will affect you and your family as well. Please stop and think about it and choose to act courageously and responsibly. Please stop its construction.

Thank you,

Mari Dew
Nashville, TN

Do or do not ..there is no try. -Yoda

From: Colleen
To: Finke, John (Health)
Subject: TransCanada Columbia Pipeline
Date: Wednesday, October 25, 2017 8:40:45 AM

Please say no to the TransCanada Columbia Pipeline
It will not serve TN.
It will only weaken our state infrastructure to serve the greedy.
Thank you,
Colleen McAtee

APPENDIX III

SOUTHERN ENVIRONMENTAL LAW CENTER (SELC) COMMENTS

SOUTHERN ENVIRONMENTAL LAW CENTER

Telephone 615-921-9470 | 1033 DEMONBREUN STREET, SUITE 205 NASHVILLE, TN 37203 | Facsimile 615-921-8011

October 25, 2017

VIA EMAIL John.Finke@Nashville.gov

John Finke, P.E., Director
Metro Public Health Department
Air Pollution Control Division
2500 Charlotte Avenue
Nashville, TN 37209

VIA HAND-DELIVERY

Metropolitan Board of Health
Pollution Control Division
2500 Charlotte Avenue
Nashville, Tennessee, 37209

RE: Draft/Proposed Part 70 Operation Permit, Columbia Gulf Transmission, LLC, Cane Ridge Compressor Station, Permit No. 70-0XX

Dear Mr. Finke and the Metropolitan Board of Health:

Thank you for the opportunity to comment on the permits the Metropolitan Government of Nashville and Davidson County proposes to issue to Columbia Gulf Transmission, LLC (Columbia) for the construction and operation of the Cane Ridge Compressor Station. The Southern Environmental Law Center submits these comments, together with the attached technical comments of Bill Powers, P.E., on behalf of Keep Southeast Nashville Healthy.

Summary and Background

Columbia proposes to construct and operate a new natural gas compressor station in Metropolitan Nashville/Davidson County, Tennessee (Nashville) as part of its Gulf Xpress Project. The proposed station would consist of two natural gas-fired Solar Titan 130 compressor turbines with an output power of 19,799 horsepower each and auxiliary equipment.[1]

The turbines will emit or contribute to the formation of criteria air pollutants, compounds for which national ambient air quality standards are set under the Clean Air Act to protect public health and the environment. In particular, the proposed station will emit particulate matter (9.3

[1] Metropolitan Government of Nashville and Davidson County, Draft/Proposed Part 70 Operating Permit, Columbia Gulf Transmission, LLC – Cane Ridge Compressor Station (2017).

tons per year), sulfur dioxide (13 tons per year), nitrogen oxides (78.2 tons per year), carbon monoxide (200.8 tons per year), and volatile organic compounds (10.18 tons per year). Acute and long-term exposure to these emissions can lead to adverse health impacts in exposed populations, including respiratory disease and respiratory symptoms, aggravated heart disease, and damage to the liver, kidney, and the central nervous system.[2] Additionally, some volatile organic compounds are suspected or known to cause cancer in humans.[3] A recent study also suggested that persistent low-level exposure to volatile organic compounds "present a significant risk to health."[4]

Nashville regulates facilities that emit these pollutants as part of its primary responsibility to protect the health and safety of its citizens. Acting pursuant to its federally and state-delegated power, Nashville has enacted air pollution and zoning laws to limit its populations' acute exposure to harmful pollution like the compressor station's industrial emissions.[5] In addition, Nashville has taken protective steps to mitigate the chronic effects of pollutants emitted by natural gas extraction infrastructure, including compressor stations.[6] Such emissions are predicted to adversely impact public health via climate change.[7]

Because Nashville cannot escape the impacts of climate change, the city has begun to address greenhouse gas emissions within its jurisdiction. For one, the Mayor has set goals for reduced greenhouse gas emissions and energy consumption through a community stakeholder

---

[2] *See, e.g.*, Southwest Pennsylvania Environmental Health Project, Summary on Compressor Stations and Health Impacts (February 24, 2015).

[3] *See* U.S. Environmental Protection Agency, Volatile Organic Compounds' Impact on Indoor Air Quality, *available at* https://www.epa.gov/indoor-air-quality-iaq/volatile-organic-compounds-impact-indoor-air-quality.

[4] Chunrong Jia, *A Non-Trivial Outdoor Exposure—VOC's at Gasoline Stations*, Presentation at 16th Annual Tennessee Environmental Conference, Mar. 14–15, 2017, *available at* https://static1.squarespace.com/static/599b34211e5b6c1cfaaa87cd/t/59b1571db07869a1beb182ea/1504794417933/2017_SpeakerBiosAbs_03022017.pdf.

[5] Nashville Local Implementation Plan, *available at* https://www3.epa.gov/region4/air/sips/tn/nash/Sec10.56.100.pdf. *See* 40 C.F.R. § 52.2220 (9/06/96, 61 Fed. Reg. 47057); Tennessee Infrastructure Requirements for the 2010 Nitrogen Dioxide National Ambient Air Quality Standard, 81 Fed Reg. 45,438-01; Tennessee; Infrastructure Requirements for the 2010 Sulfur Dioxide National Ambient Air Quality Standard, 81 Fed. Reg. 12,627-01 ("Regarding the public welfare and environment, TCA 68-201-106, Matters to be considered in exercising powers, states that 'In exercising powers to prevent, abate and control air pollution, the board or department shall give due consideration to all pertinent facts, including, but not necessarily limited to: (1) The character and degree of injury to, or interference with, the protection of the health, general welfare and physical property of the people . . .' . . . EPA has made the preliminary determination that Tennessee's SIP and practices are adequate for emergency powers . . . .").

[6] *See* Substitute Ordinance BL2015-1210

[7] Jerry M. Melillo et al., eds., *Climate Change Impacts in the United States: The Third National Climate Assessment* (2014), *available at* http://nca2014.globalchange.gov/report/sectors/human-health.

process called Livable Nashville. The greenhouse gas emissions from the proposed compressor station are therefore an unwelcome roadblock to Nashville's ability to meet the goals it set forth in the Livable Nashville report. The current draft of the report commits to reduce Nashville's greenhouse gas emissions from 2005 levels by 10% by 2020, 30% by 2030, and 70% by 2050.[8] Moreover, Mayor Barry has joined the Compact of Mayors, a global coalition of mayors and city officials committing to reduce local greenhouse gas emissions, enhance resilience to climate change, and track their progress publicly.[9] Despite these ambitious goals, the proposed station is projected to emit 176,294 tons per year of carbon dioxide equivalent (CO2e), raising Nashville's greenhouse gas emissions by approximately 1.3% from 2014 levels.[10] Installing a long-lived major greenhouse gas emitter negates the commitments made in the draft Livable Nashville report and the Compact of Mayors.

As further explained below, the projected emissions from the Cane Ridge compressor station are of particular concern because of the station's proposed location. Industrial sources are inappropriate for high-density areas like southeast Nashville, according to the Nashville city council.[11] More than that, it is inequitable to allow this station to be sited within a community with a greater than average density of minority and low-income populations, close to schools and public parks.

---

[8] *Office of Mayor Megan Barry, Draft: Livable Nashville* 6 (2017), *available at* https://www.nashville.gov/Portals/0/SiteContent/MayorsOffice/Sustainability/docs/LN%20DRAFT.pdf [hereinafter Livable Nashville draft report]. 2005 levels were 14,390,707 tons CO2e. *Livable Nashville draft report* at 6.

[9] Compact of Mayors Guide (July 2015), *available at* https://data.bloomberglp.com/mayors/sites/14/2015/07/Compact-of-Mayors-Full-Guide_July2015.pdf; Compact of Mayors, Nashville, TN, https://www.compactofmayors.org/cities/nashville-tn (last visited Sept. 25, 2017).

[10] *Id.* Nashville's 2014 CO2e emissions were 13,461,292 tons per year. FERC. Draft Environmental Impact Statement for Columbia Gas Transmission, LLC—Mountaineer Xpress Project Columbia Gulf Transmission, LLC—Gulf Xpress Project 4-288 (Feb. 2017). These calculations do not include the downstream greenhouse gas emissions effects of the pipeline project and the compressor station as required by *Sierra Club v. FERC*, No. 16-1387, at 19–27 (D.C. Cir. Aug. 22, 2017).

[11] *See* Substitute Ordinance BL2015-1210 ("WHEREAS, Natural gas compressor stations are operationally and physically similar to an industrial use; WHEREAS, Industrial uses are incompatible with many other land uses and are not sensitive to the environment; and WHEREAS, Because of the similarity to industrial uses, natural gas compressor stations are only appropriate in industrial zoning districts.").

Analysis

I. The Cane Ridge Compressor Station is inconsistent with laws enacted to protect the health and safety of Nashvillians.

The Cane Ridge compressor station cannot be sited where it has been proposed because it is inconsistent with two federally enforceable provisions of Tennessee's "State Implementation Plan," the pollution management plan required by the Clean Air Act: namely, the suitability requirement and the nuisance prohibition. Siting this industrial facility in suburban/residential Cane Ridge is also inconsistent with newly-approved provisions of Nashville's Certificate of Exemption, which grants Nashville the authority to run its air pollution program.

A. *The proposed site, located in an environmental justice community and a high-density residential area, is unsuitable for construction of a major industrial facility.*

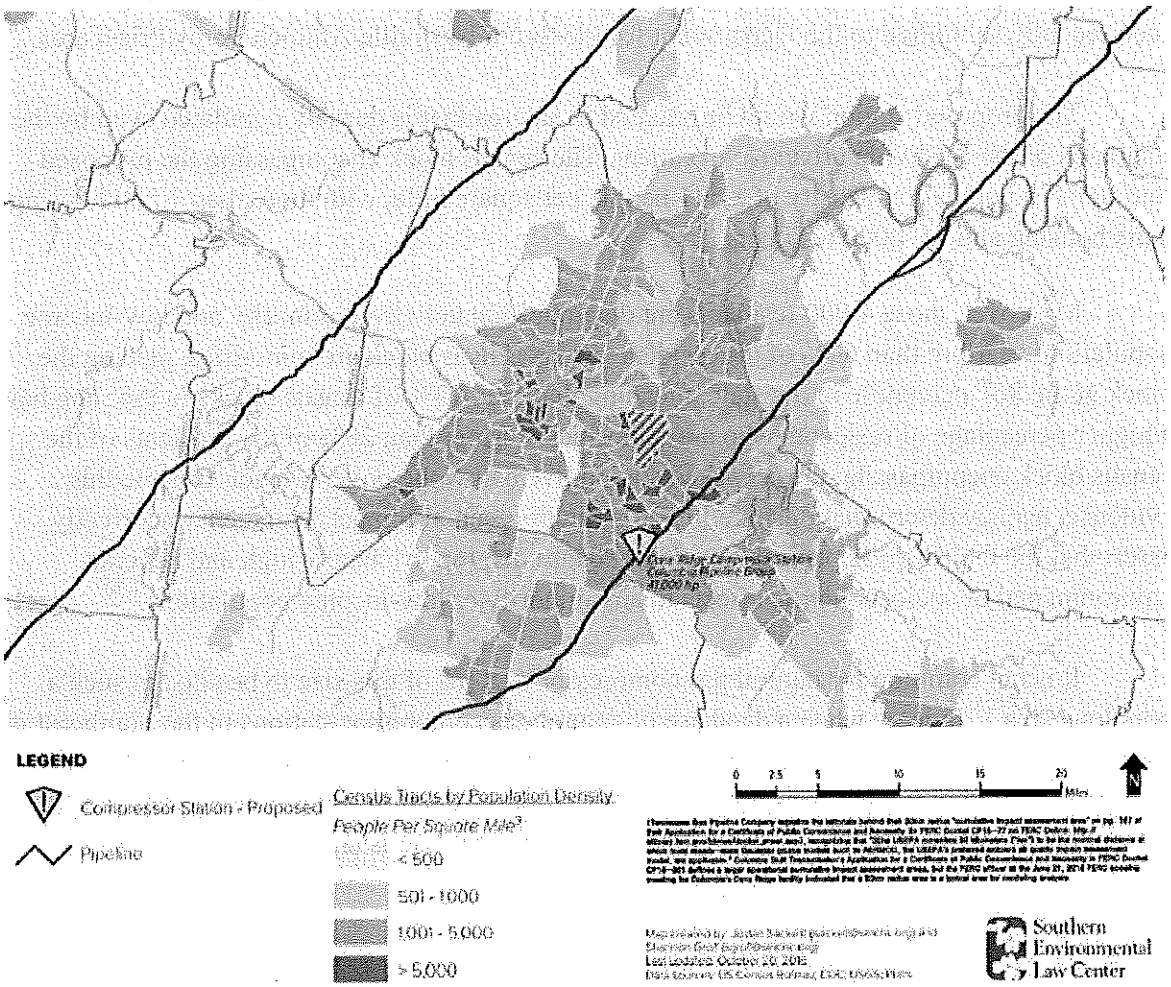
The EPA-approved Nashville SIP requires Metro Health to give due consideration to the "suitability or unsuitability of the air pollution source to the area in which it is located."[12]

The location proposed for the Columbia station is unsuitable because it will maximize the detrimental health impacts of the station's air emissions by exposing a dense, growing urban population to a new source of criteria air pollutants. And, as is too often the case, those impacts will be borne disproportionately by minority and vulnerable communities. More specifically, Columbia proposes to build its station in a growing metropolitan landscape in one of the most densely populated and fastest-growing areas in Tennessee, an area which is projected to experience one of the highest rates of development in Middle Tennessee over the next 15 years. The metropolitan statistical area that includes Nashville, has a population of 1.7 million people, and is expected to grow by more than 1 million residents over the next 15 years.[13, 14]

---

[12] Nashville Local Implementation Plan, *available at* https://www3.epa.gov/region4/air/sips/tn/nash/Sec10.56.100.pdf. *See* 40 C.F.R. § 52.2220 (9/06/96, 61 Fed. Reg. 47057). *Cf.* Tenn. Code Ann. § 68-201-106. As recently as July 2016, EPA has used this statute to conclude that Tennessee has sufficiently demonstrated compliance with the Clean Air Act. Tennessee Infrastructure Requirements for the 2010 Nitrogen Dioxide National Ambient Air Quality Standard, 81 Fed Reg. 45438-01; Tennessee; Infrastructure Requirements for the 2010 Sulfur Dioxide National Ambient Air Quality Standard, 81 Fed. Reg. 12627-01 ("Regarding the public welfare and environment, TCA 68-201-106, Matters to be considered in exercising powers, states that "In exercising powers to prevent, abate and control air pollution, the board or department shall give due consideration to all pertinent facts, including, but not necessarily limited to: (1) The character and degree of injury to, or interference with, the protection of the health, general welfare and physical property of the people . . ." . . . EPA has made the preliminary determination that Tennessee's SIP and practices are adequate for emergency powers . . . ."). *See also* Rule 1200-3-9-.02(6). 40 C.F.R. § 52.2220 (incorporating Section 1200-03-09-.02 into Tennessee SIP on 2/7/2012, 77 Fed. Reg. 6016).

[13] Nashville Area Metropolitan Planning Organization, 2040 Regional Transportation Plan (2016), available at http://www.nashvillempo.org/docs/2040RTP/Adopted/Chapter3_Trends.pdf.



In addition to Middle Tennessee's general growth trends, there is projected to be concentrated development in southeast Nashville, near Cane Ridge. The rapid growth in southeast Nashville was recently summarized by Nashville's long-range plan, which offered this historical perspective: "In 2010, according to the U.S. Census, the Southeast Community had 100,569 people, an increase of approximately 30 percent since 2000, and about 3,500 more people than forecasted in the early 1990s."[15] Indeed, according to the Metropolitan Nashville

[14] Draft Environmental Impact Statement for Columbia Gulf Transmission, LLC – Gulf Xpress Project (Feb. 2017), p. 4-218.

[15] NashvilleNext: A General Plan for Nashville & Davidson County, Vol. III (Southeast) (June 22, 2015), available at http://www.nashville.gov/Portals/0/SiteContent/Planning/docs/CommPlans2015/next-vol3-Southeast%20Nashville_Final.pdf.

Planning Department's website, approximately 100 development applications or filings have been recently submitted to the Department for the South Nashville/Antioch/Percy Priest area.[16]

The proposed station would be situated in an area that is densely populated even by the standards of the Nashville urban environment. The census block encompassing the proposed station has a population density of 1,541 people per square mile, with more than 1,500 housing units housing almost 4,000 residents.[17]

Moreover, those 4,000 residents are disproportionately from minority and low-income populations.[18] More than 60% of the residents in the census block are minorities, placing the block at the 86th percentile in the state, meaning that only 14% of census blocks in the state have a higher percentage of residents who are minorities.[19] More than 20% of the residents of the census block encompassing the proposed station live below the poverty level. Despite this evidence, agency determinations like FERC's Environmental Impact Statement, incorrectly assert that the Gulf Xpress project "would not cause disproportionately high and adverse environmental or socioeconomic effects to any minority or low-income populations."[20]

It is not common for natural gas compressor stations of this size to be sited in such a populous area.[21] Indeed, when a database of natural gas compressor stations in the Southeast is sorted by horsepower, the six next largest and six next smallest stations to the Cane Ridge Compressor Station (which does not include the proposed Joelton station) when placed next to their population, show that the Cane Ridge Compressor Station is an outlier[22]:

---

[16] *See* http://www.nashville.gov/Planning-Department.aspx.

[17] All data from EPA's EJSCREEN tool. *See also* Draft Environmental Impact Statement for Columbia Gulf Transmission, LLC – Gulf Xpress Project (Feb. 2017), p. 4-243-27.

[18] "'Minority' is defined as individuals who are Black or African American; Asian; American Indian or Alaskan Native; Native Hawaiian or Pacific Islander; or Hispanic." Draft Environmental Impact Statement for Columbia Gulf Transmission, LLC – Gulf Xpress Project (Feb. 2017), at p. 4-242.

[19] All data from EPA's EJSCREEN tool. *See also* DEIS at 4-243=7; https://www.epa.gov/sites/production/files/2017-09/documents/2017_ejscreen_technical_document.pdf.

[20] Final Environmental Impact Statement for Columbia Gulf Transmission, LLC – Gulf Xpress Project (July 2017), at ES-14

[21] *E.g.*, Draft Environmental Impact Statement for Columbia Gulf Transmission, LLC – Gulf Xpress Project (Feb. 2017), at p. 4-236 to 4-237 (discussing property values); 4-312 (discussing safety concerns); 4-315 (discussing pipeline accident data).

[22] The comparisons to other compressor stations in the Southeast in this and the next table do not analyze whether those stations were appropriately sited or whether they comply with local, state, and federal law.

Station	Owner	Horsepower	State	County	City	City population
MT PLEASANT	Texas Eastern Transmission Corp.	45000	TN	Giles	Lynnville	282
BANNER - STATION 6	Columbia Gulf Transmission Co.	43300	MS	Calhoun		
STATION 11 & 11A MT. VERNON	Florida Gas Transmission Co.	42400	AL	Mobile	Mount Vernon	1,555
CEREDO	Columbia Gas Transmission Corp.	42200	WV	Wayne	Huntington	49,177
STATION 14, QUINCY	Florida Gas Transmission Co.	41400	FL	Gadsden	Quincy	7,965
#96 - CAMPBELLSVILLE	Tennessee Gas Pipeline Co.	41200	KY	Taylor	Campbellsville	10,803
Proposed Cane Ridge Compressor Station	Columbia Pipeline Group	41000	TN	Davidson	Nashville	678,889
STANTON - STATION 1	Columbia Gulf Transmission Co.	39800	KY	Powell	Clay City	1,069
HAMPSHIRE - STATION 4	Columbia Gulf Transmission Co.	39600	TN	Maury	Mount Pleasant	4,654
#79 - LOBELVILLE	Tennessee Gas Pipeline Co.	39099	TN	Perry	Lobelville	890
NO 125 - MONROE (4)	Transcontinental Gas Pipe Line Corp.	38800	GA	Walton	Monroe	13,466
#63 - BATESVILLE	Tennessee Gas Pipeline Co.	38500	MS	Panola	Batesville	7,457
NO. 145 - GROVER	Transcontinental Gas Pipe Line Corp.	37500	NC	Cleveland	Grover	699

When the stations above 40,000 horsepower are sorted by city population, the largest 10 stations again show the Cane Ridge Compressor Station as an outlier, especially when one discounts the recently-approved Joelton station:

Station	Owner	Horse-power	State	County	City	City pop
Joelton Compressor Station	Tennessee Gas Pipeline Co.	60000	TN	Davidson	Nashville	678,889
Proposed Cane Ridge Compressor Station	Columbia Pipeline Group	41000	TN	Davidson	Nashville	678,889
CEREDO	Columbia Gas Transmission Corp.	42200	WV	Wayne	Huntington	49,177
NO. 150 - DAVIDSON	Transcontinental Gas Pipe Line Corp.	54300	NC	Iredell	Mooresville	34,887
GLADEVILLE TN	Texas Eastern Transmission Corp.	48500	TN	Wilson	Lebanon	28,408
NO. 120 - STOCKBRIDGE	Transcontinental Gas Pipe Line Corp.	71240	GA	Henry	Stockbridge	27,265
CORINTH - STATION 5	Columbia Gulf Transmission Co.	45550	MS	Alcorn	Corinth	14,870
NO. 160 - REIDSVILLE	Transcontinental Gas Pipe Line Corp.	53400	NC	Rockingham	Reidsville	14,162
NO. 140 - SPARTANBURG	Transcontinental Gas Pipe Line Corp.	56000	SC	Spartanburg	Moore	13,673
#87 - PORTLAND	Tennessee Gas Pipeline Co.	49700	TN	Sumner	Portland	11,993

B. *The proposed site is inappropriate because it is near schools, parks, and a greenway that may be regularly used by children.*

The station's location also suggests that it could have a disproportionately large effect on children. The proposed station would be located less than 1,000 meters, just less than the length of eleven football fields, from the Mill Creek Park and greenway system. Nineteen schools (1 preschool, 8 elementary schools, 5 middle schools, 3 high schools, 1 college, and 1 mixed-level

school) are within 5 miles of the proposed Cane Ridge Compressor Station.[23] Nashville is currently adding two new sections to the Mill Creek Greenway, a space that may be regularly used by local children.[24] Additionally, Metro Parks has proposed another Mill Creek greenway extension and the construction of Orchard Bend Park, a new facility with seven soccer fields, less than 5,000 feet from the proposed station.[25]

Because of these facts, Metro Health can conclude that the Cane Ridge compressor is unsuitable to for the location where Columbia proposes it be sited.

C. *The draft permit does not establish that the station will comply with Metro's "nuisance" prohibition.*

Nashville's EPA-approved SIP also contains a prohibition on the creation of nuisances that limits where air pollution sources may be sited. It states, "No person shall cause, suffer, allow or permit any emission of gases, vapors or objectionable odors beyond the property line from any source whatsoever which causes injury, detriment, nuisance or annoyance to an considerable number of persons or to the public, or which causes or has a natural tendency to cause injury or damage to business or property."[26] [27]

---

[23] The complete list: Lighthouse Christian Preschool, Montessori Academy (infants through 8th grade), A.Z. Kelley Elementary School, Cane Ridge Elementary School, Cole Elementary School, Edmondson Elementary School, Granbery Elementary School, JE Moss Elementary School, Tusculum Elementary School, Mt. View Elementary School, Antioch Middle School, Apollo Middle School, McMurray Middle School, Oliver Middle School, Thurgood Marshall Middle School, Antioch High School, Cane Ridge High School, Lighthouse Christian School, and National College.

[24] Metro Government of Nashville & Davidson County. "Greenway Plans and Projects. http://www.nashville.gov/Parks-and-Recreation/Greenways-and-Trails/Greenways-Plans-and-Projects.aspx.

[25] Todd, Jenn. "South Nashville soccer fields proposed for Cane Ridge." *The Tennessean.* 23 August 2016. http://www.tennessean.com/story/news/local/2016/08/23/south-nashville-soccer-fields-proposed-cane-ridge/89015798/.

[26] Section 10.56.170, https://www3.epa.gov/region4/air/sips/tn/nash/Sec10.56.170.pdf; https://www.municode.com/library/tn/metro_government_of_nashville_and_davidson_county/codes/code_of_ordinances?nodeId=CD_TIT10HESA_DIVIGERE_CH10.56AIPOCO_ARTIISTOP_10.56.170EMGAVAOBOD; https://www.federalregister.gov/documents/2005/10/06/05-20005/approval-and-promulgation-of-air-quality-implementation-plans-nashville-davidson-county-revised. Section 10.56.170 is part of the State implementation plan for Tennessee. *See* 40 C.F.R. § 52.2220(b) ("Material listed in paragraph (c) of this section with an EPA approval date prior to . . . April 1, 2005, for Nashville–Davidson County . . . was approved for incorporation by reference by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51."). *See also* https://www.federalregister.gov/documents/2005/10/06/05-20005/approval-and-promulgation-of-air-quality-implementation-plans-nashville-davidson-county-revised; https://www.federalregister.gov/documents/2005/10/06/05-20005/approval-and-promulgation-of-air-quality-implementation-plans-nashville-davidson-county-revised. *Cf. People of California v. BP et al*, No. CGC-17-561370 (Cal. Sup. Ct. Sept. 19, 2017) (Complaint against fossil fuel companies alleging nuisance related to global warming), *available at* http://blogs2.law.columbia.edu/climate-change-litigation/wp-content/uploads/sites/16/case-documents/2017/20170919_docket-CGC-17-561370_complaint.pdf.

Based on this "nuisance" provision, Metro Health must either reject or require appropriate control technology for the proposed Cane Ridge compressor station: selective catalytic reduction for NO_x, and oxidation catalyst for carbon monoxide and volatile organic compounds.[28] If it does not, the station could violate Section 10.56.170, prohibiting "emission of gases, vapors or objectionable odors beyond the property line . . . which causes injury, detriment, nuisance or annoyance to any considerable number of persons or to the public, or which causes or has a natural tendency to cause injury or damage to business or property." As discussed at the start of this letter, volatile organic compounds, NO_x, and carbon monoxide emissions from the proposed station can be harmful to public health, with major non-cancer effects including neurological, respiratory, reproductive, and developmental effects.[29] These potential effects are particularly concerning given the siting of the station in a high-density urban area with vulnerable populations. While the Cane Ridge draft permit includes a generic, blanket statement requiring the facility to comply with Section 10.56.170, this provision does not sufficiently assure compliance when Metro Health knows on the front-end of the process about the compressor station's emissions.

The nuisance provision's language is broad enough to allow Metro to deny or condition Columbia's permit. Metro Nashville has previously used this provision to require additional control technologies at a polluting facility. The nuisance rule specifically establishes a tool for

---

[27] *Cf. Laidlaw Envtl. Servs. of Nashville, Inc. v. Metro. Bd. of Health for Nashville & Davidson Cty.*, 934 S.W.2d 40, 51 (Tenn. Ct. App. 1996) (rejecting challenge to Section 10.56.170 as unconstitutionally vague, concluding that Board "clearly authorized to consider the location and surrounding area of the source of pollution 'in exercising its powers,'" explaining that Board's "'consideration' of the location and surroundings of the plant was not unreasonable," but finding Board's decision unreasonable given the particular facts before the court"). Chattanooga also has an EPA-approved nuisance rule, as does Memphis. *See* https://www3.epa.gov/region4/air/sips/tn/chatt/Sec4-41Rule14.pdf; https://www3.epa.gov/region4/air/sips/tn/memph/16.4.pdf.

[28] *Cf.* Bill Powers, *Review of Reasonableness of NO_x Emission Limits for Two Titan Turbines at Proposed Joelton, Tennessee Compressor Station*, July 26, 2016 (attached as Exhibit 1); Bill Powers, *Electric Motor Drive is Viable RACT Alternative to Two Titan Turbines at Proposed Joelton, Tennessee Compressor Station*, Nov. 18, 2016 (attached as Exhibit 2); Bill Powers, *Selective Catalytic Reduction (SCR) at 2.5 ppm NO_x and Dry Low NO_x Combustion at 9 ppm and 15 ppm are Cost-Reasonable RACT Alternatives to Two Titan Turbines at Proposed Joelton, Tennessee Compressor Station*, Jan. 5, 2017 (attached as Exhibit 3); Bill Powers, *Powers Engineering Response to Metro Public Health Department Questions Regarding (1) Selective Catalytic Reduction Cost and (2) the 9 ppm NO_x Limit as RACT for the Titan 250 Gas Turbines at Proposed Joelton, Tennessee Compressor Station*, Mar. 14, 2017 (attached as Exhibit 4); Bill Powers, *Comments on Proposed Joelton Compressor Station Air Permit Conditions and the Reasonably Available Control Technology Analysis Relied on by Metro Nashville to Justify Its NO_x RACT Determinations*, June 15, 2017 (attached as Exhibit 5).

[29] Chunrong Jia, *Memphis VOCs and PAHs Studies*, Presentation at Tennessee Environmental Conference and Exhibition, Mar. 14–15, 2017, *available at* https://static1.squarespace.com/static/599b34211e5b6c1cfaaa87cd/t/59b1571db07869a1beb182ea/1504794417933/2017_SpeakerBiosAbs_03022017.pdf.

Tennessee and Nashville to reduce pollution sources that may be interfering with the achievement of federal air quality standards. The provision affords them a great deal of flexibility by allowing them to take action against emitters that may not be violating a regulatory pollution standard per se, but are nevertheless hindering the State from achieving air quality goals. In *Laidlaw Environmental Services v. Metropolitan Board of Health for Nashville and Davidson County*, the Board used Section 10.56.170 as its basis for reversing the Director of the Air Pollution Division's issuance of an operating permit renewal for a wastewater treatment facility.[30] That decision was ultimately overturned by the Court, but only because the Board had previously agreed that as long as the facility complied with its consent decree, it was in compliance with Section 10.56.170.[31] The facility had hundreds of times emitted odors that were a nuisance to surrounding neighbors.[32] As such, the Board entered a consent decree with the facility to bring the facility into compliance with Section 10.56.170.[33]

Therefore, to prevent the nuisance and annoyance that could result from the emissions from the proposed station, if it does not deny the permit, Metro Health could at least require the applicant to install selective catalytic reduction for NO_x emissions, and oxidation catalyst for carbon monoxide and volatile organic compound emissions. It should also include oversight provisions to assure public health and safety.

D. *Nashville's zoning restrictions prohibit industrial facilities in non-industrial zones.*

Issuance of the construction permit for the proposed station appears to violate Nashville's Municipal Code. Section 10.56 provides, in pertinent part, that, "No new source shall be granted a construction permit unless the new source complies with the Metropolitan Zoning Code for the use of the property on which the new source is to be constructed."[34]

The property on which the station is proposed to be located consists of eight parcels in southeast Nashville, all of which are zoned for agricultural and/or residential use.[35] Metropolitan zoning requires that compressor stations be located only in areas zoned for industrial use.[36]

---

[30] *Laidlaw Environmental Services v. Metropolitan Board of Health for Nashville and Davidson County*, 934 S.W.2d 40, 49–51 (TN Ct. App. 1996). *See also Wood v. Metropolitan Nashville Board of Health*, No. M2006-01599-COA-R3-CV, 2007 WL 4207851, at *3–4 (Ct. App. Nov. 28, 2007) (citing *Laidlaw* as a case demonstrating that the Board can regulate emissions that spread beyond the boundaries of a facility's property).

[31] *Id.* at 50.

[32] *Id.*

[33] *Id.*

[34] Nashville Municipal Code § 10.56.

[35] This parcel of land is classified under the zoning code AR2A, described on the metro planning website as "agricultural, requiring a minimum lot size of 2 acres and intended for uses that generally occur in rural areas, including single-family, two-family, and mobile homes." Metro Government of Nashville & Davidson County

State and federal agencies recognize Nashville's right to enforce this ordinance in that earlier this year the Tennessee Air Pollution Control Board approved Nashville's request to incorporate the ordinance into Nashville's "Certificate of Exemption," which authorizes Nashville to operate its own air pollution control program. Nashville petitioned for the language from the ordinance to be included as additional authority into its current Certificate of Exemption. The state Air Pollution Control Board denied the request to make the ordinances part of the State Implementation Plan but, having determined that the provision was not less stringent than those of the state and that the provision was or would be adequately enforced, voted to approve Nashville's petition to include it in the COE on March 9, 2017.[37] Subsequently, the Tennessee General Assembly passed legislation, which took effect in May 2017, that prohibits municipalities or counties from including land use or zoning requirements in air pollution control requirements.[38]

Similarly, the Gulf Xpress Project Environmental Impact Statement prepared by the Federal Energy Regulatory Commission this year acknowledges Nashville's ordinance and states the expectation that "Columbia Gulf would consult with the Metropolitan Government to identify recommended site development measures for this property."[39] Notably, because of the risks associated with natural gas infrastructure in terms of safety and air pollution, other projects like liquefied natural gas facilities, require decision makers to consider state and local safety factors, like the existing and projected population and demographic characteristics of the location and the need to encourage remote siting.[40] The same reasons for considering these factors with LNG terminals apply to this compressor station.

Nashville's ordinances purport to require Columbia to re-site its station away from residential neighborhoods or use control technologies to eliminate emissions. Governmental

---

Planning Department, *Parcel ID 00900002600*, Mapping and GIS (Aug. 7, 2017 at 12:20 PM), available at http://maps.nashville.gov/ParcelViewer/.

[36] Nashville & Davidson County, Tenn., Second Substitute Ordinance No. BL2015-1210 (Aug. 10, 2015) (amending Municipal Code § 17). This ordinance was passed by the Nashville Council on August 4, 2014 by a vote of 30-3-1. It was approved by Mayor Megan Barry on August 10, 2015.

[37] Tennessee Department of Environment and Conservation, Bureau of Environment, Division of Air Pollution Control, Regular Meeting of the Air Pollution Control Board, Transcript of Proceedings at 95 (March 9, 2017).

[38] *See* Public Chapter No. 284, Senate Bill No. 1371, *available at* http://publications.tnsosfiles.com/acts/110/pub/pc0284.pdf; 110th Tennessee General Assembly, Senate Bill 1371, *available at* http://wapp.capitol.tn.gov/apps/BillInfo/default.aspx?BillNumber=SB1371&ga=110.

[39] Final Environmental Impact Statement for Columbia Gulf Transmission, LLC – Gulf Xpress Project (July 2017), p. 4-199.

[40] 15 U.S.C. § 717b-1(b).

authorities have a duty to enforce properly enacted laws such as the land use ordinance.[41,42] Nashville is no different. Therefore, the application for the construction permit for the proposed station could be denied.

E. *The proposed location includes two major new sources of pollutants, the proposed station and the Joelton Compressor Station, in the same airshed.*

Nashville is the only major city in the Southeast known to have proposals for two compressor stations of this size within its city limits (the Joelton Compressor Station would be

---

[41] The Charter of the Metropolitan Government of Nashville and Davidson County specifically provides the power to enact laws to regulate zoning and to protect public health (*see* Metropolitan Nashville and Davidson County, Tenn., Charter art. 2 sec. 2.01, and art. 10 ch. 1 .) The Metropolitan Code also provides specific authority to the Health Board: "There is imposed upon the board in addition to those functions and duties set forth in Article 10, Chapter 1, of the Charter of the metropolitan government, the authority, power and duty to adopt, promulgate and enforce such rules and regulations to carry out the provisions of this chapter which the board deems necessary in order to achieve and maintain such levels of air quality as will protect human health and safety and to the greatest degree practical, prevent injury to plant life and property, foster the comfort and convenience of the inhabitants of the metropolitan government area and promote the economic and social development of the metropolitan government area; provided, that such rules and regulations shall not conflict with any laws of the state, the Charter of the metropolitan government or any ordinance of the metropolitan government, nor shall such rules and regulations exceed the limits of authority granted to the board in this chapter." Metropolitan Nashville and Davidson County, Tenn., Code § 10.56.090.

[42] Neither the United States Supreme Court nor the Sixth Circuit have ruled on the scope of preemption of local air, health or zoning ordinances under the Natural Gas Act. Recently, however, the Supreme Court in *Oneok, Inc. v. Learjet, Inc.*, 135 S. Ct. 1591 (2015), limited federal preemption of the Natural Gas Act to allow state antitrust regulation of wholesale natural gas rates, even though that area was traditionally recognized as squarely within the exclusive jurisdictional scope of that Act. *See Schneidewind v. ANR Pipeline Co.*, 485 U.S. 293, 308 (1988). The D.C. Circuit appears to be the only Court of Appeals that has examined preemption in the context of the Clean Air Act, and it has twice refused to determine the exact scope of preemption. *Myersville Citizens for a Rural Cmty., Inc. v. Fed. Energy Regulatory Comm'n*, 783 F 3d 1301, 1321 (D.C. Cir. 2015) (declining to address question as not properly before court); *Dominion Transmission v. Summers*, 723 F. 3d 238, 245 (D.C. Cir. 2013) (deferring to Maryland Department of the Environment). The Fourth Circuit has examined the preemption issue, but only in the context of the Coastal Zone Management Act. *AES Sparrows Point LNG, LLC v. Smith*, 527 F.3rd 120 (4th Cir. 2008). With no guidance from the Supreme Court or the Sixth Circuit on this issue of first impression, the Metropolitan Nashville/Davidson County Health Department must follow local law and deny the permit. Moreover, in a case such as this, where the natural gas is being transported to a private company for export from the United States, the purposes for comprehensive regulation of the market by the Natural Gas Act do not exist. However, recently in the Middle District of Tennessee, a judge memorialized two private parties' agreement about the status of Nashville's zoning ordinances in the context of the Natural Gas Act in an order. Specifically, Tennessee Gas Pipeline LLC agreed to dismiss a lawsuit against Metro Nashville if the city agreed that Ordinances BL2015-1210 and BL2016-234 "cannot legally affect the siting of Tennessee Gas's Compressor Station 563, part of Tennessee Gas's Broad Run Expansion Project, as approved by the United States Federal Energy Regulatory Commission, Docket No. CP15-77-000, because the above-referenced ordinances are preempted by federal law as they relate to this project." *Tenn. Gas Pipeline v. Metro. Gvt. Of Nashville & Davidson Co.*, No. 3:17-cv-00272 (M.D. Tenn. Aug. 23, 2017). This order is not apparently binding on any other parties and, based on agreement rather than legal analysis, should hold no weight for future courts' analyses.

60,000 horsepower station, while the Cane Ridge Compressor Station would be 41,000 horsepower). If completed, the Joelton and Cane Ridge Compressor Stations will add a significant quantity of additional NO_x and volatile organic compound emissions from point sources of fuel combustion in Nashville when the compressor station becomes operational. NO_x emissions from point sources of fuel combustion will increase 45 percent, from 549.7 tons per year to 795.3 tons per year and volatile organic compounds from point sources of fuel combustion will increase by 197 percent, from 11.0 tons per year to 32.68 tons per year.[43]

To assist Metro Health's analysis, we constructed an approximate "budget" of allowable emissions before the national ambient air quality standards (NAAQS) for ozone are exceeded by comparing background levels of criteria emissions to the budget ceiling, represented by the NAAQS concentration. Metro's background concentrations were used for all of the calculations, because the background concentrations reported by Columbia and Kinder Morgan vary considerably.

Approximate NAAQS "Budget" for Metro Nashville

Pollutant	Averaging period	NAAQS max concentration ($\mu g/m^3$)	Background levels, Metro ($\mu g/m^3$)	Percentage of NAAQS "budget" used by background levels	Percentage remaining in the "budget"
NO_2	1-hour	188.00	73.33	0.39	0.61
	Annual	100.00	16.13	0.16	0.84
CO	1-hour	40000.00	2060.00	0.05	0.95
	8-hour	10000.00	1831.00	0.18	0.82
PM2.5	24-hour	35.00	19.70	0.56	0.44
	Annual	12.00	9.76	0.81	0.19
PM10	24-hour	150.00	30.00	0.20	0.80
PM2.5/10	N/A	N/A	N/A	N/A	N/A
VOC	N/A	N/A	N/A	N/A	N/A
SO_2	1-hour	196.00	18.31	0.09	0.91
	3-hours (SECONDARY)	365 (24 hours)	18.31	N/A	N/A

Using reported emissions and background concentration data, we compared the cumulative emissions and NAAQS levels to indicate roughly if the addition of the proposed Compressor Station and the Joelton Compressor Station, will threaten Metro's attainment status. Overlooking the variation in model outputs given the limited purposes of this exercise, we added

[43] Metro Nashville/Davidson County Health Department Pollution Control Division, Air Pollution Control – 2014 Annual Report, Table 1 – 2014 Davidson County Annual Emission Inventory, p. 5.

the companies' self-reported modeled impacts to the background concentration provided by Metro Nashville then divided this sum by the maximum concentration of the pollutant associated with NAAQS.

Approximate Percentage Self-Reported Modeled Impact

Pollutant	Averaging period	Self-reported modeled impact, Joelton ($\mu g/m^3$)	Self-reported modeled impact, Cane Ridge ($\mu g/m^3$)	NAAQS max concentration ($\mu g/m^3$)	Background levels, Metro ($\mu g/m^3$)	Percentage self-reported modeled impact
NO_2	1-hour	31.23	7.70	188.00	73.33	0.60
	Annual	0.65	N/A	100.00	16.13	N/A
CO	1-hour	31.69	23.30	40000.00	2060.00	0.05
	8-hour	25.21	9.50	10000.00	1831.00	0.19
PM2.5	24-hour	0.68	0.40	35.00	19.70	0.59
	Annual	0.04	0.00	12.00	9.76	0.82
PM10	24-hour	N/A?	0.40	150.00	30.00	N/A
PM2.5/10	N/A	N/A?	N/A	N/A	N/A	N/A
VOC	N/A	N/A?	N/A	N/A	N/A	N/A
SO_2	1-hour	N/A?	0.70	196.00	18.31	N/A
	3-hours (SECONDARY)		0.2 (24-hr avg)	365 (24 hours)	18.31	N/A

NO_x concentrations consume more of the budget than the other pollutants. The additional NO_x contributions modeled and reported by the companies contribute to an increase in the percentage of the NO_x NAAQS budget. In addition, the additional 248 tons of NO_x emissions that could be released yearly by the two proposed compressor stations could contribute to a 1.1% increase in ozone levels. If these ozone levels are recorded at the Hendersonville monitoring station downwind of Metro Nashville, they could reduce the margin of compliance at this station by one-third.[44]

[44] Gebhart, Howard D. "The Siting of New Proposed Nitrogen Oxide (NOx) Emission Sources in the Greater Nashville Region and Implications for Ozone NAAQS Compliance." 19 January 2017 (attached as Exhibit 6).

II. Even though it is connected to a major population center, the Cane Ridge Compressor Station applies NO_x control technology that is less protective than that of other stations in the Southeast, which are themselves not the most protective possible.

A. *The Clean Air Act requires best available control technology for turbines of fossil fuel-fired electric plants, which are analogous to the Cane Ridge turbines.*

Because the proposed station would use the same turbines as fossil fuel-fired steam electric plants that must comply with best available control technology (BACT), Metro should require the compressor stations to apply selective catalytic reduction for NO_x emissions, and oxidation catalyst for carbon monoxide and volatile organic compound emissions. The Clean Air Act identifies specific sources in attainment areas that must apply BACT when they have the potential to emit 100 tons per year (tpy) or more of a regulated pollutant. This category of sources includes fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input (MMBtu).[45] The EPA and its regions have interpreted this source category broadly, and in 1993, the EPA clarified that it includes natural gas combined cycle plants and cogeneration plants, which can use the same types of turbines that would be utilized at the compressor station.[46] In that guidance, the EPA explained that "many Regions and States [had] long considered gas turbine combined cycle and cogeneration facilities to be subject to a 100 tpy major source threshold," beginning with Region V's application of BACT to a natural gas steam electric plant in 1987.[47] The guidance merely ensured that the remaining regions and states applied the standard consistently.[48]

But for the final destination of their generated electricity, the Titan 130 turbines would expressly be subject to BACT under the Act. The Titan 130 turbines have a total heat input of more than 250 MMBtu.[49] They have the potential to emit more than 100 tons per year of carbon monoxide (a regulated pollutant) and similarly emit significant amounts of NO_x, volatile organic compounds, and greenhouse gases.[50] The turbines utilize a fossil fuel—natural gas—to generate

---

[45] Clean Air Act § 169, 42 USC § 7479; 40 C.F.R. § 52.21.

[46] Memorandum from Edward J. Lillis, EPA Permits Programs Branch Chief, to Bernard E. Turlinski, EPA Region III Air Enforcement Branch Chief, and George T. Czerniak, EPA Region V Air Enforcement Branch Chief, Determining Prevention of Significant Deterioration (PSD) Applicability Thresholds for Gas Turbine Based Facilities, Feb. 2, 1993.

[47] *Id.*

[48] *Id.*

[49] Metro Nashville/Davidson County Health Department Air Pollution Control Division, *Draft/Proposed Part 70 (Title V) Operating Permit, Permit Number 70-0XXX, Columbia Gulf Transmission, LLC – Cane Ridge Compressor Station, Antioch, TN*, July 2017.

[50] *Id.*

electricity.[51] The exact turbines used at the compressor station are used at the natural gas combined cycle and cogeneration plants that must apply BACT under the same circumstances.[52] The only marginal distinction between the Titan 130 turbines and those at plants required to apply BACT under the Clean Air Act is that the latter generate electricity and send it to the electric grid, and the former send it to power the compressor station. The engineering characteristics and emissions profiles of the two turbines are the same.[53]

Therefore, Metro should require the turbines to apply BACT, which in this case is selective catalytic reduction for NO_x emissions, and oxidation catalyst for carbon monoxide and volatile organic compounds.

B. *The Titan 130 natural gas turbines must comply with the nuisance provision of the Metro Code.*

The Titan 130 turbines at the proposed station should apply control technology for NO_x and carbon monoxide to comply with the Clean Air Act and the Metro Code, specifically selective catalytic reduction for NO_x emissions, and oxidation catalyst for carbon monoxide and volatile organic compound emissions. As explained above, the station must include best available control technology to comply with Section 10.56.160 of the Metro Code, which was approved by the EPA as part of the Tennessee State Implementation Plan in 1996.[54] This section of Metro's federally enforceable SIP prohibits emissions which cause injury, detriment, nuisance, or annoyance or which cause or have a natural tendency to cause injury or damage to business or property.[55] Without proper control technologies, however, the Titan 130 turbines will emit more NO_x, carbon monoxide, volatile organic compounds, and greenhouse gas emissions, leading to the kind of detriment, nuisance, and annoyance to the residents of the surrounding community that the nuisance law aims to prevent.

Therefore, to comply with the Metro Code and the Clean Air Act, Metro Nashville must require the proposed station to include selective catalytic reduction for NO_x emissions, and oxidation catalyst for carbon monoxide and volatile organic compound emissions.

---

[51] *Id.*

[52] Powers Report, Oct. 17, 2017.

[53] *Id.*

[54] Municipal Code § 10.56.170 (approved by EPA, 61 Fed. Reg. 47,057 (Sept. 6, 1996)).

[55] *Id. See Laidlaw Environmental Services v. Metro. Bd. of Health*, 934 S.W.2d 40, 49–51 (Tenn. Ct. App. 1996) (describing precedent of the Air Board requiring emissions restrictions to bring the facility into compliance with Section 10.56.170); *see also Wood v. Metro. Nashville Bd. of Health*, No. M2006-01599-COA-R3-CV, 2007 WL 4207851, at *3–4 (Tenn. Ct. App. Nov. 28, 2007) (citing *Laidlaw* as a demonstrating that the Board can regulate emissions that spread beyond the boundaries of a facility's property).

C. *The Cane Ridge Compressor Station does not reflect the most advanced emissions technology, compared to other proposed compressor stations in the Southeast.*

The attached technical comments of Bill Powers discuss Columbia's and Metro Health's analysis of controls for nitrogen oxide, carbon monoxide, and volatile organic control emissions. These comments pertain to Columbia's need to at least meet the demonstrably-achievable industry practices as evidenced by three (proposed, not completed) compressor stations in West Virginia, Virginia, and North Carolina.[56] Those potential compressor stations propose to use selective catalytic reduction to emit five parts per million nitrogen oxides, and oxidation catalyst to minimize emissions of volatile organic compounds and carbon monoxide. Those proposed stations are not subject to Title V, are located in rural areas that are in attainment for ozone, and yet included stronger emissions controls than Columbia proposes for the Cane Ridge compressor station. That said, technology exists to achieve a 1.5 or 2.0 ppm NOx limit. Moreover, an electric motor drive is a technologically feasible zero-emission option. The Cane Ridge compressor station therefore does not reflect the most advanced emissions technology.

III. Current air pollution monitors and standards may be insufficient to ensure the protection of public health in Nashville.

The locations of Nashville's ambient air quality monitors cannot provide Nashville with the best data to protect air quality in the Cane Ridge area. The closest ambient ozone monitor, the Percy Priest ozone monitor, is nearly 10 miles from the proposed station.[57] The monitors are centered on downtown Nashville, and there is not a single known ambient air monitor in the Cane Ridge area. The lack of air quality monitors in the Cane Ridge area suggests that, even if ambient air monitors record conditions below National Ambient Air Quality Standards, they may conceal variability over time and on the neighborhood level.

A growing pool of studies indicate that National Ambient Air Quality Standards are insufficient to protect public health. A New England Journal of Medicine study, for example, found adverse effects in Medicare beneficiaries related to exposure to particulate matter and ozone at levels *below* National Ambient Air Quality Standards.[58] Even the recently lowered

---

[56] These comments do not analyze whether these compressor stations were appropriately sited or comply with local, state, and federal law. Instead, they merely point to other compressor stations in the region that voluntarily installed more protective control technologies than those proposed by Columbia for the Cane Ridge station.

[57] Nashville appears to be in compliance with the 75 ppb standard based on the report. However, it does not appear to be in compliance with the 70 ppb standard.

[58] Qian Di, M.S. et al., *Air Pollution and Mortality in the Medicare Population, New England Journal of Medicine* 376:2513-2522 (June 29, 2017).

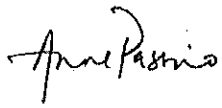
0.070 ppm ozone standard sits at the top of the range of concentrations defined by the scientific committee charged with recommending protective ozone levels to EPA.[59] In fact, this same committee explained that "a level of 70 ppb provides little margin of safety for the protection of public health, particularly for sensitive subpopulations."[60] Instead, the committee recommended that EPA designate an ozone limit between 60 ppb and 70 ppb, rather than at the upper limit.[61] A number of older studies have found associations between exposure to air pollution components and health outcomes at levels below standards.[62]

Conclusion

For the foregoing reasons, Keep Southeast Nashville Healthy respectfully asks that the Metropolitan Nashville/Davidson County Health Department deny the Draft/Proposed Part 70 Operation Permit, Columbia Gulf Transmission, LLC, Cane Ridge Compressor Station, Permit No. 70-0XX or install emissions and other protections sufficient to protect the public health and comply with Metro's federally enforceable pollution ordinances.

Thank you for the opportunity to provide comments.

Sincerely,



Anne Passino

Encl.

cc: Joshua C. Lee
Metropolitan Attorney, Department of Law
Josh.Lee@nashville.gov

---

[59] Letter from Clean Air Scientific Advisory Committee Chair Dr. H. Christopher Frey to EPA Administrator Gina McCarthy, CASAC Review of the EPA's Second Draft Policy Assessment for the Review of the Ozone National Ambient Air Quality Standards, June 26, 2014).

[60] *Id.*

[61] *Id.*

[62] Brunekreef, Bert *et al.* offer a review of the literature in Brunekreef, Bert, Douglas W. Dockery, and Michal Zrzyzanowski, *Epidemiologic Studies on Short-Term Effects of Low Levels of Major Ambient Air Pollution Components, Environmental Suppl* 2: 3 (1995).

Attachment A

BILL POWERS, P.E.

PROFESSIONAL HISTORY

Powers Engineering, San Diego, CA 1994-
ENSR Consulting and Engineering, Camarillo, CA 1989-93
Naval Energy and Environmental Support Activity, Port Hueneme, CA 1982-87
U.S. Environmental Protection Agency, Research Triangle Park, NC 1980-81

EDUCATION

Master of Public Health – Environmental Sciences, University of North Carolina
Bachelor of Science – Mechanical Engineering, Duke University

PROFESSIONAL AFFILIATIONS

Registered Professional Mechanical Engineer, California (Certificate M24518)
American Society of Mechanical Engineers
Air & Waste Management Association

TECHNICAL SPECIALTIES

Thirty-five years of experience in:

- Distributed solar photovoltaics (PV) siting and regional renewable energy planning
- Power plant air emission control system and cooling system assessments
- Petroleum refinery air engineering and testing
- Combustion equipment permitting, testing and monitoring
- Air pollution control equipment retrofit design/performance testing
- Latin America environmental project experience

DISTRIBUTED SOLAR PV SITING AND REGIONAL RENEWABLE ENERGY PLANNING

Bay Area Smart Energy 2020 Plan . Author of the March 2012 *Bay Area Smart Energy 2020* strategic energy plan for the nine-county region surrounding San Francisco Bay. This plan uses the zero net energy building targets in the *California Energy Efficiency Strategic Plan* as a framework to achieve a 60 percent reduction in GHG emissions from Bay Area electricity usage, and a 50 percent reduction in peak demand for grid electricity, by 2020. The 2020 targets in the plan include: 25 percent of detached homes and 20 percent of commercial buildings achieving zero net energy, adding 200 MW of community-scale microgrid battery storage and 400 MW of utility-scale battery storage, reduction in air conditioner loads by 50 percent through air conditioner cycling and targeted incentive funds to assure highest efficiency replacement units, and cooling system modifications to increase power output from The Geysers geothermal production zone in Sonoma County. Report is available online at: http://pacificenvironment.org/-1-87.

Solar PV technology selection and siting for SDG&E Solar San Diego project. Served as PV technology expert in California Public Utilities Commission proceeding to define PV technology and sites to be used in San Diego Gas & Electric (SDG&E) $250 million "Solar San Diego" project. Recommendations included: 1) prioritize use of roof-mounted thin-film PV arrays similar to the SCE urban PV program to maximize the installed PV capacity, 2) avoid tracking ground-mounted PV arrays due to high cost and relative lack of available land in the urban/suburban core, 3) and incorporate limited storage in fixed rooftop PV arrays to maximizing output during peak demand periods. Suitable land next to SDG&E substations capable of supporting 5 to 40 MW of PV (each) was also identified by Powers Engineering as a component of this project.

Rooftop PV alternative to natural gas-fired peaking gas turbines, Chula Vista. Served as PV technology expert in California Energy Commission (CEC) proceeding regarding the application of MMC Energy to build

a 100 MW peaking gas turbine power plant in Chula Vista. Presented testimony that 100 MW of PV arrays in the Chula Vista area could provide the same level of electrical reliability on hot summer days as an equivalent amount of peaking gas turbine capacity at approximately the same cost of energy. The preliminary decision issued by the presiding CEC commissioner in the case recommended denial of the application in part due to failure of the applicant or CEC staff to thoroughly evaluate the PV alternative to the proposed turbines. No final decision has yet been issued in the proceeding (as of May 2009).

San Diego Smart Energy 2020 Plan. Author of October 2007 "San Diego Smart Energy 2020," an energy plan that focuses on meeting the San Diego region's electric energy needs through accelerated integration of renewable and non-renewable distributed generation, in the form of combined heat and power (CHP) systems and solar photovoltaic (PV) systems. PV would meet approximately 28 percent of the San Diego region's electric energy demand in 2020. Annual energy demand would drop 20 percent in 2020 relative to 2003 through use all cost-effective energy efficiency measures. Existing utility-scale gas-fired generation would continue to be utilized to provide power at night, during cloudy whether, and for grid reliability support. Report at: http://www.etechinternational.org/new_pdfs/smartenergy/52008_SmE2020_2nd.pdf

Development of San Diego Regional Energy Strategy 2030. Participant in the 18-month process in the 2002-2003 timeframe that led to the development of the San Diego Regional Energy Strategy 2030. This document was adopted by the SANDAG Board of Directors in July 2003 and defines strategic energy objectives for the San Diego region, including: 1) in-region power generation increase from 65% of peak demand in 2010 to 75% of peak demand in 2020, 2) 40% renewable power by 2030 with at least half of this power generated in-county, 3) reinforcement of transmission capacity as needed to achieve these objectives. The SANDAG Board of Directors voted unanimously on Nov. 17, 2006 to take no position on the Sunrise Powerlink proposal primarily because it conflicts the Regional Energy Strategy 2030 objective of increased in-region power generation.

POWER PLANT EMISSION CONTROL AND COOLING SYSTEM CONVERSION ASSESSMENTS

LMS100 Gas Turbine Power Plant Air Emissions Control Assessment. Lead engineer to assess Best Available Control Technology (BACT) for four proposed LMS100 gas turbines to be owned and operated by El Paso Electric Company. El Paso Electric proposed NO_x and CO emission rates of 2.5 ppm and 6.0 ppm respectively, use of wet cooling tower(s) for intercooler heat rejection, and up to 5,000 hours per year of operation. I identified BACT as equivalent to combined cycle plant levels, 2.0 ppm NO_x and 2.0 ppm CO, due to high operating hour limit., and air cooling with mist augmentation at high ambient temperatures as BACT for PM. The TCEQ Office of Public Interest Council agreed that BACT for the LMS100s should be 2.0 ppm NO_x and 2.0 ppm CO, and that air cooling with mist augmentation should be BACT for PM.

Biomass Plant NO_x and CO Air Emissions Control Evaluation. Lead engineer for evaluation of available nitrogen oxide (NO_x) and carbon monoxide (CO) controls for a 45 MW Aspen Power biomass plant in Texas where proponent had identified selective non-catalytic reduction (SNCR) for NO_x and good combustion practices for CO as BACT. Identified the use of tail-end SCR for NO_x control at several operational U.S. biomass plants, and oxidation catalyst in use at two of these plants for CO and VOC control, as BACT for the proposed biomass plant. Administrative law judge concurred in decision that SCR and oxidation catalyst is BACT. Developer added SCR and oxidation catalyst to project in subsequent settlement agreement.

Biomass Plant Air Emissions Control Consulting. Lead expert on biomass air emissions control systems for landowners that will be impacted by a proposed 50 MW biomass to be built by the local East Texas power cooperative. Public utility agreed to meet current BACT for biomass plants in Texas, SCR for NOx and oxidation catalyst for CO, in settlement agreement with local landowners.

Combined-Cycle Power Plant Startup and Shutdown Emissions. Lead engineer for analysis of air permit startup and shutdown emissions minimization for combined-cycle power plant proposed for the San Francisco Bay Area. Original equipment was specified for baseload operation prior to suspension of project in early 2000s. Operational profile described in revised air permit was load following with potential for daily start/stop.

Recommended that either fast start turbine technology be employed to minimize start/stop emissions or that "demonstrated in practice" operational and control software modifications be employed to minimize startup/shutdown emissions.

IGCC as BACT for Air Emissions from Proposed 960 MW Coal Plant. Presented testimony on IGCC as BACT for air emissions reduction from 960 MW coal plant. Applicant received air permit for a pulverized coal plant to be equipped with a baghouse, wet scrubber, and wet ESP for air emissions control. Use of IGCC technology at the emission rates permitted for two recently proposed U.S. IGCC projects, and demonstrated in practice at a Japanese IGCC plant firing Chinese bituminous coal, would substantially reduce potential emissions of NO_x, SO_2, and PM. The estimated control cost-effectiveness of substituting IGCC for pulverized coal technology in this case was approximately $3,000/ton.

Analysis of Proposed Air Emission Limits for 600 MW Pulverized Coal Plant. Project engineer tasked with evaluating sufficiency of air emissions limits and control technologies for proposed 600 MW coal plant Arkansas. Determined that the applicant had: 1) not properly identified SO_2, sulfuric acid mist, and PM BACT control levels for the plant, and 2) improperly utilized an incremental cost effectiveness analysis to justify air emission control levels that did not represent BACT.

Eight Pulverized Coal Fired 900 MW Boilers – IGCC Alternative with Air Cooling. Provided testimony on integrated gasification combined cycle (IGCC) as a fully commercial coal-burning alternative to the pulverized coal (PC) technology proposed by TXU for eight 900 MW boilers in East Texas, and East Texas as an ideal location for CO2 sequestration due to presence of mature oilfield CO2 enhanced oil recovery opportunities and a deep saline aquifer underlying the entire region. Also presented testimony on the major increase in regional consumptive water use that would be caused by the evaporative cooling towers proposed for use in the PC plants, and that consumptive water use could be lowered by using IGCC with evaporative cooling towers or by using air-cooled condensers with PC or IGCC technology. TXU ultimately dropped plans to build the eight PC plants as a condition of a corporate buy-out.

Utility Boilers – Conversion of Existing Once-Through Cooled Boilers to Wet Towers, Parallel Wet-Dry Cooling, or Dry Cooling. Provided expert testimony and preliminary design for the conversion of four natural gas and/or coal-fired utility boilers (Unit 4, 235 MW; Unit 3, 135 MW; Unit 2, 65 MW; and Unit 1,65 MW) from once-through river water cooling to wet cooling towers, parallel wet-dry cooling, and dry cooling. Major design constraints were available land for location of retrofit cooling systems and need to maintain maximum steam turbine backpressure at or below 5.5 inches mercury to match performance capabilities of existing equipment. Approach temperatures of 12 °F and 13 °F were used for the wet towers. SPX Cooling Technologies F-488 plume-abated wet cells with six feet of packing were used to achieve approach temperatures of 12 °F and 13 °F. Annual energy penalty of wet tower retrofit designs is approximately 1 percent. Parallel wet-dry or dry cooling was determined to be technically feasible for Unit 3 based on straightforward access to the Unit 3 surface condenser and available land adjacent to the boiler.

Utility Boiler – Assessment of Air Cooling and Integrated Gasification/Combined Cycle for Proposed 500 MW Coal-Fired Plant. Provided expert testimony on the performance of air-cooling and IGCC relative to the conventional closed-cycle wet cooled, supercritical pulverized coal boiler proposed by the applicant. Steam Pro™ coal-fired power plant design software was used to model the proposed plant and evaluate the impacts on performance of air cooling and plume-abated wet cooling. Results indicated that a conservatively designed air-cooled condenser could maintain rated power output at the design ambient temperature of 90 °F. The IGCC comparative analysis indicated that unit reliability comparable to a conventional pulverized coal unit could be achieved by including a spare gasifier in the IGCC design, and that the slightly higher capital cost of IGCC was offset by greater thermal efficiency and reduced water demand and air emissions.

Utility Boiler – Assessment of Closed-Cycle Cooling Retrofit Cost for 1,200 MW Oil-Fired Plant. Prepared an assessment of the cost and feasibility of a closed-cycle wet tower retrofit for the 1,200 MW Roseton Generating Station. Determined that the cost to retrofit the Roseton plant with plume-abated closed-cycle wet cooling was well established based on cooling tower retrofit studies performed by the original owner (Central Hudson Gas & Electric Corp.) and subsequent regulatory agency critique of the cost estimate. Also determined that elimination of redundant and/or excessive budgetary line items in owners cost estimate brings the closed-cycle retrofit in line with expected costs for comparable new or retrofit plume-abated cooling tower applications.

Nuclear Power Plant – Assessment of Closed-Cycle Cooling Retrofit Cost for 2,000 MW Plant. Prepared an assessment of the cost and feasibility of a closed-cycle wet tower retrofit for the 2,000 MW Indian Point Generating Station. Determined that the most appropriate arrangement for the hilly site would be an inline plume-abated wet tower instead of the round tower configuration analyzed by the owner. Use of the inline configuration would allow placement of the towers at numerous sites on the property with little or need for blasting of bedrock, greatly reducing the cost of the retrofit. Also proposed an alternative circulating cooling water piping configuration to avoid the extensive downtime projected by the owner for modifications to the existing discharge channel.

Kentucky Coal-Fired Power Plant – Pulverized Coal vs IGCC. Expert witness in Sierra Club lawsuit against Peabody Coal Company's plan to construct a 1,500 MW pulverized-coal fired power plant in Kentucky. Presented case that Integrated Gasification Combined Cycle (IGCC) is a superior method for producing power from coal, from environmental and energy efficiency perspective, than the proposed pulverized-coal plant. Presented evidence that IGCC is technically feasible and cost competitive with pulverized coal.

Power Plant Dry Cooling Symposium – Chair and Organizer. Chair and organizer of the first symposium held in the U.S. (May 2002) that focused exclusively on dry cooling technology for power plants. Sessions included basic principles of wet and dry cooling systems, performance capabilities of dry cooling systems, case studies of specific installations, and reasons why dry cooling is the predominant form of cooling specified in certain regions of North America (Massachusetts, Nevada, northern Mexico).

Utility Boiler – Best Available NO_x Control System for 525 MW Coal-Fired Circulating Fluidized Bed Boiler Plant. Expert witness in dispute over whether 50 percent NO_x control using selective non-catalytic reduction (SNCR) constituted BACT for a proposed 525 MW circulating fluidized bed (CFB) boiler plant. Presented testimony that SNCR was capable of continuous NO_x reduction of greater than 70 percent on a CFB unit and that tail-end selective catalytic reduction (SCR) was technically feasible and could achieve greater than 90 percent NO_x reduction.

Utility Boilers – Evaluation of Correlation Between Opacity and PM_{10} Emissions at Coal-Fired Plant. Provided expert testimony on whether correlation existed between mass PM_{10} emissions and opacity during opacity excursions at large coal-fired boiler in Georgia. EPA and EPRI technical studies were reviewed to assess the correlation of opacity and mass emissions during opacity levels below and above 20 percent. A strong correlation between opacity and mass emissions was apparent at a sister plant at opacities less than 20 percent. The correlation suggests that the opacity monitor correlation underestimates mass emissions at opacities greater than 20 percent, but may continue to exhibit a good correlation for the component of mass emissions in the PM_{10} size range.

Utility Boilers – Retrofit of SCR and FGD to Existing Coal-Fired Units.
Expert witness in successful effort to compel an existing coal-fired power plant located in Massachusetts to meet an accelerated NO_x and SO_2 emission control system retrofit schedule. Plant owner argued the installation of advanced NO_x and SO_2 control systems would generate > 1 ton/year of ancillary emissions, such as sulfuric acid mist, and that under Massachusetts Dept. of Environmental Protection regulation ancillary emissions > 1 ton/year would require a BACT evaluation and a two-year extension to retrofit schedule. Successfully

demonstrated that no ancillary emissions would be generated if the retrofit NO_x and SO_2 control systems were properly sized and optimized. Plant owner committed to accelerated compliance schedule in settlement agreement.

Utility Boilers – Retrofit of SCR to Existing Natural Gas-Fired Units.
Lead engineer in successful representation of interests of California coastal city to prevent weakening of an existing countywide utility boiler NO_x rule. Weakening of NO_x rule would have allowed a merchant utility boiler plant located in the city to operate without installing selective catalytic reduction (SCR) NO_x control systems. This project required numerous appearances before the county air pollution control hearing board to successfully defend the existing utility boiler NO_x rule.

PETROLEUM REFINERY AIR ENGINEERING/TESTING EXPERIENCE

BP Whiting Refinery Expansion Air Permit. Served as lead engineer on review of netting analysis that resulted in the BP Whiting Refinery Expansion receiving a minor source air permit from the Indiana Department of Environmental Management. Determined that BP Whiting omitted several major sources of emissions, underestimated others, and incorrectly calculated contemporaneous increases and decreases in air emissions. These sources included refinery heaters, flares, coking units, sulfur recovery, and fugitive emissions. These errors and omissions were sufficient in number and magnitude to exceed NSR significance thresholds.

Hyperion Refinery Air Permit. Served as lead engineer on review of BACT determinations in the PSD air permit for the proposed Hyperion Refinery in South Dakota.. BACT review included controls for refinery heaters, cooling systems, fugitive emissions, and greenhouse gases. BACT was identified as SCR for all refinery heaters, use of enclosed ground flare for periodic flare gas emissions from gasification process, and use of leakless fugitive emission components.

Big West Refinery Expansion EIS. Lead engineer on comparative cost analysis of proposed wet cooling tower and fin-fan air cooler for process cooling water for the proposed clean fuels expansion project at the Big West Refinery in Bakersfield, California. Selection of the fin-fin air-cooler would eliminate all consumptive water use and wastewater disposal associated with the cooling tower. Air emissions of VOC and PM_{10} would be reduced with the fin-fan air-cooler even though power demand of the air-cooler is incrementally higher than that of the cooling tower. Fin-fan air-coolers with approach temperatures of 10 °F and 20 °F were evaluated. The annualized cost of the fin-fin air-cooler with a 20 °F approach temperature is essentially the same as that of the cooling tower when the cost of all ancillary cooling tower systems are considered.

Criteria and Air Toxic Pollutant Emissions Inventory for Proposed Refinery Modifications. Project manager and technical lead for development of baseline and future refinery air emissions inventories for process modifications required to produce oxygenated gasoline and desulfurized diesel fuel at a California refinery. State of the art criteria and air toxic pollutant emissions inventories for refinery point, fugitive and mobile sources were developed. Point source emissions estimates were generated using onsite criteria pollutant test data, onsite air toxics test data, and the latest air toxics emission factors from the statewide refinery air toxics inventory database. The fugitive volatile organic compound (VOC) emissions inventories were developed using the refinery's most recent inspection and maintenance (I&M) monitoring program test data to develop site-specific component VOC emission rates. These VOC emission rates were combined with speciated air toxics test results for the principal refinery process streams to produce fugitive VOC air toxics emission rates. The environmental impact report (EIR) that utilized this emission inventory data was the first refinery "Clean Fuels" EIR approved in California.

Air Toxic Pollutant Emissions Inventory for Existing Refinery. Project manager and technical lead for air toxic pollutant emissions inventory at major California refinery. Emission factors were developed for refinery heaters, boilers, flares, sulfur recovery units, coker deheading, IC engines, storage tanks, process fugitives, and

catalyst regeneration units. Onsite source test results were utilized to characterize emissions from refinery combustion devices. Where representative source test results were not available, AP-42 VOC emission factors were combined with available VOC air toxics speciation profiles to estimate VOC air toxic emission rates. A risk assessment based on this emissions inventory indicated a relatively low health risk associated with refinery operations. Benzene, 1,3-butadiene and PAHs were the principal health risk related pollutants emitted.

Air Toxics Testing of Refinery Combustion Sources. Project manager for comprehensive air toxics testing program at a major California refinery. Metals, Cr^{+6}, PAHs, H_2S and speciated VOC emissions were measured from refinery combustion sources. High temperature Cr^{+6} stack testing using the EPA Cr^{+6} test method was performed for the first time in California during this test program. Representatives from the California Air Resources Board source test team performed simultaneous testing using ARB Method 425 (Cr^{+6}) to compare the results of EPA and ARB Cr^{+6} test methodologies. The ARB approved the test results generated using the high temperature EPA Cr^{+6} test method.

Air Toxics Testing of Refinery Fugitive Sources. Project manager for test program to characterize air toxic fugitive VOC emissions from fifteen distinct process units at major California refinery. Gas, light liquid, and heavy liquid process streams were sampled. BTXE, 1,3-butadiene and propylene concentrations were quantified in gas samples, while BTXE, cresol and phenol concentrations were measured in liquid samples. Test results were combined with AP-42 fugitive VOC emission factors for valves, fittings, compressors, pumps and PRVs to calculate fugitive air toxics VOC emission rates.

COMBUSTION EQUIPMENT PERMITTING, TESTING AND MONITORING

EPRI Gas Turbine Power Plant Permitting Documents – Co-Author.
Co-authored two Electric Power Research Institute (EPRI) gas turbine power plant siting documents. Responsibilities included chapter on state-of-the-art air emission control systems for simple-cycle and combined-cycle gas turbines, and authorship of sections on dry cooling and zero liquid discharge systems.

Air Permits for 50 MW Peaker Gas Turbines – Five Sites Throughout California.
Responsible for preparing all aspects of air permit applications for five 50 MW FT-8 simple-cycle turbine installations at sites around California in response to emergency request by California state government for additional peaking power. Units were designed to meet 2.0 ppm NO_x using standard temperature SCR and innovative dilution air system to maintain exhaust gas temperature within acceptable SCR range. Oxidation catalyst is also used to maintain CO below 6.0 ppm.

Kauai 27 MW Cogeneration Plant – Air Emission Control System Analysis. Project manager to evaluate technical feasibility of SCR for 27 MW naphtha-fired turbine with once-through heat recovery steam generator. Permit action was stalled due to questions of SCR feasibility. Extensive analysis of the performance of existing oil-fired turbines equipped with SCR, and bench-scale tests of SCR applied to naphtha-fired turbines, indicated that SCR would perform adequately. Urea was selected as the SCR reagent given the wide availability of urea on the island. Unit is first known application of urea-injected SCR on a naphtha-fired turbine.

Microturbines – Ronald Reagan Library, Ventura County, California.
Project manager and lead engineer or preparation of air permit applications for microturbines and standby boilers. The microturbines drive the heating and cooling system for the library. The microturbines are certified by the manufacturer to meet the 9 ppm NO_x emission limit for this equipment. Low-NO_x burners are BACT for the standby boilers.

Hospital Cogeneration Microturbines – South Coast Air Quality Management District.
Project manager and lead engineer for preparation of air permit application for three microturbines at hospital cogeneration plant installation. The draft Authority To Construct (ATC) for this project was obtained two weeks after submittal of the ATC application. 30-day public notification was required due to the proximity of

the facility to nearby schools. The final ATC was issued two months after the application was submitted, including the 30-day public notification period.

Gas Turbine Cogeneration – South Coast Air Quality Management District. Project manager and lead engineer for preparation of air permit application for two 5.5 MW gas turbines in cogeneration configuration for county government center. The turbines will be equipped with selective catalytic reduction (SCR) and oxidation catalyst to comply with SCAQMD BACT requirements. Aqueous urea will be used as the SCR reagent to avoid trigger hazardous material storage requirements. A separate permit will be obtained for the NO_x and CO continuous emissions monitoring systems. The ATCs is pending.

Industrial Boilers – NO_x BACT Evaluation for San Diego County Boilers.
Project manager and lead engineer for preparation of Best Available Control Technology (BACT) evaluation for three industrial boilers to be located in San Diego County. The BACT included the review of low NO_x burners, FGR, SCR, and low temperature oxidation (LTO). State-of-the-art ultra low NO_x burners with a 9 ppm emissions guarantee were selected as NO_x BACT for these units.

Peaker Gas Turbines – Evaluation of NO_x Control Options for Installations in San Diego County.
Lead engineer for evaluation of NO_x control options available for 1970s vintage simple-cycle gas turbines proposed for peaker sites in San Diego County. Dry low-NO_x (DLN) combustors, catalytic combustors, high-temperature SCR, and NO_x absorption/conversion ($SCONO_x$) were evaluated for each candidate turbine make/model. High-temperature SCR was selected as the NOx control option to meet a 5 ppm NO_x emission requirement.

Hospital Cogeneration Plant Gas Turbines – San Joaquin Valley Unified Air Pollution Control District.
Project manager and lead engineer for preparation of air permit application and Best Available Control Technology (BACT) evaluation for hospital cogeneration plant installation. The BACT included the review of DLN combustors, catalytic combustors, high-temperature SCR and $SCONO_x$. DLN combustion followed by high temperature SCR was selected as the NO_x control system for this installation. The high temperature SCR is located upstream of the heat recovery steam generator (HRSG) to allow the diversion of exhaust gas around the HRSG without compromising the effectiveness of the NO_x control system.

1,000 MW Coastal Combined-Cycle Power Plant – Feasibility of Dry Cooling.
Expert witness in on-going effort to require use of dry cooling on proposed 1,000 MW combined-cycle "repower" project at site of an existing 1,000 MW utility boiler plant. Project proponent argued that site was two small for properly sized air-cooled condenser (ACC) and that use of ACC would cause 12-month construction delay. Demonstrated that ACC could easily be located on the site by splitting total of up to 80 cells between two available locations at the site. Also demonstrated that an ACC optimized for low height and low noise would minimize or eliminate proponent claims of negative visual and noise impacts.

Industrial Cogeneration Plant Gas Turbines – Upgrade of Turbine Power Output.
Project manager and lead engineer for preparation of Best Available Control Technology (BACT) evaluation for proposed gas turbine upgrade. The BACT included the review of DLN combustors, catalytic combustors, high-, standard-, and low-temperature SCR, and $SCONO_x$. Successfully negotiated air permit that allowed facility to initially install DLN combustors and operate under a NO_x plantwide "cap." Within two major turbine overhauls, or approximately eight years, the NO_x emissions per turbine must be at or below the equivalent of 5 ppm. The 5 ppm NO_x target will be achieved through technological in-combustor NO_x control such as catalytic combustion, or SCR or SCR equivalent end-of-pipe NO_x control technologies if catalytic combustion is not available.

Gas Turbines – Modification of RATA Procedures for Time-Share CEM.
Project manager and lead engineer for the development of alternate CO continuous emission monitor (CEM) Relative Accuracy Test Audit (RATA) procedures for time-share CEM system serving three 7.9 MW turbines located in San Diego. Close interaction with San Diego APCD and EPA Region 9 engineers was required to receive approval for the alternate CO RATA standard. The time-share CEM passed the subsequent annual RATA without problems as a result of changes to some of the CEM hardware and the more flexible CO RATA standard.

Gas Turbines – Evaluation of NO_x Control Technology Performance. Lead engineer for performance review of dry low-NO_x combustors, catalytic combustors, high-, standard-, and low-temperature selective catalytic reduction (SCR), and NO_x absorption/conversion ($SCONO_x$). Major turbine manufacturers and major manufacturers of end-of-pipe NO_x control systems for gas turbines were contacted to determine current cost and performance of NO_x control systems. A comparison of 1993 to 1999 "$/kwh" and "$/ton" cost of these control systems was developed in the evaluation.

Gas Turbines – Evaluation of Proposed NO_x Control System to Achieve 3 ppm Limit.
Lead engineer for evaluation for proposed combined cycle gas turbine NO_x and CO control systems. Project was in litigation over contract terms, and there was concern that the GE Frame 7FA turbine could not meet the 3 ppm NO_x permit limit using a conventional combustor with water injection followed by SCR. Operations personnel at GE Frame 7FA installatins around the country were interviewed, along with principal SCR vendors, to corroborate that the installation could continuously meet the 3 ppm NO_x limit.

Gas Turbines – Title V "Presumptively Approvable" Compliance Assurance Monitoring Protocol.
Project manager and lead engineer for the development of a "presumptively approval" NO_x parametric emissions monitoring system (PEMS) protocol for industrial gas turbines. "Presumptively approvable" means that any gas turbine operator selecting this monitoring protocol can presume it is acceptable to the U.S. EPA. Close interaction with the gas turbine manufacturer's design engineering staff and the U.S. EPA Emissions Measurement Branch (Research Triangle Park, NC) was required to determine modifications necessary to the current PEMS to upgrade it to "presumptively approvable" status.

Environmental Due Diligence Review of Gas Turbine Sites – Mexico. Task leader to prepare regulatory compliance due diligence review of Mexican requirements for gas turbine power plants. Project involves eleven potential sites across Mexico, three of which are under construction. Scope involves identification of all environmental, energy sales, land use, and transportation corridor requirements for power projects in Mexico. Coordinator of Mexican environmental subcontractors gathering on-site information for each site, and translator of Spanish supporting documentation to English.

Development of Air Emission Standards for Gas Turbines - Peru. Served as principal technical consultant to the Peruvian Ministry of Energy in Mines (MEM) for the development of air emission standards for Peruvian gas turbine power plants. All major gas turbine power plants in Peru are currently using water injection to increase turbine power output. Recommended that 42 ppm on natural gas and 65 ppm on diesel (corrected to 15% O_2) be established as the NO_x limit for existing gas turbine power plants. These limits reflect NO_x levels readily achievable using water injection at high load. Also recommended that new gas turbine sources be subject to a BACT review requirement.

Gas Turbines – Title V Permit Templates. Lead engineer for the development of standardized permit templates for approximately 100 gas turbines operated by the oil and gas industry in the San Joaquin Valley. Emissions limits and monitoring requirements were defined for units ranging from GE Frame 7 to Solar Saturn turbines. Stand-alone templates were developed based on turbine size and NO_x control equipment. NO_x utilized in the target turbine population ranged from water injection alone to water injection combined with SCR.

Gas Turbines – Evaluation of NO_x, SO_2 and PM Emission Profiles. Performed a comparative evaluation of the NO_x, SO_2 and particulate (PM) emission profiles of principal utility-scale gas turbines for an independent power producer evaluating project opportunities in Latin America. All gas turbine models in the 40 MW to 240 MW range manufactured by General Electric, Westinghouse, Siemens and ABB were included in the evaluation.

Stationary Internal Combustion Engine (ICE) RACT/BARCT Evaluation. Lead engineer for evaluation of retrofit NO_x control options available for the oil and gas production industry gas-fired ICE population in the San Joaquin Valley affected by proposed RACT and BARCT emission limits. Evaluation centered on lean-burn compressor engines under 500 bhp, and rich-burn constant and cyclically loaded (rod pump) engines under 200 bhp. The results of the evaluation indicated that rich burn cyclically-loaded rod pump engines comprised 50 percent of the affected ICE population, though these ICEs accounted for only 5 percent of the uncontrolled gas-fired stationary ICE NO_x emissions. Recommended retrofit NO_x control strategies included: air/fuel ratio adjustment for rod pump ICEs, Non-selective catalytic reduction (NSCR) for rich-burn, constant load ICEs, and "low emission" combustion modifications for lean burn ICEs.

Air Toxics Testing of Natural Gas-Fired ICEs. Project manager for test plan/test program to measure volatile and semi-volatile organic air toxics compounds from fourteen gas-fired ICEs used in a variety of oil and gas production applications. Test data was utilized by oil and gas production facility owners throughout California to develop accurate ICE air toxics emission inventories.

AIR ENGINEERING/AIR TESTING PROJECT EXPERIENCE – GENERAL

Reverse Air Fabric Filter Retrofit Evaluation – Coal-Fired Boiler. Lead engineer for upgrade of reverse air fabric filters serving coal-fired industrial boilers. Fluorescent dye injected to pinpoint broken bags and damper leaks. Corrosion of pneumatic actuators serving reverse air valves and inadequate insulation identified as principal causes of degraded performance.

Pulse-Jet Fabric Filter Performance Evaluation – Gold Mine. Lead engineer on upgrade of pulse-jet fabric filter and associated exhaust ventilation system serving an ore-crushing facility at a gold mine. Fluorescent dye used to identify bag collar leaks, and modifications were made to pulse air cycle time and duration. This marginal source was in compliance at 20 percent of emission limit following completion of repair work.

Pulse-Jet Fabric Filter Retrofit - Gypsum Calciner. Lead engineer on upgrade of pulse-jet fabric filter controlling particulate emissions from a gypsum calciner. Recommendations included a modified bag clamping mechanism, modified hopper evacuation valve assembly, and changes to pulse air cycle time and pulse duration.

Wet Scrubber Retrofit – Plating Shop. Project engineer on retrofit evaluation of plating shop packed-bed wet scrubbers failing to meet performance guarantees during acceptance trials, due to excessive mist carryover. Recommendations included relocation of the mist eliminator (ME), substitution of the original chevron blade ME with a mesh pad ME, and use of higher density packing material to improve exhaust gas distribution. Wet scrubbers passed acceptance trials following completion of recommended modifications.

Electrostatic Precipitator (ESP) Retrofit Evaluation – MSW Boiler. Lead engineer for retrofit evaluation of single field ESP on a municipal solid waste (MSW) boiler. Recommendations included addition of automated power controller, inlet duct turning vanes, and improved collecting plate rapping system.

ESP Electric Coil Rapper Vibration Analysis Testing - Coal-Fired Boiler. Lead engineer for evaluation of ESP rapper effectiveness test program on three field ESP equipped with "magnetically induced gravity return" (MIGR) rappers. Accelerometers were placed in a grid pattern on ESP collecting plates to determine maximum instantaneous plate acceleration at a variety of rapper power setpoints. Testing showed that the rappers met performance specification requirements.

Aluminum Remelt Furnace Particulate Emissions Testing. Project manager and lead engineer for high temperature (1,600 °F) particulate sampling of a natural gas-fired remelt furnace at a major aluminum rolling mill. Objectives of test program were to: 1) determine if condensable particulate was present in stack gases, and 2) to validate the accuracy of the in-stack continuous opacity monitor (COM). Designed and constructed a customized high temperature (inconel) PM_{10}/Mtd 17 sampling assembly for test program. An onsite natural gas-fired boiler was also tested to provide comparative data for the condensable particulate portion of the test program. Test results showed that no significant levels of condensable particulate in the remelt furnace exhaust gas, and indicated that the remelt furnace and boiler had similar particulate emission rates. Test results also showed that the COM was accurate.

Aluminum Remelt Furnace CO and NO_x Testing. Project manager and lead engineer for continuous week-long testing of CO and NO_x emissions from aluminum remelt furnace. Objective of test program was to characterize CO and NO_x emissions from representative remelt furnace for use in the facility's criteria pollution emissions inventory. A TECO Model 48 CO analyzer and a TECO Model 10 NO_x analyzer were utilized during the test program to provide ± 1 ppm measurement accuracy, and all test data was recorded by an automated data acquisition system.

OIL AND GAS PRODUCTION AIR ENGINEERING/TESTING EXPERIENCE

Air Toxics Testing of Oil and Gas Production Sources. Project manager and lead engineer for test plan/test program to determine VOC removal efficiency of packed tower scrubber controlling sulfur dioxide emissions from a crude oil-fired steam generator. Ratfisch 55 VOC analyzers were used to measure the packed tower scrubber VOC removal efficiency. Tedlar bag samples were collected simultaneously to correlate BTX removal efficiency to VOC removal efficiency. This test was one of hundreds of air toxics tests performed during this test program for oil and gas production facilities from 1990 to 1992. The majority of the volatile air toxics analyses were performed at in-house laboratory. Project staff developed thorough familiarity with the applications and limitations of GC/MS, GC/PID, GC/FID, GC/ECD and GC/FPD. Tedlar bags, canisters, sorbent tubes and impingers were used during sampling, along with isokinetic tests methods for multiple metals and PAHs.

Air Toxics Testing of Glycol Reboiler – Gas Processing Plant. Project manager for test program to determine emissions of BTXE from glycol reboiler vent at gas processing facility handling 12 MM/cfd of produced gas. Developed innovative test methods to accurately quantify BTXE emissions in reboiler vent gas.

Air Toxics Emissions Inventory Plan. Lead engineer for the development of generic air toxics emission estimating techniques (EETs) for oil and gas production equipment. This project was performed for the Western States Petroleum Association in response to the requirements of the California Air Toxics "Hot Spots" Act. EETs were developed for all point and fugitive oil and gas production sources of air toxics, and the specific air toxics associated with each source were identified. A pooled source emission test methodology was also developed to moderate the cost of source testing required by the Act.

Fugitive NMHC Emissions from TEOR Production Field. Project manager for the quantification of fugitive Nonmethane hydrocarbon (NMHC) emissions from a thermally enhanced oil recovery (TEOR) oil production field in Kern County, CA. This program included direct measurement of NMHC concentrations in storage tank vapor headspace and the modification of available NMHC emission factors for NMHC-emitting devices in TEOR produced gas service, such as wellheads, vapor trunklines, heat exchangers, and compressors. Modification of the existing NMHC emission factors was necessary due to the high concentration of CO_2 and water vapor in TEOR produced gases.

Fugitive Air Emissions Testing of Oil and Gas Production Fields. Project manager for test plan/test program to determine VOC and air toxics emissions from oil storage tanks, wastewater storage tanks and produced gas lines. Test results were utilized to develop comprehensive air toxics emissions inventories for oil and gas production companies participating in the test program.

Oil and Gas Production Field – Air Emissions Inventory and Air Modeling. Project manager for oil and gas production field risk assessment. Project included review and revision of the existing air toxics emission inventory, air dispersion modeling, and calculation of the acute health risk, chronic non-carcinogenic risk and carcinogenic risk of facility operations. Results indicated that fugitive H_2S emissions from facility operations posed a potential health risk at the facility fenceline.

TITLE V PERMIT APPLICATION/MONITORING PLAN EXPERIENCE

Title V Permit Application – San Diego County Industrial Facility. Project engineer tasked with preparing streamlined Title V operating permit for U.S. Navy facilities in San Diego. Principal emission units included chrome plating, lead furnaces, IC engines, solvent usage, aerospace coating and marine coating operations. For each device category in use at the facility, federal MACT requirements were integrated with District requirements in user friendly tables that summarized permit conditions and compliance status.

Title V Permit Application Device Templates - Oil and Gas Production Industry. Project manager and lead engineer to prepare Title V permit application "templates" for the Western States Petroleum Association (WSPA). The template approach was chosen by WSPA to minimize the administrative burden associated with listing permit conditions for a large number of similar devices located at the same oil and gas production facility. Templates are being developed for device types common to oil and gas production operations. Device types include: boilers, steam generators, process heaters, gas turbines, IC engines, fixed-roof storage tanks, fugitive components, flares, and cooling towers. These templates will serve as the core of Title V permit applications prepared for oil and gas production operations in California.

Title V Permit Application - Aluminum Rolling Mill. Project manager and lead engineer for Title V permit application prepared for largest aluminum rolling mill in the western U.S. Responsible for the overall direction of the permit application project, development of a monitoring plan for significant emission units, and development of a hazardous air pollutant (HAP) emissions inventory. The project involved extensive onsite data gathering, frequent interaction with the plant's technical and operating staff, and coordination with legal counsel and subcontractors. The permit application was completed on time and in budget.

Title V Model Permit - Oil and Gas Production Industry. Project manager and lead engineer for the comparative analysis of regional and federal requirements affecting oil and gas production industry sources located in the San Joaquin Valley. Sources included gas turbines, IC engines, steam generators, storage tanks, and process fugitives. From this analysis, a model applicable requirements table was developed for a sample device type (storage tanks) that covered the entire population of storage tanks operated by the industry. The U.S. EPA has tentatively approved this model permit approach, and work is ongoing to develop comprehensive applicable requirements tables for each major category of sources operated by the oil and gas industry in the San Joaquin Valley.

Title V Enhanced Monitoring Evaluation of Oil and Gas Production Sources. Lead engineer to identify differences in proposed EPA Title V enhanced monitoring protocols and the current monitoring requirements for oil and gas production sources in the San Joaquin Valley. The device types evaluated included: steam generators, stationary ICEs, gas turbines, fugitives, fixed roof storage tanks, and thermally enhanced oil recovery (TEOR) well vents. Principal areas of difference included: more stringent Title V O&M requirements for parameter monitors (such as temperature, fuel flow, and O_2), and more extensive Title V recordkeeping requirements.

RACT/BARCT/BACT EVALUATIONS

BACT Evaluation of Wool Fiberglass Insulation Production Line. Project manager and lead engineer for BACT evaluation of a wool fiberglass insulation production facility. The BACT evaluation was performed as a component of a PSD permit application. The BACT evaluation included a detailed analysis of the available control options for forming, curing and cooling sections of the production line. Binder formulations, wet

electrostatic precipitators, wet scrubbers, and thermal oxidizers were evaluated as potential PM_{10} and VOC control options. Low NO_x burner options and combustion control modifications were examined as potential NO_x control techniques for the curing oven burners. Recommendations included use of a proprietary binder formulation to achieve PM_{10} and VOC BACT, and use of low-NO_x burners in the curing ovens to achieve NO_x BACT. The PSD application is currently undergoing review by EPA Region 9.

RACT/BARCT Reverse Jet Scrubber/Fiberbed Mist Eliminator Retrofit Evaluation. Project manager and lead engineer on project to address the inability of existing wet electrostatic precipitators (ESPs) and atomized mist scrubbers to adequately remove low concentration submicron particulate from high volume recovery boiler exhaust gas at the Alaska Pulp Corporation mill in Sitka, AK. The project involved thorough on-site inspections of existing control equipment, detailed review of maintenance and performance records, and a detailed evaluation of potential replacement technologies. These technologies included a wide variety of scrubbing technologies where manufacturers claimed high removal efficiencies on submicron particulate in high humidity exhaust gas. Packed tower scrubbers, venturi scrubbers, reverse jet scrubbers, fiberbed mist eliminators and wet ESPs were evaluated. Final recommendations included replacement of atomized mist scrubber with reverse jet scrubber and upgrading of the existing wet ESPs. The paper describing this project was published in the May 1992 TAPPI Journal.

Aluminum Smelter RACT Evaluation - Prebake. Project manager and technical lead for CO and PM_{10} RACT evaluation for prebake facility. Retrofit control options for CO emissions from the anode bake furnace, potline dry scrubbers and the potroom roof vents were evaluated. PM_{10} emissions from the coke kiln, potline dry scrubbers, potroom roof vents, and miscellaneous potroom fugitive sources were addressed. Four CO control technologies were identified as technologically feasible for potline CO emissions: potline current efficiency improvement through the addition of underhung busswork and automated puncher/feeders, catalytic incineration, recuperative incineration and regenerative incineration. Current efficiency improvement was identified as probable CO RACT if onsite test program demonstrated the effectiveness of this approach. Five PM_{10} control technologies were identified as technologically feasible: increased potline hooding efficiency through redesign of shields, the addition of a dense-phase conveying system, increased potline air evacuation rate, wet scrubbing of roof vent emissions, and fabric filter control of roof vent emissions. The cost of these potential PM_{10} RACT controls exceeded regulatory guidelines for cost effectiveness, though testing of modified shield configurations and dense-phase conveying is being conducted under a separate regulatory compliance order.

RACT/BACT Testing/Evaluation of PM_{10} Mist Eliminators on Five-Stand Cold Mill. Project manager and lead engineer for fiberbed mist eliminator and mesh pad mist eliminator comparative pilot test program on mixed phase aerosol (PM_{10})/gaseous hydrocarbon emissions from aluminum high speed cold rolling mill. Utilized modified EPA Method 5 sampling train with portion of sample gas diverted (after particulate filter) to Ratfisch 55 VOC analyzer. This was done to permit simultaneous quantification of aerosol and gaseous hydrocarbon emissions in the exhaust gas. The mesh pad mist eliminator demonstrated good control of PM_{10} emissions, though test results indicated that the majority of captured PM_{10} evaporated in the mesh pad and was emitted as VOC.

Aluminum Remelt Furnace/Rolling Mill RACT Evaluations. Lead engineer for comprehensive CO and PM_{10} RACT evaluation for the largest aluminum sheet and plate rolling mill in western U.S. Significant sources of CO emissions from the facility included the remelt furnaces and the coater line. The potential CO RACT options for the remelt furnaces included: enhanced maintenance practices, preheating combustion air, installation of fully automated combustion controls, and energy efficiency modifications. The coater line was equipped with an afterburner for VOC and CO destruction prior to the initiation of the RACT study. It was determined that the afterburner meets or exceeds RACT requirements for the coater line. Significant sources of PM_{10} emissions included the remelt furnaces and the 80-inch hot rolling mill. Chlorine fluxing in the melting and holding furnaces was identified as the principal source of PM_{10} emissions from the remelt furnaces. The facility is in the process of minimizing/eliminating fluxing in the melting furnaces, and exhaust gases generated

in holding furnaces during fluxing will be ducted to a baghouse for PM_{10} control. These modifications are being performed under a separate compliance order, and were determined to exceed RACT requirements. A water-based emulsion coolant and inertial separators are currently in use on the 80-inch hot mill for PM_{10} control. Current practices were determined to meet/exceed PM_{10} RACT for the hot mill. Tray tower absorption/recovery systems were also evaluated to control PM_{10} emissions from the hot mill, though it was determined that the technical/cost feasibility of using this approach on an emulsion-based coolant had not yet been adequately demonstrated.

BARCT Low NO_x Burner Conversion – Industrial Boilers. Lead engineer for evaluation of low NO_x burner options for natural gas-fired industrial boilers. Also evaluated methanol and propane as stand-by fuels to replace existing diesel stand-by fuel system. Evaluated replacement of steam boilers with gas turbine co-generation system.

BACT Packed Tower Scrubber/Mist Eliminator Performance Evaluations. Project manager and lead engineer for Navy-wide plating shop air pollution control technology evaluation and emissions testing program. Mist eliminators and packed tower scrubbers controlling metal plating processes, which included hard chrome, nickel, copper, cadmium and precious metals plating, were extensively tested at three Navy plating shops. Chemical cleaning and stripping tanks, including hydrochloric acid, sulfuric acid, chromic acid and caustic, were also tested. The final product of this program was a military design specification for plating and chemical cleaning shop air pollution control systems. The hydrochloric acid mist sampling procedure developed during this program received a protected patent.

BACT Packed Tower Scrubber/UV Oxidation System Pilot Test Program. Technical advisor for pilot test program of packed tower scrubber/ultraviolet (UV) light VOC oxidation system controlling VOC emissions from microchip manufacturing facility in Los Angeles. The testing was sponsored in part by the SCAQMD's Innovative Technology Demonstration Program, to demonstrate this innovative control technology as BACT for microchip manufacturing operations. The target compounds were acetone, methylethylketone (MEK) and 1,1,1-trichloroethane, and compound concentrations ranged from 10-100 ppmv. The single stage packed tower scrubber consistently achieved greater than 90% removal efficiency on the target compounds. The residence time required in the UV oxidation system for effective oxidation of the target compounds proved significantly longer than the residence time predicted by the manufacturer.

BACT Pilot Testing of Venturi Scrubber on Gas/Aerosol VOC Emission Source. Technical advisor for project to evaluate venturi scrubber as BACT for mixed phase aerosol/gaseous hydrocarbon emissions from deep fat fryer. Venturi scrubber demonstrated high removal efficiency on aerosol, low efficiency on VOC emissions. A number of VOC tests indicated negative removal efficiency. This anomaly was traced to a high hydrocarbon concentration in the scrubber water. The pilot unit had been shipped directly to the jobsite from another test location by the manufacturer without any cleaning or inspection of the pilot unit.

Pulp Mill Recovery Boiler BACT Evaluation. Lead engineer for BACT analysis for control of SO_2, NO_x, CO, TNMHC, TRS and particulate emissions from the proposed addition of a new recovery furnace at a kraft pulp mill in Washington. A "top down" approach was used to evaluate potential control technologies for each of the pollutants considered in the evaluation.

Air Pollution Control Equipment Design Specification Development. Lead engineer for the development of detailed Navy design specifications for wet scrubbers and mist eliminators. Design specifications were based on field performance evaluations conducted at the Long Beach Naval Shipyard, Norfolk Naval Shipyard, and Jacksonville Naval Air Station. This work was performed for the U.S. Navy to provide generic design specifications to assist naval facility engineering divisions with air pollution control equipment selection. Also served as project engineer for the development of Navy design specifications for ESPs and fabric filters.

CONTINUOUS EMISSION MONITOR (CEM) PROJECT EXPERIENCE

Process Heater CO and NO_x CEM Relative Accuracy Testing. Project manager and lead engineer for process heater CO and NO_x analyzer relative accuracy test program at petrochemical manufacturing facility. Objective of test program was to demonstrate that performance of onsite CO and NO_x CEMs was in compliance with U.S. EPA "Boiler and Industrial Furnace" hazardous waste co-firing regulations. A TECO Model 48 CO analyzer and a TECO Model 10 NO_x analyzer were utilized during the test program to provide ± 1 ppm measurement accuracy, and all test data was recorded by an automated data acquisition system. One of the two process heater CEM systems tested failed the initial test due to leaks in the gas conditioning system. Troubleshooting was performed using O_2 analyzers, and the leaking component was identified and replaced. This CEM system met all CEM relative accuracy requirements during the subsequent retest.

Performance Audit of NO_x and SO_2 CEMs at Coal-Fired Power Plant. Lead engineer on system audit and challenge gas performance audit of NO_x and SO_2 CEMs at a coal-fired power plant in southern Nevada. Dynamic and instrument calibration checks were performed on the CEMs. A detailed visual inspection of the CEM system, from the gas sampling probes at the stack to the CEM sample gas outlet tubing in the CEM trailer, was also conducted. The CEMs passed the dynamic and instrument calibration requirements specified in EPA's Performance Specification Test - 2 (NO_x and SO_2) alternative relative accuracy requirements.

LATIN AMERICA ENVIRONMENTAL PROJECT EXPERIENCE

Preliminary Design of Ambient Air Quality Monitoring Network – Lima, Peru. Project leader for project to prepare specifications for a fourteen station ambient air quality monitoring network for the municipality of Lima, Peru. Network includes four complete gaseous pollutant, particulate, and meteorological parameter monitoring stations, as well as eight PM_{10} and TSP monitoring stations.

Evaluation of Proposed Ambient Air Quality Network Modernization Project – Venezuela. Analyzed a plan to modernize and expand the ambient air monitoring network in Venezuela. Project was performed for the U.S. Trade and Development Agency. Direct interaction with policy makers at the Ministerio del Ambiente y de los Recursos Naturales Renovables (MARNR) in Caracas was a major component of this project.

Evaluation of U.S.-Mexico Border Region Copper Smelter Compliance with Treaty Obligations – Mexico. Project manager and lead engineer to evaluate compliance of U.S. and Mexican border region copper smelters with the SO_2 monitoring, recordkeeping and reporting requirements in Annex IV [Copper Smelters] of the La Paz Environmental Treaty. Identified potential problems with current ambient and stack monitoring practices that could result in underestimating the impact of SO_2 emissions from some of these copper smelters. Identified additional source types, including hazardous waste incinerators and power plants, that should be considered for inclusion in the La Paz Treaty process.

Development of Air Emission Limits for ICE Cogeneration Plant - Panamá. Lead engineer assisting U.S. cogeneration plant developer to permit an ICE cogeneration plant at a hotel/casino complex in Panama. Recommended the use of modified draft World Bank NO_x and PM limits for ICE power plants. The modification consisted of adding a thermal efficiency factor adjustment to the draft World Bank NO_x and PM limits. These proposed ICE emission limits are currently being reviewed by Panamanian environmental authorities.

Mercury Emissions Inventory for Stationary Sources in Northern Mexico. Project manager and lead engineer to estimate mercury emissions from stationary sources in Northern Mexico. Major potential sources of mercury emissions include solid- and liquid-fueled power plants, cement kilns co-firing hazardous waste, and non-ferrous metal smelters. Emission estimates were provided for approximately eighty of these sources located in Northern Mexico. Coordinated efforts of two Mexican subcontractors, located in Mexico City and Hermosillo, to obtain process throughput data for each source included in the inventory.

Translation of U.S. EPA Scrap Tire Combustion Emissions Estimation Document – Mexico. Evaluated the Translated a U.S. EPA scrap tire combustion emissions estimation document from English to Spanish for use by Latin American environmental professionals.

Environmental Audit of Aluminum Production Facilities – Venezuela. Evaluated the capabilities of existing air, wastewater and solid/hazardous waste control systems used by the aluminum industry in eastern Venezuela. This industry will be privatized in the near future. Estimated the cost to bring these control systems into compliance with air, wastewater and solid/hazardous waste standards recently promulgated in Venezuela. Also served as technical translator for team of U.S. environmental engineers involved in the due diligence assessment.

Assessment of Environmental Improvement Projects – Chile and Peru. Evaluated potential air, water, soil remediation and waste recycling projects in Lima, Peru and Santiago, Chile for feasibility study funding by the U.S. Trade and Development Agency. Project required onsite interaction with in-country decisionmakers (in Spanish). Projects recommended for feasibility study funding included: 1) an air quality technical support project for the Santiago, Chile region, and 2) soil remediation/metals recovery projects at two copper mine/smelter sites in Peru.

Air Pollution Control Training Course – Mexico. Conducted two-day Spanish language air quality training course for environmental managers of assembly plants in Mexicali, Mexico. Spanish-language course manual prepared by Powers Engineering. Practical laboratory included training in use of combustion gas analyzer, flame ionization detector (FID), photoionization detector (PID), and occupational sampling.

Stationary Source Emissions Inventory – Mexico. Developed a comprehensive air emissions inventory for stationary sources in Nogales, Sonora. This project requires frequent interaction with Mexican state and federal environmental authorities. The principal Powers Engineering subcontractor on this project is a Mexican firm located in Hermosillo, Sonora.

VOC Measurement Program – Mexico. Performed a comprehensive volatile organic compound (VOC) measurements program at a health products fabrication plant in Mexicali, Mexico. An FID and PID were used to quantify VOCs from five processes at the facility. Occupational exposures were also measured. Worker exposure levels were above allowable levels at several points in the main assembly area.

Renewable Energy Resource Assessment Proposal – Panama. Translated and managed winning bid to evaluate wind energy potential in Panama. Direct interaction with the director of development at the national utility monopoly (IRHE) was a key component of this project.

Comprehensive Air Emissions Testing at Assembly Plant – Mexico. Project manager and field supervisor of emissions testing for particulates, NO_x, SO_2 and CO at turbocharger/air cooler assembly plant in Mexicali, Mexico. Source specific emission rates were developed for each point source at the facility during the test program. Translated test report into Spanish for review by the Mexican federal environmental agency (SEMARNAP).

Air Pollution Control Equipment Retrofit Evaluation – Mexico. Project manager and lead engineer for comprehensive evaluation of air pollution control equipment and industrial ventilation systems in use at assembly plant consisting of four major facilities. Equipment evaluated included fabric filters controlling blast booth emissions, electrostatic precipitator controlling welding fumes, and industrial ventilation systems controlling welding fumes, chemical cleaning tank emissions, and hot combustion gas emissions. Recommendations included modifications to fabric filter cleaning cycle, preventative maintenance program for the electrostatic precipitator, and redesign of the industrial ventilation system exhaust hoods to improve capture efficiency.

Comprehensive Air Emissions Testing at Assembly Plant – Mexico. Project manager and field supervisor of emissions testing for particulates, NO_x, SO_2 and CO at automotive components assembly plant in Acuña, Mexico. Source-specific emission rates were developed for each point source at the facility during the test program. Translated test report into Spanish.

Fluent in Spanish. Studied at the Universidad de Michoacán in Morelia, Mexico, 1993, and at the Colegio de España in Salamanca, Spain, 1987-88. Have lectured (in Spanish) on air monitoring and control equipment at the Instituto Tecnológico de Tijuana. Maintain contact with Comisión Federal de Electricidad engineers responsible for operation of wind and geothermal power plants in Mexico, and am comfortable operating in the Mexican business environment.

PUBLICATIONS

Bill Powers, "*More Distributed Solar Means Fewer New Combustion Turbines*," Natural Gas & Electricity Journal, Vol. 29, Number 2, September 2012, pp. 17-20.

Bill Powers, "*Bay Area Smart Energy 2020,*" March 2012. See: http://pacificenvironment.org/-1-87

Bill Powers, "*Federal Government Betting on Wrong Solar Horse*," Natural Gas & Electricity Journal, Vol. 27, Number 5, December 2010,

Bill Powers, "*Today's California Renewable Energy Strategy—Maximize Complexity and Expense*," Natural Gas & Electricity Journal, Vol. 27, Number 2, September 2010, pp. 19-26.

Bill Powers, "*Environmental Problem Solving Itself Rapidly Through Lower Gas Costs*," Natural Gas & Electricity Journal, Vol. 26, Number 4, November 2009, pp. 9-14.

Bill Powers, "*PV Pulling Ahead, but Why Pay Transmission Costs?*" Natural Gas & Electricity Journal, Vol. 26, Number 3, October 2009, pp. 19-22.

Bill Powers, "*Unused Turbines, Ample Gas Supply, and PV to Solve RPS Issues*," Natural Gas & Electricity Journal, Vol. 26, Number 2, September 2009, pp. 1-7.

Bill Powers, "*CEC Cancels Gas-Fed Peaker, Suggesting Rooftop Photovoltaic Equally Cost-Effective*," Natural Gas & Electricity Journal, Vol. 26, Number 1, August 2009, pp. 8-13.

Bill Powers, "*San Diego Smart Energy 2020 – The 21st Century Alternative*," San Diego, October 2007.

Bill Powers, "*Energy, the Environment, and the California – Baja California Border Region*," Electricity Journal, Vol. 18, Issue 6, July 2005, pp. 77-84.

W.E. Powers, *"Peak and Annual Average Energy Efficiency Penalty of Optimized Air-Cooled Condenser on 515 MW Fossil Fuel-Fired Utility Boiler,"* presented at California Energy Commission/Electric Power Research Institute Advanced Cooling Technologies Symposium, Sacramento, California, June 2005.

W.E. Powers, R. Wydrum, P. Morris, *"Design and Performance of Optimized Air-Cooled Condenser at Crockett Cogeneration Plant,"* presented at EPA Symposium on Technologies for Protecting Aquatic Organisms from Cooling Water Intake Structures, Washington, DC, May 2003.

P.J. Blau and W.E. Powers, *"Control of Hazardous Air Emissions from Secondary Aluminum Casting Furnace Operations Through a Combination of: Upstream Pollution Prevention Measures, Process Modifications and End-of-Pipe Controls,"* presented at 1997 AWMA/EPA Emerging Solutions to VOC & Air Toxics Control Conference, San Diego, CA, February 1997.

W.E. Powers, et. al., *"Hazardous Air Pollutant Emission Inventory for Stationary Sources in Nogales, Sonora, Mexico ,"* presented at 1995 AWMA/EPA Emissions Inventory Specialty Conference, RTP, NC, October 1995.

W.E. Powers, *"Develop of a Parametric Emissions Monitoring System to Predict NO_x Emissions from Industrial Gas Turbines,"* presented at 1995 AWMA Golden West Chapter Air Pollution Control Specialty Conference, Ventura, California, March 1995.

W. E. Powers, et. al., *"Retrofit Control Options for Particulate Emissions from Magnesium Sulfite Recovery Boilers,"* presented at 1992 TAPPI Envr. Conference, April 1992. Published in *TAPPI Journal*, July 1992.

S. S. Parmar, M. Short, W. E. Powers, *"Determination of Total Gaseous Hydrocarbon Emissions from an Aluminum Rolling Mill Using Methods 25, 25A, and an Oxidation Technique,"* presented at U.S. EPA Measurement of Toxic and Related Air Pollutants Conference, May 1992.

N. Meeks, W. E. Powers, *"Air Toxics Emissions from Gas-Fired Internal Combustion Engines,"* presented at AIChE Summer Meeting, August 1990.

W. E. Powers, *"Air Pollution Control of Plating Shop Processes,"* presented at 7th AES/EPA Conference on Pollution Control in the Electroplating Industry, January 1986. Published in *Plating and Surface Finishing* magazine, July 1986.

H. M. Davenport, W. E. Powers, *"Affect of Low Cost Modifications on the Performance of an Undersized Electrostatic Precipitator,"* presented at 79th Air Pollution Control Association Conference, June 1986.

AWARDS

Engineer of the Year, 1991 – ENSR Consulting and Engineering, Camarillo
Engineer of the Year, 1986 – Naval Energy and Environmental Support Activity, Port Hueneme
Productivity Excellence Award, 1985 – U. S. Department of Defense

PATENTS

Sedimentation Chamber for Sizing Acid Mist, Navy Case Number 70094

ATLANTIC COAST PIPELINE, LLC
ATLANTIC COAST PIPELINE
Docket Nos. CP15-___-000
CP15-___-000
CP15-___-000

and

DOMINION TRANSMISSION, INC.
SUPPLY HEADER PROJECT
Docket No. CP15-___-000

Resource Report 9
Air and Noise Quality

Final

Prepared by

NATURAL RESOURCE GROUP
an ERM Group company

September 2015

Summary of Required Federal Energy Regulatory Commission Report Information

Minimum Filing Requirements:	Report Section Reference
1. Describe existing air quality in the vicinity of the project. (§ 380.12(k)(1)) • Identify criteria pollutants that may be emitted above U.S. Environmental Protection Agency (EPA)-identified significance levels.	Sections 9.1.3 and 9.1.4
2. Quantify the existing noise levels (day-night sound level (Ldn) and other applicable noise parameters) at noise sensitive areas and at other areas covered by relevant state and local noise ordinances. (§ 380.12(k)(2)) • If new compressor station sites are proposed, measure or estimate the existing ambient sound environment based on current land uses and activities. • For existing compressor stations (operated at full load), include the results of a sound level survey at the site property line and nearby noise-sensitive areas. • Include a plot plan that identifies the locations and duration of noise measurements. • All surveys must identify the time of day, weather conditions, wind speed and direction, engine load, and other noise sources present during each measurement.	Sections 9.2.2, 9.2.3, and 9.2.4
3. Quantify existing and proposed emissions of compressor equipment plus construction emissions, including nitrogen oxides (NO_X) and carbon monoxide (CO), and the basis for these calculations. Summarize anticipated air quality impacts for the project. (§ 380.12(k)(3)) • Provide the emission rate of NO, from existing and proposed facilities, expressed in pounds per hour and tons per year for maximum operating conditions, include supporting calculations, emission factors, fuel consumption rate, and annual hours of operation.	Sections 9.1.4 and 9.1.5
4. Describe the existing compressor units at each station where new, additional, or modified compressor units are proposed, including the manufacturer, model number, and horsepower of the compressor units. For proposed new, additional, or modified compressor units include the horsepower, type, and energy source. (§ 380.12(k)(4))	Sections 9.1.1 and 9.1.2
5. Identify any nearby noise-sensitive area by distance and direction from the proposed compressor unit building/enclosure. (§ 380.12(k)(4))	Sections 9.2.3 and 9.2.4
6. Identify any applicable state or local noise regulations. (§ 380.12(k)(4)) • Specify how the facility will meet the regulations.	Section 9.2.1
7. Calculate the noise impact at noise-sensitive areas of the proposed compressor unit modifications or additions, specifying how the impact was calculated, including manufacturer's data and proposed noise control equipment. (§ 380.12(k)(4))	Sections 9.2.3 and 9.2.4

Additional Information:	Report Section Reference
Provide copies of application for state air permits and agency determinations, as appropriate.	Provided upon request
For major sources of air emissions (as defined by the EPA), provide copies of applications for permits to construct (and operate, if applicable) or for applicability determinations under regulations for the prevention of significant air quality deterioration and subsequent determinations.	Appendix 9A (emissions calculations); Changes to Mockingbird Compressor Station are considered Major. Copy of application will be provided upon request
Describe measures and manufacturer's specifications for equipment proposed to mitigate impact to air and noise quality, including emission control systems, installation of filters, mufflers, or insulation of piping and building, and orientation of equipment away from noise-sensitive areas.	Sections 9.1.4, 9.2.3, and 9.2.4

TABLE OF CONTENTS

9.0 RESOURCE REPORT 9 – AIR AND NOISE QUALITY 9-1
9.1 Air Quality 9-4
9.1.1 Atlantic Coast Pipeline 9-4
9.1.2 Supply Header 9-7
9.1.3 Existing Conditions 9-8
9.1.3.1 Local Climate for Atlantic Coast Pipeline 9-8
9.1.3.2 Local Climate for Supply Header Project 9-9
9.1.3.3 National Ambient Air Quality Standards 9-11
9.1.4 Projects Emissions 9-12
9.1.4.1 Construction Emissions 9-12
9.1.4.2 Stationary Source Emissions 9-15
9.1.4.3 Fugitive Emissions 9-17
9.1.5 Regulatory Requirements for Air Quality 9-18
9.1.5.1 Prevention of Significant Deterioration/Non-Attainment New Source Review 9-18
9.1.5.2 New Source Performance Standards 9-22
9.1.5.3 National Emission Standards for Hazardous Air Pollutants 9-26
9.1.5.4 EPA's Clean Power Plan 9-27
9.1.5.5 Title V Operating Permits 9-27
9.1.5.6 State/Commonwealth Regulations 9-28
9.1.5.7 Greenhouse Gas Mandatory Reporting Rule 9-37
9.1.5.8 General Conformity 9-37
9.1.5.9 Air Quality Modeling Analysis 9-40
9.1.5.10 Air Permit Applications 9-59
9.2 Noise Quality 9-59
9.2.1 Regulatory Requirements for Noise 9-59
9.2.1.1 Federal Noise Regulations 9-59
9.2.1.2 State/Commonwealth Noise Regulations 9-60
9.2.1.3 Local Noise Regulations 9-60
9.2.2 Existing Noise Conditions 9-61
9.2.3 Construction Noise Impacts 9-61
9.2.4 Operational Noise Impacts 9-61
9.2.4.1 Atlantic Coast Pipeline 9-61
9.2.4.2 Supply Header 9-90
9.2.4.3 Other Aboveground Facilities 9-118
9.3 References 9-119

LIST OF TABLES

Table 9.1.1-1 Summary of Proposed Equipment for the Atlantic Coast Pipeline 9-5
Table 9.1.1-2 Summary of Proposed Equipment for M&R Stations 9-5
Table 9.1.2-1 Summary of Proposed Equipment for the Supply Header Project 9-7
Table 9.1.3-1 Climate Data for Clarksburg, West Virginia (1981 to 2010) for the Atlantic Coast Pipeline 9-8
Table 9.1.3-2 Climate Data for Tye River 1 SE, Virginia (1981 to 2010) for the Atlantic Coast Pipeline 9-9
Table 9.1.3-3 Climate Data for Roanoke Rapids, North Carolina (1981 to 2010) for the Atlantic Coast Pipeline 9-9
Table 9.1.3-4 Climate Data for Salina 3 W, Pennsylvania (1981 to 2010) for the Supply Header Project..... 9-10
Table 9.1.3-5 Climate Data for Waynesburg 1 E, Pennsylvania (1981 to 2010) for the Supply Header Project 9-10
Table 9.1.3-6 Climate Data for Hannibal Lock and Dam, Ohio (1981 to 2010) for the Supply Header Project 9-11
Table 9.1.4-1 Estimated Emissions from Construction Equipment Exhaust 9-14
Table 9.1.4-2 Estimated Emissions from Particulate Matter Emissions From Material Transfers 9-14
Table 9.1.4-3 Estimated Tailpipe Emissions From Vehicles Used By Commuting Construction Workers 9-14
Table 9.1.4-4 Potential Emissions by Compressor Station for the Atlantic Coast Pipeline 9-15
Table 9.1.4-5 Potential Emissions by M&R Stations for the Atlantic Coast Pipeline 9-16
Table 9.1.4-6 Potential Emissions by Compressor Station for the Supply Header Project 9-17
Table 9.1.4-7 Engineering Measures to Minimize Methane Fugitive Emissions for the Atlantic Coast Pipeline and Supply Header Projects..... 9-18
Table 9.1.5-1 Prevention of Significant Deterioration Determination by Compressor Station for the Atlantic Coast Pipeline..... 9-20
Table 9.1.5-2 Prevention of Significant Deterioration Determination for Mockingbird Hill Compressor Station for the Supply Header Project..... 9-21
Table 9.1.5-3 Prevention of Significant Deterioration Determination for Minor Source Compressor Stations for the Supply Header Project..... 9-22
Table 9.1.5-4 General Conformity Thresholds for the Atlantic Coast Pipeline and Supply Header Project 9-38
Table 9.1.5-5 ACP and SHP Construction Emissions for Nonattainment and Maintenance Areas for Calendar Year 2017..... 9-39
Table 9.1.5-6 ACP and SHP Construction Emissions for Nonattainment and Maintenance Areas for Calendar Year 2018..... 9-40
Table 9.1.5-7 MAKEMET Input Parameters for the Atlantic Coast Pipeline 9-41
Table 9.1.5-8 Summary of Background Concentration for the Atlantic Coast Pipeline.... 9-42
Table 9.1.5-9 AERMOD Inputs: Stack Parameters and Source Information for the Atlantic Coast Pipeline 9-43
Table 9.1.5-10 Scaling Ratios to be used with AERMOD Screening Mode 9-47
Table 9.1.5-11 Air Quality Model Results for the Atlantic Coast Pipeline 9-47
Table 9.1.5-12 Summary of Background Concentrations for the Supply Header Project ... 9-52

Table 9.1.5-13 AERMOD Inputs: Stack Parameters and Source Information for the Supply Header Project 9-54
Table 9.1.5-14 Air Quality Model Results for the Supply Header Project 9-58
Table 9.1.5-15 Permit Application Timeline for the Atlantic Coast Pipeline and Supply Header Project 9-59
Table 9.2.4-1 Compressor Station 1 – Existing Ambient Sound Levels Prior to Station Construction 9-63
Table 9.2.4-2 Compressor Station 1 – Noise Quality Analysis Associated with ACP Project 9-65
Table 9.2.4-3 DIL Values for the Turbine Exhaust Muffler and Pipe Acoustic Insulation in dB per Octave-Band Center Frequency in Hz 9-66
Table 9.2.4-4 DIL Values for the Turbine Air Intake Cleaner/Silencer and Duct Acoustic Insulation in dB per Octave-Band Center Frequency in Hz 9-67
Table 9.2.4-5 Compressor Building Wall and Roof Panel Minimum TL in dB per Octave-Band Center Frequency in Hz 9-67
Table 9.2.4-6 Air Handling Unit Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-68
Table 9.2.1-7 Ventilation Air Inlet Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz 9-68
Table 9.2.4-8 Wall Air Inlet Fan Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-69
Table 9.2.4-9 Ventilation Air Discharge Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz 9-69
Table 9.2.4-10 Lube Oil Cooler Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-69
Table 9.2.4-11 Compressor Unit Gas Cooler Maximum Sound Power Level in dB per Octave-Band Center Frequency in Hz 9-70
Table 9.2.4-12 Piping Insulation Minimum IL in dB per Octave-Band Center Frequency in Hz 9-70
Table 9.2.4-13 Ultrasonic Meter Maximum Sound Pressure Levels in dB per Octave-Band Center Frequency in Hz 9-71
Table 9.2.4-14 Measurement Building Wall and Roof Panel Minimum TL in dB per Octave-Band Center Frequency in Hz 9-71
Table 9.2.4-15 Ventilation Air Inlet Acoustic Louver Minimum Transmission Loss in dB per Octave-Band Center Frequency in Hz 9-71
Table 9.2.4-16 Compressor Station 2 – Existing Ambient Sound Levels Prior to Station Construction 9-73
Table 9.2.4-17 Compressor Station 2– Noise Quality Analysis Associated with ACP Project 9-75
Table 9.2.4-18 DIL Values for the Turbine Exhaust Muffler and Pipe Acoustic Insulation in dB per Octave-Band Center Frequency in Hz 9-76
Table 9.2.4-19 DIL Values for the Turbine Air Intake Cleaner/Silencer and Duct Acoustic Insulation in dB per Octave-Band Center Frequency in Hz 9-77
Table 9.2.4-20 Compressor Building Wall and Roof Panel Minimum TL in dB per Octave-Band Center Frequency in Hz 9-77

Table 9.2.4-21 Air Handling Unit Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-78
Table 9.2.4-22 Ventilation Air Inlet Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz 9-78
Table 9.2.4-23 Wall Air Inlet Fan Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-79
Table 9.2.4-24 Ventilation Air Discharge Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz 9-79
Table 9.2.4-25 Lube Oil Cooler Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-79
Table 9.2.4-26 Compressor Unit Gas Cooler Maximum Sound Power Level in dB per Octave-Band Center Frequency in Hz 9-80
Table 9.2.4-27 Piping Insulation Minimum IL in dB per Octave-Band Center Frequency in Hz 9-80
Table 9.2.4-28 Ultrasonic Meter Maximum Sound Pressure Levels in dB per Octave-Band Center Frequency in Hz 9-81
Table 9.2.4-29 Regulator Valve Maximum Sound Pressure Levels in dB per Octave-Band Center Frequency in Hz 9-81
Table 9.2.4-30 Measurement Building Wall and Roof Panel Minimum TL in dB per Octave-Band Center Frequency in Hz 9-81
Table 9.2.4-31 Ventilation Air Inlet Acoustic Louver Minimum Transmission Loss in dB per Octave-Band Center Frequency in Hz 9-82
Table 9.2.4-32 Gas Heater Maximum Sound Pressure Levels in dB per Octave-Band Center Frequency in Hz 9-82
Table 9.2.4-33 Compressor Station 3 – Existing Ambient Sound Levels Prior to Station Construction 9-84
Table 9.2.4-34 Compressor Station 3 – Noise Quality Analysis Associated with ACP Project 9-85
Table 9.2.4-35 DIL Values for the Turbine Exhaust Muffler and Pipe Acoustic Insulation in dB per Octave-Band Center Frequency in Hz 9-86
Table 9.2.4-36 DIL Values for the Turbine Air Intake Cleaner/Silencer and Duct Acoustic Insulation in dB per Octave-Band Center Frequency in Hz 9-87
Table 9.2.4-37 Compressor Building Wall and Roof Panel Minimum TL in dB per Octave-Band Center Frequency in Hz 9-87
Table 9.2.4-38 Air Handling Unit Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-88
Table 9.2.4-39 Ventilation Air Inlet Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz 9-88
Table 9.2.4-40 Wall Air Inlet Fan Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-89
Table 9.2.4-41 Ventilation Air Discharge Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz 9-89
Table 9.2.4-42 Lube Oil Cooler Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-89
Table 9.2.4-43 Compressor Unit Gas Cooler Maximum Sound Power Level in dB per Octave-Band Center Frequency in Hz 9-90

Table 9.2.4-44 Piping Insulation Minimum IL in dB per Octave-Band Center Frequency in Hz 9-90
Table 9.2.4-45 JB Tonkin Compressor Station – Existing Sound Level Contribution Prior to SHP Modifications 9-92
Table 9.2.4-46 JB Tonkin Compressor Station – Noise Quality Analysis Associated with SHP Modifications 9-94
Table 9.2.4-47 DIL Values for the Turbine Exhaust Muffler and Pipe Acoustic Insulation in dB per Octave-Band Center Frequency in Hz 9-96
Table 9.2.4-48 DIL Values for the Turbine Air Intake Cleaner/Silencer and Duct Acoustic Insulation in dB per Octave-Band Center Frequency in Hz 9-96
Table 9.2.4-49 Compressor Building Wall and Roof Panel Minimum TL in dB per Octave-Band Center Frequency in Hz 9-97
Table 9.2.4-50 Air Handling Unit Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-97
Table 9.2.4-51 Ventilation Air Inlet and Air Handling Unit Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz 9-98
Table 9.2.4-52 Emergency Wall Air Inlet Fan Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-98
Table 9.2.4-53 Ventilation Air Discharge Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz 9-98
Table 9.2.4-54 Lube Oil Cooler Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in H 9-99
Table 9.2.4-55 Compressor Unit Gas Cooler Maximum Sound Power Level in dB per Octave-Band Center Frequency in Hz 9-99
Table 9.2.4-56 Piping Insulation Minimum IL in dB per Octave-Band Center Frequency in Hz 9-99
Table 9.2.4-57 Piping Insulation Minimum IL in dB per Octave-Band Center Frequency in Hz 9-100
Table 9.2.4-58 Valve Actuator Enclosure Wall and Roof Panel Minimum IL in dB per Octave-Band Center Frequency in Hz 9-101
Table 9.2.4-59 Acoustic Louver Minimum IL in dB per Octave-Band Center Frequency in Hz 9-101
Table 9.2.4-60 Crayne Compressor Station – Existing Sound Level Contribution Prior to SHP Modifications 9-103
Table 9.2.4-61 Crayne Compressor Station – Noise Quality Analysis Associated with SHP Modifications 9-105
Table 9.2.4-62 DIL Values for the Turbine Exhaust Muffler and Pipe Acoustic Insulation in dB per Octave-Band Center Frequency in Hz 9-106
Table 9.2.4-63 DIL Values for the Turbine Air Intake Cleaner/Silencer and Duct Acoustic Insulation in dB per Octave-Band Center Frequency in Hz 9-106
Table 9.2.4-64 Compressor Building Wall and Roof Panel Minimum TL in dB per Octave-Band Center Frequency in Hz 9-107
Table 9.2.4-65 Air Handling Unit Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-107
Table 9.2.4-66 Ventilation Air Inlet and Air Handling Unit Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz 9-108

Table 9.2.4-67 Emergency Wall Air Inlet Fan Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-108
Table 9.2.4-68 Ventilation Air Discharge Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz 9-108
Table 9.2.4-69 Lube Oil Cooler Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-109
Table 9.2.4-70 Compressor Unit Gas Cooler Maximum Sound Power Level in dB per Octave-Band Center Frequency in Hz 9-109
Table 9.2.4-71 Piping Insulation Minimum IL in dB per Octave-Band Center Frequency in Hz 9-109
Table 9.2.4-72 Mockingbird Hill Compressor Station – Existing and Baseline Sound Level Contribution Prior to SHP Modifications 9-112
Table 9.2.4-73 Mockingbird Hill Compressor Station – Noise Quality Analysis Associated with SHP Modifications 9-113
Table 9.2.4-74 DIL Values for the Turbine Exhaust Muffler and Pipe Acoustic Insulation in dB per Octave-Band Center Frequency in Hz 9-114
Table 9.2.4-75 DIL Values for the Turbine Air Intake Cleaner/Silencer and Duct Acoustic Insulation in dB per Octave-Band Center Frequency in Hz 9-115
Table 9.2.4-76 Compressor Building Wall and Roof Panel Minimum TL in dB per Octave-Band Center Frequency in Hz 9-115
Table 9.2.4-77 Air Handling Unit Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-116
Table 9.2.4-78 Ventilation Air Inlet and Air Handling Unit Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz 9-116
Table 9.2.4-79 Emergency Wall Air Inlet Fan Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-116
Table 9.2.4-80 Ventilation Air Discharge Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz 9-117
Table 9.2.4-81 Lube Oil Cooler Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz 9-117
Table 9.2.4-82 Compressor Unit Gas Cooler Maximum Sound Power Level in dB per Octave-Band Center Frequency in Hz 9-118
Table 9.2.4-83 Piping Insulation Minimum IL in dB per Octave-Band Center Frequency in Hz 9-118

LIST OF FIGURES

Figure 9.1.5-1 Building Profile for Atlantic Coast Pipeline: Compressor Station 1 9-44
Figure 9.1.5-2 Building Profile for Atlantic Coast Pipeline: Compressor Station 2 9-45
Figure 9.1.5-3 Building Profile for Atlantic Coast Pipeline: Compressor Station 3 9-46
Figure 9.1.5-4 5-Year Wind Rose for the Supply Header Project: JB Tonkin Compressor Station – Allegheny County Airport 9-49
Figure 9.1.5-5 5-Year Wind Rose for the Supply Header Project: Crayne Compressor Station – Wheeling Ohio County Airport 9-50
Figure 9.1.5-6 5-Year Wind Rose for the Supply Header Project: Mockingbird Hill Compressor Station – North Central West Virginia Airport 9-51
Figure 9.1.5-7 Building Profile for the Supply Header Project: JB Tonkin Compressor Station 9-55
Figure 9.1.5-8 Building Profile for the Supply Header Project: Crayne Compressor Station 9-56
Figure 9.1.5-9 Building Profile for the Supply Header Project: Mockingbird Hill Compressor Station 9-57

LIST OF APPENDICES

Appendix 9A Emission Estimates for Compressor Stations and Pipeline Construction
Appendix 9B Preconstruction Noise Survey and Acoustical Analysis Report

LIST OF ACRONYMS AND ABBREVIATIONS

°F	degrees Fahrenheit
ACP	Atlantic Coast Pipeline
AGL	AGL Resources, Inc.
ASOS	Automated Surface Observation System
Atlantic	Atlantic Coast Pipeline, LLC
BACT	Best Available Control Technology
BAT	best available technology
BPIP	Building Profile Input Program
Btu	British thermal unit
CAA	Clean Air Act
Certificate	Certificate of Public Convenience and Necessity
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
Commission	Federal Energy Regulatory Commission
CSR	Code of State Regulations
dB	decibels
dBA	decibels on the A-weighted scale
DIL	dynamic sound insertion loss
Dominion	Dominion Resources, Inc.
DTI	Dominion Transmission, Inc.
Duke Energy	Duke Energy Corporation
EPA	U.S. Environmental Protection Agency
EPA MOVES	EPA Motor Vehicle Emission Simulator model
ER	Environmental Report
FERC	Federal Energy Regulatory Commission
GHG	greenhouse gas
HAP	hazardous air pollutant
HDD	horizontal directional drill
HFC	hydrofluorcarbon
hp	horsepower
IL	Insertion Loss
INGAA	Interstate Natural Gas Association of America
km	kilometer
kW	kilowatt
LAER	Lowest Achievable Emission Rate
lbs	pounds
L_{dn}	day-night equivalent sound level
M&R	metering and regulating
MACT	Maximum Achievable Control Technology
MMBtu	million metric British thermal units
MMBtu/hr	million metric British thermal units per hour
MMDth/d	million dekatherms feet per day

MP	milepost
mph	miles per hour
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NA-NSR	Non-attainment New Source Review
NC DENR	North Carolina Department of Environment and Natural Resources
NED	National Elevation Dataset
NESHAP	National Emissions Standard for Hazardous Air Pollutants
ng/J	nanogram per joule
NO_2	nitrogen dioxide
NO_X	nitrogen oxide
NRC	noise reduction coefficient
NSA	noise-sensitive area
NSPS	New Source Performance Standard
NSR	New Source Review
O_2	oxygen
OGI	optical gas imaging
OTR	Ozone Transport Region
PA Code	Pennsylvania Code
PADEP	Pennsylvania Department of Environmental Protection
PFC	perfluorocarbon
Piedmont	Piedmont Natural Gas Co., Inc.
PM_{10}	particulate matter sized 10 microns in aerodynamic diameter and smaller
$PM_{2.5}$	particulate matter sized 2.5 microns in aerodynamic diameter and smaller
ppmv	parts per million by volume
ppmvd	parts per million volume dry
Projects	Atlantic Coast Pipeline and Supply Header Project
PSD	Prevention of Significant Deterioration
PTE	potential to emit
RACT	Reasonably Available Control Technology
SCR	Selective Catalytic Reduction
SF_6	sulfur hexafluoride
SHP	Supply Header Project
SO_2	sulfur dioxide
SOP	State operating permit
STC	sound transmissions class
TL	transmission loss
tpy	tons per year
USC	United States Code
USDOT	U.S. Department of Transportation
USGS	United States Geological Survey
VAC	Virginia Administrative Code
VOC	volatile organic compound

9.0 RESOURCE REPORT 9 – AIR AND NOISE QUALITY

Atlantic Coast Pipeline

Atlantic Coast Pipeline, LLC (Atlantic) is a company formed by four major U.S. energy companies – Dominion Resources, Inc. (Dominion; NYSE: D), Duke Energy Corporation (Duke Energy; NYSE: DUK), Piedmont Natural Gas Co., Inc. (Piedmont; NYSE: PNY), and AGL Resources, Inc. (AGL; NYSE: GAS). [1] The company was created to develop, own, and operate the proposed Atlantic Coast Pipeline (ACP or Project), an approximately 564.1-mile-long, interstate natural gas transmission pipeline system designed to meet growing energy needs in Virginia and North Carolina (see Figure 1.1.1-1 in Resource Report 1). The ACP will be capable of delivering up to 1.5 million dekatherms per day (MMDth/d) of natural gas that will be used to generate electricity, heat homes, and run local businesses. The pipeline Project will facilitate cleaner air, increase the reliability and security of natural gas supplies, and provide a significant economic boost in West Virginia, Virginia, and North Carolina. More information is provided at the company's website at www.dom.com/acpipeline. Atlantic has contracted with Dominion Transmission, Inc. (DTI), a subsidiary of Dominion, to permit, build, and operate the ACP on behalf of Atlantic. [2]

Atlantic is seeking authorization from the Federal Energy Regulatory Commission (FERC or Commission) under Section 7(c) of the Natural Gas Act to construct, own, operate, and maintain the following proposed facilities for the ACP system: [3]

Mainline Pipeline Facilities:

- AP-1: approximately 300.1 miles of underground 42-inch outside diameter natural gas transmission pipeline in Harrison, Lewis, Upshur, Randolph, and Pocahontas Counties, West Virginia; Highland, Augusta, Nelson, Buckingham, Cumberland, Prince Edward, Nottoway, Dinwiddie, Brunswick, and Greensville Counties, Virginia; and Northampton County, North Carolina.
- AP-2: approximately 183.0 miles of underground 36-inch outside diameter natural gas transmission pipeline in Northampton, Halifax, Nash, Wilson, Johnston, Sampson, Cumberland, and Robeson Counties, North Carolina.

---

1 On August 24, 2015, Southern Company and AGL Resources announced that the boards of directors of both companies have approved a definitive merger agreement. Pursuant to the agreement, AGL Resources will become a new wholly owned subsidiary of Southern Company. The companies expect to complete the transaction in the second half of 2016.

2 As described in this report, DTI actions associated with the ACP are on behalf of Atlantic.

3 Atlantic is also requesting a Blanket Certificate of Public Convenience and Necessity pursuant to Part 284, Subpart G, of the Commission's regulations authorizing open-access transportation of natural gas for others with pre-granted abandonment authority, and a Blanket Certificate of Public Convenience and Necessity pursuant to Part 157, Subpart F, of the Commission's regulations authorizing certain facility construction and operation, certain certificate amendments and abandonments.

Lateral Pipeline Facilities:

- AP-3: approximately 79.3 miles of underground 20-inch outside diameter natural gas lateral pipeline in Northampton County, North Carolina; and Greensville and Southampton Counties and the Cities of Suffolk and Chesapeake, Virginia.
- AP-4: approximately 0.6 mile of underground 16-inch outside diameter natural gas lateral pipeline in Brunswick County, Virginia.
- AP-5: approximately 1.1 miles of underground 16-inch outside diameter natural gas lateral pipeline in Greensville County, Virginia.

Compressor Station Facilities:

- Compressor Station 1 (Marts Compressor Station): a new, natural gas-fired compressor station approximately at milepost [4] (MP) 7.6 of the AP-1 mainline in Lewis County, West Virginia.
- Compressor Station 2 (Buckingham Compressor Station): a new, natural gas-fired compressor station approximately at MP 191.5 of the AP-1 mainline in Buckingham County, Virginia.
- Compressor Station 3 (Northampton Compressor Station): a new natural gas-fired compressor station approximately at MP 300.1 of the AP-1 mainline and MP 0.0 of the AP-2 mainline and 0.0 of the AP-3 lateral in Northampton County, North Carolina.

Other Aboveground Facilities:

- Nine new metering and regulating (M&R) stations at receipt and/or delivery points along the new pipelines (including one at Compressor Station 1 and one at Compressor Station 2).
- Thirty-one valve sites at select points along the new pipelines at intervals specified by U.S. Department of Transportation (USDOT) regulations at Title 49 Code of Federal Regulations (CFR) Part 192.
- Eight sets of pig launcher and/or receiver sites at 11 points along the new pipelines (including launcher/receiver sites at Compressor Stations 2 and 3).

As required by 18 CFR 380.12, Atlantic is submitting this Environmental Report (ER) in support of its Application to the Commission for a Certificate of Public Convenience and Necessity (Certificate) to construct and operate the proposed ACP facilities.

[4] The mileposts used in this report are based on three-dimensional changes in topography (elevation) along the proposed pipeline routes. Therefore, the straight-line distance between two mileposts depicted on two-dimensional maps and figures of the routes may be less than 5,280 feet. The mileposts are reference points along the routes.

Supply Header Project

DTI proposes to construct and operate approximately 37.5 miles of pipeline loop and modify existing compression facilities in Pennsylvania and West Virginia (see Figure 1.1.1-1 in Resource Report 1). This Project, referred to as the Supply Header Project (SHP), will enable DTI to provide firm transportation service of up to 1.5 MMDth/d to various customers, including Atlantic. Atlantic will be a Foundation Shipper in the SHP, and will utilize the SHP capacity to allow its shippers access to natural gas supplies from various DTI receipt points for further delivery to points along the ACP. By providing its customers access to an affordable and stable source of natural gas, the SHP also satisfies the same purpose and need as the ACP by increasing the reliability and security of natural gas supplies in Virginia and North Carolina.

DTI is seeking authorization from the Commission under Section 7(c) of the Natural Gas Act to construct, own, operate, and maintain the following proposed facilities for the SHP:

Pipeline Loops:

- TL-636: approximately 3.9 miles of underground 30-inch outside diameter natural gas pipeline looping DTI's existing LN-25 pipeline in Westmoreland County, Pennsylvania.
- TL-635: approximately 33.6 miles of underground 30-inch outside diameter natural gas pipeline looping DTI's existing TL-360 pipeline in Harrison, Doddridge, Tyler, and Wetzel Counties, West Virginia.

Compressor Station Modifications:

- JB Tonkin Compressor Station: modifications at DTI's existing JB Tonkin Compressor Station in Westmoreland County, Pennsylvania.
- Crayne Compressor Station: modifications at DTI's existing Crayne Compressor Station in Greene County, Pennsylvania.
- Burch Ridge Compressor Station: crossover piping at DTI's existing Burch Ridge Compressor Station in Marshall County, West Virginia.
- Mockingbird Hill Compressor Station: modifications at or near DTI's existing Mockingbird Hill Compressor Station in Wetzel County, West Virginia.

Other Aboveground Facilities:

- One new M&R station at a new delivery point within Atlantic's proposed Compressor Station 1 in Lewis County, West Virginia.
- Six valve sites at select points along the new pipeline loops at intervals specified by USDOT regulations at 49 CFR 192.
- Two sets of pig launcher and receiver sites at the ends of each of the new pipeline loops.

DTI is also requesting authorization from the FERC under Section 7(b) of the Natural Gas Act to abandon in place two existing gathering compressor units (Hasting Compressor Units 1 and 2) at its existing Hastings Compressor Station in Wetzel County, West Virginia.

As required by 18 CFR 380.12, DTI is submitting this ER in support of its Application to the Commission for a Certificate to construct and operate the proposed SHP facilities.

Scope of Resource Report 9

This Resource Report addresses the effects of the ACP and SHP (Projects) on the existing air and noise environment and describes proposed measures to mitigate the effects. This Report also presents the long-term impacts of operation of the additional compressor units. This Report also addresses comments received from the public during the FERC Pre-filing Process as well as comments received directly from the FERC and other Federal and State/Commonwealth agencies.

9.1 AIR QUALITY

9.1.1 Atlantic Coast Pipeline

Design Basis:

The three new compressor stations proposed for the ACP will have approximate outputs of 55,015 horsepower (hp), 40,715 hp, and 21,815 hp of compression. Table 9.1.1-1 lists the gas-driven compressor engines that will be installed at each station. Each station will include approximately six structures (e.g., compressor, auxiliary, office, utility gas, drum storage, and storage building(s)), with a chain-link security fence installed around the periphery of the site. Equipment at the station will include piping (including associated valves, flanges, and connections), gas filter/separators, gas coolers, inlet air filters, exhaust silencers, tanks, blowdown silencers, heaters, and auxiliary generators.

Three proposed M&R stations, located in Brunswick County, Virginia, Greensville County, Virginia, and Randolph County, West Virginia, will include heaters and/or microturbines. Table 9.1.1-2 lists the heaters at each M&R station. The Woods Corner M&R station will also have line heaters; however, this station will be collocated with Compressor Station 2 in Buckingham County, Virginia. The remaining M&R stations will not include heaters or other fired equipment.

Alternative Design Basis Considerations:

Atlantic evaluated the option of using electric-driven units instead of the proposed natural gas-fired engines at Compressor Stations 1, 2, and 3. The primary factors Atlantic considered when planning the type of compression to be utilized for the ACP were station hydraulic design conditions, planned operational characteristics, capital costs, and station-related environmental impacts, including construction footprint, air emissions, and noise. Reliability of electrical service and the delivery facilities needed to get the power to the compressor stations were also considered. During the Winter and Summer months, the need for consumer regional purchased power is at peak demand. This coincides with typical peaks for consumer demand for natural gas in the Winter (heating) and the Summer (electric generation load for cooling). With electric-driven units, such coincident peaks could introduce reliability risk.

TABLE 9.1.1-1

Summary of Proposed Equipment for the Atlantic Coast Pipeline

Facility ID	Location	Emission Unit	Unit Size	Units
Compressor Station 1	Lewis County, WV	*Total Station Compression*	*55,015*	*hp*
		Solar Titan 130 Turbine	20,500	hp
		Solar Mars 100 Turbine	15,900	hp
		Solar Taurus 70 Turbine	10,915	hp
		Solar Taurus 60 Turbine	7,700	hp
		Caterpillar Emergency Generator	2,098	hp
		Boiler	10.7	MMBtu/hr
Compressor Station 2	Buckingham County, VA	*Total Station Compression*	*40,715*	*hp*
		Solar Mars 100 Turbine	15,900	hp
		Solar Taurus 70 Turbine	10,915	hp
		Solar Taurus 60 Turbine	7,700	hp
		Solar Centaur 50L Turbine	6,200	hp
		Boiler	9.5	MMBtu/hr
		Heater 1 (Woods Corner)	15	MMBtu/hr
		Heater 2 (Woods Corner)	15	MMBtu/hr
		Heater 3 (Woods Corner)	15	MMBtu/hr
		Heater 4 (Woods Corner)	15	MMBtu/hr
		Microturbines (10 x C200)	2,000 [2,680]	kW [hp]
Compressor Station 3	Northampton County, NC	*Total Station Compression*	*21,815*	*hp*
		Solar Taurus 70 Turbine	10,915	hp
		Solar Centaur 50L Turbine	6,200	hp
		Solar Centaur 40 Turbine	4,700	hp
		Caterpillar Emergency Generator	1,416	hp
		Boiler	6.30	MMBtu/hr

TABLE 9.1.1-2

Summary of Proposed Equipment for M&R Stations

Facility ID	Location	Emission Unit	Unit Size	Units
M&R Station 1 (Brunswick)	Brunswick County, VA	Heater 1	16.0	MMBtu/hr
		Heater 2	16.0	MMBtu/hr
		Heater 3	16.0	MMBtu/hr
M&R Station 2 (Greensville)	Greensville County, VA	Heater 1	17.0	MMBtu/hr
		Heater 2	17.0	MMBtu/hr
		Heater 3	17.0	MMBtu/hr
M&R Station 3 (Long Run)	Randolph County, WV	Heater 1	9.8	MMBtu/hr
		Heater 2	9.8	MMBtu/hr
		Heater 3	9.8	MMBtu/hr
		Capstone Microturbine 1	200 [268]	kW [hp]
		Capstone Microturbine 2	200 [268]	kW [hp]

Use of electric compression, from the perspective of meeting Atlantic's emissions goals, was not considered environmentally superior to natural gas compression in terms of reducing regional emissions. Although local air emissions from electric motor-driven compressors would be lower than those from natural gas-fired compressors, use of electric motor-driven compressors would result in a higher load on the electric power grid and higher emissions from the electric

power generating stations. Given the amount of hp necessary and efficiency losses associated with electric motor-driven compressors, Atlantic would require the same number of electric units as it would for natural gas turbines at each station to maintain the same level of operational flexibility needed to handle varying nominations by its customers. Electrically driven compression would also require additional aboveground power grid infrastructure, including high-voltage power lines and substations. This additional electric infrastructure would increase the environmental footprint at the three compressor stations, the planned station footprint, project costs, and impacts on landowners currently unaffected by the ACP as proposed.

The amount of electrical power needed to run the electric-driven compressor units would consist of approximately 32,000 kilowatts (kW) for Compressor Station 1, approximately 22,000 kW for Compressor Station 2, and approximately 12,000 kW for Compressor Station 3. No potential benefits were identified to justify utilizing electric-driven compression at the ACP Compressor Stations. Atlantic focused its planning efforts on natural gas turbine technology and evaluated available natural gas turbine manufacturers able to provide turbine compression packages to meet the ACP's delivery and operating conditions. A detailed assessment of use of electric-driven compressor units at each compressor station is provided in Resource Report 10.

Atlantic also evaluated the feasibility and economic viability of implementing waste heat recovery and subsequent opportunities for electric cogeneration based on the threshold criteria established and provided in the Interstate Natural Gas Association of America (INGAA) issued white paper entitled "Waste Energy Recovery Opportunities for Interstate Natural Gas Pipelines, February 2008 (INGAA, 2008)." These threshold criteria include:

1. gas-turbine driven hp capacity of at least 15,000 hp; and
2. stations which operate more than 5,250 hours per year (60 percent run-time load factor).

The three new compressor stations proposed for the ACP will have approximate outputs of 55,015 hp, 40,715 hp, and 21,815 hp of compression.

Each of the proposed compressor stations exceeds the hp capacity threshold per the INGAA white paper. The ACP pipeline system is designed based on assumed flow rates. However, ACP cannot anticipate the run-time load factor for the compressor stations. The run-time load factors for each of the facilities will depend on customer demands for gas flows on the ACP pipeline system. Without firm verification of the run-time load factors, the compressor stations do not currently meet or exceed the 60 percent run-time load factor criteria. As discussed in Section III.C.1 of the INGAA white paper, it often takes a period of time once the pipeline system is placed in-service to develop sufficient operating history to perform an adequate economic analysis about the feasibility of waste heat power recovery. As such, with the uncertainty of run-time load factors, the Project is not conducive to economically viable waste heat recovery opportunities at this time.

9.1.2 Supply Header

Design Basis:

The addition of new gas-driven turbines at three existing stations, as proposed for the SHP, will provide an additional 41,000 hp, 21,830 hp, and 7,700 hp of compression. Table 9.1.2-1 lists the gas-driven compressor engines that will be installed at these stations. The improvements will also include the construction of new structures and the expansion of existing buildings, with a chain-link security fence installed around the periphery of the expanded site. Equipment at the station will include piping (including associated valves, flanges, and connections), gas filter/separators, gas coolers, inlet air filters, exhaust silencers, tanks, blowdown silencers, heaters, and auxiliary generators.

TABLE 9.1.2-1

Summary of Proposed Equipment for the Supply Header Project

Facility ID	Location	Emission Unit	Unit Size	Units
Mockingbird Hill Compressor Station	Wetzel County, WV	*Total Station Compression Added*	*41,000*	*hp*
		Solar Titan 130 Turbine	20,500	hp
		Solar Titan 130 Turbine	20,500	hp
		Caterpillar Emergency Generator	1,416	hp
		Boiler	7.20	MMBtu/hr
JB Tonkin Compressor Station	Westmoreland County, PA	*Total Station Compression Added*	*21,830*	*hp*
		Solar Taurus 70 Turbine	10,915	hp
		Solar Taurus 70 Turbine	10,915	hp
		Caterpillar Emergency Generator	1,416	hp
		Boiler	6.50	MMBtu/hr
Crayne Compressor Station	Greene County, PA	*Total Station Compression Added*	*7,700*	*hp*
		Solar Taurus 60 Turbine	7,700	hp

The SHP will also include improvements to the Burch Ridge Compressor Station located in Marshall County, West Virginia. This work will include the installation of crossover piping to allow for bi-directional flow. No additional compression, structures, or equipment will be added at this station. Other than *de minimis* fugitive emissions from the new piping, the improvements to the Burch Ridge Compressor Station will not result in impacts on air quality or noise and, therefore, will not be discussed in detail in this report.

Alternative Design Basis Considerations:

Because the additional compression facilities being proposed for the SHP will be constructed adjacent to existing DTI compression stations, no alternative designs were evaluated for these facilities. However, the same considerations provided in Section 9.1.1 for the ACP facilities would also apply to the SHP facilities.

9.1.3 Existing Conditions

9.1.3.1 Local Climate for Atlantic Coast Pipeline

Compressor Station 1 is located in Lewis County, West Virginia in the northwest portion of the State. This area is very mountainous, which leads to colder snowy Winters, warm but mild Summers, and a greater amount of precipitation relative to the lower lying areas. Summer temperatures in this area are typically in the lower 70s (degrees Fahrenheit [°F]) while Winter temperatures are typically in the lower 30s. Prevailing winds are usually from the south and west. Average annual precipitation totals are approximately 46 inches. The nearest surface weather station to the compressor station site is located in Clarksburg, West Virginia. A summary of climate data collected at this station is provided in Table 9.1.3-1.

TABLE 9.1.3-1

Climate Data for Clarksburg, West Virginia (1981 to 2010) for the Atlantic Coast Pipeline

Month	Temperature (degrees Fahrenheit)			Precipitation (inches)
	Maximum	Minimum	Average	
January	39.0	21.2	30.1	3.34
February	42.5	23.0	32.7	3.22
March	52.0	29.2	40.6	4.14
April	64.7	38.6	51.6	3.56
May	73.5	48.1	60.8	4.80
June	81.6	57.7	69.7	4.38
July	84.5	62.3	73.4	4.75
August	83.2	61.3	72.2	3.76
September	76.3	53.4	64.9	3.21
October	64.9	41.0	52.9	3.07
November	53.8	32.6	43.2	3.90
December	42.3	25.2	33.7	3.47

Compressor Station 2 is located in the mostly rural and heavily forested Buckingham County, Virginia in the geographic center of the Commonwealth. This area lies to the east of the mountains and the Shenandoah Valley, and to the west of the Chesapeake Bay and coastal plains. Temperatures in the Summer are typically in the mid-70s (°F) while Winter temperatures are typically around the upper 30s. Annual rainfall totals average approximately 44 inches with rain or precipitation events occurring consistently throughout the year. Winds in the region are typically from the southwest, although during the Fall and Spring seasons it is common for winds to come from the northeast. The nearest surface weather station to the compressor station site with 30 years of observation data is located along the Tye River near Amherst, Virginia. A summary of climate data collected at this station is provided in Table 9.1.3-2.

TABLE 9.1.3-2

Climate Data for Tye River 1 SE, Virginia (1981 to 2010) for the Atlantic Coast Pipeline

Month	Temperature (degrees Fahrenheit)			Precipitation (inches)
	Maximum	Minimum	Average	
January	47.3	24.9	36.1	3.21
February	51.1	27.0	39.0	3.01
March	59.4	32.9	46.1	3.74
April	69.5	42.0	55.8	3.41
May	76.2	51.0	63.6	4.51
June	83.8	60.4	72.1	3.59
July	87.2	65.0	76.1	4.04
August	86.0	63.5	74.7	3.77
September	79.6	56.0	67.8	4.16
October	70.6	43.9	57.2	3.64
November	61.2	35.1	48.2	3.61
December	49.7	27.5	38.6	3.56

Compressor Station 3 is located in Northampton County, North Carolina, in the eastern side of the State. The average Summer temperature is in the upper 70s (°F) while the average Winter temperature is in the lower 40s. Annual precipitation totals 46 inches, with much of the rain falling in Summer storms. Prevailing winds typically come from the south and southwest during the Spring and Summer months but usually come from the north or northeast during the Fall. The closest surface weather station to the compressor station site is located in Roanoke Rapids, North Carolina. A summary of climate data collected at this station is provided in Table 9.1.3-3.

TABLE 9.1.3-3

Climate Data for Roanoke Rapids, North Carolina (1981 to 2010) for the Atlantic Coast Pipeline

Month	Temperature (degrees Fahrenheit)			Precipitation (inches)
	Maximum	Minimum	Average	
January	48.6	29.6	39.1	3.60
February	51.9	32.0	42.0	3.09
March	59.5	38.0	48.7	4.16
April	69.8	46.5	58.1	3.58
May	77.5	55.7	66.6	3.65
June	85.5	65.4	75.5	3.93
July	89.3	69.5	79.4	4.86
August	87.5	67.9	77.7	4.53
September	81.3	60.7	71.0	4.40
October	71.6	49.1	60.3	3.23
November	62.3	40.5	51.4	3.34
December	52.1	32.8	42.5	3.34

9.1.3.2 Local Climate for Supply Header Project

The JB Tonkin Compressor Station is located in Westmoreland County, Pennsylvania, just east of the City of Pittsburgh. The Crayne compressor station is located in Greene County, Pennsylvania, just south of the City of Pittsburgh. These areas are very rural with hilly or mountainous terrain. The average temperatures are around 70 °F in the Summer and 30 °F in the

Winter. Prevailing winds are typically from the west. Average annual precipitation totals are approximately 40 inches. The nearest weather surface stations to the JB Tonkin and Crayne sites are located in Salina and Waynesburg, Pennsylvania, respectively. The 30-year averages for the climate data collected at these stations are provided in Tables 9.1.3-4 and 9.1.3-5.

TABLE 9.1.3-4

Climate Data for Salina 3 W, Pennsylvania (1981 to 2010) for the Supply Header Project

Month	Temperature (degrees Fahrenheit)			Precipitation (inches)
	Maximum	Minimum	Average	
January	36.5	19.6	28.0	2.97
February	39.8	21.2	30.5	2.51
March	49.1	27.6	38.4	3.29
April	62.0	37.7	49.9	3.49
May	71.3	47.1	59.2	4.18
June	79.6	56.1	67.8	4.23
July	83.3	60.5	71.9	4.65
August	82.6	58.9	70.7	3.92
September	75.6	51.9	63.8	3.54
October	63.9	41.0	52.4	2.66
November	52.4	33.3	42.8	3.75
December	40.4	24.1	32.2	3.19

TABLE 9.1.3-5

Climate Data for Waynesburg 1 E, Pennsylvania (1981 to 2010) for the Supply Header Project

Month	Temperature (degrees Fahrenheit)			Precipitation (inches)
	Maximum	Minimum	Average	
January	38.0	18.7	28.3	2.97
February	41.5	20.3	30.9	2.61
March	50.7	26.6	38.7	3.65
April	63.2	35.8	49.5	3.08
May	72.0	45.7	58.9	4.36
June	80.0	55.1	67.6	3.74
July	83.4	59.5	71.5	4.16
August	82.4	58.1	70.3	3.65
September	76.3	50.1	63.2	3.18
October	65.1	38.1	51.6	2.81
November	53.8	30.3	42.0	3.35
December	41.6	23.0	32.3	2.91

The Mockingbird Hill Compressor Station is located in Wetzel County, West Virginia in the northwest portion of the State. Temperatures near this site are typically in the lower 70s (°F) during the Summer and in the lower 30s during the Winter. Winds in this region are typically from the west. Average annual precipitation totals are approximately 42 inches. The nearest surface weather station to the compressor station site with 30 years of observation data is located just across the Ohio River, in Hannibal, Ohio. A summary of climate data collected at this station is provided in Table 9.1.3-6.

TABLE 9.1.3-6

Climate Data for Hannibal Lock and Dam, Ohio (1981 to 2010) for the Supply Header Project

Month	Temperature (degrees Fahrenheit)			Precipitation (inches)
	Maximum	Minimum	Average	
January	38.4	21.0	29.7	3.04
February	42.1	23.0	32.6	2.94
March	51.5	29.0	40.3	3.61
April	63.9	38.3	51.1	3.33
May	72.3	47.9	60.1	4.52
June	80.5	57.3	68.9	4.08
July	83.6	62.2	72.9	4.38
August	83.0	61.7	72.4	3.49
September	76.6	54.4	65.5	3.12
October	65.6	42.8	54.2	2.72
November	54.0	33.6	43.8	3.37
December	41.8	25.3	33.5	3.24

9.1.3.3 National Ambient Air Quality Standards

The Clean Air Act of 1970 (CAA) (Title 42 United States Code [USC] § 7401 et seq.) required the U.S. Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. The EPA has established NAAQS for seven pollutants:

- sulfur dioxide (SO_2);
- carbon monoxide (CO);
- nitrogen dioxide (NO_2);
- inhalable particulate matter (i.e.; particulate matter sized 10 microns in aerodynamic diameter and smaller [PM_{10}]);
- fine particulate matter (i.e.; particulate matter sized 2.5 microns in aerodynamic diameter and smaller [$PM_{2.5}$]) excluding regulated precursors for $PM_{2.5,}$ which are addressed by their own standards;
- lead; and
- ozone (for which nitrogen oxides [NO_x] and volatile organic compounds [VOC] are regulated as precursors).

Revisions to Section 107 of the CAA in 1977 required the States/Commonwealths and EPA to identify areas of the country which meet and do not meet the NAAQS. Areas meeting the NAAQS are called "attainment areas," and areas not meeting the NAAQS are called "non-attainment areas." The designation of an area is made on a pollutant-by-pollutant basis. If an area is designated as non-attainment, permitting requirements are more stringent. Pollutants classified as non-attainment are subject to Non-attainment New Source Review (NA-NSR). If a project is determined to be a “major modification,” the applicant must:

- demonstrate the use of the Lowest Achievable Emission Rate (LAER);
- obtain emission offsets, if applicable, before operation of the new source; and
- investigate the use of alternative sites or control technologies.

In many cases, a lower "major source" threshold also applies in nonattainment areas, which makes it more likely that a new source or an existing source that performs a project could trigger NA-NSR.

The EPA maintains a list of attainment/non-attainment designations for all seven criteria pollutants on their "Green Book" website (EPA, 2014). The Green Book was used to determine the area designations for the proposed ACP and SHP.

Atlantic Coast Pipeline

The proposed ACP compressor stations will be located in Lewis County, West Virginia; Buckingham County, Virginia; and Northampton County, North Carolina. All of these Counties are currently designated as being in attainment with the NAAQS for all criteria pollutants.

Supply Header

The compressor stations that will be added to as part of the SHP are located in Marshall and Wetzel Counties, West Virginia and Westmoreland and Greene Counties, Pennsylvania. Marshall and Wetzel Counties are designated as being in attainment with the NAAQS for all criteria pollutants. Westmoreland County is designated as non-attainment with the 8-hour ozone standard. In addition, because Pennsylvania is part of the Ozone Transport Region (OTR), all Counties in the Commonwealth are treated as non-attainment for ozone. Consequently, the JB Tonkin and Crayne Compressor Stations are also located in areas classified as non-attainment for ozone.

Chapter 184(a) of the CAA established the OTR, which includes 11 States/ Commonwealths and the District of Columbia. It requires that areas in the OTR be treated as moderate (or higher) non-attainment for ozone and its precursors, NO_X and VOC. A source in the OTR with a potential to emit 50 tons per year (tpy) of VOC and/or 100 tpy of NO_X is considered a major source.

In addition, Greene County and Westmoreland County are currently designated as non-attainment with the 24-hour and annual $PM_{2.5}$ standards, but no lower permitting thresholds apply for $PM_{2.5}$.

Other than ozone and $PM_{2.5}$, Greene and Westmoreland Counties are designated as attainment with the NAAQS for all other criteria pollutants.

9.1.4 Projects Emissions

9.1.4.1 Construction Emissions

Construction activities will result in temporary increases in emissions of some pollutants due to the use of non-stationary equipment powered by diesel fuel or gasoline engines; the

temporary generation of fugitive dust due to disturbance of the ground surface, vegetation clearing, and other dust generating actions; and indirect emissions attributable to workers commuting to and from work sites during construction.

These sources are not considered stationary sources and their impacts will generally be temporary and localized. Therefore, the emissions are not required to be evaluated as part of the Prevention of Significant Deterioration (PSD) or NA-NSR major source determination analysis. Furthermore, the emissions from construction activities are not expected to cause or significantly contribute to an exceedance of the NAAQS.

Fugitive Dust Emissions

Fugitive dust will result from land clearing, grading, excavation, concrete work, and vehicle traffic on paved and unpaved roads. The amount of dust generated will be a function of construction activity, soil type, soil moisture content, wind speed, precipitation, vehicle traffic, vehicle types, and roadway characteristics. Emissions will be greater during dry periods and in areas of fine textured soils subject to surface activity. The Projects will employ proven construction-related practices to control and limit releases of fugitive dust, including the application of water or other commercially available dust control agents on unpaved areas subject to frequent vehicle traffic. Additionally, Atlantic and DTI have prepared and will implement a *Fugitive Dust Control and Mitigation Plan* for the Projects, which identifies the measures to be implemented during construction to control fugitive dust (see Appendix 1F of Resource Report 1).

Open Burning

Contractor(s) may utilize open burning as a means of disposing of land-clearing waste during construction as noted in the *Timber Removal Plan* and *Fire Prevention and Suppression Plan*; however, there are no specific locations where this is currently planned. Burning of non-merchantable wood will be allowed only where the contractor has acquired all applicable permits and approvals (e.g., agency and landowner) and in accordance with State/Commonwealth and local regulations, and only with site-specific approval from Atlantic or DTI. Burning additionally will be conducted in accordance with the *Fire Prevention and Suppression Plan* (see Appendix 1F of Resource Report 1). Prior to initiating burning, the contractor will provide Atlantic or DTI with copies of required permits and approvals.

Construction Engine Emissions

Construction related emission estimates are based on a typical construction equipment list, hours of operation, and vehicle miles traveled by the construction equipment and supporting vehicles for each the Projects. This is a conservative estimate based on worst-case assumptions and the EPA emission factors. Nevertheless, the estimated air emissions from construction of the Projects are expected to be transient in nature, with negligible impact on the baseline regional air quality. Construction equipment will be properly maintained and operated only on an as-needed basis to minimize the construction engine emissions. There will also be some emissions attributable to vehicles delivering materials to the construction sites.

Table 9.1.4-1 and Table 9.1.4-2 summarize the estimated emissions of criteria pollutants from construction equipment and particulate matter emissions from material transfers and road traffic, respectively. Emission factors in grams per vehicle mile traveled for on-road vehicles were obtained from the EPA MOVES (Motor Vehicle Emission Simulator) model. Emissions from non-road construction equipment engines used during construction were estimated based on the anticipated types of non-road equipment and their associated levels of use. Emission factors in grams per hp-hour were obtained from the EPA MOVES model. Potential particulate matter emissions from material transfers and unpaved/paved road were estimated using EPA's AP-42 emissions factors.

TABLE 9.1.4-1

Estimated Emissions from Construction Equipment Exhaust

Source	NO_X	CO	VOC	SO_2	PM	PM_{10}	$PM_{2.5}$	CO_2
	(total tons during construction activities)							
ACP Compressor Stations	85.4	55.1	13.3	0.106	8.79	8.79	8.53	18,269
SHP Compressor Stations	72.7	48.5	12.2	0.090	7.66	7.66	7.43	15,551
M&R Stations	28.5	15.6	4.02	0.039	2.56	2.56	2.48	6,944
Pipeline Spread	2,250	1,159	321	2.72	207	207	201	465,909

TABLE 9.1.4-2

Estimated Emissions from Particulate Matter From Material Transfers and Road Traffic

Source	PM	PM_{10}	$PM_{2.5}$
	(total tons during construction activities)		
ACP Compressor Stations	448	166	27.6
SHP Compressor Stations	245	89.9	14.2
M&R Stations	328	119	19.2
Pipeline Spread	12,551	5,714	890

Commuting Emissions

Table 9.1.4-3 summarizes the estimated tailpipe emissions of criteria pollutants and total HAPs from vehicles used by commuting construction workers. Emission factors in grams per vehicle mile traveled for on-road vehicles were obtained from the EPA MOVES model.

TABLE 9.1.4-3

Estimated Tailpipe Emissions From Vehicles Used By Commuting Construction Workers

Source	NO_X	CO	VOC	SO_2	PM	PM_{10}	$PM_{2.5}$	CO_2
	(total tons during construction activities)							
ACP Compressor Stations	3.01	42.3	2.28	0.042	0.177	0.177	0.101	5,079
SHP Compressor Stations	1.72	25.0	1.27	0.024	0.102	0.102	0.057	2,648
M&R Stations	2.18	21.1	1.36	0.022	0.137	0.137	0.101	3,810
Pipeline Spread	24.6	361	25.9	0.425	1.29	1.29	0.586	68,581

9.1.4.2 Stationary Source Emissions

Atlantic Coast Pipeline

Table 9.1.4-4 presents estimates of the annual maximum potential emissions from operation of the proposed ACP compressor stations. The emission values presented below are based on design data for the hp needed for compression and sizing of boilers and emergency generators (or microturbines). The potential emissions at the compressor stations also include emissions from storage tanks and fugitive sources (e.g., methane leaks from fittings, valves, etc.). Detailed emissions calculations are provided in Appendix 9A.

Emissions of all pollutants have been minimized through the selection of the most efficient turbines. Larger turbines, with greater hp output, are more efficient. More efficient models use less fuel and produce less emissions for the same hp output. The new compressor stations will utilize the largest most efficient turbines that meet the pipeline operational requirements.

The turbine design includes the state-of-the-art SoLoNOx technology to minimize NO_X emissions. Also, oxidation catalysts will be installed to further reduce emissions of VOC by approximately 50 percent and emissions of CO by approximately 80 percent.

In addition, best in class measures will be installed and operated to further reduce NO_x emission from the combustion turbines and these measures are reflected in the values in Table 9.1.4-4. Specifically, NO_X emissions from the combustion turbines will be controlled to 5 ppm through the use of Selective Catalytic Reduction (SCR). This emission rate represents the lowest level of NO_x emissions by turbines in compression service applications.

TABLE 9.1.4-4

Potential Emissions by Compressor Station for the Atlantic Coast Pipeline

Compressor Station	NO_X	CO	VOC	SO_2	$PM/PM_{10}/PM_{2.5}$	CO_2e	NH_3
	(tons per year)						
Compressor Station 1 (Lewis County, West Virginia)	44.4	74.4	56.1	7.24	42.8	304,519	28.4
Compressor Station 2 (Buckingham County, Virginia)	41.5	75.8	57.6	5.83	35.1	292,856	21.8
Compressor Station 3 (Northampton County, North Carolina)	19.7	31.1	41.1	3.10	18.4	145,686	12.4

Notes:
Emission factors used in all calculations were supplied by the manufacturer or retrieved from EPA's AP-42 Section 3.1.
NO_X data assumes 5-parts per million emission rate achieved through the use of SCR
Assume all particulate matter (PM) is less than 1.0 microns.
NH_3 emissions are associated with the operation of the turbine SCRs at a manufacturer estimated value of 10 ppm NH3 slip.
Equivalent carbon dioxide (CO_2e) emissions were calculated based upon Table A-1 of 40 Code of Federal Regulations Part 98 Subpart A.
The ACP Kincheloe and SHP CNX M&R stations emissions are included in the emissions for Compressor Station 1 as the facilities are considered to be co-located.
The Woods Run M&R station emissions are included in the emissions for Compressor Station 2 as the facilities are considered to be co-located.

Based on air quality modeling that has been performed, the air emissions from these facilities will not cause or contribute to violations of national ambient air quality standards. See Section 9.1.5.9 additional details regarding air quality modeling.

Table 9.1.4-5 presents current estimates of the annual maximum potential emissions from operation of the proposed ACP M&R stations. Detailed emissions calculations are provided as Appendix 9A. The emissions values presented below are based on design data for the sizing of line heaters for the Long Run, Greensville, and Brunswick M&R stations. The potential emissions at the stations also include emissions from fugitive sources (e.g., methane leaks from fittings, valves, etc.) Under applicable State/Commonwealth air quality regulations, these sources will not require individual air permits.

TABLE 9.1.4-5

Potential Emissions by M&R Station for the Atlantic Coast Pipeline

M&R Station	NO_X	CO	VOC	SO_2	$PM/PM_{10}/PM_{2.5}$	CO_2e
	(tons per year)					
Brunswick M&R Station (Brunswick County, Virginia)	2.31	7.78	1.32	0.124	1.47	24,968
Greensville M&R Station (Greensville County, Virginia)	2.46	8.27	1.40	0.131	1.57	26,523
Long Run M&R Station (Randolph County, West Virginia)	2.21	6.91	1.00	0.095	0.931	17,843
Remaining M&R stations (w/o line heaters)	0	0	0.210	0	0	313

Notes:
Emission factors used in all calculations were supplied by the manufacturer or retrieved from EPA's AP-42 Section 3.1.
Assume all particulate matter (PM) is less than 1.0 microns.
Equivalent carbon dioxide (CO_2e) emissions were calculated based upon Table A-1 of 40 Code of Federal Regulations Part 98 Subpart A.

Supply Header

Table 9.1.4-6 presents the annual maximum potential emissions associated with the new sources to be installed at the SHP compressor stations. Detailed emissions calculations will be provided in Appendix 9A. The emission values presented below are based on design data for the hp needed for compression and sizing of boilers and emergency generators (or microturbines). The potential emissions at the compressor stations also include emissions from storage tanks and fugitive sources (e.g., methane leaks from fittings, valves, etc.).

It is noted that, at the stations with the largest increases in compression hp, DTI is taking measures that will reduce the overall emissions from the sites. Specifically, at JB Tonkin, DTI is requesting an update to the existing site permit to reduce emission limits associated with the existing Cooper engine as well as the existing Waukesha generator. A significantly reduced NO_X emission rate from the Cooper engine is proposed, reflective of increased engine tuning and the use of high pressure fuel injection. The existing Waukesha generator is used for emergencies, but was originally permitted as operating 8,760 hours per year. DTI is lowering the allowable operating hours for testing and maintenance to 500 hours per year. These combined actions result in reductions of potential emissions from these units of approximately 144 tpy of NO_x, 6 tpy of CO, 0.2 tpy of PM_{10} and $PM_{2.5}$, and 2 tpy of VOC.

TABLE 9.1.4-6

Potential Emissions by Compressor Station for the Supply Header Project

Compressor Station	NO_X	CO	VOC	SO_2	$PM/PM_{10}/PM_{2.5}$	CO_2e
				(tons per year)		
JB Tonkin (Westmoreland County, Pennsylvania)	31.6	28.8	28.6	2.88	17.1	127,084
Crayne (Greene County, Pennsylvania)	11.3	8.5	14.6	1.08	6.36	49,862
Mockingbird Hill (Wetzel County, West Virginia)	55.5	58.6	29.9	5.17	30.6	208,563
Burch Ridge (Marshall County, West Virginia)	0	0	0.012	0	0	18.5

Notes:

Emission factors used in all calculations were supplied by the manufacturer or retrieved from U.S. Environmental Protection Agency's AP-42 Section 3.1.

NO_X data assumes 9-parts per million emission rate achieved through the Solar built-in SoLoNOx technology

Assumes all particulate matter (PM) is less than 1.0 microns.

The SHP CNX M&R Station fugitive emissions are captured as part of the Compressor Station 1of the Atlantic Coast Pipeline as the sites are considered to be co-located.

Equivalent carbon dioxide (CO_2e) emissions were calculated based upon, Table A-1 of 40 Code of Federal Regulations Part 98 Subpart A.

At the Hastings Compressor Station, which is covered by the same Title V operating permit as the Mockingbird Hill Compressor Station, DTI will abandon in place two existing Cooper GMXE-6 engines and replace them with newer Ajax engines. The replacement of the Cooper GMXE-6 engines from Hastings will result in a decrease of approximately 183 tpy of NO_x emissions, based on the potential of the Ajax engines and the annual average of the 2013-2014 actual emissions of the existing Cooper engines.

Emissions of all pollutants have been minimized through the selection of the most efficient turbines. Larger turbines, with greater hp output, are more efficient. More efficient models use less fuel and produce less emissions for the same hp output. The new compressor stations will utilize the largest most efficient turbines to meet the pipeline operational requirements.

Also, the turbine design includes the state-of-the-art SoLoNOx technology to minimize NO_x emissions and oxidation catalysts will be installed to further reduce emissions of VOC by approximately 50 percent and emissions of CO by approximately 80 percent.

Based on air quality modeling that has been performed, the air emissions from these facilities will not cause or contribute to violations of national ambient air quality standards. See Section 9.1.5.8 additional details regarding air quality modeling.

9.1.4.3 Fugitive Emissions

For both ACP and SHP, best in class engineering design and operational measures to minimize fugitive and episodic methane emissions have been evaluated and will be employed. These measures represent the most efficient design with the least environmental impact while providing reliable pipeline operation. These measures include the measures described in Table 9.1.4-7.

TABLE 9.1.4-7

Engineering Measures to Minimize Methane Fugitive Emissions for the Atlantic Coast Pipeline and Supply Header Projects

Equipment/Process	Type of Measure	Control Measures Description
Blowdowns	Engineering/Design	Install a large volume, lower pressure header; send unit blowdown gas to the header, in order to recover the blowdown gas as fuel, where sufficient fuel burning sources are installed to utilize the recovered blowdown gas.
Blowdowns	Engineering/Design	Locate isolation valves as close to compressor buildings to minimize venting of gas at compressor station during operation and maintenance.
Blowdowns	Engineering/Design	Install fittings for capped emergency shutdown system testing instead of full station blowdown.
Blowdowns	Work Practice	Pumping down the pressure of lines to as low a pressure as possible using in-line compression prior to blowdown for maintenance.
Blowdowns	Work Practice	Close main and unit valves prior to blowdown
Centrifugal Compressors	Engineering/Design	Installation and operation of lean premix combustion turbine compressors
Centrifugal Compressors	Engineering/Design	Dry Seals on compressors [a]
Fugitive Components	Engineering/Design	Install low leak fugitive components, where practicable
Fugitive Components	Work Practice	Implementation of enhanced leak detection/monitoring program [a]
Pneumatic Controller	Engineering/Design	Use of instrument air instead of natural gas activated at compressor stations [a]
Turbines	Engineering/Design	Automated air/fuel ratio control system
Turbines	Engineering/Design	Electric motor starters instead of gas start systems

[a] These will comply with requirements of applicable EPA proposed New Source Performance Standards (NSPS); 40CFR Part 60 Subpart OOOOa.

9.1.5 Regulatory Requirements for Air Quality

The provisions of the CAA that are potentially applicable to construction and operation of the new compressor stations proposed for the ACP and modified compressor stations proposed for the SHP are:

- PSD/NA-NSR;
- New Source Performance Standards (NSPS);
- National Emission Standards for Hazardous Air Pollutants (NESHAP);
- EPA's Clean Power Plan;
- Title V Operating Permits;
- State/Commonwealth Regulations; and
- Conformity of General Federal Actions.

The following is a brief description of these regulations and their requirements.

9.1.5.1 Prevention of Significant Deterioration/Non-Attainment New Source Review

Title I of the CAA requires any new major stationary source of air pollution, or existing source proposing major modification, to obtain an air construction permit before commencing actual on-site construction. Air construction permits for major sources or modifications in an attainment area are issued under the PSD regulations, whereas air construction permits for sources in a non-attainment area are issued under the NA-NSR program. The entire program, including both PSD and NA-NSR permitting, is referred to as the New Source Review (NSR) program.

To be classified as a new major PSD source, the potential emissions from the source must either be greater than 100 tpy for any pollutant regulated by the EPA under the CAA for sources that are among the 28 source categories listed in section 169 of the CAA, or greater than 250 tpy for sources that are not among the 28 listed source categories. Natural gas compressor stations are not identified in the list of 28 source categories in section 169 of the CAA; therefore, the applicability threshold for PSD review for the proposed compressor stations is 250 tpy for each pollutant. For each pollutant that triggers PSD, a Best Available Control Technology (BACT) analysis and detailed dispersion modeling must be performed.

As a part of the PSD permitting process, Federal Class I areas must be considered. In 1977, the United States Congress designated certain lands as Mandatory Federal Class I areas because their air quality was considered a special feature of the area (e.g., in national parks or wilderness areas). These Class I areas, as well as any other areas that have been re-designated Class I since 1977, are given special protection under the PSD program. If a new source is a major PSD source and is near a Class I area, the source is required to determine its impacts on the Class I area. DTI is currently evaluating the Mockingbird Hill Compressor Station with respect to the PSD rules. If PSD is determined to be applicable, then DTI would be required to determine its impacts on the surrounding Federal Class I areas. The Mockingbird Hill Compressor Station is located approximately 70 miles northeast of the Otter Creek Wilderness Class I area and 80 miles northeast of the Dolly Sods Wilderness Class I area. Both wilderness areas are managed by the U.S. Forest Service. The remaining SHP and ACP compressor stations are not expected to be subject to PSD regulations.

Major source thresholds for NA-NSR vary by pollutant and the degree of non-attainment designated for the region. Areas within the OTR, specifically Pennsylvania for the SHP, are also potentially subject to NA-NSR permitting requirements for NO_X and VOCs as ozone precursor pollutants. Sources that trigger NA-NSR review must achieve the LAER through installation of control technology and obtain offsets from the region for the pollutant of concern.

On May 13, 2010, EPA issued the final greenhouse gas (GHG) permitting rule officially known as the *Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule* establishing GHGs as a PSD pollutant and setting major source emission thresholds for GHGs on a carbon dioxide equivalent (CO_2e) basis. If new construction or modification of an existing facility results in a net emissions increase above established major source thresholds for GHGs on a CO_2e basis, GHG is considered a regulated pollutant for that project. Under the rule, GHG pollutants are considered to include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFC), perfluorocarbons (PFC), and sulfur hexafluoride (SF_6). On June 23, 2014 in the case of *Utility Air Regulatory Group v. EPA*, however, the U.S. Supreme Court held that EPA did not have authority to regulate GHG emissions from sources that would not otherwise be subject to NSR permitting. The Court also held that the agency can require a source to comply with BACT standards for GHG emissions if the facility's emissions of NAAQS pollutants trigger PSD.

Thus, for projects already triggering PSD for another pollutant, GHG emissions also potentially trigger PSD review.

Atlantic Coast Pipeline

The proposed locations of the ACP compressor and M&R stations are all located in attainment areas, and would be subject to PSD permitting if the potential emissions of any criteria pollutant are over 250 tpy. Emissions estimates, however, indicate that the potential emissions of all criteria pollutants at each ACP compressor and M&R station will be below PSD permitting thresholds. The compressor station emissions are outlined in Table 9.1.5-1.

TABLE 9.1.5-1

Prevention of Significant Deterioration Determination by Compressor Station for the Atlantic Coast Pipeline

Compressor Station	NO_X	CO	VOC	SO_2	$PM/PM_{10}/PM_{2.5}$	CO_2e
	(tons per year)					
Compressor Station 1 (Lewis County, West Virginia)	44.4	74.4	56.1	7.24	42.8	304,519
Compressor Station 2 (Buckingham County, Virginia)	41.5	75.8	57.6	5.83	35.1	292,856
Compressor Station 3 (Northampton County, (North Carolina)	19.7	31.1	41.1	3.10	18.4	145,686
PSD Threshold (Major Source)	250	250	250	250	250	100,000 [a]

[a] *Only after another pollutant triggers PSD.*

Construction and operation of the proposed ACP compressor stations and M&R stations will not trigger PSD requirements for any criteria pollutant. Although each compressor station is above the 100,000 tpy threshold for CO_2e, sources are only subject to PSD and GHG BACT review if the source also triggers PSD for another pollutant. Because none of the compressor stations or M&R stations trigger PSD requirements for any criteria pollutants, GHG emission sources are not subject to BACT review.

Supply Header

The Mockingbird Hill Compressor Station is permitted under a combined Title V permit along with the Lewis Wetzel Compressor Station and Hastings Compressor Station. Currently, the combined emissions of these sites exceed the PSD major source thresholds for NO_x and VOCs. To determine whether PSD permitting is required for the additions to the Mockingbird Hill Compressor Station, the major modification thresholds for PSD as outlined in Table 9.1.5-2 need to be considered. Because the Mockingbird Hill Compressor Station is located in an area that is designated as attainment for all pollutants, NA-NSR thresholds do not apply. A project is a major modification for a regulated pollutant if it causes two types of emissions increases: a significant emissions increase and a significant net emissions increase.

TABLE 9.1.5-2

Prevention of Significant Deterioration Determination for Mockingbird Hill Compressor Station for the Supply Header Project

Compressor Station	NO_X	CO	VOC	SO_2	$PM/PM_{10}/PM_{2.5}$	CO_2e
			(tons per year)			
Mockingbird Hill (Wetzel County, West Virginia)	55.5	58.6	29.9	5.17	30.6	208,563
Other Contemporaneous Changes	(167)	-	-	-	-	-
Significant Net Emissions Increase	(112)	-	-	-	-	-
PSD Threshold (Major Modification)	40.0	100.0	40.0	40.0	25.0/ 15.0/ 10.0	75,000 [a]

[a] *Only after another pollutant triggers PSD.*

Based on potential emissions increases from the Project, the Mockingbird Hill Compressor Station additions will cause a significant emissions increase for NO_X, PM_{10}, $PM_{2.5,}$ and GHGs per the totals in Table 9.1.5-2. However, consistent with West Virginia regulations (45 Code of State Regulations (CSR) 14.2.46); regarding PSD applicability, contemporaneous emissions from the site are also considered to determine if the Project causes a significant net emissions increase. When considering the contemporaneous emission changes, the net change in NO_x emissions is a decrease of 112 tpy and, thus, the Project does not cause a significant net increase in NO_x emissions. Therefore, the NO_x emissions changes from the equipment added to the Mockingbird Hill Compressor Station do not trigger PSD requirements. The other contemporaneous changes are described briefly within this section.

Aside from the replacement of the Hastings Station engines occurring coincident with the SHP modifications to Mockingbird, two additional projects are considered contemporaneous changes with regard to the SHP. These changes are the installation of the Lewis Wetzel Station and the modification of the dehydration unit and associated equipment of the Hastings Station.

The Lewis Wetzel Station began operations in 2012. Emission units permitted at the Lewis Wetzel Station include one (1) Caterpillar Model 3612 Compressor Engine (001-03) rated at 3,550 hp and equipped with a Catalytic Converter (CC1); one (1) Cummings Model KTA19G Auxiliary Generator (002-05) rated at 530 hp; and one (1) Bryan Model RV 450W-FDG Boiler (005-05) rated at 4.5 million metric British thermal units per hour (MMBtu/hr). The Hastings Station modification included the replacement of the dehydration unit, associated reboiler, and the enclosed combustion device. The application for modification was filed in March of 2015 and is still under review by the West Virginia Department of Environmental Quality.

The dehydration unit modification, the Lewis Wetzel station construction, and the replacement Ajax engine emissions were based on the potential to emit of the units associated with these projects. The emissions decrease from the removal of the Hastings engines was determined based on average annual emissions during the 24-month period in 2013 and 2014.

The net impacts of the three contemporaneous projects were not determined to be a significant impact to PM_{10}, $PM_{2.5}$, and GHG emissions. As such, the proposed changes at the Mockingbird Hill Compressor Station result in both a significant emissions increase and a significant net emissions increase for PM_{10} and $PM_{2.5}$. Therefore, the changes at Mockingbird meet the definition of a major modification in regards to PM_{10} and $PM_{2.5.}$ Additionally, since the project triggers PSD for particular matter and the increase in GHG emissions above 75,000 tpy CO_2e, the project is subject to PSD for GHG as well. Therefore, a BACT analysis and air

dispersion modeling to demonstrate compliance with the PM_{10} and $PM_{2.5}$ NAAQS are required as part of the air permit application. For GHGs, only a BACT analysis is required. The Mockingbird Hill permit application submitted in September 2015 includes these analyses.

Currently, the Burch Ridge Compressor Station, the JB Tonkin Compressor Station, and the Crayne Compressor Station are below major source thresholds for all PSD pollutants and thus the changes that would be made to these stations as part of the SHP would not be subject to PSD permitting. The Burch Ridge Compressor Station is currently located in attainment areas only and, other than fugitives, there are no expected emissions associated with changes at this location.

The JB Tonkin Compressor Station and Crayne Compressor Station are required to be evaluated against NA-NSR thresholds for ozone and $PM_{2.5}$ to determine if the project is a major source project. Under Pennsylvania rule 25 Pennsylvania Code (PA Code) § 127.201(c), the major source thresholds that apply to minor sources are 100 tpy for NO_X and 50 tpy for VOC. These thresholds apply to the Crayne Compressor Station. The JB Tonkin Compressor Station is an existing major source for ozone. Per PA Code § 121.1, the thresholds for determining if the project triggers NA-NSR review are lower (40 tpy for NOx and 40 tpy for VOC).

The major source determinations for JB Tonkin and Crayne Compressor Stations are provided in Table 9.1.5-3.

TABLE 9.1.5-3

Prevention of Significant Deterioration Determination for Minor Source Compressor Stations for the Supply Header Project

Compressor Station	NO_X	CO	VOC	SO_2	$PM/PM_{10}/PM_{2.5}$	CO_2e
				(tons per year)		
JB Tonkin (Westmoreland County, PA)	31.6	28.8	28.6	2.88	17.1	127,084
PSD Threshold (Major Source)	250	250	250	250	250	100,000 [a]
NA-NSR Threshold (Major Source)	40.0	-	40.0	-	-	-
Crayne (Greene County, PA)	11.3	8.463	14.6	1.08	6.36	49,862
PSD Threshold (Major Source)	250	250	250	250	250	100,000 [a]
NA-NSR Threshold (Major Source)	100.0	-	50.0	-	-	-

[a] *Only after another pollutant triggers PSD.*

9.1.5.2 New Source Performance Standards

NSPS in 40 CFR Part 60 regulate emissions from new emissions sources from specific source categories. The emissions units proposed as part of the new compressor stations associated with the ACP and the new equipment at the existing compressor stations as part of the SHP are potentially subject to the following requirements:

- Subpart Dc – Small Steam Generating Units;
- Subpart Kb – Storage Vessels;
- Subpart JJJJ – Stationary Spark Ignition Internal Combustion Engines;
- Subparts KKKK & GG – Stationary Gas Turbines; and
- Subparts OOOO & OOOOa – Crude Oil and Natural Gas Production, Transmission and Distribution.

The text provided below provides an overview of the applicability of the major rules.

Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units

Subpart Dc applies to steam generating units for which construction, modification, or reconstruction is commenced after June 9, 1989 and that have a maximum design heat capacity of 100 MMBtu/hr or less, but greater than or equal to 10 MMBtu/hr. The ACP equipment subject to this regulation includes the Boiler installed at ACP-1, the four line heaters proposed to be installed at ACP-2, and the line heaters at the Brunswick and Greensville M&R Stations. To demonstrate compliance with this rule, these sites will maintain and report fuel records certifying the fuel is in compliance with the NSPS Dc standards for SO_2.

There are no potentially subject combustion sources associated with SHP that are greater than 10 MMBtu/hr and therefore the equipment associated with SHP is not subject to NSPS Subpart Dc.

Subpart Kb - Standards of Performance for Volatile Organic Liquid Storage Vessels

This regulation applies to volatile organic liquid storage vessels with storage capacities greater than or equal to 75 cubic meters (19,812 gallons) for which construction, reconstruction, or modification commenced after July 23, 1984. There are no petroleum storage vessels with capacities greater than 75 cubic meters planned at the ACP and SHP compressor stations. Therefore, this regulation is not applicable.

Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines

Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines NSPS 40 CFR Part 60 Subpart JJJJ applies to owners and operators of spark-ignition internal combustion engines that commence construction after June 12, 2006 and to owners and operators of spark-ignition internal combustion engines that commence modification or reconstruction after that same date. The new natural gas auxiliary generators associated with the ACP and SHP are subject to these requirements. Subpart JJJJ establishes emissions limits (based on engine size) and compliance requirements for new engines ordered after June 12, 2006. If the engines are not certified by the manufacturer, specific testing requirements will apply.

For stationary internal combustion engines that are considered emergency engines, there are no operational limits on the use of qualified units for emergency purposes. Operation for other purposes is limited to no more than 100 hours per year for maintenance checks and readiness testing. As part of the 100-hour limit, operation for non-emergency purposes is allowed for up to 50 hours per year. Records of engine operation as recorded by a non-resettable hour meter must be maintained, and the records must document the hours of operation of the generator and the reason for operation (e.g., emergency, testing, non-emergency operation).

The auxiliary generator engines at both ACP and SHP compressor stations are Caterpillar G3516 (1,416 hp) or G3516C (2,098 hp) natural gas fired stationary internal combustion engines,

used only as emergency use engines. The emissions limits specified in Subpart JJJJ for emergency spark ignition engines greater than 130 hp for NOx, CO, and VOC are 2.0, 4.0, and 1.0 grams per hp-hour, respectively. Both engines have emissions guarantees that are at or below these limits.

All auxiliary generators at the ACP and SHP stations will be subject to NSPS notification and recordkeeping requirements, including records of notifications, maintenance, and documentation that the engines are certified to meet applicable emissions standards. If the engines are not certified by the manufacturer, then additional recordkeeping requirements apply.

Subpart KKKK – Standards of Performance for Stationary Gas Turbines

NSPS 40 CFR Part 60 Subpart KKKK regulates stationary combustion turbines with a heat input rating of 10 MMBtu/hr or greater that commence construction, modification, or reconstruction after February 18, 2005. Subpart KKKK limits emissions of NO_X as well as the sulfur content of fuel that is combusted from subject units.

The proposed Solar combustion turbines will be subject to the requirements of this subpart. Subpart KKKK specifies several subcategories of turbines, each with different NOx emissions limitations. All proposed turbines, except the Solar Centaur 40 turbine, fall within the "medium sized" (>50MMBtu/hr, < 850 MMBtu/hr) category for natural gas turbines. The Solar Centaur 40 turbine falls within the "small sized, mechanical drive" (< 50 MMBtu/hr) category for natural gas turbines. "Medium sized" turbines must meet a NOx limitation of 25 parts per million by volume (ppmv) at 15 percent oxygen (O_2), and "small sized, mechanical drive" turbines must meet a NOx limitation of 100 ppmv at 15 percent O_2 under the requirements of Subpart KKKK and will minimize emissions consistent with good air pollution control practices during startup, shutdown and malfunction.

Solar provides an emissions guarantee of 9 parts per million volume dry (ppmvd) NOx at 15 percent O_2 for SoLoNOx equipped units, except for the Solar Centaur 40 equipped with SoLoNOx, which has an emissions guarantee of 25 ppmvd NOx at 15 percent O_2. These guarantees apply at all times except during periods of start-up and shutdown and periods with ambient temperatures below 0°F. In addition, SCR will be installed to lower emissions for all turbines installed at the new ACP compressor Stations to further reduce NOx emissions to 5 ppmvd at 15 percent O_2, except during periods of start-up and shutdown and periods with ambient temperatures below 0°F.

The ACP and SHP compressor stations plan to conduct stack tests for NO_X emissions to demonstrate compliance with the Subpart KKKK emissions limits.

The NSPS Subpart KKKK emission standard for SO_2 is the same for all turbines, regardless of size and fuel type. All new turbines are required to meet an emission limit of 110 nanogram per joule (ng/J) (0.90 pounds [lbs]/megawatt-hr) or a sulfur limit for the fuel combusted of 0.06 lbs/MMBtu. The utilization of natural gas as fuel ensures compliance with the SO_2 standard due to the low sulfur content of pipeline quality natural gas.

Subpart GG – Standards of Performance for Stationary Gas Turbines

Subpart GG applies to all stationary gas turbines with a heat input at peak load equal to or greater than 10.7 gigajoules per hour (10 MMBtu/hr) based on the lower heating value of the fuel fired, which commence construction, modification, or reconstruction after October 3, 1977. However, 40 CFR 60 Subpart KKKK states that stationary combustion turbines regulated under Subpart KKKK are exempt from the requirements of Subpart GG. As the new turbines associated with the ACP and SHP will be subject to Subpart KKKK, they are exempt from the requirements of Subpart GG.

Subparts OOOO and OOOOa – Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution

Subpart OOOO currently applies to affected facilities that commenced construction, reconstruction, or modification after August 23, 2011. Subpart OOOO establishes emissions standards and compliance schedules for the control of VOCs and SO_2 emissions for affected facilities producing, transmitting, or distributing natural gas. Compressors located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment are subject to this Subpart. Custody transfer is defined as the transfer of natural gas after processing and/or treatment in the producing operations. All compressor stations will be located after the point of custody transfer, and therefore centrifugal compressors driven by the proposed turbines are not currently subject to this regulation. Storage vessels located in the natural gas transmission and storage segment that have the potential for VOC emissions equal to or greater than 6 tpy are also subject to this Subpart. All storage vessels to be located at compressor stations will emit less than this threshold, and thus will not be subject to this regulation.

On August 18, 2015, EPA proposed amendments to 40 CFR 60, Subpart OOOO and proposed an entirely new Subpart OOOOa. If finalized, revisions proposed for Subpart OOOO would apply to oil and natural gas production, transmission, and distribution affected facilities that were constructed, reconstructed, and modified between August 23, 2011 and the Federal Register publication date (anticipated September 2015). Conversely, if finalized, Subpart OOOOa will apply to oil and natural gas production, transmission, and distribution affected facilities that are constructed, reconstructed, and modified after the Federal Register date. The proposed NSPS Subpart OOOOa would establish standards for both VOC and methane. In all cases, natural gas is used as a surrogate for both methane and VOC.

Based on the expected date of publication in the Federal Register, it is anticipated the Projects will be required to comply with the requirements of NSPS Subpart OOOOa. There is uncertainty if Subpart OOOOa will become final or what the final requirements will specifically include; however, the proposal contains provisions that would affect additional sources at the proposed facilities beyond Subpart OOOO. While storage tanks remain covered, Subpart OOOOa also includes provisions intended to reduce emissions from centrifugal compressors and equipment leaks from transmission and storage facilities. For centrifugal compressors, Subpart OOOOa proposes the use of dry seals or the control of emissions if wet seals are used. Dry seals are already planned for use in all proposed compressors. For equipment leaks, Subpart OOOOa proposes requiring periodic surveys using optical gas imaging (OGI) technology and subsequent

repair of identified leaks. The Projects will comply with all applicable leak detection provisions of proposed Subpart OOOOa.

9.1.5.3 National Emission Standards for Hazardous Air Pollutants

The EPA has established NESHAP for specific pollutants and industries in 40 CFR Parts 61 and 63. The ACP and SHP do not include any of the specific sources for which NESHAP have been established in 40 CFR Part 61; therefore, these requirements will not apply to the ACP or SHP.

The 40 CFR Part 63 NESHAP requirements apply to certain emission units at facilities that are major sources or area sources of HAPs. The ACP and SHP compressor stations will include units that could be subject to the following requirements:

- Subpart HHH – Natural Gas Transmission and Storage Facilities;
- Subpart YYYY – Stationary Combustion Turbines;
- Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines;
- Subpart DDDDD – Major Source Industrial, Commercial, and Institutional Boilers And Process Heaters; and
- Subpart JJJJJJ –Area Source Industrial, Commercial, and Institutional Boilers.

The air permit applications contain detailed regulatory applicability reviews for each compressor station site. The text provided below provides an overview of the applicability of the major rules.

Subpart HHH – Natural Gas Transmission and Storage Facilities

NESHAP 40 CFR Part 63 Subpart HHH is applicable to glycol dehydration units at natural gas transmission and storage facilities that are major sources of hazardous air pollutant (HAP) emissions located downstream of the point of custody transfer. There are no new proposed glycol dehydration units; therefore this regulation is not applicable to the ACP and SHP.

Subpart YYYY – Stationary Combustion Turbines

NESHAP 40 CFR Part 63 Subpart YYYY is applicable to new and reconstructed stationary combustion turbines at major sources of HAPs. The stationary combustion turbines associated with the ACP and SHP are located at compressor stations that are projected to be area sources of HAP emissions (i.e., not a major source); therefore, this regulation is not applicable to the ACP or SHP.

Subpart ZZZZ – Stationary Reciprocating Internal Combustion Engines

NESHAP 40 CFR Part 63 Subpart ZZZZ is applicable to stationary reciprocating internal combustion engines at major and area sources of HAPs. Auxiliary generators at each compressor station will be subject to requirements under this regulation. However, new source

auxiliary generators are required to comply with the requirements of 40 CFR Part 63 Subpart ZZZZ by complying with the requirements of 40 CFR 60 Part Subpart JJJJ (described in Section 9.1.5.2). Specific requirements under 40 CFR Part 63 Subpart ZZZZ are also addressed in the air permit applications.

Subpart DDDDD – Major Source Industrial, Commercial, and Institutional Boilers And Process Heaters

Industrial, commercial, or institutional boilers or process heaters located at a major source of HAPs are subject to this Subpart. The ACP and SHP compressor stations will not be major sources of HAPs, and therefore will not be subject to this Subpart.

Subpart JJJJJJ –Area Source Industrial, Commercial, and Institutional Boilers

This Subpart applies to area sources of HAPs. The ACP and SHP compressor stations are all area source of HAPs; however, gas-fired boilers as defined by this Subpart are not subject to any requirements under this rule. As such, this Subpart does not apply.

9.1.5.4 EPA's Clean Power Plan

Although none of the equipment to be installed for ACP or SHP is subject to the Clean Power Plan, the Plan is a driver of gas demand that will be met by the Projects.

In August, 2015, the EPA finalized its Clean Power Plan aimed at reducing CO_2 emissions from power generating facilities. [The Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units,] The pre-publication version of the final rule identifies fossil fuel electric utility generating units as the largest stationary sources of greenhouse gas emissions in the United States, and notes that coal-fired units are the largest emitters (EPA, 2015). The final rule provides guidelines to achieve reductions of approximately 32 percent from the power sector's 2005 CO_2 emissions levels by 2030. A main component of the rule is to encourage the decreased utilization of aging base load coal-fired plants and increased generation of electricity using cleaner fuel sources, including natural gas. Once the final rule is published in the Federal Register and becomes effective, each State/Commonwealth will be required to adopt a plan to meet tailored goals in CO_2 emissions, which could continue to spur increased reliance on natural gas. The final rule is anticipated to be published in the Federal Register in October 2015 (EPA, 2015).

9.1.5.5 Title V Operating Permits

Title V of the CAA requires States to establish an air operating permit program. The requirements of Title V are outlined in 40 CFR Part 70, and the permits required by these regulations are often referred to as Part 70 permits. If a facility's potential to emit exceeds the criteria pollutant or HAP thresholds, the facility is considered a major source. Under Title V, the major source threshold level for an air emission source is 100 tpy for criteria pollutants in attainment areas. The major source HAP thresholds for a source are 10 tpy of any single HAP or 25 tpy of all HAPs in aggregate.

Atlantic Coast Pipeline

Compressor Stations 1, 2, and 3 and the M&R Stations associated with the ACP are below Title V major source thresholds for criteria pollutants and HAPs. Therefore, the locations are not subject to Title V Operating Permit requirements.

Supply Header

The existing equipment at the Mockingbird Hill compressor station complex is currently subject to a Title V Operating Permit. Additionally, the existing equipment at the JB Tonkin compressor station is currently subject to a Title V Operating Permit and considered a major NOx source under Pennsylvania's NA-NSR rules. Crayne is not subject to Title V because its existing potential emissions are less than 100 tpy of NO_x and 50 tpy of VOC, but rather is authorized under a State operating permit (SOP). The status of these stations will not change due to the SHP.

9.1.5.6 State/Commonwealth Regulations

The air permit applications contain detailed regulatory applicability reviews for each compressor station site. The text provided below provides an overview of the applicability of the state regulations.

Pennsylvania

The air quality regulations for the Commonwealth of Pennsylvania are codified in Title 25, Subpart C, Article III of the Pennsylvania Code (25 PA Code 121-145). As stated, plans are to modify two existing compressor stations in Westmoreland County, Pennsylvania and Greene County, Pennsylvania as part of the SHP. The planned additions to each of the stations include combustion turbines. Based on the installation of these sources and projected emission levels, the following presents a discussion of Pennsylvania air quality regulations.

General Provisions (25 PA Code § 121)

This regulation contains provisions to provide for the control and prevention of air pollution in the Commonwealth of Pennsylvania and is applicable to both compressor stations. The regulation gives definitions of relevant terms for the article and establishes the various regions controlled by the article. §121.9 prohibits the use of stack height exceeding good engineering practice stack height, or dispersion technique to conceal or dilute an emission of air contaminants in order to circumvent a violation of an air quality regulation.

Prohibition of Certain Fugitive Emissions (25 PA Code § 123.1)

This regulation prohibits the emission of fugitive air contaminants from any sources besides listed exemptions and requires the facility to take all reasonable actions to minimize particulate matter from becoming airborne.

Fugitive Particulate Matter (25 PA Code § 123.2)

This regulation states that the facility shall not emit fugitive particulate matter if the emissions are visible at the point the emissions pass outside the facility's property. Good operating procedures will prevent fugitive dust emissions at the both stations.

Particulate Matter Limits for Combustion Units (25 PA Code § 123.11)

Condition 25 PA Code § 123.11 regulates particulate matter emissions by limiting particulate matter emissions from combustion units to $3.6E^{-0.56}$ lb/MMBtu. This limit will apply to the turbines installed at both compressor stations. The limitation will be maintained through the combustion of pipeline quality natural gas.

Sulfur Compound Emissions (25 PA Code § 123.21)

This regulation establishes SO_2 emissions from any source. The turbines and emergency generators must meet the limit for SO_2 emissions of 500 parts per million, by volume, dry basis (parts per million). SO_2 emissions from natural gas combustion will be negligible and well below the specified limit.

Sulfur Compound Emissions for Combustion Units (25 PA Code § 123.22)

This regulation establishes SO_2 emissions from combustion units. The turbines and emergency generators must meet section 123.22(a)(1) for non-air basin areas. This limit prohibits the emission of SO_2 in excess of the rate of 4 pounds per million metric British thermal units (MMBtu) over a 1-hour period. SO_2 emissions from natural gas combustion will be negligible and well below the specified limit.

NESHAP (25 Pa Code § 124)

The facilities are required to comply with applicable NESHAP, which are incorporated by reference in 25 Pa §124. The facilities shall comply with applicable NESHAP requirements for the combustion turbines and the generators.

Odor Emissions Limitations (25 PA Code § 123.31)

Condition 25 PA Code §123.31 prohibits the emission of malodorous air contaminants, from any source, if they are detectable outside the property line of the compressor station and gives guidelines for incineration if malodorous air contaminants must be controlled. No malodorous air contaminants are expected to be emitted from the facility such that malodors are detectable beyond the property line.

Visible Emissions Limitations (25 PA Code § 123.41)

This regulation establishes opacity limits for visible emissions from any source at the compressor station. Any visible air contaminant cannot have opacity equal to or greater than 20 percent for a period or more than 3 minutes in one hour or greater than or equal to 60 percent

at any time. Combustion of natural gas at the facility is not expected to generate visible emissions under normal operating conditions.

Construction, Modification, Reactivation and Operation of Sources (25 PA Code § 127)

Ch. 127 outlines the requirements and provisions for obtaining a plan approval from the Pennsylvania Department of Environmental Protection (PADEP). Both Crayne and JB Tonkin must obtain a plan approval before construction can commence at either site. 127.12(a)(5) requires that the applicant show that the emissions from each new source will be the minimum attainable through the use of the best available technology (BAT).

Stationary Sources of NOx and VOCs (25 PA Code §129.91–§129.95)

§129.91–§129.95 applies to owners and operators of a major NO_X and/or VOC emitting facility which are not covered by §129.91. The combustion turbines at the Pennsylvania sites are sources not covered by §129.91 and are therefore subject to these regulations. §129.91–§129.95 establishes Reasonably Available Control Technology (RACT) requirements for facilities that are major sources for NO_X and/or VOC. A written RACT proposal for each source of VOCs and NO_X at the facility will be submitted to the DEP and the EPA and follow guidelines established in §129.92. Emission limitations based on the heat input of the source are established in §129.93 and recordkeeping requirements for the applicable sources is outlined in §129.95.

Degreasing Operations (25 PA Code § 129.63)

Condition 25 PA Code § 129.63 regulates cleaning machines that are not subject to NESHAP. It establishes standards and emission limits for different types of cleaning machines: cold cleaning, batch vapor, in-line vapor, and airless/airtight.

Sampling and Testing (25 PA Code § 139)

This regulation details PADEP approved sampling and testing procedures, monitoring requirements, performance tests, etc.

Sampling and Testing Methods and Procedures (25 PA Code § 139 Subchapter A)

This regulation establishes PADEP approved sampling and testing methods for stationary sources and ambient levels of air contaminants.

Monitoring Duties of Certain Sources (25 PA Code § 139 Subchapter B)

Subchapter B details various monitoring duties for certain sources. It requires periodic monitoring of air contaminants as well as the submittal of monitoring reports to the PADEP.

Requirements for Source Monitoring for Stationary Sources (25 PA Code § 139 Subchapter C)

Subchapter C establishes requirements for monitoring systems. General requirements are established in §139.101. Additional monitoring systems dealing with opacity, TRS compound and waste incinerator monitoring are covered in this regulation.

Operating Permit Terms and Conditions (25 PA Code § 127.441- 127.450)

The facility will comply with the terms and conditions of the operating permit, will have proper operation of the source, will incorporate applicable NSPS and NESHAPs requirements, and require monitoring and reporting requirements.

West Virginia

The air quality regulations for the State of West Virginia are codified in Title 45 of the CSR – Series 1 through 42. As stated, plans are to modify existing compressor stations in Wetzel and Marshall Counties, West Virginia as part of the SHP. A new compressor station is planned to be constructed in Lewis County, West Virginia as part of the ACP. The planned additions and construction of the compression stations include the instillation of combustion turbines, emergency generators, and auxiliary boilers. Based on the installation of these sources and projected emission levels, the following presents a discussion of West Virginia air quality regulations.

To Prevent and Control Air Pollution from Combustion of Fuel in Indirect Heat Exchangers (45 CSR 02)

This regulation limits the amount of particulate emissions and smoke to be released by indirect heat exchangers for units with heat capacities of greater than or equal to 10 MMBtu per hour. Units in excess of 10 MMBtu per hour must operate with visible emissions of less than 10 percent opacity. The line heaters at Long Run M&R Station will be less than 10 MMBtu/hr and are therefore not subject to the opacity limitation. This fact, coupled with the emissions from the station being below minor source permitting thresholds for West Virginia, exempt the Long Run M&R Station from requiring an air permit.

To Prevent and Control the Discharge of Air Pollutants in the Open Air which Causes or Contributes to an Objectionable Odor or Odors (45 CSR 04)

The discharge of air pollutants which cause or contribute to objectionable odors is prohibited in public areas. Internal combustion engines and certain agricultural practices are exempt from this rule.

To Prevent and Control Air Pollution from the Emission of Sulfur Oxides (45 CSR 10)

The purpose of this regulation is to prevent and control emissions of sulfur oxides. All fuel burning equipment at affected facilities are subject to the weight emission standards for SO_2. Compliance with this limit can be demonstrated by the combustion of pipeline quality natural gas. Monitoring and record keeping of aggregate fuel usage is required.

Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants (45 CSR 13)

The Rule 13 permit will be submitted for the operational activities associated with the compression of natural gas at Compressor Station 1.

Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution for the Prevention of Significant Deterioration (45 CSR 14)

Operation of equipment at the compressor stations will not exceed the PSD emission triggers, with the exception of the Mockingbird Hill facility modifications. Therefore, a Rule 14 permit application has been developed for the modifications at the Mockingbird Hill facility.

Standards of Performance for New Stationary Sources (45 CSR 16)

The compressor stations must meet all applicable federal NSPS regulations that apply to the Projects. The applicability of these regulations is discussed in Section 9.1.5.2.

Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution Which Cause or Contributed to Non-attainment (45 CSR 19)

Operation of equipment at the compressor stations are not located in non-attainment areas and are not subject to this rule.

Control of Air Pollution from Hazardous Waste Treatment, Storage, and Disposal Facilities (45 CSR 25)

No hazardous waste will be burned at the compressor stations; therefore, it is not subject to this hazardous waste rule.

Requirements for Operating Permits (45 CSR 30)

The proposed Compressor Station 1 emission rates will not trigger the need for a Title V permit. The Mockingbird facility is already covered by a Title V permit.

Emission Standards for Hazardous Air Pollutants (45 CSR 34)

The compressor stations must meet all applicable federal NESHAP regulations that apply to the Project. The applicability of these regulations is discussed in Section 9.1.5.3.

Control of Annual Nitrogen Oxides Emissions (45 CSR 39)

Operation of equipment at the compressor stations will not exceed the PSD emission triggers. For this reason, the facilities will not be subject to the emission limitation and trading program for the control of annual nitrogen oxide emissions.

Control of Ozone Season Nitrogen Oxides Emissions (45 CSR 40)

Operation of equipment at the compressor stations will not exceed the PSD emission triggers. For this reason, the facilities will not be subject to the emission limitation and trading program for the control of annual nitrogen oxide emissions.

Virginia

The air quality regulations for the Commonwealth of Virginia are codified in Title 9 of the Virginia Administrative Code (9 VAC) Agency 5, State Air Pollution Control Board. As stated, plans are to construct a new compressor station in Buckingham County, Virginia as part of the ACP. The planned construction of the new compression station includes the installation of four natural gas combustion turbines, one natural gas boiler, four natural gas line heaters, and auxiliary equipment. Based on the installation of these sources and projected emission levels, the following presents a discussion of Virginia air quality regulations.

General Provisions on Air Pollution Control (9 VAC 5-20)

The General Provisions on Air Pollution Control contain provisions to secure and maintain all air quality levels in Virginia. Under 9 VAC 5-20-170, the air pollution control board may require an owner of a stationary source to submit a control program, in a form and manner satisfactory to the board, showing how compliance shall be achieved. For cases of equipment maintenance or malfunctions, 9 VAC 5-20-180 will require the facility record and notify the board of such instances.

Ambient Air Quality Standards (9 VAC 5-30)

Ambient air quality standards are required to assure that ambient concentrations of air pollutants are consistent with established criteria and shall serve as the basis for effective and reasonable management of the air resources. Where applicable, all measurements of air quality shall be corrected to a reference temperature of 77 °F and to a reference pressure of 14.7 pounds per square inch absolute. Depending on the ambient air quality concentrations, air dispersion modeling may be required. SOPs are covered in 9 VAC 5-80, which is discussed in more detail below.

New and Modified Sources (9 VAC 5-50)

The owner or operator of a new or modified emission source must achieve compliance with all standards of performance prescribed under this chapter within 60 days of achieving maximum production rate, but no later than 180 days after initial startup. Upon the request of the board, the owner or operator may be requested to continuously monitor emissions and process parameters by procedures and methods acceptable to the board. Performance tests will include odor, toxic pollutants, dust, and visible emissions testing. Recordkeeping and reporting requirements include notification of startup, shutdown, malfunction, performance tests, monitoring device malfunctions or repairs, monitoring start and end times. Records must be kept for at least 5 years.

In addition, new or modified stationary sources under Article 6 may be required to demonstrate the use of BACT under 9 VAC 5-50-260. Accordingly, the ACP-2 application includes a BACT review that confirms the proposed equipment satisfies the BACT requirements.

The line heaters at the Greensville and Brunswick M&R Stations will be included as part of permit to construction applications submitted outside the ACP by Dominion Virginia Power because they are co-located with power plants.

Hazardous Air Pollutant Sources (9 VAC 5-60)

Standards and criteria on regulated HAPs are included within 9 VAC 5-60. Emissions testing and recordkeeping is also included in this chapter. A source is exempt from this chapter if the source emits less than the Federal standards for HAP emissions. Air dispersion modeling may be required depending on the site-specific emissions calculations.

Federal Operating Permits (9 VAC 5-80-50)

A Federal operating permit is required for any major source or an area source subject to a standard, limitation, or other requirement under Sections 111-112 of the Clean Air Act, unless otherwise exempt. Because the site is below the Title V major source emissions thresholds and is not subject to a Title V by rule through a Federal standard, the ACP-2 site is not subject to this rule.

State Operating Permits (9 VAC 5-80)

Article 6 permitting must be completed before construction of a new source, per 9 VAC 5-80-1100. Virginia's SOPs are most often used by stationary sources to establish federally enforceable limits on potential emissions to avoid major NSR permitting (PSD and Non-Attainment permits), Title V permitting, and/or major source Maximum Achievable Control Technology (MACT) applicability. When a source chooses to use a SOP to limit their emissions below major source permitting thresholds, it is commonly referred to as a “synthetic minor” source. SOPs can also be used to combine multiple permits from a stationary source into one permit or to implement emissions trading requirements. The ACP-2 Station, nor the M&R Stations in VA, will not seek a synthetic minor state operating permit under 9 VAC 5-50-800 and are not subject to this regulation.

Construction Permits (9 VAC 5-80-1100)

Article 6 permitting must be completed before construction of a new source. The required Form 7 application forms and attachments will be included in the Commonwealth permit application to satisfy this requirement for the construction of sources at the facility.

An Article 6 minor New Source Review permit is required for the Compressor Station 2 under 9 VAC-5-50-1100. On their own, the Greensville and Brunswick M&R Stations would not be subject to this rule because each fuel burning unit using gaseous fuel with a maximum heat input of less than 50 MMBtu/hr is exempt. The line heaters at Greensville and Brunswick are less than 50 MMBtu/hr. However, the line heaters are being included as part of separate permit applications submitted by Dominion Virginia Power because they are co-located with power plants.

Permits for Stationary Sources of Pollutants Subject To Regulation (9 VAC 5-85)

This chapter contains definitions and general provisions which are essentially identical to those discussed in chapter 20 above.

Emergency Generator General Permit (9 VAC 5-540)

Affected units are required to install a non-resettable hour metering device to monitor the operating hours for each unit, calculated monthly as the sum of each consecutive 12-month

period. The non-resettable hour metering shall be observed by the owner or operator within a frequency no less than once per month. The owner or operator shall keep a log of the following; monthly observations of meters, start-up dates, equipment malfunctions, corrective actions, and shutdown dates. Records must be kept onsite for 5 years.

North Carolina

As stated, plans are to construct a new compressor station in Northampton County, North Carolina. The planned compressor station will consist of three turbines with one reciprocating internal combustion engine as backup power and one auxiliary boiler. Based on installation of these sources and projected emission levels, the following presents a discussion of North Carolina Air Quality regulations.

Title V Procedures (15A NCAC 02Q.0500)

This rule outlines the North Carolina Department of Environment and Natural Resources (NC DENR) Title V Permitting Program. The facility's criteria pollutant potential to emit (PTE) will not exceed the applicable Title V major source threshold of 100 tpy per criteria pollutant. In addition, the facility's HAP PTE will not exceed 10 tpy per individual HAP, and will not exceed 25 tpy for combined HAPs. Therefore, the facility will be a minor source of emissions with respect to the Title V Operating Program.

Construction and Operation Permits (15A NCAC 02Q .0300)

This rule establishes the authority to require a source to obtain an air quality permit through the guidelines and rules established in 02Q.0300 prior to construction. The definition of construction in North Carolina is consistent with the EPA's rulings and definitions.

Sulfur Dioxide Emissions from Combustion Sources (15A NCAC 02D .0516)

This regulation limits for SO_2 from any source of combustion that is discharged to the atmosphere to no more than 2.3 pounds of SO_2 per million British thermal unit (Btu) input. Natural gas combustion complies with this rule. If an NSPS or MACT has a SO_2 standard, the facility shall comply with the NSPS or MACT instead of this Rule.

Control of Nitrogen Dioxide and Nitrogen Oxides Emissions (15A NCAC 02D .0519)

This regulation limits the nitrogen oxides from sulfuric acid plants, and the combustion of coal, oil or coal, and oil in combination with gaseous fuels in boilers. It will not be applicable to the turbines or the emergency reciprocating internal combustion engines at the site. The new boiler will have a maximum heat input capacity of 6.3 MMBtu/hr, and thus is not subject to this regulation.

Control of Visible Emissions (15A NCAC 02D .0521)

This regulation limits the opacity from newly constructed combustion sources to 20 percent opacity. If a NSPS or MACT has an opacity standard, the facility shall comply with the NSPS or MACT instead of this Rule.

Prevention of Significant Deterioration (15A NCAC 02D .0530)

This rule incorporates nearly all of 40 CFR 51.166, however, North Carolina has added some State-specific issues that would impact existing sources and establishes new guidelines for impacts to the Class I areas in North Carolina. Since the facility will be a synthetic minor facility, this rule will not apply at this time.

Excess Emissions Reporting and Malfunctions (15A NCAC 02D .0535)

This rule establishes State-specific requirements and definitions for a malfunction and the reporting requirements for a malfunction. The facility will comply with these requirements as applicable. In addition, sources subject to an NSPS or NESHAP rule are not subject to this regulation, unless an emission limit established in a permit issued under 15A NCAC 02Q.0700 is more stringent than the applicable NSPS or NESHAP rule.

Particulates from Fugitive Dust Emission Sources (15A NCAC 02D.0540)

This rule requires facilities to obtain a permit under 15A NCAC 02Q or subjects facilities to requirements under 15A NCAC 02D which state that the facility shall not cause or allow fugitive dust emissions to cause or contribute to substantive complaints. The facility will comply with all applicable requirements, including reporting requirements in the event of substantive fugitive dust complaints.

Monitoring, Recordkeeping, and Reporting 15A NCAC 02D.0600

This rule sets forth general monitoring, recordkeeping, and reporting requirements applicable to sources subject to the requirements of 15A NCAC 02D or 15A NCAC 02Q. The facility will comply with all applicable requirements in this regulation.

Volatile Organic Compounds (15A NCAC 02D.0900)

This rule sets forth various requirements for sources emitting VOCs. The facility is not expected to emit greater than 15 pounds VOC per day, and is therefore only potentially subject to sections .0925 and .0958 of this regulation. However, all storage tanks at the facility will have a capacity less than 39,000 gallons, and the facility is therefore not subject to section .0925. The facility will comply with all applicable requirements of section .0958.

Prevention of Significant Deterioration Requirements for GHGs (15A NCAC 02D .0544)

This rule supersedes .0530 for GHGs and alone cannot trigger a PSD review. Since the facility will be a synthetic minor facility with regards to criteria pollutants, this rule will not apply at this time.

Control of Toxic Air Pollutants (15A NCAC 02D .1100 and 15A NCAC 02Q .0700)

These rules establish the procedures and permitting requirements for the State toxic air pollutants identified for North Carolina Ambient Air. Its procedures include *de minimis* evaluation and air dispersion modeling requirements for non-*de minimis* toxic air pollutants. The facility will not emit toxic air pollutants at a rate greater than the *de minimis* levels, and therefore, no air dispersion modeling is required as confirmed by NC DENR.

9.1.5.7 Greenhouse Gas Mandatory Reporting Rule

The GHG Mandatory Reporting Rule, at 40 CFR Part 98, requires certain facilities that emit 25,000 metric tons or more of CO_2e per year to report annual emissions of specified GHGs from various processes within the facility and conduct associated monitoring. Compressor stations include source types that are subject to the GHG Mandatory Reporting Rule: Subpart C – General Fuel Combustion Sources, which became effective on December 29, 2009, and Subpart W – Petroleum and Natural Gas Systems, which became effective on December 30, 2010. The GHG Mandatory Reporting Rule is managed directly by the EPA and not through a source's Title V permit. It is expected that the compressor stations associated with the proposed Projects will be required to report GHG emissions under this rule.

9.1.5.8 General Conformity

Section 176 of the 1990 CAA Amendments required the EPA to promulgate rules to make certain Federal actions conform to the applicable State Implementation Plan. These rules, known together as the General Conformity Rule (40 CFR 93, Subpart B), require any Federal agency responsible for an action in a non-attainment or maintenance area for any criteria pollutant to determine if the action conforms with the applicable State Implementation Plan or is exempt from the General Conformity Rule requirements.

The EPA amended the General Conformity rule in 2010 (Federal Register, Volume 75, Number 64, April 5, 2010). As amended, emissions regulated by a permit issued under minor or major NSR are exempted from a General Conformity applicability analysis. Previously, only major NSR permit emissions were excluded.

General Conformity currently applies to areas designated as non-attainment or maintenance for ozone under the 1997 and 2008 8-hour ozone NAAQS. To remove the complexity of having to address requirements under two ozone NAAQS, the EPA published the "Implementation of the 2008 National Ambient Air Quality Standards for Ozone: State Implementation Plan Requirements – Proposed Rule" in the Federal Register on June 6, 2013. The proposed rule provides that all requirements, including General Conformity, will not apply to areas designated as non-attainment or maintenance for the 1997 ozone NAAQS when that NAAQS is revoked. The 1997 ozone NAAQS will be revoked upon publication of the final rule. The public comment period for the proposed rule ended August 5, 2013 and the final rule has not been promulgated to date. Until the EPA publishes the final rule, requirements to address General Conformity under the 1997 8-hour ozone NAAQS continue to apply alongside the 2008 8-hour ozone NAAQS.

A General Conformity analysis consists of two steps. The first step is an applicability analysis where estimated project emissions from construction and operation (with emission sources covered by a permit excluded) are compared to *de minimis* thresholds defined in the General Conformity Rule. Step two, a General Conformity determination, is required for each pollutant where the total of direct and indirect emissions caused by a Federal action (such as a FERC action) would equal or exceed *de minimis* levels as specified in 40 CFR Part 93.153 with the exceptions specified in 40 CFR Part 51.853(c), (d), or (e). General Conformity does not apply to Federal actions in attainment areas or unclassifiable/attainment areas (including Counties located within the Northeast Ozone Transport Region).

For ozone non-attainment areas, emissions of VOC and NO_X are evaluated because they are precursor pollutants to ozone formation. For $PM_{2.5}$ non-attainment areas, emission of NO_X and SO_2 are evaluated (in addition to direct $PM_{2.5}$) because they are precursor pollutants to $PM_{2.5}$ formation. Project activities in Counties belonging to the same non-attainment area or area under maintenance are assumed to contribute cumulatively to the non-attainment or maintenance area. During the applicability analysis, estimated emissions within non-attainment and maintenance areas are compared against preset threshold levels per 40 CFR Section 93.153. The applicability thresholds vary, depending on the severity of the non-attainment area. *De minimis* emissions are total direct and indirect emissions of a criteria pollutant caused by a Federal action in a non-attainment or maintenance area at rates less than the specified applicability thresholds. These thresholds are presented in Table 9.1.5-4.

TABLE 9.1.5-4

General Conformity Thresholds for the Atlantic Coast Pipeline and Supply Header Project

Pollutant/Non-attainment Area	Tons Per Year
Ozone (VOCs or NO_X):	
Serious non-attainment areas	50
Severe non-attainment areas	25
Extreme non-attainment area s	10
Other ozone non-attainment areas outside an Ozone Transport Region	100
Other ozone non-attainment areas inside an Ozone Transport Region:	
VOC	50
NO_X	100
Carbon monoxide (all non-attainment areas)	100
SO_2 or NO_2 (all non-attainment areas)	100
PM_{10}	
Moderate non-attainment areas	100
Serious non-attainment areas	70
$PM_{2.5}$	
Direct emissions	100
SO_2	100
NO_X (unless determined not to be a significant precursor)	100
VOC or ammonia (if determined to be significant precursors)	100
Lead (all non-attainment areas)	25

Source: 40 CFR §93.153

NO_2 nitrogen dioxide
NO_X nitrogen oxides
$PM_{2.5}$ particulate matter 2.5 microns or less in aerodynamic diameter
PM_{10} particulate matter 10 microns or less in aerodynamic diameter
SO_2 sulfur dioxide
VOC volatile organic compound

As indicated above, the general conformity rule applies only to non-attainment or maintenance areas. Note that VOC and NO_x are regulated as ozone precursor pollutants. For $PM_{2.5}$ non-attainment, direct emissions of $PM_{2.5}$ and precursor pollutants VOC, NOx, and SO_2 are regulated. For SO_2 nonattainment, direct emissions of SO_2 are regulated.

Construction emissions associated with ACP and SHP for calendar years 2017 and 2018 are presented in Tables 9.1.5-5 and 9.1.5-6. For assessment of construction emissions in non-attainment areas subject to analysis under the General Conformity Rule, construction emissions from ACP and SHP were assumed to occur in calendar year 2017 or 2018 based on the construction schedule.

TABLE 9.1.5-5

ACP and SHP Construction Emissions for Nonattainment and Maintenance Areas for Calendar Year 2017

County/City	Air Quality Designation	NO_X	VOC	SO_2	$PM_{2.5}$
			(tons per year)		
Johnston (NC)	MT, Sub1 – Ozone 8-hr (1997)	46.9	7.19	N/A	N/A
Nash (NC)	MT, Sub1 – Ozone 8-hr (1997)	38.0	5.80	N/A	N/A
	NC General Conformity de minimis	*100*	*100*	*100*	*100*
Greene (PA)	MT, Sub1 – Ozone 8-hr (1997) NT, Mod – PM2.5 24-hr (2006)	0	0	0	0
Westmoreland (PA)	NT, Mod – Ozone 8-hr (1997) NT, Mar – Ozone 8-hr (2008) NT, Mod – PM2.5 24-hr (2006)	13.7	2.31	0.021	3.86
	PA General Conformity de minimis	*100*	*50*	*100*	100
Chesapeake (VA)	MT, Mar – Ozone 8-hr (1997)	23.9	3.73	N/A	N/A
Suffolk (VA)	MT, Mar – Ozone 8-hr (1997)	56.0	8.65	N/A	N/A
	VA General Conformity de minimis	*100*	*100*	*100*	100
Marshall (WV)	MT, Sub1 – Ozone 8-hr (1997) NT – SO2 24-hr (2010)	3.75	0.672	0.006	N/A
	WV General Conformity de minimis	*100*	*100*	*100*	100

Key
Mar = Marginal
Mod = Moderate
MT = Maintenance Area
NT = Nonattainment Area
Sub1 = Former Subpart 1
N/A = Not Applicable

TABLE 9.1.5-6

ACP and SHP Construction Emissions for Nonattainment and Maintenance Areas for Calendar Year 2018

County/City	Air Quality Designation	NO_X	VOC	SO_2	$PM_{2.5}$
			(tons per year)		
Johnston (NC)	MT, Sub1 – Ozone 8-hr (1997)	68.1	10.4	N/A	N/A
Nash (NC)	MT, Sub1 – Ozone 8-hr (1997)	57.0	8.69	N/A	N/A
	NC General Conformity de minimis	*100*	*100*	*100*	*100*
Greene (PA)	MT, Sub1 – Ozone 8-hr (1997) NT, Mod – PM2.5 24-hr (2006)	17.7	3.10	0.028	6.33
Westmoreland (PA)	NT, Mod – Ozone 8-hr (1997) NT, Mar – Ozone 8-hr (2008) NT, Mod – PM2.5 24-hr (2006)	54.5	9.09	0.092	16.1
	PA General Conformity de minimis	*100*	*50*	*100*	100
Chesapeake (VA)	MT, Mar – Ozone 8-hr (1997)	1.76	0.300	N/A	N/A
Suffolk (VA)	MT, Mar – Ozone 8-hr (1997)	0	0	N/A	N/A
	VA General Conformity de minimis	*100*	*100*	*100*	100
Marshall (WV)	MT, Sub1 – Ozone 8-hr (1997) NT – SO2 24-hr (2010)	3.07	0.550	0.005	N/A
	WV General Conformity de minimis	*100*	*100*	*100*	100

Key
Mar = Marginal
Mod = Moderate
MT = Maintenance Area
NT = Nonattainment Area
Sub1 = Former Subpart 1
N/A = Not Applicable

9.1.5.9 Air Quality Modeling Analysis

An air quality dispersion modeling analysis was performed for both the new and modified compressor stations in order to assess potential impacts to the ambient air quality in the vicinity of each project site. The criteria pollutants NO_2, CO, $PM_{2.5}$, and PM_{10} were included in the air quality modeling analysis. Maximum modeled concentrations were compared to the NAAQS for each pollutant. The following paragraphs provide a summary of the assumptions used in the air quality modeling analyses and a summary of the modeling results compared to the NAAQS.

Atlantic Coast Pipeline

The modeling analyses were conducted using the most recent version of the EPA regulatory air dispersion model, AERMOD version 15181, in screening mode. The screening mode of AERMOD provides estimates for the worst case 1-hour concentrations of multiple sources using fully-developed terrain and receptor data.

A screening meteorological dataset, MAKEMET version 15181, was used to create a site-specific set of worst case meteorological conditions to be used as input for AERMOD. Inputs that were used in the MAKEMET program for the three ACP Stations are provided in Table 9.1.5-7 below. The values shown in Table 9.1.5-7 were derived from standard or default values, as well as parameters calculated using the AERSURFACE (version 13016) land cover processor. AERSURFACE was used to calculate surface roughness, Bowen ratio and albedo for each of the sites.

TABLE 9.1.5-7

MAKEMET Input Parameters for the Atlantic Coast Pipeline

MAKEMET Input Parameter	ACP-1	ACP-2	ACP-3
Minimum Wind Speed (m/s)	0.5	0.5	0.5
Anemometer Height (m)	10	10	10
Number of Wind Directions	72	72	72
Starting Wind Direction (°)	0	0	0
Wind Direction Increment (°)	5	5	5
Minimum Ambient Temperature (K)	255 (0°F)	255 (0°F)	255 (0°F)
Maximum Ambient Temperature (K)	311 (100°F)	311 (100°F)	311 (100°F)
Surface Roughness Length (m)	0.385	0.911	0.632
Bowen Ratio	0.64	0.67	0.45
Albedo	0.17	0.15	0.15

Background pollutant concentrations were estimated using existing ambient monitoring data for the region. The background monitors were determined based on proximity and general representativeness of the monitoring sites to each of the three ACP compressor stations. The background concentrations that were selected were combined with the worst-case model results, using the sum of these two values for comparison to the NAAQS. Table 9.1.5-8 summarizes the air quality data from the monitoring stations that were used for background concentrations.

A Discrete Cartesian receptor grid was used for each site in the modeling analysis. Each receptor grid was based upon:

- 50 meter spacing along the facility fenceline;
- 100 meter spacing from the fenceline out to 2.5 kilometers (km);
- 250 meter spacing from 2.5 km out to 5 km; and
- 500 meter spacing from 5 km out to 10 km.

TABLE 9.1.5-8

Summary of Background Concentrations for Atlantic Coast Pipeline

Facility	Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$) [a]	Station ID	Station Location
Compressor Station 1	NO_2	1-hour	67.68	421250005	Charleroi, PA
		Annual	16.92		
	CO	1-hour	1145	540090011	Weirton-Steubenville, WV-OH
		8-hour	916		
	$PM_{2.5}$	24-hour	19	540330003	Clarksburg, WV
		Annual	9.1		
	PM_{10}	24-hour	33	540390010	Charleston, WV
Compressor Station 2	NO_2 [b]	1-hour	69.56	511611004	Roanoke, VA
		Annual	16.92	511650003	Harrisonburg, VA
	CO	1-hour	1374	511611004	Roanoke, VA
		8-hour	1259.5		
	$PM_{2.5}$	24-hour	17	510030001	Charlottesville, VA
		Annual	7.6		
	PM_{10}	24-hour	34	510870014	Richmond, VA
Compressor Station 3	NO_2	1-hour	80.84	510360002	Richmond, VA Charles County
		Annual	9.4		
	CO	1-hour	1717.5	371830014	Raleigh-Durham, NC
		8-hour	1374		
	$PM_{2.5}$	24-hour	18	510360002	Richmond, VA Charles County
		Annual	7.9		
	PM_{10}	24-hour	33	516700010	Hopewell, VA

[a] Background concentrations are the 2014 design values for all pollutants except for PM_{10}, which is the maximum value over the 2012-2014 period.

[b] Compressor Station 2: Annual NO_2 background value is represented using the Harrisonburg, VA monitor, which is the closest NO_2 monitor to the site. However, 1-hour NO_2 values are not available for this site, and so the next closest station in Roanoke, VA is used for the 1-hour value.

Elevation data for all of the sources and receptors were created using the AERMAP (version 11103) terrain processor. National Elevation Dataset (NED) terrain data available from the United States Geological Survey (USGS) at a 1/3-arc-second (roughly 10 m) resolution was used as input into AERMAP.

Normal operations were modeled for all of the sources at each site. All of the equipment is being permitted to operate for up to 8760 hours a year, except for the emergency generators which will be operated no more than 100 hours a year. This reduction of hours for the emergency generators is represented in the modeling analysis by using an annualized emission rate instead of a short-term emission rate for NO_X and $PM_{2.5}/PM_{10}$ modeling. CO was modeled using short-term emission rates for all sources. A summary of the stack parameters and emissions information used to model each of the sites is provided in Table 9.1.5-9 below.

TABLE 9.1.5-9

AERMOD Inputs: Stack Parameters and Source Information for Atlantic Coast Pipeline

Facility	Source	Model ID	Stack Height (ft)	Exit Diameter (ft)	Exit Gas Velocity (ft/s)	Exit Gas Temperature (°F)	Pollutant Emission Rates NO_2 (lb/hr)	CO (lb/hr)	$PM_{2.5}/PM_{10}$ (lb/hr)
Compressor Station 1	Solar Titan 130 Turbine	CT01	70	10	58.8	750	3.42	6.35	3.46
	Solar Mars 100 Turbine	CT02	70	10	46.9	750	2.81	4.73	2.85
	Solar Taurus 70 Turbine	CT03	70	7.5	56.0	750	1.91	2.99	1.92
	Solar Taurus 60 Turbine	CT04	70	6	68.7	750	1.43	1.93	1.45
	Emergency Generator [a]	EGEN	5	0.5	61.1	840	0.026	9.02	0.008
	Boiler	BOIL	18	0.67	247.3	838	0.53	0.88	0.08
Compressor Station 2	Solar Mars 100 Turbine	CT01	70	10	46.9	750	2.81	4.73	2.85
	Solar Taurus 70 Turbine	CT02	70	7.5	56.0	750	1.91	2.99	1.92
	Solar Centaur 50L Turbine	CT03	70	6	68.7	750	1.43	1.93	1.45
	Solar Taurus 60 Turbine	CT04	70	6	58.0	750	1.19	1.87	1.20
	5 Microturbines (Building 1)	MT01	25	2.5	44.5	535	0.46	1.26	0.023
	5 Microturbines (Building 2)	MT02	25	2.5	44.5	535	0.46	1.26	0.023
	Auxiliary Boiler	AUXB	18	0.67	247.3	838	0.47	0.78	0.07
	Gas Heater 1	HTR1	22.83	1.94	16.72	981.79	0.19	0.63	0.12
	Gas Heater 2	HTR2	22.83	1.94	16.72	981.79	0.19	0.63	0.12
	Gas Heater 3	HTR3	22.83	1.94	16.72	981.79	0.19	0.63	0.12
	Gas Heater 4	HTR4	22.83	1.94	16.72	981.79	0.19	0.63	0.12
Compressor Station 3	Solar Taurus 70 Turbine	CT01	70	7.5	56.0	750	1.91	2.99	1.92
	Solar Centaur 50L Turbine	CT02	70	6	58.0	750	1.19	1.87	1.20
	Solar Centaur 40 Turbine	CT03	70	6	52.4	750	1.00	1.67	1.02
	Emergency Generator [a]	EGEN	5	0.5	61.1	840	0.071	5.90	0.0068
	Boiler	BOIL	18	0.67	247.3	838	0.31	0.52	0.048

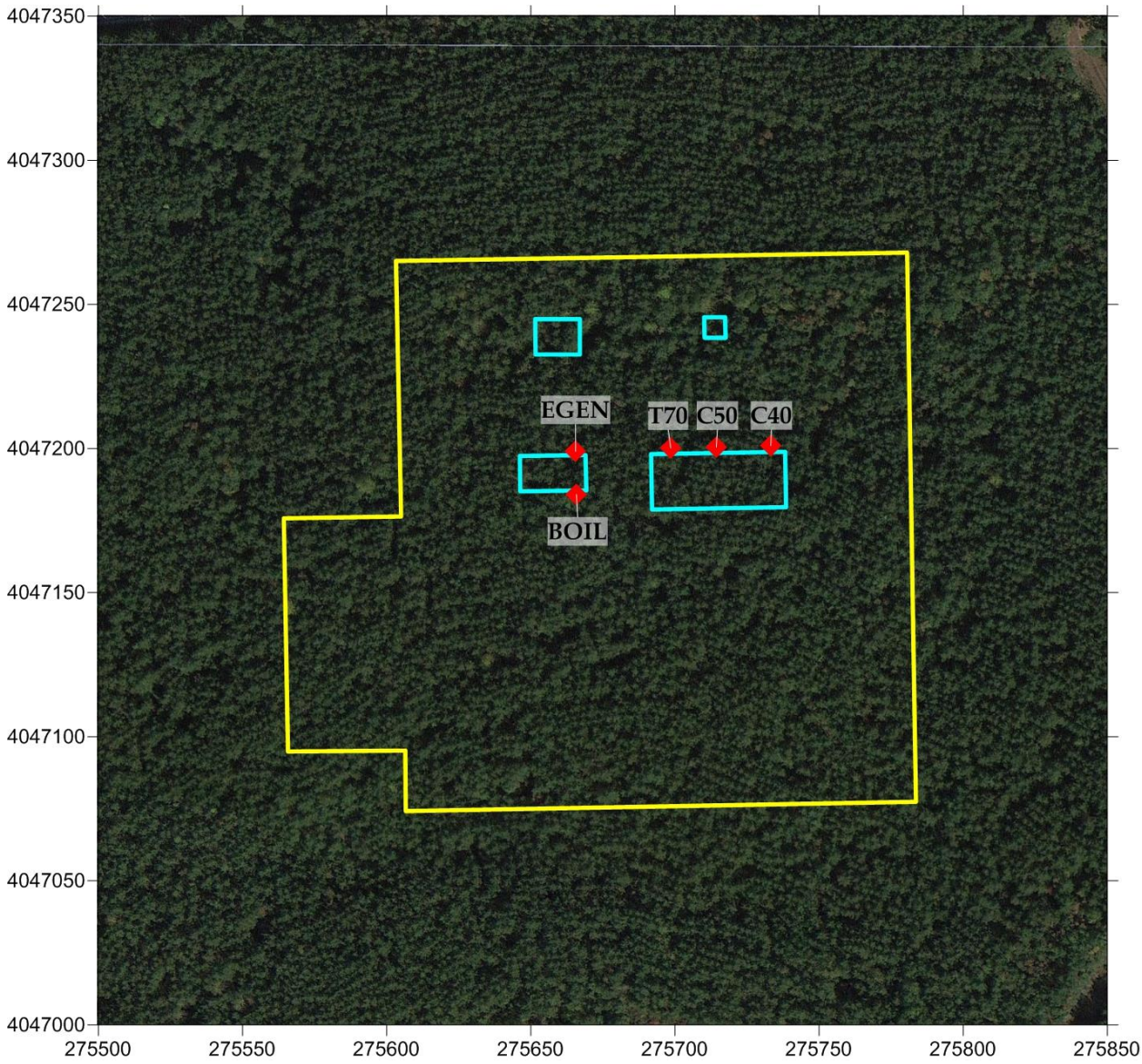
[a] NO_2 and $PM_{2.5}/PM_{10}$ Emission rates for the emergency generator are annualized rates assuming 100 hrs/yr

The EPA's Building Profile Input Program (BPIP), Version 04274, was used to calculate downwash effects for the modeled emission sources. Building locations and heights relative to the modeled sources were determined as input into BPIP. A graphical representation of the building downwash analysis is presented in Figures 9.1.5-1 through 9.1.5-3.

Figure 9.1.5-1 Building Profile for Atlantic Coast Pipeline: Compressor Station 1

Figure 9.1.5-2 Building Profile for Atlantic Coast Pipeline: Compressor Station 2

Figure 9.1.5-3 Building Profile for Atlantic Coast Pipeline: Compressor Station 3



AERMOD in screening mode can only produce modeled concentrations for the 1-hour averaging period for all pollutants. In order to convert these values into estimates for other averaging periods, the EPA recommends that the following scaling factors are used for AERMOD screening values:

TABLE 9.1.5-10

Scaling Ratios to be used with AERMOD Screening Mode

Averaging Period	Scaling Factor
3-hour	1
8-hour	0.9
24-hour	0.6
Annual	0.1

The scaling factors listed in Table 9.1.5-10 above are applied to the maximum 1-hour average model results. Comparing results derived from the maximum modeled concentration is a conservative approach since the true model design values for the NAAQS are expressed in alternate statistical forms. It is not possible to calculate the appropriate statistical forms of the model design values for comparison to the NAAQS using the screening meteorological data. The results of this analysis are provided below in Table 9.1.5-11. The Tier II ARM method was used to calculate modeled NO_2 concentrations, which assumes that 80 percent of NOx emissions will be converted into NO_2 for the 1-hour averaging period, while 75 percent will be converted for the annual averaging period.

TABLE 9.1.5-11

Air Quality Model Results for Atlantic Coast Pipeline

Facility	Pollutant	Averaging Period	Background Concentration (μg/m^3)	Model Result (μg/m^3)	NAAQS (μg/m^3)	Background + Model Concentration (μg/m^3)
Compressor Station 1	NO_2	1-hour	67.7	19.7	188	87.4
		Annual	16.9	1.8	100	18.8
	CO	1-hour	1145	3708	40000	4853
		8-hour	916	3337	10305	4253
	$PM_{2.5}$	24-hour	19	15.0	35	34.0
		Annual	9.1	2.49	12	11.59
	PM_{10}	24-hour	33	15.0	150	48.0
Compressor Station 2	NO_2	1-hour	69.6	46.2	188	115.7
		Annual	16.9	4.3	100	21.2
	CO	1-hour	1374	126.0	40000	1500
		8-hour	1259.5	113.4	10305	1373
	$PM_{2.5}$	24-hour	17	13.3	35	30.3
		Annual	7.6	2.2	12	9.8
	PM_{10}	24-hour	34	13.3	150	47.3
Compressor Station 3	NO_2	1-hour	80.8	37.9	188	118.8
		Annual	9.4	3.6	100	13.0
	CO	1-hour	1717.5	3951	40000	5668
		8-hour	1374	3556	10305	4930
	$PM_{2.5}$	24-hour	18	6.0	35	24.0
		Annual	7.9	1.0	12	8.9
	PM_{10}	24-hour	33	6.0	150	39.0

When combined with ambient background concentrations, none of the pollutants modeled in this analysis exceed their respective NAAQS. Therefore, the screening air quality model results indicate that emissions from the proposed Atlantic Coast Pipeline compressor stations will not cause or contribute violations of the NAAQS.

Supply Header

The air quality modeling analyses for the Supply Header Project were conducted using the most recent version of the EPA regulatory air dispersion model, AERMOD version 15181. All of the existing and newly proposed equipment were included in the modeling analyses in order to determine the respective facility's cumulative impact to the surrounding air quality.

Meteorological data for 2010 to 2014 was processed for each site using the latest version of the EPA AERMET (version 15181). Surface parameters were obtained from nearby Automated Surface Observation System (ASOS) data. Each of the ASOS stations were chosen due to proximity to the individual compressor station sites, and are considered regionally representative of each site. AERMET was executed using EPA recommended settings to produce the meteorological data needed for AERMOD. The AERMET analysis included the use of both the AERMINUTE and AERSURFACE preprocessors. The AERMINUTE (version 14337) meteorological data processor was used to produce wind speed and direction data based on archived 1-minute ASOS data for input into AERMET Stage 2. A 0.5 m/s wind speed threshold was applied to the 1-minute ASOS derived wind speeds in AERMET. The latest version of AERSURFACE (version 13016) was used to summarize the Bowen ratio, albedo, and surface roughness values associated with each site's respective ASOS location. USGS NLCD 1992 land use data was used as input into AERSURFACE. AERSURFACE was run 6 times, once for average, wet and dry moisture conditions with and without snow cover. Representative files for each month were combined into 5 individual calendar years, and also into one file for a 5-year period to be used as input for AERMOD.

Surface meteorological data for the JB Tonkin Compressor Station was collected from the Allegheny County Airport (KAGC, WBAN 14762), located about 26.6 km to the southwest of the site. A 5-year wind rose for KAGC, shown in Figure 9.1.5-4, indicates that the prevailing wind is from the south and southwest directions. This surface data was prepared in conjunction with upper air data from the Pittsburgh International Airport (KPIT, WBAN 94823).

The Crayne Compressor Station was represented using surface meteorological data from the Wheeling Ohio County Airport (KHLG, WBAN 14894), which is located approximately 53 km to the northwest of the project site. A 5-year wind rose for KHLG, shown in Figure 9.1.5-5, indicates that the prevailing wind is from the southwest direction. This surface data was also prepared in conjunction with upper air data from the Pittsburgh International Airport (KPIT, WBAN 94823).

The Mockingbird Hill Compressor Station was represented using surface meteorological data from the North Central West Virginia Airport (KCKB, WBAN 03802), which is located approximately 47 km to the southeast of the project site. A 5-year wind rose for KCKB, shown in Figure 9.1.5-6, indicates that the prevailing wind is from the southwest direction. This surface data was also prepared in conjunction with upper air data from the Pittsburgh International Airport (KPIT, WBAN 94823).

Figure 9.1.5-4 5-Year Wind Rose for the Supply Header Project: JB Tonkin Compressor Station – Allegheny County Airport

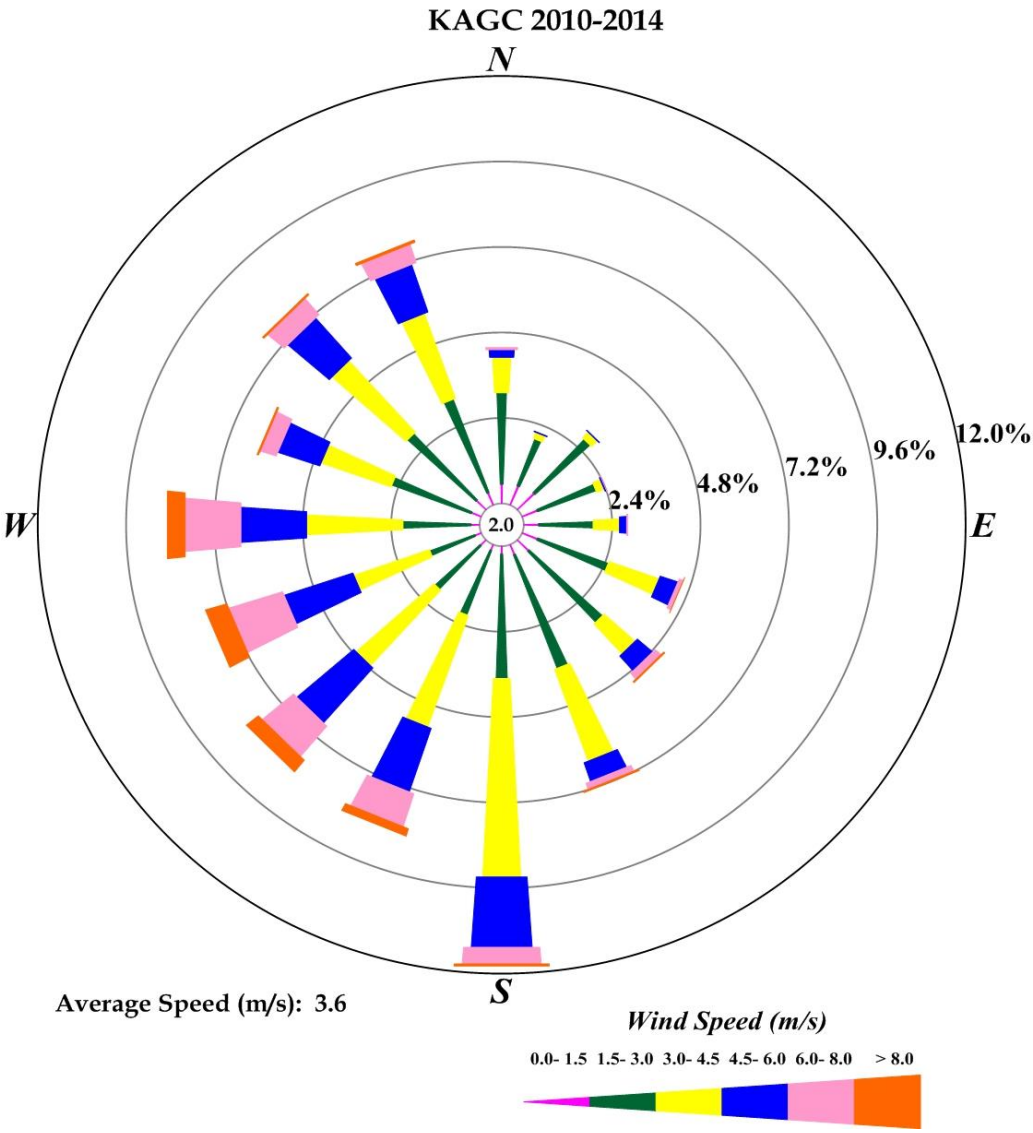


Figure 9.1.5-5 5-Year Wind Rose for the Supply Header Project: Crayne Compressor Station – Wheeling Ohio County Airport

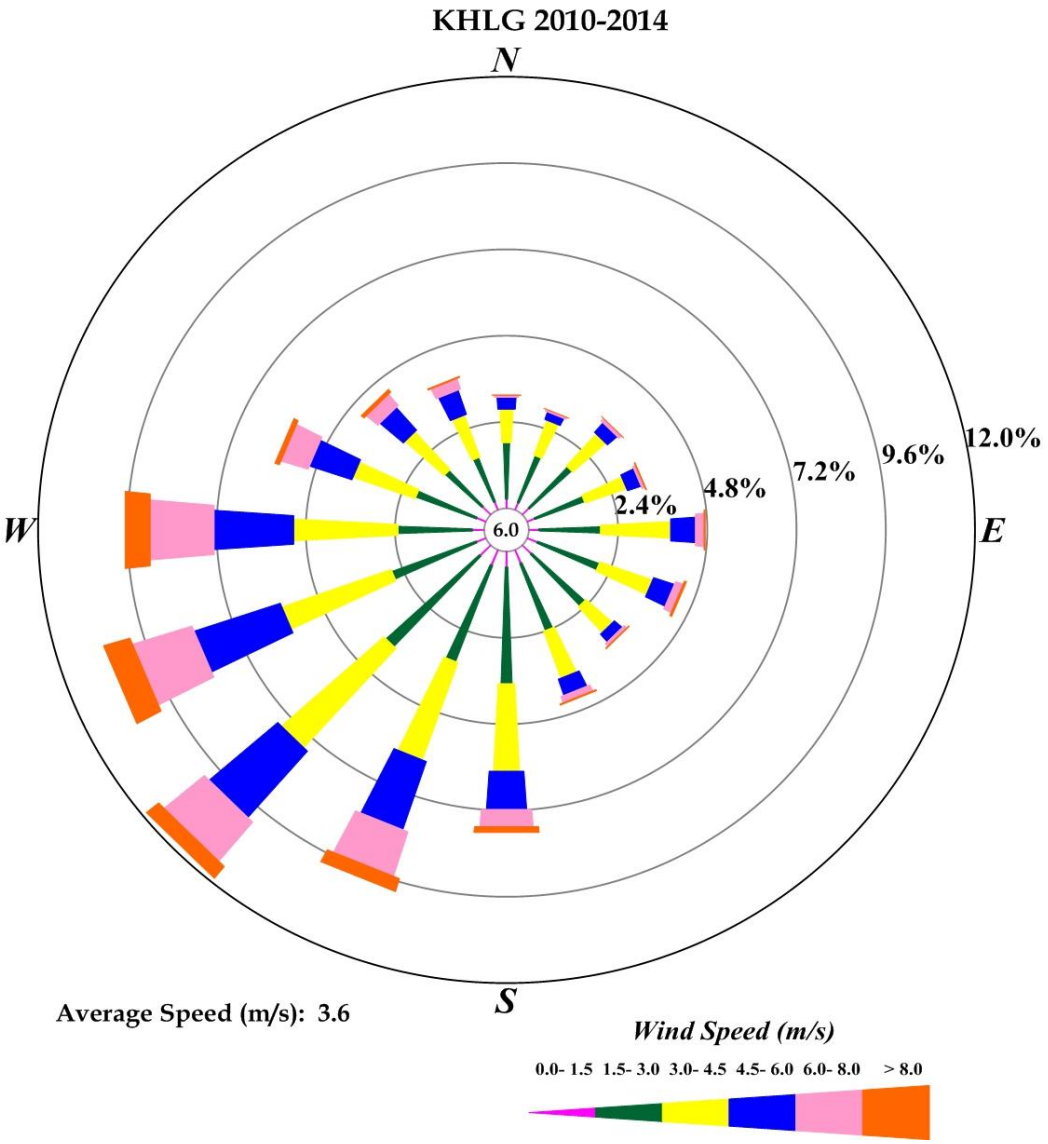
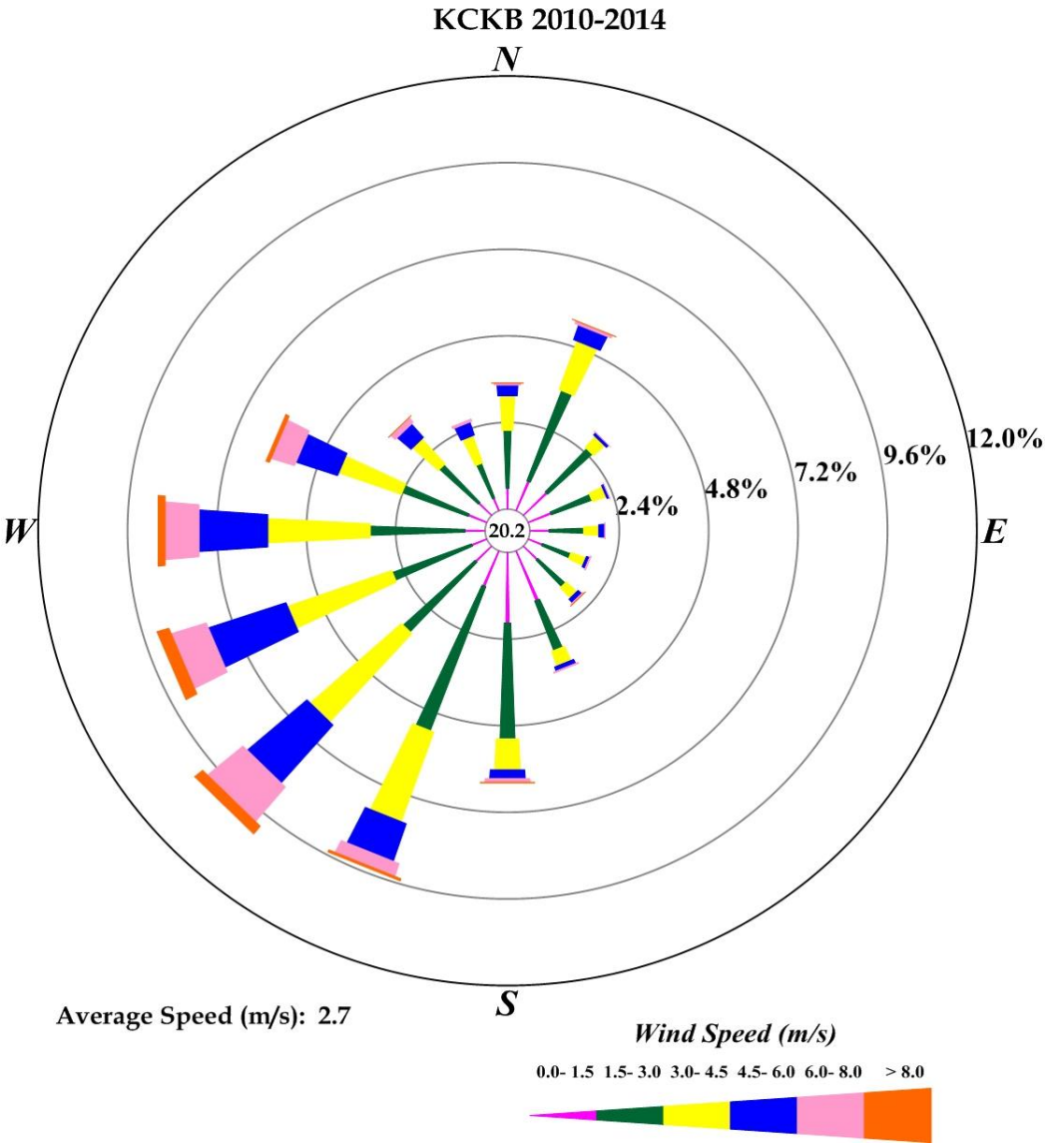


Figure 9.1.5-6 5-Year Wind Rose for the Supply Header Project: Mockingbird Hill Compressor Station – North Central West Virginia Airport



Background pollutant concentrations were estimated using existing ambient monitoring data for the region. The background monitors were determined based on proximity and general representativeness of the monitoring sites to each of the Supply Header compressor stations. The background concentrations that were selected were combined with the model results to be used in comparison to the NAAQS.

Background values for 1-hour NO_2 were determined using the third highest average background value over a three year period, between 2010-2013, averaged by season and hour of day. This method is in accordance with US EPA Guidance for incorporating background 1-hour NO_2. All other pollutants and averaging periods used the 2014 design value for the background concentrations, except for PM_{10} which used the maximum value over the 2012-2014 period. Table 9.1.5-12 summarizes the air quality data from the monitoring stations that were used for background concentrations.

TABLE 9.1.5-12

Summary of Background Concentrations for the Supply Header Project

Facility	Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$) [a]	Station ID	Station Location
JB Tonkin Compressor Station	NO_2 [b]	1-hour	Hourly/Seasonal	420031005	Natrona Heights, PA
		Annual	16.92	421250005	Charleroi, PA
	CO	1-hour	3091.5	420030008	Lawrenceville, PA
		8-hour	1603		
	$PM_{2.5}$	24-hour	22	420031008	Natrona Heights, PA
		Annual	10		
	PM_{10}	24-hour	43	420030003	Monroeville, PA
Crayne Compressor Station	NO_2	1-hour	Hourly/Seasonal	421250005	Charleroi, PA
		Annual	16.92		
	CO	1-hour	2862.5	421250005	Charleroi, PA
		8-hour	916		
	$PM_{2.5}$	24-hour	21	421250200	Washington, PA
		Annual	10		
	PM_{10}	24-hour	54	421250005	Charleroi, PA
Mockingbird Hill Compressor Station	NO_2	1-hour	Hourly/Seasonal	421250005	Charleroi, PA
		Annual	16.92		
	CO	1-hour	2862.5	421250005	Charleroi, PA
		8-hour	916		
	$PM_{2.5}$	24-hour	19	540490006	Fairmont, WV
		Annual	9.7		
	PM_{10}	24-hour	54	421250005	Charleroi, PA

[a] Background concentrations are the 2014 design values for all pollutants except for PM_{10}, which is the maximum value over the 2012-2014 period, and 1-hour NO_2. 1-hour NO_2, values were determined using the 3rd highest average background value over the 2010-2013 period, averaged by season and hour of day.

[b] JB Tonkin Compressor Station: 1-hour NO_2 background values are variable and are represented using the Natrona Heights, PA monitor, which is the closest NO_2 monitor to the site. However, a 2014 annual NO_2 design value is not available for this site, and so the next closest station with a 2014 annual design value is in Charleroi, PA.

A Discrete Cartesian receptor grid was used for each site in the modeling analysis. The receptor grids for the JB Tonkin and Crayne facilities were based upon:

- 50 meter spacing along the facility fenceline;
- 100 meter spacing from the fenceline out to 2.5 kilometers (km);
- 250 meter spacing from 2.5 km out to 5 km; and
- 500 meter spacing from 5km out to 10 km.

The receptor grid for Mockingbird Hill varies from the above receptor grid because the existing equipment covers a larger spatial extent over multiple property boundaries. The receptor grid used for the Mockingbird Hill analysis has a more thorough coverage for closer ranges, and was based upon:

- 50 meter spacing along the facility fenceline;
- 50 meter spacing from the fenceline out to 1.8 km;
- 100 meter spacing from 1.8 out to 2.5 km;
- 250 meter spacing from 2.5 km out to 4 km; and
- 500 meter spacing from 4 km out to 10 km.

Elevation data for all of the sources and receptors were created using the AERMAP (version 11103) terrain processor. NED terrain data available from the USGS at a 1/3-arc-second resolution (roughly 10 meters) was used as input into AERMAP.

Normal operations were modeled for all of the sources at each site. All of the equipment is being permitted to operate for up to 8760 hours a year, except for the emergency generators. The existing emergency generators are currently permitted to operate no more than 500 hours a year, while new emergency generators are expected to operate only 100 hours a year. This reduction of hours for the emergency generators is represented in the modeling analysis by using an annualized emission rate for NO_X and $PM_{2.5}/PM_{10}$. The short term emission rate is used to model CO for the emergency generators. A summary of the stack parameters and emissions information used to model the compressor stations is provided in Table 9.1.5-13 below.

The EPA's Building Profile Input Program (BPIP), Version 04274, was used to calculate downwash effects for the modeled emission sources. Building locations and heights relative to the modeled sources were determined as input into BPIP. A graphical representation of the building downwash analysis is presented in Figures 9.1.5-7 through 9.1.5-9.

The stack heights of all modeled sources do not exceed the greater of the GEP formula height calculated by BPIP or 65 m (213 feet).

TABLE 9.1.5-13

AERMOD Inputs: Stack Parameters and Source Information for the Supply Header Project

Facility	Source	Model ID	Stack Height (ft)	Exit Diameter (ft)	Exit Gas Velocity (ft/s)	Exit Gas Temperature (°F)	Pollutant Emission Rates		
							NO_x (lb/hr)	CO (lb/hr)	$PM_{2.5}/PM_{10}$ (lb/hr)
JB Tonkin Compressor Station	Cleaver Brooks Boiler	CLBL	21	1.00	66.6	350	0.33	0.28	0.02
	Waukesha Emergency Generator [a]	WAU0	18	0.5	378.8	400	0.07	0.21	0.00
	Cooper Engine	COO0	54	3	90.6	400	15.00	26.50	0.51
	Small Boiler Heater	SMBL	21	1	52.7	400	0.25	0.21	0.02
	Solar Taurus 70 Turbine [b]	CT01	70	7.5	52.6	750	3.41	2.99	1.92
	Solar Taurus 70 Turbine [b]	CT02	70	7.5	52.6	750	3.41	2.99	1.92
	Emergency Generator Caterpillar G3516 [bc]	NEGN	5	0.5	61.1	840	0.07	5.90	0.01
	Boiler [b]	NBLR	18	0.67	247.3	838	0.32	0.53	0.05
Crayne Compressor Station	Solar Taurus 60 Turbine (2004)	CT01	50	3.5	190.6	750	6.34	7.73	1.27
	Solar Taurus 60 Turbine (2004)	CT02	50	3.5	190.6	750	6.34	7.73	1.27
	Solar Taurus 60 Turbine (2014)	CT03	50	5	93.4	750	3.81	0.77	1.27
	4 Microturbines	MTUR	25	2.5	35.6	535	0.32	0.88	0.06
	Natural Gas Boiler	BOIL	25	1	52.7	400	0.25	0.21	0.02
	Solar Taurus 60 Turbine [b]	CT04	70	6.0	63.6	750	2.57	1.94	1.45
Mockingbird Hill Compressor Station	Solar Titan 130 Turbine [b]	TRB1	70	10.00	54.1	750	6.12	6.3	3.46
	Solar Titan 130 Turbine [b]	TRB2	70	10.00	54.1	750	6.12	6.3	3.46
	Boiler [b]	AUXB	28	0.67	247.4	838	0.35	0.59	0.054
	Emergency Generator Caterpillar G3516 [bc]	EGEN	8	0.5	61.1	840	0.071	5.9	0.006
	NG Emergency Generator Generac QT080 [a]	AUX6	5	0.5	61.1	840	0.066	20.57	0.001
	Compressor Engine CAT 3612	EN03	45	1	505.2	838	3.91	15.07	0.55
	Auxiliary Generator Cummins KTA19G [a]	AZ05	10	1	66.2	1286	0.10	1.76	0.005
	Boiler Bryan RV 450W-FDG	BLR5	18	0.67	247.4	838	0.47	0.40	0.060
	Solar Taurus 60 Turbine	TB02	50	4	145.9	900	5.12	6.24	2.69
	Capstone C60 Microturbines / Auxiliary Generator	AXG2	12	0.67	247.4	725	0.03	0.08	0.03
	Capstone C60 Microturbines / Auxiliary Generator	AXG3	12	0.67	247.4	725	0.03	0.08	0.03
	Capstone C60 Microturbines / Auxiliary Generator	AXG4	12	0.67	247.4	725	0.03	0.08	0.03
	Boiler	BLR2	18	0.67	247.4	838	0.46	0.18	0.04
	Reciprocating Engine Cooper GMXE-6 Replacement	EN01	25	1.44	45.7	574	1.19	2.39	0.009
	Reciprocating Engine Cooper GMXE-6 Replacement	EN02	25	1.44	45.7	574	1.19	2.39	0.009
	Dehydration Unit Flare	DEHY	17	0.67	33.1	950	0.30	1.62	0.030
	Heater Natco 96x30	HTR1	24	2	42.4	725	1	0.84	0.080

[a] NO_2 and $PM_{2.5}/PM_{10}$ Emission rates for the emergency generator are annualized rates assuming 500 hrs/yr
[b] New/Proposed equipment; all other equipment is existing
[c] NO_2 and $PM_{2.5}/PM_{10}$ Emission rates for the emergency generator are annualized rates assuming 100 hrs/yr

Figure 9.1.5-7 Building Profile for the Supply Header Project: JB Tonkin Compressor Station

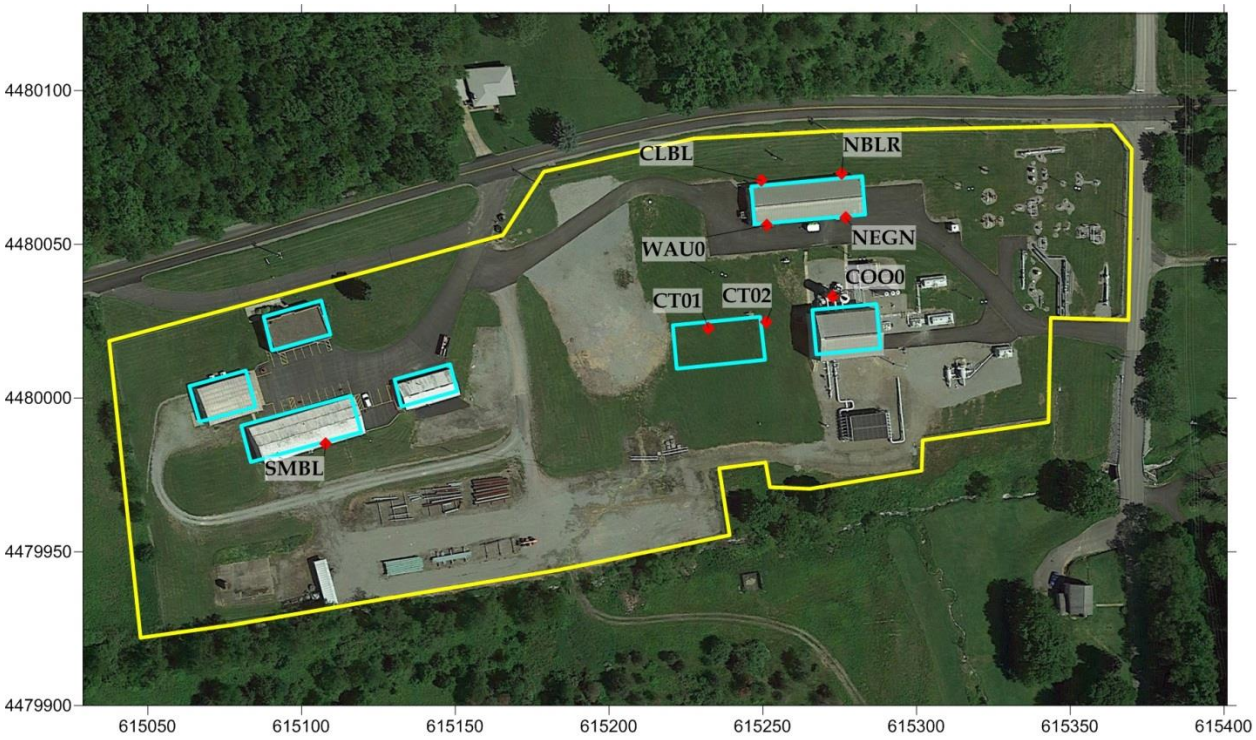


Figure 9.1.5-8 Building Profile for the Supply Header Project: Crayne Compressor Station

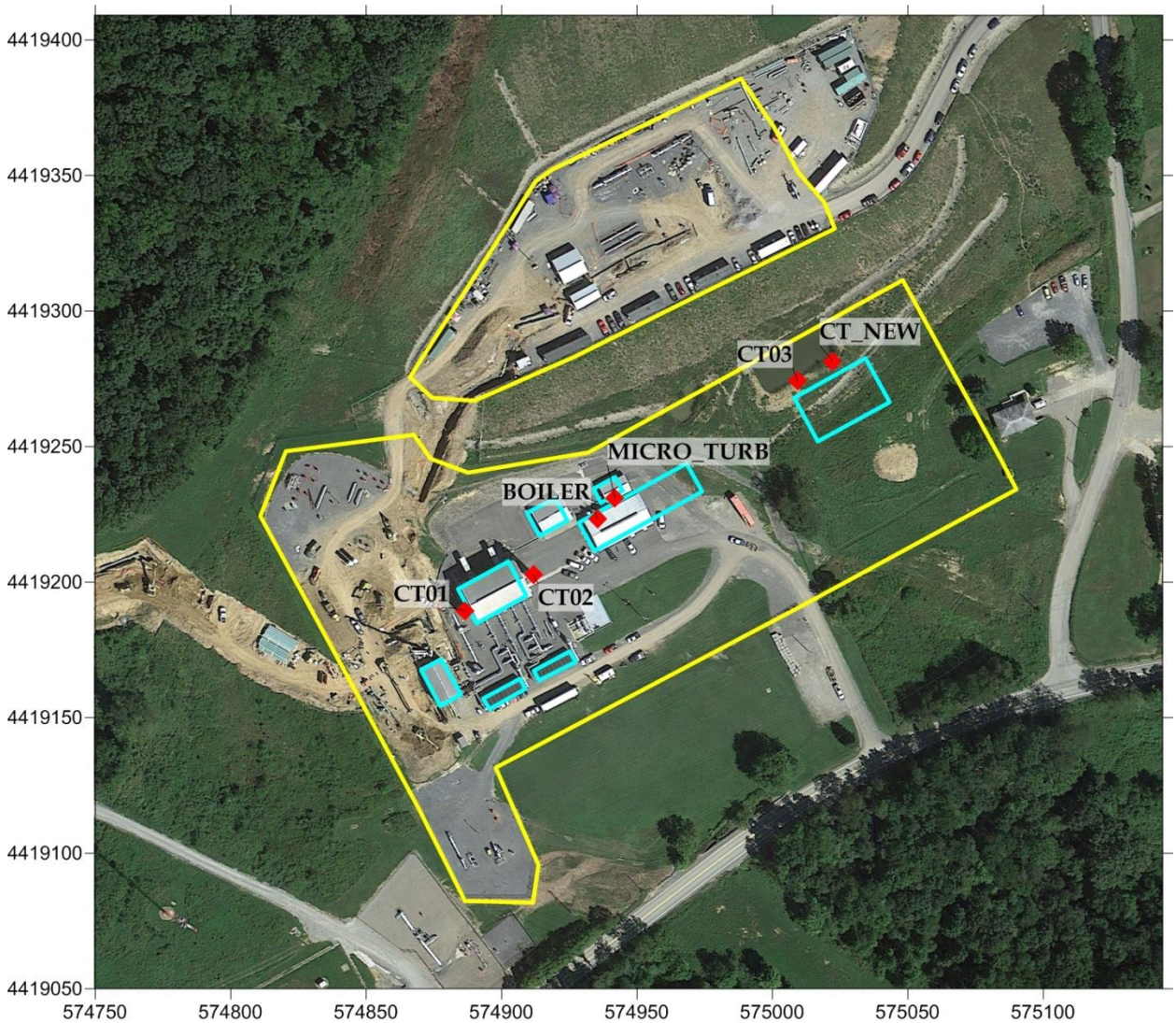
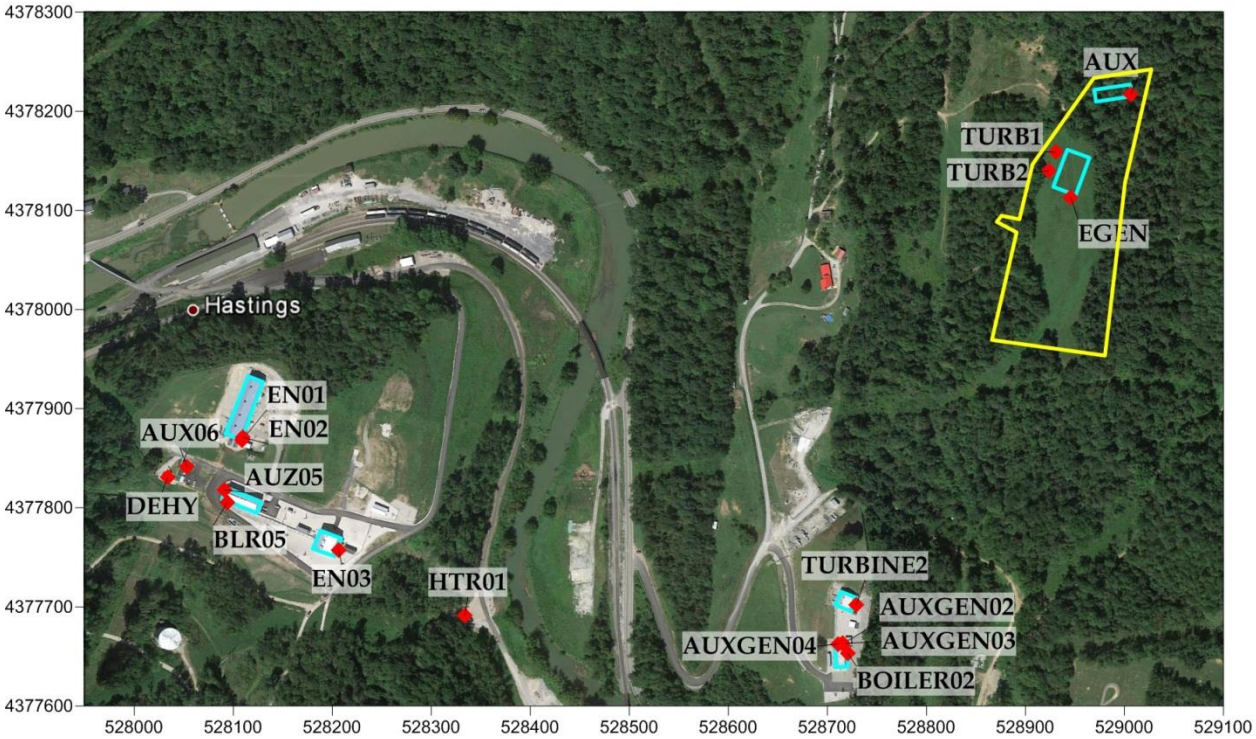


Figure 9.1.5-9 Building Profile for the Supply Header Project: Mockingbird Hill Compressor Station



The results of the modeling analysis for the Supply Header Project are provided below in Table 9.1.5-14. The Tier II ARM method was used to calculate modeled NO_2 concentrations, which assumes that 80 percent of NOx emissions will be converted into NO_2 for the 1-hour averaging period, while 75 percent will be converted for the annual averaging period.

TABLE 9.1.5-14

Air Quality Model Results for the Supply Header Project

Facility	Pollutant	Averaging Period	Background Concentration ($\mu g/m^3$) [a]	Model Result ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Background + Model Concentration ($\mu g/m^3$)
JB Tonkin Compressor Station	NO_2 [b]	1-hour	Hourly/Seasonal	117.5	188	166.5
		Annual	16.92	6.6	100	23.6
	CO	1-hour	3091.5	3223	40000	6314
		8-hour	1603	1844	10305	3447
	$PM_{2.5}$	24-hour	22	2.3	35	24.4
		Annual	10	0.5	12	10.5
	PM_{10}	24-hour	43	3.0	150	46.1
Crayne Compressor Station	NO_2	1-hour	Hourly/Seasonal	45.5	188	90.0
		Annual	16.92	2.3	100	19.2
	CO	1-hour	2862.5	106.4	40000	2969
		8-hour	916	50.1	10305	966
	$PM_{2.5}$	24-hour	21	1.5	35	22.6
		Annual	10	0.3	12	10.3
	PM_{10}	24-hour	54	2.7	150	56.7
Mockingbird Hill Compressor Station	NO_2	1-hour	Hourly/Seasonal	117.1	188	164.2
		Annual	16.92	13.3	100	30.2
	CO	1-hour	2862.5	7536	40000	10398
		8-hour	916	4623	10305	5539
	$PM_{2.5}$	24-hour	19	5.1	35	24.9
		Annual	9.7	1.2	12	11.1
	PM_{10}	24-hour	54	7.6	150	63.0

[a] Background concentrations are the 2014 design values for all pollutants except for PM_{10}, which is the maximum value over the 2012-2014 period, and 1-hour NO_2. 1-hour NO_2, values were determined using the 3rd highest average background value over the 2010-2013 period, averaged by season and hour of day.

[b] JB Tonkin Compressor Station: 1-hour NO_2 background values are variable and are represented using the Natrona Heights, PA monitor, which is the closest NO_2 monitor to the site. However, a 2014 annual NO_2 design value is not available for this site, and so the next closest station with a 2014 annual design value is in Charleroi, PA.

When combined with ambient background concentrations, none of the pollutants modeled in this analysis exceed their respective NAAQS. Therefore, the air quality model results indicate that emissions from the proposed SHP compressor stations will not cause or contribute to violations of the NAAQS.

It is noted that the Mockingbird Hill facility changes are being permitted as a PSD project due to a significant emission rate increase (>10 tons per year of $PM_{2.5}$ and > 15 tons per year of PM_{10}) from the combined Mockingbird Hill, Lewis Wetzel, and Hastings Compression facilities, which collectively are an existing major source under the PSD program. As such, the air permit

application provides additional details on the modeling completed as part of the PSD permitting process.

9.1.5.10 Air Permit Applications

As summarized in Table 9.1.5-15, applications are being submitted to the PADEP, the West Virginia Department of Environmental Protection, the Virginia Department of Environmental Quality, and the North Carolina Department of Environment and Natural Resources. Permit applications to each State/Commonwealth will be inclusive of emissions sources and the associated activities required to be permitted at each compressor station.

TABLE 9.1.5-15

Permit Application Timeline for the Atlantic Coast Pipeline and Supply Header Project

State/Commonwealth Agency	Expected Date of Submittal	Additional Coordination
Pennsylvania Department of Environmental Protection	September 2015	
West Virginia Department of Environmental Protection	September 2015	EPA Review (PSD)
Virginia Department of Environmental Quality	September 2015	
North Carolina Department of Environmental and Natural Resources	September 2015	

9.2 NOISE QUALITY

In general, the operation of the new and modified compressor stations and proposed new M&R stations for the ACP and SHP will result in an increase in noise levels in the vicinity of the respective stations over the life of the facilities. In addition, the installation of the new pipeline and other related construction activities, including horizontal directional drilling (HDD), will result in short-term increases in noise in the vicinity of those activities.

9.2.1 Regulatory Requirements for Noise

9.2.1.1 Federal Noise Regulations

FERC sound guidelines/requirements and certificate conditions require that the sound attributable to a new compressor station not exceed a day-night equivalent sound level (L_{dn}) of 55 decibels on the A-weighted scale (dBA) at any nearby noise-sensitive area (NSA). In addition, FERC guidelines typically require that the operation of a new compressor station or operation of a station after modifications should not result in a perceptible increase in vibration at a nearby NSA. A sound level of 55 dBA (L_{dn}) can be used as a “benchmark sound criterion/guideline” for assessing the noise impact of temporary or intermittent noise such as construction noise or a blowdown event.

For the compressor station modifications associated with the SHP, the FERC certificate conditions requires that the sound level, after modifications are performed, should not exceed the sound level produced by the existing compressor station at any nearby NSA in which the station sound level contribution is above 55 dBA (L_{dn}). If the existing compressor station sound level contribution at any nearby NSA is equal to or lower than 55 dBA (L_{dn}), the sound level attributable to the existing compressor station, after the modifications, should not exceed 55 dBA (L_{dn}).

9.2.1.2 State/Commonwealth Noise Regulations

Based on a review of the information published on the applicable State/Commonwealth agency websites, there are no numerical State/Commonwealth-specific noise regulations for Pennsylvania, West Virginia, Virginia, or North Carolina.

9.2.1.3 Local Noise Regulations

Pennsylvania

There are no numerical local noise regulations in the two affected Counties in Pennsylvania (Westmoreland and Greene Counties).

West Virginia

There are no numerical local noise regulations in the five affected Counties in West Virginia (Harrison, Doddridge, Tyler, Wetzel, and Marshall Counties).

Virginia

Except for Nelson County, none of the other affected Counties (Highland, Augusta, Buckingham, Cumberland, Prince Edward, Nottoway, Dinwiddie, Brunswick, Greensville, and Southampton Counties) or Cities (City of Suffolk and City of Chesapeake) in Virginia has numerical local noise regulations. A few of the Counties and Cities have ordinances that prohibit audible noise at certain distances from dwelling structures but numerical limits were not provided.

In Nelson County, maximum permissible sound levels in residential areas are 65 decibels (dB) during the daytime (7:00 a.m. to 10:00 p.m.) and 55 dB at nighttime (10:00 p.m. to 7:00 a.m.) (Sec. 8-35. Ord. of 6-30-05).

North Carolina

Except for Halifax and Cumberland Counties, none of the other affected Counties (Northampton, Nash, Wilson, Johnston, Sampson, and Robeson Counties) in North Carolina have numerical local noise regulations.

In Halifax County, sound levels of 55 dB during the daytime (7:00 a.m. to 11:00 p.m.) and 50 dB at nighttime (11:00 p.m. to 7:00 a.m.) are not permissible in residential areas **(**Sec. 30-30, Res. of 11-4-13, § 30-35).

Cumberland County established maximum permissible sound levels 60 dB during the daytime (6:00 a.m. to 10:00 p.m.) and 55 dB at nighttime (10:00 p.m. to 6:00 a.m.) for more than 5 minutes in residential areas or 10 percent of the sound level measurements, at five-second intervals during a measurement period of at least ten minutes, taken at or beyond the property boundary of the land use from which the sound emanates. Any source of sound that is the subject of a specific exemption or special permit shall not be permitted to exceed ambient sound levels by more than 15 dB (Sec. 9.5-24, Ord. of 6-1-98).

9.2.2 Existing Noise Conditions

To assess potential noise impacts resulting from construction and operation of the proposed facilities, Atlantic and DTI conducted ambient sound surveys at the new and modified compressor station sites, new M&R station sites, and HDD sites. The results of the ambient noise surveys are described in the following sections. Copies of the Preconstruction Noise Surveys and Acoustical Analysis Reports are included as Appendix 9B.

9.2.3 Construction Noise Impacts

Construction activities for the ACP and SHP sites will be performed with standard heavy equipment such as a track-excavator, backhoe, bulldozers, dump truck(s), and concrete trucks. Many construction machines operate intermittently and the type of machines in use at a construction site changes with the construction phase. Construction of the Projects may result in short-term, temporary acoustical impacts to NSAs due to earthwork (e.g., site grading) and installation of the proposed facilities. On a day-to-day basis, construction activities will typically occur 10 hours per day, six days per week. Activities on the pipeline rights-of-way will mostly occur between the hours of 6 a.m. and 6 p.m.; however, there may be situations where construction will occur 24-hours per day, seven days per week (e.g., on HDDs, stream crossings, hydrostatic testing, and final tie-in welds). Aboveground facility construction activities will most likely occur between the hours of 6 a.m. and 10 p.m. Twenty-four hour construction also may occur at aboveground facilities if schedule and/or weather conditions dictate. Nighttime construction activities at aboveground facilities will likely be limited to work inside station buildings, such as electrical, controls, etc. Of all the nighttime construction activities indicated above, HDD activities associated with pipeline construction are expected to generate the most noise, particularly at the HDD entry point where the drilling rig and engine-driven hydraulic power unit would be located. Noise impacts and recommended mitigation measures of the planned 24-hour HDD drilling operations at nearby NSAs are described below.

Horizontal Directional Drilling

Atlantic is planning to provide noise studies in locations where HDD activities will occur by Winter 2015, subject to access approvals.

9.2.4 Operational Noise Impacts

Atlantic and DTI will incorporate noise control measures and equipment sound specifications into the design plans for the proposed aboveground facilities to minimize noise impacts on nearby NSAs. A detailed summary of the operational noise impacts at the ACP and SHP aboveground facilities is described in this section.

9.2.4.1 Atlantic Coast Pipeline

Compressor Station Facilities

The acoustical analysis for the new compressor stations considers the noise that will be produced by all continuously operating equipment at the stations that could impact the sound contribution at the nearby NSAs. For the analysis, the sound contribution of each station at the

closest NSAs is estimated along with the total noise at the nearby NSAs (i.e., estimated sound level contribution of the station plus the measured ambient noise level) and noise mitigation measures required to achieve the predicted noise levels at NSAs.

Compressor Station 1

The proposed Compressor Station 1 is located in Lewis County, West Virginia and includes four turbine compressor units that would be located in two acoustically insulated compressor buildings (two compressor units in each compressor building), associated aboveground piping, and other aboveground facilities such as gas cooler, lube oil cooler, etc. Four ultrasonic meters will be located in an acoustically insulated measurement building approximately 200 feet northeast of the compressor buildings. The land uses surrounding the station are residential, agricultural, industrial, and forested areas. The DTI Lightburn Compressor Station and Extraction Plant are located approximately one mile southeast of the proposed compressor station. Ten NSAs (S1 to S10; all residences) were identified within 0.5-mile of the station. A plot plan drawing showing surrounding NSAs within 0.5-mile of the station is provided in the Marts Compressor Station Noise Study (see Appendix 9B).

Proposed Compressor Station Equipment

The plot plan drawing provided in the proposed Marts Compressor Station Noise Study (see Appendix 9B) provides an area layout of the locations of the planned compressor buildings and equipment. This proposed compressor station will consist of the installation of four turbine compressor units (one Solar Titan Model 130S, one Solar Mars Model 100S, one Taurus Model 70S, and one Taurus Model 60S) and a measurement station with noise control materials installed. Installation of the four new gas-driven turbines will provide a total of 55,015 hp of compression.

The following describes auxiliary equipment associated with the proposed compressor station (i.e., four new gas-driven turbines and measurement station):

- turbine exhaust systems designed with an adequate exhaust muffler system;
- turbine air intake filter (air cleaner) system designed with an adequate intake silencer;
- turbine air intake ducts designed with adequate acoustical insulation;
- aboveground gas piping associated with the new compressor units designed with adequate acoustical insulation;
- compressor buildings ventilation systems (air handling units and ventilation air inlet and discharge openings) designed with adequate muffler systems;
- measurement building ventilation systems designed with adequate inlet acoustic louvers and passive ridge vents;
- outdoor lube oil cooler that serves each turbine and compressor;
- gas coolers for the new compressor units; and
- unit blowdown silencer for the new units.

Existing and Baseline Sound Contribution

Sound survey measurements were conducted at the property lines and nearest NSAs on February 5, 2015. The weather conditions during the daytime measurements were a temperature of 26 ˚F decreasing to 22 ˚F, a relative humidity of 45 percent increasing to 60 percent, partly cloudy skies and light west winds (1 to 6 miles per hour [mph]). During nighttime measurements, the weather conditions were a temperature of 11 ˚F decreasing to 9 ˚F, a relative humidity of 50 percent decreasing to 45 percent, clear skies and calm winds. Audible sound sources observed during the daytime measurement period (ambient sound sources) were birds, aircraft, dogs barking, water flowing in creeks and roadside ditches, wind blowing through trees, traffic on County Highways 35/10 and 37/7 and Hollick Run Road, water dripping off houses, the DTI Lightburn Compressor Station, horses neighing at S7, and a cat meowing at S10. During the nighttime, audible ambient sound sources were aircraft , water flowing in creeks and roadside ditches, traffic on County Highways 35/10 and 35/7 and Hollick Run Road, and the DTI Lightburn Compressor Station.

Table 9.2.4-1 summarizes the existing or ambient sound levels at the nearest NSAs and property lines prior to construction of the Compressor Station 1. The existing L_{dn} sound levels ranged from 37.5 dBA at S2 to 50 dBA at S7. The existing ambient L_{dn} levels at the three property lines (P1, P2, and P3) ranged from 39.5 to 42.1 dBA. Existing ambient sound levels at the nearest NSAs and property lines are below the FERC L_{dn} limit of 55 dBA.

TABLE 9.2.4-1

Compressor Station 1 – Existing Ambient Sound Levels Prior to Station Construction

Property Line, and Closest NSAs (Residences)	Distance and Direction to the Compressor Station	Existing Sound Level Prior to Station Construction (dBA)		
		Measured $L_{eq(d)}$	Measured $L_{eq(n)}$	Calculated L_{dn}
P1. Property Line	2,000 feet N	41.3	30.6	41.1
P2. Property Line	1,500 feet E	39.3	34.6	42.1
P3. Property Line	950 feet SE	35.1	32.7	39.5
S1. Residence	3,600 feet NNW	40.0	31.3	40.5
S2. Residence	3,000 feet NNW	38.0	38.0	44.4
S3. Residence	1,800 feet N	38.2	31.3	39.6
S4. Residence	2,000 feet NNE	38.6	32.8	40.7
S5. Residence	2,300 feet ENE	43.3	32.9	43.2
S6. Residence	1,900 feet E	38.4	33.6	41.1
S7. Residence	1,900 feet ESE	37.9	44.1	50.0
S8. Residence	1,000 feet SSE	36.6	30.7	38.6
S9. Residence	2,800 feet SSW	36.4	31.0	38.7
S10. Residence	2,900 feet SW	31.7	31.5	37.9

NSAs = noise sensitive areas, dBA = A-weighted sound level, $L_{eq(d)}$ = daytime equivalent sound levels, $L_{eq(n)}$ = nighttime equivalent sound levels, L_{dn} = day-night sound levels, N= north, E = east, SE = southeast, NNW = north-northwest, NNE = north-northeast, ENE = east-northeast, ESE = east-southeast, SSE = south-southeast, SSW = south-southwest, and SW = south west.

Compressor Station Noise Impact Evaluation

The acoustical analysis considers the noise that will be produced by continuous-operating equipment at the facility that could affect the sound contribution at the closest NSAs (S1 to S10). The results of the acoustical analysis for the four new turbine compressor units and measurement station at Compressor Station 1, including a description of the acoustical analysis methodology and source of sound data, is provided in the Marts Compressor Station Noise Study (see Appendix 9B).

The following sound sources for the four new turbine compressor units and measurement station were considered to have the most noise contribution, as included in the acoustical analysis of the ACP aboveground facilities:

- noise generated by the turbines/compressors that penetrates the new compressor buildings;
- turbine exhaust noise (primary noise source that could generate perceptible vibration);
- noise radiated from turbine exhaust pipes;
- noise generated by the turbine air intake system;
- noise generated by each compressor building wall ventilation air inlet openings and air handling units;
- noise generated from each compressor building roof ventilation air discharge openings;
- noise generated from the outdoor lube oil coolers;
- noise generated from the outdoor gas coolers;
- noise radiated from aboveground gas piping and related piping components;
- noise generated by the ultrasonic meters that penetrate the new measurement building;
- noise generated by the measurement building ventilation air inlet louvres; and
- noise generated from emergency and routine maintenance blowdown events.

Table 9.2.4-2 provides an estimated summary of the noise quality analysis for Compressor Station 1, assuming operation of the facility at full load. The table includes the predicted L_{dn} sound levels from the four proposed gas turbine compressor units and measurement station; predicted total L_{dn} sound levels resulting from summing the L_{dn} sound levels from the compressor station with the existing ambient L_{dn} sound levels; and predicted noise increase from existing ambient L_{dn} sound levels.

TABLE 9.2.4-2

Compressor Station 1 – Noise Quality Analysis Associated with ACP Project

Property Line, and Closest NSAs (Residences)	Distance and Direction to the Compressor Station	Existing Ambient Sound Level Prior to Station Construction (dBA)			Predicted L_{dn} from the Four Gas Turbine Compressor Units and Measurement Station (dBA)	Predicted Total L_{dn} (Compressor Units and Measurement Station + Existing Ambient L_{dn}) (dBA)	Predicted Noise Increase from Existing Ambient L_{dn} (dBA)
		Measured $L_{eq(d)}$	Measured $L_{eq(n)}$	Calculated L_{dn}			
P1. Property Line	2,000 feet N	41.3	30.6	41.1	38.4	42.9	0.2
P2. Property Line	1,500 feet E	39.3	34.6	42.1	42.4	45.3	3.2
P3. Property Line	950 feet SE	35.1	32.7	39.5	47.4	48.1	8.6
S1. Residence	3,600 feet NNW	40.0	31.3	40.5	31.4	41.0	0.5
S2. Residence	3,000 feet NNW	38.0	38.0	44.4	34.4	39.2	1.7
S3. Residence	1,800 feet N	38.2	31.3	39.6	40.4	43.0	3.4
S4. Residence	2,000 feet NNE	38.6	32.8	40.7	38.4	42.7	2.0
S5. Residence	2,300 feet ENE	43.3	32.9	43.2	37.4	44.2	1.0
S6. Residence	1,900 feet E	38.4	33.6	41.1	39.4	43.3	2.2
S7. Residence	1,900 feet ESE	37.9	44.1	50.0	39.4	50.4	0.4
S8. Residence	1,000 feet SSE	36.6	30.7	38.6	46.4	47.1	8.5
S9. Residence	2,800 feet SSW	36.4	31.0	38.7	35.4	40.4	1.7
S10. Residence	2,900 feet SW	31.7	31.5	37.9	35.4	39.9	2.0

NSAs = noise sensitive areas, dBA = A-weighted sound level, $L_{eq(d)}$ = daytime equivalent sound levels, $L_{eq(n)}$ = nighttime equivalent sound levels, L_{dn} = day-night sound levels, N= north, E = east, SE = southeast, NNW = north-northwest, NNE = north-northeast, ENE = east-northeast, ESE = east-southeast, SSE = south-southeast, SSW = south-southwest, and SW = south west.

The results of the acoustical analysis indicates that the continuous sound attributable to the four proposed turbine compressor units operating at full rated load and the measurement station will be lower than the FERC L_{dn} limit of 55 dBA at all identified NSAs (S1 to S10) around the site, provided the specified noise control measures (summarized below) are successfully implemented. The predicted L_{dn} at the nearest NSA (S8 – approximately 1,000 feet from the four turbine compressor units and measurement station) is 46.4 with a predicted noise increase of 8.5 dBA from existing L_{dn} levels. For the remaining NSAs located at greater distances from the four turbine compressor units and measurement station, the predicted L_{dn} sound levels are lower. The results of the acoustical analysis also indicates that the sum of the L_{dn} sound levels from the four turbine compressor units and measurement station and existing ambient L_{dn} sound levels are below the FERC limit at all NSAs.

The specified noise control measures for the four turbine compressor units and measurement station are provided in the Marts Compressor Station Noise Study (see Appendix 9B) and summarized in the following sub-sections. Because noise sources that could cause perceptible vibration will also be adequately mitigated, there should not be a perceptible increase in vibration at NSAs during operation of the compressor station.

The noise level of the unit blowdown event via a blowdown silencer will be specified to meet a maximum A-wt. sound level of 60 dBA at 50 feet. The maximum sound level of a blowdown event associated with the new unit will be approximately 34 dBA at the closest NSA,

located approximately 1,000 feet from the blowdown silencer. Controlling noise levels of the unit blowdown at the closest NSA would ultimately control noise levels at NSAs located further away. Consequently, although the noise of a unit blowdown event could be slightly audible at the nearby NSAs, it is not expected to present a noise impact. In addition, a unit blowdown event occurs infrequently and for a short time frame (e.g., 1 to 5 minute period), which would further reduce potential impacts.

Noise Control Measures and Specifications for the Four Proposed Turbine Compressor Units and Measurement Station

The following provides recommended noise control measures and equipment sound specifications for major noise sources at the proposed Compressor Station 1.

Turbine Exhaust System

The turbine exhaust system for the four proposed compressor units will include a silencer system that provides the following dynamic sound insertion loss (DIL) values, which will also be adequate for minimizing perceptible increases in vibration due to this noise source. The exhaust pipes of the four proposed turbine units will be acoustically insulated from the compressor building wall to the muffler flanges (including expansion joints). DIL values for the turbine exhaust muffler and exhaust pipe acoustic insulation are provided in Table 9.2.4-3.

TABLE 9.2.4-3

DIL Values for the Turbine Exhaust Muffler and Pipe Acoustic Insulation in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Exhaust Muffler									
Turbine Exhaust - Solar Titan Model 130S and Solar Mars Model 100S	13 dB	24 dB	31 dB	41 dB	49 dB	46 dB	42 dB	33 dB	24 dB
Turbine Exhaust - Solar Taurus Model 70S and Solar Taurus Model 60S	13 dB	22 dB	29 dB	41 dB	51 dB	46 dB	39 dB	32 dB	25 dB
Exhaust Pipe Acoustic Insulation									
Turbine Exhaust - Solar Titan Model 130S, Solar Mars Model 100S, Solar Taurus Model 70S, and Solar Taurus Model 60S	0 dB	0 dB	0 dB	0 dB	5 dB	10 dB	25 dB	25 dB	20 dB

Notes:
dB = decibel
DIL= dynamic sound insertion loss
Hz = Hertz

Turbine Air Intake System

The Solar Titan Model 130S turbine air intake system will be designed with an air cleaner/silencers, and the air intake ducts will be acoustically insulated from the compressor building wall to the air cleaner housings (including expansion joints). DIL values for the air intake cleaner/silence and duct acoustic insulation are provided in Table 9.2.4-4.

TABLE 9.2.4-4

DIL Values for the Turbine Air Intake Cleaner/Silencer and Duct Acoustic Insulation in dB per Octave-Band Center Frequency in Hz

Noise Control Source	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Air Intake Cleaner/Silencer									
Turbine Exhaust - Solar Titan Model 130S	5 dB	18 dB	33 dB	41 dB	46 dB	50 dB	57 dB	88 dB	81 dB
Turbine Exhaust - Solar Mars Model 100S	5 dB	18 dB	33 dB	41 dB	46 dB	50 dB	57 dB	87 dB	80 Db
Turbine Exhaust – Solar Taurus Model 70S and Solar Taurus Model 60S	3 dB	15 dB	31 dB	40 dB	49 dB	50 dB	52 dB	80 dB	78 dB
Air Intake Duct Acoustic Insulation									
Turbine Exhaust - Solar Titan Model 130S, Solar Mars Model 100S, Solar Taurus Model 70S, and Solar Taurus Model 60S	0 dB	0 dB	0 dB	6 dB	12 dB	20 dB	26 dB	26 dB	22 dB

Notes:
dB = decibel
DIL= dynamic sound insertion loss
Hz = Hertz

Compressor Building

The turbine and compressor associated with the four new units will be installed in two compressor buildings (two units per building) with the following sound attenuation measures:

- At a minimum, the walls and roof panels of the two proposed compressor buildings will be constructed with a Sound Transmission Class (STC) of 49 and a Noise Reduction Coefficient (NRC) of 0.90. In addition, these panels will have minimum TL values as provided in Table 9.2.4-5.

TABLE 9.2.4-5

Compressor Building Wall and Roof Panel Minimum TL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Marts Station Compressor Buildings	9 dB	15 dB	22 dB	38 dB	46 dB	48 dB	52 dB	53 dB	54 dB

Notes:
dB = decibel
TL = transmission loss
Hz = Hertz

- The personnel doors of the two proposed compressor buildings will be insulated, metal doors with full weather-stripping. At a minimum, the STC rating of these doors will be 38. Windows in these doors, if present, will be double glazed using minimum 0.25 inch thick glass or acrylic panels separated by a minimum 0.5 inch airspace.

- The equipment doors of the two proposed compressor buildings will be an insulated metal door with full weather-stripping.
- The two proposed compressor buildings will have a ventilation system installed to provide adequate cooling of the building to allow full load operation of the four proposed turbine compressor units with all doors closed.
- The ventilation systems of the two compressor buildings will have a maximum of six air handling units. The maximum A-weighted sound level from each air handling unit will not exceed 70 dBA at 3 feet when measured outside of each air handling unit in all directions with maximum octave band sound pressure levels as provided in Table 9.2.4-6.

TABLE 9.2.4-6

Air Handling Unit Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Marts Station Compressor Buildings	92 dB	89 dB	79 dB	71 dB	64 dB	60 dB	55 dB	54 dB	54 dB

Notes:
dB = decibel
Hz = Hertz

- Ventilation air inlet mufflers will be located in the air paths between the air handling units and the compressor building wall penetrations to reduce the sound from the proposed turbine compressor units that escapes through these openings. Each ventilation air inlet muffler will have minimum DIL as provided in Table 9.2.4-7.

TABLE 9..2.1-7

Ventilation Air Inlet Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Marts Station Compressor Buildings	4 dB	12 dB	20 dB	23 dB	42 dB	48 dB	45 dB	38 dB	21 dB

Notes:
dB = decibel
DIL = dynamic insertion loss
Hz = Hertz

- The ventilation systems of the two compressor buildings will have a maximum of eight wall inlet fans. The maximum A-weighted sound level from each wall air inlet fan will not exceed 90 dBA at 3 feet when measured inside the compressor building without the proposed turbine compressor units operating with maximum octave band sound pressure levels as provided in Table 9.2.4-8

TABLE 9.2.4-8

Wall Air Inlet Fan Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Marts Station Compressor Buildings	99 dB	97 dB	95 dB	90 dB	86 dB	84 dB	82 dB	80 dB	77 dB

Notes:
dB = decibel
Hz = Hertz

- The ventilation systems of the two compressor buildings will have a total of twelve roof air discharge hoods with a maximum total area of 363 square feet. Ventilation air discharge mufflers will be located above the roof and under each roof air discharge hood to reduce the sound from the proposed turbine compressor units that escapes through these openings. Each ventilation air discharge muffler will have minimum DIL values as provided in Table 9.2.4-9.

TABLE 9.2.4-9

Ventilation Air Discharge Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Marts Station Compressor Buildings	3 dB	9 dB	17 dB	25 dB	39 dB	46 dB	45 dB	40 dB	25 dB

Notes:
dB = decibel
DIL = dynamic insertion loss
Hz = Hertz

Lube Oil Cooler

The maximum noise from the lube oil cooler for each turbine compressor unit will not exceed an A-weighted sound pressure level of 50 dBA at 50 feet from the centerline of the cooler with all fans running at maximum speed. Each lube oil cooler (including all fans, motors, and drivers) will have maximum octave band sound pressure levels as provided in Table 9.2.4-10.

TABLE 9.2.4-10

Lube Oil Cooler Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Lube Oil Cooler	54 dB	61 dB	58 dB	51 dB	46 dB	43 dB	39 dB	35 dB	30 dB

Notes:
dB = decibel
Hz = Hertz

Gas Cooler

The maximum noise from the gas cooler for each turbine compressor unit will not exceed an A-weighted sound power level of 87 dBA with all fans running at maximum speed. Each gas cooler (including all fans, motors, and drives) will have maximum octave band sound power levels as provided in Table 9.2.4-11.

TABLE 9.2.4-11

Compressor Unit Gas Cooler Maximum Sound Power Level in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Gas Cooler	92 dB	93 dB	92 dB	89 dB	84 dB	82 dB	76 dB	70 dB	64 dB

Notes:
dB = decibel
Hz = Hertz

Aboveground Piping

All aboveground sections of the unit suction, discharge, and bypass lines and gas cooler inlet and outlet headers and piping (including the pipe supports) of the four proposed compressor units will be acoustically insulated. The acoustic pipe insulation will have minimum Insertion Loss (IL) values as provided in Table 9.2.4-12.

TABLE 9.2.4-12

Piping Insulation Minimum IL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Aboveground Piping	0 dB	0 dB	0 dB	6 dB	12 dB	20 dB	26 dB	26 dB	22 dB

Notes:
dB = decibel
IL = insertion loss
Hz = Hertz

Unit Blowdown Silencer

The maximum A-weighted sound pressure level from each silenced unit blowdown event will not exceed 60 dBA at 50 feet.

Ultrasonic Meter

The maximum noise from each ultrasonic meter will not exceed an A-weighted sound level of 80 dBA at 3 feet with maximum octave band sound pressure levels as provided in Table 9.2.4-13.

TABLE 9.2.4-13

Ultrasonic Meter Maximum Sound Pressure Levels in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Ultrasonic Meter	70 dB	72 dB	74 dB	75 dB	75 dB	74 dB	73 dB	72 dB	70 dB

Notes:
dB = decibel
IL = insertion loss
Hz = Hertz

Measurement Building

- At a minimum, the walls and roof panels of the measurement building will be constructed with a STC of 29 and a NRC of 0.90. In addition, these panels will have minimum TL values as provided in Table 9.2.4-14.

TABLE 9.2.4-14

Measurement Building Wall and Roof Panel Minimum TL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Measurement Buildings	2 dB	8 dB	13 dB	18 dB	23 dB	31 dB	38 dB	40 dB	40 dB

Notes:
dB = decibel
TL = transmission loss
Hz = Hertz

- The doors for the measurement building will be insulated, metal doors with full weather-stripping. Windows in these doors, if present, will be double glazed using minimum 0.25 inch thick glass or acrylic panels separated by a minimum 0.5 inch airspace.

- Ventilation air inlet acoustic louvers will be located in the walls of the measurement building to reduce the sound from the four ultrasonic meters that escape through these openings. Each acoustic louver will have minimum TL values as provided in Table 9.2.4-15.

TABLE 9.2.4-15

Ventilation Air Inlet Acoustic Louver Minimum Transmission Loss in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Measurement Building	1 dB	3 dB	4 dB	5 dB	6 dB	7 dB	9 dB	111 dB	12 dB

Notes:
dB = decibel
Hz = Hertz

- The measurement building will have a maximum 12 inch wide ridge vent (i.e., natural ventilation outlet rather than forced or fan-power ventilation outlet).

Compressor Station 2

The proposed Compressor Station 2 is located in Buckingham County, Virginia and includes four turbine compressor units that would be located in two acoustically insulated compressor buildings (two compressor units in each compressor building), associated aboveground piping, and other aboveground facilities such as gas cooler, lube oil cooler, etc. Three ultrasonic meters and two regulator valves will be located in an acoustically insulated M&R building approximately 400 feet northeast of the compressor buildings. Two gas heaters will be located outside near the M&R building. The land uses surrounding the station are residential, agricultural, and forested areas. Nine NSAs (S1 to S9; all residences) were identified within 0.5-mile of the station. A plot plan drawing showing surrounding NSAs within 0.5-mile of the station is provided in the Buckingham Compressor Station Noise Study (see Appendix 9B).

Proposed Compressor Station Equipment

The plot plan drawing provided in the Buckingham Compressor Station Noise Study (see Appendix 9B) provides an area layout of the locations of the planned compressor buildings and equipment. This proposed compressor station will consist of the installation of four turbine compressor units (one Solar Titan Model 100S, one Taurus Model 70S, one Taurus Model 60S, and one Solar Taurus Model 50LS) and an M&R station with noise control materials installed. Installation of the four new gas-driven turbines will provide a total of 40,715 hp of compression.

The following describes auxiliary equipment associated with the proposed compressor station (i.e., four new gas-driven turbines and M&R station):

- turbine exhaust systems designed with an adequate exhaust muffler system;
- turbine air intake filter (air cleaner) system designed with an adequate intake silencer;
- turbine air intake ducts designed with adequate acoustical insulation;
- aboveground gas piping associated with the new compressor units designed with adequate acoustical insulation;
- compressor buildings ventilation systems (air handling units and ventilation air inlet and discharge openings) designed with adequate muffler systems;
- M&R building ventilation systems designed with adequate inlet acoustic louvers and passive ridge vents;
- outdoor lube oil cooler that serves each turbine and compressor;
- gas coolers for the new compressor units; and
- unit blowdown silencer for the new units.

Existing and Baseline Sound Contribution

Sound survey measurements were conducted at the property lines and nearest NSAs on April 21, 2015. The weather conditions during the daytime measurements were a temperature of 62 ˚F increasing to 68 ˚F, a relative humidity of 40 percent decreasing to 30 percent, clear skies, and northwest winds (5 to 9 mph decreasing to 0 to 3 mph). During nighttime measurements, the weather conditions were a temperature of 65 ˚F decreasing to 55 ˚F, a relative humidity of 50 percent, clear skies, and calm winds. Audible sound sources observed during the daytime measurement period (ambient sound sources) were wind blowing through the trees, dogs barking, local traffic, birds, insects, and airplanes. During the nighttime, audible ambient sound sources were spring peepers, local traffic, dogs barking, airplanes, and whippoorwills.

Table 9.2.4-16 summarizes the existing or ambient sound levels at the nearest NSAs and property lines prior to construction of Compressor Station 2. The existing L_{dn} sound levels ranged from 41.2 dBA at S5 to 46.1 dBA at S6. The existing ambient L_{dn} levels at the four property lines (P1, P2, P3, and P4) ranged from 39.4 to 43.4 dBA. Existing ambient sound levels at the nearest NSAs and property lines are below the FERC L_{dn} limit of 55 dBA.

TABLE 9.2.4-16

Compressor Station 2 – Existing Ambient Sound Levels Prior to Station Construction

Property Line, and Closest NSAs (Residences)	Distance and Direction to the Compressor Station	Existing Sound Level Prior to Station Construction (dBA)		
		Measured $L_{eq(d)}$	Measured $L_{eq(n)}$	Calculated L_{dn}
P1. Property Line	1,150 feet WNW	41.9	29.4	41.1
P2. Property Line	1,000 feet ENE	42.4	27.4	41.1
P3. Property Line	1,900 feet SE	43.0	33.9	43.4
P4 Property Line	400 feet SW	40.7	25.9	39.4
S1. Residence	2,700 feet WNW	47.5	29.7	45.9
S2. Residence	1,800 feet WNW	47.9	25.3	46.0
S3. Residence	1,450 feet WNW	46.4	25.3	44.6
S4. Residence	1,900 feet NNW	43.9	31.8	43.2
S5. Residence	3,600 feet ENE	39.8	32.9	41.2
S6. Residence	3,000 feet ESE	46.2	35.9	46.1
S7. Residence	3,100 feet ESE	39.7	35.4	42.7
S8. Residence	2,000 feet SE	43.0	33.9	43.4
S9. Residence	2,100 feet SE	43.0	33.9	43.4

NSAs = noise sensitive areas, dBA = A-weighted sound level, $L_{eq\,(d)}$ = daytime equivalent sound levels, $L_{eq\,(n)}$ = nighttime equivalent sound levels, L_{dn} = day-night sound levels, WNW= west-northwest, ENE = east-northeast, SE = southeast, SW = south west. NNW = north-northwest, and ESE = east-southeast.

Compressor Station Noise Impact Evaluation

The acoustical analysis considers the noise that will be produced by continuous-operating equipment at the facility that could affect the sound contribution at the closest NSAs (S1 to S9). The results of the acoustical analysis for the four new turbine compressor units and M&R station at Compressor Station 2, including a description of the acoustical analysis methodology and source of sound data is provided in the Buckingham Compressor Station Noise Study (see Appendix 9B).

The following sound sources for the four new turbine compressor units and M&R station were considered to have the most noise contribution, as included in the acoustical analysis of the ACP aboveground facilities:

- noise generated by the turbines/compressors that penetrates the new compressor buildings;
- turbine exhaust noise (primary noise source that could generate perceptible vibration);
- noise radiated from turbine exhaust pipes;
- noise generated by the turbine air intake system;
- noise generated by each compressor building wall ventilation air inlet openings and air handling units;
- noise generated from each compressor building roof ventilation air discharge openings;
- noise generated from the outdoor lube oil coolers;
- noise generated from the outdoor gas coolers;
- noise radiated from aboveground gas piping and related piping components;
- noise generated by the ultrasonic meters and regulator valves that penetrates the new measurement building;
- noise generated from the gas heaters installed outside near the M&R building;
- noise generated by the measurement building ventilation air inlet louvres; and
- noise generated from emergency and routine maintenance blowdown events.

Table 9.2.4-17 provides an estimated summary of the noise quality analysis for the Compressor Station 2, assuming operation of the facility at full load. The table includes the predicted L_{dn} sound levels from the four proposed gas turbine compressor units and M&R station; predicted total L_{dn} sound levels resulting from summing the L_{dn} sound levels from the compressor station with the existing ambient L_{dn} sound levels; and predicted noise increase from existing ambient L_{dn} sound levels.

The results of the acoustical analysis indicates that the continuous sound attributable to the four proposed turbine compressor units operating at full rated load and the M&R station will be lower than the FERC L_{dn} limit of 55 dBA at all identified NSAs (S1 to S9) around the site, provided the specified noise control measures (summarized below) are successfully implemented. The predicted L_{dn} at the nearest NSA (S3 – approximately 1,450 feet from the four turbine compressor units and M&R station) is 44.4 with a predicted noise increase of 2.9 dBA from existing L_{dn} levels. For the remaining NSAs located at greater distances from the four turbine compressor units and M&R station, the predicted L_{dn} sound levels are lower. The results of the acoustical analysis also indicate that the sum of the L_{dn} sound levels from the four turbine compressor units and measurement station and existing ambient L_{dn} sound levels are below the FERC limit at all NSAs.

The specified noise control measures for the four turbine compressor units and measurement station are provided in the Buckingham Compressor Station Noise Study (see Appendix 9B) and summarized in the following sub-sections. Because noise sources that could cause perceptible vibration will also be adequately mitigated, there should not be a perceptible increase in vibration at NSAs during operation of the compressor station.

TABLE 9.2.4-17

Compressor Station 2 – Noise Quality Analysis Associated with ACP Project

Property Line, and Closest NSAs (Residences)	Distance and Direction to the Compressor Station	Existing Ambient Sound Level Prior to Station Construction (dBA)			Predicted L_{dn} from the Four Gas Turbine Compressor Units and M&R Station (dBA)	Predicted Total L_{dn} (Compressor Units and M&R Station + Existing Ambient L_{dn}) (dBA)	Predicted Noise Increase from Existing Ambient L_{dn} (dBA)
		Measured $L_{eq(d)}$	Measured $L_{eq(n)}$	Calculated L_{dn}			
P1. Property Line	1,150 feet WNW	41.9	29.4	41.1	46.4	47.5	6.4
P2. Property Line	1,000 feet ENE	42.4	27.4	41.1	52.4	52.7	11.6
P3. Property Line	1,900 feet SE	43.0	33.9	43.4	42.4	45.9	2.5
P4 Property Line	400 feet SW	40.7	25.9	39.4	56.4	56.5	17.1
S1. Residence	2,700 feet WNW	47.5	29.7	45.9	37.4	46.4	0.5
S2. Residence	1,800 feet WNW	47.9	25.3	46.0	42.4	47.6	1.6
S3. Residence	1,450 feet WNW	46.4	25.3	44.6	44.4	47.5	2.9
S4. Residence	1,900 feet NNW	43.9	31.8	43.2	42.4	45.8	2.6
S5. Residence	3,600 feet ENE	39.8	32.9	41.2	35.4	42.2	1.0
S6. Residence	3,000 feet ESE	46.2	35.9	46.1	38.4	46.8	0.7
S7. Residence	3,100 feet ESE	39.7	35.4	42.7	37.4	43.9	1.2
S8. Residence	2,000 feet SE	43.0	33.9	43.4	42.4	45.9	2.5
S9. Residence	2,100 feet SE	43.0	33.9	43.4	41.4	45.5	2.1

NSAs = noise sensitive areas, dBA = A-weighted sound level, $L_{eq\ (d)}$ = daytime equivalent sound levels, $L_{eq\ (n)}$ = nighttime equivalent sound levels, L_{dn} = day-night sound levels, WNW= west-northwest, ENE = east-northeast, SE = southeast, SW = south west. NNW = north-northwest, and ESE = east-southeast.

The noise level of the unit blowdown event via a blowdown silencer will be specified to meet a maximum A-wt. sound level of 60 dBA at 50 feet. The maximum sound level of a blowdown event associated with the new unit will be approximately 31 dBA at the closest NSA, located approximately 1,450 feet from the blowdown silencer. Controlling noise levels of the unit blowdown at the closest NSA would ultimately control noise levels at NSAs located further away. Consequently, although the noise of a unit blowdown event could be slightly audible at the nearby NSAs, it is not expected to present a noise impact. In addition, a unit blowdown event occurs infrequently and for a short time frame (e.g., 1 to 5 minute period), which would further reduce potential impacts.

Noise Control Measures and Specifications for the Four Proposed Turbine Compressor Units and Measurement and Regulator Station

The following provides recommended noise control measures and equipment sound specifications for major noise sources at the proposed Compressor Station 2.

Turbine Exhaust System

The turbine exhaust system for the four proposed compressor units will include a silencer system that provides the following DIL values, which will also be adequate for minimizing perceptible increases in vibration due to this noise source. The exhaust pipes of the four proposed turbine units will be acoustically insulated from the compressor building wall to the muffler flanges (including expansion joints). DIL values for the turbine exhaust muffler and exhaust pipe acoustic insulation are provided in Table 9.2.4-18.

TABLE 9.2.4-18

DIL Values for the Turbine Exhaust Muffler and Pipe Acoustic Insulation in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Exhaust Muffler									
Turbine Exhaust - Solar Mars Model 100S	13 dB	24 dB	31 dB	41 dB	49 dB	46 dB	42 dB	33 dB	24 dB
Turbine Exhaust - Solar Taurus Model 70S and Solar Taurus Model 60S	13 dB	22 dB	29 dB	41 dB	51 dB	46 dB	39 dB	32 dB	25 dB
Turbine Exhaust - Solar Centaur Model 50LS	11 dB	19 dB	27 dB	35 dB	48 dB	44 dB	39 dB	28 dB	21 dB
Exhaust Pipe Acoustic Insulation									
Turbine Exhaust - Solar Mars Model 100S, Solar Taurus Model 70S, Solar Taurus Model 60S, and Solar Centaur Model 50LS	0 dB	0 dB	0 dB	0 dB	5 dB	10 dB	25 dB	25 dB	20 dB

Notes:
dB = decibel
DIL = dynamic sound insertion loss
Hz = Hertz

Turbine Air Intake System

The Solar Titan Model 130S turbine air intake system will be designed with an air cleaner/ silencers, and the air intake ducts will be acoustically insulated from the compressor building wall to the air cleaner housings (including expansion joints). DIL values for the air intake cleaner/silence and duct acoustic insulation are provided in Table 9.2.4-19.

Compressor Building

The turbine and compressor associated with the four new units will be installed in two compressor buildings (two units per building) with the following sound attenuation measures:

At a minimum, the walls and roof panels of the two proposed compressor buildings will be constructed with a STC of 49 and a NRC of 0.90. In addition, these panels will have minimum TL values as provided in Table 9.2.4-20.

TABLE 9.2.4-19

DIL Values for the Turbine Air Intake Cleaner/Silencer and Duct Acoustic Insulation in dB per Octave-Band Center Frequency in Hz

Noise Control Source	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Air Intake Cleaner/Silencer									
Turbine Exhaust - Solar Mars Model 100S	5 dB	18 dB	33 dB	41 dB	46 dB	50 dB	57 dB	87 dB	80 dB
Turbine Exhaust - Solar Taurus Model 70S and Solar Taurus Model 60S	5 dB	15 dB	31 dB	40 dB	49 dB	50 dB	52 dB	80 dB	78 dB
Turbine Exhaust - Solar Centaur Model 50LS	2 dB	14 dB	28 dB	38 dB	45 dB	49 dB	53 dB	78 dB	72 dB
Air Intake Duct Acoustic Insulation									
Turbine Exhaust - Solar Mars Model 100S, Solar Taurus Model 70S, Solar Taurus Model 60S, and Solar Centaur Model 50LS	0 dB	0 dB	0 dB	6 dB	12 dB	20 dB	26 dB	26 dB	22 dB

Notes:
dB = decibel
DIL= dynamic sound insertion loss
Hz = Hertz

TABLE 9.2.4-20

Compressor Building Wall and Roof Panel Minimum TL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Compressor Station 2 Compressor Buildings	9 dB	15 dB	22 dB	38 dB	46 dB	48 dB	52 dB	53 dB	54 dB

Notes:
dB = decibel
TL = transmission loss
Hz = Hertz

- The personnel doors of the two proposed compressor buildings will be insulated, metal doors with full weather-stripping. At a minimum, the STC rating of these doors will be 38. Windows in these doors, if present, will be double glazed using minimum 0.25 inch thick glass or acrylic panels separated by a minimum 0.5 inch airspace.
- The equipment doors of the two proposed compressor buildings will be an insulated metal door with full weather-stripping.
- The two proposed compressor buildings will have a ventilation system installed to provide adequate cooling of the building to allow full load operation of the four proposed turbine compressor units with all doors closed.
- The ventilation systems of the two compressor buildings will have a maximum of six air handling units. The maximum A-weighted sound level from each air handling unit will not exceed 70 dBA at 3 feet when measured outside of each air

handling unit in all directions with maximum octave band sound pressure levels as provided in Table 9.2.4-21.

TABLE 9.2.4-21

Air Handling Unit Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Compressor Station 2 Compressor Buildings	92 dB	89 dB	79 dB	71 dB	64 dB	60 dB	55 dB	54 dB	54 dB

Notes:
dB = decibel
Hz = Hertz

- Ventilation air inlet mufflers will be located in the air paths between the air handling units and the compressor building wall penetrations to reduce the sound from the proposed turbine compressor units that escapes through these openings. Each ventilation air inlet muffler will have minimum DIL as provided in Table 9.2.4-22.

TABLE 9.2.4-22

Ventilation Air Inlet Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Compressor Station 2 Compressor Buildings	4 dB	12 dB	20 dB	23 dB	42 dB	48 dB	45 dB	38 dB	21 dB

Notes:
dB = decibel
DIL = dynamic insertion loss
Hz = Hertz

- The ventilation systems of the two compressor buildings will have a maximum of eight wall inlet fans. The maximum A-weighted sound level from each wall air inlet fan will not exceed 90 dBA at 3 feet when measured inside the compressor building without the proposed turbine compressor units operating with maximum octave band sound pressure levels as provided in Table 9.2.4-23.

TABLE 9.2.4-23

Wall Air Inlet Fan Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Compressor Station 2 Compressor Buildings	99 dB	97 dB	95 dB	90 dB	86 dB	84 dB	82 dB	80 dB	77 dB

Notes:
dB = decibel
Hz = Hertz

- The ventilation systems of the two compressor buildings will have a total of twelve roof air discharge hoods with a maximum total area of 363 square feet. Ventilation air discharge mufflers will be located above the roof and under each roof air discharge hood to reduce the sound from the proposed turbine compressor units that escapes through these openings. Each ventilation air discharge muffler will have minimum DIL values as provided in Table 9.2.4-24.

TABLE 9.2.4-24

Ventilation Air Discharge Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Compressor Station 2 Compressor Buildings	3 dB	9 dB	17 dB	25 dB	39 dB	46 dB	45 dB	40 dB	25 dB

Notes:
dB = decibel
DIL = dynamic insertion loss
Hz = Hertz

Lube Oil Cooler

The maximum noise from the lube oil cooler for each turbine compressor unit will not exceed an A-weighted sound pressure level of 50 dBA at 50 feet from the centerline of the cooler with all fans running at maximum speed. Each lube oil cooler (including all fans, motors, and drivers) will have maximum octave band sound pressure levels as provided in Table 9.2.4-25.

TABLE 9.2.4-25

Lube Oil Cooler Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Lube Oil Cooler	54 dB	61 dB	58 dB	51 dB	46 dB	43 dB	39 dB	35 dB	30 dB

Notes:
dB = decibel
Hz = Hertz

Gas Cooler

The maximum noise from the gas cooler for each turbine compressor unit will not exceed an A-weighted sound power level of 87 dBA with all fans running at maximum speed. Each gas cooler (including all fans, motors, and drives) will have maximum octave band sound power levels as provided in Table 9.2.4-26.

TABLE 9.2.4-26

Compressor Unit Gas Cooler Maximum Sound Power Level in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Gas Cooler	92 dB	93 dB	92 dB	89 dB	84 dB	82 dB	76 dB	70 dB	64 dB

Notes:
dB = decibel
Hz = Hertz

Aboveground Piping

All aboveground sections of the unit suction, discharge, and bypass lines and gas cooler inlet and outlet headers and piping (including the pipe supports) of the four proposed compressor units will be acoustically insulated. The acoustic pipe insulation will have minimum IL values as provided in Table 9.2.4-27.

TABLE 9.2.4-27

Piping Insulation Minimum IL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Aboveground Piping	0 dB	0 dB	0 dB	6 dB	12 dB	20 dB	26 dB	26 dB	22 dB

Notes:
dB = decibel
IL = insertion loss
Hz = Hertz

Unit Blowdown Silencer

The maximum A-weighted sound pressure level from each silenced unit blowdown event will not exceed 60 dBA at 50 feet.

Ultrasonic Meter

The maximum noise from each ultrasonic meter will not exceed an A-weighted sound level of 80 dBA at 3 feet with maximum octave band sound pressure levels as provided in Table 9.2.4-28.

TABLE 9.2.4-28

Ultrasonic Meter Maximum Sound Pressure Levels in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Ultrasonic Meter	70 dB	72 dB	74 dB	75 dB	75 dB	74 dB	73 dB	72 dB	70 dB

Notes:
dB = decibel
IL = insertion loss
Hz = Hertz

Regulator Valve

The maximum noise from each operating regulator valve will not exceed an A-weighted sound level of 80 dBA at 3 feet with maximum octave band sound pressure levels as provided in Table 9.2.4-29.

TABLE 9.2.4-29

Regulator Valve Maximum Sound Pressure Levels in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Regulator Valve	96 dB	95 dB	92 dB	87 dB	81 dB	76 dB	74 dB	73 dB	72 dB

Notes:
dB = decibel
IL = insertion loss
Hz = Hertz

Measurement and Regulator Building

- At a minimum, the walls and roof panels of the M&R building will be constructed with a STC of 29 and a NRC of 0.90. In addition, these panels will have minimum TL values as provided in Table 9.2.4-30.

TABLE 9.2.4-30

Measurement Building Wall and Roof Panel Minimum TL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Measurement and Regulator Buildings	2 dB	8 dB	13 dB	18 dB	23 dB	31 dB	38 dB	40 dB	40 dB

Notes:
dB = decibel
TL = transmission loss
Hz = Hertz

- The doors for the M&R building will be insulated, metal doors with full weather-stripping. Windows in these doors, if present, will be double glazed using

minimum 0.25 inch thick glass or acrylic panels separated by a minimum 0.5 inch airspace.

- Ventilation air inlet acoustic louvers will be located in the walls of the M&R building to reduce the sound from the three ultrasonic meters and two operating regulator valves that escapes through these openings. Each acoustic louver will have minimum TL values as provided in Table 9.2.4-31.

TABLE 9.2.4-31

Ventilation Air Inlet Acoustic Louver Minimum Transmission Loss in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Measurement and Regulator Building	1 dB	3 dB	4 dB	5 dB	6 dB	7 dB	9 dB	111 dB	12 dB

Notes:
dB = decibel
Hz = Hertz

- The measurement building will have a maximum 12 inch wide ridge vent (i.e., natural ventilation outlet rather than forced or fan-power ventilation outlet).
- The maximum noise from each gas heater installed outside near the M&R building will not exceed an A-weighted sound level of 90 dBA at 3 feet with maximum octave band sound pressure levels as provided in Table 9.2.4-32.

TABLE 9.2.4-32

Gas Heater Maximum Sound Pressure Levels in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Gas Heater	111 dB	105 dB	94 dB	87 dB	87 dB	83 dB	82 dB	80 dB	78 dB

Notes:
dB = decibel
IL = insertion loss
Hz = Hertz

Compressor Station 3

The proposed Compressor Station 3, which is located in Northampton County, North Carolina, includes three turbine compressor units that will be located in one acoustically insulated compressor building, associated aboveground piping, and other aboveground facilities such as gas cooler, lube oil cooler, etc. The land uses surrounding the station are residential, agricultural, industrial, and forested areas. A closed Georgia Pacific Corp. lumber mill is located approximately one mile west-northwest of the proposed compressor station. Two NSAs (S1 and S2; both residences) were identified within 0.5-mile of the station. A plot plan drawing showing surrounding NSAs within 0.5-mile of the station is provided in the Northampton Compressor Station Noise Study (see Appendix 9B).

Proposed Compressor Station Equipment

The plot plan drawing provided in the Northampton Compressor Station Noise Study (see Appendix 9B) provides an area layout of the locations of the planned compressor buildings and equipment. This proposed compressor station will consist of the installation of three turbine compressor units (one Solar Taurus Model 70S, one Solar Centaur Model 50LS, and one Centaur Model 40S) with noise control materials installed. Installation of the three new gas-driven turbines will provide a total of 21,815 hp of compression.

The following describes auxiliary equipment associated with the proposed compressor station (i.e., three new gas-driven turbines):

- turbine exhaust systems designed with an adequate exhaust muffler system;
- turbine air intake filter (air cleaner) system designed with an adequate intake silencer;
- turbine air intake ducts designed with adequate acoustical insulation;
- aboveground gas piping associated with the new compressor units designed with adequate acoustical insulation;
- compressor buildings ventilation systems (air handling units and ventilation air inlet and discharge openings) designed with adequate muffler systems;
- outdoor lube oil cooler that serves each turbine and compressor;
- gas coolers for the new compressor units; and
- unit blowdown silencer for the new units.

Existing and Baseline Sound Contribution

Sound survey measurements were conducted at the property lines and nearest NSAs on April 23, 2015. The weather conditions during the daytime measurements were a temperature of 68 ˚F, a relative humidity of 30 percent, clear skies, and light north winds (0 to 4 mph). During nighttime measurements, the weather conditions were a temperature of 53 ˚F decreasing to 44 ˚F, a relative humidity of 65 percent increasing to 85 percent, clear skies, and light north winds. Audible sound sources observed during the daytime measurement period (ambient sound sources) were wind blowing through trees, dogs barking, airplanes, a train, and traffic on Route 301. During the nighttime, audible ambient sound sources were airplane, spring peepers, insects, owls, dogs barking, and wind blowing through the trees.

Table 9.2.4-33 summarizes the existing or ambient sound levels at the nearest NSAs and property lines prior to construction of Compressor Station 3. The existing L_{dn} sound levels at S1 and S2 were 38.2 and 38.9 dBA, respectively. The existing ambient L_{dn} levels at the four property lines (P1, P2, P3, and P4) ranged from 37.8 to 41.5 dBA. Existing ambient sound levels at the nearest NSAs and property lines are below the FERC L_{dn} limit of 55 dBA.

TABLE 9.2.4-33

Compressor Station 3 – Existing Ambient Sound Levels Prior to Station Construction

Property Line, and Closest NSAs (Residences)	Distance and Direction to the Compressor Station	Existing Sound Level Prior to Station Construction (dBA)		
		Measured $L_{eq(d)}$	Measured $L_{eq(n)}$	Calculated L_{dn}
P1. Property Line	600 feet N	41.0	28.7	40.3
P2. Property Line	2,700 feet E	42.8	27.4	41.5
P3. Property Line	3,300 feet S	38.0	27.4	37.8
P4. Property Line	3,000 feet W	40.8	29.9	40.5
S1. Residence	850 feet NNW	39.2	25.9	38.2
S2. Residence	1,700 feet NE	39.9	26.3	38.9

NSAs = noise sensitive areas, dBA = A-weighted sound level, $L_{eq\,(d)}$ = daytime equivalent sound levels, $L_{eq\,(n)}$ = nighttime equivalent sound levels, L_{dn} = day-night sound levels, N= north, E = east, S = south, W = west, NNW = north-northwest, and NE = northeast.

Compressor Station Noise Impact Evaluation

The acoustical analysis considers the noise that will be produced by continuous-operating equipment at the facility that could affect the sound contribution at the closest NSAs (S1 and S2). The results of the acoustical analysis for the three new turbine compressor units at Compressor Station 3, including a description of the acoustical analysis methodology and source of sound data is provided in the Northampton Compressor Station Noise Study (see Appendix 9B).

The following sound sources for the three new turbine compressor units were considered to have the most noise contribution, as included in the acoustical analysis of the ACP aboveground facilities:

- noise generated by the turbines/compressors that penetrates the new compressor buildings;
- turbine exhaust noise (primary noise source that could generate perceptible vibration);
- noise radiated from turbine exhaust pipes;
- noise generated by the turbine air intake system;
- noise generated by each compressor building wall ventilation air inlet openings and air handling units;
- noise generated from each compressor building roof ventilation air discharge openings;
- noise generated from the outdoor lube oil coolers;
- noise generated from the outdoor gas coolers;
- noise radiated from aboveground gas piping and related piping components; and
- noise generated from emergency and routine maintenance blowdown events.

Table 9.2.4-34 provides an estimated summary of the noise quality analysis for Compressor Station 3, assuming operation of the facility at full load. The table includes the predicted L_{dn} sound levels from the three proposed gas turbine compressor units; predicted total L_{dn} sound levels resulting from summing the L_{dn} sound levels from the compressor station with the existing ambient L_{dn} sound levels; and predicted noise increase from existing ambient L_{dn} sound levels.

TABLE 9.2.4-34

Compressor Station 3 – Noise Quality Analysis Associated with ACP Project

Property Line, and Closest NSAs (Residences)	Distance and Direction to the Compressor Station	Existing Ambient Sound Level Prior to Station Construction (dBA)			Predicted L_{dn} from the Three Gas Turbine Compressor Units (dBA)	Predicted Total L_{dn} (Compressor Units + Existing Ambient L_{dn}) (dBA)	Predicted Noise Increase from Existing Ambient L_{dn} (dBA)
		Measured $L_{eq(d)}$	Measured $L_{eq(n)}$	Calculated L_{dn}			
P1. Property Line	600 feet N	41.0	28.7	40.3	48.4	49.0	8.7
P2. Property Line	2,700 feet E	42.8	27.4	41.5	32.4	42.0	0.5
P3. Property Line	3,300 feet S	38.0	27.4	37.8	29.4	38.4	0.6
P4. Property Line	3,000 feet W	40.8	29.9	40.5	30.4	40.9	0.4
S1. Residence	850 feet NNW	39.2	25.9	38.2	45.4	46.2	8.0
S2. Residence	1,700 feet NE	39.9	26.3	38.9	37.4	41.2	2.3

NSAs = noise sensitive areas, dBA = A-weighted sound level, $L_{eq\,(d)}$ = daytime equivalent sound levels, $L_{eq\,(n)}$ = nighttime equivalent sound levels, L_{dn} = day-night sound levels, N= north, E = east, S = south, W = west, NNW = north-northwest, and NE = northeast.

The results of the acoustical analysis indicates that the continuous sound attributable to the three proposed turbine compressor units operating at full rated load will be lower than the FERC L_{dn} limit of 55 dBA at all identified NSAs (S1 and S2) around the site, provided the specified noise control measures (summarized below) are successfully implemented. The predicted L_{dn} at the nearest NSA (S1 – approximately 850 feet from the three turbine compressor units) is 45.4 with a predicted noise increase of 8 dBA from existing L_{dn} levels. For the remaining NSA (i.e., S2) located at greater distances from the three turbine compressor units, the predicted L_{dn} sound levels are lower. The results of the acoustical analysis also indicates that the sum of the L_{dn} sound levels from the three turbine compressor units and existing ambient L_{dn} sound levels are below the FERC limit at all NSAs.

The specified noise control measures for the three turbine compressor units are provided in the Northampton Compressor Station Noise Study (see Appendix 9B) and summarized in the following sub-sections. Because noise sources that could cause perceptible vibration will also be adequately mitigated, there should not be a perceptible increase in vibration at NSAs during operation of the compressor station.

The noise level of the unit blowdown event via a blowdown silencer will be specified to meet a maximum A-wt. sound level of 60 dBA at 50 feet. The maximum sound level of a blowdown event associated with the new unit will be approximately 35 dBA at the closest NSA, located approximately 850 feet from the blowdown silencer. Controlling noise levels of the unit blowdown at the closest NSA will ultimately control noise levels at NSAs located further away. Consequently, although the noise of a unit blowdown event could be slightly audible at the nearby NSAs, it is not expected to present a noise impact. In addition, a unit blowdown event occurs infrequently and for a short time frame (e.g., 1 to 5 minute period), which would further reduce potential impacts.

Noise Control Measures and Specifications for the Three Proposed Turbine Compressor Units

The following provides recommended noise control measures and equipment sound specifications for major noise sources at the proposed Compressor Station 3.

Turbine Exhaust System

The turbine exhaust system for the four proposed compressor units will include a silencer system that provides the following DIL values, which will also be adequate for minimizing perceptible increases in vibration due to this noise source. The exhaust pipes of the four proposed turbine units will be acoustically insulated from the compressor building wall to the muffler flanges (including expansion joints). DIL values for the turbine exhaust muffler and exhaust pipe acoustic insulation are provided in Table 9.2.4-35.

TABLE 9.2.4-35

DIL Values for the Turbine Exhaust Muffler and Pipe Acoustic Insulation in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Exhaust Muffler									
Turbine Exhaust - Solar Taurus Model 70S	13 dB	22 dB	29 dB	41 dB	51 dB	46 dB	39 dB	32 dB	25 dB
Turbine Exhaust - Solar Centaur Model 50LS and Solar Centaur Model 40S	11 dB	19 dB	27 dB	35 dB	48 dB	44 dB	39 dB	28 dB	21 dB
Exhaust Pipe Acoustic Insulation									
Turbine Exhaust - Solar Taurus Model 70S, Solar Centaur Model 50LS, and Solar Centaur Model 40S	0 dB	0 dB	0 dB	0 dB	5 dB	10 dB	25 dB	25 dB	20 dB

Notes:
dB = decibel
DIL= dynamic sound insertion loss
Hz = Hertz

Turbine Air Intake System

The Solar Titan Model 130S turbine air intake system will be designed with an air cleaner/silencers, and the air intake ducts will be acoustically insulated from the compressor building wall to the air cleaner housings (including expansion joints). DIL values for the air intake cleaner/silence and duct acoustic insulation are provided in Table 9.2.4-36.

TABLE 9.2.4-36

DIL Values for the Turbine Air Intake Cleaner/Silencer and Duct Acoustic Insulation in dB per Octave-Band Center Frequency in Hz

Noise Control Source	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Air Intake Cleaner/Silencer									
Turbine Exhaust - Solar Taurus Model 70S	3 dB	15 dB	31 dB	40 dB	49 dB	50 dB	52 dB	80 dB	78 dB
Turbine Exhaust - Solar Centaur Model 50LS and Solar Centaur Model 40S	2 dB	14 dB	28 dB	38 dB	45 dB	49 dB	53 dB	78 dB	72 dB
Air Intake Duct Acoustic Insulation									
Turbine Exhaust - Solar Taurus Model 70S, Solar Centaur Model 50LS, and Solar Centaur Model 40S	0 dB	0 dB	0 dB	6 dB	12 dB	20 dB	26 dB	26 dB	22 dB

Notes:
dB = decibel
DIL= dynamic sound insertion loss
Hz = Hertz

Compressor Building

The turbine and compressor associated with the three new units will be installed in one compressor buildings with the following sound attenuation measures:

- At a minimum, the walls and roof panels of the two proposed compressor buildings will be constructed with a STC of 49 and a NRC of 0.90. In addition, these panels will have minimum TL values as provided in Table 9.2.4-37.

TABLE 9.2.4-37

Compressor Building Wall and Roof Panel Minimum TL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Compressor Station 3 Compressor Buildings	9 dB	15 dB	22 dB	38 dB	46 dB	48 dB	52 dB	53 dB	54 dB

Notes:
dB = decibel
TL = transmission loss
Hz = Hertz

- The personnel doors of the proposed compressor building will be insulated, metal doors with full weather-stripping. At a minimum, the STC rating of these doors will be 38. Windows in these doors, if present, will be double glazed using minimum 0.25 inch thick glass or acrylic panels separated by a minimum 0.5 inch airspace.
- The equipment doors of the proposed compressor building will be an insulated metal door with full weather-stripping.

- The proposed compressor building will have a ventilation system installed to provide adequate cooling of the building to allow full load operation of the three proposed turbine compressor units with all doors closed.
- The ventilation systems of the compressor building will have a maximum of four air handling units. The maximum A-weighted sound level from each air handling unit will not exceed 70 dBA at 3 feet when measured outside of each air handling unit in all directions with maximum octave band sound pressure levels as provided in Table 9.2.4-38.

TABLE 9.2.4-38

Air Handling Unit Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Compressor Station 3 Compressor Buildings	92 dB	89 dB	79 dB	71 dB	64 dB	60 dB	55 dB	54 dB	54 dB

Notes:
dB = decibel
Hz = Hertz

- Ventilation air inlet mufflers will be located in the air paths between the air handling units and the compressor building wall penetrations to reduce the sound from the proposed turbine compressor units that escape through these openings. Each ventilation air inlet muffler will have minimum DIL as provided in Table 9.2.4-39.

TABLE 9.2.4-39

Ventilation Air Inlet Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Compressor Station 3 Compressor Buildings	4 dB	12 dB	20 dB	23 dB	42 dB	48 dB	45 dB	38 dB	21 dB

Notes:
dB = decibel
DIL = dynamic insertion loss
Hz = Hertz

- The ventilation systems of the compressor buildings will have a maximum of four wall inlet fans. The maximum A-weighted sound level from each wall air inlet fan will not exceed 90 dBA at 3 feet when measured inside the compressor building without the proposed turbine compressor units operating with maximum octave band sound pressure levels as provided in Table 9.2.4-40.

TABLE 9.2.4-40

Wall Air Inlet Fan Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Compressor Station 3 Compressor Buildings	99 dB	97 dB	95 dB	90 dB	86 dB	84 dB	82 dB	80 dB	77 dB

Notes:
dB = decibel
Hz = Hertz

- The ventilation systems of the compressor building will have a total of nine roof air discharge hoods with a maximum total area of 272 square feet. Ventilation air discharge mufflers will be located above the roof and under each roof air discharge hood to reduce the sound from the proposed turbine compressor units that escapes through these openings. Each ventilation air discharge muffler will have minimum DIL values as provided in Table 9.2.4-41.

TABLE 9.2.4-41

Ventilation Air Discharge Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Compressor Station 3 Compressor Buildings	3 dB	9 dB	17 dB	25 dB	39 dB	46 dB	45 dB	40 dB	25 dB

Notes:
dB = decibel
DIL = dynamic insertion loss
Hz = Hertz

Lube Oil Cooler

The maximum noise from the lube oil cooler for each turbine compressor unit will not exceed an A-weighted sound pressure level of 50 dBA at 50 feet from the centerline of the cooler with all fans running at maximum speed. Each lube oil cooler (including all fans, motors, and drivers) will have maximum octave band sound pressure levels as provided in Table 9.2.4-42.

TABLE 9.2.4-42

Lube Oil Cooler Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Lube Oil Cooler	54 dB	61 dB	58 dB	51 dB	46 dB	43 dB	39 dB	35 dB	30 dB

Notes:
dB = decibel
Hz = Hertz

Gas Cooler

The maximum noise from the gas cooler for each turbine compressor unit will not exceed an A-weighted sound power level of 87 dBA with all fans running at maximum speed. Each gas

cooler (including all fans, motors, and drives) will have maximum octave band sound power levels as provided in Table 9.2.4-43.

TABLE 9.2.4-43

Compressor Unit Gas Cooler Maximum Sound Power Level in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Gas Cooler	92 dB	93 dB	92 dB	89 dB	84 dB	82 dB	76 dB	70 dB	64 dB

Notes:
dB = decibel
Hz = Hertz

Aboveground Piping

All aboveground sections of the unit suction, discharge, and bypass lines and gas cooler inlet and outlet headers and piping (including the pipe supports) of the three proposed compressor units will be acoustically insulated. The acoustic pipe insulation will have minimum IL values as provided in Table 9.2.4-44.

TABLE 9.2.4-44

Piping Insulation Minimum IL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Aboveground Piping	0 dB	0 dB	0 dB	6 dB	12 dB	20 dB	26 dB	26 dB	22 dB

Notes:
dB = decibel
IL = insertion loss
Hz = Hertz

Unit Blowdown Silencer

The maximum A-weighted sound pressure level from each silenced unit blowdown event will not exceed 60 dBA at 50 feet.

Metering and Regulating Station Facilities

M&R stations produce a limited amount of noise as the sites consist primarily of piping connections and in some cases, fired heaters. The acoustical analysis for the M&R Station within Compressor Station 1 and the M&R Station located within Compressor Station 2 is described above as part of the overall noise assessment of those stations.

9.2.4.2 Supply Header

The following sections address modifications to the JB Tonkin, Crayne, and Mockingbird Hill Compressor Stations, and each are described in terms of existing station equipment, SHP modifications, noise analysis (baseline and predicted), and noise mitigation measures required to achieve the predicted noise levels at NSAs.

The improvements at the Burch Ridge Compressor Station will include the installation of crossover piping to allow for bi-directional flow. No additional compression, structures, or equipment will be added at this station. Other than temporary noise emissions associated with new piping, the improvements to the Burch Ridge Compressor Station will not result in impacts on noise and, therefore, is not discussed further in this section.

JB Tonkin Compressor Station Modification

The existing JB Tonkin Compressor Station includes one compressor building, one auxiliary building, associated aboveground piping, and other aboveground facilities (gas cooler, regulators, etc.). The land uses surrounding the station are residential, farm fields and forested areas. Sixteen NSAs (S2 to S17; all residences) were identified within 0.5-mile of the station. The closest residence (375 feet northwest) was purchased by DTI and is now a company house. A plot plan drawing showing surrounding NSAs within 0.5-mile of the station is provided in the JB Tonkin Compressor Station Noise Study (see Appendix 9B).

Existing Compressor Station Equipment

The plot plan drawing provided in the JB Tonkin Compressor Station Noise Study (see Appendix 9B) provides an area layout of the existing buildings/equipment and location of the planned compressor building. This compressor station currently consists of one Cooper-Bessemer Model 12V330 reciprocating engine compressor unit that was installed in 1985.

Proposed Modifications

Modifications associated with the SHP will consist of the installation of two additional turbine compressor units (two Solar Taurus Model 70S turbine compressor units) in a new acoustically insulated compressor building immediately west of the existing compressor building. The addition of the two new gas-driven turbines at the existing station will provide an additional 21,830 hp of compression.

The following describes auxiliary equipment associated with the SHP modifications (i.e., two new gas-driven turbines):

- turbine exhaust systems designed with an adequate exhaust muffler system;
- turbine air intake filter (air cleaner) system designed with an adequate intake silencer;
- turbine air intake ducts designed with adequate acoustical insulation;
- aboveground gas piping associated with the new compressor units designed with adequate acoustical insulation;
- compressor building ventilation systems (air handling units, emergency wall inlet fans, and ventilation air inlet and discharge openings) designed with adequate muffler systems;
- outdoor lube oil cooler that serves the turbine and compressor;

- gas coolers for the new compressor units; and
- unit blowdown silencer for the new units.

Existing Sound Contribution

Survey measurements were conducted at the property lines and nearest NSAs on January 15, 2015 with the existing reciprocating engine compressor unit operating at 100 percent of full rated load and speed. The weather conditions were a temperature of 21 ˚F increasing to 24 ˚F, a relative humidity of 75 percent decreasing to 70 percent, clear skies and light northeast winds (1 to 2 mph) changing to northeast winds (1 to 4 mph). The JB Tonkin Compressor Station was audible at NSAs S3 through S15, and property line locations P1 through P4. The compressor station was not audible at NSAs S2, S16, and S17. Other audible sound sources observed during the measurement period (ambient sound sources) were birds, traffic, aircraft, dogs barking, wind blowing through trees, a heat pump at S9 and water flowing in a creek near S16. Table 9.2.4-45 summarizes the existing sound level contribution of the JB Tonkin Compressor Station at the property lines, the Company House, and nearest NSAs.

TABLE 9.2.4-45

JB Tonkin Compressor Station – Existing Sound Level Contribution Prior to SHP Modifications

Property Line, Company House, and Closest NSAs (Residences)	Distance and Direction to the Compressor Addition	Existing Sound Level Contribution of Station if Operated at Full Load (dBA)		
		Measured $L_{eq(d)}$	Measured $L_{eq(n)}$	Calculated L_{dn}
P1. Property Line	650 feet N	41.9	41.9	48.3
P2. Property Line	425 feet E	57.0	57.0	63.4
P3. Property Line	900 feet S	43.1	43.1	49.5
P4. Property Line	650 feet SW	41.5	41.5	47.9
S1. Company House	375 feet NW	50.5	50.5	56.9
S2. Residence	1,300 feet NW	38.0	38.0	44.4
S3. Residence	1,400 feet NNE	36.3	36.3	42.7
S4. Residence	1,200 feet NNE	39.7	39.7	46.1
S5. Residence	1,300 feet NE	38.6	38.6	45.0
S6. Residence	1,100 feet NE	45.0	45.0	51.4
S7. Residence	1,000 feet ENE	42.0	42.0	48.4
S8. Residence	1,500 feet ENE	37.4	37.4	43.8
S9. Residence	1,300 feet E	41.5	41.5	47.9
S10. Residence	650 feet E	53.6	53.6	60
S11. Residence	600 feet E	62.1	62.1	68.5
S12. Residence	650 feet ESE	50.8	50.8	57.2
S13. Residence	1,000 feet SE	42.9	42.9	49.3
S14. Residence	450 feet SE	52.5	52.5	58.9
S15. Residence	1,400 feet S	38.8	38.8	45.2
S16. Residence	2,100 feet WSW	32.1	32.1	38.5
S17. Residence	1,700 feet W	33.2	33.2	39.6

NSAs = noise sensitive areas, dBA = A-weighted sound level, $L_{eq\ (d)}$ = daytime equivalent sound levels, $L_{eq\ (n)}$ = nighttime equivalent sound levels, L_{dn} = day-night sound levels, N= north, E = east, S = south, SW = south west, NW = northwest, NNE = north-northwest, NE = northeast, ENE = east-northeast, SE = southeast, WSW = west-southwest, W = west.

At the property lines, existing station Ldn sound levels ranged from 47.9 to 63.4 dBA. The existing station Ldn sound levels ranged from 42.7 to 68.5 dBA at the NSAs (S3 through S15) where the JB Tonkin Compressor Station was audible. The existing station Ldn sound levels at S10 (60.0 dBA), S11 (68.5 dBA), S12 (57.2 dBA), and S14 (58.9 dBA) currently exceed the FERC limit of 55 dBA Ldn; these sound levels are due to the existing compressor unit, installed in 1995. The existing station Ldn sound levels at the three NSAs (S2, S16, and S17) where the JB Tonkin Compressor Station was not audible ranged from 38.5 to 44.4 dBA, which are below the FERC Ldn limit.

Compressor Station Noise Impact Evaluation

The acoustical analysis considers the noise that will be produced by continuous-operating equipment at the facility that could affect the sound contribution at the closest NSAs (S2 to S17). The results of the acoustical analysis for the two additional turbine compressor units at the JB Tonkin Compressor Station, including a description of the acoustical analysis methodology and source of sound data is provided in the JB Tonkin Compressor Station Noise Study (see Appendix 9B).

The following sound sources for the two additional turbine compressor units were considered to have the most noise contribution, as included in the acoustical analysis of the SHP modifications:

- noise generated by the turbines/compressors that penetrates the new compressor building;
- turbine exhaust noise (primary noise source that could generate perceptible vibration);
- noise radiated from turbine exhaust pipes;
- noise generated by the turbine air intake system;
- noise generated by the wall ventilation air inlet openings and air handling units;
- noise generated from the emergency wall air inlet fans;
- noise generated from the roof ventilation air discharge openings;
- noise generated from the outdoor lube oil coolers;
- noise generated from the outdoor gas coolers;
- noise radiated from aboveground gas piping and related piping components; and
- noise generated from emergency and routine maintenance blowdown events.

Table 9.2.4-46 provides an estimated summary of the noise quality analysis for the JB Tonkin Compressor Station, assuming operation of the facility at full load. The table includes the predicted L_{dn} sound levels from the two additional gas turbine compressor units; predicted total L_{dn} sound levels resulting from summing the L_{dn} sound levels from the two additional gas turbine compressor units with the baseline station and ambient L_{dn} sound levels; and predicted noise increase from existing L_{dn} sound levels.

The results of the acoustical analysis indicates that the continuous sound attributable to the two additional turbine compressor units operating at full rated load will be lower than the FERC L_{dn} limit of 55 dBA at the nearest NSAs (S2 to S17), provided the specified noise control measures for the SHP modification are successfully implemented. The predicted L_{dn} at the nearest NSA (S14 – approximately 450 feet from the two additional turbine compressor units) is 50.4 with a predicted noise decrease of 1.1 dBA from existing L_{dn} levels. For the remaining NSAs located at greater distances from the two additional turbine units, the predicted L_{dn} sound levels are lower. The results of the acoustical analysis also indicates that the sum of the L_{dn} sound levels from the two additional compressor units and the existing station and ambient L_{dn} sound levels are below the FERC limit at NSAs S2 through S9, S13, S15, S16, and S17 where the existing station and ambient L_{dn} sound levels are below 55 dBA.

TABLE 9.2.4-46

JB Tonkin Compressor Station – Noise Quality Analysis Associated with SHP Modifications

Property Line, Company House, and Closest NSAs (Residences)	Distance and Direction to the Compressor Addition	Existing Sound Level Contribution of Station Operating at 100% Load (dBA)			Baseline L_{dn} with Existing Piping Acoustically Insulated and Regulator Valve Actuators Enclosed (dBA)	Predicted L_{dn} from the Two Additional Gas Turbine Compressor Units (dBA)	Predicted Total L_{dn} (Two Additional Compressor Units + Baseline Station L_{dn}) (dBA)	Predicted Noise Increase from Existing L_{dn} (dBA)
		Measured $L_{eq(d)}$	Measured $L_{eq(n)}$	Calculated L_{dn}				
P1. Property Line	650 feet N	41.9	41.9	48.3	47.3	47.4	50.4	2.1
P2. Property Line	425 feet E	57.0	57.0	63.4	60.4	51.4	60.9	-2.5
P3. Property Line	900 feet S	43.1	43.1	49.5	47.5	43.4	48.9	-0.6
P4. Property Line	650 feet SW	41.5	41.5	47.9	46.9	47.4	50.2	2.3
S1. Company House	375 feet NW	50.5	50.5	56.9	54.9	53.4	57.2	0.3
S2. Residence	1,300 feet NW	38.0	38.0	44.4	44.4	39.4	45.6	1.2
S3. Residence	1,400 feet NNE	36.3	36.3	42.7	41.7	38.4	43.4	0.7
S4. Residence	1,200 feet NNE	39.7	39.7	46.1	45.1	40.4	46.4	0.3
S5. Residence	1,300 feet NE	38.6	38.6	45.0	44.0	39.4	45.3	0.3
S6. Residence	1,100 feet NE	45.0	45.0	51.4	49.4	41.4	50.0	-1.4
S7. Residence	1,000 feet ENE	42.0	42.0	48.4	46.4	42.4	47.9	-0.5
S8. Residence	1,500 feet ENE	37.4	37.4	43.8	41.8	38.4	43.4	-0.4
S9. Residence	1,300 feet E	41.5	41.5	47.9	45.9	39.4	46.8	-1.1
S10. Residence	650 feet E	53.6	53.6	60.0	57.0	47.4	57.5	-2.5
S11. Residence	600 feet E	62.1	62.1	68.5	64.5	48.4	64.6	-3.9
S12. Residence	650 feet ESE	50.8	50.8	57.2	55.2	47.4	55.9	-1.3
S13. Residence	1,000 feet SE	42.9	42.9	49.3	48.3	42.4	49.3	0.0
S14. Residence	450 feet SE	52.5	52.5	58.9	56.9	50.4	57.8	-1.1
S15. Residence	1,400 feet S	38.8	38.8	45.2	43.2	38.4	44.4	-0.8
S16. Residence	2,100 feet WSW	32.1	32.1	38.5	38.5	34.4	39.9	1.4
S17. Residence	1,700 feet W	33.2	33.2	39.6	39.6	37.4	41.6	2.0

NSAs = noise sensitive areas, dBA = A-weighted sound level, $L_{eq(d)}$ = daytime equivalent sound levels, $L_{eq(n)}$ = nighttime equivalent sound levels, L_{dn} = day-night sound levels, N= north, E = east, S = south, SW = south west, NW = northwest, NNE = north-northwest, NE = northeast, ENE = east-northeast, SE = southeast, WSW = west-southwest, W = west

The sound levels at the four NSAs (S10, S11, S12, and S14) where the existing station L_{dn} sound levels are above 55 dBA will not be increased as a result of the SHP modifications. The L_{dn} sound levels at these NSAs will actually be reduced following the installation of additional noise control measures on the existing station equipment. The specified noise control measures for the two additional turbine compressor units and existing compressor station are provided in the JB Tonkin Compressor Station Noise Study (see Appendix 9B) and summarized in the following sub-sections. Because noise sources that could cause perceptible vibration will also be adequately mitigated, there should not be a perceptible increase in vibration at NSAs during operation of the compressor station.

The noise level of the unit blowdown event via a blowdown silencer will be specified to meet a maximum A-wt. sound level of 60 dBA at 50 feet. The maximum sound level of a blowdown event associated with the new unit will be approximately 41 dBA at the closest NSA, which will be located approximately 450 feet from the blowdown silencer. Controlling noise levels of the unit blowdown at the closest NSA would ultimately control noise levels at NSAs located further away. Consequently, although the noise of a unit blowdown event could be slightly audible at the nearby NSAs, it is not expected to present a noise impact. In addition, a unit blowdown event occurs infrequently and for a short time frame (e.g., 1 to 5 minute period), which would further reduce potential impacts.

Noise Control Measures and Specifications for the Two Additional Turbine Compressor Units

The following provides recommended noise control measures and equipment sound specifications associated with the SHP modifications along with other equipment that may affect the noise generated by the JB Tonkin Compressor Station after installation of the SHP modifications.

Turbine Exhaust System

The turbine exhaust system for the two additional compressor units will include a silencer system that provides the following DIL values, which will also be adequate for minimizing perceptible increases in vibration due to this noise source. The exhaust pipes of the two additional turbine units will be acoustically insulated from the compressor building wall to the muffler flanges (including expansion joints). DIL values for the turbine exhaust muffler and exhaust pipe acoustic insulation are provided in Table 9.2.4-47.

Turbine Air Intake System

The turbine air intake system will be designed with an air cleaner/ silencers, and the air intake ducts will be acoustically insulated from the compressor building wall to the air cleaner housings (including expansion joints). DIL values for the air intake cleaner/silence and duct acoustic insulation are provided in Table 9.2.4-48.

TABLE 9.2.4-47

DIL Values for the Turbine Exhaust Muffler and Pipe Acoustic Insulation in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Exhaust Muffler									
Turbine Exhaust - Solar Taurus Model 70S	13 dB	22 dB	29 dB	41 dB	51 dB	46 dB	39 dB	32 dB	25 dB
Exhaust Pipe Acoustic Insulation									
Turbine Exhaust - Solar Taurus Model 70S	0 dB	0 dB	0 dB	0 dB	5 dB	10 dB	25 dB	25 dB	20 dB

Notes:
dB = decibel
DIL= dynamic sound insertion loss
Hz = Hertz

TABLE 9.2.4-48

DIL Values for the Turbine Air Intake Cleaner/Silencer and Duct Acoustic Insulation in dB per Octave-Band Center Frequency in Hz

Noise Control Source	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Air Intake Cleaner/Silencer									
Turbine Exhaust - Solar Taurus Model 70S	3 dB	15 dB	31 dB	40 dB	49 dB	50 dB	52 dB	80 dB	78 dB
Air Intake Duct Acoustic Insulation									
Turbine Exhaust - Solar Taurus Model 70S	0 dB	0 dB	0 dB	6 dB	12 dB	20 dB	26 dB	26 dB	22 dB

Notes:
dB = decibel
DIL= dynamic sound insertion loss
Hz = Hertz

Compressor Building

The turbine and compressor associated with the two new units will be installed in a proposed compressor building with the following sound attenuation measures:

- At a minimum, the walls and roof panels of the additional compressor building will be constructed with a STC of 49 and a NRC of 0.90. In addition, these panels will have minimum Sound Transmission Loss (TL) values as provided in Table 9.2.4-49.
- The additional compressor building personnel doors will be insulated, metal doors with full weather-stripping. At a minimum, the STC rating of theses doors will be 38. Windows in these doors, if present, will be double glazed using minimum 0.25 inch thick glass or acrylic panels separated by a minimum 0.5 inch airspace.
- The additional compressor building equipment door will be an insulated metal door with full weather-stripping.

TABLE 9.2.4-49

Compressor Building Wall and Roof Panel Minimum TL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
JB Tonkin Station Compressor Building	9 dB	15 dB	22 dB	38 dB	46 dB	48 dB	52 dB	53 dB	54 dB

Notes:
dB = decibel
TL = transmission loss
Hz = Hertz

- The additional compressor building will have a ventilation system installed to provide adequate cooling of the building to allow full load operation of the two additional turbine compressor units with all doors closed.
- The additional compressor building ventilation system will have a maximum of three air handling units. The maximum A-weighted sound level from each air handling unit will not exceed 70 dBA at 3 feet when measured outside of each air handling unit in all directions with maximum octave band sound pressure levels as provided in Table 9.2.4-50.

TABLE 9.2.4-50

Air Handling Unit Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
JB Tonkin Station Compressor Building	92 dB	89 dB	79 dB	71 dB	64 dB	60 dB	55 dB	54 dB	54 dB

Notes:
dB = decibel
Hz = Hertz

- Ventilation air inlet mufflers will be located in the air paths between the three air handling units and the additional compressor building wall penetrations to reduce the sound from the two additional turbine compressor units that escapes through these openings. The ventilation air inlet mufflers will also be located in the walls of the additional compressor building directly outside of the four emergency wall air inlet fans to reduce the sound from the two additional turbine compressor units that escapes through these openings. Each ventilation air inlet and air handling unit muffler will have minimum DIL as provided in Table 9.2.4-51.
- The additional compressor building ventilation system will have a maximum of four emergency wall inlet fans. The maximum A-weighted sound level from each emergency wall air inlet fan will not exceed 90 dBA at 3 feet when measured inside the compressor building without the two additional turbine compressor units operating with maximum octave band sound pressure levels as provided in Table 9.2.4-52.

TABLE 9.2.4-51

Ventilation Air Inlet and Air Handling Unit Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
JB Tonkin Station Compressor Building	4 dB	12 dB	20 dB	23 dB	42 dB	48 dB	45 dB	38 dB	21 dB

Notes:
dB = decibel
DIL = dynamic insertion loss
Hz = Hertz

TABLE 9.2.4-52

Emergency Wall Air Inlet Fan Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
JB Tonkin Station Compressor Building	99 dB	97 dB	95 dB	90 dB	86 dB	84 dB	82 dB	80 dB	77 dB

Notes:
dB = decibel
Hz = Hertz

- The additional compressor building ventilation system will have a maximum of four roof air discharge hoods with a maximum total area of 121 square feet. Ventilation air discharge mufflers will be located above the roof and under each roof air discharge hood to reduce the sound from the two additional turbine compressor units that escapes through these openings. Each ventilation air discharge muffler will have minimum DIL values as provided in Table 9.2.4-53.

TABLE 9.2.4-53

Ventilation Air Discharge Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
JB Tonkin Station Compressor Building	3 dB	9 dB	17 dB	25 dB	39 dB	46 dB	45 dB	40 dB	25 dB

Notes:
dB = decibel
DIL = dynamic insertion loss
Hz = Hertz

Lube Oil Cooler

The maximum noise from the lube oil cooler for each turbine compressor unit will not exceed an A-weighted sound pressure level of 50 dBA at 50 feet from the centerline of the cooler with all fans running at maximum speed. Each lube oil cooler (including all fans, motors, and drivers) will have maximum octave band sound pressure levels as provided in Table 9.2.4-54.

TABLE 9.2.4-54

Lube Oil Cooler Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Lube Oil Cooler	54 dB	61 dB	58 dB	51 dB	46 dB	43 dB	39 dB	35 dB	30 dB

Notes:
dB = decibel
Hz = Hertz

Gas Cooler

The maximum noise from the gas cooler for each turbine compressor unit will not exceed an A-weighted sound power level of 87 dBA with all fans running at maximum speed. Each gas cooler (including all fans, motors, and drives) will have maximum octave band sound power levels as provided in Table 9.2.4-55.

TABLE 9.2.4-55

Compressor Unit Gas Cooler Maximum Sound Power Level in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Gas Cooler	92 dB	93 dB	92 dB	89 dB	84 dB	82 dB	76 dB	70 dB	64 dB

Notes:
dB = decibel
Hz = Hertz

Aboveground Piping

All aboveground sections of the unit suction, discharge, and bypass lines and gas cooler inlet and outlet headers and piping (including the pipe supports) of the two additional compressor units will be acoustically insulated. The acoustic pipe insulation will have minimum IL values as provided in Table 9.2.4-56.

TABLE 9.2.4-56

Piping Insulation Minimum IL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Aboveground Piping	0 dB	0 dB	0 dB	6 dB	12 dB	20 dB	26 dB	26 dB	22 dB

Notes:
dB = decibel
IL = insertion loss
Hz = Hertz

Unit Blowdown Silencer

The maximum A-weighted sound pressure level from each silenced unit blowdown event will not exceed 60 dBA at 50 feet.

Noise Control Measures and Specifications for the Existing Compressor Station

The existing L_{dn} sound levels of 60.0 dBA at S10, 68.5 dBA at S11, 57.2 dBA at S12, and 58.9 dBA at S14 are due to noise from a section of 20 inch aboveground piping east-northeast of the existing compressor building, and noise from a vertical pipe with attached valve and four regulator valve actuators northeast of the existing compressor building. To reduce the sound from the existing station so that the total sound levels after the installation of the two additional turbine compressor units do not exceed the existing L_{dn} sound levels at these four NSAs, the section 20 inch aboveground piping and the vertical pipe including the valve will be acoustically insulated, and the regulator valve actuators will be enclosed in acoustically insulated enclosures as described below.

Aboveground Piping (Existing Station)

The section of 20 inch aboveground piping (including the pipe supports) and the vertical pipe including the valve will be acoustically insulated. This acoustic pipe insulation will have minimum IL values as provided in Table 9.2.4-57.

TABLE 9.2.4-57

Piping Insulation Minimum IL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Aboveground Piping	0 dB	0 dB	0 dB	6 dB	12 dB	20 dB	26 dB	26 dB	22 dB

Notes:
dB = decibel
IL = insertion loss
Hz = Hertz

Regulator Valve Actuators (Existing Station)

The following sound attenuation measures will be installed at the regulator actuator valves associated with the existing station:

- The four regulator valve actuators will be enclosed in two acoustically insulated enclosures. The walls and roofs of these enclosures will have a minimum STC of 29 and a minimum NRC of 0.90. In addition, these panels will have minimum TL values as provided in Table 9.2.4-58.
- The personnel doors for the regulator valve actuator will be insulated, metal doors with full weather-stripping. Windows in these doors, if present, will be double glazed using minimum 0.25 inch thick glass or acrylic panels separated by a minimum 0.5 inch airspace.

TABLE 9.2.4-58

Valve Actuator Enclosure Wall and Roof Panel Minimum IL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Regulator Valve Actuators	2 dB	8 dB	13 dB	18 dB	23 dB	31 dB	38 dB	40 dB	40 dB

Notes:
dB = decibel
IL = insertion loss
Hz = Hertz

- Acoustic louvers will be located in ventilation openings in the walls of the regulator valve actuator enclosures to reduce the sound from the regulator valve actuators that escape through these openings. Each acoustic louver will have minimum TL values as provided in Table 9.2.4-64.

TABLE 9.2.4-59

Acoustic Louver Minimum IL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Regulator Valve Actuators	2 dB	6 dB	9 dB	10 dB	11 dB	15 dB	19 dB	17 dB	16 dB

Notes:
dB = decibel
IL = insertion loss
Hz = Hertz

Crayne Compressor Station Modification

The existing Crayne Compressor Station includes two existing compressor buildings, associated aboveground piping, and other aboveground facilities (gas cooler, regulators, etc.). The land uses surrounding the station are residential, industrial, and farm fields. A Texas Eastern compressor station and M&R station are adjacent to the west property line, and the EQT Pratt Compressor Station is approximately 1,500 feet southwest. Fifteen NSAs (S1 to S6 and S8 to S16; all residences) were identified within 0.5-mile of the station. The company office building (S7) that was located to the east has been torn down and excluded from this noise analysis. A plot plan drawing showing surrounding NSAs within 0.5-mile of the station is provided in the Crayne Compressor Station Noise Study (see Appendix 9B).

Existing Compressor Station Equipment

The plot plan drawing provided in the Crayne Compressor Station Noise Study (see Appendix 9B) provides an area layout of the existing buildings/equipment and location of the planned compressor building. This compressor station currently consists of three Solar Taurus Model 60S turbine compressor units. The first two units are enclosed in the same building and were installed in 2004. The third unit is enclosed in a separate building and was installed in 2014.

Proposed Modifications

Modifications associated with the SHP will consist of the installation of one additional turbine compressor unit (Solar Taurus Model 60S turbine compressor unit) in a new acoustically insulated compressor building immediately west of the compressor building housing the originally installed two turbines. The additional turbine compressor unit will be installed in an addition to the east end of the compressor building housing the third existing unit. The addition of the new gas-driven turbine at the existing station will provide an additional 7,700 hp of compression.

The following describes auxiliary equipment associated with the SHP modification (i.e., one new gas-driven turbine):

- turbine exhaust systems designed with an adequate exhaust muffler system;
- turbine air intake filter (air cleaner) system designed with an adequate intake silencer;
- turbine air intake ducts designed with adequate acoustical insulation;
- aboveground gas piping associated with the new compressor unit designed with adequate acoustical insulation;
- compressor building ventilation systems (air handling units, emergency wall inlet fans, and ventilation air inlet and discharge openings) designed with adequate muffler systems;
- outdoor lube oil cooler that serves the turbine and compressor;
- gas coolers for the new compressor unit; and
- unit blowdown silencer for the new unit.

Existing Sound Contribution

Sound survey measurements were conducted at the property lines and nearest NSAs on January 13, 2015 with all three existing Solar Taurus Model 60 turbine compressor units operating at 96 percent of full rated load. The weather conditions were a temperature of 21 ˚F increasing to 23 ˚F, a relative humidity of 65 percent decreasing to 50 percent, mostly clear skies and light northeast winds (0 to 2 mph) changing to northeast winds (1 to 4 mph). The Crayne Compressor Station was only audible at NSAs S5, S6, and S8, and property line location S17. The compressor station was not audible at NSAs S1 through S4, and S9 through S16. Other audible sound sources observed during the measurement period (ambient sound sources) were traffic, birds, dogs barking, cows, aircraft, wind blowing through trees, a water fountain at S10, power line tree trimming at S11, water flowing in a stream near S16, and the Texas Eastern compressor station at S14, S15, and S17. The station sound levels at S12 and S13 have been projected from the L_{eq} sound levels measured at the southwest property corner (S17) because access to these two NSAs was denied. Table 9.2.4-60 summarizes the existing sound level contribution of the Crayne Compressor Station at the nearest NSAs and the southwest property corner.

TABLE 9.2.4-60

Crayne Compressor Station – Existing Sound Level Contribution Prior to SHP Modifications

Closest NSAs (Residences) and Property Corner	Distance and Direction to the Compressor Addition	Existing Sound Level Contribution of Station Operating 96% Load (dBA)		
		Measured $L_{eq(d)}$	Measured $L_{eq(n)}$	Calculated L_{dn}
S1. Residence	1,700 feet NNW	40.1	40.1	46.5
S2. Residence	1,450 feet N	37.2	37.2	43.6
S3. Residence	1,100 feet NNE	36.0	36.0	42.4
S4. Residence	900 feet NNE	35.3	35.3	41.7
S5. Residence	800 feet NE	39.0	39.0	45.4
S6. Residence	500 feet ENE	44.2	44.2	50.6
S8. Residence	450 feet ESE	45.9	45.9	52.3
S9. Residence	1,800 feet ENE	43.7	43.7	50.1
S10. Residence	3,100 feet SE	38.8	38.8	45.2
S11. Residence	3,600 feet SSE	36.2	36.2	42.6
S12. Residence	1,900 feet SSW	43.4	43.4	49.8
S13. Residence	2,000 feet SSW	42.9	42.9	49.3
S14. Residence	1,900 feet SW	46.2	46.2	52.6
S15. Residence	2,500 feet SW	40.2	40.2	46.6
S16. Residence	3,200 feet W	32.3	32.3	38.7
S17. Property Corner	850 feet SSW	50.9	50.9	57.3

NSAs = noise sensitive areas, dBA = A-weighted sound level, $L_{eq\,(d)}$ = daytime equivalent sound levels, $L_{eq\,(n)}$ = nighttime equivalent sound levels, L_{dn} = day-night sound levels, NNW = north-northwest, N= north, NNE = north-northeast, NE = northeast, ENE = east-northeast, ESE = east-southeast, SE = southeast, SSE = south-southeast, SSW = south-southwest, SW = southwest, W = west.

At the nearest NSAs (S1 through S6 and S8 through S16), the existing L_{dn} sound levels with the three existing turbine compressor units operating ranged from 38.7 to 52.6 dBA, which are below the FERC L_{dn} limit of 55 dBA.

Compressor Station Noise Impact Evaluation

The acoustical analysis considers the noise that will be produced by continuous-operating equipment at the facility that could affect the sound contribution at the closest NSAs (S1 to S6 and S8 to S16). The results of the acoustical analysis for the additional turbine compressor unit at the Crayne Compressor Station, including a description of the acoustical analysis methodology and source of sound data is provided in the Crayne Compressor Station Noise Study (see Appendix 9B).

The following sound sources for the additional turbine compressor unit was considered to have the most noise contribution, as included in the acoustical analysis of the SHP modifications:

- noise generated by the turbines/compressors that penetrates the compressor building addition;
- turbine exhaust noise (primary noise source that could generate perceptible vibration);
- noise radiated from turbine exhaust pipes;
- noise generated by the turbine air intake system;

- noise generated by the wall ventilation air inlet openings and air handling units;
- noise generated from the emergency wall air inlet fans;
- noise generated from the roof ventilation air discharge openings;
- noise generated from the outdoor lube oil coolers;
- noise generated from the outdoor gas coolers;
- noise radiated from aboveground gas piping and related piping components; and
- noise generated from emergency and routine maintenance blowdown events

Table 9.2.4-61 provides an estimated summary of the noise quality analysis for the Crayne Compressor Station, assuming operation of the facility at full load. The table includes the predicted L_{dn} sound levels from the additional gas turbine compressor unit; predicted total L_{dn} sound levels resulting from summing the L_{dn} sound levels from the additional gas turbine compressor unit with the baseline station and ambient L_{dn} sound levels; and predicted noise increase from existing L_{dn} sound levels.

The results of the acoustical analysis indicates that the continuous sound attributable to the additional turbine compressor unit operating at full rated load will be lower than the FERC L_{dn} limit of 55 dBA at all identified NSAs (S1 to S6, and S8 to S17), provided the specified noise control measures for the SHP modifications are successfully implemented. The predicted L_{dn} at the nearest NSA (S8 – approximately 450 feet from the additional turbine compressor unit) is 45.4 with a predicted noise decrease of 0.8 dBA from existing L_{dn} levels. For the remaining NSAs located at greater distances from the additional turbine unit, the predicted L_{dn} sound levels are lower. The results of the acoustical analysis also indicates that the sum of the L_{dn} sound levels from the additional turbine compressor unit and the existing station and ambient L_{dn} sound levels are below the FERC limit at all the nearest NSAs.

The specified noise control measures for the additional turbine compressor unit is provided in the Crayne Compressor Station Noise Study (see Appendix 9B) and summarized in the following sub-section. Because noise sources that could cause perceptible vibration will also be adequately mitigated, there should not be a perceptible increase in vibration at NSAs during operation of the compressor station.

The noise level of the unit blowdown event via a blowdown silencer will be specified to meet a maximum A-weighted sound level of 60 dBA at 50 feet. The maximum sound level of a blowdown event associated with the new unit will be approximately 41 dBA at the closest NSA, located approximately 450 feet from the blowdown silencer. Controlling noise levels of the unit blowdown at the closest NSA would ultimately control noise levels at NSAs located further away. Consequently, although the noise of a unit blowdown event could be slightly audible at the nearby NSAs, it is not expected to present a noise impact. In addition, a unit blowdown event occurs infrequently and for a short time frame (e.g., 1 to 5 minute period), which would further reduce potential impacts.

TABLE 9.2.4-61

Crayne Compressor Station – Noise Quality Analysis Associated with SHP Modifications

Closest NSAs (Residences) and Property Corner	Distance and Direction to the Compressor Addition	Existing Sound Level Contribution of Station Operating at 96% Load (dBA)			Predicted L_{dn} from the Additional Gas Turbine Compressor Unit (dBA)	Predicted Total L_{dn} (Additional Compressor Unit + Existing Station L_{dn}) (dBA)	Predicted Noise Increase from Existing L_{dn} (dBA)
		Measured $L_{eq(d)}$	Measured $L_{eq(n)}$	Calculated L_{dn}			
S1. Residence	1,700 feet NNW	40.1	40.1	46.5	32.4	46.7	0.2
S2. Residence	1,450 feet N	37.2	37.2	43.6	33.4	44.0	0.4
S3. Residence	1,100 feet NNE	36	36	42.4	36.4	43.4	1.0
S4. Residence	900 feet NNE	35.3	35.3	41.7	38.4	43.4	1.7
S5. Residence	800 feet NE	39	39	45.4	40.4	46.6	1.2
S6. Residence	500 feet ENE	44.2	44.2	50.6	44.4	51.5	0.9
S8. Residence	450 feet ESE	45.9	45.9	52.3	45.4	53.1	0.8
S9. Residence	1,800 feet ENE	43.7	43.7	50.1	31.4	50.2	0.1
S10. Residence	3,100 feet SE	38.8	38.8	45.2	25.4	45.2	0.0
S11. Residence	3,600 feet SSE	36.2	36.2	42.6	23.4	42.7	0.1
S12. Residence	1,900 feet SSW	43.4	43.4	49.8	31.4	49.9	0.1
S13. Residence	2,000 feet SSW	42.9	42.9	49.3	30.4	49.4	0.1
S14. Residence	1,900 feet SW	46.2	46.2	52.6	31.4	52.6	0.0
S15. Residence	2,500 feet SW	40.2	40.2	46.6	27.4	46.7	0.1
S16. Residence	3,200 feet W	32.3	32.3	38.7	24.4	38.9	0.2
S17. Property Corner	850 feet SSW	50.9	50.9	57.3	39.4	57.4	0.1

NSAs = noise sensitive areas, dBA = A-weighted sound level, $L_{eq\,(d)}$ = daytime equivalent sound levels, $L_{eq\,(n)}$ = nighttime equivalent sound levels, L_{dn} = day-night sound levels, NNW = north-northwest, N= north, NNE = north-northeast, NE = northeast, ENE = east-northeast, ESE = east-southeast, SE = southeast, SSE = south-southeast, SSW = south-southwest, SW = southwest, W = west.

Noise Control Measures and Specifications for the Two Additional Turbine Compressor Units

The following provides recommended noise control measures and equipment sound specifications associated with the SHP modifications along with other equipment that may affect the noise generated by the Crayne Compressor Station after installation of the SHP modifications.

Turbine Exhaust System

The turbine exhaust system for the additional compressor unit will include a silencer system that provides the following dynamic DIL values, which will also be adequate for minimizing perceptible increases in vibration due to this noise source. The exhaust pipe of the additional turbine unit will be acoustically insulated from the compressor building addition wall to the muffler flange (including expansion joints). DIL values for the turbine exhaust muffler and exhaust pipe acoustic insulation are provided in Table 9.2.4-62.

Turbine Air Intake System

The turbine air intake system will be designed with an air cleaner/ silencer, and the air intake ducts will be acoustically insulated from the compressor building wall to the air cleaner housings (including expansion joints). DIL values for the air intake cleaner/silencer and duct acoustic insulation are provided in Table 9.2.4-63.

TABLE 9.2.4-62

DIL Values for the Turbine Exhaust Muffler and Pipe Acoustic Insulation in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Exhaust Muffler									
Turbine Exhaust - Solar Taurus Model 60S	13 dB	22 dB	29 dB	41 dB	51 dB	46 dB	39 dB	32 dB	25 dB
Exhaust Pipe Acoustic Insulation									
Turbine Exhaust - Solar Taurus Model 60S	0 dB	0 dB	0 dB	0 dB	5 dB	10 dB	25 dB	25 dB	20 dB

Notes:
dB = decibel
DIL = dynamic sound insertion loss
Hz = Hertz

TABLE 9.2.4-63

DIL Values for the Turbine Air Intake Cleaner/Silencer and Duct Acoustic Insulation in dB per Octave-Band Center Frequency in Hz

Noise Control Source	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Air Intake Cleaner/Silencer									
Turbine Exhaust - Solar Taurus Model 60S	3 dB	15 dB	31 dB	40 dB	49 dB	50 dB	52 dB	80 dB	78 dB
Air Intake Duct Acoustic Insulation									
Turbine Exhaust - Solar Taurus Model 60S	0 dB	0 dB	0 dB	6 dB	12 dB	20 dB	26 dB	26 dB	22 dB

Notes:
dB = decibel
DIL= dynamic sound insertion loss
Hz = Hertz

Compressor Building

The turbine and compressor associated with the new compressor unit will be installed in the compressor building addition with the following sound attenuation measures:

- At a minimum, the walls and roof panels of the additional compressor building addition will be constructed with a STC of 49 and a NRC of 0.90. In addition, these panels will have minimum TL values as provided in Table 9.2.4-64.
- The compressor building addition personnel doors will be insulated, metal doors with full weather-stripping. At a minimum, the STC rating of theses doors will be 38. Windows in these doors, if present, will be double glazed using minimum 0.25 inch thick glass or acrylic panels separated by a minimum 0.5 inch airspace.

TABLE 9.2.4-64

Compressor Building Wall and Roof Panel Minimum TL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Crayne Station Compressor Building Addition	9 dB	15 dB	22 dB	38 dB	46 dB	48 dB	52 dB	53 dB	54 dB

Notes:
dB = decibel
TL = transmission loss
Hz = Hertz

- The compressor building addition will have a ventilation system installed to provide adequate cooling of the building to allow full load operation of the additional turbine compressor unit with all doors closed.
- The compressor building addition ventilation system will have a maximum of one air handling units. The maximum A-weighted sound level from this air handling unit will not exceed 70 dBA at 3 feet when measured outside of the air handling unit in all directions with maximum octave band sound pressure levels as provided in Table 9.2.4-65.

TABLE 9.2.4-65

Air Handling Unit Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Crayne Station Compressor Building Addition	92 dB	89 dB	79 dB	71 dB	64 dB	60 dB	55 dB	54 dB	54 dB

Notes:
dB = decibel
Hz = Hertz

- Ventilation air inlet mufflers will be located in the air paths between the air handling unit and the compressor building addition wall penetration to reduce the sound from the additional turbine compressor unit that escapes through this opening. The ventilation air inlet mufflers will also be located in the walls of the compressor building addition directly outside of the two emergency wall air inlet fans to reduce the sound from the additional turbine compressor unit that escapes through these openings. Each ventilation air inlet and air handling unit muffler will have minimum DIL as provided in Table 9.2.4-66.
- The compressor building addition ventilation system will have a maximum of two emergency wall inlet fans. The maximum A-weighted sound level from each emergency wall air inlet fan will not exceed 90 dBA at 3 feet when measured inside the compressor building without the additional turbine compressor unit operating with maximum octave band sound pressure levels as provided in Table 9.2.4-67.

TABLE 9.2.4-66

Ventilation Air Inlet and Air Handling Unit Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Crayne Station Compressor Building Addition	4 dB	12 dB	20 dB	23 dB	42 dB	48 dB	45 dB	38 dB	21 dB

Notes:
dB = decibel
DIL = dynamic insertion loss
Hz = Hertz

TABLE 9.2.4-67

Emergency Wall Air Inlet Fan Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Crayne Station Compressor Building Addition	99 dB	97 dB	95 dB	90 dB	86 dB	84 dB	82 dB	80 dB	77 dB

Notes:
dB = decibel
Hz = Hertz

- The compressor building addition ventilation system will have a maximum of two roof air discharge hoods with a maximum total area of 61 square feet. Ventilation air discharge mufflers will be located above the roof and under each roof air discharge hood to reduce the sound from the additional turbine compressor unit that escapes through these openings. Each ventilation air discharge muffler will have minimum DIL values as provided in Table 9.2.4-68.

TABLE 9.2.4-68

Ventilation Air Discharge Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Crayne Station Compressor Building Addition	3 dB	9 dB	17 dB	25 dB	39 dB	46 dB	45 dB	40 dB	25 dB

Notes:
dB = decibel
DIL = dynamic insertion loss
Hz = Hertz

Lube Oil Cooler

The maximum noise from the lube oil cooler for the additional turbine compressor unit will not exceed an A-weighted sound pressure level of 60 dBA at 50 feet from the centerline of the cooler with all fans running at maximum speed. This lube oil cooler (including all fans, motors, and drivers) will have maximum octave band sound pressure levels as provided in Table 9.2.4-69.

TABLE 9.2.4-69

Lube Oil Cooler Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Lube Oil Cooler	54 dB	61 dB	58 dB	51 dB	46 dB	43 dB	39 dB	35 dB	30 dB

Notes:
dB = decibel
Hz = Hertz

Gas Cooler

The maximum noise from the gas cooler for the additional turbine compressor unit will not exceed an A-weighted sound power level of 87 dBA with all fans running at maximum speed. Each gas cooler (including all fans, motors, and drives) will have maximum octave band sound power levels as provided in Table 9.2.4-70.

TABLE 9.2.4-70

Compressor Unit Gas Cooler Maximum Sound Power Level in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Gas Cooler	92 dB	93 dB	92 dB	89 dB	84 dB	82 dB	76 dB	70 dB	64 dB

Notes:
dB = decibel
Hz = Hertz

Aboveground Piping

All aboveground sections of the unit suction, discharge, and bypass lines and gas cooler inlet and outlet headers and piping (including the pipe supports) of the additional compressor unit will be acoustically insulated. The acoustic pipe insulation will have minimum IL values as provided in Table 9.2.4-71.

TABLE 9.2.4-71

Piping Insulation Minimum IL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Aboveground Piping	0 dB	0 dB	0 dB	6 dB	12 dB	20 dB	26 dB	26 dB	22 dB

Notes:
dB = decibel
IL = insertion loss
Hz = Hertz

Unit Blowdown Silencer

The maximum A-weighted sound pressure level from the silenced unit blowdown event will not exceed 60 dBA at 50 feet.

Mockingbird Hill Compressor Station Modification

The existing Mockingbird Hill Compressor Station includes one existing compressor building, associated aboveground piping, and other aboveground facilities (gas cooler, regulators, etc.). The land uses surrounding the station are residential, industrial, and forested areas. The DTI Lewis Wetzel Compressor Station is approximately 2,800 feet west-southwest, the DTI Hastings Compressor Station is approximately 3,000 feet west-southwest, the DTI Hastings Extraction Plant is approximately 4,100 feet west, and the Eureka Hunter Pipeline Compressor Station is approximately 5,000 feet south of the additional proposed compressor building at the Mockingbird Hill Compressor Station. The CSX railroad tracks run along the west side of State Route 20 along Fishing Creek. Seven NSAs (S1 and S5 to S10; all residences) were identified within 0.5-mile of the station. The house (S4) on the planned property will be torn down and as such, excluded from further noise analysis. A plot plan drawing showing surrounding NSAs within 0.5-mile of the station is provided in the Mockingbird Hill Compressor Station Noise Study (see Appendix 9B).

Existing Compressor Station Equipment

The plot plan drawing provided in the Mockingbird Hill Compressor Station Noise Study (see Appendix 9B) provides an area layout of the existing buildings/equipment and location of the planned compressor building. This compressor station currently consists of one Solar Taurus Model 60S turbine compressor unit that was installed in 2008.

Proposed Modifications

Modifications associated with the SHP will consist of the installation of two additional turbine compressor units (two Solar Titan Model 130S turbine compressor units) in a new acoustically insulated compressor building approximately 1,850 feet north-northeast of the existing compressor building. The addition of the two new gas-driven turbines at the existing station will provide an additional 41,000 hp of compression.

The following describes auxiliary equipment associated with the SHP modification (i.e., two new gas-driven turbines):

- turbine exhaust systems designed with an adequate exhaust muffler system;
- turbine air intake filter (air cleaner) system designed with an adequate intake silencer;
- turbine air intake ducts designed with adequate acoustical insulation;
- aboveground gas piping associated with the new compressor units designed with adequate acoustical insulation;
- compressor building ventilation systems (air handling units, emergency wall inlet fans, and ventilation air inlet and discharge openings) designed with adequate muffler systems;
- outdoor lube oil cooler that serves the turbine and compressor;

- gas coolers for the new compressor units; and
- unit blowdown silencer for the new units.

Existing and Baseline Sound Contribution

Sound survey measurements were conducted at the nearest NSAs on January 14, 2015 with the existing turbine compressor unit operating at 100 percent of full rated load. The weather conditions were a temperature of 22 ˚F increasing to 30 ˚F, a relative humidity of 60 percent increasing to 70 percent, overcast skies with snow showers and light north-northwest winds (1 to 4 mph). The Mockingbird Hill Compressor Station was audible at NSAs S5, S8, S9, and S10. The compressor station was not audible at NSAs S1, S6, and S7 and the company houses S2 and S3. Other audible sound sources observed during the measurement period (ambient sound sources) were traffic on State Route 20, birds, dogs barking, aircraft, an off-road vehicle, the Eureka Hunter Pipeline Compressor Station, a tractor atS6 and S7, and the Hasting Extraction Plant at S1, S2, and S3.

Table 9.2.4-72 summarizes the existing sound level contribution of the Mockingbird Hill Compressor Station at the nearest NSAs and company houses. The existing L_{dn} sound levels ranged from 41.7 to 49.6 dBA at the NSAs (S5, S8, S9, and S10) where the Mockingbird Hill Compressor Station was audible, which are below the FERC L_{dn} limit of 55 dBA. The existing L_{dn} sound levels at the three NSAs (S1, S6, and S7) where the Mockingbird Hill Compressor Station was not audible ranged from 45.9 to 49.9 dBA, which are also below the FERC L_{dn} limit of 55 dBA.

Prior to the SHP modifications, discharge coolers are planned to be installed at the station in 2016 for the Monroe to Cornwell Project (i.e., a separate project). The predicted L_{dn} sound levels from the station discharge gas coolers are presented in Table 9.2.4-72. The sum of the existing station and ambient L_{dn} sound levels and the predicted L_{dn} sound levels from the station discharge gas coolers to be installed in 2016 are referred to as baseline sound level contribution, and also included in the table. The baseline L_{dn} sound levels with station discharge gas coolers installed ranged from 43.1 to 49.9 dBA at the NSAs (S1 and S5, through S10), which are below the FERC L_{dn} limit of 55 dBA. The baseline L_{dn} sound levels at the two company houses (S1 and S3) ranged from 66.8 to 70.4 dBA. Though these baseline L_{dn} levels exceed the FERC limit; however, company houses are not considered NSAs.

Compressor Station Noise Impact Evaluation

The acoustical analysis considers the noise that will be produced by continuous-operating equipment at the facility that could affect the sound contribution at the closest NSAs (S1 and S5 to S10). The results of the acoustical analysis for the two additional turbine compressor units at the Mockingbird Hill Compressor Station, including a description of the acoustical analysis methodology and source of sound data is provided in the Mockingbird Hill Compressor Station Noise Study (see Appendix 9B).

TABLE 9.2.4-72

Mockingbird Hill Compressor Station – Existing and Baseline Sound Level Contribution Prior to SHP Modifications

Closest NSAs (Residences) and Company Houses	Distance and Direction to the Compressor Addition	Existing Sound Level Contribution of Station Operating at 100% Load (dBA)			Predicted L_{dn} from the Station Discharge Gas Coolers to be Installed in 2016 for the Monroe to Cornwell Project (dBA)	Baseline L_{dn} with Station Discharge Gas Coolers Installed, prior to SHP Modifications (dBA)
		Measured $L_{eq(d)}$	Measured $L_{eq(n)}$	Calculated L_{dn}		
S1. Residence	4,500 feet WNW	43.5	43.5	49.9	18.4	49.9
S2. Company House	3,300 feet W	64.0	64.0	70.4	26.4	70.4
S3. Company House	3,100 feet W	60.4	60.4	66.8	27.4	66.8
S5. Residence	750 feet NNW	43.2	43.2	49.6	28.4	49.6
S6. Residence	2,600 feet SSE	39.5	39.5	45.9	31.4	46.1
S7. Residence	2,800 feet S	40.5	40.5	46.9	30.4	47.0
S8. Residence	2,400 feet SSW	39.0	39.0	45.4	38.4	46.2
S9. Residence	2,500 feet SSW	35.3	35.3	41.7	37.4	43.1
S10. Residence	3,000 feet SSW	38.9	38.9	45.3	33.4	45.6

NSAs = noise sensitive areas, dBA = A-weighted sound level, $L_{eq\,(d)}$ = daytime equivalent sound levels, $L_{eq\,(n)}$ = nighttime equivalent sound levels, L_{dn} = day-night sound levels, WNW = west-northwest, W = west, NNW = north-northwest, SSE = south-southeast, S = south, SSW = south-southwest.

The following sound sources for the two additional turbine compressor units were considered to have the most noise contribution, as included in the acoustical analysis of the SHP modifications:

- noise generated by the turbines/compressors that penetrates the new compressor building;
- turbine exhaust noise (primary noise source that could generate perceptible vibration);
- noise radiated from turbine exhaust pipes;
- noise generated by the turbine air intake system;
- noise generated by the wall ventilation air inlet openings and air handling units;
- noise generated from the emergency wall air inlet fans;
- noise generated from the roof ventilation air discharge openings;
- noise generated from the outdoor lube oil coolers;
- noise generated from the outdoor gas coolers;
- noise radiated from aboveground gas piping and related piping components; and
- noise generated from emergency and routine maintenance blowdown events

Table 9.2.4-73 provides an estimated summary of the noise quality analysis for the Mockingbird Hill Compressor Station, assuming operation of the facility at full load. The table includes the predicted L_{dn} sound levels from the two additional gas turbine compressor units; predicted total L_{dn} sound levels resulting from summing the L_{dn} sound levels from the two

additional gas turbine compressor units with the baseline station and ambient L_{dn} sound levels; and predicted noise increase from baseline L_{dn} sound levels.

The results of the acoustical analysis indicates that the continuous sound attributable to the two additional turbine compressor units operating at full rated load will be lower than the FERC L_{dn} limit of 55 dBA at the nearest NSAs (S1 and S5 to S10), provided the specified noise control measures for the SHP modification are successfully implemented. The predicted L_{dn} at the nearest NSA (S5 – approximately 750 feet from the two additional turbine compressor units) is 46.4 with a predicted noise increase of 2.0 dBA from baseline L_{dn} levels. For the remaining NSAs located at greater distances from the two additional turbine compressor units, the predicted L_{dn} sound levels are lower. The results of the acoustical analysis also indicates that the sum of the L_{dn} sound levels from the two additional turbine compressor units and the existing station and ambient L_{dn} sound levels are below the FERC limit at all NSAs.

TABLE 9.2.4-73

Mockingbird Hill Compressor Station – Noise Quality Analysis Associated with SHP **Modifications**

Closest NSAs (Residences) and Company Houses	Distance and Direction to the Compressor Addition	Existing Sound Level Contribution of Station Operating at 100% Load (dBA)			Predicted L_{dn} from the Station Discharge Gas Coolers to be Installed in 2016 for the Monroe to Cornwell Project (dBA)	Baseline L_{dn} with Station Discharge Gas Coolers Installed, prior to SHP Modifications (dBA)	Predicted L_{dn} from the Two Additional Gas Turbine Compressor Units (dBA)	Predicted Total L_{dn} (Two Additional Compressor Units + Baseline Station L_{dn}) (dBA)	Predicted Noise Increase from Baseline L_{dn} (dBA)
		Measured $L_{eq(d)}$	Measured $L_{eq(n)}$	Calculated L_{dn}					
S1. Residence	4,500 feet WNW	43.5	43.5	49.9	18.4	49.9	25.4	49.9	0.0
S2. Company House	3,300 feet W	64.0	64.0	70.4	26.4	70.4	30.4	70.4	0.0
S3. Company House	3,100 feet W	60.4	60.4	66.8	27.4	66.8	31.4	66.8	0.0
S5. Residence	750 feet NNW	43.2	43.2	49.6	28.4	49.6	46.4	51.3	1.7
S6. Residence	2,600 feet SSE	39.5	39.5	45.9	31.4	46.1	33.4	46.3	0.2
S7. Residence	2,800 feet S	40.5	40.5	46.9	30.4	47.0	32.4	47.1	0.1
S8. Residence	2,400 feet SSW	39.0	39.0	45.4	38.4	46.2	34.4	46.5	0.3
S9. Residence	2,500 feet SSW	35.3	35.3	41.7	37.4	43.1	33.4	43.5	0.4
S10. Residence	3,000 feet SSW	38.9	38.9	45.3	33.4	45.6	31.4	45.8	0.2

NSAs = noise sensitive areas, dBA = A-weighted sound level, $L_{eq\,(d)}$ = daytime equivalent sound levels, $L_{eq\,(n)}$ = nighttime equivalent sound levels, L_{dn} = day-night sound levels, WNW = west-northwest, W = west, NNW = north-northwest, SSE = south-southeast, S = south, SSW = south-southwest.

The specified noise control measures for the two additional turbine compressor units are provided in the Mockingbird Hill Compressor Station Noise Study (see Appendix 9B) and summarized in the following sub-sections. Because noise sources that could cause perceptible vibration will also be adequately mitigated, there should not be a perceptible increase in vibration at NSAs during operation of the compressor station.

The noise level of the unit blowdown event via a blowdown silencer will be specified to meet a maximum A-wt. sound level of 60 dBA at 50 feet. The maximum sound level of a blowdown event associated with the new unit will be approximately 37 dBA at the closest NSA, located approximately 750 feet from the blowdown silencer. Controlling noise levels of the unit

blowdown at the closest NSA would ultimately control noise levels at NSAs located further away. Consequently, although the noise of a unit blowdown event could be slightly audible at the nearby NSAs, it is not expected to present a noise impact. In addition, a unit blowdown event occurs infrequently and for a short time frame (e.g., 1 to 5 minute period), which would further reduce potential impacts.

Noise Control Measures and Specifications for the Two Additional Turbine Compressor Units

The following provides recommended noise control measures and equipment sound specifications associated with the SHP modifications along with other equipment that may affect the noise generated by the Mockingbird Hill Compressor Station after installation of the SHP modifications.

Turbine Exhaust System

The turbine exhaust system for the two additional turbine compressor units will include a silencer system that provides the following dynamic sound insertion loss (DIL) values, which will also be adequate for minimizing perceptible increases in vibration due to this noise source. The exhaust pipes of the two additional turbine units will be acoustically insulated from the compressor building wall to the muffler flanges (including expansion joints). DIL values for the turbine exhaust muffler and exhaust pipe acoustic insulation are provided in Table 9.2.4-74.

TABLE 9.2.4-74

DIL Values for the Turbine Exhaust Muffler and Pipe Acoustic Insulation in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Exhaust Muffler									
Turbine Exhaust - Solar Titan Model 130S	13 dB	24 dB	31 dB	41 dB	49 dB	46 dB	42 dB	33 dB	24 dB
Exhaust Pipe Acoustic Insulation									
Turbine Exhaust - Solar Titan Model 130S	0 dB	0 dB	0 dB	0 dB	5 dB	10 dB	25 dB	25 dB	20 dB

Notes:
dB = decibel
DIL= dynamic sound insertion loss
Hz = Hertz

Turbine Air Intake System

The turbine air intake system will be designed with an air cleaner/ silencers, and the air intake ducts will be acoustically insulated from the compressor building wall to the air cleaner housings (including expansion joints). DIL values for the air intake cleaner/silence and duct acoustic insulation are provided in Table 9.2.4-75.

TABLE 9.2.4-75

DIL Values for the Turbine Air Intake Cleaner/Silencer and Duct Acoustic Insulation in dB per Octave-Band Center Frequency in Hz

Noise Control Source	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Air Intake Cleaner/Silencer									
Turbine Exhaust - Solar Titan Model 130S	5 dB	18 dB	33 dB	41 dB	46 dB	50 dB	57 dB	88 dB	81 dB
Air Intake Duct Acoustic Insulation									
Turbine Exhaust - Solar Titan Model 130S	0 dB	0 dB	0 dB	6 dB	12 dB	20 dB	26 dB	26 dB	22 dB

Notes:
dB = decibel
DIL= dynamic sound insertion loss
Hz = Hertz

Compressor Building

The turbine and compressor associated with the two new units will be installed in a proposed compressor building with the following sound attenuation measures:

- At a minimum, the walls and roof panels of the additional compressor building will be constructed with a STC of 49 and a NRC of 0.90. In addition, these panels will have minimum TL values as provided in Table 9.2.4-76.

TABLE 9.2.4-76

Compressor Building Wall and Roof Panel Minimum TL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Mockingbird Hill Compressor Station Compressor Building	9 dB	15 dB	22 dB	38 dB	46 dB	48 dB	52 dB	53 dB	54 dB

Notes:
dB = decibel
TL = transmission loss
Hz = Hertz

- The additional compressor building personnel doors will be insulated, metal doors with full weather-stripping. At a minimum, the STC rating of theses doors will be 38. Windows in these doors, if present, will be double glazed using minimum 0.25 inch thick glass or acrylic panels separated by a minimum 0.5 inch airspace.
- The additional compressor building equipment door will be an insulated metal door with full weather-stripping.
- The additional compressor building will have a ventilation system installed to provide adequate cooling of the building to allow full load operation of the two additional turbine compressor units with all doors closed.
- The additional compressor building ventilation system will have a maximum of three air handling units. The maximum A-weighted sound level from each air handling unit will not exceed 70 dBA at 3 feet when measured outside of each air

handling unit in all directions with maximum octave band sound pressure levels as provided in Table 9.2.4-77.

TABLE 9.2.4-77

Air Handling Unit Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Mockingbird Hill Compressor Station Compressor Building	92 dB	89 dB	79 dB	71 dB	64 dB	60 dB	55 dB	54 dB	54 dB

Notes:
dB = decibel
Hz = Hertz

- Ventilation air inlet mufflers will be located in the air paths between the three air handling units and the additional compressor building wall penetrations to reduce the sound from the three additional turbine compressor units that escapes through these openings. The ventilation air inlet mufflers will also be located in the walls of the additional compressor building directly outside of the three emergency wall air inlet fans to reduce the sound from the two additional turbine compressor units that escapes through these openings. Each ventilation air inlet and air handling unit muffler will have minimum DIL as provided in Table 9.2.4-78.

TABLE 9.2.4-78

Ventilation Air Inlet and Air Handling Unit Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Mockingbird Hill Compressor Station Compressor Building	4 dB	12 dB	20 dB	23 dB	42 dB	48 dB	45 dB	38 dB	21 dB

Notes:
dB = decibel
DIL = dynamic insertion loss
Hz = Hertz

- The additional compressor building ventilation system will have a maximum of four emergency wall inlet fans. The maximum A-weighted sound level from each emergency wall air inlet fan will not exceed 90 dBA at 3 feet when measured inside the compressor building without the two additional turbine compressor units operating with maximum octave band sound pressure levels as provided in Table 9.2.4-79.

TABLE 9.2.4-79

Emergency Wall Air Inlet Fan Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Mockingbird Hill Compressor Station Compressor Building	99 dB	97 dB	95 dB	90 dB	86 dB	84 dB	82 dB	80 dB	77 dB

Notes:
dB = decibel
Hz = Hertz

- The additional compressor building ventilation system will have a maximum of six roof air discharge hoods with a maximum total area of 121 square feet. Ventilation air discharge mufflers will be located above the roof and under each roof air discharge hood to reduce the sound from the two additional turbine compressor units that escapes through these openings. Each ventilation air discharge muffler will have minimum DIL values as provided in Table 9.2.4-80.

TABLE 9.2.4-80

Ventilation Air Discharge Muffler Minimum DIL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Mockingbird Hill Compressor Station Compressor Building	3 dB	9 dB	17 dB	25 dB	39 dB	46 dB	45 dB	40 dB	25 dB

Notes:
dB = decibel
DIL = dynamic insertion loss
Hz = Hertz

Lube Oil Cooler

The maximum noise from the lube oil cooler for each additional turbine compressor unit will not exceed an A-weighted sound pressure level of 50 dBA at 50 feet from the centerline of the cooler with all fans running at maximum speed. Each lube oil cooler (including all fans, motors, and drivers) will have maximum octave band sound pressure levels as provided in Table 9.2.4-81.

TABLE 9.2.4-81

Lube Oil Cooler Maximum Sound Pressure Level at 3 feet in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Lube Oil Cooler	54 dB	61 dB	58 dB	51 dB	46 dB	43 dB	39 dB	35 dB	30 dB

Notes:
dB = decibel
Hz = Hertz

Gas Cooler

The maximum noise from the gas cooler for each turbine compressor unit will not exceed an A-weighted sound power level of 87 dBA with all fans running at maximum speed. Each gas cooler (including all fans, motors, and drives) will have maximum octave band sound power levels as provided in Table 9.2.4-82.

TABLE 9.2.4-82

Compressor Unit Gas Cooler Maximum Sound Power Level in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Gas Cooler	92 dB	93 dB	92 dB	89 dB	84 dB	82 dB	76 dB	70 dB	64 dB

Notes:
dB = decibel
Hz = Hertz

Aboveground Piping

All aboveground sections of the unit suction, discharge, and bypass lines and gas cooler inlet and outlet headers and piping (including the pipe supports) of the two additional compressor units will be acoustically insulated. The acoustic pipe insulation will have minimum Insertion Loss (IL) values as provided in Table 9.2.4-83.

TABLE 9.2.4-83

Piping Insulation Minimum IL in dB per Octave-Band Center Frequency in Hz

Source Generating or Radiating Noise	31.5 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
Aboveground Piping	0 dB	0 dB	0 dB	6 dB	12 dB	20 dB	26 dB	26 dB	22 dB

Notes:
dB = decibel
IL = insertion loss
Hz = Hertz

Unit Blowdown Silencer

The maximum A-weighted sound pressure level from each silenced unit blowdown event will not exceed 60 dBA at 50 feet.

9.2.4.3 Other Aboveground Facilities

Operation of other above ground facilities such as valve sites and pig launcher and/receiver sites are not considered to be a major source of noise pollution. The noise increases associated with the operation of these above ground facilities are not expected to significantly increase ambient sound levels. Gas blowdown events (planned) at the valve sites would be infrequent and would occur for short-term periods (5 to 20 minutes). In addition, adequate mobile blowdown silencers are expected to be employed during each gas blowdown event, which would further reduce noise increase above ambient levels. Therefore, an operational noise evaluation is not required for the valve sites and pig launcher and/receiver sites.

9.3 REFERENCES

INGAA, 2008. Waste Energy Recovery Opportunities for Interstate Natural Gas Pipelines. February 2008. Available online at: http://www.ingaa.org/cms/6208.aspx

U.S. Environmental Protection Agency. 2014. OAQPS RTP North Dakota. 2014. Available online at http://www.epa.gov/oar/oaqps/greenbk/oindex.html.

U.S. Environmental Protection Agency. 2015. U.S. Environmental Protection Agency. Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units. Final Rule. August 2015. Available online at http://www2.epa.gov/sites/production/files/2015-08/documents/cpp-final-rule.pdf.

ATLANTIC COAST PIPELINE, LLC
ATLANTIC COAST PIPELINE

and

DOMINION TRANSMISSION, INC.
SUPPLY HEADER PROJECT

Resource Report 9
Air and Noise Quality

APPENDIX 9A
Emission Estimates for Compressor Stations and Pipeline Construction

Table of Contents

Appendix 9A - Emissions Calculations

Atlantic Coast Pipeline/Supply Header Project

Table ID	Source Type	Pipeline Project	Location
9A-1	Stationary Sources	Atlantic Coast Pipeline	Compressor Station ACP-1
9A-2	Stationary Sources	Atlantic Coast Pipeline	Compressor Station ACP-2
9A-3	Stationary Sources	Atlantic Coast Pipeline	Compressor Station ACP-3
9A-4	Stationary Sources	Atlantic Coast Pipeline	M&R Stations
9A-5	Stationary Sources	Supply Header Project	Mockingbird Hill Compressor Station
9A-6	Stationary Sources	Supply Header Project	JB Tonkin Compressor Station
9A-7	Stationary Sources	Supply Header Project	Crayne Compressor Station
9A-8	Stationary Sources	Supply Header Project	Burch Ridge Compressor Station
9A-9	Construction Sources	Atlantic Coast Pipeline	Compressor Stations
9A-10	Construction Sources	Atlantic Coast Pipeline	M&R Stations
9A-11	Construction Sources	Atlantic Coast Pipeline	Pipeline Spread
9A-12	Construction Sources	Supply Header Project	Compressor Stations
9A-13	Construction Sources	Supply Header Project	Pipeline Spread

Table 9A-1-1 Project Equipment List
ACP Compressor Station 1 - Lewis County, West Virginia
Atlantic Coast Pipeline

Emission Point ID	Source	Manufacturer	Model/Type	Rated Capacity
CT-01	Compressor Turbine	Solar Turbines	Titan 130-20502S	20,500 hp
CT-02	Compressor Turbine	Solar Turbines	Mars 100-16000S	15,900 hp
CT-03	Compressor Turbine	Solar Turbines	Taurus 70-10802S	10,915 hp
CT-04	Compressor Turbine	Solar Turbines	Taurus 60-7800S	7,700 hp
EG-01	Emergency Generator	Caterpillar	G3516C	2,098 hp
WH-01	Boiler	TBD	TBD	10.7 MMBtu/hr
FUG-01	Fugitive Leaks - Blowdowns	-	-	-
FUG-02	Fugitive Leaks - Piping	-	-	-
TK-1	Accumulator Tank	-	-	2,500 gal
TK-2	Hydrocarbon (Waste Oil) Tank	--	--	2,000 gal
TK-3	Ammonia Tank	--	--	8,000 gal