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EXECUTIVE OFFICE OF ENERGY & ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
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THE OFFICE OF APPEALS AND DISPUTE RESOLUTION

June 27, 2019

In the Matter of	OADR Docket Nos. 2019-008, 2019-009, 2019-010, 2019-011, 2019-012 and 2019-013
Algonquin Gas Transmission LLC	Air Quality Plan Approval Weymouth, MA

RECOMMENDED FINAL DECISION

INTRODUCTION

These six consolidated administrative appeals involve an Air Quality Plan Approval ("the air permit") that the Southeast Regional Office of the Massachusetts Department of Environmental Protection ("MassDEP" or "the Department") issued pursuant to 310 CMR 7.02 to Algonquin Gas Transmission LLC ("the Applicant") for the construction and operation of a natural gas compressor station in the Town of Weymouth ("the proposed Project"). The proposed Project is one component of Algonquin's Atlantic Bridge Project ("AB" or "AB Project"), an interstate natural gas transmission project that the Federal Energy Regulatory Commission ("FERC") authorized pursuant to the Natural Gas Act 15 U.S.C. §§ 717 et seq. The appeals were filed by a Ten Persons Group (with residents of Weymouth, Braintree, Newton and Quincy); a Ten Persons Group (from Hingham); the Town of Hingham; the City of Quincy; the Town of

Braintree; and the Town of Weymouth with a Ten Citizens Group, (collectively "the Petitioners").

The project site is located on a peninsula that extends into the Fore River in the Weymouth Fore River Designated Port Area. Bridge Street bisects the peninsula. The proposed Project will be located on what is known as the "North Parcel." This parcel also includes the King's Cove recreation area, directly to the east of the project site. The King's Cove recreation area includes a pathway, vegetation, trees, a lookout, and gathering places along a portion of the peninsula overlooking King's Cove and the Fore River. Schloss PFT at ¶ 9. The North Parcel also contains a Massachusetts Water Resources Authority ("MWRA") pump station. To the south of Bridge Street, on the "South Parcel", is the Lovell's Grove recreation area, which includes a lawn, trees, vegetation, a walking path and access for fishing and emergency access. The Calpine Fore River Energy Center power plant is also located on the South Parcel. Schloss PFT at ¶ 10. The Town of Weymouth holds a Conservation Restriction over the King's Cove and Lovell's Grove recreational parcels. Schloss PFT at ¶ 22; Schloss Exhibit C.

Algonquin was required to obtain an air permit under 310 CMR 7.02 because the proposed Project will emit contaminants to the ambient air. Algonquin initially filed a Non-Major Comprehensive Plan Approval Permit Application ("the Application") with MassDEP's Southeast Regional Office on October 23, 2015. The Application was filed pursuant to 310 CMR 7.02(5)(a)2.a (governing an emission unit with potential emissions of a single air contaminant of equal to or greater than one ton per year and a maximum energy input capacity equal to or greater than 40,000,000 Btu per hour using natural gas). See Air permit at 3; Application (May 2018 update) at 4-1. A lengthy process then ensued. MassDEP issued a draft air permit on March

30, 2017 and allowed for a 30-day public comment period due to public interest in the project, although state regulations in effect at the time did not require it. Over 1,200 comments were received, mostly opposed to the proposed Project because of concerns regarding risks to public safety, health and the environment. See Response to Comments, January 2019. Thereafter, in July 2017, responding to concerns raised by the public about air quality and public health in Weymouth and the surrounding communities, Governor Baker directed MassDEP and the Massachusetts Department of Public Health ("MassDPH") jointly to prepare a Health Impact Assessment ("HIA") of the project. Governor Baker further directed that MassDEP would not make its decision on Algonquin's Application for the air permit until the HIA was completed.[1] The HIA was issued on January 4, 2019. MassDEP issued the air permit one week later, on January 11, 2019 [2, 3]

The Project includes one new natural gas compressor driven by a Solar Taurus 60-7802 natural gas-fired stationary combustion turbine. The turbine will use natural gas as its exclusive fuel. The Project also includes one new natural-gas fired emergency generator set, a variety of pipelines, valves, seals and other equipment related to the operation of the compressor station,

[1] Algonquin submitted several updates to its initial Application while the HIA was pending, including an update to the complete Application dated May 2018, an updated Air Dispersion Modeling Report dated May 2018, and a Sound Level Impact Assessment report dated October 15, 2018.

[2] On February 16, 2018 Algonquin brought an action against MassDEP in federal court to review MassDEP's permitting for the proposed Project. Petition for Review Pursuant to Section 19(d)(2) of the Natural Gas Act.. The matter was apparently resolved by agreement. See Algonquin Gas Transmission, LLC v. Massachusetts Department of Environmental Protection et al, USCA Case #18-1045, Joint Motion For An Order Setting Permit Schedule (D.C. Circuit, February 16, 2018)(agreeing that the Department would make its decision on Algonquin's application by January 11, 2019 and issue a Final Decision after an adjudicatory hearing by June 28, 2019). The Court denied the Joint Motion on May 31, 2018, but noted that the parties had agreed on a schedule to resolve their dispute. By agreement of Algonquin and MassDEP in this administrative appeal proceeding, the deadline for issuance of a Final Decision has been extended to July 12, 2019. The scheduling of these appeals has been based entirely on that agreed-upon schedule.

[3] The original Application and the several updates are included among MassDEP's "Basic Documents" in these appeals, filed with the Office of Appeals and Dispute Resolution ("OADR") on February 11, 2019.

and upgrades to the nearby metering and regulating station ("M&R Station"). The proposed Project will enable natural gas flowing in Algonquin's lower pressure pipeline system to the south of Weymouth to be transported into the higher pressure I-10 pipeline located at the project site.

In issuing the air permit, the Department determined that Algonquin's Application "is in conformance with the Air Pollution Control Regulations and current air pollution control engineering practice…." See Air permit at pp. 1-2. The air permit imposes operational, production, and emission limits and requirements on each of three "emission units" ("EU") at Algonquin's facility, consisting of the Solar Taurus 60 turbine as EU 1, venting of gas as EU 2, and piping components as EU 3. These limits and requirements are contained in a series of tables with notes at pages 13 through 25 of the air permit. General conditions applicable to the permit are detailed on pages 25-26 of the permit.

The Petitioners' appeal notices raised numerous objections to the air permit. Generally, the Petitioners allege that the compressor station will cause air pollution; that the permit is based on flawed analyses, flawed modelling, inaccurate and inadequate data; and the air permit does not include sufficient conditions for monitoring and notifications. More specifically, the appeals allege that: the permit fails to consider nearby Environmental Justice populations; the compressor station will violate 310 CMR 7.09 due to its emissions of odors; the compressor station will violate 310 CMR 7.10 due to its emissions of noise; the modeling of the compressor station's impacts failed to consider background conditions, failed to consider site-specific conditions, and failed to account for sporadic or intense emissions levels occurring during "blowdowns" (venting of gas) or pipeline releases. The appeals also allege that: the monitoring conditions in the permit are inadequate to

determine actual and site-specific impacts from operation of the compressor station; stricter provisions for notifying municipal authorities in Weymouth, Braintree, Quincy and Hingham should be included in the permit; the permit fails to require on-site and off-site mitigation measures for volatile organic compounds; the permit does not limit the number of "blowdowns" to two per year, the number stated in the Application; and the Applicant has failed to satisfy its insurance obligations pursuant to M.G.L. c 21C, § 4. Over the course of this proceeding the objections have been refined, with the claims primarily directed at alleged flaws in the air dispersion modeling, the selection of pollutant control technologies, and the failure to include background ambient air concentrations of air toxics in the modeling of the facility's modeling of air toxics. Importantly, the Petitioners maintain that the proposed Project will cause a "condition of air pollution" and the air permit should be denied.

Pre-filed written testimony with exhibits was submitted by nineteen witnesses, and the administrative record in this matter contains more than 6,000 pages of technical, scientific and legal materials. I conducted a hearing over the course of four days in May and June, 2019, at which the witnesses who had filed written testimony were cross-examined. The hearing was stenographically recorded, transcripts were provided to the parties, and they submitted post-hearing briefs on June 7, 2019 and June 18, 2019.

After reviewing the entire administrative record, I find that the air permit does not violate Massachusetts statutory and regulatory provisions, as alleged by the Petitioners. A preponderance of the evidence demonstrates that the permit sufficiently regulates air contaminants to prevent a condition of air pollution. First, cumulative impacts from emissions of NO_2, SO_2, PM_{10}, $PM_{2.5}$ and CO will be below the National Ambient Air Quality Standards

("NAAQS"). Second, maximum modeled impacts from the facility's emissions of air toxics during steady state operations will be below the Massachusetts Allowable Ambient Limits ("AALs") and Threshold Effects Exposure Limits ("TELs"). AALs and TELs are screening level guidelines indicating the maximum ambient air concentration of a toxic pollutant that may be contributed by a single source or facility. The AALs and TELs are conservatively set by MassDEP and are intended to overestimate risk. However, the permit conditions for startup and shutdown events is not supported by sufficient credible evidence, and therefore I recommend that the conditions in Table 8D for these events be amended to reduce the "not to exceed" limit for start-ups to 18 minutes and the "not to exceed" limit for shutdown to 17 minutes.[4] Third, although I do not believe MassDEP correctly conducted an analysis of Best Available Control Technology ("BACT") as required by 310 CMR 7.02(8)(a)2 and informed by relevant state and federal BACT guidance, a minimal preponderance of the evidence shows that the emissions limits in the air permit represent BACT. Fourth, the Petitioners failed to prove that the proposed Project will violate the noise regulation at 310 CMR 7.10 or MassDEP's Noise Policy,[5] and I find, therefore, that the proposed Project will not cause or contribute to a condition of air pollution as a result of the emission of sound.

Finally, the issues raised in the Orders that I issued subsequent to the third day of the Hearing, and that were addressed by the parties in their supplemental closing briefs, relating to MassDEP's late disclosure of additional air toxics data, do not demonstrate that the Air permit

[4] The Petitioner Town of Weymouth's modeling of 30-minute start-up events, though not without its flaws, raises a concern that emissions of VOCs could exceed health-protective guidelines, and neither Algonquin nor MassDEP could provide a good basis for the 30-minute limit.
[5] DAQC Policy 90-001, February 1, 1990.

should be denied. While the disclosure negatively impacted the process of this adjudicatory proceeding, and as I stated earlier, was unfair to the Petitioners, MassDEP does not require ambient background air toxics to be included with the compressor station's emissions, so the data are not relevant to these appeals. The evidence presented at the hearing, including at the additional hearing day on June 10, 2019, demonstrated that the additional Alpha Analytical data relate to the Health Impact Assessment, which was not subject to review in this appeal; relate to background data for air toxics, which is not used in the permitting process when a source's emissions are compared to AALs and TELs; and the only valid data showing levels of a compound above its AAL concerns 1,3-butadiene, and evidence of observations of 1,3-butadiene in the ambient air at levels in excess of the AAL is already in the administrative record.

For all of these reasons, I recommend that the Department's Commissioner issue a Final Decision affirming the air permit but with changes to certain permit conditions based on credible evidence in the record, and with the corrections noted in the attachment to the pre-filed testimony of L. Barry Goodrich.

In addition, based on the evidentiary record, I also recommend that MassDEP's Commissioner consider the following policy recommendations. First, I recommend that he direct the MassDEP Bureau of Air and Waste, Air Permitting Division, to update the dollar amounts used for cost-effectiveness determinations in the BACT analysis to reflect a cost range that accounts for inflation since the range was last revised in 1990. Second, I recommend that he direct the MassDEP Bureau of Air and Waste, Air Permitting Division, and the Office of Research and Standards to review MassDEP's "long standing practice" of requiring air toxics dispersion modeling to assess the ambient concentrations caused solely by a source's emissions,

without including background levels, to determine whether this practice is outdated, and consider developing a new practice that requires sources to include site-specific background levels of air toxics as part of a source's air dispersion modeling requirements. Such a practice would likely reduce the levels of pollution in the ambient air and better protect the public health and the environment. It would also be consistent with a small, but emerging trend in this area.

BACKGROUND

Under 310 CMR 7.02(3)(j), MassDEP will issue an air permit where an applicant has demonstrated that the emissions from a facility do not result in air quality exceeding either the Massachusetts or National Ambient Air Quality Standards ("NAAQS"); the emissions do not exceed applicable emissions limitations specified in 310 CMR 7.00; the emissions from the facility do not result in a violation of any provision of 310 CMR 7.00; the facility is not subject to 310 CMR 7.00: *Appendix A* [6]; the emissions from the facility or the operation of the facility represented the most stringent emission limitations as specified in 310 CMR 7.02(8); and the owner or operator of the facility has demonstrated that any facilities the applicant owns, operates or controls in Massachusetts is in compliance with 310 CMR 7.00. See 310 CMR 7.02(3)(j)1.- 7.

The primary NAAQS are health-based standards established under the federal Clean Air Act that are designed to protect public health, including the health of sensitive subpopulations, which include people with diseases such as asthma and cardiovascular disease, children, and the elderly, with an adequate margin of safety. The secondary NAAQS provide public welfare

[6] 310 CMR 7.00: *Appendix A* applies to a major stationary source of air pollutants which emits or has the federal potential emissions greater than or equal to 100 tons per year ("TPY") or more of any pollutant subject to regulation under the Clean Air Act, except that lower emissions of 50 TPY apply to both VOCs and NOx. See 310 CMR 7.00: *Appendix A* definition of "major stationary source".

protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. Air permit at p. 8; Cushing PFT at ¶ 20. For its Application, Algonquin's air modeling evaluated the cumulative impacts with respect to the NAAQS by adding the maximum modeled impacts from the facility to representative ambient background concentrations and comparing the results to the NAAQS. This was required by MassDEP because the predicted impacts of the facility emissions of NO_2, $PM_{2.5}$ and SO_2 for the 24-hour averaging period exceeded what are known as Significant Impact Levels ("SILs").[7] Algonquin's modeling of the cumulative impacts of the facility's emissions and ambient representative background conditions obtained from MassDEP's existing monitoring stations on Harrison Avenue and Von Hillern Street, both in Boston, showed that the maximum impacts from the facility would be below the NAAQS. Air permit at 8-9 and Table 4.[8]

Massachusetts has also established screening level guidelines – the AALs and TELs – that indicate the maximum ambient air concentration of a toxic pollutant that may be emitted by a single source or facility. Air permit at p. 10. MassDEP did not require Algonquin's modeling to take into account ambient background conditions or other sources of pollutants. Id. at 10. Algonquin's modeling analysis of air toxics over 1-hour and Annual averaging periods showed that the maximum impacts from emissions from the facility will be below the AALs and TELs. Air permit at pp. 10-11 and Table 5.

[7] SILs are the levels of ambient impact below which the United States Environmental Protection Agency ("USEPA") considers a source to have an insignificant impact on air quality. SILs are a small fraction of the NAAQS and ambient impacts below the SILs are considered *de minimis*.

[8] MassDEP maintains a network of 22 monitoring stations across the state. See https://www.mass.gov/service-details/massdep-ambient-air-quality-monitoring-network-annual-plan

Emissions sources of air contaminants[9] from the compressor station portion of the Project include the natural gas-fired turbine driven compressor unit; a natural gas-fired emergency generator; a natural gas-fired heater for the turbine fuel natural gas; 5 natural gas-fired catalytic space heaters; a remote reservoir parts washer; separator vessels and storage tanks; piping components such as pipe seals, valves, pipe fittings; and releases of natural gas from routine operations of the facility, maintenance operations, and pipeline blowdowns. See Air permit at pp. 1-7; Application at 1-1 and 2-5; Goodrich PFT at ¶ 9. Emissions sources at the existing M&R Station include 3 natural gas-fired boilers; a Hanover natural gas-fired heater; a NATCO natural gas-fired heater; and sources of fugitive emissions. Goodrich PFT at ¶ 12.[10] Construction activities to build the proposed Project will also result in emissions of air contaminants. See Application at 4-7. Algonquin will control the emissions from the facility using a variety of control technologies, design features, work practices and operating standards. The Application proposed these as the Best Available Control Technology ("BACT")[11] for each of several air contaminants, and MassDEP agreed. MassDEP determined that the emissions factors for the turbine have been established by Algonquin as BACT. The proposed Project will achieve these

[9] 310 CMR 7.00 defines an "air contaminant" as "any substance or man-made physical phenomenon in the ambient air space and includes, but is not limited to, dust, flyash, gas, fume, mist, odor, smoke, vapor, pollen, microorganism, radioactive material, radiation, heat, sound, any combination thereof, or any decay or reaction product thereof."

[10] The Application proposed combining the new compressor station emissions with the existing M&R Station's emissions for permitting purposes. The new compressor station will be located approximately 100 meters from the M&R Station. See Application at 1-1.

[11] 310 CMR 7.00 defines BACT as "an emission limitation based on the maximum degree of reduction of any regulated air contaminant emitted from or which results from any regulated facility which the Department, on a case-by-case basis taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems and techniques for control of each such contaminant. The best available control technology determination shall not allow emissions in excess of any emission standard established under the New Source Performance Standards, National Emission Standards for Hazardous Air Pollutants or under any other applicable section of 310 CMR 7.00, and may include a design feature, equipment specification, work practice, operating standard, or combination thereof."

emissions by using a combustion turbine employing a dry low NOx technology with the brand name SoLoNox to limit nitrogen oxide ("NOx") emissions and the addition of an oxidation catalyst to limit emissions of carbon monoxide ("CO") and volatile organic compounds ("VOCs"). Air permit at 3.

The air permit authorizes Algonquin to emit these air contaminants through a stack and other sources,[12] subject to numerous detailed conditions. The air permit also imposes conditions on emissions of dust and noise during construction of the project, in order to mitigate impacts from such emissions. See Air permit at p. 24, Table 12, sections 8 and 9 (prescribing the steps to be taken during construction of the project to mitigate dust and noise). The air permit contains a set of detailed operational, production and emission limits, set forth in nine tables beginning on page 13 of the air permit. Tables 8A, 8B, 8C and 8D contain emission limits for all phases of the compressor station's operations, including during standard operating conditions, during low temperature operation, during transient events, and during startup and shutdown of the compressor. Algonquin "is subject to and shall not exceed" these limits. Air permit at p. 13.

MassDEP issued the permit on January 11, 2019. Contemporaneously with the air permit, MassDEP issued a Response to Comments document ("RTC") that explains much of its decision-making. The air permit and the RTC are included within MassDEP's "Basic Documents."

On February 1, 2019, the Petitioners filed their appeals challenging MassDEP's decision to issue the permit. I consolidated the appeals, conducted a pre-hearing conference with all of the

[12] These "other sources" of air contaminants include fugitive emissions from the piping components such as pipe seals, valves, pipe fittings, and the compressor.

parties on February 15, 2019, scheduled the expedited adjudicatory hearing ("Hearing") to begin on May 15, 2019. On April 11, 2019, I granted Algonquin's and MassDEP's Motions to Dismiss Certain Claims.[13] The only issue remaining for resolution is whether the air permit complies with the requirements of 310 CMR 7.00.

The purpose of the Hearing was cross-examination of the parties' witnesses on written pre-filed testimony[14] that the parties filed according to a schedule in the Pre-Hearing Conference Report & Order that I issued on February 25, 2019. A total of nineteen witnesses submitted written pre-filed testimony during this proceeding. Sixteen of those witnesses were cross-examined during the Hearing. The witnesses are listed below. A transcript of the hearing was provided to the parties and OADR. The parties filed post-hearing briefs and at my request, proposed Findings of Fact and Conclusions of Law. To the extent the proposed findings accurately reflect my evaluation of the witnesses and analysis of the evidence presented, I have incorporated them into this Recommended Final Decision.

[13] The dismissed claims included: claims challenging the procedures and substance of the Health Impact Assessment's design, implementation, findings or recommendations; claims related to Environmental Justice and the applicability of the Executive Office of Energy and Environmental Affair's 2017 Environmental Justice Policy; claims challenging MassDEP's analysis of the impacts of reasonably foreseeable climate change pursuant to the Massachusetts Environmental Policy Act ("MEPA"), M.G.L. c. 30, § 61; claims relating to public safety (including pipeline safety, potential explosions and emergency preparedness); and claims related to the applicability of M.G.L. c. 21C, the Hazardous Waste Management Act. I deferred ruling on the motion to dismiss a claim relating to the applicability of 310 CMR 7.00, *Appendix A* until Algonquin had completed its responses to the Ten Person Group's discovery requests. Based on the lack of credible evidence that the proposed Project is a Major Source subject to the requirements of 310 CMR 7.00, *Appendix A*, I recommend that this claim also be dismissed.

[14] Pre-Filed Direct Testimony is referred to in this RFD as "[Witness] PFT with a citation to page or paragraph or exhibit. Pre-Filed Rebuttal Testimony is referred to in this RFD as "[Witness] PFR with a citation to page or paragraph or exhibit number. References to the Transcript are cited as "Tr. at page/line(s)." The transcript contains approximately 986 consecutively numbered pages in three volumes for the hearing dates of May 15-17, 2019 and 238 pages in a single volume for the hearing date of June 10, 2019.

BURDENS OF PROOF, STANDARD OF REVIEW, AND WITNESSES

As the party challenging MassDEP's issuance of a permit, the Petitioners have the burden of going forward by producing credible evidence in support of their position. Matter of Town of Freetown, Docket No. 91-103, Recommended Final Decision (February 14, 2001), adopted by Final Decision (February 26, 2001) ("the Department has consistently placed the burden of going forward in permit appeals on the parties opposing the Department's position."). So long as the initial burden of production or going forward is met, the ultimate resolution of factual disputes depends on where the preponderance of the evidence lies. Matter of Town of Hamilton, Docket Nos. 2003-065 and 068, Recommended Final Decision (January 19, 2006), adopted by Final Decision (March 27, 2006).

"A party in a civil case having the burden of proving a particular fact [by a preponderance of the evidence] does not have to establish the existence of that fact as an absolute certainty. . . . [I]t is sufficient if the party having the burden of proving a particular fact establishes the existence of that fact as the greater likelihood, the greater probability." Massachusetts Jury Instructions, Civil, 1.14(d).

The relevancy, admissibility, and weight of evidence that the parties seek to introduce are governed by G.L. c. 30A, § 11(2) and 310 CMR 1.01(13)(h)(1). Under G.L. c. 30A, § 11(2):

> [u]nless otherwise provided by any law, agencies need not observe the rules of evidence observed by courts, but shall observe the rules of privilege recognized by law. Evidence may be admitted and given probative effect only if it is the kind of evidence on which reasonable persons are accustomed to rely in the conduct of serious affairs. Agencies may exclude unduly repetitious evidence, whether offered on direct examination or cross-examination of witnesses.

Under 310 CMR 1.01(13)(h), "[t]he weight to be attached to any evidence in the record will rest within the sound discretion of the Presiding Officer. . . ."

Petitioner Ten Residents Group submitted testimony from the following witnesses:

1. Alice Arena. Ms. Arena is a resident of Weymouth and the President of the Fore River Residents Against the Compressor Station ("FRRACS").

2. Frank Singleton. Mr. Singleton is a resident of Weymouth and currently serves on the city's Conservation Commission. He holds an undergraduate degree in biology and a Master's Degree in environmental health. He has fifty years of environmental code enforcement experience, and is a member of the ISO-New England Consumer Liaison group. Singleton PFT ¶ 1.

3. Dr. Curtis Nordgaard. Dr. Nordgaard is a pediatrician with a practice in Dorchester, MA. He holds graduate degrees in biology and psychology and a medical degree. Dr. Nordgaard has served as a technical consultant on air quality and permitting issues for multiple natural gas infrastructure projects in the past two years. Nordgaard PFT ¶ 1; Nordgaard Exhibit (curriculum vitae).

4. Nathan G. Phillips, PhD. Professor Phillips is a professor at Boston University in the Department of Earth and Environment. He holds a Bachelor of Science degree in Physics and a PhD in Physiological Ecology. Phillips PFT ¶¶ 1-2; Phillips Ex. 1.

5. Dr. Richard Clapp. Professor Clapp is a Professor Emeritus at the Boston University School of Public Health and an epidemiologist specializing in the study of cancer and other diseases caused by toxic chemicals and other environmental agents. He holds a Bachelor of Arts degree in Biology, a Master of Public Health degree in Health Services, and a Doctor of Science degree in Epidemiology with a specialization in cancer epidemiology. Clapp PFT ¶¶ 1-8; Clapp Ex. 1.

Petitioner Town of Braintree submitted testimony from the following witness:

1. Dr. Douglas Dockery. Professor Dockery is the John L. Loeb and Frances Lehman Loeb Research Professor of Environmental Epidemiology at the Harvard T.H. Chan School of Public Health. He holds a Bachelor of Science degree in Physics, a Master of Science degree in Meteorology, and a Master of Science and ScD in Environmental Health Sciences. Professor Dockery performed air quality modeling for the United States Environmental Protection Agency ("USEPA") in the 1970s, and worked as a Staff Meteorologist for an environmental consulting firm, also in the 1970s. Dockery PFT ¶¶ 1-9; Dockery Ex. 1.

Petitioner Town of Weymouth submitted testimony from the following witnesseses:

1. John Hinckley, Q.E.P. Mr. Hinckley is employed by GeoInsight, Inc. as an Associate/Air Compliance Specialist. He has 20 years of permitting, modeling, management and public speaking experience. He is certified as a Qualified Environmental Professional[15] and has specialized training from the USEPA Air Pollution Training Institute in AERMOD Modeling. He holds a Bachelor of Science degree in Natural Resources and a Master of Science degree in Environmental Science & Engineering.

2. William Powers, P.E. Mr. Powers is the Principal of Powers Engineering. He is a Registered Professional Engineer with a Bachelor's degree in Mechanical Engineering and a Master's degree in Environmental Science. He has thirty-five years of specialized technical experience

[15] A Qualified Environmental Professional certification is sponsored by the Institute for Professional Environmental Practice. The Certification requires a certain number of years in the air pollution field and passing an exam. Tr. at 312:4-13. See also http://ipep.org/credentials/qep/ ("[Q.E.P.] is a multi-media, multi-disciplinary, board-certified credential, which requires environmental professionals to see 'the big picture' and to have the skills and knowledge to solve 'real world problems.')

related to air emissions and air pollution control equipment, including projects involving natural gas pipelines and compressor stations. Powers PFT at ¶¶ 4-6; Powers Exhibit 1.

3. Dr. Philip Landrigan. Dr. Landrigan is a Professor of Biology at Boston College, as well as the Director of the Global Public Health Program and Global Observatory on Pollution and Health at the college. He is also a pediatrician. He previously held the positions of Professor of Pediatrics; Professor of Preventive Medicine; and Dean for Global Health at the Icahn School of Medicine at Mount Sinai Hospital in New York. In addition to his Bachelor's and Medical degrees, Dr. Landrigan earned a Diploma of Industrial Health and a Master of Science in Occupational Medicine. Landrigan PFT at ¶¶ 1-25; Landrigan Exhibit 1.

4. Mary Ellen Schloss. Ms. Schloss has been the Conservation Administrator for the Town of Weymouth since 2004. She holds a Master of Science degree in Urban and Environmental Policy and Environmental Engineering. Schloss PFT at ¶¶ 1, 3-5.

Algonquin submitted testimony from the following witnesses:

1. Justin Fickas. Mr. Fickas is a Managing Consultant at Trinity Consultants, Inc. He has over twenty years of experience in air permitting, dispersion modeling, and management of environmental consulting associated with air permitting and dispersion modeling. He is a Registered Professional Engineer in Georgia with twelve years of professional experience. He holds a Bachelor of Science degree in Civil Engineering with an emphasis on Environmental Engineeering. Fickas PFT at ¶¶ 1-3; Fickas PFT Ex. 1.

2. L. Barry Goodrich. Mr. Goodrich is a Senior Engineer in the Air Permitting group at Enbridge, Inc. He is responsible for overseeing air permitting for the northern portion of Enbridge's gas transmission system, spanning 17 states and including the Algonquin system. He

holds Bachelor of Science and Master of Science degrees in Biological and Agricultural Engineering. Goodrich PFT at ¶¶ 1-3.

3. William Welch. Mr. Welch was Enbridge, Inc.'s Project Manager on the Atlantic Bridge Project until his retirement in 2018. The scope of his work included compressor stations, including the proposed Weymouth compressor station. He holds a Bachelor of Science degree in Mechanical Engineering. Welch PFT at ¶¶ 1-2.

4. Robert O'Neal. Mr. O'Neal is a Managing Principal for Epsilon Associates, Inc. He has over thirty years of experience performing sound level evaluations in Massachusetts, including for projects involving gas-fired power plants, rock quarries, solid waste facilities and electric substations. He is Board Certified by the Institute of Noise Control Engineering and is a Certified Consulting Meteorologist. He holds a Bachelor of Arts degree in Engineering Science and a Master of Science degree in Atmospheric Science. O'Neal PFT at ¶¶ 1-3; O'Neal Ex. A.

5. Dr. Peter Valberg. Dr. Valberg is a Principal and Health Scientist at Gradient, where he provides health risk analyses focused on the health effects of environmental chemicals, air toxics, volatile organic compounds ("VOCs"), and inhaled particulate matter ("PM"). He was previously on the faculty of the Harvard School of Public Health. Dr. Valberg holds a Bachelor of Arts degree in Physics and Mathematics; a Master of Arts degree in Physics; a PhD. in Physics; and a Master of Science in Human Physiology and Inhalation Toxicology. Valberg PFT at ¶¶ 1-9; Valberg Exhibit A.

MassDEP submitted testimony from the following witnesses:

1. Thomas A. Cushing. Mr. Cushing has been employed by MassDEP since 1987. Since 2012 he has served as the Air Quality Section Chief in MassDEP's Southeast Regional Office. Mr.

Cushing holds a Bachelor of Science degree in Chemical Engineering and has taken graduate level courses in Public Administration. Additionally, he has taken technical and regulatory training courses sponsored by NESCAUM[16] and the USEPA. Cushing PFT at ¶¶ 1-3; Cushing Exhibit 1.

2. Glenn Keith. Mr. Keith is the Director of the Division of Air and Climate Programs for MassDEP's Bureau of Air and Waste. He oversees statewide air pollution control programs and aspects of climate mitigation programs, including the statewide ambient air monitoring network, air quality regulation and policy development, and development and implementation of air pollution source programs. From 2000 until 2018, he was a Deputy Director in the Division of Air and Climate. Mr. Keith holds a Bachelor of Arts degree in Communications. Keith PFT at ¶ 1; Keith Exhibit 1.

3. Glenn Pacheco. Mr. Pacheco is a Senior Air Modeling Specialist for MassDEP. He is responsible for reviewing air quality modeling analyses for permit applications and working with the MassDEP regional air permitting staff to ensure that modeling meets USEPA and MassDEP modeling requirements and guidelines. He previously worked in the private sector as an Air Quality Scientist, where his duties included preparation of air quality impact assessments, including air dispersion modeling analyses. He holds a Bachelor of Science degree in Meteorology and has taken training courses in air quality, air dispersion modeling, meteorological measurements, and AERMOD. Pacheco PFT at ¶¶ 1-4; Pacheco Exhibit 1.

[16] NESCAUM is the acronym for the Northeast States for Coordinated Air Use Management, a nonprofit association of air quality agencies in the northeast United States. Its members include the six New England states plus New Jersey and New York. See https://www.nescaum.org/

4. Dr. Sandra Baird. Dr. Baird has been a Senior Toxicologist in MassDEP's Office of Research and Standards since 2006. She has approximately 40 years of experience in the field of toxicology. Dr. Baird holds Bachelor of Science and Master of Science degrees in Toxicology, as well as a PhD. in Toxicology. Baird PFT at ¶¶ 1-3; Baird Exhibit 1.

DISCUSSION

I. The Air Permit Complies with the Requirements of 310 CMR 7.00 Revisions to Permit Conditions are Warranted By the Evidence

A. Introduction

The Petitioners' objections to the air permit fall into four general categories. First, they object to the quality of the air dispersion modeling that Algonquin conducted. These objections include the choice of model, the modeling inputs and parameters, and the exclusion from the model of certain categories of emissions, such as start-ups. Second, they object to MassDEP's failure to require Algonquin to model the cumulative impacts of the facility's emissions of air toxics with site-specific ambient background conditions. They assert that such modeling would show emissions above the AALs and TELs for certain contaminants, resulting in a condition of air pollution. As a corollary to this objection, the Petitioners contend that MassDEP should adopt a more health-protective approach to its regulation of air contaminants. Third, they claim that the permit does not incorporate BACT and that MassDEP failed to properly conduct a BACT analysis. They assert that a properly conducted BACT analysis would demonstrate that electric compression is BACT, and if not, Selective Catalytic Reduction ("SCR") with or without SoLoNox is BACT. Fourth, they contend that the facility's emissions of sound will cause or contribute to a condition of air pollution, in violation of 310 CMR 7.10.

MassDEP and Algonquin dispute each of the Petitioners' assertions. They claim that the air dispersion model was appropriate and demonstrates compliance with all applicable requirements, and shows that there will be no unreasonable risk to human health. They argue that the AALs and TELs are conservatively developed guidelines set at levels where no adverse cancer and non-cancer effects are expected in sensitive populations over a lifetime of exposure. They claim that the BACT analysis was proper, with electric compression and SCR properly eliminated from consideration and that the emissions limitation set by the permit represent the most stringent limitations, and therefore represent BACT. They dispute there will are any violations of 310 CMR 7.10.

I find that a preponderance of the evidence demonstrates that: the air permit will comply with the Massachusetts Clean Air Act and the Air Pollution Control Regulations. First, the air dispersion modeling conducted by Algonquin was conservatively designed; included appropriate meteorological and land cover inputs; appropriately omitted intermittent emission events because of the unreliability of modeling them;[17] and demonstrates that emissions from the facility will not create unreasonable health risks. Second, the NAAQS are health-protective standards designed to account for particularly vulnerable populations, with an adequate margin of safety. By establishing an ambient, public health threshold, the primary NAAQS contemplate multiple source contributions and establish a protective limit on cumulative pollution levels that should ordinarily prevent an adverse air quality impact on public health. Similarly, the AALs and TELs are conservatively designed to protect the general population, including sensitive populations, from adverse health effects over a lifetime of exposure. Because of this, MassDEP's practice of

[17] But see Discussion below at Section 2.b.

evaluating the emissions from the compressor station without requiring the inclusion of existing ambient background conditions is a rational exercise of its authority to regulate air pollution. Third, while I agree with the Petitioners that MassDEP's BACT analysis was seriously flawed, a minimal preponderance of the evidence shows that the emissions limits set by the air permit, based on Algonquin's use of a gas-turbine employing dry low NOx technology combined with an oxidation catalyst as an additional control, represent BACT. Fourth, the Petitioners failed to present evidence to prove a violation of 310 CMR 7.10.

B. Regulatory Framework, Findings of Fact, and Conclusions of Law

The Massachusetts Clean Air Act gives MassDEP authority to adopt regulations "to prevent pollution or contamination of the atmosphere." G.L. c. 111 § 142A. MassDEP has the power to adopt ambient air quality standards and is required to adopt a plan to implement and maintain the attainment of such standards, and such standards must be at least as stringent as the minimum federal standards. G.L. c. 111 § 142D.

The air pollution control regulations, 310 CMR 7.00, establish a permitting program whereby persons can apply for, and receive, permission to emit various types and amounts of air pollution. 310 CMR 7.02 recites that its purpose is to provide an orderly procedure for the issuance of a plan approval for any construction, substantial reconstruction, alteration or operation of a facility through the review of a comprehensive or limited plan application. A comprehensive plan application is required for the construction, substantial reconstruction, or alteration of facilities meeting certain specified thresholds; a limited plan application is required for facilities falling below those thresholds. 310 CMR 7.02(4).

If a facility has the potential to emit greater than ten tons per year of a single air contaminant, the facility is subject to Comprehensive Plan Approval. 310 CMR 7.02(5)(a)(1). The regulations specify a number of criteria that must be met to receive plan approval. Among other things, they state that "plan approval will be issued" by MassDEP when: "1. The emissions from a facility do not result in air quality exceeding either the Massachusetts or National Ambient Air Quality Standards; . . . and 3. The emissions from the facility do not result in a violation of any provision of 310 CMR 7.00 . . . ." 310 CMR 7.02(3)(j) (emphasis added). Here, although the Permit arguably satisfies the preceding element 1 (compliance with NAAQS), the Petitioners contend that it violates element 3 because it will allow a condition of air pollution, which is prohibited by 310 CMR 310 CMR 7.01(1), providing:

> no person owning, leasing, or controlling the operation of any air contaminant source shall willfully, negligently, or through failure to provide necessary equipment or take necessary precautions, permit any emission from said air contamination source or sources of such quantities of air contaminants which will cause, by themselves or in conjunction with other air contaminants, a condition of air pollution.

The definition of air pollution in 310 CMR 7.00 reads:

> AIR POLLUTION means the presence in the ambient air space of one or more air contaminants or combinations thereof in such concentrations and of such duration as to:
>
> (a) cause a nuisance;
>
> (b) be injurious, or be on the basis of current information, potentially injurious to human or animal life, to vegetation, or to property; or
>
> (c) unreasonably interfere with the comfortable enjoyment of life and property or the conduct of business.

1. MassDEP's Duty to Regulate Air Quality. The Supreme Judicial Court discussed MassDEP's obligations for regulating air quality in Town of Brookline v. Commissioner of the Department of Environmental Quality Engineering, 398 Mass. 404, 411, 497 N.E.2d 9, 13 (1986). In that case a company sought an air permit for an energy plant that was to generate electricity from diesel engines. The plaintiffs claimed that the diesel emissions would cause air pollution and thus should not be permitted.

The court stated that MassDEP is "charged with evaluating the technical evidence and reaching a decision on the risk attributable to the new source. That decision includes a determination of the boundary within which the risk will be acceptable." Brookline, 398 Mass. at 411, 497 N.E.2d at 13. The court acknowledged that any level of diesel emissions may create some risk, but the creation of risk that affects others is true of almost all industrial and consumer activities. Id. at 414.

The court concluded that the "Legislature did not impose a zero-risk standard, but placed the authority to regulate in [MassDEP.] The statute permits [MassDEP] broad authority to control pollution" and determine what are reasonable and unreasonable risks. Id. at p. 414. The exercise of that judgment should be upheld unless it is "patently wrong, unreasonable, arbitrary, whimsical, or capricious . . . ." Id. at 414; see also id. at 415 (agency's method of decision making relative to assessment of risks is reviewed for whether it is "rational and conforms to the law."). In Brookline, the court accepted MassDEP's exercise of discretion when it relied upon a single study as the "best available evidence on the risk of cancer due to diesel exposure." Id. at 408. From that study and other modeling information it determined that inhalation of the expected emissions would increase the risk of lung cancer for a person continuously exposed for

one year by .005%, which it found acceptable. Id. at 409; see also Town of Brookline v. Commissioner of the Department of Environmental Quality Engineering, 387 Mass. 372, 387-91, 439 N.E.2d 792 (1982) (further discussing deference to agency expert decision between two conflicting choices).

The NAAQS. In the case of certain "criteria pollutants" – NO_2, SO_2, PM_{10}, $PM_{2.5}$ and CO – MassDEP has chosen to exercise its regulatory charge by relying upon the NAAQS to determine whether the plant will cause or contribute to a condition of air pollution. See Air permit at pp. 8-9; Pacheco PFT at ¶ 10. Massachusetts also issued Ambient Air Quality Standards based on the NAAQS, found at 310 CMR 6.00. Fickas PFT at ¶ 8.[18] The federal Clean Air Act, 42 U.S.C. § 7401 et seq., is the primary regulatory vehicle under which air emissions in the United States are managed. Under the Act, USEPA is responsible for developing acceptable levels of airborne emissions, the NAAQS, "the attainment and maintenance of which ... are requisite to protect the public health." 42 U.S.C. § 7409(b)(1).

NAAQS are established on a pollutant-by-pollutant basis and are currently in effect for several air contaminants. See 40 C.F.R. §§ 50.4 and 50.5 (SO_2), 50.9 and 50.15 (ozone), 50.11 (NO_x), and 50.13($PM_{2.5}$). In areas deemed to be in "attainment" for any of these pollutants, air quality meets or is cleaner than the NAAQS for that pollutant. 42 U.S.C. § 7407(d)(1)(A)(i). In "unclassifiable" areas, air quality cannot be classified on the basis of available information as meeting or not meeting the NAAQS. 42 U.S.C. § 7407(d)(1)(A)(iii). Areas may also be

[18] MassDEP updated these standards in June 2019. https://www.mass.gov/regulations/310-CMR-600-ambient-air-quality-standards

designated as "nonattainment," meaning that the concentration of a pollutant in the ambient air exceeds the NAAQS for that pollutant. 42 U.S.C. § 7407(d)(1)(A)(ii).

NAAQS are further subdivided into Primary NAAQS, 42 U.S.C. § 7409(b)(1), and Secondary NAAQS, 42 U.S.C. § 7409(b)(2). Primary NAAQS are intended to protect individuals, while Secondary NAAQS are set to protect the surrounding environment. The statute defines Primary NAAQS as "ambient air quality standards the attainment and maintenance of which in the judgment of the [EPA] Administrator, based on such criteria and allowing an adequate margin of safety, are requisite to protect the public health." 42 U.S.C. § 7409(b) (1). In selecting primary standards that provide an adequate margin of safety, the "Administrator is seeking not only to prevent pollution levels that have been demonstrated to be harmful but also to prevent lower pollutant levels that may pose an unacceptable risk of harm, even if the risk is not precisely identified as to nature or degree." Policy Assessment for the Review of Particulate Matter National Ambient Air Quality Standards ("Policy Assessment"), p. 1-3. [19] What is even more important here is that Congress defined public health broadly. NAAQS must protect not only average "healthy individuals, but also "sensitive citizens"--children [and the elderly], for example, or people with asthma, emphysema, or other conditions rendering them particularly vulnerable to air pollution. . . . If a pollutant adversely affects the health of these sensitive individuals, EPA must strengthen the entire national standard."[20]

[19] The Policy Assessment is available at http://www.epa.gov/ttnnaaqs/standards/pm/s_pm_2007_pa.html

[20] See also Policy Assessment, n. 4 ("The legislative history of section 109 [42 U.S.C. 7409] indicates that a primary standard is to be set at "the maximum permissible ambient air level . . . which will protect the health of any [sensitive] group of the population," and that for this purpose "reference should be made to

American Lung Ass'n v. EPA, 135 F.3d 288 (C.A.D.C. 1998) (citations omitted); accord American Farm Bureau Federation v. EPA, 559 F. 3d 512 (D.C. Cir. 2009).

To establish the NAAQS the EPA Administrator must produce "criteria," defined as the latest scientific data on "all identifiable effects on public health" caused by that pollutant. Id. § 7408(a)(2). The Administrator must then decide what margin of safety will protect the public health from the pollutant's adverse effects, both known and those that are scientifically uncertain. American Lung Ass'n, 135 F.3d 288. Then, without reference to cost or technological feasibility, the Administrator must promulgate national standards that "limit emissions sufficiently to establish that margin of safety." Id.; see 42 U.S.C. § 7409(b)(1); American Petroleum Inst. v. Costle, 665 F.2d 1176, 1181-82 (D.C.Cir.1981) (describing NAAQS promulgation procedure); Lead Industries, 647 F.2d at 1148-50 (Congress deliberately subordinated economic and technological feasibility concerns to the achievement of public health goals). MassDEP's approach in this case was to examine whether the facility's modeled emissions combined with background ambient levels will exceed the NAAQS. Pacheco PFT at ¶¶ 11-12. The emissions levels set in the air permit are all below the NAAQS.

AALs and TELs (for Air Toxics). Dr. Baird explained MassDEP's approach to setting guideline values for air toxics. MassDEP's use of AALs and TELs as screening level guidelines properly recognizes that not all risk of adverse health effects from air pollution can be eliminated, and instead focuses on eliminating unreasonable risks. Baird PFT at ¶¶ 2-3. The AALs generally derive from Non-Threshold Effects Exposure Limits ("NTELs"), which are

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a representative sample of persons comprising the sensitive group rather than to a single person in such a group S. Rep. No. 91-1196, 91st Cong., 2d Sess. 10 (1970).").

based on known or suspected carcinogenic (cancer) health effects. A NTEL is a concentration of a compound associated with a one in a million excess lifetime cancer risk over a lifetime of continuous exposure. TELs are based on non-cancer health effects. A TEL is a concentration of a compound intended to protect the general population, including sensitive populations such as children, from adverse health effects over a lifetime of continuous exposure. TELs account for the fact that people are exposed to a chemical from other sources in their daily lives, including indoor air, food, soil and water. Baird PFT at ¶ 7.

MassDEP developed the Chemical Health Effects Assessment Methodology and the Method to Derive Allowable Ambient Limits (CHEM/AAL) in the 1980s to derive ambient toxics exposure limits. Baird PFT at ¶ 6. The CHEM/AAL methodology was built upon occupational literature along with other sources of information to systematically identify and evaluate the potential adverse health effects of chemicals and to develop chemical-specific ambient limits. The methods were updated in 2011 following a scientific peer review of the revised protocol by the MassDEP/MassDPH Advisory Committee on Health Effects. The protocol considers cancer and non-cancer health effects. Baird PFT at ¶ 6; Baird Exhibit 2.

2. The Air Dispersion Modeling Presented in the May 2018 Modeling Report was Done in Accordance with Guidance and Demonstrates Compliance with Applicable Standards But Subsequent Modeling of Formaldehyde Emissions During Startups Justifies Revised Permit Conditions

The Petitioners challenge the air dispersion modeling conducted by Algonquin, contending that it fails to account for the effects of shoreline fumigation on plume dispersion; fails to account for the emissions from marine vessels in the project vicinity; mischaracterizes the project area as "rural" in the model; and omitted emissions of formaldehyde during start-ups,

thus understating the Project's total formaldehyde emissions. See Memorandum of the Ten Persons Group at p. 21; Town of Braintree's Post-Hearing Brief at pp. 10-12; Town of Weymouth's Post-Hearing Memorandum at p. 8. Algonquin and MassDEP disagree, arguing that the modeling correctly included all relevant inputs and demonstrates that emissions will comply with all applicable standards.

310 CMR 7.02(5)(c)6 provides that an applicant for a Comprehensive Plan Approval shall provide MassDEP with air dispersion modeling upon request. Air quality models are used to predict the future state of pollutants when they are released into the atmosphere. Air quality models apply mathematical formulas to characterize the atmospheric processes that disperse a pollutant released by a source. Using the emissions from a source and the meteorological inputs, dispersion modeling is able to predict concentrations of pollutants at selected downwind locations. Fickas PFT at ¶ 6, citing https://www.epa.gov/scram/air-quality-dispersion-modeling. The Federal Clean Air Act, 42 U.S.C. c. 85, requires USEPA to develop methods for modelling air pollutants, and requires USEPA to adopt regulations specifying with reasonable particularity models used to comply with the Clean Air Act's Prevention of Significant Deterioration requirements. See Clean Air Act, Section 165(e)(3)(D). USEPA developed regulations for air modeling and they are found in the Guideline on Air Quality Models, Appendix W to 40 CFR Part 51 (known as "Appendix W"). See Fickas PFT, Exhibit 16; Hearing Exhibit 16. Appendix W most recently revised as a final USEPA rule on January 17, 2017. See Federal Register, Vol. 82, No. 10.

The preferred model for use in air dispersion modeling assessments of impacts within 50 kilometers of a source is AERMOD, developed by USEPA. Fickas PFT at ¶ 10; Appendix W

(Hearing Ex. 16) at Section 4.2.2.1. MassDEP's Modeling Guidance at Section 6 requires the use of AERMOD. Fickas PFT at ¶ 10. AERMOD is a "steady-state plume dispersion model for assessment of pollutant sources from a variety of sources. AERMOD simulates transport and dispersion from multiple point, area or volume sources…." Appendix W, supra; Fickas PFT at ¶ 11. Meteorological data is incorporated into the AERMOD modeling through the use of the AERMET program, and AERMAP is used to provide data for all buildings, sources and receptors to be input into the AERMOD model. Fickas PFT at ¶ 12.

When implementing the AERMOD model and the associated AERMET and AERMAP programs,[21] an applicant typically develops a modeling protocol describing how the modeling will be done; the reviewing authority, here MassDEP, provides feedback to the applicant, which can include modifications of the protocol, and approves the modeling approach after consultation.[22] The reviewing authority can also provide certain necessary data inputs to be used in the modeling, including meteorological data and background air monitoring data. See Air Dispersion Modeling Report at 3-2 to 3-3; Table 3-1 at p. 3-2 (model selection options and justifications). The reviewing authority is often the best source for these data inputs. Fickas PFT at ¶ 13. Appendix W specifically references this sort of communication between an applicant and a reviewing authority when an air dispersion modeling protocol is being developed. See, e.g.

[21] AERMET is a meteorological data preprocessor that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts and AERMAP is a terrain data preprocessor that incorporates complex terrain using USGS Digital Elevation Data. https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models.

[22] This type of consultation and its effects on the modeling protocol are reflected in the highlighted sections on p. 3-2 of the May 2018 Updated Air Dispersion Modeling Report, including footnotes 16 through 19. It is this type of consultation, apparently, that Professor Phillips describes as "coaching" and "collaborating" resulting in a conflict of interest on the part of MassDEP. See. Tr. 181:2-15. See also Note 24, infra.

Appendix W at Section 3.0 ("The preparation of a written modeling protocol that is vetted with the appropriate reviewing authority helps to keep misunderstandings and resource expenditures at a minimum.") and Appendix W at Section 7.2.1.2 a.ii ("Selection of the appropriate model for applications where shoreline fumigation is of concern should be determined in consultation with the appropriate reviewing authority (paragraph 3.0(b)").

In developing the model, a land use analysis had to be done to determine a dispersion coefficient. Pacheco PFT at ¶ 25. Algonquin characterized the project area as "rural" using the AERSURFACE program to assess that choice. That assessment showed that the area could be classified as rural for air dispersion modeling purposes. Fickas Ex. 2 at 3-2; Fickas PFT ¶ 19. Additionally, MassDEP asked Algonquin to use the rural option to maintain consistency with prior modeling of other sources in the vicinity of the proposed Project. Id.; Pacheco PFT at ¶ 25. Algonquin's analysis used 1992 National Land Cover Data ("NLCD")[23] and a 3 kilometer radius centered on the proposed location of the turbine stack. Pacheco PFT at ¶ 26.

Algonquin initially submitted its modeling protocol to MassDEP in August 2015. Fickas PFT Ex. 3. The subsequent May 2018 Modeling Report, Fickas PFT Ex. 2, reflects the evolution of modeling assessments over time, based on discussions with MassDEP and changes to the proposed Project. It also reflects MassDEP's exercise of its discretion to request that Algonquin model emissions of air toxics to be included in the analysis of NAAQS compliance. Fickas PFT at ¶ 17-18. MassDEP did not require Algonquin to model background ambient air with facility emissions as part of the evaluation of compliance with AALs and TELs. As noted above, the air

[23] There is more recent National Land Cover Data from 2011but the AERSURFACE program is not yet able to process it because USEPA has not updated the program. Tr. 638-641 (Fickas cross-examination on selection of "rural" option).

Permit indicates that Algonquin's air modeling demonstrates that the proposed Project will comply with the requirements of 310 CMR 7.00 relative to emissions of criteria pollutants and air toxics.

a. Petitioners' Criticisms of the Modeling Relative to Shoreline Fumigation, Site Characterization and Emissions From Marine Vessels in the Project Vicinity.

Professor Dockery testified that the use of AERMOD is not consistent with USEPA Guidance for shoreline locations, where sea breeze conditions can occur and carry a plum inland aloft, largely intact before being brought to ground level. Dockery PFT at ¶¶ 11-14. He also criticized the characterization of the site as rural. In his opinion, Algonquin failed to follow the AERMOD Implementation Guide which would have taken into account the dominant Open Water surface characteristics at the site and changed the site characterization. Dockery PFT at ¶ 21. While Professor Dockery believed that meteorological data from Logan Airport was an excellent representation of surface meteorological conditions at the project site, he challenged the choice of meteorological data from a National Weather Service station in Gray, Maine as not being representative of the project site because those data do not "capture the vertical temperature structure of the atmosphere at shoreline locations during seabreeze conditions." Dockery PFT at ¶ 22.

Dr. Nordgaard also testified about shoreline fumigation. He opined that the "routine weather station data" used by Algonquin in its air dispersion modeling are inadequate to model shoreline effects in AERMOD. Dr. Nordgaard conducted his own modeling using the AERSCREEN model, and he found that "…a simplified AERSCREEN modeling analysis shows that the facility emissions may produce significant air quality impacts due to shoreline

fumigation and that the additional impact could result in a NAAQS violation." Nordgaard PFT at pp. 5-8. He disagreed that the meteorological data from Logan Airport was representative of the project site. Id. at ¶ 44.

Dr. Norgaard offered testimony that marine vessel emissions are a significant source of emissions in the project vicinity and should have been included in Algonquin's air dispersion modeling. Id. at pp. 1-8. He stated that "the most recent emissions inventory for commercial marine vessels in Norfolk county shows annual emissions of nitrogen oxides of 83.8 tons per year", relying on the "MassDEP Inventory Commercial Marine Vessels 2011 – Tables – 2-9-18 FINAL." Id. at 1. He opines that these emissions should have been accounted for by either modeling or representative data. Id. at 8, ¶ 34. In his opinion, it is reasonable to conclude that Algonquin's air dispersion modeling was incomplete and the project may cause or contribute to a NAAQS violation. Id. at 8, ¶ 35.

Professor Phillips also took issue with the characterization of the project area as rural. In his opinion, the area is "a coastal shoreline site embedded in an urban coastal community." Phillips PFT at p. 5, ¶ 5.1. Using an incorrect site characterization, even if the Logan Airport surface meteorological data were comparable, "means that the model cannot represent coastal/shoreline advection and incorrectly assumes that surface winds are uniform across a uniform surface rather than exhibiting sharp spatial gradients in surface energy balance and resulting atmospheric stability, winds and air mixing associated with the water-land boundary." Id.

He further faulted the Algonquin modeling for not including coastal parameters, Phillips PFT at p. 6, ¶ 11, and for not capturing pollution-capturing inversions. Relying on his graduate

school textbook as his source, plus a photograph of an emissions plume from a stack at the Calpine Fore River Energy Facility taken by one of the Petitioners on January 29, 2019 at a distance about one-quarter mile from the stack, Professor Phillips opined generally that a coastal inversion boundary layer will trap pollutants from compressor station's stack and expose nearby residents to undiluted compressor exhaust.

Based on the evidence described above, I make the following findings. The testimony presented by Dr. Nordgaard and Professor Phillips on these issues does not constitute credible evidence from a competent source. See In the Matter of Robert J. Cote, OADR Docket No. WET-2017-014, Recommended Final Decision, 2018 MA ENV LEXIS 47 (August 9, 2018), adopted by Final Decision, 2018 MA ENV LEXIS 46 (August 28, 2018) (to be a competent source a witness must have sufficient expertise to render testimony on the technical issues on appeal with sufficient education, training, experience and familiarity with the subject matter of the testimony). Although Dr. Nordgaard testified about his AERSCREEN analysis, he conceded at the hearing that he has not studied air dispersion modeling and has no specialized training in the use of AERSCREEN. Tr. 94:10-97:11; Tr. 97:16-98:1. Likewise, Professor Phillips lacks training and experience in air modeling to be qualified to offer an expert opinion on the air modeling.[24] As the Town of Weymouth's modeling expert John Hinckley pointed out during the hearing, to be expert in air modeling requires significant training and experience. See Tr. 308:4-

[24] Professor Phillips' credibility was also undermined by his unfounded and spurious allegations of conflicts of interest directed at MassDEP's witnesses. See Note 22 at page 29, supra. These allegations evidence a fundamental lack of understanding of how environmental permitting is done. Whether the permitting involves a natural gas compressor station, a wastewater treatment plant, a Brownfield redevelopment, a residential dock or any of the myriad other projects requiring a MassDEP issued permit or license or approval, communication between MassDEP and applicants during pre-permitting and permitting processes is a common, and beneficial, method of ensuring that MassDEP fully understands the project being proposed and project proponents fully understand the permitting requirements applicable to their project. As noted above, Appendix W also recommends it.

312:2. Dr. Nordgaard and Professor Phillips lack both of these and therefore I accord their testimony on these issues no weight.

Even if Dr. Nordgaard had demonstrated some evidence of expertise on these issues, his testimony was effectively rebutted by both MassDEP and Algonquin witnesses. See, e.g., Fickas PFR at ¶¶ 28-41. Mr. Fickas pointed out that Dr. Nordgaard's execution and interpretation of the modeling were flawed because, among other things, he misapplied an emissions rate used by the California Air Resources Board ("CARB") as a proxy emission rate and he attempted to simply add the results of his modeling to the modeling results for 1-hr NAAQS in the May 2018 Air Dispersion Modeling Report. AERSCREEN results cannot simply be added to the AERMOD results because in a multisource model like AERMOD, "the impacts would not align themselves completely in time and space to be necessarily additive." Fickas PFR at ¶¶ 29.a and 29.b.

Although Dr. Dockery has sufficient expertise in air modeling, he was effectively challenged on his testimony at the hearing. He conceded that he was using an old version of EPA Guidance to support his criticism of the use of AERMOD. Tr. 390:10-14. He also conceded that he does not have any current experience regarding the selection of an appropriate model for applications when fumigation is expected to occur, and did not do any of his own modeling with any model to evaluate potential fumigation effects at the project site. Tr. 431:16-432:1. Dr. Dockery also acknowledged that after reviewing the pre-filed rebuttal testimony of MassDEP witness Glenn Pacheco, he agrees that the characterization of the project area as rural is appropriate. Tr. 400:6-401-3. Mr. Pacheco testified that a review of other modeling analyses performed for other nearby facilities showed that rural dispersion had been utilized for the Project area and approved by MassDEP in the past. Pacheco PFT at ¶ 25. And although Dr.

Dockery did not agree that the NWS station in Gray, Maine effectively captures the "microstructure near the shoreline here [because it is ten miles inland] as that internal boundary layer develops…" he did agree that it is "the best representation for that mesoscale New England Vertical Structure." Tr. 402:17-403:15. As Mr. Pacheco testified, there are only three upper air stations available for consideration for Massachusetts facilities needing to model their emissions, the other two being Albany, NY and Chatham, MA. Albany can be excluded because it is too far inland to be useful, and Chatham can be excluded because it is considered fully immersed in a marine environment all of the time. Pacheco acknowledged that the selection of the Gray, Maine station is a compromise, but it does experience "similar varying synoptic weather patterns as the Boston area…." Pacheco PFR at ¶ 12.

MassDEP presented persuasive evidence that shoreline fumigation is not an issue at this site and that marine vessel emissions were properly omitted. Mr. Pacheco testified that in response to the Petitioners' testimony, MassDEP ran multiple iterations of AERSCREEN with the shoreline fumigation option selected to model the turbine's 60-foot stack emissions over six operating conditions, varying ambient temperature conditions and different shoreline distances. Pacheco PFR at ¶ 25. The model is programmed to produce an impact result when fumigation conditions are present and not produce a result when they are not present. Id. The model did not produce a fumigation impact result at a shoreline distance starting at .19 miles (300 meters), which is only 25% of MassDEP's best estimate of the distance to the shoreline. Id.

Even if Dr. Nordgaard were qualified to opine on the exclusion of marine vessel emissions from the air dispersion modeling, Mr. Pacheco deftly rebutted his testimony. Dr. Nordgaard relied on MassDEP Guidance. Mr. Pacheco testified that this reliance is misplaced

because the Guidance pertains to stationary, not mobile source of emissions. Mobile sources are addressed by including the most representative background data available. Pacheco PFR at ¶ 14. Dr. Nordgaard's testimony regarding the CARB modeling exercise of commercial marine vessel emissions makes an erroneous comparison of emission rates. Id. at 15. Finally, Dr. Nordgaard cited an outdated emission inventory for marine vessels in Norfolk County from 2011, rather than the 2014 inventory, which shows 19.2 tons of NOx from commercial marine vessels in Norfolk County, not 83.8 tons as stated by Dr. Nordgaard.

For the foregoing reasons, I conclude that a preponderance of the evidence supports the following finding: the choice of AERMOD was correct; the selection of AERMOD's rural option was appropriate; shoreline fumigation conditions would not negatively affect the modeling analysis; and marine vessel emissions were properly excluded from the air dispersion modeling.

b. Modeling for start-ups/shut down was not required, modeling performed during these appeal proceedings demonstrated exceedances of the AAL for formaldehyde, but not an unreasonable risk; revised conditions are recommended based on evidence presented at the Hearing.

The Petitioners allege that the facility's emissions of VOCs, particularly formaldehyde, will exceed the AAL and cause or contribute to a condition of air pollution. The basis for this allegation is that Algonquin's air modeling did not include short term and/or intermittent events such as start-ups and shut downs. The Petitioners contend that during such events emissions of VOCs will be uncontrolled because, for example, the pollution control equipment will not be operating in its destructive and removal capacity while the turbine is starting up. As a result, higher levels of air toxics will be emitted into the ambient air. Although the Application indicates

that startups will last only 9 minutes and shutdowns will last only 8.5 minutes, the Air permit sets an Operational/Production Limit for these events at "not to exceed 30 minutes." See Air permit, Table 8D.[25] The number of startup and shutdown events is estimated at 416 startup events and 416 shutdown events per year for the turbine. Application at 3-8; Application, Attachment G, Table B-1Af (predicting a "maximum" of 416 startups per year); Tr. 599.

310 CMR 7.00 does not require an applicant to model emissions of air toxics from facilities not subject to Prevention of Significant Deterioration ("PSD") permitting. See Department of Environmental Protection Division of Air Quality Control, Air Toxics Implementation Update, August 1989, ("the 1989 Air Toxics Update"). Keith PFT Exhibit 4. The proposed Project is not a PSD project. However, in this case MassDEP exercised its discretion to request air toxics modeling to address public concerns and ensure that the proposed Project would not have a detrimental impact. Cushing PFT at ¶ 24; May 2018 Air Dispersion Modeling Report at 2-5. According to the Air Dispersion Modeling Report, "all proposed and existing sources at the Weymouth Compressor Station and M&R Station were modeled and the maximum modeled concentration results were compared to Massachusetts' 24-hour [TELs] and annual [AALs]." The results of that modeling are presented in the Modeling Report in Section 4.4 at pages 4-13 through 4-20. The Modeling Report concluded that the analysis of air toxics will not cause toxic pollutant concentrations above the Massachusetts AALs and TELs. But startups and shutdowns were not included in the air dispersion modeling.

MassDEP explained in the RTC that the need to include startup and shutdown emissions

[25] The Air permit establishes emissions limits for these events and requires that the emissions associated with them be included when determining monthly and annual emissions. See Table 8D, Note 6.

is "relatively diminished" because these events last only a few minutes, and the "amount of time these emissions exist relative to the impact period is very small (less than 1% of the time for one startup/shutdown in a 24-hour period and approximately 1% of the time for all 416 startups/shutdowns in an annual period." RTC at pp. 15-16, Response to Comment 19. The startup process is estimated by Algonquin to take 9 minutes from initiation of startup to normal operation. Application at 3-5. "It is assumed that the oxidation catalyst will not yet have a measurable destruction or removal efficiency (DRE) during startup, as it is designed to meet control specifications only during normal operation." Id.

The Town of Weymouth presented credible evidence based on the operational limits set in the air permit [Table 8D] and the estimated number of startups, discussed above, that emissions of formaldehyde will exceed the AAL at least at one receptor beyond the fence line. The Compressor Station will emit formaldehyde as a product of incomplete combustion of its natural gas fuel. Powers PFT at ¶ 9. Algonquin proposes to reduce formaldehyde emissions from the turbine by 50% using an oxidation catalyst. Application at p. 23-1. This control mechanism is effective only when operating at full efficiency. Powers PFT at ¶¶ 13-14. During the warm-up period whenever the turbine starts up, the catalyst does not achieve full efficiency. Powers PFT at ¶¶ 13-14. Over the course of a year, startup formaldehyde emissions occurring over 62 hours are more than ten times greater than formaldehyde emissions occurring over 8,760 hours of normal operation. Shutdown emissions occurring over 59 hours are about 50 percent of formaldehyde emissions occurring over 8,760 hours of normal operation. Powers PFT at ¶ 13.

These high-emission startups also may have different dispersion characteristics than steady-state emissions because startups are discrete, 9-minute events. Hinckley PFT at ¶¶ 26, 29,

44. The modeling Algonquin presented to MassDEP, not including startups and shutdowns, showed formaldehyde emissions of nearly 70% of the applicable AAL. May 2018 Air Dispersion Modeling Report at pp. 4-14 to 4-19; Tr. 598. Hinckley disputed MassDEP's explanation in the RTC for excluding these events from modeling on the grounds that startup-up emissions included in the Application were dramatically higher than normal operating emissions. Hinckley PFT at ¶¶ 26-27; Application, Attachment G, Table B-1Aj. Mr. Hinckley described startup emissions as a "big slug of pollution that goes into the air…[s]tartup emissions…are about over 400 times higher than normal operation." Tr. 323:19-24, 324:1-5.

I found Mr. Hinckley to be a forthright, professional and reliable witness. Hinckley evaluated the projected formaldehyde emissions and concentrations under two scenarios: 30-minute startups and 9-minute startups. Hinckley PFT, ¶¶ 38-39. The former reflects Algonquin's actual request to MassDEP to allow startup durations as long as 30 minutes, and MassDEP's inclusion in the Plan Approval of a specific condition authorizing 30-minute startups. Prefiled Rebuttal Testimony of Thomas Cushing ("Cushing PRT"), ¶ 3; Tr. at 705:8-17 (Mr. Goodrich testifying that Algonquin requested the 30-minute limit because it would be an easy timeframe for their station operator to keep track of and "being that we knew emissions took 9 minutes, it made it an easy point to comply with.") Mr. Hinckley testified that this is typically how modeling for air permits is conducted, explaining that "according to the way this work is done, your modeling mirrors your permit limits. So if the permit limit is 30 minutes, then the model should reflect 30 minutes." Tr. 338. Given that a permit reflects the parameters under which the compressor station will operate, I credit this testimony. For 30-minute startups, Mr. Hinckley determined that the compressor station will emit formaldehyde at concentrations exceeding both

the AAL and the TEL. Hinckley PFT at ¶ 42. For 9-minute startups, Mr. Hinckley determined that if a startup occurs when other sources of emissions are operating, emissions of formaldehyde will be slightly above the AAL. Hinckley PFT at ¶ 41 and Table 1 (showing exceedance of 0.01 $\mu g/m^3$). For 30-minute startups, he determined that if a startup occurs when other sources of emissions are operating or not operating, emissions of formaldehyde will be higher than the AAL. Hinckley PFT at ¶ 41 and Table 2 (showing emissions above the 24-hour and Annual AALs).

After reviewing Mr. Hinckley's testimony, Algonquin's air dispersion modeling expert, Justin Fickas, performed his own, revised air dispersion modeling to include startups, using slightly different factors and inputs. Fickas PFR at ¶ 16. I also found Mr. Fickas to be forthright, professional and reliable. In lieu of a 30-minute startup scenario reflecting the Plan Approval's enforceable limit, Mr. Fickas modeled an 18-minute startup. Fickas PRT, ¶¶ 17, 21. His model also predicts formaldehyde concentrations that exceed the AAL in the 18-minute startup scenario. Fickas PRT, ¶¶ 17, 21. MassDEP has neither done any modeling of its own, nor offered any opinions concerning these exceedances. Both Mr. Fickas and Mr. Hinckley used AERMOD software to model formaldehyde emissions from the proposed compressor station. Fickas PRT at ¶ 9; Hinckley PFT at ¶ 38d. The location of the exceedances, i.e. the receptor point, is at or beyond the fence line of the compressor station facility.

While both Mr. Hinckley and Mr. Fickas take issue with aspects of the other's modeling,[26] I am persuaded by Hinckley's testimony that the air permit's conditions for startups

[26] Mr. Fickas expressed his preference for ratio-based modeling, which he refers to as an "annualized emissions" approach. Fickas PFR at ¶ 27. Mr. Hinckley disagreed and testified that ratio-based modeling is not the best

and shutdown will not prevent a condition of air pollution because during a 30-minute startup, emissions of formaldehyde will exceed the AAL. During an 18-minute startup sequence, an exceedance is possible. I find that the most appropriate air dispersion modeling analysis for startups was that conducted by Mr. Hinckley utilizing a 30-minute startup scenario. I make that finding because that startup scenario reflects the enforceable limit for startup duration specified in the Air permit at Table 8D on page 16. I find that air dispersion modeling for a 30-minute startup scenario shows that the Project's formaldehyde emissions will exceed the formaldehyde AAL and TEL at the point of maximum predicted modeled concentration at or beyond the property boundary. Hinckley PFT ¶ 17; Fickas PFR at ¶¶ 20, 22; Tr. 593, 622-623. I find that the next most appropriate air dispersion modeling analysis was that conducted by Mr. Fickas utilizing an 18-minute startup scenario. I make that finding because that startup scenario reflects the possibility of failed startups and the maximum startup duration reflected in the Plan Application. See Plan Application, Attachment G, Table B-1Aj. I conclude that air dispersion modeling for an 18-minute startup scenario shows that the Project's formaldehyde emissions will exceed the formaldehyde AAL at the point of maximum predicted modeled concentration at or beyond the property boundary. Tr. 622-623. Three receptor locations were predicted by Mr. Fickas' 18 minute startup model to exceed the annual AAL. Fickas PFR at ¶ 23; Table 4 and 5 at Fickas PFR p. 13.

I give slightly greater weight to Mr. Hinckley's testimony because he, more so than Mr. Fickas, recognized the potential problem with these uncontrolled emissions from startups and

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approach for modeling the compressor station's startups. Assuming a steady, small stream of 18 emissions over the course of an entire day is very different from the short, 9-minute spurt of highly concentrated formaldehyde emission that will actually result from startups. Hinckley PFT at ¶ 44.

made efforts to determine whether they potentially would be harmful. I acknowledge that EPA Guidance does not require modeling of these intermittent events, and I recognize that both Mr. Hinckley and Mr. Fickas had to tinker with AERMOD to conduct their modeling of startups. But I cannot ignore the evidence that is before me regarding the emissions of formaldehyde during these intermittent events.

Notwithstanding these findings, the record reflects Algonquin's belief that a 30-minute start-up sequence will never occur, and that an 18-minute startup sequence will be a rarity, occurring only in the event of a failed startup. In fact, Algonquin went to great pains at the hearing to deny that a 30-minute start-up would ever occur. See Goodrich PFR at ¶ 28, 30 ("The 30-minute model is not meaningful, however, because startups do not take thirty minutes – and there is nothing in the record to suggest that they do."); Tr. at 705:8-17. To the contrary, there is the Air permit itself, with an Operational/Production Limit that would allow for three failed startups without a permit violation. Tr. at 914:14-24 (Cushing testifying that a startup lasting 29 minutes would not violate the permit). Mr. Cushing explained that Algonquin requested this limit. I can only infer from Mr. Goodrich's testimony that Algonquin requested this limit to give Algonquin a more than ample margin within which to avoid the possibility of a permit violation. That being said, the air permit limitation is not justified by the evidence.

Weymouth argues that these circumstances require the permit be denied. In my judgment, the better remedy is to revise the Air permit conditions relating to startup and shutdown events in Table 8D to conform to the evidence, such that the "not to exceed" limit for start-ups is 18

minutes, and the "not to exceed" limit for shutdowns is 17 minutes.[27] These limits reflect what Algonquin asserts is the likely operational situation, and is consistent with the permit limits imposed on the Chaplin Compressor Station in Connecticut for a similar turbine.[28] Additionally, I am mindful of the fact that the AAL reflects a very conservative, health-protective guideline. The slight exceedance shown in the revised modeling beyond the fence line therefore does not, in my opinion, justify denying the permit.

Mr. Hinckley provided credible testimony that justifies including additional conditions in the Air permit to ensure that the oxidation catalyst is operating in conformance with its design, and no contrary evidence was presented by Algonquin or MassDEP. These additional conditions relate to testing and record keeping and are proposed to ensure that the oxidation catalyst will effectively and continuously achieve its purpose of controlling emissions of air toxics, which include formaldehyde, and verify that the oxidation catalyst is operating in conformance with its design. Hinckley PFT at ¶¶ 54-60. I recommend, based on the unrebutted testimony of Mr. Hinckley, that these additional conditions be included in the Air permit, and that MassDEP be directed to include them in its revised Air permit.

[27] Mr. Hinckley did not model the shutdown events, but noted that based on the Application, shutdown conditions also have some potential for elevated levels of emissions as compared to emissions during normal operations. Hinckley PFT at ¶ 23. This provides a basis for revising the Table 8D Limit on Shutdowns.

[28] The Chaplin Compressor Station is discussed in the FERC Environmental Assessment of the AB Project, and is referenced at page 2-6 of the Application. The New Source Review Permit issued to Algonquin for the Chaplin Compressor station on August 2, 2018 contains operational conditions for startup and shutdown events as 18 and 17 minutes, respectively. I was easily able to find this publicly available document at https://www.ct.gov/deep/lib/deep/air/permits/titlev/algonquin_chaplin/p_034-0006.pdf.

3. TELS and AALs are Health Protective Guidelines and the Facility's Emissions Will Not Create an Unacceptable Risk to Human Health.

The Petitioners generally do not take issue with how the AALs and TELs were developed. See Landrigan PFT at ¶¶ 77-78. They do take issue with how the AALs and TELs have been applied with respect to the compressor station, and believe that as applied to the proposed Project, they are not health-protective. Id. at ¶ 79; Clapp PFT at ¶¶ 17-19; Dockery PFT at ¶ 46. They assert that because existing ambient background conditions in the area of the project site already demonstrate high levels of carcinogenic and non-carcinogenic pollutants, any incremental increases to those levels creates unacceptable risk and will cause or contribute to a condition of air pollution. See Ten Persons Group Memorandum of Law at 13-14; Town of Braintree Memorandum of Law at 5-6; Town of Weymouth Memorandum of Law at 8. See also Dockery PFT at ¶¶ 42-45, citing Figure 52 of the HIA. They argue that these conditions require that modeling of air toxics emissions from the facility be combined with ambient background conditions to determine whether exceedances of AALs and TELs will occur, and challenge MassDEP's "long standing practice" of not requiring this type of modeling as outdated and not protective. MassDEP and Algonquin disagree with these assertions.

As discussed apreviously, MassDEP has broad authority to regulate and control air pollution. Brookline v. Comm'r of Dep't of Envtl. Quality Eng'g, 398 Mass.404, 497 N.E. 2d 9, 13 (1986). This broad authority includes the responsibility for setting the standards for determining whether emissions of air contaminants pose a reasonable or unreasonable risk. See In the Matter of Palmer Renewable Energy, LLC, OADR Docket No. 2011-021 & 022, Recommended Final Decision After Remand (July 9, 2012, 2012 MA ENV LEXIS 120, at 70,

adopted in relevant part by Final Decision (September 11, 2012) 2012 MA ENV LEXIS 113. The court in Brookline made clear that MassDEP's responsibility does not require it to set standards that eliminate all risk. Brookline, supra, at 15. MassDEP relies on a long-standing practice of not modeling air toxics from nearby significant sources. AALs and TELs represent MassDEP's policy judgment about incremental risk. Tr. at 773:15-20. MassDEP implements its policy judgment and long-standing practice based on the 1989 Air Toxics Update, Keith PFT, Ex. 4.

The 1989 Air Toxics Update states as the primary objective of the air toxics program to prevent, to the maximum extent possible, the emissions of substances into the ambient air which may cause or contribute to an increase in mortality or serious illness, or which may otherwise pose a present or potential hazard to public health, welfare or the environment. 1989 Air Toxics Update at p. 1. MassDEP requires new or modified sources of air contaminants to assess the ambient concentrations caused solely by the source's emissions, and compare those modeled concentrations to the AALs to determine if there are potentially unacceptable risks associated with that particular source.

The Petitioners presented evidence from three eminent public health professionals, experts in medicine, toxicology and epidemiology. Collectively, they opine that any emission of air toxics from the facility when combined with existing background conditions will present unacceptable risks of serious illness and disease. See, e.g. Dockery PFT at ¶ 45; Landrigan PFT at ¶ 67-70; Clapp at ¶¶ 17-19. Particularly in the area of the proposed Project, where data on ambient background concentrations are available, the Petitioners contend that application of MassDEP's "long-standing practice" makes no sense. Dr. Dockery testified that "[a]lthough it's

a very, very small risk, it's something. There is a big difference between exposures that we put on ourselves versus exposures that are imposed on us without our control." Tr. at 417:4-8.

In response, MassDEP and Algonquin presented the testimony of Dr. Baird and Dr. Valberg. Dr. Baird testified that to determine the AALs and TELs MassDEP first develops: NTELs, Non-Threshold Effects Exposure Limits, based on known or suspected cancer-causing health effects associated with a one in a million excess cancer risk over a lifetime of continuous exposure; and TELs, Threshold Effects Exposure Limits, based on non-cancer health effects of individual chemicals. TELs take into account the fact that people may be exposed to a chemical from other sources, such as food, indoor air, soil and water. Baird PFT at ¶¶ 7, 15 (discussing relative source contribution factor included in TELs). AALs and TELs are considered health protective and rely on the best available toxicity value. Baird PFT at ¶ 11. A one in a million excess cancer risk is considered de minimis, or no significant risk in most federal and state environmental regulatory programs. Id. at at ¶ 12. Dr. Baird also referenced a 2011 MassDEP Guidance document, the "Methodology for Updating Air Guidelines: Allowable Ambient Limits (AALs) and Threshold Effects Exposure Limits (TELs)", which outlines MassDEP's process for updating the AALs and TELs based on current toxicology reiterates the conservative nature of those values. Baird PFT, Exhibit 2.

Dr. Valberg concurred with Dr. Baird's opinion that AALs and TELs are health-protective. Valberg PFT at ¶¶ 16-19. His testimony described numerous studies on carcinogenic and other health effects that confirm the conservative, health-protective nature of the AALs and TELs. See, e.g., Valberg PFT at ¶¶ 35-50 (concluding that the AAL for formaldehyde is nearly

100,000 fold below the lowest concentration where an elevation of tumors was demonstrated to occur in laboratory animals).

Both Dr. Baird and Dr. Valberg agree that the AALs and TELs are screening level guidelines rather than regulatory standards. The Petitioners dispute this, arguing that the use of the word "limit" indicates that the AALs and TELs are, or should be, applied as regulatory standards similar to the application of NAAQS. As demonstrated in the Air Dispersion Modeling Report and described in the Air permit, emissions from the proposed Project will be below the applicable AALs and TELs (except as described above in the discussion of startup emissions).

A preponderance of the evidence demonstrates that in the context of risk-based environmental permitting, MassDEP's reliance upon the AALs and TELs as screening level guidelines for emissions from the compressor station facility without including ambient background of emissions of air toxics in air dispersion modeling constitutes a proper exercise of its broad discretion, is a reasonable means for implementing its statutory and regulatory obligations, and complies with Brookline. A preponderance of the evidence also supports a conclusion, therefore, that the facility's emissions, which are below the AALs and TELs, will not create an unacceptable risk to human health. Further, although the Petitioners present compelling expert testimony to support a policy change vis-a-vis MassDEP's long-standing practice regarding air toxics modeling, I believe that it would be arbitrary to disregard that practice in this instance and announce a new policy without undergoing a thorough, formal policy development process.

4. The Emissions Represent Best Available Control Technology ("BACT")

The Air permit states that "All emissions factors, which are provided by the manufacturer, have been established as Best Available Control Technology (BACT)." The Petitioners dispute that a gas-fired turbine using dry low NOx technology [here, a product called "SoLoNox"] to limit NOx emissions and equipped with an oxidation catalyst to reduce emissions of VOCs and CO is the Best Available Control Technology ("BACT"). They contend that an electric-driven compressor is BACT, or if it is not, then a gas-fired compressor using Selective Catalytic Reduction ("SCR") is BACT.

310 CMR 7.02(8)(a) provides that air permits "shall include the most stringent emission limitation" of those listed in the regulation. In this case, the applicable standard is BACT. The regulation provides that "BACT may include a design feature, equipment specification, work practice, operating standard or combination thereof." BACT is defined as:

> "an emission limitation based on the maximum degree of reduction of any regulated air contaminant emitted from or which results from any regulated facility which the Department, on a case-by-case basis taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such facility through application of production processes and available methods, systems and techniques for control of each such contaminant. The best available control technology determination shall not allow emissions in excess of any emission standard established under the New Source Performance Standards, National Emission Standards for Hazardous Air Pollutants or under any other applicable section of 310 CMR 7.00, and may include a design feature, equipment specification, work practice, operating standard, or combination thereof."

310 CMR 7.00 (emphasis added). 310 CMR 7.02(8)(a)2 further provides that an applicant can propose BACT using a "Top-Case" level of control from the most recent air permit or other action issued by MassDEP, or can propose a unit-specific top-down BACT analysis.

Algonquin proposed a top-down BACT analysis. The MassDEP BACT Guidance, June 2011, Hearing Exhibit 2, and USEPA's New Source Review Workshop Manual ("NSR Manual"), October, 1990, Hearing Exhibit 3, specify how a top-down BACT analysis is to be conducted. It is a 5-step process that involves ranking all available BACT alternatives and then, step by step, determining which is BACT, based on several factors. MassDEP Guidance specifies that the "top-case", that is, the most stringent alternative, must be examined first and MassDEP will presume it to be BACT unless the applicant can demonstrate, and MassDEP agrees, that it is not feasible for technical, energy, environmental or economic reasons. MassDEP BACT Guidance at p. 3. The top-down analysis includes the following five steps: (1) Identify all control technologies in a comprehensive list; (2) Eliminate Technically Infeasible Options; (3) Rank Remaining Control Technologies by Control Effectiveness; (4) Evaluate Most Effective Controls and Document Results; and (5) Select BACT.

Based on the evidence presented, I conclude that MassDEP's process in evaluating BACT was flawed, but that a slight preponderance of the evidence demonstrates that the emissions represented in the Air permit represent BACT using the proposed technology.

Electric Driven Compression

Algonquin did not include electric-driven compression in its BACT analysis, relying on FERC's Environmental Assessment ("EA") to eliminate it from the potential alternatives to the specified compressors for the AB project. The EA evaluated Algonquin's assessment of the feasibility of using electric-driven compression, presented to FERC in Resource Report 10, which was prepared on behalf of Algonquin. FERC concluded that using electric-driven compression "would not be preferable to or offer a significant environmental advantage over"

gas-fired compression. Application at p. 2-7. The EA evaluated two proposed compressor stations in addition to the Weymouth compressor station, both in Connecticut, in Chaplin and Oxford. MassDEP accepted and deferred to FERC's conclusion, and at the hearing testified that MassDEP opted to exercise its discretion not to consider electric-driven compression because that would have "redefined the project."

As a starting point, MassDEP erred by not including all control technologies in the BACT analysis. This resulted in its failure to consider electric motor drive compression as an available control technology. In his pre-filed rebuttal testimony, Mr. Cushing testified that the BACT analysis did not need to consider electric-driven compression because it would have "redefined the source" as that phrase is used in EPA guidance, and MassDEP did not exercise its discretion to redefine the source. Cushing PFR at ¶¶ 4-5, 8. Mr. Cushing testified that in making this determination, he relied on the Environmental Assessment ("EA") prepared by FERC and deferred to FERC's judgment. Id. at ¶ 6; Tr. at 878-880. He also testified that this was the first project he has reviewed where FERC was involved. I do not find this testimony credible for the following reasons. As a preliminary matter, FERC did not conduct a BACT analysis and FERC does not issue air permits. The Hearing evidence demonstrates that MassDEP adopted FERC's conclusions without considering MassDEP's wholly different mandate. Massachusetts retains its authority under the Clean Air Act to issue air permits, and the Clean Air Act is specifically not preempted by the Natural Gas Act. Massachusetts does not and should not abdicate its responsibilities under the Clean Air Act to FERC.[29] I have not been presented with any authority

[29] FERC provides a simple flow chart of its process for reviewing and approving projects that notes quite clearly that Clean Air Act permits are outside of its process. https://www.ferc.gov/resources/processes/flow/lng-1.asp

that supports a conclusion that a FERC Environmental Assessment replaces or overrides MassDEP's obligations to make BACT determinations.

I reviewed the EA and could find no statement that electric-driven compression was considered a "redesign of the source". Rather, the EA discussed the many reasons why electric-driven compression was not considered preferable by Algonquin. The EA does not contain a conclusion that it would redefine the source of Algonquin's project. The notion that electric-driven compression would "redefine the source" is an after-the-fact justification by both MassDEP and Algonquin of why "all control options" were not identified in Step 1 of the BACT analysis. Although Mr. Welch provided reasons why using an electric drive motor would, in his opinion, redesign the fundamental scope and purpose of the compressor station, Welch PFR at ¶¶ 4-8, this is not reasoning that was presented to MassDEP in the Application. Mr. Cushing did not scrutinize this reasoning as part of the BACT analysis, as the BACT Guidance states he should have done, because it wasn't provided to him by Algonquin. Had he required Algonquin to identify "all control options" in Step 1 of its top-down analysis, then he could have made his own determination based on the two-step process discussed below.

Mr. Powers countered Welch's testimony with his opinion that he does not consider electric driven compression to be a redesign because the objective of Algonquin's project is to compress natural gas. He made a persuasive case for why MassDEP should have required inclusion of electric driven compression in Step 1, or exercised its discretion to require inclusion of electric technology in the first step of the BACT analysis had Algonquin asserted at the time that it would redefine the source. "You can do it with a gas turbine. You can do it with an electric motor. The industry routinely does it with an electric motor of their choice." Tr. 78:16-24; 79:1-

4. While Mr. Powers agreed that an electric motor and natural gas power are "not the same thing", his opinion "is the electric motor eliminates air emissions. It eliminates air permits. It is actually the ideal thing to put in from an air quality standpoint, and [MassDEP] has the authority to look at it." Tr. 79:13-19.

Cases from the Environmental Appeals Board cited by the Town of Weymouth and Algonquin demonstrate that this determination is case specific and involves a two-step process of first defining the end, object, aim or purpose of the project and then determining which design elements are inherent to the applicant's purpose. As noted in Sierra Club, et al. v. USEPA and Prairie State Generating Company, LLC, 499 F.3d 653 (7th Cir. 2007), the line between where a control technology ends and a redesign begins is not obvious. See also Helping Hand Tools v. USEPA, 848 F.3d. 1185 (9th. Cir. 2016)("In essence, a control alternative redefines the source if it required a complete redesign of the facility.") As the court in Helping Hands noted, the second step in the two-step process requires a "hard look" by the reviewing authority "at the proposed definition to determine which design elements are inherent to the applicant's purpose and which elements can be changed to reduce pollutant emissions without disrupting the applicant's basic business purpose." Id. at 1194. I recommend that in the future, MassDEP take note of this process when scrutinizing a BACT analysis, particularly the scope of the control options presented by an applicant, to ensure that "all control options" are included in Step 1, particularly as science and technology advance. Based on the evidence, it is clear to me that MassDEP avoided this process as a result of its unwarranted deference to FERC. Nonetheless, even

assuming use of an electric driven compressor would not redefine the source, as discussed below it can be eliminated in Step 4 of the analysis.[30]

Elimination of the electric-driven compression alternative.

Mr. Powers testified that an electric drive motor alternative to the gas-fueled compressor is technically and economically feasible, would eliminate gas turbine air emission, and would lower noise levels at the compressor station. Powers PFT at ¶ 18. He stated that this technology is commonly used in pipeline compressor applications, and has been specified for the Farmington Compressor Station component of the Empire North Pipeline Project in New York. Id. at ¶¶ 20-21 and notes 8 and 9. His opinion is that electric and gas-fired motors have the same installed cost. Id. at ¶ 24. Perhaps, more importantly, "[s]election of electric motor drive technology for the compressors at the Weymouth Compressor Station would also result in substantially lower greenhouse gas emissions than would otherwise be emitted by the Taurus 60 gas turbine." Id. at 28.

In response, Algonquin's witness Mr. Welch testified that significant additional costs would be incurred to support an electric drive option, including those associated with extending a transmission line to the compressor station. Welch PFR at ¶ 17. Algonquin estimated it would take 3 ½ years after FERC approval to install an electric-motor driven compressor. Id. at ¶ 17. Installing an electric driven motor would involve planning, permitting and contracting with the local electric distribution company, add additional time to the project timeline, and require significant infrastructure to support the motor. Welch PFR at ¶ 9; Tr. at 545-562 (discussing process for and time required to permit and construct the electrical infrastructure). This

[30] The *de novo* nature of this appeal enables me to make that determination based on the evidence presented.

infrastructure would include installation of an approximately half-mile underground electric transmission line to connect the compressor station to the nearest power source at the Edgar substation and likely upgrades to that substation; and construction of a substation adjacent to the compressor station. Welch PFR at ¶ 13. Mr. Welch testified at the hearing as follows (Tr at 564:4-19):

> because if you're going to have electric drive, you need to have a power source. Okay. So there again, you need the transmission line. Assuming the power company can provide the additional power, you need to have the power line from the transmission substation. It goes through a distribution line, so it changes ownership from -- to Grid, who has the distribution rights to provide that to Algonquin. Algonquin needs to build the substation on the property, okay, to reduce that voltage. Then you also need to have a variable frequency-drive building with several drives to control that power source to the motor. There's a whole lot of other additional infrastructure that's required….

The electric distributor estimated it would cost $6-9 million dollars to upgrade the Edgar substation, and Algonquin estimated the cost to design and construct a substation at the compressor station to be approximately $3 million. Welch PFR. at ¶ 17. While there is no corroboration of these numbers, and they seem to be based on several conversations or meetings at which no notes apparently were taken, there is no evidence disputing them. This is not the most reliable evidence, but it is the only evidence in the record relative to the costs of the necessary infrastructure. But even without knowing specifically what these costs actually are, based on Mr. Welch's testimony I can reasonably infer that the total cost for this infrastructure would be substantial. Most importantly, however, Mr. Powers conceded during cross-examination at the hearing that he had not factored the costs of infrastructure into his opinion,

only the costs of the turbine itself. Tr. 70:3-14, 71:8-11. This effectively undermined his testimony.

The NSR Manual at Section IV.D.2.b., pages B.36-B.46, hearing Exhibit 3, discusses in detail how a cost effectiveness analysis is to be done. As noted above, Mr. Powers did not factor in the cost of the necessary infrastructure, just the installed costs of the electric motor. Algonquin's evidence of actual costs related to all of the elements they state would be necessary for this control technology, though scant and uncorroborated by any documentation, at least provides some basis to infer that applying the NSR Manual's guidance would result in the elimination of electric-driven compression as not cost effective. Based on this testimony, I am able to conclude that electric driven compression is not economically feasible and is properly eliminated from the BACT analysis.

SCR was not Demonstrated to be BACT; it is Not Cost Effective

The resolution of the question of "what is BACT for NOx emissions?" presents a close case, but as discussed below, a preponderance of the evidence favors the outcome included in the air permit at Table 8A, setting the emissions limits under Standing Operating Conditions. The case is close because there is no evidence in the record that MassDEP scrutinized the costs presented by Algonquin in the Application in Attachment C to the Application [31] and the Town of Weymouth presented evidence that Algonquin overinflated those costs for SCR. Elimination of Selective Catalytic Reduction ("SCR") in Step 4 of the BACT analysis for economic reasons

[31] MassDEP's BACT Guidance, Hearing Ex. 2 at p. 5 provides: "Particularly when your [the applicant] economic analysis concludes that a particular control technology would cost too much to be economically feasible, the burden is on you to prove your analysis and conclusion are reasonable. MassDEP will scrutinize (and may request justification) of each line item, as well as your assumptions relative to…." (emphasis added).

presents a close call due to the quality of the evidence presented, but sufficient evidence in the record favors Algonquin's position. Two issues are presented: the uncontrolled baseline emissions rate and the costs for the control technology. Step 3 of the BACT analysis ranked SCR as the "top-case" pollution control technology and this is not disputed. The crux of the problem is the Step 4 evaluation of the most effective controls and the documented results.

SCR would be 90% effective at controlling NOX, reducing those emissions to 2.5 ppm or lower. Powers PFT at ¶¶ 54-57. SCR was eliminated by Algonquin as not being cost-effective. MassDEP's BACT Guidance sets the cost-effectiveness range for NOx removal at $11,000-$13,000 per ton of NOx controlled. Algonquin's BACT Analysis demonstrated that SCR would cost $41,541 per ton of NOx controlled, and therefore Algonquin decided it was not cost-effective. See Application, Section 5 and Attachments C and E. MassDEP concurred with this conclusion.

Mr. Powers offered two different criticisms of this conclusion. First, he testified that Algonquin used the wrong uncontrolled baseline emissions rate. Algonquin used 9 ppm, based on the turbine manufacturer's belief that SoLoNox is part of the combustion process rather than an add-on pollution control. Mr. Powers testified that the uncontrolled baseline for the Taurus 60 turbine is 25 ppm. Powers PFT at ¶ 56. The Application states that under the New Source Performance Standards ("NSPS") the NOx limit of 25 ppm is the emission limit that will apply to the proposed equipment and will "effectively set the minimum requirement for BACT for these units for certain pollutants." Application at p. 5-3. Evidence at the hearing confirmed, however, that this is a federal limit under the NSPS, not the uncontrolled baseline for NOx for

the Solar Taurus 60 turbine with SoLoNox. Cushing PFR at ¶ 11; Tr. at 899:8-9; Goodrich PFR at ¶ 13; Powers PFT at ¶¶ 54-57.

The NSR Manual, at p. B.37, provides that baseline emissions may be assumed to be the emissions from the lower polluting process itself when calculating the cost effectiveness of adding post-process controls to an inherently lower polluting process. A preponderance of the evidence supports a finding that the Solar Taurus 60 Turbine with SoLoNox is an inherently lower polluting process Tr. at 903:17-19; Tr. 45:14-17. The Solar turbine specified for the proposed Project has a guaranteed emission rate for NOx of 9 ppm. Mr. Cushing testified that this is the appropriate baseline emissions rate to employ in the cost-effectiveness calculation. Based on his experience and training in air permitting, I credit this testimony. I also credit the testimony of Mr. Goodrich, who testified that the emissions rate of 9 ppm achieved by the Solar Turbine proposed for this Project represents BACT, based on his review of the BACT Clearinghouse and other relevant turbine approval. Finally, Mr. Powers acknowledged that SoLoNox is an inherently lower polluting technology, and that the Taurus 60 turbine with a 9 ppm NOx emission rate employs the "deluxe" version of SoLoNox. But he argues that the deluxe model should not be considered baseline. He did not provide any factual support for this opinion, or any information on cost or performance differentials between the various models of SoLoNox. I find that the baseline emissions rate used in Step 4 of the BACT analysis was correctly identified as 9 ppm.

The NSR Manual, at p. B.31, provides that "[a]verage and incremental costs effectiveness are the two economic criteria that are considered in the BACT analysis." The Manual describes "cost effectiveness" as the "dollars per ton of pollutant emissions reduced." The Manual

describes "incremental cost" as the cost per ton reduced and directs that it should be considered in conjunction with total average cost effectiveness.

Algonquin analyzed the cost of installing SCR past the combustion chamber on the turbine, using for guidance USEPA's Cost Control Manual (6th Edition), January 2002, Section 4.2, Chapter 2. Algonquin determined that installing SCR on the turbine would cost approximately $41,541 per ton of NOx removed. Application at 5-9 – 5-10. Algonquin's cost analysis is contained in Attachments C and E to the Application. Because that cost is well above MassDEP's feasibility range of $11,000-$13,000, Algonquin determined that SCR was economically infeasible for the proposed turbine. Id. at 5-10; see also Hearing Exhibit 2 (MassDEP BACT Guidance), at p. 5.

Mr. Powers opined that SCR is cost effective if reasonable assumptions are used. Powers PFT at pp. 15-18. These assumptions include the baseline emissions rate and operations and maintenance ("O&M") costs. He contends that MassDEP's cost range is based only on guidance, not in any statute or regulation, and some degree of inflation adjustment is warranted where MassDEP is using a cost range that has not been adjusted since 1990. Powers PFT at ¶¶ 50-52. Because I have already found that Algonquin used a correct baseline emissions rate, this discussion will focus on the costs of operation and maintenance of the SCR system.

Mr. Powers testified that Algonquin used erroneous cost inputs for O&M labor costs and supervisory O&M labor costs. Powers PFT at ¶ 58. SCR can be operated remotely using supervisory control and data acquisition ("SCADA") technology, and he cited three compressor stations proposed by Dominion which will employ SCADA. Id. at ¶ 59 and note 44. His opinion is that Algonquin applied a "substantial and unsupported labor cost of $35,314 per year for

operation, maintenance and supervisory labor solely to operate the SCR on the Weymouth gas turbine." Id. at ¶ 60. In his opinion, the only unique SCR parameter that requires monitoring is the ammonia reagent injection rate, and the continuous presence of on-site personnel dedicated to this task is not required. Id. at ¶ 61. With these labor costs removed, the adjusted SCR cost-effectiveness is reduced to $13,000 per ton. Id. at ¶ 62. In Mr. Powers' opinion, Algonquin greatly overstates the necessary hours at 1,100 per year, when only 20-30 hours are necessary. Tr. 52: 9-15. Although Mr. Powers feels "fairly expert on what it takes to maintain an SCR" based on his experience permitting half a dozen Solar turbines equipped with SCR, Tr. 55:2-21, he conceded that he does not have any actual experience operating these systems. Tr. 57-58. However, he also testified that he ran a test team for ten years that tested those turbines, including the SCR catalyst. Tr. 58:9-12.

Algonquin offered the testimony of Mr. Goodrich in rebuttal to Mr. Powers. He disputed Mr. Powers' statement that the compressor station can be operated remotely, obviating the need to employ personnel to maintain an SCR system. Goodrich PFR at ¶ 18. He testified that SCADA does not eliminate the need for in-person maintenance of the SCR system. "Maintaining a properly working catalyst requires on-site cleaning, periodic catalyst sampling and testing and replacement/exchange evaluations. On-site labor is also required for maintenance and inspection of the ammonia injection system, loading of ammonia and equipment adjustments. Id. Most of this work is performed by on-site personnel. Tr. 692:3-12. On-site cleaning of the SCR is done at least annually, but depends on the need. Tr. at 691:17-21. The periodic sampling, etc., is done on an as-needed basis, based on guidance from the SCR manufacturer, but would be done semi-annually or annually. Tr. at 692:13-19. The ammonia injection system is inspected daily. Tr. at

693:3-19. Loading of ammonia is done by site personnel and a contractor. Tr. at 694:8-17. Equipment adjustments are made periodically, as needed. Tr. at 694:18-23; 695:1-10. According to Mr. Goodrich, "[t]his is why the EPA Air Pollution Cost Control Manual includes estimates of four hours of labor per day associates with an SCR system." Goodrich PFR at ¶ 19. Algonquin used less than the EPA estimate of 4 hours/day and an assumed labor rate of $30/hour instead of the EPA estimated rate of $60/hour (including benefits). Goodrich PFR at ¶ 20. Finally, he notes that [Algonquin] has direct experience with maintenance and labor costs associated with SCR because "it operates older turbines purchased before the advent of SoLoNox technology for which it uses SCR to achieve NOx emissions of 25 ppm." Id. at ¶ 21. Based on its experience, it is Mr. Goodrich's opinion that $35,314/year is a reasonable and appropriate estimate of labor costs associated with SCR. Id.

Mr. Cushing was questioned at the hearing about MassDEP's cost range for cost/ton removed. He acknowledged that MassDEP has been using the same cost range since 1990. Tr. at 895:16-18. He also acknowledged that there is no regulation prohibiting MassDEP from adjusting the cost range for inflation, and that there have been internal discussions among Mr. Cushing and his regional counterparts on the subject. Tr. at 895:24-26, 896:12-23.

The Town of Weymouth argues in its closing brief that I should recommend a new cost range in the course of this proceeding and apply it to the costs calculated for SCR. I am unable to do so because there is no specific economic-based evidence in the record to support an alternative. Although Mr. Powers suggested some cost adjustment, the issue requires a broader and deeper analysis than this record enables.

Based on the foregoing evidence, I find that the Air permit appropriately established BACT for NOx. Although Mr. Powers' evidence raises serious concerns about the economic factors applied and the continued appropriateness of a cost range established nearly thirty years ago, his testimony suffers from a lack of specificity. He does not establish what the inflationary range should be, nor have any direct experience to support his estimates for labor costs. Tr. at 56-57. Although Mr. Powers has experience recommending systems and running a test program for ten years, I am more persuaded by Mr. Goodrich's experience and specific testimony regarding the O&M required for an SCR system. Therefore, I find that the Petitioners have failed to prove that a NOX emission rate achieved through the use of an SCR system is BACT.

5. The Facility's emissions of noise will not violate 310 CMR 7.10 or MassDEP's Noise Policy

MassDEP's regulations at 310 CMR 7.10 prohibit "unnecessary emissions" of noise. MassDEP Division of Air Quality Control ("DAQC") Policy Statement 90-001 (February 1, 1990) (the "MassDEP Noise Policy") interprets a violation of this noise regulation to have occurred if the source causes either:

1) An increase in the broadband sound pressure level of more than 10 dBA above the ambient, or

2) A "pure tone" condition.

"Ambient" is defined as the background A-weighted sound level that is exceeded 90% of the time, measured during equipment operating hours (L90). A "pure tone" condition occurs when any octave band sound pressure level exceeds both of the two adjacent octave band sound pressure levels by 3 dB or more. These noise limits are MassDEP policy and are applicable both

at the Property line and at the nearest residences.

Although the Petitioners alleged in their Notice of Claim that the proposed Project would create a condition of air pollution through the emission of noise, they did not produce any witnesses to support this claim. The testimony of Mr. O'Neal, the Updated Sound Level Impact Assessment Report dated October 2018 and the conditions in the Air permit to mitigate noise from the proposed Project to the maximum extent practicable clearly demonstrate that the proposed Project complies with the requirements of 310 CMR 7.10 and the Noise Policy. Nothing adduced at the hearing undermined Mr. O'Neal's persuasive testimony.

CONCLUSION

For all of the foregoing reasons, I recommend that the Department's Commissioner issue a Final Decision affirming the Air permit and recommend that the following changes[32] be included in a Final Air Quality Plan Approval:

(1) I recommend that corrections to the Air permit provided by Mr. Goodrich as Exhibit B (attached hereto) to his pre-filed direct testimony be included in the Final Air Permit;

(2) I recommend that Table 8D be revised to reflect a "Not to Exceed" limit of 18 minutes for startups and 17 minutes for shutdown, based on credible evidence that the current permit limit of 30 minutes is likely to result in emissions above the AALs;

(3) I recommend that Table 10, Record Keeping Requirements, #16 be revised such that it states "The Permittee shall make records required by this Plan Approval available to

[32] Recommendations 3-6 were suggested by the Petitioners to promote and ensure compliance with the air permit, and provide better information to the surrounding communities. I recommend they be included for those reasons.

MassDEP, USEPA and the Towns of Weymouth, Braintree and Hingham and the City of Quincy upon request."

(4) I recommend that Table 11, Reporting Requirements, #2, be revised such that the required notification of scheduled maintenance events expected to result in a blowdown with volume expected to be greater than 10,000 scf is made no later than 72 hours (not 48 hours) prior to the event and that notification to the Towns of Weymouth, Braintree and Hingham and the City of Quincy be made simultaneously with the notification to MassDEP.

(5) I recommend that Table 11, Reporting Requirements, #3, be revised such that the required notification of unplanned releases with a volume greater than 10,000 scf be made within 2 hours and that notification to the Towns of Weymouth, Braintree and Hingham and the City of Quincy be made simultaneously with the notification to MassDEP.[33]

(6) I recommend that a condition be added limiting blowdowns associated with pipeline maintenance to no more than 2 per year, consistent with Response to Comment #25.

(7) MassDEP shall provide a redline/strikeout copy of the air permit and a clean copy to OADR reflecting these changes, if and as adopted by the Commissioner in a Final Decision.

[33] See Town of Braintree's Memorandum of Law at p. 7, arguing that the current "within 2 business days of said event" requirement would mean that if the release occurs on the Friday of a holiday weekend, notification might not occur until the following Wednesday. In addition, Algonquin is not required to notify the municipal officials of these events. A 2-hour notification requirement for an event of this type would be akin the to the Massachusetts Contingency Plan's notification requirement in 310 CMR 40.0311 for sudden releases.

Date: 6/27/2019

Jane A Rothchild
Presiding Officer

SERVICE LIST

IN THE MATTER OF: ALGONQUIN GAS TRANSMISSION, LLC

Docket Nos. 2019-008, 009, 010, 011, 012, 013 Weymouth

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