Stationary Source Assessment (SSA) Response to Health Impact Claims Related to the Vantage Data Centers VA2 Facility

April 27, 2026

Facility:
Vantage Data Centers VA2, LLC
22435 Glenn Drive
Loudoun County, Virginia

Prepared by:
Virginia Department of Environmental Quality (DEQ)

Purpose:
Technical evaluation of air emissions, ambient air quality, dispersion modeling, and health impact claims associated with operation of the VA2 data center facility

Related Report:
Review of *Air Quality, Health, and Economic Impacts of the Vantage Data Center Facility*, February 27, 2026

Executive Summary

- This Stationary Source Assessment (SSA) was produced in response to inquiries received by DEQ pertaining to a report[1] produced for the Piedmont Environmental Council (PEC) regarding the air pollution related health impacts from the operation of the Vantage data center (VA2) located at 22435 Glenn Drive in Loudoun County, Virginia.
- In using the maximum permitted emissions for the facility, it appears that the PEC report overstates the actual emissions from VA2.
- Based upon full consideration of recent DEQ ambient air quality monitoring data, the air quality in the vicinity of the facility is cleaner than described by the PEC report.
- Because the PEC report uses a non-EPA[2] approved dispersion model and an EPA-maintained *screening* level tool, it is likely that the ambient air concentration increases from the pollutants emitted from the facility are less than indicated by the report.
- Review of EPA's 2024 reconsideration of the PM2.5[3] National Ambient Air Quality Standard (NAAQS)[4] indicates that the public health impacts resulting from even the PEC report's predicted increases in pollutant ambient air concentrations are unlikely.
- Based on multiple metrics, Loudoun County is currently ranked as one of the best (if not the best) localities in Virginia for the health of its population. There is no evidence that this has changed since the facility began operation.
- Vantage has publicly represented that they intend to shut down the facility's combustion turbines (CTs) and connect to the grid for primary power at the earliest opportunity.
- DEQ has launched an initiative to enhance ambient air monitoring in Northern Virginia. More information is available on DEQ's website: https://www.deq.virginia.gov/news-info/shortcuts/topics-of-interest/data-center-air-monitoring-project

1 *Air Quality, Health, and Economic Impacts of the Vantage Data Center Facility*, February 27, 2026
2 United States Environmental Protection Agency
3 Particulate Matter with an aerodynamic diameter of 2.5 microns or less
4 Whereby EPA lowered the primary annual standard from 12.0 micrograms per cubic meter (ug/m3) to 9.0 ug/m3

Introduction

Vantage Data Centers VA2, LLC (Vantage) owns a data center located at 22435 Glenn Drive, Sterling VA 20164 (Loudoun County). This facility is located within the Northern Virginia Ozone Non-Attainment Area as well as the Ozone Transport Region.

Vantage submitted a Form 7 air permit application dated March 6, 2023, for the following:

- To construct and operate forty (40) 2,750 ekW emergency diesel engine gen-sets;
- To construct and operate two (2) 2,750 ekW black start engine gen-sets; and
- To construct and operate eight (8) 161 MMBTU/hr simple cycle combustion natural gas fired turbines.

DEQ received a site suitability form from Loudoun County on March 22, 2023, received an updated local government body certification form from Loudoun County dated July 6, 2023, and issued a minor new source review permit (NSR) for the facility on September 15, 2023. The facility registration number is 74242.

As permitted, the emission units are summarized in the table below:

Ref. Nos.	(# Units) Description	Engine Model	Engine Rating (each unit)
EG-10 through EG49	(40) emergency diesel-fired engine gen-sets	Caterpillar 3516E	2,750 ekW 4,043 bhp
EP-BS1 and EP-BS2	(2) black start diesel-fired engine gen-sets	Caterpillar 3516E	2,750 ekW 4,043 bhp
TG-01 through TG-08	(8) simple cycle combustion natural gas fired turbines	Solar SMT 130*	16.5 MWe 161 MMBTU/hr

*Braden 25298 SCR with DNX® GTC catalyst.

Vantage commenced construction of the combustion turbines (CTs) on November 3, 2023, and the CTs started normal operations on April 1, 2024.

The simple cycle combustion natural gas fired turbines currently serve as the primary power source for this facility. The emergency diesel engine gen-sets only operate for emergency purposes including situations that arise from sudden and reasonably unforeseeable events where the primary energy or power source is disrupted or disconnected due to conditions beyond the control of an owner or operator of a facility (or for routine maintenance/readiness testing).

Each engine gen-set (Ref. Nos. EG10 through EG49, EP-BS1 and EP-BS2) is EPA Tier II certified, with electronic fuel injection, turbocharger, and aftercooler for the control of NOX emissions.

The CTs (Ref. Nos. TG-01 through TG-08) are equipped with closed-loop SCR with DNX® GTC catalyst for emissions reduction of NOX, CO, and VOC.

The 9/15/2023 permit requires emission testing of the CTs, and the initial emission testing for the CTs was conducted over a 10-day period; September 17, 2024 - September 27, 2024.

Summarized Findings/Method of the PEC Report (from the Executive Summary)

- The PEC report evaluated impacts from VA2 based on the full permitted annual emission limits.
- The PEC report aggregates emissions from all the turbines and generators into a single emission source (even though, except during maintenance activities, they do not operate simultaneously).
- The PEC report uses the Intervention Model for Air Pollution (InMAP) to estimate how emissions from the facility disperse and chemically transform in the atmosphere, contributing to downwind changes in annual-average PM2.5 exposure, and further argues that InMAP is the correct tool for this purpose.
- The PEC report estimates significant health impacts and associated economic damages attributable to the facility's permitted emissions using the U.S. Environmental Protection Agency's Co-Benefits Risk Assessment (COBRA) tool.
- The PEC report represents that background PM2.5 levels in the affected region are already elevated relative to national averages and are close to the current federal annual standard and that emissions from the facility would therefore add to ambient pollution levels in communities that already experience substantial existing air-quality burdens.

In using the maximum permitted emissions for the facility, the PEC report significantly overstates the actual emissions from the facility.

Tested Hourly Emissions

As demonstrated by the data collected during the September 2024 emission test event, the short-term emission rates from the CTs are significantly less than the permitted emission limits for each tested pollutant. The emission testing event included measurement of the following pollutants: Nitrogen Oxides (NOx), Carbon Monoxide (CO) and Volatile Organic Compounds (VOC).

Table 1: September 2024 Emission Test Results

Pollutant	Maximum Hourly Emission Rate for any CT (3-hour average)	Maximum Hourly Emission Rate for any CT (highest single hour)	Permit Limit	Actual Emissions as a (%) of permit limit
NOx	0.98 pounds/hour	1.06 pounds/hour	1.41 pounds/hour	75%
CO	0.39 pounds/hour	0.48 pounds/hour	1.07 pounds/hour	45%
VOC	0.39 pounds/hour	0.44 pounds/hour	1.22 pounds/hour	36%

As seen in Table 1, even using the highest tested emission rate for a single hour from any CT, the short-term emissions from the CTs are significantly less than the permitted emission limits for all pollutants.

The emission test event also produced data indicating that the actual sulfur dioxide emissions from the CTs were well below (less than 10%) their permitted limit, but that data consisted of a relatively small sample size. Therefore, to adopt a conservative approach, DEQ used the permitted short-term sulfur dioxide emission rates in the following annual analysis.

Actual Annual Emissions

In addition, the CTs at VA2 have now been in operation since April 2024. For calendar year 2025, a full year of representative facility operation, the facility reports 47,131 hours of combined CT normal operation and 637 hours of combined CT uncontrolled operation.

Using the data from the September 2024 emission test event (where available) and maximum permitted emission rates (where no test data is available), this reported utilization results in actual annual emissions as shown in Table 2.

Table 2: Actual Annual (2025) CT Emissions

Pollutant	Actual Annual (2025) Emissions – Controlled for all CTs combined	Actual Annual (2025) Emissions – Uncontrolled for all CTs combined	Total Actual Annual (2025) Emissions – Total for all CTs combined
PM2.5	37.9 tons/year	0.5 tons/year	38.4 tons/year
NOx	25.0 tons/year	2.0 tons/year	27.0 tons/year
SO2[5]	13.0 tons/year	0.2 tons/year	13.2 tons/year
CO	11.3 tons/year	2.0 tons/year	13.3 tons/year
VOC	10.4 tons/year	0.4 tons/year	10.8 tons/year

When summed with the calendar 2025 annual emissions from VA2's traditional diesel-fired emergency generators, the facility's total annual emissions are significantly below the permitted annual emission limits.

Table 3: Actual Annual (2025) Emissions - Facility

Pollutant	Actual Annual (2025) Emissions – Total for all CTs combined	Actual Annual (2025) Emissions – emergency generators	Actual Annual (2025) Emissions – Facility Total	Permit Limits	Actual Emissions as a (%) of permit limit
PM2.5	38.4 tons/year	0.5 tons/year	38.9 tons/year	56.5 tons/year	69%
NOx	27.0 tons/year	17.7 tons/year	44.7 tons/year	95.0 tons/year	47%
SO2	13.2 tons/year	0.1 tons/year	13.3 tons/year	19.2 tons/year	69%
CO	13.3 tons/year	7.0 tons/year	20.3 tons/year	41.8 tons/year	49%
VOC	10.8 tons/year	1.3 tons/year	12.1 tons/year	42.9 tons/year	28%

[5] Sulfur Dioxide

Based on DEQ's experience, the fact that VA2's actual annual emissions are significantly less than its permitted annual emission limits is typical for data center stationary sources and reflects their traditional approach of constructing substantial redundant generating capacity.

While it is likely that there will be some fluctuation in the facility's future annual emissions based upon CT availability, DEQ has no reason to believe that these actual annual emissions are not representative.

By using outdated data, the PEC report mischaracterizes the current ambient air quality in the vicinity of the facility.

In addition to overestimating the emissions from the facility, the report also mischaracterizes the current air quality in the vicinity of the facility. On pages 10 and 11 of the report, a single year (2023) of data is used to describe the existing air quality in Loudoun and Fairfax counties. Despite recognizing that compliance with the NAAQS is determined based on a rolling 3-year average, the report states that these communities "*already experience elevated background PM2.5 levels*".

First, it is worth noting that regional and national air quality in calendar year 2023 was substantially impacted by historically significant Canadian wildfire events (Canadian Wildfires). Even so, as shown in Table 4, the design value for all of the PM2.5 monitors in Northern Virginia remained in compliance with the NAAQS.

Table 4: Northern Virginia PM2.5 Monitor Data – Annual Design Values[6] (µg/m3)

Site	2018	2019	2020	2021	2022	2023	2024
(38-I) Loudoun Co.	7.1	7.2	6.5	6.9	6.7	7.3	7.0
(47-T) Arlington Co.	7.5	7.7	7.3	7.5	7.1	7.9	7.4
(46-B9) Franconia, Fairfax Co.	6.8	7.0	6.9	7.2	7.0	7.9	7.5
(46-C2) Springfield, Fairfax Co.	8.7	9.0	8.6	8.7	8.1	8.5	7.7

Further, even when using the single year metric adopted by the report, the most recent annual data (calendar 2024) shows a significant reduction (~25%) in ambient PM2.5 concentrations (Table 5) at each PM2.5 monitor in the region. This readily available 2024 data[7] is especially relevant to consideration of VA2 since the CTs begin operation in April of 2024. In other words, despite the contribution from VA2's 2024 emissions, the ambient PM2.5 concentration at the closest PM2.5 monitor dropped by 1.6 µg/m3. This reduction dwarfs the projected increase in

[6] 3-year average

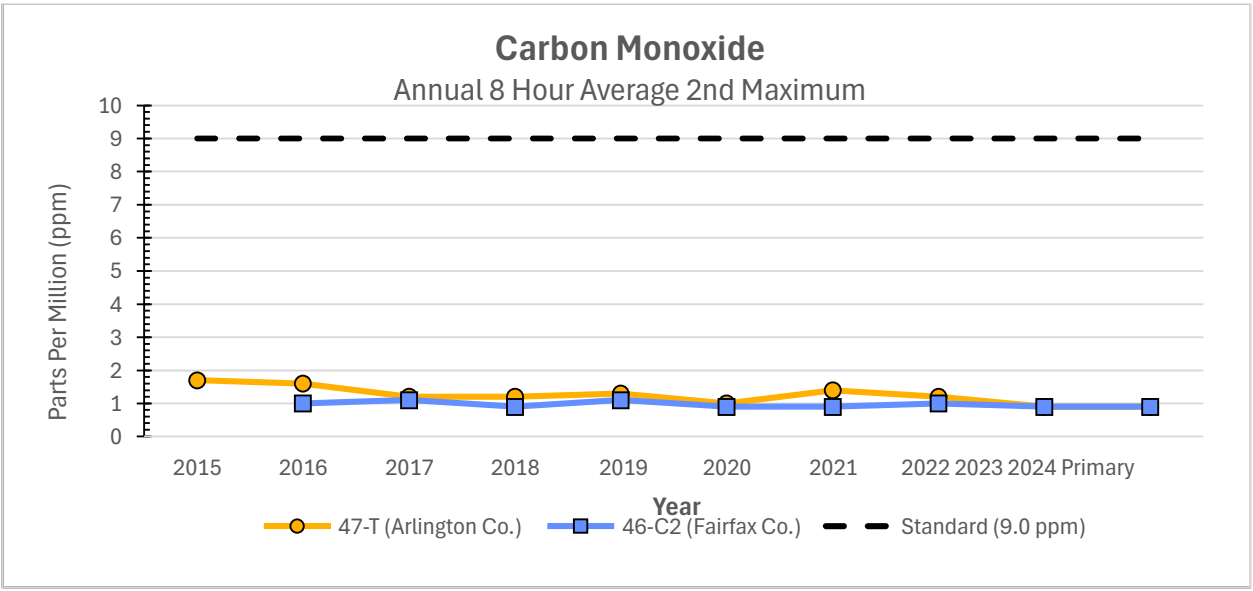
[7] 2024 Annual Ambient Air Monitoring Report

PM2.5 concentration at various locations attributed to VA2 by the report[8] and is illustrative of the fact that ambient PM2.5 concentrations are not typically driven by natural gas combustion stationary sources as a category[9][10] and especially not by individual minor sources.

Table 5: Northern Virginia PM2.5 Monitor Data – Weighted Annual Means (µg/m3)							
Site	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
(38-I) Loudoun Co.	7.0	7.2	6.2	7.4	6.4	8.2	6.4
(47-T) Arlington Co.	7.4	8.0	6.6	7.9	6.7	9.1	6.5
(46-B9) Franconia, Fairfax Co.	6.9	7.2	6.6	7.9	6.4	9.5	6.5
(46-C2) Springfield, Fairfax Co.	8.9	9.1	7.9	9.1	7.3	9.1	6.8

DEQ also notes, as indicated in Figures 1-3, that the ambient concentrations of other NAAQS pollutants, as measured by DEQ's monitors in the region, are below the relevant standards. DEQ monitors are intentionally located at geographic positions expected to represent the maximum ambient concentrations of a particular region.

Figure 1:



[8] As discussed in this document, DEQ believes these increased concentrations are overestimated and that the projected resulting health impacts are speculative

[9] 2022 EPA Policy Assessment for the Reconsideration of the National Ambient Air Quality Standards for Particulate Matter: Figure 2-2 (2022 EPA Policy Assessment)

[10] 2019 Integrated Science Assessment for Particulate Matter: Figure 2-4 (2019 EPA Science Assessment)

Figure 2:

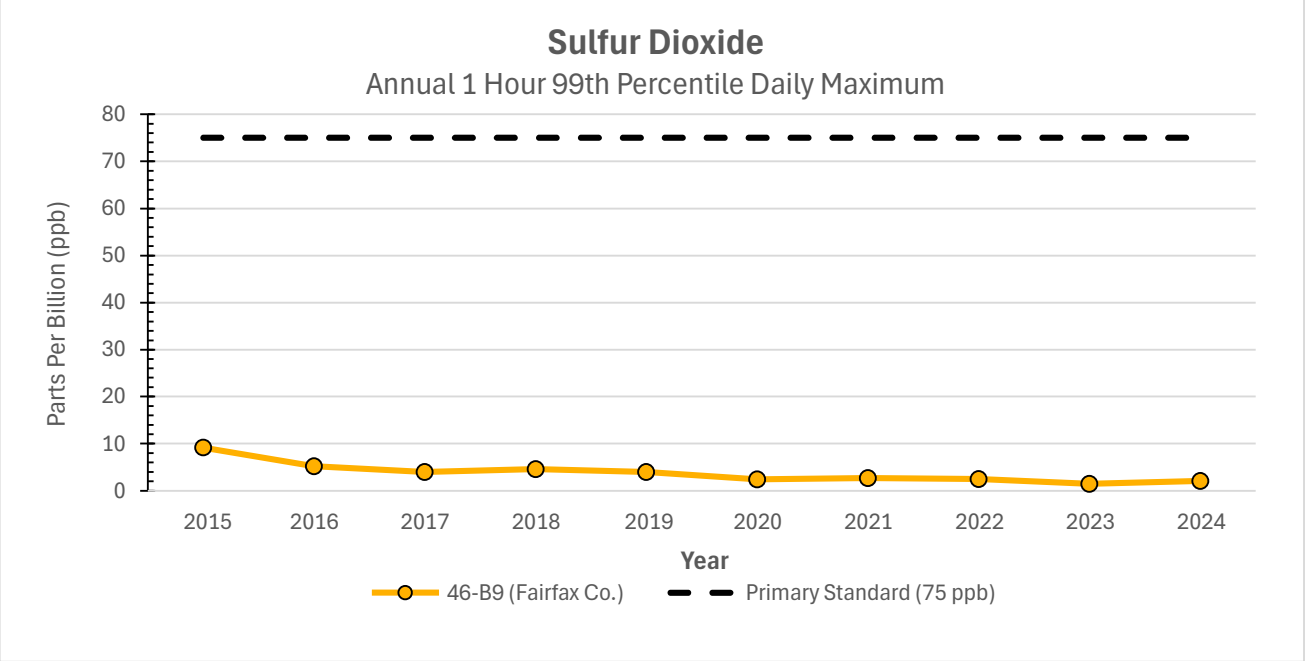
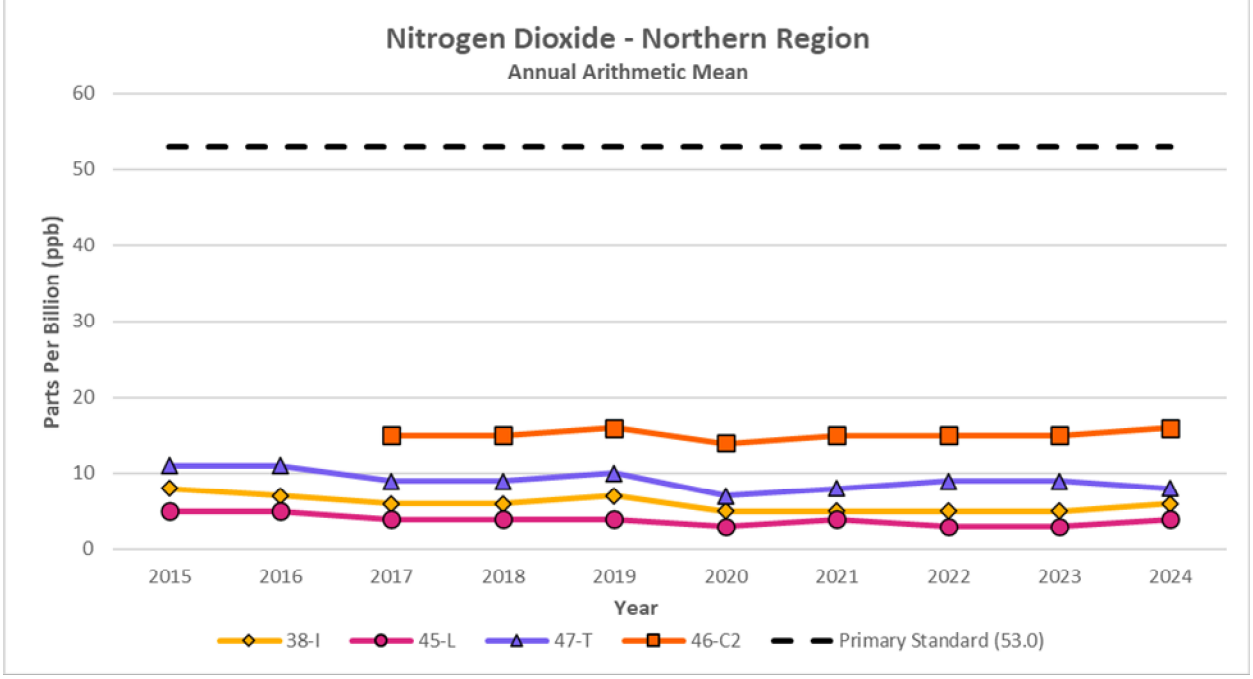


Figure 3:



Even for ozone, the NAAQS pollutant that has long caused Northern Virginia's non-attainment status[11], the most recent monitor data (Table 6) now demonstrates compliance.

[11] https://www.deq.virginia.gov/air-energy/monitoring-assessments/air-quality-planning/ozone

Table 6: Northern Virginia Ozone Monitor Data 4th Highest Daily Maximum, 8 hour average (ppm)					
Monitor	**2022**	**2023**	**2024**	**2022-2024 Average**	**NAAQS**
Loudoun Co.	0.061	0.067	0.065	0.064	0.070
Prince William Co.	0.058	0.070	0.058	0.064	0.070
Arlington Co.	0.061	0.071	0.071	0.067	0.070
Fairfax Co. (Franconia Park)	0.062	0.073	0.065	0.066	0.070

In summary, the air quality in Northern Virginia has improved over time, currently complies with all of the NAAQS (by significant margins with the exception of ozone), and is projected to continue improving in the future[12] .

The report uses a non EPA-approved dispersion model (InMAP[13]) to estimate increases in PM2.5 concentrations across Northern Virginia (and beyond) resulting from VA2's emissions.

InMAP is a recently developed model which offers an approach to estimating the human health impacts caused by air pollutant emissions and how those impacts are distributed among different groups of people.

InMAP appears to be a screening tool, in that it utilizes simplified chemistry and physics parameterizations, unlike the preferred regional photochemical models used by EPA (CMAQ and CAMx). InMAP is simplified to save computational time while still creating a mechanistic representation of the atmosphere

The report acknowledges InMAP's use case on page 10: "*Accordingly, InMAP is well-suited for screening-level, decision-relevant estimation of population-level PM2.5 exposure attributable to a single source, which is the objective of this analysis.*" (emphasis added)

However, this screening level approach should not be expected to accurately represent the ambient pollutant concentrations attributable to VA2's emissions. This is especially true when parties seek to assign blame or culpability on the basis of such an analysis.

For example, on page 6, the report states: "Facility emissions were represented as a single, aggregated elevated point source, consistent with a regional screening application of the

12 Ozone Transport Commission Mid-Atlantic/Northeast Visibility Union 2022 Version 1 Modeling Technical Support Document

13 Intervention Model for Air Pollution

Intervention Model for Air Pollution (InMAP)." However, each of VA2's engines and turbines exhaust their emissions to the atmosphere via dedicated stacks with their own physical characteristics.

DEQ Regulatory Air Quality Modeling Process for Individual Sources

In general, DEQ requires applicants that are subject to modeling to adhere to the recommendations contained in the Guideline on Air Quality Models (Appendix W to 40 CFR Part 51, "Guideline") and any other applicable DEQ and EPA guidance. The Guideline has been incorporated into EPA's regulations and provides EPA-preferred models and other recommended techniques, as well as guidance for their use in predicting ambient concentrations of air pollutants.

EPA's Guideline provides States with updated air quality models and techniques, modeling procedures, and enhanced technical guidance. These improve efficiency, accuracy, and ability of regulatory modeling applications, increasing certainty in the degree and type of air pollution emission controls necessary to achieve health protective air quality levels.

The Guideline is used to prepare and review preconstruction permit applications for new sources and modifications, SIP submittals, and other air quality assessments. The Guideline serves as a means by which national consistency is maintained in air quality analyses for regulatory activities under CAA regulations.

The continuing development of new air quality models (e.g., InMAP) in response to regulatory requirements and the expanded requirements for models to cover even more complex problems have emphasized the need for periodic review and update of guidance on these techniques. EPA addresses this process in the Guideline.

In 2005, the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) was promulgated as the EPA's preferred near-field dispersion model for regulatory applications. The EPA Office of Air Quality Planning and Standards (OAQPS) most recently released a new version (24142) of the AERMOD Modeling System on November 2, 2024.

The EPA has developed AERMOD as a preferred model suitable for regulatory application of individual sources of air pollution. AERMOD has undergone the necessary peer scientific reviews and model performance evaluation exercises that include statistical measures of model performance in comparison with measured air quality data.

The Guideline allows the use of alternative models (e.g., InMAP) and provides the criteria and process for obtaining EPA approval for use of alternative models for individual cases in situations where the preferred model is not applicable or available. EPA has a specific evaluation protocol that provides a statistical technique for evaluating model performance for predicting peak concentration values. This protocol is available to assist in developing a consistent

approach when justifying the use of other-than-preferred models recommended in the Guideline (i.e., alternative models).

An alternative model may be approved for use in evaluating an individual source, provided that:

1. The model or technique has received a scientific peer review;
2. The model or technique can be demonstrated to be applicable to the problem on a theoretical basis;
3. The databases which are necessary to perform the analysis are available and adequate;
4. Appropriate performance evaluations of the model or technique have shown that the model or technique is not inappropriately biased for regulatory application; and
5. A protocol on methods and procedures to be followed has been established.

The InMAP analysis did not appear to go through the rigorous level of approval required for regulatory applications.

Secondary Formation and Background Air Quality

The report states that AERMOD is not appropriate because it does not simulate atmospheric chemical reactions or gas-to-particle conversion and therefore does not explicitly account for secondary PM2.5 formation. Regulatory modeling of PM-2.5 does couple secondary formation explicitly obtained from preferred EPA chemical transport models with the AERMOD results. Therefore, DEQ still maintains that AERMOD is the preferred model in this circumstance.

With regard to secondary formation, it is also worth noting that VA2's emissions of two of the pollutants associated with secondary PM2.5 formation, NOx and VOC, are also two of the pollutants where the report's use of permitted emissions represents the largest overestimation relative to the facility's actual emissions.

DEQ's Experience Prior with InMAP

Based upon a comparison of predicted PM2.5 ambient concentrations using InMAP versus predicted PM2.5 concentrations using AERMOD, with both analyses accounting for secondary formation, for a recent DEQ permitting action (the Chesterfield Energy Reliability Center), DEQ observed that InMAP overpredicted (relative to the AERMOD method) the ambient PM2.5 concentration (by a factor of at least 5) at the one downwind location where a comparison was possible.

The report does not include detailed input information, output files or model settings (if any) that allow DEQ modeling staff to further evaluate its results.

The Report predicts health impacts resulting from the increases in ambient pollutant concentration resulting from VA2's emissions.

Despite the fact that there is a health impact estimation function built into the InMAP model platform, it does not appear that the report used this feature to estimate public health impacts from the InMAP-predicted ambient PM2.5 concentration increases. Instead, according to page 20 of the report: "*To estimate the health-related economic impacts attributable to increased air pollution from the Vantage Data Center facility, we used the U.S. EPA's Co-Benefits Risk Assessment (COBRA) model. COBRA is a nationally recognized, screening-level tool that links changes in air pollution to health outcomes using peer-reviewed epidemiological concentration–response functions. Given user-specified emissions, the model estimates annual changes in health outcomes—such as premature mortality and illness—and assigns monetary values. For this analysis, COBRA was run using a scenario representing an industrial combustion unit in Loudoun County, Virginia emitting annual quantities consistent with permitted limits: 56.51 tons of primary PM2.5, 19.21 tons of SO_2, 95.0 tons of NO_x, and 42.87 tons of VOCs.*"

Unmentioned in the report, however, is the fact that COBRA does not directly convert annual mass emission rates into the health outcome monetary values that it produces. According to EPA's COBRA website[14], COBRA "*uses a simple air quality model, the Source Receptor (S-R) Matrix, to estimate effects of changes on ambient particulate matter and ozone.*" This air quality model is further described as "*quick and dirty*". In other words, relative to AERMOD, the changes in ambient pollutant concentrations resulting from VA2's emissions predicted by this model are likely to be even less accurate and representative of actual changes in ambient concentrations at specific locations than InMAP. The report does not include any actual COBRA-generated concentration data to use as a basis for further comparison.

Given the likely impact of the overestimations already discussed (actual emissions are ~ 50% of permitted annual emissions; InMAP has been found to overestimate predicted ambient concentration increases by a factor of at least 5), the COBRA-generated health impact estimates are overstated by at least an order of magnitude and likely more. As discussed in the next section, negative impacts of any magnitude are speculative.

In summary, COBRA is a screening tool intended for consideration of regional and national policy level decisions which might impact air pollution emissions and associated health impacts. This tool was not intended for and not appropriate for consideration of individual stationary sources.

[14] Assessing the Economic Impacts of Clean Energy: How COBRA Works

PM2.5 Health Impact Information

The report makes numerous statements and claims about the public health impacts of PM2.5 emissions, and DEQ agrees that PM2.5 emissions can result in harmful effects[15].

However, it appears that the report overlooks the recent (2024) EPA reconsideration of the PM2.5 NAAQS[16]. EPA indicates uncertainty in health impacts associated with small changes in concentration below the new annual PM2.5 NAAQS (9.0 µg/m3) as noted in the 2024 reconsideration final rule preamble[17]. For example, in Section II.A, the EPA Administrator noted the following:

- In reaching conclusions with regard to the standards, the decision will draw on the scientific information and analyses about health effects and population risks, as well as judgments about how to consider the range and magnitude of uncertainties that are inherent in the scientific evidence and analyses. This approach is based on the recognition that the available health effects evidence generally reflects a continuum, consisting of levels at which scientists generally agree that health effects are likely to occur, through lower levels at which the likelihood and magnitude of the response become increasingly uncertain. This approach is consistent with the requirements of the NAAQS provisions of the Clean Air Act and with how the EPA and the courts have historically interpreted the Act (summarized in section I.A above). These provisions require the Administrator to establish primary standards that, in the judgment of the Administrator, are requisite to protect public health with an adequate margin of safety."

Furthermore, in Section II.B.4 (Administrator's Conclusions), EPA states[18]:

- "This section summarizes the Administrator's considerations and conclusions related to the adequacy of the current primary PM2.5 standards and presents his decision to revise the primary annual PM2.5 standard to a level of 9.0 µg/m3 and retain the primary 24-hour PM2.5 standard. In establishing primary standards under the Act that are "requisite" to protect public health with an adequate margin of safety, the Administrator is seeking to establish standards that are neither more nor less stringent than necessary for this purpose. He recognizes that the requirement to provide an adequate margin of safety was intended to address uncertainties associated with inconclusive scientific and technical information and to provide a reasonable degree of protection against hazards that research has not yet identified. However, the Act does not require that primary standards be set at a zero-risk level; rather, the NAAQS must be sufficiently protective, but not more stringent than necessary. Given these requirements, the Administrator's final decision in this reconsideration is a public health policy judgment drawing upon

15 Particulate Matter (PM) Basics | US EPA
16 Final Reconsideration of the National Ambient Air Quality Standards for Particulate Matter (PM) | US EPA
17 Federal Register: Reconsideration of the National Ambient Air Quality Standards for Particulate Matter
18 These excerpts are not consecutive in the EPA document

scientific and technical information examining the health effects of PM2.5 exposures, including how to consider the range and magnitude of uncertainties inherent in that information. This public health policy judgment is based on an interpretation of the scientific and technical information that neither overstates nor understates its strengths and limitations, nor the appropriate inferences to be drawn, and is informed by the Administrator's consideration of advice from the CASAC and public comments received on the proposal."

- "As such, he notes that there is no specific point in the air quality distribution of any epidemiologic study that represents a "bright line" at and above which effects have been observed and below which effects have not been observed. The Administrator further notes that the epidemiologic studies provide the strongest support for reported health effect associations for this middle portion of the PM2.5 air quality distribution, which corresponds to the bulk of the underlying data, rather than the extreme upper or lower ends of the distribution, and concludes that the long-term study reported means from both long- and short-term studies provide the strongest support for reported health effect associations in epidemiologic studies
- "The Administrator also notes the information provided by the quantitative risk assessment on the distribution of concentrations associated with the estimated mortality risk for a higher annual standard level of 10.0 µg/m3 and a lower standard level of 8.0 µg/m3 (U.S. EPA, 2022b, sections 3.4.2.2 and 3.6.2.2, Figure 3-18 and 3-19). The Administrator finds that, for an annual standard level of 10.0 µg/m3, the quantitative risk assessment estimates that the standard would allow multiple exposures at concentrations above the lowest means in the key epidemiologic studies, and therefore, calls into question whether a standard level of 10.0 µg/m3 would provide enough public health protection. Additionally, the Administrator also finds that, for a lower annual standard level of 8.0 µg/m3, the quantitative risk assessment estimates the exposure concentrations to be below 8 µg/m3, with the majority of those exposures being at concentrations of below 7 µg/m3. The Administrator observes that the majority of exposure concentrations under this air quality scenario are estimated to fall outside of the range of concentrations in which he has the most confidence in the associations and that the additional risk reductions will actually occur."
- "In making this decision to retain the current level of the primary PM2.5 24-hour standard at 35 µg/m3 in conjunction with revising the annual standard level from 12.0 µg/m3 to 9.0 µg/m3 , given all of the evidence and information discussed above, the Administrator judges that the revised suite of primary PM2.5 standards and the rationale supporting these levels appropriately reflects consideration of the strength of the available evidence and other information and its associated uncertainties as well as the advice of CASAC (Clean Air Scientific Advisory Committee) and consideration of public comments. He additionally judges that this suite of primary PM2.5 standards is requisite to protect public health, including at-risk populations, with an adequate margin

> of safety from effects associated with long and short-term exposures to fine particles. This judgment by the Administrator appropriately considers the requirement for standards that are requisite to protect public health but are neither more nor less stringent than necessary."

Additionally, in its response to comments document[19] for its proposal to revise the PM2.5 NAAQS, EPA stated:

- "At the same time, the EPA disagrees with the view that there are no meaningful uncertainties associated with a level of 8 µg/m3. The decision of the appropriate standard level, which in conjunction with the other elements of the standard would protect public health with an adequate margin of safety, requires a public health policy judgment, taking into account all of the evidence and its related uncertainties. The EPA agrees that the CAA requires the Administrator to set a health-protective standards but notes that the CAA does not require the Administrator to establish a primary NAAQS at a zero-risk level, but rather at a level that reduces risk sufficiently so as to protect public health with an adequate margin of safety. As detailed in section II.B.4 of the notice of final rulemaking, in considering the available scientific evidence, quantitative information, CASAC's advice, and public comments, the Administrator concludes that there are remaining uncertainties in the evidence associated with a standard with a level below 9.0 µg/m3, and that the extent to which adopting such a standard could result in further public health improvements is sufficiently uncertain that he judges such a standard would be more stringent than requisite."

These excerpts show that EPA (the Administrator) considered information that there has been no observed bright line for PM2.5 health impacts but still determined that an annual PM2.5 NAAQS standard below 9.0 µg/m3 was not supported by the existing body of scientific data. The body of scientific evidence considered in this review included the primary PM2.5 public health research cited by the report.

It is important to note that DEQ does not conduct or evaluate the merits of health impact calculations and studies since DEQ has no expertise in this field. However, the authors of EPA's 2022 Integrated Science Assessment[20] and the members of CASAC[21] are such experts, and their collective judgement was reflected in the revised 2024 PM2.5 NAAQS.

As previously discussed, based on the metric for evaluating existing air quality adopted by the report (the most recent average annual PM2.5 monitor value), the ambient air quality measured

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19 Responses to Significant Comments on the 2023 Proposed Rule for the Reconsideration of the National Ambient Air Quality Standards for Particulate Matter

20 Supplement to the 2019 Integrated Science Assessment for Particulate Matter (Final Report, 2022) | Integrated Science Assessments | Environmental Assessment | US EPA

21 CASAC Review of the EPA's Policy Assessment for the Reconsideration of the National Ambient Air Quality Standards for Particulate Matter

by each Northern Virginia monitor is below not only 9.0 µg/m3, but also 8.0 µg/m3 (the lowest PM2.5 NAAQS value considered by EPA) and even 7.0 µg/m3.

Public Health Indicators for Loudoun County

By many metrics, Loudoun County is one the healthiest (if not the healthiest) counties in Virginia and the United States as a whole.

Figure 4:

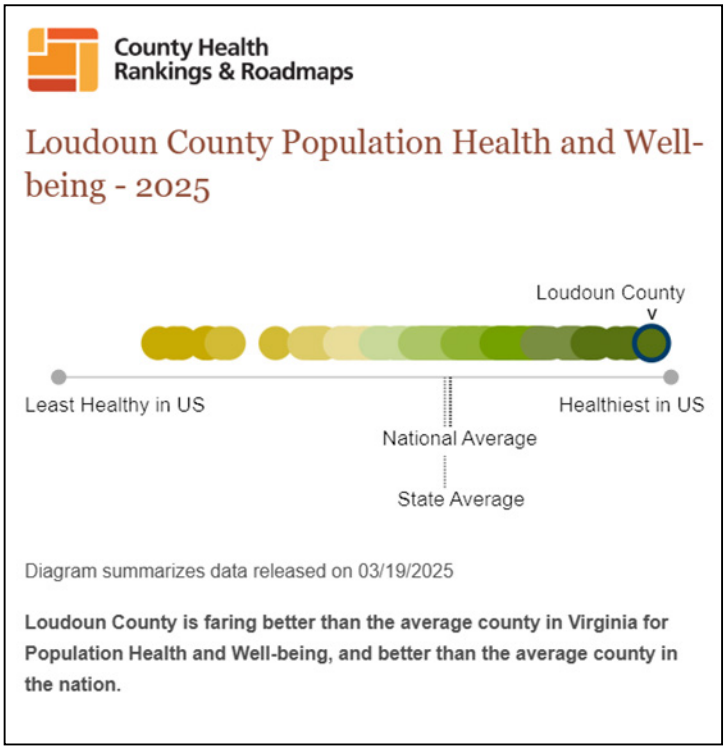
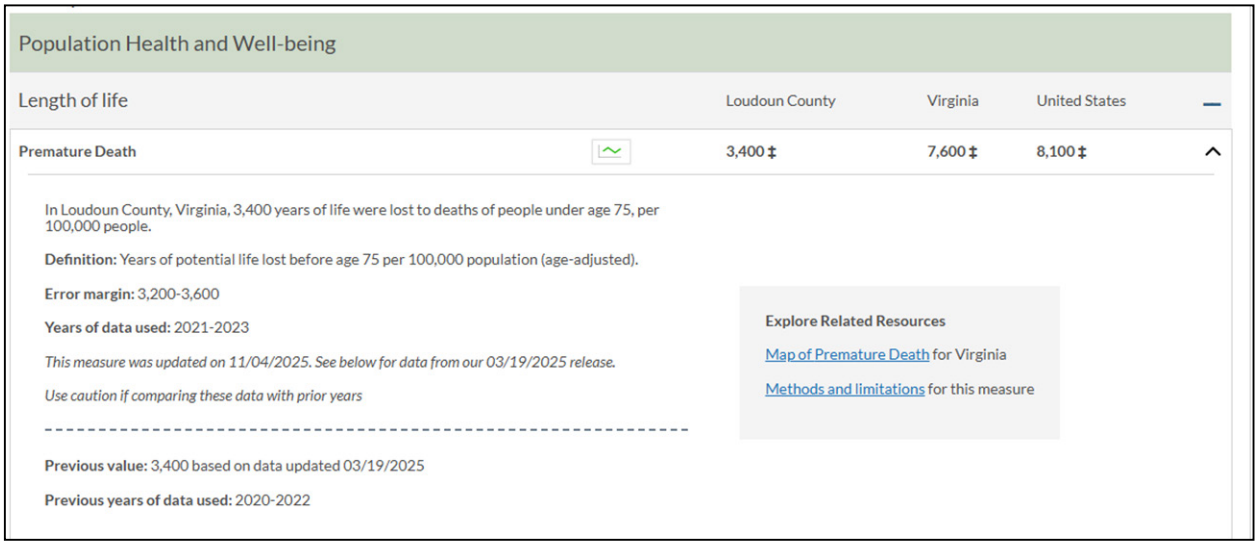


Figure 5:



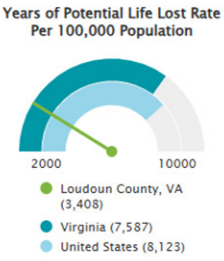
Loudoun, Virginia | County Health Rankings & Roadmaps

This data is confirmed directly by the Virginia Department of Health:

Figure 6:

Report Area	Premature Deaths (2021-2023)	Years of Potential Life Lost, Total	Years of Potential Life Lost, Rate per 100,000 Population
Loudoun County, VA	2,179	42,155	3,408
Loudoun Health District	2,179	42,155	3,408
Rural Virginia Average	23,153	333,004	11,942
Urban Virginia Average	91,471	1,535,448	7,151
Virginia	114,624	1,840,553	7,587
United States	4,622,957	75,489,049	8,123

Note: This indicator is compared to the state average.



VDH Assessment – Virginia's Plan For Well-Being

This data is inclusive of calendar year 2023 where, as previously discussed, the ambient PM2.5 concentrations (as recorded by DEQ's Northern Virginia monitors) were measured at relatively high levels. The health data for Fairfax County is similar.

In addition, on page 20 of the report, it is clearly shown that the Adult Asthma Prevalence %, for the areas described as impacted by VA2's emission in the report, are all below both the Virginia and the national averages.

Future VA2 Operations

Vantage has publicly represented that they intend to shut down the CTs and connect to the grid for primary power at the earliest opportunity. DEQ contacted Vantage in March 2026 and confirmed that this was still the facility's plan. The timing of this future grid connection will depend on Dominion's schedule for upgrading transmission lines to and in Loudoun County.

Enhanced DEQ Air Monitoring Plans for Northern Virginia

DEQ has initiated a special air monitoring study directed at measuring the impact of data centers on overall air quality in Loudoun and Prince William Counties where Virginia has the largest concentration of data centers. The study will follow a phased approach where the first phase was to deploy air quality "sensors" at multiple locations within each county to determine areas of elevated pollutant concentrations. These sensors will be left in place for up to 6 weeks after which they will be moved to new locations throughout each county. The pollutants currently being measured are: NO2, CO and PM2.5. It is important to note that while the sensors do produce good data, the data cannot be used to determine compliance with the NAAQS. Rather, the data produced by the sensors will guide DEQ decisions in phase two of the study.

For the second phase of the study, DEQ's Office of Air Quality Monitoring (AQM) will analyze the sensor data from phase one and identify any areas of elevated pollutant concentrations. For any area identified as having elevated concentrations of pollutants, AQM will deploy mobile air monitoring instruments that are certified by EPA as being accurate enough to generate data that can be compared to the NAAQS.

In the final stage of the special study, information from phase two will be used to determine possible locations for additional *permanent* monitoring sites within each county.

The study began on March 2, 2026, and will continue through the summer of 2026.