

Direct Testimony of George Thurston, Sc.D.

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IN THE MATTER
Of the Buckingham Compressor Station

Supplementary Testimony of
George Thurston Sc.D.

January 4, 2019

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1 IMPLICATIONS OF DR. FJORD’S UNION HILL SURVEY TO AIR POLLUTION
2 HEALTH IMPACTS OF THE BUCKINGHAM COMPRESSOR STATION

3 Q. What are the factors that cause a person or a population to be more at risk
4 from air pollution exposure, such as the exposures that will be associated with
5 the proposed Buckingham Compressor Station?

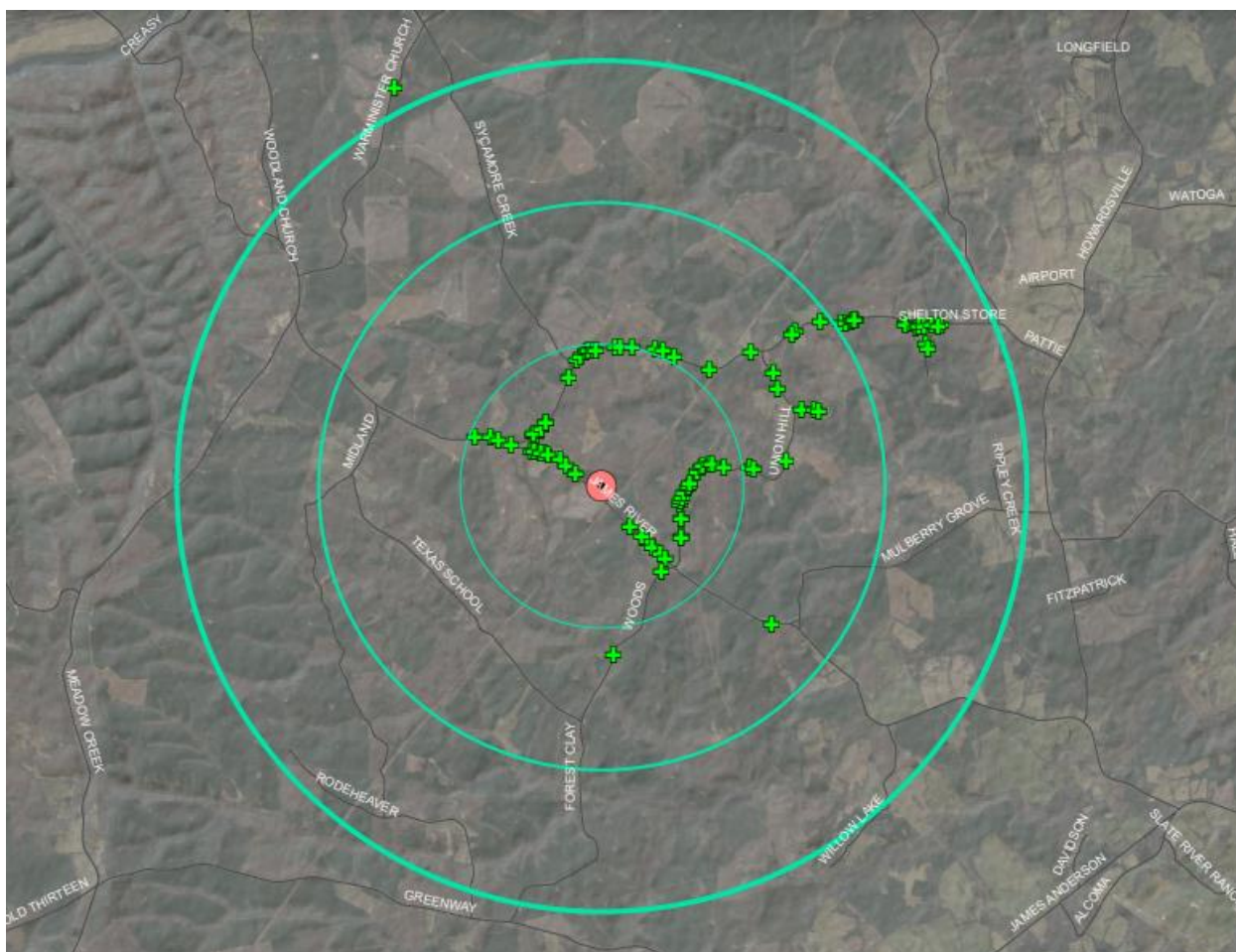
6 A. As discussed in my original Declaration, September 21, 2018, and in the recent
7 treatise on air pollution health effects by Schraufnagel et al (2018) (to which I am a
8 co-author), both extrinsic (external) and intrinsic (internal) factors determine
9 vulnerability to adverse health effects from exposures to air pollution. The most
10 important extrinsic population factor is the level of exposure to pollution. People of
11 lower social and economic status often have greater exposures to air pollution
12 because they often live in areas of greater traffic density and near point sources of
13 pollution such as power plants and industrial facilities like the proposed natural gas
14 combustion compressor station. Other extrinsic neighborhood factors that contribute
15 to vulnerability include poor housing, the lack of stores to purchase healthy food
16 (e.g., fruits and vegetables that contain antioxidants), violent crime, segregation,
17 lack of green space, and poor access to health care. Intrinsic individual factors that
18 increase vulnerability to air pollution include age (very young and very old),
19 preexisting disease, pregnancy, genetic and epigenetic variation, smoking, and
20 obesity. The concept of cumulative risk combines both the extrinsic and intrinsic
21 factors when attempting to assess the vulnerability of an individual or a population
22 to the ill effects of air pollution.

23 Q. How do the results of Dr. Fjord’s Community Questionnaire relate to
24 the consideration of the human health impacts of the air pollution resulting
25 from operation of the proposed compressor station?

26 A. Dr. Fjord’s report indicates that a number of the above extrinsic and intrinsic
27 factors that increase the adverse effects of air pollution are present in this
28 population. Regarding extrinsic risk factors, as shown in the below figure, a high
29 percentage of the studied Union Hill population live immediately around the
30 proposed facility, most within one mile of the facility, and therefore will receive

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1 the highest pollution exposures from the facility's operation. In addition, though
2 not included in Dr. Fjord's household survey, this is a neighborhood with a very
3 high percentage of residents living in poverty, which is another extrinsic risk
4 factor for environmental health effects. This fact is confirmed by the census
5 information for the neighborhood's Census tract (9301.01) which has a poverty
6 rate of 26.6% (Virginia DEQ, 2018), which is more than double that of the State
7 of Virginia, overall (11%).



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9 Figure 1. Location of Union Hill Residents Surveyed relative to the proposed facility (red
10 dot). Rings are 1, 2, and 3 miles from the proposed facility location. (Source:
11 Comments of Stephen Metts)

12 *In addition, the population living near the proposed facility are shown by Dr.*
13 *Fjord's results to have multiple individual intrinsic risk factors. For example, as*

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1 shown by Table 1 from her report, race by self-identification indicated that
2 minorities, an especially susceptible population, make up 83.5% of residents.

3 Table 1. Race by self-identification of Surveyed Union Hill Residents

	African American	Native American and African American	White	Native American and White	Native American	Hispanic	Asian
Count	124	27	33	9	3	3	1
%	62	13.5	16.5	4.5	1.5	1.5	.5

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5 Moreover, as shown in Table 2, of Weekday residents, 32% are Children, and
6 25% Elderly, which are both intrinsic susceptibility risk factors for air pollution
7 exposure.

8 Table 2. Age Distribution of Surveyed Union Hill Residents

Age Range	0-6	7-18	18-21	22-40	41-65	65+	Unknown	Total
Count	28	36	5	36	43	50	2	200
%	14	18	2.5	18	21.5	25	1	100

9 Importantly, for the 67 households where Dr. Fjord's research team was able to
10 have extensive questionnaire time, 35 responded with pre-existing medical
11 diagnoses or 59.32% of reached households. This indicates a very high percentage
12 of susceptible people due to their having a pre-existing health condition.

13 **Q. Based on this information what are your Conclusions?**

14 A. The population surrounding the proposed facility location is seen to have multiple
15 susceptibility risk factors, and, as a result, to be especially vulnerable to exposure
16 and susceptible to the adverse health effects of the air pollution from the proposed
17 Buckingham Compressor Station. It is therefore concluded that this especially
18 vulnerable population will suffer especially increased health risks associated with
19 operation of the facility.

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2 LITERATURE CITED

3 Fjord, Lakshmi. Union Hill Household Study. 01-02-2019.

4 Schraufnagel DE, Balmes JR, Cowl CT, De Matteis S, Jung SH, Mortimer K, Perez-Padilla R,

5 Rice MB, Riojas-Rodriguez H, Sood A, Thurston GD, To T, Vanker A, Wuebbles DJ. Air

6 Pollution and Noncommunicable Diseases: A Review by the Forum of International Respiratory

7 Societies' Environmental Committee, Part 1: The Damaging Effects of Air Pollution. Chest. 2018

8 Nov 9.

9

10 Virginia DEQ. (2018). Appendix U .Racial, Ethnic, And Poverty Statistics For Census Tracts
11 Within 1 Mile Of The Atlantic Coast Pipeline And Supply Header Project.

12 [https://www.google.com/url?q=https://www.deq.virginia.gov/Portals/0/DEQ/Air/BuckinghamC
ompressorStation/PUBLIC_COMMENT_DOC_FEIS_Volume-III-part-2%2520-Appendix U-
statistics for census tracts.pdf&sa=D&ust=1546658697684000&usg=AFQjCNHNCnX8cWVFhqk
EwIFWtpyPBvfV6g](https://www.google.com/url?q=https://www.deq.virginia.gov/Portals/0/DEQ/Air/BuckinghamC
13 ompressorStation/PUBLIC_COMMENT_DOC_FEIS_Volume-III-part-2%2520-Appendix_U-
14 statistics_for_census_tracts.pdf&sa=D&ust=1546658697684000&usg=AFQjCNHNCnX8cWVFhqk
15 EwIFWtpyPBvfV6g)

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