

**Blowin' in the Wind:  
What Bob Dylan  
*Wasn't* Singing About**

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MASTER'S IN SCIENCE IN SUSTAINABILITY SCIENCE

DRAFT: RISK ASSESMENT AND MONITORING PLAN FOR BUCHANAN-VERPLANCK  
ELEMENTARY SCHOOL

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**The Capstone Project team included research into wind patterns around Indian Point in their draft report on risk assessment and monitoring.**

Data for this report was acquired from a publicly available NASA database (NASA, 2022), which includes the parameters of wind direction, the wind speed, humidity, precipitation for the area around Indian Point Energy Center for the last 20 years. Data was available at three different temporal resolutions: Monthly, Daily, and Hourly.

NASA. (2022). *Data Access Viewer*. Retrieved from The POWER Project:  
<https://power.larc.nasa.gov/data-access-viewer/>

**The Capstone Project team's draft report explained why they collected and reviewed the wind data:**

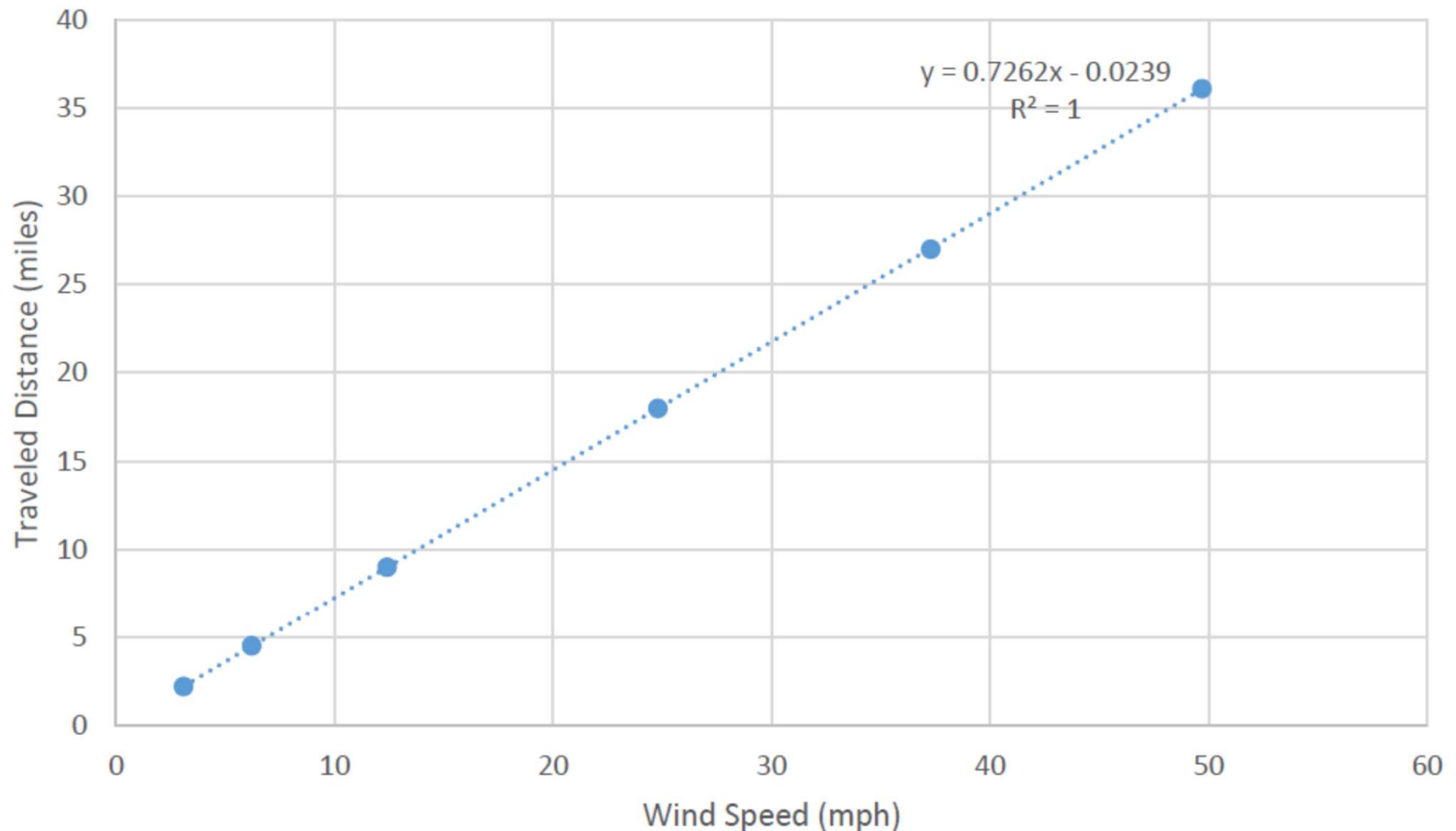
***Recognizing that the elevation of the Indian Point Energy Center is higher than that of the elementary school, we consider wind to be crucial in facilitating the transport of contaminants towards the school.***

Buchanan-Verplanck Elementary School lies approximately 0.7 miles south of Indian Point Energy Center. Given this, the team first analyzed the data to determine if the area experienced northerly winds, how frequently northerly winds happen, and if there is any seasonal variation to wind direction. For the purposes of this report, it is considered as “south” to constitute the directional range of 101.25 degrees to 191.25 degrees.

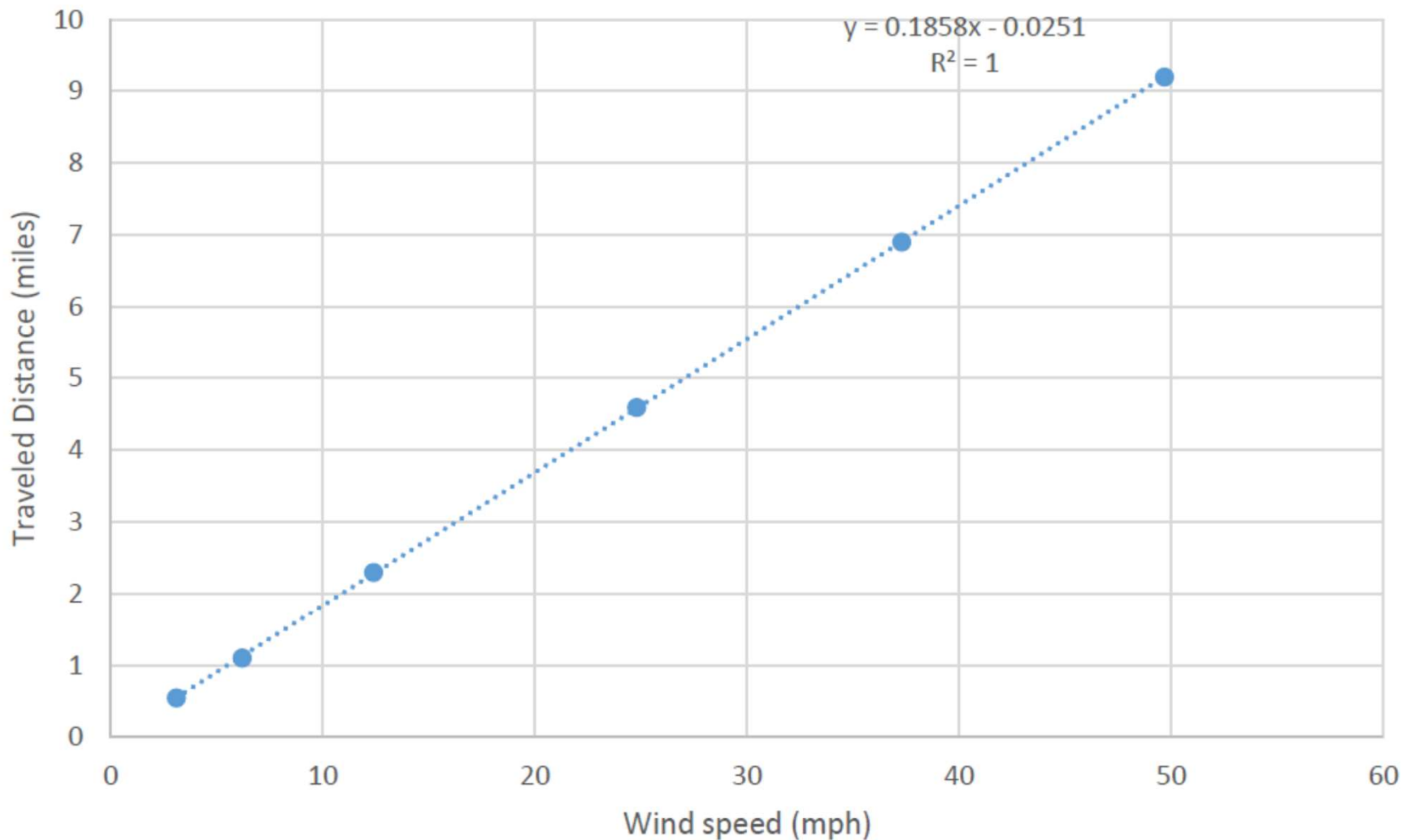
**The Capstone Project team found the NASA data to show how often the prevailing wind direction was from Indian Point towards the Buchanan-Verplanck Elementary School:**

- **The prevailing wind direction from the monthly data was towards the school in only three months during the 20-year span (1.2% of the time)**
- **The prevailing wind direction from the daily data was towards the school 25.2% of the days during the 20-year span**
- **The prevailing wind direction from the hourly data was towards the school 20.6% of the hours during the 20-year span**

**The Capstone Project team complemented their research into prevailing wind directions with data on how wind speeds affect transport of particles. The team considered two particle sizes: PM2.5 and a particle four times larger, PM10. The team used a general model to indicate how far winds of various speeds could carry particles of that size:**



*Figure 8 PM2.5 Traveled Distance by Wind Speed*

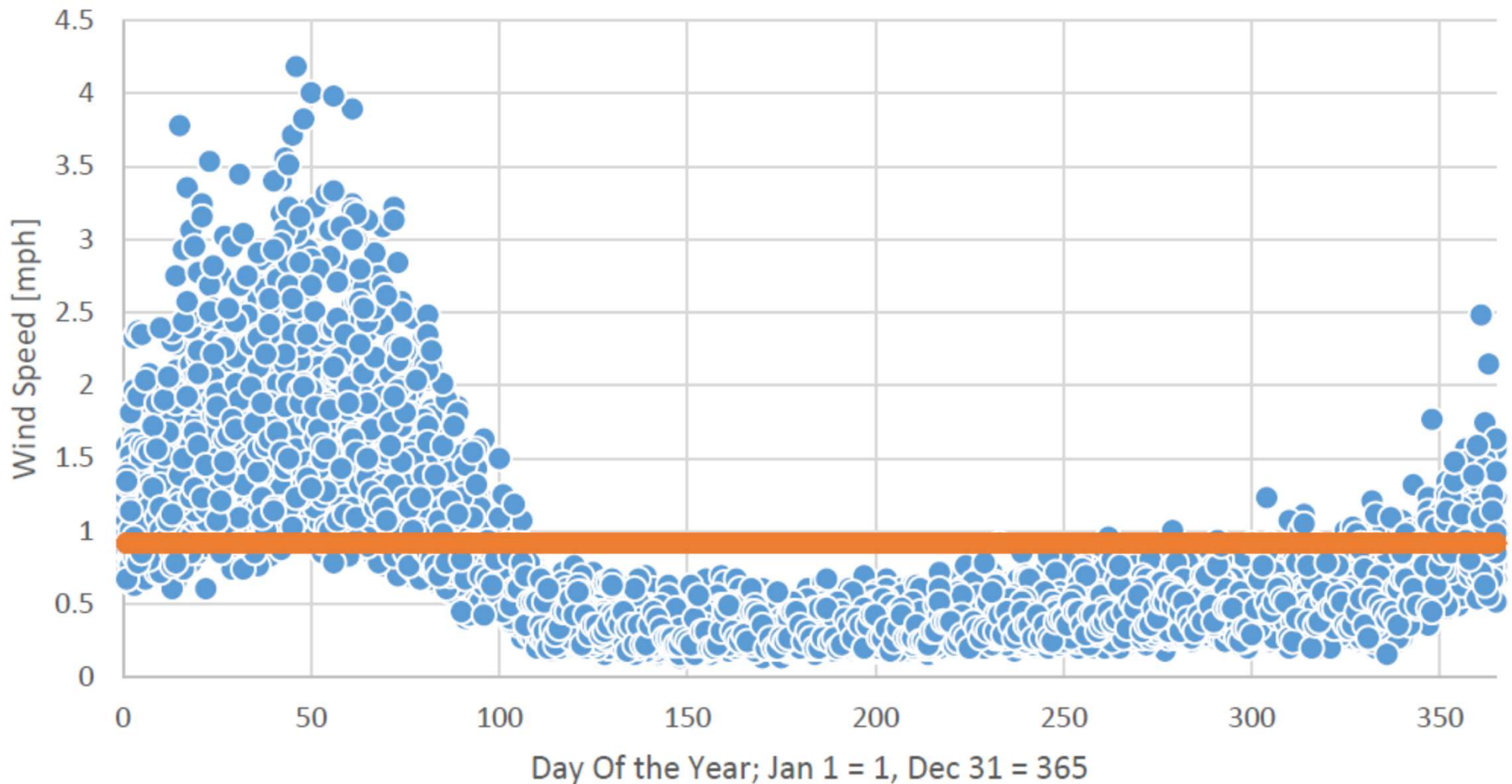


*Figure 7 PM10 Traveled Distance by Wind Speed*

**The Capstone Project team used the model to determine the wind speed needed to carry particles 0.7 miles to the school. For PM2.5 particles, wind speeds of 0.92 miles per hour (mph) and higher can do it. For PM10 particles, wind speeds of 3.59 mph or higher can do it.**



**The Capstone Project team used the wind speed data to indicate when the daily winds are strong enough to be able to carry particles to the school (even when blowing in a different direction):**



*Figure 9 Daily Wind Speed and Threshold for PM<sub>2.5</sub>*

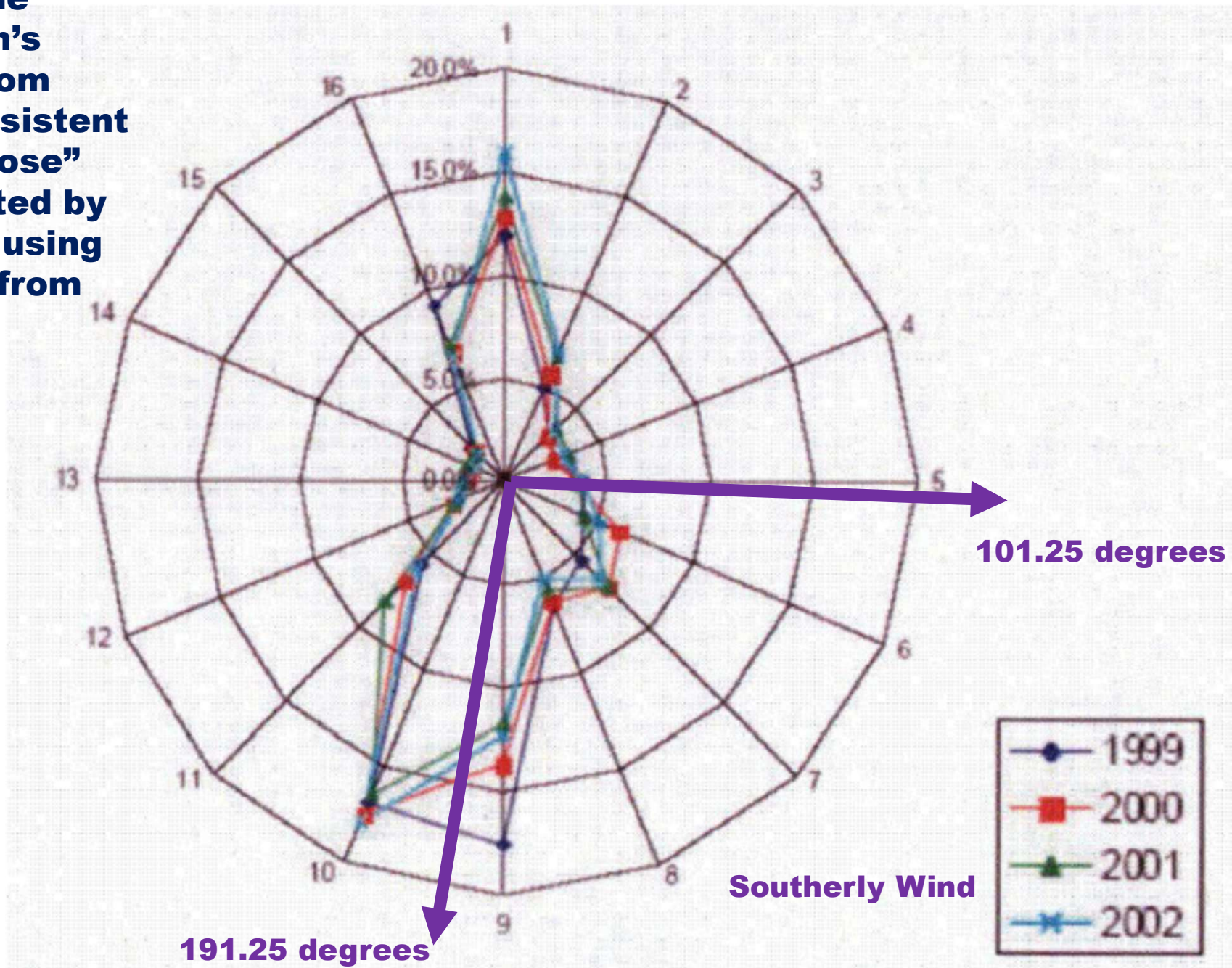
**The Capstone Project team combined the wind direction and wind speed data to determine how often the wind would be blowing towards the school of sufficient velocity to carry PM2.5 and the larger PM 10 particles that distance:**

Additionally, an analysis on hourly wind data can be conducted to approximate the frequency of winds at a 10-meter elevation fulfilling all conditions that would result in the transport of PM2.5 or PM10 from Indian Point Energy Center to the school – namely, travelling south and exceeding the minimum wind speed threshold. For PM2.5 and PM10 the percentage of time that the wind fulfills all the conditions to get to the school is 20.8% and 13.3% respectively.

**In other words (and numbers), 79.2% of the time the wind is blowing in a different direction and/or of is of insufficient speed to carry PM2.5 particles from Indian Point to the school. And 86.7% of the time, the wind conditions will not carry PM10 particles from Indian Point to the school.**



**The Capstone Project team's wind data from NASA is consistent with "wind rose" data submitted by NYS to NRC using information from Entergy**



**Source: State of New York Office of the Attorney General comments to NRC on Draft Supplement Environmental Impact Statement for Indian Point, March 4, 2016. ([ML17188A338](#))**