

Summary of Minisink Monitoring Results

The Minisink compressor station has been in operation since the summer of 2013. Families living within a few kilometers of the station have been experiencing episodic health symptoms since the station began operation. The facility is a 12,000 horsepower compressor. At the request of the community, EHP placed 5 Speck particulate matter (PM 2.5) monitors near residences from October 19 – December 17, 2014 and collected health information from 8 families living within 1.5 kilometers of the site. Residents also collected air samples of VOCs using Summa canisters on four occasions.

Major Findings

SUMMARY OF HEALTH IMPACTS

EHP collected health information from 35 individuals, 12 of whom are children. A medical professional collected the data. Symptoms that developed after the potential exposure period (beginning summer 2013) or worsening pre-existing symptoms without a more plausible cause were reviewed. The health findings are consistent with information from other research reported in peer-reviewed literature and by other environmental health organizations. The predominant health impacts reported were:

- Respiratory problems (22, includes 6 experiencing nosebleeds)
- Neurological problems, (12, all of whom report headaches)
- Dermatological problems (10, skin rashes)
- Overall physical health self-assessments, when compared to a national standard (SF36), are below normal for 2 out of the 8 individuals who completed the SF36. Overall mental health and wellbeing levels were below normal for half of the respondents.

PM2.5 MONITORING RESULTS

Monitoring of PM2.5 outside residences near the Minisink Compressor station demonstrated the following:

- Four of the 5 Speck monitors recorded elevated PM2.5 baseline values in outside ambient air compared to regional levels of AQI PM2.5 reported from Newburgh, NY Airport. The average hourly AQI for the monitoring period was 6.4 ug/m³. The average hourly values for the Specks ranged from 4 to 20

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ug/m³. The Speck monitor that recorded the lowest average PM_{2.5} value was separated from the compressor station by 2 valleys, likely showing the effect of topography. (Table 1)

- There were times when more than one monitor showed unusually high PM_{2.5} values. (Table 2)
- All residential 24-hour averages of PM_{2.5} outside levels were below the EPA level of concern (35ug/m³), with one exception. One home had one 24-hour period with an average of 64ug/m³. This shows how the standard 24-hour averaging time can mask peak exposures.
- Periods of low wind speed and nighttime (especially early morning hours) were found to increase potential exposures to PM_{2.5} and any associated chemicals at residences near the compressor station.

Table 1. Baseline hourly average PM_{2.5} levels recorded by Speck monitors for entire monitoring period (Oct 19 – Dec 17 2014). Values in ug/m³.

DISTANCE (km) from compressor	0.5		0.5	0.8	1.5		1.0
SPECK ID	A		B	C	D		E
Average	14.6		8.7	11	4		20
Range of baseline	10-30		1-21	5-25	1-20		15-25

Table 2. Episodic high levels of PM_{2.5} outside multiple homes occurred within similar time frames seven times over 59 days. These results are based on hourly averages of ug/m³ values.

Date of Peak event	# of monitors showing a peak out of # in use	Recorded peak levels	Daily AQI average
10/30	3/4	31, 90, 426	5.0
11/5	2/5	33, 57	5.5
11/7	3/5	36.5, 114, 133	5.3
11/12	4/5	53.7, 131, 269, 325	9.0
12/3	3/5	40, 235, 399	5.0
12/6	2/5	76, 160	10.8
12/17	3/5	99, 162, 229	9.9

Tables 1 and 2 show that although hourly baseline Speck values averaged between 4 and 20 ug/m³, peaks in PM_{2.5} were recorded at multiple sites on the same days

with values between 31 and 426 ug/m³. Concurrently, the average regional AQI for the same time period was 6.4ug/m³.

SUMMA CANISTER RESULTS

Four chemical samples were taken outside of four homes in November 2014. The chemicals detected are the same chemicals found at numerous shale gas development facilities by other researchers. The sampling times do not correlate with recorded peaks of PM_{2.5}, so likely show what might be in the air in between episodic peaks.

Chemicals	Summa canister results as of 12.12.2014			
	11.4.14 12hr overnight	11.12.14 12hr day	11.9.14 12hr day	11.12.14 grab
Methane	2.4ppmv	3.0ppmv	2.25ppmv	2.4ppmv
Acetone	7.9ug/m ³ 3.3ppb		5.9ug/m ³ 2.5ppb	
Dichlorodifluoromethane (CFC12)	2.2ug/m ³ 0.45ppb	2.5ug/m ³ 0.51ppb	2.6ug/m ³ 0.52ppb	2.5ug/m ³ 0.52ppb
Ethanol	27ug/m ³ 14ppb		44ug/m ³ 23ppb	
Ethylbenzene			0.99ug/m ³ 0.23ppb	
Propene		2.7ug/m ³ 1.6ppb		
Toluene	1.0ug/m ³ 0.27ppb	1.5ug/m ³ 0.4ppb	0.7ug/m ³ 0.19ppb	1.2ug/m ³ 0.32ppb
Trichlorofluoromethane	1.3 ug/m ³ 0.24ppb	2.3 ugm ³ 0.4ppb	1.6ug/m ³ 0.28ppb	1.6ug/m ³ 0.29ppb
Trichlorotrifluoroethane			0.66ug/m ³ 0.086ppb	

The levels of reported VOCs were not high in terms of health effects for a single chemical exposure, but are still of concern if these exposures occur over a long period of time or if high spikes periodically occur.

Conclusions

Based on the monitoring results and health intakes, EHP finds that families living near the Minisink Compressor station are exposed to elevated levels of PM_{2.5}, when compared to the regional AQI. PM_{2.5} is one of a number of air pollutants associated with compressor stations. Summa canister sampling revealed that some of these

chemicals are present in the air near the monitored homes. This leads us to conclude that residents are exposed to air pollution from the Minisink compressor.

The episodic nature of health symptoms reported by residents is likely associated with the episodic high emissions that come from the compressor station. This conclusion is supported by the periodically high levels of PM2.5 recorded by the Speck monitors. While baseline levels of PM2.5 are relatively low, high short-term spikes may have health effects that are not currently evident. We recommend that health symptoms be monitored over time.

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