

# PUBLIC HEALTH EVALUATION OF AMBIENT AIR NEAR A SHALE GAS WELL SITE AND SCHOOL CAMPUS:

## Results from Long-term Air Monitoring at the Yonker Well Site Nearby the Fort Cherry School Campus in Washington County, PA

An air monitoring study was conducted to determine whether operations at the Yonker well site may contribute to ambient air concentrations of potential health concern at the nearby Fort Cherry School District campus. Almost two years of measurements were made at three monitoring sites nearby to the Yonker well site during all phases of development and production of natural gas and natural gas liquids.

### KEY FINDINGS

- This air quality and public health evaluation showed that measured fine particulate matter (PM<sub>2.5</sub>) and volatile organic compounds (VOCs) concentrations were consistently below health-based air comparison values and thus are not expected to pose acute or chronic health concerns.
- The data for the air monitoring sites located between the Yonker well site and the Fort Cherry School District campus indicated an absence of air quality impacts of potential health concern at the campus associated with Yonker well site air emissions.
- The measured PM<sub>2.5</sub> and VOC concentrations do not provide evidence of elevated long-term average concentrations relative to other parts of Washington County that are more distant from local natural gas development. The measured concentrations reflect the cumulative contributions of both air emissions from the Yonker well site as well as from other local and regional air emission sources such as area well sites, and include concentrations during all phases of well pad construction and operation.
- A wind direction analysis showed that winds which would blow Yonker well site air emissions towards the Fort Cherry School District campus (*i.e.*, winds from the south and southeast) were intermittent and relatively infrequent.

### LOCATION OF THE YONKER WELL SITE RELATIVE TO THE AIR MONITORING SITES AND FORT CHERRY SCHOOL DISTRICT CAMPUS.



### THINGS TO KEEP IN MIND

- Health-based air comparison values are not bright lines above which health effects are expected; instead, due to the use of conservative assumptions and safety/uncertainty factors, they typically specify exposure levels that are from several-hundred-fold to several-thousand-fold lower than the exposure level at which an actual adverse effect was observed in people or laboratory animals.
- Measured air concentrations are not specific to just air emissions from the Yonker well site, as there is other local and regional Marcellus Shale development; moreover, the majority of the measured species have a large number of common anthropogenic and natural sources and are commonly measured in ambient air.

## STUDY METHODS

- An air monitoring network was designed to measure PM<sub>2.5</sub>, VOCs, and meteorological parameters during the development and operation of the Yonker well site (December 2016 – October 2018).
- Three air monitoring sites ranged from about 1,000 to 2,800 feet from the Yonker well site.
- A public health evaluation of this air monitoring dataset was conducted by comparing measured air concentrations to: (1) conservative (i.e., health-protective) acute and chronic health-based air comparison values, and (2) air concentrations measured at PADEP monitoring sites in Washington County that are representative of regional background air quality.

## NOVEL ASPECTS OF THIS STUDY

- Almost two years of air monitoring collected during all phases of development and production, including over a year of monitoring during the production phase alone.
- Two air monitoring sites located between the well site and a nearby school campus.
- Monitored airborne PM<sub>2.5</sub> and 58 VOC species.
- Comparison of both short-term (24-hour) and long-term (>1 year) average air concentrations to health-based air comparison values.

COMPARISON OF MEAN VOC CONCENTRATIONS BY MONITORING SITE AND YONKER WELL SITE DEVELOPMENT PHASE WITH CHRONIC HEALTH-BASED AIR COMPARISON VALUES (HBACVs): (A) BENZENE, (B) ETHYLBENZENE, (C) TOLUENE AND (D) XYLENES.

