Environmental Protection Agency

Air Quality Impact Evaluation for Piqua, ESRG Battery Burning

Background

In 2018, the Regional Air Pollution Control Agency (RAPCA) approved an open burning request from the city of Piqua for the burning of lithium-ion batteries for fire training and research. Most recently, the Energy Safety Response Group (ESRG) was conducting the testing and training activities. In September 2023, RAPCA and Ohio EPA conducted an inspection and determined that ESRG's activities were not consistent with an open burning authorization. After meeting with Ohio EPA and RAPCA, ESRG stopped the open burning. Ohio EPA then formally revoked the burn permission after discussions with the City. Neighbors of the burn site are concerned about the environmental and health impacts of the unsupervised burns. To gain a better understanding of the burns' impacts on air quality, Ohio EPA conducted computer modeling of select burn events to provide specifics about the estimated quantity of emissions and predicted ground-level concentrations.

Modeling Overview

Lithium-ion battery technology is relatively new and there is limited published research about the emissions to expect when these batteries burn. There is ongoing active research into this issue, and we anticipate additional credible and tested information to emerge about the batteries that will help guide agencies reviewing these types of fires in the future.

The emissions data that ESRG provided to Ohio EPA did not contain sufficient information to develop the model, so Ohio EPA used available data on the largest burns and published documents on emissions for these types of operations to inform the model. Because of limited research and incomplete emission data, Ohio EPA's Division of Air Pollution Control (DAPC) took a conservative approach and looked at worst-case scenarios with its modeling. DAPC used U.S. EPA's preferred model to assess potential ground-level impacts for the three largest burns conducted on the site. These burns happened on Apr. 6, Jul. 27, and Aug. 8, 2023. After reviewing available information on typical emissions from the batteries, DAPC focused on hydrogen fluoride because it was the most harmful of potential emissions.

Air Emission Modeling Results

Ohio EPA mapped out potential contaminant plumes based on meteorological conditions reported at the Dayton International Airport for the select burn dates. The model consisted of all known circumstances of the burns including weather, wind direction, burn duration, and mass of battery combusted. The modeling showed all potential areas of emissions exposure were within 1,000 feet of the facility's fence line.

None of the modeled days showed the possibility of serious and/or long-term health effects from emissions exposure during the burn events.

Two of the modeled days (April 6 and July 27) showed there was a potential for exposures that could lead to short-term, mild health symptoms. On those days it was possible that neighbors to the northeast and southeast of the burn site, including the dog park, could have experienced eye irritation, throat burning, headache, shortness of breath, chest pain, and nausea. Again, our modeling and health impact evaluation was conservative and took into consideration the most harmful of potential emissions and how they may have affected the most vulnerable in the vicinity (children, the elderly, and compromised health conditions, like asthma).

What should residents concerned about health impacts do?

Anyone who believes they may have been affected when the burns occurred should talk with their doctor. Ohio EPA does not anticipate long-term chronic health effects from emissions produced at the site.

Contact

Several parties are looking into the environmental impacts of this open burning violation.

For more information on air impacts, contact Mary McCarron at Ohio EPA's Communications and Outreach Office at ***mary.mccarron@epa.ohio.gov***, or 614.644.2160.

For more information on drinking water testing, soil impacts, and work of the city of Piqua, please visit ***https://piquaoh.org/1587/Public-Safety-Training-Center***.

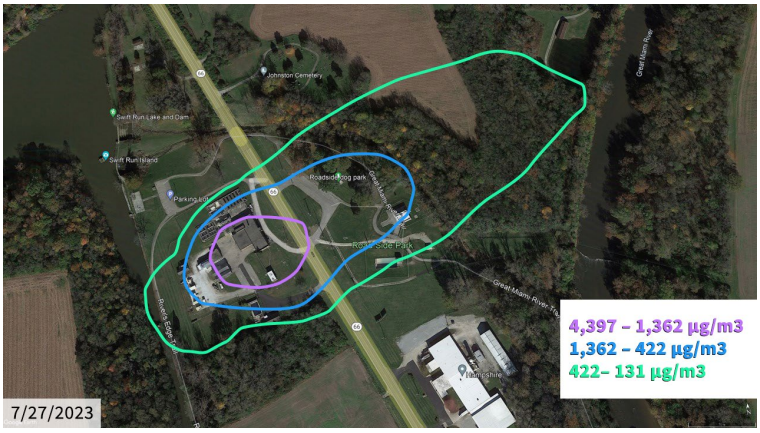
Air Quality Impact Evaluation for Piqua

Air Emission Modeling Maps (Click to Enlarge)

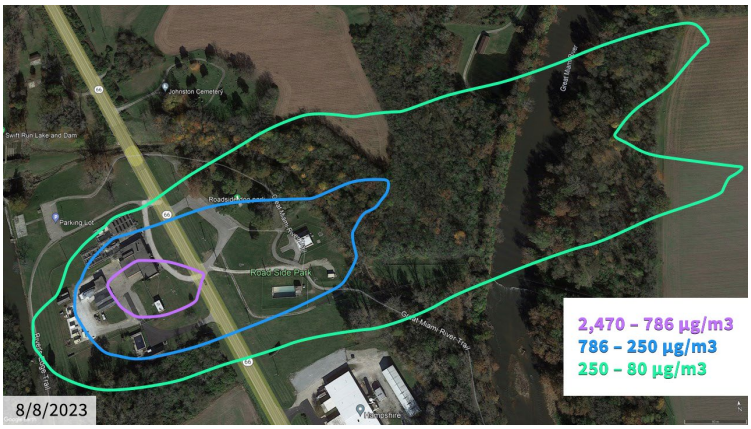
Hydrogen Fluoride (HF) is a colorless gas at room temperature that can readily mix with water to form hydrofluoric acid; both compounds are considered highly toxic. The modeled data was evaluated against the Acute Exposure Guideline Level (AEGL) established by U.S. EPA due to the applicability of exposure times and health outcomes.

- AEGL-1 (820µg/m^3, 1hr exposure) – Relates to mild symptoms (eye irritation, throat burning, headache, shortness of breath, chest pain, cough, and nausea) – Highest level of potential exposure in Piqua.
- AEGL-2 (20,000 µg/m^3, 1hr exposure) - relates to moderate and/or long-term symptoms.
- AEGL-3 (44,000 µg/m^3, 1hr exposure) - potentially fatal.

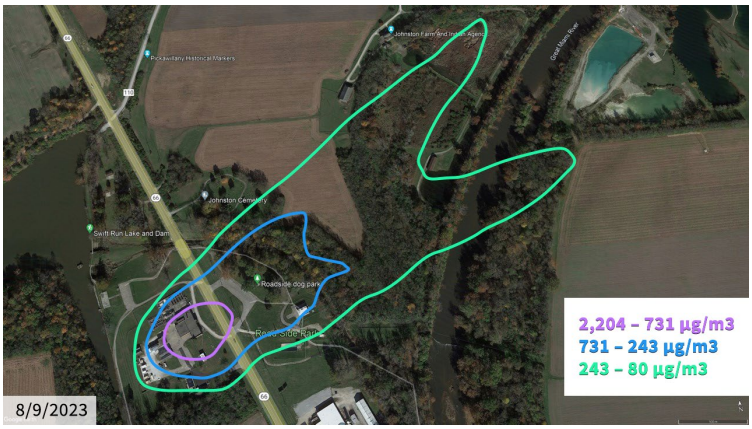
Predicted ground-level impacts on Apr. 6, 2023. Potential for short-term, mild health symptoms.



Predicted ground-level impacts on Jul. 27, 2023. Potential for short-term, mild health symptoms.



Predicted ground-level impacts Aug. 8, 2023. Low risk of potential health symptoms.



Predicted ground-level impacts on Aug. 9, 2023. Low risk of potential health symptoms.