



Shell Chemical Appalachia LLC
300 Frankfort Rd
Monaca, PA 15061

December 16, 2022

Mark Gorog P.E., Regional Manager Air Quality
Program Pennsylvania Department of Environmental
Protection Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222

RE: PA-04-00740C Ethylene Cracking Unit (Source ID 201) Acetylene Reactor Flaring Event and High-Pressure (HP) Header System (Source ID 205) Excess Emission Report

Dear Mr. Gorog,

Shell Chemical Appalachia LLC (“Shell”) is submitting this Malfunction Report to the Pennsylvania Department of Environmental Protection (PADEP) for excess emissions from flaring Ethane Cracking Unit process gas with acetylene to isolate downstream processes from this impurity and limit additional flaring.

- **Name and location of the facility**
Shell Polymers Monaca
300 Frankfort Road, Monaca PA, 15061
- **Nature and cause of the incident**

At approximately 21:42 on November 15, 2022, instrumentation was indicating increasing levels of CO in the effluent gas (cracked gas contained within the process) of the furnaces that were running at the time. Operations took appropriate actions to control the CO levels from the furnaces, but the levels continued to climb resulting in high acetylene levels in the Acetylene Reactor (R-13901). High acetylene readings were then detected in downstream process equipment including in the bottom of the Demethanizer Unit ((C-14101) indicating that acetylene was moving through ECU and would negatively impact additional downstream equipment including ethylene storage and the Polyethylene units. Process feed was directed to the off-spec ethylene tank and flow from the C2 Splitter was directed to High Pressure Header System and Totally Enclosed Ground Flares to control and prevent additional negative impacts to ethylene production and the Polyethylene Units

Contacts were made with Pipeline and the ethane feed supplier during the event to understand potential cause or potential upsets in their systems leading to the monitored CO levels in the furnaces.

- **Time when the incident was first observed, and duration of excess emissions**

Excess emission from routing off spec gas from the ECU to the HPGFs occurred from approximately 22:50 on November 15, 2022 and ended at 05:32 on November 16, 2022 (6.7 hours) when CO levels within the furnace cracked gas were returned to normal.

No visible emissions or smoke was observed from the TEGF flares during this event that occurred at night.

Excess emissions were reduced by quickly addressing the process upset and to get the process feeds back on specification as soon as practicable. Flaring was minimized by using the off-spec storage tank instead of directly flaring all of the ethylene. The flaring of the off-spec process streams avoided further impact to other downstream processes that would have resulted in more flaring to correct resulting impacts.

- **Estimated excess emissions**

Based on the flow meter readings, the estimated excess emissions for this flaring event have been calculated using the gas composition and emission factors as:

CO2e: 721.17 tons
CO: 1.42 tons
NOx: 0.35 tons
SO2: 0.00 tons
PM(filt): 0.01 tons
PM10: 0.04
PM2.5: 0.04
VOC: 2.08 tons
HAP: 0.01 tons

If you have any questions regarding this matter, please contact me at (724) 709-2467 or kimberly.kaal@shell.com.

Sincerely,



For:

Kimberly Kaal
Environmental Manager, Attorney-in-Fact

CC:
Anna Hensel, District Supervisor
Scott Beaudway, Air Quality Specialist