



Shell Chemical Appalachia LLC  
300 Frankfort Rd  
Monaca, PA 15061

October 2, 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 Source ID 202, PE3 Reactor 1 Circulation Pump Seal Leak  
Malfunction Report**

Dear Mr. Gorog,

Shell Chemical Appalachia LLC (“Shell”) is submitting this Malfunction Report to the Pennsylvania Department of Environmental Protection (PADEP) for excess flaring emissions observed from the blowdown of reactors in PE3 at the high-pressure ground flares (HPGF).

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

In preparation for PE3 initial start-up activities, the reactor circulation pump was started on September 1<sup>st</sup> and had run for a day with no apparent issues. It was noted by direct observation the next day that there were indications of an oil seal leak on the pump shaft and a vapor leak confirmed upon further investigations by operations. The leak was assessed, and it was decided to take the pump out of service, drain the oil and replace the circulation pump unit. The reactors were depressurized to allow for the replacement of the circulation pump unit with a spare that was available in the warehouse.

On September 3, 2022 flaring began from the blowdown of PE3 Reactor 1 Dump Tank (V43014) to facilitate repair of a seal on the circulation pump (P-43001) that was determined to be leaking isobutane vapor. Flaring associated with the repair blowdown ended on September 4, 2022 at 6:12PM in order to facilitate the repair and avoid potential safety concerns associated with the leak in the PE3 unit

From the investigation into why the pump was leaking vapor around the pump shaft, it was determined that an O-ring on the face of the seal cartridge between the seal cartridge and the stuffing box was not installed. It was not practical to confirm the presence at the time we received the pump at the site from the manufacturer and installed it in the unit. Once the reactor was depressurized and it was determined to be safe to do the pump replacement, the spare pump was installed with the correct O-ring in place. The new pump was blinded and was tested on both air and then water to confirm tightness. Once confirmed the pump was put into service to continue with start-up preparation activities in PE3.

- **Time when the incident was first observed, and duration of excess emissions**  
Excess emission from the blowdown of the reactors began on September 3, 2022, beginning at 03:43 PM on September 3, 2022 and ended on September 4, 2022 at 6:12 PM. No visible emissions or smoke was observed from the flares during this event.
- **Estimated rate of excess emissions**

Based on the reactor size, pressure and meter readings, the estimated excess emissions for this reactor blowdown event have been calculated using the gas composition and emission factors as:

CO<sub>2</sub>e: 1,528.80 tons  
CO: 3.76 tons  
NO<sub>x</sub>: 0.82 tons  
SO<sub>2</sub>: 0.00 tons  
PM: 0.09 tons  
VOC: 1.16 tons  
HAP: 0.02 tons

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

Sincerely,

*Kimberly Kaal*

Kimberly Kaal  
Environmental Manager, Attorney-in-Fact

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