Shell Chemical Appalachia LLC
300 Frankfort Rd
Monaca, PA 15061

February 18, 2025

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

RE: PA-04-00740C Source ID 102 Combustion Turbine/Duct Burner Unit #2 Excess NOx Emissions Malfunction Report

Dear Mr. Gorog,

Shell Chemical Appalachia LLC ("Shell"), located in Beaver Co. PA is submitting this malfunction report to the Pennsylvania Department of Environmental Protection (PADEP) for excess NOx emissions from Cogen Unit #2[1] on January 21, 2025.

This malfunction did not pose an imminent and substantial danger to public health and safety or the environment.

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

- **Nature and cause of the incident**
  On January 21, 2025, beginning at 5:00 AM., Cogen Unit #2 stack's previous hour NOx concentration exceeded the permit limit of 2 ppmvd (1 hour average at 15% O2). The cause of the exceedance was an SCR blower trip yielding a temporary shutdown of the SCR system (Source ID C102).

- **Time when the malfunction or breakdown was first observed**
  The SCR system malfunction occurred at 4:15 AM on January 21, 2025.

- **The date and time that the malfunction started and ended**
  The SCR system malfunction started on January 21, 2025, at 4:15 AM and ended approximately 5 minutes later at 4:20 AM. In total, this yielded one NOx hourly average exceedance for the 4:00-5:00 AM hour.

- **An estimate of the emissions associated with the malfunction**
  1.53 lb of excess NOx emissions over duration of the event

- **The calculations that were used to determine that quantity**
  The calculations are based on the Cogen Unit #2's stack CEMS analyzer readings over the period of the malfunction window.

  Minute data was extracted from the CEMS program for the following parameters: NOx ppmvd

[1] Identified as Combustion Turbine/Duct Burner (Source ID 102) PA-04-00740C

@15% O2 and NOx lb/hr. A representative baseline NOx lb/hr value was calculated by averaging the steady state, compliant data leading up to the event. This baseline value was then subtracted from the NOx lb/hr data for each minute the NOx concentration exceeded 2 ppmvd @15% O2 during the malfunction. The minute excess lb/hr data was then converted to lb data and summed together to calculate the total excess NOx emissions.

See Attachment A for CEMS output and calculation details.

- **The steps, if any, that the facility took to limit the duration and/or quantity of emissions associated with the malfunction**
  Per design, the standby SCR blower started automatically when the running SCR blower tripped, but the system's response time resulted in a temporary disruption in ammonia flow. Quick operator action was taken to re-establish ammonia flow and restore normal operations.

- **A detailed analysis that sets forth the Root Cause of the malfunction, to the extent determinable**
  On January 21, 2025, at approximately 4:15 AM., Cogen Unit #2's running SCR blower tripped. The standby blower started automatically, but by the time the blower flow picked up, the ammonia skid was already interlocked (low blower flow caused the SCR heater to trip, which then stops ammonia injection flow). This caused the unit's stack NOx levels to increase due to no ammonia being injected. Operations responded quickly to get ammonia flow re-established, but the brief period of no ammonia injection resulted in a previous 1-hr average NOx exceedance for the 4:00-5:00 AM hour.

  It was determined that the SCR blower tripped due to cold dense ambient air adding additional load to the blower motor. Note that site temperatures were at -2 deg. F at the time of the event. Regarding the delay in the establishment of air flow when the standby blower started, this is most likely due to sticking of the blower discharge check valve or equivalent, yielding a temporary hydraulic restriction in the air line.

- **An analysis of the measures, if any, that are available to reduce the likelihood of a recurrence of a malfunction resulting from the same Root Cause or contributing causes in the future**
  The site analyzed potential measures and has implemented the option of a recurring operator round to test-run the standby SCR blowers for all three Cogen Units. The intent of this round is to ensure the blower and air flow respond as expected in the event the standby blower is needed. Any issues noted during the blower test runs will be addressed ASAP.

- **To the extent that investigations of the causes and/or possible corrective action(s) still are underway on the due date of the report, a statement of the anticipated date by which a follow-up report will be submitted**
  N/A

- **Corrective action is final or timeline for implementation**
  Corrective action is complete.

If you have any questions regarding this matter, please don't hesitate to contact Kimberly Kaal at kimberly.kaal@shell.com or me at nathan.levin@shell.com.

Sincerely,

Nathan Levin
Operations Manager

CC:
Scott Beaudway, Air Quality Specialist
Valerie Shaffer, Air Quality District Supervisor

Attachment A

Cogen 2 CEMS Output Data and Excess Emissions Calculations

	Cogen 2 CEMS Data, minute average			Manual Calculations	
Date and Time	Nox, ppmvd @15% O2	Nox, lb/hr	Comment	NOx above baseline, lb/hr (baseline= 4.1 lb/hr)	Excess NOx Emissions, lbs
1/21/2025 3:00	1.75	4.1		-	-
1/21/2025 3:01	1.75	4.1		-	-
1/21/2025 3:02	1.74	4.1		-	-
1/21/2025 3:03	1.74	4.1		-	-
1/21/2025 3:04	1.74	4.1		-	-
1/21/2025 3:05	1.76	4.1		-	-
1/21/2025 3:06	1.75	4.1		-	-
1/21/2025 3:07	1.73	4.1		-	-
1/21/2025 3:08	1.73	4.1		-	-
1/21/2025 3:09	1.74	4.1		-	-
1/21/2025 3:10	1.73	4.1		-	-
1/21/2025 3:11	1.73	4.1		-	-
1/21/2025 3:12	1.75	4.1		-	-
1/21/2025 3:13	1.74	4.1		-	-
1/21/2025 3:14	1.75	4.1		-	-
1/21/2025 3:15	1.75	4.1		-	-
1/21/2025 3:16	1.73	4.1		-	-
1/21/2025 3:17	-	-	invalid (analyzer blowback)	-	-
1/21/2025 3:18	-	-	invalid (analyzer blowback)	-	-
1/21/2025 3:19	1.73	4.1		-	-
1/21/2025 3:20	1.73	4.1		-	-
1/21/2025 3:21	1.74	4.1		-	-
1/21/2025 3:22	1.72	4.1		-	-
1/21/2025 3:23	1.74	4.1		-	-
1/21/2025 3:24	1.73	4.1		-	-
1/21/2025 3:25	1.73	4.1		-	-
1/21/2025 3:26	1.74	4.1		-	-
1/21/2025 3:27	1.75	4.1		-	-
1/21/2025 3:28	1.75	4.1		-	-
1/21/2025 3:29	1.73	4.1		-	-
1/21/2025 3:30	1.74	4.1		-	-
1/21/2025 3:31	1.75	4.1		-	-
1/21/2025 3:32	1.76	4.1		-	-
1/21/2025 3:33	1.74	4.1		-	-
1/21/2025 3:34	1.75	4.1		-	-
1/21/2025 3:35	1.73	4.1		-	-
1/21/2025 3:36	1.75	4.1		-	-
1/21/2025 3:37	1.75	4.1		-	-
1/21/2025 3:38	1.75	4.1		-	-
1/21/2025 3:39	1.74	4.1		-	-
1/21/2025 3:40	1.74	4.1		-	-
1/21/2025 3:41	1.74	4.1		-	-
1/21/2025 3:42	1.75	4.1		-	-
1/21/2025 3:43	1.75	4.1		-	-
1/21/2025 3:44	1.75	4.1		-	-
1/21/2025 3:45	1.74	4.1		-	-
1/21/2025 3:46	1.74	4.1		-	-

1/21/2025 3:47	-	-	invalid (daily calibration)	-	-
1/21/2025 3:48	-	-	invalid (daily calibration)	-	-
1/21/2025 3:49	-	-	invalid (daily calibration)	-	-
1/21/2025 3:50	-	-	invalid (daily calibration)	-	-
1/21/2025 3:51	-	-	invalid (daily calibration)	-	-
1/21/2025 3:52	-	-	invalid (daily calibration)	-	-
1/21/2025 3:53	-	-	invalid (daily calibration)	-	-
1/21/2025 3:54	-	-	invalid (daily calibration)	-	-
1/21/2025 3:55	-	-	invalid (daily calibration)	-	-
1/21/2025 3:56	-	-	invalid (daily calibration)	-	-
1/21/2025 3:57	-	-	invalid (daily calibration)	-	-
1/21/2025 3:58	-	-	invalid (daily calibration)	-	-
1/21/2025 3:59	-	-	invalid (daily calibration)	-	-
1/21/2025 4:00	-	-	invalid (daily calibration)	-	-
1/21/2025 4:01	-	-	invalid (daily calibration)	-	-
1/21/2025 4:02	-	-	invalid (daily calibration)	-	-
1/21/2025 4:03	-	-	invalid (daily calibration)	-	-
1/21/2025 4:04	-	-	invalid (daily calibration)	-	-
1/21/2025 4:05	-	-	invalid (daily calibration)	-	-
1/21/2025 4:06	1.78	4.8		-	-
1/21/2025 4:07	1.77	4.8		-	-
1/21/2025 4:08	1.75	4.1		-	-
1/21/2025 4:09	1.74	4.1		-	-
1/21/2025 4:10	1.75	4.1		-	-
1/21/2025 4:11	1.72	4.1		-	-
1/21/2025 4:12	1.71	4.1		-	-
1/21/2025 4:13	2.46	6.2		2.1	0.03
1/21/2025 4:14	6.54	16.4		12.3	0.20
1/21/2025 4:15	8.11	20.5		16.4	0.27
1/21/2025 4:16	7.18	17.8		13.7	0.23
1/21/2025 4:17	6.17	15.8		11.7	0.19
1/21/2025 4:18	8.21	20.5		16.4	0.27
1/21/2025 4:19	4.56	11.7		7.6	0.13
1/21/2025 4:20	5.11	13		8.9	0.15
1/21/2025 4:21	2.28	5.5		1.4	0.02
1/21/2025 4:22	1.97	4.8		0.7	0.01
1/21/2025 4:23	2	4.8		0.7	0.01
1/21/2025 4:24	1.97	4.8		-	-
1/21/2025 4:25	1.92	4.8		-	-
1/21/2025 4:26	1.89	4.8		-	-
1/21/2025 4:27	1.87	4.8		-	-
1/21/2025 4:28	1.84	4.8		-	-
1/21/2025 4:29	1.83	4.8		-	-
1/21/2025 4:30	1.83	4.8		-	-
1/21/2025 4:31	1.79	4.8		-	-
1/21/2025 4:32	1.8	4.8		-	-
1/21/2025 4:33	1.78	4.8		-	-
1/21/2025 4:34	1.75	4.1		-	-
1/21/2025 4:35	1.75	4.1		-	-
1/21/2025 4:36	1.74	4.1		-	-
1/21/2025 4:37	1.72	4.1		-	-

1/21/2025 4:38	1.72	4.1		-	-
1/21/2025 4:39	1.69	4.1		-	-
1/21/2025 4:40	1.69	4.1		-	-
1/21/2025 4:41	1.69	4.1		-	-
1/21/2025 4:42	1.68	4.1		-	-
1/21/2025 4:43	1.68	4.1		-	-
1/21/2025 4:44	1.66	4.1		-	-
1/21/2025 4:45	1.65	4.1		-	-
1/21/2025 4:46	1.64	4.1		-	-
1/21/2025 4:47	1.62	4.1		-	-
1/21/2025 4:48	1.61	4.1		-	-
1/21/2025 4:49	1.61	4.1		-	-
1/21/2025 4:50	1.58	4.1		-	-
1/21/2025 4:51	1.58	4.1		-	-
1/21/2025 4:52	1.58	4.1		-	-
1/21/2025 4:53	1.58	4.1		-	-
1/21/2025 4:54	1.54	4.1		-	-
1/21/2025 4:55	1.55	4.1		-	-
1/21/2025 4:56	1.56	4.1		-	-
1/21/2025 4:57	1.54	4.1		-	-
1/21/2025 4:58	1.55	4.1		-	-
1/21/2025 4:59	1.54	4.1		-	-
1/21/2025 5:00	1.54	4.1		-	-