Shell Chemical Appalachia LLC
300 Frankfort Rd
Monaca, PA 15061

September 10, 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 IDs 102 Combustion Turbine/Duct Burner Unit #2 Excess NOx Emissions Malfunction Report

Dear Mr. Gorog,

Shell Chemical Appalachia LLC ("Shell"), located in Beaver County PA, is submitting this malfunction report to the Pennsylvania Department of Environmental Protection (PADEP) for excess NOx emissions from Cogen Unit #2[1] on August 13, 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 August 13, 2025, Cogen Unit #2's SCR system (Source ID C102) tripped, which yielded two 1-hour average NOx concentration exceedances above the permit limit of 2 ppmvd (at 15% O2).

- **Time when the malfunction or breakdown was first observed**
  SCR system trip: 8/13/25 22:07

- **The date and time that the malfunction started and ended**
  SCR system trip: 8/13/25 22:07
  Normal SCR operations restored: 8/13/25 23:09

  In total, this yielded two 1-hour average NOx concentration exceedances for the 22:00 and 23:00 hours (21:00 and 22:00 hours in CEMS program, which is not adjusted for Daylight Savings time).

- **An estimate of the emissions associated with the malfunction**
  2.83 lbs of excess NOx emissions

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

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

Minute data was extracted from the CEMS analyzer for the following parameters: NOx ppmvd @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**
  Operator action was taken to restore normal SCR system operations as quickly as possible.

- **A detailed analysis that sets forth the root cause of the malfunction, to the extent determinable**
  Water Intrusion into Electrical Panel
  On August 13, 2025, at approximately 22:07, Cogen #2's SCR heater tripped on high temperature. The system responded per design and stopped ammonia injection to the SCR catalyst, which caused the unit's stack NOx levels to increase.

  Within an hour, instrumentation/electrical technicians started investigating the cause of the trip event. Water was discovered at the bottom of the SCR heater's electrical control panel and was concluded to have entered the panel during that night's heavy rain event. The water caused the fuse of the temperature element that tripped the heater to fail, which sent a trip signal to the heater.

  Based on a physical assessment of the panel, it was concluded that water could have entered the panel through of any of the following mechanisms:
  1.) Panel door latches were not properly fastened
  2.) Panel was missing one of two lifting eye bolts, and the corresponding hole was covered with a patch of duct seal
  3.) Pilot light cover on panel door was damaged

  That night, the panel was dried out, the pilot light cover was replaced, and the panel door was properly fastened upon conclusion of the work. In addition, the potential sources of water intrusion into Unit 2's electrical panel identified above were confirmed to not be an issue for Unit 1 and 3's panels.

  Delay in Standby Heater Restart
  Within minutes of the initiating trip, the field operator responded to start up the standby SCR heater. A communication breakdown occurred between the control room and the field operator, and this resulted in a delay in successful standby heater restart and a delay in restoring normal operations. At 23:09, normal SCR system operations were restored.

- **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**
  Water Intrusion into Electrical Panel
  1.) Panel door latches were not properly fastened
      a. Door was correctly fastened following dry out of the panel on the night of the event.
      b. The details of this event as well as key learnings will be shared with the instrumentation/electrical technicians as a training opportunity. The learnings will reemphasize how to properly latch electrical panel doors per manufacturer's recommendations.
  2.) Panel was missing one of two lifting eye bolts, and the corresponding hole was covered with a

patch of duct seal
   a. Duct seal has been removed and replaced with a new lifting eye bolt.
3.) Pilot light cover on panel door was damaged
   a. Pilot light cover was repaired on the night of the event

Delay in Standby Heater Restart
Detailed discussions were held with personnel involved on the importance of clear communication during transient unit operations.

- **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**
  This is the final report for this malfunction.

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

Event	Root Cause	Corrective Actions	Timing
SCR heater trip	Water intrusion into electrical panel	Dry panel, properly fasten door, replace missing lifting eye bolt, replace pilot light cover	Complete
		Share learnings/training	10/10/2025
Delay in standby heater restart	Communication breakdown between control room and field operator	Detailed discussions with personnel involved	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

Attachment A

Cogen 2 CEMS Output Data and Excess Emissions Calculations

		Cogen 2 CEMS Data, minute average		Manual Calculations	
Trace Date and Time	Daylight Savings Corrected/Actual Date and Time	NOx @15% O2, ppmvd	NOx, lb/hr	NOx above baseline, lb/hr (baseline=3.2 lb/hr)	Excess NOx Emissions, lbs
8/13/2025 20:30	8/13/2025 21:30	1.69	3.2	-	-
8/13/2025 20:31	8/13/2025 21:31	1.67	3.2	-	-
8/13/2025 20:32	8/13/2025 21:32	1.7	3.2	-	-
8/13/2025 20:33	8/13/2025 21:33	1.7	3.2	-	-
8/13/2025 20:34	8/13/2025 21:34	1.69	3.2	-	-
8/13/2025 20:35	8/13/2025 21:35	1.72	3.2	-	-
8/13/2025 20:36	8/13/2025 21:36	1.7	3.2	-	-
8/13/2025 20:37	8/13/2025 21:37	1.71	3.2	-	-
8/13/2025 20:38	8/13/2025 21:38	1.71	3.2	-	-
8/13/2025 20:39	8/13/2025 21:39	1.72	3.2	-	-
8/13/2025 20:40	8/13/2025 21:40	1.74	3.2	-	-
8/13/2025 20:41	8/13/2025 21:41	1.72	3.2	-	-
8/13/2025 20:42	8/13/2025 21:42	1.74	3.2	-	-
8/13/2025 20:43	8/13/2025 21:43	1.73	3.2	-	-
8/13/2025 20:44	8/13/2025 21:44	1.72	3.2	-	-
8/13/2025 20:45	8/13/2025 21:45	1.71	3.2	-	-
8/13/2025 20:46	8/13/2025 21:46	1.72	3.2	-	-
8/13/2025 20:47	8/13/2025 21:47	1.72	3.2	-	-
8/13/2025 20:48	8/13/2025 21:48	1.72	3.2	-	-
8/13/2025 20:49	8/13/2025 21:49	1.72	3.2	-	-
8/13/2025 20:50	8/13/2025 21:50	1.71	3.2	-	-
8/13/2025 20:51	8/13/2025 21:51	1.71	3.2	-	-
8/13/2025 20:52	8/13/2025 21:52	1.7	3.2	-	-
8/13/2025 20:53	8/13/2025 21:53	1.69	3.2	-	-
8/13/2025 20:54	8/13/2025 21:54	1.7	3.2	-	-
8/13/2025 20:55	8/13/2025 21:55	1.68	3.2	-	-
8/13/2025 20:56	8/13/2025 21:56	1.67	3.2	-	-
8/13/2025 20:57	8/13/2025 21:57	1.68	3.2	-	-
8/13/2025 20:58	8/13/2025 21:58	1.68	3.2	-	-
8/13/2025 20:59	8/13/2025 21:59	1.68	3.2	-	-
8/13/2025 21:00	8/13/2025 22:00	1.67	3.2	-	-
8/13/2025 21:01	8/13/2025 22:01	1.68	3.2	-	-
8/13/2025 21:02	8/13/2025 22:02	1.68	3.2	-	-
8/13/2025 21:03	8/13/2025 22:03	1.67	3.2	-	-
8/13/2025 21:04	8/13/2025 22:04	1.67	3.2	-	-
8/13/2025 21:05	8/13/2025 22:05	1.67	3.2	-	-
8/13/2025 21:06	8/13/2025 22:06	1.68	3.2	-	-
8/13/2025 21:07	8/13/2025 22:07	1.91	3.7	-	-
8/13/2025 21:08	8/13/2025 22:08	4.51	9	5.80	0.10
8/13/2025 21:09	8/13/2025 22:09	6.08	11.6	8.40	0.14
8/13/2025 21:10	8/13/2025 22:10	1.55	3.2	-	-
8/13/2025 21:11	8/13/2025 22:11	0.89	1.6	-	-
8/13/2025 21:12	8/13/2025 22:12	1.67	3.2	-	-
8/13/2025 21:13	8/13/2025 22:13	1.82	3.7	-	-
8/13/2025 21:14	8/13/2025 22:14	1.79	3.7	-	-
8/13/2025 21:15	8/13/2025 22:15	1.83	3.7	-	-
8/13/2025 21:16	8/13/2025 22:16	1.85	3.7	-	-
8/13/2025 21:17	8/13/2025 22:17	1.86	3.7	-	-
8/13/2025 21:18	8/13/2025 22:18	1.84	3.7	-	-
8/13/2025 21:19	8/13/2025 22:19	1.85	3.7	-	-
8/13/2025 21:20	8/13/2025 22:20	1.84	3.7	-	-
8/13/2025 21:21	8/13/2025 22:21	1.83	3.7	-	-
8/13/2025 21:22	8/13/2025 22:22	1.82	3.7	-	-
8/13/2025 21:23	8/13/2025 22:23	1.82	3.7	-	-
8/13/2025 21:24	8/13/2025 22:24	1.83	3.7	-	-
8/13/2025 21:25	8/13/2025 22:25	1.79	3.7	-	-
8/13/2025 21:26	8/13/2025 22:26	1.77	3.7	-	-
8/13/2025 21:27	8/13/2025 22:27	1.76	3.2	-	-
8/13/2025 21:28	8/13/2025 22:28	1.78	3.7	-	-
8/13/2025 21:29	8/13/2025 22:29	1.76	3.7	-	-

8/13/2025 21:30	8/13/2025 22:30	1.76	3.7	-	-
8/13/2025 21:31	8/13/2025 22:31	1.76	3.2	-	-
8/13/2025 21:32	8/13/2025 22:32	1.78	3.7	-	-
8/13/2025 21:33	8/13/2025 22:33	1.77	3.7	-	-
8/13/2025 21:34	8/13/2025 22:34	1.79	3.7	-	-
8/13/2025 21:35	8/13/2025 22:35	1.78	3.7	-	-
8/13/2025 21:36	8/13/2025 22:36	1.76	3.2	-	-
8/13/2025 21:37	8/13/2025 22:37	1.76	3.7	-	-
8/13/2025 21:38	8/13/2025 22:38	1.79	3.7	-	-
8/13/2025 21:39	8/13/2025 22:39	1.79	3.7	-	-
8/13/2025 21:40	8/13/2025 22:40	1.83	3.7	-	-
8/13/2025 21:41	8/13/2025 22:41	2.19	4.2	1.00	0.02
8/13/2025 21:42	8/13/2025 22:42	2.77	5.3	2.10	0.04
8/13/2025 21:43	8/13/2025 22:43	2.77	5.3	2.10	0.04
8/13/2025 21:44	8/13/2025 22:44	2.36	4.8	1.60	0.03
8/13/2025 21:45	8/13/2025 22:45	2.69	5.3	2.10	0.04
8/13/2025 21:46	8/13/2025 22:46	3.16	6.4	3.20	0.05
8/13/2025 21:47	8/13/2025 22:47	3.28	6.4	3.20	0.05
8/13/2025 21:48	8/13/2025 22:48	3.35	6.4	3.20	0.05
8/13/2025 21:49	8/13/2025 22:49	3.39	6.4	3.20	0.05
8/13/2025 21:50	8/13/2025 22:50	4.86	9.6	6.40	0.11
8/13/2025 21:51	8/13/2025 22:51	6.67	13.3	10.10	0.17
8/13/2025 21:52	8/13/2025 22:52	6.98	13.8	10.60	0.18
8/13/2025 21:53	8/13/2025 22:53	7.06	13.8	10.60	0.18
8/13/2025 21:54	8/13/2025 22:54	7.12	13.8	10.60	0.18
8/13/2025 21:55	8/13/2025 22:55	5.62	11.2	8.00	0.13
8/13/2025 21:56	8/13/2025 22:56	6	11.7	8.50	0.14
8/13/2025 21:57	8/13/2025 22:57	6.33	12.2	9.00	0.15
8/13/2025 21:58	8/13/2025 22:58	6.35	12.2	9.00	0.15
8/13/2025 21:59	8/13/2025 22:59	6.76	13.3	10.10	0.17
8/13/2025 22:00	8/13/2025 23:00	7.23	14.3	11.10	0.19
8/13/2025 22:01	8/13/2025 23:01	6.9	13.3	10.10	0.17
8/13/2025 22:02	8/13/2025 23:02	5.6	11.1	7.90	0.13
8/13/2025 22:03	8/13/2025 23:03	4.04	8	4.80	0.08
8/13/2025 22:04	8/13/2025 23:04	3.04	5.8	2.60	0.04
8/13/2025 22:05	8/13/2025 23:05	2.42	4.8	1.60	0.03
8/13/2025 22:06	8/13/2025 23:06	2.27	4.3	1.10	0.02
8/13/2025 22:07	8/13/2025 23:07	2.09	4.2	1.00	0.02
8/13/2025 22:08	8/13/2025 23:08	2.02	3.7	0.50	0.01
8/13/2025 22:09	8/13/2025 23:09	2	3.7	-	-
8/13/2025 22:10	8/13/2025 23:10	1.97	3.7	-	-
8/13/2025 22:11	8/13/2025 23:11	1.97	3.7	-	-
8/13/2025 22:12	8/13/2025 23:12	1.97	3.7	-	-
8/13/2025 22:13	8/13/2025 23:13	1.94	3.7	-	-
8/13/2025 22:14	8/13/2025 23:14	1.93	3.7	-	-
8/13/2025 22:15	8/13/2025 23:15	1.91	3.7	-	-
8/13/2025 22:16	8/13/2025 23:16	1.89	3.7	-	-
8/13/2025 22:17	8/13/2025 23:17	1.86	3.7	-	-
8/13/2025 22:18	8/13/2025 23:18	1.84	3.7	-	-
8/13/2025 22:19	8/13/2025 23:19	1.82	3.7	-	-
8/13/2025 22:20	8/13/2025 23:20	1.81	3.7	-	-
8/13/2025 22:21	8/13/2025 23:21	1.8	3.7	-	-
8/13/2025 22:22	8/13/2025 23:22	1.79	3.7	-	-
8/13/2025 22:23	8/13/2025 23:23	1.77	3.7	-	-
8/13/2025 22:24	8/13/2025 23:24	1.77	3.7	-	-
8/13/2025 22:25	8/13/2025 23:25	1.76	3.2	-	-
8/13/2025 22:26	8/13/2025 23:26	1.74	3.2	-	-
8/13/2025 22:27	8/13/2025 23:27	1.74	3.2	-	-
8/13/2025 22:28	8/13/2025 23:28	1.73	3.2	-	-
8/13/2025 22:29	8/13/2025 23:29	1.74	3.2	-	-
8/13/2025 22:30	8/13/2025 23:30	1.74	3.2	-	-
				SUM (lbs)	**2.83**