Shell Chemical Appalachia LLC
300 Frankfort Rd
Monaca, PA 15061

September 25, 2023

Elizabeth Speicher, Environmental Group Manager
Pennsylvania Department of Environmental Protection
Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222

RE: Shell Chemical Appalachia LLC
Shell Polymers Monaca Site
Potter and Center Townships, Beaver County, PA
Plan Approval No. 04-00740C
Response to Notice of Violation and Request for Benzene Waste NESHAP Control Plan

Dear Ms. Speicher:

Shell Chemical Appalachia LLC ("Shell") located in Beaver County, is providing the *Benzene Waste NESHAP Control Plan* for the Shell Polymers Monaca (SPM) facility as required by the Notice of Violation (NOV) issued by the Pennsylvania Department of Environmental Protection (PADEP) on September 11, 2023. The NOV relates to a potential violation of the plan approval, PA-04-00740C, issued February 18, 2021, Section C, Condition #008, which states the following:

> "Total benzene quantity from facility waste shall not equal or exceed 11 tons per year as determined through 40 CFR §61.355. [This limit is for the purpose of compliance with limited requirements of 40 CFR Part 61 Subpart FF for a facility with benzene waste less than 10 Mg (11 tons) per year]."

The *Benzene Waste NESHAP Control Plan* details the applicability of the various rules and a summary of the requirements of the rules.

Please contact me at 724-709-2467 or Kimberly.kaal@shell.com if you have any questions or need additional information.

Sincerely,

Kimberly Kaal

Digitally signed by Kimberly Kaal
DN: cn=Kimberly Kaal
Date: 2023.09.25 15:57:26 -04'00'

Kimberly Kaal
Environmental Manager
Attorney-in-Fact

CC: Mark Gorog, Air Quality Program Manager

Benzene Waste NESHAP Control Plan
PA-04-00740C
Shell Polymers Monaca
September 25, 2023

Introduction

Shell Chemical Appalachia LLC is providing the *Benzene Waste National Emission Standards for Hazardous Air Pollutants (NESHAP) Control Plan* for the Shell Polymers Monaca (SPM) facility as required by the Notice of Violation (NOV) issued by the Pennsylvania Department of Environmental Protection (PADEP) on September 11, 2023. The NOV relates to a potential violation of the Plan Approval, PA-04-00740C, issued by PADEP on February 18, 2021, Section C, Condition #008, which states the following:

> "*Total benzene quantity from facility waste shall not equal or exceed 11 tons per year as determined through 40 CFR §61.355. [This limit is for the purpose of compliance with limited requirements of 40 CFR Part 61 Subpart FF for a facility with benzene waste less than 10 Mg (11 tons) per year].*"

The remainder of this plan details rule applicability, total annual benzene quantity (TABQ) and rule requirements, TABQ for SPM, control plan, reporting schedule, and future improvement opportunities.

Rule Applicability

SPM is subject to requirements of 40 CFR Part 61, Subpart FF, *National Emission Standard for Benzene Waste Operations,* commonly referred to as the Benzene Waste Operations NESHAP (BWON) Rule. SPM is also subject to the requirement of 40 CFR Part 63, Subpart YY, *National Emission Standards for Hazardous Air Pollutants for Source Categories: Generic Maximum Achievable Control Technology Standards* (Subpart YY), which requires that processes that generate waste containing benzene follow the waste requirements of 40 CFR Part 63, Subpart XX, *National Emission Standards for Ethylene Manufacturing Process Units: Heat Exchange Systems and Waste Operations* (Subpart XX). Subparts YY and XX are commonly referred to as the ethylene MACT (EMACT) Rule. Subpart XX requires compliance with various portions of the BWON Rule, depending on the facility's TABQ.

TABQ and Rule Requirements

The TABQ is the summation of annual aqueous benzene quantities in wastes which determines whether a facility is required to install control devices and treat wastes. The TABQ is a **pre-control** waste generation quantity calculated at the point of generation (POG), in closed equipment within the process unit, before any waste treatment occurs to remove the benzene. The TABQ does not equal the quantity released to the environment.

The calculation of TABQ calculation consists of 4 steps:

1. Identification of each applicable waste stream and determination of the POG.
2. Determination of annual waste quantity for each waste stream.
3. Determination of the flow-weighted annual average benzene concentration for each waste stream.
4. Calculation of the TABQ, which is the summation of the annual waste quantity multiplied by the flow-weighted annual average benzene concentration of each stream, as shown in the equation below:

$$TABQ = \sum_{i=1}^{n} QiCi$$

where Qi = annual waste quantity of stream i
Ci = annual average benzene concentration of stream i
n = number of affected waste streams with >10% water content, by volume.

The BWON Rule states that owners and operators must meet the following requirements:

TABQ	BWON Requirement
TABQ < 1 Mg/yr	Submit initial TABQ report and recalculate the TABQ as needed. No controls/treatment required.
1 Mg ≤ TABQ < 10 Mg/yr	Submit initial TABQ report and submit annual report with updated TABQ. No controls/treatment required.
TABQ ≥ 10 Mg/yr	• Control/treat applicable waste streams depending on chosen compliance option offered in rule. • Monitor operations, conduct performance testing/compliance demonstrations, maintain required records. • Submit initial, quarterly and annual reports.

Mg = Megagram

However, SPM complies with the EMACT Rule for benzene waste, in which the EMACT Rule is more stringent than the BWON Rule because it eliminates the provision to exempt sources from control requirements if the TABQ is < 10 Mg/yr. Essentially, the same/similar controls are required under EMACT regardless of the TABQ quantity. Under the EMACT Rule, owners and operators must meet the following requirements:

TABQ	EMACT Requirement
TABQ < 10 Mg/yr	• Control/treat waste streams (caustic waste streams and dilution steam blowdown wastes) in accordance with referenced sections of the BWON Rule. • Monitor operations, conduct performance testing/compliance demonstrations, maintain required records in accordance with BWON Rule. • Submit initial, quarterly and annual reports in accordance with EMACT/BWON Rules.
TABQ ≥ 10 Mg/yr	Submit initial TABQ report and submit annual report with updated TABQ. No controls/treatment required.

SPM's History of TABQ Reports

In the plan approval applications submitted to PADEP for the construction of the facility, SPM had estimated the TABQ as being <10 Mg/yr. This original interpretation was based on the location of POG for the Spent Caustic Stripper (C-13501) downstream of or at the outlet of the stripper. Regardless of where the POG is designated (before or after the Spent Caustic Stripper), it removes a significant portion of the benzene where most of it is stripped.

On December 23, 2022, SPM submitted an initial TABQ report in accordance with §61.357(a) of the BWON Rule with an estimated TABQ at <1 Mg/yr. The TABQ submitted in this report only included turnaround waste and it should have included process waste streams.

Then, on April 18, 2023, SPM submitted a revised TABQ report to PADEP to include all waste streams. Additionally, SPM changed the POG for Spent Caustic Stripper to the inlet of the stripper based on a thorough review of the rule. SPM concluded that the Spent Caustic Stripper did not meet the regulatory definition of a "sour water stripper" in the BWON Rule because the stripper does not remove sulfur or ammonia compounds. This change of the POG location increased the TABQ to > 10 Mg/yr and triggered the §61.357(b) obligation to report a change in TABQ value within 30 days when a revised TABQ increases above 10 Mg/yr. SPM satisfied this requirement with its submission of the report on April 18, 2023, stating the change in TABQ, along with a statement certifying installation of controls and performance of inspections.

Note that no physical or design changes occurred at the facility, only a change to the regulatory interpretation of the POG based upon the regulatory definition of a sour water stripper compared with SPM's actual Spent Caustic Stripper. Note, both types of strippers serve to significantly reduce the quantity of benzene in wastewater. The TABQ range (i.e. > or < 10 Mg/yr) is essentially irrelevant because before and after the change in the interpretation of POG for the stripper, SPM has been and continues to control/treat benzene waste streams in accordance with the BWON requirements for a facility with a TABQ greater than 10 Mg/yr, and would have to meet the same or similar requirements if the TABQ was < 10 Mg/yr under EMACT.

Control Plan

SPM is complying with the compliance option detailed in §61.342(e) of the BWON Rule known as the "6BQ" compliance option. In this compliance option, a facility employs controls such that the "post-control" benzene quantity calculated via §61.355(k) is less than 6.0 Mg/yr. This calculated quantity is also not synonymous with quantity released, but, rather, is the total amount of benzene in waste streams that is leaving vessels that are controlled for air emissions and treated for benzene in accordance with the BWON Rule.

Reporting Schedule

The initial 6BQ calculation was submitted on May 18, 2023 in the SPM's EMACT Notification of Compliance Status (NOCS) report, as required by Subpart XX, and will be submitted annually, by April 18, for the previous calendar year as part of the ongoing annual BWON reporting.

SPM monitors the tanks, closed-vent system, control devices, etc. in accordance with the BWON Rule and submits quarterly monitoring reports. These reports are required for TABQ greater than 10 Mg/yr, therefore, the first report was sent on July 27, 2023 for period of April 18, 2023 through June 30, 2023 and will be submitted quarterly thereafter.

Future Improvement Opportunity

SPM has installed a temporary induced nitrogen floatation unit (INF) and is designing a permanent INF for additional treatment and control of benzene-containing wastes. The temporary unit has been in place since May 2, 2023 and once the permanent control/treatment system is installed, further reductions in the 6BQ are expected.

SPM is also planning to sample various waste streams to continue to strengthen the TABQ and accurately quantify the 6BQ.

Conclusion

The change in interpretation of the location of the POG relative to the Spent Caustic Stripper as detailed in the April 18, 2023 report resulted in the increase of SPM's pre-control TABQ to greater than 10 Mg/yr, violating PA-04-00740C, Section C, Condition #008. However, since SPM was already controlling and treating benzene waste as if the TABQ was greater than 10 Mg/yr, as required by EMACT, no further controls were needed for SPM to demonstrate compliance via the 6BQ option within the BWON Rule. Additionally, since there was only an interpretation change and not a physical change that occurred, there was no environmental harm or excess additional releases of benzene related to this change. Moving forward, SPM will continue to comply with the BWON/EMACT standards for a facility with a TABQ greater than 10 Mg/yr, continue to demonstrate compliance with the rules via the 6BQ compliance option, and report the required information in the quarterly monitoring reports and annual compliance reports.