Shell Polymers Monaca

Totally Enclosed Ground Flares (TEGFs) Monthly Inspection Report

Prepared by: Site Heat Transfer Specialist

Reviewed by: Shell P&T Senior Heat Transfer Engineer

Report Date: September 7, 2023

For Time Period: August 8, 2023 to September 6, 2023

EXECUTIVE SUMMARY

This monthly Inspection report was prepared with the goal to demonstrate that both TEGFs are in good operating conditions based on examination performed by qualified site personnel. Operator rounds were performed nightly from August 8, 2023 to September 6, 2023 by operations personnel, there were no escalations to the Heat transfer Specialist as a result from operator rounds.

On September 6th, 2023 the Heat Transfer Specialist for the site performed a visual and drone footage inspection of the flare. At the time of the inspection some external residue formation in form of soot was observed in some of the tips in stage 2 and 5 of TEGF A and stage 2 of TEGF B. The observed external residue has no impact to the destruction efficiency of the TEGFs and aligns with Zeeco's letter in Attachment A. The current condition of the flare complies with the manufacturer's performance guarantee as described in Exhibit D of the Consent Order and Agreement entered on 24th day of May of 2023. Both TEGF's achieve the destruction efficiency to meet Plan Approval Section D, Source 205, Condition 002. See Summary Tables for details.

1. SUMMARY TABLES

TEGF A (A-59011A) – September 6 Inspection Points

Inspection Point	Acceptable per Performance Guarantee? (Yes/No)	Actions Required (Yes/No)	Comments/Action Taken
Burner Tip Residual Formation	Yes	No	Visible external Soot formation was observed in stages 2 and 5. Based on previous observation in the month of August, the Shell team addressed the observations with Zeeco where it was concluded that the soot formation does not impact the destruction efficiency guarantee. The soot formation observed for this September Inspection is no different than what was observed in the previous month.
Burner Tip Mechanical Condition	Yes	No	N/A
Burners within a Stage Ignited	Yes	No	N/A
Pilots Condition	Yes	No	N/A
Combustion Chamber External Condition	Yes	No	N/A
Combustion Chamber Internal Lining Condition	Yes	No	N/A

TEGF B (A-59011B) - September 6 Inspection Points

Inspection Point	Acceptable per Performance Guarantee? (Yes/No)	Actions Required (Yes/No)	Comments/Action Taken
Burner Tip Residual Formation	Yes	No	Visible external Soot formation was observed in stage 2. Based on previous observation in the month of August, the Shell team addressed the observations with Zeeco where it was concluded that the soot formation does not impact the destruction efficiency guarantee. The soot formation observed for this September Inspection is no different than what was observed in the previous month.
Burner Tip Mechanical Condition	Yes	No	N/A
Burners within a Stage Ignited	Yes	No	N/A
Pilots Condition	Yes	No	N/A
Combustion Chamber External Condition	Yes	No	N/A
Combustion Chamber Internal Lining Condition	Yes	No	N/A

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August 11, 2023

Shell Pennsylvania Petrochemical Complex
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Subject: Shell Monaca, PA Facility, Enclosed Ground Flares, Zeeco # 29205

Attention: Shell Heat Transfer Engineer

This letter is in specific reference to the two (2) enclosed ground flares that are currently installed at the Shell Monaca, PA facility, and also in reference to the letter issued by Zeeco to Southwest Regional Office of PADEP in May of this year.

As noted in our prior letter referenced above, based on specific Shell project testing in our Zeeco HQ test facility, and based on prior testing and extensive experience with the burner type that is applied in the Shell Monaca, PA enclosed ground flares, Zeeco are very confident the system installed at Shell can achieve the required smokeless and DRE performance.

Relative to our discussion of this week, we understand the burners are experiencing some minor SOOT formation. Based on photos, this SOOT formation seems to be on the "top" of the burners, beyond the flare gas exit points. This SOOT formation is fully expected, depending on the gases that are being flared. The formation of SOOT is not a failure of the burners to perform per specification and expected requirements. We also understand this is SOOT, and not coke, as coke would typically be forming on the INSIDE of the burner arms, and coke could result in the possible plugging of ports in the burner arms, or damage to the burners. SOOT is soft, and is largely removed from the burner tips during high flare gas velocity conditions. Partial plugging of burner ports was simulated during testing in our Zeeco HQ test facility, with no impact on the burner performance.

We hope the above information is helpful in demonstrating our view that the enclosed ground flares are in good working order at this time. Please let us know if you have any questions.

Sincerely,

Scot K. Smith
Director, Flare Division