



June 20, 2011

Russ Nettles  
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Submitted electronically to [siprules@tceq.texas.gov](mailto:siprules@tceq.texas.gov)

Re: Valero comments on the 2010 TCEQ Flare Study Project Draft Final Report  
(TCEQ PGA No. 582-8-862-45-FY09-04, Tracking No. 2008-81)

Dear Mr. Nettles:

Valero appreciates the opportunity to comment on the 2010 TCEQ Flare Study Project Draft Final Report. While we understand that the study could not be comprehensive due to budget and schedule constraints on the test matrix, we commend the TCEQ for initiating and executing this technically rigorous study. The study provides valuable new information, corroborates previous research, and develops the knowledge base for further research to address subsequent questions pertaining to combustion parameters and operating scenarios that affect a flare's destruction and removal efficiency (DRE). While Valero generally agrees with the comments submitted by the Texas Oil and Gas Association on this study, Valero offers the following additional technical and policy comments.

- 1) Valero's track record of being an industry leader in the area of environmental protection is reflected in our commitment to install flare gas recovery (FGR) systems on nearly all of the flares operated at our seven refineries in Texas. Over the last five years, we have spent approximately \$350 MM in installing these systems at our Texas refineries in order to minimize, if not eliminate, routine gas flow to our flares. The gases that are captured by the FGR systems are compressed, treated to remove hydrogen sulfide, and recycled back into our processes to be used as clean-burning fuels. Because these systems capture routine, low-flow gases (as well as, in some cases, medium and high-flow gases), Valero believes that many of the observations noted in the TCEQ Flare Study would not be applicable to flares equipped with FGR systems. For this reason, Valero is suggesting that, to the extent new rulemaking is initiated as a follow-up to this study, the TCEQ keep in mind that flares equipped with FGR systems should be exempt from any potential requirements to monitor and/or operate within any numerically specific steam-to-hydrocarbon-vent-gas ratio values.
- 2) A review of the PowerPoint presentation that TCEQ issued on May 18, 2011, summarizing the findings of the study indicates that a high-Btu (2,149 Btu/scf) vent gas condition was evaluated and that the results indicated that steam-to-vent-gas ratios beyond 4.0 correlated with good DRE (98%). Valero was unable to locate any discussion of this test scenario in the final draft study report. If this test condition was indeed evaluated, Valero believes it should be included in the flare study report.
- 3) The final report should include a discussion of the limitations of the study, including the limited ranges of vent gas composition, flare operating parameters, and meteorological conditions. The wide range of these conditions in the field precludes the application of the study's results to all flares.

- 4) The report should provide recommendations for additional studies of more diverse operating scenarios. The study results show that the tested air- and steam-assisted flares operating under 40 CFR §60.18 conditions can effectively control low Btu vent gas at low flow rates under certain operating conditions. The results also show instances in which flares that operated under low flow conditions and met 40 CFR §60.18 conditions did not achieve 98% DRE. This finding requires more study in identifying the critical operating parameters for optimal DRE and combustion efficiency.
- 5) In its finding that center steam addition may reduce DRE (#3 on page 29 of report), TCEQ should clarify the differences in how center steam and upper steam affect DRE and steam-to-vent-gas ratio. It would be beneficial to remind the report's audience that purposes of center steam addition are to mitigate internal burning, thereby protecting the flare tip's mechanical integrity, to ensure smokeless operation, and to prevent steam condensation in the steam header.
- 6) TCEQ should expand its discussion and presentation of test results regarding DRE and Combustion Zone Net Heating Value (CZNHV). The report includes DRE vs. CZNHV charts that imply that ~200 Btu/scf CZNHV is necessary for 98% DRE. This may be true for the conditions and gases tested, but other gases (e.g., hydrogen) and gas mixtures may have different flammability characteristics that would modify this conclusion. TCEQ should include flammability curves for other gases or qualify the existing charts with a statement that a different minimum Btu/scf CZNHV may be necessary for gases other than those tested.
- 7) The TCEQ should highlight that the study reveals good agreement with the 1983 EPA flare study under similar test conditions. Such a statement would be important in confirming that current flare operating practices are founded on sound scientific principles developed years ago.
- 8) The TCEQ should provide the data from particulate matter sampling conducted at the incipient smoke point during testing. This would aid the evaluation of the benefits of such operating conditions.

If you have any questions regarding these comments, please do not hesitate to call Robert Ehlers (210-345-2227) or me (210-345-5874). At Valero's upcoming meeting with the TCEQ on June 30, 2011, we will be happy to provide additional information on these comments and to address any questions or concerns you may have.

Sincerely,



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