TEXAS CHEMICAL COUNCIL

TEXAS OIL & GAS ASSOCIATION

October 12, 2009

Ms. Lindley Anderson
MC 206
Air Quality Division
Chief Engineer's Office
Texas Commission on Environmental Quality
PO Box 13087
Austin, Texas 78711-3087

RE: **TCEQ's Flare Taskforce Draft Report: Recommendations**

Dear Ms. Anderson:

Texas Chemical Council (TCC) and Texas Oil and Gas Association (TxOGA) appreciate the opportunity to provide comments on recommendations presented in the agency's draft "Flare Taskforce Report".

TCC is a statewide trade association representing 77 chemical manufacturers with more than 200 Texas facilities. The Texas chemical industry has invested more than $50 billion in physical assets in the state and pays over $1 billion annually in state and local taxes. TCC's members provide approximately 70,000 jobs and over 400,000 indirect jobs to Texans across the state. TCC member companies manufacture products that improve the quality of life for all Americans. Chemical products are the state's largest export with over $30 billion each year.

TxOGA, the largest and oldest oil and gas association in Texas, represents over 4,000 members of the oil and gas industry. The membership of TxOGA produces in excess of 90 percent of Texas' crude oil and natural gas, operates some 95 percent of the state's refining capacity, and is responsible for a vast majority of the state's pipeline mileage. The oil and gas industry employs 189,000 Texans, providing payroll and benefits of over $22 billion in the most recent data. In addition, large associated capital investments by the oil and gas industry generate significant secondary economic benefits for Texas.

The work of the agency's flare task force is of significant interest to our membership. We respectfully request your careful and thoughtful consideration of our suggestions. If you have any questions on these informal comments, please contact:

For TCC: Mike McMullen at (512) 646-6404 or Susan Moore at (832) 474 4118.
For TxOGA: Deb Hastings at (512) 478 6631 or Judy Bigon at (281) 360 6598.

Sincerely,

Mike McMullen, TCC

Deb Hastings, TxOGA

Introduction

The TCC/TxOGA comments are limited to the report itself and do not include a review of the documents cited in the Appendices. Due to the relatively short period of time to comment on this report, a thorough review of the information in the Appendices is not possible; TCC/TxOGA requests additional opportunity to comment upon the documents that TCEQ has relied on as references for this report.

Executive Summary

TCC/TxOGA applaud the TCEQ for using a public stakeholder process to gather information and data in support of their recommendations. Our support and concerns for these recommendations are as follows:

1. Contrary to the position held by some within EPA, the use of flares for the control of certain routine process gases is an appropriate pollution control practice.
2. Flare flow monitoring should be limited to flares with the greatest potential to impact air quality.
3. Gas composition monitoring should be limited to large flares with great variability in composition and high post-control emissions.
4. Because flare assist gas requirements vary considerably with differing physical and operational parameters and a specific steam- or air-to-fuel ratio is impossible to establish, continuous monitoring of air-or steam-assist flow rates serves no purpose and should be removed from the report's recommendations.
5. Current state and federal regulatory requirements to monitor flare flame presence and heating value are sufficient. Expanded monitoring for these conditions bring undue technical challenges and unnecessary burden.
6. Flare management plans and best management practices for flaring should be encouraged, but should provide flexibility that recognizes differences among processes and available equipment and provide incentives for voluntary participation.
7. Changes to the Air Permits Division technical review process and/or definition of BACT for flares should not be made unless justified by the results of the flare study and opportunity for public notice and comment is given.
8. The Flare Task Force should continue to promote stakeholder involvement in agency flare issues and educate the public and stakeholders on remote sensing capabilities and limitations.

<u>TCC/TxOGA Specific Comments on the Report</u>

<u>(1) TCEQ's Statement on Good Air Pollution Practice</u>

In the introduction of the draft Flare Task Force report, the agency writes:

In the October 2000 Enforcement Alert Newsletter, the United States Environmental Protection Agency (EPA) noted that <u>routine</u> flaring does not constitute good air pollution practice and may be in violation of the Federal Clean Air Act. [emphasis added]

<u>TCC/TxOGA Response</u>

TCC/TxOGA urge the agency to remove this statement from the report. The statement from the *Enforcement Alert Newsletter* was taken out of context, and only applies to a very limited number of flaring circumstances. The entire newsletter is devoted to a discussion of handling H_2S when a refinery sulfur recovery unit is down; this is a very limited subset of flaring situations.

Routine flaring is *not* an automatic violation of the Federal Clean Air Act. Many state and federal regulations either require flaring of certain waste gas streams or allow flaring as one of the control options. In addition, flares in Texas are authorized under the state's New Source Review air permitting program and in many cases are considered BACT. **Emissions from flares that are operating consistent with their permitted, regulatory limits are, therefore, in compliance with both the Texas Clean Air Act and the Federal Clean Air Act.**

<u>TCC/TxOGA believe that flaring is an appropriate air pollution control practice in most circumstances. In many situations, there is no alternative to flaring.</u>

The TCEQ Maintenance, Startup, Shutdown (MSS) permit conditions, for example, require purging residual chemicals from equipment to a flare in numerous circumstances to limit or prevent emissions prior to opening equipment for maintenance.

Although some plants have flare gas recovery systems that might be able to accommodate these situations, recovering waste gases in lieu of flaring is not always possible or practical for a variety of reasons:

- The quantity of waste gases may be too low for practical recovery.

- The gases may be intermittent in nature, lending them impractical for recovery.
- The gases may have a high diluent content such as nitrogen, lending them impractical and/or unsafe for recovery and reuse or for combustion as fuel in a furnace or boiler.
- The gases may have contaminants that lend them useless for recovery.
- Upset gases, such as from Pressure Relief Valves (PRVs), often must be flared rather than released directly to atmosphere. Even when the plant has a flare gas recovery system, it may not accommodate such a sudden and large quantity of waste gas.

TCC/TxOGA are aware of the recent EPA Region V flare enforcement initiative for failure to operate an air pollution control device per manufacturer's recommendations. Subsequent settlement agreements included:

- Limit steam to hydrocarbon ratio to < 3.6:1 including startup/shutdown/malfunction (SSM) on a 1-hour block average
- Strive for 0.9:1 steam to hydrocarbon ratio via automatic controls during normal operations
- Meet a net heating value of 385 BTU/scf minimum on a 1-hour block basis

TCC/TxOGA believe a regulatory package based on these settlement agreements is inappropriate. **<u>All flare systems are unique</u>** and any regulatory program should evaluate the whole flare population to achieve the desired goals effectively considering the variety of unique issues.

Further, if the TCEQ adopts the perceived EPA enforcement opinion that "routine flaring is not good air pollution practice", this after-the-fact determination of what constitutes good air pollution practice is highly problematic. Extensive emissions control programs developed for compliance with federal New Source Performance Standards (NSPS) and National Emissions Standards for Hazardous Air Pollutants (NESHAPS) would have to be scrapped and replaced with alternative and in many cases less effective controls. As is discussed above, TCC/TxOGA consider flaring an appropriate air pollution practice. It is not possible to comply with an after-the-fact re-definition of good air pollution control practice. TCEQ should refrain from accepting this EPA position.

(2) TCEQ's Draft Recommendation concerning Flare Monitoring

Require additional monitoring of flare operational parameters will help ensure proper flare operation and allow for a more accurate accounting of flare emissions in the state's emissions inventory and permit authorizations by providing reliable data for emission calculations. Require continuous air/steam assist rate flow monitoring of flares that receive routine process waste gas streams.

TCC/TxOGA Response:

(a) Monitoring flare gas flow rate

TCC/TXOGA agree with TCEQ's assessment that flare flow monitoring will provide more reliable estimates of the amount of material being sent to the flare and help ensure that the flare exit velocity is below the exit velocity limit in 40 CFR §60.18. Although industry recognizes the value of additional flare monitoring data, TCC/TxOGA encourage TCEQ to **consider the cost of implementing continuous flow monitoring where it does not currently exist and limit monitoring requirements based on a prioritized assessment of flares considering the following:**

- The maximum hourly design capacity
- The highest reported emissions
- The most significant impacts to air quality in and around nonattainment areas
- The significance of impact from flare emissions of an air pollutant watch list chemical in an air pollutant watch list area.

This will ensure that those flares with the greatest potential to impact air quality will be sufficiently monitored, while relieving those sites with smaller and lower emitting flares from the burden of expensive monitoring requirements. TCC/TxOGA support TCEQ's differentiation between routine process (non-emergency) flares and emergency flares; however, a definition for "routine" is necessary to differentiate between flows that may require monitoring and those that do not. In addition, the technical challenges of monitoring flow to these two types of flares are inherently much different. TCC/TxOGA agree that continuously monitoring the presence of a physical seal on emergency flares using a pressure or level indicator, for example, is an attractive alternative to continuous flow monitoring since it is difficult to find a flow meter designed to accommodate the full range of flow conditions, including the very high flow rates often experienced during emergency flaring. Furthermore, any future rule requirements should consider situations where it may be unsafe to attempt significant monitoring of the materials in the flare header due to toxicity concerns or flow restrictions in the flare header.

For those flares that may be required to continuously monitor flow, the type and choice of flow meter should be left to the site. Many flare systems already have flow measurement capabilities, and sites should not be forced to change-out or upgrade existing flare flow meters as even upgrading existing flow meters can cost $100,000 - 200,000 each. For new installations, because process configuration and waste gas characteristics will play important roles in flow meter selection and placement, TCEQ should avoid prescriptive requirements on flow metering technology.

Since the accuracy of continuous flow meters can vary greatly depending on design and stream characteristics, specific criteria for accuracy should not be required. In addition, although the reliability of continuous flow meters is typically very good, some consideration should be given for service factor. An on-stream factor of 95% should be sufficient to allow for temporary outages associated with flow meter malfunctions, calibration, and required maintenance.

TCC/TxOGA strongly support TCEQ's decision to avoid operational limits in conjunction with its recommended monitoring requirements. Operational limits for maximum exit velocity are already established in federal regulations, and until more research is conducted, setting other operational limits on flare flow is premature.

(b) Monitoring flare gas composition

The agency suggests that continuous monitoring of flare waste gas stream composition for flares receiving routine process waste gas streams may be appropriate. **This recommendation should be reserved for very large flares with both variability in composition and large quantities of post-control emissions because the cost of new composition monitoring equipment is significant.**

Flares in the Houston Galveston Brazoria (HGB) nonattainment area subject to TCEQ's Highly Reactive Volatile Organic Compound (HRVOC) rules already monitor for approximately 20 constituents. To meet continuous data requirements, additional gas chromatographs (GCs) and/or new analyzers would likely be necessary to expand the list of monitored components.

Any time more compounds are added and compound resolution is needed, analysis time increases. This potentially limits the analyzer's ability to meet cycle time requirements. (To be deemed "continuous", some analyzers must meet a data collection (*cycle time*) requirement of every 15 minutes.) If the additional monitoring time for the newly monitored compounds exceeds the instrument's ability to meet the 15 minute cycle time requirement, a new analyzer is required. TCEQ should instead consider a minimum cycle time of one data point every hour which is sufficient to track and report flare emissions accurately.

Column selectivity also determines whether or not new compounds can be analyzed on an existing system. Some existing HRVOC GC columns are not designed to speciate aromatics, sulfur compounds (H2S), and other hydrocarbons on the same GC. Separate GCs are needed because of the requirement for different types of columns.

The total monitoring costs for engineering design, equipment/supporting equipment, and installation is approximately $500,000 - $1,000,000 per analyzer. The actual analyzer cost *(+/- $100,000) is small in comparison to the total cost.* Existing analyzer shelters may not be large enough or configured to handle additional instrumentation; this can factor significantly into the final cost, as well.

In addition to the aforementioned costs, monitoring gas composition incurs on-going maintenance expenses associated with this equipment or additional monitoring/analysis costs during periods of analyzer downtime.

(c) Monitoring Flare Gas Assist Rates

TCC/TxOGA do not support the recommendation to require continuous monitoring of air or steam assist flow rates.

Assist gas aids in mixing air into the base of the flame to support complete combustion and smoke suppression. In the case of steam assist gas, it also facilitates the water-gas shift interaction where carbon monoxide and water vapor react to form carbon dioxide and hydrogen, thereby supporting smokeless combustion [*API Standard 521 Pressure-relieving and Depressuring Systems, Section6.4.3.2.3, p. 86*]. Assist gas also serves the purpose of cooling the flare tip metal to minimize damage from overheating.

Individual flare assist gas quantity requirements vary with several variables including:

1. Type of assist gas delivery system
2. Flare tip diameter
3. Waste gas composition and flow rate

4. Inert gas (often used to sweep the flare gas header for safety reasons) composition and concentration

TCC/TxOGA previously presented flare test data to TCEQ showing that **any assist gas rate between the snuffing point and the smoking point will provide effective and efficient combustion.** At the smoke point, combustion is obviously not complete and at the snuff point, combustion is not supported.

The smoke point and the snuff point are all affected by the variables above. The flare tip diameter is a major variable; large flames are harder to snuff than smaller flames. Smaller flames require less mixing, less steam or air and less assist gas to achieve smokeless operation compared to larger flames. High pressure steam or air is more effective at snuffing and for smoke control compared to lower pressure delivery systems. High pressure air or steam requires a lower steam or air-to-fuel ratio compared to lower pressure delivery systems.

Steam-to-fuel ratio charts for pure compounds have been published. They are reported in ranges due to the effects of the variables listed above. **Rarely, if ever, are actual flared gases pure compounds; therefore, these charts cannot be applied directly to the vast majority of actual flaring situations**. Further, the leaner the flared gas (the more inert compounds present), the lower the assist gas ratios need to be. Tests have shown there is a threshold below which smoking does not occur.

If TCEQ needs further information to support TCC's/TxOGA's assertion that any assist gas rate between the smoke point and the snuff point will support effective and efficient combustion, we strongly urge TCEQ to include tests to explore this further in the upcoming flare test experiments.

Any attempt to regulate the assist gas rate as a function of waste gas rate would be impractical from a compliance standpoint for the following reasons:

- Determining the target assist gas rate would be case-by-case for each individual flare. Such case-by-case tests would only be valid for waste gas compositions used during the test and would not be valid for the wide range of waste gas compositions that most flares see. It would be difficult or impossible to test each flare on the range of waste gases that are actually routed to the flare for control.
- Even if the flare could be tested over that wide range, writing an algorithm for controlling the assist gas rate based on the various variables

including waste gas composition and flow rate and inert gas composition and concentration would be a very complex or even impossible task.

- Further, measurement systems for composition or heat content of the waste gases have a lag time that would inevitably result in changes to the assist gas flow rate being too slow and too late. Typical composition analyzers have a 15 minute (minimum) lag time from sample to result. Typical plant flare flow rates and compositions are highly dynamic, and impossible to tie to the assist gas rate in any accurate manner. Since flares often serve multiple plant units, the dynamic nature of flow rates and compositions is further exaggerated and flows and compositions may vary over wide ranges.
- Although flare vendors may be attempting to develop assist gas control systems, such systems have not been proven in routine operation.

Thus, any attempt to control assist gas flow based on waste gas flow would inevitably result in the assist gas "chasing" the waste gas but never catching up. Therefore, if the flow data cannot be reasonably used in determining the assist gas-to-waste gas ratio, then TCC/TxOGA see no purpose in collecting the assist gas flow. Current assist gas management practices are centered on achieving smokeless operation. For operations that occur where changes can be predicted, management practices are provided in operating procedures. Each flare system and each set of flared gases are different. The operating procedures are periodically reviewed and changed, as necessary to enable operation to occur above the smoke point and below the snuff point. Tight control is only achieved if the flared gas stream is consistent and non-changing in flow and composition.
In terms of the adequacy of current assist gas management practices, the TCEQ has reported on the results of GasFindIR™ studies. As we understand the findings, possible problems are found in less than 5% of flares. If this trend is indicative of assist gas management practices, a majority of flares can be hypothesized to be operated in a manner to achieve efficient operation.

The GasFindIR™ and other remote sensing technologies should be fully assessed in the forthcoming research program.

<u>(d) Monitoring flare flame presence/heating value</u>

(A) Rule requirements for continuous monitoring to verify the presence of the flare flame/BTU content are redundant to existing federal requirements in 40 CFR §60.18 and Texas rules. **If changes are needed to these requirements, such changes should be based on the results of TCEQ's research program.**

The current **<u>heat content</u>** rules were based on EPA and industry sponsored flare test work done in the 1980's. The rules are based on flare type (air assist, steam assist or non-assist), exit velocity, BTU content, and in the case of hydrogen flared gases, hydrogen content.

To monitor for heat content, on line calorimetric devices are often used. **Continuous use of these devices should only be required based on a demonstration of need.** If the flared gases contain flammable materials in the absence of significant amounts of inert gases, online calorimetric monitoring is *not* needed because sufficient fuel is always present. If necessary, sample-based monitoring can be used.

If significant amounts of inert gases are present, assist in the form of added fuel is generally used to maintain BTU value. Again, online calorimetric requirements should be needs-based only.

(B) The current regulatory regime is sufficient to ensure the presence of a flare flame. Existing rules focus on assuring the presence of a flare pilot flame at all times with the presumption that, if the flared gas is flammable, ignition will occur if the flare pilots are lit.

If flare flame presence is to be measured or assured independently, instrumental devices (usually thermocouples) to sense the full flare flame presence pose a difficult instrumental application. The intense radiant and sensible heat shortens the available life of most direct reading instruments. Further, heat detection or radiation based detection systems are affected by varying flame position, especially if the devices are located up wind of the flame because there is usually a great amount of variation in the detector signal, making an on/off determination difficult.

Common remote measuring tools to determine flame presence are camera or light beam (IR or UV) based. UV, IR systems or visible wave length cameras are the most common. Such devices are in use by many operators to aid in assuring smokeless operation. **Normally the cameras are *not* used to detect the presence or absence of a flame because not all flames are luminous to the visible eye.** Low BTU flames, high hydrogen flames, CO flames and other types of flames do not produce orange radiation. Radiation from these types of flames is blue or light blue and is sometimes only visible at night. Hydrogen, if pure, emits minimal visible radiation and the flame is virtually invisible to the naked eye. Optical cameras, based on visible wave lengths, have similar issues. IR or UV cameras can be used, but they often experience interferences due to water.

The current regulatory regime based on the sensing of the flare pilot flame is adequate in our view. In the case of flare pilot flame monitoring, the thermocouples and other devices are shielded from the flare flame heat and radiation and the instruments only see the effects from the pilot flame. Because of the shielding, the technology is much more robust compared to the use of the technology for full scale flare flame detection. Camera or beam technology can be used, but, in our view, is not necessary for verification of flare flame or flare pilot flame presence. If camera technology is required for this purpose, again, such a decision should be based on a demonstration of need. Further, if required, consideration should be given to the recordkeeping issue related to storing video or digital images. If a need is demonstrated, only images of concern should be retained and stored.

<u>(3) TCEQ's Draft Recommendation concerning Flare Minimization Plans</u>

Requiring the development of flare minimization plans will reduce emission from routine flaring events through the implementation of appropriate control strategies.

<u>TCC/TxOGA Response</u>

Many industrial plants already have flare minimization plans in place as a best management practice. A typical plan might include:

- A discussion of planned and unplanned flaring events.
- Procedures to minimize hydrocarbon flaring including, for example, mechanical reliability programs and/or event management programs.
- Procedures to minimize emissions during planned shutdown (depressure) of process units or equipment.
- Procedures to minimize emissions during startup (pressurization) of process units or equipment.

Development of such a plan might benefit a plant by providing a review of flaring causes and a subsequent analysis of potential measures to reduce emissions from planned events.

If TCEQ decides to implement requirements for flare minimization plans, the following should be considered:

- Allow sites to maintain records on-site, available to the agency on-request.
- Allow flare minimization plans to be developed in-house by personnel who have a full understanding of the operational complexities that may

impact the plan. Use of third party contractors to review/design such plans is an unnecessary expense and should not be required.
- Limit flare minimization plans to specific flares based on size or usage.
- Encourage voluntary development of flare minimization plans by providing regulatory incentives.
- Maintain a clearing house of flare minimization options gleaned from reviewing minimization plans at various facilities, as a means to encourage the use of as many minimization techniques as possible in developing plans.
- Avoid inclusion of flare minimization plans at permit renewal as this may unnecessarily slow the permitting process. Again, the plans should be held on-site, subject to agency inspection.

TCEQ, however, should be careful to not link flare minimization plans and flare gas recovery. Flare gas recovery is not economical or technically feasible in all cases, and this must be a consideration. For example, it may not be technically feasible to recover some VOC streams and adequately purify them for introduction back into a chemical or polymerization process. Refer to TCC/TxOGA's earlier comments concerning Alternatives to Flaring.

In the draft report, the agency states, "It may be appropriate to provide incentives to encourage the voluntary implementation of best management practices (BMPs). These **BMPs could be considered separate from or as part of an overall flare minimization plan. TCC/TxOGA support the use of incentives as a valid and appropriate means to drive flaring reductions.** Incentives might include:

1. Allowing any flare emission reductions achieved by implementing best management practices or other similar programs to generate emission credits that can be traded or otherwise used by the site.
2. Reducing the frequency of inspections/investigations.
3. Reducing the penalty multiplier in enforcement cases.
4. Allowing a site-specific SEP which creates/implements a formal flare minimization plan.
5. Crediting invested funds which contribute to flare minimization toward Section 185 fees in the HGB nonattainment area.

<u>(4) TCEQ's Draft Recommendation concerning Agency Process Changes</u>

Requiring additional evaluation during agency permitting processes will help ensure proper flare operation, especially for those flares that routinely operate at a low percent of their maximum design capacity.

<u>TCC/TxOGA Response</u>

The Flare Task Force Draft Report specifically recommends a procedure be established to determine the **maximum allowable turndown ratio** as part of the Best Available Control Technology (BACT) review for flares used for both emergency and routine vent gas streams and to add additional monitoring requirements for flares qualifying for authorizations through 30 TAC Chapter 106 Permits By Rule (PBR) and 30 TAC Chapter 116 Standard Permits. Turndown ratios vary depending on the type of operation, type of flare, waste gas composition, etc. Some flares can, in fact, operate efficiently at low turndown ratios and, therefore, a single turn-down ratio is not appropriate for BACT. Research should be conducted to identify the appropriate turndown ratio, considering all the potential types of flares and associated uses, prior to considering the need for such BACT limits.

Most flares operate well below their maximum capacity most of the time. Changes should not be implemented that would restrict or eliminate a flare's usage during emergency conditions.

TCC/TxOGA presented pictures of test flares and an operating flare at low flow conditions. These flares are operating efficiently at low flows. In one case, we presented test data on an efficiently operating flare at purge gas rates. This rate is the absolute minimum operating rate. **TCC/TxOGA believe that operation at the maximum turndown ratio is efficient for some flare operations.** Each flare system will have a minimum operating rate below which inefficient operation is possible. There will not be one definition of this maximum turndown ratio for all flare systems.

TCC/TxOGA urges TCEQ to defer adding any new requirements or monitoring provisions to any type of air permit authorization until the flare research study planned for 2010 is complete, the final test results are issued, and new requirements/provisions are justified. Although the Air Permits Division (APD) already incorporates continuous monitoring requirements relating to vent gas flows, composition monitoring, and/or net heating value monitoring using devices such as calorimeters in the current boiler plate permit conditions for flares, these requirements should not be expanded until justified by the pending research. At such time, any proposed changes to the permitting process should be made available for public comment to afford all affected entities the opportunity to review and provide input to ensure the requirements are technically feasible and operationally practical. Therefore, TCC/TxOGA recommend the following:

- APD should continue to conduct case-by-case review on all 30 TAC Chapter 116 permit renewals and/or amendments and establish monitoring requirements for flares based on the specific needs identified through the technical review process. Periodic testing or monitoring should be considered when demonstrated by the applicant that it complies with the current applicable requirements. Continuous monitoring should not be required for all flares undergoing a permit review pending the completion of the flare research study to be conducted in 2010.
- Any monitoring changes for 30 TAC 106 (PBR) and 30 TAC Chapter 116 (Standard Permits) should be based on the test results from the 2010 flare research study. If justified by the test results, any additional monitoring requirements added to these permit authorizations should be proposed using the standard notice and comment rulemaking process.
- Any additional monitoring requirement added for BACT should be supported with the appropriate documentation explaining the basis for its development. Procedures developed for BACT as recommended in the Draft Report should be made available for public comments prior to implementation.

(5) TCEQ's Draft Recommendation concerning Public Outreach

Continuing to promote stakeholder involvement in agency flare issues will help improve our collective understanding of how flares factor into Texas air quality issues.

TCC/TxOGA Response

TCC/TxOGA are supportive of the Task Force's goal of continuing to promote stakeholder involvement in agency flare issues. Such dialogue on flare design, operation, maintenance, and testing, as well as the potential impacts of flare emissions on air quality, is critical to our collective understanding of the opportunities and practical constraints associated with these necessary process control devices.

As was stated in the Introduction portion of the TCEQ Flare Task Force Draft Report, "Flares are imperative for safe plant operations and must be continuously available, highly reliable, and capable of the stable combustion of unwanted gas streams over the entire range of operating conditions including: emergency releases from site-wide general power failure; episodic releases during maintenance, startup, and shutdown operations; and continuous releases associated with routine process venting."

TCC/ TxOGA concur with the Task Force's recommendation of continuing to utilize the TCEQ-sponsored Flare Task Force as a vehicle to gather and validate pertinent technical information on all aspects of flare operation from all stakeholders and to provide the public with such educational information. This effort will increase public awareness and provide a solid foundation for potential future policy and regulatory actions, if needed.

TCC/ TxOGA believe that it is inappropriate for the Task Force to serve as the vehicle to educate owners and operators of flares on "best management practices" (BMPs). This mechanism for effectively determining appropriate flare operating constraints should be integrated into the TCEQ's formal BACT analysis for specific flares.

The Task Force can also serve to evaluate and explain the observations and data acquired by remote sensing tools on operating flares. These data and observations should be explained to the public so owners, operators, the public and TCEQ have a common understanding of what the information means and what it does not mean.

(6) General Comments on the Draft Flare Task Force Report

(a) Flare Size Grouping Analysis

The TCEQ report does not differentiate between smaller de minimus plant flares and larger flares nor does it consider how varying requirements based on flare size groups would result in the greatest environmental benefits.

TCC/TxOGA Response

TCC/TxOGA recommend that TCEQ evaluate the flare population in the State of Texas to determine size groupings that have varying impacts on the environment, thereby forming a Pareto analysis that would serve as the basis to phase in flare requirements, based on environmental impact and cost-effectiveness of implementing the recommendations.

The cost to apply the flare recommendations on a dollar per ton of emissions scale would likely increase significantly with decreasing flare size and decreasing flare waste gas rates.

A Pareto analysis would demonstrate how far down into the flare population the recommendations should be applied to affect a specific desired improvement and would serve as a basis for a cost-effectiveness analysis. Nonetheless, incentives should still be available to sites with smaller flares to encourage them to incorporate flare minimization that might be practical given the size of their flares.

(b) TCEQ's Statement on direct measurement of flares

Although emissions from full-size industrial flares can be directly measured (by attaching test probes to the stack or a crane for example), the open flame design of flares makes it inherently difficult to use traditional direct measurement techniques to determine the actual emissions.

TCC/TxOGA Response

Emissions from industrial flares in a plant setting cannot be directly measured under most circumstances. Test probes on the flare can measure input but not output emissions. Emissions measurement from the tip of the flare is not feasible in actual plant situations as the open flame and radiant heat make attempting such activities unsafe. This type of sampling must be done in a controlled environment (test facility) and not in an operating plant.

(d) TCEQ's Statement on Remote Sensing Technologies

Emissions from full-size flares can also be measured using remote sensing technologies like open-path Fourier transform infrared or Differential Absorption Lidar.

TCC/TxOGA Response

The planned flare study referenced in this report should require a side-by-side comparison of these technologies against others to determine accuracy of each technology. The proven accuracy of both technologies for monitoring flare emissions and differentiating between a heat plume and an emissions plume is in question. Other comparable technologies to consider are Long Path Differential Optical Absorption Spectroscopy (LP-DOAS), Multi-Axis-DOAS and Imaging-DOAS.

Further, if remote sensing tools are to be used in the future for compliance assurance, compliance demonstration, or inspections establishing regulatory compliance, the methods developed to use these tools and the effort to develop these methods, needs to be equivalent to the method development for any compliance assurance method.

The use of these tools in the future should be based on their ability to quantify compliance with targets or qualitatively indicate problems related to targets.

<u>(e) TCEQ's Statement on the flare research study</u>

The TCEQ is planning to conduct a flare research study at a test facility in early 2010 that will examine the impact of various operational conditions on flare combustion efficiency and DRE in a controlled environment.

<u>TCC/TxOGA Response</u>

Research (concerning destruction and removal efficiency) **should be conducted and understood prior to proposing changes in flare policy or rule requirements**. Changes made before research is completed may lead to costly requirements that have little or no environmental benefit.

<u>(f) TCEQ's Statements concerning Reducing Flare Emissions</u>

1. Use of alternative control devices - Some of the routine process waste gas streams typically combusted in a flare can be directed to an alternative control device, such as a vapor combustor.

TCC/TxOGA encourages the agency to review our previous comments concerning Alternatives to Flares. With regards to vapor combustors, an insignificant increase in destruction efficiency may be achieved by replacing a flare with a vapor combustor. As such the economics associated with the change is not justified for the very small incremental emission reduction.

Vapor combustors cannot handle variations in flow similar to a flare. Installation of such technology includes a high capital cost for a technology that is not as versatile and reliable.

In our May 8, 2009, comments we cited the advantages of a vapor combustor. We also discussed flare gas recovery and use of staged flares as alternatives to flaring.

Advantages of a vapor combustor included:

(1) Achieves the highest possible DRE and provides reliable destruction efficiency regardless of the gas composition or weather conditions.
(2) Provides superior monitoring and compliance testing ability.

(3) Reduces overall emissions.
(4) Reduces fuel cost by employing waste heat recovery.
(5) Operates with less noise, a hidden flame, and lower radiation.
(6) Eliminates need for use of assisting media.
(7) Eliminates CO emissions from combustion process and incoming flare gas by effective control of combustor temperature.
(8) Further reduces overall emissions rates (acid components, particulates, etc.) by employing post combustion flue gas treatment. The use of scrubbers further reduces overall emission rates (acid components, particulates, etc.).
(9) Reduces NOx emissions by employing Low NOx technologies such as Low NOx burners, ammonia or urea injection (Non Selective Catalytic Reduction) into the combustion chamber or by utilizing flue gas treatment via use of Selective Catalytic Reduction.
(10) Provides better reliability and availability than in open flame flares.

We cited the following vapor combustor disadvantages:

(1) Increases NOx emissions if one of the available NOx control technologies is not implemented.
(2) Cannot handle high volume of flare gas due to combustor size limitations.
(3) Increases complexity of installation when employed in combination with large open flame flare.
(4) Requires more space (siting constraints).
(5) Costs more.
(6) Incurs higher maintenance and operating costs.

In summary, many alternate control devices are not able to handle wide variations in flow and composition especially if these variations occur quickly. Small, continuous, or intermittent streams (both large and small) are difficult to collect; intermittent streams are not well suited for a vapor combustor. Large intermittent streams require a large combustor that is used intermittently. Vapor combustors are sized based on the maximum volume flow, whether continuous or intermittent. When used in combination with the combustor, the flare is still needed and cannot be eliminated; the combined system is more complicated than the single system. If the combustor trips, the gases must be routed to the flare. Therefore, a flare will still be required for emergency relief and for control of gases that cannot be handled by the combustor.

The use of an alternate control device should only be considered if a significant emission reduction can be achieved relative to a flare. The decision to use an alternate control device is site-specific and should not be required by rule or as part of a BACT review.

2. Diverting or eliminating streams vented to the flares - Certain streams that are routinely directed to the flare may be rerouted and treated for use as fuel gas or recycled back in the process using flare gas/hydrocarbon recovery systems.

TCC/TxOGA are supportive of eliminating streams by reusing or recycling as part of a best management practice. Individual operating scenarios and plant specific considerations should be evaluated in the overall review. Each situation is unique and should be reviewed and justified independently based on specific site and process characteristics.

3. *Use of redundant equipment to increase reliability – Installing redundant equipment can help avoid flaring during a process upset since the spare equipment can be put online if the primary equipment breaks down.*

TCC/TxOGA believe that in most cases, this is not a practical option as redundancy does not necessarily improve reliability yet it significantly increases costs. Complexity created can sometimes reduce reliability.

4. Developing startup and shutdown procedures that minimize or eliminate flaring –

For certain units, it is possible to develop procedures to minimize or eliminate flaring during planned startup and shutdown activities; these procedures may include using reduced loads, recycling feeds, and better decontamination procedures. TCC/TxOGA believe these procedures can be addressed as best management practices.

5. Optimization of turnaround schedules - Coordinating turnaround schedules for different units can reduce flaring activity and minimize emissions associated with these periodic maintenance activities.

TCC/TxOGA support coordination of turnaround schedules to minimize flaring and encourages such review in facility turnaround planning. However, the agency should not mandate or direct facility turnaround schedules as this could result in increased safety risks, manpower shortages, and significant cost increases.

6. Operator training - Facility training programs can increase awareness about the environmental impacts of excessive flaring and teach procedures to minimize the frequency and duration of flaring events.

TCC/TxOGA support in-house training for operators to increase awareness related to flaring.

(g) TCEQ's Statement concerning 98% flare efficiency

The TCEQ's report references 98% flare efficiency throughout the document.

TCC/TxOGA response

Recommendations related to destruction efficiency (and presumed deficiencies) would be premature until the agency's research is complete. Any recommendations should address the specific issues identified/verified via agency research. **TCEQ should also recognize that flares have a site-specific function and a "one size fits all" approach to modifying the operation of flares is highly inappropriate and strongly discouraged.**

Furthermore, TCEQ permitting guidance and the HRVOC rules allow for a 99% flare efficiency for C2 and C3 compounds. TCEQ should not change any of the default flare efficiency values until the research program is completed and the results have been peer reviewed and published.

(h) Alternatives to Continuous Monitoring

TCC/TxOGA suggest use of **process knowledge and operational data** as an alternate means of monitoring flare operational parameters instead of requiring industry to install new monitoring equipment.

(i) Sampling in lieu of Continuous Monitoring

Continuous monitoring for species that are present in very low concentrations is difficult. Many high molecular weight, high boiling point compounds will be present in low concentrations unless the stream is very hot. If the species are present in low concentrations and the flare system is small, there should be a **sampling based option** in lieu of continuous monitoring. Where discrete events are a concern, sampling could occur during these events.

(7) General TCC/TxOGA Position on Issues not specifically addressed in the draft Report

(a) Concerning Attainment Status and Impact from Major/Minor Sources

TCC/TxOGA recommend that the TCEQ consider the attainment status and facility size (major source status) when developing any future regulations for flares. Areas that have demonstrated compliance with the NAAQS for ozone and other compounds should be subject to less burdensome and costly regulations than those areas in non-attainment. State-wide regulations broadly requiring continuous monitoring systems for flares are not justified in attainment areas. However, BMPs, such as routine flare stream identification, periodic monitoring and flare minimizations plans may be cost effective at PSD major facilities, but even these types of controls may not be practical for minor sources (sources that are not major under PSD or non-attainment).

(b) Comments on Data Collection and Analysis

TCC/TxOGA wish to participate cooperatively in the research planning as the project proceeds.

In terms of the data analysis from the research, particularly if flame modeling is used, there are multiple organizations and tools that can analyze the data. As the program is designed, we request that the data be acquired in a way that the data can be easily analyzed by others. This will mean consulting with other organizations *before* the data are collected. We will endeavor to identify other organizations that can analyze the data using flame models or other tools and will encourage them to contact the study team for coordinated data collection. Coordinated efforts related to flame modeling and the use of high speed photography and infrared generated temperature profiles is an area for possible collaboration. The Institute for Clean and Secure Energy at the University of Utah has recently reported on flame modeling results using the Alberta Flare Test data and may be an organization capable of peer review.

(c) Concerning Additional Research

There is on-going work in the flame research community that may be pertinent to the Flare Task Force. TCC/TxOGA reserve comment on these developments for potential discussion with the agency at a later date.