Bryan W. Shaw, Ph.D., *Chairman*
Buddy Garcia, *Commissioner*
Carlos Rubinstein, *Commissioner*
Mark R. Vickery, P.G., *Executive Director*

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

November 30, 2011

U.S. Environmental Protection Agency
1200 Pennsylvania Ave, NW
Washington, DC 20460

Attn: Docket ID No. EPA-HQ-OAR-2010-0505

Re: Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews; Proposed Rule

Dear Sir or Madam:

The Texas Commission on Environmental Quality (TCEQ) appreciates the opportunity to respond to the U.S. Environmental Protection Agency's (EPA) notice of proposed rulemaking published in the August 23, 2011, edition of the *Federal Register* entitled: "Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews; Proposed Rule."

Enclosed, please find the TCEQ's detailed comments relating to the EPA proposal referenced above. If you have any questions concerning the enclosed comments, please contact Mr. Michael Wilson, P.E., Director, Air Permits Division, Office of Air, (512) 239-1922, or at mike.wilson@tceq.texas.gov.

Sincerely,

Mark R. Vickery, P.G.
Executive Director

Enclosure

Texas Commission on Environmental Quality Comments on
Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews; Proposed Rule
Docket ID No. EPA-HQ-OAR-2010-0505

The Texas Commission on Environmental Quality (TCEQ) provides the following comments on the U.S. Environmental Protection Agency's (EPA) proposed rule referenced above. The proposed rule was published in the August 23, 2011 issue of the *Federal Register* (76 *FR* 52738).

I. Background.

In the August 23, 2011 notice, the EPA proposed changes to existing New Source Performance Standards (NSPS) relating to the oil and gas sector, specifically EPA created new Subpart OOOO which incorporates and updates the requirements of existing subparts KKK and LLL, which would apply to new and modified sources in the crude oil and natural gas production, transmission, and distribution source categories. Additionally, EPA is modifying the source category list to include any oil and gas operation not covered by the current listing and evaluating emissions from all oil and gas operations at the same time. The proposed rule changes and new standards address a variety of subjects, such as: leak detection and repair (LDAR) requirements; storage vessel control requirements; sulfur dioxide (SO_2) emissions from natural gas processing plants; well completion requirements; emission standards for pneumatic controllers; seal and packing requirements for centrifugal and reciprocating compressors; and provisions relating to startup, shutdown, and malfunction (SSM) and affirmative defense. The EPA also proposed changes to the National Emission Standards for Hazardous Air Pollutants (NESHAP) relating to the oil and gas sector; specifically Subpart HH covering the oil and gas production source category, and Subpart HHH covering the natural gas transmission and storage source category. The proposed changes to the NESHAP would establish emission standards for small glycol dehydrators; eliminate some compliance options for glycol dehydrators and other units; revise SSM requirements (including rules relating to an affirmative defense for malfunctions); revise performance test requirements; establish a more stringent leak definition under Subpart HH; and expand the control requirements of Subpart HH to include all storage vessels regardless of the potential for flash emissions (PFE).

II. Comments.

The EPA requested comments on a number of specific subject areas associated with this proposal. The TCEQ is providing comments related to some of EPA's targeted subject areas, and is also providing other comments as appropriate. The TCEQ appreciates the opportunity to comment.

A. General or Miscellaneous Comments

1. The EPA's assumptions and data underlying the proposed rules drastically underestimate the overall number of affected facilities by several orders of magnitude. Although TCEQ does not have specific nationwide numbers to substitute, the Texas specific information that is available demonstrates that EPA has seriously underestimated the impact of these rules on industry.

From a regulatory perspective these rules will significantly increase the permitting and enforcement workload for TCEQ as the delegated administrator. Implementation of these rules will dramatically increase the fiscal burden on Texas, and will likely adversely affect delegated administrators across the nation with similar oil and gas production activity.

Well completions: EPA estimated 20,000 wells throughout the country will be affected. In 2010 alone, Texas experienced approximately 10,000 new gas and oil well completions which

may have involved fracturing. In the last year, companies in Texas completed, re-completed, and re-worked thousands of wells. Based on information from industry, to enhance declining production, gas wells may be periodically re-worked or re-completed. Currently, there are approximately 95,000 active gas wells and 150,000 active oil wells in Texas.

Pneumatic controllers: EPA estimated 14,000 new and replaced controllers per year. In Texas, it is estimated that there are at least 3 controllers per well, and in 2010 there were almost 250,000 active wells, meaning there are approximately 750,000 controllers that may need to be replaced, unless an exemption is granted, once the associated well becomes subject to the new rules.

Storage vessels: EPA estimated there are 329 sites with a total of almost 2,000 tanks that would potentially be subject to the 95% control requirements throughout the country each year. For the NESHAP requirements, EPA estimated that 1,970 existing tanks would be required to control HAP emissions. In Texas, over 3,500 sites have registered in the last 12 months with an average of 2-3 tanks per site (not including produced water), and this trend is expected to continue. Under the proposed NESHAP, a large portion of these new tanks and thousands of existing tanks will be required to control emissions since applicability is based on potential to emit (PTE) of HAPs from each tank.

2. The TCEQ requests that EPA confirm the recordkeeping, monitoring, and reporting requirements under these rules are sufficient to comply with all necessary Title V requirements.

3. These proposed rules are a departure from EPA's historical practices regarding regulation of emissions from drilling and well completions. EPA has expanded the source category list for the NSPS to cover any oil and gas operation not covered by the current listing. In the expansion, wells and well drilling are considered part of the production operations subject to the rule. EPA states that state and local agencies would be able to continue to use any EPA-approved general permits, permits by rule or other similar streamlining mechanisms to permit oil and gas sources such as wells. They go on to state that the proposed standards will lead to better control of and reduce emissions from oil and gas production, gas processing, transmission and storage, including wells. EPA states that the proposed standards would not change the requirements for determining whether oil and gas sources are subject to minor NSR, nor would the proposed standards affect existing EPA-approved state and local minor NSR rules as well as policies and practices implementing those rules. However, the TCEQ's historical interpretation of sources applicable to major and minor NSR in accordance with the definitions in the Texas Clean Air Act (TCAA) do not include authority to regulate drilling.

4. The proposal for controls on wells is confusing and overly broad.

a. The concept of "exploratory" or "delineation" wells is overly broad. Without knowing which wells are in these categories, the control proposal for wells is impractical. It is not typical that production wells will always be drilled in areas where a pipeline exists or is readily available at the time of drilling. Where pit flaring is proposed to be required, there is substantial concern about fire danger, particularly in urban areas or during drought conditions. These rules, as proposed, will also disproportionally impact small producers and operators (see discussion below).

b. In addition, EPA's proposal interchangeably uses the words "re-work", "re-complete", and "re-fracturing" which describe different activities at existing wells. In many cases, "re-work" and "re-complete" do not involve fracturing, nor would they necessarily cause a potential

increase in emissions. TCEQ requests EPA clarify and narrow the applicability of the controls required for wells.

5. The Commission believes that EPA has underestimated the overall number of affected facilities and particularly the potential impact on small businesses. The proposed rules do not fully consider the impacts of the proposed regulations on stripper oil wells or marginal gas wells in the State of Texas. In 2009, approximately 75% of all Texas oil wells fell into the stripper well category.

Stripper wells are generally owned and operated by smaller drilling and production companies and thus the impact of these rules on small business is disproportionate to any resultant reduction in emissions. For example, small operators with storage tanks with applicable throughput will have to use high bleed pneumatic controllers. Therefore, in addition to the onerous reporting and recordkeeping requirements of this proposed rule, small businesses will be required to purchase a flare or equipment necessary for green completion; obtain a VRU or flare for tank controls; and purchase low bleed controllers, all of which have significant associated costs under this rule and thus will disproportionately impact small business in Texas and across the nation.

B. *Applicability, Control Requirements, Exemptions, and Compliance*

1. EPA's historical practice has been to make effective, new or revised NSPS as of the date of proposal. The proposed standards would apply to affected facilities that commence construction, reconstruction, or modification after August 23, 2011. However, this applicability timing is impractical for regulating oil and gas drilling, completion, and operational activities. Activities at oil and gas sites typically occur under short timeframes and will/could be complete at or before the time this rule is scheduled to be adopted on February 28, 2012. In addition, unlike other industries that have longer lead time for equipment, site design and construction, oil and gas drilling operations occur on much shorter and less predictable time frames, and the infrastructure needed to comply with the green completion requirements (the preferred control) is not likely to be physically available. Simply stated, the retroactive compliance date will result in thousands of affected facilities out of compliance with the proposed rules on the date the rules are adopted.

2. EPA is proposing rules in Subpart OOOO requiring installation and replacement of high bleed pneumatic controllers which include reporting, continuous compliance demonstration, and recordkeeping. The proposed rule would require the use of low bleed pneumatic controllers on each newly installed pneumatic device (including replacement of an existing device) at locations other than gas processing plants. The proposed rule only allows for an exemption from using a low bleed controller at these locations if a demonstration is made, to the Administrator's satisfaction, that the use of a high bleed device is predicated. The proposal briefly outlines circumstances when an exemption might be warranted including response time, safety, and function limitations where positive actuation or rapid actuation are likely; however the proposal does not include specific guidance on evaluating such exemptions or exemption levels. Due to the large number of controllers located in Texas, reviewing these exemptions on a case-by-case basis will place an unnecessary burden on the state as the delegated administrator. TCEQ would suggest EPA provide an exemption level based on potential emissions from high-bleed controllers (such as greater than 1 tpy), and guidance for industry and regulatory agencies regarding implementation.

3. Under proposed Subpart OOOO, EPA established a different threshold for applicability of the NSPS to new or modified storage tanks of one barrel per day (bbl/day) of condensate and 20 bbl/day of crude, requiring control of 95% of emissions. The TCEQ recommends the EPA

provide an emissions-based applicability trigger in addition to the throughput trigger because some sites may have the requisite level of material throughput to trigger the rule, but only a small amount of emissions, while others may have low throughput but high emissions based on the types of hydrocarbons passing through the system.

Use of an emissions-based applicability trigger is also important because there are instances in which an enclosed tank is necessary to control emissions. The use of an enclosed tank makes it possible to add additional control devices when necessary to further reduce emissions. In many instances, open-topped tanks do not yield emissions that would cause concern. However the amount of hydrocarbon liquids entrained in produced water, open-topped tanks and ponds may be at levels that result in a substantial amount of VOC and hydrogen sulfide (H_2S) emissions. In addition, open-topped tanks or ponds are exposed to the evaporative effects of the sun and wind, which can increase emissions. Therefore, TCEQ recommends a reasonable emissions limit be established, above which enclosed tanks are required. In a recent rule package, TCEQ established a limit of 1.0 ton per year (tpy) of volatile organic compounds (VOC) and 0.1 tpy of H_2S for open-topped tanks. Above these limits, enclosed tanks are required. These values were chosen based on potential impacts to ensure protection of public health and welfare.

Conversely, if the EPA insists that only a throughput applicability trigger is necessary, the TCEQ does not agree that the 1 bbl/day of condensate per tank is justified. The proposed rule would regulate storage tanks at levels more stringent than required under other NSPS for refineries and chemical plants. Additionally, the TCEQ has adopted requirements for the Houston/Galveston/Brazoria Counties nonattainment area and has published a proposal for the Dallas-Ft. Worth nonattainment area which requires 95% control of vapors from all oil and gas tanks at a site when there is a throughput of 1500 bbl/year of condensate.

The TCEQ is also concerned about applicability to smaller tanks or locations where it is infeasible to install vapor recovery units. In these instances, a flare would be the most likely control device necessary to comply with the proposed rules. The use of flares in highly populated areas, which can also be nonattainment areas, is a health and safety concern, wastes energy, and could contribute to ozone precursor emissions.

4. EPA is seeking comment on the use of third parties for compliance verification and reporting for NSPS Subpart OOOO. The TCEQ recommends that the delegated administrator be empowered to obtain any relevant information from those third parties to insure effective enforcement. The TCEQ maintains that this authority is integral to EPA's statement that third party verification would not supersede or substitute for inspections or audit data and information by state, local, and tribal agencies and the EPA. TCEQ further recommends that EPA remove the proposed requirements for an annual certification or third party verification, data collection, and storage of that information as these do not truly indicate compliance over time, and do not provide an environmental benefit. In addition, the TCEQ does not believe the third party data system is necessary, but creates an additional layer of bureaucracy which will likely be costly to create and maintain. No clear benefit is gained or justified for this system.

EPA is seeking comment on whether third party verification paid for by industry would result in impartial, accurate, and complete data. Without verification of the third party's qualifications, there is no way to ensure accountability and quality of results. The proposal states EPA will work with state, local and tribal agencies, and industry to develop guidance for third party verifiers. However, developing such a verification system is not only time consuming to those involved, it creates an additional layer of bureaucracy which will likely be

costly to create and maintain, therefore negating the stated purpose of relief to government agencies for compliance determinations.

C. *Startup, Shutdown, Malfunction, and Affirmative Defense*

1. The NESHAP HH and HHH and NSPS OOOO standards would apply at all times including startup and shutdown. The entity may petition for an affirmative defense for malfunctions if certain criteria are met and confirmed by the delegated Administrator. The detailed affirmative defense criteria, as proposed, are inconsistent with Texas' existing EPA-approved rules for Emission Events and Scheduled Maintenance, Startup and Shutdown Activities. Specifically, this proposal is inconsistent with Title 30, Texas Administrative Code (30 TAC), Chapter 101, Subchapter F, and would create a substantial workload issue for TCEQ to process a parallel set of requests under the federal and state regulations. The types of unauthorized emissions for which an affirmative defense is available under Texas' rules are unplanned start-up and shutdown activities and emissions events, which include upsets (malfunctions).

The proposed rules should be revised to allow state rules for affirmative defense that are EPA-approved as part of a SIP to be used in lieu of the federal procedures. This flexibility would eliminate duplicative or potentially even conflicting requirements for state agencies acting as the delegated administrator and regulated entities. Although Texas rules under 30 Texas Administrative Code Chapter 101 include affirmative defense demonstration requirements for unauthorized emissions that are substantially the same as the proposed rules, some differences exist. For example, to establish the affirmative defense under §§ 60.5415(h)(1)(iii) and 63.762(d)(1)(iii) there must be proof that the frequency**,** amount, and duration of excess emissions were minimized to the maximum extent practicable during periods of such emissions. As part of Texas' EPA-approved SIP, TCEQ rules contain affirmative defense criteria requiring proof that the amount and duration of the unauthorized emissions and any bypass of pollution equipment were minimized and all possible steps were taken to minimize the impact of the unauthorized emissions on ambient air quality, and the percentage of a facility's total annual operating hours during which emissions events occur was not unreasonably high. TCEQ's SIP-approved rules address each of the substantive requirements for an affirmative defense in the proposed federal rules and therefore, Texas and other states with SIP approved affirmative defense rules should be allowed to use their existing criteria for affirmative defense evaluations.

2. Certain provisions in the EPA's proposed affirmative defense rules need clarification or appear to be contradictory. For example:

Proposed §§ 60.5415(h)(1)(iv), 63.762(d)(1)(iv), and 63.1272(d)(1)(iv) unnecessarily require additional conditions to meet an affirmative defense to bypass a control device. In some circumstances, the bypass may be the most appropriate temporary implementation while correcting or repairing a condition of upset, since the upset may be with the control device itself. All actions required to meet an affirmative defense are sufficiently listed in the other provisions of §§ 60.5415(h)(1), 63.762(d)(1), and 63.1272(d)(1) and must be met, including those actions designed to minimize emissions.

Proposed §§ 60.5415(h)(1)(vii), 63.762(d)(1)(vii), and 63.1272(d)(1)(vii) list a requirement that "All actions in response were properly documented by *properly signed* contemporaneous operating logs," but does not define or accurately describe what would fulfill that requirement. This requirement is impractical for many sites that are unmanned, where there will be no operator logs.

Proposed §§ 60.5415(h)(1)(ix), 63.762(d)(1)(ix), and 63.1272(d)(1)(ix) require "a written root cause required to determine, correct, and eliminate the primary cause of the malfunction." This inevitably leads to an owner or operator attempting to describe a preventative action to an event that (by definition in §§ 60.5415(h)(1)(i)(B) and 63.762(d)(1)(i)(B)) could not have been prevented.

3. An initial notification is required if an owner/operator wishes to claim an affirmative defense and the proposed rules specify notification by telephone or facsimile. An electronic reporting mechanism should be allowed for the initial notifications. At a minimum, electronic notification that complies with the EPA's Cross-Media Electronic Reporting Regulation (CROMERR) standards could provide for reporting that may be relied upon for investigative and enforcement purposes. Telephone notifications should not be allowed because such notifications are difficult to verify and an impractical method to determine compliance.

D. Innovative Technology and Research Issues

1. EPA is seeking comment on innovative technology and compliance demonstrations. The TCEQ requests clarification on whether these determinations will be delegated to states. At a minimum, the TCEQ requests EPA encourage the use of new technologies which are focused on recovery instead of destruction techniques which may result in collateral emissions and exacerbate existing nonattainment conditions.

2. EPA is requesting comment and information on produced water ponds and potential emissions and controls. The TCEQ is providing current calculation guidance used in permitting and inventories in Texas. **See Attachment 1 for details.**

3. EPA is seeking comment on optical gas imaging as a sole compliance tool. **See Attachment 2 for details.**

E. Implementation and Education

During the public meeting in Arlington, Texas on September 29, 2011, the EPA panel requested specific suggestions for tools EPA could create to help smaller operators understand the rules before they are in place. In **Attachment 3**, TCEQ is including specific suggestions to aid in understanding the practical requirements of the EPA proposal and to allow small operators to better prepare for its possible implementation.

Attachment 1
Additional Information regarding Calculation of Produced Water

The following guidance is used by the TCEQ regarding the review and quantification of emissions from produced water at oil and gas production sites as recently published in the background documents for the *Air Quality Standard Permit for Oil and Gas Handling and Production Facilities*, effective February 27, 2011.

Produced water is any water found in underground formations that is brought to the surface along with oil and gas. The composition generally includes a mixture of either liquid or gaseous hydrocarbons, produced water, dissolved or suspended solids, produced solids such as sand or silt, and injected fluids and additives that may have been placed in the formation as a result of exploration and production activities, such as hydraulic fracturing. A well which has been deemed absent of crude oil or condensate (also known as "dry" gas) does not necessarily imply that hydrocarbons are not still entrained in the produced water. Produced water is by far the largest volume byproduct or waste stream associated with oil and gas sites (OGS). This water is frequently referred to as "connate water" or "formation water" and becomes produced water when the reservoir is tapped and these fluids are brought to the surface. Knowledge of the constituents of the produced water at each specific site is needed for regulatory compliance.

As produced water is brought to the surface, it is separated from the crude oil and natural gas during the production and separation process. The composition of this produced fluid is dependent on whether crude oil or natural gas is being produced, and generally contains a mixture of aromatic hydrocarbons such as benzene, toluene, ethylbenzene, and xylene (also known as BTEX), in addition to other volatile organic compounds. When the produced water flows from the separator into the storage tank, most of the hydrocarbons will either float to the top of the tank or partially dissolve in the water. The physical and chemical properties of produced water vary considerably depending on the geographic location of the field, the geological formation with which the produced water has been in contact for thousands of years, and the type of hydrocarbon product being produced. Produced water properties and volume can also vary throughout the lifetime of a reservoir. If water flooding operations are conducted, these properties and volumes may vary even more dramatically as additional water is injected into the formation.

In addition to formation water, produced water from gas operations also includes condensed water. Studies indicate that the produced waters discharged from gas/condensate platforms are about 10 times more toxic than the produced waters discharged from oil platforms.[1] The chemicals used for gas processing typically include dehydration chemicals, hydrogen sulfide-removal chemicals, and chemicals to inhibit hydrates. Well-stimulation chemicals that may be found in produced water from gas operations can include mineral acids, dense brines, and additives.[2] Volatile hydrocarbons can occur naturally in produced water. Concentrations of these compounds are usually higher in produced water from gas-condensate-producing platforms than in produced water from oil-producing platforms.[3] For more information concerning the components of produced water please reference the "White Paper" prepared by Argonne National Laboratory, which describes produced water from the production of crude oil, natural gas, and coal bed methane.

In order to account for emissions from produced water, an overview of the insoluble relationship between oil/condensate and water taking place within the tank must be addressed. Within the tank, two environments exist. The first, as the produced water enters the tank it starts out as a flowing mixture. The second, as this mixture begins to settle it separates out with the oil/condensate rising to the top layer. During these two environmental shifts, emissions are being produced. The emissions are accounted for as emissions from working, breathing, and flash (WBF).

All tanks receiving processed liquids (crude oil, condensate and water) will have emissions as the pressure to the tank drops. These emissions will consist of both hydrocarbons and H_2S. During this decrease in pressure upon the liquid, the lighter hydrocarbon compounds dissolved in the liquid are released or "flashed" off from the liquid. Additionally, some of the compounds that are liquids at the initial pressure and temperature of the tanks will transform from a liquid into a gas/vapor, and contribute to the vapor pressure within the tank as emissions from working and breathing. As these gases are released, some of the heavier hydrocarbon compounds in the liquid may become entrained in these gases and emitted. The magnitude of the flash gases will increase as the magnitude of the temperature and pressure drop increases, and as the amount of lighter hydrocarbons found in the liquid increases. Furthermore, the temperature of the liquid and the storage tank will influence the amount of WBF losses since the ability of a solution to dissolve or hold a gas is related to temperature. If the final temperature is lowered, the final solution can hold more gas which will result in slightly lower WBF gas emissions. Consequently, the estimation of WBF gas losses becomes a complex process when considering all measured and theoretical properties of the fluids.

According to Dalton's Law, the total pressure of a mixture of ideal gases is the sum of the partial pressures of each gas component. For example, when obtaining a sample of produced water in order to determine flash emissions, the pressure inside the sample container should be equal to the separator pressure. Because of Dalton's Law of partial pressure, the pressure in the sample contains the sum of all hydrocarbons. The hydrocarbon component can be determined within the sample container accurately once the total vapor pressure of the sample at the sampling conditions (that is, sample temperature and pressure) is determined. The key factor for estimating emissions from produced water is following proper sampling procedures. Proper sampling procedures allow for a representative quantification of entrained hydrocarbons in the water.

Since the oil or condensate liquid floats on top of the water, when estimating working and breathing losses, it must be assumed the tank is filled with 100% condensate or oil. Additionally, when addressing flashing of entrained hydrocarbons, it can be assumed that the percentage of VOCs entrained in the water will be liberated and contribute to the tank emissions. In order to achieve an accurate representation of emissions from produced water, 100% of working and breathing loss emissions must be assumed and combined with the percentage of VOCs entrained in the water. These results should account for the three known types of emissions associated with produced water from storage tanks.

Due to the large variation of crude and condensate properties, site specific measurements are preferred to estimate WBF emissions from produced water. The EPA's published guidance on WBF is that the direct measurement technique provides the most accurate results, but there is no standardized published reference test method available at this time. The TCEQ recognizes several methods to estimate emissions. Regardless of which method is used, all supporting data used to calculate the emissions, including identification of the calculation method, description of sampling methods, and copies of lab sampling analysis, must be provided to the regulatory agency.

Tanks 4.0 is a relatively accurate program used to determine working and breathing emissions within tanks which should be run assuming 100% of the inputs are VOCs, then combined with a method capable of calculating flash emissions before submittal as being representative of produced water emissions.

The following methods may be used for estimating working, breathing and flash emissions:

1. Direct measurement of tank emissions requires sampling and analysis of tank contents, which can be expensive, but the results can be relatively accurate.

2. Some recent updates to computer simulation programs (such as WinSim, Designer II, EPCON, HYSIM, HYSIS, and PROMAX, etc.) may also allow for working and breathing emissions to be estimated along with flash.

3. A more common method is E&P Tanks Software, V 2.0, by using site-specific sampling and information (The use of the Geographical Database option is not acceptable to TCEQ).

The following methods may be used for estimating flash emissions:

1. There are several different process simulators computer programs (WinSim, Designer II, EPCON, HYSIM, HYSIS, and PROMAX, etc.). The software is accurate when based on a site-specific sample and analysis. Flash emissions must be combined with 100% of working and breathing emissions from Tanks 4.0 before submitted as representative of produced water emissions. The majority of simulators are not capable of calculating emissions from working and breathing.

2. *AQUAlibrium* was developed for calculating the fluid phase equilibria in systems composed of sweet and sour natural gas (sour gas contains H_2S) and acid gases (hydrogen sulfide and carbon dioxide) in the presence of water. Flash emissions must be combined with 100% of working and breathing emissions from Tanks 4.0 before submitted as representative of produced water emissions.

3. Laboratory measurement of the *Gas-Oil-Ratio (GOR)* from a pressurized liquid sample is a direct laboratory analysis of the flash gas emitted from a pressurized water sample. Flash emissions must be combined with 100% of working and breathing emissions from Tanks 4.0 before submitted as representative of produced water emissions.

4. The *Vasquez-Beggs Equation* (VBE) is a calculation method based on empirical data. The VBE variables must be supported with a lab sampling analysis that verifies the American Petroleum Institute (API) gravity, separator gas gravity, stock tank gas molecular weight, and VOC fraction. If an operating variable used in the VBE calculations falls outside of the parameter limits, the applicant must use another method to calculate flash emissions. Flash emissions must be combined with 100% of working and breathing emissions from Tanks 4.0 before submitted as representative of produced water emissions.

The TCEQ always prefers that the most accurate emission estimates be submitted, based on site-specific, representative worst-case data when possible. Therefore it is preferred that the Vasquez-Beggs method is not used. However, if an applicant can justify a method is capable of representing an accurate estimation of emissions, it will be considered by the commission. If applicants choose to use the Vasquez-Beggs Equation, they should be aware of the risk of potentially underestimating emissions at a site. Regardless of which method is used to calculate produced water emissions, verification of the inputs and calculation methods are required. If produced water tanks are being quantified at an existing production site, the emission calculations should be determined from site-specific sampling or analysis. If a site is not yet in operation, information from sister-sites, nearby sites on the same field, or other empirical data may be used with a justification as to why that information is appropriate. Appropriate controls for produced water tanks are the same as those for other storage tanks, assuming there is sufficient quantity of VOC or H_2S.

Endnotes:

1. Jacobs, R.P.W.M., R.O.H. Grant, J. Kwant, J.M. Marqueine, and E. Mentzer, 1992, "The Composition of Produced Water from Shell Operated Oil and Gas Production in the North Sea," *Produced Water,* J.P. Ray and F.R. Englehart (eds.), Plenum Press, New York.

2. Stephenson, M.T., 1992, "A Survey of Produced Water Studies," in *Produced Water*, J.P. Ray and F.R. Englehart (eds.), Plenum Press, New York.

3. Utvik, T.I., 2003 "Composition and Characteristics of Produced Water in the North Sea," Produced Water Workshop, Aberdeen, Scotland, March 26-27.

Attachment 2
Optical Gas Imaging Technology

The EPA requested comment regarding the use of optical gas imaging as a sole compliance tool for the proposed leak detection and repair (LDAR) requirements. The TCEQ has serious concerns about the inconsistency basing compliance solely on the use of optical gas imaging would create compared to TCEQ and other states current enforcement practices for LDAR. This technology has both quantification and speciation limitations. The TCEQ is concerned that the inability of optical gas imaging technology to quantify leaks makes this method impractical for permitting applicability determinations and compliance demonstrations. The TCEQ supports the use of optical gas imaging instruments as an effective means of detecting leaks when the technology is used appropriately. However, the TCEQ has concerns with enforcement of the proposed LDAR requirements if based solely on optical gas imaging. Additionally, the EPA has not provided guidance on quantification of emissions when detected using only optical gas imaging.

Optical gas imaging instruments provide an effective tool for detecting leaks as part of traditional and non-traditional LDAR programs. However, as the TCEQ has indicated in comments submitted to the EPA when the federal Alternative Work Practice was proposed for 40 Code of Federal Regulations (CFR) Part 60, §60.18 and Part 63, §63.11, the effectiveness of an optical gas imaging instrument is highly dependent on the training and expertise of the operator. The EPA should adopt minimum training requirements for operators of optical gas imaging instruments that will be using the technology for compliance purposes. The TCEQ has adopted an alternative work practice, similar to the EPA's federal Alternative Work Practice, for using optical gas imaging as a compliance option for the LDAR rules in 30 Texas Administrative Code (TAC) Chapter 115 rules that are part of the Texas' state implementation plan. The TCEQ incorporated minimum initial and on-going training requirements for operators of optical gas imaging instruments in 30 TAC §115.358. Other requirements were included in the TCEQ's Chapter 115 Alternative Work Practice to help ensure proper operation and enforcement of the LDAR programs when optical gas imaging instruments were used to conduct LDAR screening, such as requiring each operator to conduct the daily instrument check. Additional discussion regarding the TCEQ's training requirements and other enhancements for the use of optical gas imaging instruments may be found in the final rules and the preamble of the Chapter 115 rulemaking in the June 18, 2010, publication of the *Texas Register* (35 TexReg 5293).

As noted above, an LDAR program based solely on optical gas imaging also creates a problem with quantification of emissions. A key limitation of optical gas imaging is that the currently available technology is not capable of quantifying emissions. The TCEQ and others commented on this issue when the EPA proposed the federal Alternative Work Practice. In response to these comments (73 FR 78207) in the December 22, 2008, *Federal Register* publication of the final rule, the EPA acknowledged this limitation and the need for new quantification approaches. The EPA also indicated that they would work with stakeholders to develop the necessary tools for quantification. However, the EPA has not issued any guidance for how to quantify emissions detected with optical gas imaging. If the EPA decides to allow optical gas imaging as the sole demonstration of compliance for the proposed LDAR requirements, the EPA must provide guidance on estimating emissions when optical gas imaging is used to detect leaks.

If the EPA is considering different options to provide greater incentives for companies to use optical gas imaging, the TCEQ suggests that the EPA consider different options for a combination approach of optical gas-imaging and Method 21 rather than relying solely on optical gas imaging. A possible approach would be to require Method 21 on leaks detected with the camera rather than require an annual Method 21 on all components screened with the Alternative Work Practice. This approach would address the issue of quantification of leaks detected with optical gas imaging. Another option is that the EPA could consider leak-skip options for the annual Method 21.

Attachment 3
Suggestions for Compliance Assistance and Outreach to Small Operators

Tool Suggestions:

TCEQ recommends EPA develop an applicability guide, written in plain, industry language, for the new NSPS Subpart OOOO, including how the new subpart OOOO interacts with subparts KKK and LLL. This guide should include a description of how and when existing equipment would become applicable to the NSPS Subpart OOOO and should include examples.

TCEQ recommends EPA also develop plain language compliance guides explaining how the rules apply to specific pieces of equipment or activities, including the following components for each piece of equipment or activity:

1. Applicability of the NSPS or NESHAP to the specific pieces of equipment or activity;
2. Real-world, simple instructions on how to comply with the rule;
3. Any exceptions to the requirements described in plain language; and
4. Required paperwork templates with examples.

An individual guide (or a specific section in an overall guide) would be appropriate for each of the following pieces of equipment or activities for the NSPS:

- Fracturing operations (explaining reduced emission completions or "green completions");
- Pneumatic controllers;
- Centrifugal and reciprocating compressors;
- Storage vessels; and
- Startup, shutdown, and malfunctions.

An individual guide (or a specific section in an overall guide) would be appropriate for each of the following pieces of equipment or activities for the NESHAP:

- Small dehydrators;
- Storage vessels;
- Non-flare combustion devices; and
- Startup, shutdown, and malfunctions.

Outreach:

TCEQ recommends EPA conduct or provide funding for states to conduct outreach to small operators via trade associations, directed mailings using lists from SIC/NAICS codes, and press release announcements once the tools are complete. Also TCEQ recommends EPA notify the state enforcement authorities (delegated administrators and local programs) and the Small Business assistance programs.

Example format for individual guides:

Activity/Equipment (i.e. Fracturing operations)

1. Applicability – describe what type of activity is applicable to the subpart, including how and when an existing, modified or new facility would be affected. (i.e. Fracturing of new wells and refracturing of existing wells after August 23, 2011 is subject to the requirements in NSPS subpart OOOO.)
2. Compliance – explain in simple, industry language how to comply with the requirements in the subpart. A bulleted or checklist format would be easy to follow.

   (i.e. - fracturing operations must be conducted as reduced emissions completions (REC) or "green completions" including:

   1. Do this (i.e. recover emissions from fracturing by _____ .)
   2. And this (i.e. also recover emissions by _____.)
   3. Or this (emissions that cannot be recovered may be pit flared)
3. Exceptions – list any exceptions to the subpart
4. Recordkeeping – list what types of records are required to show compliance, and how long each must be maintained, and include examples. (i.e. production records of gas recovered and sent via the pipeline or amount of gas flared)