
Texas Natural Resource Conservation Commission

INTEROFFICE MEMORANDUM

To: Herb Williams, Division Director,
Air Policy and Regulations Division

Date: September, 1997

From: Steve Akers, P.E., Operating Permits Division
Randy Hamilton P.E., Air Policy and Regulations Division
Scott Humphrey, Legal Services Division
Anne Inman, New Source Review Permits Division
Kurt Jacquin, Field Operations Division
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Subject: Recommendation for addition and clarification of definitions in Chapter 101 and 115, concerning the terms “enclosed vapor combustion unit”, “flare”, and “incinerator”.

Rulemaking Proposal

The Rule Interpretation Team (RIT) was requested to make an interpretation concerning whether an “Enclosed Vapor Combustion Unit” is subject to the temperature monitoring and recording requirements of 30 Texas Admin. Code (30 TAC) 115.216(a)(2)(A). After reviewing the information associated with the development of this rule, the RIT could not reach a consensus on the applicable regulations regarding enclosed vapor combustion units.

The RIT is forwarding its evaluation and opinions on this issue to the Air Policy and Regulations Division (APRD) for further action. At this time, the Team would recommend that APRD sponsor rulemaking to clarify existing terms (“incinerator”) and add new terms (clearly defining “flare” and “enclosed vapor combustion unit”) for Chapter 115 and 111 as appropriate. Along with these new definitions, it is also suggested that Monitoring and Recordkeeping Requirement Sections of Chapter 115 be revised for situations when a flare or enclosed vapor combustor unit is used as a control device.

Recommended Enforcement Policy

During the interim period while the rule is in the process of being revised, it is the opinion of the RIT, as supported by the Enforcement Division, that the following guidance should be used when interpreting § 115.216(a)(2)(A) and similar monitoring and recordkeeping sections in Chapter 115:

If a company has tested or has been monitoring an enclosed vapor combustion unit in the past as flare, then the company should continue to monitor the enclosed vapor combustion unit as a flare, per the requirements of Chapter 111.

If a company has tested or has been monitoring an enclosed vapor combustion unit in the past as an incinerator, then the company should continue to monitor the enclosed vapor combustion unit as an incinerator, per the requirements of Chapter 115.

For a company which uses an enclosed vapor combustor unit as a control device and fails to conduct monitoring per Chapter 111 (flares) or Chapter 115 (direct-flame incineration), the company will be considered to be in violation of the monitoring and recordkeeping requirements of Chapter 115, whichever is determined by the Executive Director to be most applicable based on the technical characteristics of the equipment and the waste gas streams.

Recommended Permits Policy

New or modified facilities which need to obtain authorization via the NSRP permitting process will be reviewed on a case-by-case basis. Units will be permitted, and applicable requirements specified, based on their unique design and operating parameters as represented and reviewed by TNRCC staff.

Summary

The above-mentioned recommendations are based on a compromise proposal developed by the RIT members after reaching an impasse based on two distinct rule interpretations held by the represented divisions. The compromise recognizes that abatement systems have changed during the last decade, and the current rule language does not specifically address, nor did the background documents anticipate, the technical changes which have occurred, nor the actual equipment designs used in the field. In this case, some enclosed vapor combustion units would not be considered as either flares or incinerators, but would become a separate and distinct type of control device, with unique and specific monitoring and recordkeeping requirements.

The following pages contain a summary of the two evaluations performed by RIT members. These evaluations are included in their original form as developed by their respective sponsors.

Attachment A: Background Information from the Enforcement Division summarizes the options as developed by Enforcement Division staff and supports the interpretation that enclosed vapor combustors should be considered as incinerators.

Attachment B: Background Information from the Operating Permits and New Source Review Permits Divisions outlines the evaluation and opinions of the Permits Divisions staff and supports the opinion that rulemaking is needed to clarify the technical deficiencies recognized in the current rules.

Should you have any questions concerning these recommendations please contact any of the RIT members. They are; Steve Akers (ext. 1141), Randy Hamilton (ext. 1512), Scott Humphrey (ext. 0574), Anne Inman (ext. 1276), Kurt Jacquin (ext. 1445), or Keith Sheedy (ext. 1556).

Additional Note:

If APRD pursues rulemaking to clarify the definitions in Chapter 115, the NSRP Division would also like to suggest developing a distinction between “incinerator” and “thermal oxidizer”. In the realm of public opinion, the term “incinerator” denotes a solid-waste incineration device and many local governments have passed ordinances banning the construction and operation of “incinerators”. In addition, the term “thermal oxidizer” is being used by industry and the public to denote units which chemically convert, by applied heat in a controlled environment, gaseous waste streams to less harmful components.

In the opinion of the Enforcement Division, there are three alternatives available under the TNRCC rules to address this issue of an enclosed vapor combustion units being subject to § 115.216(a)(2)(A) monitoring and recordkeeping rules:

The **first** option is to call an enclosed vapor combustion unit a flare, and monitor it as a flare.

The **second** option is to say the enclosed vapor combustion unit fits the definition of an incinerator, and it must be monitored as an incinerator.

The **third** option is to treat the enclosed vapor combustion unit as neither a flare, nor an incinerator, but consider it as a separate control device, which has no monitoring requirement.

Option One - Enclosed Vapor Combustion unit as a Flare

The problem with proposing an enclosed vapor combustion unit as a flare, with flare monitoring methods, ignores a very serious problem with these units. When a flare is enclosed, it may not control emissions to the same degree as a flare which has full exposure to air. The EPA has indicated this in the “Gasoline Distribution Industry (Stage 1) - Background Information for Promulgated Standards”, EPA-453/R-94002b, November 1994 document for § 63.420, Subpart R. In the background document, paragraph 5.2, EPA stated:

The EPA believes that these test results (relating to enclosed flares) may not necessarily be representative of performance of all enclosed-flame flares because locating the burner within a stack may create a situation in which the combustor process is deprived of the oxygen needed for complete combustion, thereby reducing the control efficiency and increasing the emission rate.

What is considered to be a flare by the EPA in § 60.18 is limited to non-assisted, steam-assisted, and air-assisted flares. In the Federal Register (51 FR 2701, Jan 21, 1986) when adopting § 60.18, EPA was clear the *Radian Flare Study* was the basis of the rule. Therefore, this limits the applicability of § 60.18 to flares with identical design specifications to those tested in the study. Because there were no tests conducted on enclosed flares, the EPA does not consider enclosed vapor combustors applicable to § 60.18. Some confusion regarding this issue was created when EPA made an inconsistent determination in a letter dated July 7, 1992. When this determination was questioned, the EPA revised their response in a letter dated March 5, 1996, and stated that vapor combustors can not be tested as flares. The EPA was asked to reconfirm this determination, and they stated again in a letter of July 12, 1996, vapor combustors do not meet the design specification, *i.e.* configuration, for § 60.18 flares. Therefore, it is clear that EPA does not consider enclosed vapor combustors as flares, because the flares of § 60.18 do not control the amount of air that reaches the flame, the way enclosed vapor combustion unit’s control the amount of air to the flame.

In Subpart R, 40 CFR § 63.420, National Emission Standards for Gasoline Distribution Facilities (Bulk Gasoline Terminals and Pipeline Breakout Stations) background document EPA, paragraph 5.2 stated: “The thermal incineration devices in the data base (for rule development) consisted of systems with enclosed combustion areas, which allowed samples of the exhaust gases to be collected and analyzed for hydrocarbon content.” This statement was given in response to a question concerning flares and enclosed flares. Again, EPA is clear in their intent to have vapor combustors (enclosed flares) exhaust emissions tested and monitored: And they do not consider enclosed vapor combustion unit’s as flares.

In developing Subpart XX, 40 CFR Part 60, Standards of Performance for Bulk Gasoline Terminals, the EPA did not consider the use of flares as control devices. The regulation is clear, an enclosed vapor combustion unit is not to be tested as a flare, because this Subpart specifies test methods and procedures that are not applicable to flares under § 60.18. Subpart XX states a combustion vapor processing system (defined in Subpart XX), shall use Method 2B (*Determination of Exhaust Gas Volume Flow Rate From Gasoline Vapor Incinerators*), as mandated in § 60.503(c)(5)(i), to measure the volume of vapor mixture exhausted at each test interval. Both a flare and the enclosed vapor combustion unit are combustion devices. Method 2B is not a method authorized for § 60.18 flare testing. Since Method 2B is used to measure exhaust stack velocities, it appears Subpart XX did not envision using flares as control devices or using the § 60.18 flare testing regulations. In addition, the preamble to the proposed Subpart XX (45 FR 83126) listed the control technologies evaluated by EPA, and flares were not included as potential control devices in the evaluation.

Subpart BB, 40 CFR 61, National Emission Standard for Benzene Emissions From Benzene Transfer Operations, states that flares may be used if they meet the requirements of §§ 60.18(b) through (f), and there must be a continuous flame present during the entire loading cycle. This Subpart does make the distinction between combustion devices; incinerator, flare, steam generating unit or process heater, all of which can be used as control devices. However, the rule does not identify vapor combustors (enclosed flares) as such, and inclusion of them as a control device under this regulation would imply they fit one of the listed categories or are covered by § 61.303(e). Section 61.303(e), provides for monitoring of control devices, which are not determined to be a flare, incinerator, steam generating unit, process heater or carbon absorber by the EPA. Use of this provision requires EPA approval. Approval from the EPA, as determined from its letters, documents and Federal Register comments, would require exhaust monitoring for vapor combustors. So it can be concluded, from the Federal Regulations, the EPA recognize the difference between flares, incinerators and other devices like enclosed vapor combustors as separate control devices.

The only Federal standard which currently contains a definition for a flare is NSPS Subpart WWW for Municipal Solid Waste Landfills. This Subpart defines a *flare* as, "...an open combustor without enclosure or shroud." This Subpart also contains a definition for "*enclosed combustor*" which is, "...an enclosed firebox which maintains a relatively constant limited peak temperature generally using a limited supply of combustion air. An enclosed flare is considered an enclosed combustor." Therefore by definition, an enclosed flare is considered an enclosed combustor, and a flare means a open combustor without enclosure or shroud. This statement is supported in EPA's letter of July 12, 1996, stating enclosed combustion devices do not meet the configuration requirements of the flares defined by § 60.18.

Additionally, 40 CFR § 265.1033, Subpart AA, *Air Emission Standard for Process Vents, (Owners and Operators of Hazardous Waste Facilities)* makes a distinction between a flare and an enclosed combustion device. This regulation is consistent with other Federal Regulations as to what is a flare, and what is a combustion device. An enclosed vapor combustion unit does not fit this regulation's definition of a flare.

Option Two - Enclosed Vapor Combustion Unit as an Incinerator Under TNRCC Rules.

The second option is that vapor combustors are incinerators under TNRCC rules. The definition for incinerator given in the States General Rules allows vapor combustors to be considered incinerators. The inclusion of vapor combustors into this definition is straight forward and does not require interpretation. As stated above, EPA has clearly determined enclosed vapor combustors should have their exhaust emissions directly tested to insure compliance with their loading regulations.

Option Three - Enclosed Vapor Combustion Unit as neither an Incinerator nor a flare Under TNRCC Rules.

The last option is that a vapor combustor is neither a flare nor an incinerator. The only support for this option is that vapor combustors (enclosed flares) have not historically been defined in the environmental community as an incinerator, and have somewhat been linked to flares.

Conclusions of the Enforcement Division

In reviewing the various options, the third option may be considered a good compromise between the other options, but for a serious concern. This option would not require monitoring of the control device under § 115.216. This is a concern, since vapor combustors do not have a proven or accepted control efficiency. Under this choice, sources may operate with emissions above what is allowed under the rule. Utilizing this approach would require encompassing a definition for incinerator which differs from that already given in the rules, and should require rule making.

For the State rule a vapor combustor could also be included in the flare category. Choice of this option would have the same concerns as expressed above. In addition, it would be contrary to what the EPA has defined by § 60.18 and § 63.11 as to what is an approved flare. Choosing either of these two options would be in conflict with Federal Regulations, by having different initial performance tests and compliance requirements for the same control device.

The development and wording of Federal Regulations dealing with loading facilities and other Federal Regulations support the concept that vapor combustors were not intended to be treated as open flares. Vapor combustors clearly fit the incinerator definition of the TNRCC and the intent of § 115.216, to have the loading rack control devices monitored when a destruction efficiency may not be assured for that type of control device operating under varied conditions. In each applicable Subpart discussed above, EPA has consistently shown that enclosed vapor combustion device are not flares, and are not to be tested as flares.

In the opinion of the Operating Permits and New Source Review Permits Divisions, the primary issue is whether vapor combustion units or enclosed flares located at gasoline bulk distribution terminals are incinerators and thus subject to the temperature monitoring requirements of 30 TAC 115.216(a)(2)(A). However, this determination will also affect other types of facilities utilizing these types of control devices.

The TNRCC has received conflicting opinions (discussed below) from EPA regarding whether these units are flares subject to the requirements of 40 CFR 60.18 or whether they are incinerators and must be tested as incinerators. The federal rules themselves are not very clear on this issue and also appear to contain conflicts. In fact, there are four federal Standards of Performance for New Stationary Sources (NSPS), one National Emission Standard for Hazardous Air Pollutants (NESHAPS) and three National Emission Standards for Hazardous Air Pollutants for Source Categories (MACT) which contain a definition for incinerator. These eight federal standards contain six different definitions for incinerator.

For state purposes, an incinerator is defined in 30 TAC 101.1 as “an enclosed combustion apparatus and appurtenances thereto which is used in the process of burning wastes for the primary purpose of reducing its volume and weight by removing the combustibles of the waste and which is equipped with a flue for conducting products of combustion to the atmosphere.” By definition, as a vent control device, a vapor combustion unit can meet the definition of an incinerator under the State rules. However, this definition has been in the general rules since at least 1972. Although there were a small number of these units around (primarily in Europe) at that time, they did not begin to come into widespread use until the mid to late-1980s. Therefore, vapor combustion units were not even considered at the time the definition was created.

Federal definitions are varied. NSPS Subpart XX for Bulk Gasoline Terminals (NSPS XX), does not contain a definition for incinerator, nor does it require incineration as a control measure. MACT Subpart R for Gasoline Distribution Facilities (MACT R), also does not contain a definition for incinerator. NESHAPS Subpart BB, for Benzene Emissions from Benzene Transfer Operations (NESHAPS BB) defines an incinerator as, “any enclosed combustion device that is used for destroying organic compounds and that does not extract energy in the form of steam or process heat. These devices do not rely on the heating value of the waste gas to sustain efficient combustion. Auxiliary fuel is burned in the device and the heat from the fuel flame heats the waste gas to combustion temperature. Temperature is controlled by controlling combustion air or fuel.” Vapor Combustors would not appear to meet this definition since once the unit is started, the heating value of the waste gas is generally sufficient to sustain combustion and auxiliary fuel is only rarely used.

None of these federal regulations for control of loading emissions contain a definition of a flare. However, at the time of proposal for NESHAPS BB, the preamble defined a flare as, “An emissions control device that uses an open flame for combustion of gases to destroy organic compounds.” (54 FR 38084) At the time of NESHAPS BB proposal, EPA also proposed NESHAPS DD for Benzene Emissions from Bulk Gasoline Terminals. NESHAPS DD was never promulgated; however, in the Control Techniques section of the preamble, EPA stated “Current flares can be open or enclosed (shielded) and may be air assisted.” (54 FR 38106)

In its description of control techniques, the background information document for MACT R says, “Typical thermal oxidation units include elevated flares, enclosed flares, and temperature controlled combustors (including those devices where only the combustion air is controlled).” The document then goes on to provide descriptions and diagrams for these devices, referring to them as elevated flares, enclosed flares, and temperature controlled flares. (See Gasoline Distribution Industry (Stage I) - Background Information for Proposed Standards, pp 4-8 through 4-13) The final MACT R states in 40 CFR 63.425, “If a flare is used to control emissions, and emissions from this device cannot be measured using these methods and procedures, the provisions of §63.11(b) shall apply.” The requirements of §63.11(b) are equivalent to §60.18(b).

The only federal standard which currently contains a definition for a flare is NSPS WWW for Municipal Solid Waste Landfills. This subpart defines a flare as, “...an open combustor without enclosure or shroud.” This subpart also contains a definition for “enclosed combustor” which is, “...an enclosed firebox which maintains a relatively constant limited peak temperature generally using a limited supply of combustion air. An enclosed flare is considered an enclosed combustor.” This subpart falls short of calling these units incinerators, and in fact, does not contain a definition for incinerator. It also appears to leave some uncertainty as to whether those enclosed devices which do not have temperature or air control are flares, enclosed combustors, or something else entirely.

In 1992, Cubix Corporation, a source sampling company, wrote a letter to EPA’s Emission Measurement Branch requesting clarification and approval to use Method 2B to test a vapor combustor located at a gasoline loading facility. Method 2B is used to determine the flow rate through a combustor using a carbon balance approach. Since this method measures both inlet and outlet organic concentrations as carbon or propane, it can also be used to determine a destruction efficiency. In a letter dated July 7, 1992, EPA responded that the vapor combustor described in the Cubix letter met the definition of an enclosed flare and should be tested using the procedures outlined in 40 CFR 60.18. The letter stated that this opinion had been coordinated within EPA and the then Texas Air Control Board. In a letter dated March 5, 1996, Les Evans of EPA’s Organic Chemicals Group responded to a request from the TNRCC’s Jon Edwards for an opinion on whether vapor combustors are flares or incinerators. Mr. Evans wrote, “The device described” (referring to the description in the 1992 Cubix letter) “is not a flare in the sense that we use the term, and it should not be tested as a flare. It should be considered an incinerator and tested for 98 percent efficiency.” This letter was followed by a second letter dated July 12, 1996 from Ms. Susan R. Wyatt, Group Leader, Organic Chemicals Group. This letter agreed with Mr. Evans’ opinion that these units are incinerators. The letter also explained that EPA did not consider the units flares because they did not meet the design criteria of the flares used in the testing to develop 40 CFR 60.18. This testing was conducted in the early to mid-1980s. As mentioned above, vapor combustors or enclosed flares did not even begin to be used in large numbers in the U.S. until the mid-1980s, so they were probably not considered in this testing program.

Rationale:

In developing this determination, there are really two questions. The first question is, “are vapor combustors or enclosed flares really incinerators?” The answer to this question is “No,” for the following reasons:

- 1) The definition contained in 30 TAC Chapter 101 was written several years prior to the wide-spread use of enclosed flares and has not been updated since at least 1972.
- 2) A determination that these units are incinerators will cause many companies to opt for elevated flares for control rather than enclosed flares in order to avoid the additional expense of temperature monitoring and stack testing. This does not make sense at a time when many public interest and environmental groups are encouraging industry to install enclosed flares for aesthetic reasons. It also does not make sense from a technical perspective since vapor combustors or enclosed flares are probably more efficient at destroying the waste material because the material is exposed to a higher temperature for a longer period of time and the wind effects are minimized.
- 3) Enclosed flares are not designed to meet the 99.9 or 99.99% destruction efficiency normally associated with direct-flame incinerators.
- 4) Many enclosed flares do not have temperature control, and some do not even have any form of air damper control. Most are either natural draft or have only small blowers designed to increase flame turbulence in order to keep the unit smokeless. Incinerators are normally forced air and designed with a combustion chamber that is larger than the stack in order to achieve some degree of recirculation and thus the higher temperatures needed for high destruction efficiencies. Vapor combustors or enclosed flares are typically a single diameter with low residence times and flame lengths that reach almost the entire height of the unit.
- 5) Enclosed flares are designed the same as an elevated flare except for the shroud which may or may not be refractory lined. They even use the same burners as elevated flares.
- 6) Just because an enclosed flare does not meet the design criteria used to establish 40 CFR 60.18 does not mean that it is an incinerator and not a flare.
- 7) Although much of EPA’s guidance is conflicting, the written material developed to support their own rulemaking seems to acknowledge that these units are flares, and nowhere does it state that they are incinerators.

Analysis of Impacts/Consequences of Determination:

- 1) Federal rules for gasoline distribution terminals would not be affected except for clarifying the probable intent for stack testing in NSPS XX.
- 2) Gasoline terminals will have to keep a daily log according to § 30 TAC 111.111(a)(4) since they would be defined as flares.
- 3) The New Source Review Division's ability to determine whether a unit should be required to stack test or meet the design and operational requirements of 40 CFR 60.18 on a case-by-case basis will not be affected.
- 4) Using enclosed vapor combustion units in other applications for VOC control, will not require these units to meet the requirements of direct-flame incinerators in vent gas control of 30 TAC 115.121.
- 5) Facilities which are not subject to federal rules and facilities without any case specific need for directly determining destruction efficiency will be spared the expense of stack sampling and/or temperature monitoring and recording.
- 6) The definition of incinerator contained in 30 TAC 101.1 should be updated and a definition for flare added.