GUIDANCE FOR 40 CFR 63 SUBPART HHH NATURAL GAS TRANSMISSION AND STORAGE MACT STANDARD

Final

Prepared for:

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GRI®

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MACT STANDARD

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DISCLAIMER

This MACT standard was promulgated on June 17, 1999. Given the short period of time between promulgation of the standards and completion of this guidance and the U.S. Environmental Protection Agency's (EPA's) history of issuing technical clarifications to MACT standards as they have been implemented by regulated industries, users of this guidance are encouraged to contact the Colorado Department of Public Health and Environment, Air Pollution Control Division, and/or EPA as necessary for clarifications. Also, given that the guidance represents a summary of information in the rule and preamble, users of the guidance are encourage to consult the language of the rule itself as needed, since the rule is the final legal authority.

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1.0 Transmission and Storage (T&S) MACT Overview

1.1 Introduction

Under the 1990 Clean Air Act Amendments, the U.S. Environmental Protection Agency (EPA) is directed to develop national emission standards for hazardous air pollutants (NESHAP) to control emissions of hazardous air pollutants (HAPs) from both existing and new major sources. The statute requires the standards to reflect the maximum degree of reduction in HAP emissions that is achievable based on control technology in use. In addition, higher levels of control may be required but must take into consideration the cost of achieving the emission reduction, any non-air quality health and environmental impacts, and energy requirements.

On June 17, 1999, the EPA promulgated final maximum achievable control technology (MACT) standards for the Natural Gas Transmission and Storage (T&S) industry. For the purposes of the rule, natural gas transmission and storage is defined as beginning at the entry point to the transmission line and ending at the transfer to the local distribution company (LDC), or to the end user if there is no LDC. The entry point to the transmission line is considered to be after the natural gas processing plant, or after lease custody transfer if there is no natural gas processing plant.

The T&S MACT rule becomes Subpart HHH of Chapter 40 of the *Code of Federal Regulations* (CFR) Part 63. Facilities subject to Subparts HHH are also subject to certain sections of the general provisions as given in Subpart A of 40 CFR Part 63.

1.2 Summary of Pollutants and Regulated Sources

The primary HAPs of concern are benzene, toluene, ethylbenzene, mixed xylenes (all three isomers), cumulatively referred to as BTEX, and n-hexane, although implementation of the rule is focused on benzene (i.e., emission cutoffs or exemptions are based on benzene). Also listed are acetaldehyde, carbon disulfide, carbonyl sulfide, ethylene glycol, formaldehyde, naphthalene, and 2,2,4-trimethylpentane. However, with the possible exception of 2,2,4-trimethylpentane, the other HAPs listed in the final rule are typically present at trace levels (or less) and won't significantly affect whether a source is covered by the rule.

This rule establishes control requirements for HAP emissions from certain glycol dehydrators located at major sources in the T&S industry; facilities without dehydrators are not

covered by Subpart HHH. Associated with the control requirements are performance testing and monitoring requirements, as well as recordkeeping and reporting provisions that document compliance.

For determining if the facility is a major source, all HAP emission points, including compressors, must be included. The rule establishes provisions for calculating HAP emissions that are different than what users may have done in previous instances, such as Title V operating permits. For more details on whether a source is affected by the rule, see Section 4 on applicability.

Facilities and units exempted from the rules based on throughput or emission cutoffs must be able to demonstrate that exemptions are met when controls are not applied or when existing controls are federally enforceable and reduce emissions sufficiently to meet exemption criteria.

1.3 Contents of Guidance

The remainder of this document presents an overview of key background information for the T&S MACT standards, a description of the equipment covered by the rule, applicability requirements, pollution prevention opportunities, a detailed summary of rule requirements, inspection checklists, frequently asked questions, and a glossary of key terms. The appendices contain sample forms and fact sheets (short summaries of the key sections).

1.4 Additional Information Resources

There are several sources of information that can be used to understand and interpret the T&S MACT rule. A good source of information on EPA's approach to the rule is the preamble published in the Federal Register. The preamble and the rule can be found on EPA's Technology Transfer (TTN) web site (address and instructions listed below). Another useful document that can be obtained from this web site is the Background Information Document (BID) prepared by EPA. This document contains the comments EPA received on the draft rule and EPA's responses to those comments. Answers to questions that arise in applying the regulations can sometimes be found in the BID document. Future EPA documents on the regulations will also likely be available on the TTN web site.

The address for EPA's TTN web site is *www.epa.gov/ttn*. The area that contains information on MACT standards is in the portion of the web site for the Office of Air and Radiation's Policy and Guidance (OAR P&G). On the TTN home page select OAR P&G. By clicking on "what's new" at this site, the user gains access to a list of all actions taken within the last 12 months and can download the files containing the rule and background information.

Another way to reach information on MACT standards from the OAR P&G screen is to select "Actions Sorted By CAA Title." At the next screen, select "Hazardous Air Pollutants (Title III)." This selection takes you to a screen that allows you to choose items listed under the headings: Federal Register Notices, Reports, Memoranda, and Fact Sheets.

- The preamble and rule can be found by choosing "Proposed and Final Preambles and Rules" under the Federal Register Notices heading.
- The BID document can be found by selecting "Background Information Documents" under the Reports heading.
- There is also a fact sheet on the MACT standard that can be found by selecting "Fact Sheets."

Another section of the TTN web site that may be useful is the Clearinghouse for Inventories and Emission factors (CHIEF). CHIEF can be found at *www.epa.gov/ttn/chief* or by selecting "CHIEF" from the TTN home page. CHIEF contains emission factors for a variety of sources.

In addition to information available from EPA, there is an abundance of information on oil and natural gas equipment and emissions available from the Gas Research Institute's (GRI's) web site. The address for GRI's site is *www.gri.org*. This site contains detailed information on GRI's overall research program, including their air quality program (listed under "technical information" and "environment and safety research"). For detailed information on glycol dehydration unit operations, from the home page, look under "quick find" and click on "explore selected technical solutions" to get to *www.gri.org/pub/solutions/glycol*.

2.0 Summary of Unique Considerations for the T&S MACT Standard

In developing Subpart HHH, EPA had extensive conversations with the transmission and storage industry on several key issues. Section 2.1 describes considerations for potential to emit, with background on storage field withdrawal practices, while Sections 2.2 through 2.5 address provisions for compliance, the definition of facility for this subpart, unique aspects of the dehydrator process vent standards, and EPA's concerns about the monitoring, recordkeeping, and reporting burden imposed on the industry.

2.1 Calculating Potential to Emit (PTE)

This section provides background on storage field withdrawal practices and a summary of special provisions for calculating PTE.

2.1.1 Storage Field Withdrawal Practices

A significant challenge that transmission and storage industry personnel face is the difficulty in predicting the gas withdrawal rate and composition from storage fields. The withdrawal rate may vary widely from day to day depending on the weather and the requirements of the LDC or end users during that weather. In addition, the number of days spent withdrawing gas from the storage field will likely vary from year to year, again depending primarily on the weather and the severity of the winter.

The composition of the gas is also especially important for this rule, since BTEX concentration in the natural gas is directly proportional to BTEX emissions from the dehydrator. Gas that is injected into the storage field may come from a variety of sources with a wide range of BTEX compositions. However, if the gas has been processed (i.e., if the natural gas liquids have been extracted), the BTEX composition will generally be relatively low (on the order of 10 to 150 ppm total BTEX typically).

A second factor that may affect gas composition is the timing of the withdrawal within the withdrawal season. As the operating pressure of the storage reservoir decreases during gas withdrawal, the production of hydrocarbon liquids, which will affect the equilibrium composition of BTEX in the gas, will vary. Early in the withdrawal season when the reservoir is full of gas, fluids from the reservoir will be primarily gas with small amounts of water and heavier hydrocarbons; however, production of hydrocarbon liquids and water will tend to

increase as the season progresses, and the vapor-liquid equilibrium will change as a function of the lower reservoir pressure so that concentrations of heavy hydrocarbons in the gas will increase.

As a result of these variations, the withdrawal rate and gas composition on any given day may or may not reflect the annual average withdrawal rate.

2.1.2 Special Provisions for Calculating Potential to Emit

To address the issues of varied withdrawal cycles, EPA developed a specific approach for calculating potential to emit for glycol dehydrators at storage facilities in the transmission and storage industry. This is described in more detail in Section 4, but essentially consists of the following elements:

- Based on the maximum (design) injection and withdrawal rates, calculate the length (in hours) of each injection and withdrawal cycle and the total number of possible cycles (with one cycle defined as injection and withdrawal) for the field.
- Using the total possible number of cycles and the length of the withdrawal cycle, calculate the maximum number of operating hours/year for the dehydrators.
- Calculate the maximum natural gas throughput based on the number of operating hours and the maximum withdrawal rate.
- Non-production parameters may be based on either the highest measured value or annual average values.

For facilities that only transport natural gas (e.g., compressor stations), the maximum facility-wide gas throughput is based on the highest actual annual natural gas throughput over the last five years, multiplied by a safety factor of 1.2. For facilities with fewer than five years of operating data (or new facilities), EPA recommends using the highest annual (or expected in the case of a new facility) throughput multiplied by 1.2, or the design capacity of the facility, whichever is greater.

The major source determination is based on uncontrolled emissions or controlled emissions with federally enforceable limits. EPA also developed from exemptions from the rule based on size (e.g., facilities that process less than 1 million standard cubic feet per day [MMscfd] of gas are exempt from the rule, while dehydrators that process less than 10 MMscfd

of gas or emit less than 1 ton per year (tpy) benzene are exempt. For more details, see Section 4.2).

EPA has extended the PTE transition policy until December 31, 1999, and is presently in rulemaking under Subpart A to address PTE issues. Under the 1995 PTE transition policy, sources with emissions less than 50% of major source thresholds may be deemed non-major by the local regulatory authority if records of actual emissions are kept, even if lower levels of emissions are not federally enforceable. Similarly, sources with emissions between 50 and 100% of major source thresholds may be considered non-major if they have State-enforceable or other practicably enforceable permit limits.

2.2 Special Provisions for Compliance Dates for Existing and New Major Sources

For existing sources (i.e., sources on which construction commenced before February 6, 1998) that are major sources, the compliance date is 3 years from the date of promulgation (i.e., the compliance date is June 17, 2002). However, for existing sources that are area (non-major) sources but that later become major sources, the compliance date is three years from the date that the source becomes major.

The rule is clear in stating that new sources (construction commenced on or after February 6, 1998) should be in compliance upon startup or upon becoming a major source, with the compliance notification due 180 days after the compliance date.

One potentially difficult scenario is when a new source that was originally an area source may become a major source at some point in the future. While EPA makes no special provisions for compliance for these sources, it should be recognized that it can be difficult for a company to know or predict whether a minor or exempt source will become a major source (for example, that a severe winter may increase gas throughput at compressor stations to historically high levels, which when coupled with a 1.2 safety factor, could cause a minor source to become major).

2.3 Definition of Facility

The definition of facility is important for understanding how this rule applies to the transmission and storage industry and how emissions are aggregated for major source determination. In many places of the 1990 Clean Air Act Amendments (CAAA), facilities were defined as sites that were contiguous and under common control by a company. However, for the transmission and storage industry, this definition could potentially lead to the aggregation of

emissions from sources such as dehydrators or compressors that are a substantial distance apart, since individual compressor stations and storage fields are connected by a pipeline that is controlled by one company. To avoid this unintended consequence, EPA developed a unique definition of facility for the transmission and storage industry. Key excerpts from the definition are as follows:

> Facility means any grouping of equipment where natural gas is processed, compressed, or stored prior to entering a pipeline to a local distribution company or (if there is no local distribution company) to a final end user. Examples of a facility in this source category are: an underground natural gas storage operation; or a natural gas compressor station that receives natural gas via pipeline, from an underground natural gas storage operation, or from a natural gas processing plant. The emission points associated with these…include, but are not limited to, dehydration and compressor station engines.
>
> Facility, for the purpose of major source determination, means natural gas transmission and storage equipment that is located inside the boundaries of an individual surface site (as defined in this section) and is connected by ancillary equipment, such as gas flow lines or power lines.
>
> Equipment…will typically be located within close proximity to other equipment…Natural gas transmission and storage equipment or groupings of equipment located on different…leases,...tracts,...or sites...shall not be considered part of the same facility.
>
> Surface site means any combination of one or more graded pad sites, gravel pad sites, foundations, platforms, or the immediate physical location upon which the equipment is physically affixed.

In the preamble to the rule, EPA explains that it intended that the facility definition should lead to an aggregation of emissions for major source determination that is reasonable, consistent with the intent of the Act, and easily implementable. Many of its decisions were clearly driven by the desire for the definition to be reasonable and easily implementable. For example, EPA does not believe it would be reasonable to aggregate emissions from surface sites that are located on the same lease but at great distances apart; nor is it reasonable to aggregate emissions from different leases. EPA also believes the terms of the definition (leases, tracts, surface sites) are well understood within the industry and by enforcement agencies.

Owners and operators of facilities after lease custody transfer (which includes the entire transmission and storage segment) must aggregate emissions from all HAP emission units at the facility when determining whether or not the facility is a major source. This primarily includes process vents, such as compressor engines and glycol dehydrators. However, the preamble

specifically mentions amine treaters and sulfur recovery units as potential emission points for HAPs for the oil and natural gas category, and it is likely that these would be included when they are present in the T&S category as well (e.g., at a natural gas storage field which is experiencing souring). (Emissions from amine units have been somewhat well-documented, while little data exists on potential HAPs from sulfur recovery units. EPA requested feedback and data on sulfur recovery units from industry during the proposal but received little/none since this information does not exist. It is generally believed that HAPs from sulfur recovery units are negligible).

EPA also notes in the preamble that natural gas storage fields should not qualify as production facilities (due to the definition of "field natural gas") under Subpart HH but as natural gas transmission and storage facilities under Subpart HHH, while a compressor station that transports gas to a natural gas processing plant is covered by Subpart HH for oil and natural gas rather than by HHH.

2.4 Glycol Dehydration Unit Process Vent Standards

2.4.1 Monitoring Requirements

MACT standards have monitoring, recordkeeping, and reporting provisions designed to ensure that the source is in continuous compliance with the standard. In many MACT standards promulgated to date, this has typically required measurements every 15 minutes to ensure compliance. However, the T&S MACT standards require regulated parameters to be measured at least once per hour and stipulate that the hourly data be used to calculate daily averages to determine compliance, except for condensers, which have their own special provisions.

2.4.2 Special Provisions for Condensers – Averaging Times

In the T&S industry, condensers are sometimes used to control emissions from glycol dehydrators. However, condensers (especially air-cooled condensers, as described in Section 3) may be subject to outlet temperature fluctuations, and therefore control efficiency fluctuations, due to ambient conditions. For example, an air-cooled condenser may not be able to achieve the 95% control efficiency required by Subpart HHH on a 90°F (or higher) summer afternoon in Colorado, but should easily achieve the 95% control during a cool summer evening at 65°F. It should also easily achieve greater than 95% during the 50°F and lower temperatures that are more typical of winter conditions, when withdrawal from storage fields is more likely to occur (EPA believes that most dehydrators in the T&S category are located at storage fields).

To address this summertime situation, Subpart HHH includes a special provision that allows compliance with the 95% control requirement to be calculated on a 30-day rolling average at transmission and storage facilities if condensers are used (data are still collected hourly, and daily averages are still calculated). Although not explicitly stated in the preamble, the language of the preamble clearly implies that the 30-day rolling average is calculated based on the last 30 operating days. This overall policy reflects EPA's belief that the longer averaging periods create no substantial change in emissions to the environment but significantly decrease the number of technical violations of the standard and reduce the administrative burdens for the industry and EPA.

2.4.3 Process Modifications

EPA has included provisions that allow an operator to achieve the 95% control reduction through a combination of process modifications and one or more control devices. EPA has not provided specific examples of these process modifications in the preamble, but they likely include installation of a flash tank and potentially the reduction of glycol circulation rate. In this case, the operator must also document the facility operations and provide this information in periodic reports.

2.5 Monitoring, Recordkeeping, and Reporting Burden

The monitoring, recordkeeping, and reporting (MRR) provisions are included in the standard to ensure that affected sources are in continuous compliance with the standard. However, EPA is sensitive to the MRR burden on both industry and the regulatory agencies, and cites the following five items in the preamble as its efforts to reduce this burden:

- Almost all reports have been consolidated into the Notification of Compliance Status report and the Periodic reports.
- If multiple tests are conducted for the same kind of emission point using the same test method, only one complete test report is required to be submitted, along with summaries of the results of other tests.
- Site-specific test plans describing quality assurance (QA) are not specifically required because the test methods in Subpart HH already contain applicable QA protocols.
- Periodic reports must be submitted semiannually for all facilities.
- The frequency of data collection for monitored parameters has been reduced to once per hour rather than once per 15 minutes, which is typical for other MACT standards.

3.0 Equipment Type: Glycol Dehydrators

The only sources that may be controlled under the T&S MACT are glycol dehydration units. A brief description of these units and their control options is provided below.

3.1 Purpose and Operation

Glycol dehydration units are commonly used in the natural gas industry to remove water from natural gas streams to prevent corrosion and hydrate formation in pipelines. The natural gas industry may have up to 40,000 glycol dehydration units in the U.S. Triethylene glycol (TEG) is the most commonly used solvent for dehydration because it offers greater dewpoint depression while minimizing glycol vapor losses.

An example glycol dehydration unit, as shown in Figure 3-1, consists of an absorber, a flash tank, heat exchanger(s), filter(s), a glycol reboiler still, and associated pumping and piping equipment. The moist natural gas enters the contactor, where water is removed by the glycol; hydrocarbons, including BTEX, are also absorbed. (BTEX compounds are usually present in the natural gas levels between 10 and 1,000 parts per million by volume [ppmv], although concentrations can be higher. For T&S sources, BTEX concentrations are typically lower, on the order of 10 to 150 ppmv.) From the absorber, the glycol flows to the flash tank (which is widely used on larger units and is less prevalent on smaller units), and the pressure of the rich glycol is decreased across a pump or valve. The flash tank removes a large fraction of the light hydrocarbons absorbed at higher pressure, and these are separated from the glycol by the pressure reduction.

Following the flash tank, the glycol is distilled to strip water and consequently BTEX and other VOC from the glycol. The still vent stream is typically greater than 90 volume % water, with the balance being hydrocarbons along with small quantities of carbon dioxide, nitrogen, and hydrogen sulfide (if present in the processed gas). The still vent stream is often released to the atmosphere, although control devices are becoming more common. An optional condensation control device is shown in the Figure 3-1 as an example. The recovered lean (dry) glycol is recycled for use in the absorber.

Figure 3-2 provides a picture of a glycol dehydrator in a production field. The pipe running diagonally across the photo acts as an aerial condenser and carries the reboiler vent condensate and noncondensable gas to a storage tank.

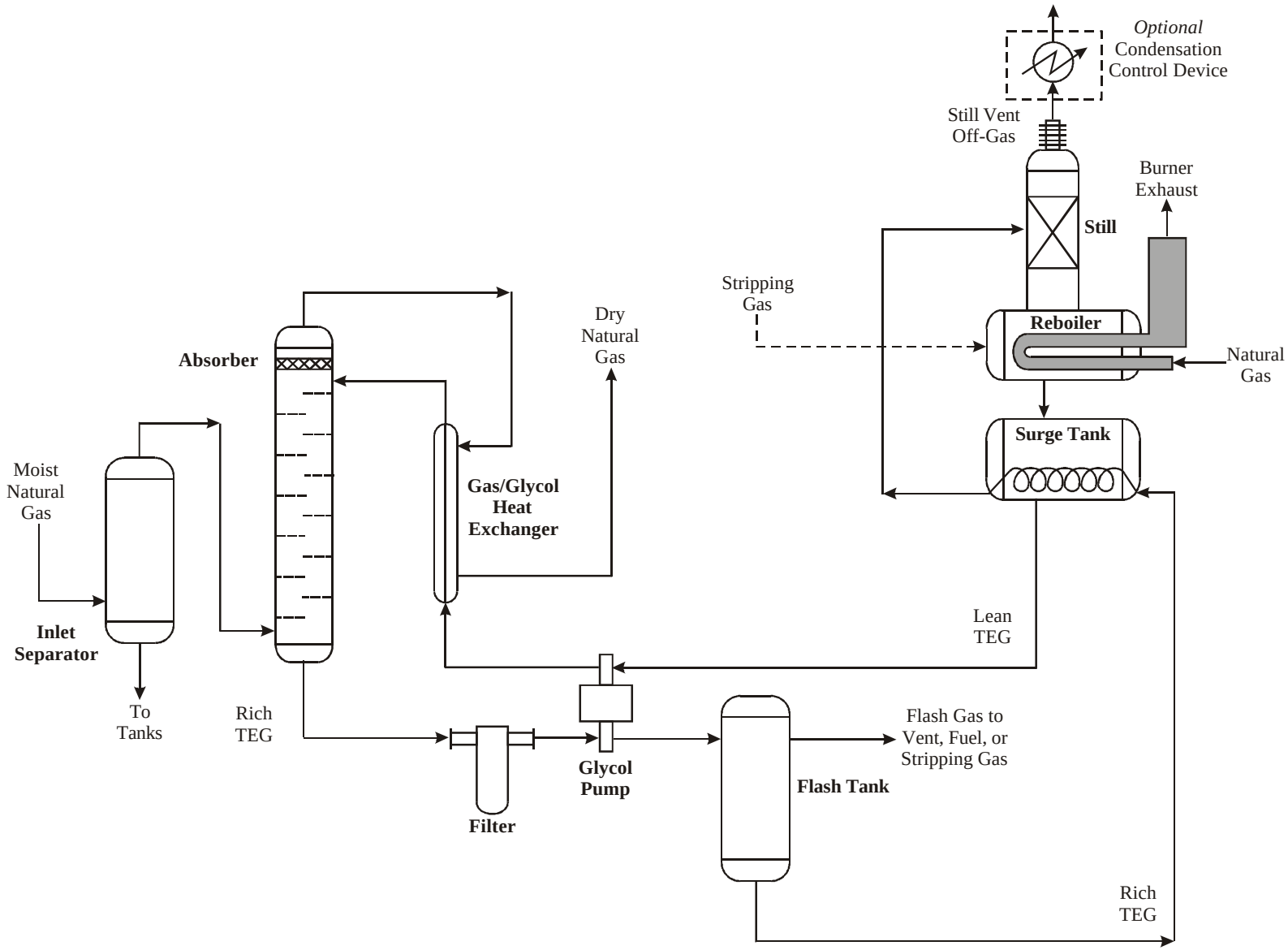

Figure 3-1. Process Flow Diagram for an Example Dehydration Unit

Figure 3-2. Glycol Dehydrator in a Production Field

3.2 Emissions

Hazardous air pollutants known to be emitted from glycol dehydrators include benzene, toluene, ethylbenzene, the xylene isomers, n-hexane, and, in some cases, 2,2,4-trimethylpentane (iso-octane).

Ethylene glycol, which is a common impurity in triethylene glycol (TEG) and is also believed to be a degradation product of TEG, may be emitted at very low concentrations. Acetaldehyde and formaldehyde have also been potentially identified as TEG degradation products, but have not been shown to be present in dehydrator emissions. None of these compounds are expected to contribute significantly to a facility's major source status.

3.3 Equipment Control Options

The two most common methods of controlling emissions are condensation and combustion.

Combustion devices typically include flares, incinerators, and the reboiler firebox. Because of the high water content of the still vent overhead stream, some type of water knockout system may be used prior to the combustion device. This water knockout may be as simple as a knockout pot or separator to remove the water that has condensed on the pipe walls from the gas prior to entering the combustion device; this setup is more typical when a flare or incinerator is used as the combustion device. In other cases, there may be a condenser on the system, and the combustion device is simply used to burn the noncondensable gases remaining after the condenser; the reboiler firebox is often used as the combustion device in these circumstances (these hybrid condenser/combustion systems are discussed below).

Because of its lower capital and operating costs, simplicity, safety, and suitability for remote/unattended operation, condensation has become the most widely used method of controlling emissions from glycol dehydrators when all dehydrators are considered. The capital and operating costs for condensation units are typically significantly lower than for flares because of the value of recovered hydrocarbons and the cost of fuel gas.

However, within the transmission and storage source category, the advantages of condensers, such as hydrocarbon recovery and the potential for remote operation, are not as significant because of the limited hours of operation of storage fields (and lower hydrocarbon recovery), potential lack of infrastructure for handling recovered hydrocarbon liquids, and the availability of operating labor. As a result, combustion may be more widely used in the transmission and storage segment than condensation.

There are several types of condensers currently used by the natural gas industry, including air-cooled, glycol-cooled, and water-cooled exchangers.

Air-cooled condensers may be natural or forced-draft systems that use ambient air as the coolant to control the still vent stream. Air-cooled condensers usually consist of a bank of tubes containing the still vent stream and a fan to force air across the tube bank (i.e., forced-draft). Natural-draft exchangers take advantage of the reduced density of the heated air to achieve a steady flow of air across the tube banks. The air flow for natural-draft operation is not as high as

forced-draft, so larger condenser areas (e.g., finned tubes) are needed to achieve the same control efficiency. Thermodynamic limitations require that the condenser outlet temperature will be above ambient. The condensed liquids and noncondensable gas from the condensation system are typically sent to a separator where the noncondensable gas is vented to the atmosphere or routed to the reboiler firebox.

Glycol-cooled condensers use rich glycol from the dehydrator as the coolant for controlling the still vent streams. The condenser is typically placed in the rich glycol line between the contactor and the knock-back cooler located in the top of the reboiler still vent and is upstream of the flash tank. The rich glycol temperature (and therefore the condenser temperature) is dependent on the natural gas temperature, which may not be the same as the ambient temperature.

Water-cooled condensers exist in a variety of configurations. Quench condensers spray a water stream directly into the still vent to condense the water and hydrocarbons. Recovered quench water is cooled in a separate heat exchanger (most likely air- cooled) or refrigeration system. Some water condensers use heat exchangers to cool the still vent stream without directly contacting the two streams. These systems may add the recovered water from the dehydrator to the recirculating water stream (which may be evaporatively cooled), or the cooling water system may be completely separate from the recovered streams. Depending on the type of water cooling used (air, refrigeration, or evaporation), the condenser outlet temperature will range from below ambient to above ambient.

Hybrid systems, including both condensation and combustion, are also used. In these systems, the noncondensable gas from the condenser is sent to a combustion device, which is typically a stand-alone flare or the reboiler burner. Although they likely achieve high levels of control, these systems may have higher capital and operating costs than a condenser system alone since additional equipment and fuel may be required. These systems also have safety concerns associated with the high British thermal unit (BTU) content of the noncondensable gas, its low and fluctuating flow rate, and the firing cycle of the reboiler. For example, if the noncondensable gas is sent to the reboiler while it is not firing, gas may accumulate in the fire tube or piping and create a hazard when the reboiler firing begins. While these systems are used by some companies, other companies have declined to use them because of safety concerns or previous accidents.

3.4 Equipment Variations

As shown in Figures 3-1 and 3-3, there are several equipment variations that occur on different glycol dehydration units. The three notable ones are the flash tank, the glycol pump, and stripping gas.

The flash tank is used to recover gas from the rich glycol as its pressure is reduced from relatively high pressure (200 to 1,000 psig) down to the flash tank pressure (typically 20 to 60 psig). The recovered flash gas is often used in the fuel system, and may sometimes be used as stripping gas in the reboiler (see more on stripping gas below). As shown in Figure 3-3, smaller units (typically less than 5 MMscfd) often will not have flash tanks, while larger units will often have flash tanks. However, some large units in the T&S segment that use incineration as a control option do not have flash tanks; they effectively use the gas that would have been removed as flash gas as fuel in the incinerator.

Although not shown in Figure 3-1, the flash tank is sometimes used as a 3-phase separator to recover additional hydrocarbons. This configuration is rarely used, especially in the T&S category.

The most widely used glycol pump is a gas/glycol energy exchange pump (e.g., Kimray pump). These are common on smaller dehydrators where electricity is not available. This pump uses the high-pressure glycol leaving the absorber to provide part of its required driving energy. Gas, taken under pressure from the absorber, is used to supply the remaining driving energy. In Kimray pumps, this discharge gas is injected into the rich glycol and will either be recovered in the flash tank or be added to the emissions from the still vent. Some models of gas-driven pumps do not commingle the gas and glycol, but simply use the gas to supply the energy. Larger dehydrators that are more typical of T&S facilities (which typically have electricity) may use an electric motor-driven reciprocating, gear, or centrifugal pump.

Stripping gas is also used on some units. Stripping gas is injected into the reboiler to "roll" or mix the glycol and help remove pockets of water. It also lowers the partial pressure of water vapor in the reboiler and still column, allowing the lean glycol to be reconcentrated to 99+%. Stripping gas (such as dry fuel gas or flash gas) is bubbled through the reboiler with a sparger tube or is added in a packed section located in the downcomer from the reboiler to the surge tank.

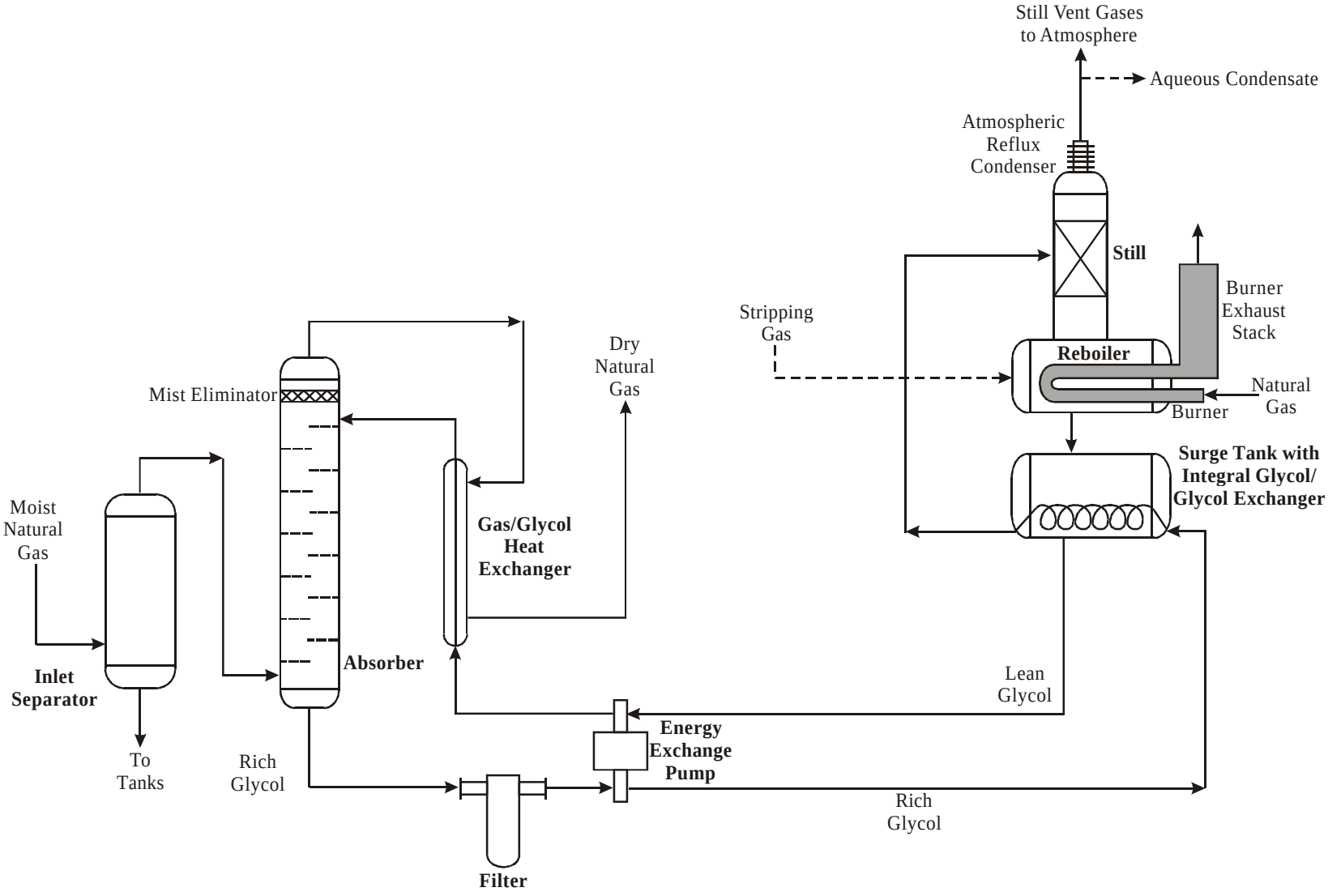

Figure 3-3. Flow Diagram for Smaller Dehydration Unit

4.0 Applicability—Transmission and Storage MACT

4.1 Overview of Applicability

For the purposes of the rule, natural gas transmission and storage is defined as beginning at the entry point to the transmission line and ending at the transfer to the LDC, or to the end user if there is no LDC. The entry point to the transmission line is considered to be after the natural gas processing plant, or after lease custody transfer if there is no natural gas processing plant.

The T&S standards apply to facilities that are major sources of HAPs but only require controls on glycol dehydrators above certain emission and throughput thresholds. For this standard, all HAP emission points at the site must be considered in the determination of a major source.

Applicability calculations for transmission compressor stations typically require gas throughput data from the last five years and the application of a 1.2 factor to those data, while T&S applicability calculations for storage fields are based on maximum throughput and storage capacity. The rule also establishes provisions for calculating HAP emissions that are different than what users may have done in previous instances, such as Title V operating permits. The MACTs follow a "once in, always in" and a "once out, not always out" philosophy with regard to applicability.

A T&S source can avoid the requirements of Subpart HHH by reducing its emissions to below the major source thresholds (i.e., become a synthetic minor source) prior to the compliance date. Such emissions reductions must be federally enforceable.

A T&S *facility* is exempt from the standard if 1) the facility does not have dehydrators; or 2) if the annual average throughput is less than 1 MMscfd annual average and the facility only has glycol dehydrators as HAP sources.

Individual dehydrators in the T&S category are exempt from control requirements if they have an annual average throughput of less than 10 MMscfd or if actual benzene emissions are less than 1 tpy.

Facilities and units exempt from the standard may still have applicable recordkeeping requirements (see Table 6-2 in Section 6.2).

4.2 Detailed MACT Applicability

The Transmission and Storage MACT has a two step applicability process. First, the MACT only applies to facilities that are major sources of HAPs, so the owner/operator must determine if the facility fits the exemption criteria or is a major source. Second, if the facility is a major source, then the owner/operator must determine if the control requirements in the standard apply. For the T&S MACT, control requirements only apply to glycol dehydrators at the facility that exceed certain emission and throughput thresholds.

The attached flow diagram in Figure 4-1 may be used to determine applicability for a facility and the units present at the facility. The user may also wish to consult the language of the rule itself to resolve questions that are not specifically covered in the text below.

Additionally, notification and reporting requirements that are required by the rule (once a source or facility is determined to be subject to the rule by use of Figure 4-1) are summarized in Section 6. Example notification and reporting forms are provided in Appendix C.

Finally, owners/operators that are exempt from the rule will generally have some recordkeeping requirements (e.g., production data and basis for emission calculations). The recordkeeping requirements in Section 6 should be consulted for more details.

Is the facility a natural gas transmission and storage facility?

The standards for the transmission and storage category apply to owners and operators of facilities that transport or store natural gas after lease custody transfer and prior to delivery to a LDC or a final end user if no LDC is present. An underground natural gas storage field and a mainline compressor station are considered part of the T&S category. A compressor station that transports gas to a natural gas processing plant (defined as any site engaging in the extraction of natural gas liquids [NGL] from field gas or the fractionation of NGL) is considered a part of the ONG category. If there is no gas processing plant present, then the gas enters the T&S category after custody transfer. Figure 4-2 provides a graphical depiction of the category definitions for T&S and ONG (figure presented by EPA at recent GRI conference).

Unless the facility is part of the T&S category, the rule does not apply.

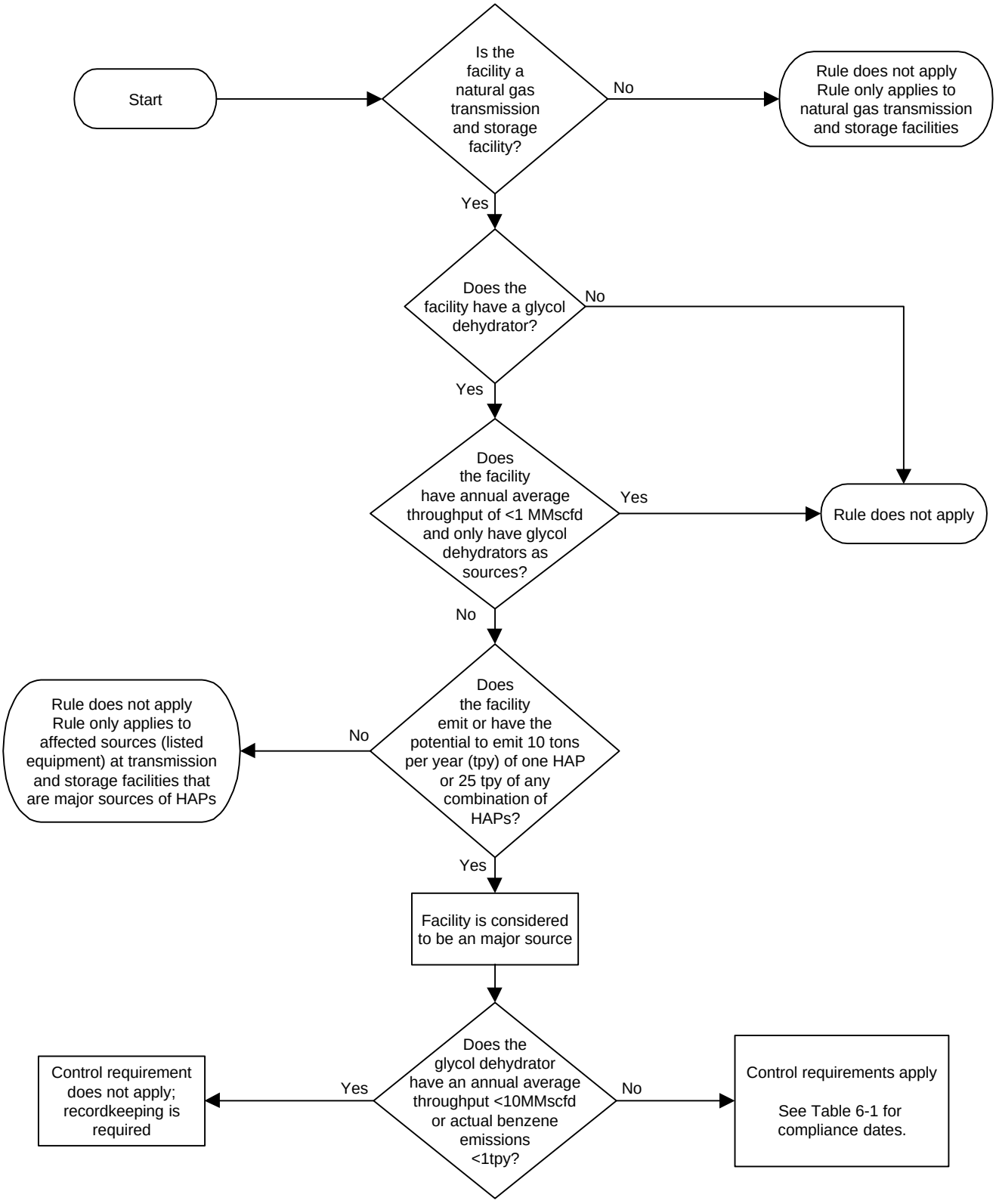

Figure 4-1. Applicability Flowchart for NESHAP for Natural Gas Transmission and Storage Facilities

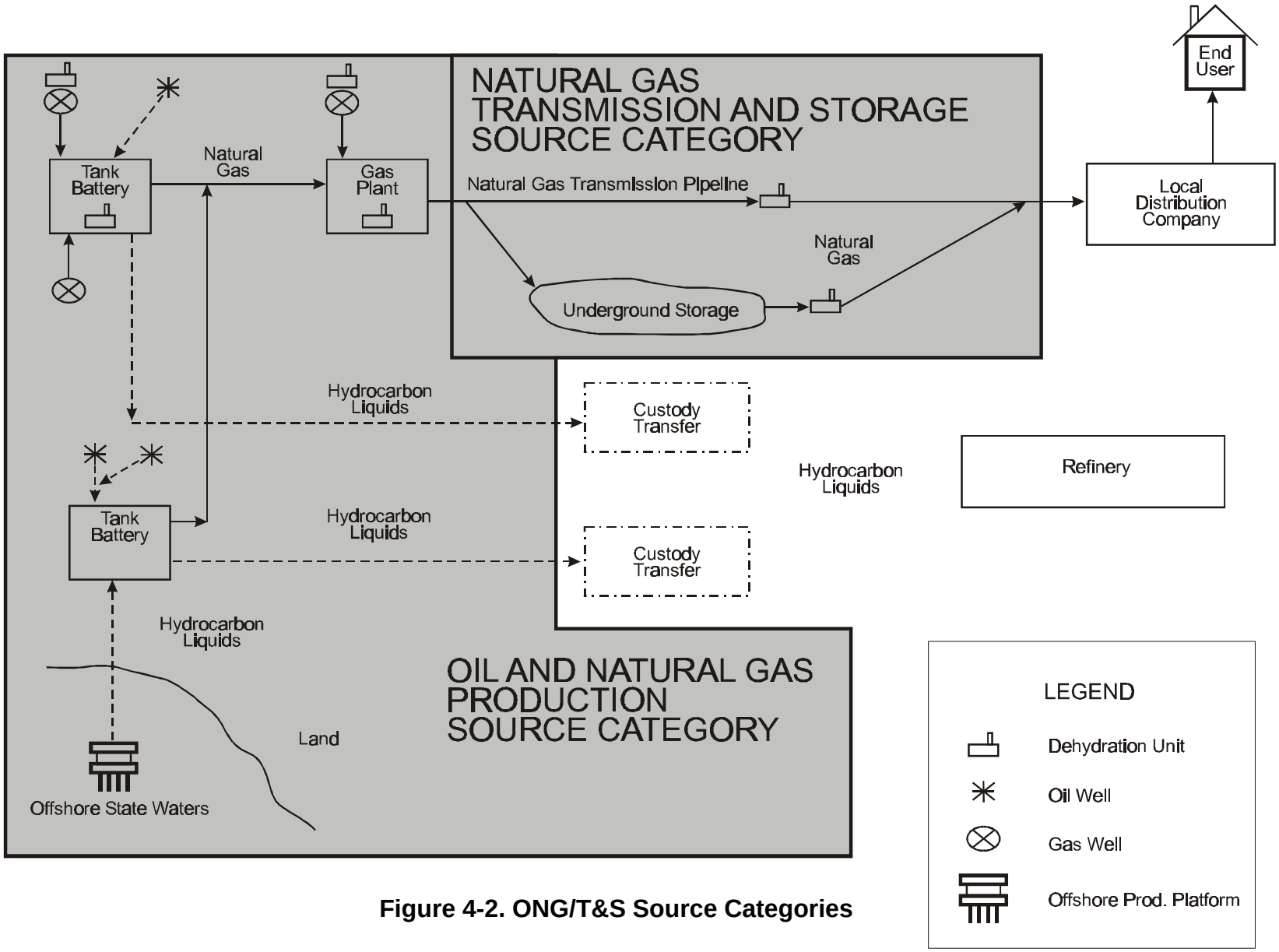

Figure 4-2. ONG/T&S Source Categories

Does the facility have a glycol dehydrator?

There must be a dehydrator present for Subpart HHH to apply. If there is not a dehydrator present, then the facility is exempt from Subpart HHH.

Does the facility have annual average throughput of less than 1 MMscfd and only have glycol dehydrators as sources?

Test procedures are provided for measuring and calculating the glycol dehydrator flow rate (meter with ± 2 % accuracy), but not for the facility as a whole. Facilities meeting this cutoff are not subject to the rule.

Does the facility emit or have the potential to emit 10 tpy of one HAP or 25 tpy of any combination of HAPs?

For the purposes of determining if a facility is a major source, the operator is required to account for all HAPs listed in section 112 of the 1990 Clean Air Act Amendments (i.e., the full list of 188 HAPs). The HAPs listed in Table 1 of the rule (and shown in Section 1.2) are the only HAPs that must be reduced by 95% if the control requirements for equipment apply. As a practical matter, however, for determining both major source status and compliance, the only HAPs that are emitted at significant levels from glycol dehydrators are BTEX, n-hexane, and possibly 2,2,4-trimethylpentane.

The following describes the calculation of maximum natural gas throughput, calculation of potential to emit (PTE), and aggregration of sources for determining whether a facility is a major source.

Maximum natural gas throughput

If the facility stores natural gas or transports and stores natural gas, complete Steps 1-5.

1. Calculate number of hours for the injection cycle.

$$IC = \frac{WGC}{IR_{\max}}$$

where:

IC	=	facility injection cycle in hours/cycle
WGC	=	working gas capacity in cubic feet
IR_{max}	=	maximum facility injection rate in cubic feet/hour

2. Calculate number of days for a withdrawal cycle.

$$WC = \frac{WGC}{WR_{max}}$$

where:

WC	=	facility withdrawal cycle in hours/cycle
WGC	=	working gas capacity in cubic feet
WR_{max}	=	maximum facility withdrawal rate in cubic feet/hour

3. Calculate the number of storage cycles per year.

$$Cycle = \frac{8760}{IC + WC}$$

where:

Cycle	=	number of storage cycles for the facility per year
8760	=	hours/year
IC	=	facility injection cycle in hours/cycle, calculated in Step 1.
WC	=	facility withdrawal cycle in hours/cycle, calculated in Step 2.

4. Calculate maximum hours of operation for all dehydrators at the facility.

$$Operation = Cycles \times WC$$

where:

Operation	=	maximum facility-wide annual glycol dehydration unit hours of operation in hours/year
Cycles	=	number of facility storage cycles, calculated in Step 3.
WC	=	facility withdrawal cycle in hours/cycle, calculated in Step 2.

5. Calculate maximum natural gas throughput for the facility.

$$Throughput = Operation \times WR_{max}$$

where:

Throughput	=	maximum facility-wide natural gas throughput in cubic feet/year
Operation	=	maximum facility-wide annual glycol dehydration unit hours of operation in hours/year, calculated in Step 4.
WR_{max}	=	maximum facility withdrawal rate in cubic feet/hour

If the facility only transports natural gas, complete Step 1.

1. Calculate the maximum facility-wide natural gas throughput.

$$Throughput = Throughput_{high5} \times 1.2$$

where:

Throughput = maximum facility-wide natural gas throughput in cubic feet/year
$Throughput_{high5}$ = highest facility-wide annual natural gas throughput over the 5 years prior to June 17,1999

The rule does not specifically address how to calculate emissions if the facility is new or has been operating for fewer than five years. For an operating facility with fewer than five years of data, EPA (via recent e-mail correspondence) recommends using the highest annual throughput multiplied by 1.2, or the design capacity of the facility, whichever is greater. For a new facility, this likely means either the highest expected annual throughput (multiplied by 1.2) or the design capacity of the new facility, whichever is higher.

Calculation of PTE

PTE should be calculated based on uncontrolled emissions, unless the controls are federally enforceable. Generally, Colorado permits that have gone through public comment are considered to be federally enforceable. In addition, the PTE transition policy (as described in Section 2.1.2) has been extended to December 31, 1999. The user of this guidance should be aware that these interpretations are subject to change due to ongoing developments in both areas (court cases regarding federal enforceability and EPA rulemaking on PTE issues).

For non-production parameters, the owner or operator shall determine the maximum values for the parameters over the same period for which the maximum throughput was determined. These parameters shall be based on an annual average or the highest single measured value.

No procedures are specified for calculating potential emissions, although GRI-GLYCalc 3.0 or higher is approved as a test method for actual benzene emissions, and it has previously been approved by EPA for estimating HAP emissions from dehydrators.

The rule is not explicit in specifying how to calculate HAP emissions from non-dehydration sources. For example, HAPs from engines may be calculated based on normal PTE criteria (maximum emissions, 8,760 hr/year of operation), although the provisions of 40 CFR 63.1270 (a) (4) could be interpreted to mean that PTE for engines could be based on annual averages or the highest single measured value. Also, the storage field throughput calculation [63.1270(a)(1)(i)] could constrain the operating hours for engines in a storage field. EPA's emission factors web site (*www.epa.gov/ttn/chief*) also provides some information that may be of use.

Aggregation of sources within a facility

For T&S facilities, all sources of HAPs (e.g., dehydrators, compressors) must be aggregated in determining whether a facility is a major source. The facility must be a major sources, or the rule does not apply.

Does the dehydrator have actual annual throughput of less than 10 MMscfd or actual benzene emissions of less than 1 tpy?

The flow measurement must be based on a flow meter with ± 2% accuracy for the flow measurement. Actual benzene emissions may be calculated with GRI-GLYCalc version 3.0 or higher or determined through stack testing with Method 18 or equivalent. Actual annual emissions are based on uncontrolled emissions or controlled emissions if federally enforceable controls are in place.

If the dehydrator meets these criteria (less than 10 MMscfd or less than 1 tpy actual benzene), then it is exempt from the control requirements of HHH. However, recordkeeping requirements for the flow and emissions calculations will apply.

If the dehydrator has actual annual throughput ≥10 MMscfd and ≥1 tpy actual benzene emissions, then it is subject to the control requirements of Subpart HHH (see Section 6 for requirements).

5.0 Pollution Prevention

Pollution prevention measures, such as process modifications or combinations of process modifications and one or more control devices that reduce the amount of HAP emissions generated, are allowed as an alternative provided they achieve the required emission reductions. Process modifications may include system optimization or more significant process modifications. For this discussion, system optimization refers to the changing of existing process parameters, as opposed to the more substantial changes in equipment or glycol that are included in significant process modifications. The focus below is limited to dehydrators, since they are the only piece of equipment covered by the T&S MACT.

5.1 System Optimization

System optimization consists of adjusting process operating parameters to reduce emissions. Reducing the glycol circulation rate is one simple way to lower emissions, since some glycol dehydration units may circulate more glycol than is necessary to meet contract specifications. Circulation rates of 2-3 gallons of glycol/pound of water removed are usually adequate to meet the requirements for water content in the natural gas stream. Low glycol circulation rates decrease the amount of HAPs absorbed from the natural gas proportionally (i.e., a 50% reduction in the circulation rate should result in a 50% reduction in emissions), so less HAPs are released from the reboiler during regeneration.

Optimizing flash tank temperature and pressure (i.e., operating at the highest temperature and lowest pressure that are practical) will reduce VOC emissions from the regenerator and allow recovery of the emissions as flash gas to be used in the fuel gas system. Very little BTEX (but more n-hexane) is removed by the flash tank, so flash tank optimization will provide only a small reduction in HAP emissions. However, by removing the lighter VOC, flash tank optimization will enhance condenser efficiency.

5.2 Significant Process Modifications

Significant modifications refer to the addition of new equipment or glycol to modify the process and reduce emissions. The significant potential modifications for dehydrators include the replacement of TEG with EG, and the use of glycol additives.

A few companies in the United States (notably some El Paso Field Services units in New Mexico) have replaced TEG with diethylene glycol (DEG) or ethylene glycol (EG). DEG and EG absorb lower levels of HAPs from the natural gas. Emissions from a DEG unit will be approximately 50% less than from a comparable TEG unit, while emissions from an EG unit will be approximately 90% less. However, DEG and EG have smaller "operating envelopes" (i.e., less room for error in achieving pipeline quality gas) than TEG because they have lower boiling points and are less thermally stable than TEG. In fact, the industry switched from DEG to TEG approximately 40 years ago because of the increased operability of TEG units.

The Gas Research Institute (GRI) is developing glycol additives for TEG and DEG systems that will reduce the absorption of HAPs into the glycol. Initial bench-scale tests have shown reductions in the 70 to 85% range. Field testing is being arranged for the fall of 1999.

6.0 Requirements

The requirements for facilities and units subject to the T&S MACT Standard includes control, testing, monitoring, recordkeeping, and reporting requirements.

There are recordkeeping requirements for some facilities and units exempt from the T&S MACT Standard.

Standards for both regulated and exempt facilities and units are summarized in this section. The following is a list of the tables provided in this section.

- Table 6-1 Compliance Dates
- Table 6-2 Recordkeeping Requirements for Exempt Facilities and Units
- Table 6-3 Initial Compliance Requirements
- Table 6-4 Initial Notification of Applicability—Items Required for Inclusion
- Table 6-5 Notification of Compliance Status Report
- Table 6-6 Control Requirements
- Table 6-7 Control Device Requirements
- Table 6-8 Recordkeeping Requirements Not Related to Control Devices
- Table 6-9 Periodic Reports—Items Required for Inclusion
- Table 6-10 Startup, Shutdown, or Malfunction Requirements
- Table 6-11 Schedule for Submittal of Construction or Reconstruction Applications
- Table 6-12 Contents of Application for Approval to Construct or Reconstruct
- Table 6-13 Notifications and Submittals Required for Source Construction or Reconstruction
- Table 6-14 Compliance Extension Requirements

In addition, a spreadsheet containing the T&S MACT requirements has been developed. This spreadsheet is designed for sorting the requirements for use as compliance checklists for

individual facilities and units. Instructions for using this spreadsheet are also included in this section.

6.1 Important Regulatory Dates

Important in understanding the requirements that must be met, are several important regulatory dates. These dates are:

- Effective Date of Standard (Promulgation) – June 17, 1999;
- Compliance Date for Existing Affected Sources that were Major on or Before June 17, 1999 – June 17, 2002;
- Compliance Date for Newly Constructed or Reconstructed Affected Sources – If construction commences after February 12, 1998, then June 17, 1999, or immediately upon startup of operation, whichever is later; and
- Initial Notification of Applicability Submission Deadline – June 17, 2000, for existing sources or within 120 days of becoming subject to the rule for new sources.

Table 6-1. Compliance Dates

Date Source Constructed	Source Size	Compliance Date[1]	Notification of Compliance Status[1]
Before 2/6/98	Major on 6/17/99	6/17/02	12/14/02
Before 2/6/98	Became Major on or After 6/18/99	3 Years after Date of Becoming Major	180 Days After Compliance Date
On or After 2/6/98	Major Upon Startup	Date of Startup	180 Days After Compliance Date
On or After 2/6/98	Area Source Upon Startup Becomes Major Later	Date Becomes Major	180 Days After Compliance Date

[1] 40 CFR 63.1270(d)

Figures 6-1 and 6-2 present compliance timelines for new and existing major sources.

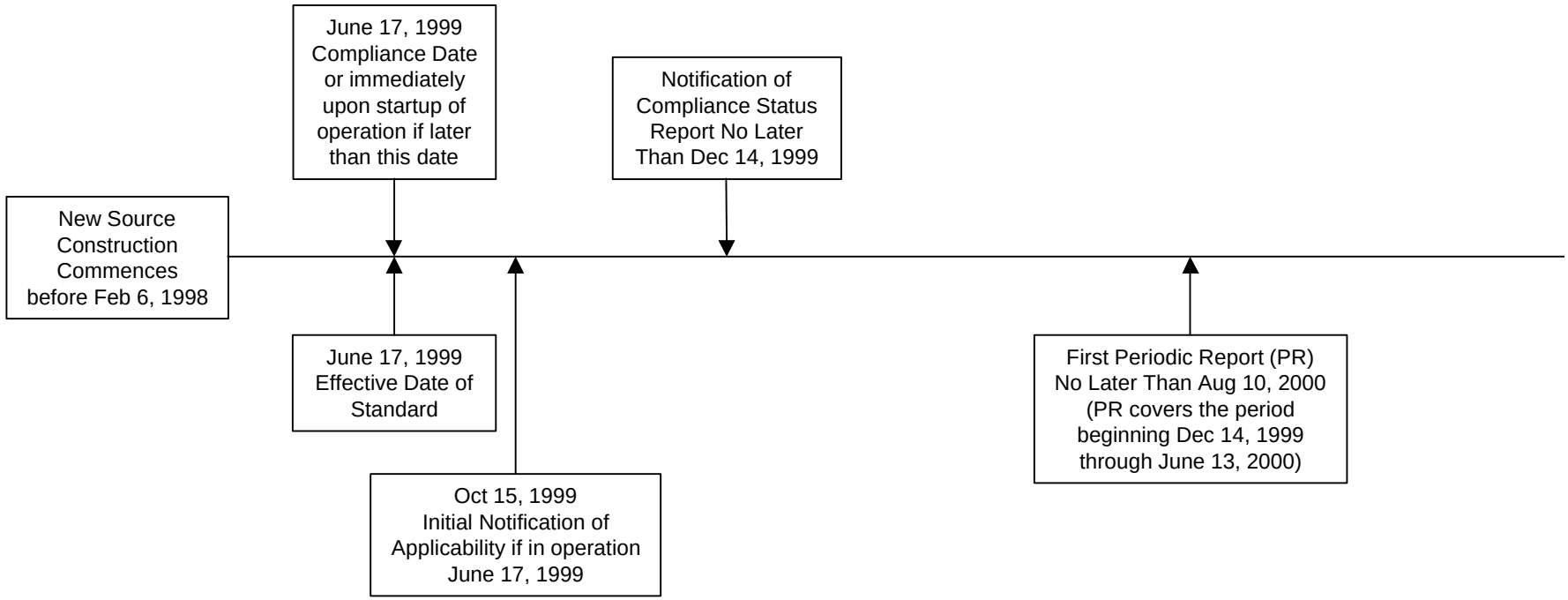

Figure 6-1. New Major Source Compliance Dates

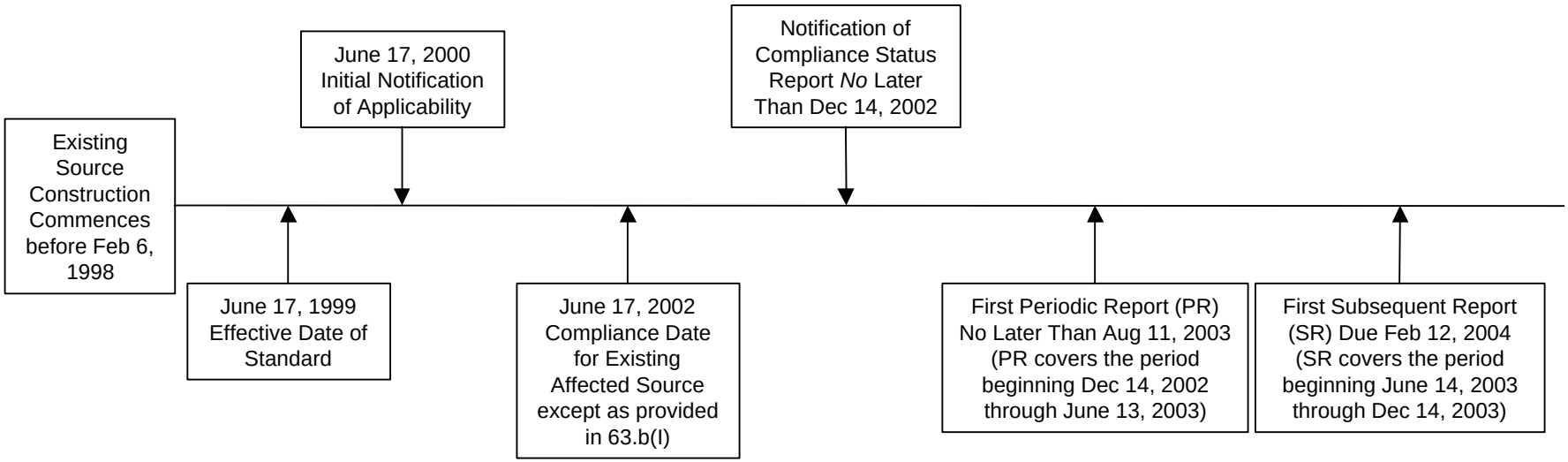

Figure 6-2. Existing Major Source Compliance Dates

6.2 Recordkeeping Requirements for Exempt Facilities and Units

Some facilities and units not subject to the MACT standard are subject to recordkeeping requirements. The requirements are summarized in Table 6-2.

6.3 Initial Compliance Requirements

Several one-time requirements must be met by facilities subject to the standard. These initial compliance requirements and the contents to be included in the required reports are summarized in the following tables.

- Table 6-3 Initial Compliance Requirements
- Table 6-4 Initial Notification of Applicability—Items Required for Inclusion
- Table 6-5 Notification of Compliance Status Report—Items Required for Inclusion

Table 6-2

RECORDKEEPING REQUIREMENTS FOR EXEMPT FACILITIES AND UNITS		(See Section 4.2 for a discussion of available exemptions.)
ALL EXEMPT FACILITIES AND UNITS	• Records of the exempt status determination(s) for a period 5 years after the determination(s) or until the status changes to an affected source. The records include an analysis demonstrating why the facility/unit is unaffected, and the analysis should be sufficiently detailed to allow the Administrator to make a finding about the applicability status. [63.1270(f)]	
EXEMPT GLYCOL DEHYDRATION UNITS	• Records of the determination that the glycol dehydrator is exempt from the general requirements of 40 CFR 63, Subpart HHH. [63.1274(d)] • For glycol dehydrator units that are exempt because the annual average flowrate is less than 10.0 MMscf/day, maintain records demonstrating the actual annual average natural gas throughput (in terms of natural gas flowrate to the glycol dehydration unit per day) is less than 10.0 MMscf/day. [63.1282(a)(1)(ii) and 63.1284(d)(1)] • For glycol dehydrator units that are exempt from the control requirements because the actual average emissions of benzene is less than 1.0 tons per year, maintain records of the actual average benzene emissions (in terms of benzene emissions per year). [63.1284(d)(2)]	

Table 6-3

INITIAL COMPLIANCE REQUIREMENTS

FACILITIES FOR WHICH CONSTRUCTION OR RECONSTRUCTION COMMENCED PRIOR TO FEBRUARY 6, 1998	• Submit the Notification of Compliance Status Report within 180 days after the compliance date shown in Table 6-1. [63.1285(d)] • Achieve compliance by the date shown in Table 6-1. [63.1270(d)]
FACILITIES FOR WHICH CONSTRUCTION OR RECONSTRUCTION COMMENCED ON OR AFTER FEBRUARY 6, 1998	• Submit the Notification of Compliance Status Report immediately upon startup. [63.1285(d)] • Achieve compliance by June 17, 1999 or immediately upon startup of operation, whichever is later. [63.760(f)]
ALL FACILITIES SUBJECT TO 40 CFR 63, SUBPART HHH	• Submit an initial notification that the facility is subject to 40 CFR 63, Subpart HHH by 1 year after the affected source became subject to the provisions of that subpart or by June 17, 2000, whichever is later. [63.1285(b)(1) and (4)] • Submit the date of the performance evaluation for the continuous monitoring system. [63.1285(b)(2)] • Submit the planned date of a performance test at least 60 days before the test. [63.1285(b)(3)] • If requested by the Administrator, submit a site-specific test plan for the performance test along with the planned date of the performance test. [63.1285(b)(3)] • Obtain or apply for an Operating Permit. [63.1274(e)] • Submit an initial Periodic Report within 240 days after the Notification of Compliance Status Report due date. [63.1285(e)(1)]

Table 6-3 (Continued)

INITIAL COMPLIANCE REQUIREMENTS	
FACILITIES USING CONDENSERS	• If the facility stores natural gas, during the period less than 30 days after the compliance date shown in Table 6-1, calculate for each season the cumulative average at the end of the withdrawal season until 30 days of condenser operating data is accumulated. [63.1282(f)(2)(iii)(A)] Or, employ the compliance demonstration for control device performance requirements option under 40 CFR 63.1282(e). • If the facility does <u>not</u> store natural gas, during the period less than 30 days after the compliance date shown in Table 6-1, calculate for each calendar year the cumulative average at the end of the calendar year until 30 days of condenser operating data is accumulated. [63.1282(f)(2)(iii)(A)] Or, employ the compliance demonstration for control device performance requirements option under 40 CFR 63.1282(e). • During the period less than 30 days after the compliance date shown in Table 6-1, demonstrate the average HAP emission reduction for the condenser 30-day average shows a HAP emission reduction equal to or greater than 95.0%. [63.1282(f)(2)(iii)(B)] Or, employ the compliance demonstration for control device performance requirements option under 40 CFR 63.1282(e).
FACILITIES USING CLOSED-VENT SYSTEMS	• Demonstrate through an initial inspection that the closed-vent system joints, seams, or other connections that are permanently or semi-permanently sealed (except those designated as unsafe or difficult to inspect) operate with no detectable emissions. [63.1283(c)(2)(i)(A)] • Demonstrate through an initial inspection that the closed-vent system components or connections other than joints, seams, or other connections that are permanently or semi-permanently sealed (except those designated as unsafe or difficult to inspect) operate with no detectable emissions. [63.1283(c)(2)(ii)(A)]

Table 6-4

INITIAL NOTIFICATION OF APPLICABILITY – ITEMS REQUIRED FOR INCLUSION
DUE DATE – JUNE 17, 2000

ALL FACILITIES SUBJECT TO 40 CFR 63, SUBPART HHH	• Name of owner or operator. [63.9(b)(2)(i)] • Address of owner or operator. [63.9(b)(2)(i)] • Address (physical location) of affected source. [63.9(b)(2)(ii)] • Identification of relevant standard (basis of the notification). [63.9(b)(2)(iii)] • Source's compliance date (June 17, 2002). [63.9(b)(2)(iii)] • Brief description of the source's nature. [63.9(b)(2)(iv)] • Brief description of the source's size. [63.9(b)(2)(iv)] • Brief description of the source's design. [63.9(b)(2)(iv)] • Brief description of the source's method of operation. [63.9(b)(2)(iv)] • Brief description of the source's operating design capacity. [63.9(b)(2)(iv)] • Identification of each point of emission for each hazardous air pollutant. [63.9(b)(2)(iv)] • A statement that the source is a major source. [63.9(b)(2)(v)]
MAJOR SOURCES PLANNING TO BE AREA (NON-MAJOR) SOURCES BY JUNE 17, 2002	• A brief, non-binding description of a schedule for the action(s) that are planned to achieve area source status. [63.1285(b)(1)]
SUBMIT INITIAL NOTIFICATIONS TO	• Manisha Blair, Colorado Department of Public Health and Environment 4300 Cherry Creek Drive S., Denver, CO. 80246-1530 • Tami Thomas-Burton, U.S. EPA, Region VIII 999 18th Street, Suite 500 8ENF-T, Denver, CO. 80202-2466

Table 6-5

NOTIFICATION OF COMPLIANCE STATUS REPORT—ITEMS REQUIRED FOR INCLUSION DUE DATE SPECIFIED IN TABLE 6-1

ALL FACILITIES	• Methods used to determine compliance. [63.9(h)(2)(i)(A)] • Results of any performance tests. [63.9(h)(2)(i)(B)] • Results of any opacity or visible emission observations. [63.9(h)(2)(i)(B)] • Results of any continuous monitoring system (CMS) performance evaluations. [63.9(h)(2)(i)(B) and 63.1285(d)(5)] • Results of any other monitoring procedures conducted. [63.9(h)(2)(i)(B)] • List of the methods that will be used to determine continuing compliance. [63.9(h)(2)(i)(C)] • Description of monitoring requirements that will be used to determine continuing compliance. [63.9(h)(2)(i)(C)] • Description of reporting requirements that will be used to determine continuing compliance. [63.9(h)(2)(i)(C)] • Description of test methods that will be used to determine continuing compliance. [63.9(h)(2)(i)(C)] • Type of hazardous air pollutants (HAPs) emitted. [63.9(h)(2)(i)(D)] • Quantity of HAPs emitted, in units and averaging times and in accordance with the test methods. [63.9(h)(2)(i)(D)] • Analysis demonstrating the source is a major source (using the emission data generated for the notification). [63.9(h)(2)(i)(E) and 63.1285(d)(8)] • Description of the air pollution control equipment for each emission point. Include each control device for each HAP and the control efficiency (%). [63.9(h)(2)(i)(F)] • Statement by the owner that the source has complied with the requirements of 40 CFR 63 Subpart HHH. [63.9(h)(2)(i)(G)] and [63.1285(d)(9)] • Definition of the source's operating day for the purpose of determining daily average values of monitored parameters. Include the times at which the operating day begins and ends. [63.1285(d)(4)(iii)]

Table 6-5 (Continued)

NOTIFICATION OF COMPLIANCE STATUS REPORT—ITEMS REQUIRED FOR INCLUSION DUE DATE SPECIFIED IN TABLE 6-1	
ALL FACILITIES (Continued)	• Complete test report for each test method used. Include the sampling site description; description of the sampling and analysis procedures; quality assurance procedures; records of operating conditions, preparation of standards and calibration; raw data sheets from field sampling and from field and laboratory analyses; documentation of calculations; and any information required by the test method. [63.1285(d)(3)] • Analysis demonstrating the conditions by which the facility is operating to achieve an overall HAP emission reduction of 95.0% through process modifications or a combination of process modifications and one or more control devices. [63.1285(d)(10)]
FACILITIES USING A CLOSED VENT SYSTEM AND A CONTROL DEVICE (OTHER THAN A FLARE)	• If a design analysis was prepared, include the design analysis documentation as specified in 40 CFR 63.1282(d)(4). [63.1285(d)(1)(i)] • If a performance test has been conducted, include the performance test results. In the performance test results include the percent reduction of HAP or TOC and the outlet concentration of HAP or TOC (in ppmvd), and value of the monitored parameters specified in 40 CFR 63.1283(d) or a site-specific parameter approved by the permitting agency, averaged over the full period of the performance test. [63.1285(d)(1)(ii)]
FACILITIES USING A CONTROL DEVICE OTHER THAN A FLARE	• Include the minimum operating parameter value or maximum operating parameter value established to define the conditions at which the control device must be operated to continuously achieve the applicable performance requirements. [63.1285(d)(4)(i)] • Include the rationale for why each of the operating parameters established to define the conditions at which the control device must be operated to continuously achieve the applicable performance requirements was chosen. [63.1285(d)(4)(ii)]

Table 6-5 (Continued)

NOTIFICATION OF COMPLIANCE STATUS REPORT—ITEMS REQUIRED FOR INCLUSION DUE DATE SPECIFIED IN TABLE 6-1	
FACILITIES USING A CLOSED VENT SYSTEM AND A FLARE	• The performance test results. [63.1285(d)(2)] • Include in the performance test results all the visible emission readings, heat content determinations, flow rate measurements, and exit velocity determinations made during the compliance determination. [63.1285(d)(2)(i)] • Include in the performance test results a statement whether a flame was present at the pilot light over the full period of the compliance determination. [63.1285(d)(2)(ii)]
GLYCOL DEHYDRATOR UNITS	• If the benzene emission limit is used to demonstrate compliance, include the following records required under 40 CFR 63.1284(c): the method used for achieving compliance and the basis for using this compliance method; the method used for demonstrating compliance with 1.0 ton per year of benzene; and any information necessary to demonstrate compliance as required by these methods. [63.1285(d)(7)]
SUBMIT NOTIFICATION OF COMPLIANCE STATUS REPORTS TO	• Manisha Blair, Colorado Department of Public Health and Environment 4300 Cherry Creek Drive S., Denver, CO. 80246-1530 • Tami Thomas-Burton, U.S. EPA, Region VIII 999 18th Street, Suite 500 8ENF-T, Denver, CO. 80202-2466

6.4 Ongoing Requirements

The following subsections summarize the requirements that must be met on an ongoing basis following the date by which compliance must be achieved (see section 6.1 for the dates for various facilities).

6.4.1 Control Requirements

For glycol dehydration units subject to the MACT standard, emissions must be reduced through application of control equipment or process modifications. These control requirements are summarized in the following tables:

- Table 6-6 Control Requirements
- Table 6-7 Control Device Requirements (includes design, operating, monitoring, recordkeeping, and reporting requirements) with requirements for:
  - — All Devices,
  - — Closed Vent Systems,
  - — All Carbon Adsorption Systems,
  - — Nonregenerable Carbon Adsorption Systems,
  - — Regenerable Carbon Adsorption Systems,
  - — Catalytic Vapor Incinerators,
  - — Thermal Vapor Incinerators,
  - — Covers and Closed Vent Systems,
  - — Condensers,
  - — Vapor Recovery Devices,
  - — Enclosed Combustion Devices,
  - — Flares, and
  - — Other Control Devices
- Table 6-8 Recordkeeping Requirements Not Related to Control Devices

Table 6-6

CONTROL REQUIREMENTS		
SOURCE	**CONTROL OPTION**	**EXEMPTIONS**
GLYCOL DEHYDRATION UNIT PROCESS VENT[a]	Connect to a process natural gas line. [63.1275(c)(1)] **- OR –** Connect through closed-vent system to air emission control system that: (1) Reduces HAP emissions by ≥ 95% (compliance is demonstrated on a daily basis with an option of a 30-day rolling average for condensers) [63.1275(b)(1)(i)]; (2) Reduces HAP emissions to an outlet concentration ≤ 20 ppmv (combustion devices only) [63.1281(d)(1)(i)(B)]; or (3) Reduces benzene emissions to ≤ 1.0 tpy. [63.1275(b)(1)(ii)] **- OR –** Reduce emissions using process modifications with or without controls. [63.1281(e)]	Units exempted from control if: (1) Actual annual average natural gas throughput to the unit is less than 10.0 MMscf/d [63.1274(d)(1)]; or (2) The unit's actual average benzene emission rate less than 1.0 tpy. [63.1274(d)(2)]

[a] Glycol dehydration unit process vent consists of the reboiler vent and the flash tank, if present.

Table 6-7

CONTROL DEVICE REQUIREMENTS

ALL DEVICES

DESIGN REQUIREMENTS	• Control device must be: 1) an enclosed combustion device; 2) a vapor recovery device; 3) another control device designed to reduce the mass content of either TOC or total HAP by 95.0% by weight or greater; or 4) a flare. [63.1281(d)(1)]
COMPLIANCE DEMONSTRATION REQUIREMENTS	• Compliance with control device performance requirements must be demonstrated with either a performance test or a design analysis. [63.1282(d)] • Daily average values of monitored parameter must be in proper range unless a condenser demonstrating compliance using the 30-day average efficiency is used.. [63.1283(d)(6)(i)] • Daily average values for each monitored operating parameter must be calculated. [63.1283(d)(4)] • For all devices except condensers, minimum or maximum operating parameter value to define conditions at which the control device must be operated to achieve compliance must be established based on either 1) values measured during the performance test and supplemented by control design analysis or control manufacturer recommendations or 2) control device design analysis and supplemented by control device manufacturer recommendations. [63.1283(d)(5)]
OPERATING REQUIREMENTS	• Control devices must be operated when emissions are routed to them. [63.1272(b)]
MONITORING REQUIREMENTS	• For glycol dehydrators and flashing tanks, a continuous monitoring system must be installed for each control device. Either a continuous parameter monitoring system , a continuous monitoring system that measures the concentration level of organic compounds in the exhaust vent stream from the control device, or a monitoring system approved by the Administrator may be used. [63.1283(d)]

Table 6-7 (Continued)

CONTROL DEVICE REQUIREMENTS

ALL DEVICES (Continued)

MONITORING REQUIREMENTS (Continued)	• Continuous parameter monitoring systems must be designed and operated so that it can be determined if the control device is achieving applicable performance requirements. [63.1283(d)(1)] • Continuous parameter monitoring systems must measure data values at least once every hour. [63.1283(d)(1)(i)] • Continuous parameter monitoring systems must record either 1) each measured data value; or 2) each block average value for each one-hour period or for shorter periods calculated from all measured data values. [63.1283(d)(1)(i)] • Continuous parameter monitoring systems must be installed, calibrated, operated, and maintained in accordance with manufacturer's specifications or other written procedures. [63.1283(d)(1)(ii)] • Organic concentration monitoring systems must meet Performance Specification 8 or 9 of 40 CFR 60, Appendix B. [63.1283(d)(3)(ii)] • Valid data points must be available for 75% of the operating hours in an operating day. [63.1283(d)(4)]
PERFORMANCE TESTING	• Performance tests must be conducted in accordance with the schedule in 40 CFR 63.7(a)(2) as follows: 1) for a new source with an initial startup after June 17, 1999, all required performance tests must be conducted within 180 days of the initial startup date; 2) for existing sources, all required performance tests must be conducted within 180 days after June 17, 2002; and 3) for sources that began construction prior to June 17, 1999, but did not start until after June 17, 1999, all required performance tests must be conducted within 180 days after startup. [63.1282(d)(3)] • Method 1 or 1A from 40 CFR 60, Appendix A must be used for sampling site selection. And sites must be located at the inlet of the first control device and the outlet of the final control device. [63.1282(d)(3)(i)]

Table 6-7 (Continued)

CONTROL DEVICE REQUIREMENTS

ALL DEVICES (Continued)

RECORDKEEPING REQUIREMENTS

- Records must be kept for five years. [63.1284(b)(1)]
- Records of daily average values of each continuously monitored parameter for each operating day must be kept. This requirement does not apply to flares. [63.1284(b)(4)(ii)]
- Control device records of all maintenance performed and the occurrence and duration of each malfunction must be maintained. [63.1284(b)(2)]
- Records of results of performance tests must be maintained. [63.1284(b)(2)]
- Records of the date and time of each period of excess emissions or parameter monitoring exceedances must be maintained. [63.1284(b)(2)]
- Monitoring system records of all required measurements; each period the system is inoperative, out of control or malfunctioning; calibration checks; zero and high-level adjustments; and all adjustments and maintenance performed must be maintained. [63.1284(b)(2), (3) and (4)]
- Records of quality control program procedures for monitoring systems must be maintained. [63.1284(b)(3)]
- Records of excursions of invalid data from monitoring systems must be maintained. [63.1284(b)(3)(iv)]

CLOSED VENT SYSTEMS

DESIGN REQUIREMENTS

- System must be designed with no detectable emissions. [63.1281(c)(2)]

Table 6-7 (Continued)

CONTROL DEVICE REQUIREMENTS

CLOSED VENT SYSTEMS (Continued)

COMPLIANCE DEMONSTRATION REQUIREMENTS	• If the closed vent system has one or more bypass devices, and a flow indicator is used to verify compliance, the flow indicator on the bypass must indicate that no flow has been detected. [63.1283(d)(6)(iv)(A)] • If the closed vent system has one or more bypass devices, and a flow indicator is NOT used to verify compliance, the closure mechanism must not be broken, the bypass line valve position must not be changed, the key for the lock-and-key type lock must be accounted for, or the car-seal must be unbroken. [63.1283(d)(6)(iv)(B)]
OPERATING REQUIREMENTS	• System must route all gases, vapors, and fumes emitted to the control device. [63.1281(c)(1)] • System must be operated with no detectable emissions. [63.1281(c)(2)]
MONITORING AND INSPECTION REQUIREMENTS	• If the system is equipped with one or more bypasses, the bypass must be equipped with either 1) a flow indicator, or a 2) secured bypass device. [63.1281(c)(3)(i)(A) or (B)] • System joints, seams, and other connections that are permanently or semi-permanently sealed (except those designated as unsafe or difficult to inspect) must be annually visually inspected for defects that could result in emissions. [63.1283(c)(2)(i)(B) and (c)(2)(ii)(C)] • System joints, seams, and other connections that are permanently or semi-permanently sealed that have been repaired, replaced, or sealed must be monitored annually to demonstrate that they operate with no detectable emissions. [63.1283(c)(2)(i)(B)]

Table 6-7 (Continued)

CONTROL DEVICE REQUIREMENTS

CLOSED VENT SYSTEMS (Continued)

MONITORING AND INSPECTION REQUIREMENTS (Continued)

- System components other than joints, seams, and other connections that are permanently or semi-permanently sealed (except those designated as unsafe or difficult to inspect) must be monitored annually to demonstrate that they operate with no detectable emissions. [63.1283(c)(2)(ii)(B)]
- If the system is equipped with one or more bypasses and secured bypass devices are used to control flow through the bypasses, the device must be inspected at least once each month to verify that the stream has not been diverted. [63.1281(c)(3)(i)(B)]

RECORDKEEPING REQUIREMENTS

- If the system is equipped with one or more bypasses, and a flow indicator is used to demonstrate compliance, hourly records of whether the closed-vent system flow indicator was operating, time and duration of times when the flow indicator was not operating, whether flow was detected, and the time and duration of all periods when the vent stream is diverted must be maintained. [63.1284(b)(4)]
- If the system is equipped with one or more bypasses, and a flow indicator is NOT used to demonstrate compliance, records of periods when the bypass seal mechanism is broken, when the bypass line valve position has changed, or when the key for a lock-and-key type lock has been checked out, or when any car-seal has been broken must be maintained. 63.1284(b)(4)(iv)]
- Records of monthly visual inspections of the seals or closure mechanisms must be maintained. [63.1284(b)(4)(iv)]

ALL CARBON ADSORPTION SYSTEMS

OPERATING REQUIREMENTS

- Carbon must be replaced on a regular, predetermined time interval. [63.1281(d)(5)(i)]
- Carbon must be treated and disposed of at a facility that meets environmental permitting and operating requirements. These requirements are detailed in the regulations. [63.1281(d)(5)]

Table 6-7 (Continued)

CONTROL DEVICE REQUIREMENTS	
NONREGENERABLE CARBON ADSORPTION SYSTEMS	
DESIGN REQUIREMENTS	• Dual carbon canisters must be incorporated. [63.1282(d)(4)(i)(F)]
COMPLIANCE DEMONSTRATION REQUIREMENTS	• If a design analysis is used, it must include the vent stream composition, constituent concentrations, flow rate, relative humidity, and temperature. [63.1282(d)(4)(i)(F)] • If a design analysis is used, it must establish the design exhaust vent stream organic concentration level; the capacity of the carbon bed; type and working capacity of activated carbon used for the carbon bed; design carbon replacement interval based on the total carbon working capacity of the control device and source operating schedule. [63.1282(d)(4)(i)(F)]
MONITORING REQUIREMENTS	• Monitoring of the design carbon replacement interval must be conducted. [63.1283(d)(3)(i)(G)]
REGENERABLE CARBON ADSORPTION SYSTEMS	
COMPLIANCE DEMONSTRATION REQUIREMENTS	• If a design analysis is used, it must include the vent stream composition, 128772(d)(4)(i)(E)] • If a design analysis is used, it must establish the design exhaust vent stream organic concentration level; the adsorption cycle time; the number and capacity of carbon beds; the type and working capacity of activated carbon used for the carbon beds; the design total regeneration stream flow over the period of each completed carbon bed regeneration cycle; the design carbon bed temperature after regeneration; the design carbon bed regeneration time; and the design service life of the carbon. [63.1282(d)(4)(i)(E)]

Table 6-7 (Continued)

CONTROL DEVICE REQUIREMENTS

REGENERABLE CARBON ADSORPTION SYSTEMS (Continued)

MONITORING REQUIREMENTS

- If a continuous parameter monitoring system is used, the following must be monitored: the average total regeneration stream mass flow or volumetric flow during each carbon bed regeneration cycle; the average carbon bed temperature for the duration of the carbon bed steaming cycle; and the actual carbon bed temperature after regeneration and within 15 minutes of completing the cooling cycle. [63.1283(d)(3)(i)(F)(1) and (2)]
- If parameter monitoring is used, the regenerating stream flow monitoring device must have an accuracy of ± 10%. [63.1283(d)(i)(F)(1)]
- If parameter monitoring is used, the temperature monitoring device must have an minimum accuracy of ± 2% of the temperature being monitored in degrees Celsius or ± 2°C whichever value is greater. 63.1283(d)(i)(F)(2)]

CATALYTIC VAPOR INCINERATORS

COMPLIANCE DEMONSTRATION REQUIREMENTS

- If a design analysis is used, it must include the vent stream composition, constituent concentrations and flow rate. [63.1282(d)(4)(i)(B)]
- If a design analysis is used, it must establish the minimum and average temperatures across the catalyst bed inlet and outlet and the design service life of the catalyst. [63.1282(d)(4)(i)(B)]

Table 6-7 (Continued)

CONTROL DEVICE REQUIREMENTS

CATALYTIC VAPOR INCINERATORS (Continued)

MONITORING REQUIREMENTS

- If parameter monitoring is used, a continuous temperature monitoring device with a continuous recorder must be used. [63.1283(d)(3)(i)(B)]
- If parameter monitoring is used, the temperature monitoring device must have a minimum accuracy of ± 2% of the temperature being monitored in degrees Celsius or ± 2°C whichever value is greater. [63.1283(d)(3)(i)(B)]
- If parameter monitoring is used, one temperature sensor must be installed in the vent stream at the nearest feasible point to the catalyst bed inlet, and a second temperature sensor must be installed in the vent stream at the nearest feasible point to the catalyst bed outlet. [63.1282(e) and 63.1283(d)(3)(i)(B)]

THERMAL VAPOR INCINERATORS

COMPLIANCE DEMONSTRATION REQUIREMENTS

- If a design analysis is used, it must include the vent stream composition, constituent concentrations, and flowrate. [63.1282(d)(4)(i)(A)]
- If a design analysis is used, it must establish the minimum and average temperatures in the combustion zone and the combustion zone residence time. [63.1282(d)(4)(i)(A)]

Table 6-7 (Continued)

CONTROL DEVICE REQUIREMENTS

THERMAL VAPOR INCINERATORS (Continued)

MONITORING REQUIREMENTS

- A continuous heat temperature monitoring device with a continuous recorder, a continuous monitoring system that measures the concentration level of organic compounds in the exhaust vent stream from the flare, or a continuous monitoring system approved by the Administrator must be installed, calibrated, operated, and maintained. [63.1283(d)(3)]
- If a temperature monitor is used it must have a minimum accuracy of ± 2% of the temperature being monitored in degrees Celsius or ± 2°C whichever value is greater. [63.1283(d)(3)(i)(A)]
- If a temperature monitor is used, the sensor must be installed at a location in the combustion chamber downstream of the combustion zone. [63.1283(d)(3)(i)(A)]

COVERS AND CLOSED VENT SYSTEMS

INSPECTION REQUIREMENTS

- A written inspection plan must be developed, kept of file, and followed that requires inspection of the system components and connections designated as: 1) unsafe to inspect as frequently as practicable during safe-to-inspect times, and 2) those designated as difficult to inspect at least once every five years. [63.1283(c)(5)]

RECORDKEEPING REQUIREMENTS

- Records identifying all parts of the cover or closed vent system that are designated as unsafe to inspect or difficult to inspect and explaining why they are unsafe or difficult to inspect must be maintained. [63.1284(b)(5)and (6)]
- Records of inspections must be kept. [63.1284(b)(8)]

Table 6-7 (Continued)

CONTROL DEVICE REQUIREMENTS

CONDENSERS

COMPLIANCE DEMONSTRATION REQUIREMENTS	• Condenser performance requirement compliance must be demonstrated using either 1) a performance test; 2) a design analysis, or 3) the procedures documented in the GRI report entitled "Atmospheric Rich/Lean Method for Determining Glycol Dehydrator Emissions" (GRI-95/0368.1) as inputs for the model GRI-GlyCalc™, version 3.0 or higher. [63.1282(d)] • A site specific performance curve must be developed showing the relationship between condenser outlet temperature and condenser control efficiency. [63.1283(d)(5)(ii)] • If daily averaging is NOT used, daily average condenser outlet temperature must be calculated for use in calculating the 30-day rolling average. [63.1282(f)(2)(i)] • If daily averaging is NOT used, daily condenser efficiency for use in calculating the 30-day rolling average must be determined using the daily average condenser outlet temperature and the condenser performance curve. [63.1282(f)(2)(ii)] • Rolling 30-day average HAP emission reduction must be calculated daily from the condenser efficiencies for the preceding 30 operating days. [63.1282(f)(2)(iii)] • If a design analysis is used, it must include the vent stream composition, constituent concentrations, flowrate, relative humidity, and temperature. [63.1282(d)(4)(i)(D)] • If a design analysis is used, it must establish the design outlet organic compound concentration level; the design average temperatures of the condenser exhaust vent streams; design average temperatures of the coolant fluid at the condenser inlet and outlet. [63.1282(d)(4)(i)(D)]
OPERATING REQUIREMENTS	• The average HAP emission reduction must be equal to or greater than 95%. [63.1283(d)(6)(ii)]

Table 6-7 (Continued)

CONTROL DEVICE REQUIREMENTS

CONDENSERS (Continued)

MONITORING REQUIREMENTS

- If parameter monitoring is used, a continuous temperature monitoring device with a continuous recorder must be used. [63.1283(d)(3)(i)(E)]
- If parameter monitoring is used, the temperature monitoring device must have a minimum accuracy of ± 2% of the temperature being monitored in degrees Celsius or ± 2°C whichever value is greater. [63.1283(d)(3)(i)(E)]
- If parameter monitoring is used, the temperature sensor must be installed at a location in the exhaust vent stream from the condenser. [63.1283(d)(3)(i)(E)]

RECORDKEEPING REQUIREMENTS

- Records of the daily 30-day rolling average condenser efficiency must be maintained. [63.1282(f)(2)(iii)]

VAPOR RECOVERY DEVICES

COMPLIANCE DEMONSTRATION REQUIREMENTS

- Site specific maximum or minimum monitoring parameter values must be established. [63.1282(e)(1)]
- Daily average of the applicable monitored parameter must be calculated. [63.1282(e)(2)]
- Daily average of the monitored parameter must be in the range established. [63.1282(e)(3)]

ENCLOSED COMBUSTION DEVICES

DESIGN REQUIREMENTS

- For a boiler or process heater, the vent stream must be introduced into the flame zone. [63.1281(d)(1)(i)(D)]

Table 6-7 (Continued)

CONTROL DEVICE REQUIREMENTS

ENCLOSED COMBUSTION DEVICES (Continued)

COMPLIANCE DEMONSTRATION REQUIREMENTS	• For a boiler or process heater, if a design analysis is used, it must include vent stream composition, constituent concentrations and flowrate. [63.1282(d)(4)(i)(C)] • For a boiler or process heater, if a design analysis is used, it must establish the minimum and average flame zone temperatures, the combustion zone residence time, and the method and location where the vent stream is introduced into the flame zone. [63.1282(d)(4)(i)(C)]
OPERATING REQUIREMENTS	• Device must either: 1) reduce the mass content of either TOC or total HAP in the gases vented to it by 95.0% by weight or greater; 2) reduce the concentration of either TOC or total HAP in the exhaust gas at the outlet to a level equal to or less than 20 ppmvd corrected to 3% oxygen; or 3) operates at a minimum residence time of 0.5 seconds at a minimum temperature of 760 degrees Celsius. [63.1281(d)(1)(i)]
MONITORING REQUIREMENTS	• For a boiler or process heater with a design heat input capacity less than 44 MW (150 million British Thermal Units per hour [mmBTU/hour]), a continuous temperature monitoring device with a continuous recorder must be installed, operated, and maintained. [63.1283(d)(3)(i)(D)] • For a boiler or process heater with a design heat input capacity less than 44 MW (150 mmBTU/hour), the temperature monitoring device must have a minimum accuracy of ± 2% of the temperature being monitored in degrees Celsius or ± 2°C whichever value is greater. [63.1283(d)(3)(i)(D)] • For a boiler or process heater with a design heat input capacity less than 44 MW (150 mmBTU/hour), the temperature sensor must be installed at a location in the combustion chamber downstream of the combustion zone [63.1283(d)(3)(i)(D)]

Table 6-7 (Continued)

CONTROL DEVICE REQUIREMENTS

ENCLOSED COMBUSTION DEVICES (Continued)

PERFORMANCE TESTING	• The performance test must be conducted using: 1) Method 18, 40 CFR 60, Appendix A; 2) Method 25A, 40 CFR 60, Appendix A; or 3) any method or data that have been validated according to Method 301 of 40 CFR 63, Appendix A. [63.1282(d)(3)(iii)]

FLARES

OPERATING REQUIREMENTS	• Must be operated in compliance with 40 CFR 63.11(b). [63.1282(d)(2)]
MONITORING REQUIREMENTS	• A continuous heat sensing monitoring device with a continuous recorder that indicates the continuous ignition of the pilot flame, a continuous monitoring system that measures the concentration level of organic compounds in the exhaust vent stream from the flare, or a continuous monitoring system approved by the Administrator must be installed, calibrated, operated, and maintained. [63.1283(d)(3)(i)(C), (3)(ii), and (3)(iii)]
RECORDKEEPING REQUIREMENTS	• Hourly records of pilot flame outages, and times and durations of all period during which all pilot flames were absent must be maintained. [63.1284(b)(4)(i)-(ii)] • Records of flare design must be maintained. [63.1284(e)(1)] • Records of all visible emissions readings, heat content determinations, flowrate measurements, exit velocity determinations, and pilot flame absence during compliance demonstration must be maintained. [63.1284(e)(2)-(3)]

Table 6-7 (Continued)

CONTROL DEVICE REQUIREMENTS

OTHER CONTROL DEVICES

COMPLIANCE DEMONSTRATION REQUIREMENTS	• Site specific maximum and minimum monitoring parameter values must be established. [63.1282(e)(1)] • Daily average of the monitored parameter must be calculated. [63.1282(e)(2)] • Daily average of the monitored parameter must be in the monitoring range established. [63.1282(e)(3)]

Table 6-8

RECORDKEEPING REQUIREMENTS
NOT RELATED TO CONTROL DEVICES

ALL FACILITIES	• Records of the annual facility natural gas or hydrocarbon liquid throughput. [63.1270(a)(3)] • The number of hours to complete the storage cycle. [63.1270(a)(1)(i)] • The number of storage cycles per year. [63.1270(a)(1)(ii)] • The maximum natural gas throughput. [63.1270(a)(1)(iv)]
GLYCOL DEHYDRATION UNIT	• The maximum annual number of hours of operation. [63.1270(a)(1)(iii)] • Maintain records of the glycol dehydration unit baseline operations, including when it is necessary to demonstrate that glycol dehydrator process vent total HAP emissions have been reduced by 95.0% through process modifications or a combination of process modifications and one or more control devices [63.1281(e)(1) and 63.1284(b)(9)] • If it is necessary to demonstrate that glycol dehydrator process vent total HAP emissions have been reduced by 95.0% through process modifications or a combination of process modifications and one or more control devices, maintain documentation 1) that the glycol dehydration unit continues to operate such that the baseline operations modifications achieve the 95.0% overall HAP emission reduction, and 2) of the conditions for which the glycol dehydration unit baseline conditions were modified. [63.1281(e)(2), 63.1281(e)(3)(i)and 63.1284(b)(10)]

* Note: Initial compliance recordkeeping requirements are summarized under Section 6.3 of this document.

6.4.2 Glycol Dehydrator Process Modification Requirements

Compliance with the glycol dehydrator MACT standard can be achieved in one of several ways. One of these is to demonstrate to the Administrator's satisfaction that using process modifications or a combination of process modifications and one or more control devices that total HAP emissions have been reduced by 95.0 percent. If this compliance method is chosen, a special set of requirements apply. These are summarized below:

- Determine baseline operations and retain records of baseline operations [63.1281(e)(1)];
- Document to the Administrator's satisfaction the conditions for which the baseline operations will be modified to achieve the 95.0 percent overall HAP emissions reduction and, if a control device is used, document the percent HAP reduction to be achieved by the control device [63.1281(e)(2)];
- Maintain records that the glycol dehydrator continues to operate in accordance with the process changes used to comply with the standard [63.1281(e)(3)(i)]; and
- If a control device is used, comply with the requirements for control devices specified in 40 CFR 63.1281(d), except that the emission reduction specified as necessary to achieve the overall reduction necessary to comply with the standard is used instead of the efficiency listed in 40 CFR 63.1281(d). [63.1281(e)(3)(ii)].

6.4.3 Reporting Requirements

After the initial reporting summarized in section 6.3 of this guidance, a periodic report must be submitted. This report is due as follows:

- First report – due no later than 240 days after the notification of Compliance Status Report due date. (For any existing major source, the first Periodic Report is due no later than August 11, 2003, covering the period beginning December 14, 2002, and ending June 3, 2003.)
- All subsequent reports – due semiannually, 60 days after the end of the reporting period. (For any existing major source, the first subsequent report is due February 12, 2004, covering the period starting June 14, 2003, and ending December 14, 2003.)

The first report covers the six-month period beginning on the date the Notification of Compliance Status Report is due. The information required to be included in Periodic Reports is summarized in Table 6-9.

Table 6-9

PERIODIC REPORTS
ITEMS REQUIRED FOR INCLUSION

ALL FACILITIES	• If a compliance demonstration method was switched from 40 CFR 1282(e) (Compliance demonstration for control device performance requirements) to 63.1282(f) (Compliance demonstration with percent reduction performance requirements), include the notification of the change in compliance demonstration. [63.1282(e)] • If any process changes were made, include a process change report with a brief description of the change(s) and a description of any modification to standard procedures or quality assurance procedures. The report should also include information involving the addition of processes or equipment and revisions to any information reported in the Notification of Compliance Status Report. [63.1285(f) and 63.1285(f)(1)-(4)] • For each excursion caused when the 30-day average condenser control efficiency is less than 95.0%, include the 30-day average values for the condenser control efficiency and the date and duration of the period the excursion occurred. [63.12855(e)(2)(ii)(B)] • For each closed-vent system with a bypass line, include the records of all periods when the vent stream is diverted from the control device through the bypass line. [63.1285(e)(2)(iv)] • For each closed-vent system with a bypass line, include the records of all periods in which the seal mechanism is broken, the bypass valve position has changed, or the key to unlock the bypass line valve was checked out. [63.1285(e)(2)(iv)] • Include the information for excess emissions and continuous monitoring system performance reports and summary reports required under 40 CFR 63.10(e)(3). [63.1285(e)(2)(i)] • Include a description for all excursions defined under 40 CFR 63.1283(d)(6) that have occurred during the 6-month reporting period. [63.1285(e)(2)(ii)]

Table 6-9 (Continued)

PERIODIC REPORTS ITEMS REQUIRED FOR INCLUSION	
ALL FACILITIES (Continued)	• For each excursion when the daily average value of a monitored operating parameter is less than the minimum or greater than the maximum operating parameter limit, include the daily average values of the monitored parameter, the applicable operating parameter, and the date and duration of the period the excursion occurred. [63.1285(e)(2)(ii)(A)] • For each excursion caused by the lack of monitoring data, include the data and duration of the period when the monitoring data were not collected and the reason why the data were not collected. [63.1285(e)(2)(ii)(D)] • If accurate, include a statement of "no excursions." [63.1285(e)(2)(vi)(A)] • If accurate, include a statement of "no continuous monitoring system has been inoperative, out of control, repaired, or adjusted." [63.1285(e)(2)(vi)(B)] • Include any changes in compliance demonstration for control device performance methods specified under 40 CFR 63.1275(b). 63.1285(e)(2)(vii)]
GLYCOL DEHYDRATION UNIT	• If the glycol dehydrator complies with the 1.0 tons per year limit for benzene emissions, include the records required under 40 CFR 63.1284(b)(10). [63.1285(e)(2)(viii)] • If the glycol dehydrator complies with the 95.0% reduction in total HAP emissions, include the following records required under 40 CFR 63.1284(c)(3): the method used for achieving compliance and the basis for using the method, the method used for demonstrating compliance with the 1.0 tons per year of benzene limit, and any information necessary to demonstrate compliance. [63.1285(e)(2)(v)]

6.5 Special Event Requirements

In addition to ongoing requirements, special events may also trigger requirements. These special events include process changes, startups, shutdowns, and malfunctions, source construction and reconstruction, requests for alternative monitoring, and compliance extensions. The requirements associated with these events are described in the remainder of this section.

6.5.1 Process Change Requirements

There are special reporting requirements that apply when a process change is made. Unfortunately, process change is not defined in either the regulations, the preamble to the regulations, or the background information documents associated with this MACT standard. Because process change is not specifically defined, determining the kinds of changes that must be reported is not straightforward. Specific process information must be submitted in the Initial Notification of Applicability and in the Notification of Compliance Status Report. The regulation addressing process change reporting specifically requires that information that has changed since submission of the Notification of Compliance Status Report must be included in the Process Change Report. The regulation also requires that information on equipment or process additions must be included in Process Change Reports. It can, therefore, be assumed that *changes* in the process information submitted in the initial Notification of Compliance Status Report or the Initial Notification of Applicability and *additions* of processes or equipment must be reported in accordance with the requirements of 40 CFR 63.775(f) "Notification of Process Change." The requirements for process change reporting are:

- Process Change Report must be submitted within 180 days after the change is made or as part of the next Periodic Report, whichever is sooner.

- Process Change Report must include: a brief description of the process change, a description of any modification to standard procedures or quality assurance procedures, and revisions to any information submitted in the original Notification of Compliance Status Report.

- If the process change involved the addition of processes or equipment, information required by the Notification Compliance Status Report must be included in the Process Change Report for that equipment.

6.5.2 Startup, Shutdown, and Malfunction Requirements

The requirements for startups, shutdowns, and malfunctions are identified in Table 6-10.

Table 6-10

STARTUP, SHUTDOWN, OR MALFUNCTION REQUIREMENTS

GENERAL	• Take measures, to the extent reasonably available, to prevent or minimize excess emissions to the maximum extent practicable. [63.1272(c)] • Demonstrate that all pieces of equipment that can comply with the provisions during periods of startup, shutdown, or malfunction or non-operation, do comply. [63.1272(a)] • Develop and implement a written Startup, Shutdown, and Malfunction Plan by June 17, 2002 that describes, in detail, procedures for operating and maintaining the source during periods of startup, shutdown, and malfunction, and describes a program of corrective action for malfunctioning process and air pollution control equipment, as required to comply with the T&S MACT. [63.6(e)(3)(i)]
RECORDKEEPING	• Records of the occurrence and duration of each startup, shutdown, and malfunction operation. [63.1284(b)(3)(ii); 63.10(b)(2)(i)] • Records of the occurrence and duration of each malfunction of air pollution control equipment. [63.1284(b)(3)(ii); 63.10(b)(2)(ii)] • Records of the actions taken during periods of startup, shutdown, and malfunction when such actions *were not consistent* with the procedures in the Startup, Shutdown, and Malfunction Plan. [63.1284(b)(3)(ii); 63.10(b)(2)(iv)] • Records of all information necessary to demonstrate conformance with the Startup, Shutdown, and Malfunction Plan, when such actions *were consistent* with the procedures in the Startup, Shutdown, and Malfunction Plan. [63.1284(b)(3)(ii); 63.10(b)(2)(v)] • A record of each period during which a (continuous monitoring system) CMS malfunctioned or was inoperative, including all out-of-control periods. [63.1284(b)(3)(ii); 63.10(b)(2)(vi)] • A record of the nature and cause of any CMS malfunction. [63.1284(b)(3)(ii); 63.10(c)(10)] • A record of the corrective action taken or preventive measures adopted for any CMS. [63.1284(b)(3)(ii); 63.10(c)(11)]

Table 6-10 (Continued)

STARTUP, SHUTDOWN, OR MALFUNCTION REQUIREMENTS

RECORDKEEPING (Continued)	• A record of the nature of the repairs or adjustments to any CMS that was inoperative or out-of-control. [63.1284(b)(3)(ii); 63.10(c)(12)] • A record of the specific identification (i.e., the date and time of commencement and completion) of each period of excess emissions and parameter monitoring exceedances, as defined in the relevant standard(s), that occurs during startups, shutdowns, and malfunctions. [63.1284(b)(3)(ii); 63.10(c)(7)] • Records indicating that malfunctions were corrected as soon as practicable in accordance with the Startup, Shutdown, and Malfunction Plan. [63.1284(b)(3)(ii); 63.6(e)(1)(ii)] • Records indicating that during periods of startup, shutdown, and malfunction, the source operated in accordance with the procedures of the Startup, Shutdown, and Malfunction Plan. [63.1284(b)(3)(ii); 63.6(e)(3)(ii)] • Records demonstrating that procedures specified in the Startup, Shutdown, and Malfunction Plan were followed. [63.1284(b)(3)(ii); 63.6(e)(3)(iii)]

REPORTING	If actions taken during the startup, shutdown, or malfunction were consistent with the Startup, Shutdown, and Malfunction Plan:
	• Submit a Startup, Shutdown, and Malfunction Report delivered or postmarked to the delegated authority by the 30th day following the end of each calendar half (or other calendar reporting period, as appropriate), or more frequently, as established by the delegated authority. If the source is required to submit excess emissions and CMS performance reports (part of the Periodic Report required by 63.1285[e]), the startup, shutdown, and malfunction report may be submitted simultaneously with the excess emissions and CMS performance (or other) reports.
	• Contents of the Startup, Shutdown and Malfunction Report if actions taken during the startup, shutdown or malfunction *were consistent* with the Startup, Shutdown and Malfunction Plan:
	  • a statement that actions taken were consistent with the plan; and
	  • a letter containing the name, title, and signature of the owner or operator or other responsible official who is certifying its accuracy.

Table 6-10 (Continued)

STARTUP, SHUTDOWN, OR MALFUNCTION REQUIREMENTS

REPORTING (Continued)

If actions taken during the startup, shutdown, or malfunction were not consistent with the Startup, Shutdown, and Malfunction Plan:

- Submit a Startup, Shutdown, and Malfunction Report stating what were actions taken. Report must be submitted within two working days after commencing the inconsistent actions, and a letter must be postmarked or delivered within seven days of the end of the event. [63.10(d)(5)(i)]
- Contents of the Startup, Shutdown and Malfunction report if actions taken during the startup, shutdown or malfunction *were not consistent* with the Startup, Shutdown and Malfunction Plan:
    - Report the action(s) that we*re not* consistent with the Startup, Shutdown, and Malfunction Plan within 24 hours after commencing such actions. [63.8(c)(1)(ii)]
    - A description of whether any excess emissions and/or parameter monitoring exceedances were believed to have occurred;
    - An explanation of the circumstances of the event; and
    - A letter containing the name, title, and signature of the owner or operator or other responsible official who is certifying its accuracy. [63.10(d)(5)(i)-(ii), 63.6(e)(3)(iv)]
- Submit a report within two weeks after commencing action(s) that are not consistent with the Startup, Shutdown, and Malfunction Plan that either certifies that corrections have been made, or that includes a corrective action plan and schedule. [63.8(c)(1)(ii)]
- Revise the Plan within 45 days after the event, to address similar malfunction events, if the Startup, Shutdown, and Malfunction Plan failed to address a malfunction event that was not originally included in the Plan. [63.6(e)(3)(viii)]

Table 6-10 (Continued)

STARTUP, SHUTDOWN, OR MALFUNCTION REQUIREMENTS

REPORTING (Continued)	For those malfunctions or other events that affect the CMS and are not addressed by the Startup, Shutdown, and Malfunction Plan. • Report all CMS repairs in the semiannual Startup, Shutdown, and Malfunction report required by 63.10(d)(5)(i). [63.8(c)(1)(i)] • Include proof that repair parts have been ordered or any other records that would indicate that the delay in making repairs is beyond the owner's or operator's control. [63.8(c)(1)(ii)]
CONTINUOUS MONITORING SYSTEM REQUIREMENTS—WORK PRACTICE	• Repair or immediately replace all continuous monitoring system (CMS) parts in accordance with the Startup, Shutdown, and Malfunction Plan, to correct "routine" or otherwise predictable CMS malfunctions, as required by 63.6(e)(3). [63.8(c)(1)(i)] • Necessary CMS parts must be kept readily available for routine repairs. [63.8(c)(1)] If a CMS is out-of-control: • Take the necessary corrective action and repeat all necessary tests which indicate that the system is out-of-control. [63.8(c)(7)] • Take corrective action and retest until the performance requirements are below the applicable limits. [63.8(c)(7)] A CMS is out-of-control if: 1) the 0 (low-level), mid-level (if applicable), or high-level calibration drift (CD) exceeds 2 times the applicable CD specification in the applicable performance standard; or 2) the CMS fails a performance test, relative accuracy test, or linearity test audit; or 3) the COMS CD exceeds 2 times the limit in the applicable performance specification in the relevant standard.

6.5.3 Construction or Reconstruction Requirements

The T&S MACT requires that after June 17, 1999 no construction of a new major affected source, reconstruction of a major affected source, or reconstruction of a major source making it an affected source, can occur without obtaining advance written approval from the delegated authority. The MACT general provisions allow for a 60-day approval or denial period, once the facility has been notified in writing that its application is complete. The delegated authority will make a completeness determination within 30 calendar days of receipt of the original application.

As identified in Table 6-11, there is a tight schedule for submittal of an application, for facilities that began construction or reconstruction before June 17, 1999 (the effective date of the rule). Approval from the Administrator or delegated authority must be obtained for each major source construction or reconstruction. The required contents of the applications are listed in Table 6-12.

The various notifications and submittals related to the construction of a new affected source, or the reconstruction of an affected source are required, and are summarized in Table 6-13. New sources having an initial startup after June 17, 1999 must conduct all required performance tests within 180 days of the initial startup date (63.7[a][2][ii]).

Table 6-11. Schedule for Submittal of Construction or Reconstruction Applications

Condition	When to Submit Application for Approval
If construction or reconstruction began AFTER June 17, 1999	As soon as practicable BEFORE construction or reconstruction is scheduled to commence
If construction or reconstruction began BEFORE June 17, 1999, but not initial startup	As soon as practicable BEFORE startup, but no later than August 16, 1999 (60 days after June 17, 1999)

Table 6-12. Contents of Application for Approval to Construct or Reconstruct

General Information

- The applicant's name and address;
- a notification of intention to construct a new major source or make any physical or operational change to a major source that meets the criteria for a reconstruction, as defined in 40 CFR 63.2;
- the address or proposed address of the source;
- an identification of the relevant standard that is the basis of the application;
- the expected commencement and completion dates of the construction or reconstruction;
- the anticipated date of initial startup of the source; and
- the type and quantity of HAPs emitted by the source, reported in units and averaging times and in accordance with the test methods specified in the relevant standard, or if actual emissions data are not yet available, an estimate of the type and quantity of HAPs expected to be emitted, reported in units and averaging times specified in the relevant standard. [63.5(d)(1)(i)-(ii), 63.5(f)(2) and 63.5(d)(1)(ii)(A)-(H)]

Specific Additional Information for Construction Applications

- the proposed nature, size, design, operating design capacity, and method of operation of the source;
- an identification of each emission point for each HAP emitted; and
- a description of the planned air pollution controls, with control efficiencies and supporting calculations. [63.5(d)(2)]

Specific Additional Information for Reconstruction Applications

- a description of the source and the components to be replaced; and
- a description of present and proposed emission control systems.

If there are economic or technical limitations to prevent the source from complying with all relevant standards or other requirements, then the reconstruction application must include:

- an estimate of the fixed capital cost of the replacements and of constructing an entirely new source,
- the estimated life of the source after the replacements, and
- a discussion of any economic or technical limitations the source may have in complying with relevant standards or other requirements after the proposed replacements. [63.5(d)(3)(i)-(v)]

Table 6-13

NOTIFICATIONS AND SUBMITTALS REQUIRED FOR SOURCE CONSTRUCTION OR RECONSTRUCTION

- Notification of construction of a new affected source, reconstruction of an affected source, or reconstruction of a source making it an affected source.

  Submitted as soon as practicable *before* the construction or reconstruction is planned to commence, if the construction or reconstruction commences *after* June 17, 1999. The notification is submitted as soon as practicable *before* startup, but no later than 60 days after June 17, 1999 if the construction or reconstruction had commenced and initial startup *had not occurred* before June 17, 1999. [63.5(b)(4)].

  For major sources, the application for approval of construction or reconstruction may be used to fulfill this notification requirement. [63.9(b)(3)]

- Notification of T&S MACT applicability must be made not later than 120 days after initial startup, for a new or reconstructed source that had an initial startup after June 17, 1999, and for which an application for approval of construction or reconstruction was not required. [63.9(b)(3)] This notification must include:

  the name and address of the owner or operator;
  the address (i.e., physical location) of the affected source;
  an identification of the relevant standard, or other requirement, that is the basis of the notification and the source's compliance date;
  a brief description of the nature, size, design, and method of operation of the source, including its operating design capacity and an identification of each point of emission for each HAP, or if a definitive identification is not yet possible, a preliminary identification of each point of emission for each HAP; and
  a statement of whether the source is a major or area source.

- Notification of the intention to construct, for new or reconstructed *major* sources that had an initial startup after June 17, 1999, and for which an application for approval of construction or reconstruction was required. This notification is required to be submitted along with the application for approval to construct or reconstruct. [63.9(b)(4)(i)]

Table 6-13 (Continued)

NOTIFICATIONS AND SUBMITTALS REQUIRED FOR SOURCE CONSTRUCTION OR RECONSTRUCTION

Subsequent notifications are:

- The date when construction or reconstruction commenced, if construction or reconstruction commenced before June 17, 1999 – to be submitted with the application for approval;
- The anticipated date of startup - delivered not more than 60 days, or less than 30 days, before the startup date;
- The actual date of startup – delivered within 15 calendar days after the actual startup date.
- New sources that began construction after February 6, 1998, but before June 17, 1999, must notify the delegated authority of their compliance obligations as for new sources that began construction after June 17, 1999.

  Submittal of actual measured emissions data and actual control device efficiency data, for construction or reconstruction of a new major source. Must be submitted no later than with the notification of compliance status, in the event only estimates or preliminary information (instead of actual data) were initially provided. [63.5(d)(1)(iii) and 63.5(d)(2)]

- Submittal of actual emissions data or control efficiency data.
  For sources that submitted estimates or preliminary information in the application for approval of construction reconstruction, in place of actual emissions data or control efficiencies.
  To be submitted as soon as the data were available, but no later than with the initial notification of compliance status. [63.9(h)(5)]

6.5.4 Alternative Monitoring Requirements

A facility may request use of alternative monitoring. All otherwise applicable requirements of the T&S MACT must be complied with until permission to use the alternative method has been granted by the delegated authority. If there are reasonable grounds to dispute the results obtained by an alternative monitoring method, requirement, or procedure, the delegated authority may require the use of a method, requirement, or procedure specified in 40 CFR 63.8(f), or the T&S MACT standard. If use of an alternative monitoring method was approved, the source must continue to use that method until receiving approval to use another method.

If an alternative method is to be used to demonstrate compliance, an application for approval must be submitted not later than the site-specific test plan (if requested), or with the site-specific performance evaluation plan (if requested), or at least 60 days before the performance evaluation is scheduled to begin. If the alternative method is not used to demonstrate compliance with a relevant standard or other requirement, the application may be submitted at any time.

If the alternative method is not approved within 30 days before the performance evaluation is scheduled to begin, the performance evaluation may be conducted within 60 days after the approval to use the alternative method is actually made.

An application for use of alternative monitoring must contain:

- A description of the proposed alternative monitoring system and performance evaluation test plan, if required under 63.8(e)(3); and
- Information justifying the request, such as the technical or economic infeasibility, or the impracticality, of the source using the required method.

6.5.5 Compliance Extension Requirements

Various notifications and submittals related to the request for a compliance extension are summarized in Table 6-14. If an existing facility is unable to achieve compliance with a standard established under the MACT general provisions or T&S MACT, an extension must be requested from the delegated authority that allows the facility up to one additional year to comply with the standard. The facility must comply with all applicable requirements of the T&S

Table 6-14. Compliance Extension Requirements

Requirement
• Submit a request in writing for a compliance extension not later than 12 months before June 17, 2002. [63.6(i)(4)(i)(B)]
• The request for a compliance extension must include: •a description of the controls to be installed to comply with the standard; •a compliance schedule, including the date by which each step toward compliance will be reached; •a description of interim emission control steps that were taken during the extension period, including milestones to assure proper operation and maintenance of emission control and process equipment; and • a statement as to whether the owner or operator is also requesting an extension of other applicable requirements (e.g., performance testing requirements). At a minimum, the list of dates shall include: (1) the date by which contracts for emission control systems or process changes for emission control will be awarded, or the date by which orders will be issued for the purchase of component parts to accomplish emission control or process changes; (2) the date by which on-site construction, installation of emission control equipment, or a process change is to be initiated; (3) the date by which on-site construction, installation of emission control equipment, or a process change is to be completed; and (4) the date by which final compliance is to be achieved. [63.6(i)(6)(i)(A), 63.6(i)(6)(i)(B)(1)-(4), 63.6(i)(6)(i)(C)-(D)]
• Submit the progress reports required as a condition of receiving an extension of compliance to the delegated authority by the dates specified in the written extension of compliance. [63.10(d)(4)]
• Apply to have the Title V permit revised to incorporate the conditions of the compliance extension. [63.6(i)(4)(i)(A)]

MACT until the compliance extension had been granted. If a compliance extension has been obtained for an existing source, the source must comply with all MACT general provisions, except for those requirements specifically overridden by the extension.

An extension allowing the source five years from the BACT or LAER technology installation date, to comply with a relevant emission standard, may be requested for existing sources that installed BACT or LAER technology prior to June 17, 1999. This is provided the BACT or LAER technology controls the same pollutant (or stream of pollutants) that would be controlled at that source by the relevant emission standard.

If such an extension is desired, the compliance extension request must be submitted in writing no later than 120 days after June 17, 1999. In addition to the other information required for a compliance extension, requests for a five-year extension under 40 CFR 63.6(i)(5) must include all information needed to demonstrate to the Administrator's satisfaction that the installation of BACT or LAER technology controls the same pollutant (or stream of pollutants) that would be controlled at that source by the relevant emission standard.

6.6 Compliance Checklist

A Microsoft® Excel 97 spreadsheet containing all of the T&S MACT requirements has been developed. This spreadsheet is designed to be sorted to develop individualized compliance checklists for specific facilities and units. The requirements have been categorized based on compliance event, requirements type, affected source type, and control device type. By sorting the requirements based on these categories and deleting nonapplicable requirements, an individualized compliance checklist can be developed.

6.6.1 Checklist Categories

Each of the T&S MACT requirements have been categorized based on compliance event type, requirement type, and control device type. The checklist category type allows a source operator or inspector to sort the checklist and identify the requirements for a specific affected source, control device, and type of compliance event under consideration. This section list the selections within the categories used to sort the requirements contained in the spreadsheet.

The compliance event types are:

- Initial – one time requirements that must be met for initial compliance
- Ongoing – requirements that must be met on an ongoing basis
- Conditional – apply only if certain conditions are met
- Performance testing – requirements specific to performance testing
- Startup, shutdown, or malfunction – requirements that must be met if a startup, shutdown, or malfunction occurs
- Requested by Administrator – requirements that only apply if the EPA Administrator makes a request

The requirement types are:

- Compliance demonstration – actions that must be taken to demonstrate compliance including determinations or calculations that must be made. Does not include monitoring, inspections, or testing.
- Equipment design or configuration
- Work practice
- Emission limit or control efficiency
- Monitoring or inspection
- Recordkeeping
- Reporting

The control device types are:

- All control devices
- All control devices except condensers
- All control devices except flares
- Carbon adsorption
- Regenerable carbon adsorption
- Nonregenerable carbon adsorption
- Cover or closed-vent system
- Catalytic vapor incinerator
- Thermal vapor incinerator
- Condenser
- Enclosed combustion device – examples include thermal vapor incinerators, catalytic vapor incinerators, boilers, and process heaters
- Flare

- Vapor recovery device
- Other control device

6.6.2 Developing an Individualized Compliance Checklist

Developing an individualized compliance checklist from the requirements spreadsheet involves identifying the categories of interest, sorting the requirements and deleting those that do not apply.

The steps to developing an individualized compliance checklist are:

1. Determine applicability of facility and units
2. Determine categories of interest

   Examples:

   - If the checklist is being developed for the first inspection after the compliance date, then requirements categorized as either initial or ongoing are of interest.
   - If the affected source subject to the standard does not use a control device to apply, then no control device category is of interest.

3. In the spreadsheet select all rows following the shaded row.
4. Select "Data" and "Sort."

   Note: When sorting by regulatory citation, the spreadsheet sorts from left to right, character by character. For numbers with decimal point, all citations that begin with 63.10 and 63.11 will appear before the citation for 63.2.

5. Make sure a dot appears in "My list has no header row."
6. Select the first category to sort by selecting the column containing that category in the "sort by" list.
7. Select the second category to sort by selecting the column containing that category in the first "then by" list.
8. Select the third category to sort by selecting the column containing that category in the second "then by" list.
9. Delete rows containing requirements with categories of no interest.

   Note: Deleting rows containing requirements with categories of no interest must be done carefully. For example, for a checklist for a source using a thermal vapor incinerator, the requirements that <u>cannot</u> be deleted are those requirements that apply

to all control devices (A), closed-vent systems (CV), enclosed combustion devices (EC), and thermal vapor incinerators (TI).

10. Readjust the height of each row by selecting format, row, and then select auto-height.
11. Print the remaining requirements for use as a checklist.

7.0 Inspections

This section contains information designed to be useful in preparing for and conducting inspections of oil and natural gas facilities subject to the T&S MACT standard using individualized compliance checklists.

7.1 Developing Compliance Checklists

A Microsoft® Excel spreadsheet containing the T&S MACT requirements has been developed for use in preparing individualized compliance checklists to be used to inspect facilities. Section 6.6.1 describes how to use the spreadsheet to develop a checklist. This section describes the information that will be needed to develop a checklist. Documents that may include the information needed include:

- Operating permits,
- Operating permit applications,
- Initial Notifications of Applicability,
- Notice of Compliance Status Reports,
- Periodic Reports
- Process change reports, and
- Operating permit compliance certification submittals.

For some of the information needed, a call to the source to request the information will be necessary.

7.1.1 Step 1—Applicability

The first step in developing a MACT compliance checklist for a facility is determining if the MACT standard is applicable to the facility or if the facility is exempt from the standard but subject to recordkeeping requirements. This information should be available from one or more of the sources of information listed above. Either the operating permit (or application if the permit has not been issued) or the Initial Notification of Applicability should contain this information. If this information is not available from any of the documents listed above, then

applicability can be determined using the information provided in section 4 of this guidance document and information obtained from the source.

It is important to keep in mind that determining whether a source is a major HAP source for purposes of this MACT standard is different from determining if a source is a major HAP source for other regulatory purposes (Section 4 of this guidance document). In reviewing documents to determine applicability of this MACT standard to the source, make sure that when the source is identified as a major HAP source, that the identification is for the MACT standard and not for another purpose.

If it is determined that the facility is a major source of HAPs as defined in the MACT standard, but is exempt from the standard, the spreadsheet should be sorted based on the "Affected Source" column and those requirements applicable to exempted sources reviewed.

7.1.2 Step 2—Affected Sources

Once it has been determined that the source is a major source of HAPs and that the MACT standard applies, the affected sources must be identified. The MACT standard applies to glycol dehydrators.

It is necessary to determine if the facility includes regulated equipment and verify that the equipment is not exempt from the MACT standard. Again, information on the equipment located at a facility and the exemptions that apply should be available in the documents mentioned above. As with exempt facilities, there are also recordkeeping requirements that may apply to exempt units. The spreadsheet should be sorted based on affected source and the requirements applicable to exempt units identified.

7.1.3 Step 3—Compliance Methods

There are several different compliance methods that can be used by a source to meet the requirements of the MACT standard. See table 6-6 for a listing of these options. To develop an individualized compliance checklist for a facility, it will be important to identify the compliance method chosen.

7.1.4 Step 4—Control Devices

Many of the requirements included in the T&S MACT regulations apply to specific control devices. To identify applicable requirements, it is necessary to identify the control devices used to comply.

7.1.5 Step 5—Compliance Period

To further narrow the requirements included in the checklist, the inspector should identify the compliance period that the inspection will cover and any compliance events that have occurred at the facility. The primary compliance periods are:

- Initial compliance; and,
- Ongoing compliance.

Compliance events that trigger MACT requirements include:

- Startup, shutdown, or malfunction of units;
- Malfunction or inoperability of control equipment
- Malfunction or inoperability of monitoring equipment;
- Performance testing; or
- A request by the Administrator or the Division.

Requirements may also be triggered by:

- Process changes (see Section 6.5.1 for a discussion of process change requirements);
- Change in compliance method used by a source; and
- An increase in annual natural gas or hydrocarbon liquid throughput above the maximum throughput originally calculated.

A review of reports submitted by the source such as Periodic Reports, notifications of upset or malfunction, or operating permit compliance certifications may be helpful in

determining if any of these events have occurred during the period for which the inspection is being conducted. A telephone call to the source may be necessary and useful in identifying compliance events that have occurred.

Once all of the necessary information has been collected, the spreadsheet can be sorted and requirements not applicable to the source deleted. Instructions on using the spreadsheet can be found in section 6.6. Many oil and gas facilities are located in remote areas. Often, compliance-related documents will be maintained in a trailer or office some distance from the regulated equipment. It may be helpful to organize the compliance checklists by requirements for which compliance is determined using records checks and those for which compliance determination requires equipment inspection.

7.2 Planning Inspection

In addition to preparing a facility-specific compliance checklist, there are other pre-inspection activities that if conducted can assist in avoiding problems and lead to an efficient inspection. These include:

- Arranging a meeting place with the source contact person;
- Arranging transportation to source location (may require four-wheel drive vehicle);
- Confirming safety equipment needed; and
- Scheduling sufficient time.

Because many of the oil and natural gas facilities to be inspected are located in remote areas, it is important to arrange a meeting place with the source contact person that can be easily located. Obtaining detailed directions to the meeting place from the contact person will also be helpful. Traveling to the source to be inspected may involve long-distance travel over unmarked and unpaved roads. Arranging transportation by the source contact person to and from the source location or verifying that the vehicle intended for use is appropriate for the roads is a worthwhile step to take in arranging the inspection. It is also important to verify the safety equipment that will be required.

Because of the distances involved in inspecting this type of source, it may be difficult and time consuming to return to the site. It is, therefore, important to allow enough time to conduct

the inspection. Before scheduling the inspection, it will be helpful to estimate the time period necessary for completing the inspection. The requirements on the facility-specific compliance checklist can be reviewed to estimate the amount of time compliance determination for each requirement will take. These estimates can then be added to obtain a total time estimate for the inspection.

7.3 Conducting Inspections

The remote location and similarity of many of the sources lead to suggestions for conducting inspections. These suggestions are based on the premise that returning to the source may be time consuming and difficult. Steps to take to avoid the necessity of returning to the source or to the office where records are maintain include:

- Reference materials: On the first inspection that includes assessing compliance with the MACT standard, take to the site a copy of the regulations, this guidance document, and any other facility-specific documents (Notification of Compliance Status Report, Periodic Reports, Operating Permit etc.) that may be useful. These reference materials may be helpful in clarifying confusing situations and resolving issues while still at the site and avoiding a return visit.

- Equipment inspection: Any questions about the equipment should be asked while at the equipment site. Answers to the questions may necessitate further examination of the equipment. When the equipment inspection is completed, taking some time at the equipment site to organize and review the checklist and any notes taken may be helpful in confirming that all inspection activities have been completed and a return visit will not be necessary.

- As part of the equipment inspection, it may be necessary to determine the glycol circulation rate. For most gas-driven pumps (e.g., Kimrays), this can be easily done by counting pump strokes and consulting the vendor literature (also on the GRI web site) regarding the volume/stroke for different pump models. In the case of electric pumps, many of these are fixed speed, and obtaining the design criteria from the operator is sufficient to verify the circulation rate. For variable speed electric pumps, the operator will often have a flow measurement or other flow tracking device already installed. If such a device is not installed, then the line may be disconnected and a manual flow test conducted (e.g., a bucket test).

- Records inspection: In reviewing records it is important to verify that the records being reviewed are for the site being inspected. Site records are usually kept in the same format, and names are often very similar. It is, therefore, prudent to verify that each record examined is for the site that is being inspected.

8.0 Frequently Asked Questions

Can I use my emissions calculations from my Title V permit for determining if my facility is a major source subject to the T&S MACT?

No. The T&S MACT has special provisions for calculating potential to emit (PTE) for HAPs. These provisions allow the owner/operator to account for less than year-round operation of a storage field or for below capacity operation of compressor stations. In most cases, these are expected to be lower than PTE calculations that were normally done for Title V. For more detail on these special provisions, see Section 2.1 and 4.2 of this document.

My compressor station with its dehydrator is an area source, but we've just signed some new transportation contracts to add gas to the pipeline through the dehy at this station. The additional gas will make me a major source. When do I have to be in compliance?

If the original facility construction or reconstruction commenced before February 6, 1998, then the facility must be in compliance within three years of becoming a major source.

If the facility construction/reconstruction commenced on or after February 6, 1998, then the facility must be in compliance on the day it becomes a major source.

For more details on compliance dates and compliance status report due dates, see Table 6-1.

What HAP emission points do I need to include in determining if my facility is a major source?

For T&S, all HAP emissions points at the facility, including potential points such as amine units, compressor engines, and sulfur recovery units, must be aggregated to determine if the facility is a major source. However, only dehydrators may be controlled under the provisions of this rule.

For more details on determining if your facility is subject to the rule, see Section 4.2.

The rule has special provisions for my compressor station throughput if the unit has operated for five years or more. How do I calculate my emissions if I've operated fewer than five years?

The rule does not specifically address how to calculate emissions if the facility is new or has been operating for fewer than five years. For an operating facility, EPA (via recent e-mail correspondence) recommends using the highest annual throughput multiplied by 1.2 or the design capacity of the facility, whichever is greater. For a new facility, this likely means either the highest expected annual throughput (multiplied by 1.2) or the design capacity of the new facility, whichever is greater.

Do I include the HAPs listed by Colorado in my calculation of my emissions to determine if I am a major source?

No. For determining if a facility is a major source, only the HAPs listed in Section 112 of the 1990 CAAA are used (i.e., the list of 188 HAPs).

What is the period I should use for my annual averages for my natural gas throughputs? Is it the five years prior to June 17, 1999? The five previous calendar years?

The rule is silent on this issue. However, in other instances the rule allows the operator to define the period for averaging (e.g., the operator can define the 24-hour period used for daily averaging for control device monitoring, so it could be a calendar day or other 24-hour period). As a practical matter, it may be most convenient to use the five previous calendar years, but this can be defined by the operator. It did not appear to be EPA's intent that this should be a rolling five-year period that would change on a daily or monthly basis; one of EPA's objectives was to minimize the monitoring, reporting, and recordkeeping burden on the industry (see Section 2).

My facility is not a major source of HAPs. Is there anything I need to do to comply with the rule?

Exempt facilities (or units that are exempt from the control device requirements) need to maintain records that prove the basis of their exemption. They should also record and maintain their production data and update the basis of their exemption on an annual basis to reflect the changing "previous five-year period" for which throughput is calculated.

My large (50 MMscfd) dehydrator has a flash tank and we use the flash gas in the plant fuel system. Do I get credit for controlling this flash gas?

The rule establishes standards for glycol dehydrator process vents, which are defined as "the glycol dehydration unit reboiler vent and the vent from the gas-condensate-glycol (GCG) separator (flash tank), if present." Therefore, if a flash tank is present, the owner/operator must achieve 95% control for both vents, and the flash tank HAPs should be included in the calculation. As a practical matter, the flash tank HAPs are typically 2-10% of the reboiler vent HAPs, so 100% control of the flash tank does not greatly change the need for 95% control of the reboiler vent.

Is truck-mounted equipment exempt from the rule?

Although the definition of facility points to the definition of surface site, which includes the phrase "physically affixed" in its definition, EPA did not intend to exempt truck-mounted equipment from the rule. As a result, any truck-mounted equipment should not be treated any differently than more permanently mounted equipment in determining whether a facility is a major source and whether control requirements apply.

How long does an existing source have to become a synthetic minor source before it is subject to the MACT rules?

Up until the compliance date. For an existing source that was major on June 17, 1999, it can become a synthetic minor source up until June 17, 2002. For an existing source that was an area source on June 17, 1999, it has up to three years after the date that it becomes major to achieve compliance or become a synthetic minor source.

9.0 Glossary and Unit Conversion Table

Affected sources for this MACT standard are glycol dehydration units that are located at facilities that are major sources.

Annual average (or actual annual average) refers to the production or throughput for a facility over a 12-month period. Because the rule does not define the 12 month period, this may be defined by the owner/operator for the facility. Based on its desire to reduce administrative burdens, it appears that EPA did not intend this be on a rolling basis (i.e., that your annual averages would have to be updated on a daily or monthly basis).

Area source is any source that is not major (i.e., that does not emit or does not have a potential to emit 10 tpy of one HAP or 25 tpy of all HAPs – see major source definition).

Boiler means an enclosed device using controlled flame combustion and having the primary purpose of recovering and exporting thermal energy in the form of steam or hot water. Boiler also means any industrial furnace as defined in 40 CFR 260.10 (section containing general hazardous waste management system regulations).

Closed-vent system means a system that is not open to the atmosphere and is composed of piping, ductwork, connections, and if necessary, flow inducing devices that transport gas or vapor from an emission point to one or more control devices. If gas or vapor from regulated equipment is routed to a process (e.g., to a fuel gas system), the conveyance system shall not be considered a closed-vent system and is not subject to closed-vent system standards.

Combustion device means an individual unit of equipment, such as a flare, incinerator, process heater, or boiler, used for the combustion of organic HAP emissions.

Compressor station means any permanent combination of compressors that move natural gas at increased pressure from fields, in transmission pipelines, or into storage.

Construction means the on-site fabrication, erection, or installation of an affected source.

Continuous recorder means a data recording device that either records an instantaneous data value at least once every hour or records hourly or more frequent block average values.

Control device means any equipment used for recovering or oxidizing HAP or volatile organic compounds (VOC) vapors. Such equipment includes, but is not limited to, absorbers, carbon adsorbers, condensers, incinerators, flares, boilers, and process heaters. For the purposes of this MACT standard, if gas or vapor from regulated equipment is used, reused (i.e., injected into the flame zone of a combustion device), returned back to the process, or sold, then the recovery system used, including piping, connections, and flow inducing devices, is not considered to be control devices or closed-vent systems.

Custody transfer means the transfer of hydrocarbon liquids or natural gas:

(1) After processing and/or treatment in the producing operations; or

(2) From storage vessels or automatic transfer facilities, or other equipment, including product loading racks, to pipelines or any other forms of transportation.

Existing source means a source on which construction or reconstruction commenced before February 6, 1998.

Facility means any grouping of equipment where natural gas is processed, compressed, or stored prior to entering a pipeline to a local distribution company or (if there is no local distribution company) to a final end user. Examples of a facility for this source category are: an underground natural gas storage operation; or a natural gas compressor station that receives natural gas via pipeline, from an underground natural gas storage operation, or from a natural gas processing plant. The emission points associated with these phases include, but are not limited to, process vents. Processes that may have vents include, but are not limited to, dehydration and compressor station engines.

Facility, for the purpose of a major source determination, means natural gas transmission and storage equipment that is located inside the boundaries of an individual surface site (as defined in this section) and is connected by ancillary equipment, such as gas flow lines or power lines.

Equipment that is part of a facility will typically be located within close proximity to other equipment located at the same facility. Natural gas transmission and storage equipment or groupings of equipment located on different gas leases, mineral fee tracts, lease tracts, subsurface unit areas, surface fee tracts, or surface lease tracts shall not be considered part of the same facility.

Federal Energy Regulatory Commission Cushion or FERC Cushion means the minimum natural gas capacity of a storage field as determined by the Federal Energy Regulatory Commission.

Field natural gas means natural gas extracted from a production well prior to entering the first stage of processing, such as dehydration.

Flash tank. See the definition for gas-condensate-glycol (GCG) separator.

Flow indicator means a device which indicates whether gas flow is present in a line or whether the valve position would allow gas flow to be present in a line.

Gas-condensate-glycol (GCG) separator means a two- or three-phase separator through which the "rich" glycol stream of a glycol dehydration unit is passed to remove entrained gas and hydrocarbon liquid. The GCG separator is commonly referred to as a flash separator or flash tank.

Glycol dehydration unit means a device in which a liquid glycol (including, but not limited to, ethylene glycol, diethylene glycol, or triethylene glycol) absorbent directly contacts a natural gas stream and absorbs water in a contact tower or absorption column (absorber). The glycol contacts and absorbs water vapor and other gas stream constituents from the natural gas and becomes "rich" glycol. This glycol is then regenerated in the glycol dehydration unit reboiler. The "lean" glycol is then recycled.

Glycol dehydration unit baseline operations means operations representative of the glycol dehydration unit operations as of June 17, 1999. For the purposes of this subpart, for determining the percentage of overall HAP emission reduction attributable to process modifications, glycol dehydration unit baseline operations shall be parameter values (including, but not limited to, glycol circulation rate or glycol-HAP absorbency)that represent actual long-term conditions (i.e., at least 1 year). Glycol dehydration units in operation for less than 1 year shall document that the parameter values represent expected long-term operating conditions had process modifications not been made.

Glycol dehydration unit reboiler vent means the vent through which exhaust from the reboiler of a glycol dehydration unit passes from the reboiler to the atmosphere or to a control device.

Glycol dehydration unit process vent means either the glycol dehydration unit reboiler vent and the vent from the GCG separator (flash tank), if present.

Hazardous air pollutants or HAPs means the chemical compounds listed in section 112(b) of the Clean Air Act (Act). All chemical compounds listed in section 112(b) of the Act need to be considered when making a major source determination. Only the HAP compounds listed in Table 1of 40 CFR 63, Subpart HHH need to be considered when determining compliance.

Incinerator means an enclosed combustion device that is used for destroying organic compounds. Auxiliary fuel may be used to heat waste gas to combustion temperatures. Any energy recovery section is not physically formed into one manufactured or assembled unit with the combustion section; rather, the energy recovery section is a separate section following the combustion section and the two are joined by ducts or connections carrying flue gas. The above energy recovery section limitation does not apply to an energy recovery section used solely to preheat the incoming vent stream or combustion air.

LDC is an acronym for "local distribution company." Gas that has been transferred to an LDC is no longer covered in the T&S category.

Major source means a facility that emits or has the potential to emit [calculated as directed in 40 CFR 63.1270(a)(1) and discussed in Section 2.1 of this document] 10 tpy or more of a single HAP or 25 tpy or more of all HAPs.

Natural gas processing plant means any processing site engaged in the extraction of natural gas liquids from field gas, or the fractionation of mixed natural gas liquids (NGL) to natural gas products, or a combination of both.

Natural gas transmission means the pipelines used for the long distance transport of natural gas (excluding processing). Specific equipment used in natural gas transmission includes the land, mains, valves, meters, boosters, regulators, storage vessels, dehydrators, compressors, and their driving units and appurtenances, and equipment used for transporting gas from a production plant, delivery point of purchased gas, gathering system, storage area, or other wholesale source of gas to one or more distribution area(s).

No detectable emissions means no escape of HAP from a device or system to the atmosphere as determined by: (1) instrument monitoring results in accordance with the requirements of 40 CFR 63.1282(b); and (2) the absence of visible openings or defects in the device or system, such as rips, tears, or gaps.

Operating parameter value means a minimum or maximum value established for a control device or process parameter which, if achieved by itself or in combination with one or more other operating parameter values, indicates that an owner or operator has complied with an applicable operating parameter limitation, over the appropriate averaging period as specified in 40 CFR 63.1282(e) and (f).

Organic monitoring device means an instrument used to indicate the concentration level of organic compounds exiting a control device based on a detection principle such as infra-red, photoionization, or thermal conductivity.

Primary fuel means the fuel that provides the principal heat input (i.e., more than 50 percent) to the device. To be considered primary, the fuel must be able to sustain operation without the addition of other fuels.

Process heater means an enclosed device using a controlled flame, the primary purpose of which is to transfer heat to a process fluid or process material that is not a fluid, or to a heat transfer material for use in a process (rather than for steam generation)

PTE is an acronym for "potential to emit." This rule establishes different calculation procedures for determining HAPs emissions than may have previously been used in other regulations.

Reconstruction means the replacement of components of an affected or a previously unaffected stationary source to such an extent that:

(1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source; and

(2) It is technologically and economically feasible for the reconstructed source to meet the relevant standard(s) established by the Administrator (or a State) pursuant to section 112 of the Act. Upon reconstruction, an affected source, or a stationary source that becomes an affected source, is subject to relevant standards for new sources, including compliance dates, irrespective of any change in emissions of hazardous air pollutants from that source.

Relief device means a device used only to release an unplanned, non-routine discharge in order to avoid safety hazards or equipment damage.

Safety device means a device that meets both of the following conditions: the device is not used for planned or routine venting of liquids, gases, or fumes from the unit or equipment on which the device is installed; and the device remains in a closed, sealed position at all times except when an unplanned event requires that the device open for the purpose of preventing physical damage or permanent deformation of the unit or equipment on which the device is installed in accordance with good engineering and safety practices for handling flammable, combustible, explosive, or other hazardous materials. Examples of unplanned events which may require a safety device to open include failure of an essential equipment component or a sudden power outage.

Shutdown means the cessation of operation for purposes including, but not limited to, periodic maintenance, replacement of equipment, or repair, of a glycol dehydration unit, or other affected source under this subpart, or equipment required or used solely to comply with this subpart.

Startup means the setting into operation of a glycol dehydration unit, or other affected equipment under this subpart, or equipment required or used to comply with this subpart. Startup includes initial startup and operation solely for the purpose of testing equipment.

Storage vessel means a tank or other vessel that is designed to contain an accumulation of crude oil, condensate, intermediate hydrocarbon liquids, produced water, or other liquid, and is constructed primarily of non-earthen materials (e.g., wood, concrete, steel, plastic) that provide structural support.

Surface site means any combination of one or more graded pad sites, gravel pad sites, foundations, platforms, or the immediate physical location upon which equipment is physically affixed.

Synthetic minor source means a source that has obtained federally-enforceable limits to become a minor source.

Temperature monitoring device means an instrument used to monitor temperature and having a minimum accuracy of ± 2 percent of the temperature being monitored expressed in ^{o}C, or $\pm 2.5\ ^{o}C$, whichever is greater. The temperature monitoring device may measure temperature in degrees Fahrenheit or degrees Celsius, or both.

Total organic compounds or TOCs, as used in this subpart, means those compounds which can be measured according to the procedures of Method 18, 40 CFR part 60, appendix A.

Underground storage means the subsurface facilities utilized for storing natural gas that has been transferred from its original location for the primary purpose of load balancing, which is the process of equalizing the receipt and delivery of natural gas. Processes and operations that may be located at an underground storage facility include, but are not limited to, compression and dehydration.

Volatile organic compounds or VOCs means any compound of carbon excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions except those listed in the Common Provisions of the Colorado air quality regulations as having negligible photochemical reactivity.

Table 9-1. Unit Conversion Table

Metric Values	Equivalent English Values
0.31 cubic meter per liter (m3/liter)	1,750 standard cubic feet per barrel (ft3/barrel)
39,700 liter/day	250 barrels per day (bpd)
79,500 liter/day	500 bpd
0.90 Megagrams per year (Mg/yr)	1.0 ton per year (tpy)
18.4 thousand cubic meters per day (m3/day)	650 thousand cubic feet per day (scf/day)
28.3 thousand m3/day	1 million scf/day (MMscf/day)
85 thousand m3/day	3 MMscf/day
283 thousand m3/day	10 MMscf/day
44 megawatts (MW)	150 million British Thermal Units per hour (mmBTU/hour)

Appendix A
Fact Sheets—MACT Overview, Equipment

Appendix B
Requirements Spreadsheet Printout

Appendix C
Example Forms

Appendix D
Preamble and Rule (40 CFR 63, Subpart HHH)

Appendix E
Example PTE Analysis for Compressor Station with Dehydrator

Appendix F
GRI Web Site Information on Glycol Dehydrator