August 10, 2007

Frequently Asked Questions (FAQs) : Directive 039: Revised Program to Reduce Benzene Emissions from Glycol Dehydrators

The questions and answers below are a summary of the most frequently asked questions received by the EUB Environment Group since the publication of EUB *Directive 039: Revised Program to Reduce Benzene Emissions from Glycol Dehydrators* (2006) and the Canadian Association of Petroleum Producers (CAPP) *Best Management Practices, Control of Benzene Emissions from Glycol Dehydrators* (2006). The responses provided are intended to clarify the responsibilities of industry for achieving a reduction in benzene emissions in Alberta's upstream oil and gas industry sector.

Effective Dates

1. What is the effective date for EUB *Directive 039: Revised Program to Reduce Benzene Emissions from Glycol Dehydrators* requirements?
   Answer: All the requirements in *Directive 039* must have been met by January 1, 2007, with the exception of the Annual Dehydrator Benzene Inventory List, which must have been completed and submitted by July 1, 2007, to cover the 2006 operating year. For subsequent years, July 1 will continue to be the annual Dehydrator Benzene Inventory List submission deadline.

Analysis

2. Do I need to do an extended analysis for benzene?
   Answer: If your C6+ portion of the analysis is equal to or greater than 0.0001 mole fraction (≥100 parts per million [ppm]), an extended analysis to determine the benzene concentration is required. The extended analysis must reflect the composition of the gas going into the dehydrator.
   Note that even though benzene is part of the C7+ group of compounds in a gas analysis due to its boiling point, C6+ is used as the trigger to decide if an extended analysis for benzene is required, since C6+ provides a more conservative and sensitive method with better resolution in determining if a significant level of benzene exists in the gas.
3. What is the accuracy of the benzene component expected in the extended analysis? Do I need to go down to 0.000 01 mole fraction (10 ppm benzene)?
   Answer: Yes. For example, a 20 million standard cubic feet per day (mmscfd) dehydrator with inlet gas containing 10 ppm benzene will produce close to 1 tonne per year (t/yr).
4. Is a yearly extended analysis showing the benzene composition required?
   Answer: Yes, unless you can demonstrate that the inlet gas composition has not changed.
5. Do I need to do an extended benzene analysis on the inlet gas if I am using the lean/rich method to calculate benzene emissions and prepare DEOS graphs?
   Answer: No, an extended benzene analysis is not required on the inlet to the dehydrator, as the benzene emissions are determined from the difference between the lean and rich glycol streams. It is expected that if a company is using the lean/rich method, benzene analysis must be done with a minimum detection limit of 1 microgram per millilitre (μg/mL).
   The benzene emission portion of the graph is generated by inputting the lean/rich data into the model at various glycol circulation rates. In generating the water content curves for the graph, you should input a gas analysis (on a dry basis), which can be wet gas to the dehy, dry gas leaving the dehy, or an extended wet gas to the dehy, whichever is available, at various glycol circulation rates. (The above comments are based on generalizations for generating the graph using GRI-GLYCalc. Licensees are responsible for understanding and entering the correct parameters for their processes as required for the software package they are using.)
   Note that for any analysis method used to determine the benzene emissions from a dehydrator, you must also account for all other sources of benzene emissions that

accompany that dehydrator (such as flash tanks, pump type, stripping gas) in the estimation and reporting of the total benzene emissions for the dehydrator unit.

Enforcement

6. What can be expected in cases of both High Risk and Low Risk noncompliances at gas or oil facilities?
   Answer: Both High Risk and Low Risk noncompliance events must be addressed. Failure to do so could result in a number of enforcement actions, including suspension or shutdown of facilities.
   Low Risk Noncompliance – Failure to comply after two notices could result in a number of possible enforcement actions, including partial or full suspension or "Refer" status. Refer status impairs the company's ability to operate in Alberta, and the EUB will treat all applications from the company as nonroutine.
   High Risk Noncompliance – Failure to comply immediately could result in a number of possible enforcement actions, including partial or full suspension or Refer status. If the risk cannot be mitigated so that the requirements are met, the dehydrator must be shut in. An action plan must be developed, submitted to the EUB, and implemented.
   See *Directive 019: Compliance Assurance—Enforcement* for additional information on the EUB enforcement and self-disclosure process.
7. How do I self-disclose (e.g., regarding delays in getting the DEOS posted)?
   Answer: Submit a self-disclosure letter outlining the noncompliance events to
   - the nearest EUB Field Centre if the dehydrator(s) in question are located within **one** Field Centre boundary
     or
   - the head office Public Safety/Field Surveillance Branch technical support staff if the dehydrators in question are located **across two or more** Field Centre boundaries.

   The letter must include the licence number, location, and your plans and schedule to rectify the noncompliance. Refer to *Directive 019*, Section 6, for complete self-disclosure requirements. Note that this procedure is required for any noncompliance event related to *Directive 039.*
8. Is the operator or the licensee responsible for compliance with the benzene requirements?
   Answer: The licensee is responsible for compliance with *Directive 039* and will be subject to enforcement for noncompliance events.

Multiple Dehydrators

9. For multiple dehydrators on a site, do I need to show benzene emissions before and after controls for each dehydrator on site?
   Answer: Yes, each dehydrator must have a DEOS showing the emissions before and after controls. This is required to ensure that the aggregate benzene emissions from all dehydrators on site meet the site emission limits.
10. Clarify what is required if I add a new (or relocated) dehydrator to an existing site with a dehydrator.
    Answer: The new (or relocated) dehydrator must operate at no more than 1 t/yr, and the aggregate emissions from all dehydrators may not go over the limit for the oldest dehydrator on site. See *Directive 039*, Section 2(ii).

Public Notification

11. What does the EUB require regarding public notification?
    Answer: *Directive 039* specifically states: "Licensees must follow the public consultation outlined in the *Benzene Control BMP*." General expectations are explained in the *Best Management Practices for Control of Benzene Emissions,* June 2006 (*Benzene Control BMP*), as well as suggested handouts (including the CAPP brochure *Benzene Emission Reductions by the Upstream Petroleum Industry*) to the public. As stated in the *Benzene Control BMP* (Section 11), residents within 750 m of a dehydrator must be informed that

the dehydrator is in compliance with the requirements, and personal contact is preferred wherever possible.

12. What if a new resident moves into the 750 m radius of an existing dehydrator?
    Answer: Notification must take place as soon as possible and no later than 12 months after the resident has occupied the residence. Emission limits must meet the required limits no later than 12 months after the resident has occupied the residence. For example, a 5 t/yr site dehydrator is now required to meet a 3 t/yr site emission limit.
13. Do you need resident consent to operate a dehydrator in close proximity (<750 m)?
    Answer: Consent is not required, but companies must document the details of the consultation that took place.
14. Does public notification apply to existing dehydrators?
    Answer: Yes. As stated in the *Benzene Control BMP,* "Public consultations are required to ensure that residents living in close proximity (<750 m) to a dehydrator are informed that the new or existing units comply…." Notification applies for all dehydrators, even if there is no benzene in the inlet gas.
15. Is an open house an acceptable method of public consultation?
    Answer: Yes, as long as each resident in close proximity is notified (residence notification should be documented and made available on request) and the intent as outlined in Section 11 of the *Benzene Control BMP* is satisfied.
    Note that public notification must be reported in the Annual Dehydrator Benzene Inventory List and documented as part of the Decision Tree Analysis in Appendix A.
16. Does the public consultation need to be updated annually?
    Answer: No, but the EUB requires the operators to do an initial consultation with new residents as soon as possible.

Methods to Determine Benzene Emissions

17. Since the GRI Glycalc model is not currently supported by its developer, will the regulators still allow its use?
    Answer: Yes, at this time it is still acceptable.
18. Is the use of other models allowed?
    Answer: Yes, provided that a company can demonstrate the suitability of the model.
19. What is the best method to determine or calculate benzene emissions?
    Answer: At this time there is no preferred method. Various methods are listed in Section 5 of the *Benzene Control BMP.*

Emission Control Methods

20. Can condenser tanks or other condensers be considered as an emission control method?
    Answer: As stated in the *Benzene Control BMP* (Appendix B), "Often still gas vapours are routed to a storage tank before being vented to atmosphere. Operating companies should assume that all gas vents from the storage tank, will result in 0% control efficiency, unless site-specific details are documented supporting an alternate control efficiency."
    Condensers will be considered as control technologies, provided that supporting engineering calculations or data on end-of-pipe testing on the inlet and exit emissions (at ambient temperatures above 15^{o}C) are made available to confirm the control efficiency for the operating conditions.
    Furthermore, the modelling must reflect whether there is a flash tank in place and whether stripping gas and gas-driven pumps are used. The effect of any of these three parameters could affect the efficiency of the condenser.
21. Are there total capture methods to determine benzene emissions?
    Answer: Yes. See the *Benzene Control BMP*, Section 5.1.

DEOS Questions

22. When does a DEOS need to be updated?
    Answer: Every 12 months. It also has to be updated upon relocation and upon a change in status (e.g., resumption of operation, shut-in, bypass, gas composition change).
23. What information is required for the government licence section on the DEOS sheet?

Answer: If a dehydrator is at a well site, use the EUB well licence number. If it is at a facility, use the facility licence number (e.g., compressor licence, plant licence, battery licence). If there is no associated licence, use the nearest upstream EUB licence number (e.g. well licence).

24. How do I determine the best glycol circulation rate from the DEOS graph?
    Answer: It is recommended that operators minimize the circulation rate to the lowest practical rate while still preventing hydrates in the gathering system and still meeting sales gas water content specification. A low circulation rate will minimize benzene emissions.
25. Is all the information shown on the sample DEOS graph required for each dehydrator graph?
    Answer: Yes. The purpose of the DEOS is to provide operators with graphical information to minimize circulation rate and benzene emissions and to provide information to EUB inspection staff.
26. Is completion of the DEOS graph required for ethylene glycol (EG) and diethylene glycol (DEG) systems?
    Answer: Yes. Although DEG and EG processes may differ from triethylene glycol (TEG) dehydrator processes, they are still considered glycol dehydrators. Any system that uses glycol as the primary (TEG, DEG) or secondary (EG) purpose of water removal has the potential for benzene emissions during glycol regeneration stages. Therefore, all glycol dehydration processes must be evaluated for benzene emissions. If the evaluation shows that benzene emissions produced are less than 0.5 t/yr for an EG unit, the DEOS graph is not necessary for that unit, but the DEOS must still be posted (see question 29).
27. Will the DEOS be available in Word format?
    Answer: Yes, the file is currently on the EUB Web site in Word and Word-fillable file formats. It is on the *Directive 039* Web page under "Forms extracted from directive." The Annual Dehydrator Benzene Inventory List Form is also there.
28. May companies create their own DEOS if it contains all of the required information?
    Answer: Yes. The EUB expects companies to retain the same format for the DEOS sheet so that inspectors and companies are looking at a consistent form.
29. Do I need to do the graph for a DEOS with no benzene?
    Answer: No, it is not necessary to complete the graph, but the DEOS must still be posted and updated every 12 months or upon a change in status.
30. If my dehydrator is shut in, do I need to do the calculation?
    Answer: The graph does not need to be done, but the DEOS sheet needs to be posted and the status and other relevant information must be completed. If the dehydrator remains shut in, the DEOS is not required to be updated every 12 months.
31. Do I have to do two gas flow rates for the DEOS graph?
    Answer: Yes. Operating rates should fall within flow rates that are plotted so that benzene emission limits can be determined for various flow rates.
32. If I have emission controls in place, do I still need to do the DEOS?
    Answer: Yes, so that benzene emission levels are known when controls are not operating. If controls are normally in place, it is expected that emissions during any control outages are tracked and reported as part of the annual inventory of emissions and that emissions remain within annual limits.
33. Is the benzene emission rate on the right axis of the graph before or after emission controls?
    Answer: For 2007 the EUB will accept the use of graphs that have been generated using data that reflect emissions either before or after controls. The EUB encourages operators to show benzene emissions for both before and after controls on the graph. The Benzene Technical Advisory Team (BTAT) will review this matter to determine if DEOS graphs in subsequent years should reflect benzene emissions before controls, such as from incinerators, flares, or condensers.
    Note that benzene emissions prior to controls must be recorded on both the posted DEOS sheets and the Annual Dehydrator Benzene Inventory forms.

Exemptions

34. Will the EUB consider exemptions from posting the DEOS for unique situations?
    Answer: At this time no exemptions are contemplated. The current program is directed to improving operations to minimize benzene emissions and maximize efficiencies.

Seasonal Operation

35. If I operate a dehydrator that has a maximum 3 t/yr emission limit only six months of the year, what is the maximum benzene emission rate?
    Answer: The dehydrator must be operated so that daily emissions during that six-month period do not exceed an average of 8.2 kilograms/day (3 t/365 days)—i.e., the total emissions are not to exceed 1.5 t/yr.

Annual Inventory

36. If my dehydrators are no longer operating, do I need to submit the information contained in the Annual Dehydrator Benzene Inventory List?
    Answer: Yes, suspended dehydrators must be reported on the Annual Dehydrator Benzene Inventory List. If a dehydrator has been decommissioned, it must be reported on the inventory list for the year that it was decommissioned.
37. What combustion efficiency should be used for flares and incinerators?
    Answer: The *Benzene Control BMP* states, on page 53, that you should assume a benzene combustion efficiency of 90% for flares and 95% for incinerators.
38. What are the requirements for reporting benzene emissions to the EUB?
    Answer: Benzene must be reported on the Annual Dehydrator Benzene Inventory List.
39. If emission control technology on a dehydrator would normally result in close to zero emissions and the control fails for a period of time, is it necessary to record these control outage emissions on the annual benzene dehydrator inventory list, or can these outage emissions just be considered as zero?
    Answer: All dehydrators must be included on the annual inventory list, with the control methodology clearly stated and emissions estimated during any outages and reported in tonnes/yr. These benzene emissions that occur during control technology outages must be added to the emissions that occur during normal controlled operations to determine total annual emissions for that dehydrator.

New or Relocated Dehydrators

40. If a dehydrator is relocated from one area of the site to another area on the same site, does it need to meet the rules for new or relocated dehydrators?
    Answer: If the dehydrator was part of an active system and then relocated somewhere else on the same site, it would be treated as an older dehydrator and not subject to modifications.
41. If a dehydrator is out of service on the same site and then placed back into service, is it treated as a new or relocated dehydrator?
    Answer: The intent is to have dehydrators that have been taken out of service modified before they are put back into service. If the dehydrator is out of service for an extended period on one site (i.e., more than 12 consecutive months), it would be treated as a new dehydrator if it was relocated on the same site.