Chesapeake Comments on Natural Gas Extraction Well Site Production Line 7/29/11 Draft GP

Note: All language in *italics* represents comments to help explain the reasoning for suggested revisions. Some comments are heighted in yellow where Chesapeake technical staff may need to follow up with OEPA.

Title Page

We suggest renaming the GP as "Minor Oil and Gas Facilities" or something similar. The GP is well written and more flexible which should help industry and the agency deal with the large number of sites associated with oil and gas production. The equipment sources covered could apply to very small gas gathering compressor stations (typically one engine < 1,350 hp). This can help industry and the agency as there may be quite a few small booster stations installed depending on the amount of gas produced at oil and condensate production sites. If the NSPS Subpart KKK requirements remain in the permit, the GP could also cover "wet gas" production sites that might have a small Joule-Thompson (JT) skid with NGL recovery, although it's unknown how many, if any, of these may need to be permitted.

B. Facility-Wide Terms and Conditions

1. Page 3. Subpart KKK was added to the list of applicable NSPS. We suggest that qualifying language be included to be clear that only applicable sources are subject to Subpart KKK.

   The vast majority of well sites do not have fugitive components or compressors that are subject to Subpart KKK. However, it may be useful for industry and the agency to allow use of the GP for equipment that is subject to Subpart KKK. Further details are given below in the fugitives section.

C. Emissions Unit Terms and Conditions

In general, we believe the emissions limits in a GP should reflect its general use so that emissions limits are not quite so specific unless the specific emissions limit is necessary for air modeling compliance or unless the emissions limit is based on a known maximum throughput or size limit such as for the SI and CI engines in the GP. For instance, this would mean: for dehydration system 4.0 tpy instead of 3.68 tpy; for storage tanks 30 tpy instead of 26.4 tpy (could be 25 tpy, but we would prefer 30 tpy); for truck loading 25 tpy instead of 24.9 tpy; and for fugitives 10 tpy instead of 9.72 tpy. If all these changes were made, the total restricted potential VOC emissions would be 89 tpy assuming an inclusion of 0.3 tpy of VOC from 10 MMBtu/hr of miscellaneous exempt heaters. This is not a big issue, but it can prevent multiple questions during the public comment period about where a specific emissions limit came from. In any preamble to the proposed rule, OEPA could explain that emissions limits are based on expected maximum emissions from a large facility with VOC emissions allotted to various sources per typical emissions

from those sources such that total restricted potential VOC emissions are well below major source levels.

A. 1. Emissions Unit: Dehydration System, P001

1. Page 6, Item P001. We suggest removing the work "enclosed".

   Control devices can include vapor recovery, BTEX eliminators (fuel combustion system on glycol still reboiler), flares and enclosed vapor combustors. "Combustion or a vapor recovery device" covers all of these.

2. Page 6, Item 1.b)(1)a. We suggest removing the 0.84 lb/hr emissions limit.

   Natural gas throughput and compositions can vary during short term periods; therefore, an exact lb/hr limit is not applicable. In addition, the compliance method is based on an annual average flowrate which would not be applicable to a 1-hour time period.

3. Page 7, Item 1.b)(2)c. We suggest changing to read "Based on maximum natural gas throughput, maximum glycol circulation rate, and maximum hydrocarbon liquid throughputs, the estimated emissions of hazardous air pollutants (HAP) calculated from the glycol dehydration units and losses from the storage vessels with the potential for flash emissions demonstrate this facility to be an "area source of HAP."

B. 2. Emissions Units: Spark Ignition Internal Combustion Engines, P002

1. Page 14, Item 2.b)(1)c. We suggest that the SO_2 emissions limitations be based on a fuel gas with 20 ppmv H_2S content.

   OEPA is more familiar with potential H_2S content of natural gas in the region. However, we are not sure of what the associated gas produced with oil or condensate production might be. For engine maintenance and longevity reasons, operators typically try to keep the sulfur content of any fuel gas below 10 ppmv of H_2S, but some operators may choose to run engines on fuel up to 20 ppmv of H_2S if that is the field fuel available. Using 7,725 Btu/hp-hr and 1,555 Hp (11.7 MMBtu/hr), 1,020 Btu/scf, and 20 ppmv of H_2S would give SO_2 emissions of 0.039 lb/hr and 0.17 tpy. This is not a real important issue, but we feel more comfortable with a higher limit.

2. Page 14, Item 2.b)(1)e. We suggest revising the SO_2 emissions limits to 0.039 lb/hr and 0.17 tpy.

3. Page 15, Item2.b)(2)b. We wonder if this language is applicable since a large SI ICE could emit more than 10 tpy of NO_X or CO.

   We are not familiar with the SIP revisions regarding BAT, but thought perhaps this language should basically state that BAT for the SI ICE is the emissions standards for NSPS.

4. Page 16, Item 2.d)(1). We suggest revising the last sentence to read "The permittee shall maintain the manufacturer's operations manual on site or at a central location for all facility ICE and it shall be made available for review upon request."

   Most sites using the GP will be unmanned and facility records are typically kept at field offices. Also, many times the engines at a site are leased from and maintained by third parties. The manufacturer's operations manuals may be located at their field office or in maintenance vehicles.

5. Pages 17 – 18, Items 2.f)(2)c, d, and e. We suggest removing the grams of pollutant per Hp-hr and ppm limitations. We suggest revising the second sentence under Applicable Compliance Method: to read "The g/Hp-hr limit is the worst case emissions limitation from Table 1 to Part 60 Subpart JJJ for engines 100 Hp or larger; …" We suggest revising the compliance language to read as follows:

   "Compliance with the tons per year ____ emissions limitation shall be determined by summing the restricted potential emissions from each non-emergency SI engine located on site using the following calculation for each engine:

   Emissions rating (g/hp-hr) x engine rating (Hp) x 1 lb/454 g x 8760 hours x 1 ton/2000 lbs = tons/year"

   The g/hp-hr limitations are not necessary since the permit already requires compliance with the NSPS standards in Table 1.

   Engines smaller than 100 Hp can have higher NO_X, CO and VOC g/hp-hr standards (engines 26-99 HP slightly higher) and very small engines higher depending on their manufacturer certifications. Since there is a hard limit on emissions based on the 1,555 Hp and maximum NSPS standards for engines 100 Hp and greater, operators using one or more engines less than 100 Hp in combination with medium engines or a large engine will need to keep the total restricted potential emissions of their combination of engines below the emissions limitations. This allows the flexibility needed to use the GP for very small well sites, say with just a small pump jack engine, or for larger sites with a combination of 1or 2 small engines along with a medium engine or large engine.

6. Page 19, Item 2.f)(2)f. We suggest revising the SO_2 emissions limits to 0.039 lb/hr and 0.17 tpy. We suggest revising the Applicable Compliance Method: to read as follows:

   "The SO_2 emissions limitation is based on a fuel gas with a maximum H_2S content of 20 ppmv.

   Compliance with the tons per year SO_2 emissions limitation shall be determined by the following calculation:

   11.7 MMBtu/hr x 1/1,020 Btu/scf x 1/379.5 scf/lb-mole x 20 ppm x 64 lb SO_2/lb-mole = 0.039 lb/hr

0.039 lb SO_2/hr x 8760 hrs/year x 1 ton/2000 lbs = 0.17 tons SO_2/year"

C. 3. Emissions Units: Compression Ignition Engines, P003

1. Page 24, Item 3.d)(5). We suggest revising the last sentence to read "The permittee shall maintain the manufacturer's operations manual on site or at a central location for all facility ICE and it shall be made available for review upon request."

   For the same reasoning as stated above. Also, it appears that the paragraph should be (2) instead of (5); i.e., should the paragraph numbering reset for c), d), and e)?

D. 4. Emissions Unit: Unpaved Roadways, F001

We appreciate and support the significant revisions to the compliance method. We still have concerns about the requirement for daily monitoring since most all of the well production sites will be unmanned, but have not come up with substitute language yet.

We will try to get a proposal to OEPA soon, either through OOGA or from Chesapeake. At a minimum, we do not believe daily monitoring should be required for those days when there may not be any traffic to the site, or for holidays and weekends. Sites that have little oil or condensate production will not have daily traffic.

E. 5. Emissions Unit Group: - Storage Tanks for water and/or petroleum liquids: T001 – T008

1. Page 38, Item 5.f)(1). We suggesting revising to read "Annual emissions shall be calculated using the total petroleum liquid throughput for the 12-month period reported based on use of a current version of the U.S. EPA's TANKS software program for storage tank working/breathing losses and either the TANKS software program or other process simulation programs such as, but not limited to, HYSYS or ProMax, to calculate VOC flash losses. If the emissions are controlled by a flare or other combustion device, then the restricted potential emissions may be calculated by applying a 98% combustion efficiency."

   Many operators use process simulation programs, other than EPA TANKS, when designing their petroleum liquid production sites and/or for determining VOC flash from storage tanks. Controlled emissions calculations need to include a maximum VOC combustion efficiency of 98%.

F. 6. Emissions Unit: Tank Truck Loading Rack, J001

1. Page 39, Item JOO1. We suggest adding the language "May incorporate a flare or enclosed vapor combustor."

This would allow operators the option of controlling truck loading emissions with a flare or an enclosed vapor combustor subject to the monitoring and compliance methods under 7.a) thru 7.g).

2. Page 39, Item 6.d)(1). We suggest revising to read "The permittee shall record the annual petroleum liquid throughput, in gallons per year. The permittee shall record the data used and calculations of the loading loss factors referenced in paragraph f)(1)."

3. Page 40, Item 6.f)(1). Under Applicable Compliance Method, we suggest revising to one compliance method for uncontrolled emissions (1)a. and one compliance method for controlled emissions (1)b. Suggested language is:

   "a. For uncontrolled emissions, compliance with the emissions limitation above shall be established by multiplying an uncontrolled loading loss factor (L_{UC}) by the annual throughput of petroleum liquids in gallons per year divided by 1,000.

   L_{UC} = 12.46 SPM/T

   b. For controlled emissions, compliance with the emissions limitation above shall be established by multiplying a controlled loading loss factor (L_C) by the annual throughput of petroleum liquids in gallons per year divided by 1,000.

   L_C = 12.46 SPM/T [1 – Eff/100], where

   Eff = 70% x 98% = 68.6 %

These changes would allow the flexibility of controlling loading loss emissions with the flare or enclosed vapor combustor. The controlled loading loss factor would be approximately 31% of the uncontrolled factor taking into consideration a collection efficiency of 70% (based on AP-42 Section 5.2 for undedicated tank trucks) and a combustion efficiency of 98%.

G. 7. Emissions Unit: Flare/Combustion Device, P005

1. Page 41, Item 7. P005. We suggest adding the language "May include enclosed vapor combustors that do not meet the definition of a flare in 40 CFR 60.18 and, therefore, are not subject to 60.18 requirements.

   Although they are highly efficient devices, enclosed vapor combustors cannot meet the testing requirements of 60.18. Also, it is our understanding that EPA is working on revising all the outdated flare regulations (general, NSPS and NESHAP) by combining into a possible new NSPS source category. Part of this is because of the advancement in flare technology such as enclosed vapor combustors that are highly efficient but cannot meet the testing requirements of 60.18.

2. Page 41, Item 7.b)(1)c. We suggest revising to read "The flare or enclosed vapor combustor shall provide a minimum destruction efficiency of 98.0% for the VOCs routed to it."

3. Page 41, Item 7.b)(2)b.i.(a). We suggest revising to read "Minimum destruction efficiency of 98.0% for VOC."

4. Page 42, Item 7.b)(2)c. We suggest revising to read "A pilot flame shall be maintained at all times in the flare or enclosed vapor combustor's pilot light burner or the flare or enclosed vapor combustor shall be equipped with a functioning electric arc ignition system. The flare or enclosed vapor combustor and any electric arc ignition system shall be installed and maintained in accordance with the manufacturer's recommendations, instructions, and/or operating manuals."

5. Page 42, Items 7.c)(1) and (1)a. We suggest changing "flare" to "flare or enclosed vapor combustor".

6. Page 43, Item 7.c)(1)b. We suggest revising to read "The flare or enclosed vapor combustor shall be operated with a flame present at all times when gases are vented to it. The arcing of any electric arc ignition system shall pulse continually. The presence of a pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame, or a device to continuously monitor the electric arc ignition system and any recorder shall be installed, calibrated, operated, and maintained in accordance with the manufacturer's recommendations, instructions, and operating manuals."

7. Page 43, Item 7.c)(1)c. We suggest adding the words "For flares," at the beginning of the sentence.

8. Page 43, Item 7.c)(2)a. We suggest revising to read "...value of 200 Btu/scf (7.45 MJ/scm) or greater...".

9. Page 44, Item 7.d)(1). We suggest revising "the flare" in the first sentence to "the flare or enclosed vapor combustor".

10. Page 44, Item 7.d)(2). We suggest revising to read:

    "The permittee shall record the following information each day for the flare or enclosed vapor combustor and process operations:

    a. all periods during which there was no pilot flame, the flare or enclosed vapor combustor was inoperable, or the electric arc ignition system was not functional and emissions were being vented to the flare or enclosed vapor combustor; and

b. the operating times for the flare or enclosed vapor combustor, pilot flame or electric arc ignition system monitoring equipment, and the associated emissions units.

11. Pages 46 – 47, Items 7.f)(3),(4) and (5). We suggest changing "9.2 MMBtu/hr" wherever it occurs to "10 MMBtu/hr".

12. Page 47, Item 7.f)(6). We suggest revising to read as follows:

"The emissions limit for VOC is based on using the AP-42 emissions factor of 0.14 lb of hydrocarbon/MMBtu from Chapter 13.5 for Industrial Flares, Table 13.5-1 "Emission Factors for Flare Operations" excluding emissions of methane (55% per Table 13.5-2 "Hydrocarbon Composition of Flare Emissions") and using the estimated burner rating of 10 MMBtu/hr.

0.063 lb VOC/MMBtu x 10.0 MMBtu/hr = 0.63 lb VOC/hr

0.63 lb VOC/hr x 8760 hr/yr x 1 ton/2000 lbs = 2.8 tons VOC/year"

We understand that the original VOC limitation was based on 98% destruction of VOC that may potentially be flared based on the example application. However, the GP is now much more flexible and written where the restricted potential VOC emissions for each source that might use the combustion control (i.e. dehydrator, storage tanks, and loading rack) are subject to specific limitations for that source although the actual emissions may be emitted from the flare or enclosed vapor combustor stack. Therefore, we are suggesting that the restricted potential VOC emissions from the actual combustion device be calculated as the AP-42 emissions factor, adjusted for methane, based on the potential combustion rating of 10 MMBtu/hr. This is conservative since most of the time the combustion device would be operating at much less than 10 MMBtu/hr.

H. 8. Emissions Unit: Equipment/Pipeline Leaks, P006

1. Page 48, Item P006. We suggest adding a sentence to read "The group of all equipment except compressors (defined in 40 CFR 60.631) within a process unit is an affected facility and subject to the provisions of Subpart KKK and the applicable requirements of 8.b), c), d), e) and f). All equipment, whether part of a process unit or not, is subject to the emission limitations of 8.b)(1) a. and 8.f)(1)a and b."

This allows for Subpart KKK applicability to any equipment that may be in gas processing service, but otherwise equipment fugitive leaks are only subject to the emissions limitations of 10 tpy VOC and no visible emissions. We would not expect very many sites with equipment subject to Subpart KKK. As an aside, in their recent proposed rule on NSPS/NESHAP revisions, EPA considered, but rejected, making well production sites and compressor stations as affected units under Subpart KKK based on a cost/benefit analysis.

Summary of Restricted Potential Emissions

Based on the restrictions and emissions limits suggested, the total restricted potential pollutant emissions including 10 MMBtu/hr of total exempted gas-fired heater capacity, would be:

Equipment/Capacity	NOx		VOC		SO2		CO		PE (PM10/2.5)	
	Lb/hr	TPY	Lb/yr	TPY	Lb/hr	TPY	Lb/hr	TPY	Lb/hr	TPY
Heaters 10 MMBtu	1.0	4.4		0.30	0.041	0.18	0.82	3.6	0.062	0.27
Fugitives				10.0						
TEG Dehydrator				4.0						
Total SI ICE	6.8	30.0		15.0	0.039	0.17	14	60	0.23	1.0
Total CI ICE	1.6	7.0		3.0	0.0023	0.01		6.0		0.40
Petro Loading				25.0						
Combustion Device	0.68	3.0		2.8	0.0059	0.026	3.7	16	-	-
Storage Tanks				30.0						
Unpaved Roads										1.8
Total		**44.4**		**89.1**		**0.39**		**85.6**		**2.5**

Qualifying Criteria Document

1. Under Storage Tanks and Loading Rack, Item 3. We suggest deleting the restriction on total condensate throughput as the compliance methodologies in the GP take into consideration total annual petroleum throughput.

   In actual practice under the GP, the process design of the facility and either the VOC limitations on a glycol dehydrator or storage tanks or loading rack will determine the allowable petroleum liquid throughput. A well site that produces oil (definition can vary, but many states consider an API gravity of less than 45° as oil) will be able to have a higher production rate and still meet the restricted potential VOC emissions limitations than a well site that produces a very light condensate. The GP as proposed in the 2nd draft can now be used for very small well sites with little oil or condensate production that do not need any controls on storage tanks or loading and for larger well sites that produce higher volum es of petroleum liquids t hat are well designed with low VOC emissions per BOPB throughput. Typically oil and condensate shale wells will come in with high productions rates that drop substantially the first year and a significant amount the second year before leveling off.

2. Under SI ICE and CI ICE, Item 5. We suggest revising to read "Will the manufacturer's operating manual and/or instructions be maintained on site or at a local field office and be readily available for review upon request?

3. Under SI ICE and CI ICE, Items 6 and 7. If possible, we suggest that the stack height restrictions be different for an engine size category based on air modeling and emissions. The 20 feet set back from property line may need to be adjusted to accomplish this. For instance, a category split could be:

   - < 150 hp, minimum of 10 feet
   - 100 hp to < 250 hp, minimum of 15 feet
   - > 250 hp, minimum of 20 feet

   Smaller engines typically come with shorter stacks and require substantial modification to support taller stacks. We understand the difficulty in demonstrating compliance with the new 1-hr NO_2 standard without specific site AERMOD modeling. We suggest OEPA work more with Chesapeake and/or OOGA on modeling to see if a stack height and minimum distance to property line can be adjusted to allow for the use of shorter engine stacks.

4. Under Excess Gas Combustion Device/Flare, Items 1, 2 and 3. We suggest revising the items to read as follows:

   "Excess Gas Flare/Combustor

   1. Will the unit meet a minimum 98.0% destruction efficiency of VOCs?

   2. If the unit is a flare, will it meet the requirements of 40 CFR Part 60.18 and/or Part 63.11?

   3. Will either a pilot flame or an electric arc auto ignition system be maintained and monitored at all times?