



**west virginia** department of environmental protection

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**ENGINEERING EVALUATION / FACT SHEET**

BACKGROUND INFORMATION

Application No.: R13-2976  
Plant ID No.: 009-00101  
Applicant: Chesapeake Appalachia, L.L.C. (CHK)  
Facility Name: Mark Owen Pad  
Location: Bethany, Brooke County  
NAICS Code: 211111  
Application Type: Construction  
Received Date: August 24, 2012  
Engineer Assigned: Roy F. Kees, P.E.  
Fee Amount: \$2,000.00  
Date Received: August 30, 2012  
Complete Date: September 20, 2012  
Due Date: December 20, 2012  
Applicant Ad Date: August 27, 2012  
Newspaper: *The Intelligencer*  
UTM's: Easting: 538.684 km      Northing: 4,452.322 km      Zone: 17T  
Description: The Mark Owen Pad is an existing natural gas production well pad with two (2) 145 hp flash gas compressor engines that are not currently permitted (do not meet the definition of a 'stationary source' under 45CSR13). This application also includes six (6) 400 bbl condensate tanks, six (6) 400 bbl brine/produced water tanks, two (2) gas production unit (GPU) burners, two (2) heater treaters, (2) line heaters, condensate truck loading, two (2) vapor combustors to control condensate tank emissions, produced water tank emissions, and loading emissions, and fugitive component emissions.

## DESCRIPTION OF PROCESS

The following process description was taken from Permit Application R13-2976:

The facility is an oil and natural gas exploration and production facility, responsible for the production of natural gas. Storage of condensate and produced water will also occur on site. Condensate, gas, and water come from the wellhead(s) to the production units, where the first stage of separation occurs. Fluids (condensate and produced water) will be sent to the heater treaters. Heater Treaters are used to treat emulsions, which are stable mixtures of condensate, solids, and water. These units use thermal, gravitational, mechanical, and sometimes chemical methods to break the emulsions and separate the condensate from water. Elevating the emulsion temperature is particularly effective in lowering condensate viscosity and promoting phase separation. The process causes hydrocarbons, including methane, to vaporize and escape. The flash from the heater treater is captured via a flash gas compressor driven by a natural gas fired engine. Produced water from the heater treaters flows into six (6) 400-bbl produced water tanks. Condensate flows into one of two low pressure towers. Flash gases from the low pressure towers are routed directly to the vapor combustor inlet with 100% capture efficiency. Condensate flows to the six (6) 400-bbl condensate storage tanks. The natural gas stream will exit the facility via pipeline. Condensate and produced water are transported off site via truck. Loading emissions will be controlled with vapor return, which has at least 70% capture efficiency, routed to the vapor combustor for at least 98% destruction efficiency. Working, breathing and flashing vapors from the 400 bbl condensate storage tanks and 400 bbl brine/produced water storage tanks will be routed to the vapor combustors with 98% destruction efficiency. The vapor combustors have natural gas fired pilots to ensure a constant flame for combustion.

## SITE INSPECTION

A site inspection was conducted by Steve Sobotka of the Northern Panhandle Regional Office on September 10, 2012. "This site was also gated and locked. The nearest residence appears to be the Owen house. The access road winds up the hill through farm land for at least 1/3 mile. I couldn't see the well pad site to determine any other residences nearby. It's doubtful there is since this is remote farmland in the area. Probably OK but can be 100% certain unless get access to site."

Directions as given in the permit application are as follows:

*From Wheeling, WV, travel north on SR 2 to the intersection of SR 2 and CR 67, just south of the community of Wellsburg, WV. Turn right onto CR 67 and travel 6.12 miles to the intersection of CR 67 and CR 88, just west of Bethany, WV. Turn left (north) on CR 88 and travel 2.03 miles to the well pad access road on the right.*

## ESTIMATE OF EMISSIONS BY REVIEWING ENGINEER

Emissions associated with this modification application consist of the combustion emissions from the compressor engines (EU-ENG1-2), two (2) GPU burners (EU-GPU1 & EU-GPU2), two (2) heater treaters (EU-HT1 & EU-HT2), two (2) line heaters (EU-LH1 & EU-LH2), six (6) condensate tanks (EU-TANKS-COND), six (6) produced water tanks (EU-TANKS-PW), condensate truck loading (EU-LOAD-COND), produced water truck loading (EU-LOAD-PW), two (2) vapor combustors (APC-COMB-LPT & APC-COMB-TKLD), two (2) vapor combustor pilots (EU-PILOTS), and fugitive emissions (EU-FUG). The following table indicates which methodology was used in the emissions determination:

Emission Unit ID#	Process Equipment	Calculation Methodology
EU-ENG1-2	145 hp Caterpillar G3306 Compressor Engine w/ NSCR	Manufacturer's Data
EU-GPU1-2	Two (2) 1.0 MMBTU/hr Gas Production Unit Burners	EPA AP-42 Emission Factors
EU-HT1-2	Two (2) 0.5 MMBTU/hr Heater Treaters	EPA AP-42 Emission Factors
EU-LH1-2	Two (2) 1.5 MMBTU/hr Line Heaters	EPA AP-42 Emission Factors
EU-TANKS-COND	Six (6) 400 bbl Condensate Tanks	EPA Tanks 4.09 Emission Estimation Software, Promax Process Simulation
EU-TANKS-PW	Six (6) 400 bbl Produced Water Tanks	EPA Tanks 4.09 Emission Estimation Software, Promax Process Simulation
EU-LOAD-COND	Condensate Truck Loading	EPA AP-42 Emission Factors
EU-LOAD-PW	Produced Water Truck Loading	EPA AP-42 Emission Factors

APC-COMB-LPT & APC-COMB-TKLD	One (1) 20.0 MMBTU/hr Vapor Combustor and one (1) 8.0 MMBTU/hr Vapor Combustor	EPA AP-42 Emission Factors
EU-PILOTS	Two (2) Vapor Combustor Pilots	EPA AP-42 Emission Factors

Fugitive emissions for the facility are based on calculation methodologies presented in the 2009 American Petroleum Institute Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry. The factors presented in the API Compendium are for methane emissions. Therefore, the fugitive VOC and HAP emissions were calculated using a representative gas analysis and the weight percent of each respective pollutant.

Maximum controlled point source emissions from the revised changes were calculated by CHK and checked for accuracy by the writer and are summarized in the table below.

Emission Point ID	Emission Unit ID	Process Unit	Pollutant	Maximum Controlled Emission Rate	
				Hourly (lb/hr)	Annual (ton/year)
EP-ENG1	EU-ENG1	145 HP Caterpillar G3306 Compressor Engine	Nitrogen Oxides	0.32	1.40
			Carbon Monoxide	0.64	2.80
			Sulfur Dioxide	<0.01	<0.01
			Particulate Matter-10	0.02	0.09
			Volatile Organic Compounds	0.22	0.96
			Formaldehyde	0.02	0.09
			Total HAPs	0.03	0.15
			Carbon Dioxide Equivalent	155.18	679.70
EP-ENG2	EU-ENG2	145 HP Caterpillar G3306 Compressor Engine	Nitrogen Oxides	0.32	1.40
			Carbon Monoxide	0.64	2.80
			Sulfur Dioxide	<0.01	<0.01
			Particulate Matter-10	0.02	0.09
			Volatile Organic Compounds	0.22	0.96
			Formaldehyde	0.02	0.09

			Total HAPs	0.03	0.15
			Carbon Dioxide Equivalent	155.18	679.70
EP-GPU1	EU-GPU1	1.0 MMBTU/hr Production Unit Burner	Nitrogen Oxides	0.11	0.48
			Carbon Monoxide	0.09	0.39
			Sulfur Dioxide	<0.01	<0.01
			Particulate Matter-10	0.01	0.04
			Volatile Organic Compounds	0.01	0.03
			Formaldehyde	<0.01	<0.01
			Total HAPs	<0.01	0.01
			Carbon Dioxide Equivalent	117.00	512.48
EP-GPU2	EU-GPU2	1.0 MMBTU/hr Production Unit Burner	Nitrogen Oxides	0.11	0.48
			Carbon Monoxide	0.09	0.39
			Sulfur Dioxide	<0.01	<0.01
			Particulate Matter-10	0.01	0.04
			Volatile Organic Compounds	0.01	0.03
			Formaldehyde	<0.01	<0.01
			Total HAPs	<0.01	0.01
			Carbon Dioxide Equivalent	117.00	512.48
EP-HT1	EU-HT1	0.50 MMBTU/hr Heater Treater	Nitrogen Oxides	0.06	0.26
			Carbon Monoxide	0.05	0.22
			Sulfur Dioxide	<0.01	<0.01
			Particulate Matter-10	<0.01	0.02
			Volatile Organic Compounds	<0.01	0.01
			Formaldehyde	<0.01	<0.01
			Total HAPs	<0.01	<0.01
			Carbon Dioxide Equivalent	58.50	256.24
EP-HT2	EU-HT2	0.50 MMBTU/hr Heater	Nitrogen Oxides	0.06	0.26
			Carbon Monoxide	0.05	0.22
			Sulfur Dioxide	<0.01	<0.01
			Particulate Matter-10	<0.01	0.02
			Volatile Organic Compounds	<0.01	0.01

		Treater	Formaldehyde	<0.01	<0.01
			Total HAPs	<0.01	<0.01
			Carbon Dioxide Equivalent	58.50	256.24
EP-LH1	EU-LH1	1.50 MMBTU/hr Line Heater	Nitrogen Oxides	0.17	0.74
			Carbon Monoxide	0.14	0.61
			Sulfur Dioxide	<0.01	<0.01
			Particulate Matter-10	0.01	0.06
			Volatile Organic Compounds	0.01	0.04
			Formaldehyde	<0.01	<0.01
			Total HAPs	<0.01	0.01
			Carbon Dioxide Equivalent	175.51	768.71
EP-LH2	EU-LH2	1.50 MMBTU/hr Line Heater	Nitrogen Oxides	0.17	0.74
			Carbon Monoxide	0.14	0.61
			Sulfur Dioxide	<0.01	<0.01
			Particulate Matter-10	0.01	0.06
			Volatile Organic Compounds	0.01	0.04
			Formaldehyde	<0.01	<0.01
			Total HAPs	<0.01	0.01
			Carbon Dioxide Equivalent	175.51	768.71
EP-TANKS-COND	EU-TANKS-COND	6 – 400 bbl Condensate Tanks	Volatile Organic Compounds	0.40	1.76
			Total HAPs	0.03	0.14
EP-TANKS-PW	EU-TANKS-PW	6 -400 bbl Produced Water Tanks	Volatile Organic Compounds	<0.01	0.01
			Total HAPs	<0.01	<0.01
EU-LOAD-COND	EP-LOAD-COND	Condensate Truck Loading	Volatile Organic Compounds	2.57	11.24
			Total HAPs	0.21	0.90
			Carbon Dioxide Equivalent	0.13	0.58
EU-LOAD-PW	EP-LOAD-PW	Produced Water Truck Loading	Volatile Organic Compounds	0.03	0.13
			Total HAPs	<0.01	0.01
			Carbon Dioxide Equivalent	0.13	0.58
			Nitrogen Oxides	2.76	12.09

APC-COMB-LPT	APC-COMB-LPT	Vapor Combustors LPT Stream	Carbon Monoxide	5.51	24.13
			Particulate Matter	0.06	0.26
			Volatile Organic Compounds	6.62	29.00
			n-Hexane	0.37	1.62
			Benzene	<0.01	0.02
			Toluene	0.02	0.09
			Ethylbenzene	0.02	0.09
			Xylenes	0.11	0.48
			Carbon Dioxide Equivalent	2,340.07	10,249.51
APC-COMB-TKLD	APC-COMB-TKLD	Vapor Combustors Tank/Load Stream	Nitrogen Oxides	1.10	4.82
			Carbon Monoxide	2.20	9.64
			Particulate Matter	0.02	0.09
			Volatile Organic Compounds	0.52	2.28
			n-Hexane	0.03	0.13
			Benzene	<0.01	<0.01
			Toluene	<0.01	0.01
			Ethylbenzene	<0.01	0.01
			Xylenes	0.01	0.04
			Carbon Dioxide Equivalent	936.03	4,099.80
EP-PILOTS	EU-PILOTS	Vapor Combustor Pilots	Nitrogen Oxides	0.02	0.09
			Carbon Monoxide	0.01	0.06
			Particulate Matter	<0.01	<0.01
			Volatile Organic Compounds	<0.01	<0.01
			Sulfur Dioxide	<0.01	<0.01
			Carbon Dioxide Equivalent	15.88	69.57
EU-FUG	EP-FUG	Fugitive Emissions	Volatile Organic Compounds	0.95	4.16
			Total HAPs	0.06	0.26
			Carbon Dioxide Equivalent	13.44	58.60

The following table represents the total facility emissions:

Pollutant	Maximum Annual Facility Wide Emissions (tons/year)
Nitrogen Oxides	22.76
Carbon Monoxide	41.87
Volatile Organic Compounds	50.84
Particulate Matter	0.75
Sulfur Dioxide	0.02
Formaldehyde	0.18
Total HAPs	4.15
Carbon Dioxide Equivalent	18,912.90

The following table indicates the control device efficiencies that are required for this facility:

Emission Unit	Pollutant	Control Device	Control Efficiency
EU-ENG1-2 Compressor Engine	Nitrogen Oxides	Non Selective Catalytic Reduction (NSCR)	92.58 %
	Carbon Monoxide		85.15 %
EU-TANKS-COND, EU-TANKS-PW Storage Tanks	Volatile Organic Compounds	Vapor Combustor	98.00 %
	Total HAPs		98.00 %
EU-LOAD-COND, EU-LOAD-PW Loadout Racks	Volatile Organic Compounds	Vapor Return/ Combustion	70.00 %

## REGULATORY APPLICABILITY

*Unless otherwise stated WVDEP DAQ did not determine whether the permittee is subject to an area source air toxics standard requiring Generally Achievable Control Technology (GACT) promulgated after January 1, 2007 pursuant to 40 CFR 63, including the area source air toxics provisions of 40 CFR 63, Subpart ZZZZ.*

The following rules apply to the facility:

### **45CSR2** (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers)

The purpose of 45CSR2 (Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers) is to establish emission limitations for smoke and particulate matter which are discharged from fuel burning units.

45CSR2 states that any fuel burning unit that has a heat input under ten (10) million B.T.U.'s per hour is exempt from sections 4 (weight emission standard), 5 (control of fugitive particulate matter), 6 (registration), 8 (testing, monitoring, recordkeeping, reporting) and 9 (startups, shutdowns, malfunctions). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

The heat input of all of the proposed fuel burning units (EP-GPU1-2, EP-HT1-2 and EP\_LH1-2) are below 10 MMBTU/hr. Therefore, these units are exempt from the aforementioned sections of 45CSR2. However, CHK would be subject to the opacity requirements in 45CSR2, which is 10% opacity based on a six minute block average.

### **45CSR4** (To Prevent and Control the Discharge of Air Pollutants into the Open Air which Causes or Contributes to an Objectionable Odor or Odors)

45CSR4 states that an objectionable odor is an odor that is deemed objectionable when in the opinion of a duly authorized representative of the Air Pollution Control Commission (Division of Air Quality), based upon their investigations and complaints, such odor is objectionable. No odors have been deemed objectionable.

### **45CSR6** (To Prevent and Control Air Pollution from the Combustion of Refuse)

The purpose of this rule is to prevent and control air pollution from combustion of refuse.

CHK has two (2) vapor combustors at the facility. The vapor combustors are subject to section 4, emission standards for incinerators. The vapor combustors have an allowable emission rate of 5.02 pounds of particulate matter per hour (assuming a natural gas density of 0.044 lb/ft<sup>3</sup>). The vapor combustors have negligible amounts of particulate matter emissions per hour. Therefore, the facility's vapor combustors should demonstrate compliance with this section. The facility will demonstrate compliance by maintaining records of the amount of natural gas consumed by the vapor combustors and the hours of operation. The facility will also monitor the flame of the vapor combustors and record any malfunctions that may cause no flame to be present during operation.

**45CSR10** (To Prevent and Control Air Pollution from the Emissions of Sulfur Oxides)

45CSR10 states that any fuel burning unit that has a heat input under ten (10) million B.T.U.'s per hour is exempt from sections 3 (weight emission standard), 6 (registration), 7 (permits), and 8 (testing, monitoring, recordkeeping, reporting). However, failure to attain acceptable air quality in parts of some urban areas may require the mandatory control of these sources at a later date.

The heat input of all of the proposed fuel burning units (EP-GPU1-2, EP-HT1-2 and EP-LH1-2) are below 10 MMBTU/hr. Therefore, these units are exempt from the aforementioned sections of 45CSR10.

**45CSR13** (Permits for Construction, Modification, Relocation and Operation of Stationary Sources of Air Pollutants, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, and Procedures for Evaluation)

45CSR13 applies to this source due to the fact that the changes proposed under this permitting action results in an emissions increase above permitting thresholds. Therefore, CHK is required to submit a construction application. CHK has published the required Class I legal advertisement notifying the public of their permit application, and paid the appropriate application fee (construction).

**45CSR22** (Air Quality Management Fee Program)

This facility is a minor source and not subject to 45CSR30. CHK is required to keep their Certificate to Operate current.

**40CFR60 Subpart JJJJ** (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines (SI ICE))

40CFR60.4230 states that a source that commenced construction after June 12, 2006 whose SI ICE was less than 500 hp and was manufactured on or after July 1, 2008 is subject to this rule. CHK has proposed to install two (2) 145 HP SI ICE. Since the SI ICE that CHK will install was manufactured after January 1, 2011, CHK is subject to this rule.

**40CFR60 Subpart OOOO** (Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution)

EPA issued its new source performance standards (NSPS) and air toxics rules for the oil and gas sector on April 17, 2012. 40CFR60 Subpart OOOO establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO<sub>2</sub>) emissions from affected facilities that commence construction, modification or reconstruction after August 23, 2011. The following affected sources which commence construction, modification or reconstruction after August 23, 2011 are subject to the applicable provisions of this subpart:

- a. Each gas well affected facility, which is a single natural gas well.

*The gas wells that currently exist at the Mark Owen Pad were drilled principally for the production of natural gas and were done so after August 23, 2011. Therefore, these wells would be considered affected facilities under this subpart.*

- b. Each centrifugal compressor affected facility, which is a single centrifugal compressor using wet seals that is located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment. For the purposes of this subpart, your centrifugal compressor is considered to have commenced construction on the date the compressor is installed (excluding relocation) at the facility. A centrifugal compressor located at a well site, or an adjacent well site and servicing more than one well site, is not an affected facility under this subpart.

*There are no centrifugal compressors at the Mark Owen Pad. Therefore, this section would not apply.*

- c. Each reciprocating compressor affected facility, which is a single reciprocating compressor located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment. For the purposes of this subpart, your reciprocating compressor is considered to have commenced construction on the date the compressor is installed (excluding relocation) at the facility. A reciprocating compressor located at a well site, or an adjacent well site and servicing more than one well site, is not an affected facility under this subpart.

*There are two (2) 145 hp reciprocating internal combustion engines located at the Mark Owen Pad. This engine will be delivered after the effective date of this rule. However, the rule specifically states that any reciprocating compressor located at a well site is not an affected facility under this subpart. Therefore, this section would not apply.*

- d. 1. Each pneumatic controller affected facility, which is a single continuous bleed natural gas-driven pneumatic controller operating at a natural gas bleed rate greater than 6 scfh which commenced construction after August 23, 2011, and is located between the wellhead and the point of custody transfer to the natural gas transmission and storage segment and not located at a natural gas processing plant.
2. Each pneumatic controller affected facility, which is a single continuous bleed natural gas-driven pneumatic controller which commenced construction after August 23, 2011, and is located at a natural gas processing plant.

*There are no pneumatic controllers at the Mark Owen Pad. Therefore, this section would not apply.*

- e. Each storage vessel affected facility, which is a single storage vessel, located in

the oil and natural gas production segment, natural gas processing segment or natural gas transmission and storage segment.

40CFR60 Subpart OOOO defines a storage vessel as a unit that is constructed primarily of nonearthen materials (such as wood, concrete, steel, fiberglass, or plastic) which provides structural support and is designed to contain an accumulation of liquids or other materials. The following are not considered storage vessels:

1. Vessels that are skid-mounted or permanently attached to something that is mobile (such as trucks, railcars, barges or ships), and are intended to be located at a site for less than 180 consecutive days. If the source does not keep or are not able to produce records, as required by §60.5420(c)(5)(iv), showing that the vessel has been located at a site for less than 180 consecutive days, the vessel described herein is considered to be a storage vessel since the original vessel was first located at the site.
2. Process vessels such as surge control vessels, bottoms receivers or knockout vessels.
3. Pressure vessels designed to operate in excess of 204.9 kilopascals and without emissions to the atmosphere.

This rule requires that the permittee determine the VOC emission rate for each storage vessel affected facility utilizing a generally accepted model or calculation methodology within 30 days of startup, and minimize emissions to the extent practicable during the 30 day period using good engineering practices. For each storage vessel affected facility that emits more than 6 tpy of VOC, the permittee must reduce VOC emissions by 95% or greater within 60 days of startup.

*The storage vessels located at the Mark Owen Pad emit more than 6 tpy of VOC. Therefore, CHK would be required by this section to reduce VOC emissions by 95%. CHK has proposed to install a vapor combustor with 98% control efficiency to capture the VOC emissions from the storage tanks.*

- f. The group of all equipment, except compressors, within a process unit is an affected facility.
  1. Addition or replacement of equipment for the purpose of process improvement that is accomplished without a capital expenditure shall not by itself be considered a modification under this subpart.
  2. Equipment associated with a compressor station, dehydration unit, sweetening unit, underground storage vessel, field gas gathering system, or liquefied natural gas unit is covered by §§60.5400, 60.5401, 60.5402, 60.5421 and 60.5422 of this subpart if it is located at an onshore natural gas processing plant. Equipment not located at the onshore natural gas processing plant site is exempt from the provisions of §§60.5400, 60.5401, 60.5402, 60.5421 and 60.5422 of this subpart.

3. The equipment within a process unit of an affected facility located at onshore natural gas processing plants and described in paragraph (f) of this section are exempt from this subpart if they are subject to and controlled according to subparts VVa, GGG or GGGa of this part.

*The Mark Owen Pad is not a natural gas processing plant. Therefore, LDAR for onshore natural gas processing plants would not apply.*

- g. Sweetening units located at onshore natural gas processing plants that process natural gas produced from either onshore or offshore wells.
1. Each sweetening unit that processes natural gas is an affected facility; and
  2. Each sweetening unit that processes natural gas followed by a sulfur recovery unit is an affected facility.
  3. Facilities that have a design capacity less than 2 long tons per day (LT/D) of hydrogen sulfide (H<sub>2</sub>S) in the acid gas (expressed as sulfur) are required to comply with recordkeeping and reporting requirements specified in §60.5423(c) but are not required to comply with §§60.5405 through 60.5407 and paragraphs 60.5410(g) and 60.5415(g) of this subpart.
  4. Sweetening facilities producing acid gas that is completely reinjected into oil-or-gas-bearing geologic strata or that is otherwise not released to the atmosphere are not subject to §§60.5405 through 60.5407, 60.5410(g), 60.5415(g), and 60.5423 of this subpart.

*There are no sweetening units at the Mark Owen Pad. Therefore, this section would not apply.*

The following rules do not apply to the facility:

**40CFR60 Subpart 60.18** (General Control Device and Work Practice Requirements)

40CFR60 Subpart 60.18 contains requirements for control devices when they are used to comply with applicable subparts of 40CFR60 and 40CFR61. The vapor combustor that CHK has proposed is not used to comply with one of these rules. The purpose of the vapor combustor is to control emissions from the tanks that are routed to it. However, these tanks are not subject to 40CFR60 Subpart Kb due to their size. In addition 40CFR60.18 refers to flares but makes no mention of vapor combustors, which are essentially enclosed combustion devices. Therefore, CHK is not subject to this standard.

**40CFR60 Subpart Kb** (Standards of Performance for VOC Liquid Storage Vessels)

40CFR60 Subpart Kb does not apply to storage vessels with a capacity less than 75 cubic meters. The tanks that CHK has proposed to install are 63.60 cubic meters each. Therefore, CHK would not be subject to this rule.

**40CFR60 Subpart KKK** (Standards of Performance for Equipment Leaks of VOC from Onshore Natural Gas Processing Plants)

40CFR60 Subpart KKK applies to onshore natural gas processing plants that commenced construction after January 20, 1984. The Mark Owen Pad is not a natural gas processing plant, therefore, CHK would not be subject to this rule.

**45CSR14** (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants)

**45CSR19** (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollution which Cause or Contribute to Nonattainment)

The Mark Owen Pad is located in Brooke County which is a non-attainment county for Particulate Matter 2.5. Because Brooke County is a non-attainment county, 45CSR19 does apply to this facility.

As shown in the table below, CHK is not subject to 45CSR14 or 45CSR19 review.

Pollutant	PSD (45CSR14) Threshold (tpy)	NANSR (45CSR19) Threshold (tpy)	Mark Owen PTE (tpy)	45CSR14 or 45CSR19 Review Required?
Carbon Monoxide	250	NA	41.87	No
Nitrogen Oxides	250	100	22.76	No
Sulfur Dioxide	250	100	0.02	No
Particulate Matter 2.5	250	100	0.75	No
Ozone (VOC)	250	NA	50.84	No
Greenhouse Gas (CO <sub>2</sub> e)	100,000	NA	18,912.90	No

## TOXICITY OF NON-CRITERIA REGULATED POLLUTANTS

There will be small amounts of various non-criteria regulated pollutants emitted from the combustion of natural gas. However, due to the concentrations emitted, detailed toxicological information is not included in this evaluation.

## AIR QUALITY IMPACT ANALYSIS

Modeling was not required of this source due to the fact that the facility is not subject to 45CSR14 (Permits for Construction and Major Modification of Major Stationary Sources of Air Pollutants) as seen in the table listed in the Regulatory Discussion Section.

## SOURCE AGGREGATION

“Building, structure, facility, or installation” is defined as all the pollutant emitting activities which belong to the same industrial grouping, are located on one or more contiguous and adjacent properties, and are under the control of the same person.

The Mark Owen Pad is located in Brooke County and will be operated by CHK, who is partial owner and operator. Several different entities are involved in the production, gathering, and transmission of gas. The Operators are the parties who drill and operate the wells. The Shippers are the owners of the gas who may or may not be the same entity as the Operator. There are also parties who own and operate the gathering system pipelines and compression station, called Gatherers. In addition, there are parties that own and operate the gas processing plants.

1. The Mark Owen Pad will operate under SIC code 1311 (Crude Petroleum and Natural Gas Extraction). There are surrounding wells and compressor stations operated by CHK that share the same two-digit major SIC code of 13 for oil and gas exploration and production. Therefore, the Mark Owen Pad does share the same SIC code as the wells and surrounding compressor stations.
2. “Contiguous or Adjacent” determinations are made on a case by case basis. These determinations are proximity based, and it is important to focus on this and whether or not it meets the common sense notion of a plant. The terms “contiguous” or “adjacent” are not defined by USEPA. Contiguous has a dictionary definition of being in actual contact; touching along a boundary or at a point. Adjacent has a dictionary definition of not distant; nearby; having a common endpoint or border.

The closest well to the Mark Owen Pad is over one quarter (1/4) mile away. Operations separated by these distances do not meet the common sense notion of a plant. Therefore, the properties in question are not considered to be on contiguous or adjacent property.

3. According to CHK, none of the wells in the area are under common control with the Mark Owen Pad. The Mark Owen Pad is operated by CHK but is owned and controlled by a group of non-affiliated companies. Through proprietary agreements, CHK’s operation of the Mark Owen Pad is controlled by the system owners. The ownership and

control of the wells in the area may be distinct for each well and is not necessarily known by CHK. The owners and operators of the wells each may take their gas in kind and consequently affect the operation of the wells in which they have an ownership interest. Furthermore, no well is dependent on the operation of the Mark Owen Pad to function, nor is the Mark Owen Pad dependent on any specific well to operate. From this analysis, CHK is not under common control with other wells in the area.

Because the facilities are not considered to be on contiguous or adjacent properties and are not fully under control of the same person, the emissions from the Mark Owen Pad should not be aggregated with other facilities in determining major source or PSD status.

### MONITORING OF OPERATIONS

CHK will be required to perform the following monitoring associated with this permit application:

1. Monitor and record quantity of natural gas consumed for all engines, and combustion sources.
2. Monitor the presence of the vapor combustor pilot flame with a thermocouple or equivalent.
3. Monitor opacity from all fuel burning units.
4. Monitor the tanks to ensure that all vapors are sent to vapor combustor.
5. Monitor the condensate truck loading to ensure that vapor return/combustion is used.

CHK will be required to perform the following recordkeeping associated with this modification application:

1. Maintain records of the amount of natural gas consumed in each combustion source.
2. Maintain records of testing conducted in accordance with the permit. Said records shall be maintained on-site or in a readily accessible off-site location
3. Maintain the corresponding records specified by the on-going monitoring requirements of and testing requirements of the permit.
4. Maintain records of the visible emission opacity tests conducted per the permit.
5. Maintain a record of all potential to emit (PTE) HAP calculations for the entire facility. These records shall include the natural gas compressor engines and ancillary equipment.
6. The records shall be maintained on site or in a readily available off-site location maintained by CHK for a period of five (5) years.
7. Monitor the tanks to ensure that the tanks vapors will be sent to vapor combustor.
8. Monitor the condensate truck loading to ensure that vapor return/combustion is used.

RECOMMENDATION TO DIRECTOR

The information provided in the permit application indicates CHK's Mark Owen Pad meets all the requirements of applicable regulations. Therefore, impact on the surrounding area should be minimized and it is recommended that the Brooke County location should be granted a 45CSR13 construction permit for their facility.

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Roy F. Kees, P.E.  
Engineer

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Date