Report and Compilation of Oil & Gas Separators on the Western Slope of Colorado

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Prepared for:

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Executive Summary

Beginning in early 2013, and for some in 2012, oil and gas operators on the western slope of Colorado began receiving “unsatisfactory” inspection ratings from the Colorado Oil and Gas Conservation Commission - Field Inspection Unit for lack of secondary containment around oil and gas separation equipment. This subject and relevant terminology was discussed at a May 14, 2013 meeting between West Slope – Colorado Oil and Gas Association and representatives from the COGCC. The COGCC Field Inspection Unit stated that separators are considered tanks, as defined in the COGCC Rules - Series 100 Definitions; and as such, the Rules require secondary containment for separation equipment. As a result of the meeting, WSCOGA financed a study to investigate the terminology, reliability, and spill and fire record of separators as used by the primary natural gas producers operating in the Piceance Basin of Western Colorado.

Although there may be differing opinions on oil and gas terminology and their interpretations as it relates to regulations, both regulators and operators agree that environmental protection and personnel safety is paramount. This report evaluates existing regulations, fire safety and spill discharges associated with separators, both gravity and fired vessel, from contributing WSCOGA operators. The record stands on its own merit and provides evidence that existing regulations or combinations of regulations; whether under the jurisdiction of the Colorado Oil and Gas Conservation Commission or the U. S. Environmental Protection Agency; is providing a successful strategy for ensuring spill prevention and control for separation equipment.

A total of four reportable separator related spills and incidents were reported by WSCOGA contributors over a three year period with no spills migrating off site. During the same study period, COGCC Staff Reports tabulated a total of 1381 reportable spills statewide. There were no reported heater treater or fired vessel spills from contributing operators. A total of two fires were reported for the 4,750 separators, 110 fired vessels, and two heater treaters operated by WSCOGA members during the past three years with no adjacent collateral damages – accounting for an incident rate of 0.04% . This impeccable record has been maintained without sized secondary containment. Sized secondary containment, in the opinion of both oil and gas operators and the USEPA, can be a fire hazard if discharges collect or pool around separation equipment.

Historically, COGCC rules have not specified that secondary containment is required for separation units. Fortunately, there has been overlap in State and Federal regulations, and the USEPA has had regulations in place, under 40 CFR112, to provide for environmental protection applicable to separators, referred to as *flow-through process vessels* in the federal vernacular. Existing general secondary containment regulations require inspection or testing of components, prompt removal or initiation of actions to stabilize and remediate any oil accumulations, and corrective actions.

The USEPA believes, as stated in 73 FR 74278, that SPCC rules for separators or flow-through process vessels allows the owner or operator of an oil production facility flexibility in how to design secondary containment for this equipment and in how to comply with the additional requirements that maintain environmental protection. WSCOGA members and operators concur with this philosophy and would encourage the Colorado Oil and Gas Conservation Commission to recognize existing Federal regulations and their effectiveness.

Introduction

Beginning in early 2013, and for some in 2012, oil and gas operators on the western slope of Colorado began receiving “unsatisfactory” inspection ratings from the Colorado Oil and Gas Conservation Commission - Field Inspection Unit for lack of secondary containment around oil and gas separation equipment. This subject and relevant terminology was discussed at a May 14, 2013 meeting between West Slope – Colorado Oil and Gas Association and representatives from the COGCC. The COGCC Field Inspection Unit stated that separators are considered tanks, as defined in the COGCC Rules - Series 100 Definitions; and as such, the Rules require secondary containment for separation equipment.

WSCOGA expressed its concern regarding reinterpretation of the Rules, contrary to historical inspection practices, by the COGCC Field Inspection Unit and explained the magnitude of this policy change and the significant financial and compliance implications to the oil and gas industry. As a result of the meeting, WSCOGA initiated a study to review the terminology, reliability, and spill and fire safety of separation equipment in use by its members.

A separator survey was sent out to ten WSCOGA member companies requesting data on separator inventories and spill/fire history for the period of 2010 through the present. Contributors included WPX Energy, EnCana, Bill Barrett Corporation, Occidental, SG Interests, Ursa and XTO. Contained within is a unique compilation of spills, as it provides information and insight into both reportable and non-reportable spills (-less than 5 barrels under the former COGCC thresholds), and causes of those discharges. This report provides discussion and commentary on separator nomenclature, COGCC rules, existing federal regulations pertaining to the subject, spill and fire history, and summarizes the results of the survey.

Definitions and Vernacular

Separators, heater treaters, and tanks are regulated in the oil and gas industry primarily under the regulations of Colorado Oil and Gas Conservation Commission and the U.S. Environmental Protection Agency under 40 CFR 112. The Colorado Department of Public Health and the Environment - Air Quality Control Division also regulates applicable emissions. Operators are required to abide by the design, safety and environmental standards as set forth in these regulations. As such, their references and definitions are relied upon in the interpretation and understanding of the regulations.

A formal written definition for the terms “separator” and “heater treater” used in the context of the oil and gas industry is not contained within the Rules of the COGCC. Whereas terms such as containers, LACT, gas well, and pit are clearly defined in the Rules. The Statement of Basis, Specific Statutory Authority, and Purpose for the COGCC 2008 Rules sought to clarify the definition of the term “tank” and stated that, while this term is generally understood by the

regulated community, the addition of the definition was to provide additional clarity. COGCC Series 100 Rules – Definitions states: *"TANK shall mean a stationary vessel that is used to contain fluids, constructed of non-earthen materials (e.g. concrete, steel, plastic) that provide structural support."* This definition is similar to the U.S. Environmental Protection Agency's definition of a storage vessel. Federal Register, 77 FR 49569, states *"Storage vessel means a tank or other vessel that is designed to contain an accumulation of crude oil, condensate, intermediate hydrocarbon liquids, or produced water and that is constructed primarily of non-earthen materials (e.g., wood, concrete, steel, plastic) that provide structural support. The following process units are not considered storage vessels: Surge control vessels and knockout vessels."*

The USEPA is also proposing to further clarify the definition of a storage vessel or tank and differentiate it from a pressure vessel. The Federal Register, 78 FR 22148, dated April 12, 2013 states:

> *"Storage vessel means a tank or other vessel that contains an accumulation of crude oil, condensate, intermediate hydrocarbon liquids, or produced water, and that is constructed primarily of nonearthen materials (such as wood, concrete, steel, fiberglass, or plastic) which provide structural support. The following are <u>not</u> 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 you do not keep or are not able to produce records, as required by Sec. 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 (30 psi) and without emissions* to the atmosphere."

The National Fire Protection Association's "Flammable and Combustible Liquids Code – NFPA 30, 2000 Edition, also provides a definition of a storage tank. Section 1.6.43.8 reads "Storage Tank. Any vessel having a liquid capacity that exceeds 60 gal (227 L), is intended for fixed installation, and is not used for processing."

Separators, heater treaters, and tanks are referenced individually in the COGCC Rules as being distinct pieces of equipment and one of many components of a production facility. COGCC Series 100 Rules – Definitions states: *"PRODUCTION FACILITIES shall mean all storage, separation, treating, dehydration, artificial lift, power supply, compression, pumping, metering, monitoring, flowline, and other equipment directly associated with oil wells, gas wells, or injection wells."* COGCC Rule 605.b.(1) states: *"Fired vessels (FV) including heater-treaters (HT) shall be minimum of fifty (50) feet from separators or well test units."* Heater treaters are

referenced as “fired vessels” with setbacks to separators, making a clear distinction between the two pieces of equipment..

Interestingly, the term “tank” is referenced sixty-two times in the COGCC Rules; “separator” is mentioned ten times, and “heater treater” is mentioned five times, and each are listed as individual pieces of equipment. Rule 303(b)(3)C – Information Required, is a typical equipment reference found in the Rules; *“A list of major equipment components to be used in conjunction with drilling and operating the well(s), including all tanks, pits, flares, combustion equipment, separators, and other ancillary equipment and a description of any pipelines for oil, gas, or water.* Another example is found in the Rule definitions:*”* T*EMPORARILY ABANDONED WELL shall mean a well which is incapable of production or injection without the addition of one or more pieces of wellhead or other equipment, including valves, tubing, rods, pumps, heater-treaters, separators, dehydrators, compressors, piping or tanks.”*

The Colorado Department of Public Health and the Environment - Air Quality Control Division’s “Revised Regional Haze Plan, dated January 7, 2011 defines a heater treater as “*a combination of a heater, free-water knockout and oil/condensate and gas separator.”*

The USEPA through the Spill Prevention Control and Countermeasures program, 40 CFR Part 112, also differentiates between oil storage containers and separation vessels. Separation vessels are referred to as “flow-through process vessels”. 40 CFR Part 112.2 – Definitions states “*Bulk storage container means a container used to store oil. These containers are used for purposes including, but not limited to, the storage of oil prior to use, while being used, or prior to further distribution in commerce. Oil-filled electrical, operating, or manufacturing equipment is not a bulk storage container.”* The Federal Register, 73 FR 74277, dated December 5, 2008, states *”Flow–through process vessels, such as horizontal or vertical separation vessels – for example, heater-treater, free-water knockout, gun-barrel, etc. – have the primary purpose of separating the oil from other fractions (water and/or gas) and then sending the fluid stream to the appropriate container.”*

Generically, a separator used in the context of the oil and gas industry may be defined as an item of production equipment used to separate liquid components of the well stream from the gaseous elements. Separators can be configured vertically or horizontally and are generally cylindrical or spherical in shape.

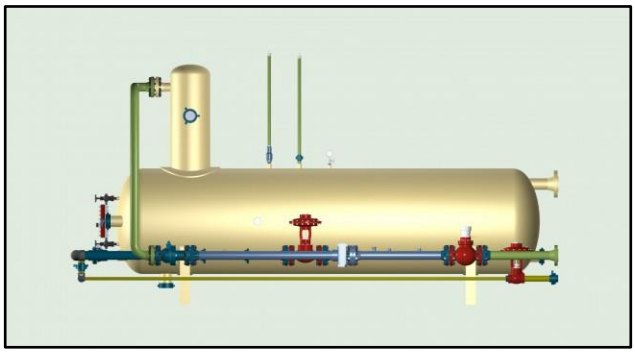

Figure 1 Generic Gravity Separator

Separation is accomplished principally by gravity, the heavier liquids falling to the bottom and the gas rising to the top. Float valves or other liquid-level controls regulate the level of oil and water in the separator. These *separators* are generally used in western Colorado where low to moderate fluids are produced, and *gas* production is the primary function Figures 1 and 2 depict a generic separator.

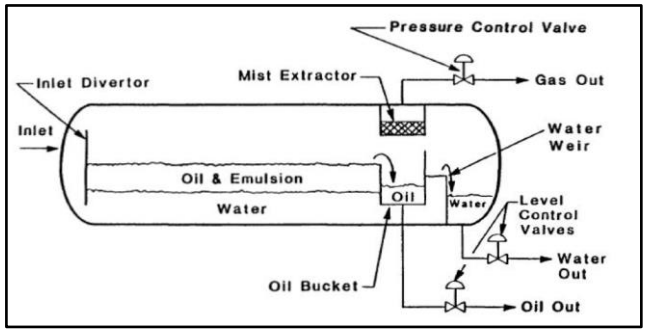

Figure 2 Generic Gravity Separator Schematic

A “heater treater”, as understood by the oil and gas industry, is a type of separator that uses direct heat or fire to speed the separation of emulsions; and is generally used where large fluid well streams are present and oil production is the primary function. It typically consists of a combination of a heater, free-water knockout, and oil and gas separator. Heater treaters are direct-fire units with a fire tube located inside the separator pressure vessel to apply direct heat into the separator for the purpose of emulsion separation. Figure 3 provides a generic heater treater schematic.

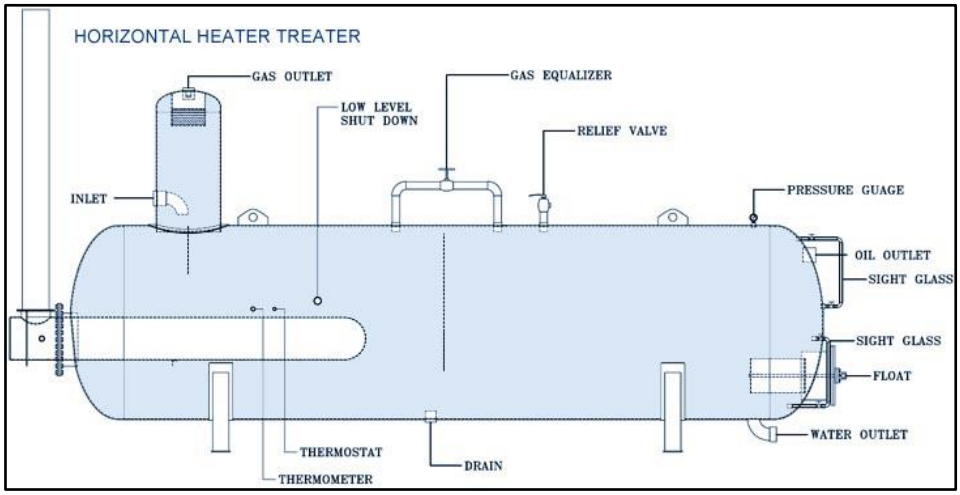

Figure 3 Generic Heater Treater

As indicated by the WSCOGA operator’s survey, the majority of separators used in the Rocky Mountain region of Colorado are generally for natural gas production where low to moderate fluids are produced. These separators are not equipped with a fire tube located inside the separator pressure vessel. Heat, however, can be applied ahead of the separator by passing the well stream fluid through a glycol/water bath heat exchanger to increase well stream fluid temperature lost as it passes through a pressure reducing choke. The choke reduces high well

head pressures to the desired operating pressure, but as a thermodynamic consequence, the pressure drop can lower the temperature of the well stream fluid to the freezing level. The glycol/water heat exchangers are typically operated in the winter months operating at a temperature range of between 60^{o}F to 190^{o}F.

Historically, a stand-alone line heater, Figure 4, was used in the winter months between the wellhead and the separator to prevent freezing. The equipment evolved over time for the region's weather conditions into the modern natural gas separator unit with a combined atmospheric glycol/water bath heat exchanger and separator pressure vessel packaged in one unit. See Figure 5

Figure 4 Line Heater from KW International

In light of the absence of a definition for a separator or heater treater, the COGCC Rules do provide for the common or accepted understanding or definition of words peculiar to the oil and gas industry. Under COGCC Series 100 Rules – Definitions states: ***"****ALL OTHER WORDS used herein shall be given their usual customary and accepted meaning, and all words of a technical nature, or peculiar to the oil and gas industry, shall be given that meaning which is generally accepted in said oil and gas industry."* The common vernacular or understanding by oil and gas operators on the western slope is that there is a distinct difference between separators used in this region and a heater treater.

Separators and Heater-Treaters Survey Inventory

The WSCOGA operator's survey respondents revealed that there are over 4,750 gravity-type separators in their operations using the pressure vessel and glycol/ water bath heat exchanger design. These separators consisted of single, dual and quad units. One operator identified over 110 fired vessel secondary-pass separators used to further separate water and oil after running through the gravity separator. These units differed slightly from heater-treaters in that they did not have free water knockouts. Only two heater treaters, or 0.04% of the total, were identified in the survey using a fire tube design located inside the separator pressure vessel with heater, free-water knockout, and oil and gas separation.

Major manufacturers of the separator equipment used by WSCOGA contributors are provided in Table 1. Cimarron and Cameron were identified as having the number one and two positions of the market share, respectively, in western Colorado.

Table 1

Separator Manufacturers Identified in WSCOGA Survey

Cimarron	National PA	Benchmark
Cameron	Olman	American Tank
Central tank	R&R Tank	Western Fabricators
Latoka	Valerus	BET
Leed	Pesco	Wasatch
Natco	JW Williams	

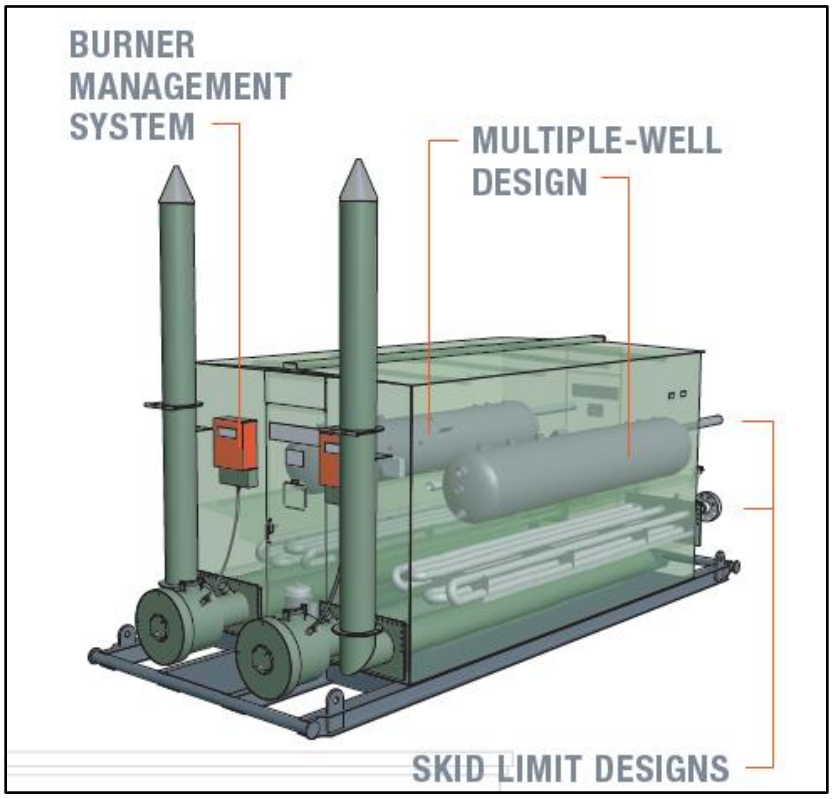

Figure 5 Typical Dual Gravity Separator as manufactured by Cimarron.

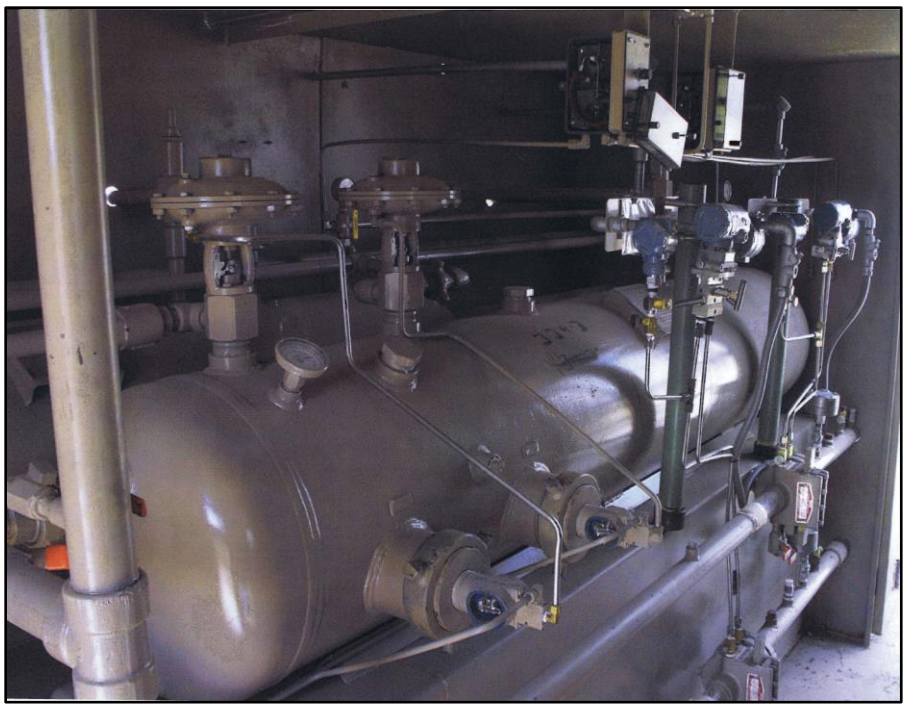

Figure 6 Typical Gravity Separator, inside view, as manufactured by Cimarron.

Figure 7 Gravity Separator manufactured by Pesco.

Figure 8 Gravity Separator manufactured by Valerus.

Separator Construction

The COGCC Rules do not contain construction specifications or standards for separation equipment, however, COGCC Rules 605.a. does provide for standards, such as API and UL, for atmospheric tanks. American Petroleum Institute has a standard for separators contained in their publication entitled "API Specification 12J – Specifications for Oil and Gas Separators, 8th Edition. The proprietary nature of separation equipment made it difficult to obtain data on manufacturer's construction standards, specifications and materials.

A specification cut-sheet for a gravity separator without a fire tube, Model 1HORZ3P, 20"Dx90"L, manufactured by Cimarron Energy, Inc., was provided and indicated that it was constructed of A106 carbon steel with a yield strength of 35,000 psi. The unit is rated for 1000 psig at 200°F. The pressure vessel separator is constructed to American Society of Mechanical Engineers (ASME), Section 8, Division 1 specifications. Several operators indicated that their normal separator operating pressures were between 225 and 250 psi with glycol/water bath temperatures maintained at around 85° F in the winter months.

In terms of numbers, the predominate separator used in the region is manufactured by Cimarron; and is constructed with a separator pressure vessel, 20" diameter x 90" length, with a volume of approximately 3.1 barrels. Located within the unit, is an atmospheric tank containing a glycol/water bath heat exchanger. The typical Cimarron quad separator unit glycol/water bath

contains two tanks, each holding a volume of 17.9 barrels. The corresponding double separator unit has two tanks each holding10.7 barrels, and the single separator has one 11 barrel tank.

Spill Incidence

Separator spill records obtained from the operator's survey are summarized in Table 2. Operators were requested to provide discharge data on all separator-related spills including both produced water/oil and glycol. This compilation of spills is unique as it provides information and insight into both reportable and non-reportable spills of less than 5 barrels under former COGCC rule thresholds.

Table 2

West Slope Colorado Oil and Gas Association
Contributor's Separator Survey Data Summary

Spill Date	Spill Volume PW/Oil (bbls)	Spill Volume Glycol (bbls)	Offsite Migration	Failure Category	Failure Specifics	Fire	Areal Extent ($ft.^2$)	Areal Extent ($ft.^2$/bbl)
7/9/2010	22	0	No	Human Error	Valve left open	No	707	32.1
10/28/2010	0.24	0	No	Equipment Failure	Separator freeze	No		
12/23/2010	0.267	0	No	Equipment Failure	Water dumpline broke	No	36	134.8
9/30/2010	0	0.6	No	Equipment Failure	Leak in glycol line in separator	No		
1/11/2011	0	0.24	No	Equipment Failure	Valve failure	No		
1/14/2011	2.5	0	No	Equipment Failure	Leak in pipe	No		
1/14/2011	0	0.12	No	Equipment Failure	Leak in plug at base of unit	No		
1/29/2011	0	0	No	Equipment Failure	Bypass line washout. Sand in separator	**Yes**		
2/12/2011	1	0	No	Equipment Failure	Crack in pipe fitting	No		
3/21/2011	0	0.18	No	Equipment Failure	Leak in gauge	No		
4/1/2011	0	5.9	No	Equipment Failure	Valve failure	No		
4/29/2011	22.5	0	No	Human Error	Valve left open	No	4034	179.3
5/6/2011	1	0	No	Human Error	Valve left open	No		
7/5/2011	50	0	No	Human Error	Valve left open	No	2832	56.6
7/18/2011	0	0.6	No	Equipment Failure		No		
8/28/2011	10	10	No	Equipment Failure	Coils failure--from pessure	No	2057	205.7
12/27/2011	1	0	No	Human Error	Valve left open	No		
1/3/2012	0	0.95	No	Equipment Failure	Separator malfunction	No		
3/15/2012	1.5	0	No	Equipment Failure	Separator malfunction	No		
4/2/2012	0	0.24	No	Equipment Failure	Coil failure--corrosion	No		
4/27/2012	0	17.9	No	Equipment Failure	Leak in separator	No		
4/30/2012	2	0	No	Equipment Failure	Separator malfunction	No		
8/20/2012	3	0	No	Human Error	Valve left open	No		
11/19/2012	1	0	No	Equipment Failure	Separator malfunction	No		
12/21/2012	0	0.12	No	Equipment Failure	Oil flowed into glycol/water burner tube.	**Yes**	10	83.3
12/28/2012	1	0	No	Human Error	Valve left open	No		
12/28/2012	0.76	0	No	Equipment Failure	Frozen valve cracked	No		
2/1/2013	1.5	0	No	Human Error	Valve left open	No		
3/7/2013	0	2.67	No	Human Error	Separator punctured during transport	No		
4/24/2013	0	0.18	No	Equipment Failure	Coil Failure	No		
5/31/2013	0	0.5	No	Equipment Failure	Separator malfunction	No		
Totals	**121.27**	**40.2**						**691.9**
						Average $Ft.^2$/bbl		**115.3**

*As reported by contributing members of WSCOGA.

For the period of July 9, 2010 through May 31, 2013, respondents provided spill information on produced water/condensate and glycol discharges. This information included incident date,

offsite migration, failure category, cause of discharge, areal or spatial extent, and whether the incident resulted in a fire. Details are provided for the selected spill events and fire incidents.

A total of 4 reportable separator related spills and incidents were reported by contributors over the 3 year period. Reports indicate that none of the spills migrated off site. During the same study period COGCC Staff Reports tabulated a total 1381 reportable spills statewide. See Figure 9. There were no reported heater treater spills from WSCOGA contributors.

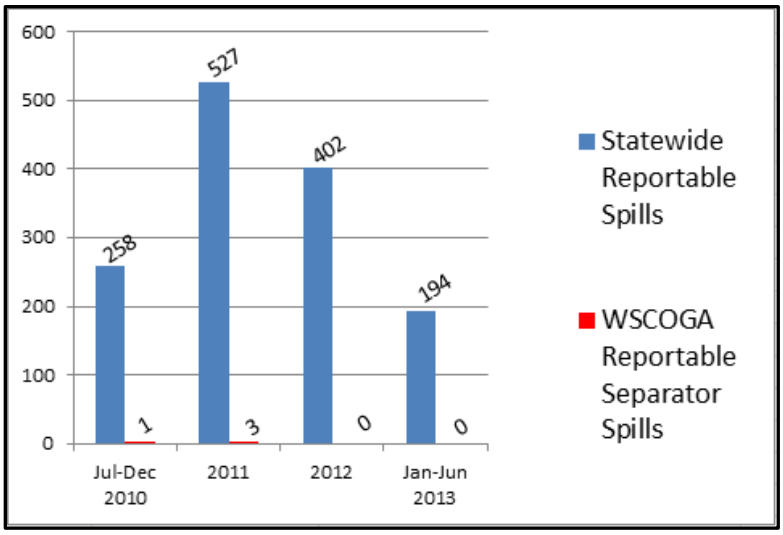

Figure 9 Statewide Spills versus WSCOGA Reported Spills

In terms of all reportable and non-reportable oil and produced water spills, 47% of the spills, were less than one barrel, 29% were between 1 and 5 barrels, 5.9% were between 5 and 10 barrels, and 17.6% were greater than 10 barrels.

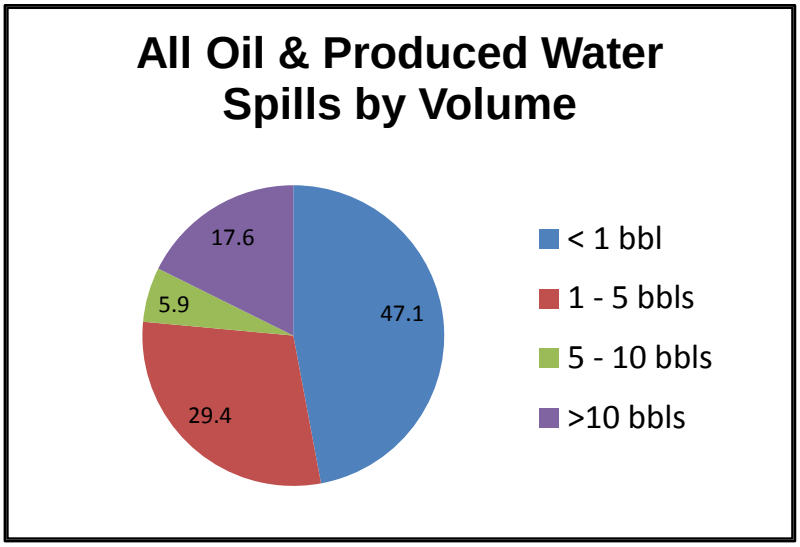

Figure 10 Oil and Produced Water Spills by Volume

There were a total of 31 separator spill incidents reported, with 23 listed as equipment failures and 9 as human error. Equipment failures included frozen valve/pipes, glycol pipe and water bath leaks, and piping and heat exchanger coiling failures due to sand. It is interesting to note that 8 of the 9 human errors were identified or caused by a valve being left open.

Of the 8 human error discharges, five events were under 5 bbls and non-reportable; and the remaining three spills were over 22 barrels. The three largest separator related discharges are highlighted below.

On April 29, 2011, a ball valve was left open on one of the separators when a pressure test was conducted on newly installed flow lines. This caused condensate and produced water to spray out of the open valve into the air and onto the well pad beyond the perimeter fence of the separator units. The incident discharged a reported 22.5 bbls of produced water and condensate and impacted 4034 ft.^{2} of the pad surface. The well was shut-in and the ball valve was closed.

Figure 11 April 29, 2011 Spill Spray Incident

On July 5, 2011, an employee left a valve open on one of the separator dump lines. When the separator dump valve activated, produced water flowed out of the open valve and onto the well pad. The incident discharged a reported 50 bbls of produced water and impacted 2832 ft.^{2} of the pad surface.

On July 9, 2010, a contractor left a sampling valve open on a separator. When the separator dumped, produced water flowed out of the open valve and onto the well pad. The incident discharged a reported 22 bbls of produced water and impacted 707 ft.^{2} of the pad surface. The entire release was contained on the well pad.

A number of observations can be made from the three highlighted pressure vessel separator spills.

- These are the three worst separator-related spills reported.
- These are the three worst separator-related spills over a three year period.
- These are the three worst separator-related spills from 4,750 separators and over 110 fired vessels and heater treaters. The spill incidence rate is 0.06%.
- These spills did not migrate off pad and the sites were successfully remediated.
- These separators did not have sized secondary containment.
- These separators were included in an existing SPCC plan.

Limited data was available on the spatial extent or coverage of discharges on the ground. Of 6 spills reviewed, including the three largest, the average spatial extent of the spills was approximately 115 square feet per barrel. This ranged from 32 ft.^{2}/bbl. to 205.7 ft.^{2}/bbl. In an experiment conducted by an operator in another basin, 1 and 5 bbls of fresh water was spilled on a level gravel area with lime/clay soils and low atmospheric humidity. The one barrel and five barrel spills had spatial extents of approximately 180 ft.^{2} and 825 ft.^{2}, respectively.

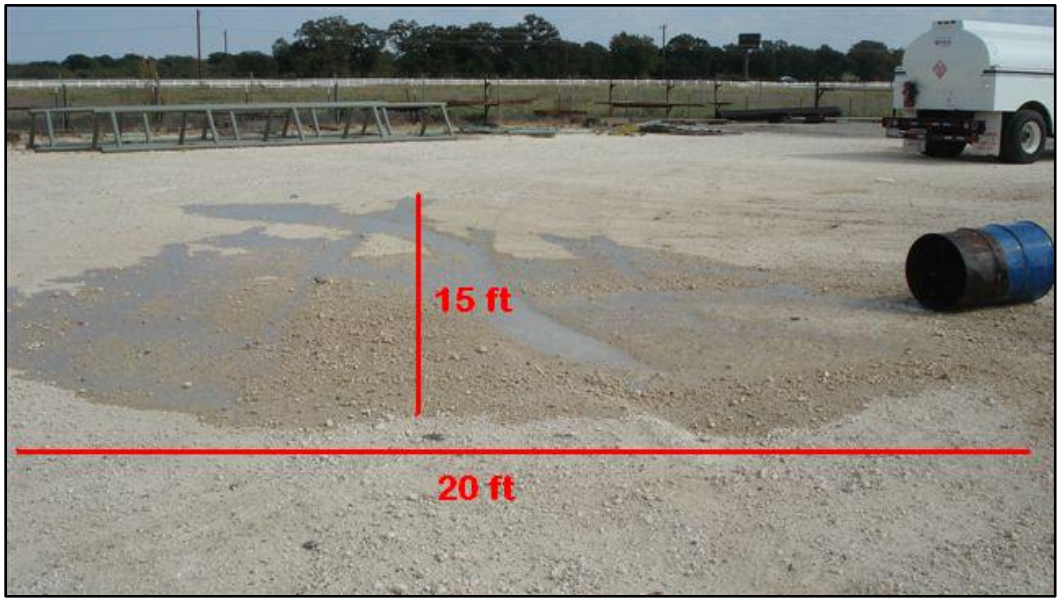

Figure 12 One barrel spill of water and resulting spatial extent.

Fire Safety Record

The operator's survey revealed only two separator related fire incidents, as described below.

For the January 29, 2011 fire, a bypass valve on the separator was left open, causing the line to be washed out by sand from the well stream. As a result, gas was released and was ignited by the glycol/water bath heater. There was no spill associated with the fire.

For the December 21, 2012 fire, the dump line to the oil storage tank was closed or possibly froze, forcing excess liquid to the supply line. This caused the scrubber pot to flood, allowing condensate to flow into the burner tube of the glycol/water bath Heater and ignite. The scrubber pot supplies natural gas to the heater, and in this case, the condensate was consumed inside of the burner tube. A minimal spill of 0.12 bbls of glycol was reported.

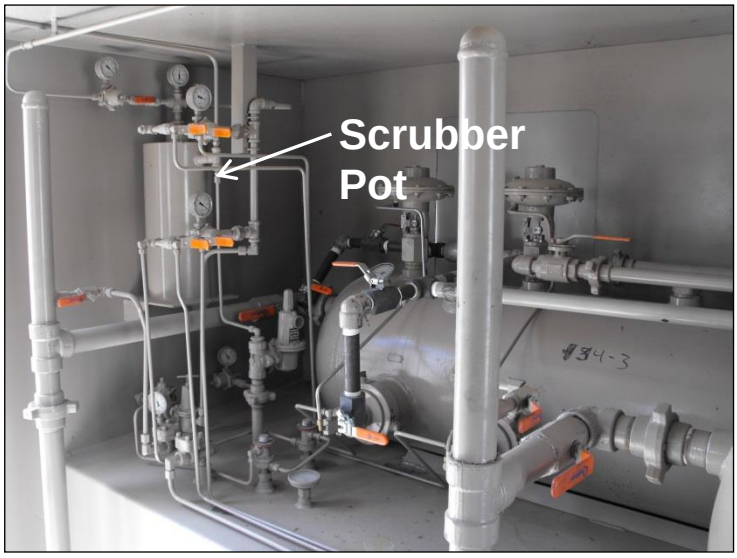

Figure 13 Scrubber pot inside separator.

In both cases, there was no sized secondary containment and the fires were contained to the separator units. The wells were shut in and the fire extinguished.

The incidence of separator-related fires, as evidenced by the survey, is quite small. A total of two fires were reported for the 4,750 separators, 110 fired vessels and two heater treaters operated by WSCOGA members during the past three years. This record stands on its own and provides evidence of the reliability and safety of the modern natural gas separator unit combining an atmospheric glycol/water bath heat exchanger and separator pressure vessel into a single unit.

Even with the negligible fire risk, WSCOGA operators have expressed concern that placing secondary containment structures around separators would increase fire potential by possibly concentrating fuel at the separator and increasing risk to response team personnel. It is interesting to note that the USEPA also acknowledges fire potential hazards associated with sized secondary containment around separators, heater treaters and other process vessels. The Federal Register, 73 FR 74278, states:

> *"EPA is modifying the requirements at § 112.9(c) to provide an alternative to the sized secondary containment requirements for flow-through process vessels at oil production facilities. Flowthrough process vessels, such as horizontal or vertical separation vessels—for example, heater-treater, free-water knockout, gun-barrel, etc. EPA is taking this action because* ***the Agency agrees with concerns regarding the requirement to provide sized secondary containment around flow-through process vessels, such as heater treaters, due to a potential fire hazard if spilled oil collects around such equipment****."*
>
> *"Therefore, EPA is requiring additional measures for flow-through process vessels at oil production facilities that do not have sized secondary containment, including inspection*

or testing of components, prompt removal or initiation of actions to stabilize and remediate any oil accumulations, and corrective action."

Secondary Containment

Historically, the COGCC rules have not specified that secondary containment is required around separators. COGCC Rules 605.a.(4) OIL AND GAS FACILITIES states *"Berms or other secondary containment devices shall be constructed around crude oil, condensate, and produced water tanks to provide secondary containment for the largest single tank and sufficient freeboard to contain precipitation."* The USEPA, however, has regulations in place to provide for environmental protection from flow-through process vessels. The owners of oil production facilities are, and have been required to comply with these regulations in their appropriate SPCC plans.

The SPCC program, 40 CFR Part 112.7, of the USEPA has established several methodologies for providing for environmental protection and prevention of discharges from flow-through process vessels at oil production facilities. These include sized secondary containment including precipitation volume; and active and passive measures for general secondary containment of the most likely discharge. The general secondary containment provisions also require inspection or testing of components, prompt removal or initiation of actions to stabilize and remediate any oil accumulations, and corrective actions. The USEPA believes, as stated in 73 FR 74278, that these rules for flow-through process vessels allows the owner or operator of an oil production facility flexibility in how to design secondary containment for this equipment and in how to comply with the additional requirements that maintain environmental protection.

As described in one of the WSCOGA member's SPCC plan:

"As provided in Part 112.9(c)(5), in lieu of secondary containment, this Plan has chosen to implement alternate requirements for separators or flow-through process vessels as described below.

1. *A regular inspection and testing schedule, as provided in Appendix C, will be followed and documented for the separator and associated components.*
2. *Corrective actions and repairs will be taken on separators and associated appurtenances as indicated on regularly scheduled visual inspection, tests, or evidence of a discharge.*
3. *Accumulations of oil discharges associated with separators and associated appurtenances shall be promptly removed or actions shall be initiated to stabilize or remediate the discharge.*
4. *If the facility discharges more than 1000 U.S. gallons in a single discharge or more than 42 gallons in each of two discharges within a 12-month period, from the flow-through process vessels, then within 6 months, the flow-through process vessels shall comply with the secondary containment requirements of Part 112.9(c)(2) and (c)(3)."*

Additionally, WSCOGA members also rely on general/tertiary containment on location and/or location specific Oil Spill Contingency Plans to meet alternative containment requirements for separator or other flow-through process vessels.

Conclusions

Although there may be differing opinions on oil and gas terminology and their interpretations as it relates to regulations, both regulators and operators agree that environmental protection and personnel safety is paramount. This report has evaluated existing regulations, fire safety and spill discharges associated with separators, both gravity and fired vessel, from contributing WSCOGA operators. The record stands on its own merit and provides evidence that existing regulations or combinations of regulations; whether under the jurisdiction of the COGCC or the USEPA; are providing a successful strategy for ensuring spill prevention and control for separation equipment.

A total of four reportable separator-related spills and incidents were reported by WSCOGA contributors over a three year period with no spills migrating off site. During the same study period, COGCC Staff Reports tabulated a total of 1381 reportable spills statewide. There were no reported heater treater or fired vessel spills from contributing operators. A total of two fires were reported for the 4,750 separators,110 fired vessels, and two heater treaters operated by WSCOGA members during the past three years with no adjacent collateral damages. This impeccable record has been maintained without sized secondary containment. Sized secondary containment, in the opinion of both oil and gas operators and the USEPA, can be a fire hazard if discharges collect or pool around separation equipment.

Historically, COGCC rules have not specified that secondary containment is required for separation units. Fortunately, there has been overlap in State and Federal regulations, and the USEPA has had regulations in place, under 40 CFR 120, to provide for environmental protection applicable to separators, referred to as flow-through process vessels in the federal vernacular. Existing general secondary containment regulations require inspection or testing of components, prompt removal or initiation of actions to stabilize and remediate any oil accumulations, and corrective actions.

The USEPA believes, as stated in 73 FR 74278, that SPCC rules for separators or flow-through process vessels allows the owner or operator of an oil production facility flexibility in how to design secondary containment for this equipment and in how to comply with the additional requirements that maintain environmental protection. WSCOGA members and operators concur with this philosophy and would encourage the Colorado Oil and Gas Conservation Commission to recognize existing Federal regulations and their effectiveness.