Appendix D:

Calculation of Emission Estimates and Reductions

OVERVIEW

A. TANK EMISSION CALCULATION

To determine the emission impact from the tank portion of the proposed regulation, staff first determined tank system count by district, using data from ARB's 2009 Oil and Gas Industry Survey (2009 Survey) to get a system count by district. For the purposes of this regulation, a tank system is considered a separator and the first crude and first water tanks tied to the separator. Staff used the separator counts in the ARB Survey as a proxy for the number of tank systems by facility per district. Staff then used Western States Petroleum Association and California Air Resources Board crude and water tank flash data to determine emission factors in metric tons per barrel of crude, water, and dry gas, produced water, for methane, volatile organic compounds (VOC), and Benzene, Toluene, Ethylbenzene, and Xylene (BTEX). The emission factors were then applied to system throughputs of crude, produced water, and dry gas, providing estimates of total methane, VOC, and BTEX emissions per system.

Staff used the estimated methane emissions by tank system to determine the number of systems that would be above the regulation's 10 metric ton per year (MT/yr) threshold for controls. Staff was then able to determine reductions assuming the 95% control efficiency in the regulation.

B. DETAILED EXPLANATION OF THE TANK EMISSION CALCULATION

Below is a detailed explanation of how staff calculated the emission impacts on oil and gas tanks from the proposed Oil and Gas GHG Regulation.

1. Determining number of systems

The foundation of the tank system count analysis is the 2009 Survey. First, staff used the information in the 2009 ARB Survey to determine the number of water and crude tanks related to crude and natural gas operations. However, the 2009 ARB Survey data did not contain any information on water tanks. Since the provisions are concerned only with the separator and first crude and first water tank, staff used the counts of separators as a proxy for tank systems. Using the 2009 Survey separator data, Staff determined 14 types of separators that represented the head of a system.

Separator Names used in Tank Emission Analysis

- Condensate
- Condensate Accumulator
- Condensate Tank
- Condensate Vessel

- Free Water Knockout
- Horizontal
- Horizontal Separator
- Horizontal Separators
- Natural Gasoline Bullet
- Oil Water Separator
- Separator
- Vertical Separator
- Wash Tank
- 3-Phase

Based on this approach, staff determined that there are 2785 tank systems. They also assumed that there is at least one water tank and one crude tank attached to the separators. The 2009 Survey data contains information regarding whether or not the separators had vapor recovery systems (VRS) or were uncontrolled. Staff assumed that if the separator was equipped with a VRS, then the subsequent water and crude tanks attached to the system were also equipped with a VRS, and that if a separator was uncontrolled (not equipped with a VRS), then the subsequent water and crude tanks attached to the system also were uncontrolled. There was one exception to this assumption.

Based on discussions with the San Joaquin Valley Air Pollution Control District (SJVAPCD), staff assumed all water tanks in the SJVAPCD are uncontrolled, even if the separator is controlled. Therefore, for the systems in the SJAPCD, it was assumed that all of the water tanks were uncontrolled, even if the separator associated with the water tank was equipped with a VRS. Table D-1 shows the system counts from the 2009 Survey.

Table D-1: System Counts

Category	Count	All non-VRS systems
Systems	2785	1066
Companies	183	50
Facilities	731	523

2. Emission Factor Development

To get emission factors for methane, VOCs, and BTEX per barrel of produced crude oil and per barrel of crude oil produced water, staff used

water tank flash data from Air Resources Board (ARB) testing[1] and crude and water tank flash data from Western States Petroleum Association (WSPA) tests[2]. There were 21 crude produced water tank flash tests and 17 dry gas produced water tank flash tests used from the ARB dataset. There were approximately 188 crude oil and crude produced water tank flash tests used from the WSPA dataset.

a) Crude Oil Related Emission Factors Using WSPA Data

The WSPA crude oil flash data contained the following information:

- Crude Throughput (barrels per year (bbls/yr))
- Reid Vapor Pressure (pounds per square inch absolute (psia)) (not used in analysis)
- Crude Oil API gravity (not used in analysis)
- Flash Gas Molecular Weight (MW) (g per gram-mole (g/g-mole))
- Gas Oil Ratio (GOR) (standard cubic feet per barrel (scf/bbl))
- Methane (weight percent (wt%))
- CO2 (wt%)
- VOC C3-C10 (wt%)
- VOC C10+ (wt%)
- BTEX (wt%)

Example Calculation using WSPA data

Example Flash Data:

Crude Throughput	= 100,000 bbl/yr
GOR	= 1.5 scf/bbl
Flash Gas MW	= 30 g/g-mole
Methane	= 50 wt%
CO2	= 30 wt%
VOC C3-C10	= 15 wt%
VOC C10+	= 0.001 wt%
BTEX (wt%)	= 0.01 wt%

[1] Kuo, Jeff. 2011. Methane and Carbon Dioxide Emissions from California Crude Oil and Gas Operations, California State University, Fullerton, June 30, 2011.
[2] WSPA and ARB flash test data used in this analysis is included in the back of this appendix.

To get the amount of entrained gas in the oil produced, multiply crude throughput by the GOR:

Entrained gas = 100,000 bbl/yr x 1.5 scf/bbl = 150,000 scf/yr

Next use the Flash Gas MW to determine the amount of emissions in metric tons:

Where:

Base condition constant

= 4.22119e-05 g-mole/cm^3 at 60 degrees F and 1 atm,

Emissions = Flash Gas MW x Entrained gas x base condition constant x unit conversions

= 30 g/g-mole x 150,000 scf/yr x 4.2219e-05 g-mole/cm^3 *28,317 cm^3/ft^3 x 0.002203 lb/g x 0.005 tons/lb x 0.907 MT/ton

= 8.06 MT/yr

To get the contribution of emissions by individual pollutant, multiply each pollutants weight percent as a percentage by the emissions:

Methane emissions = 0.5 x 8.06 MT = 4.03 MT

BTEX emissions = 0.0001 x 8.06 MT = 0.0008 MT

For VOC sum the weight percents of VOC C3-C10 and VOC C10+ then multiply by the emissions to get total VOC emissions:

VOC emissions = (0.15 + 0.00001) x 8.06 MT = 1.21 MT

To convert the emissions to an emission factor, divide each pollutant's emissions by the total crude throughput of the tank.

Methane Emission Factor = 4.03MT/ 100,000 bbl = 4.03e-5 MT/bbl

BTEX Emission Factor = 0.0008 MT / 100,000 bbl = 8e-9 MT/bbl

VOC Emission Factor = 1.21 MT / 100,000bbl = 1.21e-5 MT/bbl

The WSPA water flash data contained the following information:

- Water Throughput (bbls/yr)
- Flash Gas MW (g/g-mole)

- Gas Water Ratio (GWR) (scf/bbl)
- Methane (wt%)
- CO2 (wt%)
- VOC C3-C10 (wt%)
- VOC C10+ (wt%)
- BTEX (wt%)

The calculation for the water tank emission factors is the same as the crude emission factor calculations above, except the water tank emission factors uses GWR instead of GOR and water throughput instead of crude throughput.

b) Crude Oil Related Emission Factors Using ARB Data

The calculation for developing the crude oil related emission factors using ARB data is nearly identical to the calculation using WSPA data. The only exception is that the ARB data was speciated by individual compound. So the individual VOCs and BTEX compounds had to be manually added together to create similar pollutant categories as the WSPA data.

c) Combined Crude Oil Related Emission Factors

The throughputs and the individual pollutant emissions were summed from the ARB and WSPA datasets and an overall emission factor was determined from the total of the summed datasets, as shown in Tables D-2 through D-7.

Table D-2: Crude Methane Emission Factor

Dataset	Crude Throughput (bbl/yr)	Methane (MT/yr)	Methane Emission Factor (MT/bbl)
ARB	N/A	N/A	
WSPA	96,376,935	5,910	
Total	**96,376,935**	**5,910**	**6.13E-05**

Table D-3: Crude VOC Emission Factor

Dataset	Crude Throughput (bbl/yr)	VOC (MT/yr)	VOC Emission Factor (MT/bbl)
ARB	N/A	N/A	
WSPA	96,376,935	5,097	
Total	96,376,935	5,097	**5.29E-05**

Table D-4: Crude BTEX Emission Factor

Dataset	Crude Throughput (bbl/yr)	BTEX (MT/yr)	BTEX Emission Factor (MT/bbl)
ARB	N/A	N/A	
WSPA	11,976,536	0.50	
Total	**11,976,536**	**0.50**	**4.21E-08**

Table D-5: Crude Produced Water Methane Emission Factor

Dataset	Water Throughput (bbl/yr)	Methane (MT/yr)	Methane Emission Factor (MT/bbl)
ARB	28,506,500	116	
WSPA	1,361,401,787	8,145	
Total	**1,389,908,288**	**8,261**	**5.94E-06**

Table D-6: Crude Produced Water VOC Emission Factor

Dataset	Water Throughput (bbl/yr)	VOC (MT/yr)	VOC Emission Factor (MT/bbl)
ARB	28,506,500	41	
WSPA	1,321,470,497	805	
Total	**1,349,976,997**	**846**	**6.26E-07**

Table D-7: Crude Produced Water BTEX Emission Factor

Dataset	Water Throughput (bbl/yr)	BTEX (MT/yr)	BTEX Emission Factor (MT/bbl)
ARB	23,031,500	2.68	
WSPA	10,047	0.0017	
Total	**23,041,547**	**2.68**	**1.17E-07**

d) Natural Gas Emission Factors

The ARB data also contained 19 flash tests on dry gas produced water. The dry gas produced water emission factors came from these 19 flash tests.

Dry Gas Produced Water Methane Emission Factor

= 4.73e-05 MT/bbl

Dry Gas Produced Water VOC Emission Factor

= 6.59e-06 MT/bbl

Dry Gas Produced Water BTEX Emission Factor

= 6.51e-07 MT/bbl

3. Emission Estimates by System for All Systems

Staff used the emission factors above to estimate emissions from each tank system identified in the 2009 ARB Survey. In order to do so, throughput of crude, dry gas, crude oil produced water, and dry gas produced water is necessary.

The 2009 Survey contained throughput data for each separator. However, when staff compared the separator throughput with overall facility throughput, many survey respondents used their facility throughput as their separator throughput. In instances where a facility had multiple separators that represented system heads, this led to an overestimate of the system throughputs. This overestimate of the system throughputs led to an overestimate of the calculated emissions. In order to combat the prevalent issue of survey respondents using their facility throughput as their separator throughput, staff decided to divide the facility throughput by the number of separators that represented system heads at each facility. This gave each separator a proportion of the totally facility throughput. Staff used this method for every facility, even if the facility appeared to report its separator throughput correctly.

a) Crude Oil Produced Water

The 2009 Survey did not contain crude produced water data, but did contain crude throughput data. Staff used 2007 Division of Oil, Gas, and Geothermal Resources (DOGGR) statewide data on crude and produced water throughput to develop a ratio of water to crude[3]. The 2007 DOGGR statewide data showed that oil and condensate totals were approximately 243,000,000 barrels (bbls) and water totals were approximately 2,550,000 bbls. These totals show that the oil and condensate represent about 10 percent of the total water throughput, verifying staff's proposed ratio. As a result, staff used the following formula to determine crude oil produced water:

$$Facility\ Crude\ Oil\ Produced\ Water\ (bbls) = \frac{Factilty\ Crude\ Throughput\ (bbls\ )}{0.10}$$

b) Dry Gas Produced Water

The 2009 Survey did not contain dry gas produced water data, but did contain dry gas throughput data. Staff used the 2007 DOGGR statewide data from dry gas counties (Butte, Colusa, Glenn, Humboldt, Madera, San Joaquin, Sutter, Tehama, and Yolo) to calculate a ratio of dry gas to dry gas produced water[1]. The amount of dry gas for those counties was 22,048,095 thousand cubic feet (MCF) and the amount of dry gas produced water was 446,950 bbls. This leads to a ratio of 49,330 SCF of dry gas per barrel of produced water. As a result, staff used the following formula to determine dry gas oil produced water:

$$Factily\ Dry\ Gas\ Produced\ Water\ (bbls) = \frac{Factility\ Dry\ Gas\ Throughput\ (SCF)}{49{,}330\ (\frac{SCF}{bbl})}$$

c) Methane, VOC and BTEX Emission Calculations

To calculate emissions from the tanks systems, Staff multiplied the system throughput by the emission factor

For example,

Crude throughput for System X

= 100,000 bbls

Water throughput for System X

[3] DOGGR. 2008. 2007 Annual Report of the State Oil & Gas Supervisor, Publication no. PR06.

= 1,000,000 bbls

Crude Methane Emissions

= 100,000 bbls * 6.13E-5 MT/bbl = 6.13 MT

Crude VOC Emissions

= 100,000 bbls * 5.29E-05 MT/bbl = 5.29 MT

Crude BTEX Emissions

= 100,000 bbls * 4.21E-08 MT/bbl = 0.00421 MT

Crude Water Methane Emissions

= 1,000,000 bbls * 5.94E-6 MT/bbl = 5.94 MT

Crude Water VOC Emissions

= 1,000,000 bbls * 6.26E-07 MT/bbl = 0.626 MT

Crude Water BTEX Emissions

= 1,000,000 bbls * 1.17E-07 MT/bbl = 0.117 MT

If this system were uncontrolled, it would be considered subject to the regulation because the total methane emissions are above 10 MT (6.13 MT + 5.94 MT = 12.07 MT). This calculation is performed on every system at each facility to determine the number of systems that would be subject to the storage tank regulation. For dry gas systems, dry gas throughput was used instead of crude throughput to determine the methane emissions from the system.

d) Oxides of Nitrogen (NOx), Carbon Monoxide (CO), HYDROCARBON (HC), PARTICULATE MATTER (PM), and OXIDES OF SULFUR (SOx) EMISSION CALCULATIONS

In order to estimate emissions related to combustion from vapor recovery, Staff needed appropriate emission factors. Staff used emission factors from the United States Environmental Protection Agency (U.S. EPA) entitled, Emissions Factors & AP 42, Compilation of Air Pollutant Emission Factors for flares[4][5]. Table D-8 shows the existing flare emissions factors.

[4] U.S. EPA. 2016. Natural Gas Combustion. AP 42, Fifth Edition, Volume I.Chapter 1: External Combustion Sources.

[5] U.S. EPA. 2016. Industrial Flares. AP 42, Fifth Edition, Volume I, Chapter 13: Miscellaneous Sources.

Table D-8: Flare Emission Factors

Pollutant	Emission Factor (lb/10^6 scf)
NOx	68
CO	370
Hydrocarbons	140
CO2	120000
Lead	0.0005
N2O (Uncontrolled	2.2
N2O (low nox burner)	0.64
PM (Total)	7.6
PM10 (condensable)	5.7
PM2.5 (filterable)	1.9
SO2	0.6
TOC	11
Methane	2.3
VOC	5.5
Benzene	2.10E-03
Toluene	3.40E-03

For the low-NOx incinerator emission factors, staff used a combination of test data and manufacturer reported emission factors. For NOx, CO, and hydrocarbons, Staff used manufacturer reported emission factors[6]. For PM and SOx, manufacturer test data was used to determine emission factors for those pollutants[7]. For PM, the PM emissions were measured as PM10 in the actual test data. However, the manufacturer indicated that the PM10 test data included PM2.5 in the result. In order to get a PM2.5 and a PM10 emission factor, staff used the ratio of PM10 to PM2.5 from the flare emission factors and applied it to the low-NOx incinerator PM10 emission result. This gave a PM2.5 and a PM10 emission factor proportional to the flare emission factors for the same pollutants. Table D-9 shows the low-NOx incinerator emission factors.

[6] Aeron. 2015. Certified Ultra Low Emissions Burner, Sheets CEB 50 through CEB 1200:
[7] Aeron 2011 – 2013. Summary of Test Results, low-NOx incinerator test data submitted to ARB.

Table D-9: Low-NOx Incinerator Emission Factors

Pollutant	Emission Factor (lb/10^6 scf)
NOx	18.00
CO	10.00
Hydrocarbons	5.00
PM Total	7.23
PM10	5.42
PM2.5	1.81
SOx	0.04

Once staff had the emission factors for both flares and low-NOx incinerators, the next step was to determine the amount of gas that was going to be flared/incinerated. From the 2009 Survey staff could determine what kind of VRS was on each system. For systems that had no VRS, it was assumed that a low-NOx incinerator would have to be installed to deal with the captured gas. For facilities that had existing flares for VRS, it was assumed that they would replace their smallest flare with a low-NOx incinerator and any gas that going to the replaced smallest flare plus the additional captured gas would now go to the low-NOx incinerator. For facilities that had other VRS disposal methods such as disposal wells, collection systems, or steam turbines, it was assumed that the additional gas that would be captured would be routed to those same disposal methods. From the 2009 Survey, staff determined that there were 26 systems that were uncontrolled. These 26 systems spanned 5 facilities. However, one of the facilities had systems that were spread miles apart. Therefore, it was determined for that one facility three flare replacements would need to occur to capture the non-VRS systems that were spread apart.

In addition to the non-VRS systems, staff had discussions with the SJVAPCD and discovered that almost all of the water tanks in the San Joaquin Valley were uncontrolled. Therefore, for this analysis, staff assumed all water tanks were uncontrolled in the SJVAPCD. From the 2009 Survey, staff determined that there were 291 systems spanning 17 facilities that needed VRS controls on their water tanks because their systems were above 10 MT of methane emissions. Of the 17 facilities, 7 facilities were using flares as VRS for their controlled systems. The other 10 facilities were assumed to route their additional captured water tank to their other methods of disposal.

The next step was to determine the emissions from the existing flares. The 2009 Survey contained the throughput of each flare. Therefore, staff just multiplied the emission factors in Table D-6 by the throughput of the smallest flare on each facility. For the non-VRS systems, the total throughput of the smallest flare on each facility was 33,508,028 standard cubic feet (SCF) of gas. For the non-VRS water tank systems the total throughput of the smallest flare on each facility was 147,601,681 SCF.

Now that a baseline of emissions had been established, the next step was to determine the amount of emission if the smallest flares were replaced with low-NOx incinerators. To do this, staff multiplied the existing smallest flare throughput with the low-NOx incinerator emission factors in Table D-9.

The next step was to determine the amount of additional gas that would be captured and sent to the low-NOx incinerator. Staff converted the amount of methane emissions estimated to be vented from the uncontrolled systems to gas. Staff assumed a methane composition of 78.8 percent.

Example of converting methane emissions to gas

Assumptions:

Methane Density = 0.0419 lb/ft^3

1 ton = 2000 lbs

1 Metric ton = 0.907 tons

Methane Mole Fraction 0.788

Convert 10 MT methane to gas:

$$\frac{10\ MT\ CH4}{0.907\ \frac{MT}{ton}} \times 2000\ \frac{lbs}{ton} \times \frac{1}{0.0419 \frac{lb}{ft3}} \times \frac{1}{0.788} = 667{,}855\ ft3$$

The total amount of additional gas captured from the non-VRS systems was calculated to be 31,074,810 SCF. The total amount of additional captured from the the non-VRS water tanks was calculated to be 292,184,404. The total additional gas captured was calculated to be 323,259,214 SCF. Multiply the total additional gas captured by the emission factors in Table D-9.

To determine the emission impacts of NOx, CO, HC, PM, and SOx from the combustion of the captured gas, staff added the emissions from the existing gas using the low-NOx incinerator and the emissions

from the additional gas sent to the low-NOx incinerator and subtract the emissions from the existing flare. Table D-10 shows the total emissions impact from non-methane pollutants.

Table D-10: Total Emission Impact From Non-Methane Pollutants

Pollutant	Non- VRS Systems Emissions (tons)	Non-VRS Water Tank Emissions (tons)	Total Emissions (tons)
NOx	-0.56	-1.06	-1.62
CO	-5.88	-25.11	-30.98
Hydrocarbons	-2.18	-9.23	-11.42
PM Total	0.11	1.03	1.13
PM10	0.08	0.77	0.85
PM2.5	0.03	0.26	0.28
SOx	-0.0088	-0.0355	-0.0442

e) Natural Gas Speciation

Throughout the emissions analysis staff assumed that all gas was 78.8 percent methane. Staff used a speciation for gas found in a August 2009 API Compendium of Greenhouse Gas Methodologies[8] and ratioed up the species to reflect a 78.8 percent composition. This ratioed up speciation was applied to the methane emission reductions from each major component of the regulation to determine the reductions from VOCs, HCs, Benzene, Toluene, Ethyl-Benzene and Xylenes. Table D-11 shows the speciation fraction used in the July 1996 API study and the adjusted speciation fraction ratioed up to 78.8 percent that was used in this analysis.

[8] API. 2009. Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry. August 2009.

Table D-11: Gas Speciation

Pollutant	API 2009 Average Speciation Fraction	Average Speciation Ratioed to 78.8
Methane	0.766	0.788
Non-Methane	0.2342	0.212
VOC	0.144	0.130350128
C6+	0.010232	0.009262101
Benzene	0.002482	0.002246729
Toluene	0.001158	0.001048232
Ethyl-Benzene	0.000174	0.000157506
Xylenes	0.000898	0.000812878

f) NOx Emissions from Well stimulation Circulation Tanks

Staff calculated NOx emissions based on the amount of methane being captured from requiring vapor controls on well stimulation circulation tanks. In Appendix B, it is estimated that the vapor controls on well stimulation circulation tanks will result in 68 tons of methane reduction a year. This is equivalent to approximately 4,525,000 SCF of gas. Multiply this volume of gas by the NOx emission factor in Table D-9 and you get 81.45 pounds of NOx or 0.041 tons of NOx per year.

4. VOC to Methane Equivalency Analysis

The average VOC speciation fraction of natural gas from API 2009 is 0.13 (See Table D-11). Six tons of VOC is equivalent to approximately 46 tons of total emissions. The assumed speciation of methane in natural gas is 0.788 throughout this document. Therefore, 6 tons of VOC is equivalent to 36 tons of methane.

$$\frac{VOC\ tons}{VOC\ spectiaon} = \frac{6\ tons}{0.13} = 46\ tons\ of\ total\ emissions$$

$$total\ emissions\ tons * methane\ speciation = \ 46\ tons\ * 0.788$$
$$= 36\ tons\ of\ methane$$

5. Throughput Threshold Analysis

In order to reduce the amount of unnecessary flash testing for small oil and gas operators, staff analyzed flash testing data and system throughput data to determine throughput threshold that would exempt facilities below the threshold from having to do flash test on their systems. In order to bracket the problem staff looked at the highest GOR and the highest GWR from the ARB and WSPA flash test data and applied them to the system throughputs at each facility. Staff then looked at which throughput levels equaled 10 MT of methane. The throughput levels for systems at 10 MT of methane were 5.5 barrels of oil per day (BOPD) and 367 barrels of water per day (BWPD) for crude systems and 208 BWPD for dry gas systems. This established an upper end bracket for a crude throughput and a water throughput that would virtually ensure that no system that would be exempted from flash testing would exceed 10 MT of methane. Once the upper end bracket was established, staff started easing the thresholds upwards to see how high the thresholds could go while still be effective at preventing excess emissions. Staff eventually pushed the crude threshold up to 50 BOPD and were considering a crude only threshold limit for crude systems. So staff decided to test the 50 BOPD threshold on the WSPA flash data. At 50 BOPD there were 4 WSPA tanks systems that would exceed 10 MT of methane and not be required to flash test. So staff decided to reinstitute the water throughput threshold. However, staff wanted to make the regulation simpler by having one set of threshold limits that applied to both crude and dry gas systems, instead of separate threshold limits for each. Since staff pushed the crude throughput threshold limit up to 50 BOPD, it was decided that the rounded dry gas water threshold upper limit should be used for the water threshold. So the crude throughput threshold limit of 50 BOPD and the water throughput threshold limit of 200 BWPD were settled upon. Staff ran some analysis to see the effects of these new threshold limits. The 50 BOPD and the 200 BWPD threshold limits captured every system in the 2009 Survey and the WSPA flash data that would exceed 10 MT of methane with a compliance margin in case of high flash test data. The 50 BOPD and the 200 BWPD limits would exempt about 1500 out of approximately 2600 systems from flash testing. Whereas the 50 BOPD only limit would exempt 1700 out of 2600 systems.

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Table D-12: ARB Fullerton Crude Water Data

Crude Oil Produced Water	**Crude Water Tanks System 1**	**Crude Water Tanks System 2**	**Crude Water Tanks System 3**	**Crude Water Tanks System 4**	**Crude Water Tanks System 5**	**Crude Water Tanks System 6**	**Crude Water Tanks System 7**	**Crude Water Tanks System 8**	**Crude Water Tanks System 9**	**Crude Water Tanks System 10**	**Crude Water Tanks System 11**	**Crude Water Tanks System 12**	**Crude Water Tanks System 13**	**Crude Water Tanks System 14**	**Crude Water Tanks System 15**	**Crude Water Tanks System 16**	**Crude Water Tanks System 17**	**Crude Water Tanks System 18**	**Crude Water Tanks System 19**	**Crude Water Tanks System 20**	**Crude Water Tanks System 21**	**Crude Water Tanks System 22**
Water Sample Association	Crude	Crude	Crude	Crude	Crude	Crude	Crude	Crude	Crude Oil	Crude Oil	Crude Oil	Crude Oil	Crude Oil	Crude Oil	Crude Oil	Crude Oil	Crude Oil	Crude Oil	Crude Oil	Crude Oil	Crude Oil	Crude Oil
Date Sampled	2/1/2011	3/30/2011	3/30/2011	3/30/2011	2/10/2011	2/1/2011	2/1/2011	2/1/2011	7/19/2010	7/19/2010	6/13/2011	6/13/2011	6/14/2011	8/3/2011	8/3/2011	7/29/2011	7/29/2011	8/1/2011	8/1/2011	8/2/2011	8/2/2011	8/2/2011
Date Analyzed	3/3/2011	4/7/2011	4/7/2011	4/6/2011	3/7/2011	3/3/2011	3/3/2011	3/3/2011	7/29/2010	7/29/2010	9/14/2011	9/13/2011	9/14/2011	9/13/2011	9/13/2011	9/14/2011	9/14/2011	9/14/2011	9/13/2011	9/13/2011	9/13/2011	9/14/2011
Job Number	J11220	J11870	J11870	J11869	J11218	J11217	J11221	J11221	J04256	J04255	J14913	J14910			J14905	J14903	J14902	J14909	J14911	J14908	J14912	J14900
API Gravity of Associated Crude	**26.46**	**16.5**	**13**	**15**	**32**	**32**	**19.11**	**19.11**	**24.22**	**36.57**	**15**	**15.9**	**19.8**	**15.5**	**12.91**	**17.47**	**17.13**	**11**	**11**	**12**	**14.08**	**12**
Air District	SBAPCD	SJV	SJV	SJV	SCAQMD	SCAQMD	SCAQMD	SCAQMD	SJV	SJV	SJV	SJV	SJV	SJV	SJV	SCAQMD	SCAQMD	SJV	SJV	SJV	SCAQMD	SJV
Sample Pressure (psig)		22	30	34	100	17	142	140	60	48	40	40	27	49	45	80	90	40	50	30	8	60
Sample Temperature (deg F)	70	78	68	180	102	100	137	131	110	N/A	152	70	70	110	180	69	69	220	160	240	218	215
Gas-Water-Ratio (ft^3/bbl)	0.39	0.94	1.29	0.49	1.18	0.44	1.32	1.20	0.54	0.59	1.84	1.00	0.34	0.17	0.66	1.55	1.21	0.48	0.81	0.23	0.03	0.30
Base Conditions (Flashed to)	14.65 PSI & 60°F	14.65 PSI & 60°F	14.65 PSI & 60°F	14.65 PSI & 60°F	14.65 PSI & 60°F	14.65 PSI & 60°F	14.65 PSI & 60°F	14.65 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F
Throughput (bbl/day)	7	1,000	75	1,000	18	800	1,200	6,500	6,000	4,500	207	924	1,298	2	3,663	1,204	1,742	3,680	1,380	17,000	10,900	15,000
Chromatograph Compounds	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**
Nitrogen	8.46	0	0	0	0.269	2.34	0	0.199	7.326	6.818	0	0	0.121	0	0	0	0	0	1.029	0	0	0.542
Carbon Dioxide	46.997	88.82	91.394	84.152	24.621	15.009	47.363	42.839	44.874	23.601	92.325	88.757	54.987	31.613	86.705	63.266	65.578	81.421	84.869	80.073	77.52	78.122
Methane	16.237	8.887	6.231	6.725	45.384	26.843	41.456	50.069	31.522	11.236	5.943	7.422	28.501	62.803	10.539	27.37	29.774	12.875	5.829	12.616	8.972	20.053
Ethane	2.883	0.063	0.764	0.353	11.033	11.871	2.246	2.803	5.121	16.656	0.885	0.723	2.288	0.374	0.461	1.779	1.244	0.0823	0.313	0.348	0.437	0.576
Propane	2.809	0.032	0.025	0.142	10.434	18.557	1.713	0.997	3.003	20.854	0.396	0.105	4.92	0.079	0.079	0.916	0.727	0.983	5.057	1.203	0.253	0.295

Crude Oil Produced Water	Crude Water Tanks System 1	Crude Water Tanks System 2	Crude Water Tanks System 3	Crude Water Tanks System 4	Crude Water Tanks System 5	Crude Water Tanks System 6	Crude Water Tanks System 7	Crude Water Tanks System 8	Crude Water Tanks System 9	Crude Water Tanks System 10	Crude Water Tanks System 11	Crude Water Tanks System 12	Crude Water Tanks System 13	Crude Water Tanks System 14	Crude Water Tanks System 15	Crude Water Tanks System 16	Crude Water Tanks System 17	Crude Water Tanks System 18	Crude Water Tanks System 19	Crude Water Tanks System 20	Crude Water Tanks System 21	Crude Water Tanks System 22
Isobutane	0.591	0.008	0.012	0.055	0.946	4.345	0.964	0.396	0.509	2.763	0.086	0.027	1.526	0.052	0.009	0.299	0.178	0.008	0.01	0.035	0.045	0
n-Butane	2.249	0.023	0.039	0.19	2.952	8.565	1.683	0.547	1.407	8.227	0.134	0.062	2.286	0.087	0.005	0.684	0.367	0.263	0.056	0.156	0.089	0.286
2,2 Dimethyl propane	0.741	0.009	0.022	0.048	0.098	0	0.126	0.068	0	0.083	0	0.009	0.056	0.02	0.006	0.031	0.04	0.062	0.013	0.021	0.055	0
Isopentane	0.907	0.049	0.042	0.141	0.485	3.105	1.113	0.203	0.676	2.012	0	0.02	0.869	0.02	0.006	0.297	0.114	0.05	0.005	0.021	0.055	0
n-Pentane	1.042	0.019	0.045	0.229	0.431	2.516	0.898	0.135	0.627	1.78	0	0.006	0.666	0.02	0.006	0.193	0.032	0.05	0.013	0.086	0.027	0
2,2 Dimethyl butane	0.297	0.002	0.002	0.008	0.007	0.071	0.06	0.011	0.037	0.039	0.002	0.002	0.029	0.045	0.023	0.026	0.015	0.014	0.002	0.021	0.119	0
Cyclopentane	0.108	0.009	0.005	0.026	0.344	0.37	0.06	0.057	0.146	0.083	0.014	0.03	0.049	0.119	0.058	0.042	0.039	0.047	0.004	0.03	0.407	0
2,3 Dimethyl butane	0.454	0.007	0.013	0.074	0.014	0.079	0.063	0.026	0.05	0.374	0.004	0.02	0.052	0.04	0.041	0.088	0.036	0.019	0.004	0.016	0.066	0
2 Methylpentane	1.568	0.121	0.115	0.594	0.131	0.59	0.331	0.059	0.387	0.428	0.015	0.197	0.32	0.174	0	0.128	0.038	0.084	0.03	0.089	0.213	0
3 Methylpentane	1.293	0.182	0.171	0.832	0.124	0.375	0.204	0.059	0.365	0.328	0.011	0.309	0.259	0.15	0	0.151	0.062	0.11	0.046	0.098	0.166	0
n-Hexane	1.602	0.713	0.569	2.775	0.227	0.675	0.394	0.066	1.269	0.865	0.022	1.172	0.729	0.344	0.09	0.233	0.071	0.296	0.176	0.226	0.517	0
Methylcyclopentane	0.665	0.136	0.125	0.661	0.437	0.696	0.176	0.136	0.459	0.394	0.019	0.285	0.225	0.051	0	0.28	0.121	0.152	0.055	0.114	0	0
Benzene	0.052	0.018	0.006	0.042	0.535	0.532	0.051	0.05	0.398	1.685	0.008	0.004	0.029	0.158	0.056	0.023	0.038	0.056	0.012	0.199	0.386	0
Cyclohexane	0.44	0.145	0.139	0.821	0.208	0.476	0.241	0.093	0.544	0.258	0.019	0.391	0.264	0.04	0	0.283	0.15	0.019	0.011	0.066	1.033	0
2-Methylhexane	0.575	0.008	0.005	0.066	0.025	0.119	0.066	0.021	0.133	0.133	0.003	0.02	0.08	0.033	0	0.033	0.007	0.017	0.003	0.024	0.191	0
3-Methylhexane	0.64	0.008	0.008	0.064	0.029	0.129	0.058	0.021	0.133	0.133	0.005	0.01	0.09	0.104	0	0.063	0.014	0.031	0.005	0.03	0.2	0
2,2,4 Trimethyl pentane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other C7's	1.8	0.289	0.095	0.437	0.196	0.51	0.158	0.38	0.281	0.254	0.015	0.207	0.239	1.049	0.09	0.746	0.211	0.366	0.15	0.43	1.546	0
n-Heptane	1.105	0.01	0.01	0.14	0.041	0.228	0.085	0.03	0.18	0.215	0.005	0.008	0.141	0.071	0.038	0.023	0.003	0.019	0.02	0.214	0.144	0
Methylcyclohexane	1.072	0.023	0.015	0.326	0.134	0.44	0.194	0.075	0.127	0.149	0.012	0.025	0.197	0.203	0.071	0.321	0.084	0.079	0.067	0.428	0.842	0
Toluene	0.098	0.012	0.007	0.097	0.368	0.425	0.082	0.059	0.096	0.307	0.005	0.012	0.052	0.208	0.138	0.012	0.032	0.066	0.077	0.579	1.117	0
Other C8's	2.345	0.075	0.069	0.434	0.123	0.454	0.09	0.221	0.194	0.202	0.017	0.031	0.299	0.409	0.1	1.294	0.363	0.192	0.072	0.681	1.285	0
n-Octane	0.509	0.012	0.006	0.084	0.014	0.06	0.013	0.019	0.049	0.042	0.003	0.006	0.065	0.107	0.061	0.008	0.031	0.022	0.02	0.22	0.158	0
Ethylbenzene	0.051	0.008	0.005	0.026	0.031	0.028	0.016	0.027	0.019	0.003	0.003	0.005	0.021	0.125	0.028	0.077	0.069	0.035	0.016	0.055	0.291	0

Crude Oil Produced Water	Crude Water Tanks System 1	Crude Water Tanks System 2	Crude Water Tanks System 3	Crude Water Tanks System 4	Crude Water Tanks System 5	Crude Water Tanks System 6	Crude Water Tanks System 7	Crude Water Tanks System 8	Crude Water Tanks System 9	Crude Water Tanks System 10	Crude Water Tanks System 11	Crude Water Tanks System 12	Crude Water Tanks System 13	Crude Water Tanks System 14	Crude Water Tanks System 15	Crude Water Tanks System 16	Crude Water Tanks System 17	Crude Water Tanks System 18	Crude Water Tanks System 19	Crude Water Tanks System 20	Crude Water Tanks System 21	Crude Water Tanks System 22
M & P Xylenes	0.101	0.017	0.003	0.044	0.083	0.087	0.033	0.036	0.015	0.018	0.003	0.011	0.082	0.264	0.182	0.042	0.029	0.05	0.099	0.377	0.724	0
O-Xylene	0.027	0.006	0	0.016	0.031	0.024	0.008	0.009	0.008	0.003	0.003	0.003	0.021	0.08	0.054	0.039	0.018	0.024	0.024	0.086	0.296	0
Other C9's	1.333	0.043	0.038	0.25	0.042	0.133	0.015	0.091	0.036	0.053	0.003	0.019	0.131	0.142	0.125	0.799	0.278	0.101	0.057	0.414	0.904	0
n-Nonane	0.266	0.013	0	0.034	0.011	0.017	0.005	0.011	0.009	0.004	0	0.007	0.026	0.127	0.103	0.021	0.004	0.025	0.019	0.132	0.234	0
Other C10's	0.708	0.037	0.011	0.066	0.058	0.056	0.011	0.048	0	0	0.007	0.018	0.189	0.365	0.302	0.349	0.18	0.129	0.085	0.478	1.015	0
n-Decane	0.215	0.007	0	0.007	0.012	0.009	0	0.048	0	0	0.004	0.004	0.019	0.181	0.129	0	0.005	0.024	0.011	0.1	0.193	0
Undecanes (11)	0.03	0.012	0.008	0.024	0.038	0.064	0.024	0.091	0	0	0.008	0.004	0.172	0.327	0.039	0.083	0.042	0.071	0.026	0.02	0.432	0
Total	100.27	99.823	99.999	99.983	99.916	99.798	100	100	100	100	99.979	99.931	100	99.984	99.544	99.999	99.994	97.8423	98.285	99.686	99.932	99.874
Specific Gravity	1.241	1.333	1.383	1.421	0.841	1.056	0.894	0.814	0.965	1.235	1.381	1.365	1.037	0.737	1.297	1.052	1.009	1.252	1.38	1.282	1.408	1.126
Molecular Weight (g/g-mole)	35.71	38.42	39.85	40.9	24.26	30.37	25.8	23.49	27.84	35.47	39.79	39.34	29.9	21.28	37.4	30.32	29.11	36.08	39.74	36.92	40.49	32.48
Gas Volume Measured																						
Throughput (bbl/day)	7	1,000	75	1,000	18	800	1,200	6,500	6,000	4,500	207	924	1,298	2	3,663	1,204	1,742	3,680	1,380	17,000	10,900	15,000
Gas-Water-Ratio (ft^3/bbl)	0.39	0.94	1.29	0.49	1.18	0.44	1.32	1.2	0.54	0.59	1.84	1	0.34	0.17	0.66	1.55	1.21	0.48	0.81	0.23	0.03	0.3
Cubic Feet per Year	996	343,100	35,314	178,850	7,753	128,480	578,160	2,847,000	1,182,600	969,075	139,021	337,260	161,082	124	882,417	681,163	769,354	644,736	407,997	1,427,150	119,355	1,642,500
Vapor Recovery System	??	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Convert Volume to Tons																						
MW Sample Gas (g/g-mole)	35.71	38.42	39.85	40.90	24.26	30.37	25.80	23.49	27.84	35.47	39.79	39.34	29.90	21.28	37.40	30.32	29.11	36.08	39.74	36.92	40.49	32.48
Cubic Feet Year	996	343,100	35,314	178,850	7,753	128,480	578,160	2,847,000	1,182,600	969,075	139,021	337,260	161,082	124	882,417	681,163	769,354	644,736	407,997	1,427,150	119,355	1,642,500
Cm^3 per Ft^3	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317
Base Condition	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-	4.221 19E-

Crude Oil Produced Water	Crude Water Tanks System 1	Crude Water Tanks System 2	Crude Water Tanks System 3	Crude Water Tanks System 4	Crude Water Tanks System 5	Crude Water Tanks System 6	Crude Water Tanks System 7	Crude Water Tanks System 8	Crude Water Tanks System 9	Crude Water Tanks System 10	Crude Water Tanks System 11	Crude Water Tanks System 12	Crude Water Tanks System 13	Crude Water Tanks System 14	Crude Water Tanks System 15	Crude Water Tanks System 16	Crude Water Tanks System 17	Crude Water Tanks System 18	Crude Water Tanks System 19	Crude Water Tanks System 20	Crude Water Tanks System 21	Crude Water Tanks System 22
Constant (g-mole/cm^3)	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05	05
Convert grams to pounds	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3	0.00220264 3
Convert pounds to tons	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050
Tons/Year (total sample)	0.04684267 6	17.3529937 4	1.85254384 5	9.62960746 2	0.24759080 1	5.13661069 2	19.6364998 8	88.0373204 1	43.3414500 5	45.2496172 4	7.28201054 7	17.4660831 3	6.34036111 6	0.00347648	43.4451851 5	27.1879572 3	29.4825417 7	30.6227917 5	21.3442630 3	69.3629644 4	6.36186904 9	70.2292014 7
MT/Year (total sample)	0.04249496	15.7423711 2	1.68059950 6	8.73583294 2	0.22461059 6	4.65985483 5	17.8139330 4	79.8661136 3	39.3187020 9	41.0497622 5	6.60612884 5	15.8449640 8	5.75187885	0.00315381	39.412809	24.6644999 1	26.7461119 9	27.7805293 7	19.3631897	62.9250228 6	5.77139051 9	63.7108598 8
Emissions Calculations																						
Sample Pressure (psig)	0	22	30	34	100	17	142	140	60	48	40	40	27	49	45	80	90	40	50	30	8	60
Gas-Water-Ratio (ft^3/bbl)	0.39	0.94	1.29	0.49	1.18	0.44	1.32	1.2	0.54	0.59	1.84	1	0.34	0.17	0.66	1.55	1.21	0.48	0.81	0.23	0.03	0.3
Methane																						
WT% CH4	16.237	8.887	6.231	6.725	45.384	26.843	41.456	50.069	31.522	11.236	5.943	7.422	28.501	62.803	10.539	27.37	29.774	12.875	5.829	12.616	8.972	20.053
WT Fraction CH4	0.16237	0.08887	0.06231	0.06725	0.45384	0.26843	0.41456	0.50069	0.31522	0.11236	0.05943	0.07422	0.28501	0.62803	0.10539	0.2737	0.29774	0.12875	0.05829	0.12616	0.08972	0.20053
MT/Year CO2e (uncontrolled)	0.145	29.380	2.199	12.337	2.141	26.268	155.084	839.751	260.275	96.859	8.245	24.696	34.426	0.042	87.228	141.764	167.231	75.112	23.702	166.711	10.874	268.295
MT/Barrel (uncontrolled)	0.00006	0.00008	0.00008	0.00003	0.00033	0.00009	0.00035	0.00035	0.00012	0.00006	0.00011	0.00007	0.00007	0.00006	0.00007	0.00032	0.00026	0.00006	0.00005	0.00003	0.00000	0.00005
MT/Year CO2e (controlled 95%)	0.007	1.469	0.110	0.617	0.107	1.313	7.754	41.988	13.014	4.843	0.412	1.235	1.721	0.002	4.361	7.088	8.362	3.756	1.185	8.336	0.544	13.415
MT/Barrel (controlled 95%)	0.00000	0.00000	0.00000	0.00000	0.00002	0.00000	0.00002	0.00002	0.00001	0.00000	0.00001	0.00000	0.00000	0.00000	0.00000	0.00002	0.00001	0.00000	0.00000	0.00000	0.00000	0.00000
Carbon Dioxide																						
WT%	46.99	88.82	91.39	84.15	24.62	15.00	47.36	42.83	44.87	23.60	92.32	88.75	54.98	31.61	86.70	63.26	65.57	81.42	84.86	80.07	77.52	78.12

Crude Oil Produced Water	Crude Water Tanks System 1	Crude Water Tanks System 2	Crude Water Tanks System 3	Crude Water Tanks System 4	Crude Water Tanks System 5	Crude Water Tanks System 6	Crude Water Tanks System 7	Crude Water Tanks System 8	Crude Water Tanks System 9	Crude Water Tanks System 10	Crude Water Tanks System 11	Crude Water Tanks System 12	Crude Water Tanks System 13	Crude Water Tanks System 14	Crude Water Tanks System 15	Crude Water Tanks System 16	Crude Water Tanks System 17	Crude Water Tanks System 18	Crude Water Tanks System 19	Crude Water Tanks System 20	Crude Water Tanks System 21	Crude Water Tanks System 22
CO2	7		4	2	1	9	3	9	4	1	5	7	7	3	5	6	8	1	9	3		2
WT Fraction CO2	0.46997	0.8882	0.91394	0.84152	0.24621	0.15009	0.47363	0.42839	0.44874	0.23601	0.92325	0.88757	0.54987	0.31613	0.86705	0.63266	0.65578	0.81421	0.84869	0.80073	0.7752	0.78122
MT/Year CO2 (uncontrolled)	0.020	13.982	1.536	7.351	0.055	0.699	8.437	34.214	17.644	9.688	6.099	14.064	3.163	0.001	34.173	15.604	17.540	22.619	16.433	50.386	4.474	49.772
MT/Barrel (uncontrolled)	0.00000782	0.00003831	0.00005611	0.00002014	0.00000842	0.00000240	0.00001926	0.00001442	0.00000806	0.00000590	0.00008072	0.00004170	0.00000668	0.00000137	0.00002556	0.00003551	0.00002759	0.00001684	0.00003263	0.00000812	0.00000112	0.00000909
MT/Year CO2e (controlled 95%)	0.001	0.699	0.077	0.368	0.003	0.035	0.422	1.711	0.882	0.484	0.305	0.703	0.158	0.000	1.709	0.780	0.877	1.131	0.822	2.519	0.224	2.489
MT/Barrel (controlled 95%)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
MTCO2e/ Barrel Uncontrolled	**0.0001**	**0.0001**	**0.0001**	**0.0001**	**0.0003**	**0.0001**	**0.0004**	**0.0004**	**0.0001**	**0.0001**	**0.0002**	**0.0001**	**0.0001**	**0.0001**	**0.0001**	**0.0004**	**0.0003**	**0.0001**	**0.0001**	**0.0000**	**0.0000**	**0.0001**
MTCO2e/ Barrel Controlled 95%	**0.00000**	**0.00001**	**0.00001**	**0.00000**	**0.00002**	**0.00000**	**0.00002**	**0.00002**	**0.00001**	**0.00000**	**0.00001**	**0.00001**	**0.00000**	**0.00000**	**0.00000**	**0.00002**	**0.00001**	**0.00000**	**0.00000**	**0.00000**	**0.00000**	**0.00000**
VOCs Measured																						
WT% C3-C9	24.474	1.984	1.591	8.622	18.49	43.589	8.895	3.892	11.148	41.685	0.807	2.996	13.697	4.194	1.266	7.131	3.167	3.215	6.104	5.919	11.129	0.581
WT Fraction C3-C9	0.24474	0.01984	0.01591	0.08622	0.1849	0.43589	0.08895	0.03892	0.11148	0.41685	0.00807	0.02996	0.13697	0.04194	0.01266	0.07131	0.03167	0.03215	0.06104	0.05919	0.11129	0.00581
Tons/Year C3-C9 (uncontrolled)	0.011	0.344	0.029	0.830	0.046	2.239	1.747	3.426	4.832	18.862	0.059	0.523	0.868	0.000	0.550	1.939	0.934	0.985	1.303	4.106	0.708	0.408
Tons VOC/BBL Uncontrolled	0.000004	0.000001	0.000001	0.000002	0.000007	0.000008	0.000004	0.000001	0.000002	0.000011	0.000001	0.000002	0.000002	0.000000	0.000000	0.000004	0.000001	0.000001	0.000003	0.000001	0.000000	0.000000
Tons/Year (controlled)	0.001	0.017	0.001	0.042	0.002	0.112	0.087	0.171	0.242	0.943	0.003	0.026	0.043	0.000	0.028	0.097	0.047	0.049	0.065	0.205	0.035	0.020
Tons VOC/BBL Controlled	0.00000002	0.00000000	0.00000001	0.00000001	0.00000003	0.00000004	0.00000002	0.00000001	0.00000001	0.00000001	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000	0.00000000

Crude Oil Produced Water	Crude Water Tanks System 1	Crude Water Tanks System 2	Crude Water Tanks System 3	Crude Water Tanks System 4	Crude Water Tanks System 5	Crude Water Tanks System 6	Crude Water Tanks System 7	Crude Water Tanks System 8	Crude Water Tanks System 9	Crude Water Tanks System 10	Crude Water Tanks System 11	Crude Water Tanks System 12	Crude Water Tanks System 13	Crude Water Tanks System 14	Crude Water Tanks System 15	Crude Water Tanks System 16	Crude Water Tanks System 17	Crude Water Tanks System 18	Crude Water Tanks System 19	Crude Water Tanks System 20	Crude Water Tanks System 21	Crude Water Tanks System 22

Table D-13: ARB Fullerton DG Water Data

Dry Gas Produced Water	**Dry Gas Water Tanks System 23**	**Dry Gas Water Tanks System 24**	**Dry Gas Water Tanks System 25**	**Dry Gas Water Tanks System 26**	**Dry Gas Water Tanks System 27**	**Dry Gas Water Tanks System 28**	**Dry Gas Water Tanks System 29**	**Dry Gas Water Tanks System 30**	**Dry Gas Water Tanks System 31**	**Dry Gas Water Tanks System 32**	**Dry Gas Water Tanks System 33**	**Dry Gas Water Tanks System 34**	**Dry Gas Water Tanks System 35**	**Dry Gas Water Tanks System 36**	**Dry Gas Water Tanks System 37**	**Dry Gas Water Tanks System 38**	**Dry Gas Water Tanks System 39**
Water Sample Association	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas	Natural Gas
Date Sampled	8/9/2010	8/9/2010	8/9/2010	8/9/2010	8/9/2010	8/9/2010	11/11/2010	11/11/2010	11/11/2010	11/11/2010	11/11/2010	11/11/2010	8/10/2010	8/10/2010	8/10/2010	3/30/2011	3/30/2011
Date Analyzed	8/24/2010	8/24/2010	8/24/2010	8/25/2010	8/25/2010	8/25/2010	11/22/2010	11/22/2010	11/22/2010	11/22/2010	11/22/2010	11/22/2010	8/24/2010	8/24/2010	8/24/2010	4/8/2011	4/8/2011
Job Number	J04537.501	J04537.401	J04537.001	J04537.201	J04537.301	J04537.101	JO6156	JO6152	JO6154	JO6155	JO6157	J06153	J04538.201	J04538.001	J04538.501	J11871	J11871
Sample Pressure (psig)	29	117	108	120	185	117	820	805	822	810	820	800	39	65	780	1450	1450
Sample Temperature (deg F)	82	90	81	84	80	82	62	66	75	70	90	62	79	63	90	93	93
Gas-Water-Ratio (ft^3/bbl)	0.35	1.33	0.87	1.14	1.93	1.41	5.4	6.5	5.2	6.4	6.5	3.6	0.53	1.25	8.46	5.93	8.68
Base Conditions (Flashed to)	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.73 PSI & 60°F	14.65 PSI & 60°F	14.65 PSI & 60°F
Throughput (bbl/day)	41	5	8	14	20	6	1	4	24	1	27	7	5	90	16	1	1
Chromatograph Compounds	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**	**Wt %**
Nitrogen	0	12.239	0	3.447	0.827	8.282	4.42	1.216	0.606	3.759	0.21	5.399	0.181	4.56	0.672	0.397	0.786
Carbon Dioxide	11.844	5.5	5.863	5.28	3.408	4.519	2.652	1.266	1.815	1.633	0.859	1.712	28.4	11.9	4.493	26.42	30.182
Methane	80.768	69.614	84.658	84.721	92.617	84.846	92.309	97.064	97.065	94.048	98.489	91.965	46.024	61.623	54.194	65.628	64.48
Ethane	1.08	1.734	0.906	1.035	0.578	0.325	0.348	0.265	0.212	0.365	0.169	0.472	5.91	4.591	8.805	5.597	2.697
Propane	0.648	0.435	0.237	0.211	0.152	0	0.018	0.013	0.009	0.02	0.003	0.087	3.014	2.168	9.552	1.054	0.263
Isobutane	0.564	0.118	0.129	0.085	0.052	0	0.008	0.004	0.003	0.004	0.001	0.021	0.691	0.556	3.298	0.072	0.031
n-Butane	0.555	0.201	0.196	0.186	0.155	0	0.008	0.003	0.016	0.009	0.008	0.032	1.256	0.918	5.11	0.046	0.059
2,2 Dimethylpropane	0	0	0.124	0	0.06	0	0.002	0	0.02	0.005	0.005	0	0.08	0.013	0.115	0.007	0.024
Isopentane	0.509	0.264	0.152	0.065	0.09	0	0.005	0.011	0.007	0.007	0.003	0.03	0.62	0.526	2.283	0.014	0.035
n-Pentane	0.665	0.165	0.02	0	0.107	0	0.007	0.003	0.009	0.009	0.001	0.019	0.388	0.496	1.827	0.014	0.045

Dry Gas Produced Water	Dry Gas Water Tanks System 23	Dry Gas Water Tanks System 24	Dry Gas Water Tanks System 25	Dry Gas Water Tanks System 26	Dry Gas Water Tanks System 27	Dry Gas Water Tanks System 28	Dry Gas Water Tanks System 29	Dry Gas Water Tanks System 30	Dry Gas Water Tanks System 31	Dry Gas Water Tanks System 32	Dry Gas Water Tanks System 33	Dry Gas Water Tanks System 34	Dry Gas Water Tanks System 35	Dry Gas Water Tanks System 36	Dry Gas Water Tanks System 37	Dry Gas Water Tanks System 38	Dry Gas Water Tanks System 39
2,2 Dimethylbutane	0	0.004	0.024	0.01	0.005	0	0.001	0	0.001	0.004	0	0.001	0.024	0.032	0.086	0	0.004
Cyclopentane	0.011	0.043	0.039	0.035	0.021	0.004	0.004	0.002	0.001	0.001	0	0.009	0.17	0.156	0	0.014	0.003
2,3 Dimethylbutane	0.023	0.105	0.043	0.029	0.01	0.025	0.001	0.001	0.001	0.001	0.001	0.002	0.034	0.052	0.413	0.004	0.008
2 Methylpentane	0.178	0.838	0.272	0.223	0.066	0.177	0.006	0.004	0.008	0.006	0.006	0.011	0.295	0.332	0.555	0.051	0.092
3 Methylpentane	0.271	1.176	0.363	0.296	0.066	0.237	0.004	0.004	0.009	0.005	0.008	0.005	0.267	0.296	0.343	0.085	0.138
n-Hexane	0.771	3.329	1.245	0.998	0.174	0.582	0.011	0.009	0.028	0.02	0.026	0.011	0.727	0.705	0.67	0.293	0.451
Methylcyclopentane	0.26	0.994	0.471	0.383	0.115	0.154	0.015	0.012	0.015	0.007	0.006	0.033	0.566	0.77	1.109	0.07	0.106
Benzene	0.106	0.696	0.835	0.237	0.116	0.045	0.011	0.012	0.004	0.002	0.003	0.022	2.278	0.849	0.743	0.012	0.011
Cyclohexane	0	0.715	0.433	0.393	0.11	0.01	0.003	0.001	0.01	0.006	0.001	0.007	0.753	0.856	1.076	0.091	0.122
2-Methylhexane	0.016	0.036	0.05	0.045	0.018	0.006	0.002	0.001	0.002	0.002	0	0.002	0.108	0.144	0.147	0.005	0.01
3-Methylhexane	0.016	0.031	0.05	0.051	0.018	0.006	0.003	0.001	0.002	0.001	0	0.003	0.112	0.158	0.147	0.005	0.01
2,2,4 Trimethylpentane	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other C7's	0.339	0.283	0.242	0.223	0.106	0.176	0.023	0.019	0.017	0.008	0.008	0.04	0.347	0.737	0.72	0.068	0.337
n-Heptane	0.038	0.061	0.111	0.096	0.048	0.017	0.007	0.004	0.007	0.004	0.001	0.007	0.231	0.358	0.299	0.005	0.01
Methylcyclohexane	0.085	0.185	0.321	0.282	0.175	0.062	0.02	0.012	0.003	0.004	0.002	0.021	0.82	1.546	1.252	0.01	0.014
Toluene	0.27	0.324	0.811	0.389	0.24	0.1	0.022	0.01	0.008	0.004	0.005	0.008	3.516	1.52	0.773	0.014	0.013
Other C8's	0.096	0.252	0.421	0.322	0.183	0.076	0.028	0.026	0.038	0.019	0.003	0.041	0.632	1.408	0.681	0.016	0.032
n-Octane	0.043	0.058	0.095	0.071	0.034	0.013	0.004	0.002	0.005	0.002	0.002	0.003	0.123	0.276	0.099	0	0.006
Ethylbenzene	0.029	0.032	0.094	0.042	0.025	0.012	0.003	0.003	0.003	0.002	0.001	0.003	0.177	0.113	0.028	0	0
M & P Xylenes	0.196	0.13	0.459	0.203	0.101	0.067	0.01	0.004	0.005	0.002	0.005	0.003	1.039	0.523	0.138	0.005	0.005
O-Xylene	0.052	0.032	0.106	0.054	0.025	0.018	0.003	0.001	0.002	0.001	0.002	0.001	0.237	0.109	0.028	0	0
Other C9's	0.068	0.206	0.336	0.284	0.12	0.043	0.014	0.016	0.023	0.02	0.007	0.021	0.311	0.886	0.229	0	0.006
n-Nonane	0.056	0.046	0.121	0.058	0.023	0.015	0.002	0.001	0.004	0.001	0.006	0.001	0.077	0.149	0.022	0	0
Other C10's	0.268	0.101	0.438	0.151	0.092	0.081	0.009	0.008	0.014	0.013	0.035	0.007	0.365	0.519	0.067	0	0

Dry Gas Produced Water	Dry Gas Water Tanks System 23	Dry Gas Water Tanks System 24	Dry Gas Water Tanks System 25	Dry Gas Water Tanks System 26	Dry Gas Water Tanks System 27	Dry Gas Water Tanks System 28	Dry Gas Water Tanks System 29	Dry Gas Water Tanks System 30	Dry Gas Water Tanks System 31	Dry Gas Water Tanks System 32	Dry Gas Water Tanks System 33	Dry Gas Water Tanks System 34	Dry Gas Water Tanks System 35	Dry Gas Water Tanks System 36	Dry Gas Water Tanks System 37	Dry Gas Water Tanks System 38	Dry Gas Water Tanks System 39
n-Decane	0.039	0.022	0.055	0.032	0.008	0.008	0.001	0.001	0.002	0.001	0.034	0	0.028	0.04	0.006	0	0
Undecanes (11)	0.136	0.031	0.28	0.063	0.055	0.094	0.016	0.001	0.026	0.005	0.09	0.001	0.199	0.113	0.02	0	0
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	99.998	100	99.997	99.98
Specific Gravity	0.638	0.68	0.625	0.616	0.583	0.605	0.608	0.579	0.585	0.593	0.575	0.606	0.872	0.746	0.802	0.703	0.714
Molecular Weight (g/g-mole)	18.43	19.64	18.06	17.79	16.86	17.48	17.58	16.73	16.9	17.15	16.62	17.52	25.13	21.52	23.14	20.3	20.63
Gas Volume Measured																	
Throughput (bbl/day)	41	5	8	14	20	6	1	4	24	1	27	7	5	90	16	1	1
Gas-Water-Ratio (ft^3/bbl)	0.35	1.33	0.87	1.14	1.93	1.41	5.4	6.5	5.2	6.4	6.5	3.6	0.53	1.25	8.46	5.93	8.68
Cubic Feet per Year	5,238	2,427	2,540	5,825	14,089	3,088	1,971	9,490	45,552	2,336	64,058	9,198	967	41,063	49,406	2,164	3,168
Vapor Recovery System	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Convert Volume to Tons																	
MW Sample Gas (g/g-mole)	18.43	19.64	18.06	17.79	16.86	17.48	17.58	16.73	16.90	17.15	16.62	17.52	25.13	21.52	23.14	20.30	20.63
Cubic Feet Year	5,238	2,427	2,540	5,825	14,089	3,088	1,971	9,490	45,552	2,336	64,058	9,198	967	41,063	49,406	2,164	3,168
Cm^3 per Ft^3	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317	28317
Base Condition Constant (g-mole/cm^3)	4.22119 E-05	4.22119 E-05	4.22119 E-05	4.22119 E-05	4.22119 E-05	4.22119 E-05	4.22119 E-05	4.22119 E-05	4.22119 E-05	4.22119 E-05	4.22119 E-05	4.22119 E-05	4.22119 E-05	4.22119 E-05	4.22119 E-05	4.22119 E-05	4.22119 E-05
Convert grams to pounds	0.00220 2643	0.00220 2643	0.00220 2643	0.00220 2643	0.00220 2643	0.00220 2643	0.00220 2643	0.00220 2643	0.00220 2643	0.00220 2643	0.00220 2643	0.00220 2643	0.00220 2643	0.00220 2643	0.00220 2643	0.00220 2643	0.00220 2643
Convert pounds to tons	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050	0.00050
Tons/Year (total sample)	0.12707 6847	0.06275 5577	0.06039 7113	0.13642 6278	0.31270 4457	0.07105 6038	0.04561 4385	0.20900 5871	1.01342 2369	0.05273 917	1.40151 3664	0.21214 0622	0.03199 8348	1.16327 9261	1.50502 2166	0.05784 1551	0.08604 1535
MT/Year (total	0.11528 2177	0.05693 0902	0.05479 1339	0.12376 3838	0.28368 0711	0.06446 0953	0.04138 0674	0.18960 6936	0.91936 1308	0.04784 4171	1.27143 1809	0.19245 0735	0.02902 8413	1.05530 9194	1.36533 3143	0.05247 2972	0.07805 5567

Dry Gas Produced Water	Dry Gas Water Tanks System 23	Dry Gas Water Tanks System 24	Dry Gas Water Tanks System 25	Dry Gas Water Tanks System 26	Dry Gas Water Tanks System 27	Dry Gas Water Tanks System 28	Dry Gas Water Tanks System 29	Dry Gas Water Tanks System 30	Dry Gas Water Tanks System 31	Dry Gas Water Tanks System 32	Dry Gas Water Tanks System 33	Dry Gas Water Tanks System 34	Dry Gas Water Tanks System 35	Dry Gas Water Tanks System 36	Dry Gas Water Tanks System 37	Dry Gas Water Tanks System 38	Dry Gas Water Tanks System 39
sample)																	
Emissions Calculations																	
Sample Pressure (psi)	29	117	108	120	185	117	820	805	822	810	820	800	39	65	780	1450	1450
Gas Water Ratio	0.35	1.33	0.87	1.14	1.93	1.41	5.4	6.5	5.2	6.4	6.5	3.6	0.53	1.25	8.46	5.93	8.68
Methane																	
WT% CH4	80.768	69.614	84.658	84.721	92.617	84.846	92.309	97.064	97.065	94.048	98.489	91.965	46.024	61.623	54.194	65.628	64.48
WT Fraction CH4	0.80768	0.69614	0.84658	0.84721	0.92617	0.84846	0.92309	0.97064	0.97065	0.94048	0.98489	0.91965	0.46024	0.61623	0.54194	0.65628	0.6448
MT/Year CO2e (uncontrolled)	1.955	0.832	0.974	2.202	5.517	1.149	0.802	3.865	18.740	0.945	26.297	3.717	0.281	13.657	15.539	0.723	1.057
MT/Barrel (uncontrolled)	0.00013	0.00046	0.00033	0.00043	0.00076	0.00052	0.00220	0.00265	0.00214	0.00259	0.00267	0.00145	0.00015	0.00042	0.00266	0.00198	0.00290
MT/Year CO2e (controlled 95%)	0.098	0.042	0.049	0.110	0.276	0.057	0.040	0.193	0.937	0.047	1.315	0.186	0.014	0.683	0.777	0.036	0.053
MT/Barrel (controlled 95%)	0.00001	0.00002	0.00002	0.00002	0.00004	0.00003	0.00011	0.00013	0.00011	0.00013	0.00013	0.00007	0.00001	0.00002	0.00013	0.00010	0.00014
Carbon Dioxide																	
WT% CO2	11.844	5.5	5.863	5.28	3.408	4.519	2.652	1.266	1.815	1.633	0.859	1.712	28.4	11.9	4.493	26.42	30.182
WT Fraction CO2	0.11844	0.055	0.05863	0.0528	0.03408	0.04519	0.02652	0.01266	0.01815	0.01633	0.00859	0.01712	0.284	0.119	0.04493	0.2642	0.30182
MT/Year CO2 (uncontrolled)	0.014	0.003	0.003	0.007	0.010	0.003	0.001	0.002	0.017	0.001	0.011	0.003	0.008	0.126	0.061	0.014	0.024
MT/Barrel (uncontrolled)	0.00000091	0.00000172	0.00000110	0.00000128	0.00000132	0.00000133	0.00000301	0.00000164	0.00000190	0.00000214	0.00000111	0.00000129	0.00000452	0.00000382	0.00001050	0.00003798	0.00006454
MT/Year CO2e (controlled 95%)	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.000	0.000	0.006	0.003	0.001	0.001
MT/Barrel (controlled 95%)	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

Dry Gas Produced Water	Dry Gas Water Tanks System 23	Dry Gas Water Tanks System 24	Dry Gas Water Tanks System 25	Dry Gas Water Tanks System 26	Dry Gas Water Tanks System 27	Dry Gas Water Tanks System 28	Dry Gas Water Tanks System 29	Dry Gas Water Tanks System 30	Dry Gas Water Tanks System 31	Dry Gas Water Tanks System 32	Dry Gas Water Tanks System 33	Dry Gas Water Tanks System 34	Dry Gas Water Tanks System 35	Dry Gas Water Tanks System 36	Dry Gas Water Tanks System 37	Dry Gas Water Tanks System 38	Dry Gas Water Tanks System 39
MTCO2e/Barrel Uncontrolled	**0.00013**	**0.00046**	**0.00033**	**0.00043**	**0.00076**	**0.00053**	**0.00220**	**0.00265**	**0.00214**	**0.00259**	**0.00267**	**0.00146**	**0.00016**	**0.00042**	**0.00267**	**0.00202**	**0.00296**
MTCO2e/Barrel Controlled 95%	**0.00001**	**0.00002**	**0.00002**	**0.00002**	**0.00004**	**0.00003**	**0.00011**	**0.00013**	**0.00011**	**0.00013**	**0.00013**	**0.00007**	**0.00001**	**0.00002**	**0.00013**	**0.00010**	**0.00015**
VOCs Measured																	
WT% C3-C9	5.809	10.713	7.679	5.213	2.392	1.83	0.243	0.178	0.256	0.175	0.108	0.443	18.816	16.503	31.721	1.955	1.835
WT Fraction C3-C9	0.05809	0.10713	0.07679	0.05213	0.02392	0.0183	0.00243	0.00178	0.00256	0.00175	0.00108	0.00443	0.18816	0.16503	0.31721	0.01955	0.01835
Tons/Year (uncontrolled)	0.007	0.007	0.005	0.007	0.007	0.001	0.000	0.000	0.003	0.000	0.002	0.001	0.006	0.192	0.477	0.001	0.002
Tons VOC/Barrel Uncontrolled	0.0000004933	0.0000036838	0.0000015883	0.0000013918	0.0000010246	0.0000005938	0.0000003037	0.0000002548	0.0000002962	0.0000002529	0.0000001536	0.0000003678	0.0000032991	0.0000058440	0.0000817480	0.0000030981	0.0000043256
Tons/Year (controlled)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.024	0.000	0.000
Tons VOC/Barrel Controlled	0.0000000247	0.0000001842	0.0000000794	0.0000000696	0.0000000512	0.0000000297	0.0000000152	0.0000000127	0.0000000148	0.0000000126	0.0000000077	0.0000000184	0.0000001650	0.0000002922	0.0000040874	0.0000001549	0.0000002163

Table D-14: WSPA Dataset #1 Crude Oil Flash Samples

	Crude Oil Flash Sample									
Tank Farm	**2014 Crude Throughput (bbl)**	**Reid Vapor Pressure (psia)**	**Crude Oil API Gravity**	**Flash Gas MW (g/g-mole)**	**GOR (scf/bbl)**	**Methane (Wt%)**	**CO2 (Wt%)**	**VOC [C3-C10] (Wt%)**	**VOC [C10+] (Wt%)**	**BTEX (Wt%)**
Tank Farm 1	2,260,581	2.1	17	33.08	2.715	24.92	15.08	59.99	0.01	0
Tank Farm 2	1,249,560	0.6	17	31.43	1.123	27.71	30.55	41.7	0	0.04
Tank Farm 3	9,414,322	1.7	18	23.55	7.069	51.57	12.51	35.92	0	0
Tank Farm 4	230,900	5.1	31.2	34.17	14.471	19.21	0.25	80.53	0	0.01
Tank Farm 5	69,133	1.8	21.2	27.22	4.442	40.62	5.15	54.23	0	0
Tank Farm 6	197,040	4.2	33.2	43.55	6.398	7.86	7.87	84.27	0	0
Tank Farm 7	100,103	1	32.8	28.17	10.768	21.54	0.69	77.76	0	0.01
Tank Farm 8	48,779	1.6	29.6	25.44	6.37	32.4	9.51	58.09	0	0
Tank Farm 9	6,198	0.6	21.8	22.71	2.28	44.13	2.78	53.09	0	0
Tank Farm 10	2,429,842	0.1	11.8	25.03	1.931	42.88	53.92	3.2	0	0
Tank Farm 11	8,747	1.8	20.8	43.78	0.853	11.56	26.1	62.34	0	0
Tank Farm 12	292,695	0.7	13.1	28.53	2.231	31.27	63.26	5.47	0	0
Tank Farm 13	7,835	2.4	24.8	31.92	10.891	18.03	25.32	56.65	0	0
Tank Farm 14	73,541	8.6	34.6	44.75	16.059	5.4	0.29	94.31	0	0
Tank Farm 15	14,743	2.9	33.2	35.69	10.801	17.77	0.25	81.97	0	0.01
Tank Farm 16	924,983	6.5	25.8	38.65	8.516	14.66	0.3	85.04	0	0
Tank Farm 17	176,209	2.7	28.2	34.39	11.131	18.8	6.52	74.68	0	0
Tank Farm 18	45,395	3.7	20.6	43.22	3.196	5.56	0.48	93.94	0	0.02
Tank Farm 19	54,139	2.6	26.1	26.28	16.448	39.24	16.46	44.3	0	0
Tank Farm 20	33,174	2.6	26.5	32.46	8.885	26.69	7.38	65.91	0	0.02
Tank Farm 21	57,643	0.4	16.4	33.15	1.948	20.54	58.92	20.54	0	0
Tank Farm 22	2,517	2.3	24.6	26.26	12.098	35.6	36.05	28.35	0	0

Table D-15: WSPA Dataset #1 Produced Water Flash Sample

	Produced Water Flash Sample							
Tank Farm	2014 Water Throughput (bbl)	Flash Gas MW (g/g-mole)	GWR (scf/bbl)	Methane (Wt%)	CO2 (Wt%)	VOC [C3-C10] (Wt%)	VOC [C10+] (Wt%)	BTEX (Wt%)
Tank Farm 1	109,398,086	34.26	0.908	16.34	83.66	0	0	0
Tank Farm 2	37,974,800	35.5	0.558	13.74	86.25	0.01	0	0
Tank Farm 3	71,407,306	25.12	0.864	43.15	56.83	0.02	0	0
Tank Farm 4	738,682	19.89	0.378	70.81	24.75	4.44	0	0
Tank Farm 5	187,980	31.06	0.918	23.99	75.81	0.2	0	0
Tank Farm 6	1,302,932	42.75	1.075	1.94	95.28	2.78	0	0
Tank Farm 7	453,483	20.5	0.333	65.94	33.45	0.61	0	0
Tank Farm 8	32,724	19.69	1.159	72.04	21.28	6.67	0.01	0
Tank Farm 9	5,279	22.45	2.085	56.29	38.35	5.36	0	0
Tank Farm 10	31,928,149	38.26	1.103	8.42	90.07	1.51	0	0
Tank Farm 11	71,289	41.95	0.492	3.02	96.27	0.71	0	0
Tank Farm 12	3,166,001	40.14	1.197	5.7	93.67	0.63	0	0
Tank Farm 13	90,549	38.25	1.532	8.84	89.14	2.02	0	0
Tank Farm 14	555,341	44.37	0.103	10.72	14.56	74.72	0	0
Tank Farm 15	25,821	21.52	0.898	60.13	39.14	0.73	0	0
Tank Farm 16	1,288,097	21.68	0.144	60.07	30.51	9.42	0	0
Tank Farm 17	6,480,307	37.54	0.991	12.22	79.49	8.29	0	0
Tank Farm 18	461,705	44.01	0.315	0	99.96	0.04	0	0
Tank Farm 19	1,037,544	25.38	1.139	42.01	46.72	11.27	0	0
Tank Farm 20	1,215,654	32.91	1.102	19.48	80.07	0.45	0	0
Tank Farm 21	22,713	32.3	1.061	20.81	79.12	0.07	0	0
Tank Farm 22	78,514	34.99	2.246	14.83	85.04	0.13	0	0

Table D-16: WSPA Crude Dataset #2

	Crude Oil Flash Sample									
Tank Farm	2014 Crude Throughput (bbl)	Reid Vapor Pressure (psia)	Crude Oil API Gravity	Flash Gas MW (g/g-mole)	GOR (scf/bbl)	Methane (Wt%)	CO2 (Wt%)	VOC [C3-C10] (Wt%)	VOC [C10+] (Wt%)	BTEX (Wt%)
Tank Farm 1	1,225,438	3.7	26.3	31.42	11.824	24.45	34.71	30.86	0	0.01
Tank Farm 10	788,450	0.2	10.8	18.67	3.063	77.05	19.7	0.12	0	0
Tank Farm 101	1,030,740	0.9	16.8	18.9746	1.852581	76.81431	15.82913	6.377339	0	0
Tank Farm 103	3,246	0.4	15.2	20.375	1.963078	51.49176	2.418754	0.012539	0	0
Tank Farm 105	5,946	0.3	13.2	16.92876	331.2604	88.01012	0.501345	0	0	0
Tank Farm 106	5,991	0.3	15	16.69867	1.248221	94.22659	4.32881	1.444604	0	0
Tank Farm 107	10,159	1.1	16.5	20.83107	2.017638	59.2504	6.865083	14.57106	0	0
Tank Farm 108	37,985	5.3	35.3	31.87611	15.63251	22.89939	0	60.00559	0.000694	0.023967
Tank Farm 109	272	1.5	20.2	21.65979	15.82216	56.13387	10.81279	16.24968	0	0
Tank Farm 11	334,663	0.6	10.7	20.67	0.857	61.1	20.81	3.61	0	0
Tank Farm 110	45,395	3.7	20.6	43.21828	3.195757	5.559086	0.475081	82.67105	0	0.018662
Tank Farm 111	392,686	0.65	15.4	18.42371	3.498334	76.45615	9.91468	2.639746	0	0
Tank Farm 112	18,726	1	20.7	22.50258	9.316953	53.72506	22.46505	13.57988	0.001242	0
Tank Farm 113	4,879	8	37.5	33.71681	42.09923	16.13935	0.153939	60.33903	0.000878	0.015472
Tank Farm 114	73,541	8.6	34.6	44.75252	16.05923	5.402023	0.294284	84.41408	0.001111	0.003407
Tank Farm 115	31,864	2.7	32.5	47.00499	7.423727	4.882739	16.74217	73.6173	0	0
Tank Farm 116	98,376	6	29.1	40.77252	29.53785	7.571031	6.333711	69.99259	0	0
Tank Farm 117	98,376	5.4	30.9	43.15119	63.38001	3.836978	9.468192	71.11549	0	0
Tank Farm 118	197,040	4.2	33.2	43.5546	6.397833	7.864757	7.865012	74.75683	0	0
Tank Farm 119	14,976	5.4	36.2	48.17265	19.06956	3.061039	0.68618	84.86298	0	0
Tank Farm 120	43,215	4.8	28.6	44.81802	9.286603	6.589311	0.341968	84.28561	0	0
Tank Farm 121	13,098	3.7	22	47.53639	2.786334	5.54786	0	88.19923	0	0.010518
Tank Farm 125	197,040	3.4	30	37.54187	28.70456	11.84967	9.403102	62.70886	0	0
Tank Farm 126	446,056	5.3	21	34.61139	4.196467	20.20899	0.872949	68.72063	0	0
Tank Farm 127	69,133	1.8	21.2	27.22455	4.44204	40.61628	5.151408	47.18989	0.001434	0
Tank Farm 13	159,873	0.2	10.8	20.94	0.939	55.16	15.82	2	0	0
Tank Farm 130	76,499	3	17.8	25.24961	8.584963	42.85463	0.745305	41.95402	0.001641	0

	Crude Oil Flash Sample									
Tank Farm	2014 Crude Throughput (bbl)	Reid Vapor Pressure (psia)	Crude Oil API Gravity	Flash Gas MW (g/g-mole)	GOR (scf/bbl)	Methane (Wt%)	CO2 (Wt%)	VOC [C3-C10] (Wt%)	VOC [C10+] (Wt%)	BTEX (Wt%)
Tank Farm 131	12,314	3.2	23.6	35.32927	6.81985	19.70136	0.194455	70.33054	0.002078	0.010824
Tank Farm 132	24,861	0.5	12.6	31.47617	0.804743	28.43912	0.786779	63.41138	0	0
Tank Farm 134	52,798	2	24.2	27.07014	3.267658	41.32338	6.551257	47.83917	0	0.042214
Tank Farm 135	57,772	3.4	18.6	39.88153	3.934664	10.75618	0	78.5917	0	0
Tank Farm 136	1,882	2.8	28.9	36.72705	3.66299	17.19755	0.406666	70.10884	0.001153	0.013748
Tank Farm 137	16,607	2.1	22.7	25.51451	16.78665	42.82269	0.109983	45.30262	0.001728	0
Tank Farm 138	9,348	1.7	17.9	54.89345	10.17449	3.330442	0.947596	90.07534	0	0
Tank Farm 139	4,589	2.9	15.7	42.49846	2.098869	13.20214	0.655421	80.53433	0.002609	0.016291
Tank Farm 14	159,873	0.5	11	25.73	0.444	17.29	7.74	1.74	0	0
Tank Farm 140	475	3.1	15.5	33.85558	5.781136	23.8388	0	67.12369	0.003277	0.015173
Tank Farm 141	11,905	1.3	15	24.69047	10.78745	44.77728	0.647883	39.60552	0.002199	0
Tank Farm 142	8,470	3.4	30.3	50.56633	2.235243	4.313184	0	94.34553	0.002117	0.017767
Tank Farm 143	230,900	5.1	31.2	34.17152	14.47074	19.20723	0.246908	65.23372	0	0.00746
Tank Farm 144	3,860	4.8	23.6	28.9988	8.452952	31.28668	0	54.25642	0	0
Tank Farm 145	6,263	6.3	30.7	53.92558	7.213503	1.087803	0	95.9566	0	0.013018
Tank Farm 146	9,949	2.2	15.2	34.27251	4.731513	23.17662	0.736501	67.60692	0	0.009688
Tank Farm 147	23,190	3.3	21	34.3989	6.587397	20.81514	0.178336	67.29355	0.003185	0.007273
Tank Farm 148	100,103	1	32.8	28.16765	10.76782	21.54303	0.694377	30.10744	0.0018	0.005534
Tank Farm 149	451,954	1.8	17.4	40.87175	3.521652	9.946971	0.13783	79.06972	0.002869	0
Tank Farm 150	182,231	2.5	18	34.57243	7.278493	8.617933	0.118263	53.49722	0.001522	0
Tank Farm 151	54,529	6.9	31.6	36.84871	28.45833	11.84825	0.65292	68.2489	0.000235	0.003256
Tank Farm 152	8,961	2	18.7	32.54065	17.51002	19.90595	0.377781	58.15504	0.001468	0.007657
Tank Farm 153	982,205	5.2	24.7	36.37839	7.445378	20.01664	2.206124	72.32742	0.00182	0
Tank Farm 154	14,714	6	30.5	47.82508	6.887994	2.097897	0.568047	85.8691	0.001655	0.008108
Tank Farm 155	982,205	5.1	27.8	47.67457	9.736298	5.861646	1.864361	88.12752	0.001196	0.00487
Tank Farm 156	23,067	6.5	28.7	37.79354	21.26961	10.68362	0.352376	68.91121	0.000936	0.009062
Tank Farm 157	1,428	4.9	30.6	45.51571	5.910931	3.062297	0.234706	79.70632	0.000683	0.011953
Tank Farm 158	95,039	5	25.1	40.42334	6.725365	12.73658	0	77.93926	0.003481	0.011585
Tank Farm 159	759	2.4	25.4	28.89214	5.431524	32.60933	0.634649	50.76462	0.00073	0.022027

	Crude Oil Flash Sample									
Tank Farm	**2014 Crude Throughput (bbl)**	**Reid Vapor Pressure (psia)**	**Crude Oil API Gravity**	**Flash Gas MW (g/g-mole)**	**GOR (scf/bbl)**	**Methane (Wt%)**	**CO2 (Wt%)**	**VOC [C3-C10] (Wt%)**	**VOC [C10+] (Wt%)**	**BTEX (Wt%)**
Tank Farm 16	913	0.4	0	58.5	5.336	35.08	61.46	3.08	0	0
Tank Farm 160	10,320	6.1	28.7	34.01147	33.33109	17.24264	0.515361	63.07859	0.001161	0.005085
Tank Farm 162	27,901	1.4	8.5	38.41514	17.35586	14.61501	1.139264	72.59916	0.002874	0.008168
Tank Farm 163	2,671	4.6	31.7	51.73715	2.661966	2.369865	2.063434	88.23341	0.004175	0.01113
Tank Farm 165	29,112	4.6	31.9	38.08682	14.62469	14.47845	1.944299	73.59896	0.001034	0.006334
Tank Farm 17	68,547	0.8	10.3	33.7	0.363	18.91	76.22	4.87	0	0
Tank Farm 19	292,532	0.6	10.8	18.83	3.156	75.48	19.04	0.36	0	0
Tank Farm 2	1,673,425	0.9	12.3	27.62	2.473	34	63.98	1.4	0	0
Tank Farm 20	93,379	2.2	23.3	31.87	3.346	25.01	33.42	35.45	0	0
Tank Farm 21	409,977	0.9	12.7	24.64	1.333	45.43	51.26	2.33	0	0
Tank Farm 22	2,618,564	0.4	13.2	29.13	0.901	29.3	68.51	1.02	0	0
Tank Farm 23	423,266	0.5	13.4	29.84	4.343	27.2	72.49	0.02	0	0
Tank Farm 24	1,072,965	0.5	11	32.21	0.680	20.83	77.01	0.37	0	0
Tank Farm 25	255,542	0.3	12.9	30.25	0.793	24.36	64.7	2.86	0	0
Tank Farm 26	1,113,128	0.6	11	33.17	0.932	18.43	79.55	0.07	0	0
Tank Farm 27	1,113,128	0.4	12.8	24.19	2.127	46.37	49.2	0.75	0	0
Tank Farm 28	179,848	1.8	22	32.17	10.815	18.18	51.92	13.91	0	0
Tank Farm 3	992,565	1	13.8	24.94	8.956	43.68	54.16	1.02	0	0
Tank Farm 30	179,848	0.5	14.2	27.95	7.488	12	16.41	2.13	0	0
Tank Farm 32	834,956	0.5	0	59.8	3.882	57.51	34.71	0.32	0	0
Tank Farm 33	459,922	0.4	18.3	25.6	2.362	40.46	56.44	0.05	0	0
Tank Farm 34	179,848	6.9	31.4	34.69	45.095	16.43	16.51	52.66	0	0
Tank Farm 35	1,113,128	1	18.7	29.75	2.438	16.04	31.53	8.48	0	0
Tank Farm 36	179,848	1.6	21.9	28.32	8.438	31.83	41.29	18.87	0	0
Tank Farm 37	179,848	2.6	21.8	37.28	6.121	11.6	65.62	18.63	0	0
Tank Farm 39	1,325,555	7.8	30.7	44.06	16.548	5.85	1.12	84.13	0	0
Tank Farm 4	15,271,669	4.8	28.1	40.15	9.153	11.23	23.79	59.5	0	0
Tank Farm 40	294,540	6.2	30.3	42.46	12.372	10.55	3.07	81.77	0	0.01
Tank Farm 41	1,086,818	7.1	29.1	45.86	10.909	6.13	0.8	87	0	0.01

	Crude Oil Flash Sample									
Tank Farm	**2014 Crude Throughput (bbl)**	**Reid Vapor Pressure (psia)**	**Crude Oil API Gravity**	**Flash Gas MW (g/g-mole)**	**GOR (scf/bbl)**	**Methane (Wt%)**	**CO2 (Wt%)**	**VOC [C3-C10] (Wt%)**	**VOC [C10+] (Wt%)**	**BTEX (Wt%)**
Tank Farm 42	1,958,644	4.9	28.8	49.06	5.080	4.88	2.33	89.55	0	0.02
Tank Farm 43	424,603	8.3	32.5	47.38	10.329	5.59	1.57	88.67	0	0
Tank Farm 44	33,174	2.6	26.5	32.46143	8.884517	26.68646	7.383677	59.91604	0.000505	0.015503
Tank Farm 45	176,209	2.7	28.2	34.38947	11.13063	18.79762	6.521442	62.17677	0	0
Tank Farm 46	51,684	7.5	33.1	43.84607	29.31854	5.271561	2.329941	81.5765	0	0.037017
Tank Farm 47	38,493	5.6	25.7	38.44332	6.950425	14.77541	2.139958	77.11208	0	0
Tank Farm 48	14,743	2.9	33.2	35.68696	10.80139	17.77345	0.25453	68.28692	0.000756	0.015066
Tank Farm 5	8,736,302	0.6	20.2	27.96	1.151	35.4	41.77	21.3	0	0
Tank Farm 50	647,573	3	25.2	25.27817	50.71236	25.18014	2.363251	14.03833	0	0
Tank Farm 51	58,472	3.4	31.2	29.15229	10.73545	31.69697	5.735076	50.23638	0	0.07446
Tank Farm 53	147,004	3	27.5	31.75527	23.91285	26.65227	8.000574	57.08218	0.001041	0.007399
Tank Farm 54	171,474	2.4	27.2	40.42545	5.108398	4.577803	1.30779	62.68888	0.001905	0
Tank Farm 55	91,607	2.3	27.4	39.65949	5.830681	4.501521	13.46039	52.50332	0.001623	0
Tank Farm 56	647,573	2.4	25.5	32.58563	11.70836	25.73761	7.49886	61.1296	0.002978	0.006781
Tank Farm 57	23,425	2.5	29.6	31.1323	6.832823	22.31762	3.78888	48.50452	0.002153	0.011705
Tank Farm 58	28,827	2.7	25.5	47.06796	0.905879	8.815327	0.75708	88.94609	0	0.003189
Tank Farm 6	8,736,302	0.6	12.7	26.88	4.878	36.6	61.97	1.1	0	0
Tank Farm 60	91,607	1.7	24.9	24.70545	21.78475	48.09194	5.544902	39.00801	0.001067	0.004706
Tank Farm 62	6,685	1.3	16.3	38.22025	8.835261	7.799713	87.36699	1.300817	0	0
Tank Farm 63	7,835	2.4	24.8	31.91621	10.89066	18.02924	25.32187	30.29639	0.003446	0
Tank Farm 64	2,429,842	0.05	11.8	25.02802	1.930764	42.87924	53.92315	0.417246	0	0
Tank Farm 65	6,198	0.6	21.8	22.70541	2.280086	44.12612	2.776589	14.72547	0	0
Tank Farm 66	292,695	0.65	13.1	28.53116	2.230643	31.27206	63.25923	4.067557	0	0
Tank Farm 67	54,139	2.6	26.1	26.28301	16.4475	39.23859	16.46356	33.09485	0	0
Tank Farm 68	7,091	1.7	25.6	24.63603	14.39281	47.19412	34.545	16.70307	0.000746	0
Tank Farm 71	8,747	1.8	20.8	43.77519	0.852807	11.55967	26.10169	61.41782	0	0
Tank Farm 72	2,517	2.3	21.9	26.26467	12.09783	35.60027	36.04818	12.73909	0.003762	0
Tank Farm 73	2,285	0.5	10.7	25.06415	5.074412	43.38871	56.22962	0.236134	0	0
Tank Farm 76	659,826	6.1	30.9	40.31714	17.92482	10.99271	2.244656	77.28431	0	0.003924

	Crude Oil Flash Sample									
Tank Farm	**2014 Crude Throughput (bbl)**	**Reid Vapor Pressure (psia)**	**Crude Oil API Gravity**	**Flash Gas MW (g/g-mole)**	**GOR (scf/bbl)**	**Methane (Wt%)**	**CO2 (Wt%)**	**VOC [C3-C10] (Wt%)**	**VOC [C10+] (Wt%)**	**BTEX (Wt%)**
Tank Farm 79	48,779	1.6	20.4	25.44395	6.37031	32.39621	9.509104	19.10728	0.004657	0
Tank Farm 80	8,393	2.4	20.4	42.03111	3.142197	6.298519	26.40593	52.32153	0.00281	0
Tank Farm 85	4,440,933	0.5	12.5	16.43225	8.980984	95.23163	1.51618	0.013027	0	0
Tank Farm 87	57,995	0.3	14.2	17.89701	14.56877	80.11172	8.352089	0.365906	0	0
Tank Farm 89	4,440,933	0.4	14.6	22.7532	6.417227	45.12859	27.47294	0.963332	0	0
Tank Farm 9	992,565	0.5	12.4	21.89	0.359	57.71	39.53	0.4	0	0
Tank Farm 90	57,995	0.3	13.3	16.90629	9.275279	91.10967	6.267619	0.006696	0	0
Tank Farm 91	924,983	6.5	25.8	38.64536	8.516479	14.66144	0.30188	76.75049	0.001192	0.003904
Tank Farm 92	53,550	2.9	32.4	29.66795	17.43035	27.80564	15.49417	42.10791	0.00145	0.009113
Tank Farm 93	112,836	4.7	28.5	35.12511	21.27871	18.26431	12.34313	60.16095	0.00106	0.004967
Tank Farm 94	862,980	2.6	25.8	26.42987	14.82285	43.00515	1.936053	50.19446	0.000586	0.00338
Tank Farm 95	606,518	1.5	20.5	23.56843	8.910803	53.73177	1.967473	39.34993	0.001636	0
Tank Farm 96	10,531	0.6	20.2	17.30857	2.725726	87.58494	3.827073	3.591284	0	0
Tank Farm 97	57,643	0.4	16.4	33.14946	1.947594	20.54071	58.92049	17.89037	0	0
Tank Farm 98	6,972	0.4	14.8	18.77994	8.051823	66.79634	1.217255	0.352792	0	0

Table D-17: WSPA Water Dataset #2

	Produced Water Flash Sample							
Tank Farm	**2014 Water Throughput (bbl)**	**Flash Gas MW (g/g-mole)**	**GWR (scf/bbl)**	**Methane (Wt%)**	**CO2 (Wt%)**	**VOC [C3-C10] (Wt%)**	**VOC [C10+] (Wt%)**	**BTEX (Wt%)**
Tank Farm 85	69,961,303	16.98157486	0.686204	91.31088	8.659109	0.030008	0	0
Tank Farm 6	152,582,286	39.42	1.767	6.69	93.26	0.06	0	0
Tank Farm 89	69,961,303	32.01473925	1.257251	21.50131	78.46952	0.029173	0	0
Tank Farm 4	157,320,153	40.54	1.463	5.67	90.41	3.92	0	0
Tank Farm 74	31,848,216	25.04936978	1.329654	44.62852	42.84264	10.89398	0	0
Tank Farm 5	152,582,286	38.63	0.835	7.98	91.94	0.01	0	0
Tank Farm 111	20,816,607	20.85572489	0.801158	63.68624	36.31376	0	0	0
Tank Farm 64	31,928,149	38.25516636	1.103001	8.416178	90.06941	0.089023	0	0
Tank Farm 84	11,845,861	19.39184939	0.677077	72.83505	27.1264	0.038552	0	0
Tank Farm 83	11,845,861	23.46767835	0.707565	48.16194	45.50862	0.036044	0	0
Tank Farm 22	34,502,591	40.36	1.257	5.14	94.58	0.01	0	0
Tank Farm 9	19,388,356	35.64	1.180	10.79	73.11	0.03	0	0
Tank Farm 49	31,848,216	41.13003981	1.575893	4.206514	95.11716	0.676327	0	0
Tank Farm 3	19,388,356	38.52	1.364	8.18	91.71	0.06	0	0
Tank Farm 75	31,848,216	24.94959978	0.236006	44.34209	49.20346	5.345632	0	0
Tank Farm 82	11,845,861	18.29448491	0.396476	80.64331	19.32123	0.035457	0	0
Tank Farm 1	12,342,046	38.98	1.667	7.86	88.42	3.09	0	0
Tank Farm 42	17,788,511	36.88	0.584	11.12	88.76	0.12	0	0
Tank Farm 87	2,348,729	18.44444684	1.178439	79.51303	20.4807	0.006037	0	0
Tank Farm 10	6,967,019	34.97	1.289	11.93	70.53	0.08	0	0
Tank Farm 88	10,132,193	30.61144732	0.471378	25.12859	74.79841	0.073009	0	0
Tank Farm 2	19,388,356	41.1	1.102	4.07	95.89	0.04	0	0
Tank Farm 40	6,149,164	33.43	0.875	18.16	81.79	0.04	0	0
Tank Farm 39	7,780,946	29.5	0.483	28.25	71.59	0.16	0	0
Tank Farm 27	14,790,748	39.54	1.516	3.42	78.18	0.02	0	0
Tank Farm 99	2,925,394	21.80299036	0.802083	58.42702	41.57298	0	0	0
Tank Farm 45	6,480,307	37.53807818	0.990809	12.21836	79.48539	8.29538	0	0

	Produced Water Flash Sample							
Tank Farm	**2014 Water Throughput (bbl)**	**Flash Gas MW (g/g-mole)**	**GWR (scf/bbl)**	**Methane (Wt%)**	**CO2 (Wt%)**	**VOC [C3-C10] (Wt%)**	**VOC [C10+] (Wt%)**	**BTEX (Wt%)**
Tank Farm 90	2,348,729	22.7567476	1.003005	53.57676	46.41376	0.009474	0	0
Tank Farm 77	6,254,997	36.14396473	0.821809	14.82453	72.43285	12.74262	0	0
Tank Farm 34	2,864,213	33.7	1.476	17.17	80.73	0.62	0	0
Tank Farm 105	1,226,854	17.54395056	0.98	86.53692	13.46308	0	0	0
Tank Farm 11	2,404,306	33.34	1.377	16.51	72.36	0.02	0	0
Tank Farm 94	2,860,805	24.55832735	0.534508	45.73167	53.21412	1.054212	0	0
Tank Farm 35	14,790,748	37.97	0.557	5.47	72.3	0.12	0	0
Tank Farm 19	2,897,597	31.1	0.877	20.65	60.41	0.02	0	0
Tank Farm 78	2,493,018	27.3543444	0.577617	38.02141	36.10269	22.43199	0.012047	0
Tank Farm 41	3,072,889	31.35	0.666	21.65	72.49	0.06	0	0
Tank Farm 58	1,739,541	24.59952693	0.607521	52.47416	9.633247	37.8926	0	0
Tank Farm 67	1,037,544	25.38232449	1.139159	42.00506	46.72132	7.657799	0.001028	0
Tank Farm 101	1,349,022	21.66679956	0.709101	60.57593	33.07231	6.351753	0	0
Tank Farm 32	6,264,112	35.97	0.451	9.8	72.59	0.06	0	0
Tank Farm 12	4,468,777	38.95	0.948	5.3	81.82	0.01	0	0
Tank Farm 24	4,875,954	41.46	1.227	3.51	96.4	0	0	0
Tank Farm 66	3,166,001	40.14426221	1.197072	5.6964	93.66531	0.623342	0	0
Tank Farm 44	1,215,654	32.90847632	1.101967	19.4782	80.07037	0.451424	0	0
Tank Farm 50	985,630	28.41391197	0.947147	32.33292	64.65152	3.015556	0	0
Tank Farm 92	2,865,262	38.23787887	0.844347	8.659271	91.34073	0	0	0
Tank Farm 28	2,864,213	40.99	1.934	3.47	91.96	0.01	0	0
Tank Farm 43	4,914,999	30.64	0.181	28.86	48.74	22.4	0	0
Tank Farm 95	1,299,398	32.83559835	0.939167	19.52176	80.47824	0	0	0
Tank Farm 30	2,864,213	37.89	1.256	4.96	69.19	0.06	0	0
Tank Farm 23	2,482,846	41.38	1.694	3.64	96.36	0	0	0
Tank Farm 26	14,790,748	42.41	0.595	1.61	95.09	0.01	0	0
Tank Farm 36	2,864,213	40.38	1.055	4.8	93.71	0.2	0	0
Tank Farm 33	4,070,860	40.31	0.648	4.5	90.87	0.03	0	0
Tank Farm 102	2,192,751	29.67582237	0.264687	27.6879	72.19009	0	0	0

	Produced Water Flash Sample							
Tank Farm	**2014 Water Throughput (bbl)**	**Flash Gas MW (g/g-mole)**	**GWR (scf/bbl)**	**Methane (Wt%)**	**CO2 (Wt%)**	**VOC [C3-C10] (Wt%)**	**VOC [C10+] (Wt%)**	**BTEX (Wt%)**
Tank Farm 21	2,177,225	39.04	0.775	7.2	92.14	0.01	0	0
Tank Farm 56	985,630	30.84225055	0.524832	26.2085	66.46658	7.322867	0	0
Tank Farm 20	2,177,225	41.42	1.394	3.21	95.61	0.01	0	0
Tank Farm 143	738,682	19.89057249	0.378419	70.80717	24.74945	4.443373	0	0
Tank Farm 93	731,049	35.59965714	1.006542	13.23172	85.55293	0.005105	0	0
Tank Farm 37	2,864,213	42.81	1.623	1.62	98.34	0.05	0	0
Tank Farm 13	738,060	34.81	0.861	11.92	68.68	0.01	0	0
Tank Farm 91	1,288,097	21.68489871	0.144493	60.0738	30.51059	9.415611	0	0
Tank Farm 148	453,483	20.50330939	0.332865	65.93777	33.45341	0.608822	0	0
Tank Farm 127	187,980	31.05642746	0.918385	23.98527	75.80509	0.209641	0	0
Tank Farm 118	1,302,932	42.74989214	1.075133	1.936619	95.27612	2.787264	0	0
Tank Farm 108	476,869	16.043	0.145414	100	0	0	0	0
Tank Farm 25	1,514,226	40.98	0.400	4.1	94.53	0.19	0	0
Tank Farm 72	78,514	34.98694974	2.245833	14.8283	85.04026	0.125545	0	0
Tank Farm 7	312,763	36.64	0.758	8.5	73.34	0	0	0
Tank Farm 46	112,125	30.78881663	0.721875	24.80844	74.56647	0.625092	0	0
Tank Farm 96	73,059	25.08634462	0.772005	43.27204	56.72796	0	0	0
Tank Farm 79	32,724	19.69365075	1.15901	72.04285	21.27834	6.213724	0.010202	0
Tank Farm 126	1,545,601	26.47860516	0.032083	38.01458	61.85011	0.126521	0	0
Tank Farm 63	90,549	38.24817329	1.532428	8.836821	89.13807	1.399906	0.000569	0
Tank Farm 48	25,821	21.52429507	0.898333	60.13132	39.13817	0.730511	0	0
Tank Farm 114	555,341	44.37179686	0.102831	10.72089	14.55749	71.99699	0	0
Tank Farm 73	32,724	30.89766611	1.01644	24.37197	75.52878	0.099245	0	0
Tank Farm 80	131,537	41.8160412	1.511997	2.928877	96.34488	0.205432	0	0
Tank Farm 8	312,763	39.33	0.713	2.16	69.89	0	0	0
Tank Farm 97	22,713	32.30093481	1.061266	20.81255	79.12286	0.06459	0	0
Tank Farm 57	23,147	27.40747556	0.551862	41.6622	8.760026	46.7443	0	0
Tank Farm 65	5,279	22.44764599	2.084542	56.28968	38.34714	5.36251	0	0
Tank Farm 112	271,479	42.01404642	0.371553	2.793593	96.96268	0.243727	0	0

	Produced Water Flash Sample							
Tank Farm	**2014 Water Throughput (bbl)**	**Flash Gas MW (g/g-mole)**	**GWR (scf/bbl)**	**Methane (Wt%)**	**CO2 (Wt%)**	**VOC [C3-C10] (Wt%)**	**VOC [C10+] (Wt%)**	**BTEX (Wt%)**
Tank Farm 113	9,529	28.80673627	1.010625	30.05172	4.700344	42.36684	0	0.210823
Tank Farm 71	71,288	41.94761306	0.492387	3.019242	96.27216	0.7086	0	0
Tank Farm 69	600	21.3	4.933518	44.96896	21.29782	18.11352	0.001878	0
Tank Farm 70	2,098	35.2232386	0.224999	16.50731	75.67057	7.822126	0	0
Tank Farm 16	435	39.43	1.382	6.68	93.26	0.06	0	0
Tank Farm 146	75	32.22672557	0.537795	24.22539	64.1923	11.58231	0	0
Tank Farm 136	68	33.40430755	0.28386	21.85926	41.16462	25.90804	0	0

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