

******* LIQUID SPILLS - VOLUME CALCULATIONS *******

Location of spill: COG - Willow 17 State SWD #1

Date of Spill: 29-Oct-2018

If the leak/spill is associated with production equipment, i.e. - wellhead, stuffing box, flowline, tank battery, production vessel, transfer pump, or storage tank place an "X" here: ☒

Input Data:

If spill volumes from measurement, i.e. metering, tank volumes, etc. are known enter the volumes here: OIL: 0.0 BBL WATER: 0.0 BBL

If "known" spill volumes are given, input data for the following "Area Calculations" is optional. The above will override the calculated volumes.

Total Area Calculations							Standing Liquid Calculations								
Total Surface Area		width	length	wet soil		oil (%)	Standing Liquid Area		width	length	liquid depth	oil (%)			
	Rectangle Area #1	60 ft	70 ft	X	3.50 in	1.50%		Rectangle Area #1	0 ft	X	0 ft	X	0 in	0%	
	Rectangle Area #2	0 ft	X	0 ft	X	0.00 in	0%		Rectangle Area #2	0 ft	X	0 ft	X	0 in	0%
	Rectangle Area #3	0 ft	X	0 ft	X	0.0 in	0%		Rectangle Area #3	0 ft	X	0 ft	X	0 in	0%
	Rectangle Area #4	0 ft	X	0 ft	X	0.0 in	0%		Rectangle Area #4	0 ft	X	0 ft	X	0 in	0%
	Rectangle Area #5	0 ft	X	0 ft	X	0.0 in	0%		Rectangle Area #5	0 ft	X	0 ft	X	0 in	0%
	Rectangle Area #6	0 ft	X	0 ft	X	0 in	0%		Rectangle Area #6	0 ft	X	0 ft	X	0 in	0%
	Rectangle Area #7	0 ft	X	0 ft	X	0 in	0%		Rectangle Area #7	0 ft	X	0 ft	X	0 in	0%
	Rectangle Area #8	0 ft	X	0 ft	X	0 in	0%		Rectangle Area #8	0 ft	X	0 ft	X	0 in	0%

0.1

production system leak - DAILY PRODUCTION DATA REQUIRED

Average Daily Production: Oil 0 BBL Water 0 BBL 0 Gas (MCFD)

Total Hydrocarbon Content in gas: 0% (percentage)

Did leak occur before the separator?: ☒ YES ☒ N/A (place an "X")

H2S Content in Produced Gas: 0 PPM

H2S Content in Tank Vapors: 0 PPM

Amount of Free Liquid Recovered: 30 BBL

Percentage of Oil in Free Liquid Recovered: 0% (percentage)

Liquid holding factor *: 0.14 gal per gal

Use the following when the spill wets the grains of the soil.

* Sand = 0.08 gallon (gal.) liquid per gal. volume of soil.
* Gravelly (caliche) loam = 0.14 gal. liquid per gal. volume of soil.
* Sandy clay loam soil = 0.14 gal liquid per gal. volume of soil.
* Clay loam = 0.16 gal. liquid per gal. volume of soil.

Use the following when the liquid completely fills the pore space of the soil:

Occurs when the spill soaked soil is contained by barriers, natural (or not).
* Clay loam = 0.20 gal. liquid per gal. volume of soil.
* Gravelly (caliche) loam = 0.25 gal. liquid per gal. volume of soil.
* Sandy loam = 0.5 gal. liquid per gal. volume of soil.

Total Solid/Liquid Volume: <u>4,200</u> sq. ft. <u>1,207</u> cu. ft. <u>18</u> cu. ft.	Total Free Liquid Volume: <u>sq. ft.</u> <u>cu. ft.</u> <u>cu. ft.</u>
Estimated Volumes Spilled	Estimated Production Volumes Lost
Liquid in Soil: <u>30.1</u> BBL <u>0.5</u> BBL	Estimated Production Spilled: <u>0.0</u> BBL <u>0.0</u> BBL
Free Liquid: <u>0.0</u> BBL <u>0.0</u> BBL	
Totals: <u>30.1</u> BBL <u>0.5</u> BBL	Estimated Surface Damage
	Surface Area: <u>4,200</u> sq. ft.
Total Liquid Spill Liquid: <u>30.1</u> BBL <u>0.46</u> BBL	Surface Area: <u>.0964</u> acre
Recovered Volumes	Estimated Weights, and Volumes
Estimated oil recovered: <u>BBL</u> <u>check - okay</u>	Saturated Soil = <u>137,200</u> lbs <u>1,225</u> cu. ft. <u>45</u> cu. yds.
Estimated water recovered: <u>BBL</u> <u>check - okay</u>	Total Liquid = <u>31</u> BBL <u>1,283</u> gallon <u>10,673</u> lbs

Air Emission from flowline leaks:

Volume of oil spill: - BBL
Separator gas calculated: - MCF
Separator gas released: - MCF
Gas released from oil: - lb
H2S released: - lb
Total HC gas released: - lb
Total HC gas released: - MCF

Air Emission of Reporting Requirements:

New Mexico
HC gas release reportable? NO
H2S release reportable? NO
Texas
NO
NO