

Facility:
North Dakota Well #1

Emission Summary
North Dakota Department of Health*

*The NDDH PTE is post-control

Emission Source	PTE (TPY)				
	VOC	HAP	NOx	CO	SO ₂
Oil/Condensate Tanks	24.48	0.69	0.35	1.90	N/A
Treater Flare	40.16	0.63	1.68	9.12	0.00
Treater Burner	0.01	0.00	0.21	0.18	N/A
RICE Engine	2.90	NA	1.93	4.83	N/A
Truck Loading	2.48	NA			
Pneumatic Pump	0.00	0.00			
Pneumatic Controllers	0.00	0.00			
Glycol Dehydrator	0.00	0.00			
Totals (TPY)	70.03	1.32	4.17	16.03	0.00

Emission Control Requirements

Emission Source	Controls Required	Initial Control Installation Deadline		Additional Control Installation Deadline	
		YES	NO	YES	NO
Oil/Condensate Tanks	YES	6/1/2011	NA	8/30/2011	NA
Treater	YES	6/1/2011	NA		
Pneumatic Pump	NO	NA	NA		
Glycol Dehydrator	NO	NA	NA		

Document/Permit Requirements*

Document/Permit Required	YES/NO	Due Date
Registration Packet	YES	8/30/2011
Title V Permit	NO	NA
PSD Permit	NO	NA

*Owners and operators of O&G facilities with the potential to emit at or above major source thresholds must adequately control emissions or follow the normal permitting process established in Chapters 33-15-14 and 33-15-15 of the North Dakota Air Pollution Control Rules.

RICE Input Data

Line 1	Number of Engines	2	Enter the number of engines that will be installed at the production facility.
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	RICE Engine #1		Description
Line 2	Hours of Operation	8760	Engine is assumed to operate 8,760 hours per year.
Line 3	Maximum HP Rating	100	Manufacturer's maximum hp rating.
Line 4	NOx g/hp-hr	10	Manufacturer's emission factor, actual test results or AP-42 factor in grams per horsepower hour (g/hp-hr) for nitrogen oxides (NOx).
Line 5	CO g/hp-hr	10	Manufacturer's emission factor, actual test results or AP-42 factor in g/hp-hr for carbon monoxide (CO).
Line 6	VOC g/hp-hr	5	Manufacturer's emission factor, actual test results or AP-42 factor in g/hp-hr for total organic compounds (TOC or THC).
Line 7	NOx Control Efficiency	90%	NOx control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.
Line 8	CO Control Efficiency	75%	CO control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.
Line 9	VOC Control Efficiency	70%	VOC control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.

	RICE Engine #2		Description
Line 10	Hours of Operation	8760	Engine is assumed to operate 8,760 hours per year.
Line 11	Maximum HP Rating	100	Manufacturer's maximum hp rating.
Line 12	NOx g/hp-hr	10	Manufacturer's emission factor, actual test results or AP-42 factor in grams per horsepower hour (g/hp-hr) for nitrogen oxides (NOx).
Line 13	CO g/hp-hr	10	Manufacturer's emission factor, actual test results or AP-42 factor in g/hp-hr for carbon monoxide (CO).
Line 14	VOC g/hp-hr	5	Manufacturer's emission factor, actual test results or AP-42 factor in g/hp-hr for total organic compounds (TOC or THC).
Line 15	NOx Control Efficiency	90%	NOx control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.
Line 16	CO Control Efficiency	75%	CO control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.
Line 17	VOC Control Efficiency	70%	VOC control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.

	RICE Engine #3		Description
Line 18	Hours of Operation	0	Engine is assumed to operate 8,760 hours per year.
Line 19	Maximum HP Rating	100	Manufacturer's maximum hp rating.
Line 20	NOx g/hp-hr	10	Manufacturer's emission factor, actual test results or AP-42 factor in grams per horsepower hour (g/hp-hr) for nitrogen oxides (NOx).
Line 21	CO g/hp-hr	5	Manufacturer's emission factor, actual test results or AP-42 factor in g/hp-hr for carbon monoxide (CO).
Line 22	VOC g/hp-hr	4	Manufacturer's emission factor, actual test results or AP-42 factor in g/hp-hr for total organic compounds (TOC or THC).
Line 23	NOx Control Efficiency	90%	NOx control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.
Line 24	CO Control Efficiency	75%	CO control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.
Line 25	VOC Control Efficiency	70%	VOC control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.

	RICE Engine #4		Description
Line 26	Hours of Operation	0	Engine is assumed to operate 8,760 hours per year.
Line 27	Maximum HP Rating	100	Manufacturer's maximum hp rating.
Line 28	NOx g/hp-hr	10	Manufacturer's emission factor, actual test results or AP-42 factor in grams per horsepower hour (g/hp-hr) for nitrogen oxides (NOx).
Line 29	CO g/hp-hr	5	Manufacturer's emission factor, actual test results or AP-42 factor in g/hp-hr for carbon monoxide (CO).
Line 30	VOC g/hp-hr	4	Manufacturer's emission factor, actual test results or AP-42 factor in g/hp-hr for total organic compounds (TOC or THC).
Line 31	NOx Control Efficiency	90%	NOx control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.
Line 32	CO Control Efficiency	75%	CO control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.
Line 33	VOC Control Efficiency	70%	VOC control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.

	RICE Engine #5		Description
Line 34	Hours of Operation	0	Engine is assumed to operate 8,760 hours per year.
Line 35	Maximum HP Rating	100	Manufacturer's maximum hp rating.
Line 36	NOx g/hp-hr	10	Manufacturer's emission factor, actual test results or AP-42 factor in grams per horsepower hour (g/hp-hr) for nitrogen oxides (NOx).
Line 37	CO g/hp-hr	5	Manufacturer's emission factor, actual test results or AP-42 factor in g/hp-hr for carbon monoxide (CO).
Line 38	VOC g/hp-hr	4	Manufacturer's emission factor, actual test results or AP-42 factor in g/hp-hr for total organic compounds (TOC or THC).
Line 39	NOx Control Efficiency	90%	NOx control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.
Line 40	CO Control Efficiency	75%	CO control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.
Line 41	VOC Control Efficiency	70%	VOC control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.

	RICE Engine #6		Description
Line 42	Hours of Operation	0	Engine is assumed to operate 8,760 hours per year.
Line 43	Maximum HP Rating	100	Manufacturer's maximum hp rating.
Line 44	NOx g/hp-hr	10	Manufacturer's emission factor, actual test results or AP-42 factor in grams per horsepower hour (g/hp-hr) for nitrogen oxides (NOx).
Line 45	CO g/hp-hr	5	Manufacturer's emission factor, actual test results or AP-42 factor in g/hp-hr for carbon monoxide (CO).
Line 46	VOC g/hp-hr	4	Manufacturer's emission factor, actual test results or AP-42 factor in g/hp-hr for total organic compounds (TOC or THC).
Line 47	NOx Control Efficiency	90%	NOx control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.
Line 48	CO Control Efficiency	75%	CO control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.
Line 49	VOC Control Efficiency	70%	VOC control efficiency of any applicable controls (NSCR catalyst, AFRC, etc) obtained from manufacturer data or actual test results.

Input Data



NORTH DAKOTA DEPARTMENT of HEALTH

GREEN = Requires input
RED = No input required. This is a calculated value.

Facility Information			
e 1	North Dakota Well #1		Name of the facility and the well number.
e 2	6/1/2011		First date of production or the date of modification of the facility.
e 3	8/15/2011		Date registration packet is submitted to the NDDoH.

Production Data			Description
e 4	BOPD	240	Average daily production in barrels of oil per day (BOPD), based on the first 30 days of production.
e 5	Mscfd	150	Average daily production of gas in Mscf per day, based on the first 30 days of production.
e 6	Decline Factor	0.6	Expected decline factor for the first year of operation. Enter the default value 0.6; anything lower needs prior approval from the NDDoH.
e 7	Adjusted BOPD	144	This is the calculated BOPD expected to be produced using the above entered decline factor.
e 8	Adjusted Treater Gas (Mscfd)	90	This is the calculated mscfd of gas the well is expected to produce using the above entered decline factor.

Oil/Condensate Tank Data			Description
e 9	Flash Gas Method: Default Bakken EF		Use the drop down menu to choose the appropriate flash gas method.
e 10	Bakken EF scf/bbl	97.91	The scf/bbl from direct measurement or representative sample. If specific data is not available, use the Bakken default of 97.91.
e 11	Estimated Tank Vapors (scfd)	14099.04	This is the estimated scfd of tank vapors based on the following: adjusted BOPD multiplied by the scf/bbl entered on Line 9.
e 12	Lower Heating Value	2000	Lower heating value (Btu/scf) of tank vapors. If site specific data is not available, use the Bakken default value of 2000.
e 13	Molecular Weight	45.19	Molecular weight of the tank vapors in pounds per pound-mole (lb/lb-mole). If site specific data is not available, use the Bakken default value of 45.19.
e 14	VOC%	79.86%	VOC weight fraction of the tank vapor gas (C3+). If site specific data is not available, use the Bakken default value of 79.8%.
e 15	HAP%	2.26%	HAP weight fraction of the tank vapor gas. If site specific data is not available, use the Bakken default value of 2.26%.
e 16	H ₂ S weight %	0.000%	H ₂ S weight percent of the tank vapor gas.
e 17	H ₂ S mole %	0.000%	H ₂ S mole percent of the tank vapor gas.
e 18	Ground Pit Flare		Use the drop down menu to choose the appropriate emission control type.
e 19	Control Destruction Efficiency	90%	Control efficiency of any applicable controls. This is a fixed number based on control type.

Treater Gas Data			Description
e 20	Btu/scf	1500	Btu/scf of wellstream gas.
e 21	Molecular Weight	28.96	Average molecular weight of the wellstream gas in lb/lb-mole.
e 22	Specific Gravity	1	If necessary to convert specific gravity to molecular weight, enter the specific gravity of the wellstream gas.
e 23	Calculated Molecular Weight	28.96	This is the calculated molecular weight based on the specific gravity entered above. Please enter this number on Line 21.
e 24	VOC%	32.00%	VOC weight fraction of the wellstream gas (Note: Weight%, not Mole%).
e 25	HAP%	0.50%	HAP weight fraction of the wellstream gas. (Note: Weight%, not Mole%).
e 26	H ₂ S weight %	0.000%	H ₂ S weight percent of the wellstream gas
e 27	H ₂ S mole %	0.000%	H ₂ S mole percent of the wellstream gas
e 28	Ground Pit Flare		Use the drop down menu to choose the appropriate emission control type.
e 29	Control Destruction Efficiency	90%	Control efficiency of any applicable controls (combustor, pit flare, utility flare, etc).

Treater Burner(s)			Description
e 30	Total Btu/hr	500,000	Total burner rating for the heater treater burner(s) in btu/hr. If there are multiple burners, add the total heat input together.
e 31	Hours of Operation	8,760	The burner(s) is/are assumed to operate 8,760 hours per year.

Truck Loading			Description
e 32	Oil is hauled by truck		Use the drop down menu to choose the appropriate oil sales method. If oil is sold through a LACT, no input values are required in Lines 30-35.
e 33	Submerged loading: dedicated vapor balance service	1	Use the drop down list to choose the appropriate mode of operation. The saturation factor will automatically be selected based on mode of operation.
e 34	Molecular Weight	50.00	Molecular weight of tank vapors in lb/lb-mole If no site specific data is available, please refer to Table 2 on the Truck Loading tab.
e 35	Vapor Pressure	2.30	True vapor pressure of liquid loaded, pounds per square inch absolute (psia) if no site specific data is available, please refer to Table 2 on the Truck Loading tab.
e 36	Temperature	50.00	Temperature of bulk liquid loaded in Fahrenheit. If no site specific data is available, use an estimated average annual temperature.
e 37	Load Rate (bbl/hr)	100	Load rate of liquid loaded in barrels per hour.
e 38	Load Time (hrs)	1.00	The time it takes to load/unload one load (hrs).

Pneumatic Pumps			Description
e 39	Number of Pneumatic Pumps	2	Number of pneumatic pumps at facility.
e 40	Hours of Operation	4380	Hours the pump is in operation annually. For winter months only, please enter 4380 hours.
e 41	scf/min	0.50	Pneumatic source consumption rate as per manufacturer data (scf/min).
e 42	Routed exhaust back into closed loop system		Use the drop down menu to choose the appropriate emission control type.
e 43	Control Efficiency	100%	Control efficiency of any applicable controls (combustor, routing exhaust to fuel supply, VRU, etc).

Pneumatic Controllers			Description
e 44	Number of Pneumatic Controllers	10	Number of pneumatic controllers at facility.
e 45	Bleed rate (scf/hr)	0.00	Average bleed rate of device (scf/hr).

Glycol Dehydrator			Description
e 46	VOC (TPY)	0.00	VOC emissions calculated in GRI-GLYCalc software (if no glycol dehydrator enter 0).
e 47	HAP (TPY)	0.00	HAP emissions calculated in GRI-GLYCalc software (if no glycol dehydrator enter 0).