Construction Permit Application
Preliminary Analysis Summary

Section 1 – Applicant Information	
Company Name:	**Noble Energy, Inc**
Permit Number:	**14WE1300**
Source Location:	**Cougar B02-67-1HN, 68-1HN, 69-1HN Battery NWNW Section 2, T5N, R64W, Weld County (non-attainment)**
Equipment Description:	**Point 001: Condensate tanks**
	Point 002: Truck loadout
	Point 003: produced water tanks
	Point 004: fugitive emissions
	Point 005: RICE
	Point 006: RICE
AIRS ID:	**123-9D0C**
Date:	**November 3, 2014**
Review Engineer:	**Stephanie Chaousy**
Control Engineer:	**Chris Laplante**

Section 2 – Action Completed					
	Grandfathered		Modification		APEN Required/Permit Exempt
X	**CP1**		Transfer of Ownership		APEN Exempt/Permit Exempt

Section 3 – Applicant Completeness Review				
Was the correct APEN submitted for this source type?	**X**	**Yes**		No
Is the APEN signed with an original signature?	**X**	**Yes**		No
Was the APEN filled out completely?	**X**	**Yes**		No
Did the applicant submit all required paperwork?	**X**	**Yes**		No
Did the applicant provide ample information to determine emission rates?	**X**	**Yes**		No
If you answered "no" to any of the above, when did you mail an Information Request letter to the source?				
On what date was this application complete?	**July 25, 2014**			

Section 4 – Source Description	
AIRS Point	**Equipment Description**
001	**Nine (9) above ground 300 bbl atmospheric condensate storage tanks. Emissions from these tanks are controlled by a flare.**
002	**Truck Condensate Loadout**
003	**Three (3) above ground 300 bbl and four (4) above ground 60 bbl atmospheric produced water storage tanks. Emissions from these tanks are controlled by a flare.**
004	**Fugitive VOC leak emissions**

005	**One (1) Cummins, Model G5.9, Serial Number 2LB016831, natural gas-fired, naturally aspirated, 4SRB reciprocating internal combustion engine, site rated at 84 horsepower. This engine shall be equipped with a non-selective catalytic reduction (NSCR) system and air-fuel ratio control. This emission unit is used for natural gas compression.**
006	**One (1) Cummins, Model G5.9, Serial Number 2LB017011, natural gas-fired, naturally aspirated, 4SRB reciprocating internal combustion engine, site rated at 84 horsepower. This engine shall be equipped with a non-selective catalytic reduction (NSCR) system and air-fuel ratio control. This emission unit is used for natural gas compression.**

Is this a portable source?		Yes	**X**	**No**		
Is this location in a non-attainment area for any criteria pollutant?	**X**	**Yes**		No		
If "yes", for what pollutant?		PM_{10}		CO	**X**	**Ozone**
Is this location in an *attainment maintenance* area for any criteria pollutant?		Yes	**X**	**No**		
If "yes", for what pollutant? **(Note: These pollutants are subject to minor source RACT per Regulation 3, Part B, Section III.D.2)**		PM_{10}		CO		Ozone
Is this source located in the 8-hour ozone non-attainment region? **(Note: If "yes" the provisions of Regulation 7, Sections XII and XVII.C may apply)**	**X**	**Yes**		No		
Point 002: Is this source located at an oil and gas exploration site?	**X**	**Yes**		No		
Point 002: If yes, does this source load less than 10,000 gallons of crude oil per day on an annual average, splash fill less than 6750 bbl of condensate (hydrocarbons that have an API gravity of 40 degrees or greater) per year or submerged fill less than 16,308 bbl of condensate per year?		**Yes**	**X**	**No**		
Point 002: Is this source located at a facility that is considered a major source of hazardous air pollutant (HAP) emissions?		**Yes**	**X**	**No**		
Point 002: Will this equipment be operated in any NAAQS nonattainment area?	**X**	**Yes**		No		
Point 002: Does this source load gasoline into transport vehicles?		Yes	**X**	**No**		
Point 003: Are "flash" emissions anticipated from these tanks?	**X**	**Yes**		No		
Point 003: Is this tank located at an E&P site?	**X**	**Yes**		No		
Point 003: Is this tank located at a non-E&P, midstream or downstream site?		Yes	**X**	**No**		
Point 003: Is this source claiming exempt status for this source based on the fraction of oil in the stored water (less than 1% by volume crude oil on an average annual basis)?	**X**	**Yes**		No		
Point 003: Are these produced water tanks located at a commercial facility that accepts oil production wastewater for processing?		Yes	**X**	**No**		
Point 003: Are these produced water tanks subject to Colorado Oil and Gas Conservation Commission (COGCC) 805 Rule?		Yes	**X**	**No**		

Section 5 – Emission Estimate Information	
AIRS Point	**Emission Factor Source**
001	**Source provided site-specific emission factors using gas sample, WinSim and EPA Tanks. See Section 14 for calculations.**

002	**AP-42: Chapter 5.2, Equation 1** L = 12.46*S*P*M/T L = loading losses in lb per 1000 gallons loaded S = Saturation Factor P = true vapor pressure of liquid loaded [psia] M = molecular weight of vapors [lb/lb-mole] T = temperature of bulk liquid loaded [deg. R]
003	**CDPHE Memo 09-02**
004	**EPA-453/R-95-017, Table 2-4**
005	**NOx, CO: Manufacturer specs** **VOC: conservative** **All HAPS: AP-42**
006	**NOx, CO: Manufacturer specs** **VOC: conservative** **All HAPS: AP-42**

Did the applicant provide actual process data for the emission inventory?		Yes	**X**	**No**

Basis for Potential to Emit (PTE)

AIRS Point	Process Consumption/Throughput/Production
001	**225,000 BBL per year**
002	**225,000 BBL per year**
003	**150,000 BBL per year**
004	See table below
005	**4.79 MMscf/yr**
006	**4.79 MMscf/yr**

Equipment Type	Gas	Heavy Oil (or Heavy Liquid)	Light Oil (or Light Liquid)	Water/Oil
Connectors	**2373**	**294**	**595**	**290**
Flanges	**363**	**---**	**111**	**16**
Open-Ended Lines	**21**	**---**	**---**	**---**
Pump Seals	**---**	**---**	**2**	**---**
Valves	**9847**	**98**	**590**	**116**
Other	**322**	**---**	**52**	**38**

Basis for Permitted Emissions (Permit Limits)

AIRS Point	Process Consumption/Throughput/Production
001	**225,000 BBL per year**
002	**225,000 BBL per year**
003	**150,000 BBL per year**
004	See table below
005	**4.79 MMscf/yr**
006	**4.79 MMscf/yr**

Equipment Type	Gas	Heavy Oil (or Heavy Liquid)	Light Oil (or Light Liquid)	Water/Oil
Connectors	**2373**	**294**	**595**	**290**
Flanges	**363**	**---**	**111**	**16**
Open-Ended Lines	**21**	**---**	**---**	**---**
Pump Seals	**---**	**---**	**2**	**---**
Valves	**9847**	**98**	**590**	**116**
Other	**322**	**---**	**52**	**38**

Does this facility use control devices?	**X**	**Yes**		No

AIRS Point	Process	Control Device Description	% Reduction Granted
001	01	Flare	95
003	01	Flare	95
005	01	NSCR and AFCR	NOx: 75.5% CO: 67.2%
006	01	NSCR and AFCR	NOx: 75.5% CO: 67.2%

Section 6 – Emission Summary (tons per year)

	Point	NO_x	VOC	CO	Single HAP	Total HAP
PTE:	001	---	245.0	---	7.4 (Hexane)	9.3
	002	---	29.1	---	2.0 (Hexane)	4.1
	003	---	19.7	---	1.7 (hexane)	2.2
	004	---	38.6	---	1.8 (Hexane)	3.7
	005	9.3	0.8	11.9	0.06 (formaldehyde)	0.08
	006	9.3	0.8	11.9	0.06 (formaldehyde)	0.08
Uncontrolled point source emission rate:	001	---	245.0	---	7.4 (Hexane)	9.3
	002	---	29.1	---	2.0 (Hexane)	4.1
	003	---	19.7	---	1.7 (hexane)	2.2
	004	---	38.6	---	1.8 (Hexane)	3.7
	005	9.3	0.8	11.9	0.06 (formaldehyde)	0.08
	006	9.3	0.8	11.9	0.06 (formaldehyde)	0.08
Controlled point source emission rate:	001	---	12.3	---	0.4 (Hexane)	0.5
	002	---	29.1	---	2.0 (Hexane)	4.1
	003	---	1.0	---	0.1 (hexane)	0.1
	004	---	38.6	---	1.8 (Hexane)	3.7
	005	2.3	0.8	3.9	0.06 (formaldehyde)	0.08
	006	2.3	0.8	3.9	0.06 (formaldehyde)	0.08

Section 7 – Non-Criteria / Hazardous Air Pollutants

Pollutant	CAS #	BIN	Uncontrolled Emission Rate (lb/yr)	Are the emissions reportable?	Controlled Emission Rate (lb/yr)
Point 001					
Benzene	71432	A	1598	**Yes**	80
Toluene	108883	C	1283	**Yes**	64
Ethylbenzene	100414	C	77	**No**	4
Xylenes	1330207	C	401	**Yes**	20
n-Hexane	110543	C	14850	**Yes**	743
2,2,4-TMP	540841	C	405	**Yes**	20

Point 002					
Benzene	71432	A	473	**Yes**	473
Toluene	108883	C	1590	**Yes**	1590
Ethylbenzene	100414	C	267	**Yes**	267
Xylenes	1330207	C	1757	**Yes**	1757
n-Hexane	110543	C	3902	**Yes**	3902
2,2,4-TMP	540841	C	283	**Yes**	283
Point 003					
Benzene	71432	A	1050	**Yes**	53
n-Hexane	110543	C	3300	**Yes**	165
Point 004					
Benzene	71432	A	481	**Yes**	481
Toluene	108883	C	1429	**Yes**	1429
Ethylbenzene	100414	C	237	**No**	237
Xylenes	1330207	C	1537	**Yes**	1537
n-Hexane	110543	C	3668	**Yes**	3668
Points 005 and 006 each					
Formaldehyde	50000	A	119	**No**	119
Acetaldehyde	75070	A	16	**No**	16
Acrolein	107028	A	15	**No**	15
Benzene	71432	A	9	**No**	9

Note: Regulation 3, Part A, Section II.B.3.b APEN emission reporting requirements for non-criteria air pollutants are based on potential emissions without credit for reductions achieved by control devices used by the operator.

Section 8 –Testing Requirements				
Will testing be required to show compliance with any emission rate or regulatory standard?		Yes	**X**	**No**
If “yes”, complete the information listed below				

Section 9 – Source Classification											
Is this a new previously un-permitted source?	**X**	**Yes**		No							
What is this facility classification?		True Minor	**X**	**Synthetic Minor**		Major					
Classification relates to what programs?	**X**	**Title V**		PSD	**X**	**NA NSR**	**X**	**MACT**			
Is this a modification to an existing permit?		Yes	**X**	**No**							
If “yes” what kind of modification?		Minor		Synthetic Minor		Major					

Section 10 – Public Comment				
Does this permit require public comment per CAQCC Regulation 3?	X	**Yes**		No

If "yes", for which pollutants? Why?				
For Reg. 3, Part B, III.C.1.a (emissions increase > 25/50 tpy)?	**X**	**Yes**		No
For Reg. 3, Part B, III.C.1.c.ii (subject to MACT)?		Yes	**X**	**No**
For Reg. 3, Part B, III.C.1.d (synthetic minor emission limits)?	**X**	**Yes**		No

Section 11 – Modeling				
Is modeling required to demonstrate compliance with National Ambient Air Quality Standards (NAAQS)?		Yes	**X**	**No**
If "yes", for which pollutants? Why?				

AIRS Point	Section 12 – Regulatory Review
	Regulation 1 - Particulate, Smoke, Carbon Monoxide and Sulfur Dioxide
001-006	**Section II.A.1 -** Except as provided in paragraphs 2 through 6 below, no owner or operator of a source shall allow or cause the emission into the atmosphere of any air pollutant which is in excess of 20% opacity. This standard is based on 24 consecutive opacity readings taken at 15-second intervals for six minutes. The approved reference test method for visible emissions measurement is EPA Method 9 (40 CFR, Part 60, Appendix A (July, 1992)) in all subsections of Section II. A and B of this regulation.
	Regulation 2 – Odor
001-006	**Section I.A** - No person, wherever located, shall cause or allow the emission of odorous air contaminants from any single source such as to result in detectable odors which are measured in excess of the following limits: For areas used predominantly for residential or commercial purposes it is a violation if odors are detected after the odorous air has been diluted with seven (7) or more volumes of odor free air.
	Regulation 3 - APENs, Construction Permits, Operating Permits, PSD
001-006	**Part A-APEN Requirements** **Criteria Pollutants**: For criteria pollutants, Air Pollutant Emission Notices are required for: each individual emission point in a non-attainment area with uncontrolled actual emissions of one ton per year or more of any individual criteria pollutant (pollutants are not summed) for which the area is non-attainment. ***(Applicant is required to file an APEN since emissions exceed 1 ton per year VOC)***
001-006	**Part B – Construction Permit Exemptions** ***Applicant is required to obtain a permit since uncontrolled VOC emissions from this facility are greater than the 2.0 TPY threshold (Reg. 3, Part B, Section II.D.2a)***
002	**Part B, III.D.2** - RACT requirements for new or modified minor sources This section of Regulation 3 requires RACT for new or modified minor sources located in nonattainment or attainment/maintenance areas. This source is/is not located in the 8-hour ozone nonattainment area, but not the 1-hour ozone area. The date of interest for determining whether the source is new or modified is therefore November 20, 2007 (the date of the 8-hour ozone NA area designation). Since the tank battery from which loadout is occurring will be in service since after the date above, this source is considered "new or modified." Operator is using submerged fill (0.6 saturation factor), therefore, RACT requirements are satisfied.
004	**Part B, III.D.2** - RACT requirements for new or modified minor sources This section of Regulation 3 requires RACT for new or modified minor sources located in nonattainment or attainment/maintenance areas. This source is/is not located in the 8-hour ozone nonattainment area. The date of interest for determining whether the source is new or modified is therefore November 20, 2007 (the date of the 8-hour ozone NA area designation). Since the fugitives will be in service since after the date above, this source is considered "new or modified." Operator has agreed on the Division's standard conditions.
	Regulation 6 - New Source Performance Standards

001	**NSPS Kb: for storage vessels greater than 19,800 gallons after 7/23/84.** Is this source greater than 19,800 gallons (471 bbl)? No Is this source subject to NSPS Kb? No WHY? The storage tanks do not meet the criteria of this subpart, therefore, not subject.
002	No applicable subpart. This facility is not a bulk gasoline terminal.
004	**NSPS OOOO: Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution. For fugitive emissions at natural gas processing plants subject to NSPS OOOO. This subpart establishes emission standards and compliance schedules for the control of volatile organic compounds (VOC) and sulfur dioxide (SO_2) emissions from affected facilities that commence construction, modification or reconstruction after August 23, 2011.** Is this source at a "natural gas processing plant?" No Is this source subject to NSPS OOOO? No WHY? Facility does not meet the definition of "natural gas processing plant" therefore not meeting the criteria of this subpart.
005, 006	**NSPS JJJJ:** the date of construction is the date it was ordered or reconstructed/modified. These engines were manufactured after the 7/1/2008 effective date and are therefore subject to JJJJ.
	Regulation 7 – Volatile Organic Compounds
001, 003	**XII**. VOLATILE ORGANIC COMPOUND EMISSIONS FROM OIL AND GAS OPERATIONS ***(Applicant is subject to the emission control requirements for condensate tanks since it is located in a non-attainment area.)*** **XVII.C** STATEWIDE CONTROLS FOR OIL AND GAS OPERATIONS… ***(Applicant is currently subject to this since actual uncontrolled emissions are greater than 20 tpy of VOC.)***
002	No sections apply. Per Regulation 7, Section VI.C, a terminal is defined as a petroleum liquid storage and distribution facility that has a daily average throughput of more than 76,000 liters of gasoline (20,000 gallons), which is loaded directly into transport vehicles. This facility is neither a terminal, nor a bulk plant per definitions in Reg 7, Section VI.C.
004	**Section XII.G: If facility is a natural gas processing plant located in non-attainment area, then subject to Section XII.G.** This facility is not a natural gas processing plant, therefore, not subject.
005, 006	These engines are not subject to Regulation 7 because they are subject to the more stringent requirements of NSPS JJJJ.
	Regulation 8 – Hazardous Air Pollutants
001	**MACT EEEE: Organic Liquids Distribution** This source is not subject to MACT EEEE because it is not located at a major source of HAP.
001, 004	**MACT HH** This source is not subject to MACT HH because it is not located at a major source of HAP.
002, 003	None
005, 006	**MACT ZZZZ:** the date of construction is the first time the engine is installed at any location, therefore the engines are new sources for ZZZZ applicability.

Section 13 – Aerometric Information Retrieval System Coding Information

Point	Process	Process Description	Emission Factor	Pollutant / CAS #	Fugitive (Y/N)	Emission Factor Source	Control (%)
001	**01**	E&P Condensate Storage Tanks	51.9048 lb/1000 gal	VOC	No	Engineering calculation (WimSim + EPA Tanks)	95
			0.1690 lb/1000 gal	Benzene / 71432	No	Engineering calculation (WimSim + EPA Tanks)	95
			0.1357 lb/1000 gal	Toluene/ 108883	No	Engineering calculation (WimSim + EPA Tanks)	95
			0.0081 lb/1000 gal	Ethylbenzene / 100414	No	Engineering calculation (WimSim + EPA Tanks)	95
			0.0424 lb/1000 gal	Xylenes/ 1330207	No	Engineering calculation (WimSim + EPA Tanks)	95
			1.5714 lb/1000 gal	n-Hexane / 110543	No	Engineering calculation (WimSim + EPA Tanks)	95

			0.0429 lb/1000 gal	2,2,4-TMP /540841	No	Engineering calculation (WimSim + EPA Tanks)	95
	SCC	**40400311 – Fixed Roof Tank, Condensate, working+breathing+flashing losses**					
002	**01**	Truck loadout	6.15 lb/1000 gal	VOC	No	AP-42	0
			0.0500 lb/1000 gal	Benzene / 71432	No	Engineering calculation	0
			0.1683 lb/1000 gal	Toluene/ 108883	No	Engineering calculation	0
			0.0283 lb/1000 gal	2,2,4-TMP /540841	No	Engineering calculation	0
			0.1859 lb/1000 gal	Xylenes/ 1330207	No	Engineering calculation	0
			0.4129 lb/1000 gal	n-Hexane / 110543	No	Engineering calculation	0
			0.0299 lb/1000 gal	2,2,4-TMP/ 540841	No	Engineering calculation	0
	SCC	**40600132: Crude Oil: Submerged Loading (Normal Service)**					
003	**01**	Produced Water Storage Tanks	6.2381 lb/1000 gal	VOC	No	CDPHE PS Memo 09-02	95
			0.1667 lb/1000 gal	Benzene	No	CDPHE PS Memo 09-02	95
			0.5238 lb/1000 gal	n-Hexane	No	CDPHE PS Memo 09-02	95
	SCC	**40400315 – Fixed Roof Tank, Produced Water, working+breathing+flashing losses**					
004	**01**	Fugitive VOC Leak Emissions		VOC	Yes	EPA-453/R-95-017, Table 2-4	NA
	SCC	**31000220: All Equip. Leak Fugitives (Valves, flanges, connections, seals, drains)**					
005 and 006 each	**01**	4SRB Reciprocating Internal Combustion Engine	11.41 g/hp-hr	NOx	No	Manufacturer	75.5
			1.0 g/hp-hr	VOC	No	Operator estimation (conservative)	0
			14.64 g/hp-hr	CO	No	Manufacturer	67.2
	SCC	**40400315 – Fixed Roof Tank, Produced Water, working+breathing+flashing losses**					

Section 14 – Miscellaneous Application Notes

AIRS Point	**001**	**Condensate Storage Tanks**

A permit will be issued because the uncontrolled VOC emissions are greater than 2 TPY (permit threshold).

Emissions were calculated using site-specific emission factors from EPA Tanks (working and breathing) and WinSim Design II model (flashing). A gas analysis was used in the model for calculating the flash losses. Sampled on June 6, 2014 (within a year of application submittal).

Uncontrolled emission factors with 225,000 bbl/yr:

Component	Uncontrolled emissions-EPA Tanks (TPY)	Uncontrolled emissions-WinSim (TPY)	Emission factor-EPA Tanks (lb/bbl)	Emission factor-WinSim (lb/bbl)	Total Emission factor – (lb/bbl)	Total emission factor-(lb/1000 gal)	Uncontrolled Total emission (lb/yr)
VOC	41.04	204.02	0.36	1.81	2.18	51.9048	-
Benzene	0.082	0.0064	0.0007	0.0064	0.0071	0.1690	1597.5
Toluene	0.078	0.565	0.0007	0.0050	0.0057	0.1357	1282.5
Ethylbenzene	0.0043	0.034	0.00004	0.0003	0.00034	0.0081	76.5
Xylenes	0.0225	0.176	0.0002	0.00157	0.00178	0.0424	400.5
n-hexane	1.12	6.26	0.010	0.056	0.066	1.5714	14850
2,2,4-TMP	0.029	0.179	0.0003	0.0016	0.0018	0.0429	405

AIRS Point	002	Truck Condensate Loadout

		Units	Basis
S	0.6		Submerged loading: dedicated normal service
P	6.9	Psia	Based on EPA TANKs run
M	62	Lb/lb-mole	Based on EPA TANKs run
T	520	Deg R	Based on EPA TANKs run
L	6.15	Lb/10^3 gal	This value is used to calculate annual emissions
	0.258	Lb/bbl	

AP-42: Chapter 5.2
Equation 1
L = 12.46*S*P*M/T
L = loading losses in lb per 1000 gallons loaded
S = Saturation Factor
P = true vapor pressure of liquid loaded [psia]
M = molecular weight of vapors [lb/lb-mole]
T = temperature of bulk liquid loaded [deg. R]

L	6.15lb/10^3 gal	
	2.58E-01lb/bbl	
Annual requested Throughput		9450000gal/yr
Annual requested VOC emissions		58122lb/yr
		29.06tpy

HAP emissions were calculated using HAP weight% from the Cougar B02-67-1HN low pressure separator extended condensate analysis sampled June 6, 2014.

Component	Component wt%	Uncontrolled (lb/yr)	Emission factor (lb/bbl)	Emission factor (lb/1000 gal)
Benzene	0.813	473	0.0021	0.0500
Toluene	2.735	1590	0.0071	0.1683
Ethylbenzene	0.459	267	0.0012	0.0283
Xylenes	3.023	1757	0.0078	0.1859
n-hexane	6.713	3902	0.0173	0.4129
2,2,4-TMP	0.487	283	0.0013	0.0299

AIRS Point	003	**Produced Water Storage Tanks**

A permit will be issued because the uncontrolled VOC emissions are greater than 2 TPY (permit threshold).

State-Developed Emission factors in **lb/1000 gal** are:

County	**Produced Water Tank Default Emission Factors (lb/1000 gal)**		
	VOC	**Benzene**	**n-Hexane**
Adams, Arapahoe, Boulder, Broomfield, Denver, Douglas, Jefferson, Larimer and Weld	6.2381	0.1667	0.5238
Garfield, Mesa, Rio Blanco and Moffat	4.2381	0.0952	0.2381
Remainder of Colorado	6.2381	0.1667	0.5238

AIRS Point	004	**Fugitive VOC Leak Emissions**

A permit will be issued because the uncontrolled VOC emissions are greater than 2 TPY (permit threshold).

AIRS Point	**005**	**RICE**
A permit will be issued because the uncontrolled CO emissions are greater than 5 TPY (permit threshold).		
AIRS Point	**006**	**RICE**
A permit will be issued because the uncontrolled CO emissions are greater than 5 TPY (permit threshold).		