Form 3160-5
(March 2012)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

RECEIVED
MAR 27 2014
Farmington Field Office
Bureau of Land Management

FORM APPROVED
OMB No. 1004-0137
Expires: October 31, 2014

SUNDRY NOTICES AND REPORTS ON WELLS

Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE – *Other instructions on page 2.*

1. Type of Well ☑ Oil Well ☐ Gas Well ☐ Other	5. Lease Serial No. NM-109399
	6. If Indian, Allottee or Tribe Name
	7. If Unit of CA/Agreement, Name and/or No.
	8. Well Name and No. Warner-Caldwell 3B
2. Name of Operator Logos Operating, LLC	9. API Well No. 30-045-35506
3a. Address 4001 N Butler Ave Bldg 7101 Farmington, NM 87401 3b. Phone No. *(include area code)* 505-330-93333	10. Field and Pool or Exploratory Area Basin Dakota-Nageezi Gallup
4. Location of Well *(Footage, Sec., T.,R.,M., or Survey Description)* 384' FNL & 1960' FEL Sec 8, T23N R08W, UL B	11. County or Parish, State San Juan, NM

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☑ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Subsequent Report	☐ Casing Repair	☐ New Construction	☐ Recomplete	☑ Other Water Source
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
☐ Final Abandonment Notice	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.)

Logos requests to recycle produced water from the attached locations. The recycled water will be used for the fracture stimulation on the subject well. Please also see the attached water analysis reports for the currently producing wells which will assist in serving as a baseline for water quality and the NMOCD notice for 'No OCD Permit Required for Re-use of Produced Water'. Logos plans to use 100% recycled water for fracture stimulation whenever possible.

Any excess water will be hauled to Basin Disposal.

RCVD APR 1 '14
OIL CONS. DIV.
DIST. 3

14. I hereby certify that the foregoing is true and correct. Name *(Printed/Typed)*

Tamra Sessions — Title Operations Technician

Signature Tamra Sessions — Date 03/12/2014

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by — Title Petr. Eng — Date 3/31/14

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon. — Office

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

(Instructions on page 2)

NMOCD

Accepted For Record

Producing Location								
Well Name	**Well Number**	**Type**	**Lease**	**API #**	**Section**	**Township**	**Range**	**OCD Unit Letter**
LOGOS	#601H	Oil	Jicarilla	30-043-21182	5	22N	05W	D
JICARILLA O	#003E	Oil	Jicarilla	30-043-21165	10	22N	03W	O
ROADRUNNER	#002X	Oil	State	30-045-35494	2	24N	08W	H
LOGOS	#012	Oil	Jicarilla	30-043-21160	6	22N	05W	J
LOGOS	#011	Oil	Jicarilla	30-043-21159	6	22N	05W	K
LOGOS	#010	Oil	Jicarilla	30-043-21158	6	22N	05W	L
LOGOS	#009	Oil	Jicarilla	30-043-21157	5	22N	05W	H
LOGOS	#008	Oil	Jicarilla	30-043-21156	5	22N	05W	G
LOGOS	#007	Oil	Jicarilla	30-043-21155	5	22N	05W	E
NCRA STATE	#008P	Oil	State	30-039-31195	16	24N	06W	P
ENCHILADA	#002X	Oil	State	30-039-31194	16	23N	06W	H
NCRA STATE	#007A	Oil	State	30-039-31181	16	24N	06W	A
NCRA STATE	#006F	Oil	State	30-039-31180	16	24N	06W	F
LOGOS	#006	Gas	Federal	30-045-35422	8	23N	08W	G
LOGOS	#005	Gas	Federal	30-045-35423	4	23N	08W	P
LOGOS	#003	Oil	Federal	30-043-21135	5	22N	06W	P
LOGOS	#002	Oil	Jicarilla	30-043-21120	6	22N	05W	I
LOGOS	#001	Oil	Jicarilla	30-043-21119	5	22N	05W	F

Logos Resources

County: Sandoval | Field: Jicarilla
State: NM | Location: Logos #1
Sampled at: WH | Formation:
Date: Feb. 21, 2013 | Depth: 0

H & M Precision Water Analysis Report

Sum +	mg/L	meq/L		Sum -	mg/L	meq/L
Potassium	0.0	0.00		Sulfate	11.0	0.23
Sodium	15,003.0	652.59		Chloride	24,000.0	676.95
Calcium	225.0	11.23		Carbonate	0.0	0.00
Magnesium	94.5	7.77		Bicarbonate	330.0	5.41
Iron	17.4	0.93		Hydroxide	0.0	0.00
Barium	4.0	0.06	Analysis	-	0.0	0.00
Strontium	0.0	0.00	Balanced	-	0.0	0.00
CATIONS	15,343.9	672.58		ANIONS	24,341.0	682.59

System Parameters

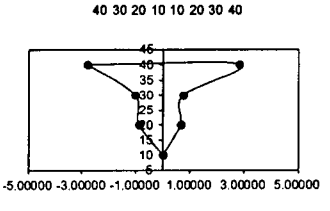
Total Dissolved Solids @180C	39,685	mg/L
Sample Temperature, 'F	70	F
Sample pH, standard units	6.94	Units
Dissolved Oxygen	0.0	ppm
Carbon Dioxide	0.0	mg/L
Total Sulfide, (TS)	0.0	mg/L
Sulfide Ion, (S)	0	mg/L
Dissolved Hydrogen Sulfide, (TS-S)	0	mg/L
Specific Gravity	1.0283	
Resistivity, measured	0	ohm/m^3
Ionic strength	0.687	
Sulfate Reducing Bacteria	nd	
Aerobic Bacteria	nd	
Manganese Level	4	mg/L

Scaling Tendency

	CACO3			CASO4			
	Stiff Davis	A		SOLUBILITY		S	A
Temp F	Index	index	Temp F	Actual	Calculated	Index	Index
32	-1.25	-619					
50	-1.12	-505	50	0.23	68.06	-67.83	-1617
68	-0.97	-396	68	0.23	68.31	-68.08	-1623
77	-0.89	-343	86	0.23	68.56	-68.33	-1629
86	-0.78	-278	104	0.23	68.66	-68.43	-1631
104	-0.56	-172	122	0.23	68.61	-68.38	-1630
122	-0.29	-77	140	0.23	67.65	-67.42	-1607
140	0.02	6	158	0.23	66.67	-66.45	-1584
158	0.34	63	176	0.23	65.69	-65.46	-1560
176	0.69	106					

BASO4 SCALE POSSIBLE: NO

Water Analysis Patern



NOTE: Stiff Davis Index
- indicates undersaturation. Scale formation negative.
0 indicates the water is at saturation point. Scale unlikely.
+ indicates supersaturation. A positive scaling condition exists.

NOTE: Skillman Method Calcium Sulfate 'S Index'
- indicates undersaturation. Scale formation negative.
0 indicates the water is at saturation point. Scale unlikely.
+ indicates supersaturation. A positive scaling condition exists.

NOTE: A Index; worst possible case. Assumes 100% precipitation.
- Units = pounds of scale produced / 1000 bbls. of water.
- A Index =< 0 Scale formation negative.
- A Index > 0 Scale formation positive.

Approved: Zech Schaff
02/25/13 v4.01

Logos Resources

County: Sandoval
State: NM
Sampled at: WH
Date: Jan.22,2013
H & M Precision Water Analysis Report

Field: Jicarilla
Location: Logos #2
Formation:
Depth: 0

Sum +	mg/L	meq/L		Sum -	mg/L	meq/L
Potassium	0	0		Sulfate	0	0
Sodium	15569.2	677.22		Chloride	25000	705.16
Calcium	324.5	16.19		Carbonate	0	0
Magnesiun	136.2	11.2		Bicarbonat	810	13.27
Iron	14.4	0.77		Hydroxide	0	0
Barium	0	0	Analysis	-	0	0
Strontium	0	0	Balanced	-	0	0
CATIONS	16044.3	705.38		ANIONS	25810	718.43

System Parameters

Total Dissolved Solids @180C	41854.3 mg/L
Sample Temperature, 'F	70 F
Sample pH, standard units	7.1 Units
Dissolved Oxygen	0 ppm
Carbon Dioxide	0 mg/L
Total Sulfide, (TS)	0 mg/L
Sulfide Ion, (S)	0 mg/L
Dissolved Hydrogen Sulfide, (TS-S)	0 mg/L
Specific Gravity	1.0296
Resistivity, measured	0 ohm/m^3
Ionic strength	0.726
Sulfate Reducing Bacteria	nd
Aerobic Bacteria	nd
Manganese Level	0 mg/L

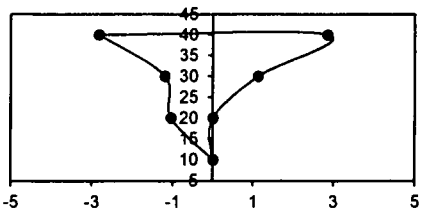
Scaling Tendency

	CACO3			CASO4			
	Stiff Davis	A		SOLUBILITY	S		A
Temp F	Index	index	Temp F	Actual	Calculatec	Index	Index
32	-0.55715	-320					
50	-0.42668	-225	50	0	67.27646	-67.2765	-1603.53
68	-0.2821	-135	68	0	67.52018	-67.5202	-1609.34
77	-0.19977	-91	86	0	67.76313	-67.7631	-1615.13
86	-0.0877	-37	104	0	67.84894	-67.8489	-1617.18
104	0.133054	50	122	0	67.77816	-67.7782	-1615.49
122	0.397505	127	140	0	66.81607	-66.8161	-1592.56
140	0.716725	191	158	0	65.84147	-65.8415	-1569.33
158	1.035621	231	176	0	64.85385	-64.8539	-1545.79
176	1.381819	257					

BASO4 SCALE POSSIBLE NO

Water Analysis Patern

40 30 20 10 10 20 30 40



NOTE: Stiff Davis Index
- indicates undersaturation. Scale formation negative.
0 indicates the water is at saturation point. Scale unlikely.
+ indicates supersaturation. A positive scaling condition exists.

NOTE: Skillman Method Calcium Sulfate 'S Index'
- indicates undersaturation. Scale formation negative.
0 indicates the water is at saturation point. Scale unlikely.
+ indicates supersaturation. A positive scaling condition exists.

NOTE: A Index; worst possible case. Assumes 100% precipitation.
- Units = pounds of scale produced / 1000 bbls. of water.
- A Index =< 0 Scale formation negative.
- A Index > 0 Scale formation positive.

Approved: Zech Schaff
41298.7 v4.01

Logos Resources

County: Sandoval
State: NM
Sampled at: WH
Date: May 16, 2013

Field: Jicarilla
Location: Logos #3
Formation:
Depth: 0

H & M Precision Water Analysis Report

Sum +	mg/L	meq/L		Sum -	mg/L	meq/L
Potassium	0.0	0.00		Sulfate	0.0	0.00
Sodium	12,563.4	546.48		Chloride	20,500.0	578.23
Calcium	406.1	20.26		Carbonate	0.0	0.00
Magnesium	170.5	14.03		Bicarbonate	830.0	13.60
Iron	43.2	2.32		Hydroxide	0.0	0.00
Barium	0.0	0.00	Analysis	-	0.0	0.00
Strontium	0.0	0.00	Balanced	-	0.0	0.00
CATIONS	13,183.2	**583.09**		ANIONS	21,330.0	**591.83**

System Parameters

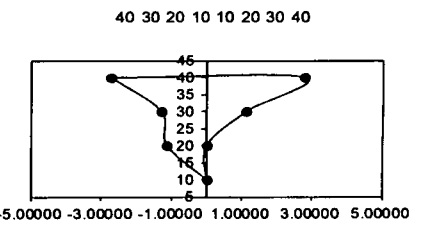
Total Dissolved Solids @180C	34,513	mg/L
Sample Temperature, 'F	70	F
Sample pH, standard units	**7.27**	Units
Dissolved Oxygen	0.0	ppm
Carbon Dioxide	0.0	mg/L
Total Sulfide, (TS)	0.0	mg/L
Sulfide Ion, (S)	0	mg/L
Dissolved Hydrogen Sulfide, (TS-S)	0	mg/L
Specific Gravity	1.0246	
Resistivity, measured	0	ohm/m^3
Ionic strength	0.605	
Sulfate Reducing Bacteria	nd	
Aerobic Bacteria	nd	
Manganese Level	0	mg/L

Scaling Tendency

	CACO3			CASO4			
	Stiff Davis	A		SOLUBILITY		S	A
Temp F	Index	index	Temp F	Actual	Calculated	Index	Index
32	-0.22	-119					
50	-0.09	-44	50	0.00	60.31	-60.31	-1438
68	0.07	29	68	0.00	60.57	-60.57	-1444
77	0.15	63	86	0.00	60.83	-60.83	-1450
86	0.26	105	104	0.00	60.96	-60.96	-1453
104	0.48	172	122	0.00	60.96	-60.96	-1453
122	0.75	231	140	0.00	60.01	-60.01	-1430
140	1.05	279	158	0.00	59.05	-59.05	-1407
158	1.37	311	176	0.00	58.08	-58.08	-1384
176	1.71	332					

BASO4 SCALE POSSIBLE NO

Water Analysis Patern



NOTE: Stiff Davis Index
- indicates undersaturation. Scale formation negative.
0 indicates the water is at saturation point. Scale unlikely.
+ indicates supersaturation. A positive scaling condition exists.

NOTE: Skillman Method Calcium Sulfate 'S Index'
- indicates undersaturation. Scale formation negative.
0 indicates the water is at saturation point. Scale unlikely.
+ indicates supersaturation. A positive scaling condition exists.

NOTE: A Index; worst possible case. Assumes 100% precipitation.
- Units = pounds of scale produced / 1000 bbls. of water.
- A Index =< 0 Scale formation negative.
- A Index > 0 Scale formation positive.

Approved: Zech Schaff
05/24/13

v4.01

NOTICE

NO OCD PERMIT REQUIRED FOR RE-USE OF PRODUCED WATER

AT OIL AND GAS OPERATIONS

The Oil Conservation Division (OCD) has the authority in Section 70-2-12 NMSA 1978 (2004) to regulate "the disposition of water produced or used in connection with the drilling for or producing of oil or gas or both and to direct surface or subsurface disposal of the water, including disposition by use in drilling for or production of oil and gas ... in a manner that will afford reasonable protection against contamination of fresh water supplies designated by the state engineer." The Oil Conservation Commission has enacted a rule, 19.15.34 NMAC, which regulates the transportation and disposition of produced water. Rule 19.15.34.12 NMAC allows the disposition of produced water for use as a drilling or completion fluid at a drilling site or disposition under other Division authorization.

The Energy, Minerals and Natural Resources Department and OCD Director support the growing interest in the re-use of produced water for oil and gas operations. The Director notes that there is some confusion about the applicability of OCC rules to re-use produced water and whether prior authorization from OCD is needed for re-use of produced water.

No OCD permit or authorization is required for the re-use of produced water, drilling fluids or other oil field liquids as a drilling or completion fluid or other type of oil field fluid, including makeup water, fracturing fluid or drilling mud, at a permitted drilling, production or plugging operation. However, the re-use of produced water is NOT permitted for any use which involves contact with fresh water zones. No permit is required for the delivery of produced water to permitted salt water disposal facilities, secondary recovery, pressure maintenance or EOR projects, surface waste management facilities, or to well sites for use in drilling, completion, or plugging operations. Produced water must be stored and re-used in a manner that protects fresh water, public health, and the environment. Produced water, brine makeup water, or frac flowback water can be stored in permanent pits or in temporary multi-well fluid management pits when used only on wells identified in the multi-well fluid management pit permit.

Multi-well Fluid Management Pits, Rule 19.15.17 NMAC

To request approval to construct a multi-well fluid management pit, an operator must file an application form C-144 with required attachments, including a list of wells with approved APDs associated with the pit, to the appropriate division district office. A form C-102 must also be provided showing the proposed pit location. These pits may be used for the storage, treatment and recycling of stimulation fluids and flow-back water during the drilling and completion of multiple wells, and may not be used for disposal of drilling, completion or other waste. Multi-well fluid management pits must be closed within 6 months from the date all stimulation operations on all wells identified in the permit cease.

Permanent Pits, Rule 19.15.17 NMAC

To request approval to construct a permanent pit, an operator or commercial entity must file an application Form C-144 with required attachments to the OCD Environment Bureau in Santa Fe and submit a copy to the appropriate OCD District Office. Fluids stored in a permanent pit can include produced water from different wells, different leases, or from deep saline aquifers. Permanent pits must be closed within 60 days of cessation of operation of the pit.

Other Re-use of Produced Water

Any other re-use of produced water that is regulated by OCD requires an authorization or permit from OCD issued on a case by case basis. An Application for Re-Use of Produced Water, form form C-147, must be submitted to the appropriate OCD District Office. The Application can be found on the OCD Forms webpage (http://www.emnrd.state.nm.us/OCD/forms.html).

Transportation of Produced Water, Rule 19.15.34 NMAC

Approval (with form C-133) is still required to transport produced water or other liquid oil field waste.

All applicable law and OCD rules must be complied with in connection with the re-use of produced water. OCD retains the authority to limit or condition the re-use of produced water that may adversely impact fresh water, public health, safety or the environment.