

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Well Operator's Report of Well Work

API 47 - 061 - 01811 County Monongalia District Clay
Quad Osage, WV Pad Name Boggess Field/Pool Name _____
Farm name Blake R. & H. Preston Boggess Well Number 1H
Operator (as registered with the OOG) Northeast Natural Energy LLC
Address 707 Virginia St. E, Suite 1200 City Charleston State WV Zip 25301

As Drilled location NAD 83/UTM Attach an as-drilled plat, profile view, and deviation survey
Top hole Northing 439153934 Easting 577763.8
Landing Point of Curve Northing 4391497.1 Easting 577610.2
Bottom Hole Northing 4394765.7 Easting 575653.2

Elevation (ft) 1,266 GL Type of Well New Existing Type of Report Interim Final
Permit Type Deviated Horizontal Horizontal 6A Vertical Depth Type Deep Shallow
Type of Operation Convert Deepen Drill Plug Back Redrilling Rework Stimulate
Well Type Brine Disposal CBM Gas Oil Secondary Recovery Solution Mining Storage Other _____
Type of Completion Single Multiple Fluids Produced Brine Gas NGL Oil Other _____
Drilled with Cable Rotary

Drilling Media Surface hole Air Mud Fresh Water Intermediate hole Air Mud Fresh Water Brine
Production hole Air Mud Fresh Water Brine

Mud Type(s) and Additive(s)
Synthetic Based Mud - Horizontal Section: BIO-BASE 365, CALCIUM CHLORIDE POWDER, G-SEAL PLUS, HRP, LIME, M-I WATE (BARITE),
M-I-X II MEDIUM, MEGADRIL P SYSTEM, MEGADRIL P SYSTEM RENTAL, MEGAMUL, SAFE-CARB 250, VERSATHIN HF, VERSAWET, VG-PLUS, VINSEAL MEDIUM, WALNUT NUT PLUG MEDIUM

Date permit issued 12/18/2018 Date drilling commenced 2/19/19 Date drilling ceased 4/28/19
Date completion activities began 9/20/19 Date completion activities ceased 10/11/19
Verbal plugging (Y/N) NA Date permission granted NA Granted by NA

Please note: Operator is required to submit a plugging application within 5 days of verbal permission to plug

Freshwater depth(s) ft 320', 1010', 1125' Open mine(s) (Y/N) depths N
Salt water depth(s) ft 1550', 1900' Void(s) encountered (Y/N) depths N
Coal depth(s) ft 348', 620', 680', 1010' Cavern(s) encountered (Y/N) depths N
Is coal being mined in area (Y/N) N

Reviewed by:

API 47-061 - 01811 Farm name Blake R. & H. Preston Boggess Well number 1H

CASING STRINGS	Hole Size	Casing Size	Depth	New or Used	Grade wt/ft	Basket Depth(s)	Did cement circulate (Y/N) * Provide details below*
Conductor	30	24	40'	N	NA	NA	Y to surface
Surface	17.5	13.38	1,250'	N	54.5	N/A	Y, 71 bbl
Coal							
Intermediate 1	12.25	9.63	2,491'	N	40	N/A	Y, 25 bbl
Intermediate 2							
Intermediate 3							
Production	8.5	5.5	20,881'	N	20	N/A	Y
Tubing							
Packer type and depth set							

Comment Details _____

CEMENT DATA	Class/Type of Cement	Number of Sacks	Slurry wt (ppg)	Yield (ft ³ /sks)	Volume (ft ³)	Cement Top (MD)	WOC (hrs)
Conductor	4500 psi ready mix	35		.75	27	CTS	48
Surface	Class A	1,218	15.6	1.19	1,459	CTS	8+
Coal							
Intermediate 1	Class A	808	15.2	1.26	1,019	CTS	8+
Intermediate 2							
Intermediate 3							
Production	Class A	857	8.3	1.18	2,602	1185	8+
Tubing							

Drillers TD (ft) 20,898' Loggers TD (ft) 20,868'
 Deepest formation penetrated Marcellus Plug back to (ft) NA
 Plug back procedure NA

Kick off depth (ft) 7,184'

Check all wireline logs run caliper density deviated/directional induction
 neutron resistivity gamma ray temperature sonic

Well cored Yes No Conventional Sidewall Were cuttings collected Yes No

DESCRIBE THE CENTRALIZER PLACEMENT USED FOR EACH CASING STRING _____
Surface: Bow spring centralizers every 3rd joint or approximately 120'
Intermediate: Bow spring centralizers every 3rd joint or approximately 120'
Production: Rigid body centralizers placed at a minimum of every other joint (~80') from TD to surface

WAS WELL COMPLETED AS SHOT HOLE Yes No DETAILS _____

WAS WELL COMPLETED OPEN HOLE? Yes No DETAILS _____

WERE TRACERS USED Yes No TYPE OF TRACER(S) USED _____

API 47- 061 - 01811 Farm name Blake R. & H. Preston Boggess Well number 1H

<u>PRODUCING FORMATION(S)</u>	<u>DEPTHS</u>		
Marcellus	8,022	TVD	20,898 MD

Please insert additional pages as applicable.

GAS TEST Build up Drawdown Open Flow OIL TEST Flow Pump

SHUT-IN PRESSURE Surface 2043 psi Bottom Hole 4379 psi DURATION OF TEST 24 hrs

OPEN FLOW Gas Oil NGL Water GAS MEASURED BY
278 mcfpd bpd bpd bpd Estimated Orifice Pilot

LITHOLOGY/ TOP BOTTOM TOP BOTTOM
 FORMATION DEPTH IN FT DEPTH IN FT DEPTH IN FT DEPTH IN FT DESCRIBE ROCK TYPE AND RECORD QUANTITY AND
 NAME TVD TVD MD MD TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H₂S, ETC)

LITHOLOGY/ FORMATION	TOP DEPTH IN FT NAME TVD	BOTTOM DEPTH IN FT TVD	TOP DEPTH IN FT MD	BOTTOM DEPTH IN FT MD	DESCRIBE ROCK TYPE AND RECORD QUANTITY AND TYPE OF FLUID (FRESHWATER, BRINE, OIL, GAS, H ₂ S, ETC)
	0		0		See Attached

Please insert additional pages as applicable.

Drilling Contractor Highlands Drilling
 Address 900 Virginia St. E City Charleston State WV Zip 25301

Logging Company Schlumberger
 Address 4600 Jbary Court, Suite 200 City Canonsburg State PA Zip 15317

Cementing Company BJ Services
 Address 1036 E Main St City Bridgeport State WV Zip 26330

Stimulating Company Producers Services
 Address 109 Graham St. City Zanesville State OH Zip 43701

Please insert additional pages as applicable.

Completed by Hollie Medley Telephone 304-212-0422
 Signature  Title Regulatory Manager Date 1/10/2020

Boggess 1H Perforation Information

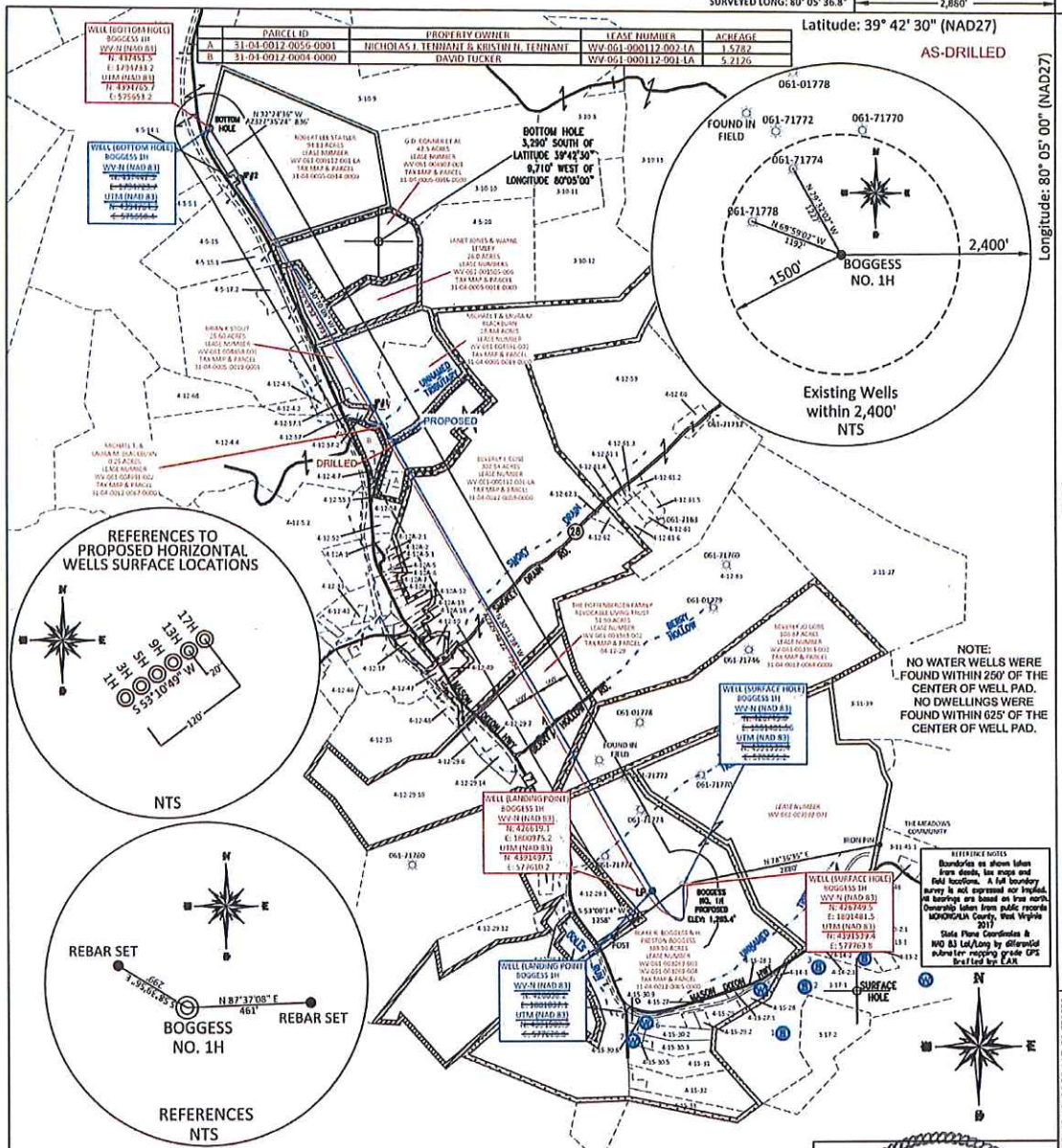
Stage Number	Report Date	Cluster 5 Bottom TD	Cluster 1 Top TD	Total Shots
1	9/20/19	20,739	0	0
2	9/20/19	20,533	20,703	40
3	9/20/19	20,302	20,452	40
4	9/21/19	20,117	20,254	40
5	9/22/19	19,881	20,052	40
6	9/22/19	19,692	19,838	40
7	9/22/19	19,498	19,648	40
8	9/22/19	19,298	19,460	40
9	9/22/19	19,056	19,246	40
10	9/23/19	18,855	19,011	40
11	9/23/19	18,677	18,827	40
12	9/23/19	18,464	18,617	40
13	9/23/19	18,271	18,431	40
14	9/24/19	18,083	18,229	40
15	9/25/19	17,882	18,037	40
16	9/25/19	17,689	17,836	40
17	9/26/19	17,463	17,638	40
18	9/26/19	17,253	17,430	40
19	9/26/19	17,067	17,215	40
20	9/27/19	16,885	17,022	40
21	9/27/19	16,689	16,834	40
22	9/27/19	16,535	16,642	40
23	9/28/19	16,384	16,477	40
24	9/28/19	16,234	16,342	40
25	9/28/19	16,051	16,200	40
26	9/29/19	15,799	16,002	40
27	9/29/19	15,619	15,772	40
28	9/30/19	15,369	15,525	40
29	9/30/19	15,152	15,318	40
30	9/30/19	14,950	15,098	40
31	10/1/19	14,719	14,889	40
32	10/1/19	14,525	14,676	40
33	10/1/19	14,304	14,465	40
34	10/1/19	14,088	14,260	40
35	10/2/19	13,893	14,048	40
36	10/3/19	13,700	13,840	40
37	10/3/19	13,460	13,644	40
38	10/3/19	13,273	13,436	40
39	10/4/19	13,087	13,226	40
40	10/4/19	12,859	13,016	40
41	10/4/19	12,671	12,801	40
42	10/5/19	12,490	12,626	40
43	10/5/19	12,278	12,415	40
44	10/5/19	12,082	12,217	40
45	10/5/19	11,871	12,025	40
46	10/6/19	11,681	11,840	40
47	10/6/19	11,487	11,630	40
48	10/7/19	11,271	11,446	40
49	10/7/19	11,042	11,231	40
50	10/7/19	10,859	11,013	40
51	10/8/19	10,619	10,797	40
52	10/8/19	10,416	10,583	40
53	10/8/19	10,209	10,362	40
54	10/9/19	9,990	10,169	40
55	10/9/19	9,790	9,951	40
56	10/9/19	9,582	9,757	40
57	10/5/19	9,384	9,535	40
58	10/5/19	9,191	9,341	40
59	10/10/19	9,019	9,136	40
60	10/11/19	8,808	8,971	40
61	10/11/19	8,608	8,753	40
62	10/11/19	8,426	8,567	40
63	10/11/19	8,292	8,372	40

Bogges 1H Stimulation Information

Stage Number	Report Date	ISIP (psi)	Breakdown Pressure (psi)	Avg Treating Pressure (psi)	Avg Treating Rate (BPM)	Pad Volume (bbls)	Total Clean Fluid (Bbls)	Total Proppant Amount (lbs)	Flush Volume (bbls)
1	9/20/19	6,022	7,645	8,897	82	576	6,551	299,900	466
2	9/20/19	6,015	6,996	9,370	84	145	8,533	404,220	459
3	9/20/19	5,774	7,742	9,060	79	157	8,423	403,940	453
4	9/21/19	5,721	6,220	8,934	81	220	8,578	398,740	451
5	9/22/19	5,869	6,184	8,880	82	245	8,809	403,420	443
6	9/22/19	5,319	7,073	9,039	85	83	8,458	399,520	447
7	9/22/19	5,589	6,579	9,059	84	61	7,901	402,120	440
8	9/22/19	5,869	6,277	8,555	80	88	9,045	399,440	432
9	9/22/19	5,536	6,433	8,706	80	188	8,392	398,780	434
10	9/23/19	5,479	6,558	8,977	83	70	8,318	406,420	485
11	9/23/19	5,860	6,459	8,907	85	50	8,116	400,640	420
12	9/23/19	6,060	6,372	8,349	80	66	7,995	399,760	415
13	9/23/19	6,064	6,715	8,672	83	198	8,344	402,060	410
14	9/24/19	5,804	6,269	9,318	66	74	10,917	135,620	405
15	9/25/19	5,631	6,560	8,813	84	70	8,723	408,620	401
16	9/25/19	5,564	6,362	8,485	81	80	8,102	398,420	395
17	9/26/19	5,606	6,989	8,849	84	48	8,412	383,520	397
18	9/26/19	5,758	6,482	8,754	83	76	7,716	392,500	387
19	9/26/19	5,543	6,300	8,678	83	70	8,715	400,530	379
20	9/27/19	5,787	6,070	8,737	83	65	7,673	337,680	548
21	9/27/19	5,860	6,769	8,595	79	72	8,859	400,020	372
22	9/27/19	5,630	6,521	8,865	84	46	8,248	399,900	374
23	9/28/19	5,738	7,177	8,785	83	146	8,486	402,100	377
24	9/28/19	5,738	6,886	8,613	83	40	8,346	403,930	365
25	9/28/19	5,694	6,345	8,925	80	80	8,360	400,200	359
26	9/29/19	5,444	6,669	8,680	83	45	8,397	399,980	357
27	9/29/19	5,718	6,339	8,600	83	71	9,999	502,480	351
28	9/30/19	5,325	5,909	8,360	83	84	10,382	497,600	390
29	9/30/19	5,689	5,887	8,405	80	88	9,918	502,840	341
30	9/30/19	5,455	6,326	8,685	85	60	8,629	447,860	335
31	10/1/19	6,205	5,760	8,113	82	50	9,548	497,260	335
32	10/1/19	5,644	5,569	7,854	81	80	9,585	502,440	328
33	10/1/19	5,585	5,892	7,849	80	88	10,053	511,840	320
34	10/1/19	6,004	6,163	8,037	82	31	9,532	501,920	317
35	10/2/19	5,665	6,071	8,278	85	50	9,839	504,700	315
36	10/3/19	6,089	5,765	8,133	86	67	9,224	500,440	310
37	10/3/19	5,918	6,148	8,172	85	118	9,128	503,280	302
38	10/3/19	5,719	5,776	7,959	82	55	8,539	503,320	296
39	10/4/19	5,929	5,770	7,914	83	100	8,973	500,180	297
40	10/4/19	5,593	6,193	7,990	83	65	8,614	500,260	290
41	10/4/19	5,876	6,173	8,309	87	95	8,450	501,660	283
42	10/5/19	6,084	6,245	8,040	83	70	8,841	499,940	280
43	10/5/19	5,938	6,487	8,225	83	60	8,634	500,580	320
44	10/5/19	5,780	6,421	8,241	86	70	8,556	500,900	272
45	10/5/19	5,977	6,075	8,098	83	355	9,329	459,660	995
46	10/6/19	5,742	5,862	7,704	84	85	9,462	499,800	262
47	10/6/19	5,883	6,011	7,821	84	65	9,127	501,200	258
48	10/7/19	5,759	6,668	7,917	83	105	9,705	500,280	251
49	10/7/19	6,145	7,144	8,009	83	65	9,650	505,980	248
50	10/7/19	5,606	6,445	8,156	85	45	8,787	502,580	247
51	10/8/19	5,830	6,593	7,830	83	108	9,615	501,680	239
52	10/8/19	5,802	7,197	8,101	82	70	9,023	481,940	235
53	10/8/19	5,800	6,625	8,299	85	93	10,292	504,060	229
54	10/9/19	5,565	6,853	8,234	83	219	10,114	498,960	229
55	10/9/19	5,896	6,413	8,025	84	83	8,915	472,000	225
56	10/9/19	6,392	6,563	8,269	82	60	10,519	498,980	218
57	10/5/19	5,741	7,245	8,128	80	73	9,950	500,140	212
58	10/5/19	5,880	7,010	8,012	80	68	8,838	455,200	205
59	10/10/19	5,732	6,911	8,131	85	45	9,367	525,480	204
60	10/11/19	6,549	7,422	8,350	80	81	11,423	499,580	195
61	10/11/19	5,662	6,661	7,894	80	63	9,360	499,620	194
62	10/11/19	6,223	6,933	8,324	85	30	9,336	518,840	192
63	10/11/19	5,692	6,339	7,885	85	75	8,832	483,820	186

Bogges Pad Lithology

Lithology/Formation	Top Depth in FT TVD	Bottom Depth in FT TVD	Describe rock type and record quantity and type of fluid (freshwater, brine, oil, gas, H2S, etc)
Shale/Sand	0	270	Shale/Sand
Sand/silt	270	320	Sand/silt
sand/shale	320	348	sand/shale
coal	348	352	coal
Sand/silt	352	380	Sand/silt
sandstone/limestone	380	500	sandstone/limestone
Sand/silt	500	620	Sand/silt
coal	620	625	coal
Siltstone/Limestone	625	680	Siltstone/Limestone
coal	680	684	coal
Limestone/Siltstone	684	770	Limestone/Siltstone
Siltstone/Shale	770	920	Siltstone/Shale
Sandstone	920	1010	Sandstone
coal	1010	1017	coal
sandstone/siltstone	1017	1280	sandstone/siltstone
sandstone/siltstone	1280	1850	sandstone/siltstone
Red Shale/Siltstone	1850	1970	Red Shale/Siltstone
Limestone	1970	2030	Limestone
Big Injun	2030	2150	Big Injun
sandstone/siltstone	2150	2210	sandstone/siltstone
Gantz	2210	2240	Gantz
siltstone/shale	2240	2510	siltstone/shale
Upper Devonian undifferentiated	2510	6350	Upper Devonian undifferentiated
siltstone/shale	6350	7008	siltstone/shale
Middlesex	7008	7310	Middlesex
Burkett	7310	7640	Burkett
Geneseo	7640	7692	Geneseo
Tully	7692	7745	Tully
Hamilton	7745	7870	Hamilton
Marcellus	7870	TD	Marcellus



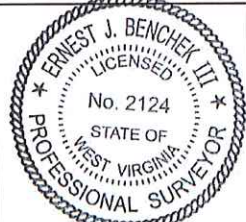
FILE #: NEE14
 DRAWING #: 2862
 SCALE: PLAT: 1" = 2000'
 TACK MARK: 1" = 2000'

MINIMUM DEGREE OF ACCURACY: 1/200

PROVEN SOURCE OF ELEVATION: SUBMETER MAPPING GRADE GPS

I, THE UNDERSIGNED, HEREBY CERTIFY THAT THIS PLAT IS CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF AND SHOWS ALL THE INFORMATION REQUIRED BY LAW AND THE REGULATIONS ISSUED AND PRESCRIBED BY THE DEPARTMENT OF ENVIRONMENTAL PROTECTION.

Signed: *[Signature]*
 L.L.S. #2124; Ernest J. Benchek III



(+) DENOTES LOCATION OF WELL ON UNITED STATES TOPOGRAPHIC MAPS
 WYDEP
 OFFICE OF OIL & GAS
 601 57TH STREET
 CHARLESTON, WV 25304

Well Type: Oil Waste Disposal Production Deep
 Gas Liquid Injection Storage Shallow

WATERSHED: DUNKARD CREEK
 COUNTY/DISTRICT: MONONGALIA / CLAY
 SURFACE OWNER: BLAKE R. & PRESTON H. BOGGESS
 OIL & GAS ROYALTY OWNER: BLAKE R. & PRESTON H. BOGGESS 'et al'
 LEASE NUMBERS:

DATE: JANUARY 13, 2020
 OPERATOR'S WELL #: BOGGESS NO. 1H
 API WELL #: 47 61 47-061-01811
 STATE COUNTY PERMIT
 AS-BUILT
 ELEVATION: 1,266.2'
 QUADRANGLE: OSAGE, WV
 ACREAGE: 389.96 +/-
 ACREAGE: 1075.72 +/-

DRILL CONVERT DRILL DEEPER REDRILL FRACTURE OR STIMULATE
 PLUG OFF FORMATION PERFORATE NEW FORMATION PLUG & ABANDON
 CLEAN OUT & REPLUG OTHER CHANGE (SPECIFY):

TARGET FORMATION: MARCELLUS
 AS-DRILLED DEPTH: TVD: 8,022' TMD: 20,898'
 WELL OPERATOR: NORTHEAST NATURAL ENERGY LLC
 ADDRESS: 707 VIRGINIA STREET EAST, SUITE 1200
 CITY: CHARLESTON STATE: WV ZIP CODE: 25301

SURFACE HOLE DEC. LAT: 39 05 20555 SURVEYED LAT: 39 40 112.2

Borehole: Original Borehole	Well: Bogges 1H	Field: WV Monongalia County (NAD 83)	Structure: Patterson 334
Gravity & Magnetic Parameters Model: HDGM 2019 Dp: 66.661° Date: 18-Apr-2019 MagDec: -9.264° FS: 62120.835mT Gravity FS: 999.334mgm (R.00665 Based)		Surface Location NAD83 West Virginia State Plane, Northern Zone, US Feet Lat: N 39 40 12.49 Northing: 426749.531US Grid Conv: -0.3784' Lon: W 80 5 38.03 Easting: 1801481.477US Scale Fact: 0.99994104	
Miscellaneous Slot: Bogges 1H TVD Ref: KB(1293ft above MSL) Plan: Northeast Natural Bogges 1H Gyro-MVD 0' to 20898 MD			

True North

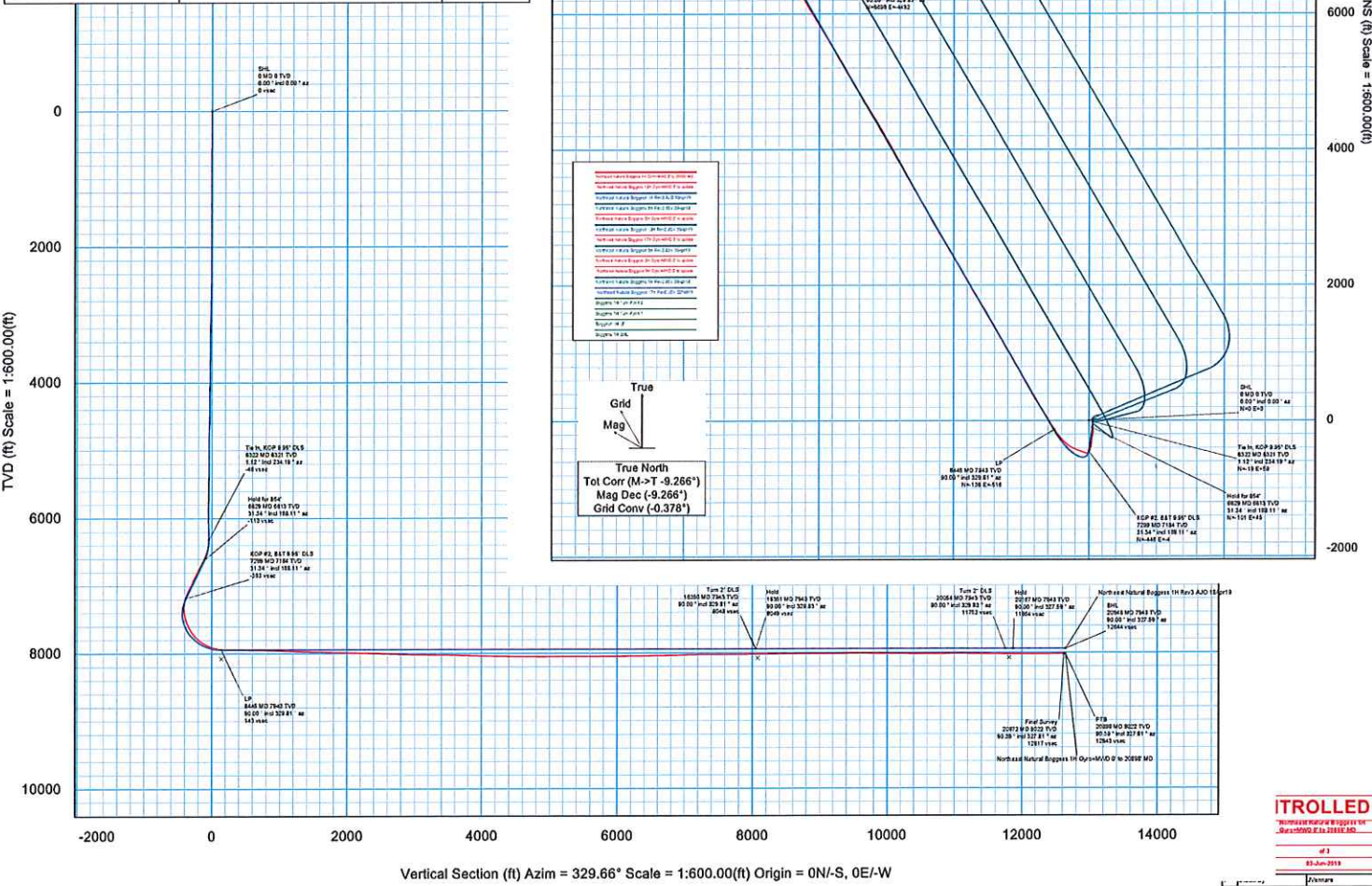
EW (ft) Scale = 1:600.00(ft)

Critical Points								
Critical Point	MD	INCL	AZIM	TVD	VSEC	N(YPR)	E(YPR)	DLS
SHL	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Final Survey	20872.00	90.38	327.81	8022.43	12618.72	10038.78	-8505.38	2.38
FTB	20898.00	90.38	327.81	8022.31	12642.71	10057.78	-8519.20	0.00

PK	Seq	Survey Tool	Vendor/Tool	Rate (ft)	Casing Rate (ft)	Expected MD From Meas Ind	MD To (ft)	Survey Frequency (ft)	EOU Size (ft)	EOU Size (ft)	Comments/Contingency
1	1	NAL_NGS-MSHOT-Cyph	Qyph	30	30	0	35	1.58	425	1.251	1.25
1	2	NAL_NGS-MSHOT-Cyph	Qyph	30	30	25	25	Ad Dns	1.251	1.251	1.25
1	3	NAL_NGS-MSHOT		30	30	25	8222	Ad Dns	11.051	3.623	
1	4	NAL_MVD_1_8_DGS		30	30	6322	20898	Ad Dns	450	183	13.725

Surface Location	
Northing	Easting
426749.531	1801481.477
Latitude: N 39 40 12.49	Longitude: W 80 5 38.03
Vtrue Azimuth: 329.66	

Target Name	Shape	Dimension	Latitude	Longitude	Northing	Easting	TVD	VSec	N(YPR)	E(YPR)	Local Coord
Bogges 1H Turn Point 2	Point	N/A	N 39 41 53.79 W 80 5 57.48	434733.53	178187.10	8074.00	11908.35		947.73	-8502.59	
Bogges 1H Turn Point 1	Point	N/A	N 39 41 18.92 W 80 5 31.86	425558.82	179123.68	8074.00	8077.38		9722.10	-8505.56	
Bogges 1H LP	Point	N/A	N 39 40 11.15 W 80 5 42.63	426117.20	180064.82	8074.00	143.38		-138.78	-8515.00	
Bogges 1H SHL	Point	N/A	N 39 41 57.77 W 80 5 7.40	427447.30	178472.70	8074.00	12643.86		1053.56	-8528.69	



ITROLLED
 This document contains Schlumberger information.
 Date: 18-Jun-2019
 Page Number: 10

BJ Cementing Treatment Report

SERVICE SUPERVISOR	Javier Macias	FORMATION	Marcellus Shale
CLIENT FIELD REPRESENTATIVE	Nathan Cadwell	RIG	Highlands 8
DISTRICT	Massillon, OH	COUNTY	MONONGALIA
SERVICE	Cementing	STATE / PROVINCE	WV

WELL GEOMETRY

TYPE	OD (in)	ID (in)	WEIGHT (lbs/ft)	MD (ft)	TVD (ft)	EXCESS (%)	GRADE	THREAD
Previous Casing	24.00	23.25	94.58	40.00	40.00			
Open Hole		17.50		1,265.00	1,265.00	60.00		
Casing	13.38	12.62	54.50	1,250.00	1,250.00			

HARDWARE

Bottom Plug Used?	No	Tool Type	Float Collar
Bottom Plug Provided By		Tool Depth (ft)	1,146.00
Bottom Plug Size		Max Tubing Pressure - Rated (psi)	
Top Plug Used?	Yes	Max Tubing Pressure - Operated (psi)	
Top Plug Provided By	BJ	Max Casing Pressure - Rated (psi)	2,730.00
Top Plug Size	13.375	Max Casing Pressure - Operated (psi)	2,184.00
Centralizers Used	Yes	Pipe Movement	None
Centralizers Quantity	9.00	Job Pumped Through	Manifold
Centralizers Type	Bow	Top Connection Thread	BTC
Landing Collar Depth (ft)	1,147	Top Connection Size	13.375

CIRCULATION PRIOR TO JOB

Well Circulated By	BJ	YP Mud In	
Circulation Prior to Job	Yes	YP Mud Out	
Circulation Time (min)	30.00	Solids Present at End of Circulation	No
Circulation Rate (bpm)	4.50	10 sec SGS	
Circulation Volume (bbls)	184.00	10 min SGS	
Lost Circulation Prior to Cement Job	No	30 min SGS	
Mud Density In (ppg)		Flare Prior to / during the Cement Job	No
Mud Density Out (ppg)		Gas Present	No
PV Mud In		Gas Units	
PV Mud Out			

TEMPERATURE

Ambient Temperature (°F)	30.00	Slurry Cement Temperature (°F)	60.00
Mix Water Temperature (°F)	60.00	Flow Line Temperature (°F)	

FLUID DETAILS

FLUID TYPE	FLUID NAME	DENSITY (ppg)	YIELD (Cu Ft/sk)	H ₂ O REQ. (gals/sk)	VOL (sk)	VOL (Cu Ft)	VOL (bbls)
Spacer / Pre Flush / Flush	Fresh Water	8.3400					10.0000
Spacer / Pre Flush / Flush	Gel Spacer	8.6100					25.0000
Spacer / Pre Flush / Flush	Fresh Water	8.3400					10.0000
Tail Slurry	Cement Slurry	15.6000	1.1979	5.23	1,218	1,459.0000	259.7000
Displacement Final	Fresh Water	8.3400				0.0000	187.1000

FLUID TYPE	FLUID NAME	COMPONENT	CONCENTRATION	UOM
Spacer / Pre Flush / Flush	Gel Spacer	Fresh Water	100.0000	PCT
Spacer / Pre Flush / Flush	Gel Spacer	IntegraSeal POLI	1.0000	PPB
Spacer / Pre Flush / Flush	Gel Spacer	EXTENDER, BENTONITE	20.0000	PPB
Tail Slurry	Cement Slurry	CEMENT, CLASS A	100.0000	PCT
Tail Slurry	Cement Slurry	IntegraSeal POLI	0.2500	LBS/SK
Tail Slurry	Cement Slurry	ACCELERATOR, SALT, CHLORIDE, CALCIUM, A-7P, PELLETS	2.0000	BWOB

TREATMENT SUMMARY



TIME	FLUID	RATE (bpm)	FLUID VOL. (bbls)	PIPE PRESSURE (psi)	ANNULUS PRESSURE (psi)	COMMENTS
	Fresh Water	0.00	10.00			
	Gel Spacer	0.00	25.00			
	Fresh Water	0.00	10.00			
	Cement Slurry	0.00	259.70			
	Fresh Water	0.00	187.10			

MIN / MAX / AVG PRESSURE AND RATES

	MIN	MAX	AVG
Pressure (psi)	0.00	3,000.00	500.00
Rate (bpm)	0.00	5.50	4.50



DISPLACEMENT AND END OF JOB SUMMARY

Displaced By	BJ	Amt of Cement Returned / Reversed	71.00
Calculated Displacement Vol (bbls)	177.00	Method Used to Verify Returns	Visual
Actual Displacement Vol (bbls)	178.00	Amt of Spacer to Surface	25.00
Did Float Hold?	Yes	Pressure Left on Casing (psi)	0.00
Bump Plug	Yes	Amt Bled Back After Job	1.00
Bump Plug Pressure (psi)	1,350.00	Total Volume Pumped (bbls)	652.00
Were Returns Planned at Surface	Yes	Top Out Cement Spotted	No
Cement Returns During Job	Full	Lost Circulation During Cement Job	No

CEMENT PLUG

Bottom of Cement Plug?	No	Wiper Balls Used?	No
Wiper Ball Quantity		Plug Catcher	No
Number of Plugs			

SQUEEZE

Injection Rate (bpm)		Fluid Density (ppg)	
Injection Pressure (psi)		ISIP (psi)	
Type of Squeeze		FSIP (psi)	
Operators Max SQ Pressure (psi)			

Comments

TREATMENT REPORT

JOB SUMMARY

BJ Cementing Treatment Report

SERVICE SUPERVISOR	Andrew Gilbert	FORMATION	Marcellus Shale
CLIENT FIELD REPRESENTATIVE	Nathan Caldwell	RIG	Highlands 8
DISTRICT	Massillon, OH	COUNTY	MONONGALIA
SERVICE	Cementing	STATE / PROVINCE	WV

WELL GEOMETRY

TYPE	OD (in)	ID (in)	WEIGHT (lb/ft)	MD (ft)	TVD (ft)	EXCESS (%)	GRADE	THREAD
Casing	9.63	8.84	40.00	2,491.00	2,491.00			
Open Hole		12.25		2,550.00	2,550.00	40.00		
Previous Casing	13.38	12.62	54.50	1,250.00	1,250.00			

HARDWARE

Bottom Plug Used?	No	Tool Type	Float Collar
Bottom Plug Provided By		Tool Depth (ft)	2,449.00
Bottom Plug Size		Max Tubing Pressure - Rated (psi)	
Top Plug Used?	Yes	Max Tubing Pressure - Operated (psi)	
Top Plug Provided By	Non BJ	Max Casing Pressure - Rated (psi)	3950.00
Top Plug Size	9.625	Max Casing Pressure - Operated (psi)	3160.00
Centralizers Used	Yes	Pipe Movement	None
Centralizers Quantity	20.00	Job Pumped Through	Manifold
Centralizers Type	Bow	Top Connection Thread	BTC
Landing Collar Depth (ft)	2,449	Top Connection Size	9.625

CIRCULATION PRIOR TO JOB

Well Circulated By	BJ	YP Mud In
Circulation Prior to Job	No	YP Mud Out
Circulation Time (min)		Solids Present at End of Circulation
Circulation Rate (bpm)		No
Circulation Volume (bbls)	195.00	10 sec SGS
Lost Circulation Prior to Cement Job	No	10 min SGS
Mud Density In (ppg)		30 min SGS
Mud Density Out (ppg)		Flare Prior to / during the Cement Job
PV Mud In		No
PV Mud Out		Gas Present
		No
		Gas Units

TEMPERATURE

Ambient Temperature (°F)	35.00	Slurry Cement Temperature (°F)	59.00
Mix Water Temperature (°F)	54.00	Flow Line Temperature (°F)	

FLUID DETAILS

FLUID TYPE	FLUID NAME	DENSITY (ppg)	YIELD (Cu Ft/sk)	H ₂ O REQ (gals/sk)	VOL (sk)	VOL (Cu Ft)	VOL (bbls)
Spacer / Pre Flush / Flush	Clear Shoe	8.3400					195.0000
Spacer / Pre Flush / Flush	Gel Spacer	8.6100					25.0000
Spacer / Pre Flush / Flush	Fresh Water	8.3400					10.0000
Tail Slurry	Cement Slurry	15.2000	1.2618	5.75	808	1019.0000	181.4000
Displacement Final	Fresh Water	8.3400				0.0000	186.5000

FLUID TYPE	FLUID NAME	COMPONENT	CONCENTRATION	UOM
Spacer / Pre Flush / Flush	Gel Spacer	Fresh Water	100.0000	PCT
Spacer / Pre Flush / Flush	Gel Spacer	EXTENDER, BENTONITE	20.0000	PPB
Tail Slurry	Cement Slurry	ACCELERATOR, SALT, CHLORIDE, CALCIUM, A-7P, PELLETS	1.5000	BWOB
Tail Slurry	Cement Slurry	FOAM PREVENTER, FP-13L	0.7000	GALS/100SK
Tail Slurry	Cement Slurry	CEMENT, CLASS A	100.0000	PCT

TREATMENT SUMMARY

TIME	FLUID	RATE (bpm)	FLUID VOL (bbls)	PIPE PRESSURE (psi)	ANNULUS PRESSURE (psi)	COMMENTS
2/22/2019 12:52:00 AM	Clear Shoe	6.80	195.00	280.00		
2/22/2019 1:02:00 AM	Gel Spacer	3.50	25.00	152.00		



2/22/2019 1:04:00 AM	Fresh Water	5.00	10.00	140.00		
2/22/2019 1:44:00 AM	Cement Slurry	5.00	180.00	242.00		
2/22/2019 2:21:00 AM	Fresh Water	6.00	186.00	500.00		

MIN / MAX / AVG PRESSURE AND RATES

	MIN	MAX	AVG
Pressure (psi)	0.00	1500.00	300.00
Rate (bpm)	0.00	6.80	5.00



DISPLACEMENT AND END OF JOB SUMMARY

Displaced By	BJ	Amt of Cement Returned / Reversed	25.00
Calculated Displacement Vol (bbls)	188.50	Method Used to Verify Returns	Visual
Actual Displacement Vol (bbls)	186.00	Amt of Spacer to Surface	25.00
Did Float Hold?	Yes	Pressure Left on Casing (psi)	0.00
Bump Plug	Yes	Amt Bled Back After Job	1.00
Bump Plug Pressure (psi)	1500.00	Total Volume Pumped (bbls)	596.00
Were Returns Planned at Surface	Yes	Top Out Cement Spotted	No
Cement Returns During Job	Full	Lost Circulation During Cement Job	No

CEMENT PLUG

Bottom of Cement Plug?	No	Wiper Balls Used?	No
Wiper Ball Quantity		Plug Catcher	No
Number of Plugs			

SQUEEZE

Injection Rate (bpm)		Fluid Density (ppg)	
Injection Pressure (psi)		ISIP (psi)	
Type of Squeeze		FSIP (psi)	
Operators Max SQ Pressure (psi)			

Comments

TREATMENT REPORT

JOB SUMMARY

Hydraulic Fracturing Fluid Product Component Information Disclosure

Job Start Date:	9/20/2019
Job End Date:	10/12/2019
State:	West Virginia
County:	Monongalia
API Number:	47-061-01802-00-00
Operator Name:	Northeast Natural Energy LLC
Well Name and Number:	Bogges 1H
Latitude:	39.67005600
Longitude:	-80.09355000
Datum:	NAD27
Federal Well:	NO
Indian Well:	NO
True Vertical Depth:	8,020
Total Base Water Volume (gal):	23,798,262
Total Base Non Water Volume:	0



Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Water	Company 1	Carrier/Base Fluid	Water	7732-18-5	100.00000	87.21211	None
Sand (Proppant)	Producers Service Corp	Proppant					
SlimSTREAM FR 9800P	Producers Service Corp	Friction Reducer	Silica Substrate	14808-60-7	100.00000	12.46219	None
			copolymer of 2-propanamide	Proprietary	30.00000	0.01529	None
			Petroleum Distillate	64742-47-8	20.00000	0.01019	None
			Alcohols, C12-16, ethoxylated	68551-12-2	2.00000	0.00102	None
			Oleic Acid Diethanolamide	93-83-4	2.00000	0.00102	None
			Ammonium chloride ((NH4)Cl)	12125-02-9	1.00000	0.00051	None
7.5% HCL	Producers Service Corp	Acidizing					
BIOC11139A	Producers Service Corp	Biocide	Hydrochloric Acid	7647-01-0	7.50000	0.01844	None
			Benzyl-(C12-C16 Alkyl)-Dimethyl-Ammonium Chloride	68424-85-1	30.00000	0.00671	None
			Glutaraldehyde	111-30-8	10.00000	0.00224	None

SCAL16486A	Producers Service Corp	Scale Inhibitor	Ethanol	64-17-5	5.00000	0.00112	None
			Ethylene Glycol	107-21-1	30.00000	0.00181	None
			Amine Triphosphate	Proprietary	30.00000	0.00181	None
			Sodium Phosphate	7632-05-5	30.00000	0.00181	None
4-N-1	Producers Service Corp	Inhibitor					
			Acetic acid	64-19-7	90.00000	0.00043	None
			Methanol	67-56-1	10.00000	0.00005	None
			2-Ethylhexanol	104-76-7	10.00000	0.00005	None
			Cocamide Diethanolamine	68603-42-9	5.00000	0.00002	None
			Diethanolamine	111-42-2	1.00000	0.00000	None
Ingredients shown above are subject to 29 CFR 1910.1200(i) and appear on Material Safety Data Sheets (MSDS). Ingredients shown below are Non-MSDS.							
Other Chemical(s)	Listed Above	See Trade Name(s) List					
			Petroleum Distillate	64742-47-8	20.00000	0.01019	
			Glutaraldehyde	111-30-8	10.00000	0.00224	
			Sodium Phosphate	7632-05-5	30.00000	0.00181	
			Amine Triphosphate	Proprietary	30.00000	0.00181	
			Ethanol	64-17-5	5.00000	0.00112	
			Alcohols, C12-16, ethoxylated	68551-12-2	2.00000	0.00102	
			Oleic Acid Diethanolamide	93-83-4	2.00000	0.00102	
			Ammonium chloride ((NH4)Cl)	12125-02-9	1.00000	0.00051	
			2-Ethylhexanol	104-76-7	10.00000	0.00005	
			Methanol	67-56-1	10.00000	0.00005	
			Cocamide Diethanolamine	68603-42-9	5.00000	0.00002	
			Diethanolamine	111-42-2	1.00000	0.00000	

* Total Water Volume sources may include fresh water, produced water, and/or recycled water

** Information is based on the maximum potential for concentration and thus the total may be over 100%

Note: For Field Development Products (products that begin with FDP), MSDS level only information has been provided. Ingredient information for chemicals subject to 29 CFR 1910.1200(i) and Appendix D are obtained from suppliers Material Safety Data Sheets (MSDS)

State of West Virginia
Department of Environmental Protection - Office of Oil and Gas
Discharge Monitoring Report
Oil and Gas General Permit

Company Name: Northeast Natural Energy LLC
API No: 47-061-01811 County: Monongalia
District: Clay Well No: Bogges 1H
Farm Name: Blake R. & H. Preston Bogges

Discharge Date/s From:(MMDDYY) NA To: (MMDDYY) NA

Discharge Times. From: _____ To: _____

Total Volume to be Disposed from this facility (gallons): _____

Disposal Option(s) Utilized (write volumes in gallons):

- (1) Land Application: _____ (Include a topographical map of the Area.)
- (2) UIC: _____ Permit No. _____
- (3) Offsite Disposal: _____ Site Location: _____
- (4) Reuse: _____ Alternate Permit Number: _____
- (5) Centralized Facility: _____ Permit No. _____
- (6) Other method: _____ (Include an explanation)

Follow Instructions below to determine your treatment category:

Optional Pretreatment test: _____ Cl- mg/l _____ DO mg/l

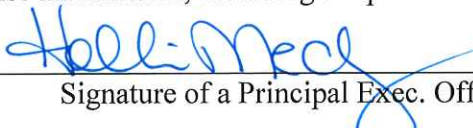
1. Do you have permission to use expedited treatment from the Director or his representative?
(Y/N) _____ If yes, who? _____ and place a four (4) on line 7.
If not go to line 2
2. Was Frac Fluid or flowback put into the pit? (Y/N) _____ If yes, go to line 5. If not, go to line 3.
3. Do you have a chloride value pretreatment (see above)? (Y/N) _____ If yes, go to line 4
If not, go to line 5.
4. Is the Chloride level less than 5000 mg/l? (Y/N) _____ If yes, then enter a one (1) on line 7.
5. Do you have a pretreatment value for DO? (See above) (Y/N) _____ If yes, go to line 6
If not, enter a three (3) in line 7.
6. Is the DO level greater than 2.5 mg/l?(Y/N) _____ If yes, enter a two (2) on line 7. If not, enter a three (3) on line 7.
7. _____ is the category of your pit. Use the Appropriate section.
8. Comments on Pit condition: Utilized a closed loop system

Name of Principal Exec. Officer: Hollie Medley

Title of Officer: Regulatory Manager

Date Completed: 1/10/2020

I certify under penalty of law that I have personally examined and am familiar with the information submitted on this document and all the attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.



Signature of a Principal Exec. Officer or Authorized agent.

Category 1
Sampling Results
API No : _____

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	5	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl	5,000	_____	5,000	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
Total Al***		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Disposal Area		_____	Monitor	_____	Acres

*** Al is only reported if the pH is above 9.0

Category 2
Sampling Results
API No : _____

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	10	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
Total Al***		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Disposal Area		_____	Monitor	_____	Acres

* Can be 25,000 with inspector's approval,

(Inspector's signature): _____

Date: _____

** Include a description of your aeration technique.

Aeration Code: _____

*** Al is only reported if the pH is above 9.0

Category 3
Sampling Results
API No : _____

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	20	_____	N/A	N/A	Days
Fe	6	_____	6	_____	mg/l
D.O.	2.5	_____	2.5	_____	mg/l
Settleable Sol.	0.5	_____	0.5	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
Total Al***		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Disposal Area		_____	Monitor	_____	Acres

* Can be 25,000 with inspector's approval,

(Inspector's signature): _____ Date: _____
 ** Include a description of your aeration technique. Aeration Code: _____
 *** Al is only reported if the pH is above 9.0.

Category 4
Sampling Results
API No: _____

Parameter	Predischarge		Discharge		Units
	Limits	Reported	Limits	Reported	
pH	6-10	_____	6-10	_____	S.U
Settling Time	1	_____	N/A	N/A	Days
Fe	Monitor	_____	Monitor	_____	mg/l
D.O.	Monitor	_____	Monitor	_____	mg/l
Settleable Sol.	Monitor	_____	Monitor	_____	mg/l
Cl*	12,500	_____	12,500	_____	mg/l
Oil	Trace	_____	Trace	_____	Obs.
TOC**		_____	Monitor	_____	mg/l
Oil and Grease		_____	Monitor	_____	mg/l
TSS		_____	Monitor	_____	mg/l
Total Mn	Monitor	_____	Monitor	_____	mg/l
Volume		_____	Monitor	_____	Gal
Flow		_____	Monitor	_____	Gal/min
Activated Carbon (0.175)		_____	N/A	N/A	lb/Bl
Date Site Reclaimed	N/A	N/A			10 days from dis.
Disposal Area		_____	Monitor	_____	Acres

* Can be 25,000 with inspector's approval,

(Inspector's signature): _____ Date: _____