		Amended Administrative Record Index of Final Permit		
		Muskegon Development Company, MI-035-2R-0034, Holcomb 1-22		
		(*these documents are located within the permit folder)		
Doc.#	**Name**	**Subject**	**Date**	
1A	U.S. EPA-Region 5	**Review of Geographic Factors and EJ Screen Data for Holcomb 1-22 well site**	8/9/2016	
1	Muskegon Development Company	***Permit Application, received August 11, 2016**	8/9/2016	
2	U.S. EPA-Region 5	**UIC Permit Application Completeness Review Checklist**	8/19/2016	
3	U.S. EPA-Region 5	***Completeness letter sent to permittee**	10/13/2016	
4	U.S. EPA-Region 5	***Request for Third Party Estimate of Plugging & Abandonment Costs**	10/13/2016	
5	Muskegon Development Company	*Permit additional information (reply with 3rd party P&A cost estimate), dated 10/19/16	10/26/2016	
6	U.S. EPA-Region 5	***Fact Sheet/Statement Of Basis for issuance of UIC permit**	10/28/2016	
7	U.S. EPA-Region 5	**Draft permit MI-035-2R-0034**	10/28/2016	
		Documents cited for Statement of Basis:		
8	Muskegon Development Company	*List of residents within 1/4 mile radius Area Of Review	8/9/2016	
9	Muskegon Development Company	*Base of Underground Source Of Drinking Water	8/9/2016	
10	Muskegon Development Company	*Depth of injection zone (Dundee Formation and confining zone (Bell Shale) - Att. G	8/9/2016	
11	U.S. EPA-Region 5	*Construction requirements & internal technical review	9/16/2016	
12	Muskegon Development Company	*Injection fluid and daily volume	8/9/2016	
13	U.S. EPA-Region 5	*Maximum injection pressure (calculated by EPA)	9/16/2016	
14	U.S. EPA-Region 5	*Monitoring and reporting requirements (Permit Attachment A)	9/30/2016	
15	Muskegon Development Company	*Plugging & Abandonment Plan (Permit Attachment B)	8/9/2016	
16	Muskegon Development Company	*Financial assurance of ability to plug and abandon well	8/9/2016	
		Supporting documents for the draft permit:		
17	U.S. EPA-Region 5	*Internal Technical Review Sheet	8/26/2016	
18	U.S. EPA-Region 5	*Internal well construction analysis and diagram	9/16/2016	
19	Muskegon Development Company	Endangered Species Act compliance report (included with permit application)	6/13/2016	
20	U.S. EPA-Region 5	*Internal review of Endangered Species Act compliance (memo to file)	9/22/2016	
21	Western Michigan University	Michigan Hydrologic Atlas, Part I (Hydrology for UIC in Michigan)	1981	
22	U.S. EPA-Region 5	*National Historical Preservation Act impact of well project (memo to file)	7/26/2016	
23	U.S. EPA-Region 5	*Seismic risk impact regarding well project (memo to file)	9/28/2016	
24	Michigan Dept. of Env. Quality	GeoWebFace maps and well reports of wells within the Area of Review	9/28/2016	
25	U.S. EPA-Region 5	Draft Permit transmittal letter to Muskegon Development Company	2/10/2017	
26	U.S. EPA-Region 5	Updated Fact Sheet, February 2017	2/10/2017	
27	U.S. EPA-Region 5	Transmittal letter: Public Notice and Comment Period, to ACHP	2/10/2017	
28	U.S. EPA-Region 5	Transmittal letter: Public Notice and Comment Period, to MDNR, Forest Resources Div.	2/10/2017	
29	U.S. EPA-Region 5	Transmittal letter: Public Notice and Comment Period, to MDNR, Fisheries Division	2/10/2017	
30	U.S. EPA-Region 5	Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Division	2/10/2017	
31	U.S. EPA-Region 5	Transmittal letter: Public Notice and Comment Period, to Michigan SHPO	2/10/2017	

32	U.S. EPA-Region 5	Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service	2/10/2017	
33	U.S. EPA-Region 5	Transmittal letter: Public Notice and Comment Period, to Harrison District Library	2/10/2017	
34	Lilly Simmons	Transmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)	2/10/2017	
35	Lilly Simmons & Bill Tong	Certificate of Service and Mailing List for Public Notice and Fact Sheet	2/10/2017	
36	U.S. EPA-Region 5	Hearing & Public Comment Advertisement sent to Clare County Review	6/20/2017	
37	U.S. EPA-Region 5	Updated Fact Sheet, June 2017	6/20/2017	
38	U.S. EPA-Region 5	Second comment period notification letter, sent to Office of Fed. Agency Prog., ACHP	6/21/2017	
39	U.S. EPA-Region 5	Second comment period notification letter, sent to U.S. Fish & Wildlife Service	6/21/2017	
40	U.S. EPA-Region 5	Second comment period notification letter, sent to Michigan SHPO	6/21/2017	
41	U.S. EPA-Region 5	Second comment period notification letter, sent to Michigan DNR, Forestry Resources	6/21/2017	
42	U.S. EPA-Region 5	Second comment period notification letter, sent to Michigan DNR, Wildlife Division	6/21/2017	
43	U.S. EPA-Region 5	Second comment period notification letter, sent to Michigan DNR, Fisheries Division	6/21/2017	
44	U.S. EPA-Region 5	Second comment period notification letter, sent to Harrison District Library	6/21/2017	
45	U.S. EPA-Region 5	Certificate of Service and Mailing List for second comment period notification	6/21/2017	
46	U.S. EPA-Region 5	EPA advertisement of Public Hearing, Clare Country Review, June 23, 2017, Page 3B	6/21/2017	
47	U.S. EPA-Region 5	Attendance sheet for July 25, 2017 EPA public hearing at Clare High School	7/25/2017	
48	Clare County Review	Article by Pat Maurer, "Injection well raises concerns" about July 25 public hearing	7/27/2017	
49	U.S. EPA-Region 5	EPA Notification letter of extension of comment period to August 18, 2017	7/27/2017	
50	Bill Tong & Lilly Simmons	Certificate of Service and Mailing List for extension of public comment to 8/18/17	7/28/2017	
51	U.S. EPA-Region 5	Notification of extension of comment period to August 18, 2017, to ACHP	7/28/2017	
52	U.S. EPA-Region 5	Notification of extension of comment period to August 18, 2017, to USFWS	7/28/2017	
53	U.S. EPA-Region 5	Notification of extension of comment period to August 18, 2017, to MDNR Forestry	7/28/2017	
54	U.S. EPA-Region 5	Notification of extension of comment period to August 18, 2017, MDNR Wildlife	7/28/2017	
55	U.S. EPA-Region 5	Notification of extension of comment period to August 18, 2017, MDNR Fisheries	7/28/2017	
56	U.S. EPA-Region 5	Notification of extension of comment period to August 18, 2017, Michigan SHPO	7/28/2017	
57	U.S. EPA-Region 5	Notification of extension of comment period to August 18, 2017, Harrison Dist. Library	7/28/2017	
58	Jane Rose Reporting	Official Transcript of July 25, 2017 Public Hearing on Draft Permit for Holcomb 1-22 Well	8/8/2017	
59	U.S. EPA-Region 5	Chronological compilation of All Verbatim (Raw) Comments & Draft Responses (60 pg.)	3/12/2018	
60	U.S. EPA-Region 5	Final Response to Comments on Draft Permit for Holcomb 1-22 Well (18 pg.)	6/20/2018	
		Email Comments on Draft Permit		
	From	**Subject**	**Date Received**	**Size**
61	Kirby North Ancona	FW: UIC Class II Public Notice: MI-035-2R-0034	2/12/2017 0:00	236 KB
62	Tong, William	FW: UIC public notice per 124.10e MI-035-2R-0034	2/14/2017 0:00	9 KB
63	Jeffery Loman	Comments on Proposed Class II Permit MI-035-2R-0034 (Holcomb 1-22, Permit # MI-035	2/27/2017 0:00	40 KB
64	Wes Raymond	comments re: permit MI-035-2R-0034	3/15/2017 0:00	39 KB
65	Kirby North Ancona	Holcomb1-22 well permit issues	7/17/2017 0:00	192 KB
66	Sheryl Judd	Public Comment: Proposed injection well in Clare County	7/26/2017 0:00	69 KB
67	Deb Sherrod	Public Comment: Proposed Injection Well in Clare County	7/27/2017	70 KB
68	Stephanie Terpening	Clare county, MI injection well comment	7/27/2017	71 KB

69	Wayne Terpening	Holcomb #1-22 Injection Well Permit Application MI-035-2R-0034	7/27/2017 0:00	68 KB
70	Rep. Jason Wentworth (District 97)	RE: Clare county, MI injection well comment MI-035-2R-0034	7/27/2017 0:00	84 KB
71	Leigh Clarke	Letter for Public Comment Regarding Proposed Underground Injection Permit, Holcomb	7/27/2017 0:00	252 KB
72	Sue Rees	Please do NOT vote for the injection well in Dodge City in Clare County	7/31/2017 0:00	60 KB
73	Sue Rees	Injection in Dodge city	7/31/2017 0:00	63 KB
74	Rebecca Terpening	Public Notice: Public Hearing for Draft Class II Permit MI-035-2R-0034	8/1/2017 0:00	63 KB
75	Tong, William	Transcriptions of post-hearing handwritten comments (includes PDF scans of original doc	8/7/2017 0:00	1 MB
76	Snooks	public comment regarding Holcomb 1-22 injection well	8/8/2017 0:00	49 KB
77	R5-R1605@epa.gov	PDF scan of post card comment from Matthew Stephenson	8/10/2017 0:00	300 KB
78	Linda Secco	Townline and Athey Hamilton Township, mi	8/10/2017	48 KB
79	R5-R1605@epa.gov	PDF scan of post card comment from Michael and Diane Prior	8/11/2017	1 MB
80	terrynmic@charter.net	Holcomb 1-22 well	8/14/2017	45 KB
81	Bryan Cummings	Objection Holcomb #1-22 well	8/15/2017	69 KB
82	Andrew Verhage	Holcomb 1-22 well MI-035-2R-0034	8/15/2017	56 KB
83	Rick Fanslau	Holcomb 1-22 well,#MI-035-2R-0034	8/17/2017	46 KB
84	gxcube@verizon.net	Fwd: Holcomb 1-22 well, #MI-035-2R-0034	8/17/2017	52 KB
85	Emerson Addison	Holcomb 1-22 well, #MI-035-2R-0034	8/18/2017	125 KB
86	Letha Raymond	Public Comment - Permit Number: MI-035-2R-0034. Holcomb 1-22 well, Hamilton Twp, C	8/18/2017	184 KB
87	Martin Johnson	Re: Holcomb 1-22 well, #MI-035-2R-0034	8/18/2017	49 KB
88	Stephanie Terpening	Holcomb 1-22 well, #MI-035-2R-0034	8/18/2017	58 KB
89	LuAnne Kozma	RE: Holcomb 1-22 weel, #MI035-2R-0034	8/18/2017	209 KB
90	Paul J. Mooradian	Holcomb Well	8/19/2017	52 KB
		Additional Supporting Documents Cited in Appeal Response		
Doc.#	**Author**	**Subject**	**Date**	
91	U.S. EPA-Region 5	Final Permit MI-035-2R-0034 (appealed to EAB on August 10, 2018)	7/3/2018	
92	Executive Order 12898, 59FR 7629	Federal Action to Address Environmental Justice in Minority & Low-Income Populations	2/16/1994	
93	Anthony Ingraffea	Fluid Migration Mechanisms Due to Faulty Well Design and/or Construction	1/1/2016	
94	Abraham Lustgarten, ProPublica	Injection Wells: The Poison Beneath Us	6/21/2012	
95	U.S. EPA	What is EJSCREEN? (https://www.epa.gov/ejscreen/what-ejscreen)		
96	U.S. EPA-Region 5	Response to Comments on Draft Class II Permit in Clare County, Michigan,		
		Issued to Muskegon Development Co.(Permit No. MI-035-2R-0034), Holcomb 1-22 Well	7/3/2018	
97	U.S. EPA-Region 5	Revised Response to Comments on Draft Class II Permit in Clare County, Michigan,	9/26/2019	
		Issued to Muskegon Development Co.(Permit No. MI-035-2R-0034), Holcomb 1-22 Well		
98	U.S. EPA-Region 5	Final Permit MI-035-2R-0034 (re-issued)	9/26/2019	
		William K. Tong	Sept. 26, 2019	
		Permit Writer	Date Signed	

Administrative Record Index of Final Permit
Muskegon Development Company, MI-035-2R-0034, Holcomb 1-22
(*these documents are located within the permit folder)

Doc.#	Name	Subject	Date
1	Muskegon Development Company	***Permit Application, received August 11, 2016**	8/9/2016
2	U.S. EPA-Region 5	**UIC Permit Application Completeness Review Checklist**	8/19/2016
3	U.S. EPA-Region 5	***Completeness letter sent to permittee**	10/13/2016
4	U.S. EPA-Region 5	***Request for Third Party Estimate of Plugging & Abandonment Costs**	10/13/2016
5	Muskegon Development Company	*Permit additional information (reply with 3rd party P&A cost estimate), dated 10/19/16	10/26/2016
6	U.S. EPA-Region 5	***Fact Sheet/Statement Of Basis for issuance of UIC permit**	10/28/2016
7	U.S. EPA-Region 5	**Draft permit**	10/28/2016
		Documents cited for Statement of Basis:	
8	Muskegon Development Company	*List of residents within 1/4 mile radius Area Of Review	8/9/2016
9	Muskegon Development Company	*Base of Underground Source Of Drinking Water	8/9/2016
10	Muskegon Development Company	*Depth of injection zone (Dundee Formation and confining zone (Bell Shale) - Att. G	8/9/2016
11	U.S. EPA-Region 5	*Construction requirements & internal technical review	9/16/2016
12	Muskegon Development Company	*Injection fluid and daily volume	8/9/2016
13	U.S. EPA-Region 5	*Maximum injection pressure (calculated by EPA)	9/16/2016
14	U.S. EPA-Region 5	*Monitoring and reporting requirements (Permit Attachment A)	9/30/2016
15	Muskegon Development Company	*Plugging & Abandonment Plan (Permit Attachment 8)	8/9/2016
16	Muskegon Development Company	*Financial assurance of ability to plug and abandon well	8/9/2016
		Supporting documents for the draft permit:	
17	U.S. EPA-Region 5	*Internal Technical Review Sheet	8/26/2016
18	U.S. EPA-Region 5	*Internal well construction analysis and diagram	9/16/2016
19	Muskegon Development Company	Endangered Species Act compliance report (included with permit application)	6/13/2016
20	U.S. EPA-Region 5	*Internal review of Endangered Species Act compliance (memo to file)	9/22/2016
21	Western Michigan University	Michigan Hydrologic Atlas, Part I (Hydrology for UIC in Michigan)	1981
22	U.S. EPA-Region 5	*National Historical Preservation Act impact of well project (memo to file)	7/26/2016
23	U.S. EPA-Region 5	*Seismic risk impact regarding well project (memo to file)	9/28/2016
24	Michigan Dept. of Env. Quality	GeoWebFace maps and well reports of wells within the Area of Review	9/28/2016
25	U.S. EPA-Region 5	Draft Permit transmittal letter to Muskegon Development Company	2/10/2017
26	U.S. EPA-Region 5	Updated Fact Sheet, February 2017	2/10/2017
27	U.S. EPA-Region 5	Transmittal letter: Public Notice and Comment Period, to ACHP	2/10/2017
28	U.S. EPA-Region 5	Transmittal letter: Public Notice and Comment Period, to MDNR, Forest Resources Div.	2/10/2017
29	U.S. EPA-Region 5	Transmittal letter: Public Notice and Comment Period, to MDNR, Fisheries Division	2/10/2017
30	U.S. EPA-Region 5	Transmittal letter: Public Notice and Comment Period, to MDNR, Wildlife Division	2/10/2017
31	U.S. EPA-Region 5	Transmittal letter: Public Notice and Comment Period, to Michigan SHPO	2/10/2017
32	U.S. EPA-Region 5	Transmittal letter: Public Notice and Comment Period, to U.S. Fish & Wildlife Service	2/10/2017
33	U.S EPA-Region 5	Transmittal letter: Public Notice and Comment Period, to Harrison District Library	2/10/2017
34	Lilly Simmons	Transmittal letter: Public Notice and Comment Period, to Michigan DEQ (e-mail)	2/10/2017
35	Lilly Simmons & Bill Tong	Certificate of Service and Mailing List for Public Notice and Fact Sheet	2/10/2017
36	U.S. EPA-Region 5	Hearing & Public Comment Advertisement sent to Clare County Review	6/20/2017
37	U.S. EPA-Region 5	Updated Fact Sheet, June 2017	6/20/2017
38	U.S. EPA-Region 5	Second comment period notification letter, sent to Office of Fed. Agency Prog., ACHP	6/21/2017

39	U.S. EPA-Region 5	Second comment period notification letter, sent to U.S. Fish & Wildlife Service	6/21/2017
40	U.S. EPA-Region 5	Second comment period notification letter, sent to Michigan SHPO	6/21/2017
41	U.S. EPA-Region 5	Second comment period notification letter, sent to Michigan DNR, Forestry Resources	6/21/2017
42	U.S. EPA-Region 5	Second comment period notification letter, sent to Michigan DNR, Wildlife Division	6/21/2017
43	U.S. EPA-Region 5	Second comment period notification letter, sent to Michigan DNR, Fisheries Division	6/21/2017
44	U.S. EPA-Region 5	Second comment period notification letter, sent to Harrison District Library	6/21/2017
45	U.S. EPA-Region 5	Certificate of Service and Mailing List for second comment period notification	6/21/2017
46	U.S. EPA-Region 5	EPA advertisement of Public Hearing, Clare Country Review, June 23, 2017, Page 3B	6/21/2017
47	U.S. EPA-Region 5	Attendance sheet for July 25, 2017 EPA public hearing at Clare High School	7/25/2017
48	Clare County Review	Article by Pat Maurer, "Injection well raises concerns" about July 25 public hearing	7/27/2017
49	U.S. EPA-Region 5	EPA Notification letter of extension of comment period to August 18, 2017	7/27/2017
50	Bill Tong & Lilly Simmons	Certificate of Service and Mailing List for extension of public comment to 8/18/17	7/28/2017
51	U.S. EPA-Region 5	Notification of extension of comment period to August 18, 2017, to ACH P	7/28/2017
52	U.S. EPA-Region 5	Notification of extension of comment period to August 18, 2017, to USFWS	7/28/2017
53	U.S. EPA-Region 5	Notification of extension of comment period to August 18, 2017, to MDNR Forestry	7/28/2017
54	U.S. EPA-Region 5	Notification of extension of comment period to August 18, 2017, MDNR Wildlife	7/28/2017
55	U.S. EPA-Region 5	Notification of extension of comment period to August 18, 2017, MDNR Fisheries	7/28/2017
56	U.S. EPA-Region 5	Notification of extension of comment period to August 18, 2017, Michigan SHPO	7/28/2017
57	U.S. EPA-Region 5	Notification of extension of comment period to August 18, 2017, Harrison Dist. Library	7/28/2017
58	Jane Rose Reporting	Official Transcript of July 25, 2017 Public Hearing on Draft Permit for Holcomb 1-22 Well	8/8/2017
59	U.S. EPA-Region 5	Chronological compilation of All Verbatim (Raw) Comments & Draft Responses (60 pg.)	3/12/2018
60	U.S. EPA-Region 5	Final Response to Comments on Draft Permit for Holcomb 1-22 Well (18 pg.)	6/20/2018

Email Comments on Draft Permit

	From	Subject	Date Received	Size
61	Kirby North Ancona	FW: UIC Class I Public Notice: MI-035-2R-0034	2/12/2017 0:00	236 KB
62	Tong, William	FW: UIC public notice per 124.1 0e MI-035-2R-0034	2/14/2017 0:00	9 KB
63	Jeffery Loman	Comments on Proposed Class I Permit MI-035-2R-0034 (Holcomb 1-22, Permit# MI-03!	2/27/2017 0:00	40 KB
64	Wes Raymond	comments re: permit MI-035-2R-0034	3/15/2017 0:00	39 KB
65	Kirby North Ancona	Holcomb1 -22 well permit issues	7/17/2017 0:00	192 KB
66	Sheryl Judd	Public Comment: Proposed injection well in Clare County	7/26/2017 0:00	69 KB
67	Deb Sherrod	Public Comment: Proposed Injection Well in Clare County	7/27/2017	70 KB
68	Stephanie Terpening	Clare county, MI injection well comment	7/27/2017	71 KB
69	Wayne Terpening	Holcomb #1-22 Injection Well Permit Application MI-035-2R-0034	7/27/2017 0:00	68 KB
70	Rep. Jason Wentworth (District 97)	RE: Clare county, MI injection well comment MI-035-2R-0034	7/27/2017 0:00	84 KB
71	Leigh Clarke	Letter for Public Comment Regarding Proposed Underground Injection Permit, Holcomb	7/27/2017 0:00	252 KB
72	Sue Rees	Please do NOT vote for the injection well in Dodge City in Clare County	7/31/2017 0:00	60 KB
73	Sue Rees	Injection in Dodge city	7/31/2017 0:00	63 KB
74	Rebecca Terpening	Public Notice: Public Hearing for Draft Class II Permit MI-035-2R-0034	8/1/2017 0:00	63 KB
75	Tong, William	Transcriptions of post-hearing handwritten comments (includes PDF scans of original doc	8/7/2017 0:00	1 MB
76	Snooks	public comment regarding Holcomb 1-22 injection well	8/8/2017 0:00	49 KB
77	R5-R1605@epa.gov	PDF scan of post card comment from Matthew Stephenson	8/10/2017 0:00	300 KB
78	Linda Secco	Townline and Athey Hamilton Township, mi	8/10/2017	48 KB
79	R5-R1605@epa.gov	PDF scan of post card comment from Michael and Diane Prior	8/11/2017	1 MB
80	terrynmic@charter.net	Holcomb 1-22 well	8/14/2017	45 KB
81	Bryan Cummings	Objection Holcomb #1-22 well	8/15/2017	69 KB

82	Andrew Verhage	Holcomb 1-22 well MI-035-2R-0034	8/15/2017 56 KB
83	Rick Fanslau	Holcomb 1-22 well,#MI-035-2R-0034	8/17/2017 46 KB
84	gxcu be@verizon _net	Fwd: Holcomb 1-22 well, #MI-035-2R-0034	8/17/20'17 52 KB
85	Emerson Addison	Holcomb 1-22 well, #MI-035-2R-0034	8/18/2017125KB
86	Letha Raymond	Public Comment - Permit Number: MI-035-2R-0034. Holcomb 1-22 well, Hamilton Twp, C	8/18/2017 184 KB
87	Martin Johnson	Re: Holcomb 1-22 well, #MI-035-2R-0034	8/18/2017 49 KB
88	Stephanie Terpening	Holcomb 1-22 well, #MI-035-2R-0034	8/18/2017 58 KB
89	LuAnne Kozma	RE: Holcomb 1-22 weel, #MI035-2R-0034	8/18/2017 209 KB
90	Paul J. Mooradian	Holcomb Well	8/19/2017 52 KB

William K Toby
Permit Writer

6/25/18
Date Signed

Doc. #1A

Review of Geographic Factors related to UIC Permit Issuance
August 18, 2016

Applicant	Muskegon Development Company
Well Name	Holcomb #1-22
Permit Writer	Bill Tong
Permit No.	MI-035-2R-0034; MDEQ #59345
Latitude/Longitude	44.0308, -84.6595 based on GeoWebFace data, Clare County
Bedrock	The well site is near the border between the Jurassic Red Beds and the Saginaw Formatfon. These may be USDWs.
Coastal Zone Management Area	The site is not within the Michigan Coastal Zone Management Area.
EJ	EJSCREEN: there is one parameter> 20%: Low Income Population is 56%.
Field Rules?	Not applicable
Public notice map	g:/UIC/Technical/Permits/Maps/03 5r0034.gif
Traverse USDW?	This site is not in the area in Michigan in which the Traverse Limestone- can be an Underground Source of Drinking Water.
Tribal land?	There are no federally-recognized tribal lands in Clare County. The site is 15 miles from the Saginaw Chippewa Indian Tribe land in Isabella Co.
Wild & Scenic River?	There are no federally-recognized Wild & Scenic Rivers in Clare County.
WHPA?	The site is 5.1 miles from the Skeels Christian School Type 2 Provisional WBPA.
Nearest Public Water Supply	7.6 miles from the 8.1 miles from the City of Harrison, PWSID MI0003030; Gladwin Nursing and Rehabilitation Community ... ; PWSID MJ0062653
Nearest Private Water Supply	None shown nearby
Other notes	

Bedrock from the MDNR Michigan Bedrock Geology shapefile, dated 8/J 2/16.

EJSCREEN Report (Version 2016)

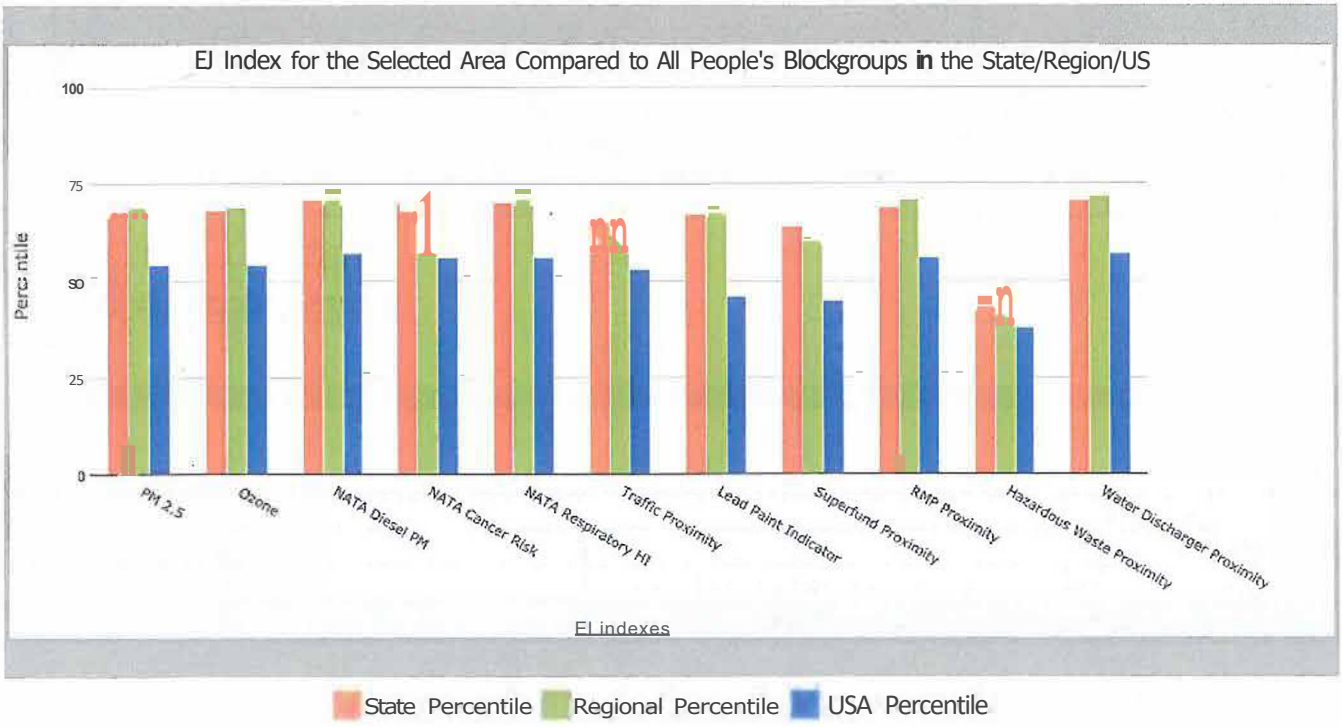
3 mile Ring Centered at 44.030800,-84.659500, MICHIGAN, EPA Region 5

Approximate Population: 1,577

Input Area (sq. miles): 28.27

MI-035-2R-0034

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
EJ Indexes			
EJ Index for PM2.5	69	70	54
EJ Index for Ozone	68	69	54
EJ Index for NATA• Diesel PM	71	72	57
EJ Index for NATA• Air Toxics Cancer Risk	70	71	56
EJ Index for NATA• Respiratory Hazard Index	70	72	56
EJ Index for Traffic Proximity and Volume	66	68	53
EJ Index for Lead Paint Indicator	67	68	46
EJ Index for Superfund Proximity	64	61	45
EJ Index for RMP Proximity	69	71	56
EJ Index for Hazardous Waste Proximity	44	49	38
EJ Index for Water Discharger Proximity	71	72	57



This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

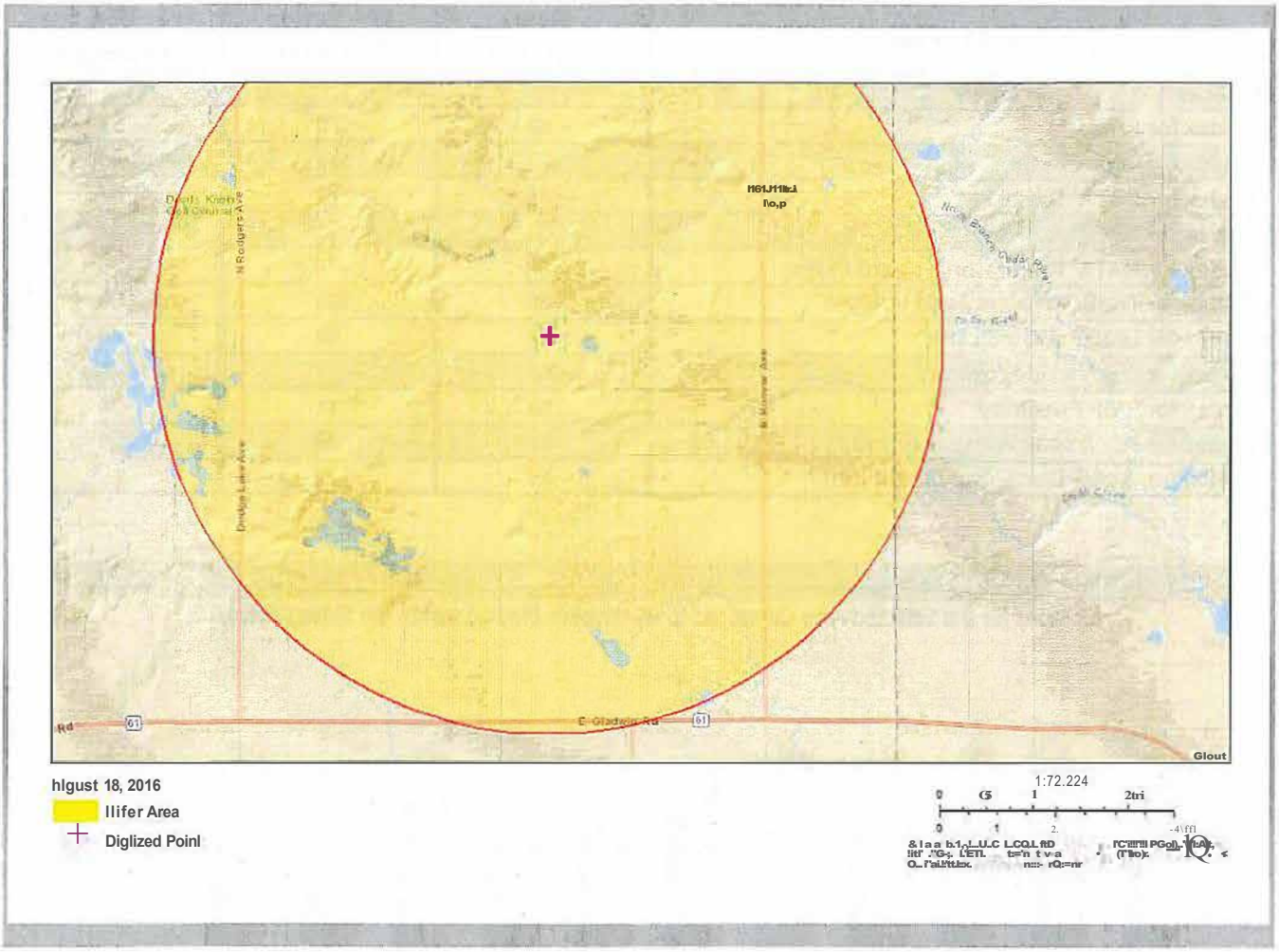
EJSCREEN Report (Version 2016)

3 mile Ring Centered at 44.030800,-84.659500, MICHIGAN, EPA Region 5

Approximate Population: 1,577

Input Area (sq. miles): 28.27

MI-035-2R-0034



Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	0
National Pollutant Discharge Elimination System (NPDES)	0

&EPA !; o) Protcelion

EJSCREEN Report (Version 2016)

3 mile Ring Centered at 44.030800,-84.659500, MICHIGAN, EPA Region 5

Approximate Population: 1,577

Input Area {sq. miles): 28.27

MI-035-2R-0034

Selected Variables	Value	State Avg.	%ilein State	EPA Region Ave.	%ile in EPA Re1don	USA Avg.	%ilein USA
Environmental Indicators							
Particulate Matter (PM 2.s in µg/m'}	8.21	9.76	8	10.6	3	9.32	24
Ozone (ppb)	46.8.	50.3	7	·50.3	13	47.4	41
NATA' Diesel PM (µg/m^3}	0.153	0.726	6	0.931	<50th	0.937	<50th
NATA' Cancer Risk (lifetime risk per million)	21	31	7	34	<50th	40	<50th
NATA" Respiratory Hazard Index	0.62	1.3	6	1.7	<SOth	1.8	<50th
Traffic Proximity and Volume (daily traffic count/distance to road}	5.1	570	16	370	12	590	11
Lead Paint Indicator(% Pre-1960 Housing)	0.3	0.39	49	0.39	46	0.3	60
Superfund Proximity (site count/km distance)	0.046	0.14	35	0.12	39	0.13	39
RMP Proximity (facility count/km distance}	0.044	0.32	10	0.51	4	0.43	6
Hazardous Waste Proximity (facility count/km distance)	0.026	0.069	42	0.069	36	0.072	36
Water Discharger Proximity (facility count/km distance)	0.023	0.25	1	0.31	0	0.31	2
Demographic Indicators							
Demographic Index	**30%**	**30%**	**66**	**29%**	**67**	**36%**	**51**
Minority Population	**5%**	**24%**	**24**	**24%**	**26**	**37%**	**13**
Low Income Population	**56%**	**35%**	**81**	**33%**	**84**	**35%**	**81**
Linguistically Isolated Population	**1%**	2 %	**66**	**2%**	**62**	5%	**48**
Population With Less Than **High School Education**	**15%**	**11%**	**74**	**11%**	**73**	**14%**	**63**
Population Under 5 years ofage	6 %	6 %	**58**	**6%**	54	6 %	**51**
Population over 64 years of age	**22%**	**15%**	**84**	**14%**	**85**	**14%**	**85**

*The Nationai-Scr;le Air Toxics Assessrnfl1t {NATA} i EP,C/s ongcin€L comprehensive evalu tion of air toxics in the United States. EPA developed the NATA to prioritize air Wxics, r,mission sources, and bc:ations of interBst for further study. Ii is important to remember ttlat NATA provides broad estimates of health risks over geogr phic areas of the country, not def1nitive risks tc specific tndividuals or locations.. Mort information cm the NATA analysis can be found Qt: https://WWW. t;pa.gov/n::1-tional-sir-toxlcs--assessment.

For additional information, see: www.epa.gov/environmentaliustice

EJSCREEN is a s:,eening tool for pre-dedsional use only. it can heip identify areas that may warrant additional consideration, anaiy;b, or outre?.ch. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users sho•Jid keep ,n rninrl that screening tooi, re subject to substantial uncertainty in their demographic and environmental data, particuial'ly when looking at small gecgraph'c areas. :m,,ort8nt c<iveat, .,nd uncertainties apply to this $Creening-level information, so it is essentia! to understand the limitations on appropriate interpreu tions a11t applicat!ons of th s indicators. Please see EJSCREEN documentation for d,scussion of these issues before using reports. Ths s0.:reening mo: dnes not provide data en every environmental impact and demographic factor that may be relevant to a particular lo.cation. E.JSCREEN outputs shcJ!d be ;upp,2mented w!tl; .iddttiono! information and local knowledge before taking any action to address potential EI concerns.

Doc. #1

MUSKEGON DEVELOPMENT COMPANY

1425 South Mission Road, Mount Pleasant, Michigan 48858

(989) 772-4900 (Fax) (989) 773-4094

August 9th, 2016

RECEIVED

bLJfj 11 ?vl:jh

UIC BRANCH

EPA, REGION 5

Anna **Miller**
Underground Injection Control Branch
UIC Section
U.S. EPA-Region 5
77 West Jackson Blvd.
Chicago, IL 60604-3590

Attention: WU-161

Dear Ms. Miller:

Enclosed is an Underground Injection Control permit application for the Holcomb 1-22 well. The application is to convert the existing producing oil well to water injection for the purpose of secondary recovery. Muskegon Development Company is Operator of the well.

The Holcomb 1-22 is located in Section 22, T 19N-R3W, Clare County, MI, and is a part of our Smith Creek Unit.

Thank you.

Sincerely,

Bennett E. Myler, Geologist
Muskegon Development Company

Encl.

Nf · D35 - aR - OD 34-
\?. + \Dhi4YL- \\ Tong

OMB No. 2040-0042 Approval Expires 12/31/2018

United States Environmental Protection Agency

Underground Injection Control Permit Application

(Collected under the authority of the Safe Drinking Water Act. Sections 1421, 1422, 40 CFR 144)

I. EPA ID Number			
		T/A	C
U			

Read Attached Instructions Before Starting

For Official Use Only

Application approved mo day year	Date received mo day year	Permit Number	Well ID	FINDS Number

II. Owner Name and Address				III. Operator Name and Address			
Owner Name: Holcomb 1-22				Owner Name: Muskegon Development Company			
Street Address: NW/4, NE/4, NW/4, Section 22		Phone Number		Street Address: 1425 South Mission Road		Phone Number: (989) 772-4900	
City: T19N-R03W	State: MI	ZIP CODE		City: Mt. Pleasant	State: MI	ZIP CODE: 48858	

IV. Commercial Facility	V. Ownership	VI. Legal Contact	VII. SIC Codes
[ ] Yes [x] No	[x] Private [ ] Federal [ ] Other	[ ] Owner [x] Operator	1311

VIII. Well Status *(Mark "x")*

[ ] A. Operating	Date Started mo day year	[x] B. Modification/Conversion	[ ] C. Proposed

IX. Type of Permit Requested *(Mark "x" and specify if required)*

[x] A. Individual	[ ] B. Area	Number of Existing Wells	Number of Proposed Wells	Name(s) of field(s) or project(s)
		1	0	Smith Creek

X. Class and Type of Well *(see reverse)*

A. Class(es) (enter code(s))	B. Type(s) (enter code(s))	C. If class is "other" or type is code 'x,' explain	D. Number of wells per type (if area permit)
II	R	N/A	N/A

XI. Location of Well(s) or Approximate Center of Field or Project

Latitude Deg	Min	Sec	Longitude Deg	Min	Sec	Township and Range Sec	Twp	Range	1/4 Sec	Feet From	Line	Feet From	Line
						22	19N	03W	NW	490	N	1826	W

XII. Indian Lands (Mark 'x')

[ ] Yes
[x] No

XIII. Attachments

(Complete the following questions on a separate sheet(s) and number accordingly; see instructions)

For Classes I, II, III, (and other classes) complete and submit on a separate sheet(s) Attachments A--U (pp 2-6) as appropriate. Attach maps where required. List attachments by letter which are applicable and are included with your application.

XIV. Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all 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. (Ref. 40 CFR 144.32)

A. Name and Title *(Type or Print)*	B. Phone No. *(Area Code and No.)*
William C. Myler, Jr., President	(989) 772-4900
C. Signature	**D. Date Signed**
William C. Myler	8/8/16

EPA Form 7520-6 (Rev. 12-11)

PROPOSED CONVERSION TO WATER INJECTION WELL
HOLCOMB 1-22
HAMILTON TOWNSHIP, CLARE COUNTY, MICHIGAN
T19N-R03W, SECTION 22
MICHIGAN PERMIT # 59345

Muskegon Development Company is submitting the following application to convert the Holcomb 1-22 well to water injection for the purpose of enhanced oil recovery from the Richfield formation. The productive Richfield zone is from 4948' to 5010'. The injection zone is the same interval.

The proposed injection well has production pipe with sufficient cement to provide external mechanical integrity. The surface casing is $9\frac{5}{8}$" pipe set at 792' and cemented to surface. An intermediate string of 7" casing is set at 4,082' and cemented with 150 sacks. The production pipe is $4\frac{1}{2}$" casing set at 5201' and cemented with 200 sacks. The Richfield formation is completed in casing with perforations at 4948-4954', 4966-4976', 4990-5000', and 5004-5010.

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

ATTACHMENT A: AREA OF REVIEW

The area of review includes the area within ¼ mile of the Holcomb 1-22 wellbore.

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

ATTACHMENT B: MAP OF WELLS/AREA OF REVIEW

Maps displaying the Holcomb 1-22 well and surrounding area are presented in the appendix. The maps show the well is located in a wooded area with a few residents nearby. There are no hazardous waste treatment or disposal facilities within the area of review. There are no mines, quarries or known faults within the area of review.

The following wells have penetrated the injection zone and are within the area of review:

Well Name	Permit #	Location
1. Fanslau 1-22	58365	NE/4, NW/4, NW/4, Section 22, T19N-R03W
2. Miller 1-22	48189 (Plugged)	NW/4, SE/4, NW/4, Section 22, T19N-R03W

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

ATTACHMENT C:

WELL DATA

See appendix for state completion logs which contain all pertinent well data.

CORRECTIVE ACTION PLAN

The Holcomb 1-22 injection well will be monitored for rate, tubing pressure, and casing pressure. If an unexplained change in the performance of the well occurs, the well will be shut in. The problem will be identified and the appropriate authorities will be notified.

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

ATTACHMENT E: NAME AND DEPTH OF U.S.D.W.'S

The underground source of drinking water in the area is the Glacial Drift. The drift in this area extends from the surface to a depth of approximately 464'. It is an unconsolidated formation of clay, gravel and sand.

The Hydrogeologic Atlas of Michigan, Western Michigan University, 1981, is the reference used to determine the depth to the lowest U.S.D.W.

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

ATTACHMENT G: GEOLOGICAL DATA ON INJECTION AND CONFINING ZONES

The Richfield Formation is part of the Detroit River Group and consists of alternating zones of dolomitic limestone and anhydrite, with zones ranging from 5' to 15' thick. The top of the Richfield occurs near 4948' and has an average thickness of approximately 180'.

The injection interval will be the Richfield Formation from 4948' to 5010'. The Richfield is immediately confined uphole by approximately 85' of the Massive Anhydrite and then approximately 850' of Detroit River anhydrite and salt. The Richfield Formation is underlain by the Amherstburg Limestone.

RECEIVED
AUG 1 1 2016
UIC BRANCH
EPA, REGION 5

ATTACHMENT H: OPERATING DATA

INJECTION RATES AND VOLUMES

The proposed average injection rate is 150 barrels of water per day. The maximum anticipated rate should be no greater than 350 barrels of water per day.

INJECTION PRESSURES

The proposed average injection pressure is 3,250 psig. The maximum injection pressure will be 3,345 psig based on a fracture gradient of 1.112 psi/ft. This fracture pressure gradient was determined from an ISIP observed during an acid treatment performed on the nearby Fanslau 1-22 well in May of 2016. A graph and job ticket is included in the appendix.

NATURE OF THE ANNULUS FLUID

The annulus fluid will be fresh water mixed with TECHNI-HIB™ 606W, or equivalent. This chemical works as a corrosion inhibitor and oxygen scavenger, and will be used at the recommended volume. The casing tubing annulus pressure will be monitored weekly for the purpose of insuring mechanical integrity.

SOURCE AND ANALYSIS OF INJECTION FLUID

The injection fluid will be fresh water. The source of the injection fluid will be the glacial drift. Analysis of a representative sample taken from a water well within ¼ mile of where the supply well will be located is included in the appendix.

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

ATTACHMENT I: FORMATION TESTING PROGRAM

FLUID PRESSURE

The average bottom hole pressure of the Richfield formation in this area is estimated to be around 1300 psig, based on a bottom hole pressure bomb test conducted on the nearby Fanslau 1-22 well in May of 2016.

FRACTURE PRESSURE

In May 2016, the nearby Fanslau 1-22 well was treated with acid and flushed with fresh water. The top of the injection interval was 4968'. It was concluded that a surface pressure of 3374 psia would be needed to fracture the Richfield formation in the Fanslau 1-22, yielding a 5526 psia formation fracture pressure and a 1.112 psi/ft fracture gradient.

PHYSICAL CHARACTERISTICS

The productive Richfield formation in this area consists of dolomitic beds with matrix porosity of 10 to 15 percent.

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

ATTACHMENT J: STIMULATION PROGRAM

The only stimulations that are anticipated for this well are periodic acid stimulations. A sample workover procedure is included in the appendix.

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

ATTACHMENT K: INJECTION PROCEDURES

INJECTION PUMP

The injection pump will be a National Oilwell Varco 30T-2 Triplex Plunger Pump, or equivalent. The manufacturer's literature is included in the appendix.

WATER TANK

The water supply storage tank will be located next to the injection pump. It will be an API approved steel tank. Fresh water will be produced into this tank and then pumped into the injection well.

SAFETY SWITCH

A high/low pressure safety switch will be installed at the pump. Low pressure due to a leak in the system will cause the pump to automatically shut down. High pressure due to a restriction in the system will also cause the pump to automatically shut down.

TUBING/PACKER

API round external upset thread 2 3/8" tubing will be used with a Baker Model AD-1 packer set near 4898'. All literature is included in the appendix.

RECEIVED
AUG 1 1 2016
UIC BRANCH
EPA, REGION 5

ATTACHMENT L: WELL CONSTRUCTION

Well information for the subject injection well, and all other wells in the area of review, is reported on the State Completion logs.

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

ATTACHMENT M: CONSTRUCTION DETAILS

An illustration of the well construction and well head equipment is presented in the appendix.

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

ATTACHMENT O: PLANS FOR WELL FAILURE

If a well failure is detected, the well will be shut in until the faulty equipment is replaced and the well returned to a safe operating condition. If the failure and operating pose no environmental hazard, then nothing further will be done.

In the case of casing leaks or some other major failure, the well will be shut in and the appropriate authorities notified. The well will remain shut in until the condition is corrected. This correction may involve squeezing off the leak with cement, replacing the faulty casing, or other actions as the situation dictates. The well will not be returned to active status until its integrity has been determined.

RECEIVED
AUG 1 1 2016
UIC BRANCH
EPA, REGION 5

ATTACHMENT P: MONITORING PROGRAM

This project shall be monitored throughout its entire life. All EPA monitoring guidelines and minimum reporting requirements shall be followed.

A) Injection fluid analysis and report by an independent laboratory shall be completed once within the first year of authorization and thereafter annually.
B) The injection pressure and annulus pressure will be monitored weekly and reported monthly.
C) The flow rate will be monitored weekly and reported monthly.
D) The cumulative injected volume shall be monitored weekly and reported monthly.
E) There will be a quarterly annulus fill up to test well integrity.

A summary of the monthly reports shall be sent to the EPA at the end of the year.

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

ATTACHMENT Q:

PLUGGING AND ABANDONMENT PROCEDURES

1. Move in Service Unit.
2. Pull tubing and packer.
3. Set Bridge Plug at +/- 4898'.
4. Run in hole with dump bailer and dump 5 sacks of cement on top of plug.
5. Free-point, cut and pull 4 ½" casing at about 3164'.
6. Run tubing 50' below top of 4 ½" casing and spot 35 sx Class A cement.
7. Free-point, cut and pull 7" casing at about 2650'.
8. Pull tubing to 50' below top of 7" casing and spot 65 sx Class A cement.
9. Pull tubing to 842' and place a cement plug from 842' to surface with 335 sx Class A cement.
10. Cut off casing 3' below ground level and cap with welded steel plate.
11. Clean and level location.

ESTIMATED COSTS FOR PLUGGING THE HOLCOMB 1-22 WELL

Cement service and cement	$7,000.00
Service Rig	10,000.00
Wireline Service	6,000.00
Site Supervision	1,800.00
Water	1,500.00
Trucking	1,500.00
TOTAL COST	$27,800.00

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

ATTACHMENT R: NECESSARY RESOURCES

Attached in the appendix is a copy of Muskegon Development Company's most recent financial statement.

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

ATTACHMENT U: DESCRIPTION OF BUSINESS

Muskegon Development Company is a Michigan Corporation dedicated to the exploration and production of oil and gas in the State of Michigan. We are the oldest continuously operating independent oil company in the State of Michigan, having served the State from 1927-2016.

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

APPENDIX

Topographic map with Area of Review outlined

Field map displaying wells within Area of Review

Proposed completion sketch for the Holcomb 1-22

Typical stimulation procedure for the Holcomb 1-22

National 30T-2 Triplex pump specifications

Surface construction sketch for the Holcomb 1-22

Plugging and Abandonment Plan for the Holcomb 1-22

TECHNI-HIB™ 606W specifications

Baker Packer Model AD-1 specifications

API Round Thread tubing specifications

Form VII-10

Muskegon Development Company Financial Statement

Analysis of injection water

Maximum injection pressure determination

Copy of letter to Michigan State Historic Preservation Office regarding site review

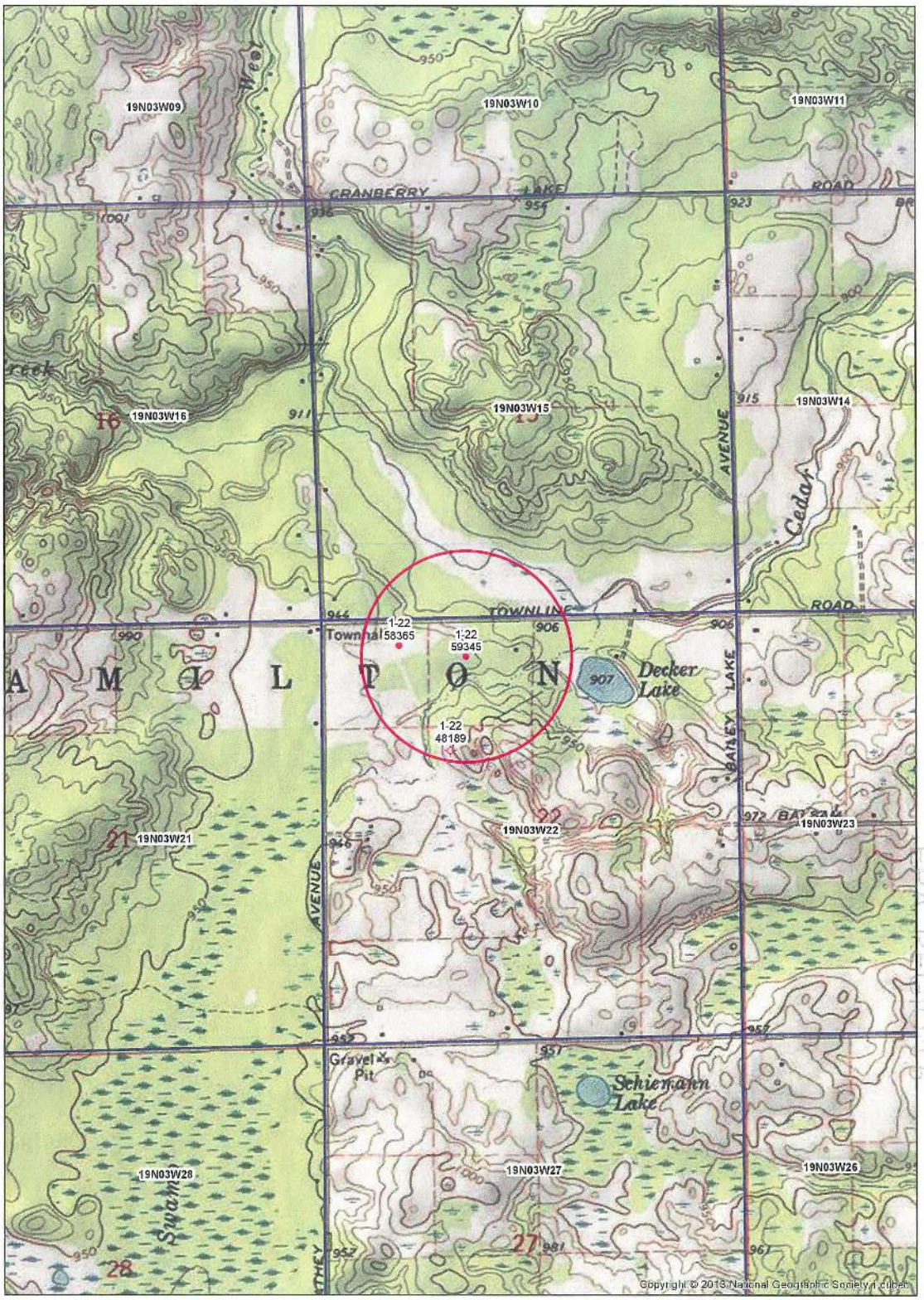
Copy of State Well Records and Well Information for Wells within the Area of Review

List of landowners within the Area of Review

Endangered or Threatened Species Review

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

Holcomb 1-22, Permit #59345
0.25 Mile Radius of Review

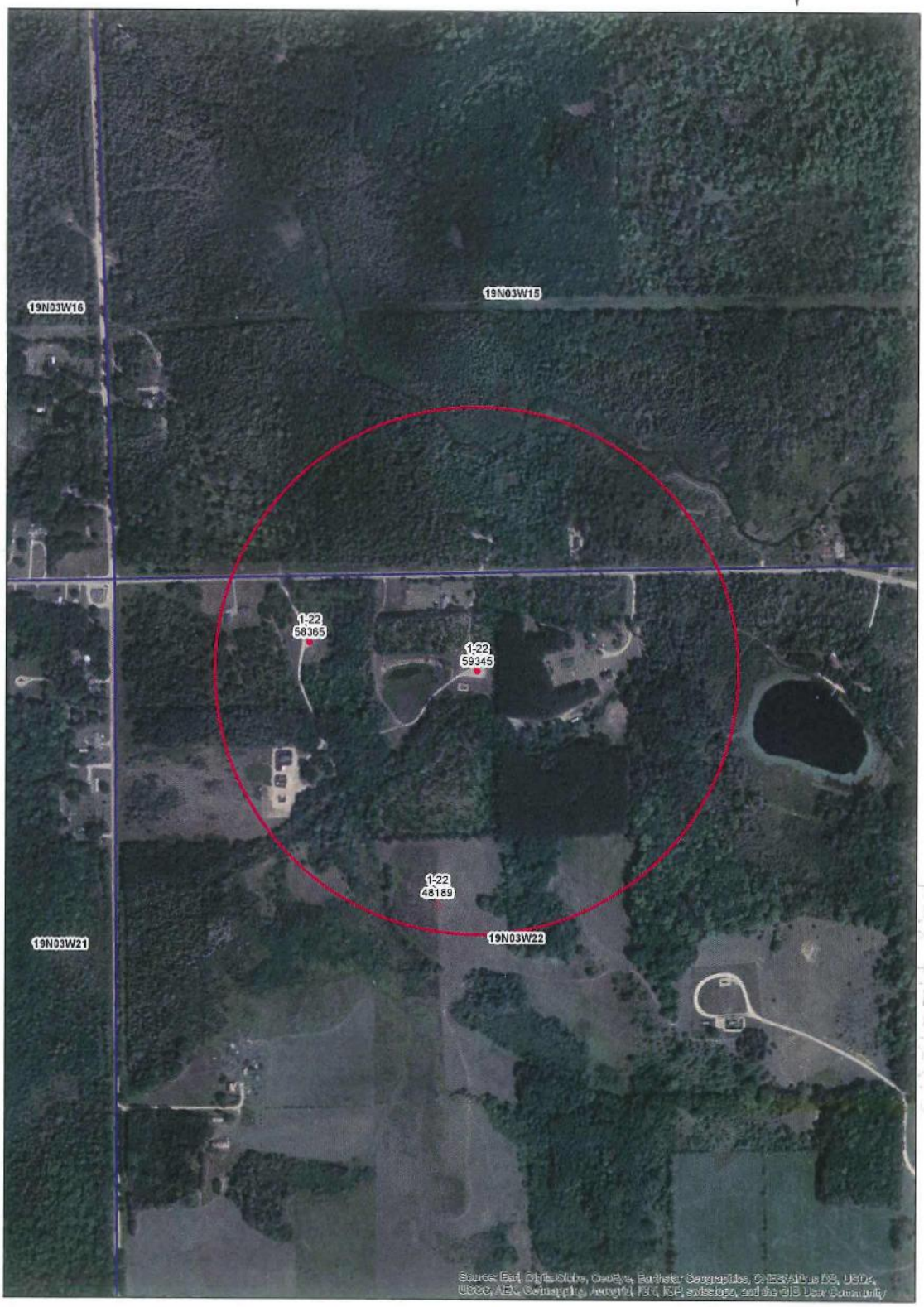


Hamilton Township, Clare County
Revised 6/7/2016, BM

0.5 0.25 0 0.5 Miles

RECEIVED
AUG 11 2016
UIC BRANCH
EPA REGION 5

Holcomb 1-22, Permit #59345
0.25 Mile Radius of Review



Hamilton Township, Clare County
Revised 6/7/2016, BM

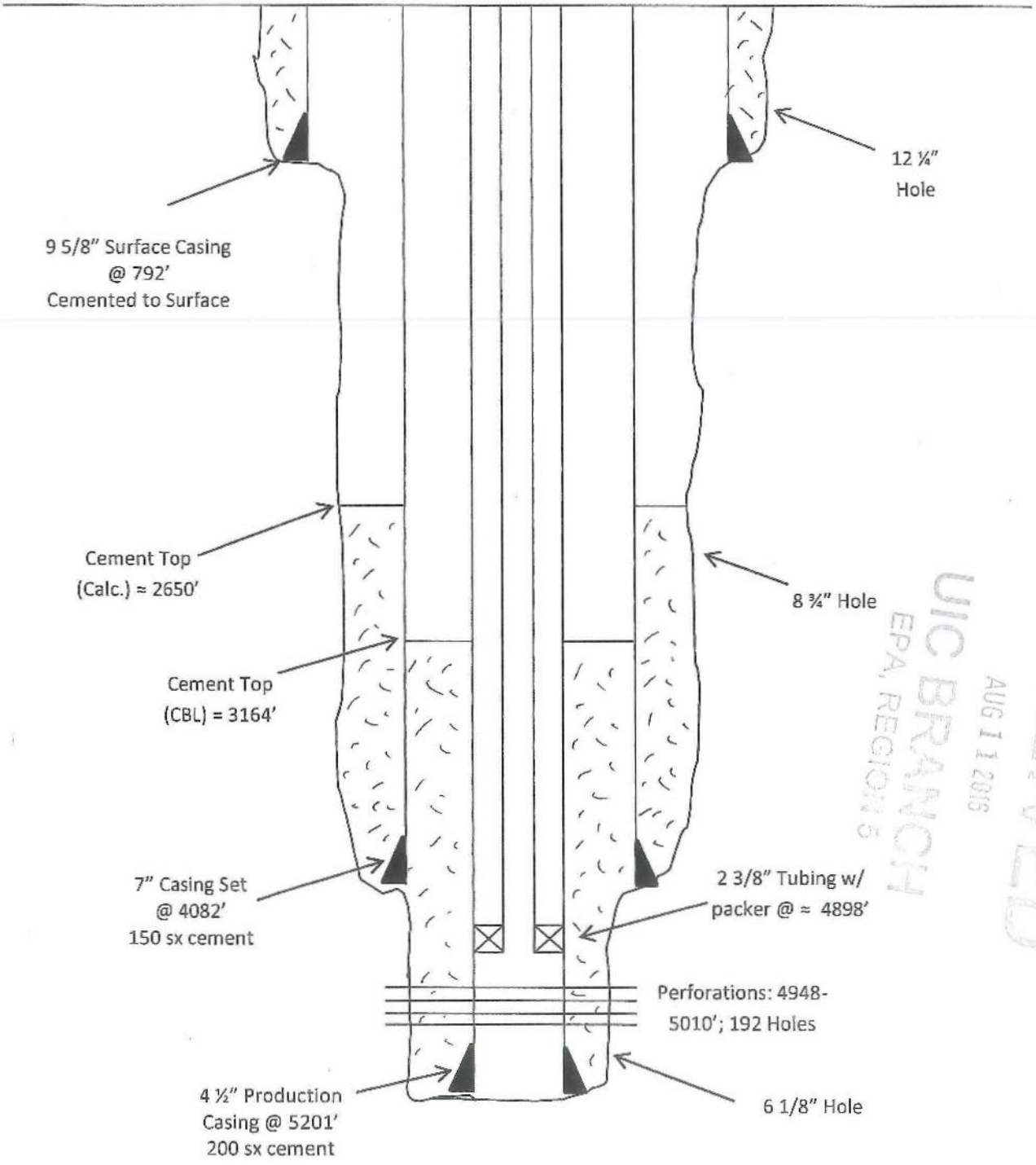
0.2 0.1 0 0.2 Miles

RECEIVED
AUG 11 2016
MI DEPARTMENT OF ENVIRONMENTAL QUALITY

WELL CONSTRUCTION

Holcomb 1-22

Permit # 59345



RECEIVED
AUG 11 2015
UIC BRANCH
EPA, REGION 6

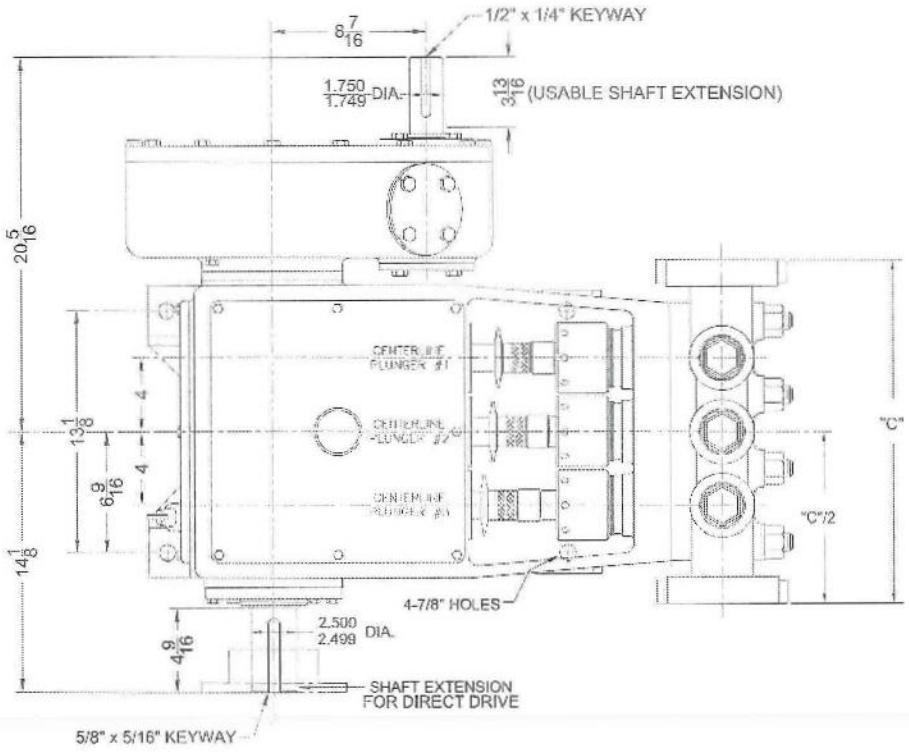
TYPICAL STIMULATION PROCEDURE

HOLCOMB 1-22

1. Move in Service Unit.
2. Swab tubing until fluid level is close to seating nipple.
3. Pump acid down tubing.
4. Displace acid to seating nipple with appropriate volume of fresh water.
5. Shut in well for 30 minutes.
6. Return well to injection.

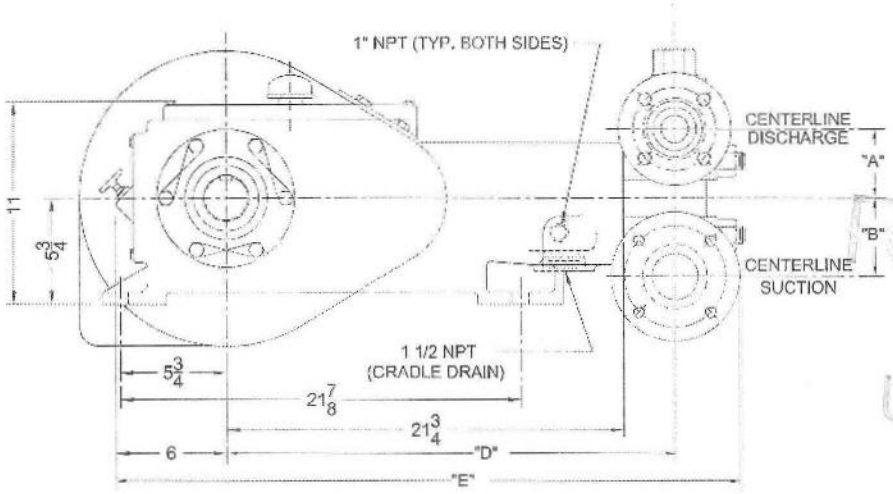
RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

30T-2 Triplex Plunger Pump



Specifications

Pump Size
(maximum plunger size x stroke length in.(mm)
2 1/4 x 2 (57.2 x 50.8)
Rated bhp at 500 rpm (kw): 30 (22.4)
Rated plunger load pounds(Kg): 3565 (1617)
Maximum discharge pressure: psi(kPa)
L model: 2000 (13,788)
H model: 5000 (34,470)
Crankshaft extension: in.(mm)
Diameter: 2.5/2.499 (63.5/63.4746)
Length: 4 9/16 (115.9)
Keyway (width x depth):
5/8 x 5/16 (15.88 x 7.94)
Maximum recommended sheave
in.(mm): 37.5 (952.5)
Minimum recommeded sheave
in.(mm): 20 (508)
For larger sizes: **Contact Factory**
Pinion shaft extension,
if gear reducer is supplied in.(mm)
For belt or chain drive:
Contact Factory
For direct drive:
Diameter: 1.75/1.749 (44.5/44.425)
Length: 3 13/16 (96.8)
Keyway (width x depth):
1/2 x 1/4 (12.7 x 6.4)
Accessory gear reduction unit ratio:
3.50:1, 3.83:1, 4.2:1
Oil Capacity gallons (L)
Crankcase: 1.2 (4.5)
Gear Reducer: 2/3 (2.5)
Weight, pump only on
wood shipping skids pounds (Kg): 640 (290)
Gear reducer, approximate pounds (Kg):
300 (136.08)



RECEIVED
AUG 1 1 2016
UIC BRANCH
EPA, REGION 5

Pump Model	Flange Connections		Dimensions in inches (mm)				
	Discharge Connection Sizes	Suction Connection Sizes	A	B	C	D	E
30T-2L Threaded	1 1/2 (38.10) FNPT	2 1/2 (63.5) FNPT	3 3/4	4 1/4	15 3/4	24 9/16	32 7/8
30T-2L Flanged	1 1/2 (38.10) API-2000 RJ	2 1/2 (63.5) ANSI-150 FF	3 3/4	4 1/4	18 1/4	24 9/16	34 1/16
30T-2H	1 (25.4) ANSI-2500 RJ	2 (50.8) ANSI-300 FF	3 5/8	4	17 1/2	24 5/16	33 9/16

30T-2 Triplex Plunger Pump

Performance Data

PUMP	English Units					200 * RPM		300 RPM		350 RPM		400 RPM		450 RPM		500 RPM	
	Plunger Dia. In.	Plunger Area Sq. In.	BPD per RPM	GPM per RPM	Max. Press. PSI	BPD	GPM	BPD	GPM	BPD	GPM	BPD	GPM	BPD	GPM	BPD	GPM
30T-2L	2.250	3.9761	3.5410	0.1033	897	709	20.66	1063	30.99	1240	36.16	1417	41.32	1594	46.49	1771	51.65
	2.000	3.1416	2.7980	0.0816	1135	560	16.32	840	24.48	980	28.56	1120	32.64	1260	36.72	1399	40.80
	1.750	2.4053	2.1430	0.0625	1482	429	12.50	643	18.75	751	21.88	858	25.00	965	28.13	1072	31.25
	1.500	1.7671	1.5737	0.0459	2000	315	9.18	473	13.77	551	16.07	630	18.36	709	20.66	787	22.95
30T-2H	1.500	1.7671	1.5737	0.0459	2000	315	9.18	473	13.77	551	16.07	630	18.36	709	20.66	787	22.95
	1.375	1.4849	1.3234	0.0386	2401	265	7.72	398	11.58	464	13.51	530	15.44	596	17.37	662	19.30
	1.250	1.2272	1.0937	0.0319	2905	219	6.38	329	9.57	383	11.17	438	12.76	493	14.36	547	15.95
	1.125	0.9940	0.8846	0.0258	3586	177	5.16	266	7.74	310	9.03	354	10.32	399	11.61	443	12.90
	1.000	0.7854	0.6994	0.0204	4539	140	4.08	210	6.12	245	7.14	280	8.16	315	9.18	350	10.20
	0.938	0.6910	0.6137	0.0179	5000	123	3.58	185	5.37	215	6.27	246	7.16	277	8.06	307	8.95
	Brake Horsepower Required					12.0		18.0		21.0		24		27		30	

PUMP	Metric Units					200 * RPM		300 RPM		350 RPM		400 RPM		450 RPM		500 RPM	
	Plunger Dia. mm	Plunger Area cm^2	M^3/Hr per RPM	L/Sec. per RPM	Max. Press. kPa	M^3/Hr	L/Sec.	M^3/Hr	L/Sec.	M^3/Hr	L/Sec.	M^3/Hr	L/Sec.	M^3/Hr	L/Sec.	M^3/Hr	L/Sec.
30T-2L	57	25.652	0.0235	0.0065	6185	4.69	1.30	7.04	1.96	8.21	2.28	9.38	2.61	10.56	2.93	11.73	3.26
	51	20.268	0.0185	0.0051	7826	3.71	1.03	5.56	1.54	6.49	1.80	7.41	2.06	8.34	2.32	9.27	2.57
	44	15.518	0.0142	0.0039	10218	2.84	0.79	4.26	1.18	4.97	1.38	5.68	1.58	6.39	1.77	7.10	1.97
	38	11.401	0.0104	0.0029	13790	2.08	0.58	3.13	0.87	3.65	1.01	4.17	1.16	4.69	1.30	5.21	1.45
30T-2H	38	11.401	0.0104	0.0029	13790	2.08	0.58	3.13	0.87	3.65	1.01	4.17	1.16	4.69	1.30	5.21	1.45
	35	9.580	0.0088	0.0024	16554	1.75	0.49	2.63	0.73	3.07	0.85	3.51	0.97	3.94	1.10	4.38	1.22
	32	7.917	0.0072	0.0020	20029	1.45	0.40	2.17	0.60	2.54	0.70	2.90	0.81	3.26	0.91	3.62	1.01
	29	6.413	0.0059	0.0016	24725	1.17	0.33	1.76	0.49	2.05	0.57	2.34	0.65	2.64	0.73	2.93	0.81
	25	5.067	0.0046	0.0013	31295	0.93	0.26	1.39	0.39	1.62	0.45	1.85	0.51	2.08	0.58	2.32	0.64
	24	4.458	0.0041	0.0011	34474	0.81	0.23	1.22	0.34	1.42	0.40	1.63	0.45	1.83	0.51	2.03	0.56
	Kilowatts Required					8.9		13.4		15.7		18		20		22	

Volumetric Rate is based on 100% Volumetric Efficiency. Brake Horsepower/Kilowatts Required is based on 90% Mechanical Efficiency. * For operation below 200 RPM, auxiliary lubrication system required. Not all plunger sizes are shown. Contact National-Oilwell for additional information.

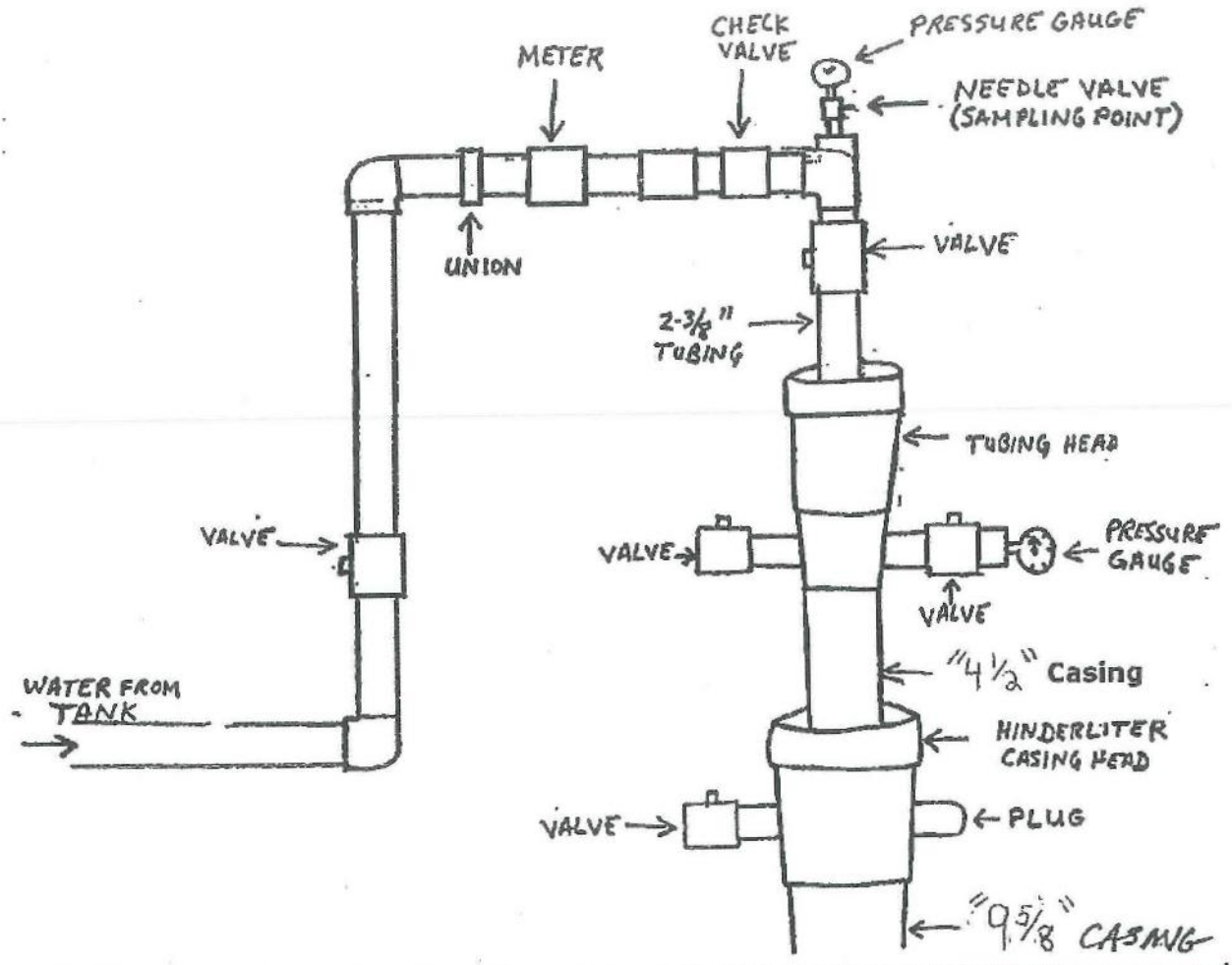
The information and data on this sheet is accurate to the best of our knowledge and belief, but are intended for general information only. Applications suggested for the materials are described only to help readers make their own evaluations and decisions, and are neither guarantees nor to be construed as express or implied warranties of suitability for these or other applications. National Oilwell makes no warranty either express or implied beyond that stipulated in National Oilwell Standard Terms and Conditions of Sale.

RECEIVED
AUG 11 2015
UIC BRANCH
EPA, REGION 5

Authorized Distributor:

NATIONAL OILWELL VARCO
www.nov.com • mission.sales@nov.com
10000 Richmond, Houston, Texas 77042
(713)346-7500 (phone) • (713)346-7366 (fax)

Injection Well Surface Construction



RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

TECHNI-HIB™ 606W Corrosion Inhibitor CHEMICAL

Product Information

Description

TECHNI-HIB 606W corrosion inhibitor is a water-soluble combination of a cationic filming corrosion inhibitor and sulfite-based oxygen scavenger.

Uses

TECHNI-HIB 606W corrosion inhibitor has been developed for use as a packer fluid inhibitor, hydrostatic test inhibitor and general purpose filming corrosion inhibitor for water injection systems, water disposal operations, power water pumping systems and high water/oil ratio producing oil wells where a small amount of oxygen is present.

Application

TECHNI-HIB 606W corrosion inhibitor can be injected continuously into a system at a rate of 60 to 120 ppm (1 to 2 quarts per 100 barrels of water). When used as a packer fluid inhibitor, 2500 to 5000 ppm (10 to 20 gallons per 100 barrels of water) is required. When used as a hydrostatic test fluid inhibitor, TECHNI-HIB 606W corrosion inhibitor injected at a rate of 500 to 3500 ppm is typically recommended dependent on conditions.

Technical Data

Specific Gravity @ 60°F	0.96 - 1.008
Pounds Per Gallon @ 60°F	8.0 - 8.4
Freeze Point	-40°F
Flash Point(TCC)	85°F
pH	6 - 6.5
Appearance	Dark Brown Liquid

SOLUBILITIES:	
Fresh Water	Soluble
2% Brine	Soluble
15% Brine	Soluble
Crude Oil	Insoluble

Safety Precautions

WARNING! FLAMMABLE. Keep away from heat, sparks, and open flame. Keep container closed when not in use. Do not breathe vapors, use with adequate ventilation. Avoid contact with eyes, skin, and clothing.

References

TECHNI-HIB 606W corrosion inhibitor is available in 55-gallon drums and bulk quantities. Refer to Material Safety Data Sheet for additional information and first aid.

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

The above features and/or data are supplied solely for informational purposes and BJ Services Company makes no guarantees or warranties, either expressed or implied, with respect to their accuracy or use. All product warranties and guarantees shall be governed by the BJ Services Company standard at the time of sale or delivery of service. Actual product performance or availability depends on the timing and location of the job, the type of job and the particular characteristics of each job. This document is controlled by the reference date. To ensure that this is the current version, please reference the Services section of the BJ Services Website (www.bjservices.com) or ask your BJ representative.

SPECIFICATION GUIDES

AD-1™ Tension Packer, Product Family No. H73908

Casing			Packer				
OD		Weight •	Size	Nom ID		Max Gage Ring OD	
in.	mm	lb/ft		in.	mm	in.	mm
4	101.6	9.5–11.6	41A	1.890	48.1	3.281	83.3
4-1/2	114.3	12.6–15.1	41B	1.890	48.1	3.609	91.7
		9.5–13.5	43A			3.786	96.2
5	127.0	15–18	43B	1.890	48.1	4.140	105.2
		11.5–15	43C			4.265	108.3
5-1/2	139.7	26	43C	1.890	48.1	4.265	108.3
		20–23	45A2	1.953	49.6	4.515	114.7
		15.5–20	45A4			4.656	118.3
		13–15.5	45B			4.796	121.8
5-3/4	146.1	22.5	45B	1.953	49.6	4.796	121.8
6	152.4	26	45B	1.953	49.6	4.796	121.8
		20–23	45C			5.077	129.0
		15–18	45D			5.171	131.3
6-5/8	168.3	34	45E2	1.953	49.6	5.421	137.7
		28–32	45E4			5.499	139.7
		24	47A2	2.409	61.2	5.671	144.0
		17–20	47A4			5.827	148.0
7	177.8	38	47A2	2.409	61.2	5.671	144.0
		32–35	47A4			5.827	148.0
		26–29	47B2			5.983	152.0
		20–26	47B4			6.093	154.8
		17–20	47C2			6.281	159.5
7-5/8	193.7	33.7–39	47C4	2.409	61.2	6.468	164.3
		24–29.7	47D2			6.687	169.9
		20–24	47D4			6.827	173.4
8-5/8	219.1	40–49	49A2	3.000	76.2	7.327	186.1
		32–40	49A4			7.546	191.7
		20–28	49B			7.796	198.0
9-5/8	244.5	47–53.5	51A2	4.000	101.6	8.218	208.7
		40–47	51A4			8.437	214.3
		29.3–36	51B			8.593	218.3
10-3/4	273.1	32.7–55.5	53A	4.000	101.6	9.515	241.7
11-3/4	298.5	38–60	53B	4.000	101.6	10.515	261.1
12-3/4	323.9	48–53	55A	4.000	101.6	11.625	295.3
13-3/8	339.7	48–72	55B	4.000	101.6	12.000	304.8

ADL-1™ Tension Packer, Product Family No. H73912

Casing			Packer				
OD		Weight •	Size	Nom ID		Gage Ring OD	
in.	mm	lb/ft		in.	mm	in.	mm
5-1/2	139.7	13–17	45B x 2.90	2.903	73.7	4.750	120.7
6	152.4	23–26	45C x 2.90	2.903	73.7	5.000	127.0
		18–20	45D x 2.90			5.218	132.5
7	177.8	23–29	47B x 4.12	4.125	104.8	5.983	152.0
		17–20	47C2 x 4.12			6.281	159.5
8-5/8	219.1	24–32	49A4 x 4.00	4.000	101.6	7.615	193.4

• *When selecting a packer for a casing weight common to two weight ranges (same OD), choose the packer size shown for the lighter of the two weight ranges. Example: for 7-in. (177.8 mm) 20 lb/ft casing use packer size 47C2. Under certain circumstances the other packer size may be run, such as when running in mixed casing strings. Repair kits, including items as packing elements, seal strings, etc., are available for redressing retrievable packers. Contact your Baker Hughes representative. Use only on Baker Hughes repair parts.*

RECEIVED
AUG 11 2016
UIC BRANCH

AD-1 and ADL-1 Tension Packers

Product Family Nos. H73908 and H73912

APPLICATION

The AD-1™ tension packer is a compact, economical, retrievable packer. Primarily used in waterflood applications, it can also be used for production, treating operations, and when a set-down packer is impractical. And because the AD-1 is tension-set, it is ideally suited for shallow wells where set-down weight is not available.

Advantages

- Uses Baker Hughes rugged rocker-type slips
- Bore-through-the-packer mandrel is larger than drift
- Simple, low-cost packer for fluid injection
- Three release methods ensure retrievability
- Uses proven one-piece packing element

Additional Information

The ADL-1™ tension packer is a large-bore version of the AD-1 and offers the same features and benefits; running and retrieving operations are also the same.

AD-1 Tension Packer
Product Family No. H73908

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

TUBING TABLES

Dimensional & Grade Designators								Collapse Resistance	Internal Yield Pressure		
OD Size	Weight T&C Non-Upset	Weight T&C Upset	Weight PE Non-Upset	NOM Body Wall	NOM ID	Drift Diameter	Product Grade		Pipe Body	Improved Buttress Thd Non-Upset Regular	Improved Buttress Thd Non-Upset Special Clr
in.	lb/ft	lb/ft	lb/ft	in.	in.	in.		psi	psi	psi	psi
1.900	5.15	--	5.13	0.300	1.300	1.206	T95	25,260	26,250	--	--
1.900	5.15	--	5.13	0.300	1.300	1.206	USS C95	25,260	26,250	--	--
2.063	--	--	3.18	0.156	1.751	1.657	H40	5,590	5,290	--	--
2.063	--	--	3.18	0.156	1.751	1.657	J55	7,690	7,280	--	--
2.063	--	--	3.18	0.156	1.751	1.657	L80	11,180	10,590	--	--
2.063	--	--	3.18	0.156	1.751	1.657	N80 Type 1	11,180	10,590	--	--
2.063	--	--	3.18	0.156	1.751	1.657	N80	11,180	10,590	--	--
2.063	--	--	3.18	0.156	1.751	1.657	C90	12,420	11,910	--	--
2.063	--	--	3.18	0.156	1.751	1.657	R95	12,980	12,570	--	--
2.063	--	--	3.18	0.156	1.751	1.657	T95	12,980	12,570	--	--
2.063	--	--	3.18	0.156	1.751	1.657	USS C95	12,980	12,570	--	--
2.063	4.50	--	4.42	0.225	1.613	1.519	H40	7,770	7,630	--	--
2.063	4.50	--	4.42	0.225	1.613	1.519	J55	10,690	10,500	--	--
2.063	4.50	--	4.42	0.225	1.613	1.519	L80	15,550	15,270	--	--
2.063	4.50	--	4.42	0.225	1.613	1.519	N80 Type 1	15,550	15,270	--	--
2.063	4.50	--	4.42	0.225	1.613	1.519	N80	15,550	15,270	--	--
2.063	4.50	--	4.42	0.225	1.613	1.519	C90	17,490	17,180	--	--
2.063	4.50	--	4.42	0.225	1.613	1.519	R95	18,460	18,130	--	--
2.063	4.50	--	4.42	0.225	1.613	1.519	T95	18,460	18,130	--	--
2.063	4.50	--	4.42	0.225	1.613	1.519	USS C95	18,460	18,130	--	--
2.063	4.50	--	4.42	0.225	1.613	1.519	P110 SR16	21,380	20,990	--	--
2.063	4.50	--	4.42	0.225	1.613	1.519	P110	21,380	20,990	--	--
2.375	4.00	--	3.94	0.167	2.041	1.947	H40	5,230	4,920	4920	4920
2.375	4.00	--	3.94	0.167	2.041	1.947	J55	7,190	6,770	6770	6770
2.375	4.00	--	3.94	0.167	2.041	1.947	L80	9,980	9,840	9840	9840
2.375	4.00	--	3.94	0.167	2.041	1.947	N80 Type 1	9,980	9,840	9840	9840
2.375	4.00	--	3.94	0.167	2.041	1.947	N80	9,980	9,840	9840	9840
2.375	4.00	--	3.94	0.167	2.041	1.947	C90	10,940	11,070	11070	11070
2.375	4.00	--	3.94	0.167	2.041	1.947	R95	11,410	11,690	11690	11690
2.375	4.00	--	3.94	0.167	2.041	1.947	T95	11,410	11,690	11690	11690
2.375	4.00	--	3.94	0.167	2.041	1.947	USS C95	11,410	11,690	11690	11690
2.375	4.60	4.70	4.44	0.190	1.995	1.901	H40	5,890	5,600	5600	5600
2.375	4.60	4.70	4.44	0.190	1.995	1.901	J55	8,100	7,700	7700	7700
2.375	4.60	4.70	4.44	0.190	1.995	1.901	L80	11,780	11,200	11200	11200
2.375	4.60	4.70	4.44	0.190	1.995	1.901	N80 Type 1	11,780	11,200	11200	11200
2.375	4.60	4.70	4.44	0.190	1.995	1.901	N80	11,780	11,200	11200	11200
2.375	4.60	4.70	4.44	0.190	1.995	1.901	C90	13,250	12,600	12600	12600
2.375	4.60	4.70	4.44	0.190	1.995	1.901	R95	13,980	13,300	13300	13300
2.375	4.60	4.70	4.44	0.190	1.995	1.901	T95	13,980	13,300	13300	13300
2.375	4.60	4.70	4.44	0.190	1.995	1.901	USS C95	13,980	13,300	13300	13300
2.375	4.60	4.70	4.44	0.190	1.995	1.901	P110 SR16	16,130	15,400	15400	15400
2.375	4.60	4.70	4.44	0.190	1.995	1.901	P110	16,130	15,400	15400	15400
2.375	5.80	5.95	5.76	0.254	1.867	1.773	J55	10,510	10,290	10290	9310
2.375	5.80	5.95	5.76	0.254	1.867	1.773	L80	15,280	14,970	14970	13550
2.375	5.80	5.95	5.76	0.254	1.867	1.773	N80 Type 1	15,280	14,970	14970	13550
2.375	5.80	5.95	5.76	0.254	1.867	1.773	N80	15,280	14,970	14970	13550

Internal Yield Pressure					Tension						Ductile Rupture Capped End
					Yield Pipe Body	Threaded & Coupled Joint Strength					
Round Thread			Lame' - Von Mises			Improved Buttress Thd		Round Thread			
NUE	Upset EUE		Open	Capped		Non-Upset		NUE	Upset EUE		
Non-Upset	Regular	Special Clr	End	End		Regular	Special Clr	Regular	Regular	Special Clr	
psi	psi	psi	psi	psi	lb	lb	lb	lb	lb	lb	psi
--	--	--	25,010	26,080	143,300	--	--	--	--	--	32,050
--	--	--	25,010	26,080	143,300	--	--	--	--	--	32,050
--	--	--	5,230	5,690	37,400	--	--	--	--	--	5,900
--	--	--	7,200	7,830	51,400	--	--	--	--	--	7,420
--	--	--	10,470	11,390	74,800	--	--	--	--	--	11,540
--	--	--	10,470	11,390	74,800	--	--	--	--	--	10,020
--	--	--	10,470	11,390	74,800	--	--	--	--	--	12,150
--	--	--	11,780	12,810	84,200	--	--	--	--	--	13,510
--	--	--	12,430	13,530	88,800	--	--	--	--	--	12,860
--	--	--	12,430	13,530	88,800	--	--	--	--	--	14,240
--	--	--	12,430	13,530	88,800	--	--	--	--	--	14,240
--	--	--	7,460	7,960	52,000	--	--	--	--	--	8,690
--	--	--	10,260	10,940	71,400	--	--	--	--	--	10,950
--	--	--	14,920	15,920	103,900	--	--	--	--	--	17,100
--	--	--	14,920	15,920	103,900	--	--	--	--	--	14,780
--	--	--	14,920	15,920	103,900	--	--	--	--	--	18,000
--	--	--	16,780	17,910	116,900	--	--	--	--	--	20,080
--	--	--	17,720	18,900	123,400	--	--	--	--	--	19,060
--	--	--	17,720	18,900	123,400	--	--	--	--	--	21,160
--	--	--	17,720	18,900	123,400	--	--	--	--	--	21,160
--	--	--	20,510	21,880	142,900	--	--	--	--	--	22,840
--	--	--	20,510	21,880	142,900	--	--	--	--	--	25,350
4,920	--	--	4,870	5,320	46,300	46,300	46,300	30,100	--	--	5,460
6,770	--	--	6,700	7,320	63,700	63,700	63,700	41,400	--	--	6,880
9,840	--	--	9,750	10,640	92,600	92,600	92,600	60,200	--	--	10,690
9,840	--	--	9,750	10,640	92,600	92,600	92,600	60,200	--	--	9,290
9,840	--	--	9,750	10,640	92,600	92,600	92,600	60,200	--	--	11,250
11,070	--	--	10,970	11,970	104,200	104,200	104,200	67,800	--	--	12,510
11,690	--	--	11,580	12,640	110,000	110,000	110,000	71,500	--	--	11,910
11,690	--	--	11,580	12,640	110,000	110,000	110,000	71,500	--	--	13,180
11,690	--	--	11,580	12,640	110,000	110,000	110,000	71,500	--	--	13,180
5,600	5,600	5,600	5,530	6,000	52,200	52,200	52,200	36,000	52,200	52,200	6,250
7,700	7,700	7,700	7,600	8,250	71,700	71,700	71,700	49,400	71,700	71,700	7,880
11,200	11,200	11,200	11,060	12,000	104,300	104,300	104,300	71,900	104,300	104,300	12,250
11,200	11,200	11,200	11,060	12,000	104,300	104,300	104,300	71,900	104,300	104,300	10,630
11,200	11,200	11,200	11,060	12,000	104,300	104,300	104,300	71,900	104,300	104,300	12,900
12,600	12,600	12,600	12,440	13,500	117,400	117,400	117,400	80,900	117,400	117,400	14,350
13,300	13,300	13,300	13,140	14,250	123,900	123,900	123,900	85,400	123,900	123,900	13,660
13,300	13,300	13,300	13,140	14,250	123,900	123,900	123,900	85,400	123,900	123,900	15,120
13,300	13,300	13,300	13,140	14,250	123,900	123,900	123,900	85,400	123,900	123,900	15,120
15,400	15,400	15,400	15,210	16,500	143,400	143,400	143,400	98,900	143,400	143,400	16,370
15,400	15,400	15,400	15,210	16,500	143,400	143,400	143,400	98,900	143,400	143,400	18,120
10,290	10,220	7,860	10,070	10,750	93,100	93,100	93,100	70,800	93,100	93,100	10,720
14,970	14,860	11,440	14,640	15,640	135,400	135,400	135,400	103,000	135,400	135,400	16,740
14,970	14,860	11,440	14,640	15,640	135,400	135,400	135,400	103,000	135,400	135,400	14,470
14,970	14,860	11,440	14,640	15,640	135,400	135,400	135,400	103,000	135,400	135,400	17,620

VII-10

INFORMATION REQUIRED OF CLASS II INJECTION WELL OPERATORS SEEKING BLANKET OR FINANCIAL STATEMENT COVERAGE

Company Name: Muskegon Development Company **Date Company Started:** 1927 **Public:** ___ **Private:** X

The following information on production fields should be supplied. The information should cover:
(1) The field(s) associated with the injection wells in this financial responsibility application;
(2) At least one currently producing field that the applicant has operated for more than five years; and
(3) At least one field with an estimated remaining operating life exceeding five years.

Field Name	Field Location	Date Production Started	Number of Producing Wells	Number of Injection Wells	Wells Plugged	Estimated Remaining Operating Life of Field
1. Smith Creek Field	Hamilton Twp., Clare Co.	2007	3	0 (1 proposed)	0	20 years
2. Kawkawlin Central Unit	Kawkawlin Twp., Bay Co.	2000 (Unit)	37	19	1	20 years
3. Lower Chub Project	Chester Twp., Otsego Co.	1991	19	1	0	10 years
4. Williams Unit	Williams Twp., Bay Co.	1982	17	8	3	7 years
5. Caulkins Lake Project	Charlton Twp., Otsego Co.	1990	30	2	0	11 years

I certify that the information provided above is correct.

Signature of Professional Engineer: Michael A. Mesbergen Date: June 7, 2016

Michael A. Mesbergen

Registration Number State of Michigan: 6201027199

RECEIVED
AUG 11 2016
UIC BRANCH

Muskegon Development Company

Contents

Report Letter	1-2
Financial Statements - Income Tax Basis	
Statement of Assets, Liabilities, and Stockholder's Equity	3
Statement of Revenue and Expenses	4
Statement of Stockholder's Equity	5
Notes to Financial Statements	6-10

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

plante moran

Plante & Moran, PLLC
Suite 300
600 East Front Street
Traverse City, MI 49686
Tel: 231.947.7800
Fax: 231.947.0348
plantemoran.com

Independent Auditor's Report

To the Board of Directors
Muskegon Development Company

We have audited the accompanying financial statements of Muskegon Development Company (the "Company"), which comprise the statement of assets, liabilities, and stockholder's equity - income tax basis as of December 31, 2015 and 2014 and the related income tax basis statements of revenue and expenses and stockholder's equity for the years then ended, and the related notes to the financial statements.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with the basis of accounting the Company uses for income tax purposes; this includes determining that the basis of accounting used for income tax purposes is an acceptable basis for the preparation of the financial statements in the circumstances. Management is also responsible for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the assets and liabilities of Muskegon Development Company as of December 31, 2015 and 2014 and its revenue and expenses for the years then ended in accordance with the basis of accounting the Company uses for income tax purposes described in Note 1.

RECEIVED
AUG 11 2016
UIC BRANCH

Praxity
MEMBER
GLOBAL ALLIANCE OF INDEPENDENT FIRMS

To the Board of Directors
Muskegon Development Company

Basis of Accounting

We draw attention to Note 1 to the financial statements, which describes the basis of accounting. The financial statements are prepared on the basis of accounting the Company uses for income tax purposes, which is a basis of accounting other than accounting principles generally accepted in the United States of America. Our opinion is not modified with respect to this matter.

Plante & Moran, PLLC

June 29, 2016

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

Muskegon Development Company

Statement of Assets, Liabilities, and Stockholder's Equity
Income Tax Basis

	December 31, 2015	December 31, 2014
Assets		
Current Assets		
Cash and cash equivalents	$ 17,409,691	$ 24,932,781
Accounts receivable:		
Trade	3,283,300	6,846,063
Joint interest billing	1,885,660	1,382,763
Related party (Note 4)	5,267,915	5,224,538
Inventory	1,155,271	875,854
Total current assets	29,001,837	39,261,999
Proved Oil And Gas Properties - Net	33,376	38,271
Property and Equipment - Net (Note 2)	1,088,287	1,225,817
Certificates of Deposit	304,622	303,834
Other Assets	30,375	10,293
Total assets	**$ 30,458,497**	**$ 40,840,214**
Liabilities and Stockholder's Equity		
Current Liabilities		
Trade accounts payable	$ 1,812,124	$ 3,790,786
Undistributed oil and gas revenue	3,588,278	5,008,346
Related party payables (Note 4)	6,080,099	10,799,182
Accrued payroll and payroll taxes	107,093	148,807
Total current liabilities	11,587,594	19,747,121
Plugging Fund Payable	1,548,783	1,459,451
Stockholder's Equity		
Common stock - No par value	1,252,355	1,252,355
Additional paid-in capital	3,163	3,163
Retained earnings	16,066,602	18,378,124
Total stockholder's equity	17,322,120	19,633,642
Total liabilities and stockholder's equity	**$ 30,458,497**	**$ 40,840,214**

RECEIVED
AUG 11 2016
LRC BRANCH
EPA, REGION 5

Muskegon Development Company

Statement of Revenue and Expenses
Income Tax Basis

	Year Ended December 31, 2015	Year Ended December 31, 2014
Net Sales		
Management and operator fees	$ 4,146,343	$ 4,067,539
Oil and gas production sales	1,005,932	1,465,392
Equipment rental fees	768,768	768,768
Gain on sale of property and equipment	38,222	186,924
Total revenue	5,959,265	6,488,623
Operating Expenses		
General and administrative expenses	3,586,629	3,500,176
Lease operating expenses	596,441	1,203,695
Exploration and geological expenses	580,523	601,298
Depreciation, depletion, and amortization	489,765	468,605
Total operating expenses	5,253,358	5,773,774
Income from Operations	705,907	714,849
Other Income (Expense)		
Interest income	28,844	36,028
Other (expense) income	(46,273)	95,572
Total other (expense) income	(17,429)	131,600
Net Income	**$ 688,478**	**$ 846,449**

RECEIVED
AUG 1 1 2016
UIC BRANCH
EPA, REGION 5

See Notes to Financial Statements.

Muskegon Development Company

Statement of Stockholder's Equity
Income Tax Basis

	Common Stock	Additional Paid-in Capital	Retained Earnings	Total
Balance - January 1, 2014	$ 1,252,355	$ -	$ 17,531,675	$ 18,784,030
Net income	-	-	846,449	846,449
Cash contributions	-	3,163	-	3,163
Balance - December 31, 2014	1,252,355	3,163	18,378,124	19,633,642
Net income	-	-	688,478	688,478
Dividends declared	-	-	(3,000,000)	(3,000,000)
Balance - December 31, 2015	**$ 1,252,355**	**$ 3,163**	**$ 16,066,602**	**$ 17,322,120**

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

See Notes to Financial Statements.

Fibertec
environmental
services

Monday, July 18, 2016

Fibertec Project Number:	73682 Amended
Project Identification:	Smith Creek - Supply Water /
Submittal Date:	06/13/2016

Mr. Bennett Myler
Muskegon Development Company
1425 S. Mission
Mt. Pleasant, MI 48858

Dear Mr. Myler,

Thank you for selecting Fibertec Environmental Services as your analytical laboratory. The samples you submitted have been analyzed in accordance with NELAC standards and the results compiled in the attached report. Any exceptions to NELAC compliance are noted in the report. These results apply only to those samples submitted. Please note TO-15 samples will be disposed of 14 days after the reporting date. All other samples will be disposed of 30 days after the reporting date.

This report has been amended to correct units on all parameters to mg/L. This report has also been amended to correct the alkalinity results based on updated lab information.

If you have any questions regarding these results or if we may be of further assistance to you, please contact me at (517) 699-0345.

Sincerely,

Amanda Ryf

By Amanda Petrovsky at 11:23 AM, Jul 18, 2016

For Daryl P. Strandbergh
Laboratory Director

Enclosures

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

Client Identification:	Muskegon Development Company	Sample Description:	Supply Water	Chain of Custody:	42531.422
Client Project Name:	Smith Creek - Supply Water	Sample No:	1	Collect Date:	06/13/16
Client Project No:	NA	Sample Matrix:	Ground Water	Collect Time:	12:30

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Specific Gravity at 60°F (Analysis Performed in Cadillac) — **Aliquot ID: 73682-001D** — **Matrix: Ground Water**
Method: ASTM D1429-08D — **Description: Supply Water**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Specific Gravity	1.000		NA	0.000	1.0	NA	NA	06/14/16	NA	CAT

Trace Elements by ICP/MS, Dissolved — **Aliquot ID: 73682-001B** — **Matrix: Ground Water**
Method: EPA 3005A (Dissolved)/EPA 6020A — **Description: Supply Water**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Barium	U		mg/L	0.1	100	06/17/16	PT16F17B	06/17/16	T416F17A	JLH
2. Calcium	71		mg/L	3	100	06/17/16	PT16F17B	06/17/16	T416F17A	JLH
3. Magnesium	20		mg/L	1	100	06/17/16	PT16F17B	06/17/16	T416F17A	JLH
4. Potassium	2		mg/L	1	100	06/17/16	PT16F17B	06/17/16	T416F17A	JLH
5. Sodium	6		mg/L	3	100	06/17/16	PT16F17B	06/17/16	T416F17A	JLH

Trace Elements by ICP/MS, Total Recoverable — **Aliquot ID: 73682-001C** — **Matrix: Ground Water**
Method: EPA 3005A (Total Recoverable)/EPA 6020A — **Description: Supply Water**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Iron	U		mg/L	2.5	500	06/17/16	PT16F17C	06/17/16	T416F17A	JLH

Inorganic Anions by IC — **Aliquot ID: 73682-001** — **Matrix: Ground Water**
Method: EPA 9056A — **Description: Supply Water**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
1. Sulfate	12		mg/L	1	1.0	06/17/16	PW16F16B	06/17/16	WT16F17A	NRV

Sulfide — **Aliquot ID: 73682-001A** — **Matrix: Ground Water**
Method: HACH 8131 — **Description: Supply Water**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Sulfide	U	L-	mg/L	0.2	1.0	06/20/16	PW16F20B	06/20/16	WF16F20A	NRV

Client Identification:	**Muskegon Development Company**	Sample Description:	**Supply Water**	Chain of Custody:	**42531.422**
Client Project Name:	**Smith Creek - Supply Water**	Sample No:	**1**	Collect Date:	**06/13/16**
Client Project No:	**NA**	Sample Matrix:	**Ground Water**	Collect Time:	**12:30**

Sample Comments:

Definitions: Q: Qualifier (see definitions at end of report) NA: Not Applicable ‡: Parameter not included in NELAC Scope of Analysis.

Alkalinity by Titrimetry — **Aliquot ID: 73682-001** — **Matrix: Ground Water**
Method: SM 2320 B-1997 — **Description: Supply Water**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Bicarbonate Alkalinity	**190**		mg CaCO3/L	20	1.0	NA	NA	06/17/16	WD16F17A	RKP
‡ 2. Carbonate Alkalinity	U		mg CaCO3/L	20	1.0	NA	NA	06/17/16	WD16F17A	RKP

Specific Conductance at 25°C (Analysis Performed in Cadillac) — **Aliquot ID: 73682-001D** — **Matrix: Ground Water**
Method: SM 2510 B-1997 — **Description: Supply Water**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Specific Conductance	**790**		µmho/cm	1.0	1.0	NA	NA	06/14/16	NA	CAT

Resistivity at 25°C (Analysis Performed in Cadillac) — **Aliquot ID: 73682-001D** — **Matrix: Ground Water**
Method: SM 2510 B-1997 — **Description: Supply Water**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Resistivity	**13**		ohm-m	0.000	1.0	NA	NA	06/14/16	NA	CAT

Residue, Filterable (TDS) (Analysis Performed in Cadillac) — **Aliquot ID: 73682-001D** — **Matrix: Ground Water**
Method: SM 2540 C-1997 — **Description: Supply Water**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Total Dissolved Solids	**250**		mg/L	250	10	06/28/16	NA	06/29/16	NA	EAS

Chloride by Titrimetry (Analysis Performed in Cadillac) — **Aliquot ID: 73682-001D** — **Matrix: Ground Water**
Method: SM 4500-Cl⁻ B-1997 — **Description: Supply Water**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. Chloride	**21**		mg/L	10	1.0	NA	NA	06/17/16	NA	CAT

pH, Electrometric (Analysis Performed in Cadillac) — **Aliquot ID: 73682-001D** — **Matrix: Ground Water**
Method: SM 4500-H+ B-2000 — **Description: Supply Water**

Parameter(s)	Result	Q	Units	Reporting Limit	Dilution	Preparation P. Date	Preparation P. Batch	Analysis A. Date	Analysis A. Batch	Init.
‡ 1. pH	**7.95**		pH Units	-1.00	1.0	NA	NA	06/13/16 14:03	NA	CAT

Definitions/ Qualifiers:

- **A:** Spike recovery or precision unusable due to dilution.
- **B:** The analyte was detected in the associated method blank.
- **E:** The analyte was detected at a concentration greater than the calibration range, therefore the result is estimated.
- **J:** The concentration is an estimated value.
- **M:** Modified Method
- **U:** The analyte was not detected at or above the reporting limit.
- **X:** Matrix Interference has resulted in a raised reporting limit or distorted result.
- **W:** Results reported on a wet-weight basis.
- ***:** Value reported is outside QC limits

Exception Summary:

L- : Recovery in the associated laboratory sample (LCS) exceeds the lower control limit. Results may be biased low.

ACCREDITED IN ACCORDANCE WITH nelac

Accreditation Number(s):

T104704518-16-5 (TX)

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

Central Michigan Cementing Services
1934 Commercial Drive • Mt. Pleasant, MI USA 48858
Phone: 989/775-0940 • Fax: 989/775-0943

JOB DESCRIPTION FORM

COMPANY Muskegon Development DATE 5-25-16 JOB #

WELL NAME R&P Fanslau NO. 1-22

COUNTY Clare SECTION PN 58365 TWP. N. Hamilton STATE MI

CONTRACTOR Kip Howland

JOB DESCRIPTION Treat Perfs w/ 1,500 Gals 20% HCL

~~0800 Spot Equipment & Rig UP~~

0816 Roll Hole w/ 50 BBLs FW

0830 Pressure Test Lines to 1,500 PSI

0832 Spot ACID 19.7 BBLs & Set Packer

0835 Start Treating .25 Bpm 3,500 PSI

0845 go to 1 BBL Flush & Fix Leak.

0859 Start Pumping .25 Bpm 3,825 PSI

0914 .25 Bpm 3,400 PSI .25 BBLs ACID Pumped

0921 Increase Rate .50 Bpm 26 BBLs in

0930 .50 BPM 3,610 PSI 31 BBLs in

0938 Start Flush Increase Rate .75 Bpm 3,650 PSI

0955 3,600 PSI 12 BBLs Flush in Increase Rate 1.0 Bpm

1004 20 BBLs Flush in 1.0 Bpm 3,700 PSI

1014 30 BBLs Flush in 1.0 Bpm 3,600 PSI Increase Rate 1.5 Bpm 3,820 PSI

1040 Shut Down 70 BBLs Flush in

ISIP 3,675 PSI

5 min 3,280 PSI TOTAL ACID 35.7 BBLs

10 min 3,130 PSI TOTAL Flush 70 BBLs

15 min 2,883 PSI

1056 Shut in Well Rig Down F/ Tubing & Stand by

CEMENTER JD Stahl OPERATOR Dave Davis & Andrew Weber

Central Michigan
Cementing Services

JOB REPORT

COMPANY DETAILS

Company: Muskegon development

Contact: Kipp Holland

Phone: 989-289-4082

Email:

JOB DETAILS

DATE 5/25/2016 8:42:19AM

START TIME 5/25/2016 8:42:19AM

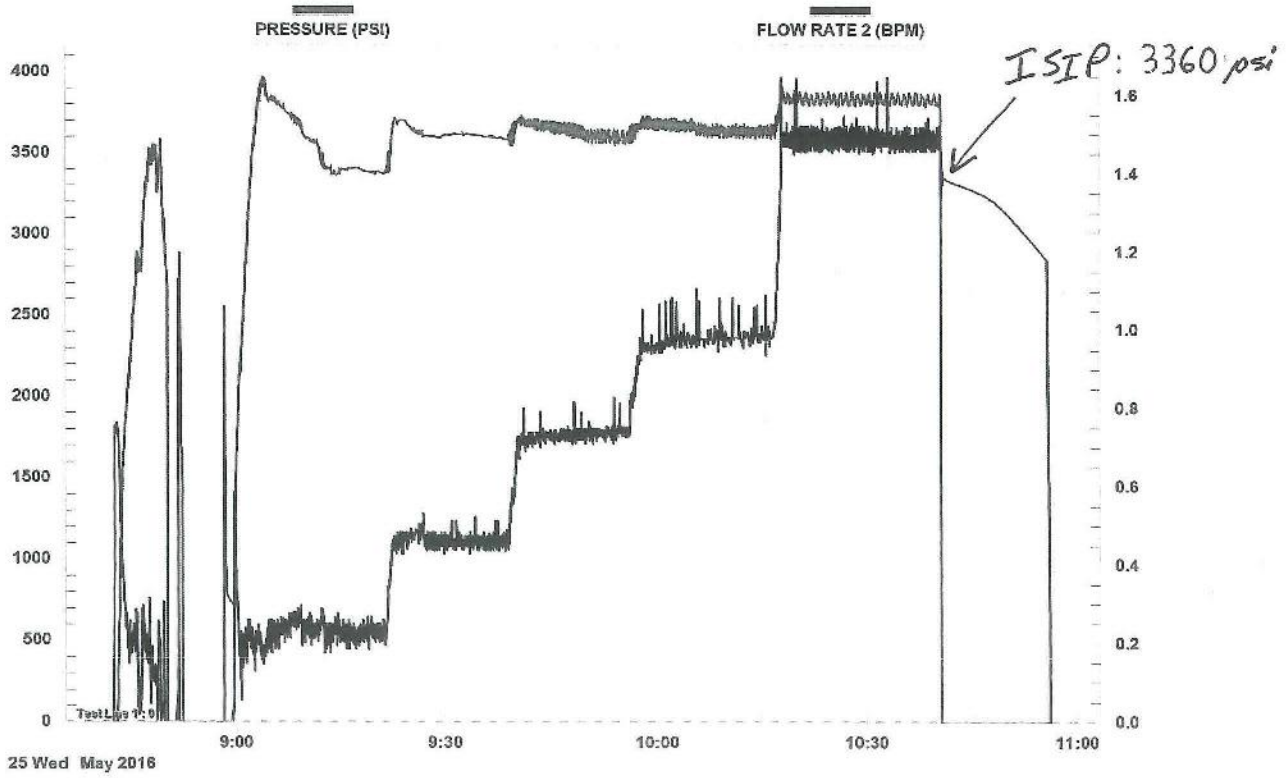
END TIME 5/25/2016 10:56:35AM

Ticket#: 5675

Operator: Andrew W

LSD#: R-P Fanslau 1-22

Comments: 1500 Gal 20% Acid treatment pn 58365 hamilton twp clare co



Muskegon Development Company
Smith Creek
Fracture Pressure Gradient Calculation

Well	Permit #	Location Description	Top of Treated Interval (ft)	Treatment Date	ISIP From Chart (psig)	ISIP From Chart (psia)	Fluid Gradient (psi/ft)	Hydrostatic Pressure (psia)	Formation Fracture Pressure (psia)	Frac Gradient (psi/ft)
Fanslau 1-22 *	58365	NE/4, NW/4, NW/4, Section 22, T19N-R3W, Clare County	4968	5/25/2016	3360	3374.7	0.433	2151	5526	1.112

* Note: ISIP was observed after flushing tubular volume with fresh water.

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

STATE OF MICHIGAN

RICK SNYDER
GOVERNOR

MICHIGAN STATE HOUSING DEVELOPMENT AUTHORITY
STATE HISTORIC PRESERVATION OFFICE

KEVIN ELSENHEIMER
EXECUTIVE DIRECTOR

July 25, 2016

LISA PERENCHIO
EPA REGION 5
77 WEST JACKSON BLVD WU 16J
CHICAGO IL 60604

AUG - 1 2016

RE: ER04-92 Muskegon Development Company Well Projects - Holcomb 1-22, Sec. 22, T19N, R3W, Hamilton Township, Clare County (EPA)

Dear Ms. Perenchio:

Under the authority of Section 106 of the National Historic Preservation Act of 1966, as amended, we have reviewed the above-cited undertaking at the location noted above. Based on the information provided for our review, it is the opinion of the State Historic Preservation Officer (SHPO) that **no historic properties are affected** within the area of potential effects of this undertaking.

This letter evidences the EPA's compliance with 36 CFR § 800.4 "Identification of historic properties," and the fulfillment of the EPA's responsibility to notify the SHPO, as a consulting party in the Section 106 process, under 36 CFR § 800.4(d)(1) "No historic properties affected." **If the scope of work changes in any way, or if artifacts or bones are discovered, please notify this office immediately.**

We remind you that federal agency officials or their delegated authorities are required to involve the public in a manner that reflects the nature and complexity of the undertaking and its effects on historic properties per 36 CFR § 800.2(d). The National Historic Preservation Act also requires that federal agencies consult with any Indian tribe and/or Tribal Historic Preservation Officer (THPO) that attach religious and cultural significance to historic properties that may be affected by the agency's undertakings per 36 CFR § 800.2(c)(2)(ii).

The State Historic Preservation Office is not the office of record for this undertaking. You are therefore asked to maintain a copy of this letter with your environmental review record for this undertaking.

If you have any questions, please contact Brian Grennell, Cultural Resource Management Specialist, at 517-335-2721 or by email at GrennellB@michigan.gov. **Please reference our project number in all communication with this office regarding this undertaking.** Thank you for this opportunity to review and comment, and for your cooperation.

Sincerely,

Brian G. Grennell
Cultural Resource Management Specialist

for Brian D. Conway
State Historic Preservation Officer

SAT:BGG

Copy: Bennett Myler, Muskegon Development Company

RECEIVED
AUG 11 2016
UIC LIBRANCH
EPA, REGION 5

Wells Within Area of Review (1/4 Mile)

Permit #	Well Name	Location	Section	TWN-RNG	Completion Date	Elevation (Ft.)	Richfield Top
59345	Holcomb 1-22	NW/4, NE/4, NW/4	22	T19N-R3W	9/20/2008	946	4948
58365	Fanslau 1-22	NE/4, NW/4, NW/4	22	T19N-R3W	3/13/2008	951	4950
48189	Miller 1-22	NW/4, SE/4. NW/4	22	T19N-R3W	5/6/1994 (Plugged)	967	4992

Permit #	Well Name	Total Depth (Ft.)	Surface Casing Size (in.)	Surface Casing Depth (Ft.)	Surface CSG Cmt Vol (sx)	Hole Size (in.)	Est. TOC
59345	Holcomb 1-22	5201	9.625	792	500	12.25	Surface
58365	Fanslau 1-22	5200	9.625	791	450	12.25	Surface
48189	Miller 1-22	5220	9.625	808	400	12.25	Surface

Permit #	Well Name	Prod. CSG Size (in.)	Prod. Casing Depth (Ft.)	Prod. CSG Cmt. Vol. (sx)	Hole Size (in.)	Calc. Cmt. Top (Ft.)	Ft. of Cmt. Above RF
59345	Holcomb 1-22	4.5	5201	200	6.125	3164	1784
58365	Fanslau 1-22	4.5	5197	175	6.125	3169	1780
48189	Miller 1-22	*	*	*	*	*	*

*See Plugging Record

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 8

BAKER HUGHES

Baker Atlas

COMPENSATED Z-DENSILOG
COMPENSATED NEUTRON LOG
GAMMA RAY LOG

FILE NO:	COMPANY	NORTHSHORE PETROLEUM, LLC.
	WELL	HOLCOMB 1-22
API NO: 21-035-59345	FIELD	HAMILTON
	COUNTY	CLARE STATE MICHIGAN

Ver. 3.87
THANK YOU!

LOCATION:
NW/4, NE/4, NW/4,
490' FNL & 1826' FWL,
HAMILTON TWP.
SEC 22 TWP 19N RGE 03W

OTHER SERVICES
DLL/MLL/GR

PERMANENT DATUM	G.L.	ELEVATION	933.3 FT
LOG MEASURED FROM	K.B.	12.6 FT	ABOVE P.D.
DRILL. MEAS. FROM	KELLY BUSHING		

ELEVATIONS:
KB 945.6 FT
DF 944.4 FT
GL 933.3 FT

DATE		06-SEP-2008					
RUN	TRIP	1	1		1		1
SERVICE ORDER		559849					
DEPTH DRILLER		5202 FT					
DEPTH LOGGER		5202 FT					
BOTTOM LOGGED INTERVAL		5202 FT					
TOP LOGGED INTERVAL		100 FT					
CASING DRILLER		7 IN	@ 4078 FT			@	
CASING LOGGER		4776 FT					
BIT SIZE		6.125 IN					
TYPE OF FLUID IN HOLE		BRINE					
DENSITY	VISCOSITY	10.5 LB/G	28 S				
PH	FLUID LOSS	10.0	N/A				
SOURCE OF SAMPLE		BOREHOLE					
RM AT MEAS. TEMP.		.014 OHMM	@ 85 DEGF			@	
RMF AT MEAS. TEMP.		.014 OHMM	@ 85 DEGF			@	
RMC AT MEAS. TEMP.		.014 OHMM	@ 85 DEGF			@	
SOURCE OF RMF	RMC	C.	C.				
RM AT BHT		.01 OHMM	@ 117 DEGF			@	
TIME SINCE CIRCULATION		5 HRS.					
MAX. RECORDED TEMP.		117 DEGF					
EQUIP. NO.	LOCATION	4117	MT. PLSNT.				
RECORDED BY		DARWIN BROWN					
WITNESSED BY		MR. MARK ANDREASON			MR. JOHN COLLINS		

PROPERTY OF STATE OF MICHIGAN GEOLOGICAL SURVEY

IN MAKING INTERPRETATIONS OF LOGS OUR EMPLOYEES WILL GIVE CUSTOMER THE BENEFIT OF THEIR BEST JUDGEMENT. BUT SINCE ALL INTERPRETATIONS ARE OPINIONS BASED ON INFERENCES FROM ELECTRICAL OR OTHER MEASUREMENTS, WE CANNOT, AND WE DO NOT GUARANTEE THE ACCURACY OR CORRECTNESS OF ANY INTERPRETATION, WE SHALL NOT BE LIABLE OR RESPONSIBLE FOR ANY LOSS, COST, DAMAGES, OR EXPENSES WHATSOEVER INCURRED OR SUSTAINED BY THE CUSTOMER RESULTING FROM ANY INTERPRETATION MADE BY ANY OF OUR EMPLOYEES.

BOREHOLE RECORD

BIT SIZE	FROM	TO
99999 IN	0 FT	78 FT
12.25 IN	78 FT	782 FT
8.75 IN	782 FT	4090 FT
6.125 IN	4090 FT	5202 FT

CASING RECORD

SIZE	WEIGHT	GRADE	FROM	TO
13.375 IN			0 FT	78 FT
9.625 IN			0 FT	782 FT
7 IN			0 FT	4078 FT

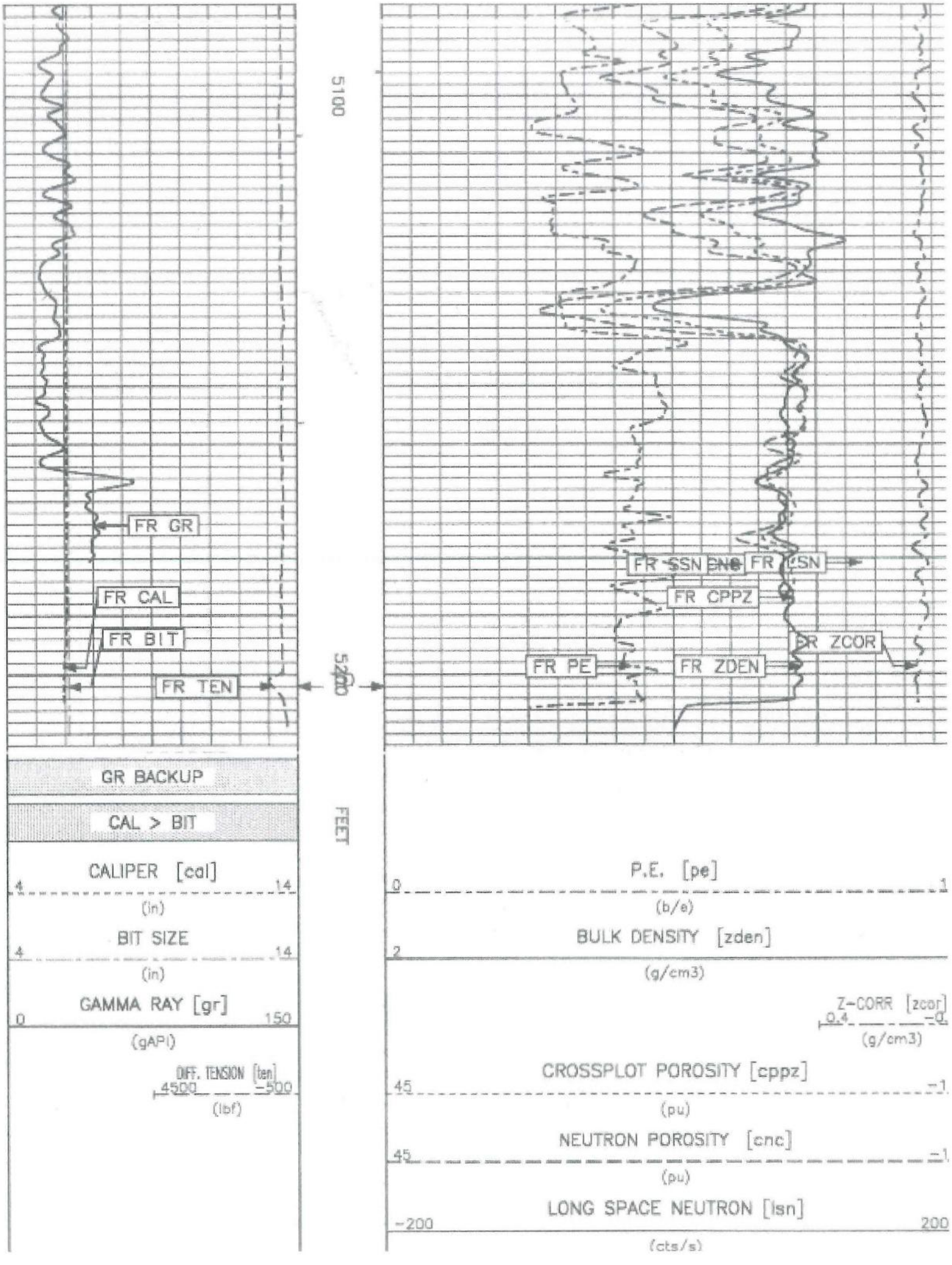
REMARKS

RUN 1 TRIP 1 : KELLY BUSHING WAS USED AS DEPTH REFERENCE POINT.

CNC AND PORZ WERE RUN ON A LIMESTONE MATRIX.

CVOL = CEMENT VOLUME CORRECTED FOR 4 1/2" CASING,
BVOL = BOREHOLE VOLUME.

5000
4900
Top of Richfield


5100
5200
FEET
FR GR
FR CAL
FR BIT
FR TEN
FR SSN
FR LSN
FR CPPZ
FR ZCOR
FR PE
FR ZDEN
GR BACKUP
CAL > BIT
CALIPER [cal]
4
14
(in)
BIT SIZE
4
14
(in)
GAMMA RAY [gr]
0
150
(gAPI)
DIFF. TENSION [ten]
4500
-500
(lbf)
P.E. [pe]
0
1
(b/e)
BULK DENSITY [zden]
2
(g/cm3)
Z-CORR [zcor]
0.4
-0.
(g/cm3)
CROSSPLOT POROSITY [cppz]
45
-1
(pu)
NEUTRON POROSITY [cnc]
45
-1
(pu)
LONG SPACE NEUTRON [lsn]
-200
200
(cts/s)

BAKER HUGHES

Baker Atlas

Cement Bond Log
Gamma Ray / CCL

File No:	Company	NORTHSHORE PETROLEUM, LLC.	
	Well	HOLCOMB 1-22	
API No:	Field	HAMILTON	
21-035-59345	County	CLARE	State MICHIGAN

THANK YOU!	Location NW/4, NE/4, NW/4, 490' FNL & 1826' FWL HAMILTON CO. SEC 22 TWP 19N RGE 03W	Other Services TEMP/NOISE PERF

Permanent Datum	G.L.	Elevation	933.3 ft
Log Measured From	K.B.	12.6 ft	Above P. D.
Drill Measured From	KELLY BUSHING		

Elevations
KB 945.9 ft
DF 944.4 ft
GL 933.3 ft

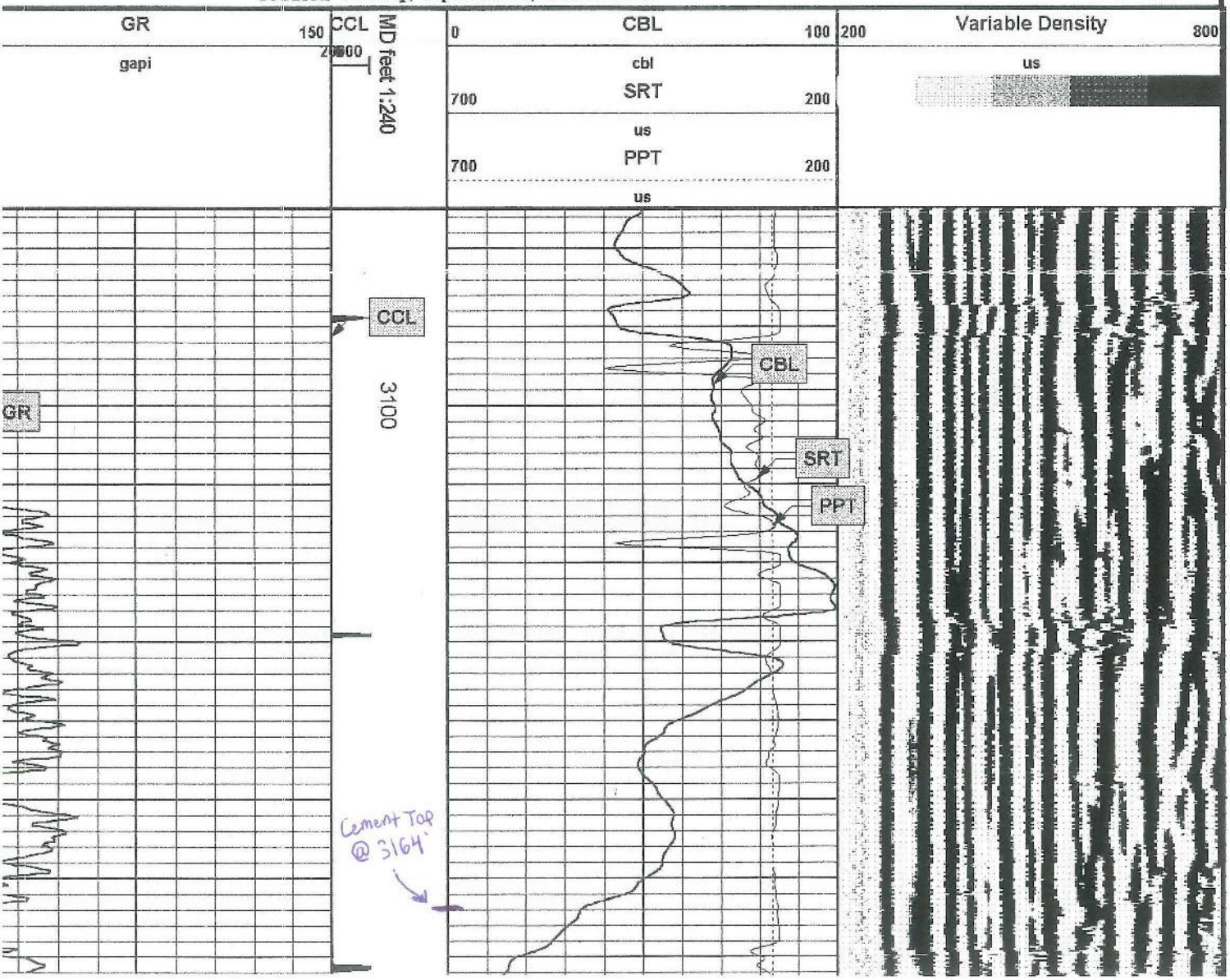
Date	19 SEP 2008				
Run	ONE				
Service Order	560357				
Depth Driller	5202 ft				
Depth Logger	5101 ft				
Bottom Logged Interval	5097 ft				
Top Logged Interval	3100 ft				
Time Started	11:00				
Time Finished	13:00				
Operator Rig Time	2				
Type of Fluid in Hole	WATER				
Fluid Density	NA				
Salinity	NA				
Fluid Level	500 ft				
Logged Cement Top					
Wellhead Pressure	0 psi				
Maximum Hole Deviation	NA				
Nominal Logging Speed	35 fpm				
Maximum Recorded Temperature	NA				
Reference Log	Z-DEN/ NEU				
Reference Log Date	6 SEP 2008				
Equipment No.	Location	4206	MT. PLEASANT		
Recorded By		JASON SHRYOCK			
Witnessed By		MR. LARRY ANDERSON			

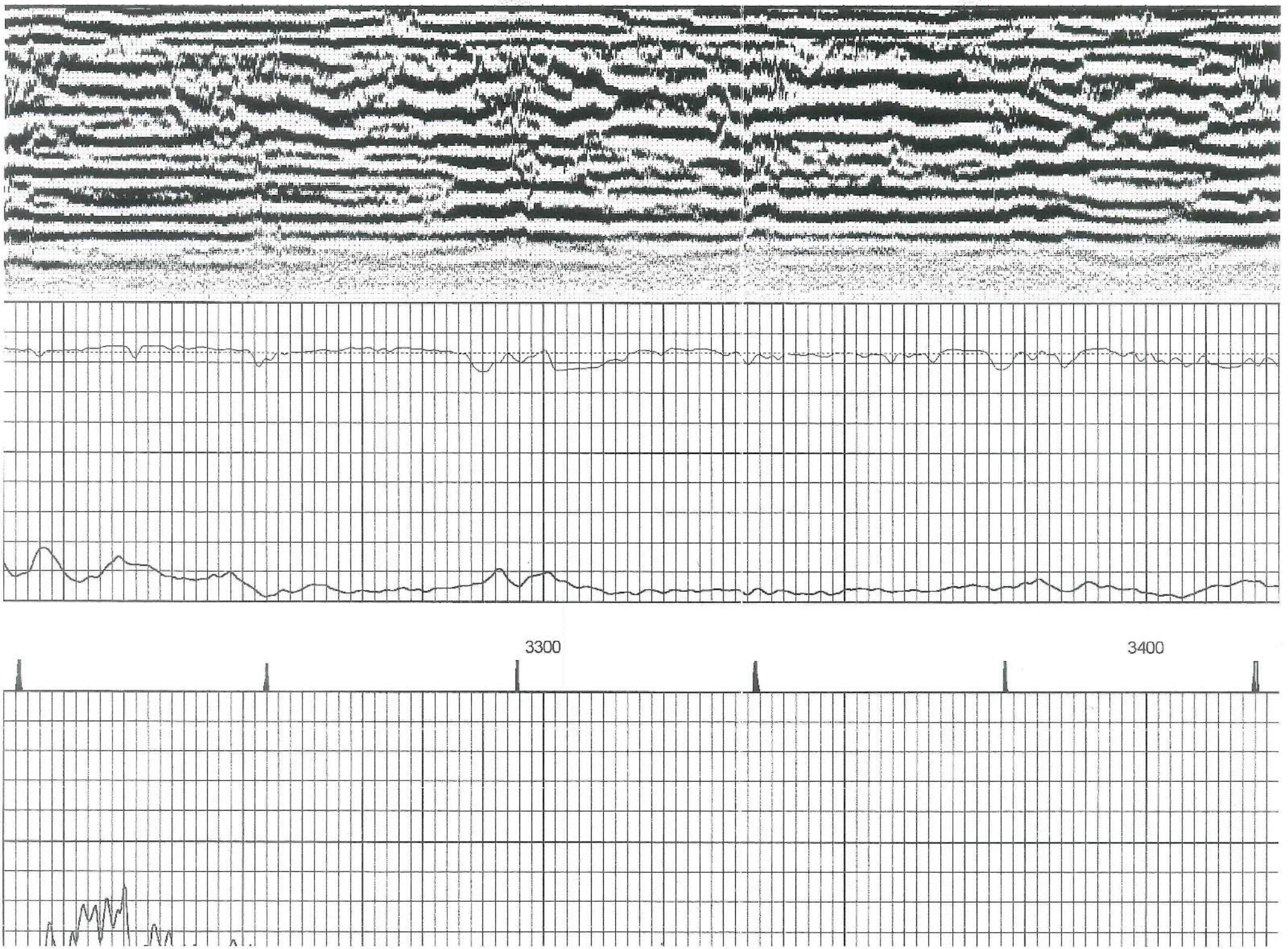
DEPTH OFFSETS

(for Acquired Curves)

SERIES	DEPTH OFFSET	ACQUIRED CURVES					
1311XA	-11.000	GR					
2421XA	-11.000	NEU					
2302XA	-9.500	CCL	ACCL				
1412XA	0.000	CBL	SRT	SATT	BI	PPT	SIG
SYSTEM	0.000	TTEN	TEN				

Created by : CBL, v4.7.013
Plotted by : PlotMgr, v5.2.165
Company Name : NORTHSHORE PETROLEUM, LLC.
Well Name : HOLCOMB 1-22
File Name : c:\welldata\b60357\cblmain.xtf
Mode : PlotMgr 5.2.165
Interval : 3075.00 - 5100.25 feet UP
Created : Friday, September 19, 2008 15:09:05




3300
3400

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY - OFFICE OF GEOLOGICAL SURVEY

RECORD OF WELL DRILLING OR DEEPENING

Required by authority of Part 615 Supervisor of Wells or Part 625 Mineral Wells, of Act 451 PA 1994, as amended. Non-submission and/or falsification of this information may result in fines and/or imprisonment.

Permit number/Deepening number: 59345

(Submit 3 copies within 60 days of drilling completion.)

API number: 21-035-59345-00-00

Well name and number: HOLCOMB 1-22

☒ Part 615 Oil/Gas Well ☐ Part 625 Mineral Well

Name and address of permittee
Northshore Petroleum, LLC
4406 Grand Cayman Dr.
Sugar Land, Texas 77479

Surface location: NW 1/4 of NE 1/4 of NW 1/4 Section 22 T19N R3W

Township: Hamilton

County: Clare

Footages: 490 ft. from North line and 1826 ft. from West line of sec.

Name and address of drilling contractor
Arrow Drilling Services
4030 Columbus Dr.
Kalkaska, MI 49646

Directionally drilled (check one): ☐ Yes ☒ No

Previous permit numbers: none

Subsurface location (if directionally drilled): 1/4 of 1/4 of 1/4 Section T R

Township: County:

Date drilling began: August 22, 2008

Date drilling completed: Sept. 5, 2008

Total depth of well: Driller 5200 ft Log 5202 ft

Formation at total depth: Amherstburg

Footages: ft. from line and ft. from line of sec.

Elevations: K.B. 945.6 ft. R.F. 944.4 ft. R.T. ft. Grd 933.3 ft

Feet drilled - cable tools: from n/a to n/a

Feet drilled - rotary tools: from Surface to 5200 ft

Casing, Casing Liners and Cementing, Operating Strings

Size	Where set	Cement	T.O.C.	Ft. pulled
9.625"	792 ft	500 sxs	Surface	
7.0"	4082 ft	150 sxs	3375 ft	
4.5"	5201 ft	200 sxs	3744 ft	

Water Fill Up (F.U.) or Lost Circulation (L.C.) (X)

Formation	F.U.	L.C.	Depth	Amount
Dundee		X	3884 ft	

Gross Pay Intervals

Formation	Oil or Gas	From	To
Richfield	Oil	4948	5010

All Other Oil and Gas Shows Observed or Logged

Formation	Oil or Gas	Depth	Where Observed (X) Samples	Odor	Pits	Mud Line	Gas Log	Fill Up
See attached sheet								

Depth Correction

Depth	Correction

Deviation Survey

Run at	Degrees
2080 ft	1-1/2 deg
2530 ft	1 deg
3050 ft	3/4 deg
3570 ft	1/2 deg

Plugged Back

Yes	No	Depth

Geophysical / Mechanical Logs (list each type run)

Brand	Log types	Logged intervals
Baker Atlas	Z-Densilog-Comp. Neutron-Gamma	100 - 5202 ft
Baker Atlas	Dual Laterolog-Micro-Laterolog Gamma	4776 - 5202 ft

Notice: Report complete sample and formation record, coring record, and drill stem test information on reverse side.

CERTIFICATION "I state that I am authorized by said owner. This report was prepared under my supervision and direction. The facts stated herein are true, accurate and complete to the best of my knowledge."

Date	Name and title (print)	Signature
Nov. 10, 2008	Mark W. Andreason, COO	

Submit to: OFFICE OF GEOLOGICAL SURVEY,
MICHIGAN DEPT OF ENVIRONMENTAL QUALITY
PO BOX 30256, LANSING, MI 48909-7756

EQP 7200-5 (rev. 8/2004)

DEC 16 2008

FORMATION RECORD

Attach additional sheets if necessary

API number	Permit number/Deepening number
	59345

Elevation used	Geologist name	Tops taken from
945.6 ft	Allen Bentz / Mark Andreason	☐ Driller's log ☐ Sample log ☒ Electric log

Note: if well directionally drilled, add true vertical depth formation tops where appropriate

From	To	Formation (type, color, hardness)
Surface	464 ft	GLACIAL DRIFT
464 ft	923 ft	SAGINAW FORMATION - Shale, lt grey, frm, sl. calc.
923 ft	981 ft	PARMA SANDSTONE - Sandstone, lt. brn to clr, sub rnd, calc cement
981 ft	1238 ft	MICHIGAN FORMATION - Shale, lt -med grey, sdst interbeds at top, calc. interbeds at base, Triple Gyp @ 1028ft, Brown Lime @1098 ft.
1238 ft	1314 ft	STRAY SANDSTONE - Sandstone clr, frosted , vf-mg, strong gas show
1314 ft	1530 ft	MARSHALL SANDSTONE - Sandstone, clr, fg-mg, sub-rnd
1530 ft	2472 ft	COLDWATER SHALE - Shale, med-dk grey, sli calc, pyr.
2472 ft	2506 ft	SUNBURY SHALE - Shale, blk
2506 ft	2522 ft	BEDFORD SHALE - Shale, lt gry
2522 ft	3034 ft	ANTRIM SHALE - Shale, dk brn-blk calc at places, gas shows
3034 ft	3068 ft	TRAVERSE FORMATION - Shale, grey - brn, limest interbeds
3068 ft	3716 ft	TRAVERSE LIMESTONE - Limest, lt gry - lt brn, vf-fxlyn, foss, dns, hd
3716 ft	3782 ft	BELL SHALE - Shale, m-dk grey
3782 ft	4044 ft	DUNDEE LIMESTONE - Limest., from 3782-3834 ft, lt brn, vfxyln, oil odor, Dolomite from 3834-4044 per logs, no returns, no cuttings
4044 ft	4149 ft	DETRIOT RIVER ANHYDRITE - interbedded dol and anhydrites
4149 ft	4648 ft	DETROIT RIVER SALTS - Massive salt beds w/interbed dol & anhydrite
4648 ft	4878 ft	SOUR ZONE - Intrbdded Dolomite, brn & Limest., dk. gy, & anhydrite, oil/gas shws at 4686-94 & 4810-22
4878 ft	4966 ft	MASSIVE ANHYDRITE - Anhydrite, milky-transl, numerous thin brn, vfx limestone & dolomite beds.
4966ft	5142ft	RICHFIELD ZONE - Dolomite, brn, vf-mx and Limestone, brn-lt brn, vfx, beds, oil shows in dolomite beds, anhydrite interbeds in upper half.
5142 ft	5200 ft (TD)	AMHERSTBURG FORMATION - Limestone, dk brn-brn, argill & foss

If well was cored, attach core description

DRILL STEM TEST DATA

None

LIST ATTACHMENTS

Z-Densilog-Comp Neutron-Gamma Log
Dual Laterolog-Micro-Laterolog-Gamma Log

OFFICE OF GEOLOGICAL SURVEY USE ONLY

Reviewed by

Date of review

DEC 26 2008

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY – OFFICE OF GEOLOGICAL SURVEY

RECORD OF WELL COMPLETION

By authority of Part 615 or Part 625 of Act 451 PA 1994, as amended. Non-submission and/or falsification of this information may result in fines and/or imprisonment.

(Submit 3 copies within 60 days of well completion.)
☒ Part 615 Oil/Gas Well ☐ Part 625 Mineral Well

Permit number/deepening permit no.	API number
59345	21-011-59345-00-00

Type of well (after completion): OIL PRODUCER

Well name & number: HOLCOMB 1-22

Name and address of permittee:
Northshore Petroleum, LLC
4406 Grand Cayman Dr.
Sugar Land, Texas 77479

Directionally drilled (check one)	Previous permit numbers	Total depth of well
☐ Yes ☒ No		M.D. 5200 T.V.D. 5200

Surface location	Subsurface location (if directionally drilled)
NW ¼ of NE ¼ of NW ¼ Section 22 T 19N R 3W	¼ of ¼ of ¼ Section T R

Township	County	Township	County
Hamilton	Clare		

Footages: North/South	East/West	Footages: North/South	East/West
490 Ft. from North line and	1826 Ft. from West line of Sec.	Ft. from line and	Ft. from line of Sec.

Part 615 - oil/gas wells			Part 625 - mineral wells		
Date well completed	Producing formation(s)	Injection formation(s)	Date of first injection	Disposal formation(s)	Solution formation(s)
9/20/08	Richfield				

COMPLETION INTERVALS(S)

Date	Number holes	Perforation or open hole interval	Open	
			Yes	No
9/20/08	192	4,948-54', 4,966-76', 4,990-5,000', 5,004-10'	X	

STIMULATION BY ACID OR FRACTURING

Date	Interval treated	Materials and amount used
9/20/08	4,948-54', 4,966-76', 4,990-5,000', 5,004-	2,000 gals. 20% NE-HCl
9/29/08	4,948-54', 4,966-76'	2,000 gals. 20% NE-HCl

PRODUCTION TEST DATA

Oil Bbls/day	Gravity °API	Condensate Bbls/day	Gas MCF/day	Water Bbls/day	H_2S Grains/100 ft^3.	B.H.P. and depth
20	41.1	NA	15 (est.)	16	NA	2,183 psia @ 5000 ft

CERTIFICATION "I state that I am authorized by said owner. This report was prepared under my supervision and direction. The facts stated herein are true, accurate and complete to the best of my knowledge."

Name and title (print or type)	Signature	Date
Mark W. Andreason, COO		November 10, 2008

Submit to: OFFICE OF GEOLOGICAL SURVEY
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
PO BOX 30256
LANSING MI 48909-7756

EQP 7130 (rev. 8/2004)

DEC 2 6 2008

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY - OFFICE OF GEOLOGICAL SURVEY

RECORD OF WELL DRILLING OR DEEPENING

Required by authority of Part 615 Supervisor of Wells or Part 625 Mineral Wells, of Act 451 PA 1994, as amended. Non-submission and/or falsification of this information may result in fines and/or imprisonment.

Permit number/Deepening number: 58365

(Submit 3 copies within 60 days of drilling completion.)

API number: 21-035-58365-00-00

☒ Part 615 Oil/Gas Well ☐ Part 625 Mineral Well

Well name and number: R & P FANSLAU #1-22

Name and address of permittee:
Northshore Petroleum, LLC
4406 Grand Cayman Dr.
Sugar Land, Texas 77479

Surface location: NE 1/4 of NW 1/4 of NW 1/4 Section 22 T19N R3W

Township: Hamilton

County: Clare

Footages: 330 ft. from North line and 987 ft. from West line of sec.

Name and address of drilling contractor:
Bigard & Huggard Drilling, Inc.
5580 Venture Way
Mt. Pleasant, Michigan 48858

Directionally drilled (check one): ☐ Yes ☒ No

Previous permit numbers: none

Subsurface location (if directionally drilled): 1/4 of 1/4 of 1/4 Section T R

Township: County:

Footages: ft. from line and ft. from line of sec.

Date drilling began	Date drilling completed
September 20, 2007	September 27, 2007

Total depth of well	Formation at total depth
Driller 4135 ft Log 4129 ft	Detroit River Anhydrite

Elevations: K.B. 951 ft. R.F. 950 ft. R.T. ft. Grd 939 ft

Feet drilled - cable tools: from n/a to n/a

Feet drilled - rotary tools: from Surface to 4135 ft

Casing, Casing Liners and Cementing, Operating Strings

Size	Where set	Cement	T.O.C.	Ft. pulled
9.625"	791 ft	450 sacks	Surface	
7.0"	4114 ft	450 sacks	801 ft	

Water Fill Up (F.U.) or Lost Circulation (L.C.) (X)

Formation	F.U.	L.C.	Depth	Amount

Gross Pay Intervals

Formation	Oil or Gas	From	To
Dundee	Oil	3840	4032

All Other Oil and Gas Shows Observed or Logged

Formation	Oil or Gas	Depth	Where Observed (X) Samples	Odor	Pits	Mud Line	Gas Log	Fill Up
See attached sheet								

Depth Correction

Depth	Correction

Deviation Survey

Run at	Degrees
720 ft	1.5 deg
1309 ft	1 deg
2899 ft	1.5 deg
3146 ft	1 deg

Plugged Back

Yes	No	Depth

Geophysical / Mechanical Logs (list each type run)

Brand	Log types	Logged intervals
Baker Atlas	Z-Densilog-Comp. Neutron-Gamma	Surface - 4126 ft
Baker Atlas	Dual Laterolog-Micro-Laterolog Gamma	790 - 4126 ft
Baker Atlas	Circumferential Borehole Imager (CBIL)	3250-3470, 3750-4060

Notice: Report complete sample and formation record, coring record, and drill stem test information on reverse side.

CERTIFICATION "I state that I am authorized by said owner. This report was prepared under my supervision and direction. The facts stated herein are true, accurate and complete to the best of my knowledge."

Date	Name and title (print)	Signature
October 4, 2007	Mark W. Andreason, CEO	

Submit to: OFFICE OF GEOLOGICAL SURVEY,
MICHIGAN DEPT OF ENVIRONMENTAL QUALITY
PO BOX 30256, LANSING, MI 48909-7756

EQP 7200-5 (rev. 8/2004)

OCT 09 2007

FORMATION RECORD

Attach additional sheets if necessary

API number	Permit number/Deepening number
	58365

Elevation used	Geologist name	Tops taken from
951 ft KB	Jim Sanborn / Mark Andreason	☐ Driller's log ☐ Sample log ☒ Electric log

Note: if well directionally drilled, add true vertical depth formation tops where appropriate

From	To	Formation (type, color, hardness)
Surface	490 ft	GLACIAL DRIFT
490 ft	922 ft	SAGINAW FORMATION - Shale, grey, firm to soft and thin & thick beds of Sandstone, clear to white, fine-coarse grained, friable to cmt'd.
922 ft	946 ft	PARMA SANDSTONE - Sandstone, clear, fgr, abundant pyrite.
946 ft	975 ft	BAYPORT LIMESTONE - Limest., lt grey, vfxlyn, hard, dense, mixed w/ Sandstone, fgr, clear, well-srtd.
975 ft	1243 ft	MICHIGAN FORMATION - Shale, med-dk grey, frm-hd w/ stringers of Limestone and Sandstone; Triple Gyp Mbr @ 1040 ft, interbedded shale, med-dk gry and anhy; Brown Lime Mbr @ 1104 ft, interbed lst w/ scat gold flor and shale.
1243 ft	1311 ft	STRAY SANDSTONE - Sandstone, clr to tan, frosted sub-rnd grains, yel gold flor; Limest w/ shale stringers from 1270-1311 ft.
1311 ft	1534 ft	MARSHALL SANDSTONE - Sandst clr - white frosted grns, pp flor at top fgr, poory cemented, shaly at base.
1534 ft	2472 ft	COLDWATER SHALE - Shale, lt to med gry to bluish gry, firm, hard, slightly pyritic and calc in part.
2472 ft	2505 ft	SUNBURY SHALE - Shale, dk gry - black, firm, hard, brittle, v. carb.
2505 ft	2520 ft	BEDFORD SHALE - Shale, gry to dk brn, dense, brit, argill.
2520 ft	3030 ft	ANTRIM SHALE - Shale, blk-dk gry, frm, hard, brittle, v carb., tr spores w/ gld flor, v, calc and silty at base; Lachine Mbr @ 2825 ft; Paxton Mbr @ 2915 ft; Norwood Mbr @ 2976 ft.
3030 ft	3054 ft	TRAVERSE FORMATION - Shale, lt gry grn, soft, silty and calc.
3054 ft	3700 ft	TRAVERSE LIMESTONE - Limest., dk brn to brn and crmy wh to tan, typically vf-fxlyn, hd, dense, shale beds incr at base; micropor-vuggy 15-30% flor & cut 3270-3302 & 3404-3424.
3700 ft	3762 ft	BELL SHALE - Shale, med-dk gy
3762 ft	4041 ft	DUNDEE FM - Lst tan-buff, fxyln w/ abunt dd oil stn & flor 3762-3842; Lst grading to Dol, tan to lt brn, fxyln, gd suc, intrxlyn & vug por, gd cut& >40% brite yel gold flor 3842-4020 ft.
4041 ft	4135 ft (TD)	DET. RIVR ANHY Anhy & Dol intrbed

If well was cored, attach core description

DRILL STEM TEST DATA

None

LIST ATTACHMENTS

Z-Densilog-Comp Neutron-Gamma Log
Dual Laterolog-Micro-Laterolog-Gamma Log
Circumferential Borehole Imager (CBIL)

OFFICE OF GEOLOGICAL SURVEY USE ONLY

Reviewed by

Date of review

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY - OFFICE OF GEOLOGICAL SURVEY

RECORD OF WELL DRILLING OR DEEPENING

Required by authority of Part 615 Supervisor of Wells or Part 625 Mineral Wells, of Act 451 PA 1994, as amended. Non-submission and/or falsification of this information may result in fines and/or imprisonment.

Permit number/Deepening number: 58365

(Submit 3 copies within 60 days of drilling completion.)

API number: 21-035-58365-00-00

☒ Part 615 Oil/Gas Well ☐ Part 625 Mineral Well

Well name and number: R & P FANSLAU #1-22 (Deepening)

Name and address of permittee:
Northshore Petroleum, LLC
4406 Grand Cayman Dr.
Sugar Land, Texas 77479

Surface location: NE 1/4 of NW 1/4 of NW 1/4 Section 22 T19N R3W

Township: Hamilton

County: Clare

Footages: 330 ft. from North line and 987 ft. from West line of sec.

Name and address of drilling contractor:
Bigard & Huggard Drilling, Inc.
5580 Venture Way
Mt. Pleasant, Michigan 48858

Directionally drilled (check one): ☐ Yes ☒ No

Previous permit numbers: none

Subsurface location (if directionally drilled): 1/4 of 1/4 of 1/4 Section T R

Township: County:

Footages: ft. from line and ft. from line of sec.

Date drilling began	Date drilling completed
February 17, 2007	February 22, 2007

Total depth of well	Formation at total depth
Driller 5200 ft Log 5118 ft	Amherstburg Fm.

Elevations: K.B. 951 ft. R.F. 950 ft. R.T. ft. Grd 939 ft

Feet drilled - cable tools: from n/a to n/a

Feet drilled - rotary tools: from 4135 ft to 5200 ft

Casing, Casing Liners and Cementing, Operating Strings

Size	Where set	Cement	T.O.C.	Ft. pulled
9.625"	791 ft	450 sacks	Surface	
7.0"	4114 ft	450 sacks	801 ft	
4.5"	5197 ft	175 sacks	3704 ft	

Water Fill Up (F.U.) or Lost Circulation (L.C.) (X)

Formation	F.U.	L.C.	Depth	Amount

Gross Pay Intervals

Formation	Oil or Gas	From	To
Sour Zone	Oil/Gas	4679	4684
Sour Zone	Oil/Gas	4752	4756
Richfield	Oil/Gas	4966	5014

All Other Oil and Gas Shows Observed or Logged

Formation	Oil or Gas	Depth	Where Observed (X) Sam-ples	Odor	Pits	Mud Line	Gas Log	Fill Up
See attached sheet								

Depth Correction

Depth	Correction

Deviation Survey

Run at	Degrees
4679 ft	0.75 deg
5160 ft	1.5 deg

Plugged Back

Yes	No	Depth

Geophysical / Mechanical Logs (list each type run)

Brand	Log types	Logged intervals
Baker Atlas	Z-Densilog-Comp. Neutron-Gamma	4111 - 5118 ft
Baker Atlas	Dual Laterolog-Micro-Laterolog Gamma	4111 - 5118 ft

Notice: Report complete sample and formation record, coring record, and drill stem test information on reverse side.

CERTIFICATION "I state that I am authorized by said owner. This report was prepared under my supervision and direction. The facts stated herein are true, accurate and complete to the best of my knowledge."

Date	Name and title (print)	Signature
February 26, 2008	Mark W. Andreason, CEO	

Submit to: OFFICE OF GEOLOGICAL SURVEY,
MICHIGAN DEPT OF ENVIRONMENTAL QUALITY
PO BOX 30256, LANSING, MI 48909-7756

EQP 7200-5 (rev. 8/2004)

FEB 2 8 2008

FORMATION RECORD

Attach additional sheets if necessary

API number	Permit number/Deepening number
	58365

Elevation used	Geologist name	Tops taken from
951 ft KB	Jim Sanborn / Mark Andreason	☐ Driller's log ☐ Sample log ☒ Electric log

From	To	Formation (type, color, hardness)
Note: if well directionally drilled, add true vertical depth formation tops where appropriate		
4148 ft	4640 ft	DETROIT RIVER SALT - Salt beds w/ anhydrite & dolomite interbeds
4640 ft	4878 ft	SOUR ZONE - Intrbdded Dolomite, brn & Limest., dk. gy, & anhydrite, crm, micro-suc por, w/ oil staining, flor & cut, and sour odor in dolomite beds at 4679-92, 4752-70, and 4830-56.
4878 ft	4966 ft	MASSIVE ANHYDRITE - Anhydrite w/ thin dolomite intrbds
4966 ft	5150 ft	RICHFIELD ZONE - Dolomite, vf-fxln, tan to brn, interxyln-suc por, abndt vis oil, good flor & cut from 4968-5016. Some anhydrite intrbds at top. Denser dolomites and incr lime % toward base.
5150 ft	5200 ft (TD)	AMHERSTBURG FM. - Limestone, dk - med brn, vfxln, hd, dns, fossils

From	To	Formation (type, color, hardness)

If well was cored, attach core description

DRILL STEM TEST DATA

None

LIST ATTACHMENTS

Z-Densilog-Comp Neutron-Gamma Log
Dual Laterolog-Micro-Laterolog-Gamma Log

OFFICE OF GEOLOGICAL SURVEY USE ONLY

Reviewed by

Date of review

DEQ

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY – OFFICE OF GEOLOGICAL SURVEY

RECORD OF WELL COMPLETION

By authority of Part 615 or Part 625 of Act 451 PA 1994, as amended. Non-submission and/or falsification of this information may result in fines and/or imprisonment.

(Submit 3 copies within 60 days of well completion.)

☒ Part 615 Oil/Gas Well ☐ Part 625 Mineral Well

Permit number/deepening permit no.	API number
58365	21-035-58365-00-00

Type of well (after completion): OIL PRODUCER

Well name & number: R. & P. FANSLAU 1-22

Name and address of permittee:
Northshore Petroleum, LLC
4406 Grand Cayman Dr.
Sugar Land, Texas 77479

Directionally drilled (check one)	Previous permit numbers	Total depth of well
☐ Yes ☒ No		M.D. 5,200 T.V.D. 5,200

Surface location	Subsurface location (if directionally drilled)
NE ¼ of NW ¼ of NW ¼ Section 22 T 19N R 3W	¼ of ¼ of ¼ Section T R
Township: Hamilton	County: Clare
Township:	County:
Footages: North/South 330 Ft. from North line and 987 Ft. from West line of Sec.	Footages: North/South Ft. from line and East/West Ft. from line of Sec.

Part 615 - oil/gas wells			Part 625 - mineral wells		
Date well completed	Producing formation(s)	Injection formation(s)	Date of first injection	Disposal formation(s)	Solution formation(s)
3/13/2008	Richfield				

COMPLETION INTERVALS(S)

Date	Number holes	Perforation or open hole interval	Open	
			Yes	No
12/13/07	248	3,868-3,930' - 4 spf (Squeezed)		X
1/7/08	40	3,818-3,828' - 4 spf (Squeezed)		X
3/13/08	144	4,968-4,978'; 4,996-5,002'	X	
		5,006-5,014' - 6 spf		

STIMULATION BY ACID OR FRACTURING

Date	Interval treated	Materials and amount used
12/13/07	3,868-3,930'	500 gals. 20% HCl - (interval made only water)
3/13/08	4,968-4,978'; 4,996-5,002'	500 gals. 20% HCl
	5,006-5,014'	

PRODUCTION TEST DATA

Oil Bbls/day	Gravity °API	Condensate Bbls/day	Gas MCF/day	Water Bbls/day	H_2S Grains/100 ft^3.	B.H.P. and depth
90	41.2		81 (est.)	0	69.1	2,612 psia - 5,030'

CERTIFICATION "I state that I am authorized by said owner. This report was prepared under my supervision and direction. The facts stated herein are true, accurate and complete to the best of my knowledge."

Name and title (print or type)	Signature	Date
Mark W. Andreason		April 16, 2008

Submit to: OFFICE OF GEOLOGICAL SURVEY
MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
PO BOX 30256
LANSING MI 48909-7756

APR 22 2008

EQP 7130 (rev. 8/2004)

FEB 15 1995

STATE OF MICHIGAN
DEPARTMENT OF NATURAL RESOURCES
GEOLOGICAL SURVEY DIVISION
P.O. BOX 30028, LANSING, MICHIGAN 48909

RECORD OF WELL DRILLING OR DEEPENING

USE APPROPRIATE BLOCKS, FOR ITEMS NOT LISTED SUBMIT ATTACHMENTS.

REQUIRED BY AUTHORITY OF:
☒ ACT 61, P.A. 1939, AS AMENDED. (Submit 2 copies within 30 days of completion)
☐ ACT 315, P.A. 1969, AS AMENDED. (Submit 2 copies within 60 days of completion.)

NON-SUBMISSION AND/OR FALSIFICATION OF THIS INFORMATION MAY RESULT IN FINES AND/OR IMPRISONMENT.

PERMIT NO./DEEPENING PERMIT NO.	TYPE OF WELL (after completion)
48189	dry

FIELD/FACILITY NAME: East Hamilton

WELL NAME & NUMBER: Miller 1-22

SURFACE LOCATION: NW ¼ of SE¼ of NW ¼ Section 22 T 19N R 3W

NAME AND ADDRESS OF OWNER
Dart Oil & Gas Corporation
600 Dart Rd., P.O. Box 177
Mason, MI 48854-0177

TOWNSHIP: Hamilton — COUNTY: Clare

FOOTAGES: NORTH/SOUTH: 990 Ft. from S Line and EAST/WEST: 990 from E Line of ¼ Sec.

NAME AND ADDRESS OF DRILLING CONTRACTOR
McLachlan Drilling Company
P.O. Box 548
Evart, MI 49631-0548

SUBSURFACE LOCATION (if directionally drilled): NW ¼ of SE¼ of NW¼ Section 22 T 19N R 3W

TOWNSHIP: Hamilton — COUNTY: Clare

FOOTAGES: NORTH/SOUTH: 990 Ft. from S Line and EAST/WEST: 990 from E Line of ¼ Sec.

DATE DRILLING BEGAN	DATE DRILL. COMPLETED	DATE WELL COMPLETED
02-08-94	02-18-94	05-06-94

TOTAL DEPTH OF WELL	FORMATION AT T.D.	PROD. FORMATION(S)
Driller 5220' Log 5220'	Amherstburg	Dundee

FEET DRILLED — CABLE TOOLS: From NA To
FEET DRILLED — ROTARY TOOLS: From 0 To 5220'

DATE OF FIRST INJECTION	INJECTED FORMATION	SOLUTION FORMATION
NA	NA	NA

ELEVATIONS: K.B. 966.8 ft. | R.F. 965' ft. | R.T NA ft. | Grd. 953' ft.

CASING, CASING LINERS AND CEMENTING, OPERATING STRINGS

SIZE	WHERE SET	CEMENT	FT. PULLED
16"	85'	driven	
9 5/8"	808'	400 sx Class A	
5 1/2"	4013'	600 sx Howco Lt, 180 sx Class A	

PERFORATIONS

DATE	NUMBER HOLES	INTERVAL PERFORATED	OPEN YES	OPEN NO
5-3-94	4	3860' - 3862'		X

GROSS PAY INTERVALS

FORMATION	OIL OR GAS	FROM	TO
NA			

ALL OTHER OIL AND GAS SHOWS OBSERVED OR LOGGED

FORMATION	OIL OR GAS	DEPTH	WHERE OBSERVED (X): Samples	Odor	Pits	Mud Line	Gas Log.	Fill Up
Stray Sd	Gas	1280'			X			
Dundee	Oil	3858-70'	X				X	
Richfield	Oil	4992'-5002'	X				X	

STIMULATION BY ACID OR FRACTURING

DATE	INTERVAL TREATED	MATERIALS AND AMOUNT USED
5-3-94	3860' - 3862'	500 gal 20% HCl

WATER FILL UP (F.U.) OR LOST CIRCULATION (L.C.) (X)

FORMATION	F.U.	L.C.	DEPTH	AMOUNT
Dundee		X	3858-4076	630 BBL

MECHANICAL LOGS, LIST EACH TYPE RUN — DEPTH CORRECTION — DEVIATION SURVEY — PLUGGED BACK

	BRAND	(X)	LOG TYPES	LOGGED INTERVALS	DEPTH	CORRECTION	RUN AT	DEGREES	PLUGGED BACK YES	PLUGGED BACK NO	PLUGGED BACK DEPTH
	~~Schlumberger~~ Halliburton		CNL/GR	176-5220	4261'	4256'	950'	3/4°			
	~~Birdwell~~ Halliburton		CAL	792-5220			2324'	1°			
OTHER	Halliburton		LDT	1094-1144, 2838-5220			3357'	1°			
	Halliburton		DLL/MLL/GR	1086-1482, 2840-5220			5220'	3/4°			

PRODUCTION TEST DATA

OIL — Bbls/day	GRAVITY — °API	COND. Bbls/day	GAS — MCF/day	WATER — Bbls/day	H_2S — Grains/100 cu. ft.	B.H.P. AND DEPTH
NA	NA	NA	NA	NA	NA	NA

I AM RESPONSIBLE FOR THIS REPORT. THE INFORMATION IS COMPLETE AND CORRECT.

DATE	NAME AND TITLE (PRINT)	SIGNATURE
2-13-95	David W. Farner, Petroleum Engineer	David W. Farner

NOTICE: REPORT COMPLETE SAMPLE AND FORMATION RECORD, CORING RECORD AND DRILL STEM TEST INFORMATION ON REVERSE SIDE.

FR 7200-5
Rev 8/85

FORMATION RECORD

(ATTACH ADDITIONAL SHEETS IF NECESSARY)

#48189

Miller 1-22

ELEVATION USED.	GEOLOGIST NAME:	TOPS TAKEN FROM:
KB 966.8'	Dave Farner	☐ DRILLERS LOG ☐ SAMPLE LOG ☒ ELECTRIC LOG

NOTE: IF WELL DIRECTIONALLY DRILLED, *ADD* TRUE VERTICAL DEPTH FORMATION TOPS WHERE APPROPRIATE.

FROM	TO	FORMATION (TYPE, COLOR, HARDNESS)
0	660	Glacial Drift
660	1278	Saginaw/Michigan sh, ss, Lm, gyp
1278	1350	Michigan Stray ss, shly IP, gas show
1350	1510	Marshall ss, shly IP
1510	2508	Coldwater sh
2508	2560	Sunbury/Berea/Bedford sh, ss, sh
2560	3070	Antrim sh, dk brn-drn
3070	3111	Traverse Formation sh-shly Lm
3111	3742	Traverse Limestone Lm-shly Lm-sh, occ vis Ø, no shows
3742	3803	Bell Shale
3803	4076	Dundee Lm, tan, Dol, brn-dk brn-tan, vf-fxln, vis Ø, good oil show 3858-3870
4076	4910	Detroit River Anhy, salt, Dol
4910	4992	Massive Anhydrite
4992	5163	Richfield Dol brn, mic-vfxln, some vis Ø and oil st, mostly tite-low Ø, oil show 4992-5002
5163	5220	Amherstburg Lm-dk brn, brn, blk grainst, tite

FROM	TO	FORMATION (TYPE,COLOR, HARDNESS)

IF WELL WAS CORED, ATTACH CORE DESCRIPTION

DRILL STEM TEST DATA

LIST ATTACHMENTS:

GEOLOGICAL SURVEY USE ONLY

REVIEWED BY:

DATE OF REVIEW:

DNR

Michigan Department of Natural Resources
Geological Survey Division

RECORD OF WELL PLUGGING OR REWORK

NOV 23 1994

REQUIRED BY AUTHORITY OF: ACT 61, PA 1939, as amended or ACT 315, PA 1969, as amended. Non-submission and / or falsification of this information may result in fines and / or imprisonment.

Permit Number	Well Name & Number
48189	Miller 1-22

Type of Well	Field Name
Oil	East Hamilton

1/4 1/4 1/4, Section, Township, Range, County: NW, SE, NW, Sec 22 T19N R3W

Date Plugging / Rework Started	Date Plugging / Rework Completed
10-26-94	10-28-94

Name and Address of Well OWNER

PRELIMINARY COPY

Dart Oil & Gas Corporation
600 Dart Road, P O Box 177
Mason, MI 48854-0177

Name and Address of Contractor/Service Company (attach additional sheets as needed)

Beckman Production Services
P O Box 670
Kalkaska, MI 49646

Indicate Operation & Type of Well Permit

☒ PLUGGING ☐ REWORK ☒ Act 61 Oil & Gas ☐ Act 315 Mineral Wells

☐ Tools, tubing, etc. left in hole - describe in Daily Chronology.

Name of DNR employee issuing Plugging Permit or Approving Change of Well Status: William Booker Date issued: 9-29-94

☐ Well logs run - list types and depths in Daily Chronology.

For WELL PLUGGING Only (HOLE CONDITIONS AFTER PLUGGING)

CASING			
Casing Size	Where Set	Amount Casing Pulled	Depth Casing Cut/Perfed: Windows Milled
16"	85'	0	
9 5/8"	808'	0	
5 1/2"	4013'	0	

PLUGS				
Depth Bottom	Depth Top	Type of Bridge or Plug	Cement Plugs: Cement type, # sx, and additives	Tagged Top? Y/N
3954	3704		29 sx Cl A	N
2600	2400		23 sx Cl A	N
370	1170		23 sx Cl A	N
900	700		23 sx Cl A	N
270	surf		30 sx Cl A	Y

Check ☐ if NORM material was reinserted into wellbore. If so, describe materials fully in the Daily Chronology section on back of this form.

For WELL REWORK Only

REWORK WAS TO:

☐ TEMPORARILY ABANDON

☐ CONVERT TO: ☐ Disposal Well ☐ Production ☐ Storage ☐ Enhanced Recovery ☐ Other

☐ REMEDIAL: ☐ Perf & Test ☐ Repair Casing / Cement ☐ Redrill ☐ Other

☐ PLUGBACK: ☐ New Production Zone ☐ Disposal ☐ Storage ☐ Enhanced Recovery ☐ Other

Well Casing Record - BEFORE Rework

Casing		Cement		Perforations			Acid or Fracture Treatment Record
Size	Depth	Sacks	Type	From	To	If plugged, HOW?	

GEOLOGICAL SURVEY

DEC 24 1996

Permits & Bonding Unit

Well Casing Record - AFTER Rework (Indicate additions and changes only: complete Test Record on next page)

Casing		Cement		Perforations			Acid or Fracture Treatment Record
Size	Depth	Sacks	Type	From	To	If plugged, HOW?	

BEFORE REWORK			AFTER REWORK		
Total Depth	Formation / Zone	Well Completed For	Total Depth	Formation / Zone	Well Completed For

RECEIVED
NOV 23 1994

PR 7200 – 8 REV. 09/92

MDNR - ~~AGE~~ GSD
SAGINAW - BAY

42

813

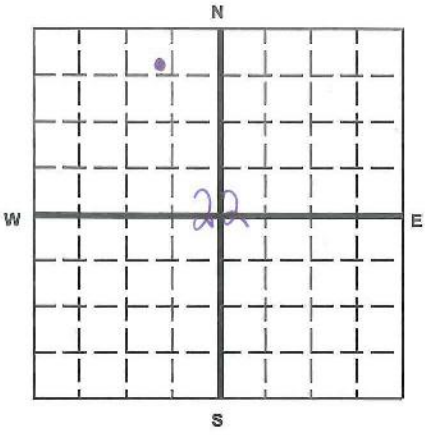
OMB No. 2040-0042 Approval Expires 12/31/2018

United States Environmental Protection Agency
Washington, DC 20460

PLUGGING AND ABANDONMENT PLAN

Name and Address of Facility	Name and Address of Owner/Operator
Holcomb 1-22 Smith Creek Field	Muskegon Development Comapany 1425 South Mission Road, Mt. Pleasant, MI, 48858

Locate Well and Outline Unit on Section Plat - 640 Acres



State	County	Permit Number
Michigan	Clare	59345

Surface Location Description

[ ] 1/4 of NW 1/4 of NE 1/4 of NW 1/4 of Section 22 Township 19N Range 3W

Locate well in two directions from nearest lines of quarter section and drilling unit

Surface Location 490 ft. frm (N/S) N Line of quarter section and 1826 ft. from (E/W) W Line of quarter section.

TYPE OF AUTHORIZATION

- [x] Individual Permit
- [ ] Area Permit
- [ ] Rule

Number of Wells 1

Lease Name Holcomb

WELL ACTIVITY

- [ ] CLASS I
- [x] CLASS II
  - [ ] Brine Disposal
  - [x] Enhanced Recovery
  - [ ] Hydrocarbon Storage
- [ ] CLASS III

Well Number 1-22

CASING AND TUBING RECORD AFTER PLUGGING

SIZE	WT (LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE
9 5/8"	36		792'	12 1/4"
7"	23		1432'	8 3/4"
4.5"	11.6"		2037'	6 1/8"

METHOD OF EMPLACEMENT OF CEMENT PLUGS

- [x] The Balance Method
- [x] The Dump Bailer Method
- [ ] The Two-Plug Method
- [ ] Other

CEMENTING TO PLUG AND ABANDON DATA:	PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
Size of Hole or Pipe in which Plug Will Be Placed (inche	4.5"	4.5", 7"	7", 8 3/4"	9 5/8"			
Depth to Bottom of Tubing or Drill Pipe (ft	4898'	3214'	2700'	892'			
Sacks of Cement To Be Used (each plug)	5	35	65	335			
Slurry Volume To Be Pumped (cu. ft.)	5.90	41.30	76.70	395.30			
Calculated Top of Plug (ft.)	4848'	3014'	2500'	Surface			
Measured Top of Plug (if tagged ft.)	C.I.B.P.						
Slurry Wt. (Lb./Gal.)	15.6	15.6	15.6	15.6			
Type Cement or Other Material (Class III)	Class A	Class A	Class A	Class A			

LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)

From	To	From	To
4948'	4954'	3164'	Assumed Free Point for 4.5"
4966'	4976'	2650'	Calculated Free Point for 7"
4990'	5000'		
5004'	5010'		

Estimated Cost to Plug Wells

$27,800

Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all 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. (Ref. 40 CFR 144.32)

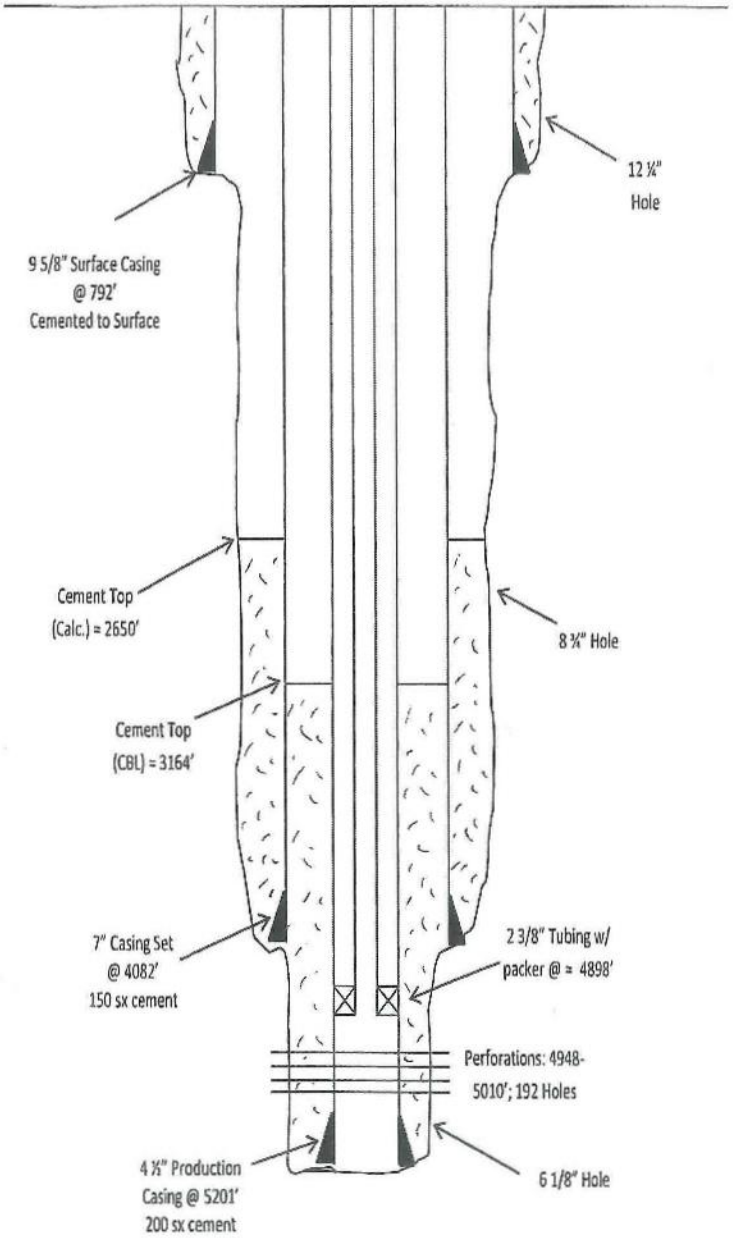
Name and Official Title *(Please type or print)*	Signature	Date Signed
William C. Myler, Jr., President	William C. Myler	8/8/16

EPA Form 7520-14 (Rev. 12-11)

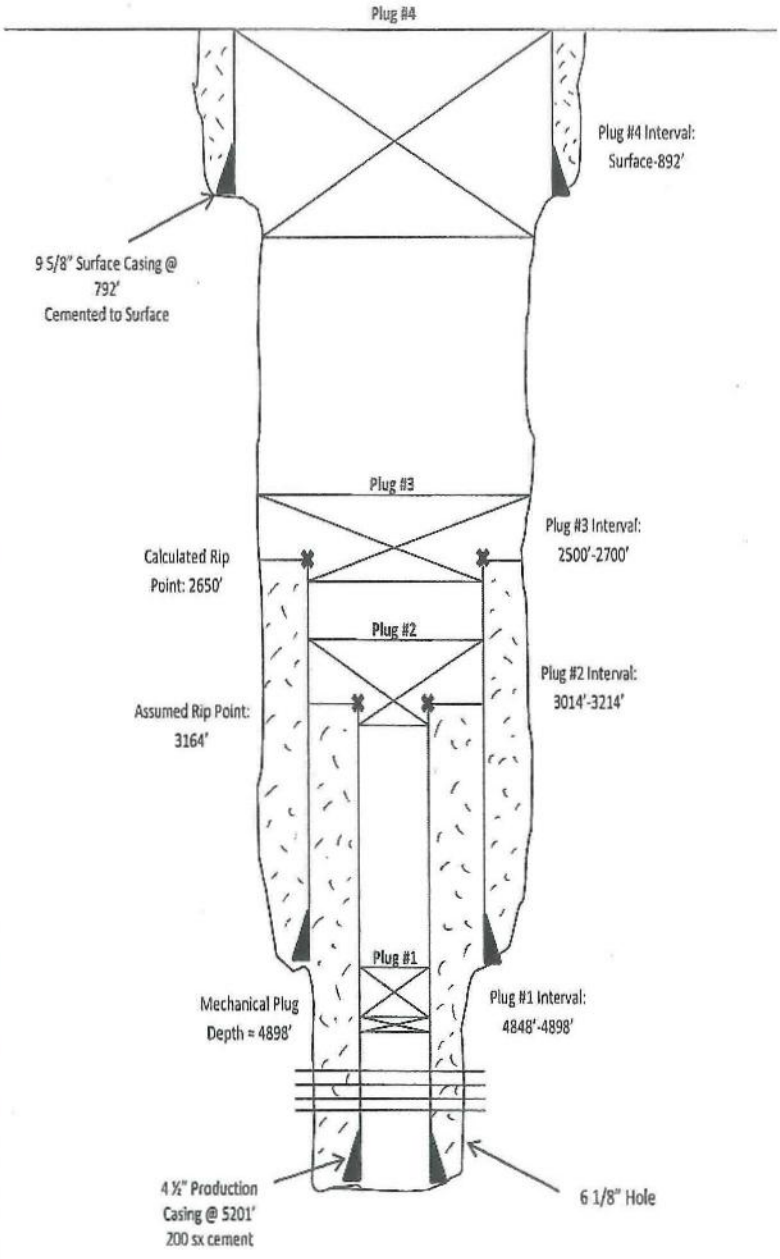
WELL CONSTRUCTION

Holcomb 1-22

Permit # 59345



PLUGGING & ABANDONMENT PLAN



RECEIVED
AUG 11 2015
UIC BRANCH
EPA REGION 5

Muskegon Development Company

Financial Report
December 31, 2015

RECEIVED
AUG 11 2016
UIC BRANCH
EPA, REGION 5

List of Landowners Within 1320' of Holcomb 1-22

Hamilton Township, Clare County, T19N-R03W

Section	Short Legal Description	Owner Name	Owner's Street Address	City, State Zip
15	W/2 SE SW	Oblinsky, Frank & Nancy	9321 East Townlake Road	Harrison, Michigan 48625
15	W/2 E/2 SE SW	Burtka Trust, Richard A. & Eveline E.	3360 12th Street	Wyandotte, Michigan 48192
15	E/2 E/2 SE SW	Molinari, James & Lydia Magda	9463 East Townline Lake Road	Harrison, Michigan 48625
15	SW SW except 300-05 & 300-06	Roe, Herman L. II & Marilyn K.	5600 Cribbins Road	North Street, Michigan 48049
15	W/2 SW SE & W/2 W/2 E/2 SW SE	Scott, Paul & Shawn	10447 Lewis Road	Clio, Michigan 48420
22	N/2 NW NW	Fanslau Trust, Robert A. & Pearl	9062 East Townline Lake Road	Harrison, Michigan 48625
22	S/2 NW NW	Fanslau, Frederick & Katherine	200 North Occidental Road, Apt 23	Tecumseh, Michigan 49286
22	W/2 NE NW	Weaver, Vernon & Miranda	9326 East Townline Lake Road	Harrison, Michigan 48625
22	E/2 NE NW	Driver, Ronald E.	9478 East Townline Lake Road	Harrison, Michigan 48625
22	W/2 NW NE	Primemark Properties LLC	437 North Larch	Lansing, Michigan 48912
22	N 330' of SW NW	Miller, Alvin B.	10860 Strasburg	Erie, Michigan 48133
22	S 990' of SW NW	Cover, Willis & Pamela E.	9161 Balsam Road	Harrison, Michigan 48625
22	E/2 S/2 NW	Troyer, Levi & Naomi	2593 North Bailey Lake Avenue	Harrison, Michigan 48625
22	S/2 NE	Troyer, Levi & Naomi	2593 North Bailey Lake Avenue	Harrison, Michigan 48625

MUSKEGON DEVELOPMENT COMPANY

1425 South Mission Road, Mount Pleasant, Michigan 48858
(989) 772-4900 (Fax) (989) 773-4094

June 13th, 2016

Anna Miller
Underground Injection Control Branch
U.S. Environmental Protection Agency – Region 5
Mail Code WU-16J
77 W. Jackson Blvd.
Chicago, IL, 60604-3590

Dear Ms. Miller,

I have reviewed the potential impact to endangered species caused by conversion of the existing Holcomb 1-22 producing well to a water injection well. The Holcomb 1-22 well is located in Clare County, MI, which contains habitat for two threatened or endangered species (1): The Northern Long-Eared Bat and the Kirtland's Warbler.

Clare County is a potential habitat for the threatened Northern Long-Eared Bat during spring and summer time. It typically roosts and forages in upland forests (2). The Long-Eared Bat hibernates in caves and mines during late-Autumn and winter. The Kirtland's Warbler is an endangered species that is found in Clare County (3). They typically nest in the low-hanging branches of Jack Pine trees, and migrate to the Bahamas in late-Autumn.

The project area is contained within a 75 ft. radius circle centered at the well. The project area contains little to no vegetation.

It is my determination that conversion of the Holcomb 1-22 well to water injection is not likely to adversely affect the Northern Long-Eared Bat or the Kirtland's Warbler. The project area does not contain any trees that would provide shelter for either threatened or endangered animals.

Please contact me at (989) 772-4900 or bennettmyler@muskegondevelopment.com if you have any questions. Thank you.

Sincerley,

Bennett Myler, Geologist

(1) http://www.fws.gov/midwest/endangered/lists/michigan-cty.html
(2) http://www.fws.gov/midwest/endangered/mammals/nleb/index.html
(3) http://www.fws.gov/midwest/endangered/birds/Kirtland/kiwafctsht.html

Holcomb 1-22, Permit #59345
75 Ft. Radius of Review

Hamilton Township, Clare County
Revised 6/7/2016, BM

0.02 0.01 0 0.02 Miles

STATE OF MICHIGAN

RICK SNYDER
GOVERNOR

MICHIGAN STATE HOUSING DEVELOPMENT AUTHORITY
STATE HISTORIC PRESERVATION OFFICE

KEVIN ELSENHEIMER
EXECUTIVE DIRECTOR

July 25, 2016

LISA PERENCHIO
EPA REGION 5
77 WEST JACKSON BLVD WU 16J
CHICAGO IL 60604

RE: ER04-92 Muskegon Development Company Well Projects - Holcomb 1-22, Sec. 22, T19N, R3W, Hamilton Township, Clare County (EPA)

Dear Ms. Perenchio:

Under the authority of Section 106 of the National Historic Preservation Act of 1966, as amended, we have reviewed the above-cited undertaking at the location noted above. Based on the information provided for our review, it is the opinion of the State Historic Preservation Officer (SHPO) that **no historic properties are affected** within the area of potential effects of this undertaking.

This letter evidences the EPA's compliance with 36 CFR § 800.4 "Identification of historic properties," and the fulfillment of the EPA's responsibility to notify the SHPO, as a consulting party in the Section 106 process, under 36 CFR § 800.4(d)(1) "No historic properties affected." **If the scope of work changes in any way, or if artifacts or bones are discovered, please notify this office immediately.**

We remind you that federal agency officials or their delegated authorities are required to involve the public in a manner that reflects the nature and complexity of the undertaking and its effects on historic properties per 36 CFR § 800.2(d). The National Historic Preservation Act also requires that federal agencies consult with any Indian tribe and/or Tribal Historic Preservation Officer (THPO) that attach religious and cultural significance to historic properties that may be affected by the agency's undertakings per 36 CFR § 800.2(c)(2)(ii).

The State Historic Preservation Office is not the office of record for this undertaking. You are therefore asked to maintain a copy of this letter with your environmental review record for this undertaking.

If you have any questions, please contact Brian Grennell, Cultural Resource Management Specialist, at 517-335-2721 or by email at GrennellB@michigan.gov. **Please reference our project number in all communication with this office regarding this undertaking.** Thank you for this opportunity to review and comment, and for your cooperation.

Sincerely,

Brian G. Grennell
Cultural Resource Management Specialist

for Brian D. Conway
State Historic Preservation Officer

SAT:BGG

Copy: Bennett Myler, Muskegon Development Company

RECEIVED
AUG 01 2016
UIC BRANCH
EPA, REGION 5

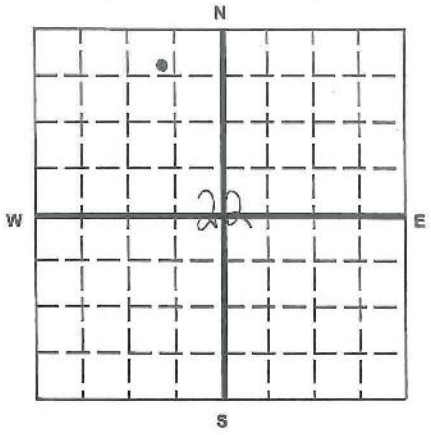
OMB No. 2040-0042 Approval Expires 12/31/2018

United States Environmental Protection Agency
Washington, DC 20460

PLUGGING AND ABANDONMENT PLAN

Name and Address of Facility	Name and Address of Owner/Operator
Holcomb 1-22 Smith Creek Field	Muskegon Development Comapany 1425 South Mission Road, Mt. Pleasant, MI, 48858

Locate Well and Outline Unit on Section Plat - 640 Acres



State	County	Permit Number
Michigan	Clare	59345

Surface Location Description

1/4 of NW 1/4 of NE 1/4 of NW 1/4 of Section 22 Township 19N Range 3W

Locate well in two directions from nearest lines of quarter section and drilling unit

Surface Location 490 ft. frm (N/S) N Line of quarter section
and 1826 ft. from (E/W) W Line of quarter section.

TYPE OF AUTHORIZATION

- [x] Individual Permit
- [ ] Area Permit
- [ ] Rule

Number of Wells 1

WELL ACTIVITY

- [ ] CLASS I
- [x] CLASS II
  - [ ] Brine Disposal
  - [x] Enhanced Recovery
  - [ ] Hydrocarbon Storage
- [ ] CLASS III

Lease Name Holcomb Well Number 1-22

CASING AND TUBING RECORD AFTER PLUGGING

SIZE	WT (LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE
9 5/8"	36		792'	12 1/4"
7"	23		1432'	8 3/4"
4.5"	11.6"		2037'	6 1/8"

METHOD OF EMPLACEMENT OF CEMENT PLUGS

- [x] The Balance Method
- [x] The Dump Bailer Method
- [ ] The Two-Plug Method
- [ ] Other

CEMENTING TO PLUG AND ABANDON DATA:	PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
Size of Hole or Pipe in which Plug Will Be Placed (inche	4.5"	4.5", 7"	7", 8 3/4"	9 5/8"			
Depth to Bottom of Tubing or Drill Pipe (ft	4898'	3214'	2700'	892'			
Sacks of Cement To Be Used (each plug)	5	35	65	335			
Slurry Volume To Be Pumped (cu. ft.)	5.90	41.30	76.70	395.30			
Calculated Top of Plug (ft.)	4848'	3014'	2500'	Surface			
Measured Top of Plug (if tagged ft.)	C.I.B.P.						
Slurry Wt. (Lb./Gal.)	15.6	15.6	15.6	15.6			
Type Cement or Other Material (Class III)	Class A	Class A	Class A	Class A			

LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)

From	To	From	To
4948'	4954'	3164'	Assumed Free Point for 4.5"
4966'	4976'	2650'	Calculated Free Point for 7"
4990'	5000'		
5004'	5010'		

Estimated Cost to Plug Wells

$27,800

Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all 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. (Ref. 40 CFR 144.32)

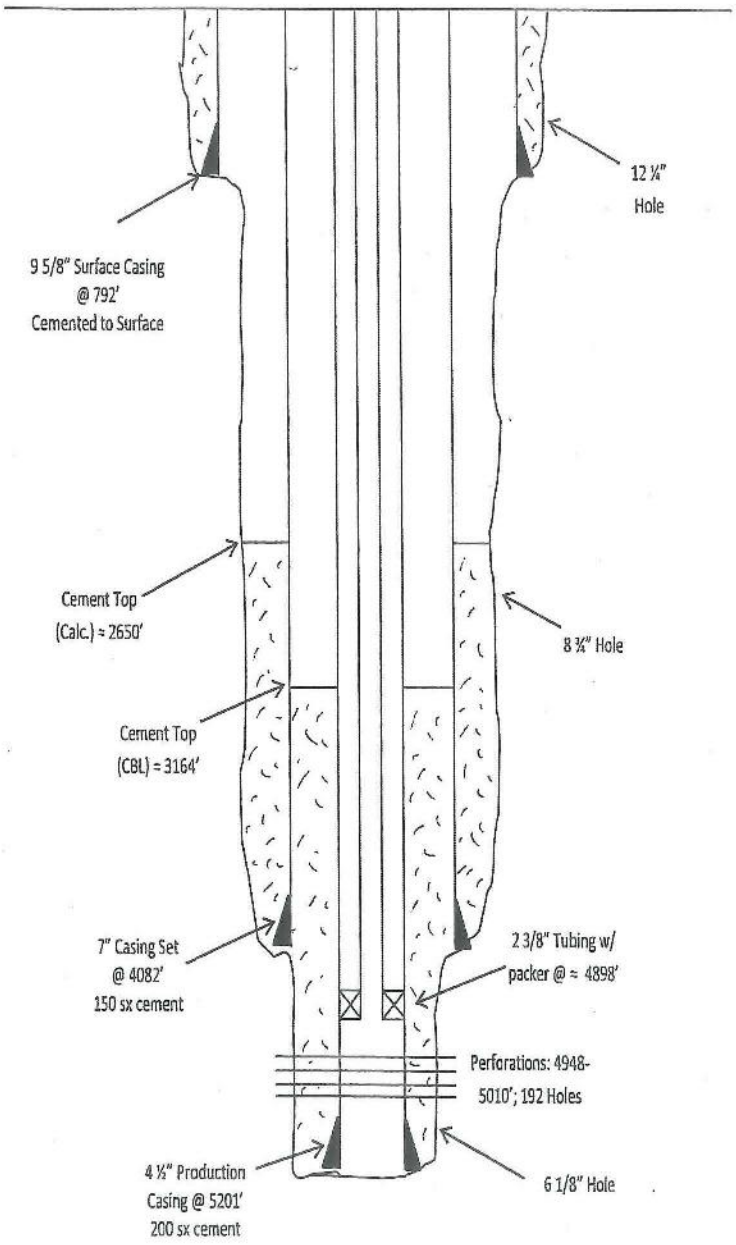
Name and Official Title *(Please type or print)*	Signature	Date Signed
William C. Myler, Jr., President	William C. Myler	8/8/16

EPA Form 7520-14 (Rev. 12-11)

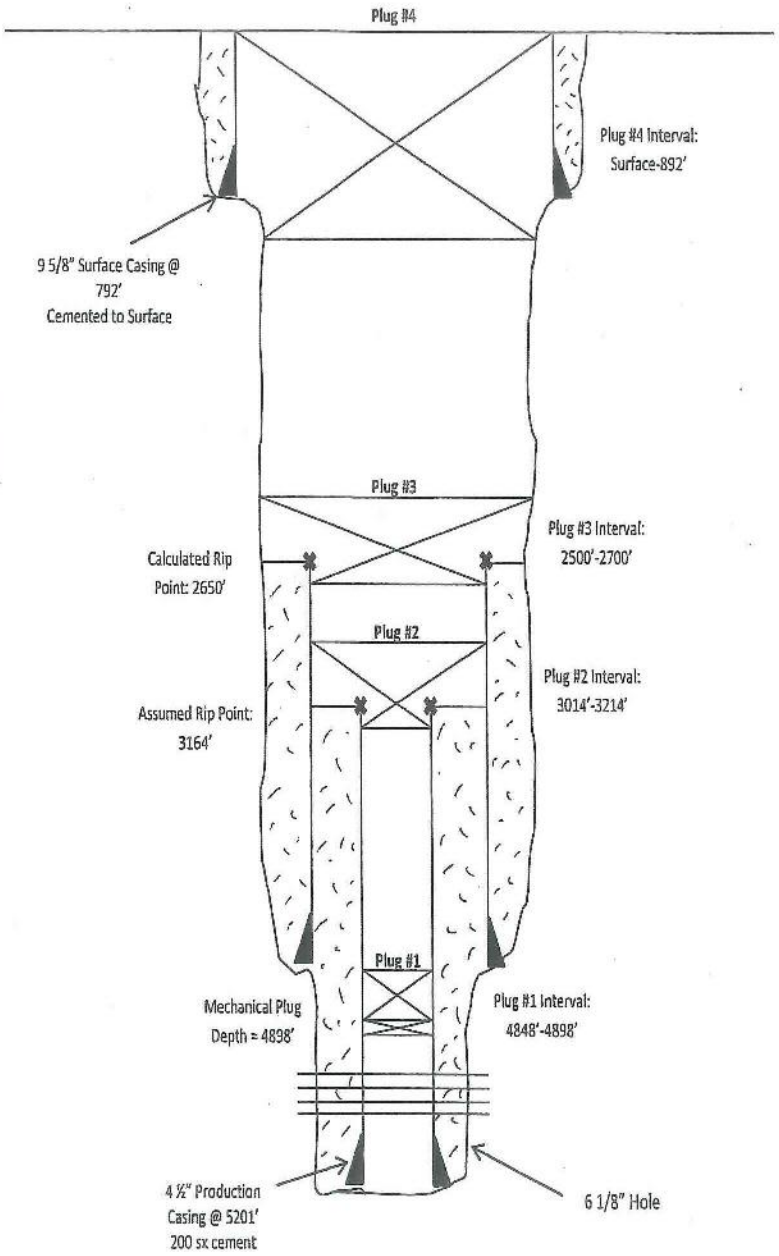
WELL CONSTRUCTION

Holcomb 1-22

Permit # 59345



PLUGGING & ABANDONMENT PLAN



(2)

UIC Permit Application Completeness Review Checklist

Source of information: G:\UIC\Reporting, Tracking, & Communications\Quality System-Quality Assurance (SOPs)\SOPs - UIC\Permits\Permitting SOP & Info\Form_7520-6_0_508c.pdf

Complete this form, save the file, and print a hard copy for inclusion with the signoff package for the completeness letter to be sent to the permit applicant.

Permit Writer: Bill Tong Bill Tong	**Date Received:** August 19, 2016	**Date Completed:** August 19, 2016
Permittee: Muskegon Development Company	**Well Name:** Holcomb 1-22	**Permit #:** MI-035-2R-0034

√=yes X=no	Permit Application	Description
√	Signed by William C. Myler, Jr., company president	**Permit Application has been signed by an authorized company official?** *(If not, a letter requesting an authorized signature must be sent before resuming review of the permit application)*
√	**Attachment A**	**AREA OF REVIEW METHODS** - Give the methods and, if appropriate, the calculations used to determine the size of the area of review (fixed radius or equation).The area of review shall be a fixed radius of 1/4 mile from the well bore unless the use of an equation is approved in advance by the Director. (For Class I wells, the area of review is a radius of 2 miles)
	Class I:	Required
	Class II:	Required
	Class III:	Required
	Class V:	Not Applicable
√	**Attachment B**	**MAPS OF WELL/AREA AND AREA OF REVIEW** - Submit a topographic map, extending one mile beyond the property boundaries, showing the injection well(s) or project area for which a permit is sought and the applicable area of review. The map must show all intake and discharge structures and all hazardous waste treatment, storage, or disposal facilities. If the application is for an area permit, the map should show the distribution manifold (if applicable) applying injection fluid to all wells in the area, including all system monitoring points. Within the area of review, the map must show the following:
	Class I:	The number, or name, and location of all producing wells, injection wells, abandoned wells, dry holes, surface bodies of water, springs, mines (surface and subsurface), quarries, and other pertinent surface features, including residences and roads, and faults, if known or suspected. In addition the map must identify those wells, springs, other surface water bodies, and drinking water wells located within one quarter mile of the facility property boundary. Only information of public record is required to be included in this map.
	Class II:	In addition to requirements for Class I, include pertinent information known to the applicant. This requirement does not apply to existing Class II wells.
	Class III:	In addition to requirements for Class I, include public water systems and pertinent information known to the applicant.
	Class V:	Required (see Class V Permit Application Guidelines for details)

√=yes X=no	Permit Application	Description
√	**Attachment C**	**CORRECTIVE ACTION PLAN AND WELL DATA-** Submit a tabulation of data reasonably available from public records or otherwise known to the applicant on all wells within the area of review, including those on the map required in B, which penetrate the proposed injection zone. Such data shall include the following:
	Class I:	A description of each well's types, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information the Director may require. In the case of new injection wells, include the corrective action proposed to be taken by the applicant under 40 CFR § 144.55.
	Class II:	In addition to requirement for Class I, in the case of Class II wells operating over the fracture pressure of the injection formation, all known wells within the area of review which penetrate formations affected by the increase in pressure. This requirement does not apply to existing Class II wells.
	Class III:	In addition to requirements for Class I, the corrective action proposed under 40 CFR § 144.55 for all Class III wells.
	Class V:	Not applicable
NA	**Attachment D**	**MAPS AND CROSS SECTION OF USDWs** - Submit maps and cross sections indicating the vertical limits of all underground sources of drinking water within the area of review (both vertical and lateral limits for Class I), their position relative to the injection formation and the direction of water movement, where known, in every underground source of drinking water which may be affected by the proposed injection. (Does not apply to Class II wells.)
	Class I:	Maps and cross sections indicating the vertical and lateral limits of all USDWs within the AOR, their position relative to the injection formation, and the direction of water movement, where known, in every USDW which may be affected by the proposed injection
	Class II:	Not applicable
	Class III:	Maps and cross sections indicating the vertical limits of all USDWs within the AOR, their position relative to the injection formation, and the direction of water movement, where known, in every USDW which may be affected by the proposed injection.
	Class V:	Required (see Class V Permit Application Guidelines for details)
√	**Attachment E**	**NAME AND DEPTH OF USDWs (CLASS II)** - For Class II wells, submit geologic name, and depth to bottom of all underground sources of drinking water which may be affected by the injection.
	Class I:	Not Required
	Class II:	Required
	Class III:	Not Required
	Class V:	Not applicable

NA	**Attachment F**	**MAPS AND CROSS SECTIONS OF GEOLOGIC STRUCTURE OF AREA** - Submit maps and cross sections detailing the geologic structure of the local area (including the lithology of injection and confining intervals) and generalized maps and cross sections illustrating the regional geologic setting. (Does not apply to Class II wells.)
	Class I:	Required
	Class II:	Not Required
	Class III:	Required
	Class V:	Required (see Class V Permit Application Guidelines for details)
√	**Attachment G**	**GEOLOGICAL DATA ON INJECTION & CONFINING ZONES (Class II)** - For Class II wells, submit appropriate geological data on the injection zone and confining zones including lithologic description, geological name, thickness, depth and fracture pressure.
	Class I:	Not Required
	Class II:	Required
	Class III:	Not Required
	Class V:	Not Applicable
√	**Attachment H**	**OPERATING DATA** - Submit the following proposed operating data for each well (including all those to be covered by area permits): (1) average and maximum daily rate and volume of the fluids to be injected; (2) average and maximum injection pressure; (3) nature of annulus fluid; (4) for Class I wells, source and analysis of the chemical, physical, radiological and biological characteristics, including density and corrosiveness, of injection fluids; (5) for Class II wells, source and analysis of the physical and chemical characteristics of the injection fluid; (6) for Class III wells, a qualitative analysis and ranges in concentrations of all constituents of injected fluids. If the information is proprietary, maximum concentrations only may be submitted, but all records must be retained.
	Class I:	Required
	Class II:	Required
	Class III:	Required
	Class V:	Required (see Class V Permit Application Guidelines for details)
√	**Attachment I**	**FORMATION TESTING PROGRAM** - Describe the proposed formation testing program
	Class I:	The program must be designed to obtain data on fluid pressure, temperature, fracture pressure, other physical, chemical, and radiological characteristics of the injection matrix and physical and chemical characteristics of the formation fluids.
	Class II:	Testing program must be designed to obtain data on fluid pressure, estimated fracture pressure, physical and chemical characteristics of the injection zone. (Does not apply to existing Class II wells or projects.)

	Class III:	Testing program must be designed to obtain data on fluid pressure, fracture pressure, and physical and chemical characteristics of the formation fluids if the formation is naturally water bearing. Only fracture pressure is required if the program formation is not water bearing. (Does not apply to existing Class III wells or projects.)
	Class V:	Not Applicable
√	**Attachment J**	**STIMULATION PROGRAM** - Outline any proposed stimulation program.
	Class I:	Required
	Class II:	Required
	Class III:	Required
	Class V:	Not Applicable
√	**Attachment K**	**INJECTION PROCEDURES** - Describe the proposed injection procedures including pump, surge, tank, etc.
	Class I:	Required
	Class II:	Required
	Class III:	Required
	Class V:	Required (see Class V Permit Application Guidelines for details)
√	**Attachment L**	**CONSTRUCTION PROCEDURES** - Discuss the construction procedures (according to §146.12 for Class I, §146.22 for Class II, and §146.32 for Class III) to be utilized. This should include details of the casing and cementing program, logging procedures, deviation checks, and the drilling, testing and coring program, and proposed annulus fluid. (Request and submission of justifying data must be made to use an alternative to packer for Class I.)
	Class I:	Required per 40 C.F.R. § 146.12. Request and submission of justifying data must be made to use an alternative to packer
	Class II:	Required per 40 C.F.R. § 146.22.
	Class III:	Required per 40 C.F.R. § 146.32.
	Class V:	Not Applicable
√	**Attachment M**	**CONSTRUCTION DETAILS** - Submit schematic or other appropriate drawings of the surface and subsurface construction details of the well.
	Class I:	Required
	Class II:	Required
	Class III:	Required
	Class V:	Required (see Class V Permit Application Guidelines for details)
NA	**Attachment N**	**CHANGES IN INJECTED FLUID** - Discuss expected changes in pressure, native fluid displacement, and direction of movement of injection fluid. (Class III wells only.)
	Class I:	Not Required
	Class II:	Not Required
	Class III:	Required

	Class V:	Not Applicable
√	**Attachment O**	**PLANS FOR WELL FAILURES** - Outline contingency plans (proposed plans, if any, for Class II) to cope with all shut-ins or wells failures, so as to prevent migration of fluids into any USDW.
	Class I:	Required
	Class II:	Proposed plans, if any
	Class III:	Required
	Class V:	Not Applicable
√	**Attachment P**	**MONITORING PROGRAM** - Discuss the planned monitoring program. This should be thorough, including maps showing the number and location of monitoring wells as appropriate and discussion of monitoring devices, sampling frequency, and parameters measured. If a manifold monitoring program is utilized, pursuant to §146.23(b)(5), describe the program and compare it to individual well monitoring.
	Class I:	Required
	Class II:	Required
	Class III:	Required
	Class V:	Required (see Class V Permit Application Guidelines for details)
√	**Attachment Q**	**PLUGGING AND ABANDONMENT PLAN** - Submit a plan for plugging and abandonment of the well including: (1) describe the type, number, and placement (including the elevation of the top and bottom) of plugs to be used; (2) describe the type, grade, and quantity of cement to be used; and (3) describe the method to be used to place plugs, including the method used to place the wells in a state of static equilibrium prior to placement of the plugs. Also for a Class III well that underlies or is in an exempted aquifer, demonstrate adequate protection of USDWs. Submit this information on EPA Form 7520-14, Plugging and Abandonment Plan.
	Class I:	Required
	Class II:	Required for new Class II wells.
	Class III:	Required; in addition, demonstrate adequate protection of USDWs.
	Class V:	Required (see Class V Permit Application Guidelines for details)
√	**Attachment R**	**NECESSARY RESOURCES** - Submit evidence such as a surety bond or financial statement to verify that the resources necessary to close, plug or abandon the well are available.
	Class I:	Required
	Class II:	Required
	Class III:	Required
	Class V:	Required

NA	**Attachment S**	**AQUIFER EXEMPTIONS** – If an aquifer exemption is requested, submit data necessary to demonstrate that the aquifer meets the following criteria: (1) does not serve as a source of drinking water; (2) cannot now and will not in the future serve as a source of drinking water; and (3) the TDS content of the ground water is more than 3,000 and less than 10,000 mg/l and is not reasonably expected to supply a public water system. Data to demonstrate that the aquifer is expected to be mineral or hydrocarbon producing, such as general description of the mining zone, analysis of the amenability of the mining zone to the proposed method, and timetable for proposed development must also be included. For additional information on aquifer exemptions, see 40 CFR §§ 144.7 and 146.04.
	Class I:	Required
	Class II:	Required
	Class III:	Required
	Class V:	Not Applicable
√	**Attachment T**	**EXISTING EPA PERMITS** - List program and permit number of any existing EPA permits, for example, NPDES, PSD, RCRA, etc.
	Class I:	Required
	Class II:	Required
	Class III:	Required
	Class V:	Required (see Class V Permit Application Guidelines for details)
√	**Attachment U**	**DESCRIPTION OF BUSINESS** - Give a brief description of the nature of the business.
	Class I:	Required
	Class II:	Required for new Class II wells
	Class III:	Required
	Class V:	Required

(3)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

AUG 2 3 2016

REPLY TO THE ATTENTION OF:
WU-16J

CERTIFIED MAIL 7015 0640 0004 5965 0811
RETURN RECEIPT REQUESTED

Bennett Myler
Muskegon Development Company
1425 South Mission Road
Mount Pleasant, Michigan 48858

Re: Completeness Review of Underground Injection Control Permit Application Number MI-035-2R-0034 for the Holcomb 1-22 Injection Well

Dear Mr. Myler:

On August 11, 2016, we received from Muskegon Development Company a permit application for the Holcomb 1-22 Class II secondary recovery injection well. Title 40 of the Code of Federal Regulations (40 CFR) Section 124.3(c) requires us to perform a completeness review of the application. We have reviewed the application and determined that the application is complete.

We are proceeding with the evaluation of the information provided in the application for technical soundness and compliance with applicable federal regulations. If additional information is necessary to clarify, modify, or supplement the information you provided, we will notify you. When we determine that the information you provided is sufficient for a permitting decision, a draft decision will be made and a statement of basis will be prepared and supplied to you as well as the public for comment.

If you have any questions, please feel free to contact Bill Tong of my staff at (312) 886-9380 or tong.william@epa.gov.

Sincerely,

Stephen M. Jann, Chief
Underground Injection Control Branch

cc: Mark Snow, Michigan DEQ
Sam Williams, AEG Group

(4)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

OCT 1 3 2016

REPLY TO THE ATTENTION OF:
WU-16J

CERTIFIED MAIL 7015 0640 0004 5965 0927
RETURN RECEIPT REQUESTED

Bennett Myler
Muskegon Development Company
1425 South Mission Road
Mount Pleasant, Michigan 48858

Re: Third Party Estimate for Plugging Costs for Holcomb 1-22 Injection Well, Permit #MI-035-2R-0034

Dear Mr. Myler:

To facilitate the completion of our review of the permit application for the Holcomb 1-22 well, please be aware that EPA requires that the estimate of total plugging liability costs are to be based on contracted costs for plugging and abandonment operations by a third party, not on "in-house" cost estimates. The estimates should be based on a "turn-key" plugging operation, including all related costs of these procedures.

Please submit an amended Attachment Q to the permit application which includes third party cost estimates for plugging the Holcomb 1-22 well.

If you have any questions, please feel free to contact Bill Tong of my staff at (312) 886-9380 or tong.william@epa.gov.

Sincerely,

Stephen M. Jann, Chief
Underground Injection Control Branch

cc: Mark Snow, Michigan DEQ
Sam Williams, AEG Group

(5)

MUSKEGON DEVELOPMENT COMPANY

1425 South Mission Road, Mount Pleasant, Michigan 48858

(989) 772-4900 (Fax) (989) 773-4094

October 19th, 2016

RECEIVED
OCT 25 2016
UIC BRANCH
EPA, REGION 5

Bill Tong
Underground Injection Control Branch
UIC Section
U.S. EPA-Region 5
77 West Jackson Blvd.
Chicago, IL 60604-3590

Attention: WU-16J

Dear Mr. Tong:

As requested, I have sent an amended Attachment Q for the permit application to convert the Holcomb 1-22 well to a water injection well. This includes a third party cost estimate for plugging the well.

Thank you.

Sincerely,

Bennett E. Myler, Geologist
Muskegon Development Company

Encl.

ATTACHMENT Q

RECEIVED
OCT 25 2016
UIC BRANCH
EPA, REGION 5

LEASE MANAGEMENT, INC.
503 INDUSTRIAL AVE. / P.O. BOX 290 / MT. PLEASANT, MI 48804-0290 / 989-773-5948 / FAX 989-773-5798

October 18, 2016

Bennett Myler
Muskegon Development Company
1425 South Mission Road
Mt. Pleasant, Michigan 48858

Topic: Cost Estimate to Plug the Holcomb 1-22 Well

Lease Management is pleased to offer our services for plugging the Holcomb 1-22 well in Clare County Michigan. This proposal is based on plugging instructions titled "attachment Q". The scope of work is to provide complete plugging and abandonment services that include: our service rig, labor, tools, and cement to properly plug the well in accordance with the plugging instructions. This proposal is based on the plugging instructions as currently written and assume work goes as planned.

WORK PLAN and COST SUMMARY:

1. Day 1 :
    a. Mobilize Equipment and rig up
    b. Install BOP
    c. Pull tubing & packer, bit n scrapper run
2. Day 2 :
    a. Set CIBP
    b. Dump bail 5 sx
    c. Free Point 4 ½" , cut n pull (3164')
3. Day 3:
    a. Run in tubing 50' into 4 ½" stub, spot 35sx
    b. Free point & cut 7"
    c. Pull 7" casing (2650)
4. Day 4
    a. Run in tubing 50' into 7" stub, spot 65sx
    b. Pull tubing to 842', cement to surface 335 sx
5. Day 5
    a. Contingency day for pulling casing
6. Day 6
    a. Rig down move out
7. Cut and Cap casing
8. Clean, Level, and Seed location

RECEIVED
OCT 25 2016
UIC BRANCH
EPA REGION 5

Other Cost:

1. Mud Pit Rental
2. Misc. Tool Rentals (7" casing tongs)
3. Waste Hauling

TOTAL: **$29,600**

Terms:

- Lease Management will provide our services on a time and material basis
- Tubing and casing will be credited to LMI

I hope you find this proposal acceptable and look forward to performing the job in a safe efficient manner.

Sincerely,

Doug Struble
Lease Management
(989) 773-5948 office
(989) 506-2333 cell

RECEIVED
OCT 25 2016
UIC BRANCH
EPA, REGION 5

(6)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

STATEMENT OF BASIS FOR ISSUANCE OF UNDERGROUND INJECTION CONTROL (UIC) DRAFT PERMIT

Permit Number: MI-035-2R-0034

Facility Name: Holcomb 1-22

Muskegon Development Company of Mount Pleasant, Michigan, has applied for a U. S. Environmental Protection Agency (EPA) permit to convert the Holcomb 1-22 well so it can be used for enhanced oil recovery in Clare County, Michigan.

Review of the permit application indicates that no significant environmental impact should result from the proposed injection. EPA, therefore, intends to issue a permit for this well. Under the authority of Title 40 of the Code of Federal Regulations (40 C.F.R.) Parts 144 and 146, EPA permits must specify conditions for construction, operation, monitoring, reporting, and plugging and abandonment of injection wells so as to prevent the movement of fluids into any Underground Source of Drinking Water (USDW). General provisions for EPA UIC permit requirements are found at 40 C.F.R. Parts 144 and 146, while regulations specific to Michigan injection operations are found at 40 C.F.R. Part 147 Subpart X. In accordance with 40 C.F.R. § 124.7, general information and highlighted permit conditions specific to this well are as follows:

Area of Review (AOR) and Corrective Action: In accordance with 40 C.F.R. §§ 144.55, 146.6 and 146.7, this is the area surrounding the well within which the applicant must research wells which penetrate the injection zone. If any of these wells are improperly sealed, completed or abandoned, and might provide a conduit for fluid migration, the applicant must develop a corrective action plan as shown in Attachment C of the permit to address the deficiency. The applicant has provided documentation on the well population within 1/4 mile of the injection well (i.e., the AOR). There are 2 producing, 0 injection, 0 temporarily abandoned, and 1 plugged and abandoned wells within the 1/4 mile radius AOR which penetrate the injection zone. Based on current information, there are no inadequately constructed wells within the AOR so there is no need for a corrective action.

Underground Sources of Drinking Water (USDWs): USDWs are defined by the UIC regulations as aquifers or portions thereof which contain less than 10,000 milligrams per liter of total dissolved solids and which are being or could be used as a source of drinking water. The base of the lowermost possible USDW in the vicinity of the injection well has been identified at approximately 464 feet below ground surface. This water-bearing formation is the Glacial Drift.

Injection and Confining Zone: Injection for enhanced oil recovery is limited by the permit to the Richfield Formation of the Detroit River Group in the interval between 4948 and 5010 feet below ground surface. This injection zone is separated from the lowermost USDW by approximately 4484 feet of rock strata. The confining zone is composed of the rocks of the Detroit River Anhydrite, Detroit River Salts, and Massive Anhydrite between 4013 and 4948 feet below ground surface, that serve to confine or impede potential upward flow between the top of the confining zone and the bottom of the lowermost USDW.

Construction Requirements: The proposed conversion of the well meets the regulatory criteria of 40 C.F.R. § 146.22. This requires that all converted wells which inject fluids which are brought to the surface in connection with oil or natural gas production, or for enhanced recovery of oil or natural gas, be sited so that they inject into a formation which is separated from any USDW by a confining zone free of known open faults or fractures within the AOR. All such wells must also be cased and cemented to prevent the movement of fluids into or between USDWs. The permittee shall not commence conversion of any well until a final permit has been issued. In addition, the permittee shall not commence injection until the requirements of Part I. (E) 10 of the final permit have been met.

Injection Fluid: The injected fluid is limited by the permit to fresh water for enhanced oil recovery. The expected maximum daily volume of fluid to be injected is 350 barrels.

Maximum Injection Pressure: The maximum injection pressure shall be limited to 3238 pounds per square inch gauge (psig). EPA calculated this limit using the formula on page A-1 of the draft permit. This limitation will ensure that the pressure during injection does not initiate fractures in the injection zone.

Monitoring and Reporting Requirements: In accordance with 40 C.F.R. §§ 144.54 and 146.23, the applicant will be responsible for observing and recording injection pressure, flow rate, annulus pressure, and cumulative volume on a weekly basis and reporting this to EPA on a monthly basis. The applicant will also be responsible for observing, recording and reporting annulus liquid loss on a quarterly basis. An analysis of the injected fluid must be submitted on an annual basis. In addition, the applicant is required to conduct and pass a two-part Mechanical Integrity Test (MIT), in accordance with 40 C.F.R. § 146.8, before authorization to inject is granted, and after the well is completed. The applicant is also required to repeat the annulus pressure test, which is the first part of the MIT, at least once every five (5) years thereafter. If a temperature or noise log or another method as approved by the Director is used to determine the second part of the MIT (i.e., the absence of fluid movement), then the applicant will be required to repeat this test at least once every five (5) years thereafter. These tests will provide EPA with an evaluation of the integrity of the tubular goods (casing, tubing and packer) as well as documentation as to the absence or presence of fluid movement behind the casing.

Plugging and Abandonment: In accordance with 40 C.F.R. §§ 146.10 and 146.24(d), the permit includes a plugging and abandonment plan for an environmentally protective well closure at the time of cessation of operations. Muskegon Development Company has demonstrated adequate financial responsibilities to close, plug, and abandon this underground injection

operation. Muskegon Development Company has provided Financial Statement Coverage as financial assurance for the company's injection wells in Michigan. This coverage must be updated on an annual basis.

Issuance and Effective Date of Permit: In accordance with 40 C.F.R. § 124.15, the permit will become effective immediately upon issuance if no public comments are received that request a change in the draft permit. However, in the event that public comments are received that request changes to the draft permit, and EPA issues a final permit, then the final permit will become effective 45 days after the date of issuance unless the permit is appealed. In accordance with 40 C.F.R. § 144.36(a), the permit will be in effect for the life of the facility, unless it is otherwise modified, revoked and reissued, or terminated as provided at 40 C.F.R. §§ 144.39, 144.40, and 144.41. The permit will expire in one (1) year if the permittee fails to commence construction, unless a written request for an extension of this one (1) year period has been approved by the Director. The permit will be reviewed by EPA at least once every five (5) years from its effective date for consistency with new or revised Federal regulations.

Questions and requests for additional information may be submitted to William Tong at (312) 886-9380 or tong.william@epa.gov via the internet. The date for closure of the comment period includes the required 30 days for public comment and an additional three days for the delay caused by mailing. The public comment period will close as described in the Public Notice. Requests for a hearing must be submitted in writing. If EPA determines that there is significant public interest in the draft permit, a public notice of a scheduled hearing will be published locally and mailed to interested parties.

To preserve your right to appeal any final permit decision that may be made in this matter under 40 C.F.R. Part 124, you must either send in written comments or participate in a public hearing on the draft permit decision. (A hearing is not planned at this time.) The first appeal must be made to the Environmental Appeals Board; only after all agency review procedures have been exhausted may you file an action in the appropriate Circuit Court of Appeals for review.

U.S. Environmental Protection Agency
Region 5 (WU-16J)
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

2/1/17

Christopher Korleski **Date**
Director, Water Division

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
UNDERGROUND INJECTION CONTROL PERMIT: CLASS II

Permit Number: MI-035-2R-0034

Facility Name: Holcomb 1-22

Pursuant to the provisions of the Safe Drinking Water Act, as amended 42 U.S.C. §§ 300f et seq., (commonly known as the SDWA) and implementing regulations promulgated by the U.S. Environmental Protection Agency at Parts 124, 144, 146, and 147 of Title 40 of the Code of Federal Regulations (40 C.F.R.),

Muskegon Development Company of Mount Pleasant, Michigan

is hereby authorized to convert and operate an injection well located in Michigan, Clare County, T19N, R3W, Section 22, NW 1/4 Section, for injection into the Richfield Formation of the Detroit River Group at depths between 4948 and 5010 feet, upon the express condition that the permittee meet the restrictions set forth herein. Injection shall not commence until the operator has received authorization in accordance with Part I(E)(10) of this permit.

The injection shall be limited to fresh water for enhanced oil recovery from production wells owned or operated by Muskegon Development Company.

All references to Title 40 of the Code of Federal Regulations are to all regulations that are in effect on the date that this permit is effective. All terms used in this permit shall have the meaning set forth in the SDWA and implementing regulations at 40 C.F.R. Parts 124, 144, 146, and 147.

This permit shall become effective on _____ and shall remain in full force and effect during the operating life of the well, unless this permit is otherwise revoked and reissued, terminated or modified pursuant to 40 C.F.R. §§ 144.39, 144.40, and 144.41. This permit shall also remain in effect upon delegation of primary enforcement responsibility to the State of Michigan, unless that State chooses to adopt this permit as a State permit. The permit will expire in one (1) year if the permittee fails to commence construction, unless a written request for an extension of this one (1) year period has been approved by the Director. The permittee may request an expiration date sooner than the one (1) year period, provided no construction on the well has commenced. This permit will be reviewed at least every five (5) years from the effective date specified above.

Signed and dated: _____

DRAFT

Christopher Korleski
Director, Water Division

TABLE OF CONTENTS

PART I ..... - 2 -

A. EFFECT OF PERMIT ..... - 2 -
B. PERMIT ACTIONS ..... - 2 -
C. SEVERABILITY ..... - 2 -
D. CONFIDENTIALITY ..... - 2 -
E. DUTIES AND REQUIREMENTS ..... - 3 -
1. *Duty to Comply* ..... - 3 -
2. *Penalties for Violations of Permit Conditions* ..... - 3 -
3. *Need to Halt or Reduce Activity not a Defense* ..... - 3 -
4. *Duty to Mitigate* ..... - 3 -
5. *Proper Operation and Maintenance* ..... - 3 -
6. *Duty to Provide Information* ..... - 4 -
7. *Inspection and Entry* ..... - 4 -
8. *Records* ..... - 4 -
9. *Notification Requirements* ..... - 5 -
10. *Commencing Injection* ..... - 7 -
11. *Signatory Requirements* ..... - 7 -
12. *Notice of Plugging and Abandonment* ..... - 7 -
13. *Plugging and Abandonment* ..... - 7 -
14. *Financial Responsibility* ..... - 8 -
15. *Insolvency* ..... - 8 -
16. *Corrective Action* ..... - 8 -
17. *Mechanical Integrity* ..... - 9 -
18. *Restriction on Injected Substances* ..... - 10 -

PART II ..... - 11 -

A. CONSTRUCTION REQUIREMENTS ..... - 11 -
1. *Siting* ..... - 11 -
2. *Casing and Cementing* ..... - 11 -
3. *Tubing and Packer Specifications* ..... - 11 -
4. *Wellhead Specifications* ..... - 11 -
5. *Logs and Tests* ..... - 11 -
6. *Formation Data* ..... - 12 -
7. *Prohibition of Unauthorized Injection* ..... - 12 -
B. OPERATING, MONITORING AND REPORTING REQUIREMENTS ..... - 12 -
1. *Operating Requirements* ..... - 12 -
2. *Monitoring Requirements* ..... - 13 -
3. *Reporting Requirements* ..... - 13 -

PART III ..... - 15 -

OPERATING, MONITORING AND REPORTING REQUIREMENTS 16
PLUGGING AND ABANDONMENT PLAN 17
CORRECTIVE ACTION PLAN 18

PART I

GENERAL PERMIT COMPLIANCE

A. EFFECT OF PERMIT

The permittee is allowed to engage in underground injection in accordance with the conditions of this permit. The underground injection activity, otherwise authorized by this permit or rule, shall not allow the movement of fluid containing any contaminant into underground sources of drinking water, if the presence of that contaminant may cause a violation of any Primary Drinking Water Regulation pursuant to 40 C.F.R. Part 142 or may otherwise adversely affect the health of persons. Any underground injection activity not specifically authorized in this permit or otherwise authorized by permit or rule is prohibited. Issuance of this permit does not convey property rights of any sort or any exclusive privilege; nor does it authorize any injury to persons or property, any invasion of other private rights, or any infringement of State or local law or regulations. Compliance with the terms of this permit does not constitute a defense to any action brought under Section 1431 of the Safe Drinking Water Act (SDWA), or any other law governing protection of public health or the environment.

B. PERMIT ACTIONS

This permit may be modified, revoked and reissued, or terminated for cause as specified in 40 C.F.R. §§ 144.39, 144.40, and 144.41. The filing of a request for a permit modification, revocation and reissuance, termination, or the notification of planned changes or anticipated noncompliance on the part of the permittee does not stay the applicability or enforceability of any permit condition.

C. SEVERABILITY

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit shall not be affected thereby.

D. CONFIDENTIALITY

In accordance with 40 C.F.R. Part 2 and § 144.5, any information submitted to EPA pursuant to this permit may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, EPA may make the information available to the public without further notice. If a claim is asserted, the validity of the claim will be assessed in accordance with the procedures in 40 CFR Part 2 (Public Information). Claims of confidentiality for the following information will be denied:

(1) The name and address of the permittee; and,

(2) Information which deals with the existence, absence or level of contaminants in drinking water.

E. DUTIES AND REQUIREMENTS

1. Duty to Comply

The permittee shall comply with all conditions of this permit, except to the extent and for the duration such non-compliance is authorized by an emergency permit pursuant to 40 C.F.R. § 144.34. Any permit noncompliance constitutes a violation of the SDWA and is grounds for enforcement action, permit termination, revocation and reissuance or modification.

2. Penalties for Violations of Permit Conditions

Any person who operates this well in violation of permit conditions is subject to civil penalties, fines, and other enforcement action under the SDWA and may be subject to such actions under the Resource Conservation and Recovery Act. Any person who willfully violates a permit condition is subject to criminal prosecution.

3. Need to Halt or Reduce Activity not a Defense

It shall not be a defense for a permittee in an enforcement action to state that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

4. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit.

5. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

6. **Duty to Provide Information**

The permittee shall furnish to the Director, by the date specified by the Director, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Director, upon request, copies of records required by this permit to be retained.

7. **Inspection and Entry**

The permittee shall allow the Director, or an authorized representative, upon the presentation of credentials and other documents as may be required by law to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be retained under the conditions of this permit;

c. Inspect, at reasonable times, any facilities, equipment (including monitoring equipment), practices, or operations, regulated or required under this permit; and

d. Sample or monitor the injected fluids, at reasonable times, for the purposes of assuring permit compliance, or as otherwise authorized by the SDWA, at any location.

8. **Records**

a. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and copies of all records required by this permit, for a period of at least three (3) years from the date of the sample, measurement or report. The permittee shall also maintain records of all data required to complete this permit application and any supplemental information submitted under 40 C.F.R. §§ 144.31 and 144.51. These periods may be extended by request of the Director at any time by written notice to the permittee.

b. The permittee shall retain records concerning the nature and composition of all injected fluids until three (3) years after the completion of plugging and abandonment in accordance with the plugging and abandonment plan, contained in Part III(B) of this permit. The owner or operator shall continue to retain the records after the three (3) year retention period unless he delivers the records to the Regional Administrator or obtains

written approval from the Regional Administrator to discard the records.

c. Records of monitoring information shall include:

(i) The date, exact place, and the time of sampling or measurements;

(ii) The individual(s) who performed the sampling or measurements;

(iii) A precise description of both sampling methodology and the handling of samples;

(iv) The date(s) analyses were performed;

(v) The individual(s) who performed the analyses;

(vi) The analytical techniques or methods used; and,

(vii) The results of such analyses.

9. **Notification Requirements**

a. **Planned Changes** - The permittee shall notify and obtain the Director's approval at least thirty (30) days prior to any planned physical alterations or additions to the permitted facility, or changes in the injection fluids. Within ten (10) days prior to injection, an analysis of new injection fluids shall be submitted to the Director for approval in accordance with Parts II(B)(2) and II(B)(3) of this permit.

b. **Anticipated Noncompliance** - The permittee shall give at least thirty (30) days advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

c. **Transfer of Permits** - This permit is not transferable to any person except after notice is sent to the Director at least thirty (30) days prior to transfer and the requirements of 40 C.F.R. § 144.38 have been met. The Director may require modification or revocation and reissuance of the permit to change the name of the permittee and incorporate such other requirements as may be necessary under the SDWA.

d. **Compliance Schedules** - Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted to the Director no later than thirty (30) days following each schedule date.

e. **Twenty-Four Hour Reporting**

(i) The permittee shall report to the Director any noncompliance which may endanger health or the environment. This information shall be provided orally within twenty-four (24) hours from the time the permittee becomes aware of the circumstances, and shall include the following information:

(a) Any monitoring or other information which indicates that any contaminant may cause an endangerment to an underground source of drinking water; or,

(b) Any noncompliance with a permit condition or malfunction of the injection system which may cause fluid migration into or between underground sources of drinking water.

(ii) A written submission shall also be provided as soon as possible but no later than five (5) days from the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

f. **Other Noncompliance** - All other instances of noncompliance shall be reported at the time when monthly reports are submitted under Part II(B)(3)(a) of this permit. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent recurrence of the noncompliance.

g. **Other Information** - If or when the permittee becomes aware that the permittee failed to submit any relevant facts in the permit application, or submitted incorrect information in a permit application or in any report to the Director, the permittee shall promptly submit such facts or corrected information in accordance with 40 C.F.R. § 144.51(l)(8).

h. **Report on Permit Review** - Within thirty (30) days of receipt of the final issued permit, the permittee shall report to the Director that the permittee has read and is personally familiar with all terms and conditions of this permit.

10. **Commencing Injection**

The permittee shall not commence injection into any newly drilled or converted well until:

a. Formation data and injection fluid analysis have been submitted in accordance with Parts II(A)(6) and II(B)(2), respectively;

b. A report on any logs and tests required under Parts II(A)(5) and III(D) of this permit has been submitted;

c. Mechanical integrity of the well has been demonstrated in accordance with Part I(E)(17);

d. Any required corrective action has been performed in accordance with Parts I(E)(16) and III(C); and,

e. Construction is complete and the permittee has submitted to the Permit Writer, by certified mail with return receipt requested, a notice of completion of construction using EPA Form 7520-10 and either:

(i) The Director has inspected or otherwise reviewed the new injection well and finds it is in compliance with the conditions of the permit; or,

(ii) The permittee has not received, within thirteen (13) days of the date of the Director's receipt of the report required above, notice from the Director of his or her intent to inspect or otherwise review the new injection well, in which case prior inspection or review is waived and the permittee may commence injection.

11. **Signatory Requirements**

All reports required by this permit and other information requested by the Director shall be signed and certified according to 40 CFR § 144.32.

12. **Notice of Plugging and Abandonment**

The permittee shall notify the Director at least forty-five (45) days before conversion or abandonment of the well.

13. **Plugging and Abandonment**

The permittee shall plug and abandon the well as provided in the plugging and abandonment plan contained in Part III(B) of this permit. Plugging shall occur as soon as practicable after operation ceases but not later than two (2) years

thereafter. During the period of non-operation, the well must be tested to ensure that it maintains mechanical integrity, unless the permittee fulfills the other requirements under 40 C.F.R. § 144.52(a)(6), prior to expiration of the two (2) year period. The permittee shall notify the Director of plugging and abandonment in accordance with the reporting procedures in Part I(E)(12) of this permit.

14. **Financial Responsibility**

The permittee shall maintain financial responsibility and resources to plug and abandon the underground injection well in accordance with 40 C.F.R. § 144.52(a)(7) as provided in Attachment R of the permit application corresponding to this permit action which is hereby incorporated by reference as if it appeared fully set forth herein. The permittee shall not substitute an alternative demonstration of financial responsibility from that which the Director has approved, unless the permittee has previously submitted evidence of that alternative demonstration to the Director and the Director has notified the permittee in writing that the alternative demonstration of financial responsibility is acceptable. The financial responsibility mechanism shall be updated periodically, upon request of the Director, except when Financial Statement Coverage is used as the financial mechanism, this coverage must be updated on an annual basis.

15. **Insolvency**

a. In the event of the bankruptcy of the trustee or issuing institution of the financial mechanism, or a suspension or revocation of the authority of the trustee institution to act as trustee or the institution issuing the financial mechanism to issue such an instrument, the permittee must submit an alternative demonstration of financial responsibility acceptable to the Director within sixty (60) days after such event. Failure to do so will result in the termination of this permit pursuant to 40 C.F.R. § 144.40(a)(1).

b. An owner or operator must also notify the Director by certified mail of the commencement of voluntary or involuntary proceedings under Title 11 (Bankruptcy), U.S. Code, naming the owner or operator as debtor, within ten (10) business days after the commencement of the proceeding. A guarantor of a corporate guarantee must make such a notification if he/she is named as debtor, as required under the terms of the guarantee.

16. **Corrective Action**

The permittee shall shut in the injection well whenever he/she or EPA determines that operation thereof may be causing upward fluid migration through the well bore of any improperly plugged or unplugged well in the area of review and shall take such steps as he/she can to properly plug the offending well(s). Any

operation of the well which may cause upward fluid migration from an improperly plugged or unplugged well will be considered a violation of this permit. If the permittee or the EPA determines that the permitted well is not in compliance with 40 C.F.R. § 146.8, the permittee will immediately shut in the well until such time as appropriate repairs can be effected and written approval to resume injection is given by the Director. In addition, the permittee shall not commence injection until any and all corrective action has been taken in accordance with any plan contained in Part III(C) of this permit and the requirements in Part I(E)(10) of this permit have been met.

17. **Mechanical Integrity**

a. The permittee must establish (prior to receiving authorization to inject), and shall maintain mechanical integrity of this well, in accordance with 40 CFR § 146.8.

b. A demonstration of mechanical integrity, in accordance with 40 C.F.R. § 146.8, shall be performed at least every five (5) years from the date of the last approved demonstration. The permittee shall notify the Director of his/her intent to demonstrate mechanical integrity at least thirty (30) days prior to such demonstration.

c. The permittee shall demonstrate the mechanical integrity of the well by pressure testing whenever:

(i) the tubing is removed from the well or replaced;

(ii) the packer is reset; or,

(iii) a loss of mechanical integrity occurs. Operation shall cease whenever one of the aforementioned conditions occurs and not resume until the Director gives approval to recommence injection.

d. The Director may, by written notice, require the permittee to demonstrate mechanical integrity at any time.

e. The permittee shall cause all gauges used in mechanical integrity demonstrations to be calibrated prior to the demonstration.

f. The permittee shall cease injection if a loss of mechanical integrity occurs or is discovered during a test, or a loss of mechanical integrity as defined by 40 C.F.R. § 146.8 becomes evident during operation. Operations shall not be resumed until the Director gives approval to recommence injection.

g. The permittee shall notify the Director of the loss of mechanical integrity, in accordance with the reporting procedures in Parts II(B)(3)(d) and

I(E)(9)(e) of this permit.

h. The permittee shall report the result of a satisfactory mechanical integrity demonstration as provided in Part II(B)(3)(d) of this permit, except the first such result after Permit issuance, which shall be sent to the Permit Writer.

18. **Restriction on Injected Substances**

The permittee shall be restricted to the injection of fluids brought to the surface in connection with oil or natural gas production or those fluids used in the enhancement of oil and gas production as specified in 40 C.F.R. § 146.5(b). Further, no fluids other than those from sources noted in the administrative record for this permit and approved by the Director shall be injected.

PART II

WELL SPECIFIC CONDITIONS FOR UNDERGROUND INJECTION CONTROL PERMITS

A. CONSTRUCTION REQUIREMENTS

1. **Siting**

Notwithstanding any other provision of this permit, the injection well shall inject only into a formation which is separated from any USDW by a confining zone that is free of known open faults or fractures within the area of the review.

2. **Casing and Cementing**

Injection wells shall be cased and cemented to prevent the movement of fluids into or between underground sources of drinking water. The casing and cement to be used in the construction of the well shall be as contained in Attachments L and M of the permit application corresponding to this permit action which is hereby incorporated by reference as if they appeared fully set forth herein.

3. **Tubing and Packer Specifications**

Injection shall only take place through tubing with a packer set in the long string casing within or below the nearest cemented and impermeable confining system immediately above the injection zone. Tubing and packer specifications shall be as represented in engineering drawings contained in Attachments L and M of the permit application corresponding to this permit action which are hereby incorporated by reference as if they appeared fully set forth herein. Any proposed changes shall be submitted by the permittee in accordance with Part I(E)(9)(a) and (b) of this permit.

4. **Wellhead Specifications**

For every injection well, the operator shall provide a female fitting, with a cutoff valve, to the tubing at the wellhead, so that the amount of injection pressure being used may be measured by a representative of EPA by attaching a gauge having a male fitting.

5. **Logs and Tests**

Upon approval of the surface casing and cementation records by the Director, any logs and tests noted in Part III of this permit shall be performed, unless already provided. Prior to commencement of injection, the permittee shall submit a descriptive report prepared by a knowledgeable log analyst interpreting the results of those logs and tests to the Director for approval along with the notice of

completion required in Part I(E)(10) of this permit.

6. **Formation Data**

If not already provided, the permittee shall determine or calculate the following information concerning the injection formation and submit it to the Director for review and approval, prior to operation:

a. Formation fluid pressure;

b. Fracture pressure; and,

c. Physical and chemical characteristics of the formation.

7. **Prohibition of Unauthorized Injection**

Any underground injection, except as authorized by permit or rule issued under the UIC program, is prohibited. The construction, including drilling, of any well required to have a permit is prohibited until the permit has been issued.

B. OPERATING, MONITORING AND REPORTING REQUIREMENTS

1. **Operating Requirements**

a. Beginning on the effective date of this permit, the permittee is authorized to operate the injection well, subject to the limitations and monitoring requirements set forth herein. The injection pressure and injected fluid shall be limited and monitored as specified in Parts I(E)(18) and III(A) of this permit.

b. Injection at a pressure which initiates fractures in the confining zone or causes the movement of injection or formation fluids into or between underground sources of drinking water is prohibited.

c. Injection between the outermost casing protecting underground sources of drinking water and the well bore is prohibited.

d. The annulus between the tubing and the long string casing shall be filled with a liquid designed to inhibit corrosion. The annulus liquid will be monitored in accordance with Parts II(B)(2)(d) and II(B)(3)(b) of this permit. Any specific annulus requirements are contained in Part III(A) of this permit.

2. **Monitoring Requirements**

a. Samples and measurements, taken for the purpose of monitoring as required in Part II(B)(3), shall be representative of the monitored activity. Grab samples shall be used to obtain a representative sample of the fluid to be analyzed. Part III(A) of this permit describes the sampling location and required parameters for injection fluid analysis. The permittee shall identify the types of tests and methods used to generate the monitoring data. The monitoring program shall conform to the one described in Part III(A) of this permit.

b. **Analytical Methods** - Monitoring of the nature of injected fluids shall comply with applicable analytical methods cited and described in Table I of 40 C.F.R. § 136.3 or in Appendix III of 40 CFR Part 261 or by other methods that have been approved by the Director.

c. **Injection Fluid Analysis** - The nature of the injection fluids shall be monitored as specified in Part III(A) of this permit. An initial analysis of the injection fluid is contained in Attachment H of the permit application corresponding to this permit action which is hereby incorporated by reference as if it appeared fully set forth herein. The Director may, by written notice require the permittee to sample and analyze the injected fluid at any time.

d. **Injection Pressure, Annulus Pressure, Annulus Liquid Loss, Flow Rate and Cumulative Volume** - Injection pressure, annulus pressure, flow rate and cumulative volume shall be recorded at least weekly and shall be reported monthly as specified in Part III(A) of this permit. Annulus liquid loss shall be recorded at least quarterly and shall be reported in accordance with the provisions of Part II(B)(3)(b), as the volume of liquid added to the annulus to keep it filled in accordance with Part II(B)(1)(d). All gauges used in monitoring shall be calibrated in accordance with Part I(E)(17)(e) of this permit.

3. **Reporting Requirements**

Copies of the monitoring results and all other reports shall be submitted to the Director at the following address:

U.S. Environmental Protection Agency
Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604-3590
Attn: UIC Branch, (WU-16J)

a. **Monthly Reports** - Monitoring results obtained during each week shall be recorded on a form which has been signed and certified according to 40 C.F.R. § 144.32. The first report shall be postmarked no later than the 10th day of the month after authorization to inject has been granted. Thereafter, forms shall be submitted at the end of each month and shall be postmarked no later than the 10th day of the month following the reporting period. This report shall include the weekly measurements of injection pressure, annulus pressure, flow rate and cumulative volume as required in Parts II(B)(2)(d) and III(A) of this permit.

b. **Quarterly Reports** - Monitoring results obtained each quarter shall include the measurement of annulus liquid loss as required in Parts II(B)(2)(d) and III(A) of this permit. Reports shall be submitted at the end of each quarter and shall be postmarked no later than the 10th day of the first month of the following quarter.

c. **Annual Reports** - Monitoring results obtained each year shall include the measurements of injected fluid characteristics as required in Part III(A) of this permit. Reports shall be submitted at the end of each anniversary year and shall be postmarked no later than the 10th day of the first month of the following year.

d. **Reports on Well Tests, Workovers, and Plugging and Abandonment** - The applicant shall provide the Director with the following reports and test results within sixty (60) days of completion of the activity:

(i) Mechanical integrity tests, except tests which the well fails in which case twenty-four (24) hour reporting under Part I(9)(e) is applicable;

(ii) Logging or other test data;

(iii) Well workovers (using EPA Form 7520-12); and

(iv) Plugging and abandonment.

PART III

SPECIAL CONDITIONS

These special conditions include, but are not limited to plans for maintaining correct operating procedures, monitoring conditions and reporting, as required by 40 C.F.R. Parts 144 and 146. These plans are described in detail in the permittee's application for a permit, and the permittee is required to adhere to these plans as approved by the Director, as follows:

A. OPERATING, MONITORING AND REPORTING REQUIREMENTS (ATTACHED)

B. PLUGGING AND ABANDONMENT PLAN (ATTACHED)

C. CORRECTIVE ACTION PLAN (ATTACHED)

OPERATING, MONITORING AND REPORTING REQUIREMENTS

Characteristic	Limitation	Minimum Monitoring Requirements		Minimum Reporting Requirements
		Frequency	Type	Frequency
*Injection Pressure	3238 psig (maximum)	weekly		monthly
Annulus Pressure		weekly		monthly
Flow Rate		weekly		monthly
Cumulative Volume		weekly		monthly
Annulus Liquid Loss		quarterly		quarterly
**Chemical Composition of Injection Fluid		annually	grab	annually

SAMPLING LOCATION: The sample location is at the well head

*The limitation on wellhead pressure serves to prevent confining-formation fracturing. This limitation was calculated using the following formula: [{1.112 *psi/ft* - (0.433 *psi/ft*)(specific gravity)} x depth] - 14.7 *psi*. The maximum injection pressure is dependent upon depth and specific gravity of the injected fluid. The Richfield Formation of the Detroit River Group at 4948 feet was used as the depth and a specific gravity of 1.05 was used for the injected fluid. The fracture gradient of 1.112 psi/ft was determined from an acid-fracture job from a nearby well.

**Chemical composition analysis shall include, but not be limited to, the following: Sodium, Calcium, Magnesium, Barium, Total Iron, Chloride, Sulfate, Carbonate, Bicarbonate, Sulfide, Total Dissolved Solids, pH, Resistivity (ohm-meters @ 75°F), and Specific Gravity.

OMB No. 2040-0042 Approval Expires 12/31/2018

EPA

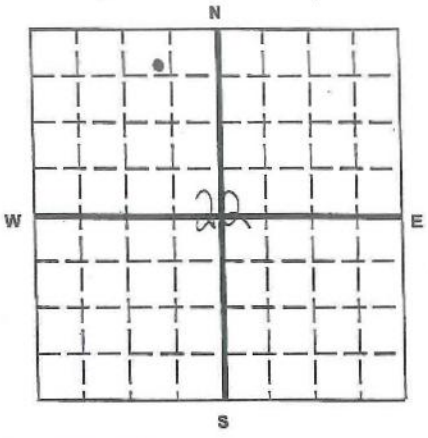
United States Environmental Protection Agency
Washington, DC 20460

PLUGGING AND ABANDONMENT PLAN

Name and Address of Facility
Holcomb 1-22
Smith Creek Field

Name and Address of Owner/Operator
Muskegon Development Comapany
1425 South Mission Road, Mt. Pleasant, MI, 48858

Locate Well and Outline Unit on Section Plat - 640 Acres



State	County	Permit Number
Michigan	Clare	59345

Surface Location Description
1/4 of NW 1/4 of NE 1/4 of NW 1/4 of Section 22 Township 19N Range 3W

Locate well in two directions from nearest lines of quarter section and drilling unit

Surface Location 490 ft. frm (N/S) N Line of quarter section
and 1826 ft. from (E/W) W Line of quarter section.

TYPE OF AUTHORIZATION
- [x] Individual Permit
- [ ] Area Permit
- [ ] Rule

Number of Wells 1

WELL ACTIVITY
- [ ] CLASS I
- [x] CLASS II
  - [ ] Brine Disposal
  - [x] Enhanced Recovery
  - [ ] Hydrocarbon Storage
- [ ] CLASS III

Lease Name Holcomb
Well Number 1-22

CASING AND TUBING RECORD AFTER PLUGGING

SIZE	WT (LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE
9 5/8"	36		792'	12 1/4"
7"	23		1432'	8 3/4"
4.5"	11.6"		2037'	6 1/8"

METHOD OF EMPLACEMENT OF CEMENT PLUGS
- [x] The Balance Method
- [x] The Dump Bailer Method
- [ ] The Two-Plug Method
- [ ] Other

CEMENTING TO PLUG AND ABANDON DATA:	PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
Size of Hole or Pipe in which Plug Will Be Placed (inche	4.5"	4.5", 7"	7", 8 3/4"	9 5/8"			
Depth to Bottom of Tubing or Drill Pipe (ft	4898'	3214'	2700'	892'			
Sacks of Cement To Be Used (each plug)	5	35	65	335			
Slurry Volume To Be Pumped (cu. ft.)	5.90	41.30	76.70	395.30			
Calculated Top of Plug (ft.)	4848'	3014'	2500'	Surface			
Measured Top of Plug (if tagged ft.)	C.I.B.P.						
Slurry Wt. (Lb./Gal.)	15.6	15.6	15.6	15.6			
Type Cement or Other Material (Class III)	Class A	Class A	Class A	Class A			

LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)

From	To	From	To
4948'	4954'	3164'	Assumed Free Point for 4.5"
4966'	4976'	2650'	Calculated Free Point for 7"
4990'	5000'		
5004'	5010'		

Estimated Cost to Plug Wells
$27,800

Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all 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. (Ref. 40 CFR 144.32)

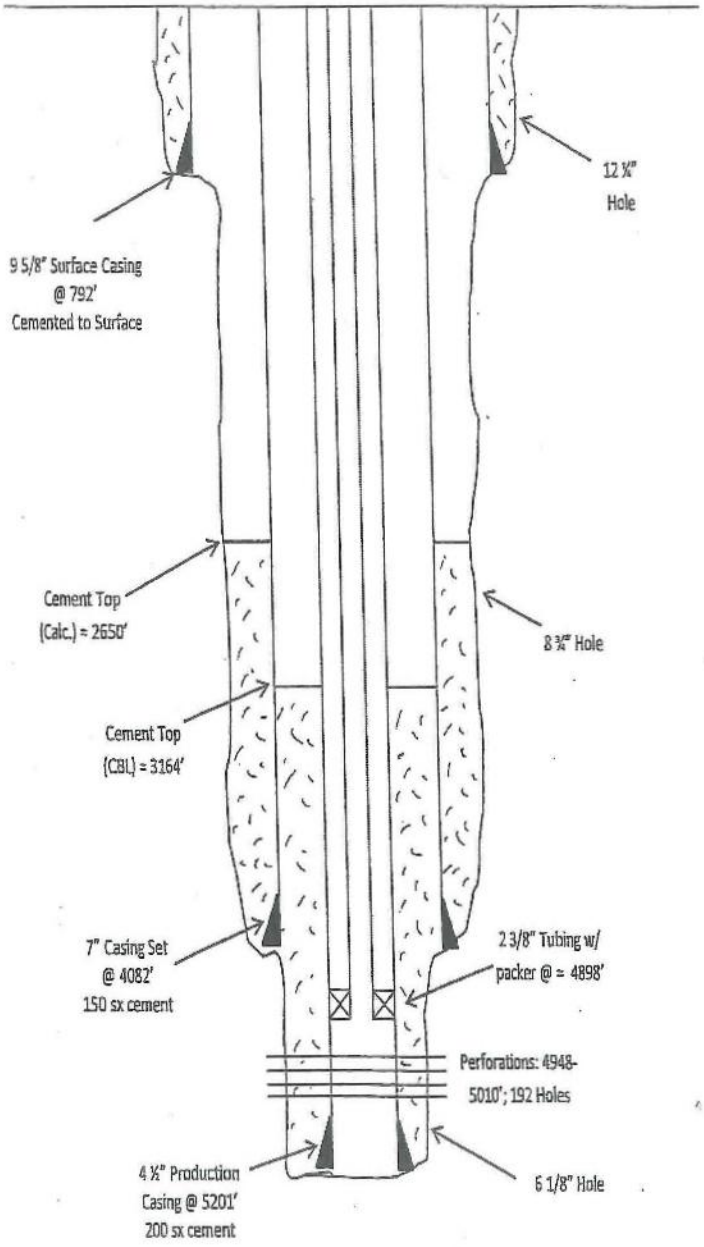
Name and Official Title *(Please type or print)*	Signature	Date Signed
William C. Myler, Jr., President	William C. Myler	8/8/16

EPA Form 7520-14 (Rev. 12-11)

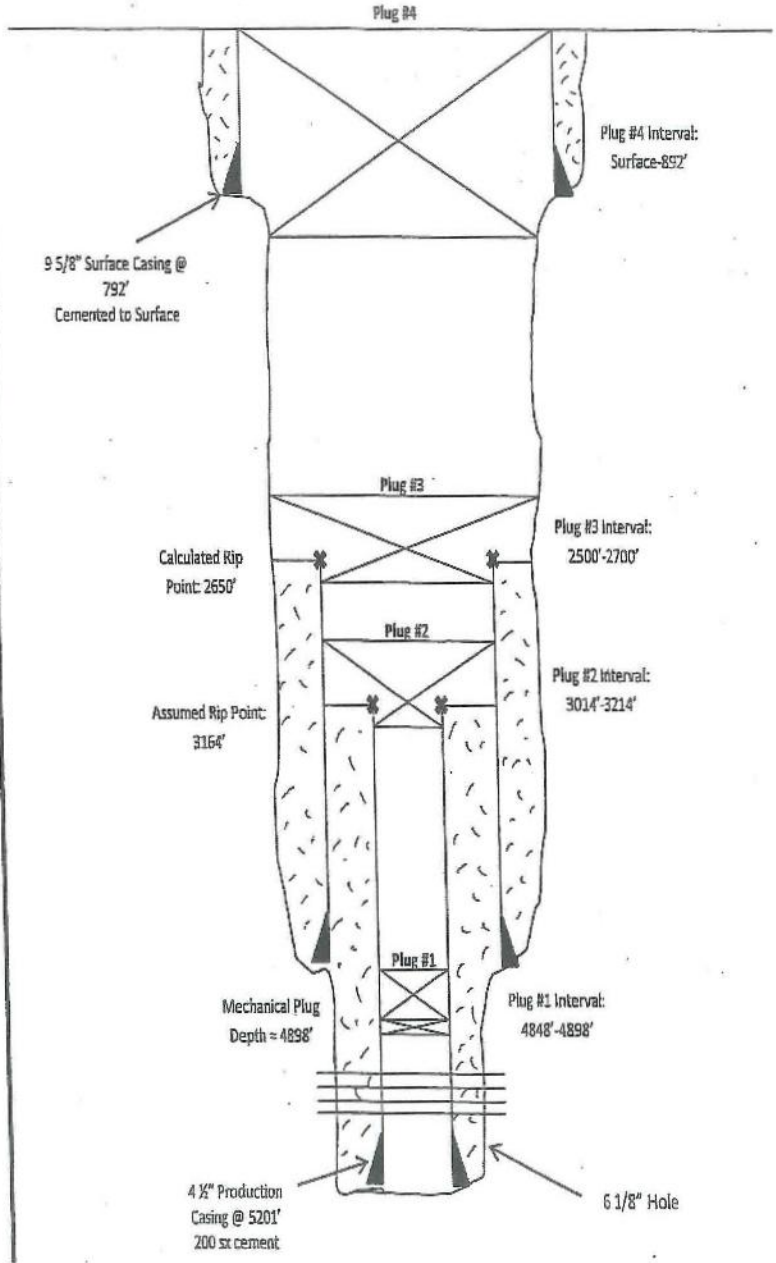
WELL CONSTRUCTION

Holcomb 1-22

Permit # 59345



PLUGGING & ABANDONMENT PLAN



CORRECTIVE ACTION PLAN

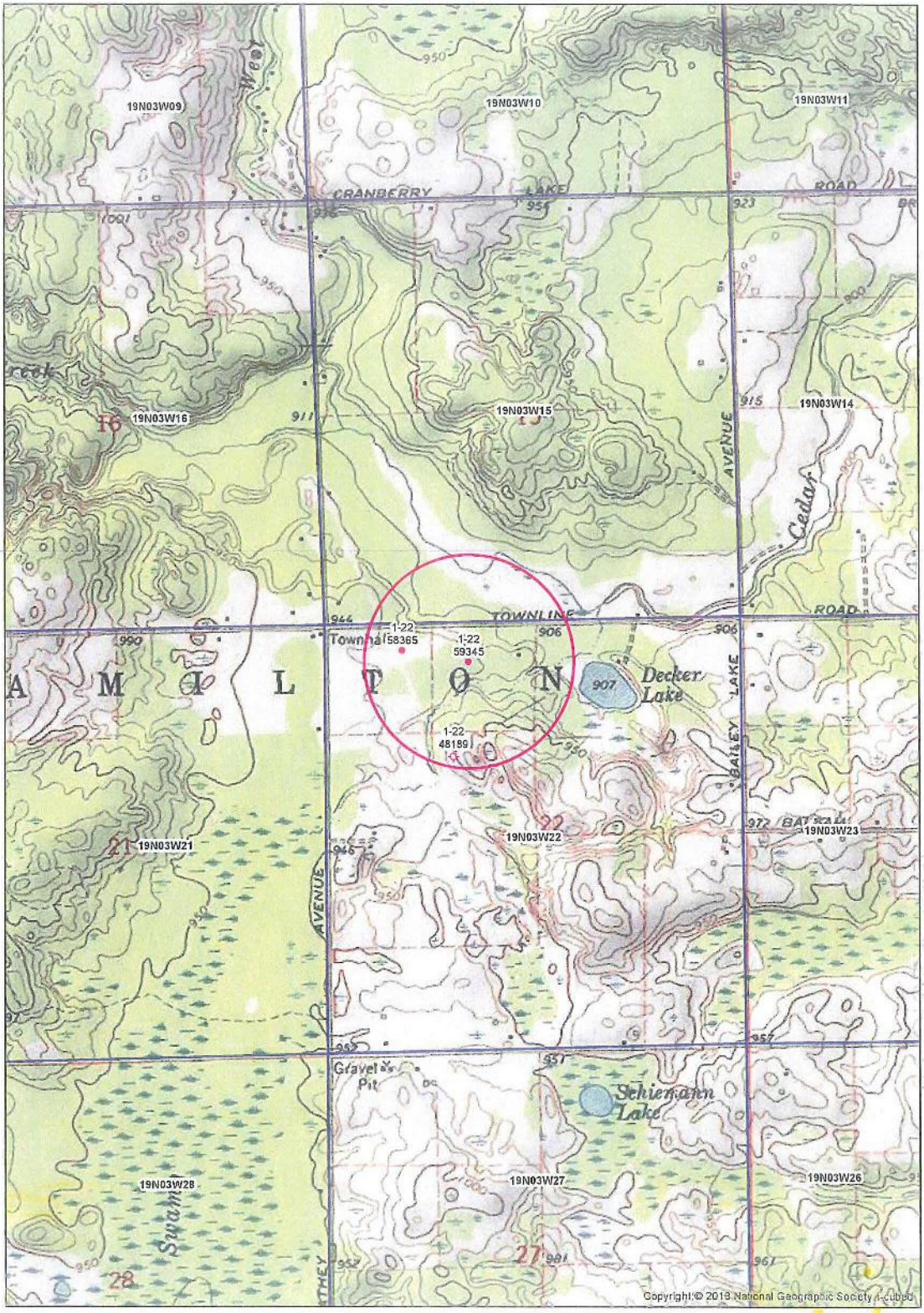
No corrective action is required at this time.

List of Landowners Within 1320' of Holcomb 1-22

Hamilton Township, Clare County, T19N-R03W

Section	Short Legal Description	Owner Name	Owner's Street Address	City, State Zip
15	W/2 SE SW	Oblinsky, Frank & Nancy	9321 East Townlake Road	Harrison, Michigan 48625
15	W/2 E/2 SE SW	Burtka Trust, Richard A. & Eveline E.	3360 12th Street	Wyandotte, Michigan 48192
15	E/2 E/2 SE SW	Molinari, James & Lydia Magda	9463 East Townline Lake Road	Harrison, Michigan 48625
15	SW SW except 300-05 & 300-06	Roe, Herman L. II & Marilyn K.	5600 Cribbins Road	North Street, Michigan 48049
15	W/2 SW SE & W/2 W/2 E/2 SW SE	Scott, Paul & Shawn	10447 Lewis Road	Clio, Michigan 48420
22	N/2 NW NW	Fanslau Trust, Robert A. & Pearl	9062 East Townline Lake Road	Harrison, Michigan 48625
22	S/2 NW NW	Fanslau, Frederick & Katherine	200 North Occidental Road, Apt 23	Tecumseh, Michigan 49286
22	W/2 NE NW	Weaver, Vernon & Miranda	9326 East Townline Lake Road	Harrison, Michigan 48625
22	E/2 NE NW	Driver, Ronald E.	9478 East Townline Lake Road	Harrison, Michigan 48625
22	W/2 NW NE	Primemark Properties LLC	437 North Larch	Lansing, Michigan 48912
22	N 330' of SW NW	Miller, Alvin B.	10860 Strasburg	Erie, Michigan 48133
22	S 990' of SW NW	Cover, Willis & Pamela E.	9161 Balsam Road	Harrison, Michigan 48625
22	E/2 S/2 NW	Troyer, Levi & Naomi	2593 North Bailey Lake Avenue	Harrison, Michigan 48625
22	S/2 NE	Troyer, Levi & Naomi	2593 North Bailey Lake Avenue	Harrison, Michigan 48625

Holcomb 1-22, Permit #59345
0.25 Mile Radius of Review

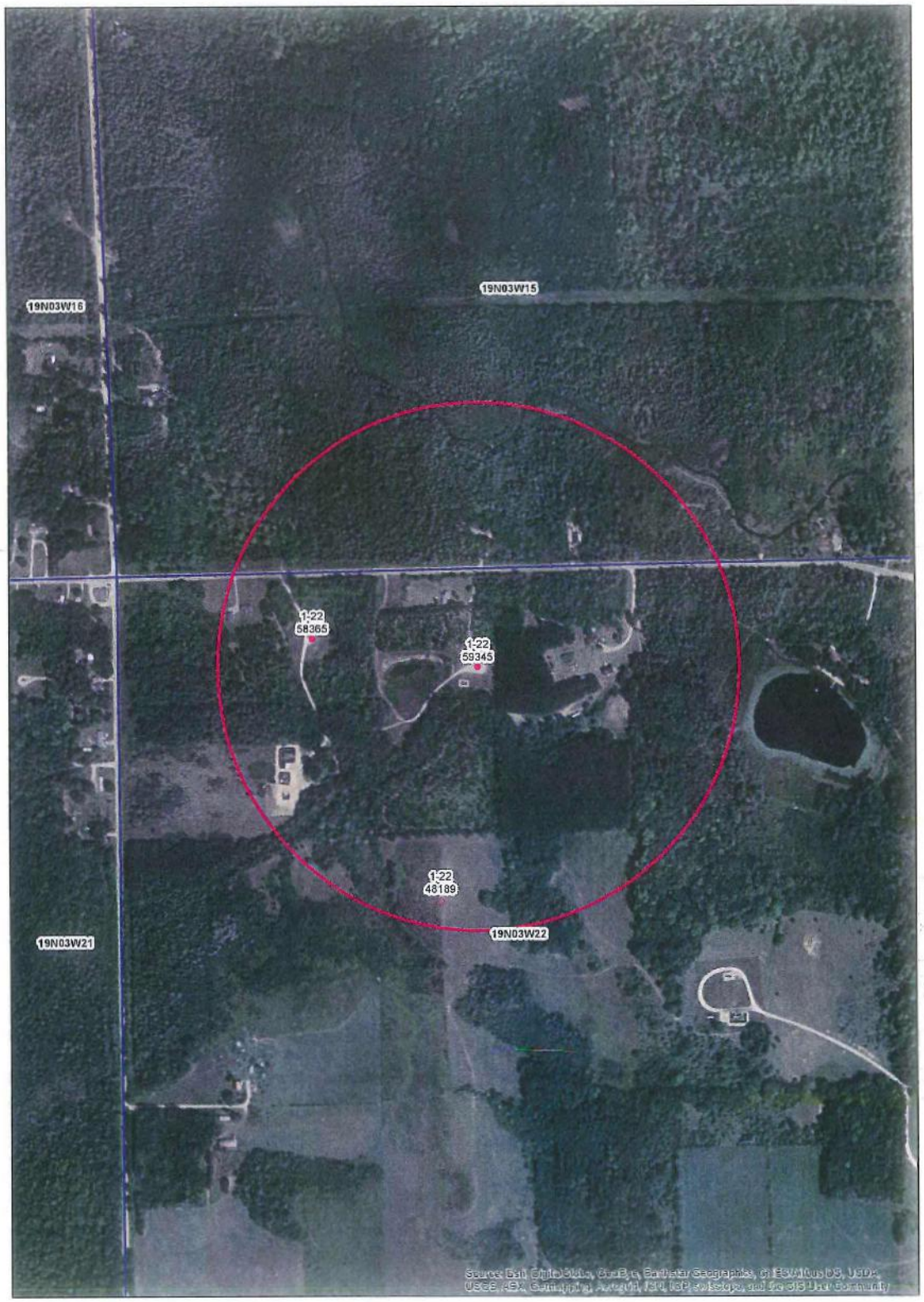


Hamilton Township, Clare County
Revised 6/7/2016, BM

0.5 0.25 0 0.5 Miles

RECEIVED
AUG 11 2016

Holcomb 1-22, Permit #59345
0.25 Mile Radius of Review



Hamilton Township, Clare County
Revised 6/7/2016, BM

(9)

ATTACHMENT E: NAME AND DEPTH OF U.S.D.W.'S

The underground source of drinking water in the area is the Glacial Drift. The drift in this area extends from the surface to a depth of approximately 464'. It is an unconsolidated formation of clay, gravel and sand.

The Hydrogeologic Atlas of Michigan, Western Michigan University, 1981, is the reference used to determine the depth to the lowest U.S.D.W.

RECEIVED
AUG 11 2015
UIC SECTION
EPA, REGION 5

(10)

ATTACHMENT G: GEOLOGICAL DATA ON INJECTION AND CONFINING ZONES

The Richfield Formation is part of the Detroit River Group and consists of alternating zones of dolomitic limestone and anhydrite, with zones ranging from 5' to 15' thick. The top of the Richfield occurs near 4948' and has an average thickness of approximately 180'.

The injection interval will be the Richfield Formation from 4948' to 5010'. The Richfield is immediately confined uphole by approximately 85' of the Massive Anhydrite and then approximately 850' of Detroit River anhydrite and salt. The Richfield Formation is underlain by the Amherstburg Limestone.

RECEIVED
AUG 1 1 2015

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

PLUGGING AND ABANDONMENT PLAN

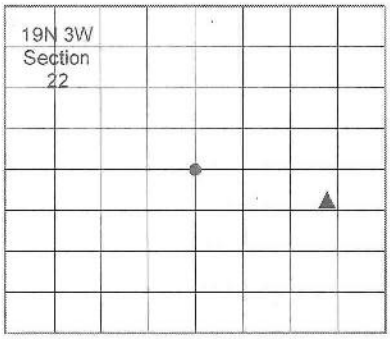
11

WELL NAME & NUMBER, FIELD NAME, LEASE NAME & NUMBER
Holcomb 1-22
Smith Creek Unit

NAME, ADDRESS, & PHONE NUMBER OF OWNER / OPERATOR
Muskegon Development Company
1425 South Mission Road
Mt. Pleasant, MI 48858

Locate Well and Outline Unit on Section Plat - 640 Acres

N



STATE	COUNTY	STATE PERMIT NUMBER
MI	Clare	59345

SURFACE LOCATION DESCRIPTION
NW Quarter section, Section 22, T 19N, R 3W

LOCATE WELL IN TWO DIRECTIONS FROM NEAREST LINES OF QUARTER SECTION AND DRILLING UNIT

Surface Location: 490 ft. From (N/S) North
And: 1826 ft. From (E/W) West

Type of Authorization
- X Permit
- Rule Authorized
- Area Permit

Number of Wells in Area Permit

US EPA Permit Number MI-035-2R-0034

WELL TYPE
- Class I
  - Hazardous
  - Nonhazardous
- Class II
  - Brine Disposal
  - Hydrocarbon Storage
  - X Enhanced Recovery
- Class III
- Class V

CASING/TUBING/CEMENT RECORD AFTER PLUGGING AND ABANDONMENT

Size	Wt (lb/ft) tbg/csg	Original Amount (csg)	CSG to be Left in Well	Hole Size	Sacks Cement Used	Type
9.625	36	792	792	12.25	500	Class A
7	23	4082	1432	8.75	150	Class A
4.5	11.6	5201	2037	6.125	200	Class A

METHOD OF EMPLACEMENT OF CEMENT PLUGS
- X Balance Method
- Dump Bailer
- Two Plug Method
- Other

CEMENT TO PLUG AND ABANDON DATA	Plug # 1	Plug #2	Plug #3	Plug #4			
Size of Hole or Pipe in Which Plug Will Be Placed (inches)	4.5	7	8.75	9.625			
Calculated Top of Plug (ft.)	4830	2996	2352	0			
Measured Top of Plug (ft.)							
Depth to Bottom of Plug (ft.)	4898	3214	2700	892			
Sacks of Cement to be Used	5	35	65	335			
Slurry Volume to be Used (cu. Ft.)	5.9	41.3	76.7	395.3			
Slurry Weight (lb./gal.)	15.6	15.6	15.6	15.6			
Type of Cement, Spacer or Other Material Used	Class A	Class A	Class A	Class A			
Type of Preflush Used							

DESCRIPTION OF PLUGGING PROCEDURE

ESTIMATED COST OF PLUGGING AND ABANDONMENT

Cement	$7,000	Water	$1,500
Service Rig	$10,000	Trucking	$1,500
Wireline Service	$6,000		$0
Site Supervision	$1,800	Total	$27,800

1800

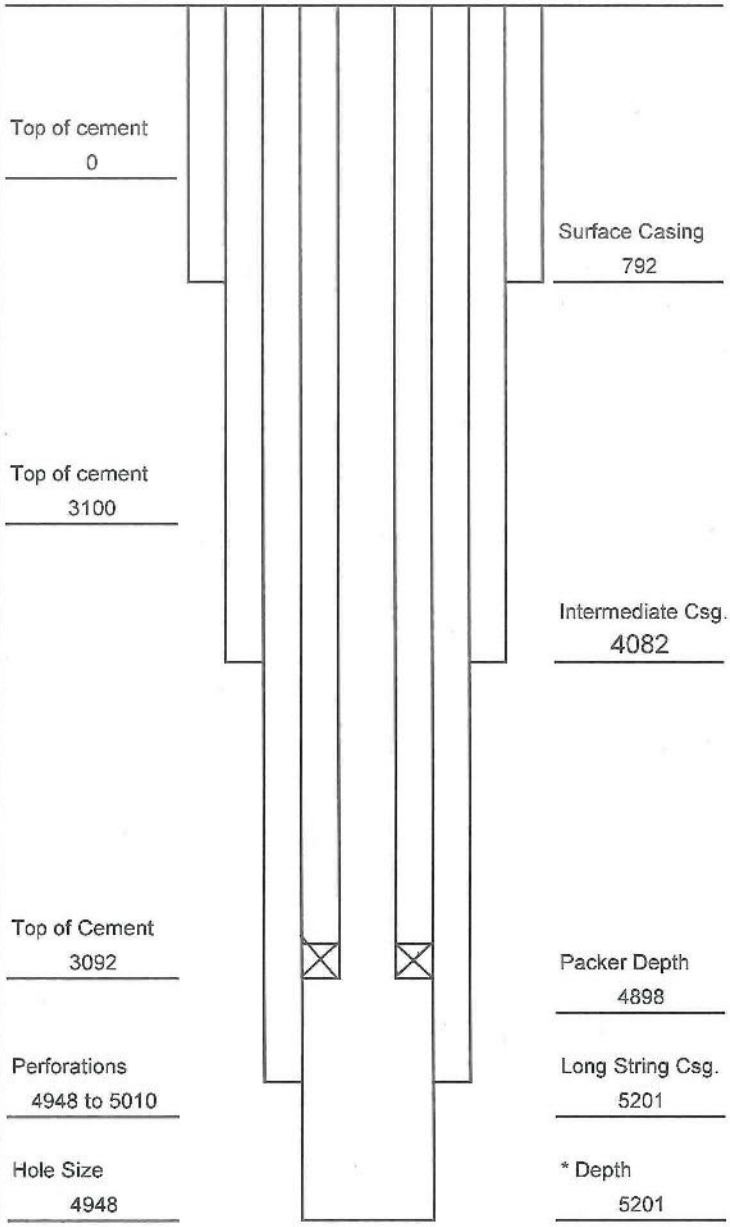
CERTIFICATION

I certify under the penalty of law that I have examined and am familiar with the information submitted in this document and all 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. (Ref.40 CFR 144.32)

NAME AND OFFICIAL TITLE	SIGNATURE	DATE SIGNED

EPA Form 7520-14

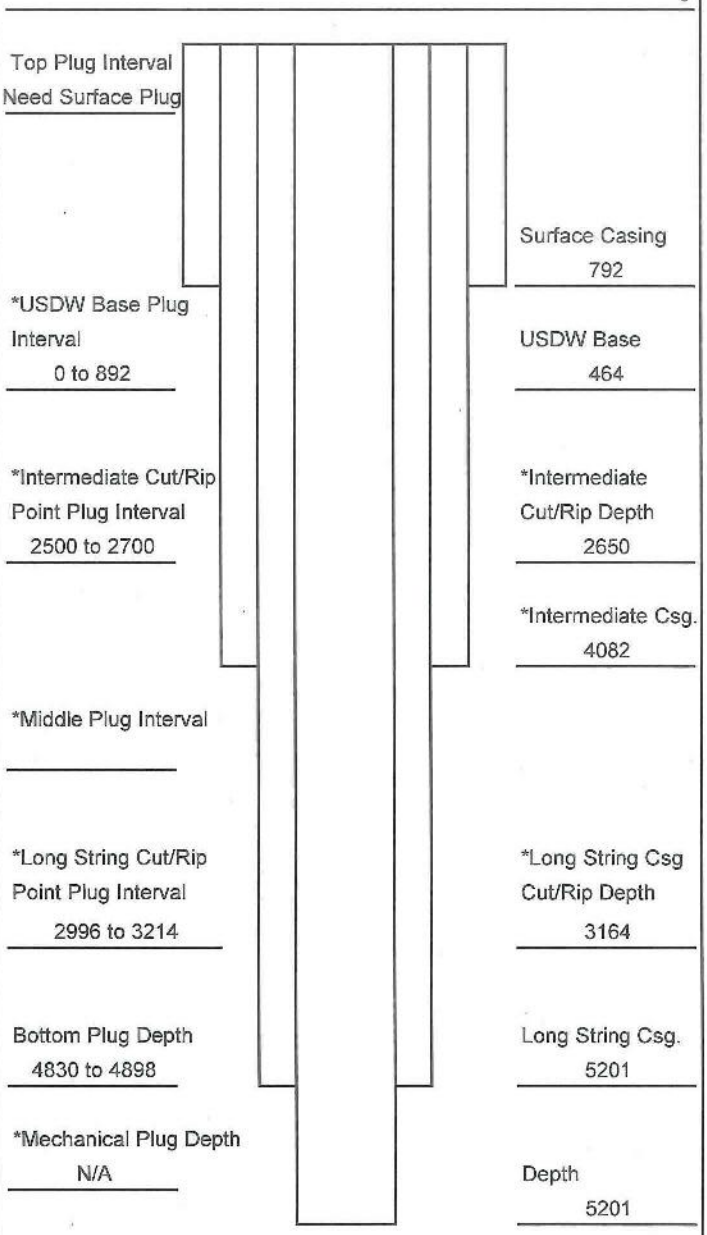
ORIGINAL WELL CONSTRUCTION DURING OPERATION



** Add Any Additional Information

* May not Apply

PLUGGING AND ABANDONMENT CONSTRUCTION

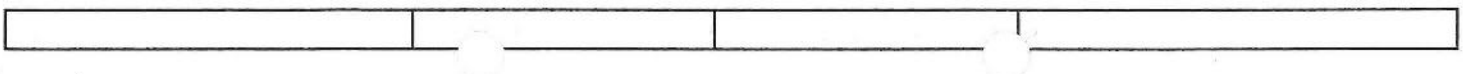


** Add Any Additional Information

* May not Apply

LIST OF ALL OPEN AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED

Specify Open Hole/ Perforations/ Varied Casing	From	To	Formation Name
	4948	5010	Richfield Formation



ATTACHMENT H: OPERATING DATA

INJECTION RATES AND VOLUMES

The proposed average injection rate is 150 barrels of water per day. The maximum anticipated rate should be no greater than 350 barrels of water per day.

INJECTION PRESSURES

The proposed average injection pressure is 3,250 psig. The maximum injection pressure will be 3,345 psig based on a fracture gradient of 1.112 psi/ft. This fracture pressure gradient was determined from an ISIP observed during an acid treatment performed on the nearby Fanslau 1-22 well in May of 2016. A graph and job ticket is included in the appendix.

NATURE OF THE ANNULUS FLUID

The annulus fluid will be fresh water mixed with TECHNI-HIB™ 606W, or equivalent. This chemical works as a corrosion inhibitor and oxygen scavenger, and will be used at the recommended volume. The casing tubing annulus pressure will be monitored weekly for the purpose of insuring mechanical integrity.

SOURCE AND ANALYSIS OF INJECTION FLUID

The injection fluid will be fresh water. The source of the injection fluid will be the glacial drift. Analysis of a representative sample taken from a water well within ¼ mile of where the supply well will be located is included in the appendix.

RECEIVED
AUG 1 1 2016
DIVISION OF
OIL & GAS

Version: Well Construction 2010-07-30

(13)

CALCULATION OF WELL-SPECIFIC PRESSURE EFFECTS

Facility Name		Operator	
Holcomb 1-22		Muskegon Development Company	
Well Name		USEPA Permit Number	State Permit Number
Holcomb 1-22		MI-035-2R-0034	59345
County	State	Well Class	Analyst
Clare	MI	2R	Bill Tong
Township	Range	Section	Date
19N	3W	22	42629

JUSTIFICATION FOR FRACTURE GRADIENT

Administrative Basis for Fracture Gradient	Field Name
Default	Default

Site-specific Testing Basis for Fracture Gradient

Source of Fracture Gradient	Well Name	Test Date	Fracture Gradient
Fracture Treatment	**Fanslau 1-22**	5/25/2016	**1.11**

MAXIMUM INJECTION PRESSURE

Fracture gradient, psi/ft	Type of Fluid, liquid or gas	Safety factor	Average well-bore temperature, F
1.11	LIQUID	0.05	
Top of Inj. Zone, ft	**Specific Gravity**	**Maximum Injection Pressure, psi**	
4948	1.000	**3238**	

PRESSURE LOSS TO FRICTION

Outer Diameter of the Tubing, in.	Weight of Tubing, lbs/ft	Inner Diameter of Tubing, in	Tubing length, ft
2.500	0.000	0.000	4898
Measured	**Reynolds Number Method**	**Hazen-Williams Method**	**Estimated from Chart**
Surface injection pressure, psi	Average velocity of injection, ft/sec	Kinematic viscosity, cSt	Maximum Flow Rate, bbl/min
	0.00		8.33
Depth of gauge, ft	Viscosity of injectate, cp	Maximum Injection Rate, gpm	Tubing material
	0.0	350	
Downhole injection pressure, psi	Reynolds Number	Roughness Constant	Total Friction Loss, psi
		100	
Total Friction Loss, psi	Total Friction Loss, psi	Total Friction Loss, psi	**Friction Loss to Use, psi**
	#VALUE!	NOT APPLICABLE	

INFORMATION FOR CALCULATING PRESSURE CHANGE

Total Volume of Well (tubing and Open Hole), gals	Total Volume of Annulus, gals
0	2143
Predicted Well Bore Storage, gals/psi	Additional Volume to Increase Pressure by 100 psi, gals
0.000	0.06

(14)

OPERATING, MONITORING AND REPORTING REQUIREMENTS

Characteristic	Limitation	Minimum Monitoring Requirements		Minimum Reporting Requirements
		Frequency	Type	Frequency
*Injection Pressure	3238 psig (maximum)	weekly		monthly
Annulus Pressure		weekly		monthly
Flow Rate		weekly		monthly
Cumulative Volume		weekly		monthly
Annulus Liquid Loss		quarterly		quarterly
**Chemical Composition of Injection Fluid		annually	grab	annually

SAMPLING LOCATION: The sample location is at the well head

*The limitation on wellhead pressure serves to prevent confining-formation fracturing. This limitation was calculated using the following formula: [{1.112 *psi/ft* - (0.433 *psi/ft*)(specific gravity)} x depth] - 14.7 *psi*. The maximum injection pressure is dependent upon depth and specific gravity of the injected fluid. The Richfield Formation of the Detroit River Group at 4948 feet was used as the depth and a specific gravity of 1.05 was used for the injected fluid. The fracture gradient of 1.112 psi/ft was determined from an acid-fracture job from a nearby well.

**Chemical composition analysis shall include, but not be limited to, the following: Sodium, Calcium, Magnesium, Barium, Total Iron, Chloride, Sulfate, Carbonate, Bicarbonate, Sulfide, Total Dissolved Solids, pH, Resistivity (ohm-meters @ 75°F), and Specific Gravity.

(15)

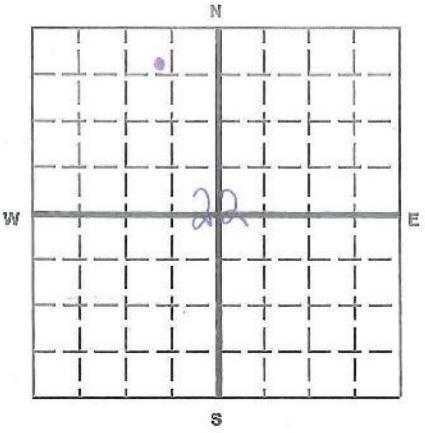
OMB No. 2040-0042 Approval Expires 12/31/2018

United States Environmental Protection Agency
Washington, DC 20460

PLUGGING AND ABANDONMENT PLAN

Name and Address of Facility	Name and Address of Owner/Operator
Holcomb 1-22 Smith Creek Field	Muskegon Development Comapany 1425 South Mission Road, Mt. Pleasant, MI, 48858

Locate Well and Outline Unit on Section Plat - 640 Acres



State	County	Permit Number
Michigan	Clare	59345

Surface Location Description

1/4 of NW 1/4 of NE 1/4 of NW 1/4 of Section 22 Township 19N Range 3W

Locate well in two directions from nearest lines of quarter section and drilling unit

Surface Location 490 ft. frm (N/S) N Line of quarter section and 1826 ft. from (E/W) W Line of quarter section.

TYPE OF AUTHORIZATION
- [x] Individual Permit
- [ ] Area Permit
- [ ] Rule

Number of Wells 1

Lease Name Holcomb

WELL ACTIVITY
- [ ] CLASS I
- [x] CLASS II
  - [ ] Brine Disposal
  - [x] Enhanced Recovery
  - [ ] Hydrocarbon Storage
- [ ] CLASS III

Well Number 1-22

CASING AND TUBING RECORD AFTER PLUGGING

SIZE	WT (LB/FT)	TO BE PUT IN WELL (FT)	TO BE LEFT IN WELL (FT)	HOLE SIZE
9 5/8"	36		792'	12 1/4"
7"	23		1432'	8 3/4"
4.5"	11.6"		2037'	6 1/8"

METHOD OF EMPLACEMENT OF CEMENT PLUGS
- [x] The Balance Method
- [x] The Dump Bailer Method
- [ ] The Two-Plug Method
- [ ] Other

CEMENTING TO PLUG AND ABANDON DATA:	PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
Size of Hole or Pipe in which Plug Will Be Placed (inche	4.5"	4.5", 7"	7", 8 3/4"	9 5/8"			
Depth to Bottom of Tubing or Drill Pipe (ft	4898'	3214'	2700'	892'			
Sacks of Cement To Be Used (each plug)	5	35	65	335			
Slurry Volume To Be Pumped (cu. ft.)	5.90	41.30	76.70	395.30			
Calculated Top of Plug (ft.)	4848'	3014'	2500'	Surface			
Measured Top of Plug (if tagged ft.)	C.I.B.P.						
Slurry Wt. (Lb./Gal.)	15.6	15.6	15.6	15.6			
Type Cement or Other Material (Class III)	Class A	Class A	Class A	Class A			

LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (if any)

From	To	From	To
4948'	4954'	3164'	Assumed Free Point for 4.5"
4966'	4976'	2650'	Calculated Free Point for 7"
4990'	5000'		
5004'	5010'		

Estimated Cost to Plug Wells
$27,800

Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all 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. (Ref. 40 CFR 144.32)

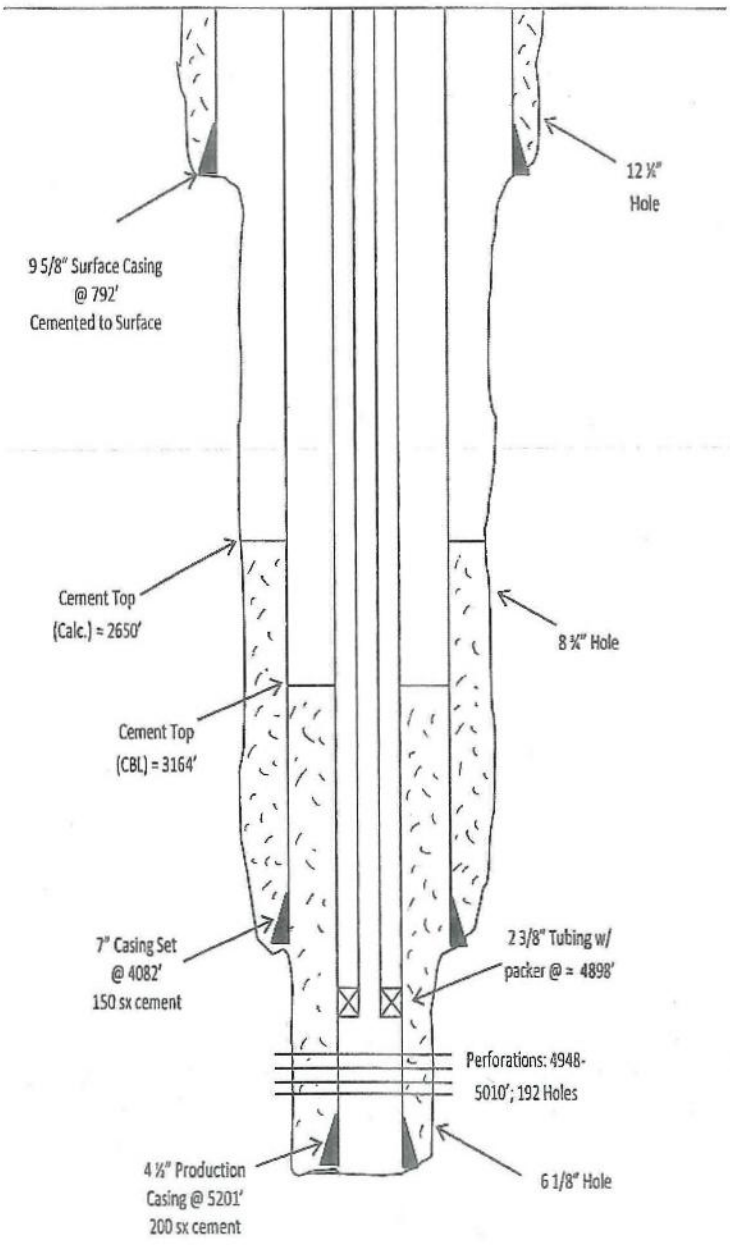
Name and Official Title *(Please type or print)*	Signature	Date Signed
William C. Myler, Jr., President	William Myler	8/8/16

EPA Form 7520-14 (Rev. 12-11)

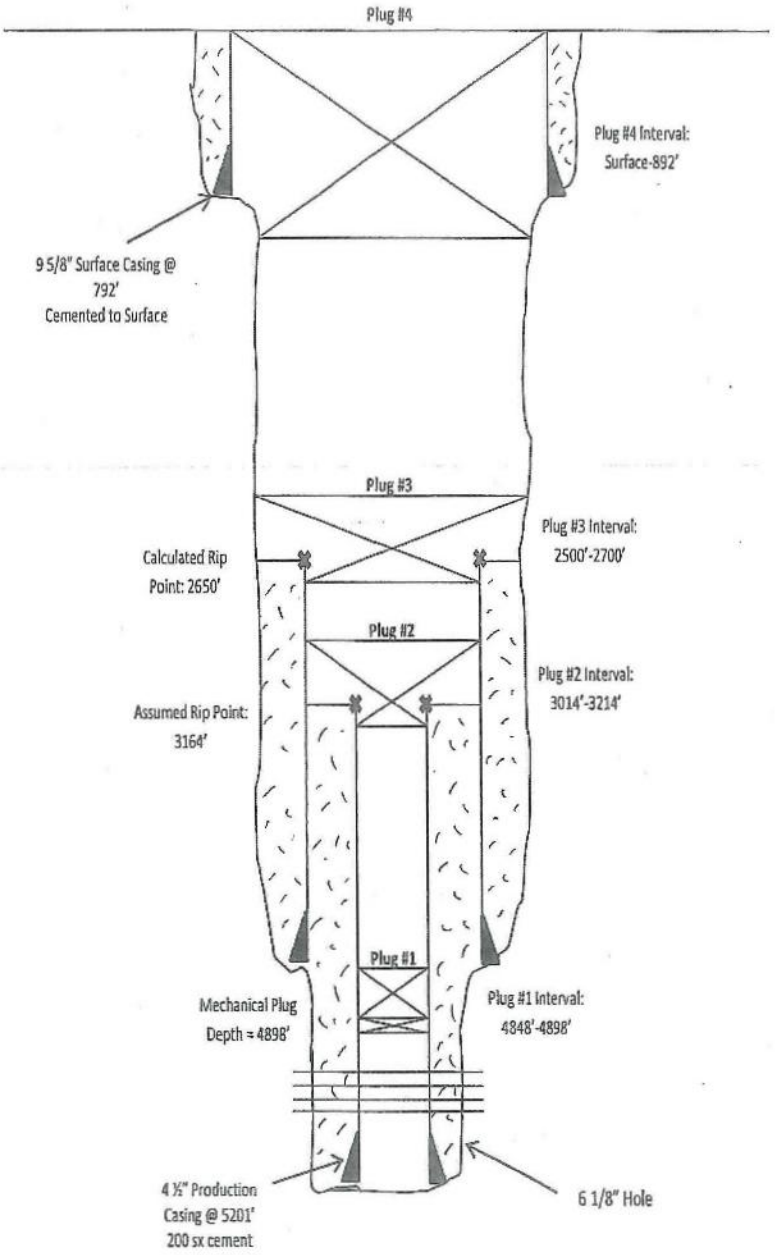
WELL CONSTRUCTION

Holcomb 1-22

Permit # 59345



PLUGGING & ABANDONMENT PLAN



RECEIVED
AUG 2 1 '23

16

Muskegon Development Company

Financial Report
December 31, 2015

RECEIVED
AUG 1 2 2016

plante moran
audit · tax · consulting

Basic Information

Facility Name	Muskegon Development Co
EPA Permit	[redacted]
Well Name	Holcomb 1-22
County	
Tribal Name	
Contact	William C. Myler
State Permit#	59345
Well Status	Proposed Well (associated with permit application only)
Class	2R
Permit Type	Individual Permit
Well Status Date	8/11/2016 12:00:00 AM

5yr Review

Review	Date Review Co...	Review Outcome

No data to display

Add Review

Monitoring

Add Report Report History

Tests

	Category	Type	Date	Result
Edit				

Add Test

Inspections

	Type	Date

Add Inspection

Violations

Add Violation Add Enforcement

A. Area of Review Methods

What is the AOR based on? 1/4 Mile

Save Cancel

B. Maps of Wells : Area of Review

Does the topographic map show all of the required features? (The map should include all surface features man-made or natural, and subsurface features such as mines, wells, and known faults) Yes

Are there topographic maps that extend one-mile beyond the property boundary that depict the facility and each of its intake and discharge structures, hazardous waste treatment, storage, or disposal facilities; each well where fluids from the facility are injected; and those wells, springs, and other surface water bodies and drinking water wells listed in the public records within a 1/4 mile.	No
Is there a list of all of the land owners within the AOR?	Yes
Surface elevation of the wellsite	933
The elevation is based on	Ground level

Save Cancel

C. Corrective Action Plan and Well Data

Number of wells that are temporarily abandoned	0
Is the construction adequate?	NA
Number of wells that are plugged and abandoned	1
Is the construction adequate?	Yes
Number of wells that are producers	2
Is the construction adequate?	Yes
Number of wells that are injectors	0
Is the construction adequate?	NA
Number of Other Wells	0
Is the construction adequate?	NA
Is there a corrective action plan?	No
Number of wells that penetrate into or through the confining zone	3

Save Cancel

E. Name and Depths of USDWs

Formation name of lowest USDW:	Glacial Drift	
Depth to base of lowest most USDW(ft)	464	
Method for USDW determination	Hydrogeological Atlas	**28** Characters Left

Save Cancel

G. Maps and Cross-sections of the geologic structure of the area

	Injection Interval	Confining Zone	Bleed Off Zone
Formation Name	Detroit River Group	Detroit River Group	
Lithology	Dolomite	Anhydrite	
Depth to Top (ft)	4948	4013	
Depth to Bottom (ft)	5010	4948	

What is the separation between the top of the injection zone and the base of the USDW?	4484
Were the presence and extent of natural or induced fractures in the injection and confining zones adequately investigated?	No

Save Cancel

H. Operating Data

The injectate is	liquid
Injection Rate Unit	Select
Method used to determine maximum injection pressure	Fracture Gradient equation
	100 Characters Left
Source of fracture gradient	Fracture Treatment data
Fracture gradient	1.112
Maximum expected injection rate(gpm)	14700
Maximum enforceable injection rate(gpm)	
Raw Maximum specific gravity of injectate (without safety factor)	1
Should database calculate MIP using Safety Factor For Specific Gravity?	Calculated MIP 1.05 yes
Friction Allowance	
Technical basis for friction allowance	
Maximum injection pressure(r5_mip_calc_formula) txtr5MipCalcFormula / lblr5MipCalcFormula	3238 3238
Does the corrosion monitoring comply with 40 CFR part 146.68(c)?	Yes
What is the composition of the annulus fluid	Fresh Water with Corrosion Inhibitors

Save Cancel

I. Formation Testing (for new wells only)

Does the formation testing proposed meet CFR 146.12 (d) and (e) [for non-haz] or 146.66 [for haz] or 146.32(b) [Class III]?	Yes
Are there adequate procedures for acquiring formation pressures above the injection interval?	Yes
Are there adequate sampling and analysis procedures for the injection zone?	Yes
Proposed method for determining fracture gradient	Nearby well acid frac

Save Cancel

J. Stimulation Program

Is a stimulation proposed	Yes
What is the type of stimulation?	acid
Is this type of stimulation approved?	Yes

Save Cancel

K. Injection Procedures

Is there a plant plan that shows the stream flow lines?	No
Are there descriptions of any filters, storage tanks, and/or pretreatment?	Yes
What is the storage tank capacity?	
What is the rate capacity of the pumps?	443
What is the pump capacity type?	Variable
Is an alarm system proposed?	No
What are the alarm thresholds?	
The shut-off system will be	Automatic
What are the shut-off thresholds?	low or high pressure

Save Cancel

L. Construction Procedures

Is this a new well, existing or a conversion: Conversion

Save Cancel

M. Construction Details

	Pipe/Hole set					Cemented	
	From top (ft)	To base(ft)	Pipe Size(in)	Hole Size(in)	Number of sacks of cement	From top(ft)	To base(ft)
Conductor							
Surface Casing	0	792	9.625	12.25	500	0	792
Intermediate Casing	0	4082	7	8.75	150	3101	4082
Long String Casing	0	5201	4.5	6.125	200	3091	5201
Liner							
Perforated Section	4948	5010					
Open Hole	5201						

Packer depth: 4898

Tail Pipe depth:

What is the plug back total depth? 5201

What is the total depth of the well? 5201

Is the packer set 100 ft or less above the injection zone? No

Tubing material:

Tubing size:

Save Cancel

O. Plans for well failure

Is the contingency plan adequate? Yes

What actions are proposed if MI is lost? Shut in well, inspect

Save Cancel

P. Monitoring Program

Where is the sample located? At the well head

Is there an adequate description of source(s) of waste?

Is there a representative of waste analysis?

What are the sampling parameters? Select

What's the frequency of physical and chemical monitoring?

What's the frequency of monitoring reports?

Save Cancel

Q. Plugging and Abandonment Plan

How many plugs will be used to plug the well? 7

Signed estimate of plugging and abandonment costs (and post-closure costs, if applicable) by an independent firm: No

Estimated Plugging Cost: 27800

Date the plan was signed: 8/8/2016

Date of 3rd Party Plugging Cost Estimate:

Save Cancel

	Plug #	Method	Base	Sacks	Yield	
Edit	Plug 1	Surface Plug	892	335	1.18	Delete
Edit	Plug 2	Intermed Rip Point	2500	65	1.18	Delete
Edit	Plug 3					Delete
Edit	Plug 4					Delete
Edit	Plug 5					Delete
Edit						Delete
Edit						Delete

Add Plug

R. Necessary Resources

Available Mechanisms: Trust agreement, Test1 Class2, Test2 Class2, Surety performance bond

Add ->

<- Remove

Selected Mechanisms: Test1 Class2

Edit Mechanisms

S. Aquifer Exemptions

Is the company asking for an aquifer exemption? N

Aquifer Name: None

Save Cancel

T. Existing Permits

List Existing permits and permit numbers: Over 350 existing UIC permit

List outstanding permit applications: MI-129-2R-0042

Save Cancel

U. Description of Business

Business description: Muskegon Development Company is a Michigan Corporation dedicated to the exploration

86 Characters Left

Save Cancel

V. Compliance with other Federal Acts

Any designated wild and scenic rivers within the AOR? No

If so, what are they?

Has the permit writer evaluated whether there are endangered or threatened species in the AOR? Yes

Are there any listed species in the AOR? Yes

List any threatened species within the area: Northern long-eared bat, Kirtl

Will the permit need an ESA Clause? No

Was the Historic Preservation Office contacted? Yes

Are there historic resources present? No

Is the well located in a coastal zone?	No ▼
If yes, then has the permit writer contacted the State Coastal Management Program in writing?	NA ▼
Does the permit application call for the diverting, impounding, deepening or controlling any surface water body in excess of 10 acres?	No ▼
EJ number	1 ej screen

Save Cancel

X. Confidentiality

Has any part of this permit application been declared confidential by the operator? No ▼

Save Cancel

Other

Comments

500 Characters Left

Update Cancel

Review Completion

Reviewer TONG WILLIAM ▼

Signature Date 8/26/2016

Update Cancel

Version: Well Construction 2010-07-30

18

CALCULATION OF CEMENT FILL AND WELL VOLUMES

Facility Name	USEPA Permit Number	State Permit Number	Well Class
Holcomb 1-22	MI-035-2R-0034	59345	2R

Well Name	State	County	Analyst
Holcomb 1-22	MI	Clare	Bill Tong

Operator	Township	Range	Section	Analysis Date
Muskegon Development Company	19N	3W	22	September 16, 2016

Geological Information		Completion Information		
Name of Lowermost USDW	Base of USDWs, ft	Plugged Back Tota	Top of Perfs, ft	Actual or Proposed Construction?
Glacial Drift	464	5201	4948	actual
Formations in Inj. Zone	Top of Inj. Zone, ft	Packer Depth, ft	Packer Depth OK?	
Richfield	4948	4898	YES	

EVALUATION OF WELL CONSTRUCTION

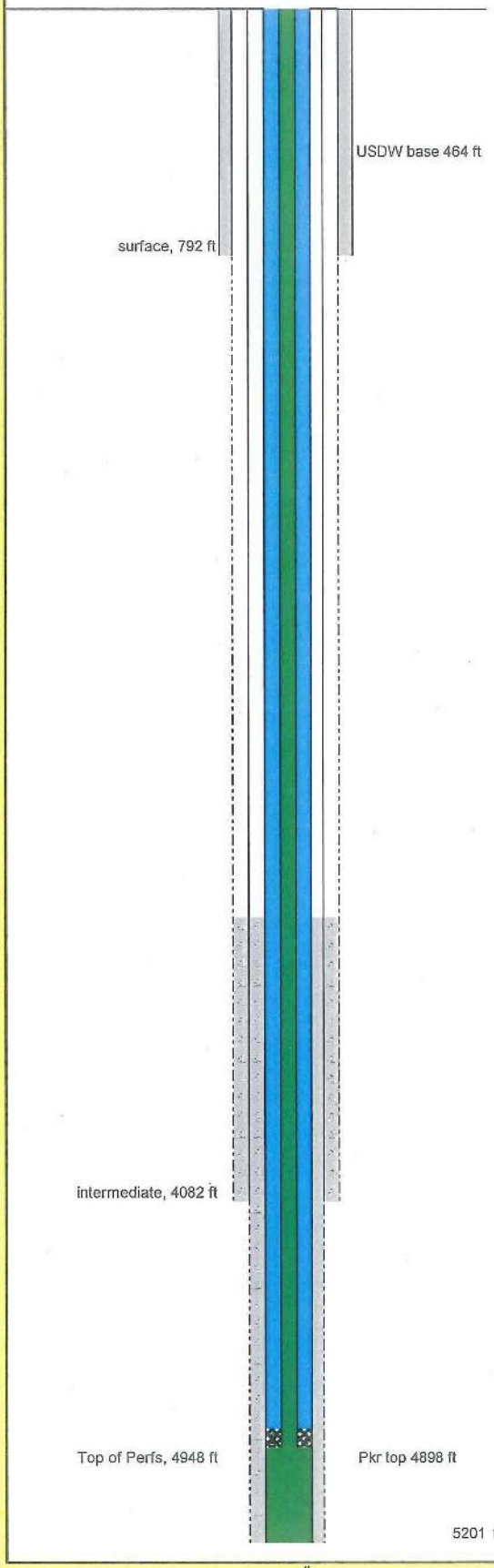
	CASING STRING				
	surface	intermediate	long string		
Top of Casing		0	0		
Bottom of Casing	792	4082	5201		
Well Bore Diameter	12.25	8.75	6.125		
Outside Diameter of Casing	9.625	7	4.5		
Weight per Foot of Casing	36	23	11.6		
1st Stage Cement					
Cu Ft to Fill Annulus in Open Hole	297.7	593.5	126.5		
Cu Ft to Fill Annulus in Cased Hole		132.1	451.3		
Cement/Epoxy Used	500	150	200		
Average Yield	1.18	1.18	1.18		
Top of Cement in Annulus	0	3101	3091		
2nd Stage Cement					
Depth of DV Tool					
Cu Ft to Fill Annulus in Open Hole					
Cu Ft to Fill Annulus in Cased Hole					
Sacks of Cement Used					
Average Yield					
Top of Cement in Annulus					
3rd Stage Cement					
Depth of DV Tool					
Cu Ft to Fill Annulus in Open Hole					
Cu Ft to Fill Annulus in Cased Hole					
Sacks of Cement Used					
Average Yield					
Top of Cement in Annulus					
Meets Standards for Surface Casing	YES	NO-cement	NO-cement		
Meets Standards for Any Casing	YES	YES	YES		
Meets Standards for Protection Casing		NO-casing	YES		

Comments

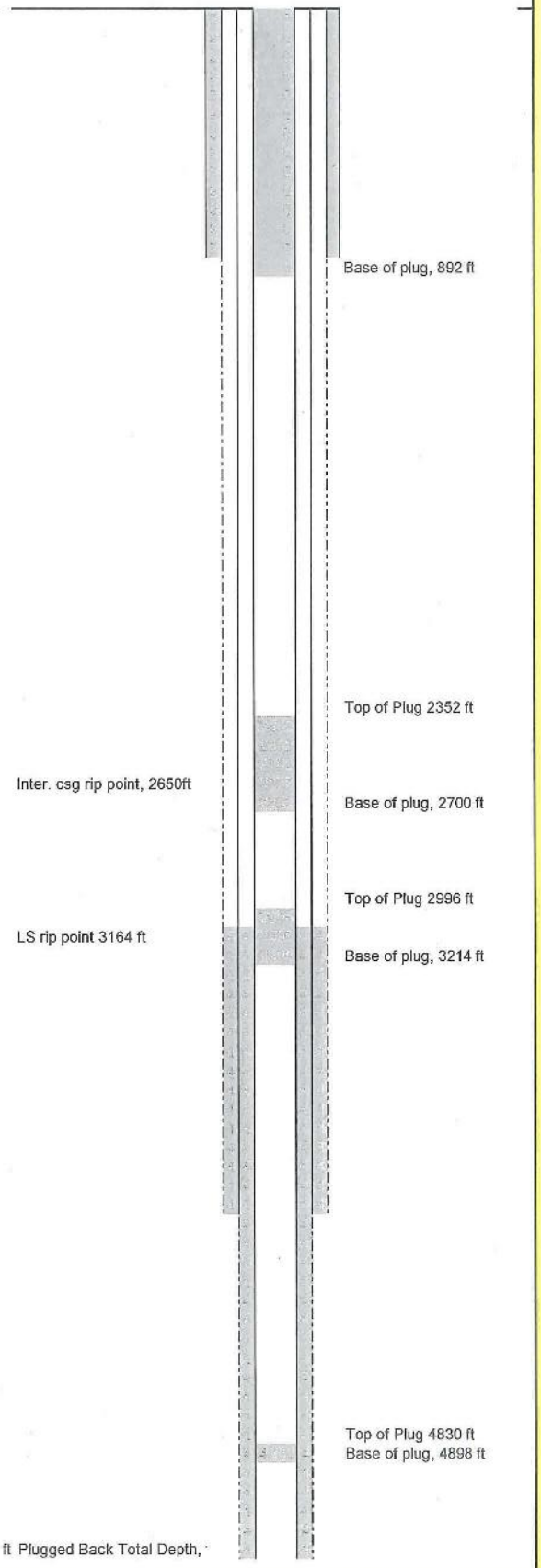
Comments in this cell

Muskegon Development Company
Holcomb 1-22
MI-035-2R-0034

SCHEMATIC OF THE WELL AS CONSTRUCTED



SCHEMATIC OF THE WELL AS TO BE PLUGGED



#

Version: Well Construction 20[illegible]-07-30

CALCULATION OF CEMENT FILL FOR PLUGS

Date of P&A Plan	Facility Name	Operator	
8/8/2016	Holcomb 1-22	Muskegon Development Company	
Well Name		USEPA Permit Number	State Permit Number
Holcomb 1-22		MI-035-2R-0034	59345
County	State	Well Class, 1W, 1I, 2, 3, 5	Analyst
Clare	MI	2R	Bill Tong
Township	Range	Section	Date
19N	3W	22	16-Sep-16

Plug 1 Balanced on BP		Plug 2 LS Rip Point	
Plug Type	Balanced on BP	Plug Type	LS Rip Point
Depth to BP, ft	4898	Depth of Long String Cut Off	3164
Sacks of Cement	5	Base of Plug, ft	3214
Yield of Cement	1.18	Sacks of Cement	35
Top of Cement Plug, ft	4830	Yield of Cement, cu ft/sk	1.18
Ft above top of inj. Zone	118	Top of Cement	2996
Plug Meets Standards		**Plug meets standards**	

Plug 3 Intermed Rip Point		Plug 4 Surface Plug	
Plug Type	Intermed Rip Point	Plug Type	Surface Plug
Depth of Inter. String Cut Of	2650		
Base of Plug, ft	2700	Base of Plug, ft	892
Sacks of Cement	65	Sacks of Cement	335
Yield of Cement, cu ft/sk	1.18	Yield of Cement, cu ft/sk	1.18
Top of Cement	2352	Top of Cement	0
Plug meets standards		**Plug meets standards**	

Plug 5	Plug 6
Plug Type	Plug Type
Base of Plug, ft	Base of Plug, ft
Sacks of Cement	Sacks of Cement
Yield of Cement	Yield of Cement
Top of Cement	Top of Cement

Plug 7	Plug 8
Plug Type	Plug Type
Base of Plug	Base of Plug, ft
Sacks of Cement	Sacks of Cement
Yield of Cement, cu ft/sk	Yield of Cement
Top of Plug, depth in ft.	Top of Cement

Plug 9	Plug 10
Plug Type	Plug Type
Base of Plug, ft	Base of Plug, ft
Sacks of Cement	Sacks of Cement
Yield of Cement	Yield of Cement
Top of Cement	Top of Cement

COMMENTS

(19)

MUSKEGON DEVELOPMENT COMPANY

1425 South Mission Road, Mount Pleasant, Michigan 48858
(989) 772-4900 (Fax) (989) 773-4094

June 13th, 2016

Anna Miller
Underground Injection Control Branch
U.S. Environmental Protection Agency – Region 5
Mail Code WU-16J
77 W. Jackson Blvd.
Chicago, IL, 60604-3590

Dear Ms. Miller,

I have reviewed the potential impact to endangered species caused by conversion of the existing Holcomb 1-22 producing well to a water injection well. The Holcomb 1-22 well is located in Clare County, MI, which contains habitat for two threatened or endangered species (1): The Northern Long-Eared Bat and the Kirtland's Warbler.

Clare County is a potential habitat for the threatened Northern Long-Eared Bat during spring and summer time. It typically roosts and forages in upland forests (2). The Long-Eared Bat hibernates in caves and mines during late-Autumn and winter. The Kirtland's Warbler is an endangered species that is found in Clare County (3). They typically nest in the low-hanging branches of Jack Pine trees, and migrate to the Bahamas in late-Autumn.

The project area is contained within a 75 ft. radius circle centered at the well. The project area contains little to no vegetation.

It is my determination that conversion of the Holcomb 1-22 well to water injection is not likely to adversely affect the Northern Long-Eared Bat or the Kirtland's Warbler. The project area does not contain any trees that would provide shelter for either threatened or endangered animals.

Please contact me at (989) 772-4900 or bennettmyler@muskegondevelopment.com if you have any questions. Thank you.

Sincerley,

Bennett Myler, Geologist

Holcomb 1-22, Permit #59345
75 Ft. Radius of Review

Hamilton Township, Clare County
Revised 6/7/2016, BM

0.02 0.01 0 0.02 Miles

STATE OF MICHIGAN
RICK SNYDER
GOVERNOR
MICHIGAN STATE HOUSING DEVELOPMENT AUTHORITY
STATE HISTORIC PRESERVATION OFFICE
KEVIN ELSENHEIMER
EXECUTIVE DIRECTOR

July 25, 2016

LISA PERENCHIO
EPA REGION 5
77 WEST JACKSON BLVD WU 16J
CHICAGO IL 60604

RE: ER04-92 Muskegon Development Company Well Projects - Holcomb 1-22, Sec. 22, T19N, R3W, Hamilton Township, Clare County (EPA)

Dear Ms. Perenchio:

Under the authority of Section 106 of the National Historic Preservation Act of 1966, as amended, we have reviewed the above-cited undertaking at the location noted above. Based on the information provided for our review, it is the opinion of the State Historic Preservation Officer (SHPO) that no historic properties are affected within the area of potential effects of this undertaking.

This letter evidences the EPA's compliance with 36 CFR § 800.4 "Identification of historic properties," and the fulfillment of the EPA's responsibility to notify the SHPO, as a consulting party in the Section 106 process, under 36 CFR § 800.4(d)(1) "No historic properties affected." **If the scope of work changes in any way, or if artifacts or bones are discovered, please notify this office immediately.**

We remind you that federal agency officials or their delegated authorities are required to involve the public in a manner that reflects the nature and complexity of the undertaking and its effects on historic properties per 36 CFR § 800.2(d). The National Historic Preservation Act also requires that federal agencies consult with any Indian tribe and/or Tribal Historic Preservation Officer (THPO) that attach religious and cultural significance to historic properties that may be affected by the agency's undertakings per 36 CFR § 800.2(c)(2)(ii).

The State Historic Preservation Office is not the office of record for this undertaking. You are therefore asked to maintain a copy of this letter with your environmental review record for this undertaking.

If you have any questions, please contact Brian Grennell, Cultural Resource Management Specialist, at 517-335-2721 or by email at GrennellB@michigan.gov. **Please reference our project number in all communication with this office regarding this undertaking.** Thank you for this opportunity to review and comment, and for your cooperation.

Sincerely,

Brian G. Grennell
Cultural Resource Management Specialist

for Brian D. Conway
State Historic Preservation Officer

SAT:BGG

Copy: Bennett Myler, Muskegon Development Company

RECEIVED
AUG 0 1 2016
UIC BRANCH
EPA, REGION 5

(20)

ENDANGERED SPECIES ACT COMPLIANCE DETERMINATION

To: Well file, Permit # MI-035-2R-0034, Holcomb 1-22 (Muskegon Development)

From: William K. Tong, Permit Writer
UIC Branch

William K. Tong

Re: Endangered Species Determination

Date: January 24, 2017

According to the species list published by U.S. Fish & Wildlife Service (USFWS) at their web site, the following endangered and threatened species present in Clare County as of October 2016:

https://www.fws.gov/midwest/endangered/lists/michigan-cty.html

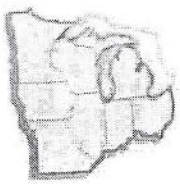
County	Species	Status	Habitat
Clare	Northern long-eared bat *Myotis septentrionalis*	Threatened	Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. Roosts and forages in upland forests during spring and summer.
	Kirtland's warbler (*Setophaga kirtlandii*)	Endangered	Nests in young stands of jack pine
	Eastern massasauga rattlesnake (*Sistrurus catenatus*)	Threatened	Lives in shallow wetlands and adjacent uplands; USFWS has determined that designating critical habitat for the eastern massasauga is not prudent.

The following information is excerpted from the report dated June 13, 2016, prepared by Bennett Myler, Geologist (Muskegon Development Company), included with the permit application:

"…The project area is contained within a 75 foot radius circle centered at the well. The conversion of the Holcomb 1-22 well to water injection is not likely to affect the Northern Long-Eared Bat, or the Kirtland's Warbler. The project area contains little or no vegetation, and does not contain any trees that would provide shelter for either threatened or endangered animals." (The Eastern massasauga was not yet listed for Clare County at the time the report was prepared; it was added by USFWS in October 2016.)

This proposed well conversion will not create any new land disturbance nor construction activity other than in the immediate vicinity of the well pad. Analysis of aerial photography of the site location on MDEQ's GeoWebFace confirms the lack of vegetation in the 75 foot radius circle centered at the well, cited by the permit applicant above. Due to there being no suitable habitat in the action area, I have determined that this well will have NO EFFECT on endangered or threatened species.

Midwest Endangered Species Home
What We Do
Featured Species
Species Information
State and County Lists
Species Lists
Fact Sheets and Brochures
Field Office Contacts
Regional Office Contacts
Contact Us



Bat Fact of the Day
View the Bat Fact Calendar

Daily Bat Fact - Jan. 24
Bats with white-nose syndrome often behave uncharacteristically during cold winter months, like flying outside in daylight and clustering near cave entrances. This video has more information on how WNS affects bats and what is being done.

Connect With Us

Great Lakes RESTORATION

Michigan

County Distribution of Federally-Listed Endangered and Threatened Species

PDF Version of this page

For more information about threatened and endangered species in Michigan, contact the U.S. Fish & Wildlife Service office at 2651 Coolidge Road, East Lansing, Michigan 48823 (517/351-6274)

Bald Eagle

Bald eagles are no longer protected under the federal Endangered Species Act and Section 7 consultation with the U.S. Fish and Wildlife Service is no longer necessary. However, the bald eagle remains protected under the Bald and Golden Eagle Protection Act.

Information about Bald Eagles
Information about Eagle Permits and the Bald and Golden Eagle Protection Act

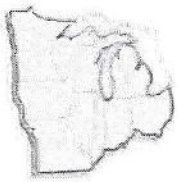
Gray Wolf

Due to a Federal court decision, gray wolves in the western Great Lakes area (including Michigan, Minnesota, and Wisconsin) were relisted under the Endangered Species Act, effective December 19, 2014.

Revised October 2016

Clare	Northern long-eared bat *Myotis septentrionalis*	Threatened	Hibernates in caves and mines - swarming in surrounding wooded areas in autumn. Roosts and forages in upland forests during spring and summer.
	Kirtland's warbler (*Setophaga kirtlandii*)	Endangered	Nests in young stands of jack pine
	Eastern massasauga (*Sistrurus catenatus*)	Threatened	

Midwest Endangered Species Home
What We Do
Featured Species
Species Information
State and County Lists
Species Lists
Fact Sheets and Brochures
Field Office Contacts
Regional Office Contacts
Contact Us



Bat Fact of the Day
View the Bat Fact Calendar

Daily Bat Fact - Jan. 25
What should you do if you find dead or dying bats, or if you observe bats with signs of white-nose syndrome? Contact your state wildlife agency (many provide an online electronic reporting system), email the U.S. Fish and Wildlife Service at WhiteNoseBats@fws.gov, or contact your nearest Service field office to report your observations. See additional information on what to do.

Connect With Us

Buy Duck Stamps
Endangered Species Day

Great Lakes RESTORATION

Eastern massasauga rattlesnake observed in Ontario, Canada.
Photo courtesy of Joe Crowley; Ontario Nature

Eastern Massasauga (*Sistrurus catenatus*)

Status: Threatened

The U.S. Fish and Wildlife Service listed the eastern massasauga rattlesnake (*Sistrurus catenatus*) as a threatened species under the Endangered Species Act. We also determined that designating critical habitat for the eastern massasauga is not prudent. The final rule published in the *Federal Register* on Sept. 30, 2016.

The eastern massasauga is a small, thick-bodied rattlesnake that lives in shallow wetlands and adjacent uplands in portions of Illinois, Indiana, Iowa, Michigan, Minnesota, New York, Ohio, Pennsylvania, Wisconsin, and Ontario. The species, a candidate for listing since 1999, has been declining over the past few decades due to loss and fragmentation of its wetland habitat. Nearly 40 percent of the historical populations are now extirpated and an additional 15 percent are of uncertain status. Of those known remaining populations, most are experiencing ongoing threats, meaning additional population losses are anticipated in the future.

News Release

Final Rule (*Federal Register*)

FAQs

Fact Sheet

Species Status Assessment (117-page PDF; 2.4MB)
This report summarizes the results of an assessment of the eastern massasauga's overall viability. The assessment begins with a description of the snake's ecological requirements for survival and reproduction as they relate to its overall viability. We generally defined viability as the ability of the species to maintain self-sustaining populations over the long-term. Using the principles of resiliency, representation, and redundancy, we considered the species' needs at the individual, population, and species scales. We also identified the beneficial and risk factors influencing the species' viability. We considered the degree to which the species' ecological needs are met both currently and as can be forecasted into the future, and assessed the consequences of any unmet needs as they relate to species viability.

Range wide Extinction Risk Modeling for the Eastern Massasauga Rattlesnake (*Sistrurus catenatus catenatus*) (66-page PDF; 2.3MB)

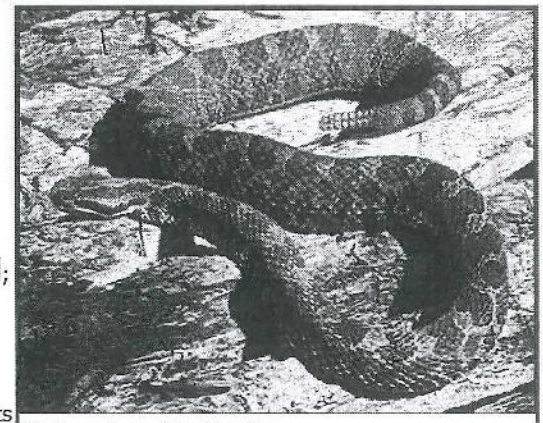


Photo courtesy of Joe Crowley

Eastern Massasauga

Status: Threatened; 2015

Habitat: Open to forested wetlands and adjacent upland areas

Lead Region: 3

Region 3 Lead Office: Chicago, Illinois Field Office

Range: Illinois, Indiana, Iowa, Michigan, Minnesota, New York, Ohio, Pennsylvania, Wisconsin, and Ontario

Endangered Species

Midwest Region

Life History and Ecology

Live and Let Live - Oakland County, Michigan Blog

Species Spotlight: Eastern Massasauga - USFWS Chicago Field Office

Eastern Massasauga - Michigan Society of Herpetologists

Species Survival Plan

AZA Species Survival Plan - A Species Survival Plan® is a collaborative science-based management program of the Association of Zoos and Aquariums (AZA).

Michigan is Main Focus of Eastern Massasauga Rattlesnake Survival Plan

Lincoln Park Zoo Recovery Efforts

Conservation and Research

Managing for Massasaugas - Edward Lowe Foundation | Land Stewardship. 4-page PDF. 2012

Long-term Research on Rattlesnake Life History Will Help Managers Plan Habitat Restoration August 7, 2012

Video
from the Michigan DNR

60-Second Snakes: The Easte...

From the Michigan DNR Natural Features Inventory

About Massasaugas

Identification and Look-Alikes

Life History and Ecology

Safety Tips and Snakebite Treatment

Report an Observation in Michigan

Species Action Plan - Pennsylvania Fish and Boat Commission (PDF). June 2011

Learning to Live with the Eastern Massasauga Rattlesnake: Expanding Outreach and Education in Southern Michigan Dec. 31, 2009. 171-page PDF

Spotlight Species Action Plan October 2009. 9-Page PDF

Restoring Southeast Michigan's High Diversity Landscapes Through Collaborative Stewardship – Hillsdale, Jackson, Lenawee, Oakland, and Washtenaw Counties, Michigan. Private Stewardship Grant (May 2007):

Reforestation and Wetland Restoration for Permanent Native Habitat in the St. Joseph River Watershed – Hillsdale County, Michigan; Defiance and Williams Counties, Ohio; Allen, Dekalb, and Noble Counties, Indiana Private Stewardship Grant. May 2007

Response to Habitat Management by the Eastern Massasauga (*Sistrurus catenatus*) at Carlyle Lake, Illinois S6 Grant Project. 2006

Molecular Diversity among Massasauga Rattlesnakes: Nuclear Intron Analyses S6 Grant Project 2006

Rome State Nature Preserve Candidate Conservation Agreement with Assurances Ashtabula County, Ohio. August 2006

Final Environmental Assessment for Eastern Massasauga Candidate Conservation Agreements in the Midwest. July 26, 2005

Survey and Management Guidances

A Handbook for Land Managers (PDF 1.2 MB)

Recommended Standard Survey Protocol

Archives

Reptiles
Midwest Endangered Species Home

Last updated: January 5, 2017

MUSKEGON DEVELOPMENT COMPANY

1425 South Mission Road, Mount Pleasant, Michigan 48858
(989) 772-4900 (Fax) (989) 773-4094

June 13th, 2016

Anna Miller
Underground Injection Control Branch
U.S. Environmental Protection Agency – Region 5
Mail Code WU-16J
77 W. Jackson Blvd.
Chicago, IL, 60604-3590

Dear Ms. Miller,

I have reviewed the potential impact to endangered species caused by conversion of the existing Holcomb 1-22 producing well to a water injection well. The Holcomb 1-22 well is located in Clare County, MI, which contains habitat for two threatened or endangered species (1): The Northern Long-Eared Bat and the Kirtland's Warbler.

Clare County is a potential habitat for the threatened Northern Long-Eared Bat during spring and summer time. It typically roosts and forages in upland forests (2). The Long-Eared Bat hibernates in caves and mines during late-Autumn and winter. The Kirtland's Warbler is an endangered species that is found in Clare County (3). They typically nest in the low-hanging branches of Jack Pine trees, and migrate to the Bahamas in late-Autumn.

The project area is contained within a 75 ft. radius circle centered at the well. The project area contains little to no vegetation.

It is my determination that conversion of the Holcomb 1-22 well to water injection is not likely to adversely affect the Northern Long-Eared Bat or the Kirtland's Warbler. The project area does not contain any trees that would provide shelter for either threatened or endangered animals.

Please contact me at (989) 772-4900 or bennettmyler@muskegondevelopment.com if you have any questions. Thank you.

Sincerley,

Bennett Myler, Geologist

Layers Tool | Map Tools | Data Search

GeoWebFace Layers

Toggle layer visibility by clicking the corresponding checkbox. Activate the transparency slider for a layer by clicking on the transparency slider.

- Oil and Gas Information
- Mining and Minerals
- Geology
- Public Land Survey System
- Ownership and Mineral Leases

GeoWebFace Map | GeoWebFace Results

Copyright © 2001-2011 State of Michigan